Working Paper MSG 88-06

PRODUCT 2: MANPOWER CONSTRAINTS

ESTIMATION AND DESIGN SPECIFICATIONS

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PRODUCT 2: MANPOWER CONSTRAINTS ESTIMATION AID

SECTION 1.0 - INTRODUCTION

1.1 OBJECTIVE OF PAPER

This report describes an aid for systematically estimating manpower constraints for Army weapon systems during the earliest phases of the acquisition process. The Manpower Constraints Estimation Aid (MCEA) is one of six automated products being developed in the Army Research Institute's (ARI) Manpower, Personnel, and Training aids for the MANPRINT integration (MPT) project.

The report presents detailed specifications for this aid. A detailed description of the aid's steps, data flow, algorithms, and required interfaces is presented. The report also includes an approach for implementing the aid.

This report is the second phase in a three-phase development process. The first phase was the development of a concept paper that outlined an overall approach to producing this aid. In the third phase, the software, documentation, and a training package will be produced and demonstrated using the detailed specifications contained in this report.

1.2 OVERVIEW OF $(MPT)^2$ PRODUCTS

Figure 1-1 displays the six $(MPT)^2$ products and their expected role in the Army's new streamlined Materiel Acquisition Process (MAP). The first four products, the System Performance Requirements Estimation Aid, the Manpower Constraints Estimation Aid, the Personnel Constraints Estimation Aid, and the Training Constraints Estimation Aid, will estimate MPT-related requirements and constraints during the Requirements/Technology Base Activities Phase of the MAP. These requirements and constraints will guide subsequent contractor design activities.

The System Performance Requirements Estimation Aid (SPREA) will help Army combat developers identify comprehensive and unambiguous system performance requirements needed to accomplish various missions.

The next three $(MPT)^2$ products will determine MPT constraints. The Manpower Constraints Estimation Aid (MCEA) will identify the maximum crew size for operators and maintainers and the maximum Direct Productive Annual Maintenance Manhours (DPAMM) for maintainers. These constraints will be based on assessments of the manpower likely to be available to man the new system.

The Personnel Constraints Estimation Aid (PCEA) will estimate the significant personnel characteristics that describe and limit the capabilities of the probable soldier population from which the new system's operators and maintainers will come. The PCEA will identify the minimally acceptable boundaries for these characteristics

The Training Constraints Estimation Aid (TCEA) will identify what the training program for the new system is likely to look like. It will also determine the maximum time needed to train the new system's operators and maintainers given available training resources.

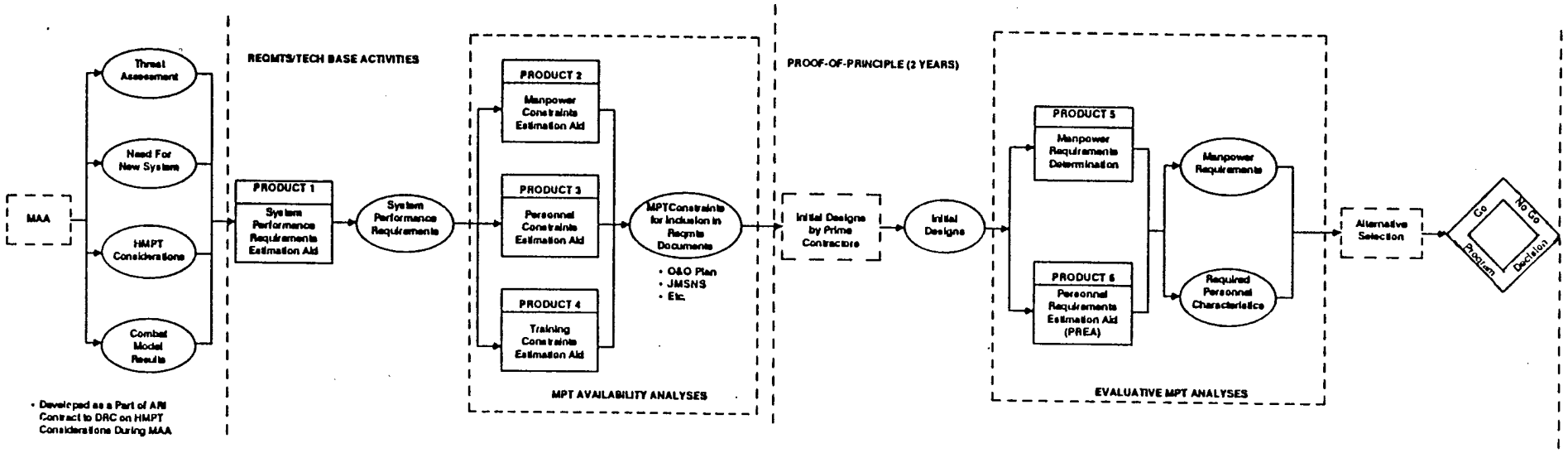


Figure 1-1. Expected Role of Six $(MPT)^2$ Products

The last two aids help evaluate contractor designs. The Manpower Determination Aid and the Personnel Requirements Estimation Aid (PREA) will be used during the Proof-of-Principle Phase after initial contractor designs have been submitted, but before analysts choose one design for development into a prototype. These products will evaluate initial contractor designs and develop MPT alternatives that minimize personnel characteristic deficits. (Personnel characteristics deficits are discrepancies between the type and number of people required and the number of these people likely to be available when the system is fielded.)

The Manpower Determination Aid (MDA) will determine the tasks, jobs, and quantitative manpower requirements associated with each contractor design.

The Personnel Requirements Estimation Aid (PREA) will determine the type and level of personnel characteristics required to effectively perform each task associated with a contractor design.

The results of these two evaluative aids will be used to select a specific design alternative for further development. The results can be incorporated into higher-level analyses such as the Cost and Operational Effectiveness Analysis (COEA).

1.3 ORGANIZATION OF REPORT

Nine sections comprise the remainder of the design specifications. The second section provides an overview of the MCEA, its outputs, functional requirements, users, and its role in the acquisition process. It also includes an overview of our approach to design specification for the $(MPT)^2$ products.

The third section describes the steps the user would go through in applying the MCEA. Included in this description is a listing of the actual frames, or computer screens, the user would go through in applying the MCEA.

The fourth section presents data flow diagrams describing the flow of information among the MCEA software components.

The MCEA will contain two types of files--libraries describing "hardwired" input data and input/output files containing data associated with a particular application. The fifth and sixth sections describe the structure of the two types of files. The description of the libraries also includes the actual values for the "hardwired" input data.

The seventh section describes the algorithms that will be used in the MCEA to calculate and/or modify data.

The eighth section describes interfaces with other MPT^2 products and external data bases. In addition, this section lists the format for all MCEA output reports.

The ninth section describes technology transfer issues and the tenth section discusses development work in Phase III.

SECTION 2.0 - PRODUCT OVERVIEW

2.1 OBJECTIVE

The objective of the Manpower Constraints Estimation Aid (MCEA) is to estimate maximum manpower constraints for early Army requirements documents and system specifications. By establishing firm, well-grounded manpower constraints the Army can greatly decrease the risk of developing a new system that exceeds the available personnel.

The MCEA estimates the maximum number of people that can be devoted to the new system given the projected supply of available personnel. This aid will not estimate what the exact crew size should be. Thus, it differs from the typical crew size analyses that examine task workload requirements for the new system to determine how many people are needed to perform the new system tasks effectively. The MCEA constraints are based on supply of available personnel, not on the task workload requirements for the new system.

2.2 MAJOR OUTPUT

The MCEA's primary output includes four estimates of maximum manpower constraints for a major weapon system. They are (1) maximum operator crew size, (2) maximum total operator requirements, (3) maximum Direct Productive Annual Maintenance Manhours (DPAMMH), and (4) maximum maintenance manpower requirements. The MCEA will break out each of these constraints by MOS and pay-

grade. To accomplish this, the MCEA helps the user identify the likely MOSs from which the new system's operators and maintainers will be drawn.

2.3 ROLE OF PRODUCT OUTPUT IN ACQUISITION PROCESS

The MCEA's output will feed two kinds of key acquisition documents that describe manpower constraints. The two types of documents are (1) Army requirements documents that guide the Army organizations charged with developing the system and (2) contractor specifications that provide detailed guidance to the contractor developing the system. A close relationship exists between these two types of documents. The contractor specifications are derived from the Army requirements documents. This section identifies the requirements documents, describes the output presentation (i.e., format), the information's location, and indicates who is responsible for the document.

Army Requirements Documents

The MCEA will feed into four primary Army requirements documents including the Justification for Major System New Start (JMSNS), the Operations and Organizational (O&O) Plan, the Letter of Agreement (LOA), and the Required Operational Capability (ROC). The JMSNS, O&O Plan, and LOA should be produced during the Requirements/Technology Base Activities Phase of the Materiel Acquisition Process (MAP). The ROC should be produced during the Proof-of-Principle Phase.

The requirements documents described above are usually prepared by the Directorate of Combat Development (DCD) within the proponent TRADOC Schools in close conjunction with the Army Materiel Command (AMC) proponent. Appendix A lists specific formats for these requirements documents, and the sections below provide more specific details on how these documents present manpower constraints.

Operational and Organizational Plan. The O&O Plan should be developed during the Requirements/Technology Base Activities Phase of the MAP. The O&O plan describes how the Army will integrate the new system into the force structure. The O&O Plan also details deployment, operation, and support for the new system in both peace and wartime.

Section 5 of the O&O Plan, Personnel Impact, should discuss manpower and personnel issues. This section describes the "personnel skills available to operate and maintain the system" (TRADOC PAM 70-2, p. 3.6). This information will "support preparation of the Tentative Qualitative and Quantitative Personnel Requirements Information (TQQPRI) and the LSA process" (TRADOC PAM 70-2, p. 3.6).

In addition to TRADOC PAM 70-2, both Chapter 3 of AR 71-9 and DARCOM/TRADOC PAM 70-2 provide O&O Plan preparation guidance.

Justification for Major System New Start. The JMSNS becomes required when the estimated cost of meeting a mission need exceeds specified limits, or other factors demand a DoD-level review. Section F of the JMSNS should describe manpower and personnel constraints. This section requires a description of "key boundary conditions for satisfying the need, such as survivability, logistics, manpower, and personnel constraints in both quantity and quality; . . ." (TRADOC PAM 70-2, p. 4.10).

In addition to TRADOC PAM 70-2, Chapter 4 of AR 1000-1, AR 71-9, and DARCOM/TRADOC PAM 70-2 also offer guidance on JMSNS development.

Letter of Agreement (LOA). The LOA defines the proposed system's concept and the research needed to develop and validate it.

Paragraphs 6 and 9 of the LOA require manpower and personnel assessments (DARCOM/TRADOC PAM 70-2). Paragraph 6, TECHNICAL ASSESSMENT, includes separate subparagraphs on training and manpower that "describe what the combat and materiel developers, logistician, trainer, and personnel administrator must do to produce the total system" (DARCOM/TRADOC PAM 70-2, p. 5.18).

Paragraph 9, MANPOWER/FORCE STRUCTURE ASSESSMENT, addresses the manpower and force structure implications of the system and alternatives to it. It contains estimated manpower requirements, per system, using unit, and total Army by component (Active, ARNG, and USAR).

> It also requires "an assessment of force structure implications resulting from system inclusion in the total force by component. If the force structure assessment exceeds current programmed force structure levels then identification of force structure tradeoffs within mission area or mission elements are required. Tradeoff analyses are addressed, to the degree necessary, to bring the force structure assessment within current programming levels. The personnel support plan will be available for evaluation during OT I." (DARCOM/TRADOC PAM 70-2, p. 5.19).

In addition to the DARCOM/TRADOC PAM 70-2 section cited above, AR 71-9, AR 702-3, DARCOM/TRADOC 70-11, and DARCOM/TRADOC PAM 70-2, Chapter 4 also provide guidance on preparing the LOA.

Required Operational Capability. The ROC is a formal requirements document that "states the minimum essential . . . information necessary to initiate the Full-Scale Development Phase or procurement of a materiel system" (DARCOM/TRADOC PAM 70-2, p. 6.1). It addresses many of the same manpower and personnel issues that the LOA addresses at a lower level of detail.

Although the formats for Paragraph 9 in the ROC's MANPOWER/ FORCE STRUCTURE ASSESSMENT matches the LOA's Paragraph 9 (see above), the difference between them is that the ROC has an additional requirement to test the personnel support package prior to Operational Testing (OT) II. The format is the same, but the ROC provides more detail than the LOA because it can draw from more detailed analyses done after the completion of OT II.

Documents for Presenting Requirements to Contractors

The Army requirements documents described above define system requirements and manpower and personnel constraints for Army organizations. However, these documents are not usually the primary mechanism for presenting requirements and constraints to contractors. The Army requirements documents might be included in the RFP package as background information, but the contractor is not contractually bound to meet the requirements in these documents.

The system specification defines the requirements documents to which the contractor must adhere. MIL-STD-490 contains procedures for describing system specifications. System specifications are described in increasing detail as the weapon system progresses through the MAP. The first system specification typically developed for a major weapon is the System/Segment Specification (SSS), or Type A specification. The SSS is developed during the Requirements/Technology Base Activities Phase of the MAP, but it can also be updated in the subsequent phase.

The combat developer within the proponent school usually develops the SSS, but this item can also be contracted out. Data Item Descriptions (DID) DI-CMAN-80008 describe the SSS format, including sections on maintainability and personnel. These maintainability and personnel sections can also describe manpower and personnel constraints.

The SSS also includes a section on qualification requirements. The section describes the methods for showing that each requirement, including both manpower and personnel constraints, has been met.

In later MAP phases, analysts develop more detailed system specifications (see MIL-STD 490). However, these specifications describe requirements for functions at the component level of the system. Consequently, these specifications are not relevant to the MCEA.

Role of Manpower/Personnel Constraints in MANPRINT

There are two major sources of MANPRINT regulatory information: AR 602-2, MANPRINT, and the draft chapter on MANPRINT included in the revised TRADOC/AMC PAM 70-2, Materiel Acquisition Handbook (hereafter referred to as the Revised TRADOC/AMC PAM 70-2).

Manpower and Personnel Constraints. According to AR 602-2 (p. 28), the Proof-of-Principle Phase will accomplish the following:

> "g. Special human factors engineering characteristics, male and female soldier characteristics, and manpower, personnel, and training considerations peculiar to the system will be addressed as specified in the requirements documents (AR 71-9). The MANPRINT portion of the requirements documents will provide soldier performance specifications and consider maximum and minimum personnel aptitudes and skill that can be required."

The revised TRADOC/AMC PAM 70-2 defines the MANPRINT data to be input to the O&O Plan during the Requirements/Technologies Base Activities Phase of the MAP. The pamphlet directs the analyst to:

> "b. Write manpower and personnel constraints for paragraph VII of the O&O Plan. Use MANPRINT objectives in the SMMP as the basis for input to the O&O Plan."

Target Audience Description (TAD). According to AR 602-2 (p. 25), the analyst should prepare a target audience description (TAD) during the Requirements/Technical Base Activities Phase of the MAP. According to the revised TRADOC/AMC PAM 70-2 (p. 11.56), the TAD will:

> "a. Describe the quantity and qualification of the soldiers or civilians who will operate, maintain, and support the system.
>
> "b. Describe the range or individual qualifications on all relevant physical, mental, physiological, biographical, and motivational dimensions. Describe how these characteristics relate to their ability to accomplish tasks associated with the operation, maintenance, and support of the weapon systems. . ."

According to AR 602-2, the TAD will provide, at a minimum, the following information on each MOS that will operate, maintain, or support a new or improved item of equipment:

(1) Projected force structure authorizations by grade and operating strength percentage, and the standards of grade authorizations;

(2) MOS/civilian designation and description

(3) Anthropometric data

(4) Physical qualifications

(5) Aptitude description of the population

(6) Biographical information such as percentage of high school graduates in the population, percentage of individuals speaking English as a second language, and other "special interests and/or abilities of the population"

(7) Skills and knowledges trained

(8) Task performance information

Relationship Between $(MPT)^2$ Products and Target Audience Description. The MCEA, in addition to its other output, will provide the projected force structure authorizations information and the MOS/civilian designation and description information in Items 1 and 2 of the TAD. The Personnel Constraints Estimation Aid (PCEA), in addition to other output, will provide Items 3 through 6 of the TAD. The PCEA will go beyond the purely descriptive information in the TAD to estimate required cut-off levels for personnel characteristics included in these items. The last TAD item, task performance information, will be one of the data sources used as an input to the Personnel Requirements Estimation Aid (PREA).

2.4 USERS

Overview of Users and Their Functions

Primary Users. The primary MCEA user will be the Directorate of Combat Development (DCD) organizations within the TRADOC proponent schools who produce requirements documents for major systems (i.e., JMSNS, O&O Plan, LOA, and ROC) and the System/Segment Specification (SSS) that guide early contractor design activities. Because each DCD is organized differently, portions of the requirements documents and SSS could be completed by either a Concepts and Studies Division, Materiel Logistics Support Division, or Requirements Division.

Secondary Users. Another major user is expected to be the Army Materiel Command (AMC) major subordinate command. The subordinate command may provide input to the TRADOC combat developer

who is constructing requirements documents. Since each major subordinate command is organized differently, the organizations using the MCEA will vary across major subordinate commands.

Typically, the AMC command will have an Advanced System Directorate (ASC) with a Requirements Analysis Division (RAD) responsible for coordinating requirements documents with TRADOC. For example, according to AVSCOM Reg 10-1, dated 5 March 1986, the Requirements Analysis Division will

> "With support from the Advanced Concepts Division (ACD) and the Systems Technology Division (STD) on assigned projects, maintain developer/user interface with TRADOC, FORSCOM, and their Army users and coordinate requirements documents such as O&Os, LOAs, LRs, and ROCs within AVSCOM."

Other potential users are the reviewers of requirements documents. The reviewers include HQ TRADOC (DCSCD), HQ AMC (AMCDRE), and the Requirements Division (DAMO-FOR) within DCSOPS; the MANPRINT Policy Office within ODCSPER(DAPE-ZAM); the MANPRINT points-of-contact within the TRADOC proponent Schools and AMC subordinate command; and the ARI field office representatives who might provide MANPRINT support to TRADOC Schools or AMC subordinate commands.

Job Type

The MCEA will be developed specifically for the primary users (see Users, p. 13). They include the combat developers within the TRADOC proponent Schools who produce requirements documents for major systems (i.e., JMSNS, O&O Plan, LOA, and ROC) and the personnel who produce the System/Segment Specification (SSS). The individuals who actually perform these functions within the assigned DCD division are typically Army majors or captains.

2.5 ASSUMPTIONS

The following assumptions underlie the development of the MCEA:

Automated Aid. The MCEA, like all the $(MPT)^2$ products, is an automated aid. Consequently, it only includes procedures or techniques that are amenable to automation.

Major System Focus. The MCEA will describe manpower constraints for major weapon systems. This means that while the general logic of the MCEA could be applied to other types of systems, we will develop the MCEA's automated tools specifically for major systems.

Force Structure Analysis. A force structure analysis that identified the type of units that will employ and support the new system and the specific systems that the new system will replace has been completed.

Constraints Based on Availability Not New System Task Requirements. MCEA manpower constraints estimate the maximum number of people that can be devoted to the new system given the projected supply of available personnel. The MCEA does not estimate what the exact crew size should be. Thus, the MCEA differs from typical crew size analyses that examine task workload requirements for the new system in detail to determine how many people are needed to perform the new system tasks effectively.

Level at Which Constraints Are Set. The MCEA will list manpower constraints for a particular MOS/paygrade combination. An analysis of available personnel within the MOSs mission area will determine the constraints. The MCEA will be capable of assessing

the impact of constraints set at higher levels (e.g., a decrease in total end strength by 10%). However, the MCEA will not allocate cuts made at higher levels across mission areas. Rather, it will focus on the manpower allocation within mission areas.

Role of TOE Versus TDA Units. The MCEA will provide a tool for calculating the impact of phasing weapon systems in and out of operational (TOE) Army units. The MCEA will not estimate projected impacts on nonoperational or TDA units. TDA requirements describe the soldiers required to operate bases, TRADOC Schools, Headquarters Companies, etc. These units will be subtracted from the pool of available personnel.

Mobilization. During mobilization, personnel with TDA assignments will augment/fill TOE requirements that are authorized during peacetime. Reservists and retirees recalled to active duty will replace the TDA personnel. The MCEA will not consider the effects of mobilization or the reserve manpower requirements.

Impact of Attrition. The MCEA will not consider the impact of wartime casualties/injuries in determining the projected availability of personnel.

Nonsystem-Specific Operational Positions. Not all personnel in an operational unit can be linked to a major weapon system. Numerous jobs are part of the generic unit structure of all divisions and battalions that Army organization and doctrine define. As a result, these manpower spaces are committed, and the MCLA will subtract them from the pool of available personnel.

Army Data Bases. The MCEA will accept information as given from the following Army data bases/documents: the force structure information in the MTOE, the authorized personnel slots in the Army Authorizations Data System, system density information from TAADS, the annual maintenance manhours in the Army Manpower Requirements Criteria (MARC) Maintenance Data Base (AMMDB), the manpower algorithms and planning factors in AR 570-2, and the Standards of Grade Authorization in AR 611-201.

2.6 HIGH LEVEL FUNCTIONAL REQUIREMENTS

Technical Requirements

Output. The Manpower Constraints Estimation Aid (MCEA) must provide four types of output: (1) maximum total operator requirements, (2) maximum total maintenance manpower requirements, (3) maximum operator crew size, and (4) maximum Direct Productive Annual Maintenance Manhours (DPAMMH).

Role In Acquisition Process. The MCEA information on manpower constraints must feed directly into Army requirements documents for major systems (JMSNS, 0&0 Plan, LOA, and ROC) and the Type A specification that guides contractor designs (see Role of Product Output in Acquisition Process, p. 5).

Users. The MCEA must be designed specifically for the combat developers within the TRADOC proponent Schools who produce requirements documents for major systems (JMSNS, 0&0 Plan, LOA, and ROC) and the Type A specifications that guides early contractor design activities (see Overview of Users and Their Functions, p. 10).

Capability For Producing Quick Estimates. The MCEA must be capable of producing quick estimates of manpower constraints.

Acceptability/Usability Requirements

The previous subsection presented an overview of the MCEA's technical requirements. This section also describes some of the acceptability and usability requirements that these tools must meet.

Produce Tailored User Output and Processes. Previous R&D products have not been implemented because they failed to meet the needs of individual Army decision makers. They were R&D products "in search of users". To avoid this problem in the current effort, it is critical to identify specific MCEA users. Furthermore, the MCEA output should be formatted so that Army users can insert them directly into MAP documents. Additionally, the aids must produce results in a timely fashion and meet the requirements of the new streamlined acquisition process. Finally, to develop products that meet users needs, users must be involved in all product development phases.

Describe "How To" Procedures. The MCEA must have sufficient "how to" procedures so that Army users with minimal training can apply each product. Whenever possible, procedures should be automated to reduce user analysis requirements. Detailed procedures for obtaining input data and interpreting results should accompany all automated tools.

Minimize Organizational Impacts. The MCEA tools must fit the user and not vice versa. Applying the tools must not require additional personnel or restructuring of existing Army organiza-

tions. They must utilize computer hardware that is available at user locations or accessible via secure lines. Furthermore, they should use existing software whenever possible. If they require new software packages, the cost of these packages must not exceed the user's typical software acquisition budget.

Minimize User Training. The members of the MAP community who are expected to be MCEA users are already overburdened and understaffed. In addition, they are trying to meet increasing acquisition requirements such as MANPRINT within the context of the streamlined acquisition process. Consequently, training time for the $(MPT)^2$ products must be minimized. We will develop user interfaces that require no prior computer experience. For example, interfaces should contain built-in job aids (e.g., help commands). When formal training is required, it must utilize only media that are readily available to users.

Security. Because the MCEA may have to accept classified data, it must provide acceptable security levels.

Off-Line Data Access. The MCEA must minimize off-line data collection. To the greatest extent possible, input data should reside on the microcomputer.

2.7 OVERVIEW OF MCEA TECHNICAL APPROACH

Background

The MA&D/DRC team uses the same concept of "constraint" in the three constraint-related $(MPT)^2$ products (Products 2, 3, and 4). Our basic approach in each of these products is to estimate the resources that will be available for the new system and then

use these resources to constrain the new system design. Available resources are identified by assessing (1) the resources associated with the systems the new system will replace, and (2) policy or other related changes that will change what resources will be available in the future. Each of the three constraint products estimates a different type of available resource. The MCEA (Product 2) estimates available manpower slots. The PCEA estimates the type of people who will be available, and the TCEA (Product 4) estimates maximum supportable training time, given available training resources. Our approach to MPT constraints is directly congruent with the Army's concept of "zero sum" resourcing, which forces new system developers to describe specifically where (i.e., what systems, units) the resources for their new system will come from. A new system may not require more resources than the systems it replaces. However, if it does, the proponent must describe exactly from where these resources will come.

The MCEA will help the user identify (1) total projected available manpower, taking into account the fielding of approved emerging systems, the phasing out of older systems, and policy related changes that change the total pool of available manpower or the way in which manpower slots are allocated and (2) the manpower associated with systems the new system will replace. By subtracting (2) from (1), the MCEA will produce estimates of the manpower constraints. If, based on initial system concept studies or other related data, the user feels that the new system will actually require more than the available manpower constraint, he or she must identify sources (i.e., systems, units, other mission areas) from which the additional manpower slots can be taken. Our version of the MCEA will not assist the user in identifying these additional sources. This requires reassessing force structure and/or mission priorities (remember that the MCEA

has already identified additional manpower available because of phased out older systems and policy changes). However, the MCEA will allow the user to assess the impact of the additional manpower from these other sources on overall manpower constraints.

Availability and Manpower Constraints

In our concept of the MCEA, manpower constraints are based on an assessment of the personnel available to man the new system. More specifically, the MCEA initially assumes that the new system's manpower requirements must not exceed the manpower requirements of the systems it will replace. If it does exceed them, the user must identify the MOSs from which the excess manpower can be drawn. Thus, the manpower requirements of the systems to be replaced play a critical role in defining the new system's maximum manpower constraints system. This concept of using the "footprint" of the old systems as a constraint for the new system is directly congruent with the way the Army determines manpower constraints for new systems. This is evident in existing documentation describing manpower assessments for developing systems. For example, both the LOA and ROC require assessments of the new system's manpower impacts. If the manpower for the new system exceeds the programmed force structure levels, then identification of force structure tradeoffs within the mission area are required. Tradeoffs must continue until the total requirements within the mission area are equal to or less than the programmed levels (AMC/TRADOC PAM 70-2).

The key to identifying manpower constraints for the new system is to determine manpower requirements for the systems it replaces. However, determining manpower requirements for an existing system is not as straightforward as it seems because manpower

requirements are stated for units, not systems. While the operators assigned to a system can be determined by simply examining job titles, the Army Modernization Information Memorandum (AMIM), etc., determining maintenance manpower requirements is more difficult. Maintainers typically work on more than one system, and there are no documents describing the number of maintainers dedicated to a system. The number of maintainers dedicated to a system must be derived from an analysis of the maintenance manhours for the equipment associated with the system. Aggregating these workhours and applying standard Army manpower determination algorithms will yield estimates of the maintenance manpower spaces dedicated to the old system(s).

Identification of Source MOSs. The MCEA will assist users in identifying the MOSs from which the manpower slots for the new system will come. Most of these slots will be from the older systems that the new system will replace. The MCEA will automatically identify the slots associated with these old systems. The MCEA will also help users compare estimated requirements to the manpower associated with the systems to be replaced. If the requirements exceed this available manpower, the user must identify additional MOSs from which the excess manpower can be taken.

The source MOSs that the MCEA identifies will also be used in Product 3 (the PCEA) and Product 4 (TCEA) to estimate available personnel and training resources. The Army uses MOSs to categorize available manpower, personnel, and training resources. Hence, the source MOSs that the MCEA identifies will play an important role in each $(MPT)^2$ constraint product.

Note that the source MOSs identified by the MCEA are not the definitive list of MOSs that will be assigned to the new system. This list can be developed only when information on the new system's design and tasks is available.

Maintenance Crew Size

The $(MPT)^2$ statement of work indicates that the MCEA should calculate maximum "maintenance crew size". Although it is quite meaningful to apply the concept of maximum crew size to operators, it is not meaningful to use this concept for maintainers. Maintenance personnel are typically not dedicated to a single system. They repair parts for multiple systems. The Army uses the metric, Direct Productive Annual Maintenance Manhours (DPAMMH) to describe the amount of maintenance required on a per-system basis. It is this metric, not a maintenance crew size, that must be specified as a constraint in Army requirements documents. Consequently, our concept of the MCEA calculate DPAMMH, not maintenance crew size. Our concept does, however, calculate the maximum total number of maintainers likely to be available to support all of the new systems.

2.8 HARDWARE/SOFTWARE CONFIGURATION

The hardware system which the MCEA will be installed on consists of the following characteristics:

a. Enhanced graphics display - The EGA will support high resolution color graphics.

b. Enhanced graphics board with 256 K bytes RAM.

c. 80286 processor.

d. Hard disk with a minimum of 20 M bytes of storage.

e. Up to 4 M bytes of enhanced memory.

f. Bernoulli Box or its functional equivalent with two removable 20M disks.

g. 80287 Math Coprocessor.

h. 1200/2400 baud Hayes-compatible internal modem.

i. One or more floppy drives that can read and write 360K floppy diskettes.

j. Dot matrix printer capable of printing 132 characters per line. This printer will be capable of outputting IBM graphics.

k. IBM AT-compatible keyboard.

All the MCEA software will be developed under the most recent version of Microsoft C. At the present time, the operating system for the products will be DOS 3.2.

The data libraries in the MCEA will be built using R-Base V. We will sort, retrieve, and store information in these files using code developed in-house via dbC Library routines. These library functions do not require any licensing fees and will be fully integrated into the MCEA code.

All of the data files which will be used by other $(MPT)^2$ products will be in delimited fixed ASCII format.

2.9 OVERVIEW OF INTERFACE DESIGN

The MCEA will use the keyboard as the input device. All user queries, responses, and requests will be entered via the AT compatible keyboard.

There are 4 types of menus in the product. The first type of menu interface is the command bar. In this interface style, the commands will be listed horizontally across the top of the computer screen. The user will use the horizontal arrow keys to position the cursor and a carriage return to select the desired option. The command menu bar will be displayed on the third and fourth line of each display.

The main menu bar will present a list of single one word commands. Positioning the cursor on a particular command will highlight that command and a more detailed description will appear on the bottom line of the main menu bar. Further explanation will be available in HELP.

The command menu bar is always presented across the top of the display and has a dark blue background. More detailed information about the command menu bar can be found in the section on commands.

A command can be selected by keying in the first letter or hitting the return key.

There will be more than one level of command menus. Only the commands appropriate to the current process or display will be presented on the menu bar.

Three types of commands will be presented using the command bar interface:

(1) General action commands: enable the user to perform some process on the data

List: Insert Copy Paste Delete Sort Report Save Switch

(2) GoTo commands: enables the user to access a data library

(3) Specialized commands: commands which are specific to a process or step

The second type is a pull-down menu design. In this type of menu, the user will use the vertical arrow keys to position a highlighted menu bar at the desired menu choice. This results in a color change, as the highlighted bar moves through the menu. The user will press the carriage return after he/she has used the cursor keys to select an option from the list.

These menus can be presented anywhere on the screen and are color coded by level. The first level has a light blue background and the second level has a green background.

Items will be presented within a menu according to logical order or frequency of use. Items will be presented in a numbered list. Only 10 items will be presented at one time on any data menu. Items will be selected form the menu by keying in the number associated with that item.

The third type of menu is a spreadsheet interface. In this menu style, the user will use a combination of cursor keys and keyboard input. The cursor keys will be used to position the

cursor in a cell of the spreadsheet. The keyboard will then be used to edit the information that is in the cell. If the entire spreadsheet does not fit on a screen, the user will be able to move from cell to cell in any direction.

All spreadsheet menus have a brown background with white lettering. The area for data entry will be visually defined on a spreadsheet by a gray background and black lettering.

The fourth type of menu interface is a command prompt. In this case, the user will respond to a specific prompt using the keyboard. For instance, the prompt "Confirm the system information? (Y/N)" The user will use the keyboard to enter 'y', 'n', 'Y', or 'N'.

All of these interfaces will be used appropriately in the product. If the user does not know how to respond to a prompt or an interface the function key 'F1' will always give the user a context-specific help screen. The help screen will provide a discussion of the information which is being requested. At any time, the user may also press the escape key. This will always take the user to the menu which immediately precedes the current menu. In this manner, the user can "back out" of the PCEA application.

At the top of every menu, there will be a "PATH>" line. This line will keep the user informed as to his/her current location in the hierarchical levels of the product. The mode will be displayed on the top line in the right hand corner. There are three modes: work, wait and help.

The MCEA interface also provides the user with a mechanism for resuming work at the last step that was complete before the system was turned off. This will consist of the software periodically updating a status file which will be referred to when a user powers up the system and accesses the MCEA.

Color specifications:

Type of Interface	Background/ Lettering	Highlight
Command Bar	Drk bl/Wht	Lt Bl/Blk
First level pop-up	Lt bl/Blk	Lt Bl/yel
Second level pop-up	Grn/Bl	Gr/Yellow
Template (Data entry)	Brw/Wht	Gry/Blk
Libraries	Blk/Wht	Gry/Blk
Help	Drk Bl/Wht	Blk/White
Message	Red/White	

Keystroke specifications: Following is a list of the general specifications for the functionality of global function and editing keys for the MCEA.

Function Keys

F1 Help - This key will always switch the system into the help mode. When this key is pressed, the system will display the first page of context specific help information explaining the current menu, screen, or prompt.

Shift F1 Help Index - When the F1 function key is pressed while holding down the shift key, the user is presented with an index of help information.

F2 Move-by-cell/Edit toggle - This key controls the function of the arrow cursor keys when the user is working in a spreadsheet-like template. In the default state, the arrow keys will move the cursor from cell to cell in the first character position. When the F2 key is pressed, the arrow keys move the cursor character by character (left and right) or line by line (up and down) within a cell. If the cursor is currently in the last character position in the cell for any particular direction, the cursor will move to the next cell in that direction. For example, if the cursor is in the first character position of a cell and the left arrow is pressed, the cursor will move to the next cell to the left of the current cell. If the cursor is in the topmost line of a particular cell and the up arrow is pressed, the cursor will move to the cell above the current cell. Repeated pressing of the F2 key will toggle between the move-by-cell and move-by-character states.

F3 Search - When this key is pressed, the user will be prompted for a string of characters or keystrokes that the system will search for. The string of keystrokes is terminated by pressing the F3 key a second time. After terminating the string, the system will search the current library, template, or list for a match for the input string. If a match is found, the cursor is moved to the matched input string. If no match is found, the cursor remains where it is and a message indicating no match found is displayed.

At times when the F3 key is not active, the user will receive a message indicating such.

F4 NOT USED AT THIS TIME

F5 NOT USED AT THIS TIME

F6 NOT USED AT THIS TIME

F7 NOT USED AT THIS TIME

F8 NOT USED AT THIS TIME

F9 Menu - Displays the active menu bar while working in a spreadsheet-like template.

F10 Save - Saves the current working file to the appropriate permanent file then returns to the current working status.

ESC quit - Always returns to the most recent previous state such as the most recent menu, screen, or prompt.

Backspace This key is only active when the system is allowing for input by the user. The backspace key moves the cursor one space to the left of its current position and erases any character from that position.

Return Terminates variable length user input.

Caps Lock Toggles the keyboard from a normal state to one that displays characters as if the shift key was being held down. When the keyboard is in the "shift key" state and the user holds down the shift key while pressing another key, the normal (non-shift) character displays.

Ins — Insert - Toggles the system from character insert for user input to typeover. When the state is character insert, the characters input by the user are inserted to the left of the current cursor position. When the state is typeover, characters are displayed at the current text cursor position. Any characters currently displayed at that position will be replaced.

Del — Delete - Deletes characters that are displayed at the current text cursor position.

Home — Moves the menu cursor to the top or the left most menu selection. Moves the cell cursor to the upper left corner of a spreadsheet-like template. Moves the text cursor to the upper left most typing position of the current input area (i.e., cell, field, etc.). See cursor definitions below.

End — The end key works the exact opposite of the home key. It moves the menu cursor to the bottom or the right most menu selection. It moves the cell cursor to the lower left corner of a spreadsheet-like template. It moves the text cursor to the lower right most typing position of the current input area. See cursor definitions below.

PgUp — Page Up - If the cursor (menu, text, of cell) position is not at the top of the current visible display or window, the cursor is moved to that position. If the cursor position is at the top of the current visible display or window, the cursor is moved to the top of the previous full screen or window-full of information.

PgDn

Page Down - If the cursor (menu, text, or cell) position is not at the bottom of the current visible display or window, the cursor is moved to that position. If the cursor position is at the bottom of the current visible window, the cursor is moved to the bottom of the next full screen or window-full of information.

Up Arrow - Moves the cursor (menu, text, or cell) up one position (line or cell).

Down Arrow - Moves the cursor (menu, text, or cell) down one position (line or cell).

Left Arrow - Moves the cursor left one position (character or cell).

Right Arrow - Moves the cursor right one position (character or cell).

Ctrl Up Arrow - Moves the cursor (menu, text, or cell) up one full screen or window-full of information to its same relative horizontal position.

Ctrl Down Arrow - Moves the cursor down one full screen or window-full of information to its same relative horizontal position.

Ctrl Left Arrow - Moves the cursor to the left by one screen or window-full of information to its same relative vertical position.

Ctrl Right Arrow - Moves the cursor to the right by one full screen or window-full of information to its same relative vertical position.

2.10 APPROACH TO SOFTWARE DESIGN SPECIFICATIONS

The key to understanding the design specifications are the user interface diagrams listed in Section 3. These diagrams provide an overview of the action sequence a user would go through in using the PCEA. Separate diagrams are provided for each of the six major steps in the PCEA. The diagrams break each step down into a series of blocks which describe "logical chunks" of user interaction. Each block may have one or more screens associated with it. A textual description accompanies each block and references the following items associated with each sequence.

- Screens
- Libraries and Working Files
- Algorithms and Models
- Output Reports

More specifically, the block description lists which of the above elements are related to each block and lists the sections, tables, etc., where detailed descriptions of these items can be found. Table 2.10-1 provides an example block description.

Screen Descriptions. Wherever possible, the actual screen expected to be used in the PCEA is listed. In some cases, the content of a screen is variable--it depends on previous user input. In these cases, we provide an example of what the screen will look like using the most complex and/or longest version of the screen.

Table 2.10-1. Example Block Description.

12-see Screens 52 to 55. The system will begin by asking the user to select the operator MOSs for the system. To query the user, a menu will be presented describing the recommended operator MOSs for the system type at the top of the screen and other MOSs in the same CMF as the recommended operator MOS. The system will read the recommended MOSs from the MOS by System Type file (see Tables 4.2-3 and 4.2-4) and other MOSs within the CMF from the MOS by CMF file and access titles from the MOS Title file. (see Tables 4.2-5 and 4.2-6). The user can continue if he agrees with the recommended MOS or select that one/or others from the CMF using menu selection procedures.

Libraries and Input/Output Files. The structure of each library file is described using the format described in Table 2.10-2. The libraries will contain prerecorded data. These data values are listed after the description of the library file structure. The I/O files describe files saved on the hard diskette. These files either provide input to, or are output from , one of six PCEA steps. Sections four and five describe libraries and I/O files.

ALGORITHM. Algorithms are described in one of two ways. Algorithms that are primarily logical, operations are described in pseudocode or flowcharts. Quantitative algorithms, or models, are described via equations. Section 6 describes algorithms and models.

Output Reports The seventh section lists printed output reports. (Screen displays are listed in this section along with the other screen descriptions).

Table 2.10-2. Example of Data Structure Format

FILE ID: MOSs by CMF

DESCRIPTION: For each CMF associated with PCEA system types, this file lists all associated MOSs.

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
1	1	File ID	5	Alpha
	2	CMF Code	2	Num
2		MOS Code	3	Alpha

ESTIMATED NO. OF TABLES = 14 (ONE FOR EACH CMF)

ESTIMATED NO. OF RECORDS: 31 (MAXIMUM NUMBER OF MOSs WITHIN A CMF)

LENGTH: VARIABLE

SECTION 3.0 - MCEA USER INTERFACE

The entire MCEA process is shown as a flowchart (see Figures 3-1 through 3-6) to illustrate the sequence of events that will be followed when using the product. In the flowchart those events requiring some type of user interface are represented by rectangles with solid lines; those events accomplished automatically (i.e., without user interface) are shown as rectangles with dashed lines. Also, the flowchart shows when and where the files and fixed data libraries are used in the MCEA process.

Since the MCEA process, as described in Figures 3-1 through 3-6, is somewhat detailed, it has been broken down into logical steps. A step represents a major function within the process and is represented by a portion of the MCEA flowchart. There are a total of ten steps in MCEA which will be described in detail in this section. The step names follow:

(1) DOS Utilities/File Review
(2) Baseline System Selection
(3) MOS Selection
(4) Direct Productive MMHs and System Density
(5) Unit Selection
(6) Selection of Manpower Units Without Baseline Systems
(7) Selection of Manpower Constraints Determination
(8) Selection of Manpower Requirements Estimation
(9) Comparison of Constraints and Requirements
(10) Reports Generation

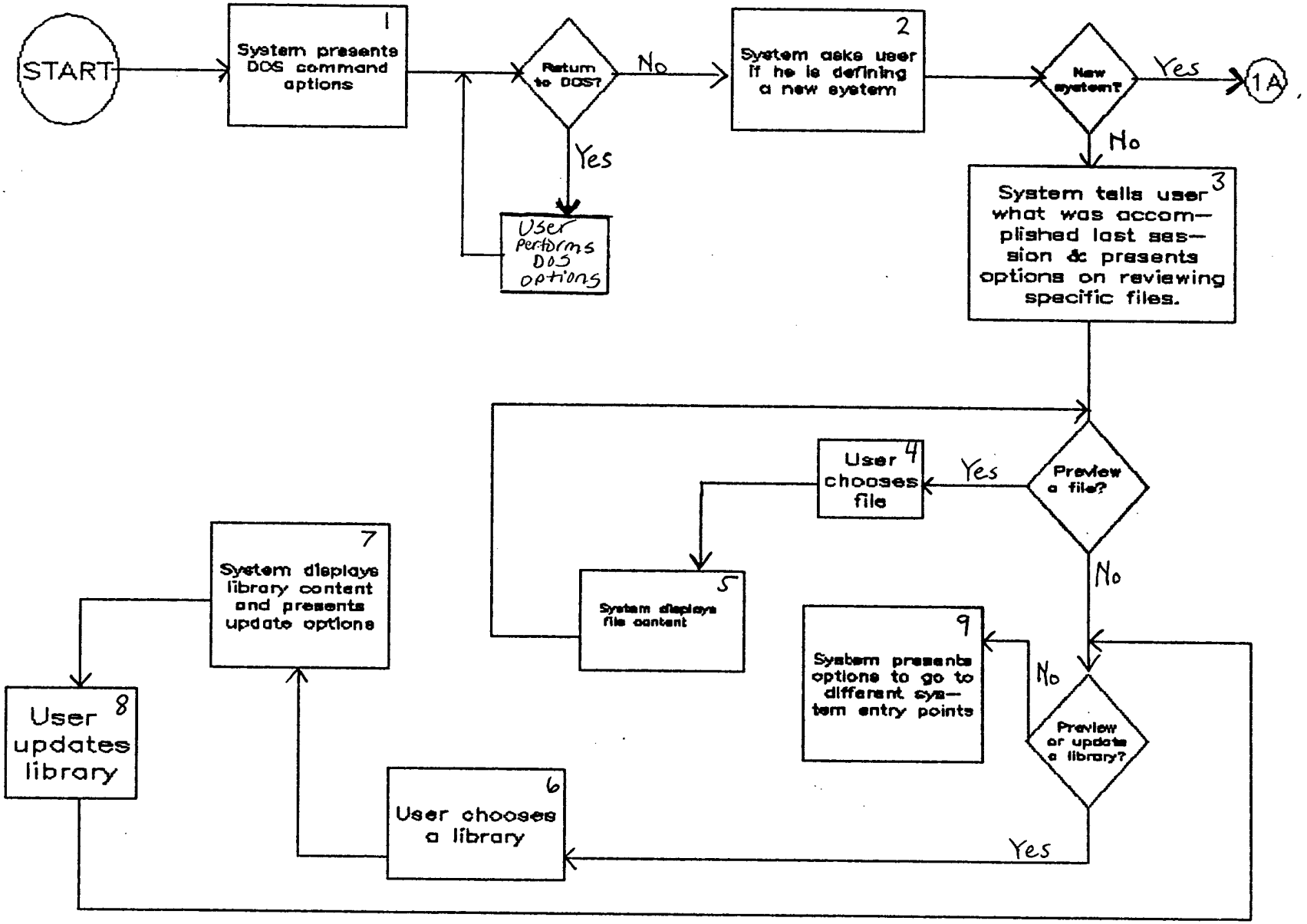


Figure 3-1. MCEA Flowchart

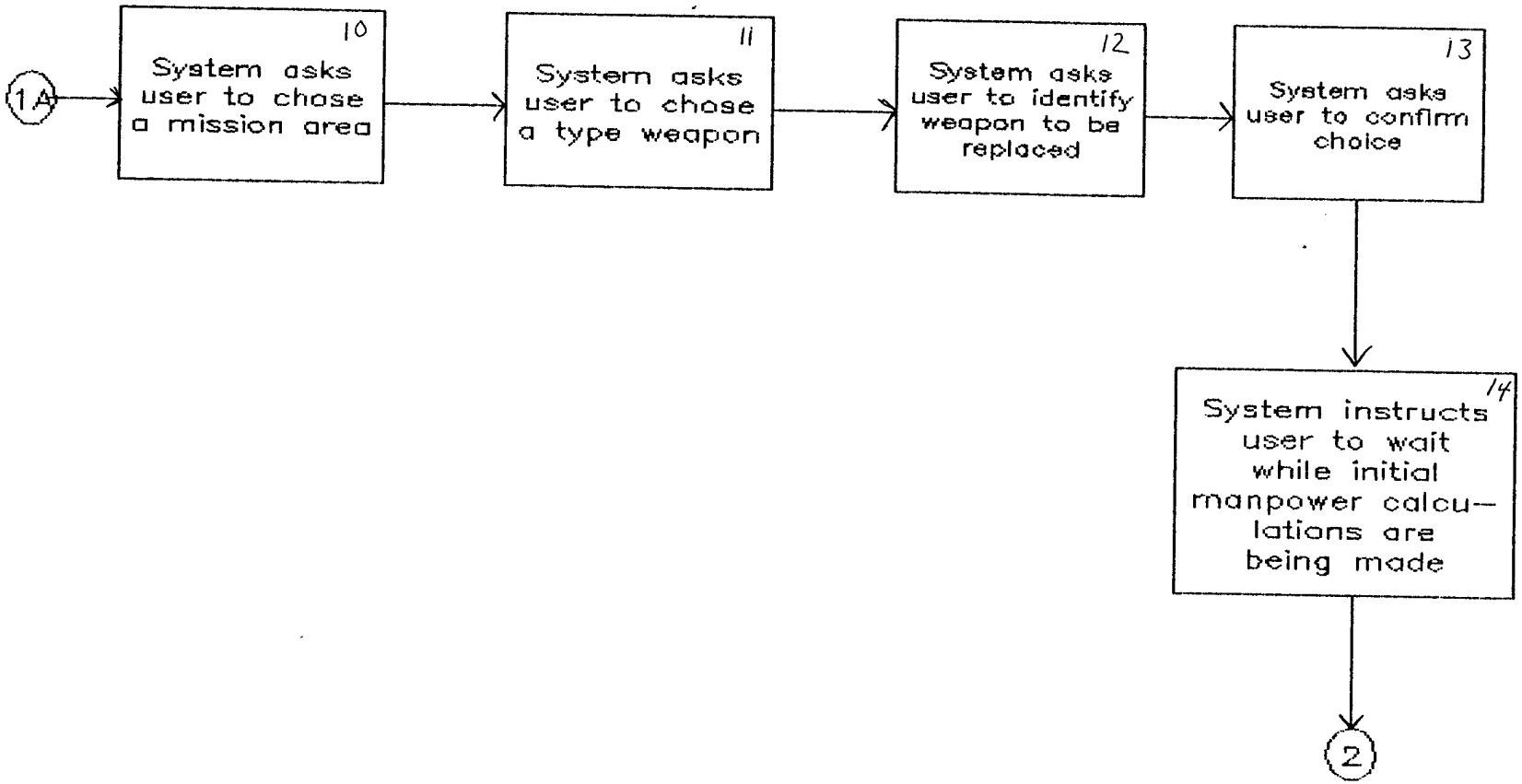


Figure 3-2. MCEA Flowchart (continued)

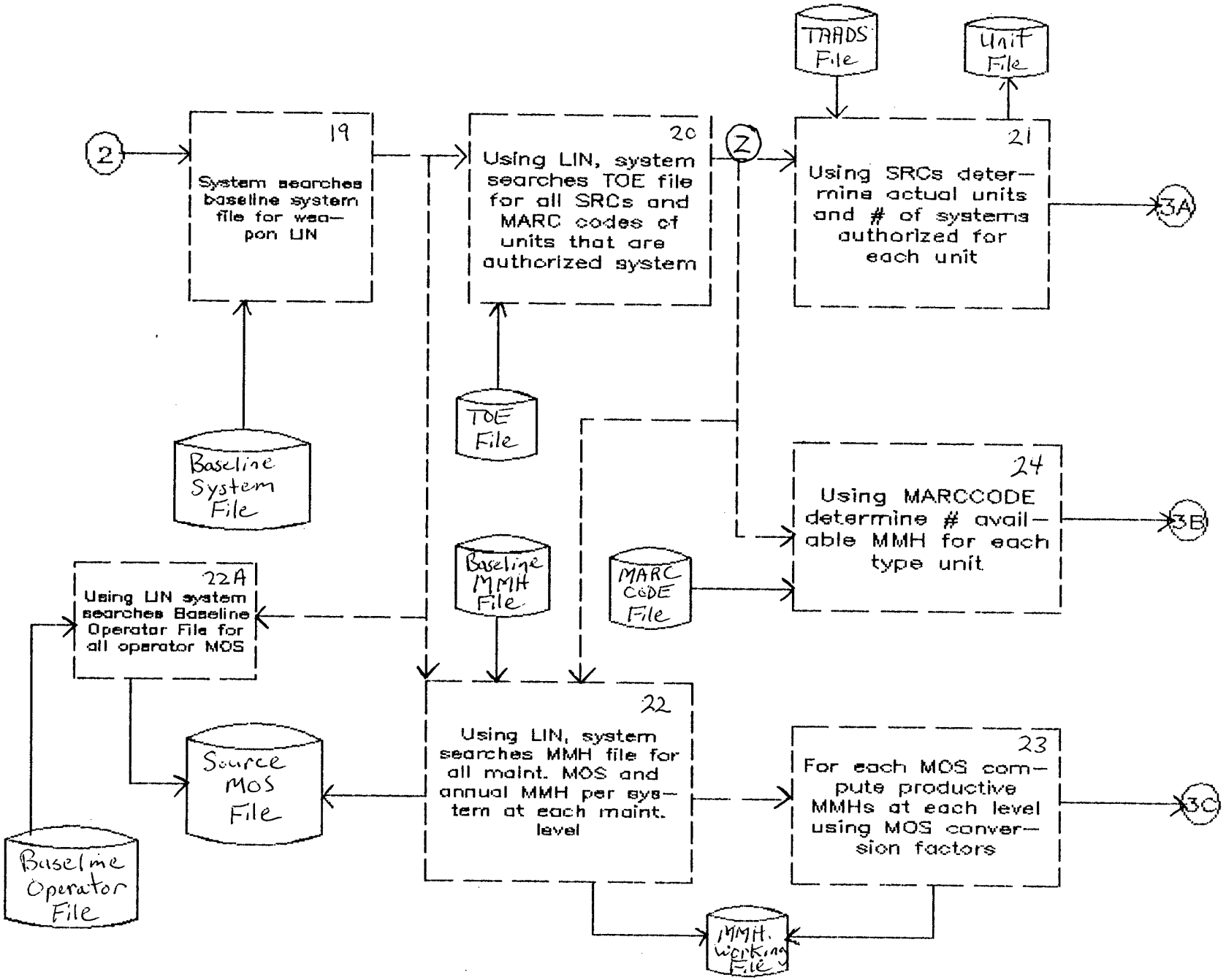


Figure 3-3. MCEA Flowchart (continued)

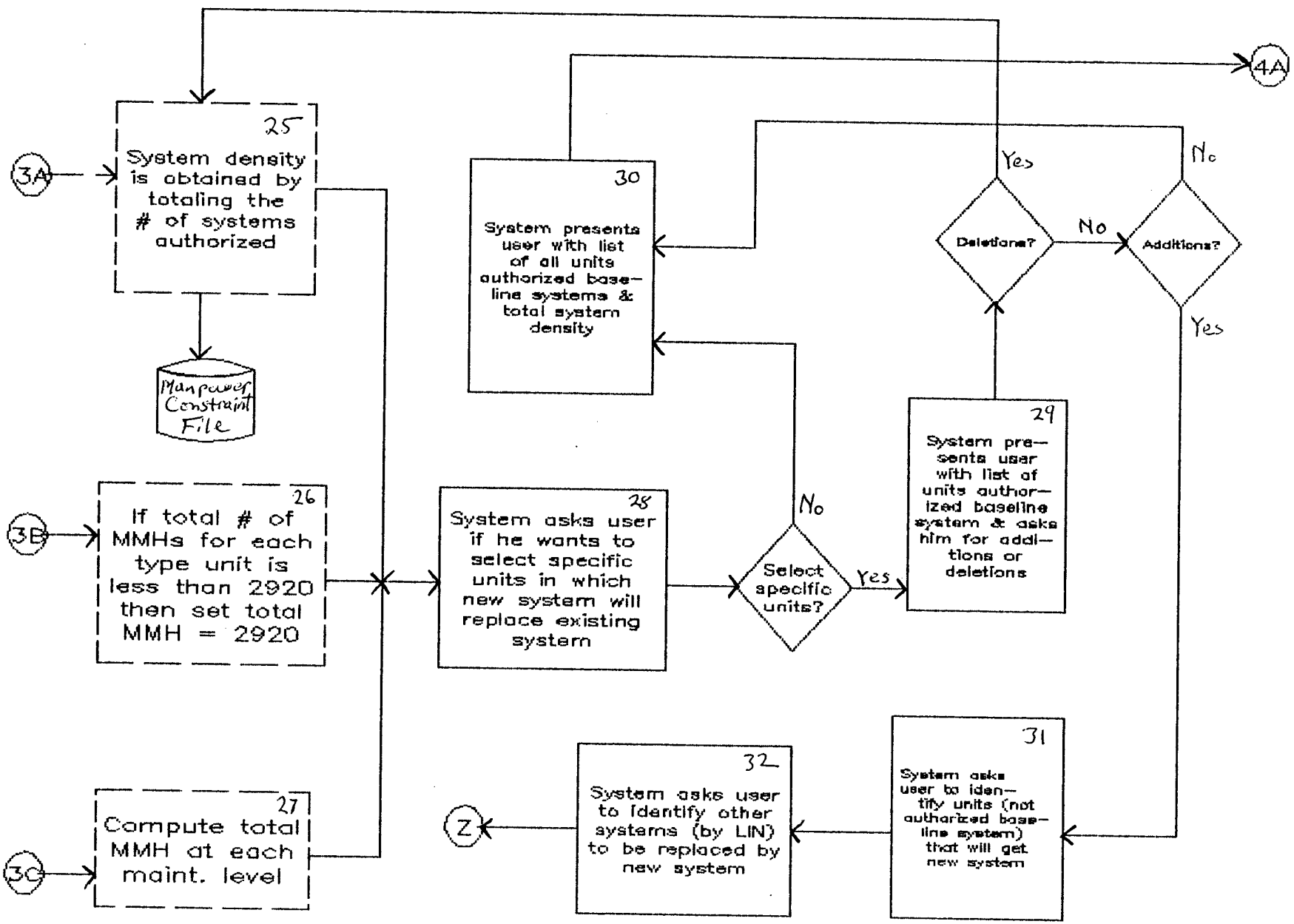


Figure 3-4. MCEA Flowchart (continued)

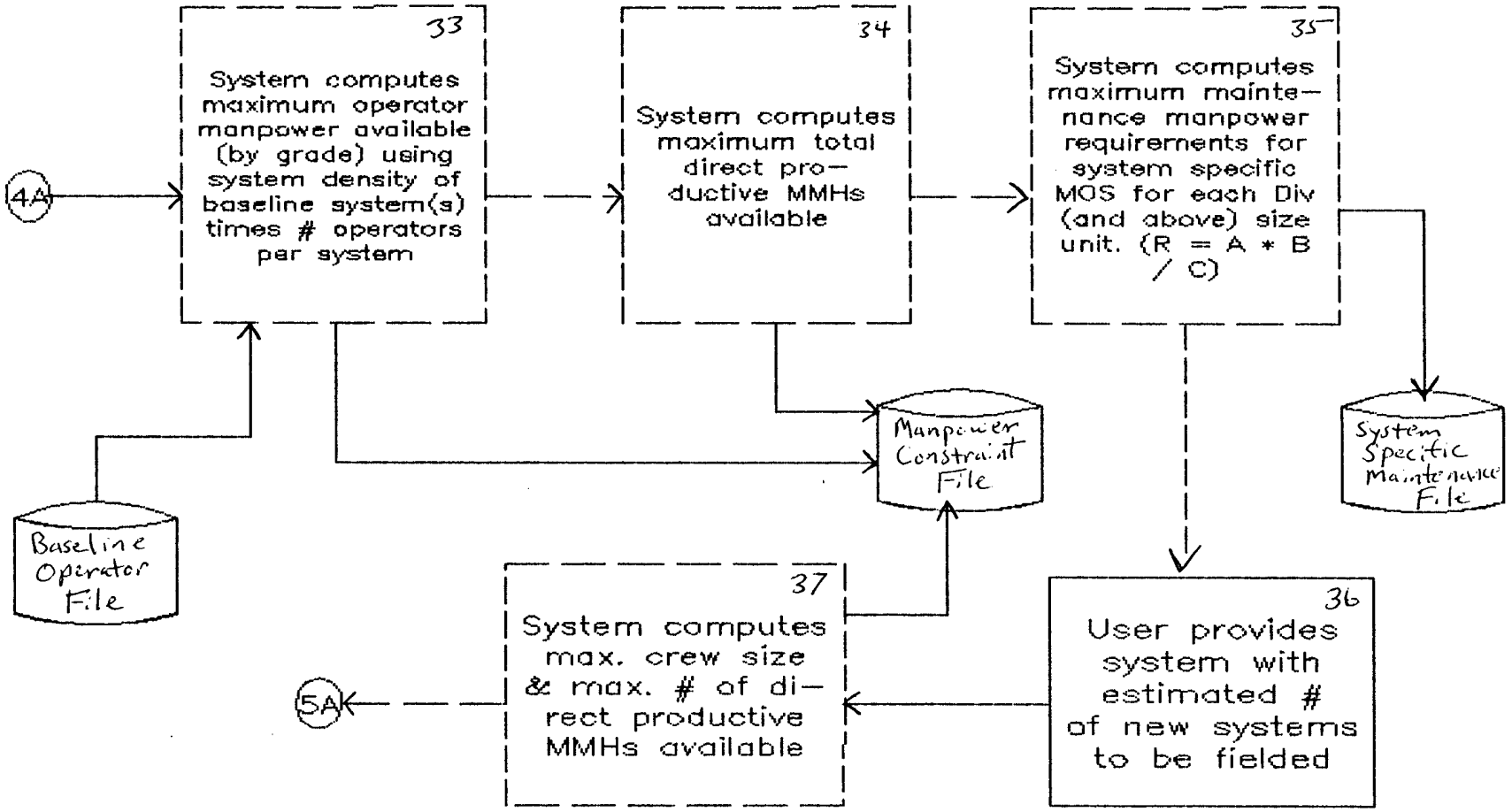


Figure 3-5. MCEA Flowchart (continued)

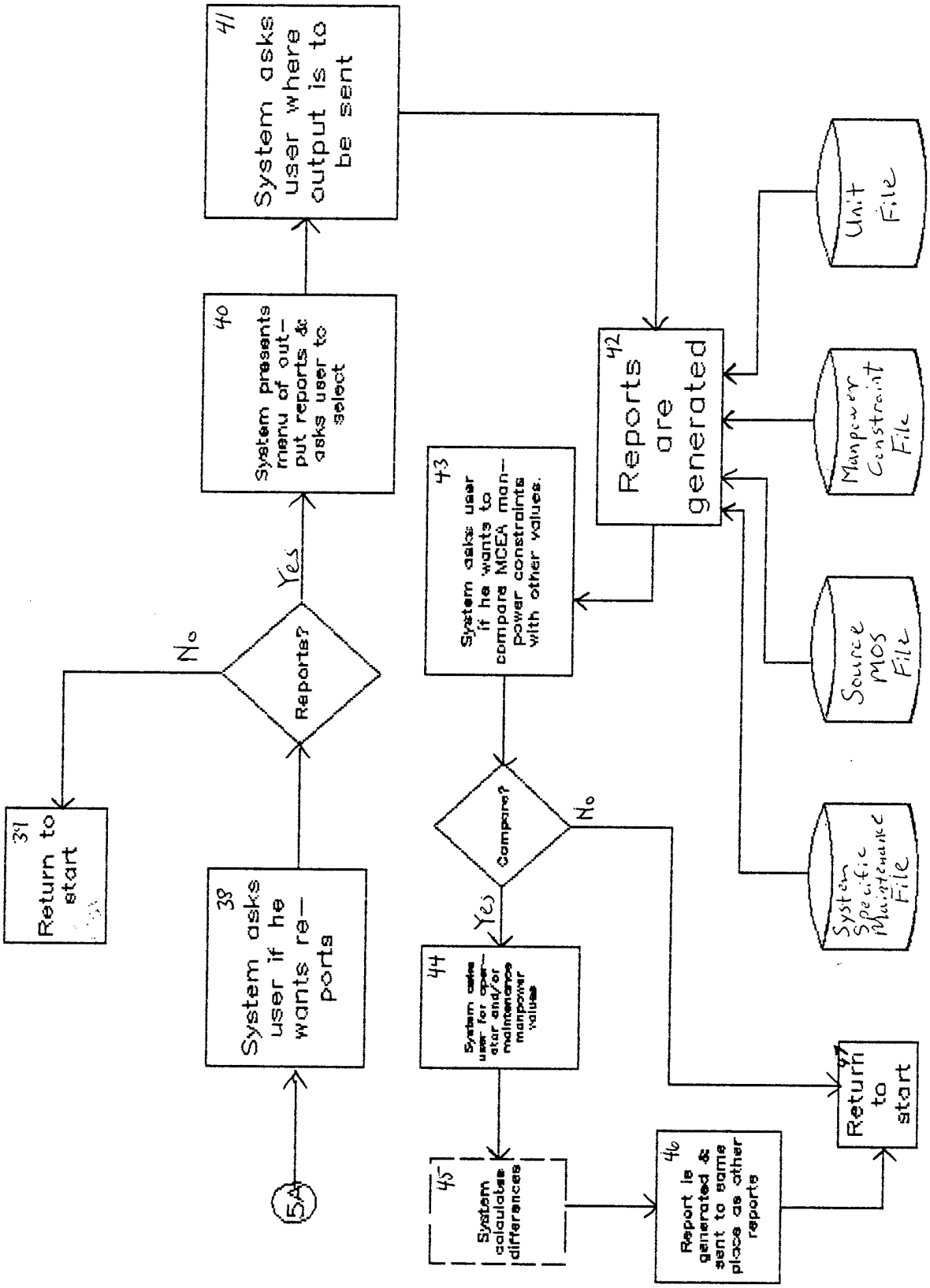


Figure 3-6. MCEA Flowchart (continued)

Each of the steps listed above is further subdivided into blocks. A block is represented by a rectangle in the MCEA flowchart and is referenced by a number in the upper righthand corner. Blocks that require user interface are composed of screens, which are the basic elements of the user interface system. The screens (which are shown in the detailed description of each step) guide the user through the steps of the MCEA process. Throughout the process the user has opportunities to either input his own data or accept default values contained in the data libraries.

Each step is explained in terms of inputs, processes, and outputs. The portion of the flowchart applicable to that step is shown and screens, files, algorithms, and output reports related to each block in the step are described. The numbering system used in the block descriptions matches the block numbers as they appear on the flowchart.

3.1 STEP 0: DOS Utilities/File Review

During this step, the user can use DOS commands to manipulate files, select an option for continuing a previous session that was not completed, or start a new analysis. Also, during this step, the user can review previously created files and update libraries if required.

3.1.1 Output

The user provides a choice of where he wants to enter the MCEA process. If the user chooses the library update option, then these revisions will be reflected in any subsequent steps.

3.1.2 Input

External Input. None.

Internal Input. If the user exercises all options in this step, all MCEA files and libraries will be called up and reviewed. For a description of the MCEA files and libraries, see Sections 4 and 5.

3.1.3 Process

The user is first given an opportunity to perform various DOS file manipulations (e.g. format disks, copy floppy diskettes, examine directory). Next, the user selects options for either continuing a previous MCEA application or starting the application for a new system. If the user elects to continue a previous

application, the system will automatically update him on what was accomplished during the last session. Finally, the user is given the option to review all files and libraries, with an additional option of updating any of the libraries.

3.1.4 User Interface Diagram

Figure 3.1-1 displays the User Interface Diagram for Step 0. Listed below are descriptions of the screens, files, algorithms, and output associated with each numbered block.

(1) See Figure 3.1-2. This step allows the user to perform utility type functions such as copying, formatting, etc.

(2) See Figure 3.1-3. This step allows the user to either resume work on a previous project, edit files, update libraries, or start from scratch.

(3) See Figure 3.1-4. This step shows the user what was accomplished during his last session and gives him an option to preview files that were constructed.

(4) See Figure 3.1-5. The system presents the user with a choice of files to preview. The user makes a selection.

(5) The MCEA displays file contents. See Figures 3.1-6 through 3.1-13.

(6) See Figure 3.1-14. This screen presents the user with the option to review four libraries.

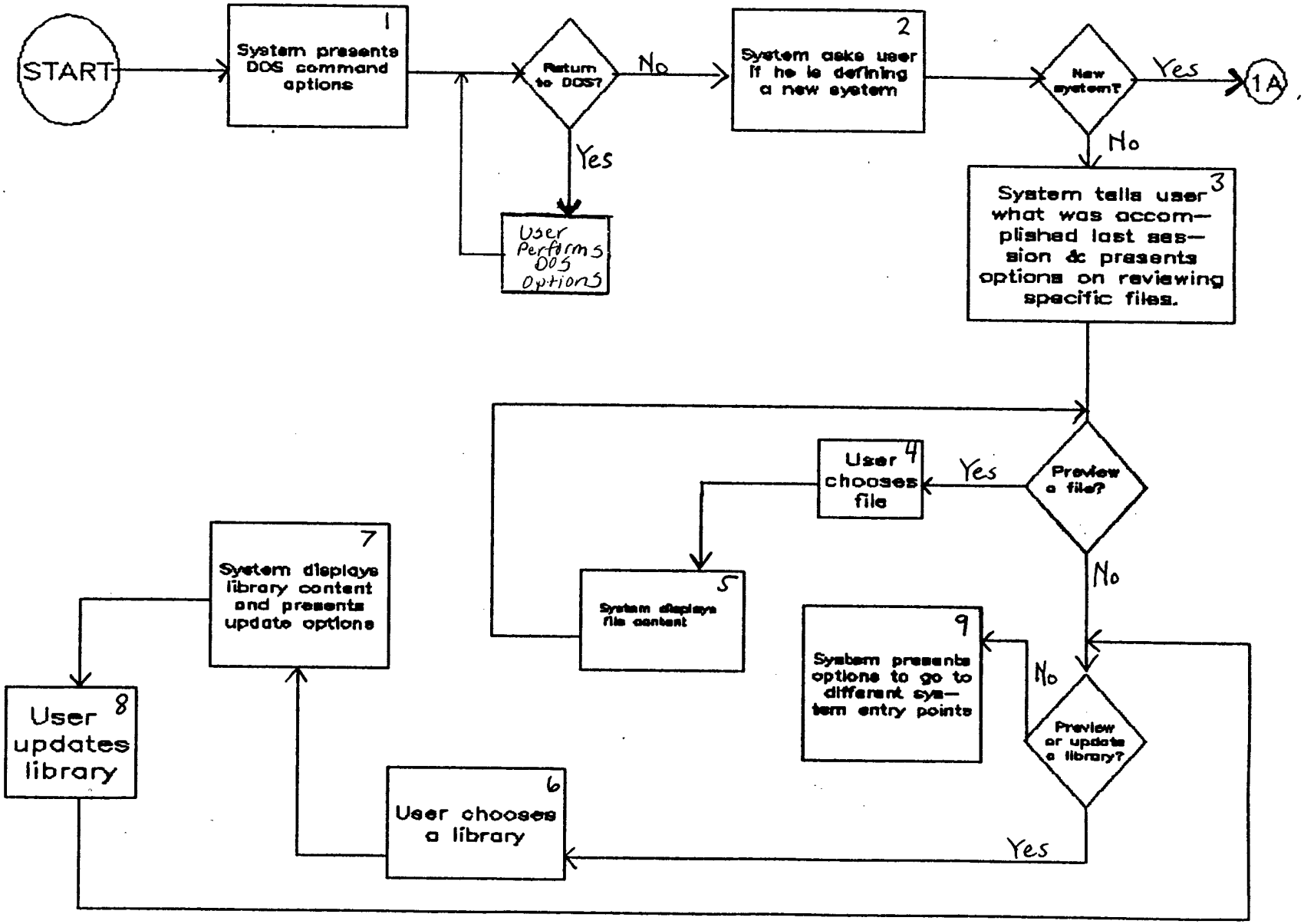


Figure 3.1.1. User Interface Diagram for Step 0

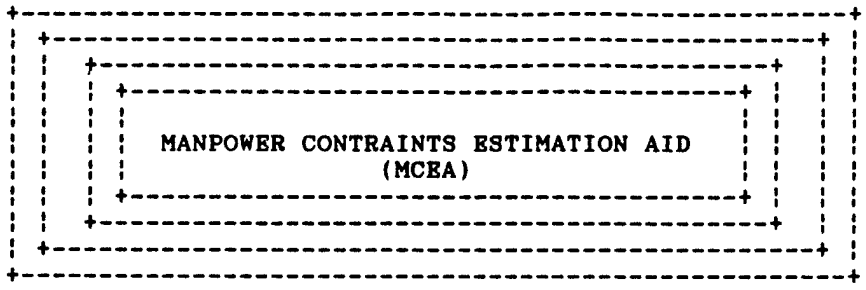
(7) See Figure 3.1-15. The user is presented with update options for each library.

(8) The user makes a choice from step 7 and enters a library update routine.

(9) See Figure 3.1-16. This step allows the user to enter the MCEA at his choice of key entry points. The estimation process will proceed using output and working files as they currently exist (i.e. files will reflect any editing changes made in previous steps).

3.1.5 Screens

There are 15 screens associated with this step. They are shown below as Figures 3.1-2 through 3.1-16.



Press <Enter <--+> to continue or <Esc> to quit

PATH: MCEA MODE: WORK

```
+--------------------------------------+
|            MCEA Main Menu            |
+--------------------------------------+
| 1. Begin work on a new system        |
| 2. Resume work on the current system |
| 3. Perform DOS functions             |
+--------------------------------------+
```

Figure 3.1-2

PATH: MCEA>DOS

MODE: WORK

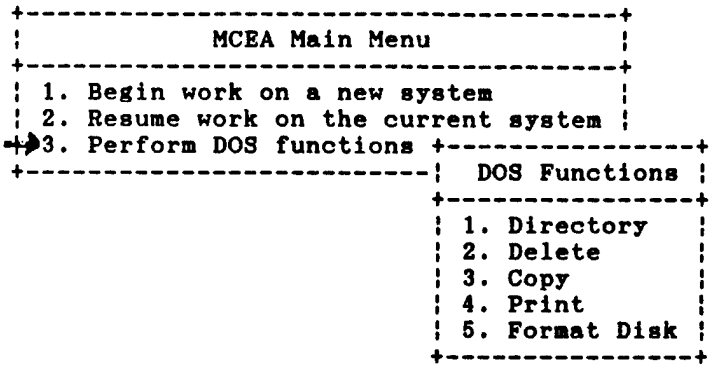


Figure 3.1-3

PATH: MCEA MODE: WORK

```
+--------------------------------------+
|           MCEA Main Menu             |
+--------------------------------------+
| 1. Begin work on a new system        |
| 2. Resume work on the current system |
| 3. Perform DOS functions             |
+--------------------------------------+
```

PATH: MCEA>RESUME MODE: WORK

```
+--------------------------------------+ +--------------------------------------+
| SYSTEM STATUS                        | |        Resume Work Options           |
+--------------------------------------+ +--------------------------------------+
| Name: XTANK                          | | 1. Reentry points                    |
| Density: 4000                        | | 2. Review files                      |
+--------------------------------------+ | 3. Update libraries                  |
| Baseline Systems                     | +--------------------------------------+
+-----------------------------+--------+
| Name                        | Density|
+-----------------------------+--------+
| M60 Tank                    | 2000   |
| M1 Tank                     | 2000   |
|                             |        |
+-----------------------------+--------+--------------------------------------+
| Units to Receive New System          |                                      |
+--------------------------------------+                                      |
| 1st Cav Division                     |                                      |
| 2nd Armor Division                   |                                      |
|                                      |                                      |
+--------------------------------------+--------------------------------------+
```

Figure 3.1-4

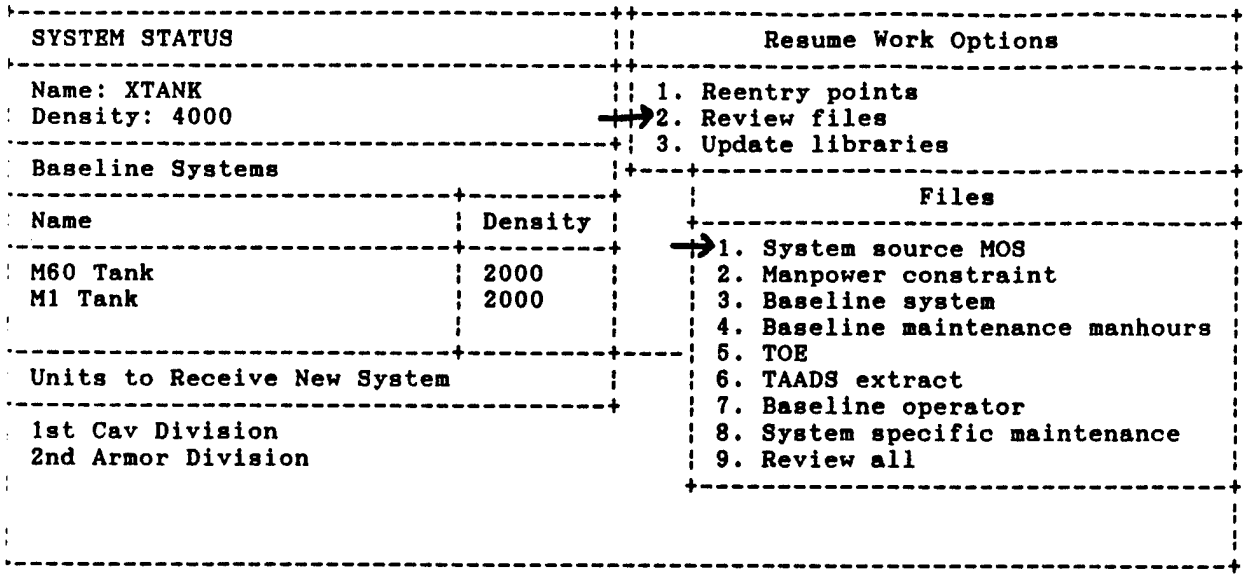

SYSTEM STATUS
Name: XTANK
Density: 4000
Baseline Systems
Name
Density
M60 Tank
2000
M1 Tank
2000
Units to Receive New System
1st Cav Division
2nd Armor Division
Resume Work Options
1. Reentry points
2. Review files
3. Update libraries
Files
1. System source MOS
2. Manpower constraint
3. Baseline system
4. Baseline maintenance manhours
5. TOE
6. TAADS extract
7. Baseline operator
8. System specific maintenance
9. Review all

Figure 3.1-5

PATH: MCEA>RESUME>FILES>MOS
Insert Delete Copy

MODE: WORK

System Source MOS File for System Name: XTANK	
Operator MOS	Maintenance MOS
19K	29E 31V 35E 35H 41CL8 45B 45E 45G 45KL8 63E 63GL8 63J

Figure 3.1-6

PATH: MCEA>RESUME>FILES>MANPOWER MODE: WORK
Insert Delete Copy

Manpower Constraint File

System Name: XTANK | Density: 4000

Operators		Maintainers	
Grade	operators/system	Category	MMHs/system
E-4	2	Unit	1241.9
E-5	1	DS	1385.9
E-6	1	GS	631.1
		Total	3258.9

Total operators/system: 4 | Total maintainers/system: 3

Figure 3.1-7

PATH: MCEA>RESUME>FILES>BASESYS MODE: WORK
Insert Delete Copy

Baseline System File	
Mission area	: Close combat, heavy
Weapon Type	: Tank
Weapon System	: M1
LIN	: T13374

Figure 3.1-8

PATH: MCEA>RESUME>FILES>BASEMAINT MODE: WORK
Insert Delete Copy

Baseline Maintenance Manhours File

Baseline System: LIN: T13374

MOS	Unit hours	DS hours	GS hours
29E	0	22.1	0
31V	20.7	0	0
35E	0	1.4	3.7
35H	0	0	4.1
41C	0	68.9	42.7
45B	0	3.4	2.1
45E	448	0	0
.	.	.	.
.	.	.	.
.	.	.	.

Figure 3.1-9

PATH: MCEA>RESUME>FILES>TOE MODE: WORK
Insert Delete Copy

TOE File					
Baseline System: M1 Tank				LIN: T13374	
SRC	MARCCODE	SRC	MARCCODE	SRC	MARCCODE
17055J330	11AA				
17035C010	11AB				
17235J120	12BC				
17235J420	11AA				

Figure 3.1-10

PATH: MCEA>RESUME>FILES>TAADS
Insert Delete Copy

MODE: WORK

TAADS Extract File			
Baseline System: M1 Tank			LIN: T13374
Unit Name	SRC	MARCCODE	Number of Systems
11th ACR	17055J330	11AA	104
2nd Armor Division	17235J120	11AB	300
.	.	.	.
.	.	.	.
.	.	.	.

Figure 3.1-11

PATH: MCEA>RESUME>FILES>BASEOP MODE: WORK
Insert Delete Copy

Baseline Operator File

Baseline System: M1 Tank			LIN: T13374		
Operator MOS	Grade	Number	Operator MOS	Grade	Number
19K	E-4	2			
19K	E-5	1			
19K	E-6	1			

Figure 3.1-12

PATH: MCEA>RESUME>FILES>SYSMAINT MODE: WORK
Insert Delete Copy

System Specific Maintenance File

New System: XTANK LIN: N/A

Unit Type	MOS	Unit req	DS req	GS req
ACR	29E	0	4	0
	31V	8	0	0
	41C	0	3	5
	45E	8	0	0
	.	.	.	.
	.	.	.	.
	.	.	.	.
Armor Division	29E	0	10	0
	31V	20	0	0
	.	.	.	.
	.	.	.	.
	.	.	.	.

Figure 3.1-13

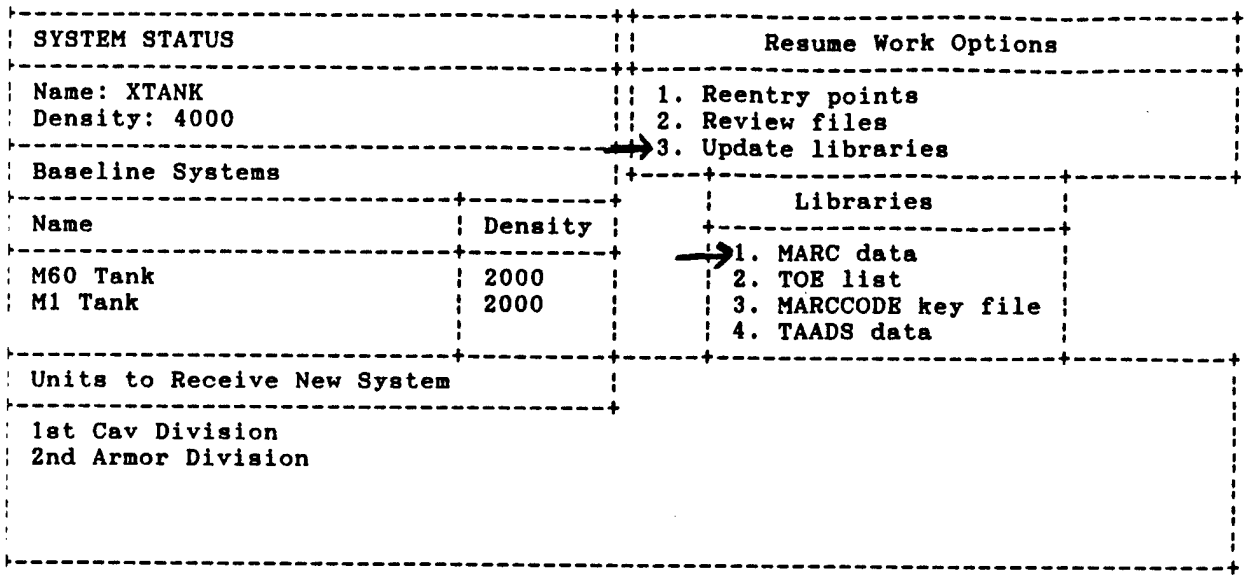

SYSTEM STATUS
Name: XTANK
Density: 4000
Baseline Systems
Name
Density
M60 Tank
2000
M1 Tank
2000
Units to Receive New System
1st Cav Division
2nd Armor Division
Resume Work Options
1. Reentry points
2. Review files
3. Update libraries
Libraries
1. MARC data
2. TOE list
3. MARCCODE key file
4. TAADS data

Figure 3.1-14

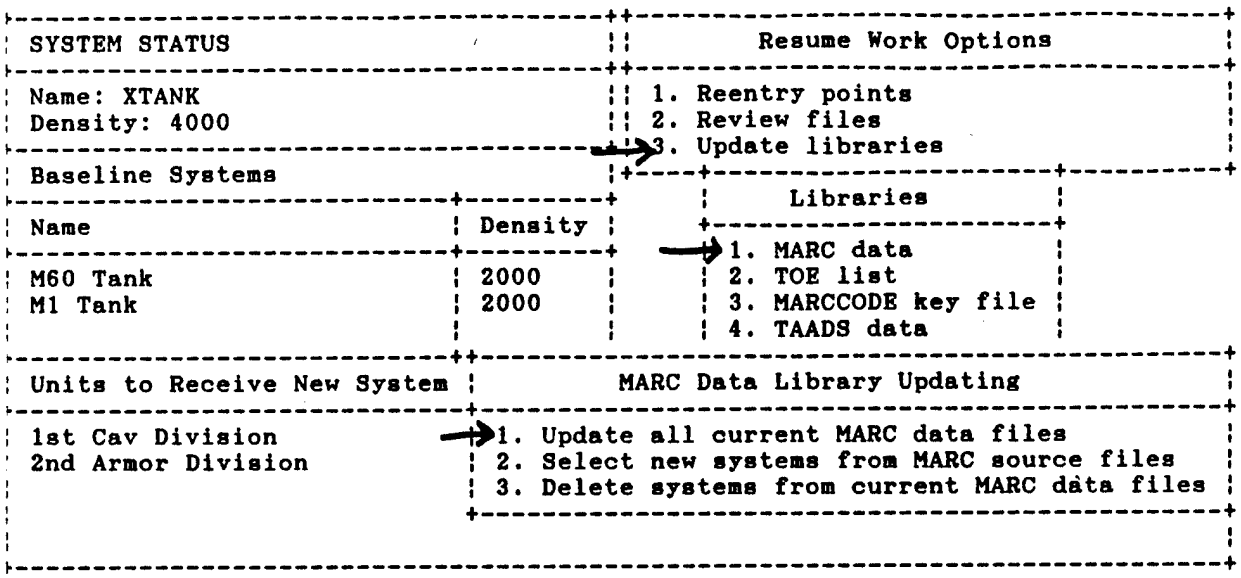

SYSTEM STATUS
Name: XTANK
Density: 4000
Baseline Systems
Name
Density
M60 Tank
2000
M1 Tank
2000
Units to Receive New System
1st Cav Division
2nd Armor Division
Resume Work Options
1. Reentry points
2. Review files
3. Update libraries
Libraries
1. MARC data
2. TOE list
3. MARCCODE key file
4. TAADS data
MARC Data Library Updating
1. Update all current MARC data files
2. Select new systems from MARC source files
3. Delete systems from current MARC data files

Figure 3.1-15

PATH: MCEA>RESUME>REENTRY MODE: WORK

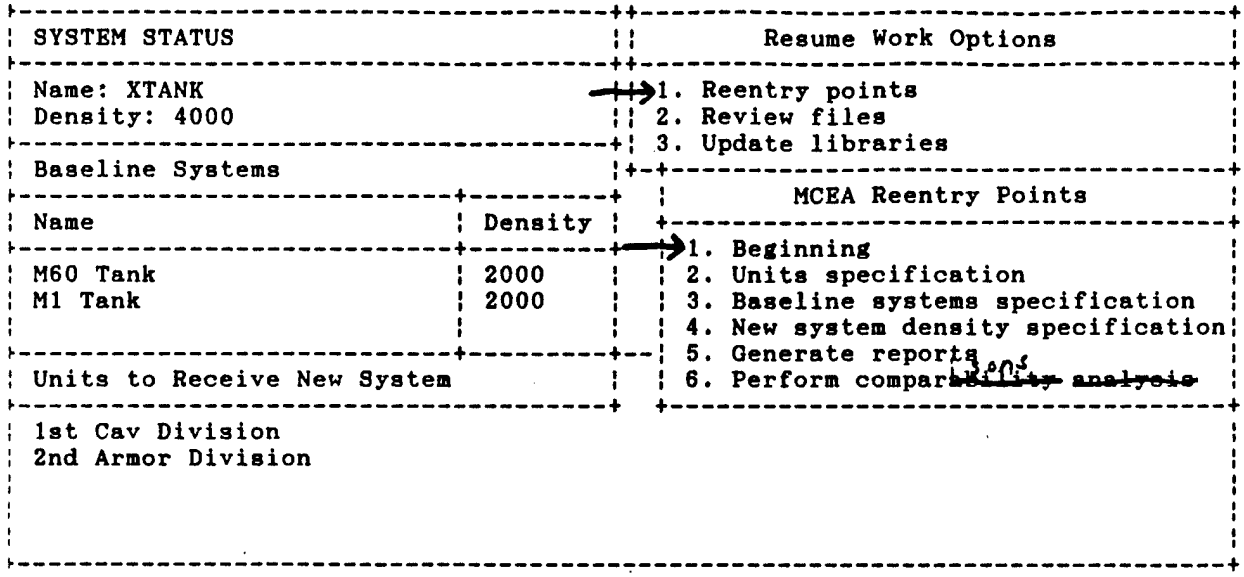


Figure 3.1-16

3.2 STEP 1: BASELINE SYSTEM SELECTION

During this step, the user identifies the baseline system(s) to be replaced by a new system. This selection will later form the basis for manpower availability calculations.

3.2.1 Output

Output from this step will be a selected baseline system(s) and its associated line item number (LIN).

3.2.2 Input

External Input. None.

Internal Input. The user will identify mission area, weapon system type, and weapon system to be replaced. This information will be used to search the Baseline System File for the system LIN.

3.2.3 Process

A series of menus is presented to the user. These menus assist in identifying baseline system(s) to be replaced. Prior to starting the initial manpower calculations, the user is asked to confirm his choices. The user is then asked to wait while computations are made.

3.2.4 User Interface Diagram

Figure 3.2-1 displays the User Interface Diagram for Step 1. Listed below are descriptions of the screens, files, algorithms, and output associated with each numbered block.

(10) See Figure 3.2-2. The user chooses a mission area.

(11) See Figure 3.2-3. The user chooses a weapon type.

(12) See Figure 3.2-4. The user chooses a specific weapon to be replaced.

(13) See Figure 3.2-5. The user is asked to confirm his choice.

(14) See Figure 3.2-6. The display continues until initial calculations through block 27 are made.

3.2.5 Screens

There are five screens associated with this step. They are shown below as Figures 3.2-2 through 3.2-6.

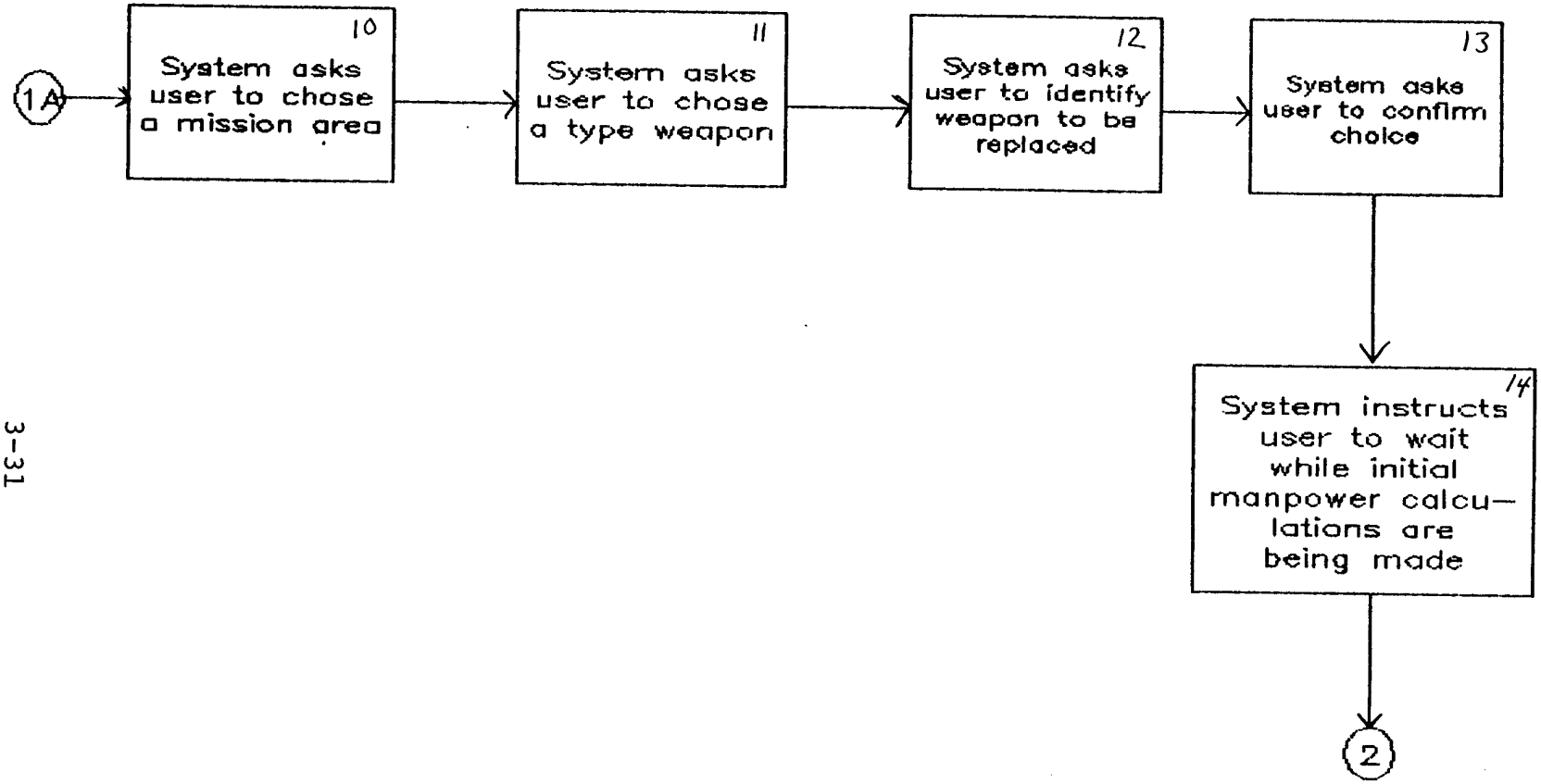


Figure 3.2.1. Step 1: DOS Options/File Review

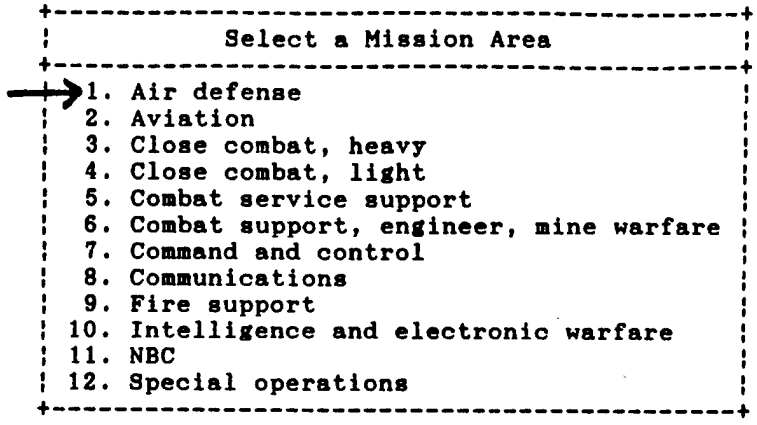

Select a Mission Area
1. Air defense
2. Aviation
3. Close combat, heavy
4. Close combat, light
5. Combat service support
6. Combat support, engineer, mine warfare
7. Command and control
8. Communications
9. Fire support
10. Intelligence and electronic warfare
11. NBC
12. Special operations

Figure 3.2-2

PATH: MCEA>INPUT>WEAPON MODE: WORK

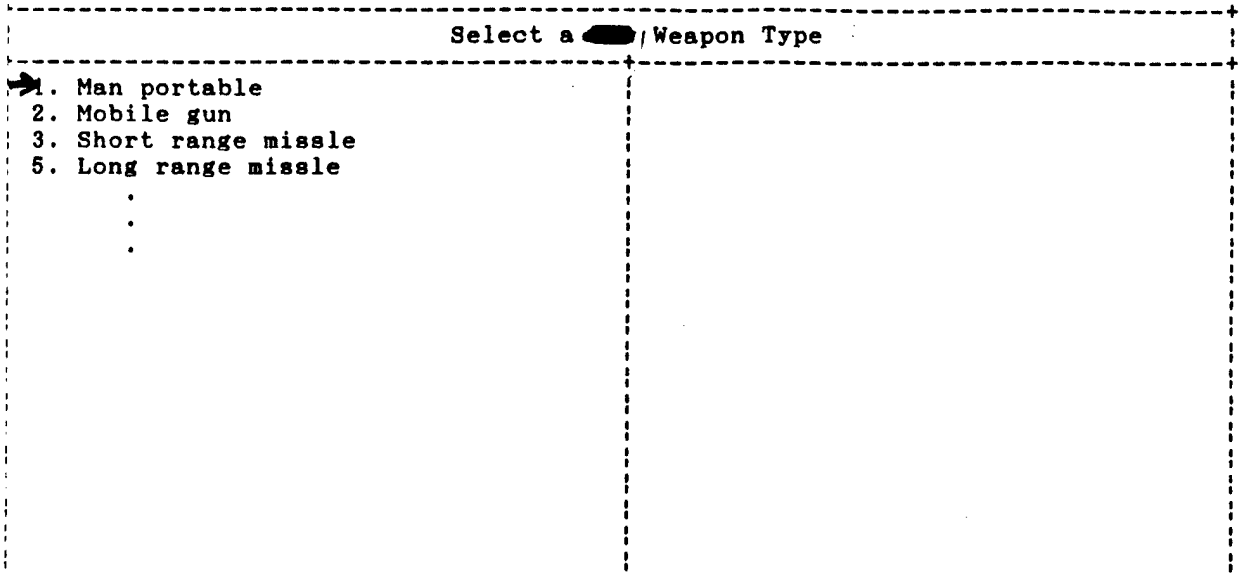


Figure 3.2-3

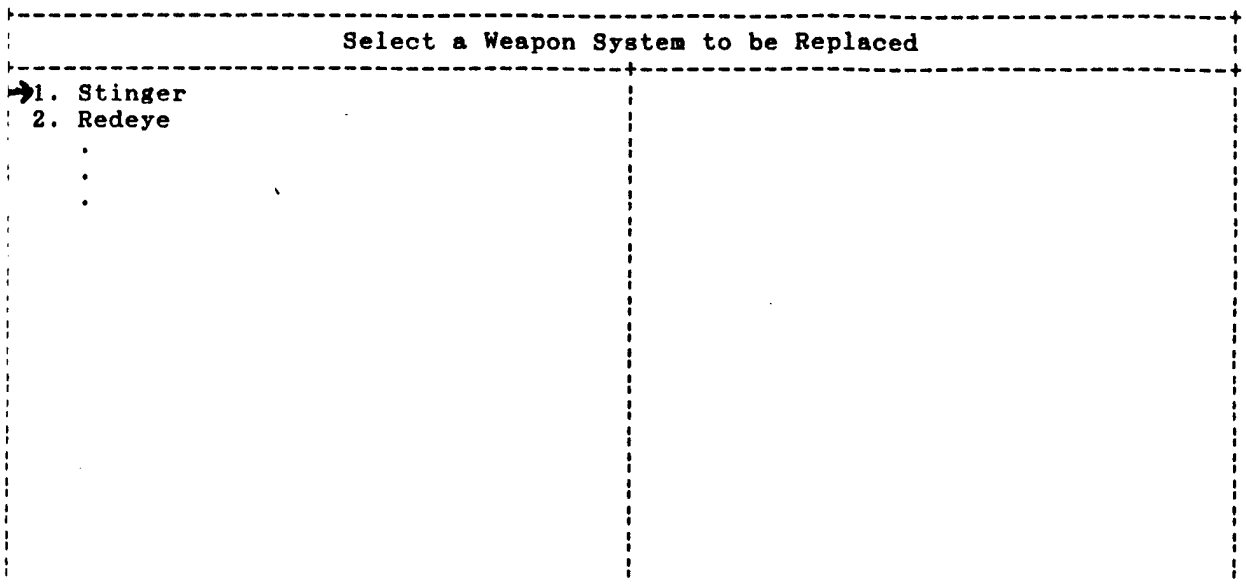


Figure 3.2-4

```
+-------------------------------------------------------------+
| You have made the following selections:                     |
|                                                             |
|     1. Mission area      :   Air defense                    |
|     2. [redacted]eapon type  :   Man portable               |
|     3. Weapon system to  :   Stinger                        |
|        be replaced                                          |
+-------------------------------------------------------------+
|                          CONFIRM (Y/N)                      |
+-------------------------------------------------------------+
```

Figure 3.2-5

PATH: MCEA>INITCALCMP MODE: WAIT

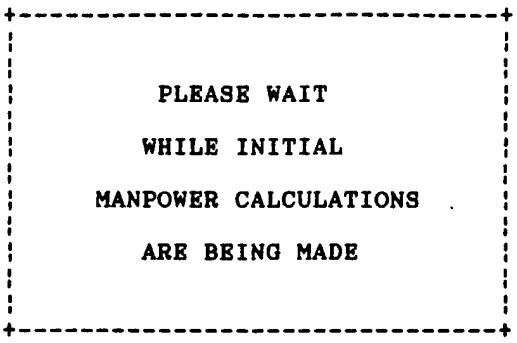


Figure 3.2-6

3.3 STEP 2: MOS SELECTION

This step is completely automated and requires no user interface. The system searches three baseline files to create a file that identifies MOS available to support the new system.

3.3.1 Output

The result of this step will be the creation of the Source MOS File. This file identifies all operator and maintenance MOS available to support the new system. The Source MOS File is one of the output files from MCEA that is used by other MPT products.

3.3.2 Input

External Input. None.

Internal Input. The output from step 1 (baseline weapon system to be replaced) will be used to search the Baseline System File for a LIN, the Baseline Operator File for operator MOS, and the Baseline MMH File for maintenance MOS.

3.3.3 Process

When the user confirms his choice of baseline system(s), the MCEA automatically begins a search of the Baseline System File to obtain the appropriate LIN. Using the LIN, the system then searches both the Baseline Operator File and the Baseline MMH File to get all MOS associated with the system. These MOS are then used to create the Source MOS File.

3.3.4 User Interface Diagram

Figure 3.3-1 displays the User Interface Diagram for Step 2. Listed below are descriptions of the screens, files, algorithms, and output associated with each numbered block.

(19) In this step, the MCEA searches the Baseline System File (described on page 114) to obtain a unique line item number (LIN) for the weapon system. The LIN becomes a key parameter for searching and obtaining information from numerous other files/libraries.

(22) Using the LIN, the MCEA searches the Baseline MMH File (described on page 115) for all maintenance MOS that support the system. Annual maintenance manhours expended at each level for each MOS are recorded in the MMH Working File. All maintenance MOS supporting the system are then entered into the Source MOS File (described on page 112).

(22A) Using the LIN, the MCEA searches the Baseline Operator File (described on page 120) for all operator MOS that support the system. These MOS are then entered into the Source MOS File (described on page 112).

3.3.5 Screens

The user will continue to see the screen at Figure 3.2-6 (described in Section 3.2) during this step.

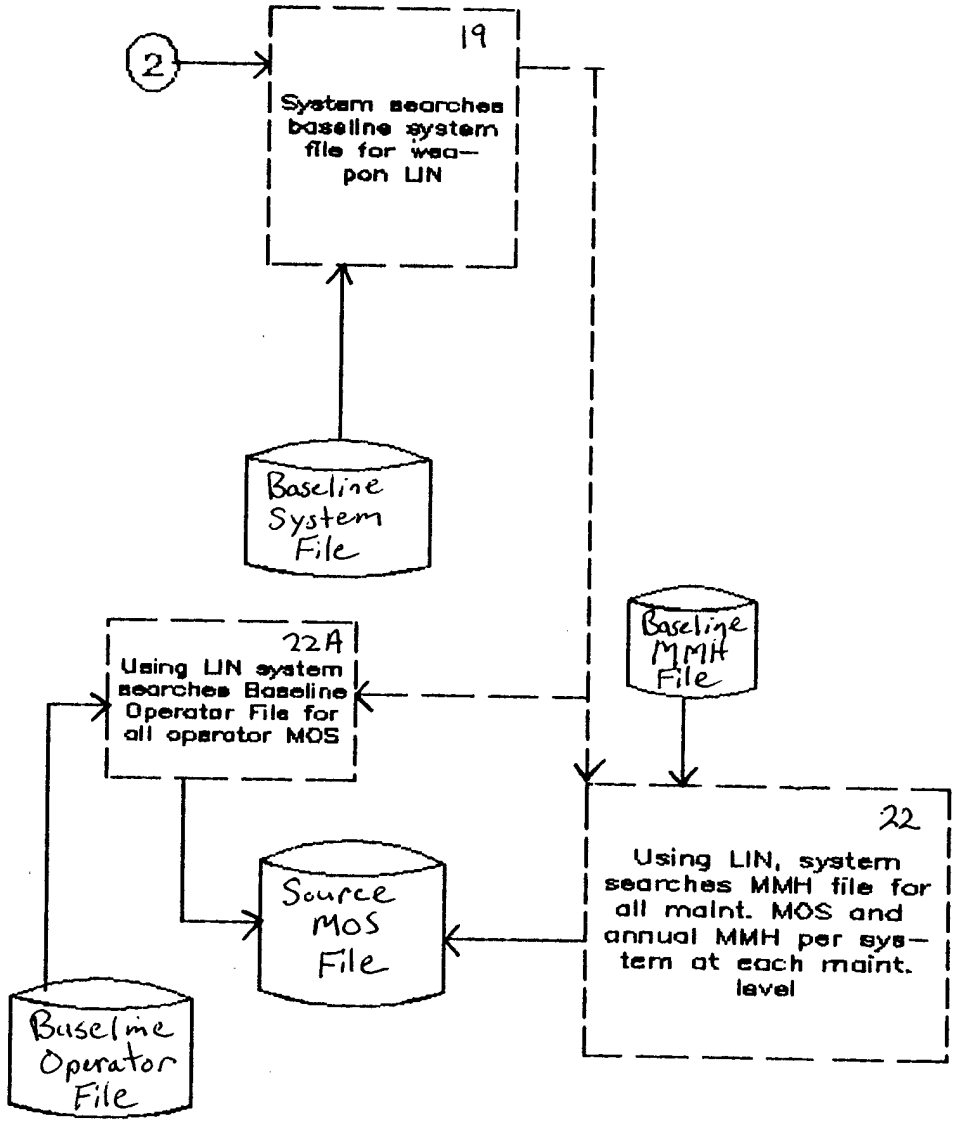


Figure 3.3.1. Step 2 MOS Selection

3.4 STEP 3: DIRECT PRODUCTIVE MMHs AND SYSTEM DENSITY DETERMINATION

This step is completely automated and requires no user interface. The step calculates total direct productive maintenance manhours and system density.

3.4.1 Output

The result of this step will be total direct productive maintenance manhours, at each maintenance level, available to each type of unit. This will be entered into the Manpower Constraint File. In addition, all units authorized to the baseline system will be listed, with the number of systems authorized, in the Unit File. The total number of systems authorized will be entered as system density in the Manpower Constraint File.

3.4.2 Input

External Input. None.

Internal Input. In this step, the system LIN searches the TOE File to obtain standard requirement codes (SRCs) and manpower requirements criteria (MARC) codes. The SRCs search The Army Authorization Document System (TAADS) to determine actual units and the number of systems authorized for each unit. The MARC codes determine the number of available maintenance manhours for each type of unit. This information is obtained from the MARC CODE File.

3.4.3 Process

The system searches the TOE File first and then the TAADS file to obtain units and system density. This information is entered into the Unit File and the Manpower Constraint File respectively. The system also computes total direct productive maintenance manhours available, at each level of maintenance, using the information extracted from the Baseline MMH File in step 2.

3.4.4 User Interface Diagram

Figures 3.4-1 and 3.4-2 display the User Interface Diagram for Step 3. Listed below are descriptions of the screens, files, algorithms, and output associated with each numbered block.

(20) Using the LIN, the MCEA searches the TOE File (described on page 116) for all units authorized to have that weapon system. Once a unit is identified, its standard requirement code (SRC) and manpower requirements criteria (MARC) code are recorded.

(21) Using the SRCs found in step 20, the MCEA searches the Army Authorization Document System (TAADS) to find actual units that have the weapon system to be replaced and the number of systems the unit is authorized. This information is placed in the TAADS Extract File (described on page 119).

(23) Maintenance manhours for each MOS at each maintenance level are converted to productive MMHs by dividing them by an indirect productive hour factor contained

in the Baseline MMH File. The MMH Working File stores these results.

(24) In this step, the MCEA determines the number of annual maintenance manhours available based on type of unit and the unit movement code. This information is obtained from the MARCCODE File (described on page 117). The algorithm for computing this is found on page 125.

(25) In this step, the MCEA computes system density by totaling the number of authorized systems found in step 21 and contained in the Unit File. System density is then entered into the Manpower Constraint File.

(26) In this step, the total annual available maintenance manhours found in step 24 is checked to insure its value is at least 2920. If less, the value is automatically set to 2920.

(27) In this step, maintenance manhours are summed across all MOS to obtain the total at each maintenance level. This result is stored in the MMH Working File.

3.4.5 Screens

The user will continue to see the screen at Figure 3.2-6 (described in Section 3.2) during this step.

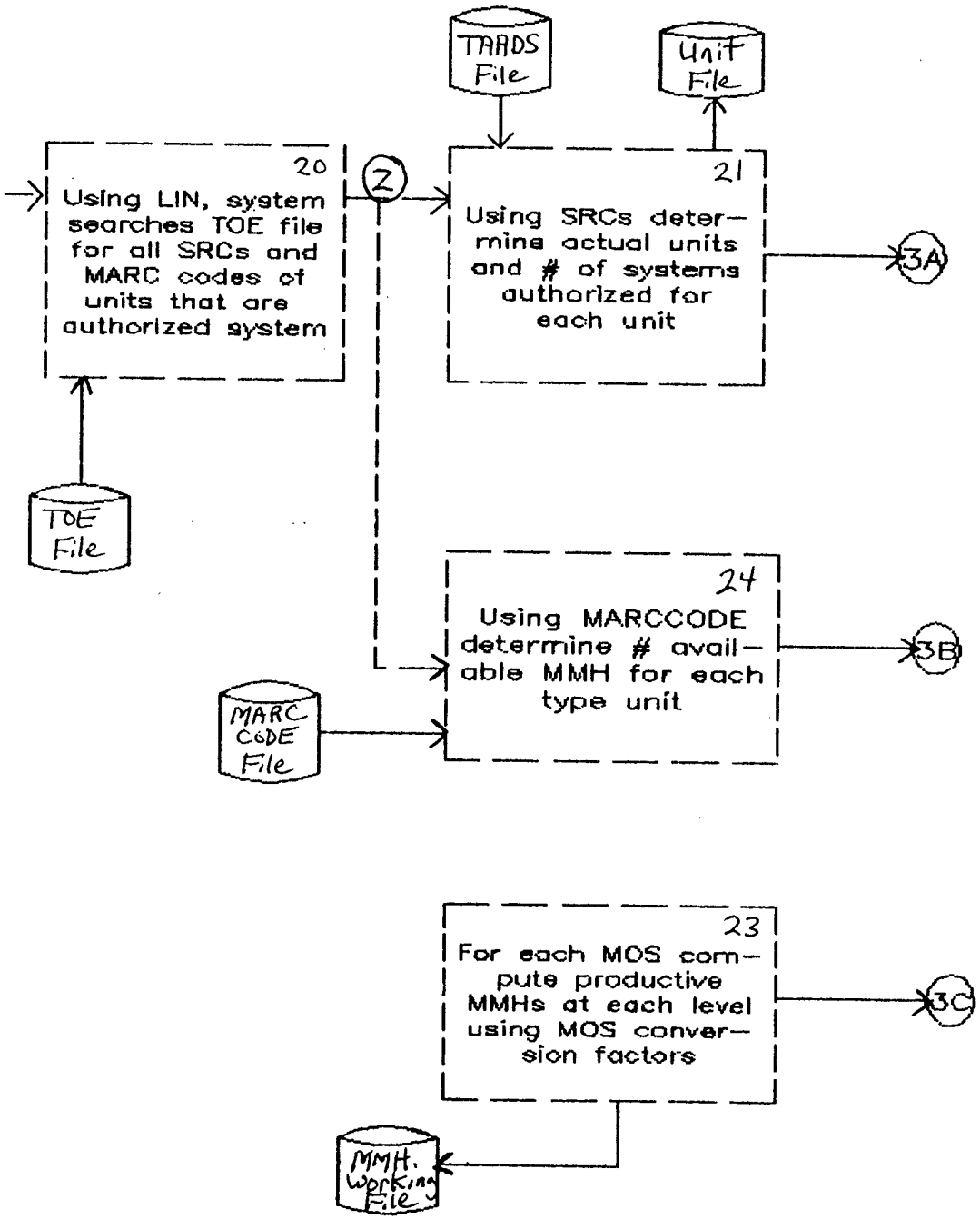


Figure 3.4.1. Step 3 Direct Productive MMHs & System Density

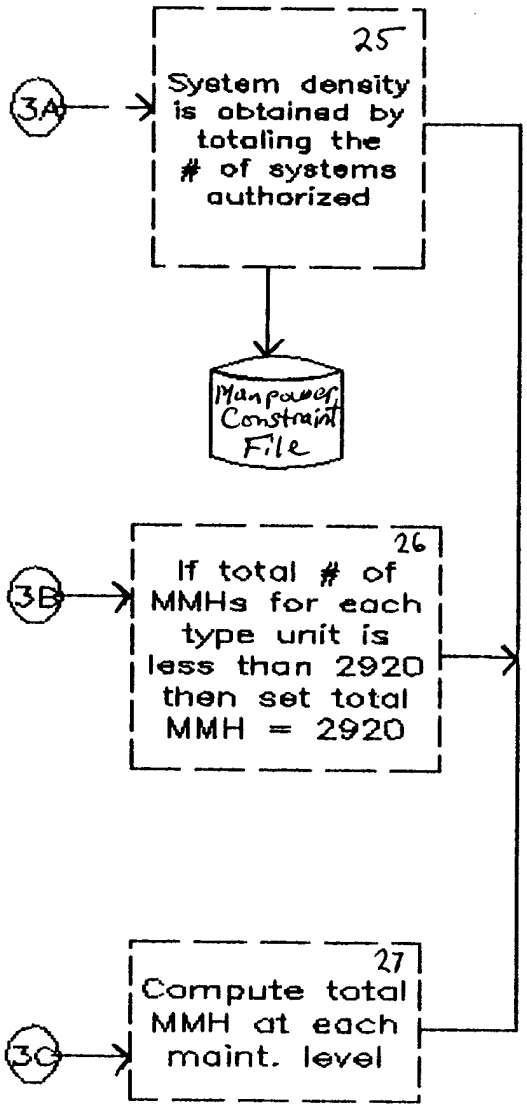


Figure 3.4.2. Step 3 Direct Productive MMHs & System Density (continued)

3.5 STEP 4: UNIT SELECTION

This step allows the user to influence the replacement strategy (new systems for baseline systems) by modifying the units contained in the Unit File. He has the option of deleting previously determined units or adding units that are not authorized the baseline system.

3.5.1 Output

There will be two major outputs from this step. The first will be a modified list of units associated with the previously determined baseline system to be replaced. This will obviously alter baseline system density and the corresponding manpower available. The second major output will be additional systems to be replaced that will also impact manpower availability. The results of both of these will be reflected in the Unit File and the Manpower Constraint File.

3.5.2 Input

External Input. None.

Internal Input. The user will select any units that have the baseline system but will not receive the new system. These units will be deleted from the Unit File. The user will also be able to select units to receive the new system that do not currently have the baseline system. For these units the user must identify (by LIN) systems to be replaced.

3.5.3 Process

The user is presented the option of specifying which units will receive the new system. He is first presented the option to delete units (with baseline systems) from the Unit File. Next he is given the opportunity to add units (without baseline systems) to receive the new system. In this case, however, he must identify some system(s) that would be replaced since it is assumed there is a zero sum constraint on manpower within the unit.

3.5.4 User Interface Diagram

Figure 3.5-1 displays the User Interface Diagram for Step 4. Listed below are descriptions of the screens, files, algorithms, and output associated with each numbered block.

(28) See Figure 3.5-2. This step allows the user to influence the replacement strategy (new system for baseline system) by specifying units that will be involved. He has the option of deleting previously determined units or adding units that are not authorized the baseline system.

(29) See Figure 3.5-3. This step allows the user to delete units.

(30) See Figure 3.5-4. This step presents the user with an updated list of units and new system density after his deletions.

(31) See Figure 3.5-5. The user is asked to identify units by SRCs that are not authorized the baseline system but will receive the new system.

(32) See Figure 3.5-5. In this step, the user must identify other weapon systems (by LIN) which would be replaced by the new system. For baseline systems, the LIN may be obtained from the Baseline System File. For other than baseline systems, the LIN can be obtained from the Army MARC Maintenance Data Base. After this step, MCEA will return to step 21 to begin new MMH and operator manpower calculations.

3.5.5 Screens

There are four screens associated with this step. They are shown below as Figures 3.5-2 through 3.5-5.

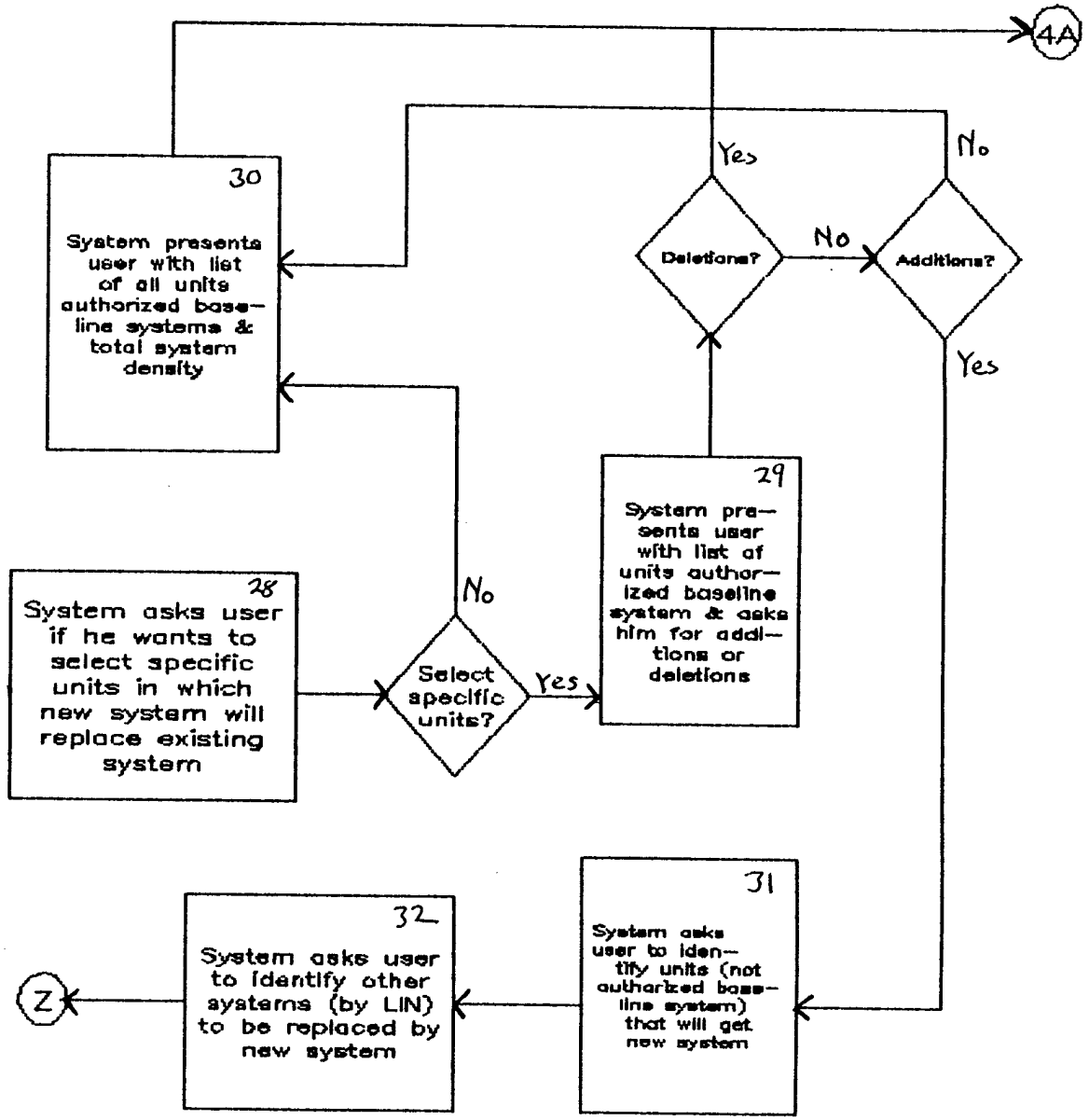


Figure 3.5.1. Step 4 Unit Selection

UNITS AUTHORIZED FOR NEW SYSTEM

System Name: Zapper LIN: N/A

Total System Density: 400

Unit	Systems
1. 1st Division	90
2. 2nd Division	60
3. 8th Division	50
4. 14th Division	120
5. 187th Brigade	80

1. Use this list
2. Add units
3. Delete Units

Figure 3.5-2

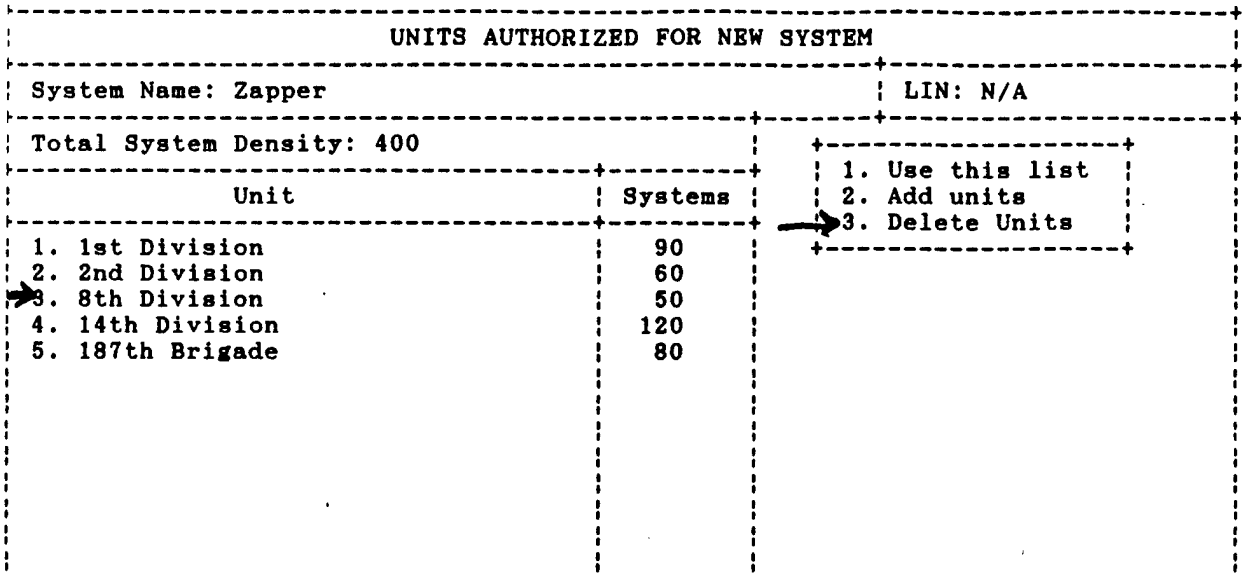

UNITS AUTHORIZED FOR NEW SYSTEM
System Name: Zapper
LIN: N/A
Total System Density: 400
1. Use this list
2. Add units
3. Delete Units
Unit
Systems
1. 1st Division 90
2. 2nd Division 60
3. 8th Division 50
4. 14th Division 120
5. 187th Brigade 80

Figure 3.5-3

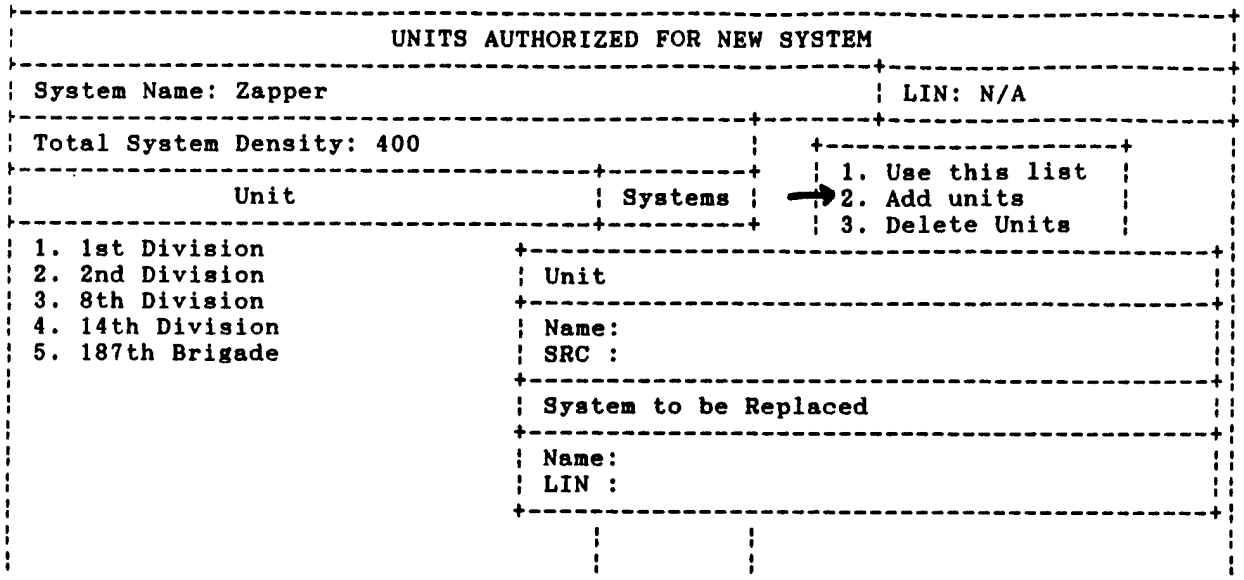
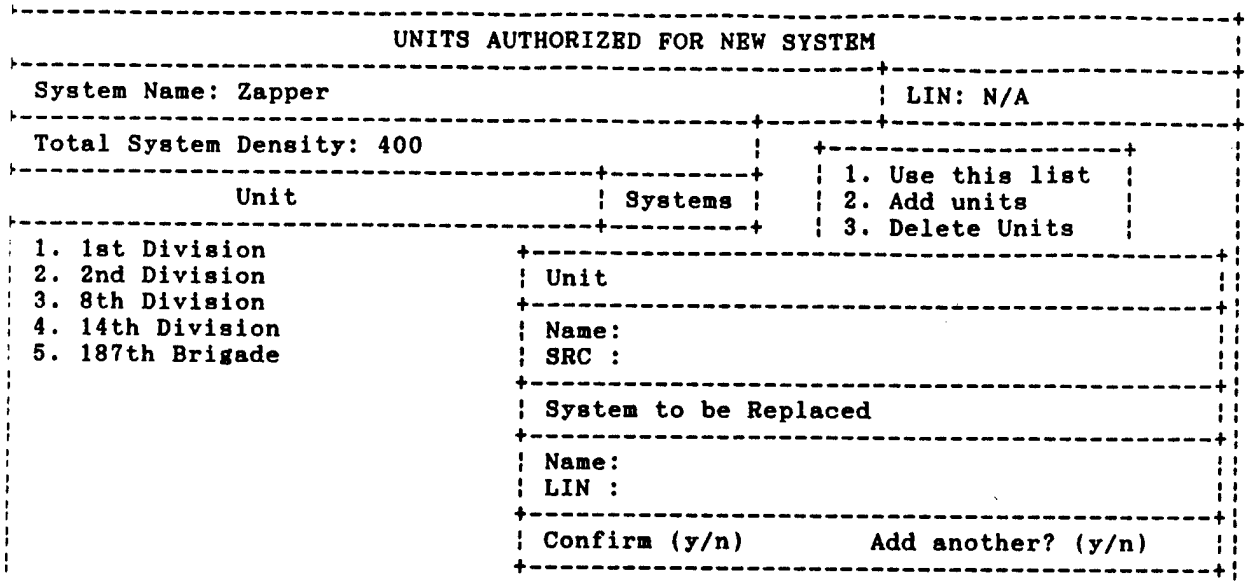

UNITS AUTHORIZED FOR NEW SYSTEM
System Name: Zapper
LIN: N/A
Total System Density: 400
Unit
Systems
1. Use this list
2. Add units
3. Delete Units
1. 1st Division
2. 2nd Division
3. 8th Division
4. 14th Division
5. 187th Brigade
Unit
Name:
SRC :
System to be Replaced
Name:
LIN :

Figure 3.5-4


UNITS AUTHORIZED FOR NEW SYSTEM
System Name: Zapper
LIN: N/A
Total System Density: 400
Unit
Systems
1. 1st Division
2. 2nd Division
3. 8th Division
4. 14th Division
5. 187th Brigade
1. Use this list
2. Add units
3. Delete Units
Unit
Name:
SRC :
System to be Replaced
Name:
LIN :
Confirm (y/n)
Add another? (y/n)

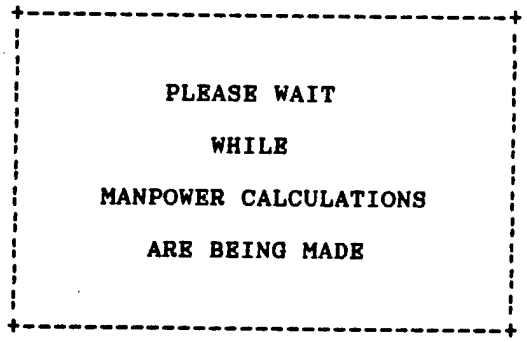

PLEASE WAIT
WHILE
MANPOWER CALCULATIONS
ARE BEING MADE

Figure 3.5-5

3.6 STEP 5: SELECTION OF UNITS WITHOUT BASELINE SYSTEM

This step is only applicable if the user has elected to add units (without the baseline) and identified additional weapon systems to be replaced. In this case, the system must go back and repeat the manpower calculations for the additional units and systems. The User Interface Diagram at Figure 3.6-1 shows where the system would be reentered and which steps would be repeated. Steps 2, 3, and 4 contain details on these operations.

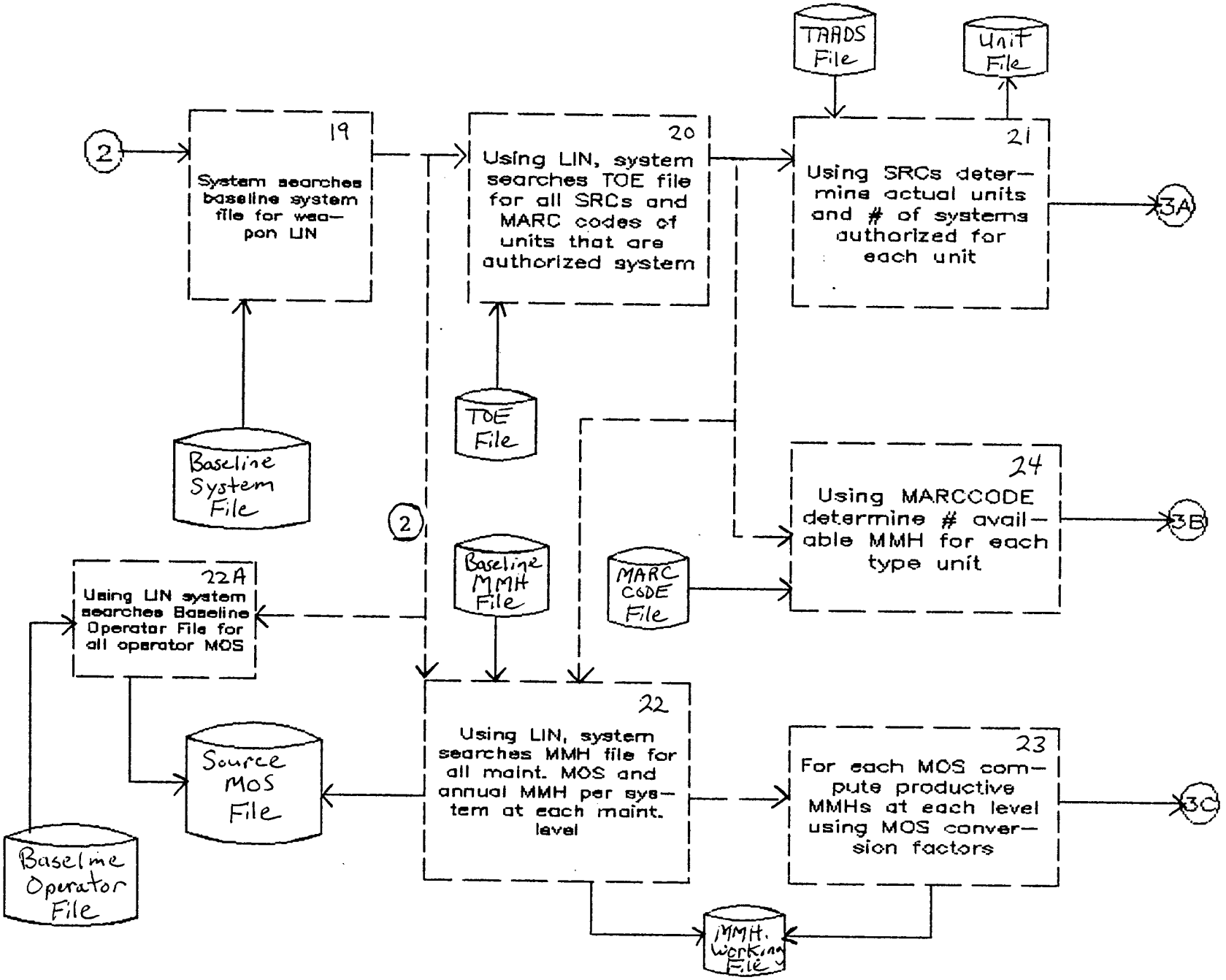


Figure 3.6.1. Step 5 Units Without Baseline System

3.7 STEP 6: MANPOWER CONSTRAINTS DETERMINATION

In this step, manpower constraints are computed in terms of per system. If there is not a one-for-one replacement of the baseline system, the user has the option of specifying system density for the new system. In addition, maintenance manpower requirements are computed for MOS that would be dedicated to the new system, as opposed to those MOS that would support more than one system.

3.7.1 Output

The output from this step will be maximum operators (by grade) available per system and maximum direct productive maintenance manhours available per system. This information will be entered into the Manpower Constraint File. In addition, the maximum maintenance manpower requirements for system specific MOS will be computed and entered into the System Specific Maintenance File.

3.7.2 Input

External Input. None.

Internal Input. Total operator strength by grade is obtained from the Baseline Operator File. Total direct productive maintenance manhours and system density are obtained from the Manpower Constraint File. The only user input in this step is an option to enter an estimated system density for the new system.

3.7.3 Process

Using total operator and maintenance manpower available and system density, constraints are calculated on a per system basis.

3.7.4 User Interface Diagram

Figure 3.7-1 displays the User Interface Diagram for Step 6. Listed below are descriptions of the screens, files, algorithms, and output associated with each numbered block.

(33) In this step, MCEA computes maximum operator manpower available (by grade). Information on operator strength by grade is obtained from the Baseline Operator File. The results of the computation are then entered into the Manpower Constraint File.

(34) In this step, MCEA sums the MMHs from step 27 and enters the result into the Manpower Constraint File.

(35) In this step, MCEA computes maintenance manpower requirements (for a detailed explanation of the algorithm used (see page 125) for different types of units. These calculations would be very useful if the decision were made to provide system specific maintainers for the new system. This calculation will be made for each maintenance level and for each MOS. Results will be stored in the System Specific Maintenance File (described on page 121).

(36) See Figure 3.7-2. In this step, the user has the option of specifying the number of new systems to be

fielded. The default will be a one-for-one replacement of the baseline system(s).

(37) Using the number of new systems to be fielded, MCEA computes the maximum crew size and the maximum direct productive MMHs available per system (computations are explained on page 123). The results are stored in the Manpower Constraint File.

3.7.5 Screens

There is one screen associated with this step. It is shown below as Figure 3.7-2.

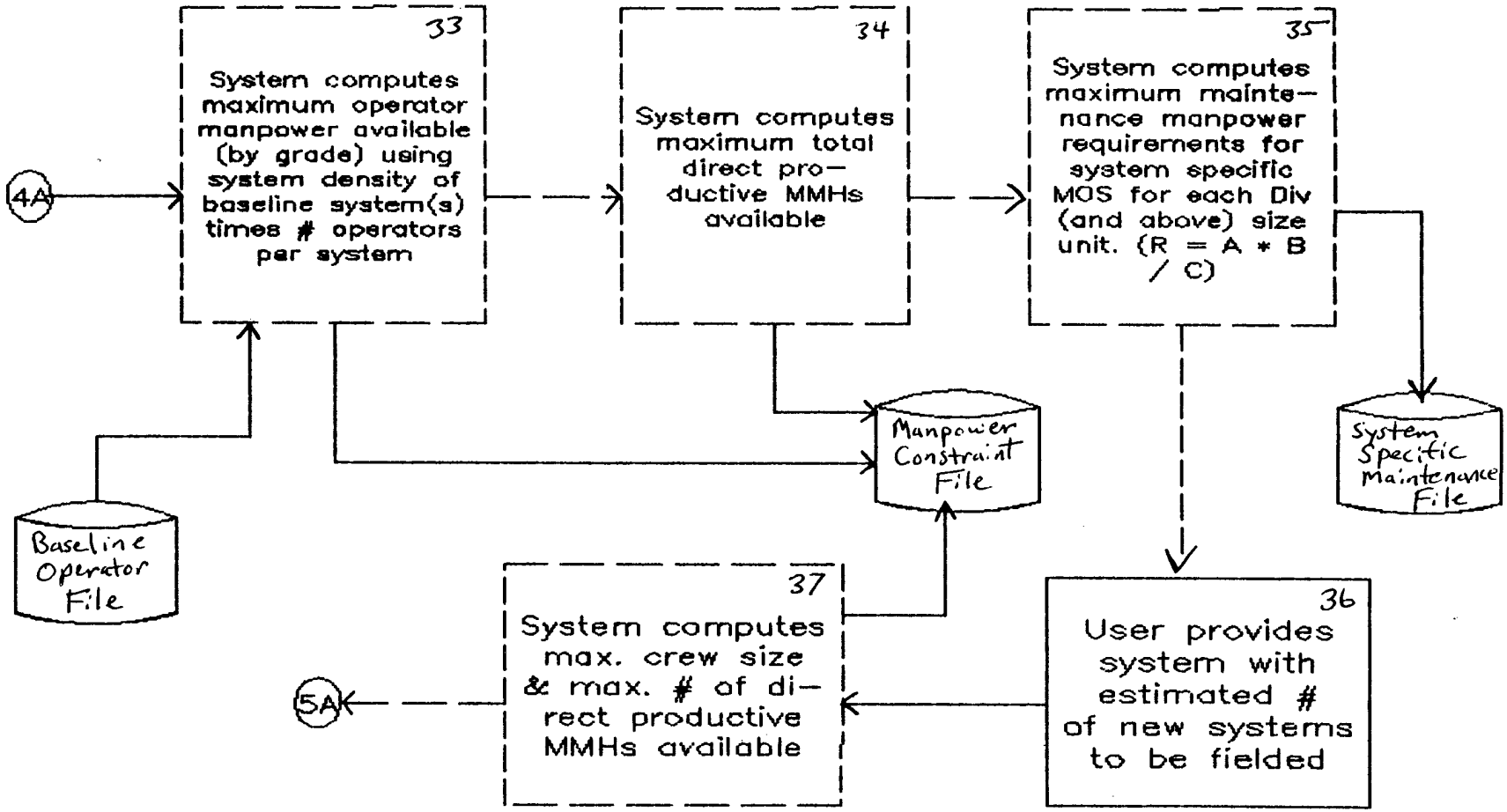


Figure 3.7.1. Step 6 Manpower Constraints

PATH: MCEA>DENSITY

MODE: WORK

```
+-----------------------------------------------+
|                SYSTEM DENSITY                 |
+-----------------------------------------------+
|                                               |
|  The default system density for the new system|
|  is a one-for-one replacement of the baseline |
|  system(s).                                   |
|                                               |
|        Default:                               |
|                                               |
|  If you want a different system density for   |
|  the new system enter the estimated number of |
|  new systems to be feilded.                   |
|                                               |
|        Estimate:                              |
|                                               |
|  Leave the estimate field blank and press the |
|  Enter key to accept the default density.     |
|                                               |
+-----------------------------------------------+
```

PATH: MCEA>DENSITY>CALC

MODE: WAIT

```
+-------------------------------+
|                               |
|          PLEASE WAIT          |
|                               |
|            WHILE              |
|                               |
|  SYSTEM DENSITY CALCULATIONS  |
|                               |
|          ARE BEING MADE       |
|                               |
+-------------------------------+
```

Figure 3.7-2

3.8 STEP 7: MANPOWER REQUIREMENTS ESTIMATION

This step provides the user with an option to enter alternative estimates on crew size and maintenance manpower for the new system. He may also examine the impact of not having a particular MOS available.

3.8.1 Output

New manpower requirements will be provided by the user. These would be used to assess the impact on overall manpower availability.

3.8.2 Input

External Input. None.

Internal Input. The user will provide crew size, direct productive maintenance manhours and/or MOS not available.

3.8.3 Process

This is an optional assessment of overall manpower impacts if the user is forced to accept given requirements. This step allows the user to input the given requirements and the system will compute the impact.

3.8.4 User Interface Diagram

Figure 3.8-1 displays the User Interface Diagram for Step 7. Listed below are descriptions of the screens, files, algorithms, and output associated with each numbered block.

(43) See Figure 3.8-2. In this step, the user is asked if he wants to compare manpower estimates obtained from other sources with the constraints generated by the MCEA. This could be part of a "what if" drill or an analysis of external constraints.

(44) See Figure 3.8-2. The user inputs operator and/or maintenance manpower values which will be compared to the MCEA values.

3.8.5 Screens

There is one screen associated with this step. It is shown as Figure 3.8-2.

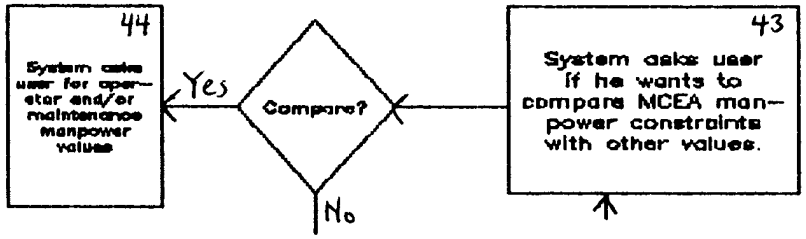


Figure 3.8.1. Step 7 User Requirements

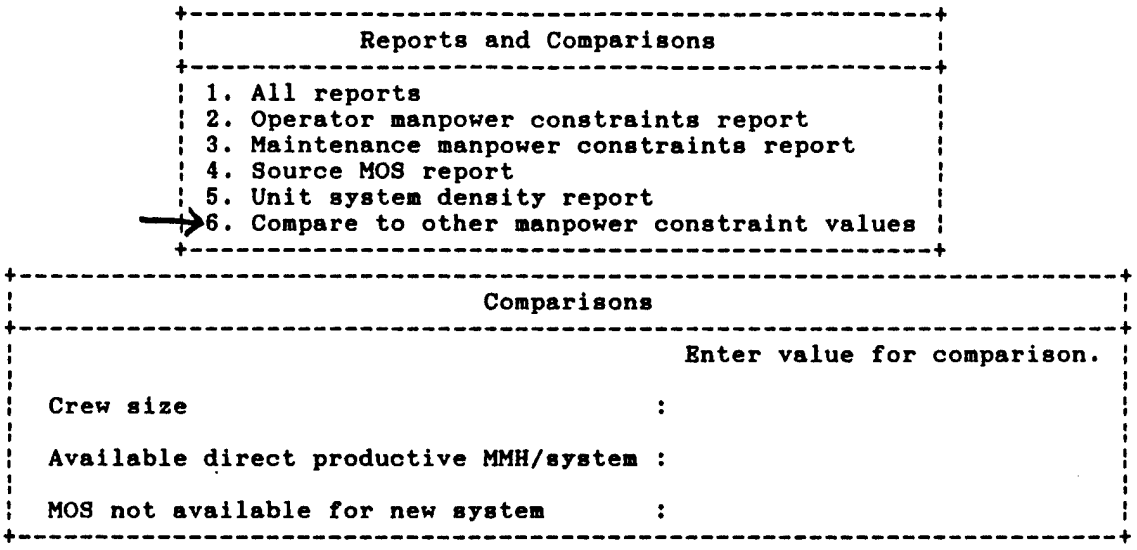

Reports and Comparisons
1. All reports
2. Operator manpower constraints report
3. Maintenance manpower constraints report
4. Source MOS report
5. Unit system density report
6. Compare to other manpower constraint values
Comparisons
Enter value for comparison.
Crew size :
Available direct productive MMH/system :
MOS not available for new system :

Figure 3.8-2

3.9 STEP 8: COMPARISON OF CONSTRAINTS AND REQUIREMENTS

In this step, the system computes the manpower impact of the user defined requirements entered in Step 7.

3.9.1 Output

The output from this step is the Overall Manpower Impact Report (see Figure 3.9-2).

3.9.2 Input

External Input. None.

Internal Input. User constraints entered in Step 7 are compared with those manpower constraints computed in Step 6.

3.9.3 Process

The system compares the constraints given by the user with those generated by the MCEA and calculates an overall manpower impact that is presented as one of the reports.

3.9.4 User Interface Diagram

Figure 3.9-1 displays the User Interface Diagram for Step 8. Listed below are descriptions of the screens, files, algorithms, and output associated with each numbered block.

(45) The MCEA calculates the differences and determines the impact. See page 126 for how calculations are made.

(46) See Figure 3.9-2. The report becomes an addition to the reports requested previously.

(47) After the reports are generated, the MCEA takes the user back to the start at Step 1.

3.9.5 Screens

There is one screen associated with this step. It is shown as Figure 3.9-2.

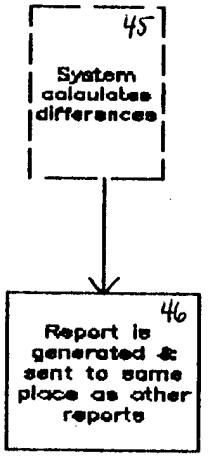


Figure 3.9.1. Step 8 Comparison of Constraints and Requirements

PATH: MCEA>REPORTS>OMI MODE: WORK

OVERALL MANPOWER IMPACT REPORT		
System Name:	Density:	
MOS		
You specified MOS as not being available to man the new system	:	
This equates to	:	MMHs maint. personnel
which is of the baseline system	:	%

PATH: MCEA>REPORTS>OMI MODE: WORK

OVERALL MANPOWER IMPACT REPORT		
System Name:	Density:	
MAINTAINERS		
Maximum direct productive maintenance manhours per system available as specified by MCEA	:	
You specification was	:	
This equates to an overall (shortage/overage) of	:	MMHs maint. personnel

PATH: MCEA>REPORTS>OMI MODE: WORK

OVERALL MANPOWER IMPACT REPORT		
System Name:	Density:	
OPERATORS		
Maximum crew size specified by MCEA was	:	
You specified crew size as	:	
Total operator manpower (shortage/overage) is	:	
which equates to	:	systems unmanned mannable systems

Figure 3.9-2

3.10 STEP 9: REPORTS

This is the final step in the MCEA process. It provides the user with an option of selecting reports.

3.10.1 Output

There are four output reports the user can review on the monitor and/or print hard copies.

3.10.2 Input

External Input. None.

Internal Input. The Manpower Constraint File, Source MOS File, Unit File, and System Specific Maintenance File provide information to the report generator.

3.10.3 Process

The user has the option of choosing which, if any, reports are generated and displayed. Depending on the reports selected, the appropriate files will be queried.

3.10.4 User Interface Diagram

Figure 3.10-1 displays the User Interface Diagram for Step 9. Listed below are descriptions of the screens, files, algorithms, and output associated with each numbered block.

(38) See Figure 3.10-2. The MCEA asks the user if he wants to see reports.

(39) The MCEA returns to the start at Block 1.

(40) See Figure 3.10-2. A menu of output reports is presented to the user.

(41) See Figure 3.10-3. The user has the option of where he wants the reports sent.

(42) Reports are generated using the files shown. See Figures 3.10-4 through 3.10-7.

3.10.5 Screens

There are six screens associated with this step. They are displayed as Figures 3.10-2 through 3.10-7.

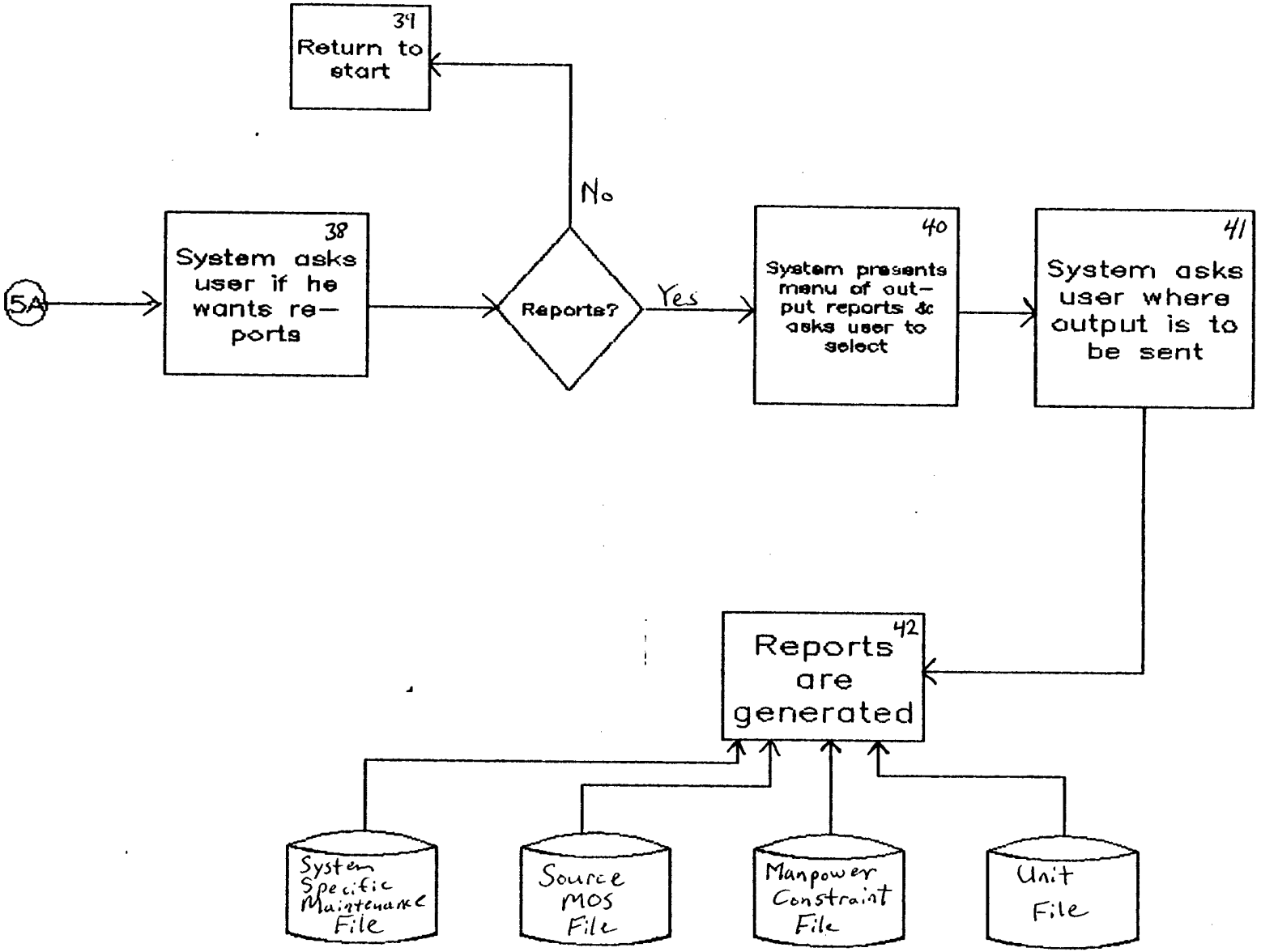


Figure 3.10.1. Step 9 Reports

Reports and Comparisons
1. All reports 2. Operator manpower constraints report 3. Maintenance manpower constraints report 4. Source MOS report 5. Unit system density report 6. Compare to other manpower constraint values

Figure 3.10-2

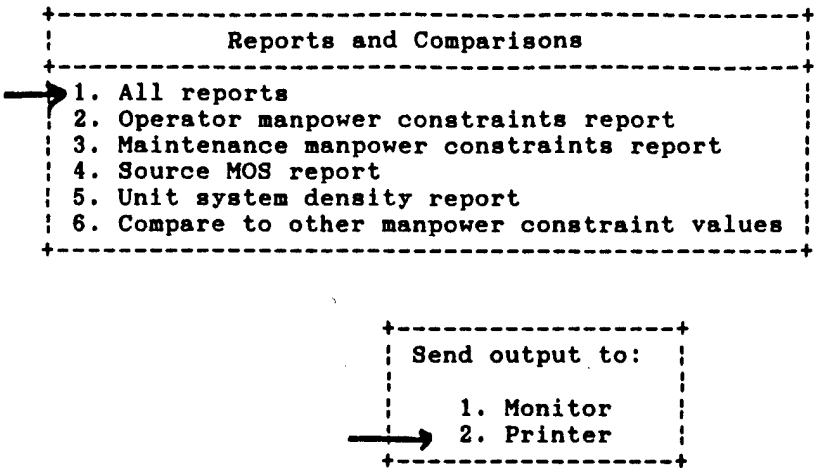

Reports and Comparisons
1. All reports
2. Operator manpower constraints report
3. Maintenance manpower constraints report
4. Source MOS report
5. Unit system density report
6. Compare to other manpower constraint values
Send output to:
1. Monitor
2. Printer

Figure 3.10-3

OPERATOR MANPOWER CONSTRAINTS REPORT

System Name: Zapper | Density: 400

Maximum number of operators available by skill level

Level	Max#	Level	Max#	Level	Max#	Level	Max#	Level	Max#
2	1								
3	1								

Maximum Crew Size: 2 | Maximum number of operators available: 800

Baseline Systems Used	Baseline System Density
Stinger	400

Figure 3.10-4

MAINTENANCE MANPOWER CONSTRAINTS REPORT

System Name: Zapper | Density: 400

Total number of direct maintenance manhours available:	Unit	DS	GS
by maintenance level	0	0	400
per system	0	0	1

Baseline Systems Used	Density
Stinger	400

Maintenance manpower requirements per system by skill level

Skill Level	Unit	DS	GS
3	0	0	.25

Figure 3.10-5

SOURCE MOS REPORT

System Name: Zapper | Density: 400

Number of operators available by MOS

MOS	Available	MOS	Available
16S	800		

Number of MMH available by MOS

MOS	Available	MOS	Available
55B	100		

Baseline Systems Used	Baseline System Density
Stinger	400

Figure 3.10-6

UNIT SYSTEM DENSITY REPORT

System Name: Zapper | Density: 400

Units to receive new system	Baseline system density	New system density
1. 1st Division	80	80
2. 2nd Division	80	80
3. 8th Division	100	100
4. 14th Division	100	100
5. 187th Brigade	40	40

Figure 3.10-7

SECTION 4.0 - DATA FLOW DIAGRAMS

The purpose of the data flow diagrams is to indicate the flow of data between the user, internal and external data files, and the various routines of the MCEA programs. The data flow diagrams are for use by programmers who will convert them into user interfaces and file access, data retrieval, and data manipulation routines.

The data flow diagrams (in Figures 4.0-1 through 4.0-6) are presented in a hierarchical arrangement, starting with a system overview and moving to diagrams which show detailed flows of data. In keeping with the hierarchical nature of the diagrams, a numbering system is used to show the level of detail of the diagrams. The first four diagrams are at a macro level and show the overall architecture of the MCEA data flow. They are labeled by name only. On the macro-level flows, the nodes which correspond to the steps listed in the MCEA concept paper are labeled in a two-digit format (e.g., 1.1, 1.2, etc.). Subsequent flow diagrams continue the numbering scheme, continuing from 1.1 through 1.5. For each of these steps, more detailed diagrams will be developed. They will be numbered using a three-digit format (e.g., 1.1.1, 1.5.1, etc.). It is at this level that the greatest degree of detail will be shown. On these diagrams, the existence of a data flow between a part of the system and the user implies the existence of a user interface (i.e., interactive screen).

There are four symbols used on the data flow diagrams. The first is the rectangle. The rectangle indicates a "source" or a "sink." The rectangles may represent sources external to the MCEA program (e.g., user, Mission Area Analyses, etc.) or internal to the program (e.g., dbms storage and retrieval routines). The second symbol is the circle which represents "transforms" or actions which are performed on or with data. The third symbol is the double underline which, when placed beneath a file name, indicates a data storage area. The final symbol is the arrow, representing the flow of data.

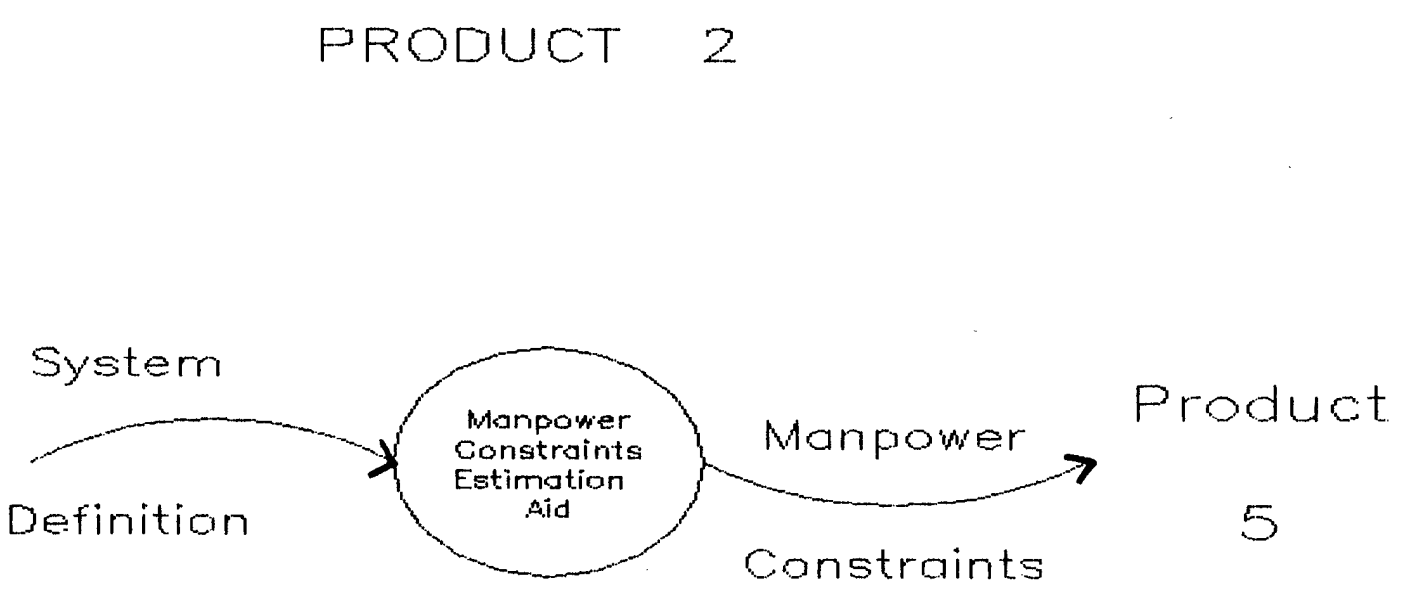


Figure 4.0-1. MCEA Data Flow Diagram

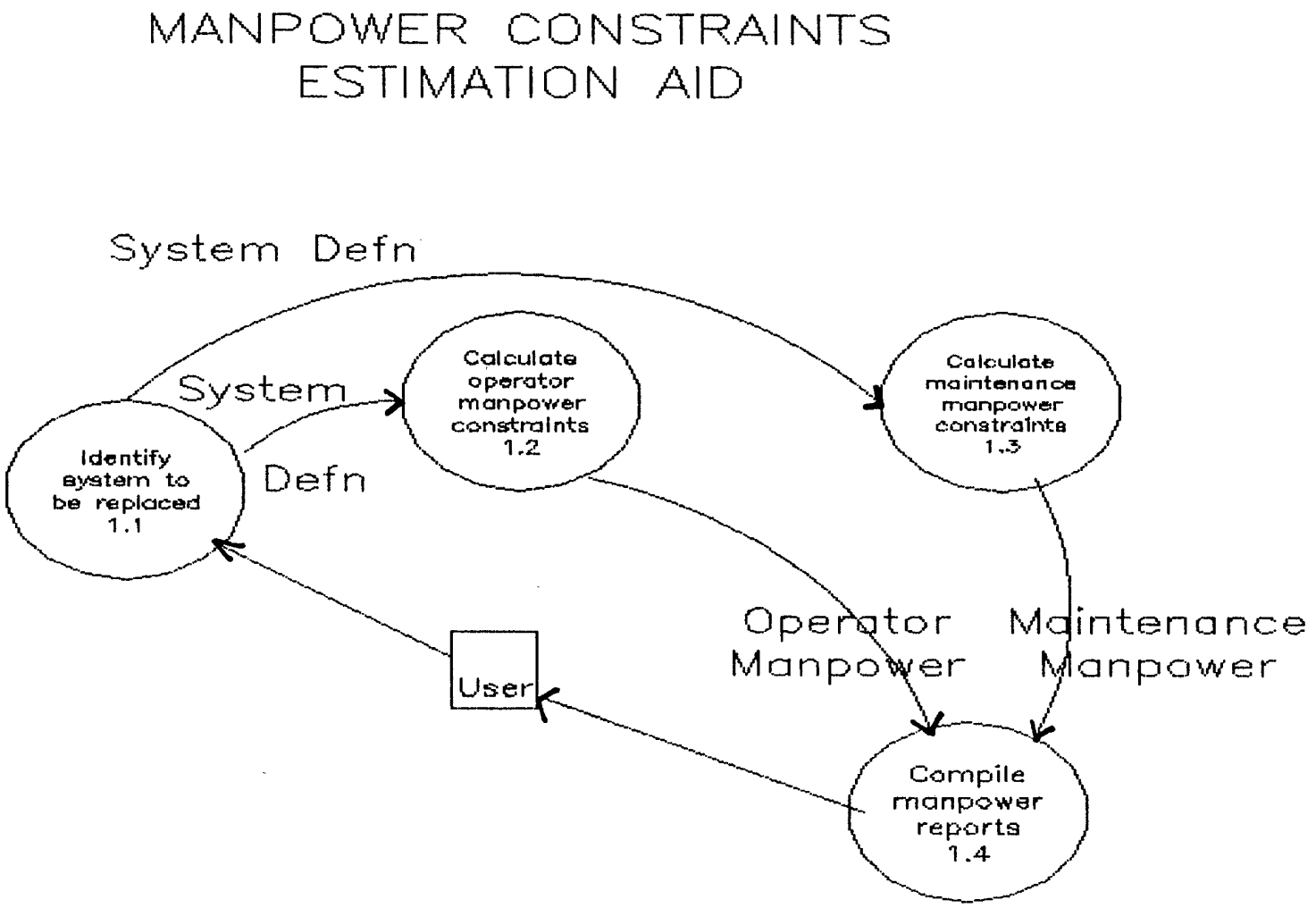


Figure 4.0-2. MCEA Data Flow Diagram

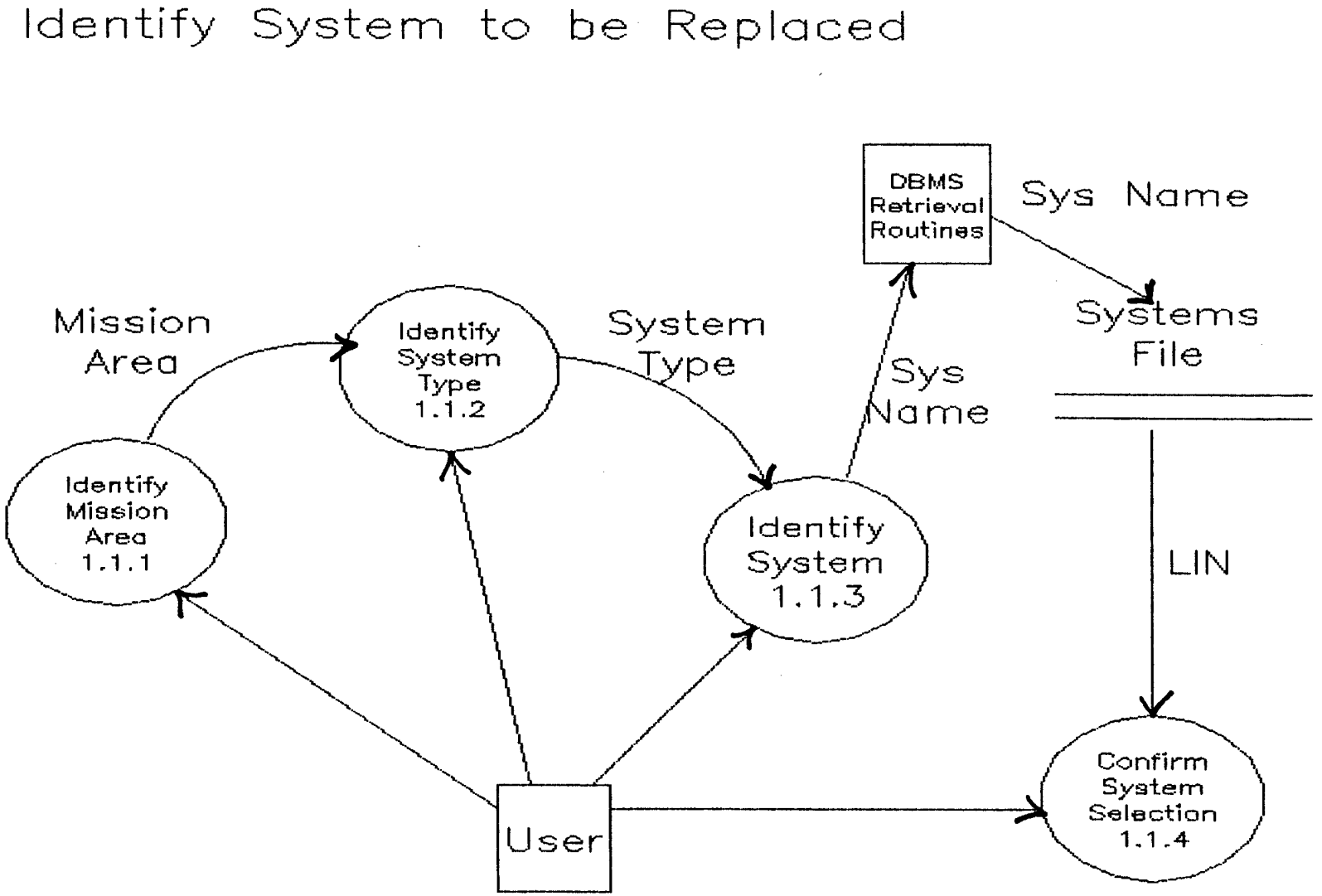


Figure 4.0-3. MCEA Data Flow Diagram

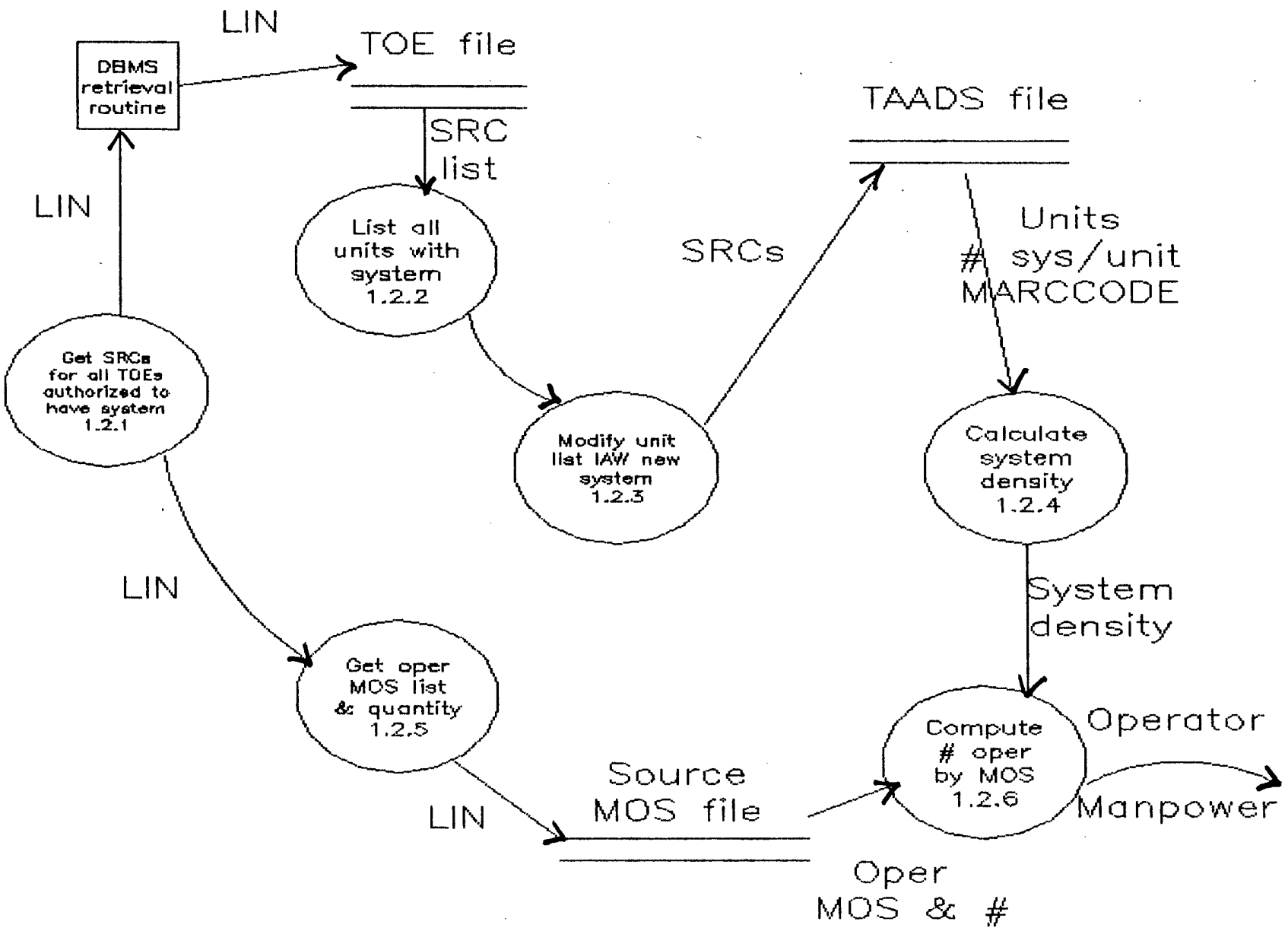


Figure 4.0-4. MCEA Data Flow Diagram

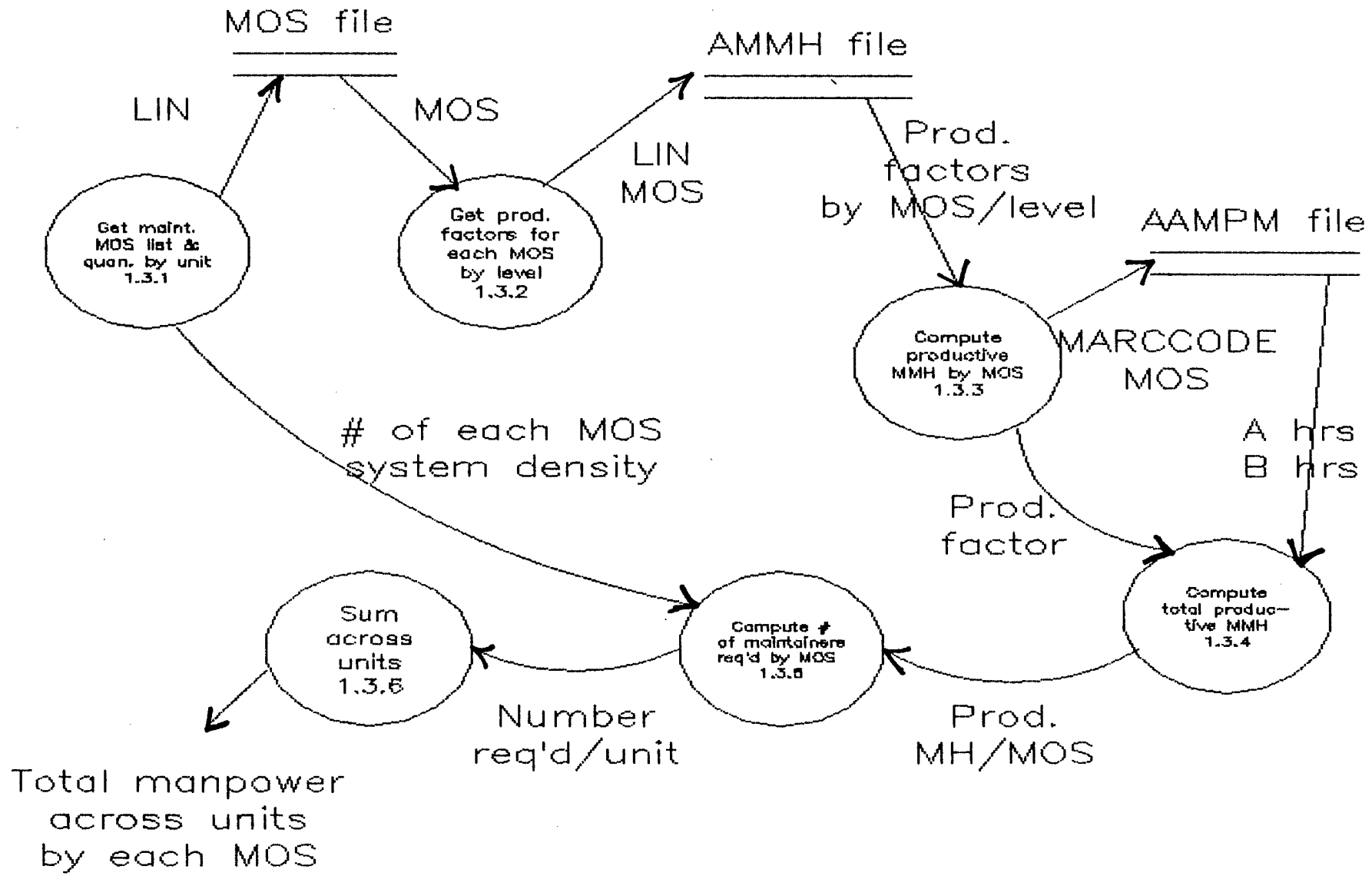


Figure 4.0-5. MCEA Data Flow Diagram

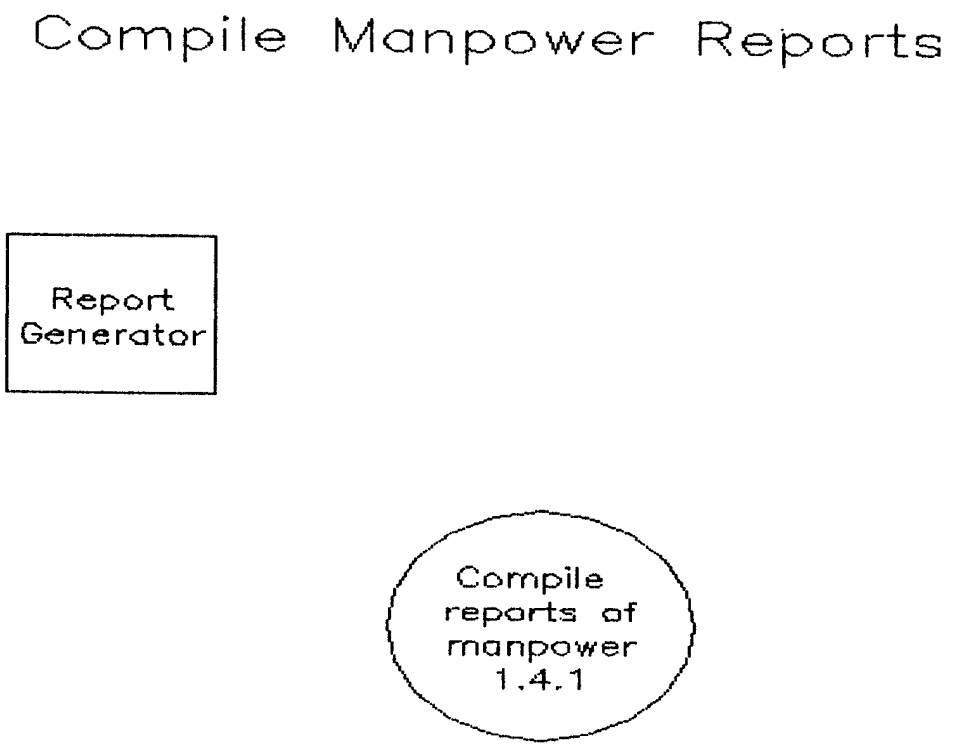


Figure 4.0-6. MCEA Data Flow Diagram

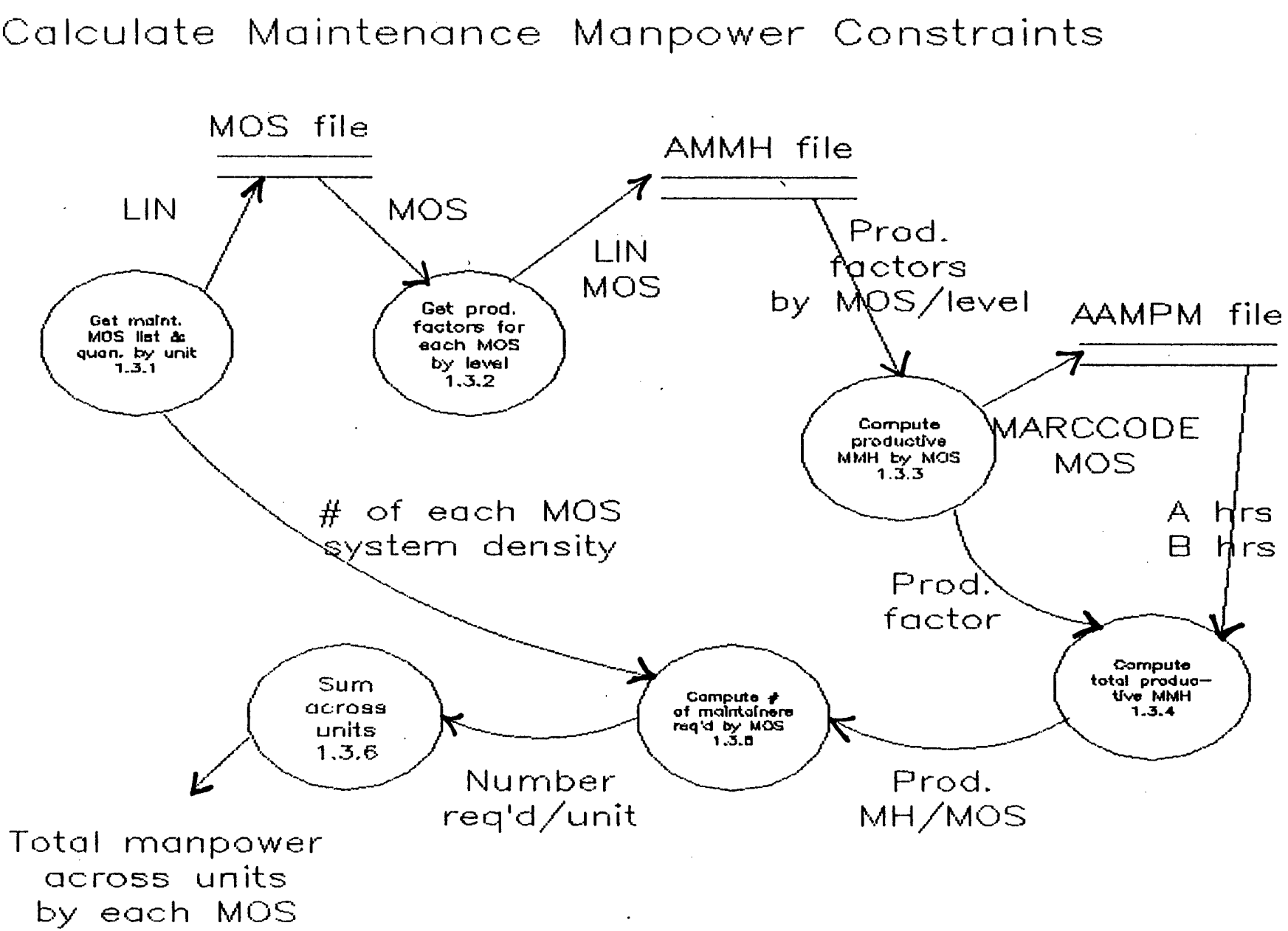


Figure 4.0-5. MCEA Data Flow Diagram

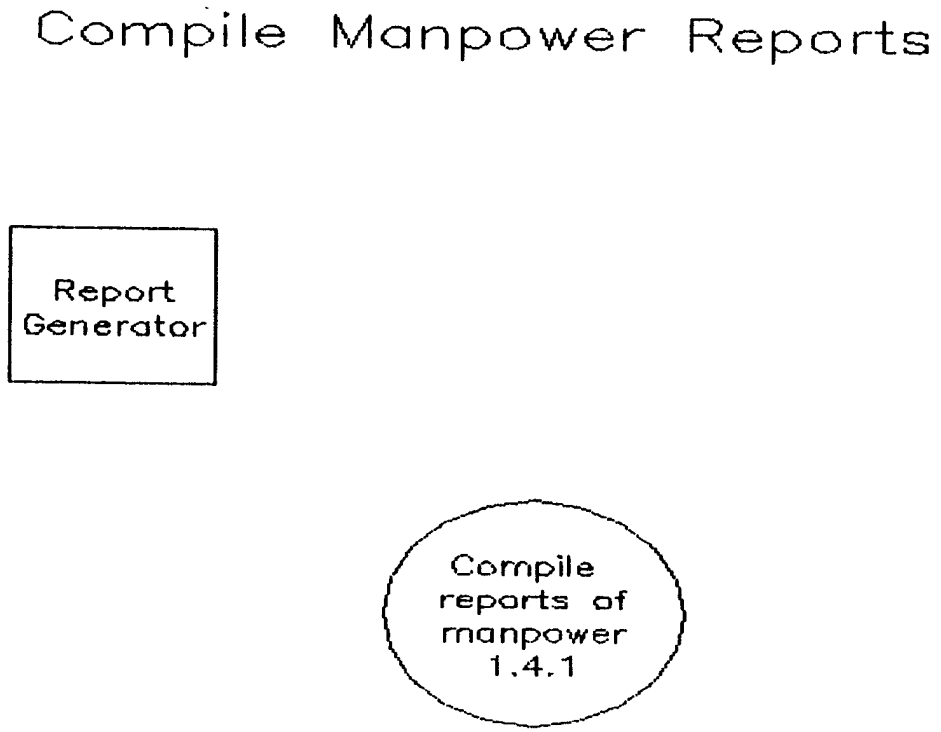


Figure 4.0-6. MCEA Data Flow Diagram

SECTION 5.0 - DESCRIPTION OF LIBRARIES

5.1 OVERVIEW

The library files for the MCEA contain data that require periodic updating. During the MCEA process, library extracts feed into input files that are used to compute the manpower constraints. The MCEA has five libraries (described in detail in the next section). All of the MCEA libraries depend on external data sources for their content. Periodically, the user will be required to update the libraries. The frequency will depend on expected changes within the external data sources and accessibility to those data. The accessibility issue will have to be addressed with the proponents responsible for maintaining the external data bases. (See discussion Below).

5.2 DESCRIPTION OF LIBRARY FILE STRUCTURE AND DATA

5.2.1 MARC Data Library

Figure 5.2-1 shows the file structure of the MARC Data Library. The data in this library are extracted from the Army MARC Maintenance Data Base (AMMDB) that the U.S. Army Logistics Center (ATCL-FO) distributes. Figures 5.2-2 and Table 5.2-1 show a description of the AMMDB File and an example of the data. We only show an example of the data because the file is quite long. A complete copy of the file is on DRC's VAX 11/780 computer and is available for examination upon request. MARC data for the baseline systems are shown at Appendix D. The AMMDB

FILE ID: MARC Data Library

DESCRIPTION: For each system lists LIN, each maintenance MOS (MAMOS), and the associated maintenance man hours spent at each level of maintenance (UNIT, DS&GS).

RECORD 1	DESCRIPTION	LENGTH	DATA TYPE
FIELD 1	File ID	30	Alphanumeric
FIELD 2	System Name	50	Alphanumeric
FIELD 3	LIN	6	Alphanumeric
RECORD 2			
FIELD 1	MAMOS (1)	10	Alphanumeric
FIELD 2	UNITHRS (1)	6	Numeric
FIELD 3	DSHRS (1)	6	Numeric
FIELD 4	GSHRS (1)	6	Numeric
RECORD 3			
FIELD 1	MAMOS (2)	10	Alphanumeric
FIELD 2	UNITHRS (2)	6	Numeric

ESTIMATED NUMBER OF RECORDS = 20,800

FIXED OR VARIABLE FILE LENGTH = V

Figure 5.2-1

ARMY MARC MAINTENANCE DATA BASE (AMMDB) FILE DESCRIPTION

Col 1 LIN: The LIN are listed in Chapter 2 and 4 of SB 700-20.

Col 2 MOS: The MOS/ASI code obtained from AR 611-201.

Special Codes used in-lieu-of MOS

AAA - Operator or No Maintenance Required
AAC - Total Contract Support
AAD - Total Depot Support
AXX - Maintenance Workload Data Unknown

Col 3 Unit/AVUM Hours: Indicates AMMH. See Remarks Below.

Col 4 IDS/AVIM Hours: Indicates AMMH. See Remarks Below.

Col 5 IDS/SRA Hours: Indicates AMMH. See Remarks Below.

Col 6 Nomenclature: Self Explanatory.

Col 7 Authority Codes: Where MARC data was derived.

Code	Definition
A	DA Approved - Improved MARC
B	DA Approved - Interim MARC
C	DA Approved - MACRIT (Before January 1985)
F	QQPRI Hours - Principal item (Final)
M	MRSA Hours - Adjusted from MRSA MARC File
R	AMMH Unknown - Maintenance Workload Unknown
S	Estimated - Like Item
W	Estimated - Proponent School/Center
Z	No DPAMMH - No Maintenance Required

Col 8 Date of update: This date is used when a change or verification is made to LIN (850101 indicates no data or known bad data).

Col 9 Notes: Used to Describe MOS/Manhours.

Code	Description
BT	Base Maintenance Team
MT	Maintenance Support Team
BA	Notes BT and 10 apply
MA	Notes MT and 10 apply
EG	Base Maintenance Support
EJ	On Site Missile Support

Figure 5.2-2

Code	Description
10	Patriot Intermediate Maintenance
11	Maintenance performed by either MOS 45S or 45N
12	Maintenance performed by any CMF 67 MOS
13	Item has AMMH of less than .1 hours
14	For calculation of aircraft manpower use the Aircraft Interim MARC study approved May 1985
15	SRA Support Maintenance no IGS Maintenance required
16	Correct MOS has not been established
17	Maintenance performed by any 33P, Q, M, R, T, as appropriate
18	Use MOS 31V hours to determine 96F requirements
19	Maintenance performed by any 63E, N, T, Y, as appropriate
20	Maintenance performed by either MOS 29F or 29G

Col 10 Maintenance Repair Codes: Listed in AMDF (27 May 1986).

Code	Definition
B	Operator Maintenance only
O	Unit Maintenance only
F	Direct Support Maintenance and below
H	General Support Maintenance and below
D	Depot Maintenance and below
L	Specialized Repair Activities and below
Z	No Maintenance required
-	Not assigned a Maintenance code

Remarks:

The AMMDB Contains Annual Maintenance Manhours (AMMH). In rder to conver these hours to Direct Production Annual Maintenance Manhours (DPAMMH), it is necessary to remove the Indirect Production Time (IPT) accomplished by dividing the AMMH listed in the data base, for a particular LIN, by the Indirect Productive Time (IPT) factors. The IPT factors are as follows:

Figure 5.2-2. (Continued)

Table 5.2-1. Army MARC Maintenance Data Base (AMMDB) Nomenclature

UPDATED SEP 1986 LIN	MCS	UNITA AVUM	ARMY MARC (AINTENANCE DATA BASE (AMMDB) IOS/ AVIM	IOS/ SRA	NOMENCLATURE	ANNUAL MAINTENANCE MANHOU S AUTH	DATE OF UPDATE	NOTE	RC
L36405	930	221.1	973.0	1514.0	LANDING CONTROL CENTRAL: AN/TSQ-72 LESS POW	C	850420		J
L95939	930	2.8	22.0	0.0	MAINTENANCE ACCESSORY: MK-1172/ARM	C	850209		J
M01374	930	0.0	16.8	0.0	MAINTENANCE KIT ELECTRONIC EQUIPMENT: MK-72	M	860410		J
M01511	930	0.0	12.6	0.0	MAINTENANCE KIT ELECTRONIC EQUIPMENT: MK-73	M	860410		
M02036	930	2.8	49.6	0.0	MAINTENANCE KIT ELECTRONIC EQUIPMENT: MK-10	C	850204		
M02041	930	0.0	0.0	24.4	MAINTENANCE KIT ELECTRONIC EQUIPMENT: MK-11	M	860410		4
M36191	930	156.2	24.8	0.0	METEOROLOGICAL DISPLAY CONSOLE: GA-2034/FSM	C	850326		J
P40374	930	0.0	28.0	0.0	POWER SUPPLY: PP-3940/G	C	850101		D
Q13817	930	233.8	0.0	0.0	RADAR DATA GROUND RECEIVING SET: AN/TKQ-2 L	F	850905		D
Q13975	930	0.0	11.9	0.0	RADAR SET: AN/APR-9B LESS POWER	C	850101		D
Q14318	930	127.4	78.4	0.0	RADAR SET: AN/FPN-33	M	860415		
Q14455	930	84.0	56.0	48.8	RADAR SET: AN/FPN-40	M	860415		
Q17058	930	0.0	0.0	0.0	RADAR SET: AN/TPN-8 LESS POWER	C	850905		J
Q18667	930	810.0	865.2	0.0	RADAR SYSTEM: AN/FSQ-84	F	850905		J
Q23692	930	0.0	112.0	0.0	RADIO RECEIVING SET: AN/ARQ-28	M	850228		F
Q25019	930	0.0	115.4	0.0	RADIO SET: AN/ARC-54	C	850224		4
Q25567	930	0.0	98.8	0.0	RADIO SET: AN/ARC-73	C	850209		J
Q25978	930	0.0	138.5	0.0	RADIO SET: AN/ARC-102	C	851231		4
Q25992	930	0.0	19.3	0.0	RADIO SET: AN/ARC-116	C	850209		J
Q41955	930	0.0	2.7	0.0	RADIO SET: AN/URC-4	F	850101		D
Q42092	930	0.0	2.7	0.0	RADIO SET: AN/URC-10	C	850101		J
Q42297	930	0.0	25.6	0.0	RADIO SET: AN/URC-68	M	860415		J
R21284	930	0.0	9.7	0.0	RECEIVER RADIO: AN/GRR-23	C	850209		D
R21285	930	0.0	9.7	0.0	RECEIVER RADIO: AN/GRR-24	C	850209		J
R21353	930	0.0	52.5	0.0	RECEIVER RADIO: AN/URR-35A	C	850209		Z
R29906	930	0.0	112.0	0.0	RECEIVER-TELETYPEWRITER SET RADIO: AN/FRR-7	C	850209		D
R38316	930	0.0	5.5	0.0	RECEIVING SET RADIO: AN/GRR-7	C	850209		
R39684	930	0.0	11.1	0.0	RECEIVING SET RADIO: R-511/ARC	C	850209		4
R83677	930	0.0	6.9	0.0	REPRODUCER CONVERTER TEST SET: AN/ASM-365	C	850209		4
T39551	930	12.6	0.0	0.0	TEST SET RECEIVER: AN/ARM-1801	M	850827		
T96851	930	0.0	6.9	0.0	SOUND RECORDER SET: AN/ASR-2B	C	851231		4
T96913	930	0.0	9.8	0.0	SOUND REPRODUCER SET: AN/ASH-2B	M	860421		D
V61444	930	0.0	2.8	0.0	TEST FACILITIES KIT: MK-994/AR	M	860423		D
V61446	930	0.0	28.0	0.0	TEST FACILITIES KIT: MK-1191/AM	M	860423		D
V62068	930	2.8	16.8	0.0	TEST HARNESS RADIO SET: AN/URM-127	M	860423		D
V63538	930	0.0	1.4	0.0	TEST SET ANTENNA: AN/ARM-135	M	860423		D
V67203	930	0.0	12.6	0.0	TEST SET AUDIO: TS-1588/AIC	M	860423		
V69862	930	0.0	2.8	0.0	TEST SET BENCH FLIGHT CONTROL SET: AN/ASM-4	M	860423		
V76466	930	0.0	12.6	0.0	TEST SET ELECTRONIC CIRCUIT PLUG-IN UNIT: A	M	860423		D
V86784	930	0.0	14.0	0.0	TEST SET RADIO: AN/ARM-45	M	860424		
V87342	930	0.0	42.0	0.0	TEST SET RADIO: AN/ARM-68	M	860424		Z
V92171	930	0.0	4.2	0.0	TEST SET SIGNAL CONVERTER: AN/ASM-410	M	860424		D
X19074	930	0.0	222.6	0.0	TRANSMITTING SET RADIO: AN/ART44	M	850424		D
X20307	930	0.0	4657.7	0.0	TRANSMITTING SET RADIO: AN/GRT23	C	850209		D
Z35256	930	12.3	53.0	0.0	JTMLS GROUND SUBSYSTEM:	F	850821		F
Z52435	930	140.0	112.0	98.0	RADAR SET: AN/TPN-18	F	850821		D
A62273	93FM1	2.9	0.0	0.0	ANEMOMETER: ML-463/PM	C	850118		D
C73685	93FM1	18.5	0.0	0.0	CALIBRATOR FREQUENCY: TS-99/FMQ-1	W	850204		D
J31590	93FM1	201.7	0.0	0.0	GENERATOR SET HYDROGEN: AN/TMQ-3	C	850118		
M04941	93FM1	514.5	0.0	0.0	METEOROLOGICAL DATA SYSTEM: AN/TMQ-31	F	851122		
M36739	93FM1	10.4	0.0	0.0	METEOROLOGICAL STATION MANUAL: AN/TMQ-4	C	850101		D
R16478	93FM1	259.4	0.0	0.0	RAWIN SET: AN/GMD-1	C	850118		
R50043	93FM1	31.9	0.0	0.0	RECORDING SET WEATHER DATA: AN/TMQ-5	C	850118		J
V88438	93FM1	32.9	0.0	0.0	TEST SET RADIO: TS-938/U	C	850118		J
W06742	93FM1	10.4	0.0	0.0	THEODOLITE DOUBLE CENTER: ML-474/GM	C	850118		D
W09434	93FM1	11.3	0.0	0.0	THERMOGRAPH: ML-477	C	850118		H
Y54401	93FM1	129.6	0.0	0.0	WIND MEASURING SET: AN/GMW-1B	W	850101		D
L60158	96D	35.0	0.0	0.0	LIGHT ASSEMBLY ELECTRIC: MX-1291/PAQ	M	860409		L
A23058	96H	231.0	0.0	0.0	AIRBORNE DATA ANNOTATION SYSTEM: AN/AYA-10	M	860215		Z
A30271	96H	0.0	0.0	0.0	AIRPLANE OBSERVATION STOL: OV-1C	B	850827	14	Z
A30296	96H	4157.0	0.0	0.0	AIRPLANE OBSERVATION STOL: OV-1D	C	850118		D
C61218	96H	5.6	0.0	0.0	CABLE ASSEMBLY SET ELECTRICAL: MX-8408/AAS-	M	850824		D
Q13862	96H	134.-	0.0	0.0	RADAR DATA TRANSMITTING SET: AN/AKT-18 LESS	F	850101		D
Z76734	96H	280.3	0.0	0.0	SURVEILLANCE TARGET ATTACK RADAR SUBSYSTEM:	F	851027		
Z76737	96H	284.5	0.0	0.0	SURVEILLANCE TARGET ATTACK RADAR SUBSY (JOI	F	851027		
E56851	96H1F	1379.0	0.0	0.0	COMBAT SURVEILLANCE SET: AN/APS-94	M	860402		
G01940	96H1F	575.4	0.0	0.0	DETECTING SET INFRARED: AN/AAS-24	M	860403		D
Q13817	96HF1	124.2	0.0	0.0	RADAR DATA GROUND RECEIVING SET: AN/TKQ-2 L	M	850204		D
U68036	96HF1	810.0	0.0	0.0	SURVEILLANCE INFORMATION CENTER (INFRARED: A	M	850204		
A19073	96R	30.4	0.0	0.0	ANTENNA GROUP: OE-239/GSQ	F	860708		Z
A01878	AAA	0.0	0.0	0.0	ACCESSORY KIT: MK-1267/V F/AN/VRC-44 48 IN	Z	850521		
A01879	AAA	0.0	0.0	0.0	ACCESSORY KIT: MK-1268/V F/AN/VRC-45 49 IN	Z	850521		J
A01882	AAA	0.0	0.0	0.0	ACCESSORY KIT: MK-1271/VIC-1 FOR USE W/AN/V	Z	850521		
A01888	AAA	0.0	0.0	0.0	ACCESSORY KIT: MK-1278/V F/AN/VRC-12 47 IN	Z	850521		Z
A01890	AAA	0.0	0.0	0.0	ACCESSORY KIT: MK-1280/G F/AN/VRC-46 53 64	Z	850521		4
A01903	AAA	0.0	0.0	0.0	ACCESSORY KIT: MK-1292/V F/AN/VRC-12 IN CAT	Z	850521		Z
A01904	AAA	0.0	0.0	0.0	ACCY KIT: MK-1293/G F/AN/VRC-46 53 64 GRC-1	Z	850521		J
A01906	AAA	0.0	0.0	0.0	ACCESSORY KIT: MK-1318/GRC-100A F/AN/GRC-10	Z	850521		Z
A01914	AAA	0.0	0.0	0.0	ACCESSORY KIT: MK-1327/VRC-24A F/AN/VRC-24	Z	850521		
A01915	AAA	0.0	0.0	0.0	ACCESSORY KIT: MK-1328/GRC-19 F/AN/GRC-19 I	Z	850521		Z
A01921	AAA	0.0	0.0	0.0	ACCESSORY KIT: MK-1334/GRC-100A F/AN/GRC-10	Z	850521		J
A01922	AAA	0.0	0.0	0.0	ACCESSORY KIT: MK-1338/G F/AN/VRC-24 I M41	Z	850521		
A01925	AAA	0.0	0.0	0.0	ACCESSORY KIT: MK-1341/GRC-19 F/AN/GRC-19 I	Z	850521		J

contains annual maintenance manhours which are converted into direct productive annual maintenance manhours during the MCEA process (see page 125). It is anticipated that this library would be updated semiannually.

5.2.2 TOE Data Library

Figure 5.2-3 shows the file structure of the TOE Data Library. The data in this library are types of Army units and their authorized manpower and equipment. MCEA first searches this library when calculating system density of the baseline systems. Using the system requirement codes (SRCs) extracted from this library MCEA can then go into the TAADS Data Library to determine actual authorizations for baseline systems. A sample of the TOE Data File is shown in Table 5.2-2. Once again, we show only an example since the file is quite long. A complete copy of the file is stored on DRC's VAX 11/780 computer an a printed extract for the baseline systems is available for examination upon request. It is anticipated that this library would be updated semiannually.

5.2.3 MARCCODE Library

Figure 5.2-4 shows the file structure of the MARCCODE Library. The data in this library are codes and associated hours for determining the annual available productive maintenance manhours in units. Depending on the type and size unit (indicated by the codes) a different number of hours will be available each year to perform maintenance. Table 5.2-3 lists the codes and hours in the MARCCODE Library. A description of how these hours are used to compute total available productive maintenance manhours is provided on page 123. It is anticipated that the data in this library would seldom change and therefore library updates would be rare.

FILE ID: TOE Data Library

DESCRIPTION: For each system lists the LIN, the Standard Requirement Code (SRC), and the MARC CODE for each TOE that is authorized the system.

RECORD 1	DESCRIPTION	LENGTH	DATA TYPE
FIELD 1	File ID	30	Alphanumeric
FIELD 2	System Name	50	Alphanumeric
FIELD 3	LIN	6	Alphanumeric
RECORD 2			
FIELD 1	SRC (1)	15	Alphanumeric
FIELD 2	MARCCODE (1)	15	Alphanumeric
RECORD 3			
FIELD 1	SRC (2)	15	Alphanumeric
FIELD 2	MARCCODE (2)	15	Alphanumeric
RECORD 4			

ESTIMATED NUMBER OF RECORDS = 10,000

FIXED OR VARIABLE FILE LENGTH = V

Figure 5.2-3

Table 5.2-2. TOE Title

LIN NO	SRC	TOE TITLE		EQUIP LVL	
M68008	07016L000 HHC INFANTRY BN (LIGHT)	S07016J400		86 00004	
PARENT SRC:	07015L000 INF BN (LIGHT)	S07015J800			01
M68008	07018H000 RIFLE CO, INF BN	R07017L000		86 00003	
PARENT SRC:	07015H020 INF BN, E/W TOW	R07015L000			03
M68008	07036L000 HHC INF BN (ABN)	S07036H000		86 00004	
PARENT SRC:	07035L000 INF BN (ABN)	S07035H010	07035H020		01
M68008	07036Z900 HHC INF BN ABN (LCCA)			00004	
PARENT SRC:	07035Z900 INF BN, ABN DIV (LCCA)				01
M68008	07038H010 CSC, INF BN (ABN), E/W 106	R07038L000		86 00004	
PARENT SRC:	07035H010 INF BN (ABN), E-W 106	R07035L000			01
M68008	07038H020 CSC, INF BN (ABN), E/W TOW	R07038L000		86 00004	
PARENT SRC:	07035H020 INF BN (ABN), E/W TOW	R07035L000			01
M68008	07047H010 RIFLE CO, INF BN (MECH)	R07247J220		86 00003	
PARENT SRC:	07045H010 INF BN (MECH), E/W 106	R07245J220			03
PARENT SRC:	07045H020 INF BN E/W 12 TOW	R07245J220			03
M68008	07047H020 RIFLE CO, INF BN (MECH)	R07247J220		86 00003	
PARENT SRC:	07045H030 INF BN E/W 18 TOW	R07245J220	07245L000		03
M68008	07056J000 HHC, INF BN (AASLT)	R07056L000		86 00004	
PARENT SRC:	07055J000 INF BN (AASLT)	R07055L000			01
M68008	07056L000 HHC INF BN (AASLT)	S07056J000		86 00004	
PARENT SRC:	07055L000 INF BN (AASLT)	S07055J000			01
M68008	07177H000 RIFLE CO, INF BN, LT INF	R07477L000		86 00003	
PARENT SRC:	07175H010 INF BN, SEP LT INF BDE	R07475L000			03
PARENT SRC:	07175H020 INF BN, SEP LT INF BDE	R07475L000			03
M68008	07318J400 COMBAT SUPPORT CO. (MTN)	R07318L000		86 00004	
PARENT SRC:	07315J400 INFANTRY BN (MOUNTAIN)	R07315L000			01
M68008	07318L000 COMBAT SUPPORT CO. (MTN)	S07318J400		00004	
PARENT SRC:	07315L000 INFANTRY BATTALION (MTN)	S07315J400			01
M68008	07476L000 HHC INF BN (SIB)			00004	
PARENT SRC:	07475L000 INFANTRY BN (SIB)				01
M68008	17117H000 CAV TP LT INF/ABN BDE			86 00003	
PARENT SRC:	57100H000 SEP ABN BDE W 1005 ADPE				01
PARENT SRC:	57100H020 SEP ABN BDE W 360-30 ADPE				01
PARENT SRC:	77100H000 SEP LT INF BDE W1005 ADPE				01
PARENT SRC:	77100H020 SEP LT INF BDE W360-30 ADP				01
M68008	17276L000 HQ AND HQ COMPANY			00006	
M68008	17277H400 CAV TRP AIR CAV SQ ABN DIV	R17207L000		86 00003	
PARENT SRC:	17275H400 AIR CAV SQDN ABN DIV	R01075L000			01

FILE ID: MARCCODE Library

DESCRIPTION: This file lists the information found in Table 3-1 of AR 570-2. Data in the table are planning factors (represented by "A" & "B") used to determine the annual available MOS productive man-hours in a unit. Values of "A" & "B" are based on the MARCCODE which is obtained from the unit TOE.

RECORD 1	DESCRIPTION	LENGTH	DATA TYPE
FIELD 1	File ID	30	Alphanumeric
FIELD 2			
FIELD 3			
RECORD 2			
FIELD 1	MARCCODE (1)	15	Alphanumeric
FIELD 2	A HRS (1)	5	Numeric
FIELD 3	B HRS (1)	5	Numeric
RECORD 3			
RECORD 82			
FIELD 1	MARCCODE (81)	15	Alphanumeric
FIELD 2	A HRS (81)	5	Numeric
FIELD 3	B HRS (81)	5	Numeric

ESTIMATED NUMBER OF RECORDS = 82

FIXED OR VARIABLE FILE LENGTH = F

Figure 5.2-4

MARCCODES

For determining the annual available
MOS productive manhours

Section A	
Code	Hours
11A	3764
11B	3990
11C	4077
11D	4395
12A	3957
12B	4183
12C	4270
12D	4588
13A	4055
13B	4282
13C	4369
13D	4687
21A	2522
21B	3077
21C	3300
21D	4081
22A	2949
22B	3504
22C	3727
22D	4508
23A	3328
23B	3883
23C	4106
23D	4887
31A	2719
31B	3274
31C	3497
31D	4278
32A	2988
32B	3544
32C	3767
32D	4548
33A	3230
33B	3785
33C	4008
33D	4789

Section B	
Code	Hours
11A	365
11B	160
11C	69
11D	30
11E	0
12A	517
12B	226
12C	97
12D	42
12E	0
13A	1036
13B	461
13C	200
13D	84
13E	0
21A	864
21B	379
21C	162
21D	70
21E	0
22A	1187
22B	519
22C	223
22D	96
22E	0
23A	989
23B	433
23C	185
23D	80
23E	0
31A	864
31B	379
31C	162
31D	70
31E	0
32A	1187
32B	519
32C	223
32D	96
32E	0
33A	989
33B	433
33C	185
33D	80
33E	0

Table 5.2-3. MARC Codes

5.2.4 TAADS Library

Appendix B (taken from AR 310-49-1) shows a sample of the MTOE document printed from the Army Authorization Document System (TAADS). The data in TAADS describe the mission, personnel, and equipment in actual units within the Army. It is from TAADS that the system density for baseline systems will be determined. However, since TAADS is a very large data base that changes quite frequently, it is recommended that the MCEA user not be required to maintain a current version of TAADS. Instead, one of the following options should be implemented to obtain baseline system density by unit. The first, and preferred method of obtaining the data, is through the Army Training Requirements and Resources System (ATTRS) terminals located at all the TRADOC schools. The ATTRS terminals are tied into the FORECAST System, which provides access (query only) to TAADS. By knowing the baseline system line item number (LIN), the user can query FORECAST and obtain a list of all units that have the baseline system and the number required and authorized. The protocol that would link the ATTRS terminal with the user's micro-computer would have to be developed during the next phase (See Section 10). If, for some reason, it is not feasible to provide the user access to TAADS through the ATTRS terminal then a less desirable option would be required. This option would require MCEA to obtain Standard Requirement Codes (SRCs) from the TOE Library. Using the SRCs, MCEA would then search a library (which has not yet been constructed), containing extracts from TAADS, to obtain a list of units with baseline systems and the number required and authorized. Most likely, because of the size of the library to be constructed from TAADS, each TRADOC proponent would have a unique library tailored to types of units and systems applicable to his mission area.

5.2.5 Distribution of Grade by MOS Library

Figure 5.2-5 shows the file structure of the Distribution of Grade by MOS Library. The data in this library are Army-wide percentages of each pay grade across each maintenance MOS that supports the baseline systems. These percentages will be used to allocate the manpower requirements calculated in MCEA among pay grades. Table 5.2-4 lists the baseline maintenance MOS and their data in this library would be updated annually. The source of information for this library is Total Army Personnel Agency Force Management Book, which is published twice a year by the Personnel Plans Branch of TAPA.

5.3 ESTIMATED SIZE OF TOTAL MCEA LIBRARY

Library Name	Estimated Size (megabytes)
MARC Data	1.10 MB
TOE Data	3.10 MB
MARCCODE	.01 MB
TAADS	N/A
Distribution of Grade by MOS	.02 MB
TOTAL	4.32 MB

FILE ID: Distribution of Grade by MOS Library

DESCRIPTION: This file lists the percentages of each pay grade across the percentages of each paygrade across each maintenance MOS that supports the baseline systems.

RECORD 1	DESCRIPTION	LENGTH	DATA TYPE
FIELD 1	File ID	30	Alphanumeric
RECORD 2			
FIELD 1	MOS (1) Designation	6	Alphanumeric
FIELD 2	MOS (1) Title	30	Alphanumeric
FIELD 3	E3 Percentage	3	Numeric
FIELD 4	E4 Percentage	3	Numeric
FIELD 5	E5 Percentage	3	Numeric
FIELD 6	E6 Percentage	3	Numeric
FIELD 7	E7 Percentage	3	Numeric
FIELD 8	E8 Percentage	3	Numeric
FIELD 9	Total MOS Manpower Authorized	6	Numeric
RECORD 3			
FIELD 1	MOS (2) Designation	6	Alphanumeric
RECORD 82			
FIELD 1	MARCCODE (81)	15	Alphanumeric
FIELD 2	A HRS (81)	5	Numeric
FIELD 3	B HRS (81)	5	Numeric

ESTIMATED NUMBER OF RECORDS = 60

FIXED OR VARIABLE FILE LENGTH = V

Figure 5.2-5

Table 5.2-4. Distribution of Grade by MOS

MOS	TITLE	E-3	E-4	E-5	E-6	E-7	E-8
24C	HAWK FIRING SEC MECH	0.19	0.37	0.17	0.19	0.07	0.00
24L	HAWK LNCH SYS MECH	0.27	0.29	0.21	0.23	0.00	0.00
24M	VULCAN SYS MECH	0.15	0.20	0.26	0.22	0.17	0.00
24N	CHAPARRAL SYS MECH	0.16	0.21	0.14	0.25	0.24	0.00
24T	PATRIOT MLS MECH	0.07	0.23	0.16	0.30	0.19	0.05
27E	TOW-DRAGON REPAIRER	0.26	0.35	0.26	0.13	0.00	0.00
27F	VULCAN REPAIRER	0.25	0.31	0.25	0.19	0.00	0.00
27G	CHAPARRAL-REDEYE REPAIRER	0.14	0.19	0.27	0.16	0.24	0.00
27L	LANCE SYS REPAIRER	0.14	0.37	0.31	0.18	0.00	0.00
27M	MLRS REPAIRER	0.25	0.28	0.28	0.19	0.00	0.00
29E	C-E RADIO REPAIRER	0.21	0.30	0.28	0.21	0.00	0.00
31V	UNIT LEVEL COMM MAINT	0.49	0.37	0.14	0.00	0.00	0.00
35E	SP ELEC DEVICES REP	0.14	0.50	0.28	0.08	0.00	0.00
35H	CALIBRATION SP	0.09	0.21	0.24	0.25	0.16	0.05
35K	AVIONIC MECH	0.44	0.25	0.31	0.00	0.00	0.00
35L	AVIONIC COMM EQ REP	0.39	0.33	0.28	0.00	0.00	0.00
35M	AV NAV FLT CON EQ REP	0.34	0.34	0.32	0.00	0.00	0.00
35R	AVIONIC SP EQ REP	0.51	0.19	0.30	0.00	0.00	0.00
39B	AUTO TEST EQ OP/REP	0.20	0.23	0.35	0.22	0.00	0.00
41C	FIRE CONTROL INSTRU REP	0.17	0.47	0.24	0.12	0.00	0.00
43M	FABRIC REPAIR SP	0.36	0.47	0.10	0.05	0.02	0.00
44B	METAL WORKER	0.38	0.42	0.20	0.00	0.00	0.00
45B	SMALL ARMS REPAIRER	0.27	0.47	0.26	0.00	0.00	0.00
45D	SP FA TURRET MECH	0.35	0.53	0.12	0.00	0.00	0.00
45E	M1 TURRET MECH	0.30	0.41	0.29	0.00	0.00	0.00
45G	FIRE CONTROL SYS REP	0.03	0.54	0.26	0.17	0.00	0.00
45K	TANK TURRET REP	0.30	0.23	0.21	0.26	0.00	0.00
45L	ARTILLERY REPAIRER	0.31	0.35	0.34	0.00	0.00	0.00
45T	BFVS TURRET MECH	0.25	0.61	0.14	0.00	0.00	0.00
52C	UTILITY EQUIP REP	0.29	0.39	0.22	0.10	0.00	0.00
52D	PWR GEN EQ REP	0.33	0.46	0.15	0.06	0.00	0.00
55B	AMMO SPECIALIST	0.30	0.32	0.19	0.10	0.09	0.00
63B	LT WHEEL VEH MECH	0.27	0.32	0.19	0.11	0.10	0.01
63D	SP FA SYS MECH	0.28	0.23	0.15	0.15	0.15	0.04
63E	M1 TANK SYS MECH	0.22	0.26	0.21	0.16	0.13	0.02
63G	FUEL & ELEC SYS REP	0.31	0.53	0.16	0.00	0.00	0.00
63H	TRACK VEH REP	0.27	0.22	0.11	0.19	0.21	0.00
63J	QM & CHEM EQ REP	0.31	0.50	0.19	0.00	0.00	0.00
63S	HVY WHEELED VEH MECH	0.32	0.38	0.30	0.00	0.00	0.00
63T	BFVS MECH	0.31	0.27	0.20	0.12	0.09	0.01
63W	WHEELED VEH REP	0.44	0.33	0.23	0.00	0.00	0.00
63Y	TRACK VEH MECH	0.30	0.33	0.37	0.00	0.00	0.00
66V	OBSN SCOUT HEL TI	0.00	0.00	0.43	0.57	0.00	0.00
66Y	AH-1 ATTACK HEL TI	0.00	0.00	0.46	0.54	0.00	0.00
67Y	AH-1 ATTACK HEL REP	0.26	0.22	0.18	0.13	0.21	0.00
68B	ACFT POWERPLANT REP	0.24	0.40	0.23	0.13	0.00	0.00
68D	ACFT POWERTRAIN REP	0.23	0.40	0.26	0.11	0.00	0.00

Table 5.2-4. Distribution of Grade by MOS (Concluded)

MOS	TITLE	E-3	E-4	E-5	E-6	E-7	E-8
68F	AIRCRAFT ELECTRICIAN	0.17	0.44	0.23	0.16	0.00	0.00
68G	ACFT STRUCTURAL REP	0.30	0.36	0.22	0.12	0.00	0.00
68H	ACFT PNEUDRAULICS REP	0.29	0.35	0.23	0.13	0.00	0.00
68J	ACFT FIRE CONTROL REP	0.26	0.20	0.18	0.19	0.17	0.00
68M	ACFT WPN SYS REP	0.36	0.37	0.27	0.00	0.00	0.00
76Y	UNIT SUPPLY SPECIALIST	0.16	0.29	0.18	0.27	0.10	0.00

SECTION 6.0 - DESCRIPTION OF MCEA INPUT/OUTPUT FILES

6.1 DESCRIPTION OF FILE STRUCTURES

6.1.1 MCEA Output Files

6.1.1.1 System Source MOS File (Figure 6.1.1-1)

(This file lists the source from which the operators and maintainers of the new system will be drawn.)

6.1.1.2 Manpower Constraint File (Figure 6.1.1-2)

(This file lists number of operators, by skill level, and maintenance manhours, by maintenance level, per system. Also listed is system density, total number of operators and total maintenance manhours that will be manpower constraints on the new system.)

6.1.2 MCEA Input Files

6.1.2.1 Baseline System File (Figure 6.1.2-1)

(For each baseline system, this file lists mission area, weapon type and line item number.)

FILE ID: System Source MOS File

DESCRIPTION: For each system lists, Operator MOS (OPMOS), Number of Operator MOS (NUMMOS), and Maintenance MOS (MAMOS) to support the system.

RECORD 1	DESCRIPTION	LENGTH	DATA TYPE
FIELD 1	File ID	30	Alphanumeric
FIELD 2	System Name	50	Alphanumeric
RECORD 2			
FIELD 1	OPMOS (1)	10	Alphanumeric
FIELD 2	NUMMOS (1)	2	Numeric
FIELD 3	OPMOS (2)	10	Alphanumeric
FIELD 4	NUMMOS (2)	2	Numeric
FIELD 5	OPMOS (3)	10	Alphanumeric
FIELD 6	NUMMOS (3)	2	Numeric
FIELD 7	MAMOS (1)	10	Alphanumeric
FIELD 8	MAMOS (2)	10	Alphanumeric

ESTIMATED NUMBER OF RECORDS = 2 per system (30 systems)

FIXED OR VARIABLE FILE LENGTH = V

Figure 6.1.1-1

FILE ID: Manpower Constraint File

DESCRIPTION: This file lists number of operators, by skill level, and maintenance manhours, by maintenance level, per system. It also lists system density, total number of operators and total maintenance manhours to be used as constraints for the new system.

RECORD 1	DESCRIPTION	LENGTH	DATA TYPE
FIELD 1	File ID	30	Alphanumeric
FIELD 2	Baseline Syst. Name	50	Alphanumeric
FIELD 3	Baseline LIN	6	Alphanumeric
FIELD 4	New System Name	50	Alphanumeric
RECORD 2			
FIELD 1	Number Operators(1)	2	Numeric
FIELD 2	Skill Level (1)	1	Numeric
FIELD 3	Number Operators(2)	2	Numeric
FIELD 4	Skill Level (2)	1	Numeric
FIELD 5	Number Operators(3)	2	Numeric
FIELD 6	Skill Level (3)	1	Numeric
FIELD 7	MMH (Unit)	5	Numeric
FIELD 8	MMH (DS)	5	Numeric
FIELD 9	MMH (GS)	5	Numeric
FIELD 10	System Density	6	Numeric
FIELD 11	Total Operators	6	Numeric
FIELD 12	Total MMH	8	Numeric
FIELD 13	Total Maintainers	6	Numeric

ESTIMATED NUMBER OF RECORDS = 2 per system (30 systems)

FIXED OR VARIABLE FILE LENGTH = F

Figure 6.1.1-2

FILE ID: Baseline System File

DESCRIPTION: For each system lists Mission Area, Type System and Line Item Number (LIN).

RECORD 1	DESCRIPTION	LENGTH	DATA TYPE
FIELD 1	File ID	30	Alphanumeric
FIELD 2	System Name	50	Alphanumeric
RECORD 2			
FIELD 1	Mission Area	50	Alphanumeric
FIELD 2	Weapon Type	30	Alphanumeric
FIELD 3	LIN	6	Alphanumeric

ESTIMATED NUMBER OF RECORDS = 2 per system (30 systems)

FIXED OR VARIABLE FILE LENGTH = V

Figure 6.1.2-1

6.1.2.2 Baseline Maintenance Manhours File (Figure 6.1.2-2)

(For each baseline system, this file lists annual maintenance manhours for each MOS at each level. The file also gives factors to calculate productive manhours.)

6.1.2.3 TOE File (Figure 6.1.2-3)

(For each baseline system, this file lists Standard Requirement Codes (SRC) and Manpower Requirement Criteria (MARC) Codes for those TOE authorized the system.)

6.1.2.4 MARCCODE Key File (Figure 6.1.2-4)

(This file lists factors used to determine annual available productive manhours for different types of units.)

6.1.2.5 The Army Authorization Document System (TAADS) Extract File (Figure 6.1.2-5)

(For each baseline system, lists all units and number of systems authorized in the unit.)

6.1.2.6 Baseline Operator File (Figure 6.1.2-6)

(For each baseline system, lists number of operators by grade and MOS.)

FILE ID: Baseline Army Maintenance Man Hours (AMMH) File

DESCRIPTION: For each system lists LIN, each maintenance MOS (MAMOS), and the associated maintenance man hours spent at each level of maintenance (UNIT, DS&GS). Also, after each level of maintenance hours (UNITHRS, DSHRS and GSHRS) is listed an indirect productive hour factor (IPHFAC) which, when divided into UNITHS, DSHRS and GSHRS, gives productive maintenance manhours at those levels.

RECORD 1	DESCRIPTION	LENGTH	DATA TYPE
FIELD 1	File ID	30	Alphanumeric
FIELD 2	System Name	50	Alphanumeric
FIELD 3	LIN	6	Alphanumeric
RECORD 2			
FIELD 1	MAMOS (1)	10	Alphanumeric
FIELD 2	UNITHRS (1)	6	Numeric
FIELD 3	UIPHFAL (1)	5	Numeric
FIELD 4	DSHRS (1)	6	Numeric
FIELD 5	DIPHFAC (1)	5	Numeric
FIELD 6	GSHRS (1)	6	Numeric
FIELD 7	GIPHFAC (1)	5	Numeric
RECORD 3			
FIELD 1	MAMOS (2)	10	Alphanumeric
FIELD 2	UNITHRS (2)	6	Numeric

ESTIMATED NUMBER OF RECORDS = 16 per system (30 systems)

FIXED OR VARIABLE FILE LENGTH = V

Figure 6.1.2-2

FILE ID: TOE File

DESCRIPTION: For each system lists the LIN, the Standard Requirement Code (SRC), and the MARC CODE for each TOE that is authorized to the system.

RECORD 1	DESCRIPTION	LENGTH	DATA TYPE
FIELD 1	File ID	30	Alphanumeric
FIELD 2	System Name	50	Alphanumeric
FIELD 3	LIN	6	Alphanumeric
RECORD 2			
FIELD 1	SRC (1)	15	Alphanumeric
FIELD 2	MARCCODE (1)	15	Alphanumeric
RECORD 3			
FIELD 1	SRC (2)	15	Alphanumeric
FIELD 2	MARCCODE (2)	15	Alphanumeric
RECORD 4			

ESTIMATED NUMBER OF RECORDS = 50 per system (30 systems)

FIXED OR VARIABLE FILE LENGTH = V

Figure 6.1.2-3

FILE ID: MARCCODE Key File

DESCRIPTION: This file lists the information found in Table 3-1 of AR 570-2. Data in the table are planning factors (represented by "A" & "B") used to determine the annual available MOS productive man-hours in a unit. Values of "A" & "B" are based on the MARCCODE which is obtained from the unit TOE.

RECORD 1	DESCRIPTION	LENGTH	DATA TYPE
FIELD 1	File ID	30	Alphanumeric
FIELD 2			
FIELD 3			
RECORD 2			
FIELD 1	MARCCODE (1)	15	Alphanumeric
FIELD 2	A HRS (1)	5	Numeric
FIELD 3	B HRS (1)	5	Numeric
RECORD 3			
RECORD 82			
FIELD 1	MARCCODE (81)	15	Alphanumeric
FIELD 2	A HRS (81)	5	Numeric
FIELD 3	B HRS (81)	5	Numeric

ESTIMATED NUMBER OF RECORDS = 82

FIXED OR VARIABLE FILE LENGTH = F

Figure 6.1.2-4

FILE ID: Baseline Operator File

DESCRIPTION: For each baseline system lists number of operators by grade and MOS per system.

RECORD 1	DESCRIPTION	LENGTH	DATA TYPE
FIELD 1	File ID	30	Alphanumeric
FIELD 2	System Name	50	Alphanumeric
FIELD 3	LIN	6	Alphanumeric
RECORD 2			
FIELD 1	Grade (1) Operators	2	Alphanumeric
FIELD 2	# Operators Grade(1)	2	Numeric
FIELD 3	MOS Grade(1) Operators	10	Alphanumeric
FIELD 4	Grade (2) Operators	2	Alphanumeric
FIELD 5	# Operators Grade(2)	2	Numeric
FIELD 6	MOS Grade(2) Operators	10	Alphanumeric
FIELD 7	Grade (3) Operators	2	Alphanumeric
FIELD 8	# Operators Grade(3)	2	Numeric
FIELD 9	MOS Grade(3) Operators	10	Alphanumeric

ESTIMATED NUMBER OF RECORDS = 2 per system (30 systems)

FIXED OR VARIABLE FILE LENGTH = V

Figure 6.1.2-6

6.1.2.7 System Specific Maintenance File (Figure 6.1.2-7)

(Contains maintenance manpower calculations (R = A*B/C) by MOS and maintenance level for each unit (Div and larger) to receive the new system.)

FILE ID: System Specific Maintenance File

DESCRIPTION: Contains Maintenance Manpower calculations (R = A*B/C) by MOS & maintenance level for each type unit (Division & larger) to receive the new system.

RECORD 1	DESCRIPTION	LENGTH	DATA TYPE
FIELD 1	File ID	30	Alphanumeric
FIELD 2	System Name	50	Alphanumeric
FIELD 3	LIN	6	Alphanumeric
RECORD 2			
FIELD 1	Unit Type	50	Alphanumeric
FIELD 2	MOS 1	10	Alphanumeric
FIELD 3	Unit Manpower Requirement	3	Numeric
FIELD 4	DS Manpower Requirement	3	Numeric
FIELD 5	GS Manpower Requirement	3	Numeric
FIELD 6	MOS (2)	10	Alphanumeric
FIELD 7	Unit Manpower Requirement	3	Numeric
FIELD 8	DS Manpower Requirement	3	Numeric
FIELD 9	GS Manpower Requirement	3	Numeric
FIELD 10	MOS 3	10	Alphanumeric
	MOS 13		
FIELD 49			
RECORD 3			
FIELD 1	Unit Name	50	Alphanumeric

ESTIMATED NUMBER OF RECORDS = 25 per system (30 systems)

FIXED OR VARIABLE FILE LENGTH = V

Figure 6.1.2-7

SECTION 7.0 - ALGORITHM AND MODEL DESCRIPTIONS

7.1 GENERAL

The algorithms and models used in MCEA for manpower calculations are relatively straightforward and in line with procedures described in Army Regulation 570-2 ("Manpower Requirements Criteria (MARC)--Tables of Organization and Equipment"). The primary source of maintenance data is the MARC Maintenance Data Base, one of the MCEA libraries described in Section 5.0. The MCEA bases operator manpower on the authorized crew at the weapon system level. The model assumes that manpower associated with operational supporting functions (e.g. fire direction center for a field artillery battery) will be available for a new system. If this is not true, then the user has the option of making adjustments to the total operator manpower. In fact, throughout the MCEA model, the system provides the user with flexibility to make adjustments based on policy decisions.

7.2 BASELINE SYSTEM DENSITY

For each baseline system identified by the user, the MCEA will calculate system density based on the following:

$$\text{System Density} = \sum_i \text{Unit}_i \times \text{Number/Parent Unit}_i \times \text{Number Systems Authorized/Unit}_i$$

where:

$Unit_i$	=	A unit identified in the TAADS data base with a SRC for the baseline system.
Number/Parent $Unit_i$	=	The number of units in the highest level parent unit.
Number Systems Authorized/$Unit_i$	=	The number of baseline systems the unit is authorized IAW TADDS.

The user has the option of specifying units to receive the new system. In this case, the system density will be the summation of authorized systems over those units only.

7.3 PRODUCTIVE MAINTENANCE MANHOURS BY MAINTENANCE LEVEL

For each baseline system identified by the user, the MCEA will search the MARC Maintenance Data Base and calculate productive maintenance manhours with the following formula:

$$\text{Productive MMH}_i = \sum_j \text{MOS}_j \text{ hrs/MOS productive factor}_{ij}$$

where:

i = maintenance level
j = a specific MOS at level i

The MOS productive factor is a number greater than 1 that reduces total MMHs to productive MMHs. The factor varies with MOS and maintenance level.

The user will have the option of excluding specific MOS from this calculation if there are reasons to suspect that those MOS would not be available to support the new system.

7.4 AVAILABLE MAINTENANCE MANHOURS BY TYPE UNIT

A four character MARC code is associated with each unit in the TAADS Data Base. This code describes the unit in terms of (1) type unit (Combat, CS, or CSS), (2) unit location (Division, Corps, or EACH), (3) security requirements, and (4) how often the unit is required to move. These four characteristics impact the annual available maintenance productive manhours. The MARCCODE Library stores all of these codes and their associated manhour values (taken from AR 570-2). Figure 7.4-1 contains the table from AR 570-2, along with the four-step procedure for determining available manhours. If, after following the four-step procedure, the obtained value is less than 2920 (which equates to eight hours per day), the number should be adjusted to equal 2920. This adjustment is in accordance with supplemental instructions from HQDA.

7.5 MAXIMUM OPERATOR MANPOWER AVAILABLE

User-identified, replaceable baseline systems are the basis for the operator manpower available for the new system. The formula is:

Table 3–1
Basic MARC planning factors for determining the annual available MOS productive man-hours (AAMPM) factor

Section A

USC	TUC #1			TUC #2			TUC #3		
	ULC #1	ULC #2	ULC #3	ULC #1	ULC #2	ULC #3	ULC #1	ULC #2	ULC #3
A	3764	3957	4055	2522	2949	3328	2719	2988	3230
B	3990	4183	4282	3077	3504	3883	3274	3544	3785
C	4077	4270	4369	3300	3727	4106	3497	3767	4008
D	4395	4588	4687	4081	4508	4887	4278	4548	4789

Section B

UMC	TUC #1			TUC #2			TUC #3		
	ULC #1	ULC #2	ULC #3	ULC #1	ULC #2	ULC #3	ULC #1	ULC #2	ULC #3
A	365	517	1036	864	1187	989	864	1187	989
B	160	226	461	379	519	433	379	519	433
C	69	97	200	162	223	185	162	223	185
D	30	42	84	70	96	80	70	96	80
E	0	0	0	0	0	0	0	0	0

Table 3–2
MARC codes for TOE/MTOE header data

The following variables will be used to establish the four-character MARC code depicted in the TOE/MTOE header data:

Character: 1st Psn
Definition: Type unit code (TUC)
Variables:
No. 1—Combat unit
No. 2—Combat support unit
No. 3—Combat service support unit

Character: 2nd Psn
Definition: Unit location code (ULC)
Variables:
No. 1—Division
No. 2—Corps
No. 3—EAC

Character: 3rd Psn
Definition: Unit security code (USC)
Variables:
A—One-unit base
B—Two-or three-unit base
C—Four plus unit base
D—No security requirement

Character: 4th Psn
Definition: Unit movement code (UMC)
Variables:
A—once in 3 days or less
B—once every 3 to 7 days
C—once every 8 to 17 days
D—once every 17 to 39 days
E—less than once every 39 days

b. To determine the appropriate MARC planning factor for a specific TOE/MTOE, the TOE/MTOE developer should follow the procedures below.

(1) *Step 1.* Select factor from section A of table 3–1 based on MARC code in TOE/MTOE header data.

(2) *Step 2.* Select unit movement factor from section B of table 3–1 based on MARC code in TOE/MTOE header data.

(3) *Step 3.* Subtract factor selected in Step 2 from factor selected in Step 1 to determine the AAMPM for nonmaintenance variable/workload driven MARC positions.

(4) *Step 4.* To determine AMMPM for maintenance variable/workload driven MARC positions, follow Steps 1–3 and subtract 840 hours from AMMPM determined in Step 3.

Figure 7.4-1

$$\text{Operator Manpower} = \sum_i \text{Baseline System}_i \text{ Density} \quad x$$

$$\text{Baseline System}_i \text{ Crew Size}$$

As the formula would suggest, the user may wish to identify more than one type of baseline system to be replaced. The maximum operator manpower available will be categorized by grade and MOS to allow the user to construct different combinations or possibilities for the crew of the new system.

7.6 MAXIMUM TOTAL DIRECT PRODUCTIVE MMHs AVAILABLE

This calculation is a summation across maintenance levels by MOS of direct productive MMHs available. It will provide the user a quick synopsis of the types and percentages (represented by MMHs) of MOS skills available to support the new system. The formula is:

$$\text{Total MMH} = \sum_i \text{MMH}_i \qquad i = \text{maintenance level}$$

In addition, the user will be provided with (via the Distribution of Grade by MOS Library an expected breakout of MOS maintenance manhours by grade. This will be useful in establishing manpower constraints by skill level.

7.7 MAINTENANCE MANPOWER REQUIREMENTS

Because operators are normally dedicated to one weapon system, manpower constraint calculations are relatively straightforward. Maintenance manpower is more complex since many maintainers are dedicated to supporting numerous systems. However, main-

tenance manpower requirements can be calculated (at least from a notional standpoint) by looking at demand in terms of maintenance manhours and supply and in terms of maintenance manhours available per maintainer in various types of units. These manpower requirements can then be structured by grade in accordance with the grade structure called for in AR 611-201. The basic formula for computing maintenance manpower requirements is:

$$A \times B / C = R$$

where
A = Annual productive manhours required per system
B = System density
C = Annual available productive manhours
R = Maintenance manpower requirement

Summing the maintenance manpower requirements across units will provide the total Army requirement.

7.8 COMPARISON OF CONSTRAINTS AND REQUIREMENTS

In step 7 of the MCEA process, the user has an option to enter alternative estimates on crew size and maintenance manpower for the new system. MOS that would not be available to support the new system may also be specified. In step 8, the impact of these user defined constraints is computed and provided as a report. Step 8 includes the following computations.

(1) $[A - B] \times C = O$

where:
A = MCEA manpower constraint on crew size

B = User manpower requirement on crew size
C = New system density
O = Operator manpower impact

(2) [D - E] x F = M

where:
D = MCEA constraint on annual maintenance manhours
E = User requirement on annual maintenance manhours
F = New system density
M = Maintenance manhour impact

(3) [G - H] x I = R

where:
G = MCEA maintenance manpower constraint
H = User maintenance manpower requirement
I = New system density
R = Maintenance manpower impact

(4) [J - K] / L = S

where:
J = Either the total number of MMHs or the total number of operators to support the system per MCEA computations
K = Either the number of MMHs or number of operators associated with the MOS(s) specified by the user
L = New system density
S = Impact of MOS not being available

SECTION 8.0 - EXTERNAL INTERFACES

8.1 INTERFACES WITH OTHER $(MPT)^2$ PRODUCTS

8.1.1 Overview

The first four $(MPT)^2$ products, the System Performance Requirements Estimation Aid (SPREA), the MCEA, the Personnel Constraints Estimation Aid (PCEA), and the Training Constraints Estimation Aid (TCEA), will estimate MPT-related requirements and constraints during the Requirements/Technology Base Activities Phase, the earliest phase of the acquisition process.

The SPREA will help Army combat developers identify comprehensive and clear system performance requirements and missions. The MCEA, the PCEA, and the TCEA will provide tools for estimating manpower, personnel, and training constraints, respectively. The resulting system performance requirements and MPT constraints will be included in Army requirements documents and system specifications, and will provide a comprehensive set of guidelines for prime contractors.

Product 5, the Manpower Determination Aid (MDA) will produce an estimate of jobs, tasks, and manpower requirements associated with a contractor design. The MDA will also compare the requirements to the manpower constraints that Product 2 identifies.

Product 6, the Personnel Requirements Estimation Aid (PREA) will determine the personnel characteristics needed to support a given contractor design. Product 6 will also identify personnel characteristic deficits by comparing the number and type of personnel available to man the new system (from Products 2 and 3,

respectively) with the number and type of personnel needed to support it (from Products 5 and 6, respectively).

8.1.2 Input/Output Files

Other products use the following MCEA output files.

(1) MOS Source File
(2) Manpower Constraint File

These files will be used by Products 3, 4, 5, and 6. Section 6 contains descriptions of these two files. The descriptions begin on page 111.

8.2 External Data Sources

- Army MARC Maintenance Data Base
  (described on page 100)

- TAADS Data Base
  (described on Page 106)

- TOE Data Base
  (described on page 106)

- MARC codes form AR 570-2
  (described on page 106)

- TAPA Force Management Book
  (described on page 108)

8.3 OUTPUT REPORT FORMATS

- Operator Manpower Constraint (Figure 3.10-4)
- Maintenance Manpower Constraint (Figure 3.10-5)
- Source MOS (Figure 3.10-6)
- Unit System Density (Figure 3.10-7)
- Impact Analysis (Figure 3.9-2)

SECTION 9 - TECHNOLOGY TRANSFER ISSUES

9.1 TRAINING STRATEGY

The goal of this software specification phase of the $(MPT)^2$ effort is to design a set of automated tools that the user can implement immediately without external training. To accomplish this, we have designed a user interface that will allow the system to be used by analysts who have very little computer experience (see section 3). The primary source of training for the average user will be included in the documentation that is developed for the system.

9.2 DOCUMENTATION SPECIFICATIONS

There are two types of documentation that will be developed for MPT^2 aid: 1) user documentation, and 2) program documentation. User documentation provides the user of the MDA with information on how to use the software and in how to use the overall tool in the aid process. Program documentation will be used to describe the programming conventions and rules that will be used in writing the computer code that makes up the aid. In the following paragraphs, we have included specifications of what will be included in each type of documentation.

9.2.1 User Documentation

User documentation is itself divided into two categories; "on-line help" and the "User's Guide". "On-line" help is documentation that the user can obtain by pressing the <F1> or

<Shift> <F1> function keys while working with the MDA software. When the user presses <F1>, a context specific help message will display. This message will give the user specific information about the screen, menu, template, or prompt the user is currently working with. This information will be brief and will generally focus on what the user is expected to do next. It will inform the user of any rules that may be in effect and will, if appropriate, provide the user with a specific example and step-by-step procedures. When the user presses <F1> while holding down the <Shift> key an alphabetical index of help information will display. From this index, the user can choose to obtain help information on any MDA topic.

The "User's Guide" will contain detailed information on all aspects of the software and the role and use of the aid as a tool in the MPT process. The User's Guide will be divided into the following six sections:

1. Getting Started - This section will provide the user with step-by-step procedures for installing the MDA software on his or her computer system and to gain access to the various components of the software.

2. Tutorial - The tutorial will give the user the background information and underlying philosophy behind the aid and its role in the MPT process. It will provide general training on how to use the software focusing on understanding and using the user interfaces. The tutorial will also provide the user with instruction on how to effectively use the other sections of the User's Guide.

3. Reference Section - This section will be divided into two sub-sections for each step of the aid. Each section will contain an alphabetically listed detailed

description of each feature of the two aids. The descriptions will include detailed explanations of the feature, rules (if any) governing its use, step-by-step procedures, sources of data that are required, and a list of places in the documentation where more information on the feature or related features can be found.

4. Messages - This section will contain a detailed non-technical description of all messages that can presented to the user by the aid. Included is a description of what the message means and exactly what the user can do about it.

5. Glossary - Alphabetically lists terms and acronyms that are used in the MDA software and in the overall MPT process.

6. Index - All features, concepts, and procedures will be thoroughly indexed to key words and page numbers in the User's Guide.

9.2.2 Program Documentation

The programming documentation conventions described in the next few paragraphs is included so that the source code written for the aid will be easily understood by current and future programmers. Clearly written and documented code makes the software easier to de-bug, modify, and enhance for future versions. Following are the programming conventions that will be employed in the development of the aid.

Indentation

We will use the following conventions for indentation of C code. Nested code will be indented one tab stop per level. Curly braces should be indented by the same number of tab stops as the code they enclose and should appear alone on a line. Curly braces that match each other will then line up vertically. Figure 9-1 is an example of the indentation style.

In a deeply nested subroutine, the code may want to creep off the right side of the screen. When this happens, it will be conceptually more clear to create a new subroutine out of the offending code.

General Structure

Anything but the simplest programs require a very large number of subroutines. A good way to structure code is to have the main program in one file, and have the subroutines in other files. In the MDA software, subroutines will be grouped by function, with all the file I/O routines together in one place and all the develop routines in another. These modules will be compiled separately and linked together with the DOS Linker. Source code files should be kept to under 1000 lines long in order to make them compile quicker when a small change is needed.

In-line Documentation

In-line documentation is the comments that the programmer puts into the source code. They provide a low-level, detailed description of what the code is doing. In-line comments will be written as the code is written and modified accordingly as the development progresses.

```
int arrayprint(array, numelements)
/*   Function to print out some elements from an array.
inputs:
          array = the array to be printed
          numelements = the number of elements to print,
                    starting at 0
outputs:
          returns TRUE if success, FALSE if failure
                                                              */
int array[]. numelements;

     {
     int i;                                    /* array index */

                                     /* check for bogus input */
     if (numelements > ARRAYSIZE)
          return(FALSE);

                                     /* one element on each line */
     for (i = 0; i < numelements; i++)
          {
          printf("Element number %d is: ", i);
          printf("%d\n", array[i]);
          }

     return(TRUE);
     }
```

Figure 9-1

Each source file will have a short header containing five items of information:

1. The file name
   Otherwise listings are encountered which are difficult to track down because we don't know the name of the file.

2. The date.
   Also to identify listings.

3. The author's name.
   So we can ask questions later. (And to give credit where it's due.)

4. A description of the file's purpose.
   Usually the 8-character file name is not enough to tell what it does. One or two sentences should be enough.

Backups

All of the source code for the MPT^2 software will be backed up early and often. The criteria for backups will be: backups should be able to survive a fire to the office with no more than one week's worth of lost work.

Testing

The MPT^2 programmers will, of course, test their own code as thoroughly as possible when they write it. But, programmers tend to overlook errors in the programs they've written. To combat this, we will follow a procedure known as break-testing before any software is released to the Army. The programmer will give an executable copy of his or her program to the tester, along

with a clean listing of the source code. Then the tester tries to "break it" in every way possible. The tester should force the program to execute every line of code as shown in the source code. This means try all branches, force every if, and produce every error message. If any bugs are found, the programmer fixes them and the tester starts all over again on the new program. When the tester can't break the software, then we know we can deliver it with confidence. We have also found that this procedure often locates bugs in sections of code other than the one being tested.

9.3 MEANS FOR ACHIEVING INSTITUTIONALIZATION

During Option 2 of the $(MPT)^2$ effort, we will produce a detailed plan for fielding the product. This fielding plan will describe the distribution of the aid's methods, hardware, software, documentation, and training programs to specified Army users in specific Army organizations. The plan will be analogous to the Materiel Fielding Plan developed for Army weapon systems.

At the present time, we believe that successful implementation will, as a minimum, require the following activities.

Identification of Specific Users. Specific users of each product must be identified and the specific MAP activities and documents into which the product will feed must be described. This will ensure that the product has a use in the "real world". Section 2 describes our approach to this.

Incorporation of Users in Product Development. To ensure that the product meets users' needs, users will be included in the product development process. As a minimum, they should use the product during the external demonstration that will take place during Option 2.

Incorporation of Acceptability/Usability Requirements into Product Specifications. We have incorporated acceptability/usability requirements into the requirements specifications for each aid (see Acceptability/Usability Requirements in section 2). The requirements will make sure that the product is easy to use (e.g. clear documentation, on-line help, etc.).

Instruction of Key Personnel. We propose that "key" personnel receive detailed training at ARI headquarters immediately after ARI has accepted the aid. These key personnel will consist of individuals who can be expected to 1) become experts in the use of the aid, 2) become instructors in using the aid, and 3) act as consultants for ongoing applications of the aid. At the present time, we recomment that these key personnel consist of selected staff members from ARI's System's Manning Lab., members of ARI field offices who have been designated as MANPRINT support personnel, and members of the MANPRINT policy office within DCSPER.

Demonstrate Aid at User's Sites. We also recommend that demonstrations of the aid be provided at all primary user's sites. This demonstration could be conducted by contractor personnel or by the key personnel who were trained at ARI headquarters. The demonstration would include hands-on training with the aid software using "real world" examples, describe the benefits of the product, and show how the product can help users produce MAP products.

Software Maintenance. Specific Army organizations must be identified that can continuously update software, documentation, and training to reflect user applications and evolving needs.

Incorporation into Army Training Programs and Regulations. Army training courses for MANPRINT, project management, etc., must be modified to describe how the aid can help users during the MAP. Regulations and pamphlets in these areas must be modified in the same way

SECTION 10 - REMAINING TECHNICAL DEVELOPMENT ACTIVITIES DURING PHASE III

The specifications set forth in this report will allow software developers to construct a program that will assist the user in determining manpower constraints for new weapon systems. However, before the program can be fully implemented, there are several technical developments which must be accomplished during that time frame. The remaining tasks in the technical development all involve the data libraries and consist of the following:

(1) Develop routines/procedures to support updating each library

(2) Develop extract routines to obtain data from each library

(3) Develop a protocol that will link the ATTRS terminal to the user's micro-computer in order to obtain TAADS data from the FORECAST system. This task also involves creating an input file to store that data.

(4) In case the ATTRS terminal cannot be linked to the user's micro-computer, a TAADS library (with selected extracts from the TAADS data base) will have to be created for each TRADOC proponent. In addition, procedures for updating each library must be developed.

The estimated time to complete tasks 1, 2, and 3 is two man-months. The estimated time to complete tasks 1, 2, and 4 is four man-months. The technical risk is considered low to accomplishing the four tasks.

APPENDIX A

REQUIREMENTS DOCUMENTS

APPENDIX A

OPERATIONAL AND ORGANIZATIONAL PLAN (O&O PLAN)

The O&O Plan describes how a system will be integrated into the force structure, deployed, operated, and supported in peacetime and wartime. The concept established required readiness objectives and is the basis for Integrated Logistic Support planning. Initially, the plan should, as a minimum, describe any deficiencies which were identified in the MAA and any constraints applicable to systems development.

I. Purpose - Describe the need for an operational capability to defeat the threat and eliminate an operational deficiency. State where in the MAA the deficiency is identified and how the need was developed from the described deficiency. (The need should be stated in broad characteristics only (e.g., a capability is needed to defeat enemy armor at "x" kilometers)).

II. Threat/ Deficiency - Describe the threat to be countered and the operational deficiency to be eliminated.

*III. Operational Plan Describe how, what, when, and where the system will be employed on the battlefield and how it will interface with other system (attach Operational Mode Summary/Mission Profile as an annex). Communications support requirements should be addressed.

*IV. Organ-
izational
Plan -Discuss the type units that will employ and support the system and when appropriate, the system(s)) to be replaced. (When the system is decided on, include the number of systems estimated to be provided each type unit. This plan will support preparation of the BOIP, the Integrated Logistic Support Plan and identification of key ancillary items.

*V Personnel
Impact Design- of the system should consider personnel skills available to operate and maintain the system. Generation of new MOS should be avoided where possible. (When the system is decided on, include an estimate of the number of people and skills estimated to operate and maintain the equipment, by type unit). This plan will support preparation of the Tentative Qualitative and quantitative Personnel Requirements Information (TQQPRI), the Personnel Support Plan, and assist in the LSA Process.

*VI. Training
Impact - Design of the equipment should consider type and extent of training required. (When system is decided on, discuss the type and amount of training required and the need for training devices and simulator). This plan will support preparation of the Training Support Plan.

*VII. Logistics Impact — System must be supportable by the Standard Army Logistics System and use standard tool and TMDE. (When the system is decided on, the proposed levels of maintenance, support concept, Test, Measurement, and Diagnostic Equipment (TMDE), Automatic Test Equipment (ATE), and Built-in Test Equipment (BITE) concepts will be discussed). This plan will support preparation of the Integrated Logistics Support Plan.

* - Complete information for these paragraphs may not be available when the initial O&O Plan is prepared.

JUSTIFICATION FOR MAJOR SYSTEM NEW START (JMSNS)

Prepare JMSNS in the format shown below. Do not exceed 3 pages, including annexes. Identify any supporting documentation.

A. Defense Guidance Element. Identify the element of Defense Guidance to which the system responds.

B. Mission and Threat. Identify the mission Are (numbers and title) and describe the role of the system in the mission area. Discuss the DIA-validated projected threat and the shortfalls of existing systems in meeting the threat. Comment on the timing of the need and general priority of this system relative to others in this mission area. The TRADOC school or Integrating Center must obtain a DIA-validated threat from INSCOM early so as not to delay JMSNSN preparation. The classification should be as low as possible; NORORM data should not be included. DIA threat documentation should be referenced in lieu of higher classification. If the need is not threat driven describe the basis for the need (e.g., cost savings).

C. Alternative Concepts. Describe the alternatives which will be considered (including product improvements) and, when appropriate, the alternative selected, the reasons for rejecting those that have not been selected, and any further tradeoffs that remain for the selected system.

D. Technology Involved. Discuss maturity of the technology planned for the selected system design and manufacturing processes, when appropriate, with particular emphasis on remaining areas of risk.

E. Funding Implications. Provide gross estimates of total RDT&E cost, total procurement cost, unit cost, and life-cycle cost. Discuss affordability. See Appendix D, this Handbook, for funding format.

F. Constraints. Describe, as applicable, key boundary conditions for satisfying the need, such as survivability; logistics, manpower and personnel constraints in both quantity and quality; standardization or interoperability within NATO or other DoD Components; and critical materials and industrial base required.

G. Acquisition Strategy. Provide summary of salient elements of proposed acquisition strategy -- program structure, competition, contracting, etc.

LETTER OF AGREEMENT (LOA)

The Letter of Agreement (LOA) will be in the format below. Limit information to that necessary for a HQDA decision. The basic document should not exceed four pages. In the LOA, use less detail and broader performance bands than in the ROC, JSOR, LR, and TDR. Terms in each paragraph of the LOA will evolve into more specific terms in the ROC, LR, and TDR. Include in the LOA all alternative system concepts recommended for demonstration and validation.

1. TITLE

   a. Give a descriptive title for the program.
   b. CARDS reference number.

2. NEED/THREAT. State what is needed. Briefly describe the threat and operational/training deficiency need for the system. Include the enemy's capability to detect, identify, locate, avoid, suppress, destroy, or otherwise counter the system. Describe the responsive threat over time to support evolutionary development when applicable.

3. TIMEFRAME AND IOC. State the timeframe in which the new or improved system is needed.

4. OPERATIONAL & ORGANIZATIONAL PLAN: In a brief paragraph state --

   a. How the equipment will be used;

   b. Geographical areas of use;

c. Weather an climatological factors to be considered during equipment operations; and

The type of units that will use and support the equipment.

Attach the mission profile to the LOA as an Annex.

5. ESSENTIAL CHARACTERISTICS. Describe only main operational feature of the system. Included Are counter-countermeasure capabilities, health, physical security, safety, and human factors engineering requirements, and reliability, availability, and maintainability (RAM) requirements. Performance must be responsive to battlefield environmental conditions of continuous combat (such as full ECM, smoke, aerosals, rain, fog, haze, and dust).

Express performance and reliability characteristics in bands of performance. Those which Are not suitable for banding will be stated as single values. During development, commercial, other service, NATO, or other allied nation characteristics of existing or programmed systems should be considered for inclusion. This will be with a view toward establishing a basis for interoperability, co-production, or standardization. Bands of performance should be flexible enough to consider competing systems of other services or allied nations. Stated bands of performance, or single value characteristics will be adjusted only after the combat and materiel developers agree that such changes Are necessary. DCSOPS will approve changes for documents previously approved by DCSOPS. The requirements and provisions for the following must be considered.

a. Interoperability;

b. Continuity of operations (CONOPS);

c. Security;

d. Reliability, availability, and maintainability (RAM) derived from mission performance parameters.

e. Standardization, including commonalty for hardware and software to which the system will adhere;

f. Nonnuclear/nuclear survivability; NBC contamination/ decontamination survivability;

g. Individual/collective protection equipment;

h. Adverse weather and reduced visibility conditions (smoke and obscurants) operations, and military operations on urbanized terrain (MOUT) where applicable;

i. Communications;

j. Operation transportability, such as: transportable in C-141 type aircraft requiring not more than.....hours teardown and..... hours setup by operator and crew, etc.

6. TECHNICAL ASSESSMENT. In the LOA, divide this paragraph into operational, technical, logistics, training, and manpower subparagraphs. In each, describe what the combat and material developers, logistician, trainer, and personnel administrator must do to produce the total system. Include a listing of major events and dates.

7. LOGISTICS SUPPORT PLAN. Briefly describe the logistics support plan. The logistics support plan will be available for evaluation during OT I.

8. TRAINING ASSESSMENT. Discuss the need for system training devices. When required include description as an annex. (See p. 6.20 for format). new Equipment Training (NET), operator and maintenance personnel training, and technical manuals and training material requirements will be stated in terms of needs for both the institution and unit training levels. The training support plan will be available for evaluation during OT I.

9. MANPOWER/FORCE STRUCTURE ASSESSMENT. Estimate manpower requirements per system, using unit, and total Army by component (Active, ARNG, USAR). Identify manpower savings resulting from replaced systems, if any. Include a statement to require an assessment of alternatives to reduce manpower requirements and an assessment of force structure implications resulting from system inclusion in the total force by component. If the force

structure assessment exceeds current programmed force structure tradeoffs within mission area or mission elements Are required. Tradeoffs analyses Are addressed to the degree necessary to bring the force structure assessment within current programming levels, if possible. The personnel support plan will be available for evaluation during OT I.

10. RATIONALIZATION, STANDARDIZATION, INTEROPERABILITY. Discuss other Services, NATO, and other foreign interest in the program. Identify similar programs contemplated by other services, NATO or other allies.

11. LIFE CYCLE COST ASSESSMENT. See appendix 1.

12. MILESTONE SCHEDULE. A listing of significant events with dates to occur between approval of the LOA and next scheduled milestone review. The following should be included: LOA approval, DT/OT/other test (Market/user Survey for OTS), and next scheduled milestone review.

APPENDIX 1 - Life Cycle Cost Assessment - Provide life-cycle costs using mainly summary parametric estimating techniques. State the major life-cycle phases of R&D, investment, and operation and support. Also include the design to cost goals. As much as possible, show the estimated cost of major items or components below the system level. These data should be consistent with the Materiel System Requirements Specification (MSRS) and Baseline Cost Estimate (BCE).

ANNEX A - Coordination. List all major commands, other Services, allied nations, and activities with whom the LOA was coordinated. Provide full rationale for nonacceptance of comments, if any.

ANNEX B - Operation Mode Summary/Mission Profile Annex. List tasks and conditions for frequency and urgency viewed for system

employment in military operations. The mission profile is logically derived from the O&O Plan. It provides the starting point for developing the system characteristics. See p. 5.23 for format for mission profile.

ANNEX C - COEA Annex. Executive summary of the COEA. Classify as required. Withdraw after HQ TRADOC approval of the LOA and handle as a separate document for transmittal as needed.

ANNEX D - Rationale Annex. Support various characteristics stated in the LOA. This provides an audit trail and rational for determining how the characteristics were derived.

ANNEX E - RAM Rationale Annex. Executive summary of the RAM Rational Report. Support the stared RAM characteristics with a logical argument that begins with the task frequency, conditions, and standards described any analyzed in the MAA. This provides an audit trail and rational for determining how the characteristics were derived. TRADOC/DARCOM Pamphlet 70-11 contains guidance on the preparation of both the RAM Rationale Report and the RAM Rational Annex.

ANNEX F - Training Devices. When required, include description of needed training devices in format on p. 6.20. A separate annex is required for each training device.

NOTES:

1. All annexes will accompany the LOA until it has completed TRADOC and DARCOM staffing.

2. Send A, B, and F with the LOA when forwarded to HQDA for approval.

REQUIRED OPERATIONAL CAPABILITY (ROC) FORMAT

The Required Operational Capability (ROC) is in the format below. Limit information to that necessary for a HQDA decision. The basic document should not exceed four pages.

1. TITLE

   a. Give a descriptive title for the program.
   b. CARDS reference number

2. NEED/THREAT. Briefly describe the operational/training deficiency need for the system and the reactive threat to the system. Include the enemy's capability to detect, identify, locate, avoid, suppress, destroy, or otherwise counter the system. Describe the responsive threat over time to support evolutionary development when applicable.

3. TIMEFRAME AND IOC. State the IOC date including IOCs for successive evolutionary model, when appropriate.

4. OPERATIONAL AND ORGANIZATIONAL PLAN (O&O Plan). In a brief paragraph state:

   a. How the equipment will be used;
   b. Geographical areas of use;
   c. Weather and climatological factors to be considered during equipment operations;
   d. Battlefield conditions (such as ECM, smoke, and dust) in which the system will operate; and
   e. The type of units that will use and support the equipment.

5. ESSENTIAL CHARACTERISTICS. Describe only main operational features of the system. Included Are counter-countermeasure capabilities, health, safety and human factors engineering requirements, and reliability, availability, and maintainability (RAM). Performance must be responsive to battlefield environmental conditions of continuous combat 9such as full ECM, smoke, aerosols, rain, fog, haze, and dust).

Express performance and reliability characteristics in bands of performance. Those which are not suitable for banding will be stated as single values. During development, commercial, other Service, NATO, or other allied nation characteristics of existing or programmed systems should be considered for inclusion with a view toward establishing a basis for interoperability, co-production, or standardization. Bands of performance should be flexible enough to consider competing systems of other Services or allied nations. Stated bands of performance, or single value characteristics Are adjusted only after the combat and materiel developers agree that changes Are necessary. DCSOPS will approve changes for documents previously approved by DCSOPS. The requirements and provisions for the following must be considered:

a. Interoperability;
b. Continuity of operations 9CONOPS);
c. Security;
d. Reliability, availability, and maintainability (RAM) derived from mission performance parameters;
e. Standardization, including commality for hardware and software to which the system will adhere;
f. Nuclear survivability; NBC contamination survivability;
g. Individual/collective protection equipment;
h. Adverse weather and reduced visibility (smoke and obscurants) operations, and military operations on urbanized terrain (MOUT) where applicable;
i. Communications.

j. Operation transportability requirements, such as: transportable in C-141 type aircraft requiring not more than ... hours teardown and .... hours set by operator and crew;

k. P3I

6. TECHNICAL ASSESSMENT. In the ROC, include a brief paragraph about the technical effort required. Address major areas for full scale development interms of scope, technical approach, and associated risks in high, medium, low, or similar categories. For NDI items, briefly outline completed or planned market survey efforts and/or military suitability evaluations.

7. LOGISTICS SUPPORT PLAN. Briefly describe the logistics support concept. The logistics support package will be tested during OT II.

8. TRAINING ASSESSMENT. Discuss the need for system training devices. When required, include description as an annex to the ROC. (see p. 6.16 for format). New equipment training (NET) operator and maintenance personnel training, and technical manuals and training materiel requirements will be stated in terms of needs for both institution and unit training levels. The training support package will be tested during OT II.

9. MANPOWER/FORCE STRUCTURE ASSESSMENT. Estimate manpower requirements per system, using unit, and total Army by component (Active, ARNG, USAR). Identify manpower savings resulting from replaced systems, if any. Include a statement to require an assessment of alternatives to reduce manpower requirements and an assessment of force structure implications resulting from system inclusion in the total force by component.

If the force structure assessment exceeds current programmed force structure levels then identification of force structure tradeoffs within mission area or mission elements is required.

Tradeoffs analysis Are addressed to the degree necessary to bring the force structure assessment within current programming levels, if possible. The personnel support package will be tested during OT II.

10. STANDARDIZATION, INTEROPERABILITY. Discuss other Service, NATO, and other foreign interest in the program. Identify similar programs contemplated by other Services, NATO or other allies.

11. LIFE CYCLE COST ASSESSMENT. See appendix 1.

12. MILESTONE SCHEDULE. A listing of significant events with dates to occur between approval of the ROC and next scheduled milestone review. The following should be included: ROC approval, DT/OT/other test (Market/user Survey for OTS), and next scheduled milestone review.

APPENDIX 1 - Life-cycle Cost Assessment. Provide life-cycle costs using mainly summary parametric estimating techniques. State the major life cycle phases of R&D, investment, and operation and support. Also include the design-to-cost goals. As much as possible, show the estimated cost of major items or components below the system level. (These data should be consistent with the Materiel System Requirements Specification (MSRS) and Baseline Cost Estimate (BCE)

ANNEX A - Coordination. List all major commands, other Services, allied nations and activities with whom the ROC was coordinated. Provide full rationale for nonacceptance of comments, if any.

ANNEX B - Operational Mode Summary/Mission Profile Annex. List tasks and conditions for frequency and urgency viewed for system employment in military operations. The mission profile is logically derived from the operational/training concept. It

provides the starting point for developing the system characteristics.

ANNEX C - COEA Annex. Executive summary of the COEA. Classify as required. Withdraw after HQ TRADOC approval of the ROC and handle as a separate document for transmittal as needed.

ANNEX D - Rational Annex. Support various characteristics stated in the ROC. This provides an audit trail and rationale for determining how the characteristics were derived.

ANNEX E - RAM Rationale Annex. Executive summary of the RAM Rationale Report. Support the sated RAM characteristics with a logical argument that begins with the task frequency, conditions, and standards described and analyzed in the Mission Area Analysis (MAA). This provides an audit trail and rationale for determining how the characteristics were derived. TRADOC/DARCOM Pamphlet 70-11 contains guidance on the preparation of both the RAM Rationale Report and the RAM Rationale Annex.

ANNEX F - TRAINING DEVICE ANNEX. Include when appropriate. (See p. 6.20 for format). A separate annex is required for each training device.

NOTES:
1. Send annex A with each requirements document
2. Annex F (when prepared) must accompany the ROC to HQDA for approval as a package
3. Send the TBOIP/TQQPRI with the ROC to HQDA for approval. When the TBOIP/TQQPRI Are not submitted, the transmittal letter will contain a statement about the projected submission date.

APPENDIX B

MODIFICATION TABLE OF ORGANIZATION AND EQUIPMENT (MTOE)

APPENDIX B

MODIFICATION TABLE OF ORGANIZATION AND EQUIPMENT (MTOE)

B-1. General. This appendix includes a sample MTOE document as it appears when printed after approval. The MTOE document is available by request via a transaction from Cycle II.

B-2. Subunits. All subunits or elements of a parent unit within the same geographical command (proponent) Are documented in the parent unit MTOE; such units include Air Defense Missile Batteries and Special Forces Companies.

B-3. Split Unit. An element to a parent unit stationed in a major command different than the main or headquarters portion of the unit. Each split unit that is assigned to a major Army command that is different from that of the parent or headquarters element is required to submit TAADS documents.

B-4. Composite units. A composite unit is built by combining one or more cellular SRC to accomplish a specified mission.

a. When constructing a composite unit, select only the teams needed to provide the capability to accomplish the assigned mission. Personnel and equipment may be added to or deleted from the individual teams in order to provide the specific needs. Once a composite unit has been established in the data base, subsequent changes Are processed in the same manner as for all MTOE.

b. HQDA regulations governing the organization of TOE units and all personnel staffing and equipment criteria must be applied

when adjusting the selected teams into a balanced unit. As with all MTOE units, the required column must be developed as level 1. Normally, in composite units the authorization column will agree with the required column. Exceptions must be approved by HQDA.

B-5. Discretionary items of equipment. Although pre-H series TOE contain 600 series remarks identifying certain equipment as WABTOC, etc., i.e., "discretionary", the term is no longer valid in TAADS. Therefore, items that Are designated by 600 series remark will be processed the same as organic items, i.e., each unwanted item must be specifically deleted. As units Are organized under H or subsequent series TOE, references to these 600 remark items will disappear.

B-6. Category. Category for MTOE is determined by USATRADOC on the basis of the unit's mission, tactics, and normal employment. Category I units Are further subdivided into two types which Are identifiable by SRC on the TOE file. Category I Type A units Are to be documented male only with corresponding MOS, ASI, and SQI as prescribed in the DA 600 series regulations and circulars. Category I Type B units can be documented with male, female, or interchangeable identities.

EXPLANATORY REMARKS
TAADS

Explanatory remarks are keyed to the circled numbers on the sample report.

1. Document Identity. The MTOENUM and CCNUM for the specific document. Category and type Are printed for Category I units.

2. Letter/Document Title. The standard letterhead of the command which prints the document.

SECTION I ORGANIZATION

3. Section I. a. Since the Section I of a base TOE applies to an MTOE, only the changes to the base Are required in TAADS (except for composite units). Changes Are made through an automated, two-paragraph input maintained at the proponent. At HQDA, the section is retained in the file during document processing and deleted when the document is approved.

b. Section I for composite units is not automated and must be prepared in accordance with procedures applicable to TDA (app C).

c. Only parent unit Section I is addressed in TAADS. The subunit base TOE Section I provides organizational guidance for each subunit within the parent unit.

d. Split units will subunit Section I applicable to the particular units.

4. Modification from Base.

a. Paragraph 1 contains the principal modifications from the base TOE used in the construction of the MTOE. All modifications Are limited to paragraph 1 without subparagraphing. Additions or deletions of related authorization publications (CTA, etc.) Are also included in this paragraph, space permitting. Capabilities at various levels of organization Are not required unless the capabilities Are modified. The last sentence of the paragraph sates the unit ALO. When subunits of a

parent unit Are required to report readiness (see ARE 220-1), the ALO must be shown for both the parent unit and each subunit therein.

b. Paragraph 1 must always reference the base TOE or consolidated change table, as part of the paragraph title. The paragraph is cumulative, listing the previous and current modifications to the document. Modification data cannot exceed 22 lines of 60 characters each, including spacing. When there Are no principal modifications, the work "NONE" will appar.

5. Parent Units organized under this MTOE. Paragraph 2 lists each parent unit organized under the MTOE by UIC, Unit Designation, DATE of unit, Command of Assignment Code, and ITAADS code if applicable. DATES may differ between units under the same MTOE. Paragraph 2 has no limitation and may be continued on additional pages as required. At least one unit must be reflected in the paragraph.

6. Supersessions. Shows the MTOE and CCNUM of the superseded document. When activating a unit under a new document, the entry will be "NONE."

7. AMS Code is required in MTOE Section I. It must consist of at least 6 positions, and be a valid code as listed in the AMSC portion of the Edit Master File (ARE 37-100-XX).

SECTION II PERSONNEL ALLOWANCE

8. Page Heading. Each page heading reflects the page number, Document Section MTOE, CCNUM, and the date and time prepared.

9. Parent Unit Data. The parent unit title (TOE title), SRC subunit multiplier and designator Are listed. See ARE310-49 for construction of SRC.

10. a. Paragraph number A numeric 3-position code is used to identify each subunit paragraph. The first digit is limited to numeric characters 1 through 9. The second and third digits differ when applied to cellular or noncellular units.

(1) Noncellular parent units always have 00 in the second and third positions. Subunits are listed in the same sequence as in the base TOE. Parent units having one SRC Are identified with 100.

(2) Cellular (composite) units Are identified by alpha characters in the eighth and ninth positions of the SRC. The Master SRC is numbered 100 and is constructed for the principal HQ element (first para). Each cell (para) in ascending sequence is assigned a number beginning with 101.

b. Subunit Multiplier. List the number of subunits under each subelement SRC. The term subunit denotes any organization (except cellular), such as, company, battery, etc., that has a unique SRC in the TOE Battalion recap document (Base TOE). A subunit multiplier is not used for cellular documents. When multiple teams Are the same paragraph of a cellular document, the number of teams is shown in each paragraph header. The quantities in the "Parent Unit Line Totals" column reflect the total of all teams.

c. Subunit Title. The subunit title is the same as the base TOE.

d. Subunit SRC. The SRC relates the subelement to the TOE paragraphs to MTOE paragraphs. Therefore, the ADPS has the capability to apply cellular TOE changes automatically to the MTOE in Cycle II.

e. Subunit Designator. An additional means to relate the subunit to the parent unit. Designators Are defined in ARE 310-49. Subunit designators do not apply to cellular type units.

11. Paragraph Description. The first line of each paragraph identifies the subunit within the parent unit followed by subparagraph listing of elements within the subunit. Subparagraph titles Are indicated as line "00". For other paragraph description, a duty position title indicates the duties to be performed in accordance with the base TOE. Then a description from the base TOE is not appropriate, the line will be deleted and new line added. Description in new lines will be in accordance with the ARE 611 series.

12. Description. Provides subunit title on first line and position titles included in that subunit. Duty position title and not exceed 20 positions.

13. Grade. A two-position code as listed ARE 310-49.

14. MOS. A five-position code defined in ARE 310-49.

15. ASI/LIC. Two, two-position coes. Additional Skill Identifier (ASI) and Language Identifier Code (LIC), Are described in ARE 310-49. A maximum of two codes is allowed per line. ASI entries have priority over LIC and if there Are two ASI a LIC would have to be entered as a non-standard remark.

16. Branch and ID. Branch is a two-position code and ID is a one-position code as listed in ARE 310-49. Documentation of branch is optional for commissioned officers. Branch is not applicable to warrant officers.

17. Subunit Line Total. The required/authorized quantities for each subunit after the multiplier has been applied.

18. Not Used.

19. Parent unit Net Change. Total net changes for all subelements Are shown only in the first printed document after the change.

a. The differences between the parent unit totals of the base document and the parent unit totals of the approved (new) document.

b. When data elements, other than quantity, have changed from the base document, the letter "C" is used to denote a change.

c. Net changes Are not shown for TOE series conversions or activations.

20. Remarks. Standard remarks Are defined in ARE 310-49. Remark code entries Are limited to two position codes in Section II and one three positions code in Section III.

21. Asterisks. Are used to reflect ommision of data in sample MTOE.

22. Totals. Provides subunit, parent unit and other than Army totals for personnel.

23. Remarks Description. Non-standard/standard remarks descriptions Are printed out at the end of each section. ASI/LIC Are also printed in Section I. A maximum of 240 characters (60 characters for 4 lines) is provided for each remark code.

24. Recapitulation.

a. Recapitulation by Identity. Only the identify groups in the documents Are listed. The subunit paragraph quantities apply to singular subunit data only. multiple subunit data Are computed and included in the parent unit totals.

b. Recapitulation by Grade, POS, ASI/LIC and Branch. Grade is listed in descending sequence within the identity group. Within grade, the POS and sort by ASI/LIC is listed din ascending sequence. Within POS/ASI/LIC, the branch is shown alphabetically. The recapitulation is presented by singular subunit.

c. When the document relates to a parent unit without subunits the data is shown for the parent unit only.

d. Subunit columns Are limited to seven and any excess subunits over seven will be included in the parent unit total column.

SECTION III EQUIPMENT ALLOWANCE

25. Paragraphs. Each paragraph will list the equipment related to the like number paragraph in Section II. Equipment is listed in alphanumeric line item number (LIN) sequence within paragraph.

26. Equipment Readiness Code. ER will print an "A" for primary weapons and equipment, "B" for auxiliary equipment and "C" for administrative support equipment.

27. Nomenclature. Generic nomenclature (SB 700-20) is limited to 63 characters.

28. Equipment Recapitulation. Equipment is recapitulated in alphanumeric order by singular subunit data only. Multiple subunit data Are computed and included in the parent unit totals. Nomenclature is limited to the first 20 spaces of the generic nomenclature. There is no edit to preclude disparities in DRC, therefore, it may erroneously differ for the same LIN documented in several paragraphs. If this condition exists the recap will contain the ERC which is the first one documented.

29 Last Page Notation. Self-explanatory.

ITAADS

MTOE may be used for document and consolidated change document prints and management extracts. MTOE cannot be initiated or changed at installation. New MTOEs Are initiated at MACOM level and forwarded to the installation master file as a staffing document. The first workfile update after receipt of the staffing MTOE will automatically produce a double spaced report of the document. The installation can then change the staffing

document on the workfile. When the document is ready to be forwarded back to the MACOM, an Input Analysis Report, type B, should be requested prior to transmitting it to the MACOM. The staffing MTOE is automatically deleted from the installation data base when it is forwarded to the MACOM.

PREPARED ON DATE 770906 160R MRS. MODIFICATION TABLE OF ORGANIZATION AND EQUIPMENT (MTOE) (1) MTOE 07045HTC01
PCN NO. ANV-901 CCNUM TC0176
PAGE 1

(2) HEADQUARTERS CATEGORY I UNIT TYPE A
U. S. ARMY TRAINING AND DOCTRINE COMMAND
4TH BN 31ST INFANTRY FT SILL

(3) SECTION I: ORGANIZATION

(4) 1. AR 725-1 AND CC TABLE 300-57 HAVE BEEN APPLIED TO PERS AND EQUIP FROM AUTH TUE. FY 76 MCGA ALLOCATIONS AND MAY 1974 MAN POWER SURVEY APPLIED. IMPLEMENTS CONVERSION FROM G SERIES TO H SERIES. UNIT IS UGN AT ALC 1.

2. PARENT UNITS ORGANIZED UNDER THIS MTOE:

(5) UIC	UNIT IDENTIFICATION	EFFECTIVE DATE	CMD OF ASGMT	ITAADS CODE
WEBWAA	4TH BN 31ST INFANTRY	750701	TCST	TO

(6) SUPERSESSIONS: THIS MTOE SUPERSEDES MTOE 07045GTC02 CCNUM TC0174

(7) AMS CODE: 8147715

LAST PAGE OF SECTION 1

B-11

PAGE 2 (8) SECTION II PERSONNEL ALLOWANCE G7045HTC01 TC01?6
PREPARED ON DATE 7?0906 1?01 HRS.

SUB-UNIT PARA	MULTI-PLIER	UNIT TITLE (9) (10)	SRC	SUB-UNIT DESIGNATER
		4TH BN 31ST INFANTRY FT STEL	G7045HC1CCC1CC	AA
100	?	HHC, INF BN (MECH)	G7046HC1005100	TO
200	?	RIFLE CO, INF BN (MECH)	G7047H01C05100	BB

(11) PARA	LINE	MULTI-PLIER	(12) DESCRIPTION	(13) GR	(14) MOS	(15) ASI/LIC	(16) LA	IL	(17) SUB-UNIT LINE REQ	SUB-UNIT TOTAL AUTH	(18) PARENT-UNIT LINE REQ	PARENT-UNIT TOTAL AUTH	(19) PARENT-UNIT NET CHANGE REQ	NET CHANGE AUTH	(20) REMKS
100		?	HHC, INF BN (MECH)												
101	00		BATTALION HQ												
101	01		BATTALION COMMANDER	04	11C00		IN	O	1	1	1	1			11 36
101	02		EXECUTIVE OFFICER	04	11C00		IN	O	1	1	1	1			11 2M
101	03		S3	04	11A00		IN	O	1	1	1	1			11
101	04		COMMUNICATION OFF	03	25A00		SC	O	1	0	1	0			T6
101	04A		COMMUNICATION OFF	02	25A00		SC	O	0	1	0	1			T6
101	05		MOTOR OFFICER	04	77D00		IN	O	1	0	1	0			
101	05A		MOTOR OFFICER	02	77D00		IN	O	0	1	0	1			
101	06		S1	03	41A00		IN	O	1	1	1	1			
101	07		S2	03	35A00		IN	O	1	0	1	0			
101	07A		S2	02	35A00		IN	O	0	1	0	1			
101	08		S4	03	92B00		MC	O	1	1	1	1			
101	09		COMD SERGEANT MAJOR	E9	00Z50		MC	E	1	1	1	1			08
			PARAGRAPH TOTAL						9	9	9	9			
102	00		COMPANY HEADQUARTERS												
102	01		COMPANY COMMANDER	03	11A00		IN	O	1	1	1	1			11
102	02		EXECUTIVE OFFICER	02	11A00		IN	O	1	1	1	1			
102	03		FIRST SERGEANT	E8	11B50		MC	E	1	1	1	1			
102	04		SUPPLY SERGEANT	E6	76Y30		MC	E	1	1	1	1			
102	05		UNIT CLERK	E5	75B20			E	1	1	1	1			
102	06		ARMORER	E4	76Y10			E	1	1	1	1			
102	07		LT VEHICLE DRIVER	E3	11B10			E	1	1	1	1			2P
102	08		SUPPLY CLERK	E3	76Y10			E	1	1	1	1			01
102	09		OP/TRAINING SERGEANT	E6	11B30		MC	E	1	1	1	1			
			PARAGRAPH TOTAL						9	9	9	9			

(21) * * *

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PARA	LINE	MULTI-PLIER	DESCRIPTION	GR	MOS	ASI/LIC	BR	ID	SUB-UNIT LINE TOTAL REQ	SUB-UNIT LINE TOTAL AUTH	PARENT-UNIT LINE TOTAL REQ	PARENT-UNIT LINE TOTAL AUTH	PARENT-UNIT NET CHANGE REQ	PARENT-UNIT NET CHANGE AUTH	RMKS
203	00		3 RIFLE PLATOON HQ												
203	01		PLATOON LEADER	O2	11C00		IN	O	3	3	3	3			
203	02		PLATOON SERGEANT	E7	11B40		NC	E	3	3	3	3			
203	03		RAD TELEPHONE OP	E3	11B10			E	3	3	3	3			G1
			PARAGRAPH TOTAL						9	9	9	9			
204	00		9 RIFLE SQUADS												
204	01		SQUAD LEADER	E6	11B30		NC	E	9	9	9	9			
204	02		TEAM LEADER	E5	11B20		NC	E	18	18	18	18			
204	03		AUTO RIFLEMAN	E4	11B10			E	18	18	18	18			
204	04		GRENADIER	E4	11B10			E	18	18	18	18			13
204	05		PER CARRIER DRIVER	E4	11B10			E	9	9	9	9			11
204	06		RIFLEMAN	E3	11B10			E	27	27	27	27			1A
			PARAGRAPH TOTAL						99	99	99	99			
205	00		3 WEAPONS SQUADS												
205	01		SQUAD LEADER	E6	11B30		NC	E	3	3	3	3			
205	02		GUNNER	E4	11B10			E	6	6	6	6			11
205	03		MACHINE GUNNER	E4	11B10			E	6	6	6	6			11
205	04		PER CARRIER DVR	E4	11B10			E	3	3	3	3			11 YM
205	05		AMMUNITION BEARER	E3	11B10			E	3	3	3	3			
205	06		ASST MACH GUNNER	E3	11B10			E	6	6	6	6			11
205	07		ASST MACH GUNNER	E3	11B10			E	6	6	6	6			11
			PARAGRAPH TOTAL						33	33	33	33			
			SUB-UNIT TOTAL						164	164	164	164	-1	-1	
			PARENT-UNIT TOTAL						219	218	219	218	-3	-3	
			OTHER THAN ARMY						0	0	0	0			

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3a

PAGE 6 SECTION II PERSONNEL ALLOWANCE 07045HTC01 TC017C
PREPARED ON DATE 770906 .608. MOS.

REMARKS:

(23)

TA 1 EM DESIGNATED GUNNER FOR .50 CAL MG DURING DISMOUNTED OPERATIONS.
TB ALSO COMMANDS COMMUNICATION PLATOON.
YM ALSO AMMUNITION BEARER.
ZM ALSO INFO OFFICER.
ZP ALSO RADIO TELEPHONE OP.
ZQ 1 EM ALSO RADIO TELEPHONE OP.
ZU RMK 01 APPLIES TO 1 EM.
ZY ALSO MOTOR OFF
01 ALSO LIGHT VEH DVR
07 ALSO INFO NCO
08 ALSO EDUC NCO
11 ARMED W/PISTOL, AUTO CAL 45
13 ARMED W/M16A1 AND M203 GREN LAUNCHER
25 ALSO ASST S4
36 COMMAND DESIGNATED POSITION

ASI/LIC:

5U QUALIFIED IN OPR OF AIR FIRE EQUIP IN JOINT OPERATIONS OF GR

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(24) RECAPITULATION BY IDENTITY

	SUB-UNIT PARA 100 REQ	SUB-UNIT PARA 100 AUTH	SUB-UNIT PARA 200 REQ	SUB-UNIT PARA 200 AUTH	PARENT UNIT TOTAL REQ	PARENT UNIT TOTAL AUTH
OFFICERS	14	14	5	5	19	19
WARRANT OFFICERS	0	0	0	0	0	0
ENLISTED	41	40	159	159	200	199
TOTAL	55	54	164	164	219	218

RECAPITULATION BY GRADE, MOS, ASI/LIC AND BRANCH

GR	MOS	ASI/ LIC	BR	SUB-UNIT PARA 100 REQ	SUB-UNIT PARA 100 AUTH	SUB-UNIT PARA 200 REQ	SUB-UNIT PARA 200 AUTH	PARENT UNIT TOTAL REQ	PARENT UNIT TOTAL AUTH
OFFICERS									
05	11C00		IN	1	1	0	0	1	1
05 TOTAL				1	1	0	0	1	1
04	11A00		IN	1	1	0	0	1	1
	11C00		IN	1	1	0	0	1	1
04 TOTAL				2	2	0	0	2	2
03	11A00		IN	1	1	0	0	1	1
	11A00	5U	IN	1	0	0	0	1	0
	11C00		IN	0	0	1	1	1	1
	25A00		SC	1	0	0	0	1	0
	35A00		IN	1	0	0	0	1	0
	41A00		IN	1	1	0	0	1	1
	77D00		IN	1	0	0	0	1	0
	92B00		MO	1	1	0	0	1	1
03 TOTAL				7	3	1	1	8	4
02	11A00		IN	1	1	0	0	1	1
	11A00	5U	IN	0	1	0	0	0	1
	11C00		IN	2	2	4	4	6	6
	25A00		SC	0	1	0	0	0	1
	35A00		IN	0	1	0	0	0	1

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(25) PARA	LIN	(26) ERC	MULTI-PLIER	(27) NOMENCLATURE	SUB-UNIT LINE TOTAL REQ (17)	SUB-UNIT LINE TOTAL AUTH (17)	PARENT-UNIT LINE TOTAL REQ (18)	PARENT-UNIT LINE TOTAL AUTH (18)	PARENT-UNIT NET CHANGE REQ AUTH (19)	RMKS (20)
100			1	MMC, INF PN (MECH)						
101				BATTALION HQ						
101	B49272	B		BAYONET-KNIFE: W/SCABBARD FOR M16A1 RIFLE	9	9	9	9		
101	M11895	B		MASK CBR: PROTECTIVE FIELD	9	9	9	9		
101	M96741	A		PISTOL CALIBER .45 AUTOMATIC:	3	3	3	3		
101	R94977	A		RIFLE 5.56 MILLIMETER: W/E	6	6	6	6		
102				COMPANY HEADQUARTERS						
102	B49272	B		BAYONET-KNIFE: W/SCABBARD FOR M16A1 RIFLE	9	9	9	9		
102	B67766	B		BINOCULAR: MODULAR CONSTRUCTION MIL SCALE RETICLE 7X50MM W/I	1	1	1	1		
102	C68719	B		CABLE TELEPHONE: WD-1/TT DR-8 1320 FT	1	1	1	1		
102	C89145	B		CAMOUFLAGE SCREEN SYSTEM: WOODLAND LT WT RADAR SCAT W/C SET SY	10	10	10	10	760	
102	C89213	B		CAMOUFLAGE SCREEN SUPPORT SYSTEM: WOODLAND	10	10	10	10	760	
102	E00533	B		CHARGER RADIAC DETECTOR: PP-1578/PD	4	4	4	4		
102	K87251	A		INSTL KIT: MK-1463/GRC F/AN/VRC-46 53 64 GRC-125 160 IN M715	0	0	0	0		
102	K87338	A		INS KT: MK-1464/U F/VRC-53,64,GRC125,160 INS NOT CVRD BY SPEC	1	1	1	1		
102	L44595	A		LAUNCHER GRENADE 40 MILLIMETER: SGLE SHOT RIFLE MTD DTCHBLE W/	4	4	4	4		
102	L91975	A		MACHINE GUN CALIBER .50: HB FLEXIBLE FOR GROUND USE	3	3	3	3		
102	M11895	B		MASK CBR: PROTECTIVE FIELD	9	9	9	9		
102	M75577	A		MOUNT TRIPOD MACHINE GUN: HEAVY CALIBER 50	3	3	3	3		
102	M96741	A		PISTOL CALIBER .45 AUTOMATIC:	1	1	1	1		
102	Q20935	B		RADIACMETER: IM-93/UD	2	2	2	2		
102	Q21483	B		RADIACMETER: IM-174/PD	1	1	1	1		
102	Q34308	A		RADIO SET: AN/GRC-160	1	1	1	1		
102	R55920	B		REEL CABLE: DR-8	1	1	1	1		
102	R94977	A		RIFLE 5.56 MILLIMETER: W/E	8	8	8	8		
102	V31211	B		TELEPHONE SET: TA-312/PT	1	1	1	1		
102	W34648	B		TOOL KIT CARPENTERS: ENGINEER SQUAD W/CHEST	1	1	1	1		
102	W48348	B		TOOL KIT PIONEER ENGINEER SQUAD: LAND CLR AND BLDG ERECTION	1	1	1	1		
102	W51910	B		TOOL KIT SMALL ARMS REPAIRMAN: ORDNANCE	1	1	1	1		
102	X31940	A		TRUCK CARGO: 1-1/4 TON 6X6 W/E	1	1	1	1		
102	X46009	B		TRUCK CARGO: 2-1/2 TON 6X6 W/E	1	1	1	1	538	
103				BATTALION HQ SECTION						
103	A01881	A		ACCESSORY KIT: MK-1270/V F/AN/VRC-12 47 IN M114	2	2	2	2		
103	A01908	A		ACCESSORY KIT: MK-1320/V F/AN/VRC-12 47 IN M577	3	3	3	3		
103	A01913	A		ACCY KIT: MK-1326/GRC F/AN/VRC-43 46 53 64 GRC-125 160 IN M577	2	2	2	2		

(21) * * *

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PARA	LIN	ERC	MULTI-PLIER	NOMENCLATURE	SUB-UNIT LINE TOTAL REQ	SUB-UNIT LINE TOTAL AUTH	PARENT-UNIT LINE TOTAL REQ	PARENT-UNIT LINE TOTAL AUTH	PARENT-UNIT NET CHANGE REQ	PARENT-UNIT NET CHANGE AUTH	RMKS
205				3 WEAPONS SQUADS	3	3	3	3			
205	A01872	A		ACCY KIT: MK-1261/GRC E/AN/VRC-43 46 53 64 GRC-125 160 IN M113	33	33	33	33			
205	B49272	B		BAYONET-KNIFE: W/SCABBARD FOR M16A1 RIFLE	9	9	9	9			
205	B67766	B		BINOCULAR: MODULAR CONSTRUCTION MIL SCALE RETICLE 7X50MM W/E	3	3	3	3			
205	D12087	A		CARRIER PERSONNEL FULL TRACKED: ARMORED	3	3	3	3			
205	L91838	A		MACHINE GUN CALIBER .50: HB FLEXIBLE VEHICLE MTD	6	6	6	6			
205	L92386	A		MACHINE GUN 7.62 MILLIMETER: LIGHT FLEXIBLE	6	6	6	6			
205	M10936	B		MASK: PROTECTIVE TANK	27	27	27	27			
205	M11895	B		MASK CBR: PROTECTIVE FIELD	3	3	3	3			
205	M75577	A		MOUNT TRIPOD MACHINE GUN: HEAVY CALIBER 50	6	6	6	6			
205	M75714	A		MOUNT TRIPOD MACHINE GUN: 7.62 MILLIMETER	3	3	3	3			
205	N04593	A		NIGHT VISION SIGHT CREW SERVED WEAPONS: AN/TVS-2	27	27	27	27			
205	N96741	A		PISTOL CALIBER .45 AUTOMATIC:	3	3	3	3			
205	Q34308	B		RADIO SET: AN/GRC-160	3	3	3	3			
205	R29799	A		RECEIVER SET RADIO: AN/PRR-9	6	6	6	6			
205	R94977	A		RIFLE 5.56 MILLIMETER: W/E	6	6	6	6			
205	R96484	A		RIFLE RECOILLESS 90 MILLIMETER:	3	3	3	3			
205	U56346	A		SUBMACHINE GUN CALIBER .45:	3	3	3	3			
205	V30252	A		TELEPHONE SET: TA-1/PT	3	3	3	3			
205	X17820	A		TRANSMITTER SET RADIO: AN/PRT-4							

REMARKS:

(22)

219 1 PER SR TRK VEH MECH,TRACK VEH MECH,TRACK VEH MECH HLPR, PWR GEN OP/MECH,SP RECOVERY VEH OP, RECOVERY VEH OP.
238 1 PER SR FLD RADIO MECH,FLD RADIO MECH.
400 1 PER AUTOMATIC RIFLEMAN.
502 1 PER TEST SET ELECTRON TUBE TV-7/U.
506 PERS CARRIER FURN FOR AIR CONTROL TM. AIR CONTROL TM FURN BY AIR FORCE.
520 USED W/LIN W32593.
521 USED W/LIN W32867 AND N65747
522 USED W/LIN W32867.
538 EQUIPPED W/RING MOUNT
542 MTD IN CARRIER COMD POST LT TRACKED.
554 MTD IN CARRIER C AND R ARMORED.
557 COMMAND POST VEHICLE.
559 COMMUNICATIONS VEH. 1 MOUNTS RADIO SET AN/VRC AND 1 MOUNTS RADIO SET AN/VSC-3.
760 SUB OF LIN Z13076 OR Z13078 IS AUTH WHEN UNIT IS OPERATING IN DESERT OR SUN ENVIRONMENT,RESPECTIVELY.

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REMARKS:

762 SUB OF LIN Z13674 OR Z13675 IS AUTH WHEN UNIT IS OPERATING IN DESERT OR SNOW ENVIRONMENT,RESPECTIVELY.

(28)

EQUIPMENT RECAPITULATION

LIN	ERC	DESCRIPTION	SUB-UNIT PARA 100 REQ	SUB-UNIT PARA 100 AUTH	SUB-UNIT PARA 200 REQ	SUB-UNIT PARA 200 AUTH	PARENT UNIT TOTAL REQ	PARENT UNIT TOTAL AUTH
A01872	A	ACCY KIT: MK-1261/GRC	0	0	12	12	12	12
A01877	A	ACCESSORY KIT: MK-126	0	0	2	2	2	2
A01881	A	ACCESSORY KIT: MK-127	2	2	0	0	2	2
A01908	A	ACCESSORY KIT: MK-132	3	3	0	0	3	3
A01913	A	ACCY KIT: MK-1326/GRC	3	3	0	0	3	3
A01936	A	ACCY KIT: MK-1296/G F	0	0	1	1	1	1
A32060	B	ALARM CHEMICAL AGENT	0	0	4	4	4	4
A71438	B	ANTENNA: AT-784/PRC	3	3	2	2	5	5
A72260	B	ANTENNA: RC-292	5	5	2	2	7	7
B49272	B	BAYONET-KNIFE: W/SCAB	57	56	165	165	222	221
B67423	B	BINOCULAR ELECTRONIC:	0	0	3	3	3	3
B67766	B	BINOCULAR: MODULAR CO	11	11	17	17	28	28
B68790	B	BIPOD RIFLE: 5.56 MIL	0	0	18	18	18	18
C52601	B	CABINET TOOL AND SPAR	0	0	1	1	1	1
C53012	B	CABINET TOOL AND SPAR	0	0	2	2	2	2
C68719	B	CABLE TELEPHONE: WD-1	10	10	10	10	20	20
C68856	B	CABLE TELEPHONE: WD-1	6	6	0	0	6	6
C68993	B	CABLE TELEPHONE: WD-1	12	12	8	8	20	20
C89145	B	CAMOUFLAGE SCREEN SYS	48	48	20	20	68	68
C89213	B	CAMOUFLAGE SCREEN SUP	48	48	20	20	68	68
D11401	A	CARRIER COMMAND AND R	2	2	0	0	2	2
D11538	A	CARRIER COMMAND POST:	5	5	0	0	5	5
D12087	A	CARRIER PERSONNEL FUL	1	1	14	14	15	15
E00533	B	CHARGER RADIAC DETECT	5	5	3	3	8	8
E45820	A	CODE CHANGER KEY: KYK	0	0	1	1	1	1
E63728	A	COMPASS MAGNETIC UNMO	2	2	0	0	2	2
E70064	B	COMP RCP PWR DRVN: TR	0	0	1	1	1	1
E94970	A	CONTROL RADIO SET: C-	1	1	0	0	1	1
G44569	C	DRAFTING EQUIPMENT SE	1	1	0	0	1	1
H02300	A	ELECTRONIC TELETYPEWR	1	1	0	0	1	1
J43918	B	GEN ST GAS ENG: 1.5KW	0	0	2	2	2	2

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EQUIPMENT RECAPITULATION

LIN	ERC	DESCRIPTION	SUB-UNIT PARA 100 REQ	SUB-UNIT PARA 100 AUTH	SUB-UNIT PARA 200 REQ	SUB-UNIT PARA 200 AUTH	PARENT UNIT TOTAL REQ	PARENT UNIT TOTAL AUTH
X17820	A	TRANSMITTER SET RADIO	0	0	18	18	18	18
X39940	A	TRUCK CARGO: 1-1/4 TO	3	3	1	1	4	4
X40009	B	TRUCK CARGO: 2-1/2 TO	1	1	2	2	3	3
X60833	A	TRUCK UTILITY: 1/4 TO	5	5	1	1	6	6

LAST PAGE OF SECTION III

** LAST PAGE OF MODIFICATION TABLE OF ORGANIZATION AND EQUIPMENT FOR MTOE 07045HTC01 CCNUM TC0176 **

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***** LAST MODIFICATION TABLE OF ORGANIZATION AND EQUIPMENT MTOE PREPARED ON 770906 *****

APPENDIX C

STANDARD REQUIREMENT CODE (SRC)

APPENDIX C

STANDARD REQUIREMENT CODE (SRC)

B-26. Standard requirements code (SRC).

a. The SRC applies to TOE or MTOE only. It's a nine-position code that identifies a basic TOE, or elements and variations thereof. For TAADS, the SRC has been expanded to 14 positions to increase the data retention capability of the system.

b. Use of SRCs provide an immediate access to data maintained in the master files for elements of or for complete TOE/MTOE.

c. Master SRCs pertain to parent units only. Other SRCs within a document pertain to subelements within a parent unit. When a parent unit, other than composite, is structured under one SRC, that SRC is the Master SRC for the unit. In composite (cellular) type parent units, the first paragraph SRC is the master SRC except for positions 13 and 14, which Are always 00 (numeric) in the master.

d. The construction of an SRC is as follows:

(1) Positions one through nine pertain to the basic TOE.

Position	Example	Meaning
1-2	07015G91000200	Base number. A two-position number identifying branch or major subdivision. Example indicates an infantry branch unit. ARE 310-31 lists base numbers.
3-5	07015G91000200	Subnumber. A three-position number indicating the organizational element of the branch or major subdivision. Normally the 5th position identifies the type of organization; i.e., group, battalion, or company. Example denotes a battalion. ARE 310-31 lists sub-numbers.
6	07015G91000200	Suffix. An alpha character indicating sequential revision
7	07015G91000200	Year. A numeric code derived from the last digit of the year when the basic TOE was published.
8-9	07015G90000200	Variation. A two-position code identifying the variations to the organizational elements of the TOE. The numeric "00" code denotes a standard table without variation.

07015G9100200.....Numeric codes. Codes that indicate variances of the same TOE. The example 10 shows an infantry battalion equipped with 106mm recoilless rifle.

19500G9AAOO1OD.....Alpha codes. Codes that indicate individual teams in cellular TOE. The example denotes Team AA, Platoon Headquarters.

(2) Positions 10 through 14 pertain to TAADS.

10-11.....07015G9100200.....TOE change number. A two-position code indicating the latest change included in the MTOE document. Example shows no change to the basic TOE.

12.....07015G9100200.....Authorized level of organization (ALO). A number or alpha character indicating the unit's level of organization. This code applies to the readiness reporting posture of the unit.

13-14.....31500F5KB08101.....Paragraph number. A two-position numeric code identifying a specific paragraph within a basic TOE.

APPENDIX D

BASELINE MAINTENANCE DATA FROM MARC DATA LIBRARY

BASELINE MAINTENANCE DATA

MA	LIN	Name	Op MOS	Main MOS Unit	AMMH DS	GS
	H31110	OH-58C	Off/WO	35K	208	0	0
				35L	0	21.4	0
				35M	0	5.5	0
				35R	0	21	0
				66V	0	0	0
				66VZ1	0	0	0
				68B	0	0	0
				68D	0	0	0
				68F	0	0	0
				68G	0	0	0
				68H	0	0	0
				TOTAL	208	47.9	0
CSS	X40009	M35 Lt Truck	N/A	43M	0	1.7	0
				63B	321	0	0
				63W	0	78	71
				TOTAL	321	79.7	71
	X39432	M880 Lt Truck	N/A	63B	235.1	0	0
				63W	0	71	54
				TOTAL	235.1	71	54
	X41653	M520 Hvy Truck	N/A	43M	0	1.7	0
				63S	394	0	0
				63W	0	100.9	74.1
				TOTAL	394	102.6	74.1
	X58093	M559 Hvy Truck	N/A	43M	0	1	0
				63J	0	78	98.9
				63S	394	0	0
				63W	0	100.9	74.1
				TOTAL	394	179.9	173

BASELINE MAINTENANCE DATA

MA	LIN	Name	Op MOS	Main MOS	Unit	AMMH DS	GS
	G95787	Stinger	16S	55B	0	0	0
				TOTAL	0	0	0
Aviation	H28647	AH-64 Apache	Off/WO	35K	188	0	0
				35L	0	60.2	0
				35M	0	9.9	0
				35R	0	21	0
				66Y	0	0	0
				67Y	0	0	0
				68BW5	0	0	0
				68DW5	0	0	0
				68FW5	0	0	0
				68G	0	0	0
				68H	0	0	0
				TOTAL	188	91.1	0
	H30517	CH-47D	Off/WO	35KW6	578.1	0	0
				35L	0	60.2	0
				35M	0	345	0
				35R	0	18.1	0
				66YU1	0	0	0
				67YU1	0	0	0
				68B	0	0	0
				68D	0	0	0
				68F	0	0	0
				68G	0	0	0
				68H	0	0	0
				TOTAL	578.1	423.3	0
	K32293	UH-60A Blackhawk	Off/WO	35KZ4	204.8	0	0
				35L	0	359.7	0
				35M	0	91	0
				35R	0	0	0
				66T	0	0	0
				67T	0	0	0
				68B	0	0	0
				68D	0	0	0
				68F	0	0	0
				68G	0	0	0
				68H	0	0	0
				68J	207.3	27.9	0
				68M	0	364	0
				TOTAL	412.1	842.6	0

BASELINE MAINTENANCE DATA

MA	LIN	Name	Op MOS	Main MOS	Unit	AMMH DS	GS
	K57821	M198 Towed Howitzer	13B	41C	0	26	17
				41L	0	67.1	31
				TOTAL	0	93.1	48
	K57667	M109A2 SP Howitzer	13B	29E	0	22.1	0
				31V	20.7	0	0
				41C	0	27	17
				45L	0	588	256
				63D	632.9	0	0
				63H	0	352	398.9
				TOTAL	653.6	989.1	671.9
	L44894	MLRS	13M	13MS3	441	0	0
				27M	0	859.6	153.7
				39B	0	0	70.8
				44B	0	11.2	7.3
				63G	0	29.4	7.3
				63H	0	114.8	114.7
				63J	8.4	8.4	0
				63T	872.2	0	0
				TOTAL	1321.6	1023.4	353.8
Air Defense	J96694	Vulcan SP AD Gun	16R	24M	1134	0	0
				27F	0	1186	216.3
				41C	0	16.9	11
				45L	0	112	49
				52D	184.9	72.9	48.3
				63H	0	197	203
				63Y	637	0	0
				TOTAL	1955.9	1584.8	527.6
	J95533	Chapparal AD System	16P	24N	1599.9	0	0
				27G	0	1680	380.6
				52C	224	109.1	81
				52D	312.1	176	103.7
				63H	0	201	128
				63Y	646	0	0
				TOTAL	2782	2166.1	693.3

BASELINE MAINTENANCE DATA

MA	LIN	Name	Op MOS	Main MOS	Unit	AMMH DS	GS
Armor	T13374	M1 Abrams Tank	19K	29B	0	22.1	0
				31V	20.7	0	0
				35E	0	1.4	3.7
				35H	0	0	4.1
				41CL8	0	68.9	42.7
				45B	0	3.4	2.1
				45E	448	0	0
				45G	0	137.8	0
				45KL8	0	477	281
				63E	748	0	0
				63GL8	0	55.4	2.3
				63HL8	0	611.9	280.6
				63J	25.2	8	14.6
				TOTAL	1241.9	1385.9	631.1
	C76335	M3 Cav Fighting Veh	19D	27ED3	0	131.7	0
				41C	0	8	4
				43M	0	1.4	0
				45B	0	6.6	0
				45K	0	86	0.1
				45T	214	0	0
				63H	0	220.4	80.3
				63TD3	1344.6	0	0
				TOTAL	1558.6	454.1	84.4
Field Artillery	L44644	Lance	13N	15DZ3	295.4	0	0
				27L	0	106.4	113.5
				43L	0	70	305
				63H	0	201	128
				63Y	646	0	0
				TOTAL	941.4	377.4	546.5
	K57392	M102 Towed Howitzer	13B	41C	0	25.1	14
				45L	0	112	24
				TOTAL	0	137.1	38
	K57803	M114 Towed Howitzer	13B	41C	0	15	9
				45L	0	67.1	13
				TOTAL	0	82.1	22

BASELINE MAINTENANCE DATA

MA	LIN	Name	Op MOS	Main MOS	Unit	AMMH DS	GS
Inf	J81750	Bradley	11M	27ED3	0	131.7	0
				41C	0	1.3	0
				43M	0	1.3	0
				45B	0	6.6	0
				45K	0	85.8	0.1
				45T	214.8	0	0
				63H	0	220.5	80.3
				63TD3	1348.5	0	0
				TOTAL	1563.3	447.2	80.4
	B56896	ITV	11HE9	27E	0	105	18.1
				29E	0	22.1	0
				31V	20.7	0	0
				39B	0	0	3.7
				41C	0	2	5
				45K	0	144.1	26
				45T	155	0	0
				63H	0	200.2	111
				63J	14	8.4	9.8
				63T	645.6	0	0
				TOTAL	835.3	481.8	173.6
	M68008	81mm Mortar	11C	41C	0	7	4
				45B	0	21	6
				76Y	11.1	0	0
				TOTAL	11.1	28	10
	B94977	M16A1 Rifle	11B	45B	0	0.8	0.2
				TOTAL	0	0.8	0.2
	L44575	M203 Grenade Launcher	11B	76Y	18.2	0	0
				TOTAL	18.2	0	0
	M09009	SAW	11B	45B	0	4.2	1.3
				76Y	3.5	0	0
				TOTAL	3.5	4.2	1.3

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PRODUCT 3: PERSONNEL CONSTRAINTS

ESTIMATION AID DESIGN SPECIFICATIONS

Prepared By:

Micro Analysis and Design
and
Dynamics Research Corporation

31 December 1987

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for the Behavioral and Social Sciences
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This working paper is an unofficial document intended for limited distribution to obtain comments. The views, opinions, and/or findings contained in this document are those of the author(s) and should not be construed as the official position of ARI or as an official Department of the Army position, policy, or decision, unless so designated by other official documentation.

FINAL

PRODUCT 3: PERSONNEL CONSTRAINTS ESTIMATION AID DESIGN SPECIFICATIONS

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PRODUCT 3: PERSONNEL CONSTRAINTS ESTIMATION AID

SECTION 1.0 - INTRODUCTION

1.1 OBJECTIVE OF PAPER

This document describes design specifications for systematically estimating personnel constraints for Army weapon systems during the earliest phases of the acquisition process. The Personnel Constraints Estimation Aid (PCEA) is one of six automated products being developed in the Army Research Institute's (ARI) Manpower, Personnel, and Training (MPT) aids for the MANPRINT integration $(MPT)^2$ project.

The development of the design specifications is the second phase in a three-phase development process. In the third phase, we will produce and demonstrate software, documentation, and training for the aid.

1.2 OVERVIEW OF $(MPT)^2$ PRODUCTS

Figure 1-1 displays the six $(MPT)^2$ products and their expected roles in the Army's new streamlined Materiel Acquisition Process (MAP). The first four products, the System Performance Requirements Estimation Aid, the Manpower Constraints Estimation Aid, the Personnel Constraints Estimation Aid, and the Training Constraints Estimation Aid, will estimate MPT-related requirements and constraints during the Requirements/Technology Base Activities Phase of the MAP. These requirements and constraints will guide subsequent contractor design activities.

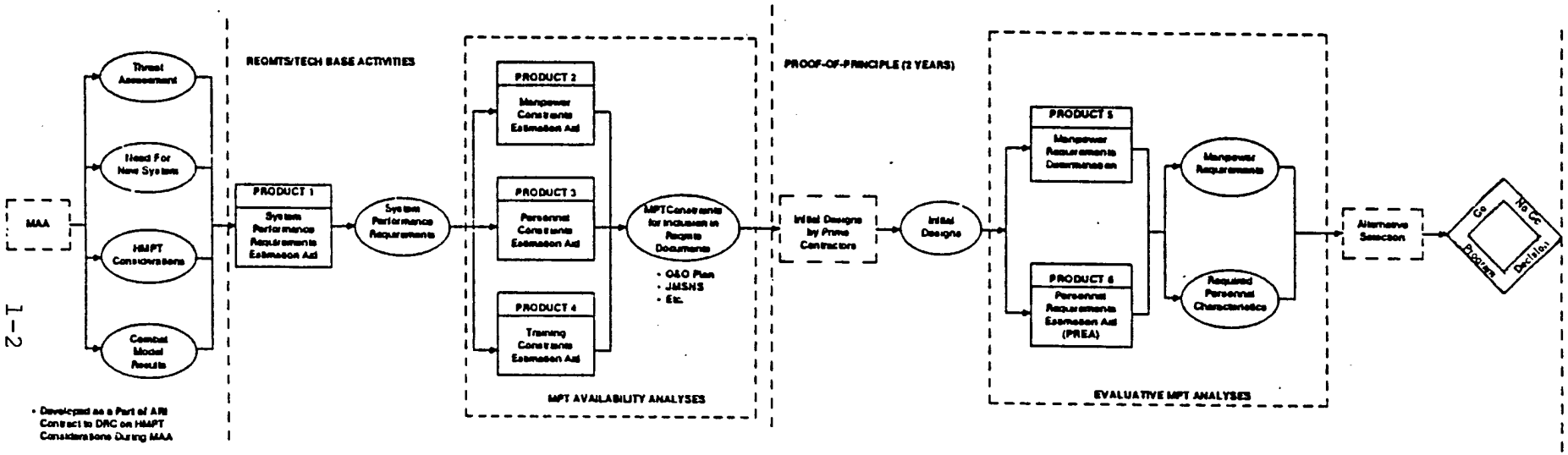


Figure 1-1. Expected Role of Six (MPT)^2 Products.

The System Performance Requirements Estimation Aid (SPREA) will help Army combat developers identify comprehensive and unambiguous system performance requirements needed to accomplish various missions.

The next three $(MPT)^2$ products will determine MPT constraints. The Manpower Constraints Estimation Aid (MCEA) will identify the maximum crew size for operators and maintainers and the maximum Direct Productive Annual Maintenance Manhours (DPAMM) for maintainers. These constraints will be based on assessments of the manpower likely to be available to man the new system.

The Personnel Constraints Estimation Aid (PCEA) will estimate the significant personnel characteristics that describe and limit the capabilities of the probable soldier population from which the new system's operators and maintainers will come. The PCEA will identify the minimally acceptable boundaries for these characteristics.

The Training Constraints Estimation Aid (TCEA) will identify what the new system's training program is likely to look like. It will also determine the maximum time needed to train the new system's operators and maintainers, given available training resources.

The last two aids will help evaluate contractor designs. The Manpower Determination Aid (MDA) and the Personnel Requirements Estimation Aid (PREA) will be used during the Proof-of-Principle Phase after initial contractor designs have been submitted, but before one design is chosen for development into a prototype. These products will evaluate initial contractor designs and develop MPT alternatives that minimize personnel characteristic deficits. (Personnel characteristic deficits are discrepancies

between the type and number of people required and the number of these people likely to be available when the system is fielded). The MDA will determine the tasks, jobs, and quantitative manpower requirements associated with each contractor design.

The PREA will determine the type and level of personnel characteristics required to perform each task associated with a contractor design effectively.

The results of these two evaluative aids will be used to select a specific design alternative for further development. As such, the results can be incorporated into higher-level analyses such as the Cost and Operational Effectiveness Analysis (COEA).

1.3 ORGANIZATION OF PAPER

Nine sections comprise the remainder of the design specifications. The second section provides an overview of the PCEA, its outputs, functional requirements, users, role in acquisition process, and our approach to design specification.

The third section describes the steps the user would go through in applying the PCEA. Included in this description is a listing of the screens the user would go through in applying the PCEA.

The PCEA will contain two types of files--libraries that describe "hardwired" input data and "input/output" files used to store input or results related to a particular application of the PCEA. The fourth and fifth sections describe the structure of these two types of files. The description of the libraries also includes the actual values for the "hardwired" input data.

The sixth section describes the algorithms and models that will be used in the PCEA to calculate and/or modify data.

The seventh section describes interfaces with other $(MPT)^2$ products and external data bases and lists the format for all PCEA output reports.

The eighth section describes technology transfer issues.

SECTION 2.0 - GENERAL PRODUCT REQUIREMENTS

2.1 OBJECTIVES

The objectives of the Personnel Constraints Estimation Aid (PCEA) are to (1) estimate the significant personnel characteristics of the soldier population that will be available to man the new system, and (2) then to identify the minimally acceptable boundaries for these characteristics. These boundaries will define a set of personnel constraints that can be included in early Army requirements documents and system specifications. The constraints will be stated in terms meaningful to materiel developers. The Army can greatly increase the probability that the new system will not exceed the personnel capabilities available to operate and maintain it by including such personnel constraints in these documents.

2.2 MAJOR OUTPUT

The PCEA's primary outputs are: (1) the current and projected distribution of personnel characteristics for the MOSs likely to be associated with the new system, (2) minimum acceptable levels for these characteristics that will ensure a high probability of successfully manning the new system, and (3) design guidance to help the contractor understand these minimum acceptable levels.

Where applicable, the PCEA will produce output reports compatible with the MANPRINT Target Audience Description (TAD) guidance (see Appendix C).

2.3 ROLE OF PRODUCT OUTPUT IN ACQUISITION PROCESS

The PCEA's output will feed two types of key acquisition documents. Both document types describe manpower constraints. The first type, Army requirements documents, guides the Army organizations in charge of developing the new system. The second type, contractor specifications, provides detailed guidance for the contractor developing the system. These documents are closely related. In fact, the contractor specifications are based on the Army requirements documents. Appendix A provides a more detailed description of the PCEA's role in feeding these two types of documents. Appendix B describes the format of these documents.

2.4 USERS

2.4.1 Overview of Users and Their Functions

2.4.1.1 Primary Users

Primary PCEA users will be the combat developers within the TRADOC proponent schools who produce requirements documents for major systems (i.e., JMSNS, O&O Plan, LOA, and ROC) and the System/Segment Specification (SSS) that guides early contractor design activities. The Directorate of Combat Development (DCD) is usually responsible for developing these documents. Each DCD is organized slightly differently. As a result, a Concepts and Studies Division, Materiel Logistics Support Division, or Requirements Division might be responsible for various portions of the requirements documents and the SSS.

2.4.1.2 Secondary Users

Other major PCEA users will be the personnel within the AMC major subordinate command who provide input to the TRADOC combat developer constructing requirements documents. Since each AMC major subordinate command is organized differently, the organization using the PCEA will vary across AMCs. Typically, the AMC command has an Advanced System Directorate (ASD) with a Requirements Analysis Division (RAD) responsible for coordinating requirements documents with TRADOC.

2.4.1.3 Other Users

Other potential users are requirements documents reviewers such as HQ TRADOC (DCSCD), HQ AMC (AMCDRE), and the Requirements Division (DAMO-FOR) within DCSOPS; the MANPRINT Policy Office within ODCSPER (DAPE-ZAM); the MANPRINT points-of-contact within the TRADOC proponent schools and AMC subordinate command; and the ARI field office representatives providing MANPRINT support to TRADOC schools or AMC subordinate commands.

2.4.1.4 Job Type

The PCEA will be developed specifically for the primary users (listed in Section 2.4.1.1). These primary users are the combat developers within the TRADOC proponent school who produce requirements documents for major systems (i.e., JMSNS, O&O Plan, LOA, and ROC) and the SSS. These document developers are usually Army majors or captains.

2.5 ASSUMPTIONS

The following assumptions underlie PCEA development:

2.5.1 Major System Focus

The PCEA's major focus will be to describe personnel constraints for major weapon systems. Although the PCEA's automated tools will be developed only for use with major systems, its general logic is applicable to other types of systems.

2.5.2 Estimate Constraints, Not Requirements

The PCEA will estimate cut-off levels for personnel characteristics based on the projected availability of personnel with those characteristics. The PCEA will not estimate what the personnel characteristics for the new system should be. This would involve estimating the new system's tasks and their individual personnel characteristic requirements. Product 6, the PREA, will estimate task personnel characteristic requirements.

2.5.3 PCEA Does Not Estimate MOS Qualification Requirements

Some personnel characteristics included in the PCEA such as ASVAB already have "official" cut-off levels for each MOS. ASVAB cut-offs are set by relating ASVAB scores to end-of-course training scores. Project A will estimate more accurate cut-offs by relating ASVAB scores and other predictors to more valid performance measures such as job performance. The purpose of the PCEA is not to determine what the official qualifying cut-off level for an

MOS should be. Also, it is not the PCEA's purpose to determine what the qualifying cut-off level for an MOS should be, given changes due to the introduction of the new system. Determining qualifying cut-off levels would require assessing the relationship between ASVAB scores and performance. Such an assessment would allow the system design to drive the required level of ASVAB, as does any approach that sets cut-off levels based on actual fielded performance. The problem with this approach is that there is no guarantee that people will be available at this level.

Unlike the ASVAB validation procedures, the PCEA sets a cut-off level based on the expected availability of personnel at different levels of the personnel characteristic. This allows the characteristics of the available personnel to constrain design rather than vice versa. The purpose of the PCEA is not to replicate Project A or develop modified versions of Project A predictor equations for new MOSs created by new systems. ARI has already designed a study called the Synthetic Validity study for that purpose.

While the PCEA will set cut-offs based on availability, it will be capable of utilizing cut-off levels set by other procedures.

2.5.4 Identification of Likely MOSs For New System

It is assumed that Product 2, the MCEA, has already identified the MOSs likely to man the new system. Identification of the new system's MOSs cannot be definitive until information on the new system's design is available. By identifying the likely MOSs, Product 2 provides an efficient mechanism for estimating and identifying the likely population from which the operators and

maintainers of the new system will be drawn. In applying Product 2, requirements for a new MOS may be identified. In this case, Product 2 will identify a surrogate existing MOS that can be used to define the population of available maintainers and operators.

2.6 HIGH-LEVEL FUNCTIONAL REQUIREMENTS

2.6.1 Technical Requirements

Output. The PCEA must generate (1) the current and projected distribution of the personnel characteristics for the MOSs likely to be associated with the new system, (2) cut-off levels for the proposed characteristics that ensure a high probability of successfully manning the new system, and (3) personnel constraint specifications expressing personnel characteristic cut-off levels in terms that materiel developers can understand.

Role in Acquisition Process. The PCEA information on manpower constraints must feed directly into Army requirements documents for major systems (i.e., JMSNS, O&O Plan, LOA, ROC) and the Type A specifications that guide contractor designs (see Role of Product Output in Acquisition Process).

Users. The PCEA must be designed for the combat developers within the TRADOC proponent school who produce requirements documents for major systems (i.e., JMSNS O&O Plan, LOA, and ROC) and the Type A specifications that guide early contractor design activities (see Overview of Users and Their Functions).

2.6.2 Acceptability/Usability Requirements

The previous subsection summarized the PCEA's technical requirements. This section also describes acceptability and usability requirements this aid must also meet.

Produce Tailored User Outputs and Processes. Often R&D products are not implemented when they fail to meet the needs of specific Army decision makers. They are R&D products "in search of users." To avoid this problem in the current effort, it is essential to identify the specific PCEA users and involve them in PCEA development. The PCEA must be capable of meeting the requirements of the new streamlined acquisition process, and its output should be formatted so that Army users can insert it directly into MAP documents.

Describe "How to" Procedures. The PCEA must have sufficient "how to" procedures to allow Army users with minimal training to apply each product. Whenever possible, procedures should be automated to reduce the amount of analysis users must do. Procedures for obtaining input data and interpreting results should accompany all automated tools.

Minimize Organizational Impacts. The PCEA tools must fit the user and not vice versa. Using the tools must not require additional personnel or restructuring the existing Army organizations. The tools must run on computer hardware that is accessible at user locations or via secure lines. The PCEA tools should use existing software whenever possible. If they require new software packages, the cost of these packages must not exceed the user's typical software acquisition budget.

Minimize User Training. The MAP community members expected to be PCEA users are already overburdened and understaffed. In addition, they are trying to meet increasing acquisition requirements, such as MANPRINT, within the context of the streamlined acquisition process. Consequently, training time for the $(MPT)^2$ products must be minimized. For example, interfaces will contain built-in job aids (e.g., help commands). When formal training is required, it must use only media that are readily available to users.

Security. Because the PCEA might have to accept classified data, it must provide acceptable levels of security.

2.7 OVERVIEW OF PCEA TECHNICAL APPROACH

2.7.1 The MA&D/DRC Concept of Personnel Constraints

The MA&D/DRC team uses the same "constraint" concept in all three constraint-related $(MPT)^2$ products (Products 2, 3, and 4). Our approach is to estimate available resources and then use these estimates to constrain the new system design. Available resources are identified by assessing (1) the resources currently associated with the systems to be replaced and (2) the factors that will change the future availability of these resources. Product 2 (the MCEA) estimates available manpower slots, and Product 3 (the PCEA) estimates the type of people who will be available. Product 4 (the TCEA) estimates the maximum training time that can be supported, given available training resources.

The PCEA will first estimate the projected distribution of personnel characteristics for the MOSs that are likely to provide personnel for the new system. Product 2 will already have identified the likely MOSs.

The PCEA determines the projected distribution of personnel characteristics, not only for the soldiers entering an MOS, but for higher paygrades as well. This is important because people with different characteristics attrite and reenlist at different rates. For example, personnel with higher aptitude scores tend to have a higher attrition rate than personnel with lower scores. Thus, to predict the availability of personnel characteristics accurately, we must take into account the impact of attrition/retention at higher paygrades.

Once the projected personnel characteristic distribution has been determined, the PCEA can identify the characteristic levels required to ensure the probability that the "right person" (i.e., the person with the right level of personnel characteristics) will be available to man the new system. The PCEA does this by looking at the expected numbers of people at each characteristic level in the projected distribution of the characteristic in the total population for the occupational specialty. These numbers define the probability of getting a person with a certain characteristic level. With the assistance of the PCEA software the user can identify their "desired" probability of having the "right" person available. In other words, this is the probability that when the system is fielded a person at or above a particular characteristic level would be assigned to the new system.

The PCEA software will examine the projected personnel characteristics distribution to find the personnel characteristic level score that will produce a probability equal to the user's desired probability.

For example, the PCEA will predict the projected distribution of General Technical (GT) scores for each MOS likely to be

associated with the new system. If the user wanted a 60% probability of having the right person available, the PCEA would set the GT constraint level at the score associated with the 40th percentile for GT scores with that MOS. Sixty percent of thed soldiers could be expected to score above this level.

The PCEA will provide default values to help the user select the probability that he or she desires to get the right person. The PCEA will also provide examples of the level of tasks performanced that personnel at the cut-off level can achieve. This will help the contractor understand the characteristic cut-off levels for characteristics that are not directly meaningful to him or her (e.g., all cognitive characteristics).

2.7.2 Definition of "Design-Related Personnel Characteristic"

Our concept of the PCEA is based on the following definition of a design-related personnel characteristic:

> A design-related personnel characteristic is an enduring human attribute that has a significant impact on operator or maintainer performance and has information available to estimate its current distribution within the Army.

The implications of this definition are significant. Only enduring human attributes should be personnel characteristics; otherwise the concept of an availability-based personnel constraint is meaningless. There must be data available to describe a characteristic's distribution within each MOS. We must otherwise be able to identify another data base that can be "reasonably" generalized to Army MOSs. Without information on a

characteristic's current distribution, we cannot estimate its future distribution, and thus cannot describe its availability or set a constraint.

A design-related personnel characteristic must be related to operator and maintainer performance -- namely, task performance time and/or task accuracy. If it is not, a contractor cannot design his or her system to accommodate a given level of that characteristic. Three types of characteristics meet the criteria described above: cognitive characteristics, psychomotor characteristics, and perceptual characteristics. Table 2.7-1 lists the personnel characteristics that we have selected for inclusion in the PCEA.

2.7.4 Estimating Future Characteristic Distributions

The PCEA must be capable of describing future personnel characteristics. Since the lead time for fielding an emerging system is five to ten years, the new system must be designed to future, rather than current, distributions. These future distributions must describe the characteristics of incoming accessions and personnel at higher paygrades because the distribution of many characteristics vary considerably from one paygrade to another. MILPERCEN has developed a model called the MLRPS to predict what the future personnel inventory will look like. Input to the MLRPS consists of the characteristics of incoming accessions and the transition rates (e.g., attrition/promotion rates) for moving from one paygrade to another. These transition rates can vary as a function of the soldier characteristics. The MLRPS will flow the accessions through these upper paygrades using these transition rates to produce an estimate of the numbers of people at each paygrade with different characteristics. Since the MLRPS

Table 2.7-1. Personnel Characteristics.

		TASK TAXONOMY TYPE
1	ASVAB CL COMPOSITE	COGNITIVE
2	ASVAB CO COMPOSITE	COGNITIVE
3	ASVAB EL COMPOSITE	COGNITIVE
4	ASVAB FA COMPOSITE	COGNITIVE
5	ASVAB GM COMPOSITE	COGNITIVE
6	ASVAB MM COMPOSITE	COGNITIVE
7	ASVAB OF COMPOSITE	COGNITIVE
8	ASVAB SC COMPOSITE	COGNITIVE
9	ASVAB ST COMPOSITE	COGNITIVE
10	ASVAB GT COMPOSITE	COGNITIVE
11	AFQT PERCENTILE SCORE	COGNITIVE
12	AFQT GROUP	COGNITIVE
13	ASVAB QUANT.	COGNITIVE
14	ASVAB SPEED	COGNITIVE
15	ASVAB TECH.	COGNITIVE
16	ASVAB VERBAL	COGNITIVE
17	READING GRADE LEVEL	COGNITIVE
18	COMP. PERC ACC	PERCEPTUAL
19	COMP. PERC SPEED	PERCEPTUAL
20	NUM. SPEED & ACC	COGNITIVE
21	PSYCHOMOTOR	MOTOR
22	SIMPLE REACTION ACC	MOTOR
23	SIMPLE REACTION SPEED	MOTOR
24	PULHES-PHYSICAL STAMINA	MOTOR
25	PULHES-UPPER EXTREMITIES	MOTOR
26	PULHES-LOWER EXTREMITIES	MOTOR
27	PULHES-HEARING	PERCEPTUAL
28	PULHES-EYES	PERCEPTUAL
29	PULHES-EXP WT LIFT	MOTOR
30	MEPSCAT	MOTOR
31	SEX	MOTOR
32	HEIGHT	MOTOR
33	BLOOD PRESSURE-DIAS.	MOTOR
34	AUDITORY PERCEPTION STANDARD	PERCEPTUAL

predicts the entire inventory for all MOSs in the Army, it must be run on a large mainframe computer. However, we have developed a technical approach for developing a "stripped-down" version of the MLRPS that will act on a smaller set of MOSs and will run on a microcomputer. Our version of the MLRPS will predict the future distribution of the variables that are used in current economic enlistment models to describe the characteristics of future accessions. Table 2.7-2 displays these "transition" rate predictor variables. The PECA will use the output of economic enlistment models to predict what the characteristics of future accessions will look like. Subpopulations will be formed within each MOS corresponding to different combinations of the transition rate predictor variables.

Historical data will be used to predict the attrition/retention rates for these groups. Data on the characteristics of the accessions and their attrition/retention rates will be input into a stripped-down version of the MLRPS that will predict what the distribution of personnel at the higher paygrades will look like over a twenty-year span. Since the economic enlistment models will not provide prediction data for all of the personnel characteristics that are related to task performance, we will use data on the relationships between transition rate predictor variables and the personnel characteristics to predict what the future distribution of these other characteristics will look like. Data on these relationships will be applied to the output of the modified MLRPS model.

2.8 HARDWARE/SOFTWARE CONFIGURATION

The hardware system which the PCEA will be installed on consists of the following characteristics:

Table 2.7-2. Transition Predictor Variables

VARIABLE	CATEGORY
1 - Sex	1-Male 2-Female
2 - High School Grad. Status	1-HS Grad. 2-Non-HS Grad.
3 - AFQT Group	1-1 2-2 3-3a 4-3b 5-4+5
4 - Age at Entry	1 17-21 2 21+
5 - Racial/Ethnic Descent Group	1-White 2-Black 3-Hispanic 4-Other

a. Enhanced graphics display - The EGA will support high resolution color graphics.

b. Enhanced graphics board with 256 K bytes RAM

c. 80286 processor

d. Hard disk with a minimum of 20 M bytes of storage

e. Up to 4 M bytes of enhanced memory

f. Bernoulli Box or its functional equivalent with two removable 20M disks

g. 80287 Math Co-processor

h. 1200/2400 baud Hayes-compatible internal modem

i. One or more floppy drives that can read and write 360K floppy diskettes

j. Dot matrix printer capable of printing 132 characters per line. This printer will be capable of outputting IBM graphics.

k. IBM AT-compatible keyboard.

All the PCEA software will be developed under the most recent version of Microsoft C. At the present time, the operating system for the products will be DOS 3.2.

The data libraries in the PCEA will be built using R-Base V. We will sort, retrieve and store information in these files using

code developed in-house via dbC Library routines. These library functions do not require any licensing fees and will be fully integrated into the PCEA code.

All of the data files which will be used by other $(MPT)^2$ products will be in delimited fixed ASCII format.

2.9 OVERVIEW OF INTERFACE DESIGN

The PCEA will use the keyboard as the input device. All user queries, responses, and requests will be entered via the AT compatible keyboard.

There are 4 types of menus in the product. The first type of menu interface is the command bar. In this interface style, the commands will be listed horizontally across the top of the computer screen. The user will use the horizontal arrow keys to position the cursor and a carriage return to select the desired option. The command menu bar will be displayed on the third and fourth line of each display.

The main menu bar will present a list of single one word commands. Positioning the cursor on a particular command will highlight that command and a more detailed description will appear on the bottom line of the main menu bar. Further explanation will be available in HELP.

The command menu bar is always presented across the top of the display and has a dark blue background. More detailed information about the command menu bar can be found in the section on commands.

A command can be selected by keying in the first letter or hitting the return key.

There will be more than one level of command menus. Only the commands appropriate to the current process or display will be presented on the menu bar.

Three types of commands will be presented using the command bar interface:

(1) General action commands: enable the user to perform some process on the data

List: Insert Copy Paste Delete Sort Report Save Switch

(2) GoTo commands: enables the user to access a data library

(3) Specialized commands: commands which are specific to a process or step

The second type is a pull-down menu design. In this type of menu, the user will use the vertical arrow keys to position a highlighted menu bar at the desired menu choice. This results in a color change, as the highlighted bar moves through the menu. The user will press the carriage return after he/she has used the cursor keys to select an option from the list.

These menus can be presented anywhere on the screen and are color coded by level. The first level has a light blue background and the second level has a green background.

Items will be presented within a menu according to logical order or frequency of use. Items will be presented in a numbered list. Only 10 items will be presented at one time on any data menu. Items will be selected form the menu by keying in the number associated with that item.

The third type of menu is a spreadsheet interface. In this menu style, the user will use a combination of cursor keys and keyboard input. The cursor keys will be used to position the cursor in a cell of the spreadsheet. The keyboard will then be used to edit the information that is in the cell. If the entire spreadsheet does not fit on a screen, the user will be able to move from cell to cell in any direction.

All spreadsheet menus have a brown background with white lettering. The area for data entry will be visually defined on a spreadsheet by a gray background and black lettering.

The fourth type of menu interface is a command prompt. In this case, the user will respond to a specific prompt using the keyboard. For instance, the prompt "Confirm the system information? (Y/N)" The user will use the keyboard to enter 'y', 'n', 'Y', or 'N'.

All of these interfaces will be used appropriately in the product. If the user does not know how to respond to a prompt or an interface the function key 'F1' will always give the user a context-specific help screen. The help screen will provide a discussion of the information which is being requested. At any time, the user may also press the escape key. This will always take the user to the menu which immediately precedes the current menu. In this manner, the user can "back out" of the PCEA application.

At the top of every menu, there will be a "PATH" line. This line will keep the user informed as to his/her current location in the hierarchical levels of the product. The mode will be displayed on the top line in the right hand corner. There are three modes: work, wait and help.

The PCEA interface also provides the user with a mechanism for resuming work at the last step that was complete before the system was turned off. This will consist of the software periodically updating a status file which will be referred to when a user powers up the system and accesses the PCEA.

Color specifications:

Type of interface	Background/ Lettering	Highlight
Command Bar	Drk bl/Wht	Lt Bl/Blk
First level pop-up	Lt bl/Blk	Lt Bl/yel
Second level pop-up	Grn/Bl	Gr/Yellow
Template (Data entry)	Brw/Wht	Gry/Blk
Libraries	Blk/Wht	Gry/Blk
Help	Drk Bl/Wht	Blk/White
Message	Red/White	

Keystroke specifications:

Following is a list of the general specifications for the functionality of global function and editing keys for the PCEA.

Function Keys

F1 Help - This key will always switch the system into the help mode. When this key is pressed, the system will display the first page of context specific help infor mation explaining the current menu, screen, or prompt.

Shift F1 Help Index - When the F1 function key is pressed while holding down the shift key, the user is presented with an index of help information.

F2 Move-by-cell/Edit toggle - This key controls the function of the arrow cursor keys when the user is working in a spreadsheet-like template. In the default state, the arrow keys will move the cursor from cell to cell in the first character position. When the F2 key is pressed, the arrow keys move the cursor character by character (left and right) or line by line (up and down) within a cell. If the cursor is currently in the last character position in the cell for any particular direction, the cursor will move to the next cell in that direction. For example, if the cursor is in the first character position of a cell and the left arrow is pressed, the cursor will move to the next cell to the left of the current cell. If the cursor is in the topmost line of a particular cell and the up arrow is pressed, the cursor will move to the cell above the current cell. Repeated pressing of the F2 key will toggle between the move-by-cell and move-by-character states.

F3 Search - When this key is pressed, the user will be prompted for a string of characters or keystrokes that the system will search for. The string of keystrokes is terminated by pressing the F3 key a second time. After terminating the string, the system will search the current library, template, or list for a match for the input string. If a match is found, the cursor is moved to the matched input string. If no match is found, the cursor remains where it is and a message indicating no match found is displayed.

At times when the F3 key is not active, the user will receive a message indicating such.

F4 NOT USED AT THIS TIME

F5 NOT USED AT THIS TIME

F6 NOT USED AT THIS TIME

F7 NOT USED AT THIS TIME

F8 NOT USED AT THIS TIME

F9 Menu - Displays the active menu bar while working in a spreadsheet-like template.

F10 Save - Saves the current working file to the appropriate permanent file then returns to the current working status.

ESC quit - Always returns to the most recent previous state such as the most recent menu, screen, or prompt.

Backspace This key is only active when the system is allowing for input by the user. The backspace key moves the cursor one space to the left of its current position and erases any character from that position.

Return Terminates variable length user input.

Caps Lock Toggles the keyboard from a normal state to one that displays characters as if the shift key was being held down. When the keyboard is in the "shift key" state and the user holds down the shift key while pressing another key, the normal (non-shift) character displays.

Ins — Insert - Toggles the system from character insert for user input to typeover. When the state is character insert, the characters input by the user are inserted to the left of the current cursor position. When the state is typeover, characters are displayed at the current text cursor position. Any characters currently displayed at that position will be replaced.

Del — Delete - Deletes characters that are displayed at the current text cursor position.

Home — Moves the menu cursor to the top or the left most menu selection. Moves the cell cursor to the upper left corner of a spreadsheet-like template. Moves the text cursor to the upper left most typing position of the current input area (i.e., cell, field, etc.). See cursor definitions below.

End — The end key works the exact opposite of the home key. It moves the menu cursor to the bottom or the right most menu selection. It moves the cell cursor to the lower left corner of a spreadsheet-like template. It moves the text cursor to the lower right most typing position of the current input area. See cursor definitions below.

PgUp — Page Up - If the cursor (menu, text, of cell) position is not at the top of the current visible display or window, the cursor is moved to that position. If the cursor position is at the top of the current visible display or window, the cursor is moved to the top of the previous full screen or window-full of information.

PgDn — Page Down - If the cursor (menu, text, or cell) position is not at the bottom of the current visible

display or window, the cursor is moved to that position. If the cursor position is at the bottom of the current visible window, the cursor is moved to the bottom of the next full screen or window-full of information.

Up Arrow - Moves the cursor (menu, text, or cell) up one position (line or cell).

Down Arrow - Moves the cursor (menu, text, or cell) down one position (line or cell).

Left Arrow - Moves the cursor left one position (character or cell).

Right Arrow - Moves the cursor right one position (character or cell).

Ctrl Up Arrow - Moves the cursor (menu, text, or cell) up one full screen or window-full of information to its same relative horizontal position.

Ctrl Down Arrow - Moves the cursor down one full screen or window-full of information to its same relative horizontal position.

Ctrl Left Arrow - Moves the cursor to the left by one screen or window-full of information to its same relative vertical position.

Ctrl Right Arrow - Moves the cursor to the right by one full screen or window-full of information to its same relative vertical position.

2.10 APPROACH TO SOFTWARE DESIGN SPECIFICATIONS

The key to understanding the design specifications are the user interface diagrams listed in Section 3. These diagrams provide an overview of the action sequence a user would go through in using the PCEA. Separate diagrams are provided for each of the six major steps in the PCEA. The diagrams break each step down into a series of blocks which describe "logical chunks" of user interaction. Each block may have one or more screens associated with it. A textual description accompanies each block and references the following items associated with each sequence.

- Screens
- Libraries and Working Files
- Algorithms and Models
- Output Reports

More specifically, the block description lists which of the above elements are related to each block and lists the sections, tables, etc., where detailed descriptions of these items can be found. Table 2.10-1 provides an example block description.

Screen Descriptions. Wherever possible, the actual screen expected to be used in the PCEA is listed. In some cases, the content of a screen is variable--it depends on previous user input. In these cases, we provide an example of what the screen will look like using the most complex and/or longest version of the screen.

Libraries and Input/Output Files. The structure of each library file is described using the format described in Table 2.10-2. The libraries will contain prerecorded data. These data values are listed after the description of the library file structure.

Table 2.10-1. Example Block Description.

12-see Screens 52 to 55. The system will begin by asking the user to select the operator MOSs for the system. To query the user, a menu will be presented describing the recommended operator MOSs for the system type at the top of the screen and other MOSs in the same CMF as the recommended operator MOS. The system will read the recommended MOSs from the MOS by System Type file (see Tables 4.2-3 and 4.2-4) and other MOSs within the CMF from the MOS by CMF file and access titles from the MOS Title file. (see Tables 4.2-5 and 4.2-6). The user can continue if he agrees with the recommended MOS or select that one/or others from the CMF using menu selection procedures.

Table 2.10-2. Example of Data Structure Format

FILE ID: MOSs by CMF

DESCRIPTION: For each CMF associated with PCEA system types, this file lists all associated MOSs.

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
1	1	File ID	5	Alpha
	2	CMF Code	2	Num
2		MOS Code	3	Alpha

ESTIMATED NO. OF TABLES: = 14 (ONE FOR EACH CMF)

ESTIMATED NO. OF RECORDS: 31 (MAXIMUM NUMBER OF MOSs WITHIN A CMF)

LENGTH: VARIABLE

The I/O files describe files saved on the hard diskette. These files either provide input to, or are output from, one of six PCEA steps. Sections four and five describe libraries and I/O files.

Algorithm. Algorithms are described in one of two ways. Algorithms that are primarily logical, operations are described in pseudocode or flowcharts. Quantitative algorithms, or models, are described via equations. Section 6 describes algorithms and models.

Output Reports. The seventh section lists printed output reports. (Screen displays are listed in this section along with the other screen descriptions).

SECTION 3.0 - STEPS IN APPLYING PCEA

3.1 OVERVIEW

Figure 3-1 describes our concept of the PCEA.

During Step 0, the user can use DOS commands to manipulate files, and select options for either continuing analysis of an existing system or start an analysis for a new system. Also, the user may enter a Product 2 Source MOS file, or he/she may create their own list of source MOSs from the master list of source MOSs. The PCEA library files store this list.

During Step 1, the system provides the user with guidance for entering the input data files needed by the PCEA. These input files are the Total Army Input Data Files, Initial Inventory File, Current Distributions File, Transition Rate File, and Product 1 Input Data Files.

The Total Army Input Files describe the projected and strength and the current distribution for subpopulations at the total Army level.

The Initial Inventory File describes the current distribution for key subpopulations for each MOS.

The Current Distribution files describe the current distribution of personnel within an MOS on each personnel characteristic. The Transition Rate File describes the current transition rates for

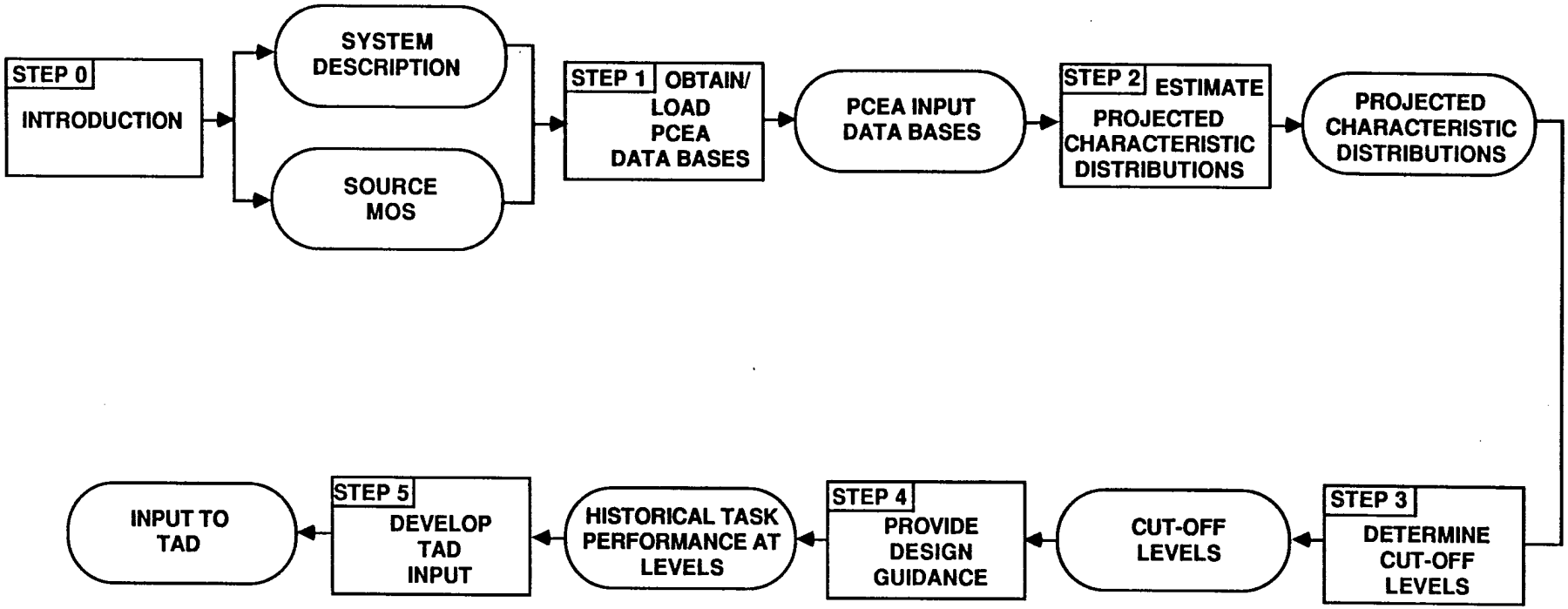


Figure 3-1. Overview of PCEA

different subpopulations within an MOS. The Product 1 Input files describe both the Product 1 functional tasks and the criteria associated with these tasks.

In Step 2, the system will estimate the future personnel characteristics distribution. A modified version of the Army's MLRPS model will estimate the expected future distribution of personnel characteristics based on (1) expected percentage of incoming accessions in key subpopulations and (2) expected changes in attrition/retention/promotion rates as a function of the changes in the characteristics that define these subpopulations.

Step 3 will determine cut-off levels for the personnel characteristics associated with the new system MOSs. The user will input his/her desired probability of having a person with the "right" type and level of personnel characteristics available to assign to the new system. The PCEA software will then identify the cut-off level for each personnel characteristic needed to produce the desired probability, taking into account the expected distributions of the characteristics.

Step 4 will produce guidance to help contractors understand the cutoff levels of characteristics (e.g., cognitive characteristics) that are not directly meaningful to designers. The guidance will describe the levels of task performance that soldiers at the personnel characteristic cut-off levels can achieve.

In Step 5, the PCEA will consolidate selected data collected in the previous steps and output it using a format similar to the MANPRINT Target Audience Description (TAD).

3.2 STEP 0 - INTRODUCTION AND SOURCE MOS SELECTION

3.2.1 Output

During step 0, the user will select the system to which the PCEA will be applied and the PCEA step in which to start the analysis. Also, the user will describe and/or enter from the file created by Product 2 the source MOSs that will be used in the analysis. Thus, the user may use the source MOS file created by Product 2 or he/she may create a new source MOS list. Specific files created and/or updated during this step are the Systems File that describe the system to which the PCEA will be applied, the PCEA steps completed to date, and the Product 3 Source MOS File, which describes the user-selected source MOSs employed in the PCEA.

3.2.2 Input

External Input. Product 2 will produce the Product 2 Source MOS file. This file contains the list of source MOSs for the new system. It is likely that the PCEA user has also applied Product 2 and, therefore, the output file from this product should be on the hard disk. However, the PCEA will also provide instructions for entering the file via PCEA floppy diskette.

Internal Input. Library files providing input to this step are the System Types By Mission Area file (Tables 4.2-1 and 4.2-2), the MOS by System Type file (Tables 4.2-3 and 4.2-4), the MOS Title file (Tables 4.2-5 and 4.2-6), and the MOS by Career Management Fields (CMF) file (Tables 4.2-7 and 4.2-8). The Systems file, which describes the current PCEA steps completed for a particular system, is another input file. The Product 2 Source MOS file (Table 5.1-2) that may already reside on the user's hard disk, is also an input.

3.2.3 Process

The user is first given an opportunity to perform various DOS file manipulations (e.g., format disks, copy floppy diskettes, format/examine directory). Next, the user opts to either continue a PCEA application for an existing system or to change a system's name and other related descriptive information, or to start a PCEA application for a new system. Finally, the system gives the user the opportunity to identify the source MOS that will be used for the system. Here, he may use, and/or modify, the Product 2 source MOS list. Otherwise, the user may select from the MOSs in the CMFs associated with his mission area.

3.2.4 User Interface Diagram

Figure 3.2.4-1 displays the User Interface Diagram for STEP 0. The sequentially numbered blocks shown below display the logical sets of user interactions for this step. Each block includes a listing of the screens, files, and algorithms associated with that particular block. Replicas of the user interface screens follow the block descriptions. Screens are referenced by the block numbers listed in the User Interface Program.

BLOCK 1 - See Screens 1 and 2. The user may select from three options: use DOS commands, define a new system, or resume a PCEA application for a new system.

BLOCK 2 - Screens 3-14 will lead the user through DOS options, including options for formatting disks, copying and deleting files, and examining or structuring a directory.

BLOCK 3 - Screens 31-33 gives an example of the system reading systems from the Systems File (see Table 5.1-1).

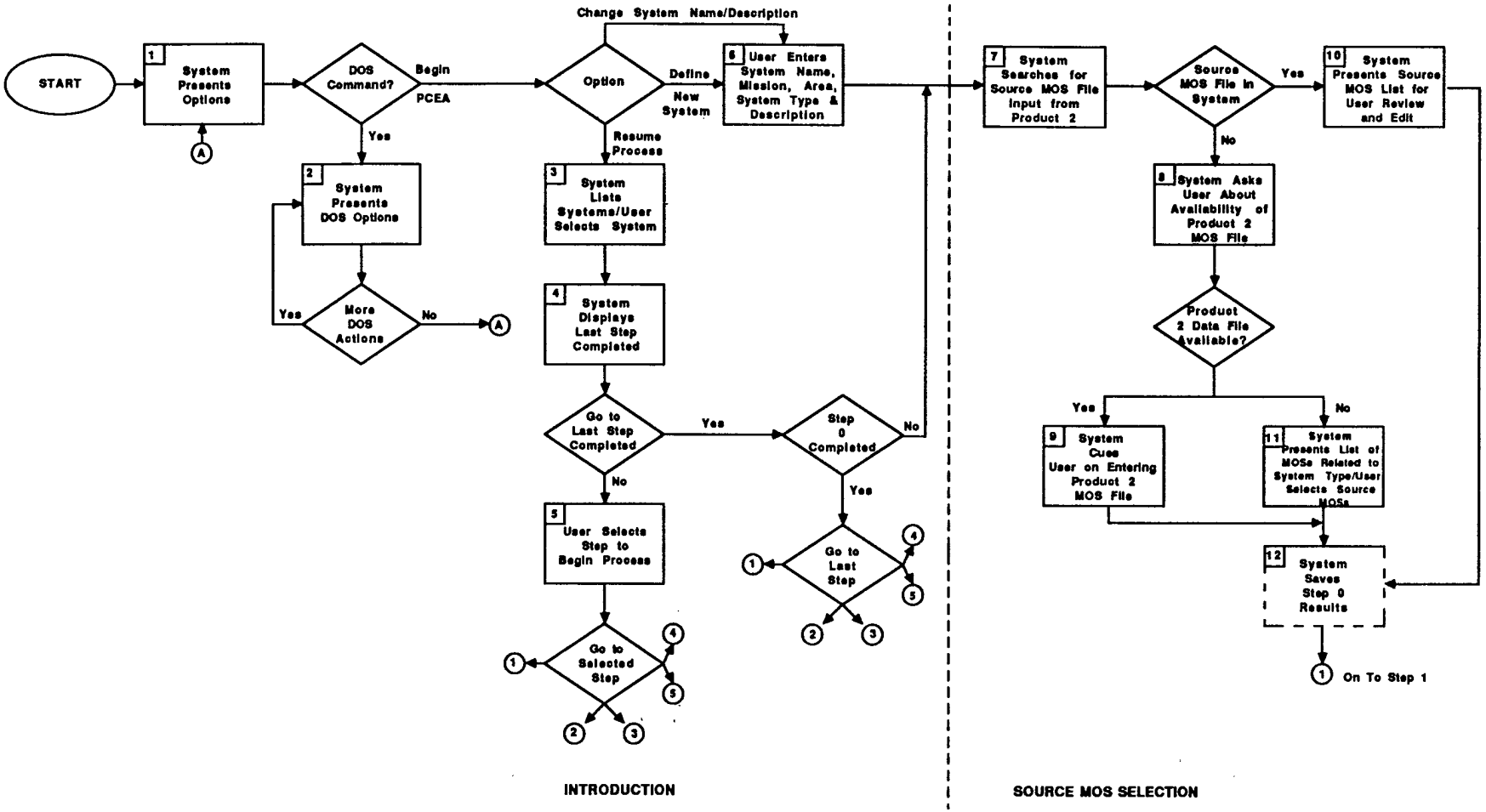


Figure 3.2.4-1. Step 0 - Introduction and Source MOS Selection.

BLOCK 4 - Screen 34 shows an example of the system reading from the Systems File (Table 5.1-1).

BLOCK 5 - Screen 35 depicts an example of the system reading from the Systems File (Table 5.1-1).

BLOCK 6 - See Screens 15-20. The user will describe the system name, mission area, and system type.

BLOCK 7 - See Screens 21 and 22. The System will search for the Product 2 Source MOS File (see Table 5.1-2) and copy it to a new file called the Product 3 Source MOS file (Table 5.1-3). These files, will include only MOS character codes. Whenever the user accesses these files the system will cross-reference to the MOS Title file (see Tables 4.2-5 and 4.2-6) to obtain appropriate MOS titles.

BLOCK 8 - See Screen 26.

BLOCK 9 - Screen 27 provides a description of the screens that guide the user's entry to the Product 2 Source MOS File from a floppy diskette.

BLOCK 10 - The system will read from the Product 3 Source MOS and the MOS Title files. Operator MOSs will be listed first and will be followed by maintainer MOSs. See Screens 23-25 for an example.

BLOCK 11 - Screens 28-30 depict this step. The system will first ask the user to select the operator MOSs for the system. To query the user, the system will present a menu. These recommended operator MOSs will appear at the top of the screen. Other MOSs in the same CMF as the recommended operator MOS will also appear on the screen. The system will read the recommended MOSs from the MOS by System Type file (see Tables 4.2-3 and

4.2-4). Other MOSs within the CMF will be read from both the MOS by CMF file (see Tables 4.2-7 and 4.2-8) and from access titles in the MOS Title file (see Tables 4.2-5 and 4.2-6). The user can continue if he agrees with recommended MOS or select that one and/or others from the CMF using menu selection procedures.

The same logic will then be followed to select maintainer MOSs. However, since several Career Management Fields are associated with maintenance of a particular system type, the user will first be shown recommended MOS and their CMF. If he or she decides not to use the recommended CMF, he or she will first be asked to select the CMFs and then to select MOSs within the CMFs. Recommended MOSs will be read from both the MOS by System type file and the MOS Title file. MOSs within a CMF will be read from the MOS by CMF file.

BLOCK 12 - The System updates both the Product 3 Source MOS file and the Systems File to indicate that Step 0 has been completed for the system.

PCEA>

MODE: WORK

PERSONNEL CONSTRAINTS ESTIMATION AID

Press <CR> to continue.....

NOTE: WE USE > TO DENOTE HIGHLIGHTING.

PCEA>UTILITIES MODE: WORK

Personnel Constraints Estimation Aid Main Menu

1. Disk Utilities : format, copy, delete, directory, copy
2. Begin PCEA Session
3. Quit

Select choice with cursor control arrows and press <CR> when ready...

PCEA>UTILITIES>FORMAT MODE: WORK

Personnel Constraints Estimation Aid

1. Disk Utilities
2. Disk Utilities Menu
3.
    1. Format Disk : format a disk
    2. Copy Disk
    3. Delete File
    4. Directory
    5. Print

Select choice with cursor control arrows and press <CR> when ready...

PCEA>UTILITIES>FORMAT MODE: WORK

FORMAT DISK

Enter disk to be formatted in drive A: and press <CR> when ready

PCEA>UTILITIES>FORMAT MODE: WAIT

FORMAT DISK

Enter disk to be formatted in drive A: and press <CR> when ready

Disk Formatting .....

PCEA>UTILITIES>FORMAT MODE: WORK

FORMAT DISK

Enter disk to be formatted in drive A: and press <CR> when ready

Disk Formatting ..... completed

Format another disk (Y/N)

PCEA>UTILITIES>COPY MODE: WORK

Personnel Constraints Estimation Aid

1. Disk Utilities
2. Disk Utilities Menu
3.
    1. Format Disk
    2. Copy Disk : copy a disk or file
    3. Delete File
    4. Directory
    5. Print

Select choice with cursor control arrows and press <CR> when ready...

PCEA>UTILITIES>DELETE MODE: WORK

Personnel Constraints Estimation AidMenu

1. Disk Utilities
2. Disk Utilities Menu
3.
    1. Format Disk
    2. Copy Disk
    3. Delete File : delete a file
    4. Directory
    5. Print

Select choice with cursor control arrows and press <CR> when ready...

PCEA>UTILITIES>DELETE MODE: WORK

DIRECTORY

M109D.HOW	2157	09/25/87
M102F.HOW	1867	09/01/87

Select File to be deleted using cursor controls then press <CR>...

PCEA>UTILITIES>DELETE MODE: WORK

DIRECTORY

M109D.HOW	2157	09/25/87
M102F.HOW	1867	09/01/87

Delete this file ? (Y/N)

PCEA>UTILITIES>DIRECTORY MODE: WORK

Personnel Constraints Estimation AidMenu

1. Disk Utilities
2. Disk Utilities Menu
3.
    1. Format Disk
    2. Copy Disk
    3. Delete File
    4. Directory : display directory
    5. Print

Select choice with cursor control arrows and press <CR> when ready...

PCEA>UTILITIES>DIRECTORY MODE: WORK

DIRECTORY

M109D.HOW	2157	09/25/87
M102F.HOW	1867	09/01/87

Press <CR> to return to Utilities Menu...

PCEA>UTILITIES>PRINT MODE: WORK

Personnel Constraints Estimation AidMenu

1. Disk Utilities
2. Disk Utilities Menu
3.
    1. Format Disk
    2. Copy Disk
    3. Delete File
    4. Directory
    5. Print : print a file

Select choice with cursor control arrows and press <CR> when ready...

PCEA>UTILITIES>PRINTING MODE: WORK

DIRECTORY

M109D.HOW	2157	09/25/87
M102F.HOW	1867	09/01/87

Select file to print using cursor controls then press <CR> when ready...

PCEA>SESSION>NEW SYSTEM>DEFINE MODE: WORK

Personnel Constraints Estimation AidMenu

1. Disk Utilities
2. Begin PCEA Session : input, view, edit, extract PCEA data
3. Begin PCEA Session Menu

    1. Define New System : begin work on new system
    2. Resume Previous Work
    3. Change Name/Descript.
    4. Quit

Select choice with cursor control arrows and press <CR> when ready...

PCEA>SESSION>NEW SYSTEM>DEFINE MODE: WORK

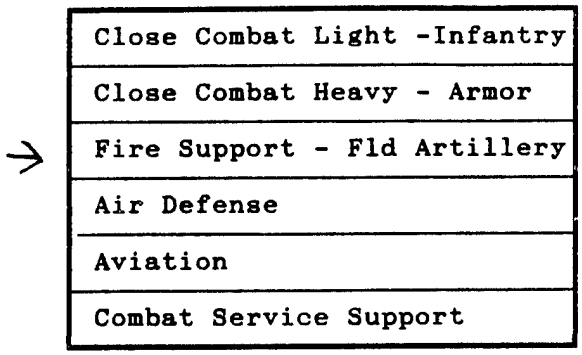
MISSION AREA

Close Combat Light -Infantry
Close Combat Heavy - Armor
Fire Support - Fld Artillery
Air Defense
Aviation
Combat Service Support

Select MISSION AREA using cursor controls and press <CR>....

PCEA>SESSION>NEW SYSTEM>DEFINE MODE: WORK

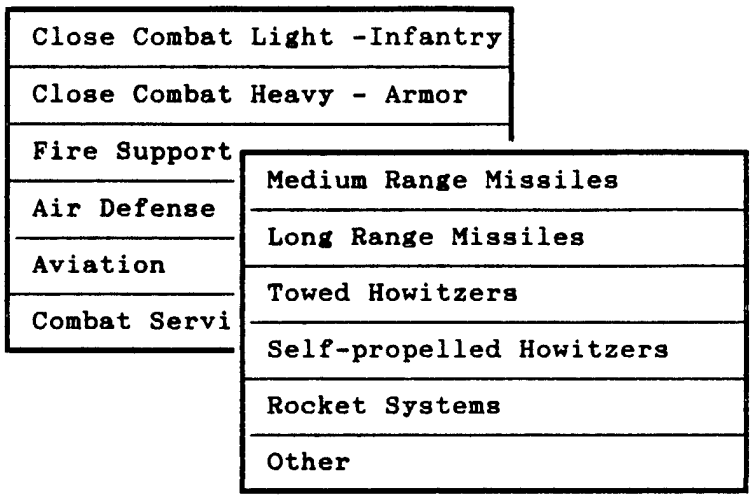
MISSION AREA



Select MISSION AREA using cursor controls and press <CR>...

PCEA>SESSION>NEW SYSTEM>DEFINE MODE: WORK

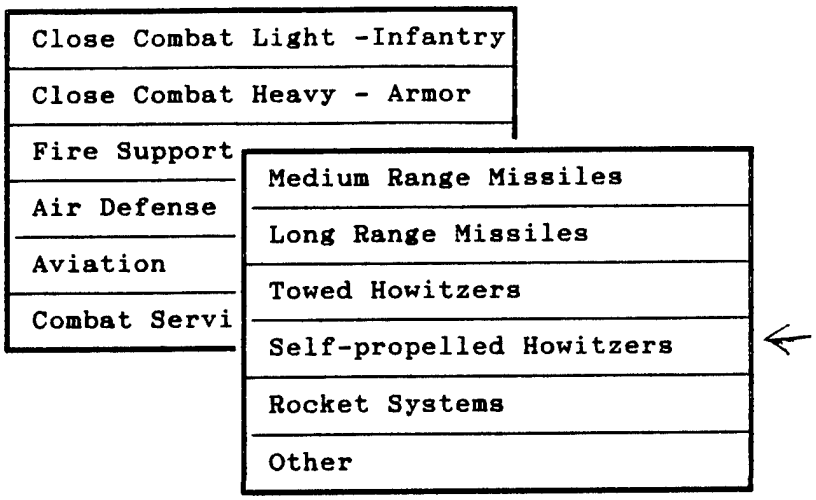
MISSION AREA



Select SYSTEM TYPE using cursor controls and press <CR>....

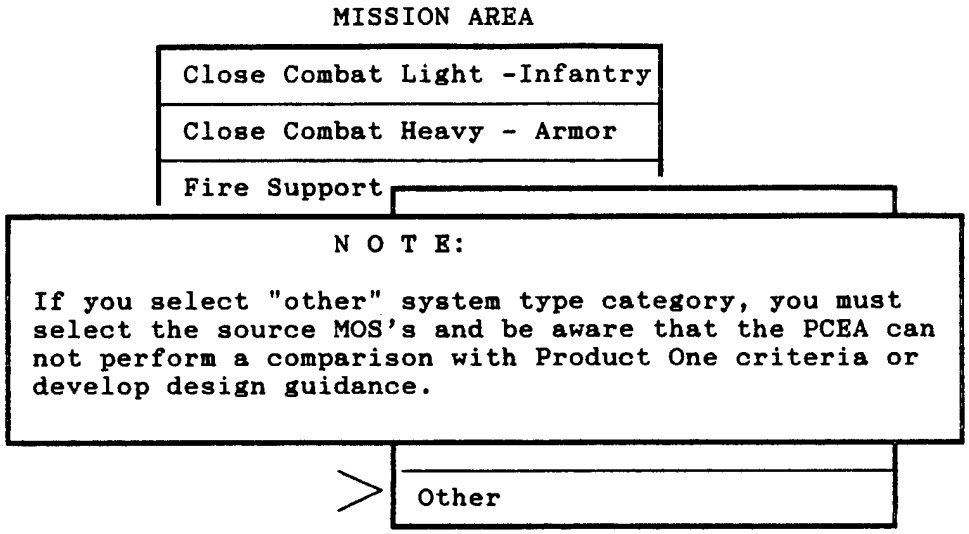
PCEA>SESSION>NEW SYSTEM>DEFINE MODE: WORK

MISSION AREA



Select SYSTEM TYPE using cursor controls and press <CR>....

PCEA>SESSION>NEW SYSTEM>DEFINE MODE: WORK



Select SYSTEM TYPE using cursor controls and press <CR>....

PCEA>SESSION>NEW SYSTEM>DEFINE MODE: WAIT

DEFINE NEW SYSTEM

Please Wait ... searching for Source MOS file...

PCEA>SESSION>NEW SYSTEM>DEFINE MODE: WAIT

DEFINE NEW SYSTEM

Please Wait ... searching for Source MOS file...

File Found.....loading.....

PCEA>SESSION>NEW SYSTEM>DEFINE MODE: WORK

Add Delete Confirm
Add an MOS to the Source MOS list

Operator MOS's		Maintainer MOS's	
13B	Cannon Crewmember	29E	Comm-Elect. Radio Repr.
		31V	Communications Maint.
		41C	Fire Contr. Instr. Repr
		45L	Artillery Repairer
		63G	Fuel/Elect Sys Repairer
		63H	Track Vehicle Repair.

PCEA>SESSION>NEW SYSTEM>DEFINE MODE: WORK

Add Delete Confirm
Delete an MOS from the source MOS list

Operator MOS's		Maintainer MOS's	
13B	Cannon Crewmember	29E	Comm-Elect. Radio Repr.
		31V	Communications Maint.
		41C	Fire Contr. Instr. Repr
		45L	Artillery Repairer
		63G	Fuel/Elect Sys Repairer
		63H	Track Vehicle Repair.

Delete this MOS? (Y/N)

PCEA>SESSION>NEW SYSTEM>DEFINE MODE: WORK

Add Delete Confirm
Confirm that source MOS list is correct for future use

Operator MOS's		Maintainer MOS's	
13B	Cannon Crewmember	29E	Comm-Elect. Radio Repr.
		31V	Communications Maint.
		41C	Fire Contr. Instr. Repr
		45L	Artillery Repairer
		63G	Fuel/Elect Sys Repairer
		63H	Track Vehicle Repair.

PCEA>SESSION>NEW SYSTEM>DEFINE MODE: WORK

DEFINE NEW SYSTEM

Please Wait ... searching for Source MOS file...

File Not Found .... Is Source MOS file available on Floppy diskette (Y/N)

PCEA>SESSION>NEW SYSTEM>DEFINE MODE: WORK

DEFINE NEW SYSTEM

Please Wait ... searching for Source MOS file...

File Not Found .... Is Source MOS file available on Floppy diskette (Y/N)

Insert Disk and press <CR>...

PCEA>SESSION>NEW SYSTEM>DEFINE MODE: WORK

DEFINE NEW SYSTEM

Please Wait ... searching for Source MOS file...

File Not Found .... Is Source MOS file available on Floppy diskette (Y/N)

Do you want to select MOS's from the CMF related to system type? (Y/N)

PCEA>SESSION>NEW SYSTEM>DEFINE MODE: WORK

Select Select All Quit
Select one or more related MOS's

Related Operator MOS's

CMF	MOS Code	MOS Title
13	13F	MLRS Crewmember
	13N	LANCE Crewmember
	13T	RPV Crewmember

PCEA>SESSION>NEW SYSTEM>DEFINE MODE: WORK

Select Select All Quit
Select one or more related MOS's

Related Maintainer MOS's

CMS	MOS Code	MOS Title
29	29F	Fixed COMSEC Equip Repair
	29G	Digital Comm Equip Repair
31	31C	Single Channel Radio Ops
	31D	MSE Trans Systems Ops
	31F	MSE Network SW Sys Ops
	31G	Tactical Communications
	31K	Combat Signaller
63	63B	Light Wheel Vehicle Mech.
	63E	M1 Abrams Tank Sys Mech.
	63G	Fuel/Electrical Sys Repair
	63J	Q-master/Chem Equip Rpr.
	63S	Heavy Wheel Vehicle Mech.

PCEA>SESSION>RESUME WORK MODE: WORK

Personnel Constraints Estimation AidMenu

1. Disk Utilities
2. Begin PCEA Session
3. Begin PCEA Session Menu

    1. Define New System
    2. Resume Previous Work : resume work begun earlier
    3. Change Name/Descript.
    4. Quit

Select choice with cursor control arrows and press <CR> when ready.....

PCEA>SESSION>RESUME WORK>DIRECTORY MODE: WORK

RESUME PREVIOUS WORK

SYSTEMS CURRENTLY IN PROGRESS:

File Name	System Type	Revision Date
1. CHOPPER.RFP	ATTACK HELICOPTER	09/12/87
2. TRUCK1.DOC	UTILITY/CARGO TRUCK	05/11/87
3. HOWITZR.RFP	TOWED HOWITZER	09/30/87
4. AMPHIB.SYS	ALL TERRAIN APC	01/06/87
5. MORTAR.PRE	75MM MORTAR	12/23/86

Select choice with cursor control arrows and press <CR> when ready.....

PCEA>SESSION>CHANGE MODE: WORK

Personnel Constraints Estimation AidMenu

1. Disk Utilities
2. Begin PCEA Session
3. Begin PCEA Session Menu

    1. Define New System
    2. Resume Previous Work
    3. Change Name/Descript. : Edit name/description of file
    4. Quit

Select choice with cursor control arrows and press <CR> when ready...

PERSONNEL CONSTRAINTS ESTIMATION AID MAIN MENU

STEP	DATE LAST ACCESSED
0-INTRODUCTION AND SOURCE MOS SELECTION	11-21-87
1-OBTAIN/LOAD PCEA DATA BASE	11-21-87
2-ESTIMATE PROJECTED CHARACTERISTIC DISTRIBUTION	11-25-87
3-DETERMINE CUT-OFF LEVELS	-
4-PROVIDE DESIGN GUIDANCE	-
5-DEVELOP TAD INPUT	-

SELECT STEP BY MOVING CURSOR CONTROL ARROWS AND PRESSING <CR> WHEN READY.

PERSONNEL CONSTRAINTS ESTIMATION AID MAIN MENU

STEP	DATE LAST ACCESSED
0-INTRODUCTION AND SOURCE MOS SELECTION	11-21-87
1-OBTAIN/LOAD PCEA DATA BASE	11-21-87
2-ESTIMATE PROJECTED CHARACTERISTIC DISTRIBUTION	11-25-87
> 3-DETERMINE CUT-OFF LEVELS	-
4-PROVIDE DESIGN GUIDANCE	-
5-DEVELOP TAD INPUT	-

SELECT STEP BY MOVING CURSOR CONTROL ARROWS AND PRESSING <CR> WHEN READY.

3.3 STEP 1: USER OBTAINS/LOADS UPDATED PCEA DATA INPUT FILES

3.3.1 Output

During Step 1, the user will load the Current Distribution File, the Initial Inventory File, the Product 1 Input Files, the Total Army Input File, and the Transition Rate File onto his or her hard disk file. The Current Distribution File describes the current distribution, or personnel characteristics, within each subpopulation in an MOS. The Transition Rate File describes the transition rates for each subpopulation within an MOS.

The Product 1 Input files describe the Product 1 functional tasks and functional task criteria associated with the system. The Total Army Input File describes the current Army end strength, current distribution data for each transition predictor variable at the total Army level, and the distribution of each subpopulation at the total Army level. The Initial Inventory File describes the current distributions of each subpopulation within an MOS. The MOS Change File describes changes made in the MOS associated with a particular area.

The Systems File is also updated at the completion of this step to record step completion.

3.3.2 Input

External Input. The user will obtain the PCEA Input Files from the PCEA maintenance organizations described in Section 7.2.

Internal Input. The PCEA maintenance organization will update the Current Distribution File (Tables 5.1-14), the Initial Inventory File (Table 5.1-7), the Transition Rate File (Table 5.1-10) the MOS Change File (Table 5.1-20), and the Total Army

Input File (Table 5.1-5) on a yearly basis. As long as the user conducts an analysis on the same set of MOSs, he or she will only have to obtain and load an updated copy of the data bases once a year. The user can then access the data bases from the hard disk throughout the year. The maintenance organization applies the Personnel Variable Rate Calculation Model to produce the Current Distribution, Transition Rate, and Initial Inventory Files. The Personnel Variable Rate Calculation Model derives personnel variable distributions on current accessions and enlisted personnel for each selected personnel characteristic by selecting data from the Current Distributions File. It will also form subpopulations and calculate transition rates for each subpopulation by reading data from the Initial Inventory File. Section 6.2-1 describes the Personnel Variable Rate Generation Algorithm. Section 7.2 presents more details on how the PCEA maintenance organization will construct these files.

A baseline version of the Total Army Input files will be stored in the library (see Tables 4.2-25A, B, C). The system will use these libraries as an input if the Total Army Input Files are not available from the maintenance organization.

The same set of users who apply Product 1 will probably apply the PCEA. Users will be warned to contact the PCEA maintenance organization to obtain an updated Product 1 Input File.

3.3.3 Process

The system will check to see if there are Current Distribution files, Transition Rate Files, and Initial Inventory Files for the source MOSs selected in Step 0. The user is then given the option to continue with the missing data. If the user wishes to input these files, the PCEA user's system will instruct the user how to (1) contact the PCEA maintenance organization to obtain

an updated copy of the input files, and (2) if the files are already available on floppy diskette, how to enter them into the system. Other PCEA input data files follow similar procedures. An updated set of input files will be included in the PCEA program software sent to first time users. This will allow users to apply the PCEA immediately. The initial input files will be generic to the mission area and will not be tailored for specific systems.

3.3.4 User Interface Diagram

Figure 3.3.4-1 displays the User Interface Diagram for Step 1. The sequentially numbered blocks shown below display the logical sets of user interactions for this step. Each block includes a listing of, the screens, files and algorithms associated with that particular block. Replicas of the user interface screens follow the block descriptions. Screens are referenced by the block numbers used in the User Interface diagram.

BLOCK 1 - See Screens 36-38. The user first indicates if he wants to identify missing input data files, load input data files or save input data files. If the user indicates he wants to identify missing input data files, the System determines if the Current Distribution Transition Rate and Initial Inventory Files are available for the MOSs selected in Step 0.

BLOCK 2 - Screens 45-49 describe how to input files received via floppy diskette.

BLOCK 3 - Screens 51-52 provides an example of a frame describing MOSs with missing input files.

BLOCK 4 - Screen 50 shows where to get input files.

BLOCK 5 - See Screen 53-54.

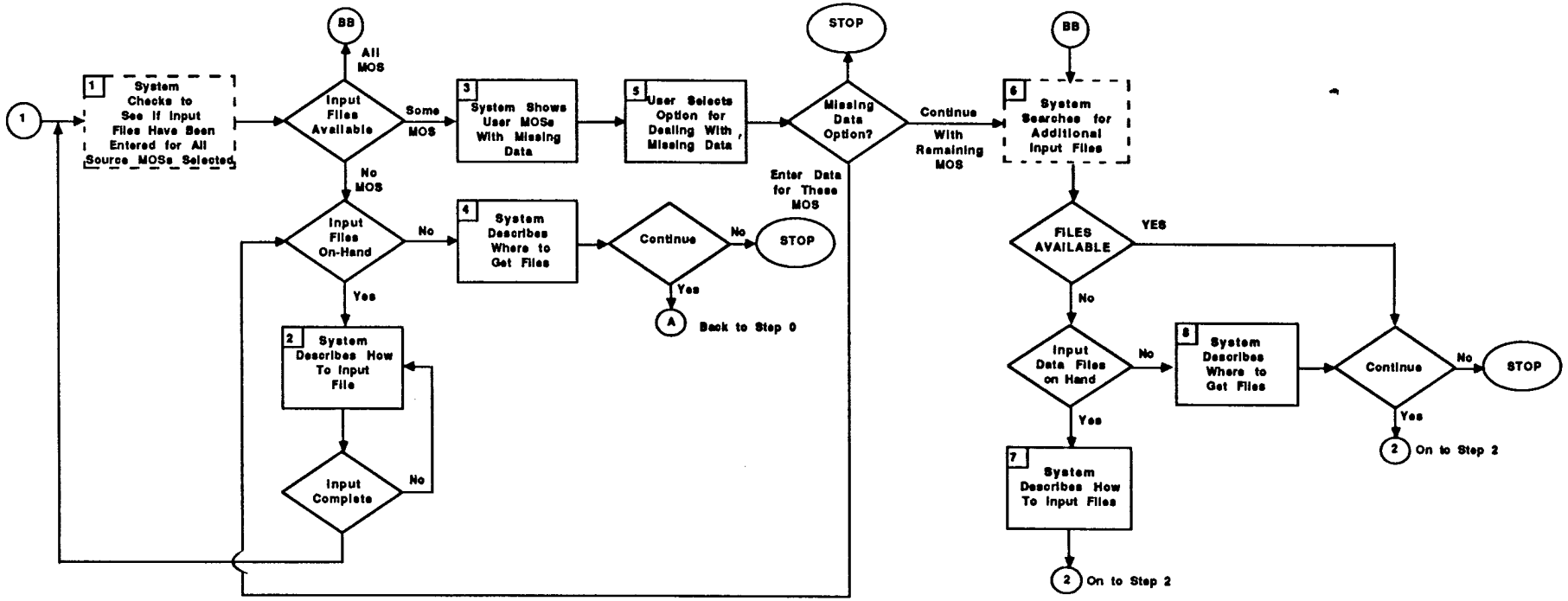


Figure 3.3.4-1. Step 1 - Obtain/Load PCEA Data Base.

BLOCK 6 - See Screens 39-44. The System checks if the Total Army Input File, the Product 1 Input Data Files and the MOS Change File are available for the System. These files describe system functions and their associated performance criteria (see Table 5.1-6). If the files are not available, the system then asks the user if the files are available on floppy diskette.

BLOCK 7 - Screen 47 describes the process of inputting Product 1 input data files that are received via floppy diskette.

BLOCK 8 - See Screen 50.

The Systems file is updated to record completion of Step 1 if the user reaches Block 7 or 8. If they were not there already, the PCEA Input files (Current Distribution, Transition Rate, Initial Inventory, Total Army Input File, and Product 1 Input Data File) are saved on the hard disk.

PCEA>SESSION>NEW SYSTEM>MOS MODE: WORK

Continue Return to Main Menu Quit
Continue with Step 1 of PCEA

PCEA STEP ONE: Loading PCEA Data Base

You are now beginning step one of the PCEA program. This step allows you to perform the following activities:

1. Input missing input data files.
2. Load input data files.
3. Save input data files.

PCEA>SESSION>NEW SYSTEM>MOS MODE: WAIT

Please wait.... checking availability of data files for all MOS's selected....

PCEA>SESSION>NEW SYSTEM>MOS MODE: WAIT

Please wait.... checking availability of data files for all MOS's selected....

Data files for all MOS's available....

Please wait.... searching for "Additional Input Files".....

PCEA>SESSION>NEW SYSTEM>MOS MODE: WAIT

Please wait.... checking availability of data files for all MOS's selected....

Data files for all MOS's available....

Please wait.... searching for additional input files....

Total Army Input Files .... found

PCEA>SESSION>NEW SYSTEM>MOS MODE: WAIT

Please wait.... checking availability of data files for all MOS's selected....

Data files for all MOS's available....

Please wait.... searching for additional input files....

Total Army Input Files .... found .... loading

PCEA>SESSION>NEW SYSTEM>MOS MODE: WAIT

Please wait.... checking availability of data files for all MOS's selected....

Data files for all MOS's available....

Please wait.... searching for additional input files....

Total Army Input Files .... found .... loading .... ready

PCEA>SESSION>NEW SYSTEM>MOS MODE: WAIT

Please wait.... checking availability of data files for all MOS's selected....

Data files for all MOS's available....

Please wait.... searching for additional input files....

Total Army Input Files .... found .... loading .... ready
Product 1 Input data files .... found .... loading .... ready

PCEA>SESSION>NEW SYSTEM>MOS MODE: WAIT

Please wait.... checking availability of data files for all
MOS's selected....

Data files for all MOS's available....

Please wait.... searching for additional input files....

Total Army Input Files .... found .... loading .... ready
Product 1 Input data files .... found .... loading .... ready
MOS Change file .... found .... loading .... ready

PCEA>SESSION>NEW SYSTEM>MOS MODE: WORK

Continue Return to Main Menu Quit
Continue to Step Two of PCEA

Please wait.... checking availability of data files for all MOS's selected....

Data files for all MOS's available....

Please wait.... searching for additional input files....

Total Army Input Files .... found .... loading .... ready
Product 1 Input data files .... found .... loading .... ready
MOS Change file .... found .... loading .... ready

All PCEA Input Files loaded.

PCEA>SESSION>NEW SYSTEM>MOS MODE: WORK

Please wait.... checking availability of data files for all MOS's selected....

MOS Change File Not Found

Is MOS Change File available on floppy diskette? (Y/N)

PCEA>SESSION>NEW SYSTEM>MOS MODE: WORK

Please wait.... checking availability of data files for all MOS's selected....

Data files not found for any MOS's.....

Are Input files on source MOS's available on floppy diskette? (Y/N)

PCEA>SESSION>NEW SYSTEM>MOS MODE: WORK

Please wait.... checking availability of data files for all
MOS's selected....

Data files not found for any MOS's.....

Are Input files on source MOS's available on floppy diskette? (Y/N)

Insert diskette and press <CR> ...

PCEA>SESSION>NEW SYSTEM>MOS MODE: WORK

Please wait.... checking availability of data files for all MOS's selected....

Data files not found for any MOS's.....

Are Input files on source MOS's available on floppy diskette? (Y/N)

Insert diskette and press <CR> .... loading .... ready.

PCEA>SESSION>NEW SYSTEM>MOS MODE: WORK

Please wait.... checking availability of data files for all MOS's selected....

Data files not found for any MOS's.....

Are Input files on source MOS's available on floppy diskette? (Y/N)

Insert diskette and press <CR> .... loading .... ready.

PCEA>SESSION>NEW SYSTEM>MOS MODE: WORK

Please wait.... checking availability of data files for all MOS's selected....

Data f

Is INP

NOTE:

INPUT file must be obtained from PCEA monitor before proceding with work in this mission area or system type. Contact the Personnel Information Systems Command, the DA systems directorate, code AATN: ASNI-ASM, 200 Stovall Street, Alexandria, VA, Zip 22332, AV 555-1212.

Initiate/Resume work on another mission? (Y/N)

PCEA>SESSION>NEW SYSTEM>MOS MODE: WAIT

Please wait.... checking availability of data files for all MOS's selected....

Data files found for some MOS's ....

Press <CR> to see MOS's with missing input data files.

PCEA>SESSION>NEW SYSTEM>MOS MODE: WORK

Continue Enter Select another system Quit
Continue - - MOS's with missing data ignored

MOS's with missing input data files

MOS	MOS Title
31V	Communications Maintenance
45L	Artillery Repairer
63H	Track Vehicle Repairer

PCEA>SESSION>NEW SYSTEM>MOS MODE: WORK

Continue Enter Select another system Quit
Enter files for MOS's with missing data

MOS's with missing input data files

MOS	MOS Title
31V	Communications Maintenance
45L	Artillery Repairer
63H	Track Vehicle Repairer

PCEA>SESSION>NEW SYSTEM>MOS MODE: WORK

Continue Enter Select another system Quit
Select another system

MOS's with missing input data files

MOS	MOS Title
31V	Communications Maintenance
45L	Artillery Repairer
63H	Track Vehicle Repairer

3.4 STEP 2: ESTIMATE PROJECTED CHARACTERISTIC DISTRIBUTIONS

3.4.1 Output

The projected personnel characteristics distribution for each source MOS is the primary output of this step. This data is stored on a file called Projected Distribution Files (see Table 5.1-15). Other outputs include the promotion rates migration in and out rates, Rate-of Stay Rates, Separation Rates (see Table 5.1-9), and an updated Systems File (Table 5.1-1).

3.4.2 Input

External Input. None.

Internal Input. Library files providing input to this step are the Personnel Variables Summary (see Tables 4.2-11 and 4.2-12) that lists the personnel characteristic and transition rate predictor variables used in PCEA; the Personnel Variables Description file (see Tables 4.2-13 and 4.2-14) that provides a detailed description (e.g., categories, min, and max values) of each personnel variable; the Projected Accessions Description file (see Table 4.2-15 and 4.2-16) that describes the expected percent distribution of future accessions in various subpopulations for the total Army; and the Current Cut-offs By MOS file (see Tables 4.2-17 and 4.2-18) that lists the cut-offs currently associated with each MOS.

3.4.4 Process

3.4.4.1 Overview of Algorithms

The Personnel Variable Rate Generation Model (PVRGM) allows the user to select, modify, and extrapolate accession subpopulation distributions, and MOS transition rates contained in the Initial Inventory, and Transition Rate Files.

The Personnel Variable Rate Generation Model incorporates four algorithms: Transition Rate Modification (Section 6.2.3), Transition Rates Extrapolation (Section 6.2.4), Subpopulation Accession Distribution Modification (Section 6.2.5), and Subpopulation Accession Extrapolation (Section 6.2.6).

The Accession Projection Algorithm then estimates the distribution of future accessions in various subpopulations within each MOS. The model fills in any missing accession distributions not generated by the user during the application of the personnel Variable Rate Generation Model. It accomplishes this estimation by first reading the Total Army Input File to obtain information for these distributions at the total Army level. The algorithm then allocates distributions to each MOS based on the MOS's current share of the total distribution. Section 6.2-2 provides a description of the Accession Distribution Algorithm.

A modified version of the MLRPS flow model, called the Personnel Characteristic Flow Model (PCFM), is then applied to estimate the predicted strength of the subpopulations within each MOS. The PCFM will flow the accessions in each subpopulation through the higher paygrades using the current and/or assigned transition rates for those subpopulations. Section 6.2.7 provides a description of the PCFM.

The user applies the Distribution Algorithm to estimate the future distribution of the personnel characteristics. (see Section 6.2-8). The Distribution Algorithm assigns distributions for each characteristic within each subpopulation based on the current distribution of the characteristic within that group.

Figure 3.4.4.1-1 displays the relationships among these four algorithms or models.

3.4.4.2 Overview of Programs

Because Step 2 is the most complex of the PCEA steps, we will present a brief overview of what the programs for this step will look like.

3.4.4.2.1 Personnel Variable Rate Generation Model (PVRGM)

The Personnel Variable Rate Generation Program (PVRGP) allows the user to select, modify and extrapolate accession subpopulation distributions, and MOS transition sites contained in the Initial Inventory, and Transition Rate Files.

The Personnel Variable Rate Generation Model incorporates four algorithms: Transition Rate Modification (Section 6.2.3), Transition Rates Extrapolution (Section 6.2.4), Subpopulation Accession Distribution Modification (Section 6.2.5), and Subpopulation Accession Distribution Extrapolation (Section 6.2.6). The PVRGM consists of five separate programs that conduct three major functions. Figure 3.4.4.2-1 depicts these functions. The PVRGM Option Selection Program allows the user to select the dimensions for the rates to be modified or extrapolated.

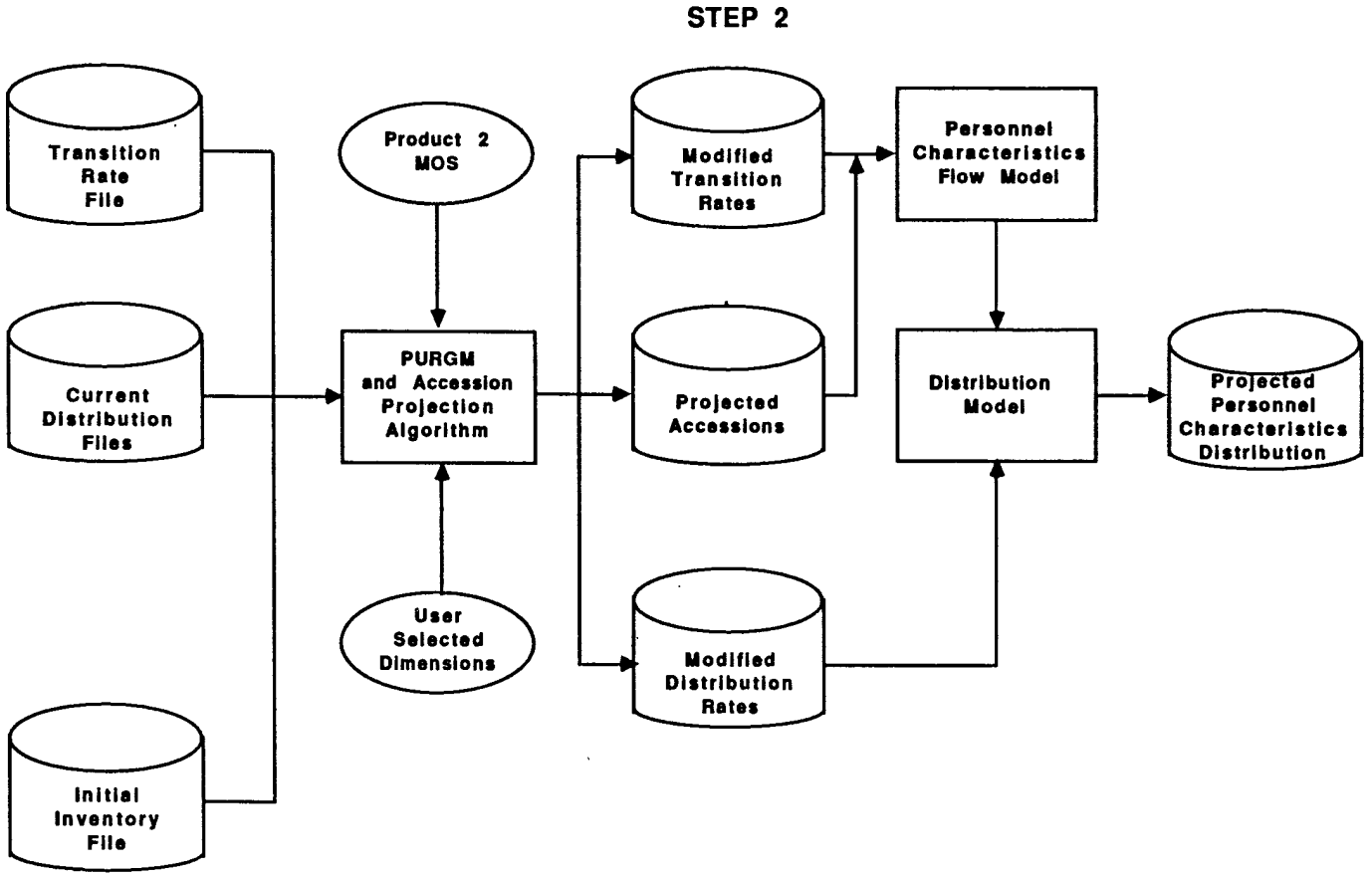


Figure 3.4.4.1-1. PCEA Model Relationships

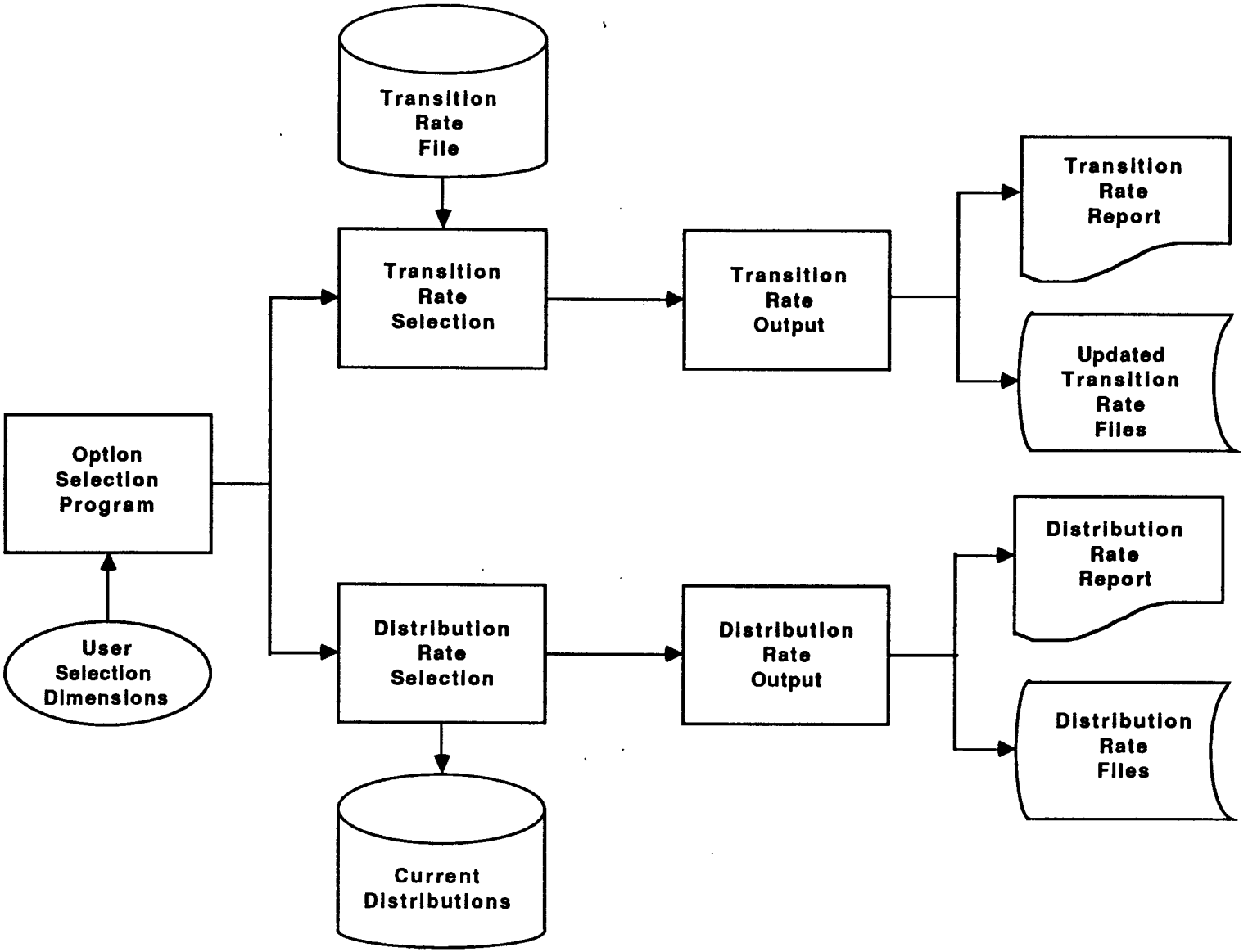


Figure 3.4.4.2-1. PCRM Structure

The Transition Rate Selection Program reads transition rates from the Transition Rate file for the MOSs selected by the user.

The Distribution Rate Selection Program reads the current distribution of subpopulations for accessions within an MOS from the Initial Inventory File. The PVRGP Rate Output Programs provide displays of the distributions and allows the user to revise these distributions and extrapolate them over future time periods, and store the resulting distributions on disk files for use in the Personnel Characteristics Flow and Distribution Models.

Option Selection Program. The user employs the PVRGP Option Selection Program allows to define the subpopulations and the personnel characteristics for which the rates will be generated. The user also selects the projection years to be used in the analysis. Specific selections made by the user are:

- Personnel Variables. The user selects an MOS and determines those personnel characteristics and transition rate predictor variables for which distributions and rates are desired. By selecting transition rate predictor variables, the user defines the subpopulations that will be used in subsequent analyses. The user should select all possible sets for rate generation. Later in the application of these rates, the user may use only a subset of the rates generated. Conversely, by selecting fewer sets for rate generation, the user reduces the computation and storage requirements for his machine and hard disk.

- Projection Horizon. The user determines the number of years, from one to 10, for which the analysis will be conducted. As with the selection of the dimensions, a smaller number of years will reduce the computational and storage requirements.

Transition Rate Selection Program. The Transition Rate Selection Program automatically generates the transition rates (attrition, promotion, and migration) for all the MOSs selected in Step 1. The program reads the transition rates for the selected MOSs from the Transition Rate File.

Distribution Rate Selection Program. The Distribution Rate Selection Program automatically generates the historical distribution of subpopulations for accessions within the MOSs selected by the user.

Transition Rate Output Programs. The Transition Rate Output Program provides four functions: (1) display of the rates generated; (2) allowance for the modification of the rates by the user, (3) extrapolation of the historical rates into future time periods, and (4) storage of the rates on permanent files for use in the Personnel Characteristics Flow Model.

- Display Function. This program provides a display of the rate generation program's output.

- Modification Function. This program allows the user to modify these rates and adjust them to reflect the expected transitions for the weapon system under evaluation. This revision capability should be used prudently. Two instances of proper use are adjusting for unreliable data or adjusting for cells where no

data exists. The modification function should not be used to force the result to meet with preconceived expectations. The user may create modified transition rates by multiplying the rates by a factor. The factor may range from zero to 10.0, where a factor f = 1.0 would not change the rate. The user may apply a rate to a single cell or a group of cells by transition rate predictor category, MOS, or grade. In addition, the user can replace rates (or groups of rates) by selecting the desired dimension and providing the desired rate.

- Extrapolation Function. This program allows the analyst to extrapolate the rates into future time periods. Since the system generates historical rates, the user transform them into future rates. The user may also modify the rates before extrapolating them. This is accomplished by multiplying the rates by a factor to produce the desired future rates. The factor may range from zero to 10.0, where a factor f = 1.0 produces a rate identical to the historical rate. The user may apply a single factor to each cell of the rate file (although this may require several thousand operations). More typically, the user can apply a factor to a group of cells by transition rate predictor category, grade, and/or year. Most frequently, the user will use a single factor for each transition category for each projection year.

- File Function. The user can store the Transition Rate File developed by the Personnel Characteristics Flow Model on permanent hard disk by selecting the system name under which the data will be retained. The user

will be warned if the disk does not contain sufficient room to store the data generated. In this case, the user will be instructed that he may go back to Step 0 and erase useless data sets to create space, or he can select another hard disk cartridge (or floppy disk) for data storage.

Distribution Rate Output Programs. Like the Transition Rate Output Program, the Distribution Rate Output Program provides four functions: (1) display of the distributions percentages generated by the computation process; (2) modification of the distributions by the user; (3) extrapolation of the historical distributions into future time periods; and (4) storage of the distributions on permanent files for use in the Distribution Model.

- Display Function. This program provides for a display of the distributions generated by the distribution rate generation program.

- Modification Function. This program allows the user to modify the distributions/percentages, using standardized software, to adjust the rates to reflect the expected distributions for the weapon system under evaluation. This revision capability should be used prudently to adjust for unreliable data or for cells where no data exists. It should never be used to force the results to meet with preconceived expectations. The user may modify the distribution rates by replacing the rates by selecting the desired rate (or groups of rates) and providing the desired change. Since the distribution rate/percentages must total to 100% for the levels within the personnel characteristic

selected, the user must take care when replacing rates. If the rates do not sum to 100%, the program will normalize the values to 100%, warn the user that the normalization process has been executed, and provide a display of the rates computed.

- Extrapolation Function. This program allows the analyst to extrapolate the rates into future time periods. Since the rates generated by the rate generation programs are historical rates, the user must transform them into future rates. The program automatically places all historical distribution rates into each projected time period.

- File Function. The user can store the Projected Distribution File developed by the Personnel Characteristics Distribution Model on permanent hard disk by selecting a system name under which the data will be retained. The user will be warned if the disk does not contain sufficient room to store the data generated.

3.4.4.2.2 Personnel Characteristics Flow Model (PCFM) Program

The PCFM program consists of five major processing programs: the Flow Program, the Modify Program, the Display Program, the Total Program, and the Report Program. The PCFM also contains several utility functions described below. Figure 3.4.4.2-2 shows the overall program structure of the model. Each of the major processing steps will be described in detail.

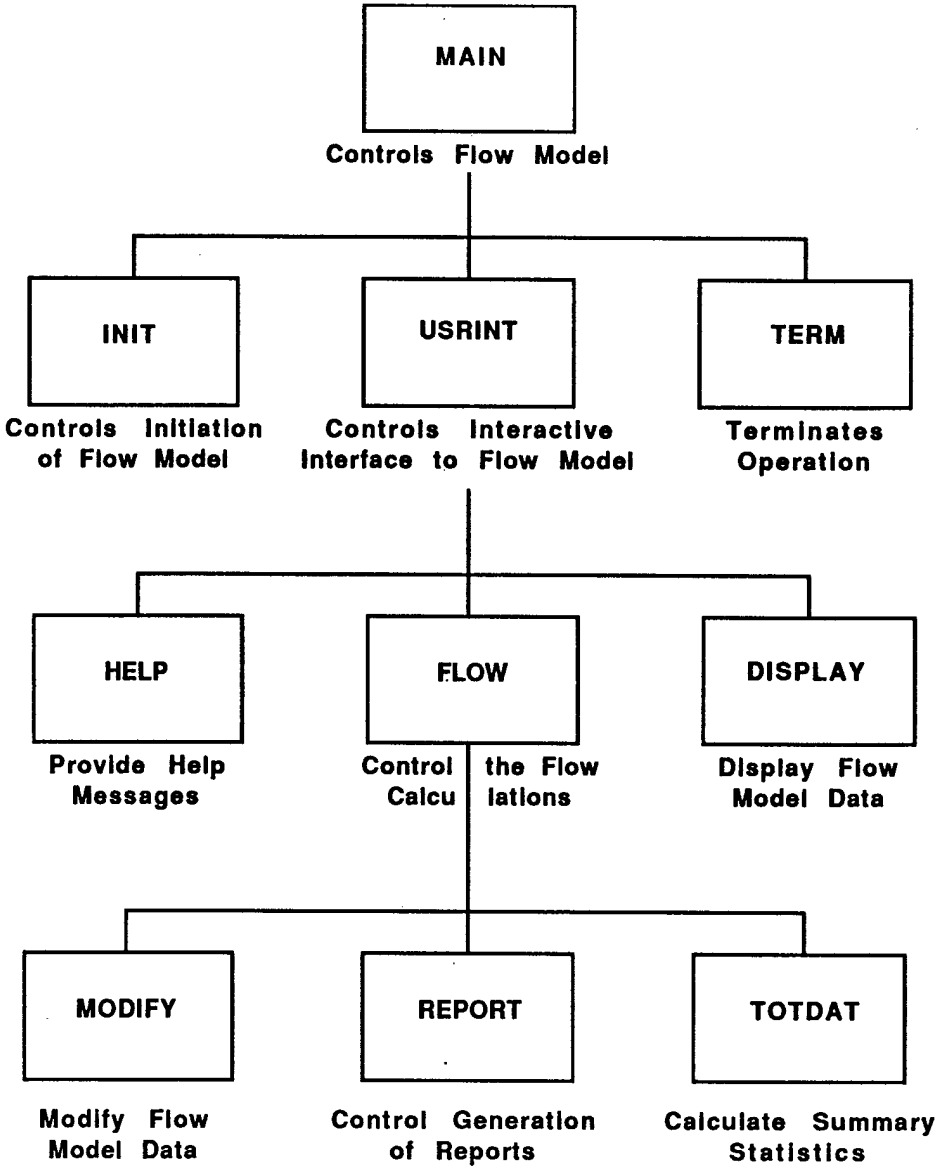


Figure 3.4.4.2-2. PCFM Structure

This section describes the program involved in running the model. Section 6.2-6 provides a detailed description of the Personnel Characteristics Flow Model algorithms. Appendix E contains a description of the changes that must be made to the current MLRPS model to produce the PCFM.

Input-Output Files and Displays. The flow model requires the following input and output data:

- Input Data:
  - Initial Inventory
  - Promotion Rates
  - Accessions
  - Separation Rates
  - Migration-Out Rates
  - Migration-In Rates
  - Training Loss Rates

- Output Data:
  - Projected Inventory
  - Projected Separations
  - Projected In-Migrations
  - Projected Out-Migrations
  - Projected Promotions

Modify Program Run Description. The MODIFY command modifies parameters and data used in the flow calculations. The changes remain in effect only for the duration of the PCFM session. The MODIFY command is run interactively after initiating the Flow Model from the PCFM main menu.

Figure 3.4.4.2-3 shows the process used by the Modify Program. When the user specifies certain modifications, the dimensions of the data to be changed, the type of operation, and the value to

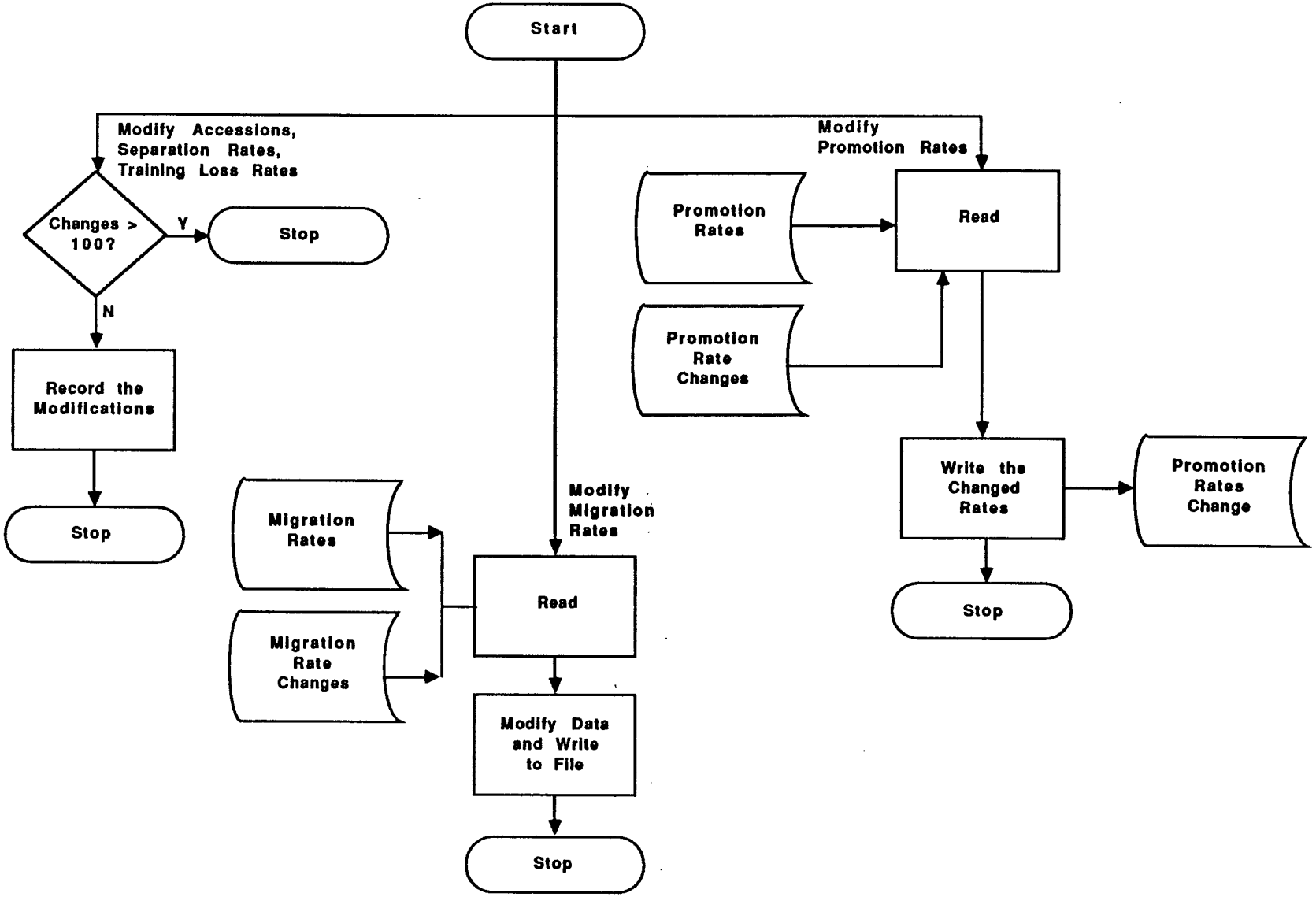


Figure 3.4.4.2-3. Flow Model Modify Process

be used in modifying the data are held in arrays and variables. Then, when the data is needed for the flow calculations or displays, the modifications are applied to the data before using it. The operations that can be used are add, subtract, multiply, divide, and assign. Any non-negative, real value can be used as a modifier.

Variables store changes made to the enlisted accessions, separation rates, and training loss rates. When the accessions, separation rates, or retraining rates are used in the Flow Program, they are reread from disk and then the changes are applied to them. If changes are made to promotion or migration rates, the changed data are written out to change files on disk.

Rates are not allowed to become less than zero or greater than one. All rates are checked to insure that they are in the 0 to 1 range after they are read in from disk and any changes made are applied to them. If the user added 10 to them, they would be negative, and would be reset to 1. If the user subtracted 10 from them, they would be too small, and would be reset to zero.

All changes made are cumulative throughout the current execution of the Flow Program. All changes made can be erased by using the RESET command, which zeroes-out the arrays and the variables used to record the changes. The number of changes that can be made is limited by the size of the arrays used to store them.

The number of changes, as recorded by the flow model for a given execution of the MODIFY command, is computed as follows. If the change applies to the entire file (i.e., to the full range of each dimension of the data) the Flow Program records it as one change. If the user selects a subset of one or more dimension ranges for modification, the number of changes recorded is equal to the product of the ranges specified. For example, accessions have dimensions of subpopulation, years of projection, grade, and MOS. If years of projection 1 through 10 and grades 1 to 4 were modified, the number of changes would be 10 x 4 = 40.

Input-Output Files and Displays. The MODIFY command reads the promotion and migration rates files. Files used for output are the change files used to save the modified promotion and migration rates.

- Input Data:
  - Enlisted Promotion Rates
  - Enlisted Migration Rates

- Input-Output Data:
  - Promotion Rates Change
  - Migration Rates Change

Display Program Run Description. The Display Program allows the user to display selected PCFM data on the screen. Subtotals and totals on any combination of dimensions may also be displayed on screen for any data that are not probabilities or rates. The display function allows the user to see the individual numbers and rates the PCFM uses. The DISPLAY command is run interactively after entering the PCFM from the PCFM main menu.

a. Computational Process. The DISPLAY function reads the PCFM input and output data and displays the individual values on the screen. If changes to the data have been made as discussed under the MODIFY command, the changes are applied to the data before it is displayed. As described under the MODIFY command, changes that the user makes to the data are recorded in variables and arrays held in memory. The DISPLAY function reflects these changes even though the original data has not been changed. The exception to this is the promotion rates and enlisted migration rates. These data have an associated change file on which changes are stored.

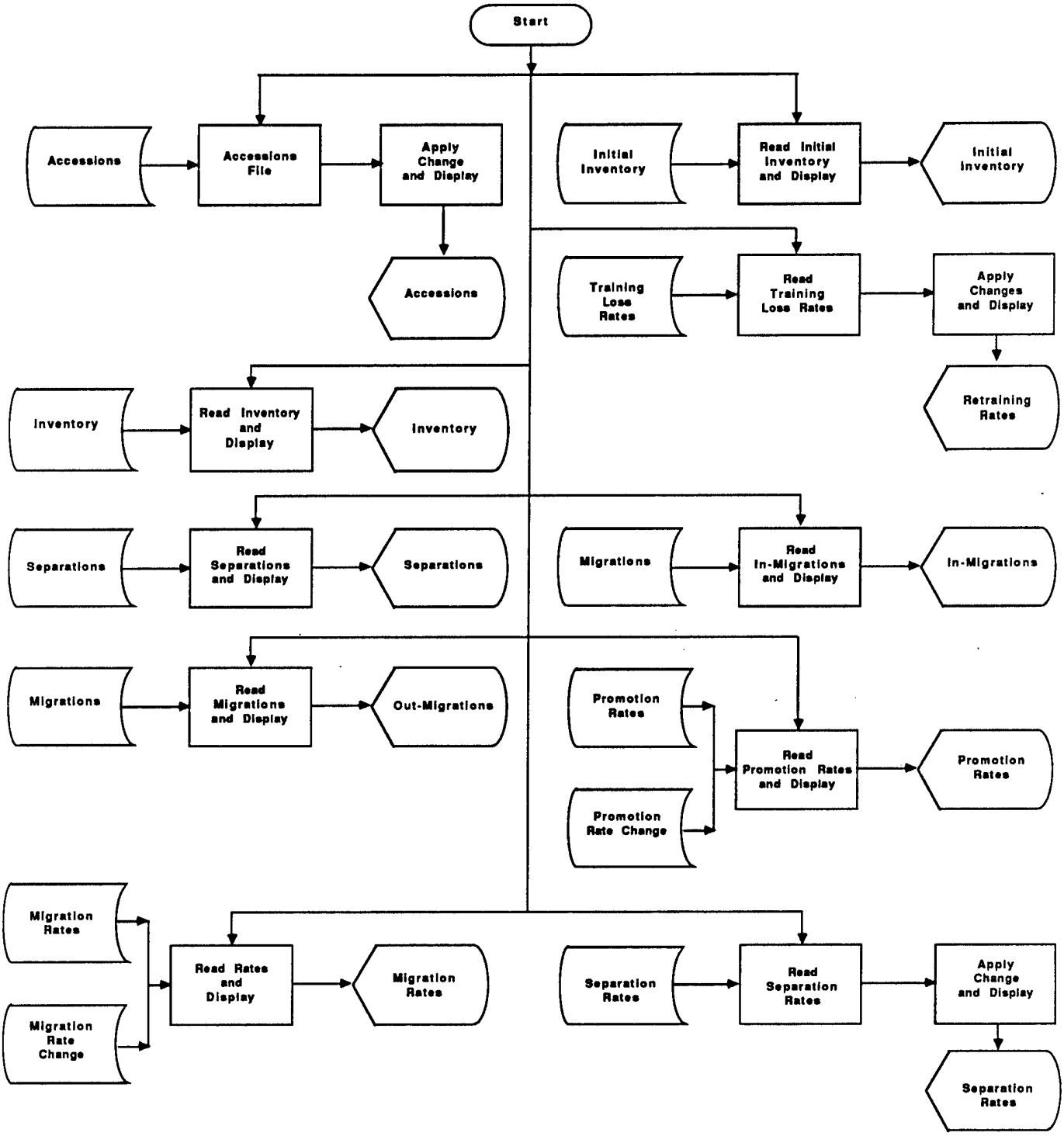


Figure 3.4.4.2-4. Flow Model Display Process

The DISPLAY function reads these change files if necessary. The flowchart in Figure 3.4.4.2-4 illustrates this process. User requested subtotals and totals are computed and held in variables as the display proceeds. The variables are written to the screen after all the individual data elements have been displayed.

b. Input-Output Files and Displays. The DISPLAY function reads the following input files:

- Accessions
- Initial Inventory
- Inventory
- Retraining Rates
- Separations
- Migrations
- Promotion Rates
- Promotion Rate Changes
- Migration Rates
- Migration Rate Changes
- Separation Rates

The DISPLAY command creates a display of the input data in tabular format with a single cell on a line. A description of each cell's dimensions precedes it. If the user selects a large number of cells, the display may be exceedingly long (requiring many CRT screens).

Total Program Run Description. The Total Program aggregates the data values associated with the PCFM and displays the totals on the terminal. It can also display subtotals on any dimension the user selects. Totals can be displayed for accessions, initial inventory, inventory, separations, promotions, and migrations (both in and out).

a. Process. The TOTAL command reads the data directly off the data files before aggregating and displaying it. Since the FLOW command generates inventory and separations files, it should be executed for totalling these two data types to get meaningful figures. The user is allowed to make changes to the accessions files with the MODIFY command, which the TOTAL command will then apply to the accessions before displaying the totals. The totals and subtotals are calculated and held in memory variables as the data is read from the files. When all the data has been read, the totals are displayed.

b. Input-Output Data and Displays. The data used for input are the following:

- Accessions
- Initial Inventory
- Inventory
- Separations
- Migrations
- Promotions

The display screen is used as an output file to display the totals.

Report Program Run Description. The REPORT program generates PCFM data reports. The reports are saved on a disk file and can be routed to various printers after termination of the PCFM.

a. Process. For each report generated, the PCFM checks the status variables it maintains. The status variables indicate whether the PCFM generated the data needed by the report. If the data has not been generated, the screen will display a message reminding

the user of that fact. The data needed for the reports are read from the disk files before being formatted for the report. Accessions reports read the accessions files and then apply any changes the user made to the accessions before printing the report.

b. Input-Output Files. The following files are used as input to the report routines.

- Initial Inventory
- Inventory
- Grade Proportion
- Accessions
- Migrations
- Promotions

The output file is the report file on disk in print image format with ANSI carriage control characters. The terminal displays status messages to the user if the current PCFM session did not generate the data needed for the reports.

c. Output Reports. The report function produces six distinct types of reports that can be generated for any combination of projection years.

Report	Description
1	Initial Inventory (see Table 7.3-4).
2	Projected inventory (see Table 7.3-5).
3	Accessions (see Table 7.3-6).
4	Separations Rates (see Table 7.3-7).
5	Migrations In/Out Rates (see Table 7.3-8).
6	Promotion Rates (see Table 7.3-9)

Section 7 provides a detailed description of output report formats.

3.4.4.3 Distribution Model

The DM computes the distribution of personnel characteristics based upon the results of the PCFM, the distribution rates computed in the PVRGM, and the user's selection of personnel characteristics. The dynamic nature of the transition rates will cause the distribution of the subpopulations to vary based upon the results of the flow analysis. For example, if the transition rates cause fewer Mental Category I-IIIA personnel to be separated, the resulting inventory will be skewed more heavily toward the Mental Category I-IIIA for the higher grades. The DM consists of three programs. Figure 3.4.4.3-1 illustrates these programs. The DM Option Selection Program allows the user to select the personnel characteristics and the levels of those characteristics to be computed in the DM. The DM Distribution Computation Program computes the personnel characteristics distributions based upon the user's selection, the results of the PCFM, and the distribution rates from the PVRGM. The PCDM Distribution Output Program prints the results of the distribution calculation and allows the user to store the distributions on hard disk file for use in the following steps of the PCEA process.

Option Selection Program. The user employs the DM Option Selection Program to define the personnel characteristics for which personnel characteristic distributions are to be computed. The user must select the personnel characteristics from the set selected during the collection of distribution rates in the PCRM. The user may select fewer than those selected for rate generation. The user may select any subset of the grades and user-defined projection years used in the PCRM process.

Distribution Computation Program. The DM Distribution Computation Program automatically computes the distribution of personnel characteristics for each of the levels for each MOS and

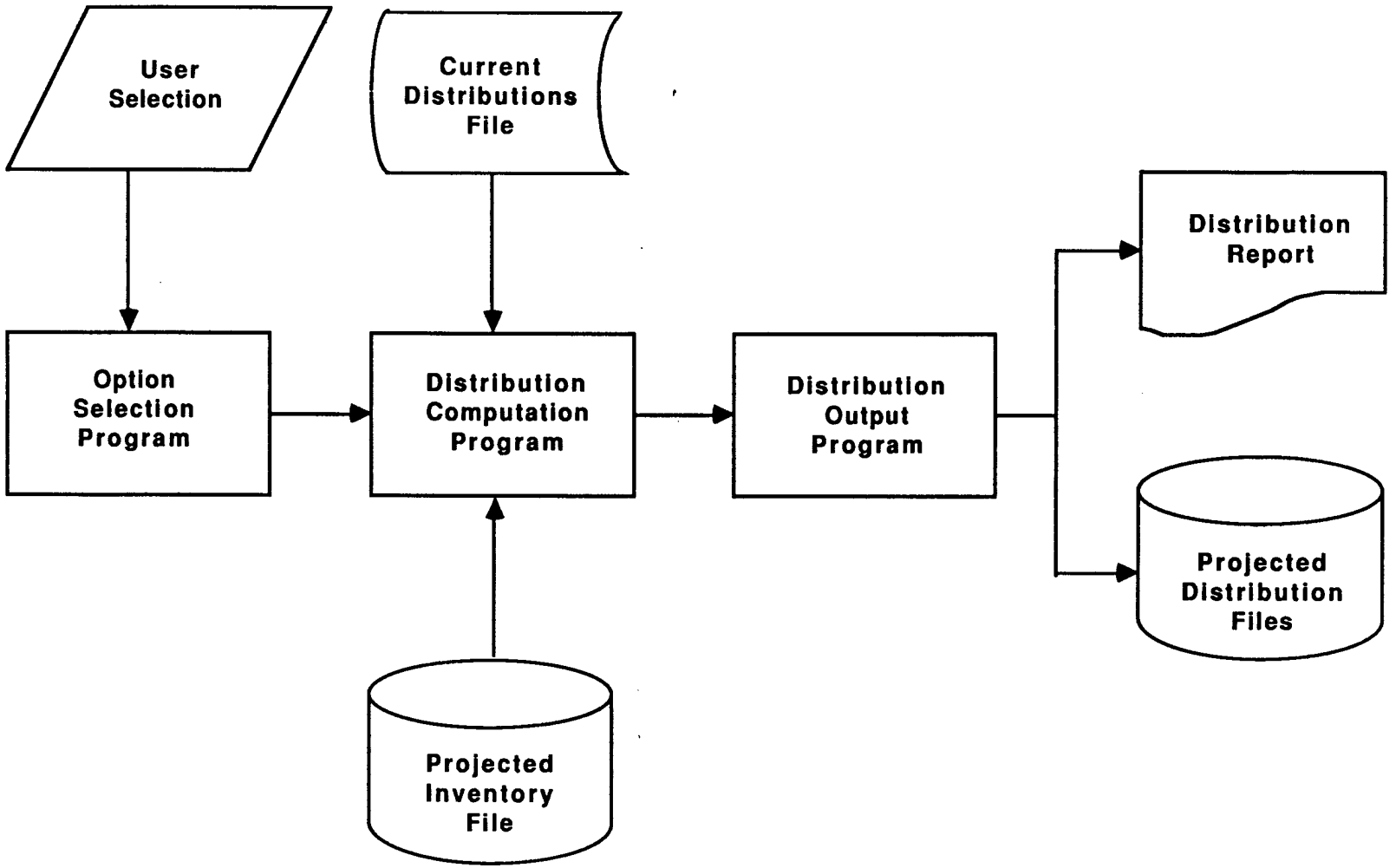


Figure 3.4.4.3-1. DM Structure

grade cell for each projection year. The program applies the distribution rates (stored by MOS, grade, and projection year) to the projected inventory determined by the PCFM (also by MOS, grade, and projection year) to produce the available personnel at each level for each personnel characteristic.

Distribution Output Program. The DM Distribution Output Program provides two functions: (1) the display of the distribution rates and projected inventory distribution, and (2) the storage of the projected inventory distributions on permanent file for use by the subsequent steps of the PCEA process.

- Display Function. The program provides for the display of the expected availability and the distribution of the projected inventory by personnel characteristic levels.

- File Function. The user can store the expected availability of personnel and the distribution of personnel by personnel characteristic level on permanent disk file for use in the following step of the PCEA process, the Determination of Cut-Off Scores. The availability of personnel by personnel characteristic level may also be useful to the weapon system designer to develop alternative weapon system designs and also to the training analyst to determine the type and duration of training needed to provide trained manpower to maintain the fielded system.

3.4.4 User Interface Diagram

Figure 3.4.4-1 depicts the User Interface Diagram for STEP 2. The sequentially numbered blocks shown below display the logical sets of user interactions for this step. Each block includes

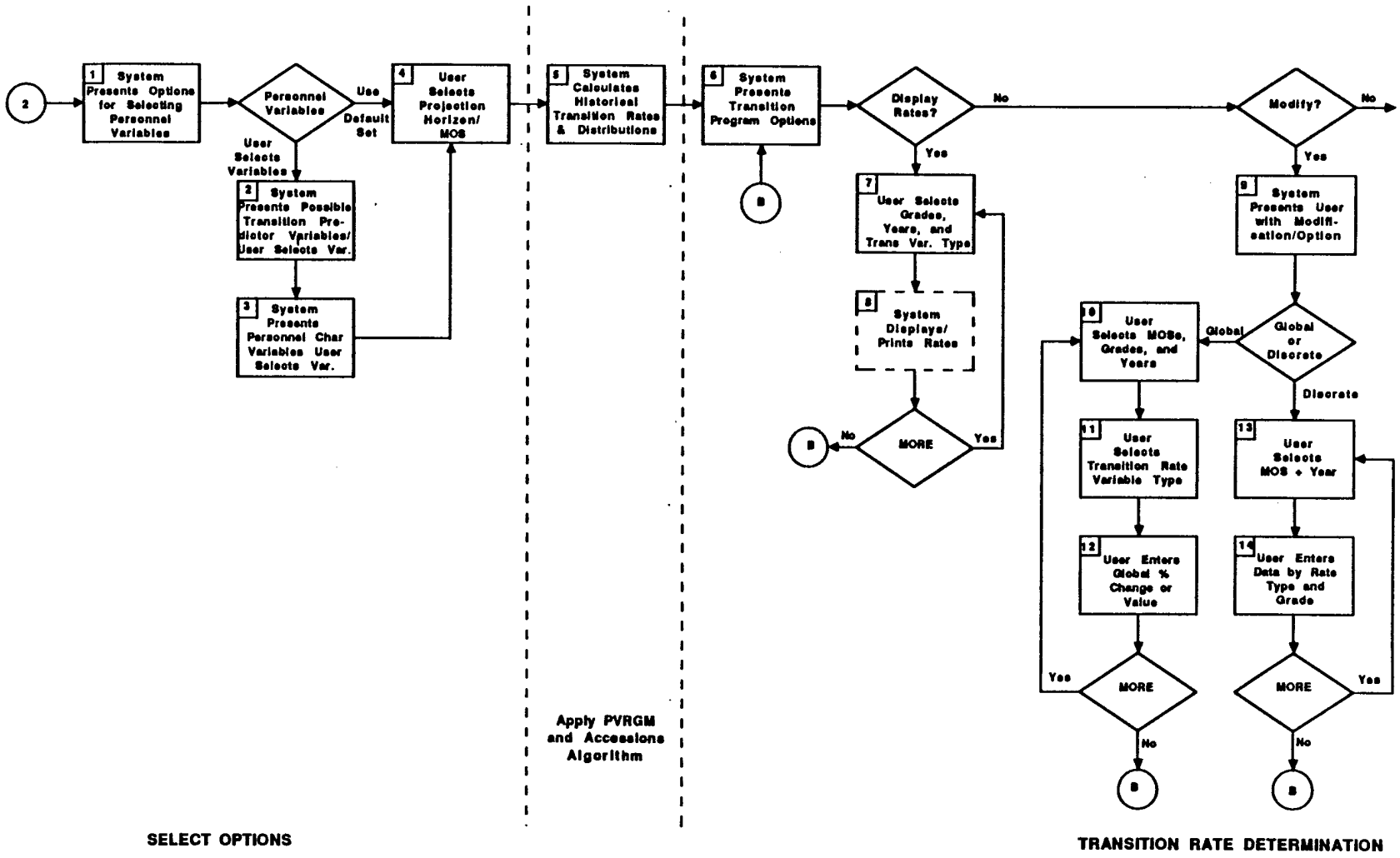


Figure 3.4.4-1. Step 2 - Estimate Projected Characteristics Distribution.

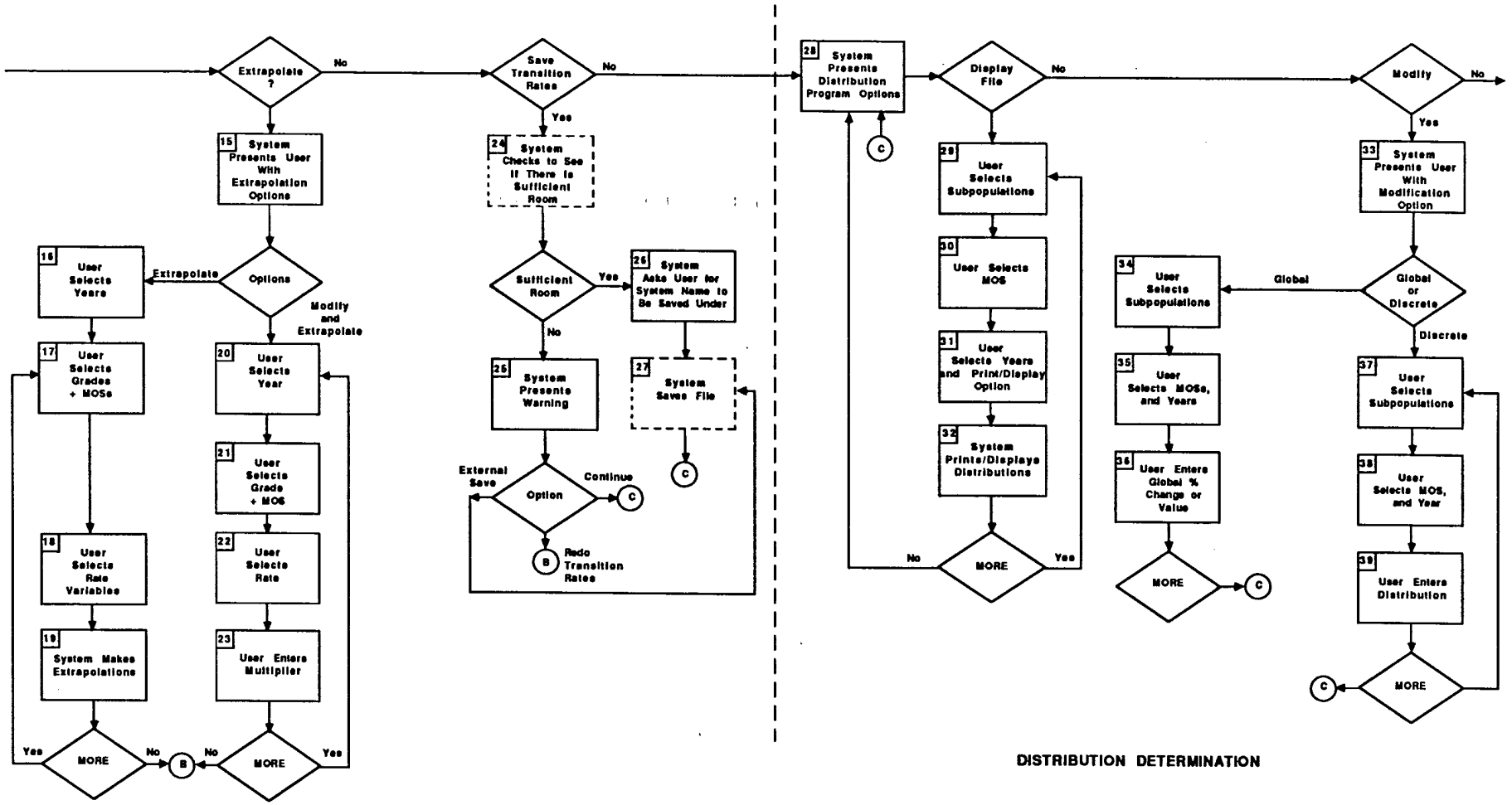


Figure 3.4.4-1. Step 2 (Continued).

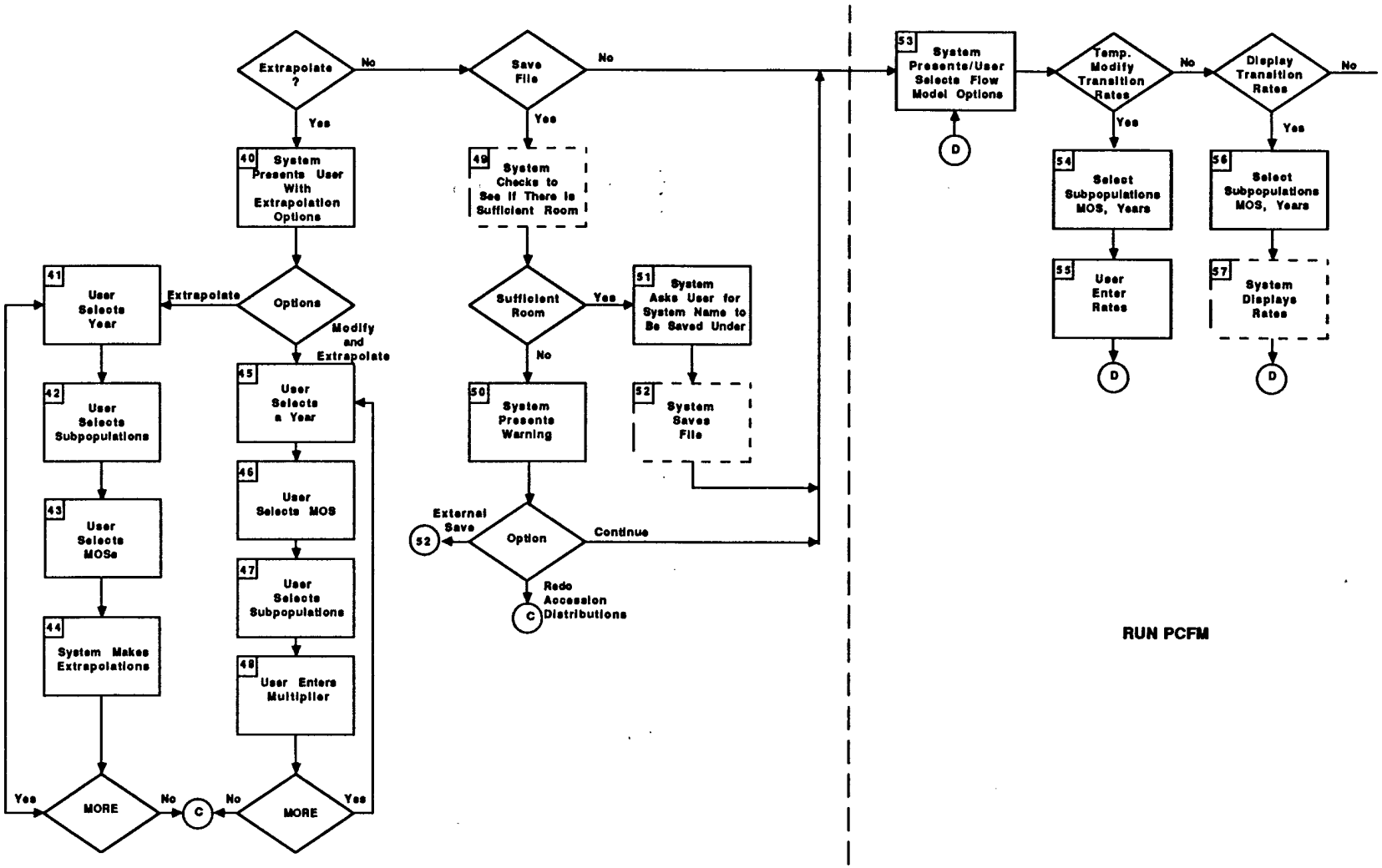


Figure 3.4.4-1. Step 2 (Continued).

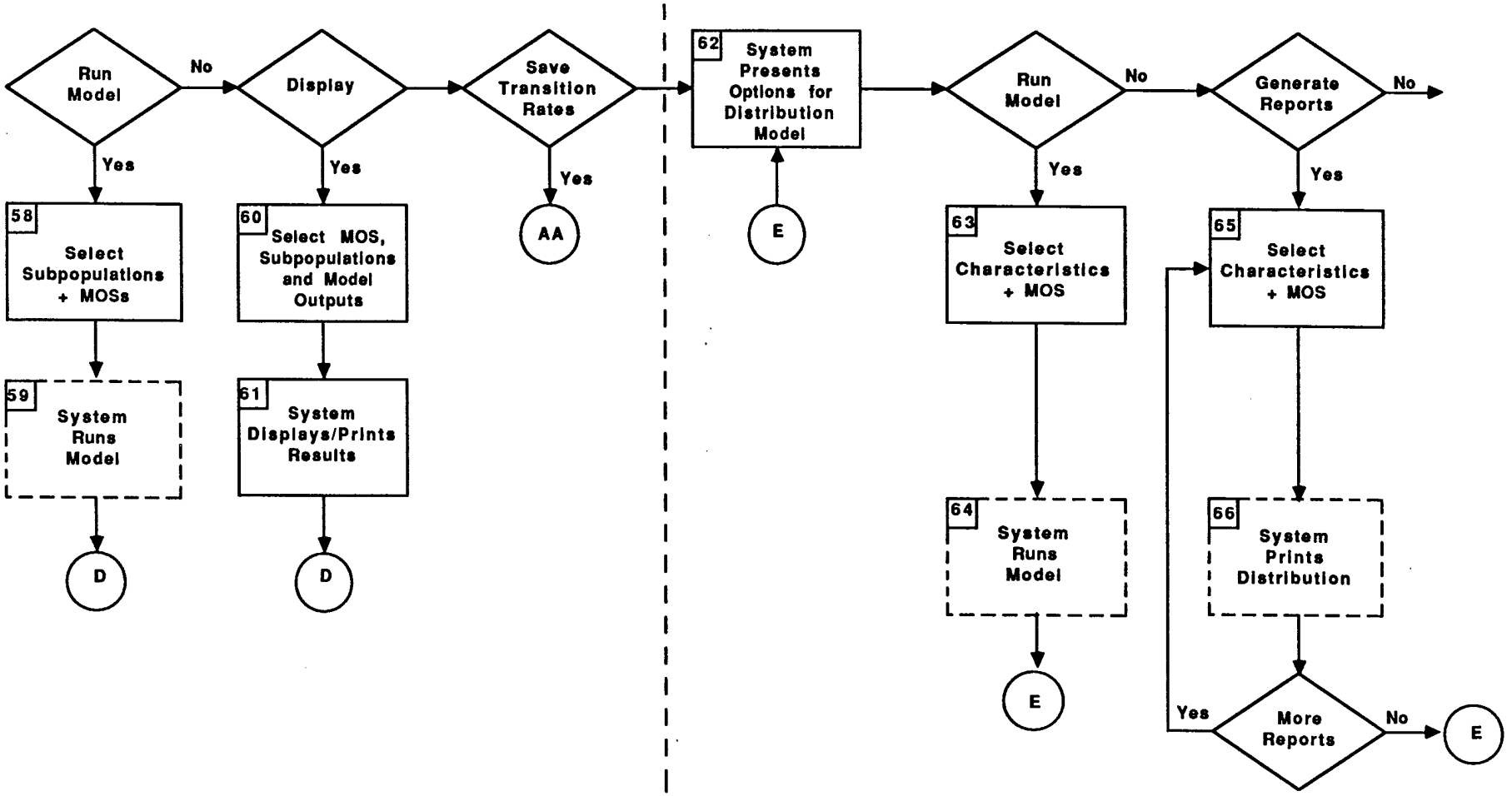


Figure 3.4.4-1. Step 2 (Continued).

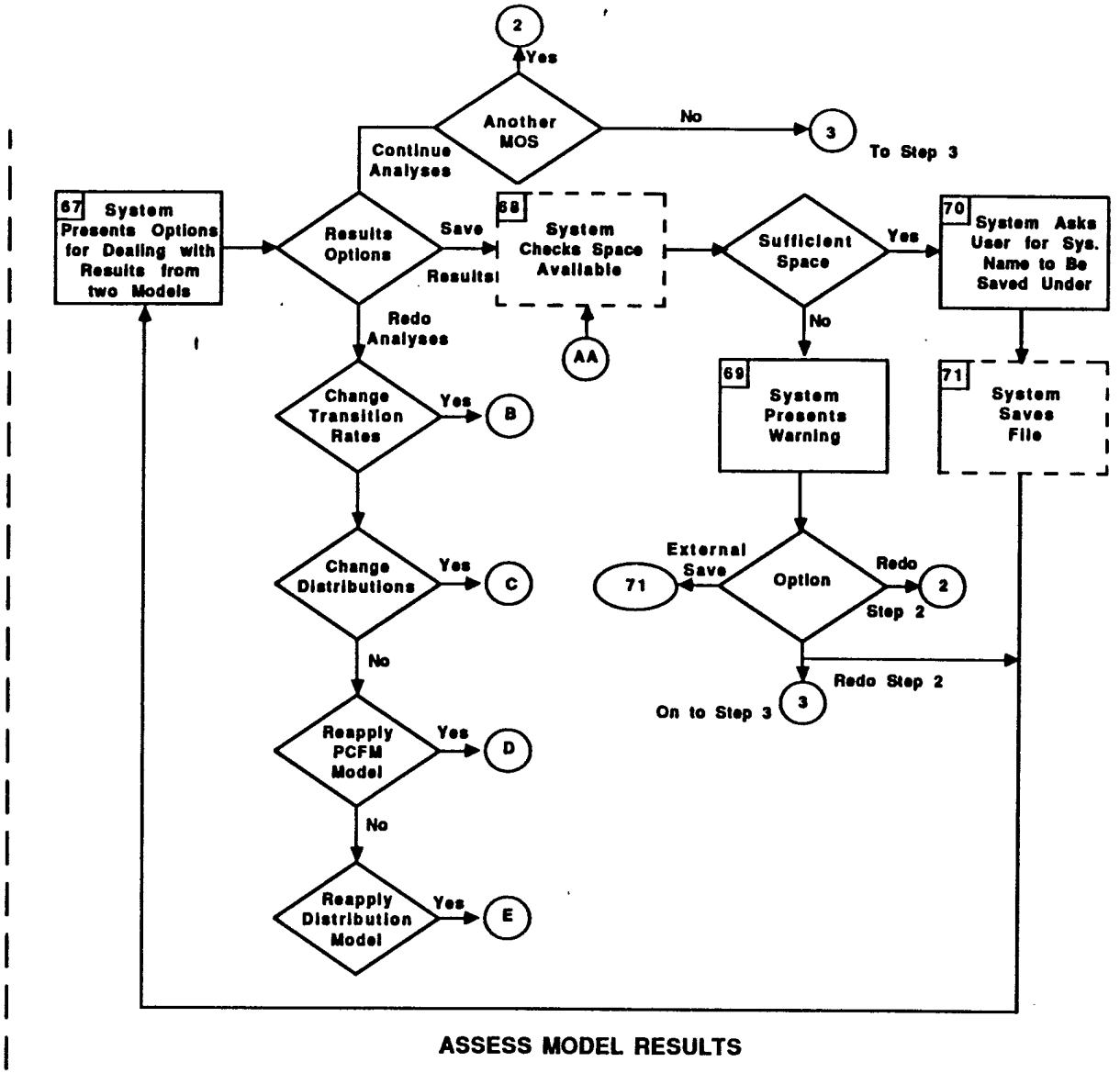


Figure 3.4.4-1. Step 2 (Continued)

descriptions for, or locations of, the screens, files, and algorithms associated with each of the blocks listed in the diagram. Replicas of the user interface screens follow the block descriptions. Screens are referenced by the block numbers listed in the Interface Diagram.

BLOCK 1 - See Screens 55, 56, 58, and 63. The first menu will be the introduction to this step. The user could select from the following options: define scope of projection analysis, describe/modify current characteristic distributions, run flow model, run distribution model, assess flow model results, or continue on to step 3. The second menu will allow user to select options for selecting personnel characteristics.

BLOCK 2 - See Screen 57. The users will select the transition predictor variables they would like to use to create subpopulation groups. In the menu, the recommended, or default, set of variables will be highlighted. The Personnel Variables Summary file (see Tables 4.2-11 and 4.2-12) lists the personnel variables and describes those variables that are transition rate predictor variables and those that are personnel characteristics variables. The default value will be all five transition predictor variables (sex, high school grad status, AFQT group, age at entry, and racial/ethnic descent group.)

BLOCK 3 - Screens 59-62 provide an example. Users will first indicate if they want to select personnel characteristics independently or interdependently. The users will then select the personnel characteristics they will use. The Personnel Variables Summary file lists the personnel variables and differentiates between transition rate predictor variables and personnel characteristics variables. The MOS Characteristic Priority file will list the default set of variables for each

MOS. If they decide to select characteristics interdependently, users may use four characteristics. If they decide to select characteristics independently, they may select 7 characteristics.

If users decide to select characteristics interdependently, they may use seven characteristics.

BLOCK 4 - See Screens 64 and 65 for an example. A user must select a projection horizon from 1 to 10. He/She must also assign a specific 4 digit calendar year (1987) to year 1. All future descriptions will be in terms of these calendar years. Next, the user must select the MOS for which he would like to estimate a rates/distributions.

BLOCK 5 - See Screens 66 and 67. A message will appear on the screen during these calculations (see Screen). The Personnel Variable Rate Generation Model (Section 6.2.1) will generate accession subpopulation distributions transition rates and current personnel characteristic distributions. The Accessions Algorithm will estimate distributions for personnel characteristics for future accessions (see Section 6.2.2).

BLOCK 6 - See Screens 68, 81, 103, and 122. The user selects one of four possible transition rate determination processes (display, modify, extrapolate, save).

BLOCK 7 - Screens 69-79 show examples of these screens. First, the system will ask the user if he wants to use all paygrades for the selected MOS. If he does, he will continue. If he does not, he will be presented with a menu of grades for each MOS. Grades will be 1/2/3, 4, 5, 6, 7, 8/9, and ALL. Next, the user will select the transition rates he would like to look at. There are six choices -- Stay rates, Promotion Rates, Migration-In Rates,

Migration-out rates, Training Loss Rates, and ALL. The user will then be asked what years he would like to view. (He will be allowed to select from any year in the projection horizon). Finally, the user will be asked if he wants to display and/or print the transition rates.

BLOCK 8 - Screen 80 displays examples of these display formats. Table 7.3-2 lists the formats for the output reports. Separate displays/reports will be presented for each MOS/grade/year combination. Subpopulation groups will form rows and transition rate variables will be columns. Entries will be rates.

BLOCK 9 - See Screens 82 and 93. The user selects modification option, either global or discrete (global indicates more than one rate will be changed with a single change entry while discrete indicates each rate will be individually changed).

BLOCK 10 - Screens 83-88, 90, and 91 show examples of these screens. First, the system will ask the user if he wants to modify all paygrades for the MOS selected in Block 3. If he does, he will continue. If he does not, he will be presented with a menu of grades for each MOS. Options are 1/2/3, 4, 5, 6, 7, 8/9 and ALL. Finally, the user will be asked for what years he would like to modify rates. (He will be allowed to select from any year in the projection horizon.)

BLOCK 11 - See Screen 89. The user selects the transition rate to be modified (separation, promotion, migration-in, migration-out, or training loss).

BLOCK 12 - See Screen 92. The user will be presented with a matrix containing transition rate variables as columns and paygrades as rows. Each column will be further divided into two

subcolumns, one for entering a percent change (a multiplier) and one for entering a specific quantitative value. The Transition Rate Modification Algorithm describes how the modifications will be made. (see Section 6.2-3).

BLOCK 13 - See Screens 94-101 depicts an example of this frame. The user will be asked what years he would like to view. (He will be allowed to select from any year in the projection horizon.)

BLOCK 14 - Screen 102 shows examples of these entry formats. Paygrades will form rows and transition rate variables will be columns. Entries will be current rates that the user could modify.

BLOCK 15 - See Screens 104 and 113. The user selects extrapolation option, either global or discrete.

BLOCK 16 - See Screens 105, 106, and 115 for an example. The user will select a baseline year and the years he would like to extrapolate to. He will not be allowed to extrapolate beyond the projection horizon.

BLOCK 17 - Screens 107-110 depict examples of these screens. The system will ask the user if he wants to extrapolate for all paygrades for the selected MOS. If he does, he will continue. If he does not, the program will present him with a menu of grades for the MOS. Options are 1/2/3, 4, 5, 6, 7, 8/9, and ALL.

BLOCK 18 - See Screen 111. The user selects the transition rate to be extrapolated.

BLOCK 19 - See Screens 112 and 121. The system will make the extrapolations for all MOSs, grades, and rates selected by the user. The Transition Rate Extrapolation Algorithm describes the procedures that will be used to make the extrapolations. (see Section 6.2.4 6.2.4)

BLOCK 20 - See Screens 114 and 115. The user will enter the baseline year and the years he/she would like to extrapolate to.

BLOCK 21 - Screens 116-119 present menus for selecting paygrades within an MOS.

BLOCK 22 - See Screen 120. The user selects transition rates for which discrete data will be entered.

BLOCK 23 - Screen 121 shows examples of these entry formats. Paygrades will form rows and transition rate variables will be columns. Entries will be % change values.

BLOCK 24 - Screen 123 describes the message that will appear while the system checks for available memory.

BLOCK 25 - See Screen 124. If there is insufficient memory, the user will have four options: (1) quit (this option is available from almost all screens), (2) continue without saving data or recent data modifications, (3) redo data, and (4) save on an external medium (i.e., floppy diskettes or additional Bernoulli Box). If he chooses the latter, additional screens will be provided to assist him in making the external saves.

BLOCK 26 - See Screen 125.

BLOCK 27 - Screens 126 and 127 displays a message that will appear during this process. Data is saved on the Transition Rate File. (see Table 5.1-9)

BLOCK 28 - See Screens 128, 135, 148, and 160. The user selects distribution program to be exercised. This section includes display, modify, extrapolate, or save options.

BLOCK 29 - See Screens 129 and 130. The user selects subpopulations.

BLOCK 30 - Screen 131 shows examples of these screens. First, the system will ask the user if he wants to see all paygrades for the MOS selected in Block 4. If he does, he will continue. If he does not, he will be presented with a menu of grades for the MOS. Grades may run from 0, 1/2/3, 4,5,6,7,8/9, and ALL. The 0 paygrade is used to refer to accessions. The user also selects the year(s) to be modified.

BLOCK 31 - See Screens 132 and 133.

BLOCK 32 - Screen 134 provides an example. Table 7.3-3 describes the output report format. Separate displays/reports will be presented for each MOS-Characteristic-Year combination. The user will be presented with a matrix with subpopulation categories as columns and paygrades as rows. Entries will be percentage values.

BLOCK 33 - See Screens 136 and 142. The user selects between the global or discrete option.

BLOCK 34 - See Screens 137 and 138. The user selects subpopulations.

BLOCK 35 - Screens 139 and 140 give examples of these screens. First, system will ask the user if he wants to modify all paygrades for the selected MOS. If he does, he will continue. If he does not, he will be presented with a menu of grades.

The user also selects the years he would like to modify.

BLOCK 36 - See Screen 141 for an example. The user will be presented with a matrix with subpopulations as columns and paygrades as rows. Each column will be further divided into two subcolumns--one for entering a percent change and one for entering a specific quantitative value. The user could enter a value in one, or the other, subcolumn for each row unless he chose the ALL row, in which case all of the other rows would be set to zero. The Subpopulation Distribution Modifications Algorithm describes procedures for making the modifications. (see Section 6.2.6)

BLOCK 37 - See Screens 143 and 144. The user selects subpopulations.

BLOCK 38 - See Screens 145 and 146. The user will select the MOSs and paygrades which will be used. In the final menu, the user will select the year he would like to modify.

BLOCK 39 - Screen 147 displays examples. The user will be presented with a matrix with subpopulations as columns and paygrades as rows. The user will enter percentage values for each cell in this matrix.

BLOCK 40 - See Screens 149 and 156. The user selects between the global or discrete option.

BLOCK 41 - Screens 150 and 151 give examples of this frame. The user will select the baseline year and the years he would like to extrapolate to.

BLOCK 42 - See Screens 152 and 153. The user selects subpopulations.

BLOCK 43 - Refer to Screen 154. First, the system will ask the user if he wants to extrapolate to all paygrades for the selected MOS. If he does, he will continue. If he does not, he will be presented with menu of grades. Grades options are 0,1/2/3, 4, 5, 6, 7, 8/9, and ALL.

BLOCK 44 - See Screen 155. The system will automatically make extrapolations for all subpopulations, MOSs, and grades selected by the user. Procedures for extrapolating are described in the Subpopulations Distribution Extrapolation Algorithm. (see Section 6.2.5).

BLOCK 45 - See Screens 157 and 158. In this menu, the user will select the target year and the years he would like to input specific distribution values.

BLOCK 46 - See Screen 159B. The user selects subpopulations.

BLOCK 47 - Screens 159 and 159A ask the user to select a paygrade.

BLOCK 48 - See Screen 159C. The user will be presented with a matrix with subpopulations as columns and paygrades as rows. The user will be required to enter percentage values (multipliers) for each cell in this matrix.

BLOCK 49 - Screen 161 describes the message that will appear on the screen while the system checks for available memory.

BLOCK 50 - See Screen 162. If there is insufficient memory, the user will have four options: (1) quit (this option is available from almost all screens), (2) continue without saving data or recent data modifications, (3) redo data, and (4) save on an external medium (i.e., floppy diskettes or additional Bernouilli Box). If he chooses the latter, additional screens will be provided to assist him in making the external saves.

BLOCK 51 - See Screen 163. User supplies system name where data will be stored.

BLOCK 52 - Screen 164 displays a message for that will appear during this process. Distributions for subpopulations, will be saved on the Projected Inventory File.

BLOCK 53 - See Screens 165, 170, and 179. The initial PCFM screen provides a brief explanation of the PCFM and then allows the user to select the function to be conducted (modify rates, display rates, run model, display results, save rates).

BLOCK 54 - Refer to Screen 166. The first frame will be a menu allowing the user to select subpopulations (These subpopulations are formed by combining categories for the transition rate predictor variables selected in Block 2). User may select single populations or groups of subpopulations to modify. Users also select MOSs and years.

BLOCK 55 - See Screen 167. The user will input modified rates on separate forms for different MOS/grade/year combinations. Subpopulations will form rows and transition rate variables will

be columns. Entries will be current values for the rates. The user will select from four operations (add, subtract, multiply, replace). The same value will be applied to each rate selected in the previous menu.

BLOCK 56 - Screen 168 gives examples of these screens. This frame will be a menu allowing the user to select the subpopulations whose data is to be displayed. Users also select MOSs and years.

BLOCK 57 - Screen 169 depicts examples of these display formats. Separate forms will be presented for each grade/year combination. Subpopulations will form rows and transition rate variables will be columns. Entries will be rates.

BLOCK 58 - See Screens 171-176. The user selects subpopulations to be included in PCFM (The projection horizon was selected in BLOCK 4). Usres also select MOSs.

BLOCK 59 - During this block, the Personnel Characteristic Flow Model (PCFM) would be run. A detailed description of the PCFM is presented in Section 6.2.7. See screens 177 and 178 for a description of the messages that will appear during the running of the PCFM.

BLOCK 60 - See Screens 180-184 for examples. The first frame will be a menu allowing the user to select from subpopulations. The following frame will ask the user to select what years he would like to look at. The next menu will allow the user to select the model outputs he wants displayed. The user options are as follows:

- Accessions
- Initial Inventory
- Projected Inventory
- Separation Rates
- Training Loss Rates
- Promotion Rates
- Migration In Rates
- Migration Out Rates

The final menu will allow the user to select options for printing and/or displaying the model outputs.

BLOCK 61 - Screens 185-191 give examples of these displays. The printed output reports are listed in Tables 7.3-4 to 7.3-10. The rows in each display will be subpopulations. The columns will be paygrades. Separate reports/displays will be provided for each grade/year combination.

BLOCK 62 - See Screens 192 and 196.

BLOCK 63 - See Screens 193 and 194. The user could select any of the characteristics selected in Block 3. Users also select MOSs.

BLOCK 64 - Screen 195 shows the message that will appear on during this process. Section 6.2.8 presents a detailed description of the Distribution Model.

BLOCK 65 - See Screens 197 and 198. The user could select any one of the characteristics selected in Block 3. Users also select MOSs.

BLOCK 66 - See Table 7.3-3 for a description of the printed output report format. The rows in each report will be characteristic categories. The columns will be paygrades. Separate reports will be provided for each year/characteristic combination. Refer to screen 199.

BLOCK 67 - See Screens 200 and 201. The user may decide to continue on to Step 3, estimate distributions for another MOS or redo analyses for the current MOS. If he decides to redo the analysis, the system will query the user on which part of the process he or she would like to redo.

BLOCK 68 - Screen 202 describes message that will appear while the system checks for available memory.

BLOCK 69 - See Screen 204. If there is insufficient memory, the user will have four options: (1) quit (this option is available from almost all screens), (2) continue without saving data or recent data modifications, (3) redo data, and (4) save on an external medium (i.e., floppy diskettes or additional Bernouilli Box). If he chooses the latter, additional screens will be provided to assist him in making the external saves.

BLOCK 70 - See Screen 203. The user supplies the system name under which the results are to be stored.

BLOCK 71 - Screen 205 shows the message that will appear on during this process. The file saved will be updated Projected Characteristic Distribution files (see Table 5.1-15) produced by the Distribution Algorithm. The temporary transition rates established during the running of the PCFM may also be saved. In this event, they would replace the current values stored in the transition rate file (see Table 5.1-9).

PCEA>SESSION>NEW SYSTEM>CUT-OFFS MODE: WORK

Return to Main Menu Quit
Continue with Step Two of PCEA

PCEA STEP TWO: Estimate Projected Characteristics Distribution

You are now beginning step two of the PCEA program. This step allows you to perform the following activities:

1. Define the scope of the projection analysis,
2. Describe/modify transition rates,
3. Describe/modify current characteristics distributions,
4. Run the flow model and run the distribution model,
5. Assess model results.

PCEA>SESSION>NEW SYSTEM>PERS VAR>TRANS MODE: WORK

Define the scope of the Projection Analysis

> Define Subpopulations
Select Personnel Characteristics
Select Projection Horizon
Quit

Select choice using cursor control arrows and press <CR> when ready

NOTE: The three activities should be performed sequentially.

PCEA>SESSION>NEW SYSTEM>PERS VAR>TRANS MODE: WORK

Subpopulation	Variables

AFQT Group
Sex
High School Graduate Status
Age at Entry into Service
Racial/Ethnic Descent Category
Use Default Set (all of above)

Select choice using cursor control arrows and press <CR> when ready

PCEA>SESSION>NEW SYSTEM>PERS VAR>PERS MODE: WORK

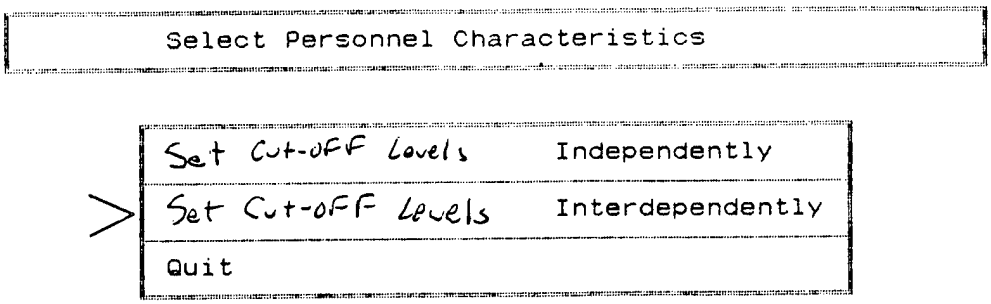
Define the scope of the Projection Analysis

> Define Subpopulations
> Select Personnel Characteristics
> Select Projection Horizon
> Quit

Select choice using cursor control arrows and press <CR> when ready

NOTE: The three activities should be performed sequentially.

PCEA>SESSION>NEW SYSTEM>PERS VAR>PERS MODE: WORK



Select choice using cursor control arrows and press <CR> when ready

PCEA>SESSION>NEW SYSTEM>PERS VAR>PERS MODE: WORK

Select Personnel Characteristics

> Set Cut-off Levels Independently
Set Cut-off Levels Interdependently
Quit

Select choice using cursor control arrows and press <CR> when ready

PCEA>SESSION>NEW SYSTEM>PERS VAR>PERS>COG MODE: WORK

Use Defaults Select Quit
Use the seven default personnel characteristics

Personnel Characteristics/ Variables

1. Sex	11. Numerical Speed and Accuracy
2. High School Grad Status	12. PULHES - Eyes
3. AFQT Category/MOS ASVAB Comp.	13. ASVAB Speed
4. Psychomotor (A)	14. ASVAB Technical
5. Simple Reaction Accuracy (A)	15. ASVAB Verbal
6. Simple Reaction Speed (A)	16. ASVAB Quantitative
7. Complex Perceptual Accuracy (A)	17. Reading Grade Level
8. Complex Perceptual Speed (A)	18. MEPSCAT
9. PULHES - Weight Lift	19. Blood Pressure Diastolic
10. Height	20. PULHES - Hearing

Press <CR> after characteristics have been selected.

PCEA>SESSION>NEW SYSTEM>PERS VAR>PERS>COG MODE: WORK

Use Defaults Select Quit
Select up to seven personnel characteristics

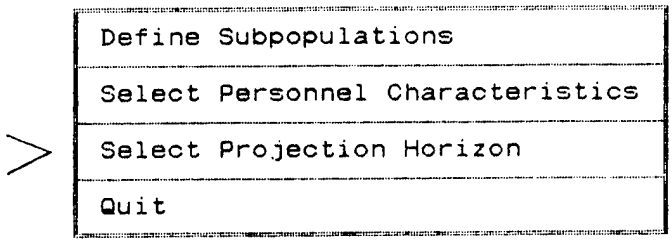
Personnel Characteristics/ Variables

1. Sex	11. Numerical Speed and Accuracy
2. High School Grad Status	12. PULHES - Eyes
3. AFQT Category/MOS ASVAB Comp.	13. ASVAB Speed
4. Psychomotor (A)	14. ASVAB Technical
5. Simple Reaction Accuracy (A)	15. ASVAB Verbal
6. Simple Reaction Speed (A)	16. ASVAB Quantitative
7. Complex Perceptual Accuracy (A)	17. Reading Grade Level
8. Complex Perceptual Speed (A)	18. MEPSCAT
9. PULHES - Weight Lift	19. Blood Pressure Diastolic
10. Height	20. PULHES - Hearing

Press <CR> after characteristics have been selected.

PCEA>SESSION>NEW SYSTEM>PERS VAR>TRANS MODE: WORK

Define the scope of the Projection Analysis



Select choice using cursor control arrows and press <CR> when ready

NOTE: The three activities should be performed sequentially.

PCEA>SESSION>NEW SYSTEM>HORIZON MODE: WORK

PROJECTION HORIZON

Input the number of years for which analysis will be conducted ___

NOTE: Must be an integer between 1 and 10

PCEA>SESSION>NEW SYSTEM>HORIZON MODE: WORK

PROJECTION HORIZON

Input the number of years for which analysis will be conducted 10

NOTE: Must be an integer between 1 and 10

Designate which calendar year will be Year 1 : _ _ _ _

PCEA>SESSION>NEW SYSTEM>RATE CALC MODE: WAIT

Please wait... the system is calculating transition rates and characteristic distributions.

PCEA>SESSION>NEW SYSTEM>RATE CALC MODE: WAIT

Please wait... the system is calculating transition rates
and characteristic distributions.

The calculations are complete ..... press <CR> to continue.

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT MODE: WORK

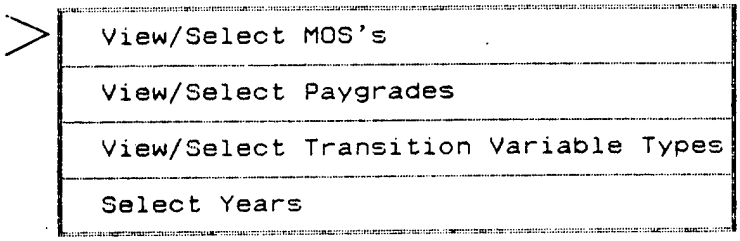
TRANSITION PROGRAM OPTIONS

> Display Transition Rates
> Modify Transition Rates
> Extrapolate Historical Rates
> Save Transition Rates

Select choice using cursor control arrows and press <CR> when ready

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>DISPLAY MODE: WORK

DISPLAY TRANSITION RATES



Select choice using cursor control arrows and press <CR> when ready

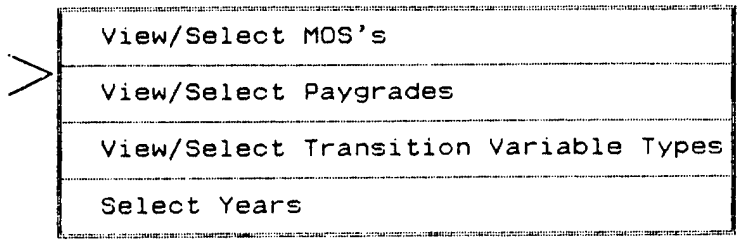
PCEA>SESSION>NEW SYSTEM>TRANS MODE: WORK

Delete Confirm

Operator MOS's		Maintainer MOS's	
138	Cannon Crewmember	29E	Comm-Elect. Radio Repr.
		31V	Communications Maint.
		41C	Fire Contr. Instr. Repr
		45L	Artillery Repairer
		63G	Fuel/Elect Sys Repairer
		63H	Track Vehicle Repair.

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>DISPLAY MODE: WORK

DISPLAY TRANSITION RATES



Select choice using cursor control arrows and press <CR> when ready

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>DISPLAY MODE: WORK

VIEW/SELECT PAYGRADES

> All Paygrades / All MOS's
Select Paygrades by MOS

Select choice using cursor control arrows and press <CR> when ready

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>DISPLAY MODE: WORK

VIEW/SELECT PAYGRADES

> All Paygrades / All MOS's
> Select Paygrades by MOS

Select choice using cursor control arrows and press <CR> when ready

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>DISPLAY MODE: WORK

VIEW/SELECT PAYGRADES

MOS	PAYGRADE 1/2/3	4	5	6	7	8/9
138	X					
31V	X					
29C	X					
63K			X	X	X	X
63Z			X	X	X	X

Select Paygrades by MOS by filling cells with X's, then press <CR> .

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>DISPLAY MODE: WORK

DISPLAY TRANSITION RATES

> View/Select MOS's
> View/Select Paygrades
> View/Select Transition Variable Types
> Select Years

Select choice using cursor control arrows and press <CR> when ready

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>DISPLAY MODE: WORK

DISPLAY TRANSITION RATES

Migration-In
Migration-Out
Promotion
Separation
Training Loss
All

Select choice using cursor control arrows and press <CR> when ready

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>DISPLAY MODE: WORK

DISPLAY TRANSITION RATES

View/Select MOS's

View/Select Paygrades

View/Select Transition Variable Types

> Select Years

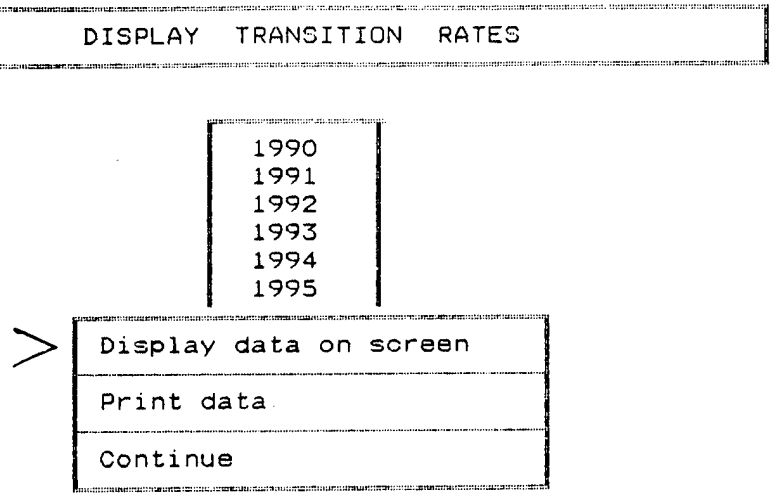
PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>DISPLAY MODE: WORK

DISPLAY TRANSITION RATES

1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
ALL

Select year(s) for Transition Rate Display.. press <CR> when ready.

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>DISPLAY MODE: WORK



Select year(s) for Transition Rate Display.. press <CR> when ready.

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>DISPLAY MODE: WORK

TRANSITION RATE REPORT System_____ System Type _____
MOS_____ Year_____ Grade_____ Date_____

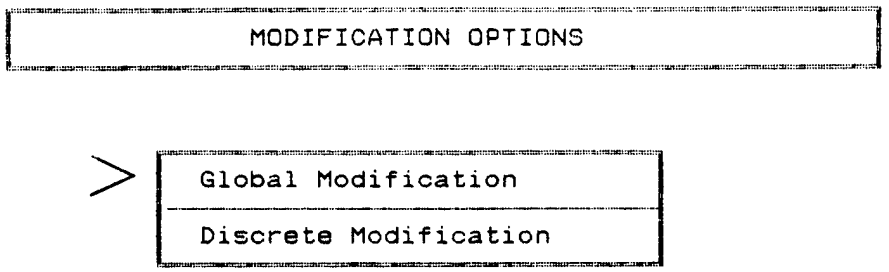
Paygrades	TRANSITION RATES				
	Separation	Promotion	Migrate In	Migrate Out	Tng Loss
1/2/3					
4					
5					
6					
7					
8/9					

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT MODE: WORK

TRANSITION PROGRAM OPTIONS

> Display Transition Rates
> Modify Transition Rates
> Extrapolate Historical Rates
> Save Transition Rates

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT MODE: WORK

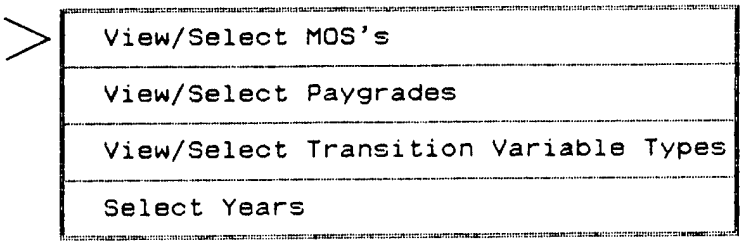


Select choice using cursor control arrows and press <CR> when ready

Note: Global Modification is used to change more than one rate using a single entry while Discrete Modification allows rates for individual MOS/paygrade combinations to be changed individually.

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>MODIFY MODE: WORK

GLOBAL MODIFICATION



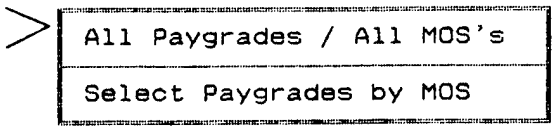
PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>MODIFY MODE: WORK

Select Confirm
Select one or more MOS's

Operator MOS's		Maintainer MOS's	
13B	Cannon Crewmember	29E	Comm-Elect. Radio Repr.
		31V	Communications Maint.
		41C	Fire Contr. Instr. Repr
		45L	Artillery Repairer
		63G	Fuel/Elect Sys Repairer
		63H	Track Vehicle Repair.

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>MODIFY MODE: WORK

GLOBAL MODIFICATION VIEW/SELECT PAYGRADES



PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>MODIFY MODE: WORK

GLOBAL MODIFICATION VIEW/SELECT PAYGRADES

> All Paygrades / All MOS's
> Select Paygrades by MOS

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>MODIFY MODE: WORK

GLOBAL MODIFICATION VIEW/SELECT PAYGRADES

MOS	PAYGRADE						
	All	1/2/3	4	5	6	7	8/9
13D	X						
29E		X	X	X			
31V	X						
41C	X						
45L				X	X	X	X

Select paygrade/MOS combinations by inserting an 'X' in the cell.

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>MODIFY MODE: WORK

GLOBAL MODIFICATION

> View/Select MOS's
> View/Select Paygrades
> View/Select Transition Variable Types
> Select Years

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>DISPLAY MODE: WORK

DISPLAY TRANSITION RATES

Migration-In
Migration-Out
Promotion
Separation
Training Loss
All

Select choice using cursor control arrows and press <CR> when ready

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>MODIFY MODE: WORK

GLOBAL MODIFICATION

View/Select MOS's

View/Select Paygrades

View/Select Transition Variable Types

> Select Years

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>MODIFY MODE: WORK

SELECT YEARS

1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
ALL

Select year(s) for global modification ..... press <CR> when ready.

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>MODIFY

GLOBAL MODIFICATION ENTRY

Transition Rate	Multiplier	Value	Value Allowed Range
Migration-In			0 - 1.0
Migration-Out			0 - 1.0
Promotion			0 - 1.0
Separation			0 - 1.0
Training Loss			0 - 1.0

Input desired multiplier or value for each transition rate. The multiplier values may range from 0 to 1000.

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT MODE: WORK

MODIFICATION OPTIONS

> Global Modification
> Discrete Modification

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>MODIFY MODE: WORK

DISCRETE MODIFICATION

> View/Select MOS's
Select Year
View/Select Transition Variable Types
View/Select Paygrades

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>MODIFY MODE: WORK

Select Confirm
Select one or more MOS's

Operator MOS's		Maintainer MOS's	
13B	Cannon Crewmember	29E	Comm-Elect. Radio Repr.
		31V	Communications Maint.
		41C	Fire Contr. Instr. Repr
		45L	Artillery Repairer
		63G	Fuel/Elect Sys Repairer
		63H	Track Vehicle Repair.

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>MODIFY MODE: WORK

SELECT YEARS

1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
ALL

Select year(s) for discrete modiification... press <CR> when ready.

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>MODIFY MODE: WORK

DISCRETE MODIFICATION

- View/Select MOS's
- Select Year
- View/Select Transition Variable Types
- View/Select Paygrades

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>MODIFY MODE: WORK

DISCRETE MODIFICATION VIEW/SELECT PAYGRADES

> All Paygrades / All MOS's

Select Paygrades by MOS

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>MODIFY MODE: WORK

DISCRETE MODIFICATION VIEW/SELECT PAYGRADES

> All Paygrades / All MOS's
> Select Paygrades by MOS

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>MODIFY MODE: WORK

DISCRETE MODIFICATION VIEW/SELECT PAYGRADES

MOS	PAYGRADE						
	All	1/2/3	4	5	6	7	8/9
13D	X						
29E		X	X	X			
31V	X						
41C	X						
45L				X	X	X	X

Select paygrade/MOS combinations by inserting an 'X' in the cell.

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>DISPLAY MODE: WORK

MODIFY TRANSITION RATES

Migration-In
Migration-Out
Promotion
Separation
Training Loss
All

Select choice using cursor control arrows and press <CR> when ready

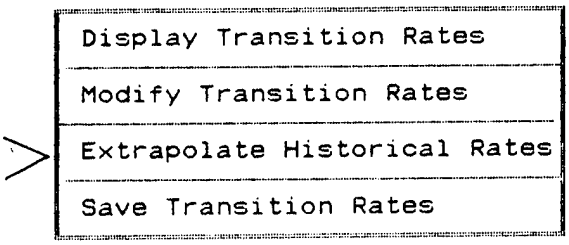
PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>MODIFY MODE: WORK

Paygrades	TRANSITION RATES Separation	Promotion	Migration-In	Migration-Out	All
1/2/3					
4					
5					
6					
7					
8/9					

Use cursor to modify values. Values may range from 0 to 1.0 .

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT MODE: WORK

TRANSITION PROGRAM OPTIONS



PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT MODE: WORK

EXTRAPOLATION OPTIONS

> Extrapolate
> Extrapolate and Modify
> Default (all years the same)

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>EXTRA MODE: WORK

Select the year you wish to extrapolate from.

SELECT YEARS - EXTRAPOLATE FROM

1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
ALL

NOTE: Do not extrapolate beyond the projection horizon...

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>EXTRA MODE: WORK

Select the years you wish to extrapolate to.

SELECT YEARS - EXTRAPOLATE TO

1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
ALL

NOTE: Do not extrapolate beyond the projection horizon...

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>MODIFY MODE: WORK

Select Confirm
Select one or more MOS's

Operator MOS's		Maintainer MOS's	
13B	Cannon Crewmember	29E	Comm-Elect. Radio Repr.
		31V	Communications Maint.
		41C	Fire Contr. Instr. Repr
		45L	Artillery Repairer
		63G	Fuel/Elect Sys Repairer
		63H	Track Vehicle Repair.

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT MODE: WORK

GLOBAL EXTRAPOLATION

> Extrapolate All MOS's/ All Paygrades

Selective Extrapolation by MOS/PG

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT MODE: WORK

GLOBAL EXTRAPOLATION

> Extrapolate All MOS's/ All Paygrades
> Selective Extrapolation by MOS/PG

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>MODIFY MODE: WORK

SELECTIVE EXTRAPOLATION BY MOS/PAYGRADES

MOS	PAYGRADE						
	All	1/2/3	4	5	6	7	8/9
13D	X						
29E		X	X	X			
31V	X						
41C	X						
45L				X	X	X	X

Put an 'X' beside all paygrade combinations you wish to extrapolate to in the future.

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>DISPLAY MODE: WORK

DISPLAY TRANSITION RATES

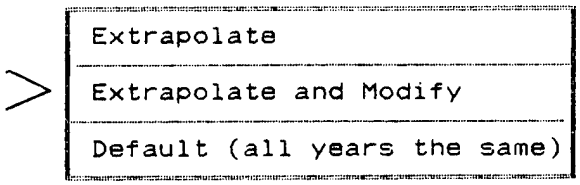
- Migration-In
- Migration-Out
- Promotion
- Separation
- Training Loss
- All

Select choice using cursor control arrows and press <CR> when ready

The system is making extrapolations.

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT MODE: WORK

EXTRAPOLATION OPTIONS



PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>EXTRA MODE: WORK

Select the year you wish to extrapolate from.

SELECT YEARS - EXTRAPOLATE FROM

1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
ALL

NOTE: Do not extrapolate beyond the projection horizon...

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>EXTRA MODE: WORK

Select the years you wish to extrapolate to.

SELECT YEARS - EXTRAPOLATE TO

1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
ALL

NOTE: Do not extrapolate beyond the projection horizon...

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>MODIFY MODE: WORK

Select Quit
Select one or more MOS's

Operator MOS's		Maintainer MOS's	
138	Cannon Crewmember	29E	Comm-Elect. Radio Repr.
		31V	Communications Maint.
		41C	Fire Contr. Instr. Repr
		45L	Artillery Repairer
		63G	Fuel/Elect Sys Repairer
		63H	Track Vehicle Repair.

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT MODE: WORK

DISCRETE EXTRAPOLATION

> Extrapolate All MOS's/ All Paygrades

Selective Extrapolation by MOS/PG

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT MODE: WORK

DISCRETE EXTRAPOLATION

> Extrapolate All MOS's/ All Paygrades
> Selective Extrapolation by MOS/PG

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>MODIFY MODE: WORK

SELECTIVE EXTRAPOLATION BY MOS/PAYGRADES

MOS	PAYGRADE						
	All	1/2/3	4	5	6	7	8/9
13D	X						
29E		X	X	X			
31V	X						
41C	X						
45L				X	X	X	X

Put an 'X' beside all paygrade combinations you wish to extrapolate to in the future.

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>DISPLAY MODE: WORK

DISPLAY TRANSITION RATES

- Migration-In
- Migration-Out
- Promotion
- Separation
- Training Loss
- All

Select choice using cursor control arrows and press <CR> when ready

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>MODIFY

GLOBAL MODIFICATION ENTRY

Transition Rate	Multiplier
Migration-In	
Migration-Out	
Promotion	
Separation	
Training Loss	

Input desired multiplier for each transition rate. The multiplier values may range from 0 to 1000.

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT MODE: WORK

TRANSITION PROGRAM OPTIONS

> Display Transition Rates
> Modify Transition Rates
> Extrapolate Historical Rates
> Save Transition Rates

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT MODE: WAIT

TRANSITION PROGRAM OPTIONS

- Display Transition Rates
- Modify Transition Rates
- Extrapolate Historical Rates
- Save Transition Rates

Please wait... checking availability of memory for saving transition rates.

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT MODE: WORK

TRANSITION PROGRAM OPTIONS

WARNING: INSUFFICIENT MEMORY !!
Continue
Redo Transition Probabilities
Quit

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT MODE: WORK

Save View Edit Delete
Save a transition rate file

SAVE TRANSITION RATES

Name of system to be saved under: m109d.trx

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT MODE: WORK

Save View Edit Delete
View list of transition rate files in system

TRANSITION RATE FILES CURRENTLY IN SYSTEM

M109D.trx	10/29/1986
M102F.trx	11/02/1987
M101X.trx	04/20/1987

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT MODE: WORK

Save View Edit Delete
Edit an existing transition rate file

EDIT TRANSITION RATE FILE

M109D.trx	10/29/1986
M102F.trx	11/02/1987
M101X.trx	04/20/1987

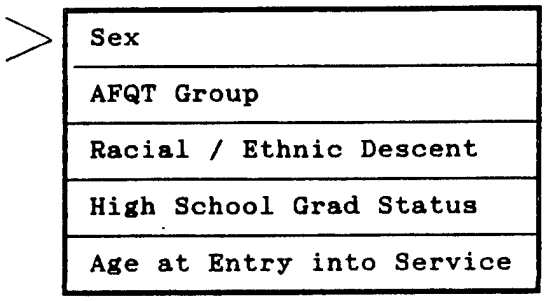
PCEA>SESSION>NEW SYSTEM>DIS PROG MODE: WORK

DISTRIBUTION PROGRAM OPTIONS

> Display Subpopulation Distributions
> Modify Subpopulation Distributions
> Extrapolate Historical Distributions
> Save Subpopulation Distributions

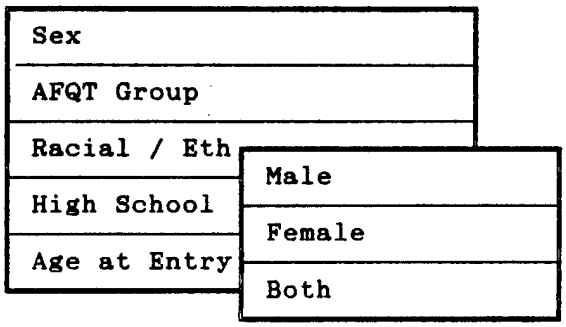
PCEA>SESSION>NEW SYSTEM>FLOW MODE: WORK

Select Quit
Select one subpopulation



PCEA>SESSION>NEW SYSTEM>FLOW MODE: WORK

Select Change Selection Quit
Select one category of the subpopulation



PCEA>SESSION>NEW SYSTEM>DIS PROG MODE: WORK

Select Quit
Select One or more MOS's

Operator MOS's		Maintainer MOS's	
13B	Cannon Crewmember	29E	Comm-Elect. Radio Repr.
		31V	Communications Maint.
		41C	Fire Contr. Instr. Repr
		45L	Artillery Repairer
		63G	Fuel/Elect Sys Repairer
		63H	Track Vehicle Repair.

PCEA>SESSION>NEW SYSTEM>DIS PROG MODE: WORK

SELECT YEAR(S)

1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
ALL

Select year(s) for Subpopulation Distribution display. Press <CR> when ready.

PCEA>SESSION>NEW SYSTEM>DIS PROG MODE: WORK

PRINT-DISPLAY OPTIONS

> Display results on screen
Print results
Continue

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>DISPLAY MODE: WORK

SUBPOPULATION DISTRIBUTION REPORT
MOS____ SYSTEM_____ SYSTEM TYPE_____ YEAR_____ DATE_____

PAYGRADES	SUBPOPULATION GROUPS								
	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
Accessions									
1/2/3									
4									
5									
6									
7									
8/9									

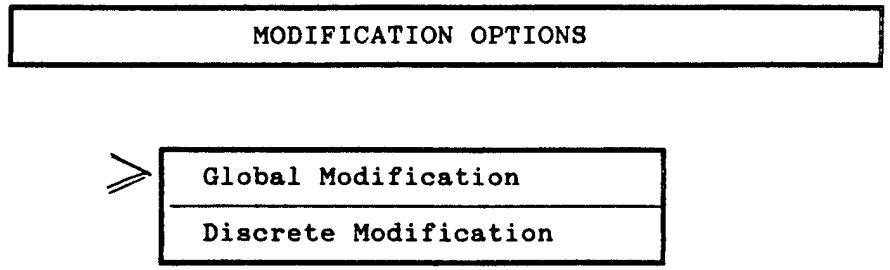
Hit any key to continue

PCEA>SESSION>NEW SYSTEM>DIS PROG MODE: WORK

DISTRIBUTION PROGRAM OPTIONS

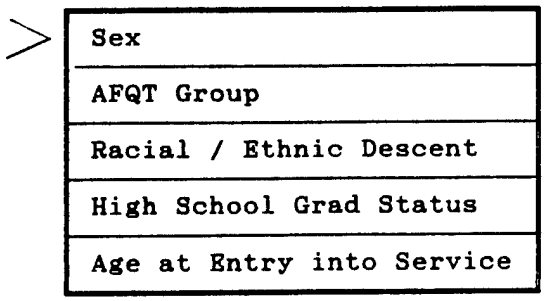
> Display Distribution Rates
> Modify Distribution Rates
> Extrapolate Historical Rates
> Save Distribution Rates

PCEA>SESSION>NEW SYSTEM>DIS PROG MODE: WORK



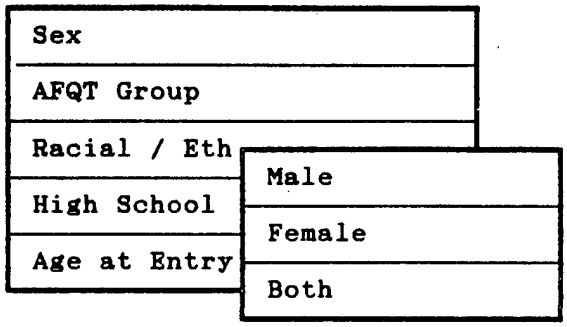
PCEA>SESSION>NEW SYSTEM>FLOW MODE: WORK

Select Quit
Select one subpopulation



PCEA>SESSION>NEW SYSTEM>FLOW MODE: WORK

Select Change Selection Quit
Select one category of the subpopulation



PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>MODIFY MODE: WORK

Select Confirm
Select one or more MOS's

Operator MOS's		Maintainer MOS's	
13B	Cannon Crewmember	29E	Comm-Elect. Radio Repr.
		31V	Communications Maint.
		41C	Fire Contr. Instr. Repr
		45L	Artillery Repairer
		63G	Fuel/Elect Sys Repairer
		63H	Track Vehicle Repair.

PCEA>SESSION>NEW SYSTEM>DIS PROG MODE: WORK

SELECT YEARS

1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
ALL

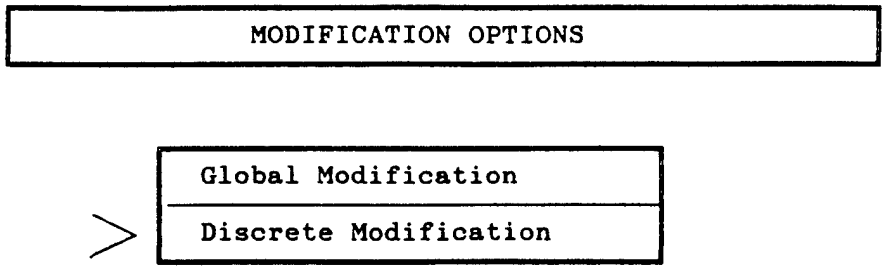
Select year(s) for distribution calculations..press <CR> when ready.

PCEA>SESSION>NEW SYSTEM>DIS PROG MODE: WORK

CHARACTERISTICS DISTRIBUTION		
Subpopulation Groups	Multiplier	Value
XXXX XXXX		
XXXX XXXXX		
XXX XXXX XXX		
XXXX XXXX		
XXXX X XXXXX		

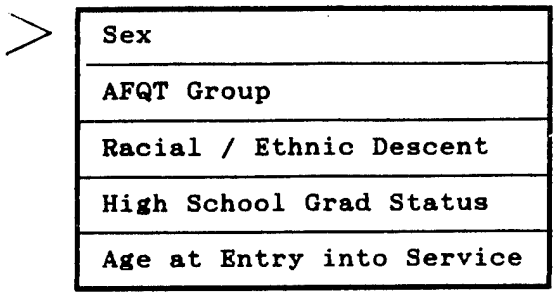
Insert multiplier or value for each subpopulation. Values must range from 0 - 1.0; multipliers must range from 0 - 1000.

PCEA>SESSION>NEW SYSTEM>DIS PROG MODE: WORK



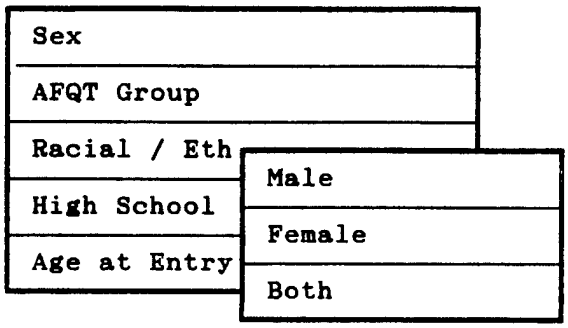
PCEA>SESSION>NEW SYSTEM>FLOW MODE: WORK

Select Quit
Select one subpopulation



PCEA>SESSION>NEW SYSTEM>FLOW MODE: WORK

Select Change Selection Quit
Select one category of the subpopulation

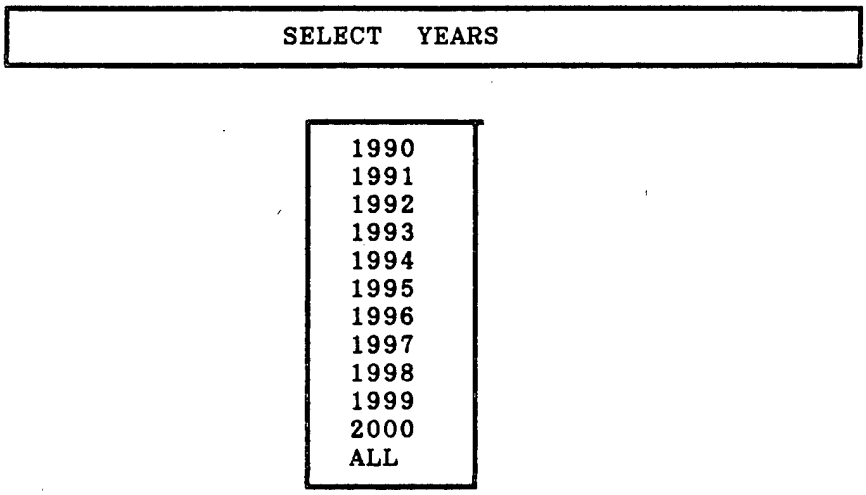


PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>MODIFY MODE: WORK

Select Confirm
Select one or more MOS's

Operator MOS's		Maintainer MOS's	
13B	Cannon Crewmember	29E	Comm-Elect. Radio Repr.
		31V	Communications Maint.
		41C	Fire Contr. Instr. Repr
		45L	Artillery Repairer
		63G	Fuel/Elect Sys Repairer
		63H	Track Vehicle Repair.

PCEA>SESSION>NEW SYSTEM>DIS PROG MODE: WORK



Select year(s) for distribution calculations... press <CR> when ready.

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>DISPLAY MODE: WORK

SUBPOPULATION DISTRIBUTION REPORT Personnel Char._____
MOS____ SYSTEM_____ SYSTEM TYPE_____ YEAR_____ DATE_____

PAYGRADES	SUBPOPULATION GROUPS								
	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
Accessions									
1/2/3									
4									
5									
6									
7									
8/9									

Use cursor to make modifications to values.

PCEA>SESSION>NEW SYSTEM>DIS PROG MODE: WORK

DISTRIBUTION PROGRAM OPTIONS

> Display Distribution Rates
> Modify Distribution Rates
> Extrapolate Historical Rates
> Save Distribution Rates

PCEA>SESSION>NEW SYSTEM>DIS PROG MODE: WORK

EXTRAPOLATION OPTIONS

> Extrapolate
> Extrapolate and Modify
> Default (all years the same)

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>EXTRA MODE: WORK

Select the years you wish to extrapolate to.

SELECT YEARS - EXTRAPOLATE TO

1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
ALL

NOTE: Do not extrapolate beyond the projection horizon...

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>EXTRA MODE: WORK

Select the year you wish to extrapolate from.

SELECT YEARS - EXTRAPOLATE FROM

1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
ALL

NOTE: Do not extrapolate beyond the projection horizon...

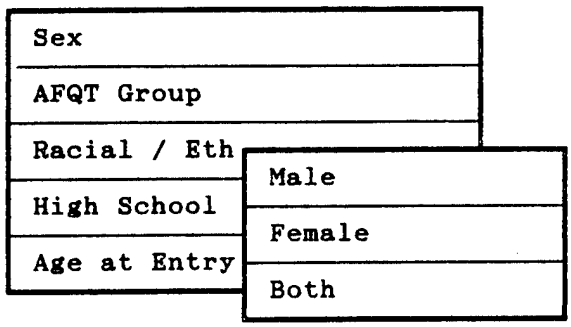
PCEA>SESSION>NEW SYSTEM>FLOW MODE: WORK

Select Quit
Select one subpopulation

Sex
AFQT Group
Racial / Ethnic Descent
High School Grad Status
Age at Entry into Service

PCEA>SESSION>NEW SYSTEM>FLOW MODE: WORK

Select Change Selection Quit
Select one category of the subpopulation

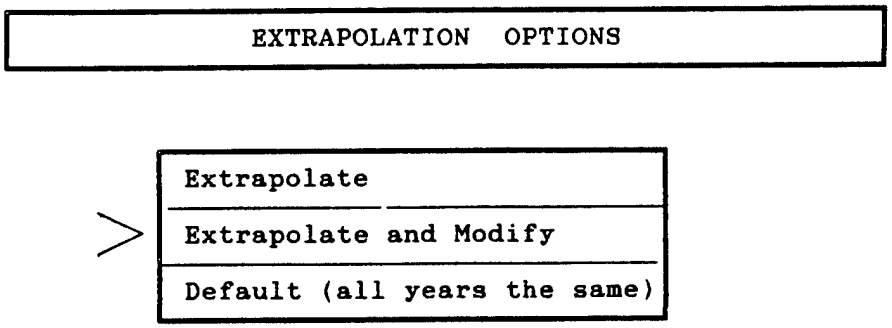


PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>MODIFY MODE: WORK

Select Confirm
Select one or more MOS's

Operator MOS's		Maintainer MOS's	
13B	Cannon Crewmember	29E	Comm-Elect. Radio Repr.
		31V	Communications Maint.
		41C	Fire Contr. Instr. Repr
		45L	Artillery Repairer
		63G	Fuel/Elect Sys Repairer
		63H	Track Vehicle Repair.

PCEA>SESSION>NEW SYSTEM>DIS PROG MODE: WORK



System is making extrapolations.

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>EXTRA MODE: WORK

Select the years you wish to extrapolate to.

SELECT YEARS - EXTRAPOLATE TO

1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
ALL

NOTE: Do not extrapolate beyond the projection horizon...

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>EXTRA MODE: WORK

Select the year you wish to extrapolate from.

SELECT YEARS - EXTRAPOLATE FROM

1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
ALL

NOTE: Do not extrapolate beyond the projection horizon...

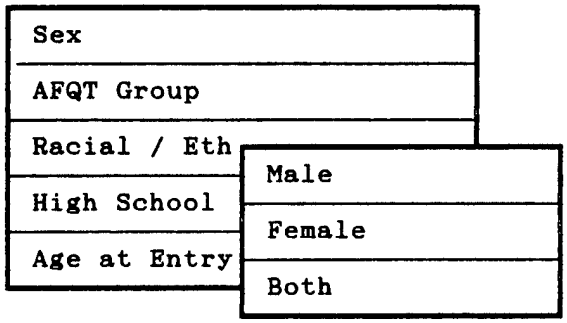
PCEA>SESSION>NEW SYSTEM>FLOW MODE: WORK

Select Quit
Select one subpopulation

Sex
AFQT Group
Racial / Ethnic Descent
High School Grad Status
Age at Entry into Service

PCEA>SESSION>NEW SYSTEM>FLOW MODE: WORK

Select Change Selection Quit
Select one category of the subpopulation



PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>MODIFY MODE: WORK

Select Confirm
Select one or more MOS's

Operator MOS's		Maintainer MOS's	
13B	Cannon Crewmember	29E	Comm-Elect. Radio Repr.
		31V	Communications Maint.
		41C	Fire Contr. Instr. Repr
		45L	Artillery Repairer
		63G	Fuel/Elect Sys Repairer
		63H	Track Vehicle Repair.

PCEA>SESSION>NEW SYSTEM>DIS PROG MODE: WORK

CHARACTERISTICS DISTRIBUTION	
Subpopulation Groups	Multiplier
XXXX XXXX	
XXXX XXXXX	
XXX XXXX XXX	
XXXX XXXX	
XXXX X XXXXX	

Insert multiplier or value for each subpopulation.
Multipliers must range from 0 - 1000.

PCEA>SESSION>NEW SYSTEM>DIS PROG MODE: WORK

DISTRIBUTION PROGRAM OPTIONS

> Display Distribution Rates
> Modify Distribution Rates
> Extrapolate Historical Rates
> Save Distribution Rates

PCEA>SESSION>NEW SYSTEM>DIS PROG MODE: WORK

DISTRIBUTION PROGRAM OPTIONS

Display Distribution Rates
Modify Distribution Rates
Extrapolate Historical Rates
Save Distribution Rates

Please wait... checking availability of memory for saving file.

PCEA>SESSION>NEW SYSTEM>DIS PROG MODE: WORK

DISTRIBUTION PROGRAM OPTIONS

WARNING: INSUFFICIENT MEMORY !!
Continue
Redo Distributions
Quit

PCEA>SESSION>NEW SYSTEM>DIS PROG MODE: WORK

Save View Edit Delete
Save a distribution rate file

SAVE DISTRIBUTION RATES

Name of system to be saved under: m109d.dis

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT MODE: WORK

Save View Edit Delete
View list of distribution rate files in system

DISTRIBUTION RATE FILES CURRENTLY IN SYSTEM

M109D.dis	11/18/1987
M102F.dis	07/23/1986
M101X.dis	05/21/1987

PCEA>SESSION>NEW SYSTEM>FLOW MODE: WORK

FLOW MODEL OPTIONS

> Temporarily Modify Transition Rates
> Display Transition Rates
> Run Flow Model
> Display Model Results

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT MODE: WORK

MODIFICATION OPTIONS

Global Modification
Discrete Modification

NOTE: TEMPORARY MODIFICATION PROCESS WOULD BE SAME AS THE PERMANENT MODIFICATION PROCESS (BLOCKS 10-14 OR SCREENS 83-102).

PROCESS OF SELECTING TRANSITION VARIABLES TO DISPLAY IS SAME AS BLOCK 7 (SCREENS 69-79).

DISPLAY OF TRANSITION RATES WOULD BE SAME AS BLOCK 8 (SCREEN 80).

PCEA>SESSION>NEW SYSTEM>FLOW MODE: WORK

FLOW MODEL OPTIONS

Temporarily Modify Transition Rates
Display Transition Rates
> Run Flow Model
Display Model Results

PCEA>SESSION>NEW SYSTEM>FLOW MODE: WORK

FLOW MODEL MENU

> Select MOS
Select Subpopulations
Execute Flow Model
Quit

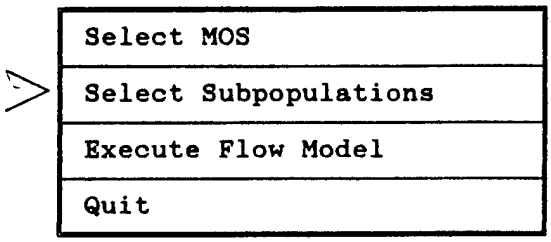
PCEA>SESSION>NEW SYSTEM>FLOW MODE: WORK

Select Quit
Select one or more MOS's

Operator MOS's		Maintainer MOS's	
13B	Cannon Crewmember	29E	Comm-Elect. Radio Repr.
		31V	Communications Maint.
		41C	Fire Contr. Instr. Repr
		45L	Artillery Repairer
		63G	Fuel/Elect Sys Repairer

PCEA>SESSION>NEW SYSTEM>FLOW MODE: WORK

FLOW MODEL MENU



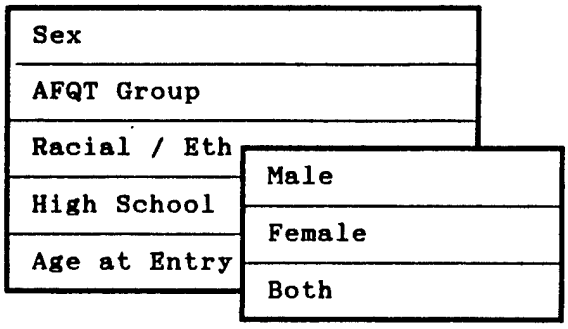
PCEA>SESSION>NEW SYSTEM>FLOW MODE: WORK

Select Quit
Select one subpopulation

Sex
AFQT Group
Racial / Ethnic Descent
High School Grad Status
Age at Entry into Service

PCEA>SESSION>NEW SYSTEM>FLOW MODE: WORK

Select Change Selection Quit
Select one category of the subpopulation



PCEA>SESSION>NEW SYSTEM>FLOW MODE: WORK

FLOW MODEL MENU

Select MOS
Select Subpopulations
Execute Flow Model
Quit

PCEA>SESSION>NEW SYSTEM>FLOW MODE: WAIT

Please wait.... PCEA is running the Flow Model.

PCEA>SESSION>NEW SYSTEM>FLOW MODE: WAIT

The flow model analysis is complete.

PCEA>SESSION>NEW SYSTEM>FLOW MODE: WORK

FLOW MODEL OPTIONS

Temporarily Modify Transition Rates
Display Transition Rates
Run Flow Model
> Display Model Results

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>MODIFY MODE: WORK

Select Confirm
Select one or more MOS's

Operator MOS's		Maintainer MOS's	
13B	Cannon Crewmember	29E	Comm-Elect. Radio Repr.
		31V	Communications Maint.
		41C	Fire Contr. Instr. Repr
		45L	Artillery Repairer
		63G	Fuel/Elect Sys Repairer
		63H	Track Vehicle Repair.

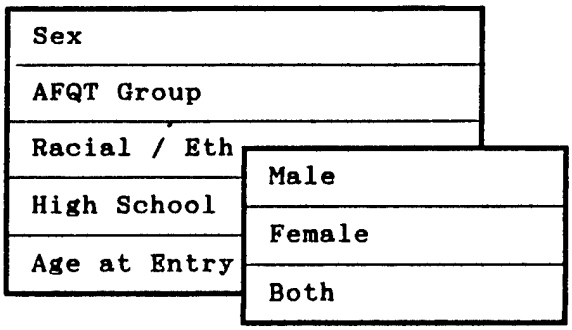
PCEA>SESSION>NEW SYSTEM>FLOW MODE: WORK

Select Quit
Select one subpopulation

Sex
AFQT Group
Racial / Ethnic Descent
High School Grad Status
Age at Entry into Service

PCEA>SESSION>NEW SYSTEM>FLOW MODE: WORK

Select Change Selection Quit
Select one category of the subpopulation



PCEA>SESSION>NEW SYSTEM>FLOW MODE: WORK

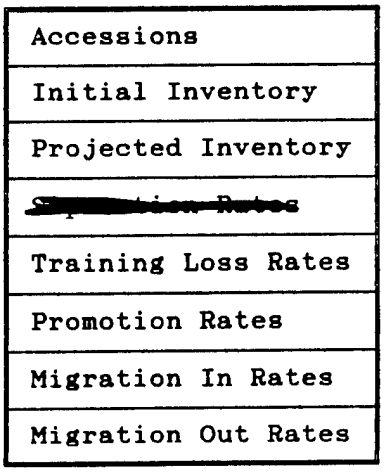
SELECT YEARS

1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
ALL

Select year(s) for displaying model results..press <CR> when ready.

PCEA>SESSION>NEW SYSTEM>FLOW MODE: WORK

Select Display All Quit
Select one or more reports



PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>DISPLAY MODE: WORK

ACCESSIONS REPORT SYSTEM _____ SYSTEM TYPE _____
MOS _____ YEAR _____ DATE _____

Subpopulation Groups	YEAR						
	YYYY	YYYY	YYYY	YYYY	YYYY	YYYY	YYYY
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>DISPLAY MODE: WORK

INITIAL INVENTORY REPORT SYSTEM _____ SYSTEM TYPE _____
MOS _____ YEAR _____ DATE _____

Subpopulation Groups	PAYGRADES						
	1/2/3	4	5	6	7	8	9
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>DISPLAY MODE: WORK

PROJECTED INVENTORY REPORT SYSTEM _____ SYSTEM TYPE _____
MOS _____ YEAR _____ DATE _____

Subpopulation	PAYGRADES						
Groups	1/2/3	4	5	6	7	8	9
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>DISPLAY MODE: WORK

PROMOTION RATE REPORT SYSTEM _____ SYSTEM TYPE _____
MOS _____ YEAR _____ DATE _____

Subpopulation Groups	PAYGRADES						
	1/2/3	4	5	6	7	8	9
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>DISPLAY MODE: WORK

TRAINING LOSS REPORT SYSTEM _____ SYSTEM TYPE _____
MOS _____ YEAR _____ DATE _____

Subpopulation	PAYGRADES						
Groups	1/2/3	4	5	6	7	8	9
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>DISPLAY MODE: WORK

MIGRATION-IN RATES REPORT SYSTEM _____ SYSTEM TYPE _____
MOS _____ YEAR _____ DATE _____

Subpopulation Groups	PAYGRADES						
	1/2/3	4	5	6	7	8	9
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							

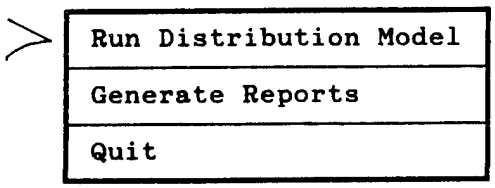
PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>DISPLAY MODE: WORK

MIGRATION-OUT RATES REPORT SYSTEM _____ SYSTEM TYPE _____
MOS _____ YEAR _____ DATE _____

Subpopulation	PAYGRADES						
Groups	1/2/3	4	5	6	7	8	9
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							

PCEA>SESSION>NEW SYSTEM>FLOW MODE: WORK

DISTRIBUTION MODEL OPTIONS



PCEA>SESSION>NEW SYSTEM>DIS MODE: WORK

Select Quit
Select one or more MOS's for distribution model execution

Operator MOS's		Maintainer MOS's	
13B	Cannon Crewmember	29E	Comm-Elect. Radio Repr.
		31V	Communications Maint.
		41C	Fire Contr. Instr. Repr
		45L	Artillery Repairer
		63G	Fuel/Elect Sys Repairer
		63H	Track Vehicle Repair.

PCEA>SESSION>NEW SYSTEM>FLOW MODE: WORK

Select Another MOS Quit

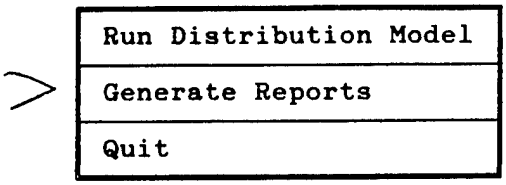
Characteristic - MOS 31V
Sex
High School Grad Status
AFQT Group
Psychomotor (Project a)
Simple Reaction Accuracy
PUHLES - Weight Lift
Height

PCEA>SESSION>NEW SYSTEM>FLOW MODE: WAIT

DISTRIBUTION MODEL MENU

Please wait... the distribution model is running.

DISTRIBUTION MODEL OPTIONS



PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>MODIFY MODE: WORK

Select Confirm
Select one or more MOS's

Operator MOS's		Maintainer MOS's	
13B	Cannon Crewmember	29E	Comm-Elect. Radio Repr.
		31V	Communications Maint.
		41C	Fire Contr. Instr. Repr
		45L	Artillery Repairer
		63G	Fuel/Elect Sys Repairer
		63H	Track Vehicle Repair.

PCEA>SESSION>NEW SYSTEM>FLOW MODE: WORK

Select Another MOS Quit
Select another MOS for design guidance edite

Characteristic - MOS 31V
Sex
High School Grad Status
AFQT Group
Psychomotor (Project a)
Simple Reaction Accuracy
PUHLES - Weight Lift
Height

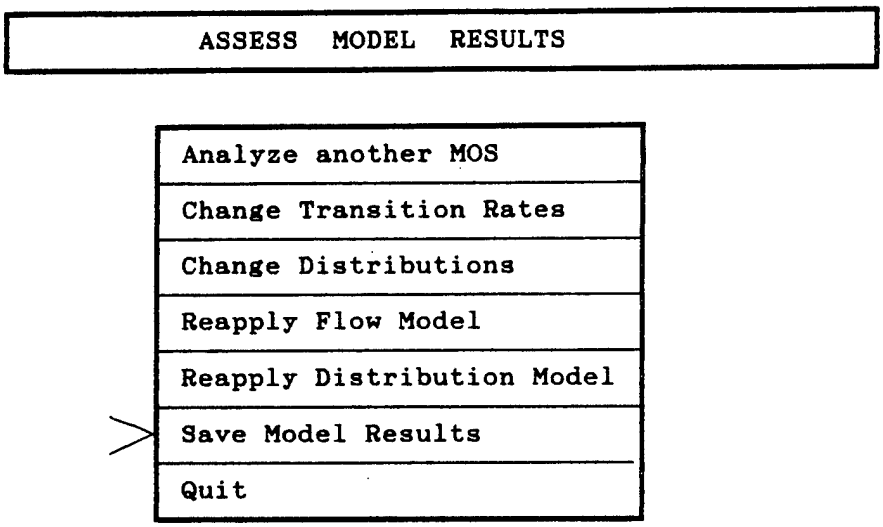
PCEA>SESSION>NEW SYSTEM>DIS PROG MODE: WORK

Paygrades	CHARACTERISTIC XXX DISTRIBUTION									
	Category 1		Category 2		Category 3		Category 4		Cat. 5	
	%	Value	%	Value	%	Value	%	Value	%	Val
Access.										
1/2/3										
4										
5										
6										
7										
8/9										

DISTRIBUTION MODEL OPTIONS

Would you like to generate more reports? (Y/N) __

PCEA>SESSION>NEW SYSTEM>FLOW MODE: WORK



PCEA>SESSION>NEW SYSTEM>FLOW MODE: WORK

ASSESS MODEL RESULTS

Analyze another MOS
Change Transition Rates
Change Distributions
Reapply Flow Model
Reapply Distribution Model
> Save Model Results
Quit

Please wait . . . checking availability of memory for saving file)

PCEA>SESSION>NEW SYSTEM>DIS PROG MODE: WORK

Save View Edit Delete
Save . . model results

SAVE MODEL RESULTS

Name of system to be saved under: m109d.flo

PCEA>SESSION>NEW SYSTEM>DIS PROG MODE: WORK

Save View Edit Delete
Save flow model results

SAVE FLOW MODEL RESULTS

Name of system to be saved under: m109d.flo

WARNING: INSUFFICIENT MEMORY !!
Continue
Redo Distributions
Quit

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT MODE: WORK

Save View Edit Delete
View list of distribution rate files in system

DISTRIBUTION RATE FILES CURRENTLY IN SYSTEM

M109D.dis	11/18/1987
M102F.dis	07/23/1986
M101X.dis	05/21/1987

3.5 STEP 3: DETERMINE CUT-OFF LEVEL

3.5.1 Output

The primary output of this step is the required cut-off level for each personnel characteristic associated with a specific MOS. This cut-off level is the primary constraint the PCEA produces. In addition to producing the cut-off levels estimates, this step will also compare task performance for selected Project A tasks that can be expected by personnel at the cut-off level with the required level of performance set by Product 1 for the functional tasks that are related to the Project A tasks.

3.5.2 Input

External Input. The user selects a cut-off determination strategy describing the paygrade and year that will drive the selection of the cut-off level for an MOS. The user also enters information on his/her desired probability for having the "right" person available in each MOS.

Internal Input. Step 2 will provide information on the projected distributions of personnel characteristics within each MOS.

The Current Cut-offs by MOS file (see Tables 4.2-17 and 4.2-18) will list the paygrade with highest manpower requirement for each MOS. (This system will recommend that this paygrade be used to set the cut-off). The Product 1 Input file (see Table 5.1-6) will list the functional task performance criteria set by Product 1.

The MOS Characteristic Priority file (see Table 4.2-19 and 4.2-20) will list the recommended characteristic priorities to be used in setting MOS cut-offs. The Project A-Product 1 Task Linkages file (see Tables 4.2-21 and 4.2-22) will list the Product A tasks associated with each functional task related to a particular system type. The Project A Task Descriptions (Tables 4.2-23 and 4.2-24) will list task titles for the Project A tasks and weights for the characteristics used to predict task performance time and/or accuracy for that task.

3.5.3 Process

The user begins by selecting a cut-off determination strategy. First, for each MOS, he or she must determine what paygrade will be used to set the cut-off level for the characteristic. The user may use the default value which typically has the heaviest manpower requirement (as determined by the standards of grade). (This information is stored in the current cut-offs by MOS library - Tables 4.2-17 and 4.2-18). The second substep is to prioritize the personnel characteristics. To do this, the system will provide a recommended set of priorities. These priorities are stored in the MOS Characteristics Priority File.

In the third substep, the user must choose the probability for having the "right" type of person available in each MOS. The "right" person is someone who scores at, or above, the cut-off level on the selected personnel characteristics for the critical paygrade. To provide input for selecting these probabilities, the user will be able to examine the probability of a soldier making it to the critical paygrade for one or more of the personnel characteristics the user selected.

In the fourth substep, the cut-off level Determination Algorithm (see Section 6.2-10), will automatically select a cut-off level for each design-related personnel characteristic associated with an MOS. If the personnel characteristics associated with an MOS are independent, then setting a cut-off level for each characteristic is relatively straightforward. The system estimates the projected distribution of each personnel characteristic during Step 2.' Given these distributions, the system will select the cut-off level using the following simple rule:

> Set the cut-off level to the personnel characteristic score associated with the percentile that is equal to one minus the user's selected probability of having the right person available in that paygrade. For example, if the user has selected a 60% desired probability, the cut-off level for all selected personnel characteristics would be set equal to the score associated with the 40th percentile score. If the score associated with the 40th percentile score for the paygrade in the MOS was 93, the cut-off level would be set at 93.

Setting a cut-off level for interrelated personnel characteristics is more complex. Here, the characteristic priorities are used to develop hierarchical distributions (see Hierarchical Distribution Algorithm (in Section 6.2.10). The program then seeks a cut-off level for a combination of characteristics that will satisfy the user's desired probability.

Once the cut-off level has been determined for each MOS, the Product 1 Comparison Algorithm (see Section 6.2-12) compares the performance expected at the cut-off levels with the performance criteria set in Product 1.

3.5.4 User Interface Diagram

Figure 3.5.4-1 displays the User Interface Diagram for Step 3. The sequentially numbered blocks shown below display the logical sets of user interactions for this step and list the screens, files, algorithms, and output reports associated with the block. Replicas of the user interface screens follow the block descriptions. Screens are referenced by the block number listed in the User Interface Diagram Components.

BLOCK 1 - Screens 206 and 207 provide examples. The user could select from three options: (1) estimate cut-off levels, (2) compare performance with Product 1 criteria, and (3) save results. The next frame will present the MOSs to be selected. The user could select from any of the MOSs selected in Block 4 of Step 2. The next frame will be a menu allowing the user to select the option for either selecting a paygrade or using the default value.

BLOCK 2 - See Screens 208 and 209. The system will read the Current Cut-offs File (see Tables 4.2-17 and 4.2-18) to develop default paygrades. Default paygrades will be set equal to the paygrade that typically has the peak manpower requirement (as determined by the standards of grade).

BLOCK 3 - Screens 210 and 211 will contain three columns. The first column will be the MOS code. Column two will be the MOS title. Column three will contain the recommended critical paygrade. The user could then modify recommended critical paygrades.

BLOCK 4 - Screens 212 and 213 will first ask the user if he wants to select cut-offs using an interdependent set of characteristics or if he waants to use an independent set. If he decides to use an independent set, he may change the default priorities. Otherwise, he must use the defaults.

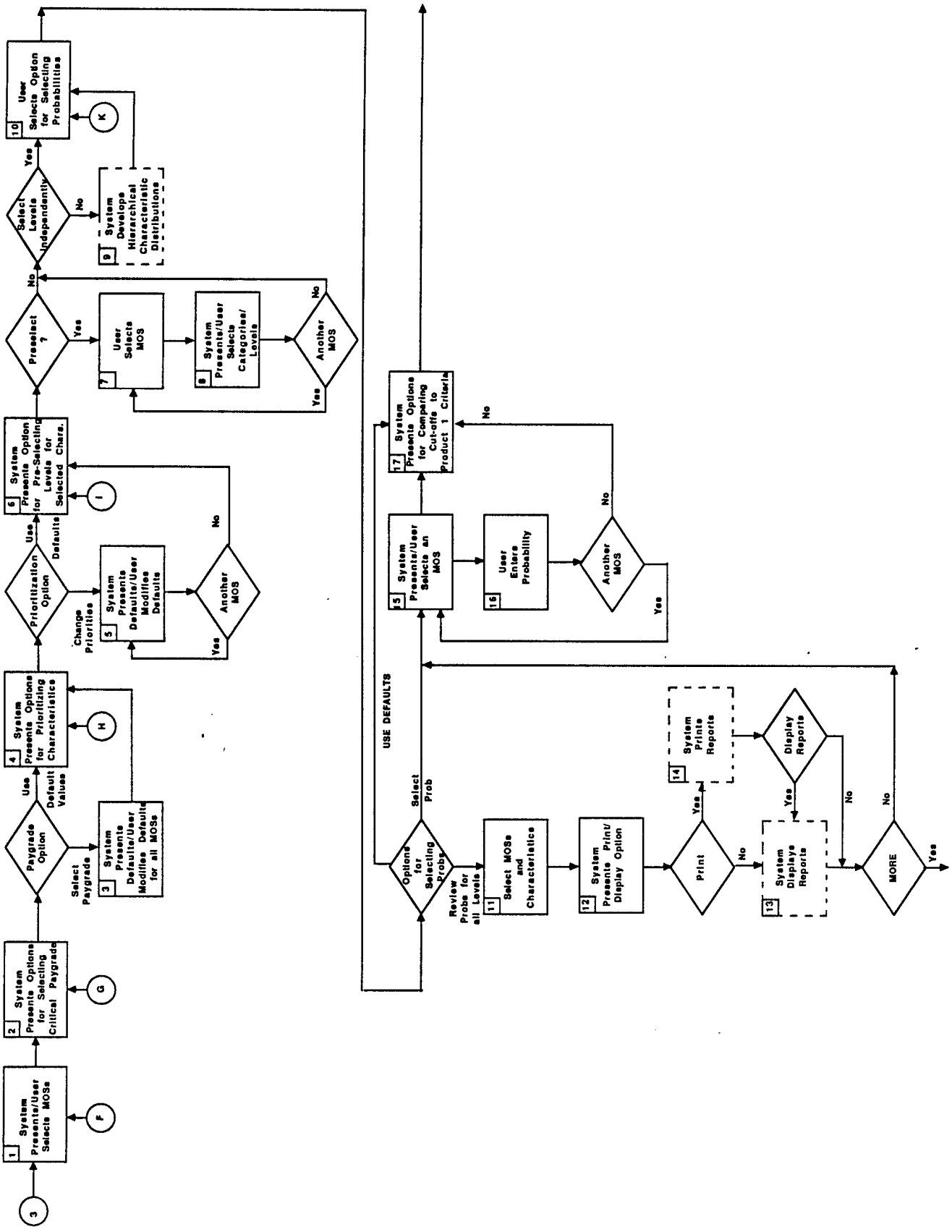


Figure 3.5.4-1. Step 3. Determine Cut-Off Levels.

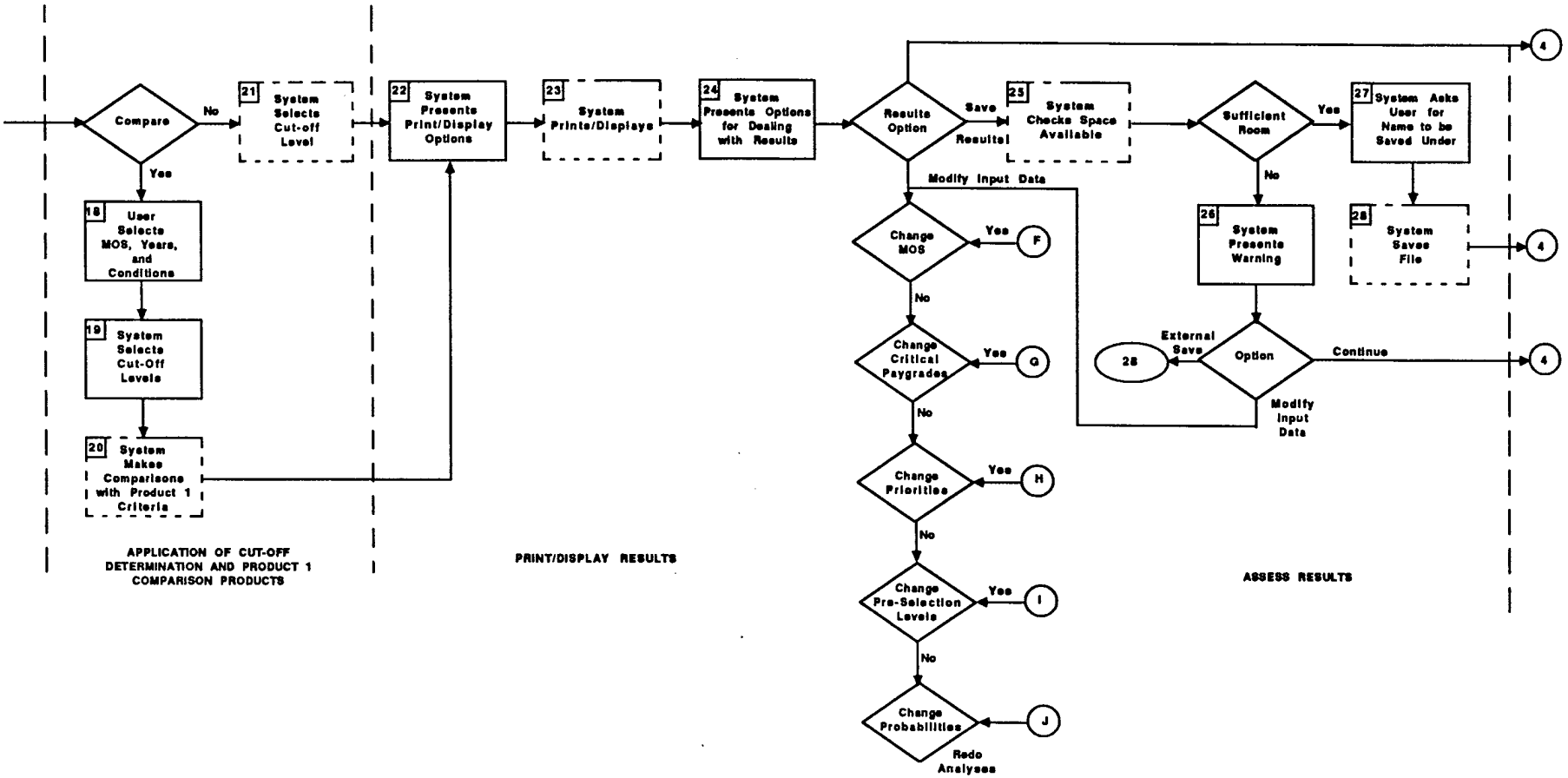


Figure 3.5.4-1. Step 3. (Continued)

BLOCK 5 - See Screens 214-219. The first screen will contain two columns. First, there will be a list of characteris tics, rank ordered in terms of their priorities. The second column will be a number signifying priorities that the user could modify. The system will read MOS priorities from the MOS Char acteristics Priority file (see Tables 4.2-14 and 4.2-20). If the user has decided to select levels independently, the system will also highlight the first XX characteristics and provide a message to the user indicating that the system will only determine cut-off levels for this number of characteristics on the present run (max is 10 for independent characteristics, 7 for interdependent).

BLOCK 6 - Screen 220 is a menu. It will ask the user if he wants to preselect levels.

BLOCK 7 - Refer to Screen 221. The user will select one of the MOSs selected in Block 1.

BLOCK 8 - Screens 222-225 give examples of these displays. The first display will show the categories associated with the highest priority characteristic and the recommended category, or characteristic level, for this characteristic. The recommended category will be read from the Current Cut-off Level file. (see Tables 4.2-17 and 4.2-18). The user could change the recommended category. For the sex variable, the user may select both categories. For all other characteristics, the user is only allowed to select one category.

The next display will be the data for the characteristic with the next highest priority. The following screens will display results for the next highest priority characteristics until results for all of the characteristics selected in Blocks 4 or 5 have been displayed.

BLOCK 9 - Screen 226 shows a description of the message that would appear on the screen during this process. See Section 6.2.11 for a detailed description of the Hierarchical Distribution Algorithm.

BLOCK 10 - See Screens 227 and 234. The user selects option for selecting probabilities (review probabilities, revise probabilities, use defaults).

BLOCK 11 - Screens 228 and 229 display examples. The user could select any of the MOSs selected in Block 1, and any of the characteristics selected in Blocks 4 or 5.

BLOCK 12 - See Screen 230. The user selects the print and/or display option.

BLOCK 13 - Screens 232 and 233 depict examples of these displays. The columns in each display will be characteristic categories. The entries would be the cumulative distribution of each category. The system will provide separate displays for each MOS/characteristic combination. If the user decided to calculate cut-off levels dependently, the columns will be the categories for the characteristic assigned the lowest level in the hierarchy. The header at the top will describe which higher level characteristic values were associated with the display. If the user preselected a level for a particular characteristic, only distributions for that level will be displayed. If the user decides to select cut-off levels independently, the display format will be similar. However, the heading describing values for higher level characteristics would be removed. The system would obtain these values by reading the Projected Distributions file (Table 5.1-15) or the Projected Hierarchical Distributions file (Table 5.1-16).

BLOCK 14 - Screen 231 provides examples of these reports. Tables 7.3-16 and 7.3-17 describe the output reports. The formats will be the same as those described in Block 13.

BLOCK 15 - See Screen 235 for an example. The user could select any of the MOSs selected in Block 1 and any of the characteristics selected in Blocks 4 or 5.

BLOCK 16 - Screen 236 gives an example of this function. There will be two different types of displays, depending on whether or not the user decides to set probabilities independently or dependently in Block 6. If the user selects the independent option, a separate display will be presented for each characteristic. This display will be as follows. The first two columns will list MOS code and title. The next column will be the critical paygrade selected in Blocks 2 or 3. If the user has preselected a cut-off level for a particular characteristic the next column will list the probabilities associated with getting someone at, or above, the preselected characteristic level at the critical paygrade. Otherwise, the columns will be left blank. Section 6.2-9 describes the Probability Determination Model, the algorithm used for calculating these probabilities. The user could then modify the entries in this display. However, he could not enter a value greater than the value associated with the preselected level.

If the user selects the dependent option, only one display will be presented. This display will be as follows. The first two columns will list the MOS code and title. The next column will be the critical paygrade selected in Blocks 2 or 3. The remaining columns will list the probabilities associated with getting someone at, or above, any preselected levels for all characteristics. Section 6.2-9 describes the Probability Determination

Model, the algorithm for calculating these probabilities. The user could then modify the entries in this display. However, he could not enter a value less than the value associated with the preselected levels.

BLOCK 17 - See Screens 237 and 241. The user indicates if he wants to compare cut-off scores to Product 1 criteria.

BLOCK 18 - Screen 238 provides examples. The user could select any of the MOSs selected in Block 1. User would also select condition set(s) and missions (within each condition set) to be used in making the comparison to Product 1 criteria.

BLOCKS 19, 20, and 21 - Refer to Screens 239, 240, and 242 for descriptions of the messages that will appear on screen during these processes. Sections 6.2.10 and 6.2.12 describe the Cut-off Level Determination Algorithm and Product 1 Comparison Algorithm.

BLOCK 22 - See Screen 243. User selects the print and/or display option.

BLOCK 23 - Screens 244-247 provide examples of these displays/ reports. There will be two types of displays. The first type will describe the recommended cut-off levels. Separate MOS displays for each MOS will be provided. Rows in the displays will be the characteristics selected in Block 4. Columns will be years in the projection horizon. Entries will be recommended cut-off levels for each characteristic.

The second type of displays will describe discrepancies between probable task performance at the cut-off level and the Product 1 task criteria. These displays will only be available if the user selects this option in Block 17. The first column will list the

Product 1 functional tasks associated with the system. The second and third columns will list time and accuracy criteria for each of these Product 1 functional tasks. (The Product 1 Condition Set and Mission associated with these criteria will be listed at the top of the display). The fourth column will list the Project A tasks linked to the functional tasks. These tasks and their linkages will be read from the Product 1 Input File (see Table 5.1-6) and the Project A-Product 1 Functional task linkages file (see Tables 4.2-21 and 4.2-22). The fifth and six columns will list the task type. The seventh and eighth columns will list probable time and accuracy estimates at the cut-off levels for the characteristics shown to be predictors of performance for that type of task. The last four columns will describe absolute and percentage differences between the Product 1 criteria and the predicted estimates for time and accuracy.

BLOCK 24 - See Screen 249. User selects the next processing option (save files, change MOS, change paygrade, change priorities, change pre-selection levels, change probabilities).

BLOCK 25 - Screen 248 describes a message that will appear on the screen while the system checks for available memory.

BLOCK 26 - Refer to Screen 251. If there is insufficient memory, the user will have four options: (1) quit (this option is available from almost all screens), (2) continue without saving data or recent data modifications, (3) redo data, and (4) save on an external medium (i.e., floppy diskettes or additional Bernouilli Box). If he chooses the latter, additional screens will be provided to assist him in making the external saves.

BLOCK 27 - See Screen 250. User selects the name to be saved under.

BLOCK 28 - Screen 252 shows the message that will appear on during this process. The system will save the Hierarchical Distribution, Characteristic Cut-off, and Selected Characteristic Priority Files (see Tables 5.1-16, 5.1-17, and 5.1-18).

PCEA>SESSION>NEW SYSTEM>CUT-OFFS MODE: WORK

Continue Return to Main Menu Quit
Continue with PCEA step three

PCEA STEP THREE: Determine Cut-off Levels

You are now beginning step three of the PCEA program. This step allows you to perform the following activities:

1. Estimate cutoff levels
2. Compare cutoffs to Product 1 (SPREA) criteria
3. Save results

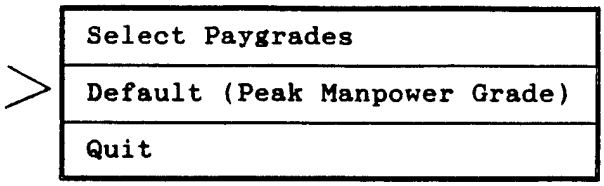
PCEA>SESSION>NEW SYSTEM>CUT-OFFS MODE: WORK

Select Quit
Select one or more MOS's for cutoff determination

Operator MOS's		Maintainer MOS's	
13B	Cannon Crewmember	29E	Comm-Elect. Radio Repr.
		31V	Communications Maint.
		41C	Fire Contr. Instr. Repr
		45L	Artillery Repairer
		63G	Fuel/Elect Sys Repairer
		63H	Track Vehicle Repair.

PCEA>SESSION>NEW SYSTEM>CUT-OFFS MODE: WORK

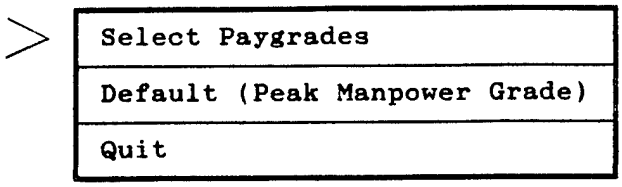
Select Paygrade Cut-off Determination Strategy



Use cursor controls to select strategy.

PCEA>SESSION>NEW SYSTEM>CUT-OFFS MODE: WORK

Select Paygrade Cut-off Determination Strategy



Use cursor controls to select strategy.

PCEA>SESSION>NEW SYSTEM>CUT-OFFS MODE: WORK

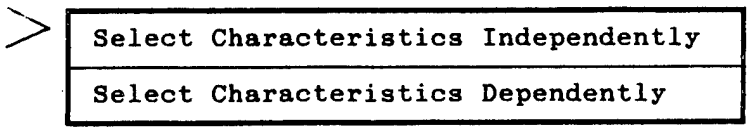
Select Edit Confirm Quit
Edit one or more MOS's as required

MOS's and their recommended critical paygrades.

MOS	MOS Title	Rec. Grade
13B	Cannon Crewmember	E-3
29E	Comm-Electronic Radio Repairer	E-3
31V	Communications Maintenance	E-3
41C	Fire Control Instrument Repair.	E-6
45L	Artillery Repairer	E-4
63G	Fuel/Elect Sys Repairer	E-3
63H	Track Vehicle Repairer	E-4

PCEA>SESSION>NEW SYSTEM>CUT-OFFS MODE: WORK

Select Strategy for Identifying cutoffs



Use cursor controls to select option.

PCEA>SESSION>NEW SYSTEM>CUT-OFFS MODE: WORK

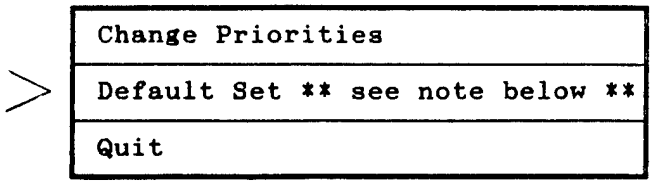
Select Strategy for Identifying cutoffs

> Select Characteristics Independently
> Select Characteristics Dependently

Use cursor controls to select option.

PCEA>SESSION>NEW SYSTEM>CUT-OFFS MODE: WORK

Select Option for Prioritizing Characteristics



NOTE: If you later plan to compare task performance at the cut-off with Project A task performance, you must use the default set

Use cursor controls to select prioritization option.

PCEA>SESSION>NEW SYSTEM>CUT-OFFS MODE: WORK

Select Strategy for setting Characteristics' Priorities

Change Priorities
Default Set
Quit

Use cursor controls to select prioritization option.

PCEA>SESSION>NEW SYSTEM>DEFINE MODE: WORK

Select Quit
Select one or more MOS's for changing priorities

Operator MOS's		Maintainer MOS's	
13B	Cannon Crewmember	29E	Comm-Elect. Radio Repr.
		31V	Communications Maint.
		41C	Fire Contr. Instr. Repr
		45L	Artillery Repairer
		63G	Fuel/Elect Sys Repairer
		63H	Track Vehicle Repair.

PCEA>SESSION>NEW SYSTEM>CUT-OFFS MODE: WORK

Select Edit Confirm Another MOS
Change the priority value for selected characteristic

Characteristics, Rank Ordered by Priority

Characteristic	Priority
Sex	1
High School Grad Status	2
AFQT Group	3
Psychomotor (Proj A)	4
Simple Reaction Accuracy	5
PUHLES - Weight Lift	6
Height	7

PCEA>SESSION>NEW SYSTEM>CUT-OFFS MODE: WORK

Select Edit Confirm Another MOS
Change the priority value for selected characteristic

Characteristics, Rank Ordered by Priority

Characteristic	Priority
Sex	1
High School Grad Status	2
AFQT Group	1
Psychomotor (Proj A)	4
Simple Reaction Accuracy	5
PUHLES - Weight Lift	6
Height	7

PCEA>SESSION>NEW SYSTEM>CUT-OFFS MODE: WORK

Select Edit Confirm Another MOS
Change the priority value for selected characteristic

Characteristics, Rank Ordered by Priority

Characteristic	Priority
Sex	3
High School Grad Status	2
AFQT Group	1
Psychomotor (Proj A)	4
Simple Reaction Accuracy	5
PUHLES - Weight Lift	6
Height	7

PCEA>SESSION>NEW SYSTEM>CUT-OFFS MODE: WORK

Select Edit Confirm Another MOS
Select another MOS for changing characteristic priorities

Characteristics, Rank Ordered by Priority

Characteristic	Priority
Sex	3
High School Grad Status	2
AFQT Group	1
Psychomotor (Proj A)	4
Simple Reaction Accuracy	5
PUHLES - Weight Lift	6
Height	7

PCEA>SESSION>NEW SYSTEM>CUT-OFFS MODE: WORK

Select Continue
Select cut-off level option

Select Cut-off Levels for Selected Characteristics

Pre-select Levels
Use all levels

PCEA>SESSION>NEW SYSTEM>CUT-OFFS MODE: WORK

Select Return to Main Menu

Operator MOS's		Maintainer MOS's	
13B	Cannon Crewmember	29E	Comm-Elect. Radio Repr.
		31V	Communications Maint.
		41C	Fire Contr. Instr. Repr
		45L	Artillery Repairer
		63G	Fuel/Elect Sys Repairer
		63H	Track Vehicle Repair.

Use cursor controls to select MOS.

PCEA>SESSION>NEW SYSTEM>CUT-OFFS MODE: WORK

Highest Category Characteristic

SEX
Male
Female
Both

The highlite bar indicates the recommended characteristic level for this characteristic. Use cursor controls to change selection.

PCEA>SESSION>NEW SYSTEM>CUT-OFFS MODE: WORK

Second Highest Category Characteristic

HIGH SCHOOL GRAD STATUS
Graduate
Non-Graduate
Both

The highlite bar indicates the recommended characteristic level for this characteristic. Use cursor controls to change selection.

PCEA>SESSION>NEW SYSTEM>CUT-OFFS MODE: WORK

Third Highest Category Characteristic

AFQT GROUP
Category 1
Category 2
Category 3
Category 4

The highlite bar indicates the recommended characteristic level for this characteristic. Use cursor controls to change selection.

PCEA>SESSION>NEW SYSTEM>CUT-OFFS MODE: WORK

Last Category Characteristic

ASVAB Cmbt Area Std Score
85 or Below
90
95
100
105

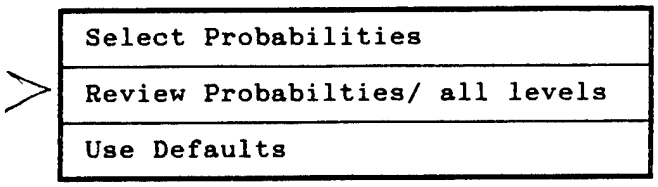
The highlite bar indicates the recommended characteristic level for this characteristic. Use cursor controls to change selection.

PCEA>SESSION>NEW SYSTEM>CUT-OFFS MODE: WORK

System is developing Heirarchical Characteristic Distributions

PCEA>SESSION>NEW SYSTEM>CUT-OFFS MODE: WORK

Select Option for Selecting Probabilities



Use cursor controls to select option.

PCEA>SESSION>NEW SYSTEM>CUT-OFFS MODE: WORK

Select Quit
Select one or more MOS's for Reviewing Probabilities

Operator MOS's		Maintainer MOS's	
13B	Cannon Crewmember	29E	Comm-Elect. Radio Repr.
		31V	Communications Maint.
		41C	Fire Contr. Instr. Repr
		45L	Artillery Repairer
		63G	Fuel/Elect Sys Repairer
		63H	Track Vehicle Repair.

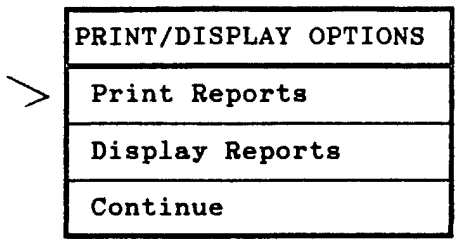
PCEA>SESSION>NEW SYSTEM>CUT-OFFS MODE: WORK

Characteristics available for Review

Characteristic
Sex
High School Grad Status
AFQT Group
Psychomotor (Project A)
Simple Reaction Accuracy
PUHLES - Weight Lift
Height

Select with highlite bar and <CR> for each choice, press F9 when complete.

PCEA>SESSION>NEW SYSTEM>CUT-OFFS MODE: WORK

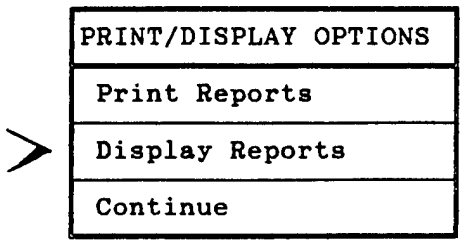


PCEA>SESSION>NEW SYSTEM>CUT-OFFS MODE: WORK

PRINT/DISPLAY OPTIONS
Print Reports
Display Reports
Continue

Reports are being printed ....

PCEA>SESSION>NEW SYSTEM>CUT-OFFS MODE: WORK



MOS 13B CRITICAL PAYGRADE E4

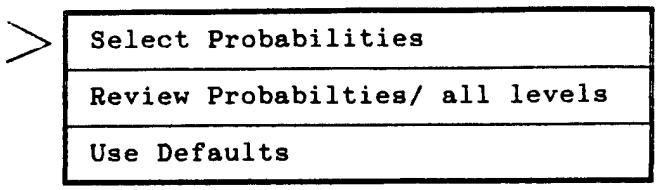
SET CUT-OFFS INDEPENDENTLY CHARACTERISTIC AFQT GROUP

AFQT GROUP	PROB.	CUMULATIVE PROBABILITY (% SCORING AT OR ABOVE)
CAT 1	3.7	3.7
CAT 2	32.6	36.3
CAT 3A	26.6	62.9
CAT 3B	28.5	91.5
CAT 4&5	8.5	100

PCEA>SESSION>NEW SYSTEM>CUT-OFFS

MODE: WORK

Select Option for Selecting Probabilities



Use cursor controls to select option.

PCEA>SESSION>NEW SYSTEM>CUT-OFFS MODE: WORK

Select Quit
Select MOS for Determining Probabilities

Operator MOS's		Maintainer MOS's	
13B	Cannon Crewmember	29E	Comm-Elect. Radio Repr.
		31V	Communications Maint.
		41C	Fire Contr. Instr. Repr
		45L	Artillery Repairer
		63G	Fuel/Elect Sys Repairer
		63H	Track Vehicle Repair.

PCEA>SESSION>NEW SYSTEM>CUT-OFFS MODE: WORK

Select Edit Confirm Quit

MOS	Title	Crit Grade	Prob.
13B	Cannon Crewmember	E-3	.8
29E	Comm-Electronic Radio Repairer	E-4	.9
31V	Communications Maintenance	E-3	.8
41C	Fire Control Instrument Repairer	E-3	.9
45L	Artillery Repairer	E-5	.8
63G	Fuel/Elect Sys Repairer	E-6	.9
63H	Track Vehicle Repairer	1/2/3	.8

NOTE: NUMBER IN PROBABILITY COLUMN

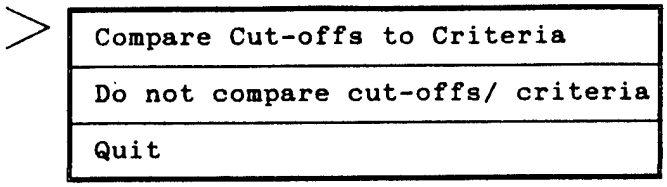
SHOW VALUES FOR FOLLOWING PRESELECTED LEVELS

-HIGH SCHOOL DEGREE STATUS -HIGH SCHOOL GRADS ONLY

THE PROBABILITY YOU SELECT CANNOT EXCEED THE LISTED LEVEL

PCEA>SESSION>NEW SYSTEM>CUT-OFFS MODE: WORK

Comparing Cut-offs to Product 1 Criteria



Use cursor controls to select option.

PCEA>SESSION>NEW SYSTEM>CUT-OFFS MODE: WORK

Select Select All Quit
Select one or more MOS for comparing Cut-offs to Product 1 Criteria

Operator MOS's		Maintainer MOS's	
13B	Cannon Crewmember	29E	Comm-Elect. Radio Repr.
		31V	Communications Maint.
		41C	Fire Contr. Instr. Repr
		45L	Artillery Repairer
		63G	Fuel/Elect Sys Repairer
		63H	Track Vehicle Repair.

PCEA>SESSION>NEW SYSTEM>CUT-OFFS MODE: WORK

System is selecting Cut-off Levels

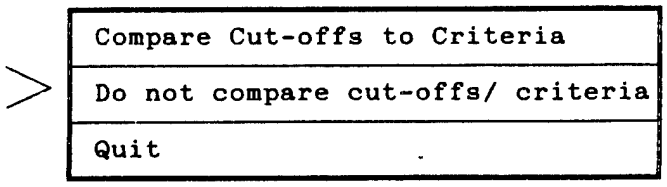
PCEA>SESSION>NEW SYSTEM>CUT-OFFS MODE: WORK

System is making comparison with Product One

Criteria

PCEA>SESSION>NEW SYSTEM>CUT-OFFS MODE: WORK

Comparing Cut-offs to Product 1 Criteria

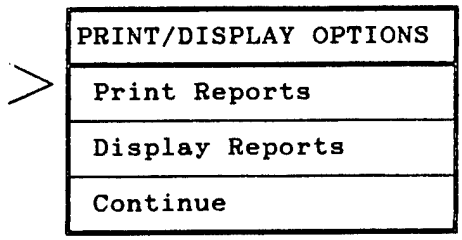


Use cursor controls to select option.

PCEA>SESSION>NEW SYSTEM>CUT-OFFS MODE: WORK

System is selecting cut-off Levels

PCEA>SESSION>NEW SYSTEM>CUT-OFFS MODE: WORK



PCEA>SESSION>NEW SYSTEM>CUT-OFFS MODE: WORK

PRINT/DISPLAY OPTIONS
Print Reports
Display Reports
Continue

Reports are printing .....

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>DISPLAY MODE: WORK

CHARACTERISTIC CUTOFF REPORT SYSTEM_____
MOS _ 68B____ YEAR _____
SYSTEM TYPE _____ DATE _____

CHARACTERISTIC	CUT-OFFs
Sex	
High School Graduate Status	
AFQT Group	
Psychomotor (Project A)	
Simple Reaction Accuracy	
PUHLES - Weight Lift	
Height	

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>DISPLAY MODE: WORK

PRODUCT 1 FUNCTIONAL TASK CRITERIA REPORT SYSTEM _____ SYST TYPE _____

MOS _____ YEAR _____ OPERATOR/MAINTAINER _____ DATE _____

PRODUCT 1			PROJECT A		
Functional Task Title	Time	Accur.	Task Type	MOS	Tas

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT>DISPLAY MODE: WORK

TEM_____ SYST TYPE _____

_____ DATE _____

PROJECT A			DISCREPANCIES			
Task	Est. Time	Est. Acc	Time Dif	Tm % Dif	Acc. Dif	Acc % Dif

PCEA>SESSION>NEW SYSTEM>CUT-OFFS MODE: WAIT

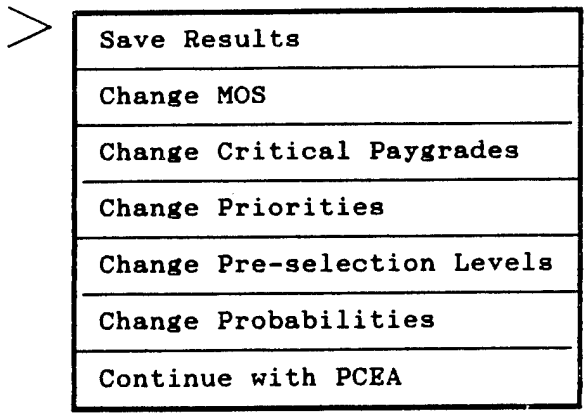
Select Option(s) for Dealing with Cut-off Determination Data

Save Results
Change MOS
Change Critical Paygrades
Change Priorities
Change Pre-selection Levels
Change Probabilities
Continue with PCEA

Please wait .... checking availability of memory for saving results.

PCEA>SESSION>NEW SYSTEM>CUT-OFFS MODE: WORK

Select Option(s) for Dealing with Cut-off Determination Data



PCEA>SESSION>NEW SYSTEM>CUT-OFF MODE: WORK

Save View Edit Delete
Save cut-off determination results

SAVE CUT-OFF DETERMINATION RESULTS

Name of system to be saved under: m109d.cut

PCEA>SESSION>NEW SYSTEM>DIS PROG MODE: WORK

Save View Edit Delete
Save cut-off determination results

SAVE CUT-OFF DETERMINATION RESULTS

Name of system to be saved under: m109d.cut

WARNING: INSUFFICIENT MEMORY !!
Save to External Device
Modify Input Data
Continue with PCEA

PCEA>SESSION>NEW SYSTEM>TRANS OUTPUT MODE: WORK

Save View Edit Delete
View list of distribution rate files in system

CUT-OFF DETERMINATION FILES CURRENTLY IN SYSTEM

M109D.cut	11/18/1987
M102F.cut	07/23/1986
M101X.cut	05/21/1987

3.6 STEP 4: PROVIDE DESIGN GUIDANCE

3.6.1 Output

Cut-off levels for certain personnel characteristics may not be directly meaningful to design contractors. Specifically, these levels may not provide enough information for them to tailor their design to the available population. To make cognitive/perceptual and psychomotor personnel characteristics more meaningful, the PCEA will display the mean level of task performance that can be expected at the cut-off levels for the Project A task types associated with New System's Functional tasks. The user will be able to print the Design Guidance created under this step or save it on floppy diskette.

3.6.2 Input

External Input. None.

Internal Input. Step 3 will provide input to the required cut-off levels for each characteristic. (See Characteristic Cut-off file, Table 5.1-17).

The MOS-Characteristic Priority File (see Table 4.2-19 and 4.2-20) will describe the quantitative relationships between task performance and personnel characteristic levels for different types of Project A tasks.

3.6.3 Process

Section 6.2-13 presents a detailed description of the Design Guidance Algorithm. The algorithm will first identify the

Project A task types associated with each MOS by reading the Project A - Product Task linkages file (see Tables 4.2-21 and 4.2.22). It will then read both the cut-offs for each MOS from the Characteristic Cut-off file (see Table 5.1-17) and the weights used to predict performance on each task type from the MOS Characteristic Priority file (see Tables 4.2-19 and 4.2-20). It will then use the weights to predict mean performance for each Project A task type.

3.6.4 User Interface Diagram

Figure 3.6.4-1 displays the User Interface Diagram for STEP 4. The sequentially numbered blocks shown below display the logical sets of user interactions for this step. Each block lists the screens, files and algorithms associated with that particular block. Replicas of the user interface screens follow the block descriptions. Screens are referenced by the block numbers listed in the Interface Diagram.

BLOCK 1 - See Screens 253 and 254. The user selects the option to be conducted (create design guidance, print and display design guidance report, or save results).

BLOCK 2 - Refer to Screen 255. The user could select any of the MOSs selected in Block 1 of Step 3.

BLOCK 3 - See Screen 256. The user could select any of the characteristics selected in Blocks 4 or 5 of Step 3 for each MOS.

BLOCK 4 - Screen 257 gives a description of the message that will appear on the screen during this process. Section 6.2-13 describes the Design Guidance Development Algorithm. The procedures for developing this guidance will vary depending on

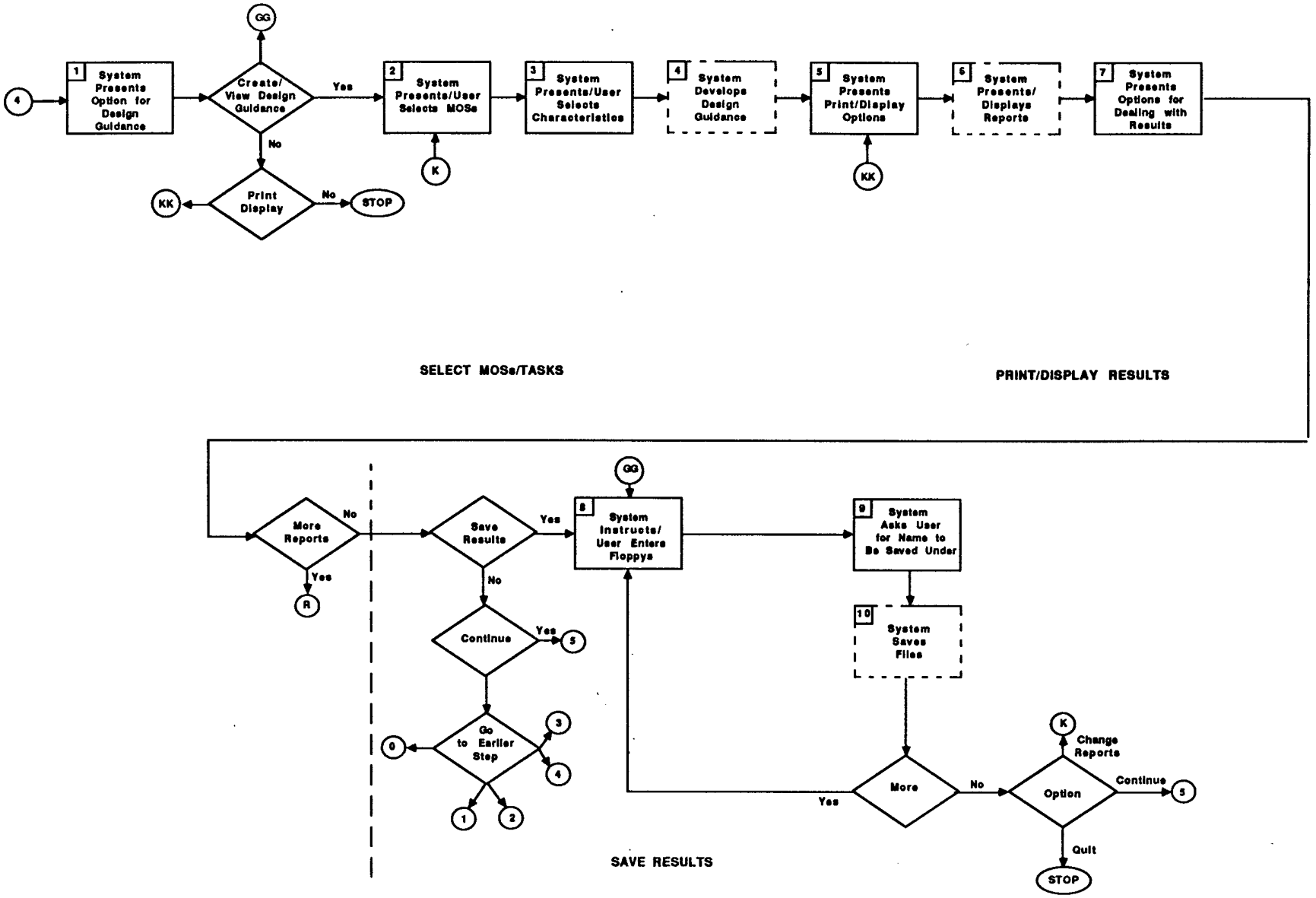


Figure 3.6.4-1. Step 4. - Provide Design Guidance

whether or not the user selected cut-offs for each characteristic independently or combined the effects of the characteristics in setting cut-offs.

BLOCK 5 - See Screen 258. The user selects options for printing or displaying results.

BLOCK 6 - Screens 259-263 give examples of displays. Tables 7.3-13 and 7.3-14 describe the output reports. Two different types of formats will be used in these displays/reports depending on whether or not the user selects cut-offs for each characteristic independently or combined the effects of the characteristics in setting cut-offs. If the cut-off levels are set independently for each characteristic, the display/report will have the following format. The first column will list the Project A tasks that the system had selected as being most relevant to the MOS. These will be read from the Project 1 Linkages file (see Tables 4.2-21 and 4.2-22). The second column will list the MOS associated with each task. The third column will describe the mean task time and/or accuracy measures associated with the cut-off score. Separate reports/displays will be presented for each MOS/characteristic combination. The cut-off levels selected for the characteristic will be listed in the headings for the table.

If the cut-off levels were set by combining characteristics, the display/report will have the following format. The first column will list the Project A tasks that the system selected as being most relevant to the MOS. The second column will list the MOS associated with each task. The third and fourth columns will describe the mean task time and/or accuracy measures associated with the cut-off scores. The cut-off levels selected for each characteristic in this set will be listed in the headings for these columns. Separate reports/ displays will be presented for each MOS.

BLOCK 7 - See Screens 264 and 265. The user selects option for dealing with results (print more reports, save results, return to earlier step.)

BLOCK 8 - Screen 266 describes the message that will appear on the screen telling the user to enter a floppy diskette.

BLOCK 9 - See Screen 267. The user selects the system name under which the files will be saved.

BLOCK 10 - Refer to Screen 268. The files saved will be the Design Guidance reports (see Tables 7.3-13 and 7.3-14) associated with each MOS. If more than one floppy diskette is needed to save the design guidance, the system will instruct the user to enter in another floppy.

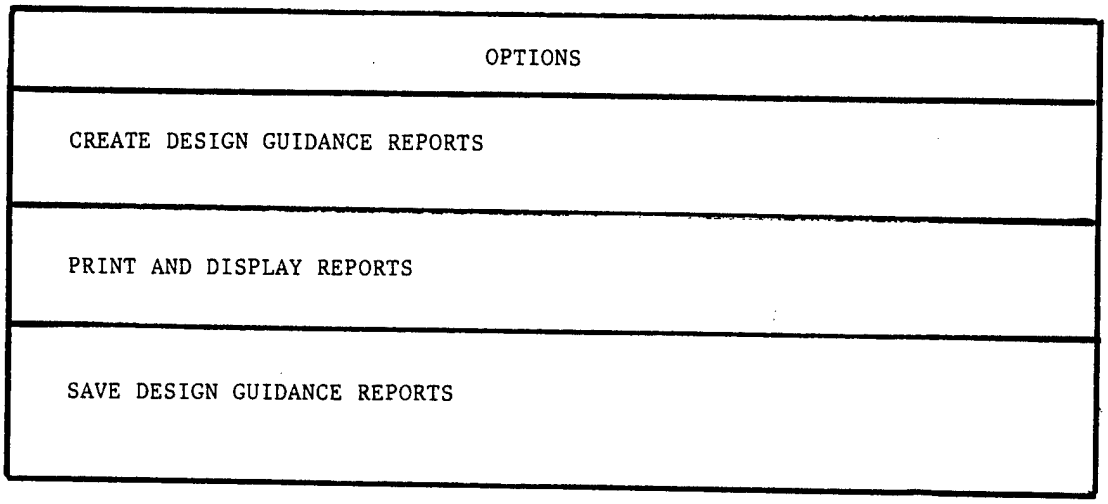
PCEA>SESSION>NEW SYSTEM>DESIGN GUIDE MODE: WORK

Continue Return to Main Menu Quit
Continue with step four of PCEA

PCEA STEP FOUR: PROVIDE DESIGN GUIDANCE

You are now beginning step four of the PCEA program. This step allows you to perform the following activities:

1. Create design guidance reports,
2. Print and display design guidance reports.
3. Save results for future use.



SELECT CHOICE USING CURSOR CONTROL AND PRESS <CR> WHEN READY.

PCEA>SESSION>NEW SYSTEM>DESIGN GUIDE MODE: WORK

Select Quit
Select one or more MOS's for Preparing Design Guidance

Operator MOS's		Maintainer MOS's	
13B	Cannon Crewmember	29E	Comm-Elect. Radio Repr.
		31V	Communications Maint.
		41C	Fire Contr. Instr. Repr
		45L	Artillery Repairer
		63G	Fuel/Elect Sys Repairer
		63H	Track Vehicle Repair.

PCEA>SESSION>NEW SYSTEM>DESIGN GUIDE MODE: WORK

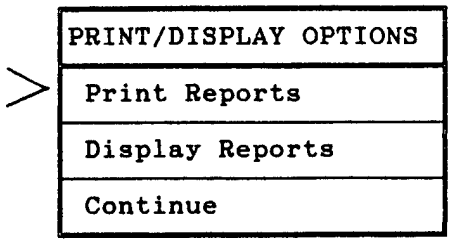
Select Another MOS Quit
Select Characteristic(s) for Design Guidance

Characteristic - MOS 13D
Sex
High School Grad Status
AFQT Group
Psychomotor (Project a)
Simple Reaction Accuracy
PUHLES - Weight Lift
Height

PCEA>SESSION>NEW SYSTEM>DESIGN GUIDE MODE: WAIT

Please wait ..... PCEA developing Design Guidance

PCEA>SESSION>NEW SYSTEM>DESIGN GUIDE MODE: WORK



PCEA>SESSION>NEW SYSTEM>DESIGN GUIDE MODE: WAIT

PRINT/DISPLAY OPTIONS
Print Reports
Display Reports
Continue

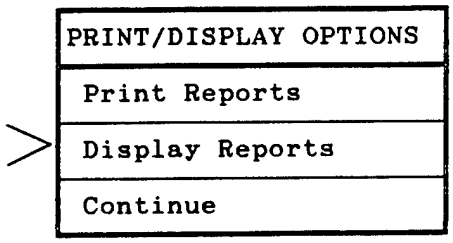
Please wait... printing reports....

PCEA>SESSION>NEW SYSTEM>DESIGN GUIDE MODE: WORK

PRINT/DISPLAY OPTIONS
Print Reports
Display Reports
Continue

Please wait... printing reports.... printing complete.

PCEA>SESSION>NEW SYSTEM>DESIGN GUIDE MODE: WORK



PCEA>SESSION>NEW SYSTEM>DESIGN GUIDE MODE: WORK

DESIGN GUIDANCE REPORT SYSTEM _____ SYSTEM TYPE _____ DATE _____

MOS _____ YEAR _____

Cut-Off Levels

#	Characteristic	Cut-off
1		
2		
3		
4		
5		
6		
7		

ESTIMATED TASK PERFORMANCE

Tsk Type	MOS	Tasks	Est Time	Est Acc.

PCEA>SESSION>NEW SYSTEM>DESIGN GUIDE MODE: WORK

DESIGN GUIDANCE REPORT INDEPENDENT CHARACTERISTICS

SYSTEM TYPE _____ DATE _____ MOS _____ YEAR _____1

Task Type	Tasks	MOS	Cut-off Levels				
			Char A: ____ Cut-off ____ Time	Acc.	Char B: ____ Cut-off ____ Time	Acc.	Char C Cut- Time

PCEA>SESSION>NEW SYSTEM>DESIGN GUIDE MODE: WORK

Continue Save Change Reports Return to Main Menu Quit
View and Edit Design Guidance Reports

DESIGN GUIDANCE OPTIONS

PCEA>SESSION>NEW SYSTEM>DESIGN GUIDE MODE: WORK

Continue Save Change Reports Return to Main Menu Quit
Save Design Guidance Reports

DESIGN GUIDANCE OPTIONS

PCEA>SESSION>NEW SYSTEM>DESIGN GUIDE MODE: WORK

Continue Save Change Reports Return to Main Menu Quit
Return to Main Menu

INSERT FLOPPY DISKETTE AND HIT <CR> WHEN READY.

PCEA>SESSION>NEW SYSTEM>DESIGN GUIDE MODE: WORK

Save View Edit Delete
Save design guidance

SAVE DESIGN GUIDANCE

Name of system to be saved under: m109d.gdc

PCEA>SESSION>NEW SYSTEM>DESIGN GUIDE MODE: WORK

Save View Edit Delete
Save design guidance

SAVE DESIGN GUIDANCE

Name of system to be saved under: m109d.gdc

SAVING DESIGN GUIDANCE FILE....FINISHED.

3.7 STEP 5: DEVELOP INPUT FOR TARGET AUDIENCE DESCRIPTION

3.7.1 Output

The output of this step is a list of data for selected personnel characteristics in a format compatible with the MANPRINT Target Audience Description (TAD). Appendix C provides a more detailed description and an example of the TAD.

This step generates no new data. Rather, information generated in previous steps is displayed in TAD output format. The TAD contains information on only a small set of personnel characteristics (see Table 7.3-15 for a description of format for describing TAD information). Unlike the present TAD, which only displays current personnel characteristic distributions, the PCEA will also allow users to display projected characteristic distributions.

3.7.2 Input

External Input. None.

Internal Input. The information needed to construct the input to the TAD will be available in the Projected Distributions File (see Table 5.1-15).

3.7.3 Process

The system will enter the Projected Distributions File, pull out the TAD personnel information for each MOS associated with the new system, and then print this information in the TAD-compatible format.

3.7.4 User Interface Diagrams

Figure 3.7.4-1 displays the User Interface Diagram for STEP 5. The sequentially numbered blocks shown below display the logical sets of user interactions for this step. Each block lists the screens, files, algorithms, and output reports associated with that particular block. Replicas of the user interface screens follow the block descriptions. Screens are referenced by the block numbers listed in the User Interface Diagram.

BLOCK 1 - See Screens 269-271. User selects options for creating TAD reports.

BLOCK 2 - Screens 272 and 273 provides an example. The user could select any of the MOSs selected in Block 1 of Step 3.

BLOCK 3 - See Screen 274. Options will include print, display, and print and display.

BLOCK 4 - Refer to Screens 275-278 and the Output Report format listed in Table 7.3-15. Separate reports/displays will be presented for each MOS/year combination.

BLOCK 5 - See Screens 279 and 280. The user selects options for dealing with results (more reports, save results, return to previous step.)

BLOCK 6 - Screen 281 describes the message that will appear on the screen telling the user to enter a floppy diskette.

BLOCK 7 - See Screens 282 and 283. The user selects the name under which the files will be saved.

BLOCK 8 - See Screen 284.

The files saved will be TAD Files (see Table 5.1-21). They will be saved on floppy diskette, not on the hard disk.

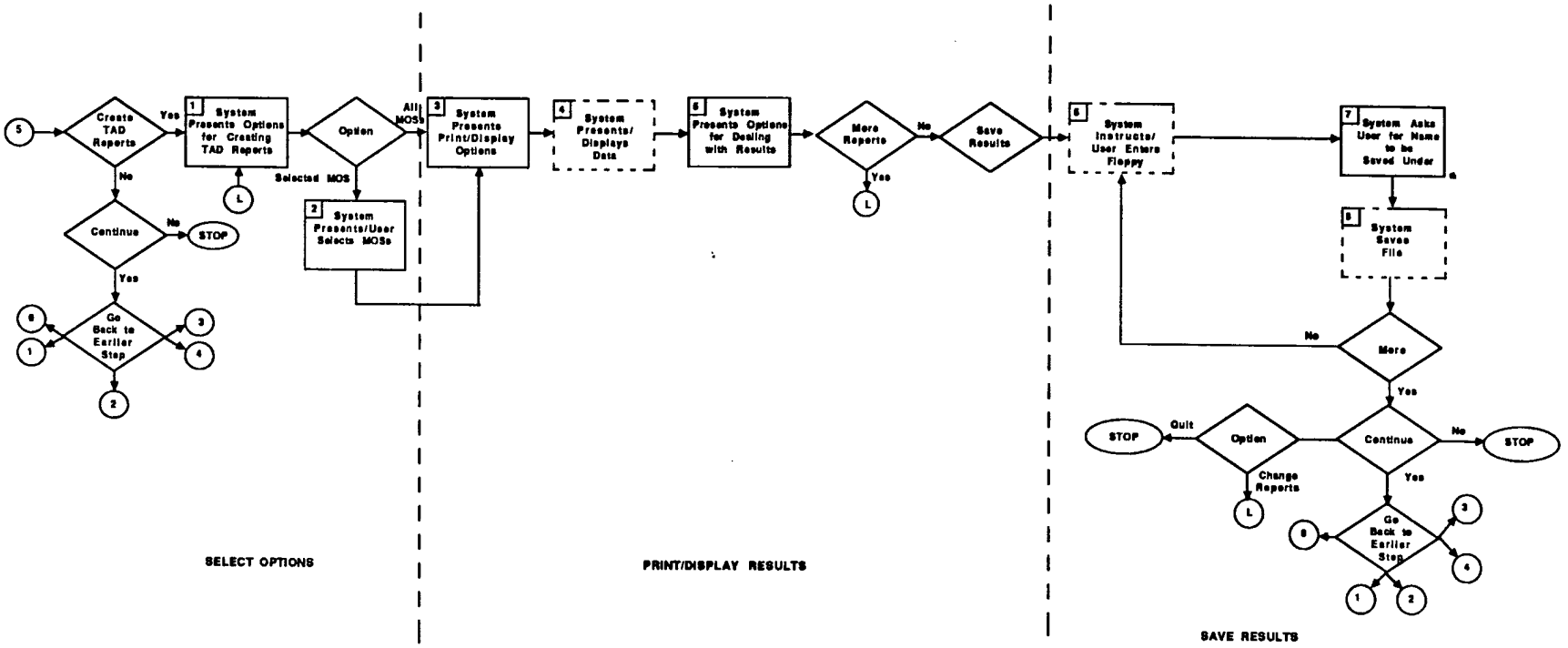


Figure 3.7.4-1. Step 5 - Develop TAD Input

PCEA>SESSION>NEW SYSTEM>TAD MODE: WORK

Continue Return to Main Menu Quit
Continue with Step Five of the PCEA

PCEA STEP FIVE: DEVELOP TAD INPUTS

You are now beginning step five of the PCEA program. This step allows you to perform the following activities:

1. Select Options for creating Target Audience Description Reports
2. Print and display Target Audience Description Reports
3. Save the results for future use.

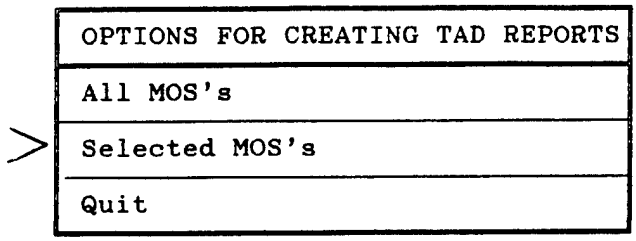
TAD INPUT OPTIONS
Create TAD Reports
Print/Display TAD Reports
Save TAD Results

PCEA>SESSION>NEW SYSTEM>TAD MODE: WORK

TAD INPUT OPTIONS
Create TAD Reports
Print/Display TAD Reports
Save TAD Results

PCEA>SESSION>NEW SYSTEM>TAD

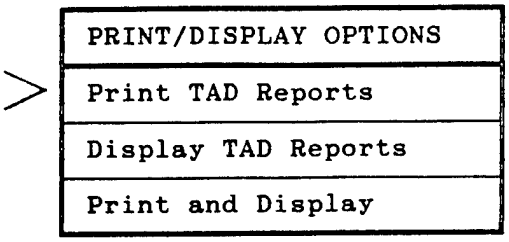
MODE: WORK



Select Quit
Select MOS for Preparing TAD Reports/Displays

Operator MOS's		Maintainer MOS's	
13B	Cannon Crewmember	29E	Comm-Elect. Radio Repr.
		31V	Communications Maint.
		41C	Fire Contr. Instr. Repr
		45L	Artillery Repairer
		63G	Fuel/Elect Sys Repairer
		63H	Track Vehicle Repair.

PCEA>SESSION>NEW SYSTEM>TAD MODE: WORK



PCEA>SESSION>NEW SYSTEM>TAD MODE: WORK

PRINT/DISPLAY OPTIONS
Print TAD Reports
Display TAD Reports
Print and Display

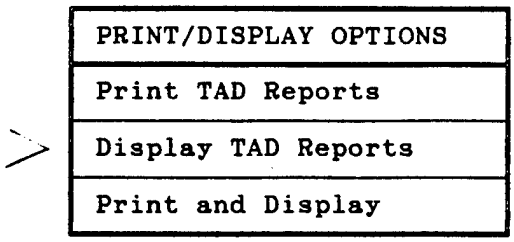
TAD Reports are being printed.....

PCEA>SESSION>NEW SYSTEM>TAD MODE: WORK

PRINT/DISPLAY OPTIONS
Print TAD Reports
Display TAD Reports
Print and Display

TAD Reports are being printed..... printing complete.

PCEA>SESSION>NEW SYSTEM>TAD MODE: WORK



PCEA>SESSION>NEW SYSTEM> MODE: WORK

Continue Return to Main Menu Print Edit Quit
Continue with step five of PCEA

Target Audience Description

MOS: 13D

CMF: 13

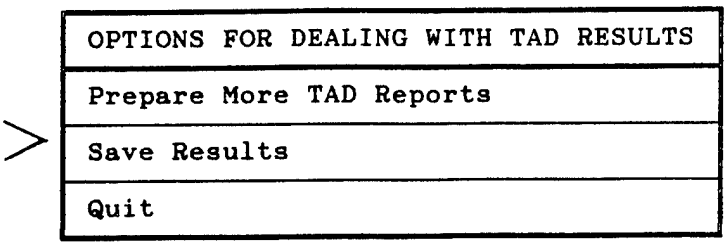
CMF Description : Operations

Branch: Artillery

NOTE A COMPLETE TAD FORMAT IS PRESENTED IN TABLE 7.3-17

PCEA>SESSION>NEW SYSTEM>TAD MODE: WORK

OPTIONS FOR DEALING WITH TAD RESULTS
Prepare More TAD Reports
Save Results
Quit


OPTIONS FOR DEALING WITH TAD RESULTS
Prepare More TAD Reports
Save Results
Quit

PCEA>SESSION>NEW SYSTEM>CUT-OFFS MODE: WORK

Save View Edit Delete
Save TAD Reports

SAVE TAD REPORTS

Insert Floppy Diskette and hit <CR>

PCEA>SESSION>NEW SYSTEM>DIS PROG MODE: WORK

Save View Edit Delete
Save TAD reports

SAVE TAD REPORTS

Name of system to be saved under: m109d.tad

PCEA>SESSION>NEW SYSTEM>DIS PROG MODE: WORK

Save View Edit Delete
Save TAD reports

SAVE TAD REPORTS

Name of system to be saved under: m109d.tad

Saving TAD file. . Finished

PCEA>SESSION>NEW SYSTEM>DESIGN GUIDE MODE: WORK

Return to Main Menu Quit Return Beginning Step Five
Return to Main Menu

COMPLETION OF STEP 5 OPTIONS

SECTION 4.0 - DESCRIPTION OF LIBRARIES

4.1 OVERVIEW

Table 4.1-1 lists the libraries associated with each Step of the PCEA.

4.2 DESCRIPTION OF LIBRARY FILE STRUCTURES AND DATA

Two tables describe each library file in the pages that follow. The first table presents the data dictionary describing the structure of the file. The second table describes the actual data elements in the library.

Table 4.1-1. List of Library Files

Step	File	Structure	Data
0	System Types By Mission Area	Table 4.2-1	4.2-2
	MOS By System Type	Table 4.2-3	4.2-4
	MOS Titles	Table 4.2-5	4.2-6
	MOS By CMF	Table 4.2-7	4.2-8
1	Intentionally Left Blank	Table 4.2-9	4.2-10
2	Personnel Variables Summary	Table 4.2-11	4.2-12
	Personnel Variables Description	Table 4.2-13	4.2-14
	Projected Accession Description	Table 4.2-15	4.2-16
	Current Cut-offs By MOS	Table 4.2-17	4.2-18
3	MOS-Characteristic Priority Files	Table 4.2-19	4.2-20A,
	Project A -Product 1 Task Linkages	Table 4.2-21	4.2-22
	Project A Task Descriptions	Table 4.2-23	4.2-24
4	Baseline Total Army Distributions Files	Table 4.2-25 A, B, C	4.2-26 A, B, C
5	None		

Table 4.2-1.

FILE ID: System Types by Mission Area

DESCRIPTION: List the system types associated with each mission area that have library data in the PCEA.

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
1	1	File ID	10	Alpha
	2	Mission Area	1	Alpha
2		System Type	1	Alpha

ESTIMATED NO. OF TABLES: 6 (6 MISSION AREAS)

ESTIMATED NO. OF RECORDS: 1

LENGTH: FIXED

Table 4.2-2. Data for System Types By Mission Area

MISSION AREA	SYSTEM TYPE
CLOSE COMBAT LIGHT (INFANTRY)	Vehicles -infantry fight veh.√ -antitank vehicles√ Man-Portable Weapons -indirect fire (mortars)√ -direct fire√ -grenade launchers√ -rifles√ -auto. weapons√ -antitank√
CLOSE COMBAT HEAVY (ARMOR)	Tanks√ Calvary Fighting vehicles√
FIRE SUPPORT (FIELD ART)	Missile Artillery -med. range missiles√ Tube Artillery√ -towed howitzers√ -self-pro. howitzers√ Rocket Systems√
AIR DEFENSE	Forward Area A.D. Systems -mobile gun systems√ -man-portable systems√
AVIATION	Attack Helicopters√ Cargo Helicopters√ Utility Helicopters√ Scout Helicopters√
COMBAT SERVICE SUPPORT	Transport Vehicles -light cargo trucks√ -heavy cargo trucks√

√ = System Type

Table 4.2-3.

FILE ID: MOS by System Type

DESCRIPTION: For each system type, list the operator and maintainer CMF, and operator and maintainer MOSs associated with the baseline system.

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
1	1	File ID	10	Alpha
2	1	System Type	1	Alpha
	2	Mission Area	1	Alpha
	3	Baseline System	1	Alpha
	4	Operator CMF Code	3	Num
	5	Maintainer 1 CMF Code	2	Num
	6	Maintainer 2 CMF Code	2	Num
	7	Maintainer 3 CMF Code	2	Num
	8	Maintainer 4 CMF Code	2	Num
	9	Operator MOS	3	Alpha
	10	Operator 2 MOS	3	Alpha
	11	Maintainer 1 MOS	3	Alpha
	12	Maintainer 2 MOS	3	Alpha
	13	Maintainer 3 MOS	3	Alpha
	14	Maintainer 4 MOS	3	Alpha
	15	Maintainer 5 MOS	3	Alpha
	16	Maintainer 6 MOS	3	Alpha
	17	Maintainer 7 MOS	3	Alpha
	18	Maintainer 8 MOS	3	Alpha
	19	Maintainer 9 MOS	3	Alpha
	20	Maintainer 10 MOS	3	Alpha
	21	Maintainer 11 MOS	3	Alpha
	22	Maintainer 12 MOS	3	Alpha

ESTIMATED NO. OF TABLES: 1

ESTIMATED NO. OF RECORDS: 21 (MAXIMUM NUMBER OF SYSTEM TYPES)

LENGTH: FIXED

Table 4.2-4. Data for MOS By System Type

MISSION AREA	SYSTEM TYPE	BASELINE SYSTEM	OPERATOR CMF (s)	MAINTAINER CMF	OPERATOR MOS	MAINTAINER MOS
CLOSE COMBAT LIGHT (INFANTRY)	Vehicles	-				
	-infantry fight veh.	M2	11	27,31,63	11M	27E,41C,43M,45B,45K,45T,63H,
	-antitank vehicles	ITV	11	27,29,31,63	11H	63J,63T,27E,29E,31V,39B,41C,45K,45T,63H
	Man-Portable Weapons	-				-
	-indirect fire (mortars)	81MM	11	63,76	11C	41C,45B,76Y
	-direct fire	-	11	-	-	-
	-grenade launchers	M203	11	76	11B	76Y
	-rifles	M16A1	11	63,76	11B	45B,76Y
	-auto. weapons	M60	11	63,76	11B	45B,76Y
	-antitank	Dragon	11	-	11B	-
CLOSE COMBAT HEAVY (ARMOR)	Tanks	M1	19	29,63	19K	45K,63E,63G,63HL,63J 29E,31V,35E,35H,41CL,45B,45E,45G
	Calvary Fighting vehicles	M3	19	27,29,63,76	19D	27ED,41C,43M,45B,45K,45T
FIRE SUPPORT (FIELD ART)	Missile Artillery	-				
	-med. range missiles	Lance	13	27,29,31,63	13N	15D 27L,63H,63Y
	Tube Artillery	-				
	-towed howitzers	M102	13	63	13B	41C,45L
	-self-pro. howitzers	M109	13	29,31,63	13B	29E,31V,41C,45L,63D,63H
	Rocket Systems	MLRS	13	27,29,31,63	13M	13M,27M,39B,44B,63G,63H,63J,63T
AIR DEFENSE	Forward area A.D. Sys.	-				
	-mobile gun systems	VULCAN	16	27,23,63	16R	24M,27F,41C,45L,52D,63H,63Y
	-man-portable systems	STINGER	16	55	16S	55B
AVIATION	Attack Helicopters	AH-64	NA	28,67	NA	35K,35L,35M,35R,66Y,67Y,68B, 68D,68F,68G,68H
	Cargo Hel.	CH-47	NA	28,67	NA	35K,35L,35M,35R,66Y,67Y,68B,68D 68F,68G,68H
	Utility Hel.	UH-60	NA	28,67	NA	35K,35L,35M,35R,66T,67T,68D,68F, 68G,68H,68J,68M
	Scout Hel.	OH-58	NA	28,67	NA	35K,35L,35M,35R,66V,68B,68D, 68F,68G,68H
COMBAT SERVICE SUPPORT	Transport Vehicles	-				
	-light cargo trucks	M35,M880	88	76,63	88M	43M,63B,63W,63S,63J
	-heavy cargo trucks	M520,M554	88	76,63	88M	43M,63B,63W,63S,63J

Table 4.2-5.

FILE ID: MOS Titles

DESCRIPTION: Lists titles for every MOS in Army as of 1987.

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
1	1	File ID	10	Alpha
2	1	MOS Code	3	Alpha
	2	MOS Title	50	Alpha
	3	MOS CMF	2	Num

ESTIMATED NO. OF TABLES: 1

ESTIMATED NO. OF RECORDS: 350

LENGTH: FIXED

Table 4.2-6. Data for MOS Titles.

Table 1-4 Alphabetical list of MOS by title.		
Title	MOS	CMF
Accounting specialist	73D	71
Administrative specialist	71L	71
Aerial intelligence specialist	96H	96
Aeroscout Observer	93B	93
AH 1 attack helicopter technical inspector	66Y	67
AH 64 attack helicopter repairer	67R	67
AH 64 attack helicopter technical inspector	66R	67
Airbrake repairer (Restive Forces)	66R	66
Aircraft armaments technical inspector	66J	67
Aircraft components repair supervisor	68K	67
Aircraft electrician	68F	67
Aircraft fire control repairer	68J	67
Aircraft maintenance senior sergeant	67Z	67
Aircraft pneudraulics repairer	68H	67
Aircraft powerplant repairer	68B	67
Aircraft powertrain repairer	68D	67
Aircraft structural repairer	68G	67
Aircraft weapon systems repairer	68M	67
Air defense artillery operations and intelligence assistant	16H	16
Air defense artillery senior sergeant	16Z	16
Air defense radar repairer	26H	23
Air traffic control radar controller	93J	93
Air traffic control systems, subsystems and equipment repairer	93D	93
Air traffic control tower operator	93H	93
Ammunition inspector	55X	55
Ammunition specialist	55B	55
Ammunition stock control and accounting specialist	55R	55
Ammunition supervisor	55Z	55
Animal care specialist	91T	91
AN/TSQ 73 air defense artillery command & control system operator/repairer	25L	23
Armament/fire control maintenance supervisor	45Z	63
Armor senior sergeant	19Z	19
Artillery repairer	45L	63
Atomic demolition munitions specialist	12E	12
Attack helicopter repairer	67Y	67
Audio/television specialist	84F	25
Audio/visual chief	25Z	25
Audio/visual equipment repairer	41E	25
Automatic data communications switching center specialist	72G	31
Automatic digital message switch equipment repairer	29H	29
Automatic test equipment operator/maintainer	39B	29
Avionic communication equipment repairer	35L	28
Avionic equipment maintenance supervisor	35P	28
Avionic mechanic	35K	28
Avionic navigation and flight control equipment repairer	35M	28
Avionic special equipment repairer	35R	28
Bands senior sergeant	02Z	97
Baritone or euphonium player	02C	97

Bassoon player	02K	97
Behavioral sciences specialist	91G	91
Biological sciences assistant	01H	91
Biomedical equipment specialist, advanced	35U	91
Biomedical equipment specialist, basic	35G	91
BRADLEY fighting vehicle system mechanic	63T	63
BRADLEY fighting vehicle system turret mechanic	45T	63
Bridge crewmember	12C	12
Broadcast journalist	71R	46
Calibration specialist	35H	29
Cannon crewmember	13B	13
Cannon fire direction specialist	13E	13
Cardiac specialist	91N	91
Cargo specialist	88H	88
Carpentry and masonry specialist	51B	51
Cartographer	81C	81
Cavalry scout	19D	19
CHAPARRAL Crewmember	16P	16
CHAPARRAL/REDEYE repairer	27G	27
CHAPARRAL system mechanic	24N	23
Chaplain Assistant	71M	71
Chemical Operations Sp	54B	54
Clarinet player	02J	97
Club manager	06J	71
College trainee	09C	-
Combat engineer	12B	12
Combat engineering senior sergeant	12Z	12
Combat signaler	31K	31
Command sergeant major	00Z	-
Commissioned officer candidate	09S	-
Communications-electronics maintenance chief	29Z	29
Communications-operations chief	31Z	31
Communications-electronics radio repairer	29E	29
Communications equipment maintenance chief	29X	29
Communications maintenance support chief	29W	29
Communications systems/ circuit controller	32D	31
Communications systems/ circuit control supervisor	31X	31
Communications systems supervisor	31Y	31
Computer/machine operator	74D	74
Computerized Systems Maintenance Chief	39V	29
Counter Signals Intelligence Specialist	97G	96
COMSEC maintenance chief	29P	29
Concrete and asphalt equipment operator	62H	51
Construction engineering supervisor	51H	61
Construction equipment repairer	62B	63
Construction equipment supervisor	62N	51
Construction surveyor	82B	81
Coronet or trumpet player	02B	97
Correctional specialist	95C	95
Counterintelligence agent	97B	96
Counterintelligence/ Human Intelligence Senior Sergeant	97Z	96
Computerized Systems Maintenance Chief	39V	29
Counter Signals Intelligence Specialist	97G	96
Court reporter	71E	71
Crane operator	88F	61
Cytology specialist	92E	91
DAS3 Computer Systems Repairer	39D	29
Data processing NCO	74Z	74
Defense acquisition radar operator	16J	16
Dental laboratory specialist	42D	81
Dental specialist	91E	91
Digital communications equipment repairer	29G	29
Digital equipment maintenance chief	29U	29
Diver	00B	51
Engineer tracked vehicle crewman	12F	12
Ear nose throat specialist	91U	91
Equipment records and parts specialist	76C	76
Electric bass player	02U	97
Electronic equipment maintenance chief	39X	29
Electronic Warfare/ Intercept Aerial Sensor Repairer	33V	33
Electronic Warfare/ Intercept Aviation System Repairer	33R	33
Electronic Warfare/ Intercept Strategic System Analyst and Command and Control Subsystem Repairer	33M	33
Electronic Warfare/ Intercept Strategic Receiving Subsystems Repairer	33P	33
Electronic Warfare/ Intercept Strategic Processing and Storage Subsystems Repairer	33Q	33
Electronic Warfare/ Intercept Tactical System Repairer	33T	33
Electronic Warfare/ Intercept Systems Maintenance Supervisor	33Z	33
Electronic warfare/signal intelligence analyst	98C	96
Electronic warfare/signal intelligence chief	98Z	96
Electronic warfare/signal intelligence emitter identifier/locator	05D	96
Electronic warfare/signal intelligence morse interceptor	05H	96
Electronic warfare/signal intelligence noncommunications interceptor	98J	96
Electronic warfare/signal intelligence non-morse interceptor	05K	96
Electronic warfare/signal intelligence voice interceptor	98G	96
Electronics equipment maintenance chief	39X	29
Executive administrative assistant	71C	71
Explosive ordnance disposal specialist	55D	55
Eye specialist	91Y	91
Fabric repair specialist	43M	76
Field Artillery digital repairer	39L	29
Field artillery firefinder radar operator	13R	13
Field artillery meteorological crewmember	93F	13
Field artillery radar crewmember (Reserve Forces)	17B	13
Field artillery senior sergeant	13Z	13
Field artillery surveyor	82C	13
Field Artillery tactical fire direction repairer	39Y	29
Field COMSEC equipment repairer	29S	29
Fighting vehicle infantryman	11M	11
Finance senior sergeant	73Z	71
Finance specialist	73C	71
Fire control instrument repairer	41C	63
Fire control systems repairer	45G	63
Firefighter	51M	51
Fire support specialist	13F	13
Flood COMSEC equipment repairer	29F	29
Flight operations coordinator	93P	93
Flute or piccolo player	02G	97
Food service specialist	94B	94
Forward area alerting radar repairer	27N	27
French horn player	02D	97

Fuel and electrical systems repairer	63G	63
General construction equipment operator	62J	51
General engineering supervisor	51Z	51
Graves registration specialist	57F	76
Ground controlled approach radar repairer	26D	26
Ground surveillance systems operator	96R	96
Guitar player	02T	97
HAWK continuous wave radar repairer	24K	27
HAWK fire control crew member	16E	16
HAWK fire control mechanic	24E	23
HAWK fire control repairer	24H	27
HAWK firing section mechanic	24C	23
HAWK information coordination central mechanic	24G	23
HAWK launcher/ mechanical systems repairer	24L	27
HAWK maintenance chief	24V	27
HAWK master mechanic	24R	23
HAWK missile crewmember	16D	16
HAWK pulse radar repairer	24J	27
Health physics specialist	91X	91
Heavy antiarmor weapons infantryman	11H	11
Heavy construction equipment operator	62E	51
Heavy lift helicopter repairer	67X	67
Heavy lift helicopter technical inspector	66X	67
Heavy wheel vehicle mechanic	63S	63
Hospital food service specialist	94F	91
IBM automatic data processing systems repairer	39K	29
Illustrator	81E	25
Imagery analyst	96D	96
Indirect fire infantryman	11C	11
Infantryman	11B	11
Infantry Senior SGT	11Z	11
Intelligence analyst	96B	96
Intelligence senior sergeant	96Z	96
Interior electrician	51R	51
Interrogator	97E	96
Journalist	71Q	46
LANCE Crewmember	13N	13
LANCE systems repairer	27L	27
Land combat/ air defense systems maintenance chief	27Z	27
Land combat support system test specialist/ LANCE repairer	27S	27
Laundry and bath specialist	57E	76
Legal specialist	71D	71
Light air defense artillery crewmember (Reserve Forces)	16F	16
Light wheel vehicle mechanic	63B	63
Locomotive electrician (Reserve Forces)	88S	88
Locomotive operator (Reserve Forces)	88U	88
Locomotive repairer (Reserve Forces)	88P	88
Machinist	44E	63
MANPADS crewmember	16S	16
Marine senior sergeant	86Y	86
Material control and accounting specialist	76P	76
Material storage and handling specialist	76V	76
Material quality specialist	51G	51
Mechanical maintenance supervisor	63Z	63
Medical laboratory specialist	92B	91
Medical NCO	91B	91
Medical specialist	91A	91
Medical supply specialist	76J	91
Medium helicopter repairer	67U	67
Medium helicopter technical inspector	66U	67
Metal worker	44B	63
Military police	95B	95
Mobile Subscriber Equipment (MSE) Communications Chief	31W	31
Mobile Subscriber Equipment (MSE) Network Switching Systems Operator	31F	31
Mobile Subscriber Equipment (MSE) Transmission System Operator	31D	31
Motion picture specialist	84C	25
Motor transport operator	88M	88
Multichannel communications equipment operator	31M	31
Multiple launch rocket system/LANCE operation/fire direction specialist	15J	13
Multiple launch rocket system crewmember	13M	13
Multiple launch rocket system repairer	27M	27
M1 ABRAMS armor crewman	19K	19
M1 ABRAMS tank systems mechanic	69E	63
M1 ABRAMS tank turret mechanic	45E	63
M48 M60 armor crewman	19E	19
M60A1/A3 tank system mechanic	63N	63
M60 tank turret mechanic	45N	63
NIKE-HERCULES custodial mechanic	24U	23
Nuclear medicine specialist	91W	91
Nuclear weapons maintenance specialist	55G	55
Oboe player	02H	97
Observation airplane repairer	67H	67
Observation airplane technical inspector	66H	67
Observation/scout helicopter repairer	67V	67
Observation/scout helicopter technical inspector	66V	67
Occupational therapy specialist	91L	91
Office machine repairer	41J	63
Operating room specialist	91D	91
Optical laboratory specialist	42E	91
Orthopedic specialist	91H	91
Orthotic specialist	42C	91
Parachute rigger	43E	76
Patient administration specialist	71G	91
PATRIOT missile crewmember	16T	16
PATRIOT Operator and system mechanic	24T	23
Percussion player	02M	97
PERSHING electrical-mechanical repairer	46N	27
PERSHING electronics materiel specialist	21G	27
PERSHING electronics repairer	21L	27
PERSHING missile crewmember	15E	13
Personnel actions specialist	75E	71
Personnel administration specialist	75B	71
Personnel information system management specialist	75F	71
Personnel management specialist	75C	71
Personnel records specialist	75D	71
Personnel sergeant	75Z	71
Petroleum laboratory specialist	77L	77
Petroleum supply specialist	77F	77
Pharmacy specialist	91Q	91
Photo and layout specialist	83E	81
Physical activity specialist	03C	71
Physical therapy specialist	91F	91
Piano player	02N	97
Plumber	51K	51

Power generation equipment repairer	52D	63
Practical nurse	91C	91
Preventive Medicine Specialist	91S	91
Programmer/analyst	74F	74
Prime power production specialist	52E	51
Printing and bindery specialist	83F	81
Psychiatric specialist	91F	91
Psychological operations specialist	96F	96
Public affairs chief	84Z	46
Quarrying specialist	62G	51
Quartermaster and chemical equipment repairer	63J	63
Radar/special electronic devices maintenance chief	39W	29
Radio/television systems specialist	25T	25
Railway car repairer (Reserve Forces)	88Q	88
Railway movement coordinator (Reserve Forces)	88W	88
Railway section repairer (Reserve Forces)	88T	88
Railway senior sergeant (Reserve Forces)	88X	88
Recruiter (Reserve Forces)	00E	79
Recruiter/retention NCO	00R	79
Reenlistment NCO (Reserve Forces)	79D	79
Remotely piloted vehicle crewmember	13F	13
Reserve Forces reporting code	09T	-
Respiratory specialist	91V	91
ROLAND system crewmember	16G	16
ROLAND system field maintenance test sets repairer	27D	27
ROLAND system mechanic	24S	23
ROLAND system repairer	27C	27
Satellite communications systems repairer	29Y	29
Satellite/microwave communications chief	29T	29
Saxophone player	02L	97
Scout helicopter repairer (NISH)	67S	67
Scout helicopter technical inspector (NISH)	66S	67
Self-propelled field artillery turret mechanic	45D	63
Senior supply sergeant	76Z	76
Simultaneous membership program	09R	-
Single channel radio operator	31C	31
Small arms repairer	45B	63

Special agent	95D	95
Special bandperson	02S	97
Special duty assignment	00D	-
Special electronic devices repairer	39E	29
Special Operations Communications Sergeant	18E	18
Special Operations Engineer Sergeant	18C	18
Special Operations Intelligence Sergeant	18F	18
Special Operations Medical Sergeant	18D	18
Special Operations Senior Sergeant	18Z	18
Special Operations Weapons Sergeant	18B	18
Special purpose equipment repairer	52X	63
Still photographic specialist	84B	26
Strategic microwave systems repairer	29V	29
Subsistence supply specialist	76X	76
Switching Systems Operator	36M	31
Tactical circuit controller	31N	31
Tactical communications chief	31G	31
Tactical computer systems repairer	39T	29
Tactical fire operations specialist	13C	13
Tactical satellite/microwave repairer	29M	29
Tactical satellite/microwave systems operator	31Q	31
Tactical transport helicopter repairer	67T	67
Tactical transport helicopter technical inspector	66T	67
Tactical telecommunications center operator	72E	31
Tank turret repairer	45K	63
Target Acquisition Surveillance Radar Repairer	29C	29
Technical drafting specialist	81B	81
Technical engineering supervisor	51T	51
Telecommunications center operator	72E	31
Telephone central office repairer	29N	29
Teletypewriter equipment repairer	29J	29
Television/radio broadcast operations chief	84T	25
Terrain analyst	81Q	81
Topographic engineering supervisor	81Z	81
Topographic instrument repair specialist	41B	81

Topographic surveyor	82D	81
TOW/DRAGON repairer	27E	27
Track vehicle mechanic	63Y	63
Track vehicle repairer	63H	63
Traffic management coordinator	88N	88
Train crewmember (Reserve Forces)	88V	88
Transmission and distribution specialist	62G	51
Transportable automatic switching systems operator/maintainer	36L	31
Transportation senior sergeant	88Z	88
Trombone player	02E	97
Tuba player	02F	97
Turbine engine driven generator repairer	52F	63
Unit level communications maintainer	31V	31
Unit supply specialist	76Y	76
Utilities equipment repairer	52C	63
Utility/cargo airplane repairer	67G	67
Utility/cargo airplane technical inspector	66G	67
Utility helicopter repairer	67N	67
Utility helicopter technical inspector	66N	67
Veterinary food inspection specialist	91R	91
VULCAN crewmember	16R	16
VULCAN repairer	27F	27
VULCAN system mechanic	24M	23
Warrant officer candidate	09W	-
Watercraft engineer	88L	88
Watercraft operator	88K	88
Water treatment specialist	77W	77
Wheel vehicle repairer	63W	63
Wire systems installer	31L	31
X-ray specialist	91P	91

Table 4.2-7.

FILE ID: MOSs by CMF

DESCRIPTION: For each CMF associated with PCEA system types, this file lists all associated MOSs.

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
1	1	File ID	10	Alpha
	2	CMF Code	2	Num
	3	CMF Title	50	Alpha
2	1	MOS Code 1	3	Alpha

ESTIMATED NO. OF TABLES: 14 (CMF)
ESTIMATED NO. OF RECORDS: 31 (MAXIMUM NO. OF MOSs PER CMF)
LENGTH: VARIABLE

Table 4.2-8. Data for MOSs by CMF.

CMF		MOS
11	Infantry	11B, 11C, 11H, 11M, 11Z
13	Field Artillery	13B, 13C, 13E, 13F, 13M, 13N, 13R, 13T, 13Z, 15E, 15J, 82C, 93F
16	Air Defense Artillery	16D, 16E, 16H, 16J, 16D, 16R, 16S, 16T, 16Z
19	Armor	19D, 19E, 19K, 19Z
23	Air Defense System Maint.	24C, 24G, 24M, 24N, 24R, 24S, 24T, 24U, 25L
27	Land Combat and Air Defense System Int. Maint.	21G, 21L, 24H, 24J, 24K, 24L, 27B, 27E, 27F, 27G, 27L, 27M, 27N, 27Z, 46N
28	Aviation Communication - Electronics System Maint.	35K, 35L, 35M, 35P, 35R
29	Communication - Electronics Maintenance	29E, 29F, 29G, 29H, 29J, 29M, 29N, 29P, 29S, 29T, 29U, 29V, 29W, 29X, 29Y, 29Z, 35H, 39B, 39C, 39D, 39E, 39K, 39L, 39T, 39V, 39W, 39X, 39Y
31	Communication - Electronics Operation	31C, 31D, 31F, 31G, 31K, 31L, 31M, 31N, 31Q, 31V, 31W, 31X, 31Y, 31Z, 32D, 36L, 36M, 72E, 72G
55	Ammunition	55B, 55D, 55G, 55R, 55X, 55Z
63	Mech. Maint.	41C, 41J, 44B, 44E, 45B, 45D, 45E, 45G, 45K, 45L, 45N, 45T, 45Z, 52C, 52D, 52F, 52X, 62B, 63B, 63D, 63E, 63G, 63H, 63J, 63N, 63S, 63T, 63W, 63Y, 63Z
67	Aircraft Maint.	66G, 66H, 66J, 66N, 66R, 66S, 66T, 66U, 66V, 66X, 66Y, 67G, 67H, 67N, 67R, 67S, 67T, 67U, 67V, 67X, 67Y, 67Z, 68B, 68D, 68F, 68G, 68H, 68J, 68K, 68M
76	Supply	43E, 43M, 57E, 57F, 76C, 76J, 76P, 76V, 76X, 76Y, 76Z
88	Transportation	88H, 88K, 88L, 88M, 88N, 88Y, 88Z

Tables 4.2-9.

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Table 4.2-10.

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Table 4.2-11.

FILE ID: Personnel Variables Summary

DESCRIPTION: Lists the personnel characteristics in PCEA, describes the data source where characteristics can be obtained, indicates if variable is derived or used as is, indicates if variable commonly has a level selected by Army, and lists the task taxonomy type commonly associated with the variable.

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
1	1	File ID	10	Alpha
2	1	Char. #	2	Num
		Char. Title	50	Alpha
		Avail on EMF	1	Num
		Avail on ORMF	1	Num
		Other Data Source	10	Alpha
		Char Type	1	Num
		Preselect (Yes/No)	1	Num
		Preselect Level	10	Alpha
		Taxonomy Type	1	Alpha

ESTIMATED NO. OF TABLES: 1

ESTIMATED NO. OF RECORDS: 34 (NUMBER OF PERSONNEL CHARACTERISTICS)

LENGTH: FIXED

Table 4.2-12. Data for Personnel Variables Summary

		1 AVAIL. ON EMF	2 AVAIL. ON ORMF	3 OTHER DATA SOURCE	4 CHAR. TYPE	5 PRE-SELECT LEVEL (YES/NO)	6 PRE-SELECT LEVEL	7 TASK TAXONOMY TYPE
1	ASVAB CL COMPOSITE	Y			PC	YES	BY MOS	COGNITIVE
2	ASVAB CO COMPOSITE	Y			PC	YES	BY MOS	COGNITIVE
3	ASVAB EL COMPOSITE	Y			PC	YES	BY MOS	COGNITIVE
4	ASVAB FA COMPOSITE	Y			PC	YES	BY MOS	COGNITIVE
5	ASVAB GM COMPOSITE	Y			PC	YES	BY MOS	COGNITIVE
6	ASVAB MM COMPOSITE	Y			PC	YES	BY MOS	COGNITIVE
7	ASVAB OF COMPOSITE	Y			PC	YES	BY MOS	COGNITIVE
8	ASVAB SC COMPOSITE	Y			PC	YES	BY MOS	COGNITIVE
9	ASVAB ST COMPOSITE	Y			PC	YES	BY MOS	COGNITIVE
10	ASVAB GT COMPOSITE	Y			PC	YES	BY MOS	COGNITIVE
11	AFQT PERCENTILE SCORE	Y			PC	NO		COGNITIVE
12	AFQT GROUP	Y			PC,TP	YES	CAT IV	COGNITIVE
13	ASVAB QUANT.	N		DERIVED	PC	NO		COGNITIVE
14	ASVAB SPEED	N		DERIVED	PC	NO		COGNITIVE
15	ASVAB TECH.	N		DERIVED	PC	NO		COGNITIVE
16	ASVAB VERBAL	N		DERIVED	PC	NO		COGNITIVE
17	READING GRADE LEVEL	N		DERIVED	PC	NO		COGNITIVE
18	COMP. PERC ACC	N		PROJ. A	PC	NO		PERCEPTUAL
19	COMP. PERC SPEED	N		PROJ. A	PC	NO		PERCEPTUAL
20	NUM. SPEED & ACC	N		PROJ. A	PC	NO		COGNITIVE
21	PSYCHOMOTOR	N		PROJ. A	PC	NO		MOTOR
22	SIMPLE REACTION ACC	N		PROJ. A	PC	NO		COMPLEX PSYCHOMOTOR CONTINUOUS
23	SIMPLE REACTION SPEED	N		PROJ. A	PC	NO		COMPLEX PSYCHOMOTOR CONTINUOUS
24	PULHES-PHYSICAL STAMINA	Y			PC	YES	BY MOS	MOTOR-GROSS MOTOR
25	PULHES-UPPER EXTREMITIES	Y			PC	YES	BY MOS	MOTOR
26	PULHES-LOWER EXTERMITIES	Y			PC	YES	BY MOS	MOTOR
27	PULHES-HEARING	Y			PC	YES	BY MOS	COMMUNICATION PERCEPTUAL SEARCHING NON-VISUAL
28	PULHES-EYES	Y			PC	YES	BY MOS	PERCEPTUAL-SEARCHING-NEAR VISUAL
29	PULHES-EXP. WT. LIFT	Y			PC	YES	BY MOS	PERCEPTUAL-SEARCHING-FAR VISUAL
30	MEPSCAT	Y			PC	YES	BY MOS	ALL
31	SEX	Y			PC,TP	YES	BY MOS	MOTOR-GROSS MOTOR
32	HEIGHT	N	Y		PC	YES	80 INCHES	MOTOR-GROSS MOTOR
33	BLOOD PRESSURE-DIAS.	N	Y		PC	YES	?	MOTOR-GROSS MOTOR
34	AUDITORY PERCEPTION STANDARD	Y			PC	YES	?	MOTOR-GROSS MOTOR
35	HIGH SCHOOL GRAD STATUS	N	N	DERIVED	TP,PC	YES	HS GRAD.	COMMUNICATION,PERCEPTUAL-SEARCHING NON-VISUAL
36	AGE AT ENTRY INTO SERVICE	N		DERIVED	TP	YES	17	COGNITIVE
37	RACIAL/ETHNIC PERCENT CATEGORY	Y			TP	NO		

Table 4.2-13.

FILE ID: Personnel Variables Description

DESCRIPTION: Provides a description of key features of each personnel characteristic.

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
1	1	File ID	10	Alpha
2	1	Short Title	10	Alpha
	2	Char. #	2	Num
	3	Characteristic Type	1	Alpha
	4	Distribution Type	1	Alpha
	5	Preselect (Yes/No)	3	Alpha
	6	Preselect Level	10	Alpha
	7	Minimum Value	6	Num
	8	Maximum Value	6	Num
	9	Cat 1 Title	10	Alpha
	10	Cat 1 Code	1	Num
	11	Cat 2 Title	10	Alpha
	12	Cat 2 Code	1	Num
	13	Cat 3 Title	10	Alpha
	14	Cat 3 Code	1	Num
	15	Cat 4 Title	10	Alpha
	16	Cat 4 Code	1	Num
	17	Cat 5 Title	10	Alpha
	18	Cat 5 Code	1	Num
	19	Cat 6 Title	10	Alpha
	20	Cat 6 Code	1	Num
	21	Data Source	1	Num
	22	Data Source Title	15	Alpha
	23	Data Source Length	3	Num
	24	Relative Position	3	Num
	25	Location	7	Num

ESTIMATED NO. OF TABLES: 1

ESTIMATED NO. OF RECORDS: 34 (NUMBER OF PERSONNEL CHARACTERISTICS)

LENGTH: VARIABLE

Table 4.2-14. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: ASVAB Combat Area Standard Score

SHORT TITLE: CO COMP

VARIABLE #: 2

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL: Varies by MOS

MINIMUM VALUE: 40

MAXIMUM VALUE: 155

CATEGORIES	CODE
85 or Below	1
86-90	2
91-95	3
96-100	4
101-105	5
106+	6

DATA SOURCE DESCRIPTION

__X__ EMF _____ ORMF PROJECT A

TITLE/ID: COSCR

VARIABLE TYPE: Numeric

LENGTH: 3

RELATIVE POSITION: 187

LOCATION: 524-526

Table 4.2-14. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: ASVAB Electronics Area Composite

SHORT TITLE: EL COMP

VARIABLE #: 3

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL: Varies by MOS

MINIMUM VALUE: 40

MAXIMUM VALUE: 155

CATEGORIES	CODE
85 or Less	1
86-90	2
91-95	3
96-100	4
101-105	5
106-110	6
111-115	7
115+	8

DATA SOURCE DESCRIPTION

__X__ EMF _____ ORMF PROJECT A

TITLE/ID: ELSCR

VARIABLE TYPE: Numeric

LENGTH: 3

RELATIVE POSITION: 188

LOCATION: 527-529

Table 4.2-14. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: ASVAB Field Artillery Aptitude Area Score

SHORT TITLE: FA COMP

VARIABLE #: 4

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL: Varies by MOS

MINIMUM VALUE: 40

MAXIMUM VALUE: 155

CATEGORIES	CODE
80 or Less	1
81-85	2
86-90	3
91-95	4
96-100	5

DATA SOURCE DESCRIPTION

__X__ EMF _____ ORMF PROJECT A

TITLE/ID: FASCR

VARIABLE TYPE: Numeric

LENGTH: 3

RELATIVE POSITION: 189

LOCATION: 530-532

Table 4.2-14. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: ASVAB Generic Maintenance Aptitude Area Score

SHORT TITLE: GM COMP

VARIABLE #: 5

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL: Varies by MOS

MINIMUM VALUE: 40

MAXIMUM VALUE: 155

CATEGORIES	CODE
80 or Less	1
81-85	2
86-90	3
91-95	4
96-100	5
100+	6

DATA SOURCE DESCRIPTION

__X__ EMF _____ ORMF PROJECT A

TITLE/ID: GMSCR

VARIABLE TYPE: Numeric

LENGTH: 3

RELATIVE POSITION: 190

LOCATION: 533-535

Table 4.2-14. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: ASVAB Motor Mechanical Aptitude Area Score

SHORT TITLE: MM COMP

VARIABLE #: 6

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL: Varies by MOS

MINIMUM VALUE: 40

MAXIMUM VALUE: 155

CATEGORIES	CODE
85 or Less	1
86-90	2
91-95	3
96-100	4
100+	5

DATA SOURCE DESCRIPTION

_X_ EMF _____ ORMF PROJECT A

TITLE/ID: MMSCR

VARIABLE TYPE: Numeric

LENGTH: 3

RELATIVE POSITION: 191

LOCATION: 536-538

Table 4.2-14. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: ASVAB Food Operations Aptitude Area Score

SHORT TITLE: FO COMP

VARIABLE #: 7

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL: Varies by MOS

MINIMUM VALUE: 40

MAXIMUM VALUE: 155

CATEGORIES	CODE
85 or Less	1
86-90	2
91-95	3
96-100	4
100+	5

DATA SOURCE DESCRIPTION

_X_ EMF _____ ORMF PROJECT A

TITLE/ID: OFSCR

VARIABLE TYPE: Numeric

LENGTH: 3

RELATIVE POSITION: 192

LOCATION: 539-541

Table 4.2-14. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: ASVAB Surveillance & Communications Apt. Area Score

SHORT TITLE: SC COMP

VARIABLE #: 8

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL: Varies by MOS

MINIMUM VALUE: 40

MAXIMUM VALUE: 155

CATEGORIES	CODE
85 or Less	1
86-90	2
91-95	3
96-100	4
100+	5

DATA SOURCE DESCRIPTION

_X_ EMF _____ ORMF PROJECT A

TITLE/ID: SCSCR

VARIABLE TYPE: Numeric

LENGTH: 3

RELATIVE POSITION: 193

LOCATION: 542-544

Table 4.2-14. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: ASVAB Skilled Technical Aptitude Area Score

SHORT TITLE: ST COMP

VARIABLE #: 9

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL: Varies by MOS

MINIMUM VALUE: 40

MAXIMUM VALUE: 155

CATEGORIES	CODE
80 or Less	1
81-85	2
86-90	3
91-95	4
96-100	5
101-105	6
106-110	7
110+	8

DATA SOURCE DESCRIPTION

_X_ EMF _____ ORMF PROJECT A

TITLE/ID: ST SCR

VARIABLE TYPE: Numeric

LENGTH: 3

RELATIVE POSITION: 194

LOCATION: 545-547

Table 4.2-14. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: ASVAB Generic Technical Composite

SHORT TITLE: GT COMP

VARIABLE #: 10

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL: Varies by MOS

MINIMUM VALUE: 40

MAXIMUM VALUE: 155

CATEGORIES	CODE
85 or Less	1
86-90	2
91-95	3
96-100	4
100+	5

DATA SOURCE DESCRIPTION

__X__ EMF _____ ORMF PROJECT A

TITLE/ID: GTSCR

VARIABLE TYPE: Numeric

LENGTH: 3

RELATIVE POSITION: 196

LOCATION: 551-553

Table 4.2-14. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: AFQT Mental Category Group

SHORT TITLE: AFQT Group

VARIABLE #: 12

CHARACTERISTIC TYPE: Personnel Characteristic Transition Type

DISTRIBUTION TYPE: Categorical

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL: NA

MINIMUM VALUE: NA

MAXIMUM VALUE: NA

CATEGORIES	CODE
1	1
2	2
3A	3
3B	4
4A+5	5

DATA SOURCE DESCRIPTION

_X_ EMF _____ ORMF PROJECT A

TITLE/ID: AFQG

VARIABLE TYPE: Alpha

LENGTH: 1

RELATIVE POSITION: 30

LOCATION: 82

Table 4.2-14. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: ASVAB Quantitative

SHORT TITLE: ASVAB Quant.

VARIABLE #: 13

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): No

PRE-SELECT LEVEL: NA

MINIMUM VALUE: 50

MAXIMUM VALUE: 180

CATEGORIES	CODE
74 or Less	1
75-77	2
78-83	3
84-86	4
87+	5

DATA SOURCE DESCRIPTION

_____ EMF _____ ORMF PROJECT A __X__ DERIVED

TITLE/ID:

VARIABLE TYPE:

LENGTH:

RELATIVE POSITION:

LOCATION:

DESCRIPTION: This variable is a composite of ASVAB subtest standardized scores MK and AR where both scores are unit weighed.

Table 4.2-14. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: ASVAB - Speed

SHORT TITLE: ASVAB - Speed

VARIABLE #: 14

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): No

PRE-SELECT LEVEL: NA

PRIORITY FOR SETTING CUT-OFF's

MINIMUM VALUE: 50

MAXIMUM VALUE: 180

CATEGORIES	CODE
70 or Less	1
71-76	2
77-84	3
85-89	4
89+	5

DATA SOURCE DESCRIPTION

_____ EMF _____ ORMF PROJECT A __X__ DERIVED

TITLE/ID:

VARIABLE TYPE:

LENGTH:

RECORD/FIELD:

RELATIVE POSITION:

LOCATION:

DESCRIPTION: This variable is a composite of ASVAB subtest standardized scores CS and ND where both scores are unit weighed.

Table 4.2-14. Data for Personnel Variables Description.

CHARACTERISTIC TITLE:

SHORT TITLE: ASVAB - Technical

VARIABLE #: 15

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): No

PRE-SELECT LEVEL: NA

MINIMUM VALUE: 50

MAXIMUM VALUE: 180

CATEGORIES	CODE
90 or Less	1
91-94	2
95-103	3
104-108	4
109-118	5

DATA SOURCE DESCRIPTION

_____ EMF _____ ORMF PROJECT A __X__ DERIVED

TITLE/ID:

VARIABLE TYPE:

LENGTH:

RELATIVE POSITION:

LOCATION:

DESCRIPTION: This variable is a composite of ASVAB test scores AS, ML. The equation for calculating is as follows: ASVAB = AS + MC + .5 EI

Table 4.2-14. Data for Personnel Variables Description.

CHARACTERISTIC TITLE:

SHORT TITLE: ASVAB - Verbal

VARIABLE #: 16

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): No

PRE-SELECT LEVEL: NA

PRIORITY FOR SETTING CUT-OFF's

MINIMUM VALUE: 50

MAXIMUM VALUE: 180

CATEGORIES	CODE
68 or Less	1
69-71	2
72-78	3
79-83	4
84-92	5

DATA SOURCE DESCRIPTION

_____ EMF _____ ORMF PROJECT A __X__ DERIVED

TITLE/ID:

VARIABLE TYPE:

LENGTH:

RECORD/FIELD:

RELATIVE POSITION:

LOCATION:

DESCRIPTION: This variable is a composite of ASVAB subtest scores AS, VE, and GS where both subtest scores are unit weighted.

Table 4.2-14. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: Reading Grade Level

SHORT TITLE: Reading GR.

VARIABLE #: 17

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): No

PRE-SELECT LEVEL: NA

MINIMUM VALUE: 3.5

MAXIMUM VALUE: 12.7

CATEGORIES	CODE
6.6 or Less	1
6.7-6.9	2
7.-7.5	3
7.6-8.3	4
8.3+	5

DATA SOURCE DESCRIPTION

_____ EMF _____ ORMF __X__ DERIVED _____ PROJECT A

TITLE/ID:

VARIABLE TYPE:

LENGTH:

RELATIVE POSITION:

LOCATION:

DESCRIPTION: This variable is derived from a GT score (Position = 196, location 551-553) using an attached conversion table.

CONVERSION FROM GT SCORES TO READING GRADE LEVEL FOR ASVAB 6/7

Raw Score	GT Score Original Std Score1	GT Score Corrected Std Score2	Converted Grade Level	Raw Score	GT Score Original Std Score1	GT Score Corrected Std Score2	Converted Grade Level
0-5	53	53	3.5	31	106	98	9.0
6	59	53	3.5	32	107	100	9.4
7	59	53	3.5	33	108	102	9.5
8	59	53	3.5	34	109	104	9.8
9	59	53	3.5	35	110	106	10.3
10	59	53	3.5	36	112	108	10.4
11	62	55	3.7	37	113	109	10.5
12	65	60	4.5	38	115	111	10.8
13	69	61	4.6	39	117	112	11.0
14	72	64	5.2	40	118	113	11.1
15	74	65	5.4	41	120	115	11.4
16	76	67	5.6	42	123	116	11.5
17	80	69	5.7	43	125	117	11.6
18	82	71	6.0	44	127	119	11.7
19	84	73	6.3	45	128	121	11.9
20	85	75	6.6	46	130	123	12.1
21	88	77	6.8	47	133	124	12.2
22	90	78	6.9	48	138	126	12.3
23	92	80	7.2	49	141	131	12.6
24	94	82	7.4	50	147	135	12.7
25	96	85	7.7				
26	97	87	7.9				
27	99	89	8.0				
28	100	92	8.3				
29	103	94	8.6				
30	104	96	8.8				

1 Operational Scores of record from 1 Jan 76 thru 30 Sep 80
2 Official Conversion as of 1 Oct 80.

Composite (GT=WK+AR)

Table 4.2-14. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: Project a Complex Perceptual Accuracy

SHORT TITLE: Complex Perc. Acc.

VARIABLE #: 18

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): No

PRE-SELECT LEVEL: NA

MINIMUM VALUE: 60

MAXIMUM VALUE: 195

CATEGORIES	CODE
77 or Less	1
78-87	2
88-112	3
113-126	4
126+	5

DATA SOURCE DESCRIPTION

_____ EMF _____ ORMF __X__ PROJECT A

TITLE/ID: B3CC PAC

VARIABLE TYPE: Numeric

LENGTH: 3

RELATIVE POSITION:

LOCATION:

Table 4.2-14. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: "Project A" Complex Perceptual Speed

SHORT TITLE: Complex Perc SD

VARIABLE #: 19

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): No

PRE-SELECT LEVEL: NA

MINIMUM VALUE: -135.00

MAXIMUM VALUE: 0

CATEGORIES	CODE
-105 or Less	1
-106 to -113	2
-112 to -91	3
-90 to -82	4
-81+	5

DATA SOURCE DESCRIPTION

_____ EMF _____ ORMF __X__ PROJECT A

TITLE/ID: B3CCCPSP

VARIABLE TYPE: Numeric

LENGTH: 3

RECORD/FIELD: NA

LOCATION:

Table 4.2-14. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: Project a Numerical Speed/Accuracy

SHORT TITLE: Num. Speed/Acc

VARIABLE #: 20

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): No

PRE-SELECT LEVEL: NA

MINIMUM VALUE: -305.00

MAXIMUM VALUE: -40.00

CATEGORIES	CODE
-170 or Less	1
-179 to -171	2
-146 to -178	3
-134 to -145	4
-134+	5

DATA SOURCE DESCRIPTION

_____ EMF _____ ORMF __X__ PROJECT A

TITLE/ID: B3CCNMSA

VARIABLE TYPE: Numeric

LENGTH: 3

RELATIVE POSITION:

LOCATION:

Table 4.2-14. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: Project A: Psychomotor

SHORT TITLE: Psychomotor

VARIABLE #: 21

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): No

PRE-SELECT LEVEL: NA

MINIMUM VALUE: -360.00

MAXIMUM VALUE: -95.00

CATEGORIES	CODE
-290 or Less	1
-298 to -289	2
-268 to -297	3
-250 to -267	4
-250+	5

DATA SOURCE DESCRIPTION

_____ EMF _____ ORMF __X__ PROJECT A

TITLE/ID: B3CCPSYM

VARIABLE TYPE: Numeric

LENGTH: 3

RELATIVE POSITION:

LOCATION:

Table 4.2-14. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: Project A: Simple Reaction Accuracy

SHORT TITLE: Simple Reaction Accuracy

VARIABLE #: 22

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): No

PRE-SELECT LEVEL: NA

MINIMUM VALUE: 20

MAXIMUM VALUE: 110

CATEGORIES	CODE
35 or Less	1
36-38	2
39-76	3
77-87	4
88-98	5

DATA SOURCE DESCRIPTION

_____ EMF _____ ORMF __X__ PROJECT A

TITLE/ID: B3CCSRAC

VARIABLE TYPE: Numeric

LENGTH: 3

RELATIVE POSITION:

LOCATION:

Table 4.2-14. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: Project A: Simple Reaction Speed

SHORT TITLE: Simp React SPD

VARIABLE #: 23

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): No

PRE-SELECT LEVEL: NA

MINIMUM VALUE: -210.00

MAXIMUM VALUE: 20.00

CATEGORIES	CODE
-65 or Less	1
-58 to -64	2
-22 to -57	3
-13 to -21	4
-13+	5

DATA SOURCE DESCRIPTION

_____ EMF _____ ORMF __X__ PROJECT A

TITLE/ID: B3CCSRSP

VARIABLE TYPE: Numeric

LENGTH: 3

RELATIVE POSITION:

LOCATION:

Table 4.2-14. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: PULHES - Physical Stamina

SHORT TITLE: P - STAMINA

VARIABLE #: 24

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Categorical

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL: Varies by MOS

MINIMUM VALUE: NA

MAXIMUM VALUE: NA

CATEGORIES	CODE
1 - No Limitations	1
2 - No Significant Limitations	2
3 - Has Significant Limitations	3
4 - Below Prescribed Criteria for Retention	4

DATA SOURCE DESCRIPTION

_X_ EMF _____ ORMF _____ PROJECT A

TITLE/ID: PHYCA (1st Character)

VARIABLE TYPE: Numeric

LENGTH: 1

RELATIVE POSITION: 5

LOCATION: 72

Table 4.2-14. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: PULHES - Upper Extremities

SHORT TITLE: P - UPPER

VARIABLE #: 25

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Categorical

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL: Varies by MOS

MINIMUM VALUE: NA

MAXIMUM VALUE: NA

CATEGORIES	CODE
1- No Limitations	1
2- No Significant Limitations	2
3- Has Significant Limitations	3
4- Below Prescribed Criteria for Retention	4

DATA SOURCE DESCRIPTION

_X_ EMF _____ ORMF _____ PROJECT A

TITLE/ID: PHYCA (3rd Character)

VARIABLE TYPE: Numeric

LENGTH: 1

RELATIVE POSITION: 5

LOCATION: 74

Table 4.2-14. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: PULHES - Lower Extremities

SHORT TITLE: P - LOWER

VARIABLE #: 26

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Categorical

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL: Varies by MOS

MINIMUM VALUE: NA

MAXIMUM VALUE: NA

CATEGORIES	CODE
1- No Limitations	1
2- No Significant Limitations	2
3- Has Significant Limitations	3
4- Below Prescribed Criteria for Retention	4

DATA SOURCE DESCRIPTION

_X_ EMF _____ ORMF _____ PROJECT A

TITLE/ID: PHYCA (2nd Character)

VARIABLE TYPE: Numeric

LENGTH: 1

RELATIVE POSITION: 5

LOCATION: 73

Table 4.2-14. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: PULHES - Eyes

SHORT TITLE: P - Eyes

VARIABLE #: 27

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Categorical

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL: Varies by MOS

MINIMUM VALUE: NA

MAXIMUM VALUE: NA

CATEGORIES	CODE
1- No Limitations	1
2- No Significant Limitations	2
3- Has Significant Limitations	3
4- Below Prescribed Criteria for Retention	4

DATA SOURCE DESCRIPTION

_X_ EMF _____ ORMF _____ PROJECT A

TITLE/ID: PHYCA (5th Character)

VARIABLE TYPE: Numeric

LENGTH: 1

RELATIVE POSITION: 5

LOCATION: 76

Table 4.2-14. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: PULHES - Hearing

SHORT TITLE: P - Hearing

VARIABLE #: 27

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Categorical

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL: Varies by MOS

MINIMUM VALUE: NA

MAXIMUM VALUE: NA

CATEGORIES	CODE
1- No Limitations	1
2- No Significant Limitations	2
3- Has Significant Limitations	3
4- Below Prescribed Criteria for Retention	4

DATA SOURCE DESCRIPTION

__X__ EMF _____ ORMF _____ PROJECT A

TITLE/ID: PHYCA (4th Character)

VARIABLE TYPE: Numeric

LENGTH: 1

RELATIVE POSITION: 5

LOCATION: 75

Table 4.2-14. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: PULHES - Experiment Weight Lift

SHORT TITLE: P- Wt. Lift

VARIABLE #: 29

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Categorical

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL: Varies by MOS

MINIMUM VALUE: NA

MAXIMUM VALUE: NA

CATEGORIES	CODE
?	?

DATA SOURCE DESCRIPTION

_X_ EMF _____ ORMF _____ PROJECT A

TITLE/ID: PHYCA (6th Character)

VARIABLE TYPE: Numeric

LENGTH: 1

RELATIVE POSITION: 5

LOCATION: 77

Table 4.2-14. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: Military Entrance Physical Stamina Category

SHORT TITLE: MEPSCAT

VARIABLE #: 30

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Categorical

PRE-SELECTION LEVEL (Yes/No): no

PRE-SELECT LEVEL: NA

MINIMUM VALUE: NA

MAXIMUM VALUE: NA

CATEGORIES	CODE
?	?

DATA SOURCE DESCRIPTION

_X_ EMF _____ ORMF _____ PROJECT A

TITLE/ID: XPACT

VARIABLE TYPE: Alpha

LENGTH: 1

RELATIVE POSITION: 26

LOCATION: 78

Table 4.2-14. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: Height

SHORT TITLE: HEIGHT

VARIABLE #: 32

CHARACTERISTIC TYPE: Personnel Characteristics

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL:

PRIORITY FOR SETTING CUT-OFF's

MINIMUM VALUE: 54

MAXIMUM VALUE: 80

CATEGORIES	CODE
56	1
60	2
64	3

DATA SOURCE DESCRIPTION

_____ EMF __X__ ORMF _____ PROJECT A

TITLE/ID:

VARIABLE TYPE: Numeric

LENGTH:

RECORD/FIELD:

RELATIVE POSITION: 276-277

LOCATION:

DESCRIPTION: Describes Height in Inches

Table 4.2-14. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: Blood Pressure - Diastolic

SHORT TITLE: DIA BLOOD PR

VARIABLE #: 33

CHARACTERISTIC TYPE: Personnel Characteristics

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL: NA

PRIORITY FOR SETTING CUT-OFF's

MINIMUM VALUE: 40

MAXIMUM VALUE: 110

CATEGORIES	CODE
45 or Below	1
46-60	2
61-75	3
76-90	4
90+	5

DATA SOURCE DESCRIPTION

_____ EMF __X__ ORMF _____ PROJECT A

TITLE/ID:

VARIABLE TYPE:

LENGTH:

RECORD/FIELD:

RELATIVE POSITION: 284-286

LOCATION:

Table 4.2-14. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: Auditory Perception Standard Score

SHORT TITLE: AUDIO PERC

VARIABLE #: 34

CHARACTERISTIC TYPE: Personnel Characteristics

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL: NA

PRIORITY FOR SETTING CUT-OFF's

MINIMUM VALUE: ?

MAXIMUM VALUE: ?

CATEGORIES	CODE
?	

DATA SOURCE DESCRIPTION

_X_ EMF _____ ORMF _____ PROJECT A

TITLE/ID: APSCR

VARIABLE TYPE: Numeric

LENGTH: 3

RECORD/FIELD: NA

RELATIVE POSITION: 195

LOCATION: 548-550

Table 4.2-14. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: High School Graduation Status

SHORT TITLE: HS GRAD

VARIABLE #: 35

CHARACTERISTIC TYPE: Personnel Char, Transition Predictor

DISTRIBUTION TYPE: Categorical

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL: HS (1)

PRIORITY FOR SETTING CUT-OFF's

MINIMUM VALUE: 0

MAXIMUM VALUE: 1

CATEGORIES	CODE
No High School Grad	1
High School Grad	0

DATA SOURCE DESCRIPTION

_X_ EMF _____ ORMF _X_ DERIVED PROJECT A

TITLE/ID: Education Certification

VARIABLE TYPE: Alpha
LENGTH: 1
RECORD/FIELD: NA
RELATIVE POSITION: 195
LOCATION: 548-550

DESCRIPTION: This variable is derived from EMF variable titled "Civilian Education Level" (CIVED Position = 22, Location = 67)

EDUCATION CERTIFICATION	HIGH SCHOOL DEGREE STATUS
D - Associates Degree	High School Graduate
K - Bachelor	
2 - HS Diploma	
3 - HS Equiv	
1 - No HS Diploma	Non-High School Grad.
6 - Compl No Diploma	
Other	

Table 4.2-14. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: Age at Entry

SHORT TITLE: AGE

VARIABLE #: 36

CHARACTERISTIC TYPE: Personnel Char.,Transition Pred.

DISTRIBUTION TYPE: Categorical

PRE-SELECTION LEVEL (Yes/No): No

PRE-SELECT LEVEL:

PRIORITY FOR SETTING CUT-OFF's

MINIMUM VALUE: 17

MAXIMUM VALUE: 65

CATEGORIES	CODE
17-21	1
21-25	2
25-30	3
30-35	4
35 and over	5

DATA SOURCE DESCRIPTION

_____ EMF _____ ORMF __X__ DERIVED PROJECT A

TITLE/ID:

VARIABLE TYPE:

LENGTH:

RECORD/FIELD:

DESCRIPTION: This variable is derived from the date of birth field on the EMF (Relative position = 43, location 123-128). The date of birth is subtracted from the entry date to obtain age at entry. Age is then assigned to the categories described above.

Table 4.2-14. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: Racial/Ethnic Descent Categories

SHORT TITLE: Racial/Eth Grp

VARIABLE #: 37

CHARACTERISTIC TYPE: Transition Predictor

DISTRIBUTION TYPE: Categorical

PRE-SELECTION LEVEL (Yes/No): No

PRE-SELECT LEVEL:

PRIORITY FOR SETTING CUT-OFF's

MINIMUM VALUE: NA

MAXIMUM VALUE: NA

CATEGORIES	CODE
White	1
Black	2
Hispanic	3
Other	4

DATA SOURCE DESCRIPTION

_X_ EMF _____ ORMF _____ PROJECT A

TITLE/ID: REDCAT

VARIABLE TYPE: Alpha

LENGTH: 1

RECORD/FIELD:

RELATIVE POSITION: 10

LOCATION: 45

Table 4.2-15.

FILE ID: Projected Accessions Descriptions

DESCRIPTION: This file lists the number of male 17-21 years old with positive propensity to enlist in various subpopulations defined by AFQT Category and High School Degree status. Data are presented for years 1987 to 1995. Data are taken from an ARI MPRL Research product by Verdugo and Nord (1987).

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
1	1	File ID	10	Alpha
	2	Year	4	Num
2	1	Subpopulation Code	1	Alpha
	2	# in Subpopulation	6	Num

ESTIMATED NO. OF TABLES: 9 (NUMBER OF YEARS IN STUDY)

ESTIMATED NO. OF RECORDS: 1

LENGTH: FIXED

Table 4.2-16. Data for Projected Accessions Description*

	1987	1988	1989	1990	1991	1992	1993	1994	1995
ICAT I-IIIA HSDG	56800	56880	56140	55192	53549	51822	49920	49631	49729
ICAT IIIB HSDG	43838	43792	43294	42763	41742	40630	39378	39131	39082
ICAT IV-V HSDG	135091	135184	134250	133491	131288	128715	125490	125076	125178
ICAT-I-IIIA NONHS	26592	26730	26587	26386	25859	25265	24537	24440	24471
ICAT IIIB NONHS	25556	25704	25561	25365	24916	24411	23805	23850	24026
ICAT IV-V NONHS	221809	222504	221363	220266	216712	212545	207435	206885	207112

Above Data for Male 17-21 years Old

Source: Data Taken From Table B-2.1
Projections of Population with Positive Propensity to Enlist in the Army by Ethnicity**

In Projections of Male Youth Population and Enlistment Propensity by Army Recruiting Battalion: 1980-1995, Naomi Vedugo and Roy Nord.

Table 4.2-17.

FILE ID: Current Cut-Offs by MOS

DESCRIPTION: For each MOS associated with PCEA system types lists current cut-off levels on selected variables as listed in 1987 versions of AR 611-201.

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
1	1	File ID	10	Alpha
2	1	MOS Code	3	Alpha
	2	CMF Code	2	Num
	3	Male Only	3	Alpha
	4	ASVAB Composite	2	Alpha
	5	ASVAB Comp. Cut-off	3	Num
	6	Pulhes set 1 - Title	5	Alpha
	7	Stamina	1	Num
	8	Upper	1	Num
	9	Lower	1	Num
	10	Hearing	1	Num
	11	Eyes	1	Num
	12	Psychiatric	1	Num
	13	Pulhes Set 2 - Title	5	Alpha
	14	Stamina	1	Num
	15	Upper	1	Num
	16	Lower	1	Num
	17	Hearing	1	Num
	18	Eyes	1	Num
	19	Psychiatric	1	Num
	20	MEPSCAT Rating	10	Alpha
	21	Color Vision	15	Alpha
	22	Vision	30	Alpha
	23	Peak Paygrade	1	Num

ESTIMATED NO. OF TABLES: 1

ESTIMATED NO. OF RECORDS: 200

LENGTH: VARIABLE

Table 4.2-18 Data For Current Cut-Offs By MOS

MOS	CMF	MALE ONLY (YES/NO)	RELEVANT ASVAB COMPOSITE	ASVAB COMPOSITE CUT-OFF	PULHES						MEPSCAT PHYSICAL DEMANDS RATING	COLOR VISION	VISION	PEAK PAYGRADE	CAPPER MOS (Y/N)
					STAMINA	UPPER	LOWER	HEARING	EYES	PSYCH.					
11B	INFANTRY	YES	CO	90	1	1	1	2	2	1	VERY HEAVY	RED/GREEN	20/20 - 20/100	SP4-E4	
11C	INFANTRY	YES	CO	90	1	1	1	2	2	1	VERY HEAVY	RED/GREEN	20/20 - 20/100	PFC-E3	
11H	INFANTRY	YES	CO	90	1	1	1	2	2	1	VERY HEAVY	RED/GREEN	20/20 - 20/100	SP4-E4	
11M	INFANTRY	YES	CO	90	1	1	1	2	2	1	VERY HEAVY	RED/GREEN	20/20 - 20/100	PFC-E3	
11Z	INFANTRY	YES	CO	90	2	2	2	2	2	1	N/A	RED/GREEN	NOT LISTED	SGM-E9	
13B	FIELD ARTILLERY	YES	FA	85	2	2	2	2	2	1	VERY HEAVY	RED/GREEN	NOT LISTED	SP4-E4	
13C	FIELD ARTILLERY	YES	ST	95	2	2	2	2	2	1	MODERATELY HEAVY	RED/GREEN	NOT LISTED	SP4-E4	
13E	FIELD ARTILLERY	YES	FA	95	2	2	2	2	2	1	MODERATELY HEAVY	RED/GREEN		SP4-E4	
13F	FIELD ARTILLERY	YES	FA	100	1	1	1	1	1	1	VERY HEAVY	NORMAL		PFC-E3	
13M	FIELD ARTILLERY	YES	OF	105	2	2	2	2	2	1	MODERATELY HEAVY	RED/GREEN		SP4-E4	
13N	FIELD ARTILLERY	NO	OF	100	2	2	2	2	2	1	VERY HEAVY	RED/GREEN		SP4-E4	
13R	FIELD ARTILLERY	YES	SC	100	2	2	2	2	2	1	VERY HEAVY	NORMAL		SP4-E4	
13T	FIELD ARTILLERY	NO	SC		2	2	2	2	2	1	HEAVY	NORMAL		PFC-E3	
13Z	FIELD ARTILLERY	NO		E9 CAPPER	2	2	2	2	2	1	N/A	RED/GREEN		MSG-E8	
15D	RECINDED														
15E	FIELD ARTILLERY	NO	OF	100	2	2	2	2	2	1	MODERATELY HEAVY	RED/GREEN		SFC-E7	
15J	FIELD ARTILLERY	YES	FA	100	2	2	2	2	2	1	VERY HEAVY	RED/GREEN		PFC-E3	
82C	FIELD ARTILLERY	YES	ST	95	2	1	1	2	1	1	VERY HEAVY	NORMAL		PFC-E3	
93F	FIELD ARTILLERY	NO	EL	95	2	2	2	2	2	1	VERY HEAVY	NORMAL		SP4-E4	
16D	AIR DEF. ARTILLERY	NO	OF	100	2	2	2	2	2	1	VERY HEAVY	RED/GREEN		SGT-E5	
16E	AIR DEF. ARTILLERY	NO	OF	100	2	2	2	2	2	1	VERY HEAVY	RED/GREEN		SSG-E6	
16H	AIR DEF. ARTILLERY	NO	OF	100	2	2	2	2	2	1	MEDIUM	RED/GREEN		SGT-E5	
16J	AIR DEF ARTILLERY	YES	OF	100	2	2	2	2	2	1	MEDIUM	RED/GREEN		PFC-E3	
16L	AIR DEF ARTILLERY	NO													
16P	AIR DEF ARTILLERY	YES	OF	100	2	2	2	2	2	1	MODERATELY HEAVY	RED/GREEN		SSG-E6	
16R	AIR DEF ARTILLERY	YES	OF	100	2	2	2	2	2	1	VERY HEAVY	RED/GREEN		SGT-E5	
16S	AIR DEF ARTILLERY	YES	OF	90	1	1	1	2	1	1	MODERATELY HEAVY	NORMAL	20/20 w/out multi-focal lenses	SGT-E5	
16T	AIR DEF ARTILLERY	NO	OF	100	2	2	2	2	2	1	MODERATELY HEAVY	NORMAL		SGT-E5	
16Z	AIR DEF. ARTILLERY	NO	OF	E8 - E9 CAPPER	2	2	2	2	2	1	N/A	RED/GREEN		SGM-E9	

MOS	CMF	MALE ONLY (YES/NO)	RELEVANT ASVAB COMPOSITE	ASVAB COMPOSITE CUT-OFF	PULHES						MEPSCAT PHYSICAL DEMANDS RATING	COLOR VISION	VISION	PEAK PAYGRADE
					P STAMINA	U UPPER	L LOWER	H HEARING	E EYES	S PSYCH.				
19D	ARMOR	YES	CO	90	1	1	1	1	2	1	VERY HEAVY	NORMAL	20/20 - 20/100	SSG-E6
19E	ARMOR	YES	CO	90	1	1	1	1	2	1	VERY HEAVY	NORMAL	20/20 - 20/100	SGT-E5
19K	ARMOR	YES	CO	90	1	1	1	1	2	1	VERY HEAVY	NORMAL	20/20 - 20/100	SGT-E5
19Z	ARMOR	YES	CO	E8 + E9 CAPPER	2	2	2	2	2	1	N/A	RED / GREEN		MSG-E8
24C	AIR DEFENSE SYSTEM MAINT.	NO	EL	110	2	2	2	2	2	1	HEAVY	NORMAL		SP4-E4
24G	AIR DEFENSE SYSTEM MAINT	NO	EL	110	2	2	2	2	2	1	VERY HEAVY	NORMAL		SP4-E4
24M	AIR DEFENSE SYSTEM MAINT	YES	EL	110	2	2	2	2	2	1	VERY HEAVY	NORMAL		SGT-E5
24N	AIR DEFENSE SYSTEM MAINT	YES	EL	110	2	2	2	2	2	1	VERY HEAVY	NORMAL		SGT-E5
24R	AIR DEFENSE SYSTEM MAINT	NO	EL	E7 CAPPER	2	2	2	2	2	1	N/A	NORMAL		SFC-E7
24S	AIR DEFENSE SYSTEM MAINT	YES	EL		2	2	2	2	2	1	MODERATELY HEAVY	NORMAL	NEAR + FAR VISUAL ACUITY CORRECTABLE TO 20/20 W/ NORMAL DEPTH PERCEPTION	
24T	AIR DEFENSE SYSTEM MAINT	NO	mm	105	2	2	2	2	2	1	MEDIUM	NORMAL		SP4-E4
24U	AIR DEFENSE SYSTEM MAINT	NO	EL	110	2	2	2	2	2	1	VERY HEAVY PDA BY USADA APPROVAL DESIRED	(APFT-MPDA-SS)		SP4-E4
24W	RECINDED													
25L	AIR DEFENSE SYSTEM MAINT	NO	EL	95	2	2	2	2	2	1	MODERATELY HEAVY	NORMAL		SSG-E6
21G	LAND COMBAT + AIR DEF. SYSTEM INT MAINT.	NO	EL	95	2	2	2	2	2	1	VERY HEAVY	NORMAL		SGT-E6
21L	LAND COMBAT + AIR DEF. SYSTEM INT MAINT	NO	EL	110	2	2	2	2	2	1	VERY HEAVY	NORMAL		SP4-E4
24H	LAND COMBAT + AIR DEF SYSTEM INT MAINT	NO	EL	110	2	2	2	2	2	1	MEDIUM	NORMAL		SGT-E5
24J	LAND COMBAT + AIR DEF SYSTEM INT MAINT	NO	EL	110	2	2	2	2	2	1	MEDIUM	NORMAL		SGT-E5
24K	LAND COMBAT + AIR DEF SYSTEM INT MAINT	NO	EL	110	2	2	2	2	2	1	MEDIUM	NORMAL		SGT-E5
24L	LAND COMBAT + AIR DEF SYSTEM INT. MAINT	NO	EL	95	2	2	2	2	2	1	MODERATELY HEAVY	NORMAL		SGT-E5
24V	LAND COMBAT + AIR DEF SYSTEM INT MAINT	NO	EL	E7+E8 RESERVES ONLY	2	2	3	2	2	1	N/A	NORMAL		SFC-E7
27B	LAND COMBAT + AIR DEF SYSTEM INT MAINT	NO	EL	95	2	2	2	2	2	1	MODERATELY HEAVY	NORMAL		SP4-E4
27C	LAND COMBAT + AIR DEF SYSTEM INT. MAINT	YES	EL	E7+E8 RESERVES ONLY	2	2	2	2	2	1	HAS NOT BEEN DETERMINED	NORMAL		SP4-E4
27E	LAND COMBAT + AIR DEF SYSTEM INT MAINT	NO	EL	95	2	2	2	2	2	1	VERY HEAVY	NORMAL		SP4-E4
27F	LAND COMBAT + AIR DEF SYSTEM INT MAINT	NO	EL	100	2	2	2	2	2	1	VERY HEAVY	NORMAL		SGT-E5
27G	LAND COMBAT + AIR DEF SYSTEM INT MAINT	NO	EL	95	2	2	2	2	2	1	VERY HEAVY	NORMAL		SGT-E5
27L	LAND COMBAT + AIR DEF SYSTEM INT MAINT	NO	EL	95	2	2	2	2	2	1	VERY HEAVY	NORMAL		SP4-E4
27M	LAND COMBAT + AIR DEF SYSTEM INT MAINT	NO	EL	95	2	2	2	2	2	1	MODERATELY HEAVY	NORMAL		SP4-E4
27N	LAND COMBAT + AIR DEF SYSTEM INT MAINT	NO	EL	110	2	2	2	2	2	1	VERY HEAVY	NORMAL		SGT-E5
27P	RECINDED													

MOS	CMF	MALE ONLY (YES/NO)	RELEVANT ASVAB COMPOSITE	ASVAB COMPOSITE CUT-OFF	PULHES						MEPSCAT PHYSICAL DEMAND RATING	COLOR VISION	VISION	PEAK PAYGRADE
					STAMINA	UPPER	LOWER	HEARING	EYES	PSYCH.				
27Z	LAND COMBAT + AIR DEF. SYSTEM INT. MAINT.	NO	EL	EB + EA CAPPER	2	2	3	2	2	1	N/A	NORMAL		SGM - E9
46N	LAND COMBAT + AIR DEF. SYSTEM INT. MAINT.	NO	EL	105	2	2	2	2	2	1	VERY HEAVY	NORMAL		SGT - E5
35K	AVIATION COMM. ELEC. SYSTEM MAINT.	NO	EL	95	2	2	2	2	2	1	VERY HEAVY	NORMAL		PFC - E3
35L	AVIATION COMM. ELEC. SYSTEM MAINT.	NO	EL	100	2	2	2	2	2	1	HEAVY	NORMAL		PFC - E3
35M	AVIATION COMM. ELECTRONICS SYS. MAINT	NO	EL	100	2	2	2	2	2	1	MEDIUM	NORMAL		SP4 - E4
35P	AVIATION COMMUNICATION ELECTRONICS SYS. MAINT.	NO	EL		3	2	3	2	2	2	N/A	NORMAL		SSG - E6
35R	AVIATION COMMUNICATION ELECTRONICS SYS. MAINT.	NO	EL	100	2	2	2	2	2	1	MODERATELY HEAVY	NORMAL		PFC - E3
29E	COMMUNICATION - ELECTRONICS MAINT.	NO	EL	110	2	2	2	2	2	1	MODERATELY HEAVY	NORMAL		SGT - E5
29F	COMMUNICATION - ELECTRONICS MAINT.	NO	EL	105	2	2	2	1	2	1	MODERATELY HEAVY	NORMAL		SP4 - E4
29G	COMMUNICATION - ELECTRONICS MAINT	NO	EL		2	2	2	2	2	1	MEDIUM	NORMAL		SP4 - E4
29H	COMMUNICATION - ELECTRONICS MAINT	NO	EL	110	2	2	2	2	2	1	MEDIUM	NORMAL		SP4 - E4
29J	COMMUNICATION - ELECTRONICS MAINT.	NO	EL	110	2	2	2	2	2	1	MODERATELY HEAVY	NORMAL		SP4 - E4
29M	COMMUNICATION - ELECTRONICS MAINT	NO	EL	100	2	2	2	2	2	1	MODERATELY HEAVY	NORMAL		SP4 - E4
29N	COMMUNICATION - ELECTRONICS MAINT	NO	EL	100	2	2	2	2	2	1	VERY HEAVY	NORMAL		PFC - E3
29P	COMMUNICATION - ELECTRONICS MAINT.	NO	EL	E7 CAPPER	2	2	2	1	2	1	N/A	NORMAL		SFC - E7
29S	COMMUNICATION - ELECTRONICS MAINT	NO	EL	105	2	2	2	1	2	1	HEAVY	NORMAL		SP4 - E4
29T	COMMUNICATION - ELECTRONICS MAINT	NO	EL		2	2	2	2	2	1	MODERATELY HEAVY	NORMAL		SFC - E7
29U	COMMUNICATION - ELECTRONICS MAINT	NO	EL		2	2	2	2	2	1	N/A	NORMAL		SFC - E7
29V	COMMUNICATION - ELECTRONICS MAINT	NO	EL	110	2	2	2	2	2	1	MEDIUM	NORMAL		SGT - E5
29W	COMMUNICATION - ELECTRONICS MAINT	NO	EL		2	2	2	2	2	1	N/A	NORMAL		SFC - E7
29X	COMMUNICATION - ELECTRONICS MAINT	NO	EL		2	2	2	2	2	1	N/A			MSG - E8
29Y	COMMUNICATION - ELECTRONICS MAINT	NO	EL	120	2	1	2	2	2	1	MODERATELY HEAVY	NORMAL		SP4 - E4
29Z	COMMUNICATION - ELECTRONICS MAINT	NO	EL		2	2	2	2	2	1	N/A			SGM - E9
35H	COMMUNICATION - ELECTRONICS MAINT	NO	EL	120	2	2	2	2	2	1	MODERATELY HEAVY	NORMAL		SGT - E5
39B	COMMUNICATION - ELECTRONICS MAINT	NO	EL	110	2	2	2	2	2	1	MEDIUM	NORMAL		SP4 - E4
39C	COMMUNICATION - ELECTRONICS MAINT	NO	EL		1	1	1	2	2	1	VERY HEAVY	NORMAL		PFC - E3
39D	COMMUNICATION - ELECTRONICS MAINT	NO	EL	110	2	1	2	2	2	1	MODERATELY HEAVY	NORMAL		SGT - E5
39E	COMMUNICATION - ELECTRONICS MAINT	NO	EL	95	2	1	2	2	2	1	MODERATELY HEAVY	NORMAL		PFC - E3
39K	COMMUNICATION - ELECTRONICS MAINT	NO	EL		2	1	2	2	2	1	MODERATELY HEAVY	NORMAL		SP4 - E4
39L	COMMUNICATION - ELECTRONICS MAINT	NO	EL		2	2	2	2	2	1	VERY HEAVY	NORMAL		SP4 - E4

MOS	CMF	MALE ONLY (YES/NO)	RELEVANT ASVAB COMPOSITE	ASVAB COMPOSITE CUT-OFF	PULHES						MEPSCAT PHYSICAL DEMANDS RATING	COLOR VISION	VISION	PEAK PAYGRADE
					STAMINA	UPPER	LOWER	HEARING	EYES	PSYCH.				
39M	RECINDED													
39T	COMMUNICATION-ELECTRONICS MAINT.	NO	EL	110	2	1	2	2	2	1	MODERATELY HEAVY	NORMAL		SP4-E4
39V	COMMUNICATION-ELECTRONICS MAINT	NO	EL		2	2	2	2	2	1	N/A	NORMAL		SFC-E7
39W	COMMUNICATION-ELECTRONICS MAINT	NO	EL		2	2	2	2	2	1	N/A	NORMAL		SFC-E7
39X	COMMUNICATION-ELECTRONICS MAINT	NO	EL		2	2	2	2	2	1	N/A	NORMAL		MSG-E8
39Y	COMMUNICATION-ELECTRONICS MAINT	NO	EL	110	2	2	2	2	2	1	VERY HEAVY	NORMAL		PFC-E3
31C	COMMUNICATION-ELECTRONICS OPERATION	NO	SC	100	1	1	1	2	2	1	VERY HEAVY			SP4-E4
31D	COMMUNICATION-ELECTRONICS OPERATION	NO	EL		1	1	1	2	2	1	HAS NOT BEEN DETERMINED	NORMAL		SP4-E4
31F	COMMUNICATION-ELECTRONICS OPERATION	NO	EL		1	1	1	2	2	1	HAS NOT BEEN DETERMINED	NORMAL		SP4-E4
31G	COMMUNICATION-ELECTRONICS OPERATION	NO	EL		2	2	2	2	2	1	N/A	NORMAL		SFC-E7
31J	RECINDED													
31K	COMMUNICATION-ELECTRONICS OPERATION	NO	EL	90	1	1	1	2	2	1	VERY HEAVY	NORMAL		PFC-E3
31L	COMMUNICATION-ELECTRONICS OPERATION	NO	EL	90	1	1	1	2	2	1	HEAVY	NORMAL		SP4-E4
31M	COMMUNICATION-ELECTRONICS OPERATION	NO	EL	95	1	1	1	2	2	1	VERY HEAVY	NORMAL		SSG-E6
31N	COMMUNICATION-ELECTRONICS OPERATION	NO	EL	95	2	2	2	2	2	1	MEDIUM	NORMAL		SSG-E6
31Q	COMMUNICATION-ELECTRONICS OPERATION	NO	SC	95	1	1	1	2	2	1	VERY HEAVY	NORMAL		SP4-E4
31V	COMMUNICATION-ELECTRONICS OPERATION	NO	EL	95	1	1	1	2	2	1	VERY HEAVY	NORMAL		SGT-E5
31W	COMMUNICATION-ELECTRONICS OPERATION	NO	EL		2	2	2	2	2	1	N/A	NORMAL		SFC-E7
31X	COMMUNICATION-ELECTRONICS OPERATION	NO	SC		2	2	2	2	2	1	N/A	NORMAL		SFC-E7
31Y	COMMUNICATION-ELECTRONICS OPERATION	NO	SC		2	2	2	2	2	1	N/A	NORMAL		SFC-E7
31Z	COMMUNICATION-ELECTRONICS OPERATION	NO	SC	EDTEN CAPPER	2	2	2	2	2	1	N/A	NORMAL		MSG-E8
32D	COMMUNICATION-ELECTRONICS OPERATION	NO	EL	105	2	2	2	2	2	1	MEDIUM	NORMAL		SP4-E4
36L	COMMUNICATION-ELECTRONICS OPERATION	NO	EL	110	2	1	2	2	2	1	MODERATELY HEAVY	NORMAL		SSG-E6
36M	COMMUNICATION-ELECTRONICS OPERATION	NO	EL	100	2	1	2	2	2	1	MODERATELY HEAVY	NORMAL		PFC-E3
72E	COMMUNICATION-ELECTRONICS OPERATION	NO	SC	90	1	1	1	2	2	1	HEAVY	NORMAL		SP4-E4
72G	COMMUNICATION-ELECTRONICS OPERATION	NO	SC	90	2	2	2	2	2	1	LIGHT	NORMAL		SP4-E4
55B	AMMUNITION	NO	GM	95	2	2	2	2	2	1	VERY HEAVY	NORMAL		PFC-E3
55D	AMMUNITION	NO	GM	105	1	1	1	1	2	1	VERY HEAVY	NORMAL		SSG-E6
55G	AMMUNITION	NO	EL	100	2	2	2	2	2	1	VERY HEAVY	NORMAL		PFC-E3
55R	AMMUNITION	NO	ST	100	2	2	2	2	2	1	MEDIUM	NORMAL		SSG-E6

MOS	CMF	MALE ONLY (YES/NO)	RELEVANT ASVAB COMPOSITE	ASVAB COMPOSITE CUT-OFF	PULHES						MEPSCAT PHYSICAL DEMANDS RATING	COLOR VISION	VISION	PEAK PAYGRADE
					STAMINA	UPPER	LOWER	HEARING	EYES	PSYCH.				
55X	AMMUNITION	NO	GM		2	2	2	2	2	1	VERY HEAVY	NORMAL		SSG - E6
55Z	AMMUNITION	NO	GM	E8+E9 CAPPER	3	3	2	2	2	1	N/A	NORMAL		SGM - E9
41C	MECH. MAINT.	NO	GM	95	2	2	2	2	2	2	VERY HEAVY	NORMAL		SP4 - E4
41J	MECH. MAINT.	NO	GM	90	3	2	3	2	2	2	MODERATELY HEAVY	NORMAL		*PFC - E3 (*44B 44E)
44B	MECH. MAINT.	NO	GM	90	2	2	2	2	2	2	VERY HEAVY	NORMAL	NEAR + DISTANCE VISUAL ACUITY 20/30 IN each EYE whether or not corrective lenses are worn *	
44E	MECH. MAINT.	NO	GM	100	2	2	2	2	2	2	HEAVY	NORMAL	Near + distance visual acuity of 20/30 in each eye whether or not corrective lenses are w	
45B	MECH MAINT	NO	GM	90	2	2	2	3	2	2	VERY HEAVY			PFC - E3
45D	MECH MAINT	YES	GM	100	2	2	2	2	2	2	VERY HEAVY	NORMAL		SP4 - E4
45E	MECH MAINT	YES	MM	100	2	2	2	2	2	2	VERY HEAVY	NORMAL		SP4 - E4
45G	MECH MAINT.	NO	EL	95	2	2	2	2	2	2	VERY HEAVY	NORMAL		SGT - E5
45K	MECH MAINT.	NO	GM	100	2	2	2	3	2	2	VERY HEAVY	NORMAL		PFC - E3
45L	MECH MAINT.	NO	GM	100	2	2	2	2	2	1	VERY HEAVY	NORMAL		PFC - E3
45N	MECH MAINT.	YES	MM	100	2	2	2	2	2	2	VERY HEAVY	NORMAL		SP4 - E4
45T	MECH MAINT	YES	GM	95	2	2	2	2	2	2	VERY HEAVY	NORMAL		PFC - E3
45Z	MECH MAINT	NO	GM	E7 CAPPER	2	2	2	2	2	1	N/A	NORMAL		SFC - E7
52C	MECH MAINT.	NO	GM	100	2	2	1	1	2	1	MODERATELY HEAVY	NORMAL		SGT - E5
52D	MECH. MAINT.	NO	GM	100	2	2	1	1	2	1	VERY HEAVY	NORMAL		SGT - E5
52E	MECH. MAINT	NO	GM	100	2	2	1	1	2	1	VERY HEAVY	NORMAL		SP4 - E4
52X	MECH. MAINT	NO			2	2	2	2	2	2	N/A	NORMAL		SFC - E7
62B	MECH. MAINT.	NO	MM	90	2	2	2	2	2	2	VERY HEAVY	NORMAL		SGT - E5
63B	MECH. MAINT.	NO	MM	90	2	2	2	2	2	2	VERY HEAVY	NORMAL		SGT - E5
63D	MECH MAINT.	YES	MM	105	2	2	2	2	2	2	VERY HEAVY	NORMAL		SP4 - E4
63E	MECH MAINT	YES	MM	100	2	2	2	2	2	2	VERY HEAVY	NORMAL		SP4 - E4
63G	MECH. MAINT	NO	MM	105	2	2	2	2	3	2	VERY HEAVY	NORMAL		SP4 - E4
63H	MECH. MAINT.	NO	MM	90	2	2	2	2	3	2	VERY HEAVY	NORMAL		SGT - E5
63J	MECH. MAINT.	NO	MM	90	2	2	2	2	2	2	VERY HEAVY	NORMAL		PFC - E3
63N	MECH MAINT	YES	MM	100	2	2	2	2	2	2	VERY HEAVY	NORMAL		SP4 - E4
63S	MECH. MAINT	NO	MM	105	2	2	2	2	2	2	VERY HEAVY	NORMAL		PFC - E3
63T	MECH. MAINT	YES	MM	105	2	2	2	2	2	2	VERY HEAVY	NORMAL		PFC - E3
63U	MECH MAINT	NO	MM	90	2	2	2	2	3	2	VERY HEAVY	NORMAL		PFC - E3

MOS	CMF	MALE ONLY (YES/NO)	RELEVANT ASVAB COMPOSITE	ASVAB COMPOSITE CUT-OFF	PULHES						MEPSCAT PHYSICAL DEMANDS RATING	COLOR VISION	VISION	PEAK PAYGRADE
					P	U	L	H	E	S				
63Y	MECH. MAINT.	NO	mm	105	2	2	2	2	2	2	VERY HEAVY	NORMAL		PFC-E3
63Z	MECH. MAINT.	NO	mm	E8+E9 CAPPER	3	2	3	2	3	2	N/A			MSG-E8
66G	AIRCRAFT MAINT.	NO	mm		2	2	2	2	1	1	HAS NOT BEEN DETERMINED	NORMAL		SSG-E6
66H	AIRCRAFT MAINT.	NO	mm		2	2	2	2	1	1	HAS NOT BEEN DETERMINED	NORMAL		SSG-E6
66J	AIRCRAFT MAINT.	NO	mm		2	2	2	2	1	1	HAS NOT BEEN DETERMINED	NORMAL		SSG-E6
66N	AIRCRAFT MAINT.	NO	mm		2	2	2	2	1	1	HAS NOT BEEN DETERMINED	NORMAL		SSG-E6
66R	AIRCRAFT MAINT.	NO	mm		2	2	2	2	1	1	HAS NOT BEEN DETERMINED	NORMAL		SSG-E6
66S	AIRCRAFT MAINT.	NO	mm		2	2	2	2	1	1	HAS NOT BEEN DETERMINED	NORMAL		SSG-E6
66T	AIRCRAFT MAINT.	NO	mm		2	2	2	2	1	1	HAS NOT BEEN DETERMINED	NORMAL		SSG-E6
66U	AIRCRAFT MAINT.	NO	mm		2	2	2	2	1	1	HAS NOT BEEN DETERMINED	NORMAL		SSG-E6
66V	AIRCRAFT MAINT.	NO	mm		2	2	2	2	1	1	HAS NOT BEEN DETERMINED	NORMAL		SSG-E6
66X	AIRCRAFT MAINT.	NO	mm		2	2	2	2	1	1	HAS NOT BEEN DETERMINED	NORMAL		SSG-E6
66Y	AIRCRAFT MAINT.	NO	mm		2	2	2	2	1	1	HAS NOT BEEN DETERMINED	NORMAL		SSG-E6
67G	AIRCRAFT MAINT.	NO	mm	105	2/3	2/2	2/3	2/2	1/2	1/2	(E2-E6) (E7) HEAVY	NORMAL		PFC-E3
67H	AIRCRAFT MAINT.	NO	mm	105	2	2	2	2	2	2	VERY HEAVY	NORMAL		PFC-E3
67N	AIRCRAFT MAINT.	NO	mm	105	2	2	2	2	1	1	VERY HEAVY	NORMAL		PFC-E3
67R	AIRCRAFT MAINT.	NO	mm	100	2	2	2	2	1	1	MODERATELY HEAVY	NORMAL		PFC-E3
67S	AIRCRAFT MAINT.	NO	mm	100	2	2	2	2	1	1	HEAVY	NORMAL		PFC-E3
67T	AIRCRAFT MAINT.	NO	mm	105	2/3	2/2	2/3	2/2	1/2	1/2	(E2-E6) VERY HEAVY	NORMAL		PFC-E3
67U	AIRCRAFT MAINT.	NO	mm	105	2/3	2/2	2/3	2/2	1/2	1/2	(E2-E6) VERY HEAVY	NORMAL		PFC-E3
67V	AIRCRAFT MAINT.	NO	mm	105	2	2	2	2	1	1	HEAVY	NORMAL		PFC-E3
67X	AIRCRAFT MAINT.	NO	mm	105	2	2	2	2	1	1	VERY HEAVY	NORMAL		PFC-E3
67Y	AIRCRAFT MAINT	NO	mm	105	2	2	2	2	1	1	VERY HEAVY	NORMAL		PFC-E3
67Z	AIRCRAFT MAINT	NO	mm	CAPPER	3	2	3	2	2	2	N/A			MSG-E8
68B	AIRCRAFT MAINT.	NO	mm	105	2	2	2	2	2	2	VERY HEAVY	NORMAL		
68D	AIRCRAFT MAINT	NO	mm	105	2	2	2	2	2	2	VERY HEAVY	NORMAL		PFC-E3
68F	AIRCRAFT MAINT.	NO	mm	105	2	2	2	2	2	2	VERY HEAVY	NORMAL		SGT-E5
68G	AIRCRAFT MAINT	NO	mm	105	2	2	2	2	2	2	HEAVY	NORMAL		PFC-E3
68H	AIRCRAFT MAINT.	NO	mm	105	2	2	2	2	2	2	HEAVY	NORMAL		PFC-E3
68J	AIRCRAFT MAINT.	NO	mm	100	2/3	2/2	2/3	2/2	2/2	1/1	(E2-E6) VERY HEAVY			PFC-E3

Same as 67 respectively

MOS	CMF	MALE ONLY (YES/NO)	RELEVANT ASVAB COMPOSITE	ASVAB COMPOSITE CUT-OFF	PULHES						MEPSCAT PHYSICAL DEMANDS RATING	COLOR VISION	VISION	PEAK PAYGRADE
					STAMINA	UPPER	LOWER	HEARING	EYES	PSYCH.				
68K	AIRCRAFT MAINT	NO	MM	E4 CAPPER	3	2	3	2	2	2	N/A	NORMAL		SFC - E7
68M	AIRCRAFT MAINT.	NO	MM	100	2	2	2	2	2	1	VERY HEAVY	NORMAL		PFC - E3
43E	SUPPLY	NO	GM	90	1	1	1	1	2	1	VERY HEAVY	NORMAL		SP4 - E4
43M	SUPPLY	NO	GM	85	2	2	2	3	2	3	VERY HEAVY			PFC - E3
57E	SUPPLY	NO	GM	85	2	2	2	2	2	2	VERY HEAVY			PFC - E3
57F	SUPPLY	NO	GM	90	2	2	2	2	2	2	VERY HEAVY			
76C	SUPPLY	NO	CL	95	2	2	2	3	2	2	HEAVY	NORMAL		SGT - E5
76J	SUPPLY	NO	CL	95	2	2	2	3	3	2	MEDIUM	NORMAL		SP4 - E4
76P	SUPPLY	NO	CL	90	2	2	2	2	2	2	HEAVY			SP4 - E4
76V	SUPPLY	NO	CL	90	2	2	2	2	2	2	HEAVY			PFC - E3
76X	SUPPLY	NO	CL	85	2	2	2	3	3	2	VERY HEAVY	NORMAL		PFC - E3
76Y	SUPPLY	NO	CL	95	2	2	2	2	2	2	HEAVY	NORMAL		SP4 - E4
76Z	SUPPLY	NO	CL	CAPPER	3	2	2	3	3	2	N/A			MSG - E8
88H	TRANSPORTATION	NO	GM	90	2	1	1	2	3	2	VERY HEAVY	RED/GREEN		SP4 - E4
88K	TRANSPORTATION	NO	MM	100	2	2	2	2	2	1	VERY HEAVY	NORMAL, based on *	UNCORRECTED ACUITY VISION OF NO MORE THAN 20/200, THAT CORRECTS WITH SPEC. LENSES TO 20/20 - 20/40	
88L	TRANSPORTATION	NO	MM	105	2	2	2	2	2	1	VERY HEAVY	NORMAL, based on *	UNCORRECTED ACUITY VISION OF NO MORE THAN 20/200, THAT CORRECTS WITH SPEC. LENSES TO 20/20 - 20/40	
88M	TRANSPORTATION	NO	OF	90	2	2	2	2	2	2	VERY HEAVY	RED/GREEN		SGT - E5
88N	TRANSPORTATION	NO	CL	100	3	2	3	2	2	3	MODERATELY HEAVY			SP4 - E4
88Y	TRANSPORTATION	NO	MM		3	2	2	3	3	2	N/A			SGM - E9
88Z	TRANSPORTATION	NO	OF		2	2	2	2	2	2	N/A			SGM - E9
44B	MECH MAINT.													PFC - E3
44E	MECH MAINT.													PFC - E3
88L	TRANSPORTATION													SP4 - E4
88K	TRANSPORTATION													SP4 - E4

* ~~as~~ in reading the pseudoisochromatic plate test

Table 4.2-19.

FILE ID: MOS Characteristics Priority File

DESCRIPTION: Lists the recommended priority for setting cut-offs for each CMF included in PCEA.

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
1	1	File ID	10	Alpha
	2	MOS	3	Num
2				
	1	Code	2	Num
	2	# of Priority 1 Char	2	Num
	3	# of Priority 2 Char	2	Num
	4	# of Priority 3 Char	2	Num
	5	# of Priority 4 Char	2	Num
	6	# of Priority 5 Char	2	Num
	7	# of Priority 6 Char	2	Num
	8	# of Priority 7 Char	2	Num
	9	# of Priority 8 Char	2	Num
	10	# of Priority 9 Char	2	Num
	11	# of Priority 10 Char	2	Num
	12	# of Priority 11 Char	2	Num
	13	# of Priority 12 Char	2	Num
	14	# of Priority 13 Char	2	Num
	15	# of Priority 14 Char	2	Num
	16	# of Priority 15 Char	2	Num
	17	# of Priority 16 Char	2	Num
	18	# of Priority 17 Char	2	Num
	19	# of Priority 18 Char	2	Num
	20	# of Priority 19 Char	2	Num
	21	# of Priority 20 Char	2	Num
	22	# of Priority 21 Char	2	Num
	23	# of Priority 22 Char	2	Num
	24	# of Priority 23 Char	2	Num
	25	# of Priority 24 Char	2	Num
	26	# of Priority 25 Char	2	Num

ESTIMATED NO. OF TABLES: 1

ESTIMATED NO. OF RECORDS: 200

LENGTH: FIXED

Table 4.2-20A. Data for CMF Characteristic Priority File

MOS	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
	#31 SEX FOR MALE ONLY MOSs ONLY	#35 HS GRAD STATUS	#12 AFQT GROUP	RELEVANT ASVAB COMPOSITE FOR MOS #1 TO 10																					

Table 4.2-20B. Priority for Transition Predictors

VARIABLE	CATEGORY
1 - Sex	1-Male 2-Female
2 - High School Grad. Status	1-HS Grad. 2-Non-HS Grad.
3 - AFQT Group	1-1 2-2 3-3a 4-3b 5-4+5
4 - Age at Entry	1 17-21 2 21+

Table 4.2-21.

FILE ID: Project A - Product 1 Task Linkages

DESCRIPTION: List project A task types and tasks associated with every functional task associated with a system type.

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
1	1	File ID	10	Alpha
	2	System Type	1	Alpha
2				
	1	Functional Task Title	50	Alpha
	2	Oper. Maintainer Task	1	Alpha
	3	Task Type	1	Num
	4	Project A Task Type	1	Num
	5	MOS	3	Alpha
	6	Project A Task #	5	Alpha

ESTIMATED NO. OF TABLES: 21

ESTIMATED NO. OF RECORDS: VARIES BY SYSTEM TYPE MAXIMUM = 20

LENGTH: VARIABLE

Table 4.2-22.

Data for Project A -

Product 1 Task Linkages

Table 4.2-22.

Table 4.2-22A lists the task taxonomy codes. Table 4.2-22B describes the task taxonomy assignments for the Project A tasks. Table 4.2-22C lists: (a) the task taxonomy assignments for the functional tasks associated with each system type and (b) the Project A tasks assigned to each functional task. In cases where there is no appropriate Project A task type, only the appropriate task taxonomy type is listed. At the present time, it is assumed that functional tasks with an assigned Project A task will have the same task type assignments as the Project A tasks. Both the task taxonomy assignments and the Project A functional task linkages must be validated by subject matter experts during Phase 3.

Table 4.2-22A. Task Taxonomy

WORDS	CODES
I. PERCEPTUAL	
A. Visual	
1. Far Visual	VI-FR
2. Near Visual	VI-NR
a. Non-Verbal	VI-Nr (Non)
b. Verbal	VI-Nr (Ver)
B. Auditory	
1. Sound Perception	Au-So
II. COGNITIVE	
A. Information Processing	
1. Numerical	IP-NOM
2. Verbal Symbolic	IP-VER
B. Problem Solving	
1. Diagnosis/Troubleshooting	PS-DIA
2. Planning	PS-PLAN
3. Selecting/Choosing	PS-SEL
III. MOTOR	
A. Complex Psychomotor	
1. Discrete	CP-DIS
2. Continuous	CP-CON
a. Aiming/Shooting	CP-CON (AIM)
b. Driving	CP-CON (DRI)
c. Piloting	CP-CON (PIL)
d. Tracking/Aligning	CP-CON (TRA)
e. Throwing	CP-CON (THRO)

Table 4.2-22A. Task Taxonomy (Continued)

WORDS	CODES
III. MOTOR	
B. Gross Motor	
1. Heavy	GM-HVY
a. Carrying/Load Bearing	GM-HVY (CAR)
b. Lifting/Loading	GM-HVY (LIF)
c. Torquing/Pulling	GM-HVY (TOR)
2. Light	GM-LITE
IV. SPEECH COMMUNICATION	
1. Face to Face	CM-V
2. Not Face to Face	CM-NF

Table 4.2-22B.

SYSTEM 1 - OPERATIONAL FUNCTIONS FOR INFANTRY FIGHTING VEHICLES

1. PLAN AND PREPARE MISSION

    1. (CMF) Receive/Review Order
    2. (11B-FHL1) Adjust/Boresight Weapon Systems
    3. (11B-FHBB) Adjust/Inspect Other Systems
    4. (11B-FHBB) Enter data onto Onboard Computer(s)
    5. (, 19E-EHD7) Prepare Vehicle/Personnel For NBC Environment

2. EXECUTE MOVEMENT

    1. (19E-EHH1) Start Engine
    2. (11B-FHBB) Check Controls/Instruments
    3. (64C-CHH5) Perform Non-Tactical Movement
    4. (64C-CHH5) Perform Tactical Movement
    5. (64C-CHH5) Perform Water Crossing

3. EXECUTE MANEUVER

    1. (64C-CHD5) Perform Evasive Maneuvers
    2. (64C-CHH5) Move to Cover
    3. (64C-CHH5) Negotiate Obstacles
    4. (CPDIS) Employ Smoke Screen
    5. (64C-CHH5) Move into Firing Position
    6. (64C-CHH5) Move out of Firing Position

4. NAVIGATE

    1. (13B-XHC4) Identify Present Location
    2. (13B-XHC5) Identify Destination
    3. (13B-XHC5) Select Travel Route
    4. (PS-plan) Estimate Time of Arrival and Fuel Requirements
    5. (19E-XHC2) Use instruments (i.e Compass) to Select Correct Heading
    6. (13B-XHC4) Identify Terrain Features

5. COMMUNICATE

    1. (11B-FHE4) Transmit/Receive Messages
    2. (11B-FHBB) Encode/Decode Messages
    3. (31C-GHJ6) Communicate Using Countermeasure Procedures
    4. (31C-GHJ6) Use Counter Measure Procedures
    5. (CM-F, IP-VER) Relay Messages
    6. (PS-SEL) Obtain Line of Signal

Table 4.2-22B. (Continued)

6. ACQUIRE TARGET

1. (11B-FHB9) Search for Target
2. (11B-FHB9) Detect/Locate Target
3. (13B-DH12) Identify Friend or Foe
4. (13B-DHI2) Identify/Locate Sources of Enemy Fire

7. ENGAGE TARGET

1. (PS-SEL) Select Target(s)
2. (PS-SEL) Select Weapon(s) and Ammo
3. (11B-FHBC) Aim/Sight Weapon
4. (11B-FHBC) Track Target
5. (CP-DIS) Fire Weapon
6. (11B-FHBC) Adjust Fire
7. (11B-FHBB) Assess Damage

8. OCCUPY DEFENSIVE POSITION

1. (PS-SEL) Select/Position
2. (19E-EHH3) Camouflage Vehicle
3. (19E-EHH3) Improve Cover
4. (13B-XHC4) Select Reference Points
5. (11B-FHBB) Develop Range Cards
6. (CM-F) Coordinate with Adjacent Vehicles/ Personnel

9. CALL FOR DIRECT SUPPORT

1. (CM-NF) Call for/Adjust Indirect Fire
2. (CM-NF; IP-SPA; VI-FM) Call for/Adjust Illumination/Smoke
3. (CM-NF; IP-SPA; VI-FM) Adjust Tank/Other Fighting Vehicle Fire

Table 4.2-22B. (Continued)

10. TRANSPORT COMBAT TROOPS

    1. (19E-EHH3) Load Troops/Equipment
    2. (19E-EHH3) Secure Troops/Equipment
    3. (19E-EHH3) Unload Troops/Equipment

11. COMPENSATE FOR EQUIPMENT MALFUNCTIONS AND EMERGENCIES

    1. (19E-EHK5) Identify Malfunction
    2. (PS-DIA) Identify Source of Malfunction
    3. (PS-SEL) Compensate For Malfunction/Execute Emergency Procedure
    4. (19E-EHJ2) Evacuate Vehicle (if appropriate)

12. PERFORM POST-MISSION TASKS

    1. (19E-EHH1) Shut Down Engine
    2. (19E-EHH1) Power Down Other Systems
    3. (11B-FHBB) Perform Checks

Table 4.2-22B. (Continued)

SYSTEM 2 - OPERATIONAL FUNCTIONS FOR ANTI-TANK VEHICLES

1. PLAN AND PREPARE MISSION

1. (CM-F) Receive/Review Order
2. (11B-FHL1) Adjust/Boresight Weapon Systems
3. (11B-FHBB) Adjust/Inspect Other Systems
4. (11B-FHBB) Enter data onto Onboard Computer(s)
5. (19E-EHD7) Prepare Vehicle/Personnel For NBC Environment

2. EXECUTE MOVEMENT

1. (19E-EHH1) Start Engine
2. (11B-FHBB) Check Controls/Instruments
3. (64C-CHH5) Perform Non-Tactical Movement
4. (64C-CHH5) Perform Tactical Movement
5. (64C-CHH5) Perform Water Crossing

3. EXECUTE MANEUVER

1. (64C-CHD5) Perform Evasive Maneuvers
2. (64C-CHH5) Move to Cover
3. (64C-CHH5) Negotiate Obstacles
4. (MCPD) Employ Smoke Screen
5. (64C-CHH5) Move into Firing Position
6. (64C-CHH5) Move out of Firing Position

4. NAVIGATE

1. (13B-XHC4) Identify Present Location
2. (13B-XHC5) Identify Destination
3. (13B-XHC5) Select Travel Route
4. (PS-PLAN) Estimate Time of Arrival and Fuel Requirements
5. (19E-XHC2) Use instruments (i.e Compass) to Select Correct Heading
6. (13B-XHC4) Identify Terrain Features

5. COMMUNICATE

1. (11B-FHE4) Transmit/Receive Messages
2. (11B-FHBB) Encode/Decode Messages
3. (31C-GHJ6) Communicate Using Countermeasure Procedures
4. (31C-GHJ6) Use Counter Measure Procedures
5. (CM-F; IP-VER) Relay Messages
6. (PS-SEL) Obtain Line of Signal

Table 4.2-22B. (Continued)

6. ACQUIRE TARGET

1. (11B-FHB9) Search for Target
2. (11B-FHB9) Detect/Locate Target
3. (13B-DH12) Identify Friend or Foe
4. (13B-DHI2) Identify/Locate Sources of Enemy Fire

7. ENGAGE TARGET

1. (PS-SEL) Select Target(s)
2. (PS-SEL) Select Weapon(s) and Ammo
3. (11B-FHBC) Aim/Sight Weapon
4. (11B-FHBC) Track Target
5. (CP-DIS) Fire Weapon
6. (11B-FHBC) Adjust Fire
7. (11B-FHBB) Assess Damage

8. OCCUPY DEFENSIVE POSITION

1. (PS-SEL) Select/Position
2. (19E-EHH3) Camouflage Vehicle
3. (19E-EHH3) Improve Cover
4. (13B-XHC4) Select Reference Points
5. (11B-FHBB) Develop Range Cards
6. (CM-F) Coordinate with Adjacent Vehicles/ Personnel

9. CALL FOR DIRECT SUPPORT

1. (CM-NF;IP-SPA;VI-NR) Call for/Adjust Indirect Fire
2. (CM-NF;IP-SPA;VI-NR) Call for/Adjust Illumination/Smoke
3. (CM-NF;IP-SPA;VI-NR) Adjust Tank/Other Fighting Vehicle Fire

Table 4.2-22B. (Continued)

10. TRANSPORT COMBAT TROOPS

1. (19E-EHH3) Load Troops/Equipment
2. (19E-EHH3) Secure Troops/Equipment
3. (19E-EHH3) Unload Troops/Equipment

11. COMPENSATE FOR EQUIPMENT MALFUNCTIONS AND EMERGENCIES

1. (19E-EHK5) Identify Malfunction
2. (PS-DIA) Identify Source of Malfunction
3. (PS-D/A) Compensate For Malfunction/Execute Emergency Procedure
4. (19E-EHJ2) Evacuate Vehicle (if appropriate)

12. PERFORM POST-MISSION TASKS

1. (19E-EHH1) Shut Down Engine
2. (19E-EHH1) Power Down Other Systems
3. (11B-FHBB) Perform Checks

Table 4.2-22B. (Continued)

SYSTEM 3 - OPERATIONAL FUNCTIONS FOR MAN-PORTABLE ANTI-TANK WEAPONS

1. (CP-DIS-GM LITE) CONDUCT PRE-OPERATIONAL INSPECTION

2. PREPARE WEAPON FOR FIRING

   1. (11B-FHBA) Assemble Round
   2. (11B-FHBA) Mount Tracker

3. GET INTO FIRING POSITION

   1. (PS-SEL) Select Firing Position
   2. (GM-HV4 (CAR)) Get Into Firing Position

4. DETECT/LOCATE TARGETS

   1. (11B-FHG9) Search for Target
   2. (11B-FHG9) Detect/Locate Target
   3. (13B-DHI2) Identify Friend or Foe

5. FIRE WEAPON

   1. (11B-FHBB) Determine Target Range
   2. (PS-SEL) Select Target
   3. (11B-FHBC) Aim/Sight Weapon
   4. (CP-DIS) Fire Weapon
   5. (11B-FHBC) Track Target

6. PERFORM POST FIRING TASKS

   1. (GM-HV4 (CAR)) Get out of firing position
   2. (11B-XHB4) Disassemble Weapon

7. (11B-XHB4) CLEAR RECOVER FROM MISFIRE

Table 4.2-22B. (Continued)

SYSTEM 4 - OPERATIONAL FUNCTIONS FOR RIFLES

1. (CP-DIS; GM(LITE)) CONDUCT PRE-OPERATIONAL INSPECTION

2. PREPARE WEAPON FOR FIRING

   1. (11B-XHB4) Assemble Weapon
   2. (11B-FHL1) Mount Sight
   3. (11B-FHL1) Zero Sight

3. GET INTO FIRING POSITION

   1. (11B-XHB4) Load Weapon
   2. (PS-SEL) Select Type of Fire
   3. (PS-SEL) Select Firing Position
   4. (GM-LITE) Get Into Firing Position

4. DETECT/LOCATE TARGETS

   1. (11B-FHG9) Search for Target
   2. (11B-FHG9) Detect/Locate Target
   3. (VI-FRL) Identify Friend or Foe

5. FIRE WEAPON

   1. (11B-FHBB) Determine Target Range
   2. (PS-SEL) Select Target
   3. (11B-FHBC) Aim/Sight Weapon
   4. (CP-DIS) Fire Weapon
   5. (11B-FHBC) Adjust/Fire
   6. (11B-XHB4) Unload

6. PERFORM POST FIRING TASKS

   1. (GM-LITE) Get out of firing position
   2. (CP-DIS) Perform Post-Operation Checks
   3. (11B-XHB4) Dismount Sight

7. (11B-XHB5) CLEAR RECOVER FROM MISFIRE

Table 4.2-22B. (Continued)

SYSTEM 5 - OPERATIONAL FUNCTIONS FOR GRENADE LAUNCHERS

1. (CP DIS; GM (LITE)) CONDUCT PRE-OPERATIONAL INSPECTION

2. PREPARE WEAPON FOR FIRING

   1. (11B-XHB4) Assemble Weapon
   2. (CP-DIS) Mount Sight
   3. (CP-DIS) Zero Weapon
   4. (11B-FHL1) Zero Sight

3. GET INTO FIRING POSITION

   1. (CP-DIS; GM-LITE) Load Weapon
   2. (PS-SEL) Select Type of Fire
   3. (PS-SEL) Select Firing Position
   4. (GM-LITE; GM HVY (CAR)) Get Into Firing Position

4. DETECT/LOCATE TARGETS

   1. (11B-FHG9) Search for Target
   2. (11B-FHG9) Detect/Locate Target
   3. (13B-DHI2) Identify Friend or Foe

5. FIRE WEAPON

   1. (11B-FHBB) Determine Target Range
   2. (PS-SEL) Select Target
   3. (11B-FHBC) Aim/Sight Weapon
   4. (CP-DIS) Fire Weapon
   5. (11B-FHBC) Adjust/Fire
   6. (11B-XHB4) Unload

6. PERFORM POST FIRING TASKS

   1. (D GM-LITE) Get out of firing position
   2. (D-CP DIS) Perform Post-Operation Checks
   3. (USE 3.2.1) Disassemble Weapon
   4. (CP-DIS) Dismount Sight

7. (11B-XHB5) CLEAR RECOVER FROM MISFIRE

Table 4.2-22B. (Continued)

SYSTEM 6 - OPERATIONAL FUNCTIONS FOR AUTOMATIC WEAPONS

1. (CP-DIS; GN LITE) CONDUCT PRE-OPERATIONAL INSPECTION

2. PREPARE WEAPON POSITION

   1. (PS-SEL) Select Position
   2. (GN-LITE; CP-DIS) Prepare Position
   3. (GN-LITE) Camouflage Position
   4. (11B-FHBB) Prepare Target Range Card
   5. (13B-DHI4) Lay Firing/Aiming Stakes

3. PREPARE WEAPON FOR FIRING

   1. (11B-XHB6) Assemble Weapon
   2. (11B-FHL1) Mount Sight
   3. (CP-DIS) Zero Weapon
   4. (11B-FHL1) Zero Sight

4. GET INTO FIRING POSITION

   1. (11B-XHB5) Load Weapon
   2. (PS-SEL) Select Type of Fire
   3. (PS-SEL) Select Firing Position
   4. (GN-LITE) Get Into Firing Position

5. DETECT/LOCATE TARGETS

   1. (11B-FHG9) Search for Target
   2. (11B-FHG9) Detect/Locate Target
   3. (VI-FQ) Identify Friend or Foe

6. FIRE WEAPON

   1. (95B-BHG8) Determine Target Range
   2. ( ) Select Target
   3. (11B-FHBC) Aim/Sight Weapon
   4. (11B-FHBC) Fire Weapon
   5. (11B-FHBC) Adjust/Fire
   6. (CP-DIS) Unload

7. PERFORM POST FIRING TASKS

   1. (GN-LITE) Get out of firing position
   2. (13B-DHI4) Remove aiming stakes
   3. (CP-DIS) Perform Post-Operation Checks
   4. (CP-DIS) Disassemble Weapon
   5. (CP-DIS) Dismount Sight

8. (11B-XHB5) CLEAR RECOVER FROM MISFIRE

Table 4.2-22B. (Continued)

SYSTEM 7 - OPERATIONAL FUNCTIONS FOR MAN-PORTABLE INDIRECT FIRE INFANTRY WEAPONS (MORTARS)

1. (CP-DIS; GM (LITE)) PERFORM PRE-OPERATIONAL CHECKS

2. PREPARE POSITION

   1. (PS-SEL) Select Position
   2. (GM-HV4 (LIF)) Prepare Position
   3. (GM-HV4 (CAR)) Camouflage Position
   4. (13B-DHI4) Emplace Aiming Posts

3. PREPARE MORTAR FOR FIRING

   1. (CP-DIS) Assemble Mortar
   2. (PS-SEL) Lay Mortar
   3. (11B-FHBA) Boresight Mortar
   4. (CP-DIS; GM LITE) Perform Pre-Fire Checks

4. FIRE MORTAR AT INDIRECT FIRE TARGETS

   1. (CM-NF) Receive Firing Order
   2. (11B-FHBA) Prepare Ammunition for Firing
   3. (CP-DIS; IP-NUM) Set Elevation and Deflection
   4. (CP-DIS) Load Mortar
   5. (CP-DIS) Fire Mortar

5. FIRE MORTAR AT DIRECT FIRE TARGETS

   1. (13B-DHI2) Identify Target
   2. (PS-SEL) Select Target
   3. (CP-DIS) Point Mortar at Target
   4. (CP-DIS) Prepare Ammunition for Firing
   5. (CP-DIS) Load Mortar
   6. (CP-DIS) Aim Mortar
   7. (CP-DIS) Fire Mortar
   8. (CP-DIS) Adjust Fire

6. PERFORM POST-FIRING TASKS

   1. (CP-DIS) Perform Post-Operation Checks
   2. (11B-FHBA) Disassemble Weapon
   3. (13B-DHI4) Displace Aiming Posts

7. (11B-XHB5) CLEAR RECOVER FROM MISFIRE

Table 4.2-22B. (Continued)

SYSTEM 8 - OPERATIONAL FUNCTIONS FOR TANKS

1. PLAN AND PREPARE MISSION

1. (@M-F) Receive/Review Order
2. (19E-EHK1) Adjust/Boresight Weapon Systems
3. (IP, 11B-FHBB) Adjust/Inspect Other Systems
4. (IP, 11B-FHBB) Enter data onto Onboard Computer(s)
5. (IP, 19E-EHD7) Prepare Vehicle/Personnel For NBC Environment

2. EXECUTE MOVEMENT

1. (19E-EHH1) Start Engine
2. (11B-FHBB) Check Controls/Instruments
3. (64C-CHH5) Perform Non-Tactical Movement
4. (64C-CHH5) Perform Tactical Movement
5. (64C-CHH5) Perform Water Crossing

3. EXECUTE MANEUVER

1. (64C-CHD5) Perform Evasive Maneuvers
2. (64C-CHH5) Move to Cover
3. (64C-CHH5) Negotiate Obstacles
4. (MCPD) Employ Smoke Screen
5. (64C-CHH5) Move into Firing Position
6. (64C-CHH5) Move out of Firing Position

4. NAVIGATE

1. (13B-XHC4) Identify Present Location
2. (13B-XHC5) Identify Destination
3. (13B-XHC5) Select Travel Route
4. (PS-Plan) Estimate Time of Arrival and Fuel Requirements
5. (19E-XHC2) Use instruments (i.e Compass) to Select Correct Heading
6. (13B-XHC4) Identify Terrain Features

5. COMMUNICATE

1. (19E-EHE8) Transmit/Receive Messages
2. (19E-EHE6) Encode/Decode Messages
3. (31C-GHJ6) Communicate Using Countermeasure Procedures
4. (31C-GHJ6) Use Counter Measure Procedures
5. (@M-F; IP-VER) Relay Messages
6. (PS-SEL) Obtain Line of Signal

Table 4.2-22B. (Continued)

6. ACQUIRE TARGET

1. (11B-FHB9) Search for Target
2. (11B-FHB9) Detect/Locate Target
3. (13B-DH12) Identify Friend or Foe
4. (13B-DHI2) Identify/Locate Sources of Enemy Fire

7. ENGAGE TARGET

1. (PS-SEL) Select Target(s)
2. (PS-SEL) Select Weapon(s) and Ammo
3. (11B-FHBC) Aim/Sight Weapon
4. (11B-FHBC) Track Target
5. (CP-DIS) Fire Weapon
6. (11B-FHBC) Adjust Fire
7. (11B-FHBB) Assess Damage

8. OCCUPY DEFENSIVE POSITION

1. (PS-SEL) Select/Position
2. (19E-EHH3) Camouflage Vehicle
3. (19E-EHH3) Improve Cover
4. (13B-XHC4) Select Reference Points
5. (11B-FHBB) Develop Range Cards
6. (CM-F) Coordinate with Adjacent Vehicles/ Personnel

9. CALL FOR DIRECT SUPPORT

1. (CM-NF;IP-SPA;VI-FR) Call for/Adjust Indirect Fire
2. (CM-NF;IP-SPA;VI-FR) Call for/Adjust Illumination/Smoke
3. (CM-NF;IP-SPA;VI-FR) Adjust Tank/Other Fighting Vehicle Fire

Table 4.2-22B. (Continued)

10. TRANSPORT COMBAT TROOPS

    1. (19E-EHH3) Load Troops/Equipment
    2. (19E-EHH3) Secure Troops/Equipment
    3. (19E-EHH3) Unload Troops/Equipment

11. COMPENSATE FOR EQUIPMENT MALFUNCTIONS AND EMERGENCIES

    1. (19E-EHK5) Identify Malfunction
    2. (PS-DIA) Identify Source of Malfunction
    3. (PS-SEL) Compensate For Malfunction/Execute Emergency Procedure
    4. (19E-EHJ2) Evacuate Vehicle (if appropriate)

12. PERFORM POST-MISSION TASKS

    1. (19E-EHH1) Shut Down Engine
    2. (19E-EHH1) Power Down Other Systems
    3. (11B-FHBB) Perform Checks

Table 4.2-22B. (Continued)

SYSTEM 9 - OPERATIONAL FUNCTIONS FOR CAVALRY FIGHTING VEHICLES

1. PLAN AND PREPARE MISSION

1. (QM-F) Receive/Review Order
2. (19E-EHK1) Adjust/Boresight Weapon Systems
3. (IP, 11B-FHBB) Adjust/Inspect Other Systems
4. (IP, 11B-FHBB) Enter data onto Onboard Computer(s)
5. (IP, 19E-EHD7) Prepare Vehicle/Personnel For NBC Environment

2. EXECUTE MOVEMENT

1. (19E-EHH1) Start Engine
2. (11B-FHBB) Check Controls/Instruments
3. (64C-CHH5) Perform Non-Tactical Movement
4. (64C-CHH5) Perform Tactical Movement
5. (64C-CHH5) Perform Water Crossing

3. EXECUTE MANEUVER

1. (64C-CHD5) Perform Evasive Maneuvers
2. (64C-CHH5) Move to Cover
3. (64C-CHH5) Negotiate Obstacles
4. (MCPD) Employ Smoke Screen
5. (64C-CHH5) Move into Firing Position
6. (64C-CHH5) Move out of Firing Position

4. NAVIGATE

1. (13B-XHC4) Identify Present Location
2. (13B-XHC5) Identify Destination
3. (13B-XHC5) Select Travel Route
4. ( ) Estimate Time of Arrival and Fuel Requirements
5. (19E-XHC2) Use instruments (i.e Compass) to Select Correct Heading
6. (13B-XHC4) Identify Terrain Features

5. COMMUNICATE

1. (19E-EHE8) Transmit/Receive Messages
2. (19E-EHE6) Encode/Decode Messages
3. (31C-GHJ6) Communicate Using Countermeasure Procedures
4. (31C-GHJ6) Use Counter Measure Procedures
5. (CMF, IP-Ver) Relay Messages
6. ( ) PS-Set) Obtain Line of Signal

Table 4.2-22B. (Continued)

6. ACQUIRE TARGET

1. (11B-FHB9) Search for Target
2. (11B-FHB9) Detect/Locate Target
3. (13B-DH12) Identify Friend or Foe
4. (13B-DHI2) Identify/Locate Sources of Enemy Fire

7. ENGAGE TARGET

1. (PS-SEL) Select Target(s)
2. (PS-SEL) Select Weapon(s) and Ammo
3. (11B-FHBC) Aim/Sight Weapon
4. (11B-FHBC) Track Target
5. (OP-DIS) Fire Weapon
6. (11B-FHBC) Adjust Fire
7. (11B-FHBB) Assess Damage

8. OCCUPY DEFENSIVE POSITION

1. (PS-SEL) Select/Position
2. (19E-EHH3) Camouflage Vehicle
3. (19E-EHH3) Improve Cover
4. (13B-XHC4) Select Reference Points
5. (11B-FHBB) Develop Range Cards
6. (CM-F) Coordinate with Adjacent Vehicles/ Personnel

9. CALL FOR DIRECT SUPPORT

1. (CM-NF; IP-SPA; VI-NR) Call for/Adjust Indirect Fire
2. (CM-NF; IP-SPA; VI-NR) Call for/Adjust Illumination/Smoke
3. (CM-NF; IP-SPA; VI-NR) Adjust Tank/Other Fighting Vehicle Fire

Table 4.2-22B. (Continued)

10. TRANSPORT COMBAT TROOPS

1. (19E-EHH3) Load Troops/Equipment
2. (19E-EHH3) Secure Troops/Equipment
3. (19E-EHH3) Unload Troops/Equipment

11. COMPENSATE FOR EQUIPMENT MALFUNCTIONS AND EMERGENCIES

1. (19E-EHK5) Identify Malfunction
2. (PS-DIA) Identify Source of Malfunction
3. (PS-DEL) Compensate For Malfunction/Execute Emergency Procedure
4. (19E-EHJ2) Evacuate Vehicle (if appropriate)

12. PERFORM POST-MISSION TASKS

1. (19E-EHH1) Shut Down Engine
2. (19E-EHH1) Power Down Other Systems
3. (11B-FHBB) Perform Checks

Table 4.2-22B. (Continued)

SYSTEM 10 - OPERATIONAL FUNCTIONS FOR MEDIUM RANGE MISSILE ARTILLERY SYSTEMS (Assumes Missile is on Self Propelled Launcher)

1. PREPARE FOR MARCH ORDER

    1. (@M-NF) Receive March Order
    2. (CP-DIS; IP (Num)) Receive Weapon from Assembly and Transport Section
    3. (CP-DIS; CP-IP (Near) CM HWY (LIE) (TOR)) Prepare Self-Propelled Launcher (SPL) for Movement
    4. (CP-DIS; C-IP (NUM); IP (Near)) Ensure Firing Point is Surveyed

2. MOVE TO FIRING POINT

    1. (19E-EHH1) Start Engine
    2. (95B-BHH1) Perform Pre-Operational Vehicle Check
    3. (64C-CHH5) Drive SPL

3. NAVIGATE

    1. (13B-XHC4) Identify Present Location
    2. (13B-XHC5) Identify Destination
    3. (13B-XHC5) Select Travel Route
    4. (M PS-PLAN) Estimate Time of Arrival and Fuel Requirements

4. COMMUNICATE

    1. (M CM-NF) Transmit/Receive Messages
    2. (19E-EHE6) Encode/Decode Messages
    3. (19E-EHE6) Communicate Using Countermeasure Procedures

5. EMPLACE SYSTEM

    1. (64C-CHH5) Position SPL Over Launch Stake
    2. (19E-EHH1) Shut Down Vehicle
    3. (IP-NUM; CP-DIS; CM-F) Prepare Vehicle For Firing Mode
    4. (VI-NC (Num); CP-DIS) Inspect Main Missile Assembly (MMA) and Warhead Section (WHS) for Damage
    5. (M-CP-DIS) Release tie down straps, release traverse, and lockpins

6. PREPARE WEAPON FOR FIRING

    1. (CP-DIS; IP (Num); PS (PLAN) Receive Firing Data
    2. (M CP-DIS) Turn on Monitor-Programmer
    3. (19E-EHL2) Conduct self test
    4. (13B-Bor.) Lay/sight weapon
    5. (19E-EHH3) Remove protective covers

Table 4.2-22B. (Continued)

7. FIRE WEAPON

1.	(CP-DIS)	Arm WHS
2.	(CP-DIS (TYPE))	Insert WHS Settings
3.	(13B-Bre.)	Move Firing Device to Firing Pit
4.	(CP-DIS)	Elevate Missile
5.	(CP-DIS)	Place in Launch Position
6.	(CN-F; GN-HVY(LITE))	Clear Area
7.	(CP-DIS)	Fire Missile

8. (CP-DIS) CONDUCT POST FIRING INSPECTIONS

9. EXECUTE FAILURE TO FIRE PROCEDURES

1.	(CP-DIS)	Lower Launcher
2.	(CP-DIS)	Safe the WHS
3.	(CP-DIS)	Disconnect Firing Device
4.	(IP-NOM; CP-DIS)	Reorient Launcher
5.	(19E-XHC2)	Obtain new orientation from remote theodolite

10. COMPENSATE FOR EQUIPMENT MALFUNCTIONS AND EMERGENCIES

1.	(PS-DIA)	Identify Malfunction
2.	(PS-DIA)	Identify Source of Malfunction
3.	(PS-SEL)	Compensate For/Recover From Malfunction

11. PERFORM EMERGENCY DESTRUCTION OF WARHEAD

1.	(CP-DIS (TYPE))	Insert Command Disablement Code
2.	(CP-DIS)	Set shape charge to warhead
3.	(GN-LITE)	Evacuate Area
4.	(CP-DIS)	Destroy warhead
5.	(VI-FIR)	Verify destruction

12. DISPLACE SYSTEM

1.	(CP-DIS)	Secure Launcher
2.	(CP-CH (DRC))	Leave Position

Table 4.2-22B. (Continued)

SYSTEM 11 - OPERATIONAL FUNCTIONS FOR TOWED HOWITZERS

1. PREPARE FOR MARCH ORDER

1. (H-CM-NF) Receive March Order
2. (95B-BHH1) Perform Pre-Operational Checks
3. (CP-DIS) Perform Fire Control Alignment
4. (CP-DIS) Test Gunner's Quadrants

2. DRIVE/MOVE CANNON

1. (64C-CHH5) Drive Vehicle(Non-tactical march)
2. (64C-CHH5) Conduct Tactical March
3. (64C-CHH5) Perform Water Crossing
(if including engineering for a bridge)

3. EMPLACE CANNON

1. (64C-CHH4) Uncouple cannon from vehicle
2. (PS-SEL) Select Position
3. (GM-HVY (LIF)) Prepare Position
4. (13B-Emp.) Emplace/Align Collimator
5. (13B-Emp.) Emplace/Align Aiming Posts

4. DISPLACE CANNON

1. (13B-Emp.) Recover Collimator
2. (13B-Emp.) Recover Aiming Posts
3. (64C-CHH4) Uncouple cannon
4. (64C-CHH5) Leave Position

5. PREPARE CANNON FOR FIRING

1. (CP-DIS) Set Up Aiming Circle
2. (13B-XHC4) Establish Azimuth of the Orienting Line
3. (13B-Lay.) Lay Weapon
4. (CP-DIS) Establish Aiming Points
5. (CP-DIS, IP(NUM) Determine Site to Crest
6. (13B-Bor.) Boresight Weapon/Telescopes
7. (13B-DHI4) Emplace Azimuth Markers
8. (19E-EHL2) Perform Prefire Checks
9. (11B-FHBB) Prepare Range Card

6. FIRE CANNON

1. (CM-NF) Receive Firing Order
2. (GM-HVY(LIF); CP-DIS) Prepare Ammunition for Firing
3. (CP-DIS) Set Elevation and Deflection
4. (GM-HVY (LIF)) Load Cannon
5. (CP-DIS) Fire Cannon
6. (GM-HVY (LIF)) Unload Cannon

Table 4.2-22B. (Continued)

7. FIRE CANNON AT DIRECT FIRE TARGETS

1. (13B-DHI2) Identify Target(s)
2. (PS-SEL) Select Target
3. (11B-FHBB) Determine Target Range
4. (PS-PLAN) Determine Target Lead
5. (PS-SEL) Select Ammunition
6. (GM-HV4(UF);CP-DIS) Load Ammunition
7. (13B-m102) Aim/Sight Weapon
8. (CP-DIS) Fire
9. (GM-HV4(UF);CP-DIS) Unload Cannon

8. NAVIGATE

1. (13B-XHC4) Identify Present Location
2. (13B-XHC5) Identify Destination
3. (13B-XHC5) Plot Travel Route
4. (PS-PLAN) Estimate Time of Arrival and Travel Requirements

9. COMMUNICATE

1. (CM-NF) Transmit/Receive Messages
2. (19E-EHE6) Encode/Decode Messages
3. (19E-EHE6) Communicate Using Countermeasure Procedures

10. DEFEND AGAINST ATTACK

1. (64C-CHH5) Deploy to Cover
2. (64C-CHH5) Evade Threat

11. COMPENSATE FOR EQUIPMENT MALFUNCTIONS AND EMERGENCIES

1. (CP-DIS; GM(HV4)(UF)) Clear Misfire on Cannon

12. CONDUCT POST-MISSION TASKS

1. (VI-NA(VER); IP VER) Complete Forms
2. (VI NA(VER); IP VER) Perform Post-Operation Checks

Table 4.2-22B. (Continued)

SYSTEM 12 - OPERATIONAL FUNCTIONS FOR SELF-PROPELLED HOWITZERS

1. PREPARE FOR MARCH ORDER

1. (MCM-NF) Receive March Order
2. (95B-BHH1) Perform Pre-Operational Checks
3. (CP-DIS) Perform Fire Control Alignment
4. (CP-DIS) Test Gunner's Quadrants
5. (19E-EHD7) Prepare Vehicle/Personnel for NBC Environment

2. DRIVE/MOVE CANNON

1. (64C-CHH5) Drive Vehicle(Non-tactical march)
2. (64C-CHH5) Conduct Tactical March
3. (64C-CHH5) Perform Water Crossing
(if including engineering for a bridge)

3. EMPLACE CANNON

1. (MPS-SEL) Select Position
2. (MGN-HVY(LIF)) Prepare Position
3. (13B-Emp.) Emplace/Align Collimator
4. (13B-DHI4) Emplace/Align Aiming Posts

4. DISPLACE CANNON

1. (13B-Emp.) Recover Collimator
2. (13B-DHI4) Recover Aiming Posts
3. (64C-CHH5) Leave Position

5. PREPARE CANNON FOR FIRING

1. (CP-DIS) Set Up Aiming Circle
2. (13B-XHC4) Establish Azimuth of the Orienting Line
3. (13B-Lay.) Lay Weapon
4. (CP-DIS) Establish Aiming Points
5. (CP-DIS) Determine Site to Crest
6. (13B-Bor.) Boresight Weapon/Telescopes
7. (13B-DHI4) Emplace Azimuth Markers
8. (19E-EHL2) Perform Prefire Checks
9. (11B-FHBB) Prepare Range Card

6. FIRE CANNON

1. (MCM-NF) Receive Firing Order
2. (GM-HVY(LIF);CP-DIS) Prepare Ammunition for Firing
3. (CP-DIS) Set Elevation and Deflection
4. (GM-HVY(LIF)) Load Cannon
5. (CP-DIS) Fire Cannon
6. (GM-HVY(LIF)) Unload Cannon

Table 4.2-22B. (Continued)

7. FIRE CANNON AT DIRECT FIRE TARGETS

1. (13B-DHI2) Identify Target(s)
2. (PS-SEL) Select Target
3. (11B-FHBB) Determine Target Range
4. (PS-PLAN) Determine Target Lead
5. (PS-SEL) Select Ammunition
6. (CM-HVY(LIF);CP-DIS) Load Ammunition
7. (13B-m102) Aim/Sight Weapon
8. (CP-DIS) Fire
9. (CM-HVY (LIF); CP-DIS) Unload Cannon

8. FIRE CREW SERVED WEAPONS

1. (CP-DIS) Load Ammunition
2. (13B-DHI2) Identify Target(s)
3. (PS-SEL) Select Target
4. (11B-FHBB) Determine Target Range
5. (CP-CON(AIM); VI-FIL) Aim/Sight Weapon
6. (CP-DIS) Fire Weapon
7. (CP-CON(AIM)) Adjust Fire
8. (13B-XHB5) Unload Weapon

9. NAVIGATE

1. (13B-XHC4) Identify Present Location
2. (13B-XHC5) Identify Destination
3. (13B-XHC5) Plot Travel Route
4. (PS-PLAN) Estimate Time of Arrival and Travel Requirements

10. COMMUNICATE

1. (CM-NF) Transmit/Receive Messages
2. (19E-EHE6) Encode/Decode Messages
3. (19E-EHE6) Communicate Using Countermeasure Procedures

11. DEFEND AGAINST ATTACK

1. (64C-CHH5) Deploy to Cover
2. (64C-CHH5) Evade Threat

12. COMPENSATE FOR EQUIPMENT MALFUNCTIONS AND EMERGENCIES

1. (PS-DIA) Identify Malfunction
2. (PS-DIA) Identify Source of Malfunction
3. (PS-SEL) Compensate/Recover from Malfunction
4. (19E-EHJ2) Evacuate Vehicle
5. (CP-DIS) Extinguish Fire
6. (13B-XHB7) Clear Misfire on Crew Served Weapon
7. (CP-DIS) Clear Misfire on Cannon

Table 4.2-22B. (Continued)

13. CONDUCT POST-MISSION TASKS

1. (VI-Nr(Ver); IP-Ver) Complete Forms
2. (VI-Nr(Ver); IP-Ver) Perform Post-Operation Checks

Table 4.2-22B. (Continued)

SYSTEM 13 - OPERATIONAL FUNCTIONS FOR ROCKET FIELD ARTILLERY SYSTEMS

-TBD

Table 4.2-22B. (Continued)

SYSTEM 14 - OPERATIONAL FUNCTIONS FOR AIR DEFENSE MOBILE GUN SYSTEM

1. PREPARE FOR MARCH ORDER

    1. (CM-NF) Receive March Order
    2. (CP-DIS-VI-NR(NBN)) Prepare Weapon System for Travel
    3. (31 C - GH#1) Performs Pre-Operational Vehicle Checks
    4. (19E-EHD7) Prepare Vehicle/Personnel for NBC Environment (if personal MOPP is only req's, as in VULCAN)

2. MOVE VEHICLE

    1. (19E-EHH1) Start/Stop Engine
    2. (64C-CHH3) Couple Weapon To Vehicle
    3. (64C-CHH5) Drive Vehicle
    4. (64C-CHH5) Perform Tactical Movement
    5. (64C-CHH5) Perform Water Crossing

3. EMPLACE SYSTEM

    1. (PS-SEL) Select Position
    2. (64C-CHH5) Move Vehicle Onto Position
    3. (19E-EHH5) Camouflage Vehicle

4. PREPARE WEAPON FOR ENGAGEMENT

    1. (PS-SEL; CM-F) Designate Observation and Command Posts Primary Target Lines and Sectors of Search
    2. (CP-DIS; IP(NBN); PS(RAN) Establish Observation and Command Posts
    3. (GN-HV4(LIF); CP-DIS) Emplace/Start Auxiliary Power Unit
    4. (19E-EHL2) Perform Prefire Checks
    5. (PS-SEL) Determine Aiming Points
    6. (CP-DIS) Emplace Target Alert System
    7. (13B-Bor.) Boresight Weapon

5. LOAD/RELOAD WEAPON

    1. (GN-HV4(LIF); CP-DIS) Prepare Ammunition
    2. (11B-FHBA) Prepare Weapon for Firing
    3. (CP-DIS; GN-HV4(LIF)) Load Ammunition

6. ACQUIRE TARGET

    1. (11B-FHG9) Search for Target
    2. (13B-DHI2) Detect/Locate Target
    3. (13B-DHI2) Identify Friend or Foe

Table 4.2-22B. (Continued)

7. ENGAGE AIRCRAFT TARGETS

1. (PS-SEL) Select Target
2. (IP-SPA) Determine Target Speed and Range
3. (13B-Sig.) Aim/Sight Weapon
4. (CP-CON(AIM)) Track Target
5. (CP-DIS) Fire Weapon
6. (CP-CON (AIM)) Adjust Fire
7. (CP-DIS) Reset Target Alert System

8. ENGAGE GROUND TARGETS

1. (PS-SEL) Select Target
2. (11B-FHBB) Determine Target Range
3. (13B-Sig.) Aim/Sight Weapon
4. (MCP-DIS) Fire Weapon
5. (M CP-CON (AIM)) Adjust Fire

9. NAVIGATE

1. (13B-XHC4) Identify Present Location
2. (13B-XHC5) Identify Destination
3. (13B-XHC5) Plot Travel Route
4. (PS-PLAN) Estimate Time of Arrival and Fuel Requirements

10. COMMUNICATE

1. (CM-NF) Transmit/Receive Messages
2. (19E-EHE6) Encode/Decode Messages
3. (19E-EHE6) Communicate Using Countermeasure Procedures

11. DEFEND AGAINST ATTACK

1. (CP-CON(DNI)) Deploy to Cover
2. (CP-CON (DNI)) Evade Threat

12. DISPLACE SYSTEM

1. (CP-DIS; GN (HV4)(UF) Remove APU
2. (CP-DIS) Disconnect/Remove Target Alert System
3. (CP-CON(DNI)) Leave Position

13. PERFORM POST-MISSION TASKS

1. (IP-NUN; VI-NTE (NAV) Perform Post-Operational Checks

Table 4.2-22B. (Continued)

14. COMPENSATE FOR EQUIPMENT MALFUNCTIONS AND EMERGENCIES

1. (PS-DIA; PS(PLAN); PS-SEL) Identify Malfunction
2. (PS-DIA) Identify Source of Malfunction
3. (PS-SEL) Compensate/Recover from Malfunction
4. (19E-EHJ2) Evacuate Vehicle
5. (GN-LITE; OP-DIJ) Extinguish Fires

Table 4.2-22B. (Continued)

SYSTEM 15 - OPERATIONAL FUNCTIONS FOR MAN-PORTABLE AIR DEFENSE SYSTEMS

1. (CP-DIS; GM LITE) CONDUCT PRE-OPERATIONAL INSPECTION

2. PREPARE WEAPON FOR FIRING

   1. (CP-DIS) Prepare Round
   2. (11B-FHBA) Ready Weapon for Firing

3. GET INTO FIRING POSITION

   1. (PS-SEL) Select Firing Position
   2. (GM-LITE) Get Into Firing Position

4. DETECT/LOCATE TARGET

   1. (VI-FR) Search for Target
   2. (VI-FR) Detect Target
   3. (13B-DHI2) Identify Friend or Foe

5. FIRE WEAPON

   1. (CP-CON (AIM)) Aim Weapon
   2. (11B-FHBC) Track Target
   3. (IP-SPA) Determine Target Range
   4. (CP-DIS) Set Superelevation and Lead
   5. (CP-DIS) Fire Weapon

6. (CP-DIS) CLEAR RECOVER FROM MISFIRE

7. PERFORM POST-FIRING TASKS

   1. (CP-DIS) Discard Expended Launch Tube

Table 4.2-22B. (Continued)

SYSTEM 16 - OPERATIONAL FUNCTIONS FOR ATTACK HELICOPTERS

1. PLAN AND PREPARE FOR MISSION

1 (PS-PLAN	) Plan Flight
2 (VI-NR(NON)	) Check Load
3 (IP-NUM	) Calculate Weight and Balance Bearing
4 (PS-PLAN	) Prepare Performance Planning Card
5 (IP-NUM; CP-DIS (TYPE)	) Enter Preflight Data
6 (VI-NR(NON) CP-DIS	) Conduct Preflight Inspection
7 (IP-VER; CP-DIS	) Perform Engine Start, Run-Up, and Before Take-Off Checks
8 (IPF-EHD -7	) Prepare Vehicle/Personnel For NBC Environment

2. TAXI AND TAKEOFF

1 (CP-CON; DRI (PIL)	) Perform Ground Taxi (1015)
2 (CP-DIS	) Perform Hover Power Check (1017)
3 (CP-CON (PIL)	) Perform Hovering Flight (1017)
4 (CP-CON (PIL	) Perform Takeoff

3. FLY AIRCRAFT TO/FROM MISSION AREA

1 (CP-CON (PIL)	) Cruise (Non-Tactical Flight)
2 (CP-CON (PIL)	) Perform Tactical Flight
3 (VI-NR(NON) CP-DIS	) Monitor Instruments
4 (CP-CON (PIL)	) Perform Holding Procedure

4. NAVIGATE

1 (IP-NUM; VI-NR (VER)	) Identify Present Location
2 (IP-NUM; VI-NR (VER)	) Identify Destination
3 (PS-SEL	) Select Travel Route
4 (IP- NUM	) Estimate Time of Arrival and Fuel Requirements

5. COMMUNICATE

1 (CM - NF	) Transmit/Receive Messages
2 (IP-VER; IP-NUM	) Encode/Decode Messages
3 (CM - NF	) Communicate Using Countermeasure Procedures

6. APPROACH AND LAND AIRCRAFT

1 (CP-DIS	) Perform Before Landing Checks
2 (CP- CON (PIL)	) Approach
3 (CP- CON (PIL)	) Land
4 (CP-CON (DRI)	) Taxi

Table 4.2-22B. (Continued)

7. PERFORM AFTER LANDING TASKS

1 (CP-DIS	) Conduct Engine Shutdown
2 (VI-NR (NVN) CP-DIS	) Conduct Post Flight Checks
3 (QSB BHB	) Complete Reports and Forms
4 (CM-F	) Conduct Briefing

8. COMPENSATE FOR INFLIGHT EQUIPMENT MALFUNCTIONS AND EMERGENCIES

1 (M-PS-DIA	) Identify Malfunction
2 (PS-DIA	) Identify Source of Malfunction
3 (PS-SEL	) Compensate/Recover from Malfunction
4 (IPE-EHSR	) Extinguish Fire
5 (HB-XH BJ	) Clear Weapon Misfire
6 (IPE EHSR	) Evacuate Aircraft

9. ACQUIRE TARGETS

1 (VI-FR	) Detect/Locate Targets
2 (VI-FR	) Identify Friend or Foe

10. ATTACK TARGET

1 (CP-CON (PIL)	) Maneuver for Attack
2 (PS-SEL	) Select Target(s)
3 (PS-SEL	) Select Weapon
4 (CP-CON (AIM)	) Aim/Sight Weapon
5 (CP-CON (AIM)TPA	) Track Target
6 (CP-DIS	) Fire Weapon
7 (CP-CON (AIM)	) Adjust Fire
8 (CP-CON (PIL)	) Egress From Attack Position

11. DEFEND AGAINST ATTACK

1 (CP-CON (PIL)	) Deploy to Cover
2 (VI-FR	) Identify/Locate Source of Threat/Fire
3 (VI-FR	) Identify/Locate Threat Target Tracking
4 (CP-CON (PIL)	) Perform Evasive Maneuvers
5 (JIC-EHSR	) Employ ECCM
6 (CP-DIS	) Dispense/Disperse Smoke

12. PERFORM RECONNAISSANCE

1 (CP-CON (PIL)	) Move to Recon Area
2 (VI-FR; IP (VER)	) Obtain Tactical Information
3 (CM-NF; IP-VER	) Transmit Tactical Report

13. CALL FOR DIRECT SUPPORT

1 (CM-F; VI-FR	) Call for and Adjust Indirect Fire
2 (CM-F; VI-FR	) Request/Adjust Illumination

Table 4.2-22B. (Continued)

SYSTEM 17 - OPERATIONAL FUNCTIONS FOR CARGO HELICOPTERS

1. PLAN AND PREPARE FOR MISSION

1. (PS-Plan) Plan Flight
2. (VI-NR(NON)) Check Load
3. (IP-NUM) Calculate Weight and Balance Bearing
4. (PS-PLAN) Prepare Perfmance Planning Card
5. (IP-NUM;CP-DIS(THR)) Enter Preflight Data
6. (VI-NR(NON) CPDis) Conduct Preflight Inspection
7. (IP-VER;CP-DIS) Perform Engine Start, Run-Up, and Before Take-Off Checks
8. (IGF-EHD-7) Prepare Vehicle/Personnel For NBC Environment

2. TAXI AND TAKEOFF

1. (CP-CON;DRI(PI)) Perform Ground Taxi (1015)
2. (CP-DIS) Perform Hover Power Check (1017)
3. (CP-CON-(PI)) Perform Hovering Flight (1017)
4. (CP-CON (PI)) Perform Takeoff

3. FLY AIRCRAFT TO/FROM MISSION AREA

1. (CP-CON (PI)) Cruise (Non-Tactical Flight)
2. (CP-CON(PI)) Perform Tactical Flight
3. (VI-NR(NON);CP-DIS) Monitor Instruments
4. (CP-CON (PIL)) Perform Holding Procedure

4. NAVIGATE

1. (IP-NUM;VI-NR(VER)) Identify Present Location
2. (IP-NUM;VI-NR(VER)) Identify Destination
3. (PS-SEL) Select Travel Route
4. (IP-NUM) Estimate Time of Arrival and Fuel Requirements

5. COMMUNICATE

1. (CM-NF) Transmit/Receive Messages
2. (IP-VER;IP-NUM) Encode/Decode Messages
3. (CM-NF) Communicate Using Countermeasure Procedures

6. APPROACH AND LAND AIRCRAFT

1. (CP-DIS) Perform Before Landing Checks
2. (CP-CON (PIL)) Approach
3. (CP-CON (PIL)) Land
4. (CP-CON (DRI)) Taxi

Table 4.2-22B. (Continued)

7. PERFORM AFTER LANDING TASKS

1. (CP-Dis) Conduct Engine Shutdown
2. (VI-NF(NAV);CP-Dis) Conduct Post Flight Checks
3. (95B-BH13) Complete Reports and Forms
4. (CM-F) Conduct Briefing

8. COMPENSATE FOR INFLIGHT EQUIPMENT MALFUNCTIONS AND EMERGENCIES

1. (PS-DIA) Identify Malfunction
2. (PS-DM) Identify Source of Malfunction
3. (PS-SEL) Compensate/Recover from Malfunction
4. (19E-EHJ2) Extinguish Fire
5. (HB-XHBJ) Clear Weapon Misfire
6. (19E-EHJ2) Evacuate Aircraft

9. ACQUIRE TARGETS

1. (VI-FR) Detect/Locate Targets
2. (VI-FR) Identify Friend or Foe

10. ATTACK TARGET

1. (CP-CON(PIL)) Maneuver for Attack
2. (PS-SEL) Select Target(s)
3. (PS-SEL) Select Weapon
4. (CP-CON(AIM)) Aim/Sight Weapon
5. (CP-CM-AIM)TM) Track Target
6. (CP-DIS) Fire Weapon
7. (CP-CON(AIM)) Adjust Fire
8. (CP-CON(PIL)) Egress From Attack Position

11. DEFEND AGAINST ATTACK

1. (CP-CON(PIL)) Deploy to Cover
2. (VI-FR) Identify/Locate Source of Threat/Fire
3. (VI-FR) Identify/Locate Threat Target Tracking
4. (CP-CON(PIL)) Perform Evasive Maneuvers
5. (31C-EHJ6) Employ ECCM
6. (CP-DIS) Dispense/Disperse Smoke

12. LOAD/UNLOAD INTERNAL LOADS

1. (CM-F) Brief Pasengers
2. (CM-F;GN HW(LIF)) Load Passengers/Cargo
3. (CM-F;GN HW(LIF)) Unload Passengers/Cargo

13. RAISE/LOWER EXTERNAL LOADS

1. (VI-FR.CP-CON(PIL) Attach Load
2. (VI-FR);CP-CON(PIL) Raise Load
3. (VI-FR;CP-CON(PIL) Lower Load

Table 4.2-22B. (Continued)

14. (CP-CON (PIL); CM-F) PERFORM PARADROP

15. (CP-CON (PIL) CM-F) RAPPEL TROOPS

16. PERFORM RECONNAISSANCE

1. (OP-CON (PIL)) Move to Recon Area
2. (VI-FR; IP-VER) Obtain Tactical Information
3. (CM-NF; IP-VER) Transmit Tactical Report

17. CALL FOR DIRECT SUPPORT

1. (CM-F; VI-FR) Call for and Adjust Indirect Fire
2. (CM-F; VI-FR) Request/Adjust Illumination
3. (CM-F; VI-FR) Adjust Attack Helicopter Fire

Table 4.2-22B. (Continued)

SYSTEM 18 - OPERATIONAL FUNCTIONS FOR UTILITY HELICOPTERS

1. PLAN AND PREPARE FOR MISSION

1 (PS-PLAN	) Plan Flight
2 (VI-NT(NON)	) Check Load
3 (IP-NUM	) Calculate Weight and Balance Bearing
4 (PS-PLAN	) Prepare Performance Planning Card
5 (IP(NUM);@D-DIS (TYPE)	) Enter Preflight Data
6 (VI-NT(NON);CP(DIS)	) Conduct Preflight Inspection
7 (IP-VER;CP-DIS	) Perform Engine Start, Run-Up, and Before Take-Off Checks
8 (IPE-END7	) Prepare Vehicle/Personnel For NBC Environment

2. TAXI AND TAKEOFF

1 (CP-CON;DRI (PIC)	) Perform Ground Taxi (1015)
2 (CP-PCS	) Perform Hover Power Check (1017)
3 (CP-CON (PIC)	) Perform Hovering Flight (1017)
4 (CP-CON (PIC)	) Perform Takeoff

3. FLY AIRCRAFT TO/FROM MISSION AREA

1 (CP-CON (PIL)	) Cruise (Non-Tactical Flight)
2 (CP-CON (PIC)	) Perform Tactical Flight
3 (VI-NR (NON);CP-DIS)	Monitor Instruments
4 (CP-CON (PIC)	) Perform Holding Procedure

4. NAVIGATE

1 (IP-NUM;VI-NT (VER)	) Identify Present Location
2 (IP-NUM;VI NT (VER)	) Identify Destination
3 (PS-SEL	) Select Travel Route
4 (IP-NUM	) Estimate Time of Arrival and Fuel Requirements

5. COMMUNICATE

1 (CM-NF	) Transmit/Receive Messages
2 (IP-VER;IP-NUM	) Encode/Decode Messages
3 (CM-NF	) Communicate Using Countermeasure Procedures

6. APPROACH AND LAND AIRCRAFT

1 (CP-DIS	) Perform Before Landing Checks
2 (CP-CON (PIC)	) Approach
3 (CP-CON (PIC)	) Land
4 (CP-CON (DRIE)	) Taxi

Table 4.2-22B. (Continued)

7. PERFORM AFTER LANDING TASKS

1 (CP-DIS	) Conduct Engine Shutdown
2 (VI-NR(NVW);CP-DIS	) Conduct Post Flight Checks
3 (95B-BH13	) Complete Reports and Forms
4 (CM-F	) Conduct Briefing

8. COMPENSATE FOR INFLIGHT EQUIPMENT MALFUNCTIONS AND EMERGENCIES

1 (DPS-DIA	) Identify Malfunction
2 (PS-DIA	) Identify Source of Malfunction
3 (PS-SEL	) Compensate/Recover from Malfunction
4 (19E-EHJ2	) Extinguish Fire
5 (HB-XHBJ	) Clear Weapon Misfire
6 (19E-EHJ2	) Evacuate Aircraft

9. ACQUIRE TARGETS

1 (VI-FR	) Detect/Locate Targets
2 (VI-FR	) Identify Friend or Foe

10. ATTACK TARGET

1 (CP-CON(PIL)	) Maneuver for Attack
2 (PS-SEL	) Select Target(s)
3 (PS-SEL	) Select Weapon
4 (CP-CON (AIM)	) Aim/Sight Weapon
5 (CP-CON-(AIM)TDA	) Track Target
6 (CP-DIS	) Fire Weapon
7 (CP-CON (AIM)	) Adjust Fire
8 (CP-CON(PIL)	) Egress From Attack Position

11. DEFEND AGAINST ATTACK

1 (CP-CON (PIL)	) Deploy to Cover
2 (VI-FR	) Identify/Locate Source of Threat/Fire
3 (VI-FR	) Identify/Locate Threat Target Tracking
4 (CP-CON (PIL)	) Perform Evasive Maneuvers
5 (31C-EHJ6	) Employ ECCM
6 (CP-DIS	) Dispense/Disperse Smoke

12. LOAD/UNLOAD INTERNAL LOADS

1 (CM-F	) Brief Pasengers
2 (CM-F; GM HVY (LIF)	) Load Passengers/Cargo
3 (CM-F; GM HVY (LIF)	) Unload Passengers/Cargo

13. RAISE/LOWER EXTERNAL LOADS

1 (VI-FR; CP-CON (PIL)	) Attach Load
2 (VI-FR; CP-CON (PIL)	) Raise Load
3 (VI-FR; CP-CON (PIL)	) Lower Load

Table 4.2-22B. (Continued)

14. (CP-CON(PIL);CM-F) PERFORM PARADROP

15. (CP-CON (PIL);CH-F) RAPPEL TROOPS

16. PERFORM RECONNAISSANCE

1 (CP-CON(PIL)) Move to Recon Area
2 (VI-FR;IP-VER) Obtain Tactical Information
3 (CH-NF;IP-VER) Transmit Tactical Report

17. CALL FOR DIRECT SUPPORT

1 (CM-F;VI-FR) Call for and Adjust Indirect Fire
2 (CM-F;VI-FR) Request/Adjust Illumination
3 (CM-F;VI-FR) Adjust Attack Helicopter Fire

Table 4.2-22B. (Continued)

SYSTEM 19 - OPERATIONAL FUNCTIONS FOR SCOUT HELICOPTERS

1. PLAN AND PREPARE FOR MISSION

1 (PS-PLAN	) Plan Flight
2 (VI-NR (NON)	) Check Load
3 (IP-NUM	) Calculate Weight and Balance Bearing
4 (PS-PLAN	) Prepare Performance Planning Card
5 (IP-NUM; CP-DIS (TYPE)	) Enter Preflight Data
6 (VI-NR (NON); CP-DIS	) Conduct Preflight Inspection
7 (IP-VER; CP-DIS	) Perform Engine Start, Run-Up, and Before Take-Off Checks
8 (19F-ENTD-7	) Prepare Vehicle/Personnel For NBC Environment

2. TAXI AND TAKEOFF

1 (CP-CON; DRI (PIL)	) Perform Ground Taxi (1015)
2 (CP-DIS	) Perform Hover Power Check (1017)
3 (CP-CON (PIL)	) Perform Hovering Flight (1017)
4 (CP-CON (PIL)	) Perform Takeoff

3. FLY AIRCRAFT TO/FROM MISSION AREA

1 (CP-CON (PIL)	) Cruise (Non-Tactical Flight)
2 (CP-CON (PIL)	) Perform Tactical Flight
3 (VI-NR (NON); CP-DIS	) Monitor Instruments
4 CP-CON (PIL)	) Perform Holding Procedure

4. NAVIGATE

1 (IP-NUM; VI-NR (VER)	) Identify Present Location
2 (IP-NUM; VI-NR (VER)	) Identify Destination
3 (PS-SEL	) Select Travel Route
4 (IP-NUM	) Estimate Time of Arrival and Fuel Requirements

5. COMMUNICATE

1 (CM-NF	) Transmit/Receive Messages
2 (IP-VER; IP-NUM	) Encode/Decode Messages
3 (CM-NF	) Communicate Using Countermeasure Procedures

6. APPROACH AND LAND AIRCRAFT

1 (CP-DIS	) Perform Before Landing Checks
2 (CP-CON (PIL)	) Approach
3 (CP-CON (PIL)	) Land
4 (CP-CON (DRI)	) Taxi

Table 4.2-22B. (Continued)

7. PERFORM AFTER LANDING TASKS

1 (CP-DIS	) Conduct Engine Shutdown
2 (VI-NR (NVN); CP-DIS	) Conduct Post Flight Checks
3 (95B-BH-13	) Complete Reports and Forms
4 (CM-F	) Conduct Briefing

8. COMPENSATE FOR INFLIGHT EQUIPMENT MALFUNCTIONS AND EMERGENCIES

1 (M-PS-DIA	) Identify Malfunction
2 (PS-DIA	) Identify Source of Malfunction
3 (PS-SEL	) Compensate/Recover from Malfunction
4 (19E-EHJ2	) Extinguish Fire
5 (HB-XH BJ	) Clear Weapon Misfire
6 (19E-EHJ2	) Evacuate Aircraft

9. ACQUIRE TARGETS

1 (VI-FR	) Detect/Locate Targets
2 (VI-FR	) Identify Friend or Foe

10. ATTACK TARGET

1 (CP-CON (PIL)	) Maneuver for Attack
2 (PS-SEL	) Select Target(s)
3 (PS-SEL	) Select Weapon
4 (CP-CON (AIM)	) Aim/Sight Weapon
5 (CP-CON (AIM) TPA	) Track Target
6 (CP-DIS	) Fire Weapon
7 (CP-CON (AIM)	) Adjust Fire
8 (CP-CON (PIL)	) Egress From Attack Position

11. DEFEND AGAINST ATTACK

1 (CP-CON (PIL)	) Deploy to Cover
2 (VI-FR	) Identify/Locate Source of Threat/Fire
3 (VI-FR	) Identify/Locate Threat Target Tracking
4 (CP-CON (PIL)	) Perform Evasive Maneuvers
5 (31C-EHJ6	) Employ ECCM
6 (CP-DIS	) Dispense/Disperse Smoke

12. PERFORM RECONNAISSANCE

1 (CP-CON (PIL)	) Move to Recon Area
2 (VI-FR; IP (VER)	) Obtain Tactical Information
3 (CM-NF; IP (VER)	) Transmit Tactical Report

13. CALL FOR DIRECT SUPPORT

1 (CM-F; VI-FR	) Call for and Adjust Indirect Fire
2 (CM-F; VI-FR	) Request/Adjust Illumination
3 (CM-F; VI-FR	) Adjust Attack Helicopter Fire

Table 4.2-22B. (Continued)

SYSTEM 20 OPERATIONAL FUNCTIONS FOR LIGHT CARGO TRANSPORT TRUCKS

1. PLAN AND PREPARE MISSION

1.	(IP-VEH)	Receive/Review Order
2.	(VI-NR (VEH))	Complete Vehicle Record Forms
3.	(95B-BHH1)	Perform Pre-Operational Checks
4.	(19E-EHH3)	Camouflage Vehicle
5.	(MAP-DIS)	Mark Vehicle

2. PREPARE LOAD

1.	(VI-FR; GN LTE)	Observe/Check Loading of Cargo/Passengers
2.	(M CN-F)	Brief Pasengers
3.	(19E-EHH3)	Secure Load
4.	(64C-CHH3)	Couple Trailer
5.	(19E-EHH3)	Load Vehicle

3. DRIVE VEHICLE

1.	(19E-EHH1)	Start Vehicle
2.	(64C-CHH5)	Drive Vehicle
3.	(64C-CHH5)	Drive Vehicle in Motor March or Convoy

4. DEFEND AGAINST ATTACK

1.	(CP-CON (DRI))	Deploy to Cover
2.	(64C-CHH5)	Perform Evasive Maneuvers

5. COMPENSATE FOR EQUIPMENT MALFUNCTIONS AND EMERGENCIES

1.	(GN HWY (LIF) (TOW) CP-DIS)	Perform Self-Recovery of Vehicle

6. LOAD/UNLOAD VEHICLE

1.	(19E-EHH3)	Load Cargo/Passengers
2.	(19E-EHH3)	Unload Cargo/Passengers

7. PERFORM POST-MISSION PROCEDURES

1.	(64C-CHHS)	Park Vehicle
2.	(CP-DIS; VI-NR (VEH))	Perform Post-Operational Checks
3.	(IP-VEH; VI-NR (VEH))	Complete Vehicle Record Forms

Table 4.2-22B. (Continued)

SYSTEM 21 OPERATIONAL FUNCTIONS FOR HEAVY CARGO TRANSPORT TRUCKS

Same as SYSTEM 20 - Light Cargo Trucks

Table 4.2-22B. (Continued)

SYSTEM 19 - OPERATIONAL FUNCTIONS FOR SCOUT HELICOPTERS

Same as SYSTEM 17 - - CARGO, except

I. DELETE these functions

12. LOAD/UNLOAD INTERNAL LOADS
13. RAISE/LOWER EXTERNAL LOADS
14. PERFORM PARADROP
15. RAPPEL TROOPS

Table 4.2-22B. (Continued)

SYSTEM 16 - OPERATIONAL FUNCTIONS FOR ATTACK HELICOPTERS

Same as SYSTEM 17 - - CARGO, except

I. DELETE these functions

12. LOAD/UNLOAD INTERNAL LOADS

13. RAISE/LOWER EXTERNAL LOADS

14. PERFORM PARADROP

15. RAPPEL TROOPS

II. Delete this task

17. CALL FOR DIRECT SUPPORT
    3. Adjust Attack Helicopter fire

Table 4.2-22B. (Continued)

SYSTEM 18 - OPERATIONAL FUNCTIONS FOR UTILITY HELICOPTERS

Same as SYSTEM - 17 CARGO helicopter

Table 4.2-22C. Project A Tasks, Taxons, Weights, and Descriptions

MOS	CODE	Description	W1	Primary Taxon	W2	Secondary Taxon	W3	Tertiary Taxon
11B	FHBC	Engage Targets with LAW (M72A2)	70.00	CP-Con(Aim)+	15.00	CP-Dis	15.00	VI-Fr
	FHB9	Engage Enemy Target with Hand Grenades	80.00	CP-Con(Thro)+	20.00	CP-Dis		
	FHL1	Zero an AN/PVS-4 to an M16A1 Rifle	45.00	CP-Con(Tra)+	40.00	CP-Dis	15.00	VI-Fr
	XHB5	Load, Reduce a Stoppage, and Clear an M60 Machinegun	100.00	CP-Dis				
	XHD1	Put On, Wear, Remove M17 Protective Mask With Hood	100.00	CP-Dis				
	XHB6	Set Headspace and Timing on an M2 Caliber .50 Machinegun (Mech)	100.00	CP-Dis				
	XHA4	Put On Field Or Pressure Dressing	100.00	CP-Dis				
	FHBA	Prepare a Dragon for Firing	100.00	CP-Dis				
	FHE4	Operate Radio Set AN/PRC-77 - Manpack Operations (or AN/PRC-25 (AN/GRC-160 or AN/GRC-125))	100.00	CP-Dis				
	XHI1	Install and Fire/Recover an M18A1 Claymore Mine	85.00	CP-Dis+	15.00	VI-Nr(Non)		
	XHB4	Perform Operator Maintenance On an M16A1 Rifle, Magazine, and Ammunition	90.00	CP-Dis+	10.00	VI-Nr(Non)		
	FHJ1	Techniques of Movement in Urban Terrain	90.00	GM-Lite+	10.00	VI-Fr		
	FHBB	Prepare Range Card for M60 Machinegun	50.00	IP-Ver+	30.00	IP-Num	20.00	VI-Fr
	FHG9	Conduct Day and Night Surveillance Without Aid of Electronic Devices	100.00	VI-Fr				

Table 4.2-22C. Project A Tasks, Taxons, Weights, and Descriptions (Continued)

MOS	CODE	Description	W1	Primary Taxon	W2	Secondary Taxon	W3	Tertiary Taxon
13B	DHI-	Sight on a Target With Direct Fire Telescope (M102-DHIP, M109-DHI6, M110-DHIB, M198-DHIN)	80.00	CP-Con(Aim)+	20.00	VI-Fr		
	DHI-	Lay Howitzer for Initial Direction of Fire (M100 Series-DHIL, M100-DHI7)	50.00	CP-Con(Tra)+	40.00	IP-Num	10.00	VI-Nr(Non)
	DHI-	Boresight Direct Fire Telescope Using DAP (Distant Aiming Point; M102-DHIQ, M109-DHI5, M110-DHIA, M198-DHIM)	70.00	CP-Con(Tra)+	30.00	VI-Fr		
	XHB7	Perform Operator Maintenance on a Caliber .50 M2 Machinegun	100.00	CP-Dis				
	XHE3	Install and Operate a Field Telephone	100.00	CP-Dis				
	XHD1	Put On, Wear, Remove M17 Protective Mask with Hood	100.00	CP-Dis				
	XHB6	Set Headspace and Timing on an M2 Caliber .50 Machinegun	100.00	CP-Dis				
	DHJ-	Disassemble/Assemble Breech Mechanism (M102-DHJ8, M109-DHJ1, M110-DHJ4, M198-DHJ6)	100.00	CP-Dis				
	XHB3	Load, Reduce a Stoppage, and Clear an M16A1 Rifle	100.00	CP-Dis				
	XHA3	Administer Nerve Agent Antidote to Self (Self-Aid)	100.00	CP-Dis				
	XHD3	Put On and Wear Protective Clothing	100.00	CP-Dis				
	DHI-	Emplace/Recover Collimator (M102-DHI3, M198-DHIJ)	85.00	CP-Dis+	15.00	CP-Con(Tra)		
	DHI4	Emplace/Recover Aiming Posts	75.00	CP-Dis+	15.00	CP-Con(Tra)	10.00	VI-Fr
	XHA2	Perform Cardiopulmonary Resuscitation (CPR) on an Adult Using the One-Man Method	60.00	CP-Dis+	40.00	PS-Dia		
	DHI2	Use Visual Signals to Control Movement (Mounted)	80.00	CP-Dis+	20.00	VI-Fr		
	XHC4	Determine an Azimuth Using an M2 Compass	80.00	IP-Num+	20.00	VI-Fr		
	XHC5	Measure an Azimuth on a Map with a Protractor	60.00	IP-Num+	40.00	VI-Nr(Ver)		

Table 4.2-22C. Project A Tasks, Taxons, Weights, and Descriptions (Continued)

MOS	CODE	Description	W1	Primary Taxon	W2	Secondary Taxon	W3	Tertiary Taxon
19E	XHE7	Send a Radio Message	100.00	CM-F				
	EHK1	Boresight and System Calibrate an M60A3 Tank	70.00	CP-Con(Tra)+	30.00	VI-Fr		
	EHBC	Perform Operator Maintenance on M3A1 Submachinegun	100.00	CP-Dis				
	EHL1	Prepare Loader's Station for Operation (on an M48A5/M60-Series Tank)	100.00	CP-Dis				
	EHJ1	Operate Gas Particulate Filter Unit (on an M60-Series	100.00	CP-Dis				
	EHE8	Operate Radio Set AN/VRC-64 or AN/GRC-160 (AN/VRC-53 or AN/GRC-125)	100.00	CP-Dis				
	EHK5	Perform Operator Maintenance on an M240 Machinegun	100.00	CP-Dis				
	EHD7	Put On M25A1 Protective Mask With Hood	100.00	CP-Dis				
	EHH3	Remove and Install Track Blocks [Measure Track Tension] (on an M48A5/M60-Series Tank)	100.00	CP-Dis				
	XHA4	Put On Field or Pressure Dressing	100.00	CP-Dis				
	EHH1	Start/Stop Tank Engine (on an M48A5/M60)	100.00	CP-Dis				
	EHL2	Perform Gunner's and Loader's Prepare-to-Fire Checks [LRF Self-Test] (on an M60A3 Tank)	70.00	CP-Dis+	30.00	VI-Nr(Non)		
	EHJ2	Escape from Tank (an M48A5/M60-Series Tank)	100.00	GM-Lite				
	XHC2	Determine Grid Coordinates of a Point on a Military Map Using the Military Grid Reference System	80.00	IP-Num+	20.00	VI-Nr(Ver)		
	EHE6	Use an Automated CEOI	60.00	IP-Ver+	40.00	CM-F		

Table 4.2-22C. Project A Tasks, Taxons, Weights, and Descriptions (Continued)

MOS	CODE	Description	W1	Primary Taxon	W2	Secondary Taxon	W3	Tertiary Taxon
31C	GHJ1	Establish, Enter and Leave a Radio Net	100.00	CM-NF				
	XHD3	Put On and Wear Protective Clothing	100.00	CP-Dis				
	XHA4	Put on Field or Pressure Dressing	100.00	CP-Dis				
	XHB3	Load, Reduce a Stoppage, and Clear an M16A1 Rifle	100.00	CP-Dis				
	GHJ6	Recognize Electronic Countermeasures (ECM) and Implement Electronic Counter-Countermeasures (ECCM)	70.00	CP-Dis+	30.00	AU-So		
	GHI7	Install Radio Set AN/GRC-106	80.00	CP-Dis+	20.00	VI-Nr(Non)		
	GHIA	Install Radio Teletypewriter Set AN/GRC-142 or AN/GRC-122	80.00	CP-Dis+	20.00	VI-Nr(Non)		
	GHI1	Operate Radio Teletypewriter Set AN/GRC-142 or AN/GRC-122	80.00	CP-Dis+	20.00	VI-Nr(Ver)		
	GHH2	Operate Generator Set PU-620	80.00	CP-Dis+	20.00	VI-Nr(Ver)		
	GHH1	Perform PMCS on Cargo Truck [M1028] (1-1/4 Ton, with Communication Shelter M1028)	60.00	CP-Dis+	20.00	VI-Nr(Ver)	20.00	VI-Nr(Non)
	XHC2	Determine Grid Coordinates of a Point on a Military Map Using the Military Grid Reference System	80.00	IP-Num+	20.00	VI-Nr(Ver)		
	GHJ4	Prepare a Message in 16-Line Format	100.00	IP-Ver				
	GHJ3	Use the KTC 1400 D Numerical Cipher/Authentication System	70.00	IP-Ver+	30.00	CM-NF		
	GHI3	Operate Terminal Communications AN/UGC-74A	60.00	IP-Ver+	20.00	VI-Nr(Ver)	20.00	CP-Dis
	GHH3	Perform Operator's Troubleshooting Procedures on Generator Set [PU-620]	60.00	PS-Dia+	30.00	CP-Dis	10.00	VI-Nr(Non)

Table 4.2-22C. Project A Tasks, Taxons, Weights, and Descriptions (Continued)

MOS	CODE	Description	W1	Primary Taxon	W2	Secondary Taxon	W3	Tertiary Taxon
63B	XHG5	Use Challenge and Password	100.00	CM-F				
	XHB3	Load, Reduce a Stoppage, and Clear an M16A1 Rifle	100.00	CP-Dis				
	XHA4	Put On Field or Pressure Dressing	100.00	CP-Dis				
	XHD1	Put On, Wear, Remove M17 Protective Mask With Hood	100.00	CP-Dis				
	HHN1	Replace Fuel Pump [Truck, Cargo, 2 1/2-ton, 6 x 6]	80.00	CP-Dis+	20.00	VI-Nr(Non)		
	HHJ2	Repair Electrical Wiring [Truck, Cargo, 1 1/4-Ton, 4 x 4]	80.00	CP-Dis+	20.00	VI-Nr(Non)		
	HHM2	Replace Air Hydraulic Cylinder [Truck, Cargo, 2 1/2-Ton, 6 x 6]	80.00	CP-Dis+	20.00	VI-Nr(Non)		
	HHH1	Replace Wheel Bearings [Truck, Cargo, 2 1/2-Ton, 6 x 6]	80.00	CP-Dis+	20.00	VI-Nr(Non)		
	HHM1	Replace Service Brakes [Truck, Utility, 1/4-Ton, 4 x 4]	80.00	CP-Dis+	20.00	VI-Nr(Non)		
	HHK1	Adjust Clutch Pedal Free Travel [Truck, Utility, 1/4-Ton, 4 x 4]	80.00	CP-Dis+	20.00	VI-Nr(Non)		
	HHI1	Maintain Assigned Toolkit	80.00	CP-Dis+	20.00	VI-Nr(Non)		
	XHC1	Determine a Magnetic Azimuth Using a Compass	60.00	IP-Num+	20.00	IP-Ver	20.00	VI-Fr
	HHM3	Troubleshoot Service Brake Malfunctions [Truck, Utility, 1/4-Ton, 4 x 4]	60.00	PS-Dia+	30.00	CP-Dis	10.00	VI-Nr(Non)
	HHJ1	Troubleshoot Electrical System [Truck, Cargo, 5-Ton, 6 x 6]	60.00	PS-Dia+	30.00	CP-Dis	10.00	VI-Nr(Non)
	HHN3	Troubleshoot Fuel System Malfunctions [Truck, Cargo, 2 1/2-Ton, 6 x 6]	60.00	PS-Dia+	30.00	CP-Dis	10.00	VI-Nr(Non)

Table 4.2-22C. Project A Tasks, Taxons, Weights, and Descriptions (Continued)

MOS	CODE	Description	W1	Primary Taxon	W2	Secondary Taxon	W3	Tertiary Taxon
64C	CHH5	Operate Tractor and Semitrailer	100.00	CP-Con(Dri)				
	XHB3	Load, Reduce a Stoppage, and Clear an M16A1 Rifle	100.00	CP-Dis				
	XHB5	Load, Reduce a Stoppage and Clear an M60 Machinegun	100.00	CP-Dis				
	CHH3	Couple Semitrailer	100.00	CP-Dis				
	XHA3	Administer Nerve Agent Antidote	100.00	CP-Dis				
	CHH4	Uncouple Semitrailer	100.00	CP-Dis				
	XHA1	Administer First Aid to Nerve Agent Casualty (Buddy Aid)	100.00	CP-Dis				
	XHA4	Put On Field or Pressure Dressing	100.00	CP-Dis				
	XHD3	Put on and Wear Protective Clothing	100.00	CP-Dis				
	CHD5	Decontaminate Equipment Using the ABC M11 Decontaminating Apparatus	100.00	CP-Dis				
	XHA2	Perform Cardiopulmonary Resuscitation (CPR) on an Adult Using the One-Man Method	60.00	CP-Dis+	40.00	PS-Dia		
	XHB4	Perform Operator Maintenance On an M16A1 Rifle, Magazine, and Ammunition	90.00	CP-Dis+	10.00	VI-Nr(Non)		
	XHC3	Measure Distance on a Map	90.00	IP-Num+	10.00	VI-Nr(Non)		
	XHC2	Determine Grid Coordinates of a Point on a Military Map Using the Military Grid Reference System	80.00	IP-Num+	20.00	VI-Nr(Ver)		
	CHD6	Use M8 Paper to Identify a Chemical Agent	80.00	VI-Nr(Non)+	20.00	CP-Dis		

Table 4.2-22C. Project A Tasks, Taxons, Weights, and Descriptions (Continued)

MOS	CODE	Description	W1	Primary Taxon	W2	Secondary Taxon	W3	Tertiary Taxon
71L	XHA4	Put On Field or Pressure Dressing	100.00	CP-Dis				
	XHD1	Put On, Wear, Remove M17 Protective Mask With Hood	100.00	CP-Dis				
	AHJ5	Type Straight Copy Material	60.00	CP-Dis(Typ)+	30.00	VI-Nr(Ver)	10.00	CP-Dis
	AHJ4	Type a Joint Message Form (DD Form 173/1)	50.00	CP-Dis+	30.00	CP-Dis(Typ)	20.00	VI-Nr(Ver)
	AHJ7	Type a Basic Comment to a Disposition Form	50.00	CP-Dis+	30.00	CP-Dis(Typ)	20.00	VI-Nr(Ver)
	AHJ6	Type a Memorandum	50.00	CP-Dis+	30.00	CP-Dis(Typ)	20.00	VI-Nr(Ver)
	AHJ9	Type a Military Letter	50.00	CP-Dis+	30.00	CP-Dis(Typ)	20.00	VI-Nr(Ver)
	AHJ3	Type a Second or Subsequent Comment to a Disposition Form	50.00	CP-Dis+	30.00	CP-Dis(Typ)	20.00	VI-Nr(Ver)
	AHJ2	Type Military Orders	50.00	CP-Dis+	30.00	CP-Dis(Typ)	20.00	VI-Nr(Ver)
	XHB4	Perform Operator Maintenance On an M16A1 Rifle Magazine, and Ammunition	90.00	CP-Dis+	10.00	VI-Nr(Non)		
	AHK2	Receipt/Transfer Classified Material	50.00	CP-Dis+	40.00	VI-Nr(Ver)	10.00	IP-Ver
	XHC2	Determine Grid Coordinates of a Point on a Military Map Using the Military Grid Reference System	80.00	IP-Num+	20.00	VI-Nr(Ver)		
	AHH1	File Documents/Correspondence	70.00	IP-Ver+	30.00	VI-Nr(Ver)		
	AHH3	Prepare a Requisition for Publications/BlankForms using AUTODIN (DA Form 4569)	60.00	IP-Ver+	30.00	VI-Nr(Ver)	10.00	CP-Dis(Typ)

Table 4.2-22C. Project A Tasks, Taxons, Weights, and Descriptions (Continued)

MOS	CODE	Description	W1	Primary Taxon	W2	Secondary Taxon	W3	Tertiary Taxon
91A	XHA4	Put On a Field or Pressure Dressing	100.00	CP-Dis				
	IHA6	Open the Airway	100.00	CP-Dis				
	IHI1	Initiate an Intravenous Infusion	100.00	CP-Dis				
	IHI3	Measure and Record a Patient's Pulse	100.00	CP-Dis				
	IHI9	Maintain a Sterile Field & Change a Sterile Dressing	100.00	CP-Dis				
	IHI4	Measure and Record a Patient's Respiration	90.00	CP-Dis+	10.00	IP-Num		
	IHI5	Measure and Record a Patient's Bloodpressure	90.00	CP-Dis+	10.00	IP-Num		
	XHA2	Perform Cardiopulmonary Resuscitation (CPR) on an Adult Using the One-Man Method	60.00	CP-Dis+	40.00	PS-Dia		
	IHIA	Assemble Needle and Syringe (Vial)	90.00	CP-Dis+	10.00	VI-Nr(Non)		
	IHI8	Administer an Injection (Ampule)	90.00	CP-Dis+	10.00	VI-Nr(Non)		
	IHI7	Change Sterile Dressing	90.00	CP-Dis+	10.00	VI-Nr(Non)		
	IHI6	Assemble Needle and Syringe (Ampule)	90.00	CP-Dis+	10.00	VI-Nr(Non)		
	IHIB	Administer an Injection (Vial)	90.00	CP-Dis+	10.00	VI-Nr(Non)		
	IHAB	Splint a Suspected Fracture	90.00	CP-Dis+	10.00	VI-Nr(Non)		
	IHI7	Change Sterile Dressing	90.00	CP-Dis+	10.00	VI-Nr(Non)		
	IHJ1	Decontaminate Mercury Thermometers	90.00	CP-Dis+	10.00	VI-Nr(Non)		
	XHC2	Determine Grid Coordinates of a Point on a Military Map Using the Military Grid Reference System	80.00	IP-Num+	20.00	VI-Nr(Ver)		
	IHA9	Initiate a Field Medical Card	70.00	VI-Nr(Ver)+	30.00	IP-Ver		

Table 4.2-22C. Project A Tasks, Taxons, Weights, and Descriptions (Continued)

MOS	CODE	Description	W1	Primary Taxon	W2	Secondary Taxon	W3	Tertiary Taxon
95B	BHM1	Operate a Dismount Point	100.00	CM-F				
	BHE1	Prepare/Operate FM Radio Sets	100.00	CM-NF				
	XHB2	Operate and Maintain a .38 Caliber Revolver	100.00	CP-Dis				
	XHA4	Put On Field or Pressure Dressing	100.00	CP-Dis				
	XHB3	Load, Reduce a Stoppage, and Clear an M16A1 Rifle	100.00	CP-Dis				
	XHD1	Put On, Wear, Remove M17 Protective Mask With Hood	100.00	CP-Dis				
	XHB5	Load, Reduce a Stoppage and Clear M60 Machinegun	100.00	CP-Dis				
	XHB1	Operate and Maintain a .45 Caliber Pistol	100.00	CP-Dis				
	XHA2	Perform Cardiopulmonary Resuscitation (CPR) on an Adult Using the One-Man Method	60.00	CP-Dis+	40.00	PS-Dia		
	BHL6	Use Hand and Arm Signals to Direct Traffic	80.00	CP-Dis+	20.00	VI-Fr		
	BHH1	Perform Operator/Crew Preventive Maintenance Checks and Services	70.00	CP-Dis+	30.00	VI-Nr(Non)		IP-Ver
	XHC6	Call For/Adjust Indirect Fire	60.00	IP-Num+	40.00	CM-NF		
	BHG8	Estimate Range	70.00	IP-Num+	30.00	VI-Fr		
	XHC1	Determine a Magnetic Azimuth Using a Compass	80.00	IP-Num+	20.00	VI-Fr		
	XHC7	Navigate From One Point On the Ground To Another Point	60.00	IP-Num+	40.00	VI-Nr(Ver)		
	XHC2	Determine Grid Coordinates of a Point on a Military Map Using the Military Grid Reference System	80.00	IP-Num+	20.00	VI-Nr(Ver)		
	BHL3	Prepare Military Police Reports and Forms	70.00	IP-Ver+	30.00	VI-Nr(Ver)		
Average:			84.29		23.50		15.24	

Table 4.2-23.

FILE ID: Project A Task Description

DESCRIPTION: Describes Performance Prediction Equations for Project A Tasks

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
1	1	File ID	10	Alpha
	2	MOS Code	3	Alpha
2				
	1	Task Type	2	Num
	2	Associated Task 1 #	5	Num
	3	Associated Task 1 Title	50	Alpha
	4	Associated Task 2 #	5	Num
	5	Associated Task 2 Title	50	Alpha
	6	Associated Task 3 #	5	Num
	7	Associated Task 3 Title	50	Alpha
	8	Associated Task 4 #	5	Num
	9	Associated Task 4 Title	50	Alpha
	10	Associated Task 5 #	5	Num
	11	Associated Task 5 Title	50	Alpha
	12	Time Mean	4	Num
	13	Time SD	4	Num
	14	Predictor 1 #	2	Num
	15	Predictor 1 Wt	5	Num
	16	Predictor 2 #	2	Num
	17	Predictor 2 Wt	5	Num
	18	Predictor 3 #	2	Num
	19	Predictor 3 Wt	5	Num
	20	Predictor 4 #	2	Num
	21	Predictor 4 Wt	5	Num
	22	Predictor 5 #	2	Num
	23	Predictor 5 Wt	5	Num
	24	Predictor 6 #	2	Num
	25	Predictor 6 Wt	5	Num
	26	Predictor 7 #	2	Num
	27	Predictor 7 Wt	5	Num
	28	Predictor 8 #	2	Num
	29	Predictor 8 Wt	5	Num
	30	Predictor 9 #	2	Num
	31	Predictor 9 Wt	5	Num
	32	Predictor 10 #	2	Num
	33	Predictor 10 Wt	5	Num
	34	Time Intercept	5	Num
	35	Single Pred. 1 #	2	Num
	36	Single Pred. 1 Wt	5	Num

Table 4.2-23. (Continued)

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
	37	Single Pred. 1 Int.	5	Num
	38	Single Pred. 2 #	2	Num
	39	Single Pred. 2 Wt	5	Num
	40	Single Pred. 2 Int.	5	Num
	41	Single Pred. 3 #	2	Num
	42	Single Pred. 3 Wt.	5	Num
	43	Single Pred. 3 Int.	5	Num
	44	Single Pred. 4 #	2	Num
	45	Single Pred. 4 Wt.	5	Num
	46	Single Pred. 4 Int.	5	Num
	47	Single Pred. 5 #	2	Num
	48	Single Pred. 5 Wt.	5	Num
	49	Single Pred. 5 Int.	5	Num
	50	Single Pred. 6 #	2	Num
	51	Single Pred. 6 Wt	5	Num
	52	Single Pred. 6 Int.	5	Num
	53	Single Pred. 7 #	2	Num
	54	Single Pred. 7 Wt.	5	Num
	55	Single Pred. 7 Int.	5	Num
	56	Single Pred. 8 #	2	Num
	57	Single Pred. 8 Wt.	5	Num
	58	Single Pred. 8 Int.	5	Num
	59	Single Pred. 9 #	2	Num
	60	Single Pred. 9 Wt.	5	Num
	61	Single Pred. 9 Int.	5	Num
	62	Single Pred. 10 #	2	Num
	63	Single Pred. 10 Wt.	5	Num
	64	Single Pred. 10 Int.	5	Num
	65	Accuracy Mean	4	Num
	66	Accuracy SD	4	Num
	67	Predictor 1 #	2	Num
	68	Predictor 1 Wt.	5	Num
	69	Predictor 2 #	2	Num
	70	Predictor 2 Wt.	5	Num
	71	Predictor 3 #	2	Num
	72	Predictor 3 Wt.	5	Num
	73	Predictor 4 #	2	Num
	74	Predictor 4 Wt.	5	Num
	75	Predictor 5 #	2	Num
	76	Predictor 5 Wt.	5	Num
	77	Predictor 6 #	2	Num
	78	Predictor 6 Wt.	5	Num
	79	Predictor 7 #	2	Num
	80	Predictor 7 Wt.	5	Num
	81	Predictor 8 #	2	Num
	82	Predictor 8 Wt.	5	Num
	83	Predictor 9 #	2	Num
	84	Predictor 9 Wt.	5	Num

Table 4.2-23. (Continued)

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
	85	Predictor 10 #	2	Num
	86	Predictor 10 Wt.	5	Num
	87	Time Intercept	2	Num
	88	Single Pred. 1 #	2	Num
	89	Single Pred. 1 Wt.	5	Num
	90	Single Pred. 1 Int.	5	Num
	91	Single Pred. 2 #	2	Num
	92	Single Pred. 2 Wt.	5	Num
	93	Single Pred. 2 Int.	5	Num
	94	Single Pred. 3 #	2	Num
	95	Single Pred. 3 Wt.	5	Num
	96	Single Pred. 3 Int.	5	Num
	97	Single Pred. 4 #	2	Num
	98	Single Pred. 4 Wt.	5	Num
	99	Single Pred. 4 Int.	5	Num
	100	Single Pred. 5 #	2	Num
	101	Single Pred. 5 Wt.	5	Num
	102	Single Pred. 5 Int.	5	Num
	103	Single Pred. 6 #	2	Num
	104	Single Pred. 6 Wt.	5	Num
	105	Single Pred. 6 Int.	5	Num
	106	Single Pred. 7 #	2	Num
	107	Single Pred. 7 Wt.	5	Num
	108	Single Pred. 7 Int.	5	Num
	109	Single Pred. 8 #	2	Num
	110	Single Pred. 8 Wt.	5	Num
	111	Single Pred. 8 Int.	5	Num
	112	Single Pred. 9 #	2	Num
	113	Single Pred. 9 Wt.	5	Num
	114	Single Pred. 9 Int.	5	Num
	115	Single Pred. 10 #	2	Num
	116	Single Pred. 10 Wt.	5	Num
	117	Single Pred. 10 Int.	5	Num

NO. OF TABLES = 10 (NO. OF PROJECT A MOSs)

NO. OF RECORDS = 10 (MAX. NO. OF TASK TYPES WITHIN AN MOS)

TYPE = VARIABLE

Table 4.2-24. Data for Project A Prediction Equations

This table will list separate regression equations for each task type with available Project A data. The equations will predict task performance (either time or accuracy) as a function of personnel characteristics and task performance frequency and recency. Since we did not receive the frequency data until two weeks before the due date for the design specifications, we were not able to complete development of the regression equations. However, preliminary results are enclosed in Attachment A.

Table 4.2-25A.

FILE ID: Projected End Strength

DESCRIPTION: Lists the projected end strength listed in current USAREL strategic plan (FY 86-91).

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
1	1	File ID	10	Alpha
	1	Year	4	Num
2	2	End Strength in Hundred Thousands	3	Num

ESTIMATED NO. OF TABLES: 1

ESTIMATED NO. OF RECORDS: 5 (NUMBER OF YEARS IN END STRENGTH PROJECTION)

LENGTH: VARIABLE

Table 4.2-25B.

FILE ID: Distribution Data for Transition Predictor Variables

DESCRIPTION: Lists the % distribution of each category associated with each transition predictor variable.

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
1	1	File ID	10	Alpha
	2	Transition Predictor Code	1	Alpha
2	1	Category Code	1	Alpha
	2	% Distribution	4	Num

ESTIMATED NO. OF TABLES: 5 (NUMBER OF TRANSITION PREDICTOR VARIABLES)

ESTIMATED NO. OF RECORDS: 5 (MAXIMUM NUMBER OF CATEGORIES WITHIN A TRANSITION PREDICTOR VARIABLE)

LENGTH: FIXED

Table 4.2-25C.

FILE ID: % Distribution for Hierarchical Subpopulations

DESCRIPTION: Lists the % distributions for subpopulations at each level subpopulation hierarchy.

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
1	1	File ID	10	Alpha
	2	Baseline Year	4	Num
2	1	Subpopulation %	3	Num

ESTIMATED NO. OF TABLES: 1

ESTIMATED NO. OF RECORDS: 160

LENGTH: FIXED

Table 4.2-26A Data for Projected End Strength*

	FY 87	FY 88	FY 89	FY 90	FY 91
End Strength	780	780	780	780	780

*SOURCE: I am The American Soldier, FC 21-451, 31 October 1986, and USAREC Strategic Plan FY 86-91

Table 4.2-26B % Distribution Data for Transition Predictor Variables*

VARIABLE	CATEGORY	%
1- Sex	1-Male	87.1
	2-Female	12.9
2- High School Grad. Status	1-HS Grad.	90.7
	2-Non-HS Grad.	9.3
3- AFQT Group	1-1	3.7
	2-2	32.6
	3-3a	26.6
	4-3b	28.5
	5-4+5	8.5
		0.0
4- Age at Entry	1 17-21	87.0
	2 21+	13
5- Racial/Ethnic Descent Group	1-White	73.0
	2-Black	21.0
	3-Hispanic	2.4
	4-Other	3.6

* SOURCE: I am The American Soldier, 31 October 1986

TABLE 4.2-26C % DISTRIBUTION DATA FOR HIERARCHIAL SUBPOPULATION

LEVEL	VARIABLE	CATEGORY	%	PERCENTAGE	
1	SEX	MALE	87.1	87.1	
		FEMALE	12.9	12.9	
					100.00
2	H.S. GRAD. STATUS	HIGH SCHOOL GRADUATE	90.7		
		NON-HIGH SCHOOL GRADUATE	9.3		
		Male - H.S. Grad.		78.9997	
		Male - Non-H.S. Grad.		8.1003	
		Female - H.S. Grad.		11.7003	
		Female - Non-H.S. Grad.		1.1997	
					100.00
3	AFQT GROUP	1	3.7		
	GROUP 1	Male H.S. Grad.		2.922988	
		Male Non-H.S. Grad.		0.299711	
		Female H.S. Grad.		0.432911	
		Female Non-H.S. Grad.		0.044388	
					3.70
	GROUP 2	2	32.6		
		Male H.S. Grad.		25.75390	
		Male Non-H.S. Grad.		2.640697	
		Female H.S. Grad.		3.814297	
		Female Non-H.S. Grad.		0.391102	
					32.60
	GROUP 3A	3A	26.6		
		Male H.S. Grad.		21.01392	
		Male Non-H.S. Grad.		2.154679	
		Female H.S. Grad.		3.112279	
		Female Non-H.S. Grad.		0.319120	
					26.60
	GROUP 3B	3B	28.5		
		Male H.S. Grad.		22.51491	
		Male Non-H.S. Grad.		2.308585	
		Female H.S. Grad.		3.334585	
		Female Non-H.S. Grad.		0.341914	
					28.50
	GROUP 4 & 5	4 & 5	8.5		
		Male H.S. Grad.		6.714974	
	(Group 4 = 8.5%)	Male Non-H.S. Grad.		0.688525	
	(Group 5 = 0%)	Female H.S. Grad.		0.994525	
		Female Non-H.S. Grad.		0.101974	
					8.50

TABLE 4.2-26C % DISTRIBUTION DATA FOR HIERARCHIAL SUBPOPULATION

LEVEL	VARIABLE	CATEGORY	%	PERCENTAGE	
4	AGE AT ENTRY	AGE 17-21	87		
		1			
		Male H.S. Grad.		2.543000	
		Male Non-H.S. Grad.		0.260748	
		Female H.S. Grad.		0.376632	
		Female Non-H.S. Grad.		0.038618	
					3.22
		2			
		Male H.S. Grad.		22.40589	
		Male Non-H.S. Grad.		2.297407	
		Female H.S. Grad.		3.318439	
		Female Non-H.S. Grad.		0.340258	
					28.36
		3A			
		Male H.S. Grad.		18.28211	
		Male Non-H.S. Grad.		1.874571	
		Female H.S. Grad.		2.707683	
		Female Non-H.S. Grad.		0.277634	
					23.14
		3B			
		Male H.S. Grad.		19.58797	
		Male Non-H.S. Grad.		2.008469	
		Female H.S. Grad.		2.901089	
		Female Non-H.S. Grad.		0.297465	
					24.80
		4 & 5			
		Male H.S. Grad.		5.842027	
		Male Non-H.S. Grad.		0.599017	
		Female H.S. Grad.		0.865237	
		Female Non-H.S. Grad.		0.088717	
					7.40
		AGE 21+	13		
		1			
		Male H.S. Grad.		0.379988	
		Male Non-H.S. Grad.		0.038962	
		Female H.S. Grad.		0.056278	
		Female Non-H.S. Grad.		0.005770	
					0.48
		2			
		Male H.S. Grad.		3.348007	
		Male Non-H.S. Grad.		0.343290	
		Female H.S. Grad.		0.495858	
		Female Non-H.S. Grad.		0.050843	
					4.24

TABLE 4.2-26C % DISTRIBUTION DATA FOR HIERARCHIAL SUBPOPULATION

LEVEL	VARIABLE	CATEGORY	%	PERCENTAGE
		3A		
		Male H.S. Grad.		2.731809
		Male Non-H.S. Grad.		0.280108
		Female H.S. Grad.		0.404596
		Female Non-H.S. Grad.		0.041485
				3.46
		3B		
		Male H.S. Grad.		2.926938
		Male Non-H.S. Grad.		0.300116
		Female H.S. Grad.		0.433496
		Female Non-H.S. Grad.		0.044448
				3.71
		4 & 5		
		Male H.S. Grad.		0.872946
		Male Non-H.S. Grad.		0.089508
		Female H.S. Grad.		0.129288
		Female Non-H.S. Grad.		0.013256
				1.11
5	RACIAL/ETHNIC DECENT GROUP	WHITE	73	
		AGE 17-21		
		1		
		Male H.S. Grad.		1.856390
		Male Non-H.S. Grad.		0.190346
		Female H.S. Grad.		0.274941
		Female Non-H.S. Grad.		0.028191
				2.35
		2		
		Male H.S. Grad.		16.35630
		Male Non-H.S. Grad.		1.677107
		Female H.S. Grad.		2.422460
		Female Non-H.S. Grad.		0.248389
				20.70
		3A		
		Male H.S. Grad.		13.34594
		Male Non-H.S. Grad.		1.368437
		Female H.S. Grad.		1.976608
		Female Non-H.S. Grad.		0.202673
				16.89
		3B		
		Male H.S. Grad.		14.29922
		Male Non-H.S. Grad.		1.466182
		Female H.S. Grad.		2.117795

TABLE 4.2-26C % DISTRIBUTION DATA FOR HIERARCHIAL SUBPOPULATION

LEVEL	VARIABLE	CATEGORY	%	PERCENTAGE
		Female Non-H.S. Grad.	0.217149	
				18.10
		4 & 5		
		Male H.S. Grad.	4.264680	
		Male Non-H.S. Grad.	0.437282	
		Female H.S. Grad.	0.631623	
		Female Non-H.S. Grad.	0.064764	
				5.40
		AGE 21+		
		1		
		Male H.S. Grad.	0.277391	
		Male Non-H.S. Grad.	0.028442	
		Female H.S. Grad.	0.041383	
		Female Non-H.S. Grad.	0.004212	
				0.35
		2		
		Male H.S. Grad.	2.444045	
		Male Non-H.S. Grad.	0.250602	
		Female H.S. Grad.	0.361976	
		Female Non-H.S. Grad.	0.037115	
				3.09
		3A		
		Male H.S. Grad.	1.994221	
		Male Non-H.S. Grad.	0.204479	
		Female H.S. Grad.	0.295355	
		Female Non-H.S. Grad.	0.030284	
				2.52
		3B		
		Male H.S. Grad.	2.136665	
		Male Non-H.S. Grad.	0.219084	
		Female H.S. Grad.	0.316452	
		Female Non-H.S. Grad.	0.032447	
				2.70
		4 & 5		
		Male H.S. Grad.	0.637251	
		Male Non-H.S. Grad.	0.065341	
		Female H.S. Grad.	0.094380	
		Female Non-H.S. Grad.	0.009677	
				0.81
5	RACIAL/ETHNIC DECENT GROUP	BLACK	21	
		AGE 17-21		
		1		
		Male H.S. Grad.	0.534030	

TABLE 4.2-26C % DISTRIBUTION DATA FOR HIERARCHIAL SUBPOPULATION

LEVEL	VARIABLE	CATEGORY	%	PERCENTAGE
		Male Non-H.S. Grad.	0.054757	
		Female H.S. Grad.	0.079092	
		Female Non-H.S. Grad.	0.008109	
				0.68
		2		
		Male H.S. Grad.	4.705237	
		Male Non-H.S. Grad.	0.482455	
		Female H.S. Grad.	0.696872	
		Female Non-H.S. Grad.	0.071454	
				5.96
		3A		
		Male H.S. Grad.	3.839243	
		Male Non-H.S. Grad.	0.393659	
		Female H.S. Grad.	0.568613	
		Female Non-H.S. Grad.	0.058303	
				4.86
		3B		
		Male H.S. Grad.	4.113474	
		Male Non-H.S. Grad.	0.421778	
		Female H.S. Grad.	0.609228	
		Female Non-H.S. Grad.	0.062467	
				5.21
		4 & 5		
		Male H.S. Grad.	1.226825	
		Male Non-H.S. Grad.	0.125793	
		Female H.S. Grad.	0.181699	
		Female Non-H.S. Grad.	0.018630	
				1.55
	AGE 21+			
		1		
		Male H.S. Grad.	0.079797	
		Male Non-H.S. Grad.	0.008182	
		Female H.S. Grad.	0.011818	
		Female Non-H.S. Grad.	0.001211	
				0.10
		2		
		Male H.S. Grad.	0.703081	
		Male Non-H.S. Grad.	0.072091	
		Female H.S. Grad.	0.104130	
		Female Non-H.S. Grad.	0.010677	
				0.89
		3A		
		Male H.S. Grad.	0.573680	
		Male Non-H.S. Grad.	0.058822	
		Female H.S. Grad.	0.084965	
		Female Non-H.S. Grad.	0.008711	

TABLE 4.2-26C % DISTRIBUTION DATA FOR HIERARCHIAL SUBPOPULATION

LEVEL	VARIABLE	CATEGORY	%	PERCENTAGE
				0.73
		3B		
		Male H.S. Grad.		0.614657
		Male Non-H.S. Grad.		0.063024
		Female H.S. Grad.		0.091034
		Female Non-H.S. Grad.		0.009334
				0.78
		4 & 5		
		Male H.S. Grad.		0.183318
		Male Non-H.S. Grad.		0.018796
		Female H.S. Grad.		0.027150
		Female Non-H.S. Grad.		0.002783
				0.23
5	RACIAL/ETHNIC DECENT GROUP	HISPANIC	2.4	
		AGE 17-21		
		1		
		Male H.S. Grad.		0.061032
		Male Non-H.S. Grad.		0.006257
		Female H.S. Grad.		0.009039
		Female Non-H.S. Grad.		0.000926
				0.08
		2		
		Male H.S. Grad.		0.537741
		Male Non-H.S. Grad.		0.055137
		Female H.S. Grad.		0.079642
		Female Non-H.S. Grad.		0.008166
				0.68
		3A		
		Male H.S. Grad.		0.438770
		Male Non-H.S. Grad.		0.044989
		Female H.S. Grad.		0.064984
		Female Non-H.S. Grad.		0.006663
				0.56
		3B		
		Male H.S. Grad.		0.470111
		Male Non-H.S. Grad.		0.048203
		Female H.S. Grad.		0.069626
		Female Non-H.S. Grad.		0.007139
				0.60
		4 & 5		
		Male H.S. Grad.		0.140208
		Male Non-H.S. Grad.		0.014376
		Female H.S. Grad.		0.020765
		Female Non-H.S. Grad.		0.002129

TABLE 4.2-26C % DISTRIBUTION DATA FOR HIERARCHIAL SUBPOPULATION

LEVEL	VARIABLE	CATEGORY	%	PERCENTAGE
				0.18
		AGE 21+		
		1		
		Male H.S. Grad.		0.009119
		Male Non-H.S. Grad.		0.000935
		Female H.S. Grad.		0.001350
		Female Non-H.S. Grad.		0.000138
				0.01
		2		
		Male H.S. Grad.		0.080352
		Male Non-H.S. Grad.		0.008238
		Female H.S. Grad.		0.011900
		Female Non-H.S. Grad.		0.001220
				0.10
		3A		
		Male H.S. Grad.		0.065563
		Male Non-H.S. Grad.		0.006722
		Female H.S. Grad.		0.009710
		Female Non-H.S. Grad.		0.000995
				0.08
		3B		
		Male H.S. Grad.		0.070246
		Male Non-H.S. Grad.		0.007202
		Female H.S. Grad.		0.010403
		Female Non-H.S. Grad.		0.001066
				0.09
		4 & 5		
		Male H.S. Grad.		0.020950
		Male Non-H.S. Grad.		0.002148
		Female H.S. Grad.		0.003102
		Female Non-H.S. Grad.		0.000318
				0.03
5	RACIAL/ETHNIC DECENT GROUP	OTHER	3.6	
		AGE 17-21		
		1		
		Male H.S. Grad.		0.091548
		Male Non-H.S. Grad.		0.009386
		Female H.S. Grad.		0.013558
		Female Non-H.S. Grad.		0.001390
				0.12
		2		
		Male H.S. Grad.		0.806612
		Male Non-H.S. Grad.		0.082706

TABLE 4.2-26C % DISTRIBUTION DATA FOR HIERARCHIAL SUBPOPULATION

LEVEL	VARIABLE	CATEGORY	%	PERCENTAGE
		Female H.S. Grad.	0.119463	
		Female Non-H.S. Grad.	0.012249	
				1.02
		3A		
		Male H.S. Grad.	0.658155	
		Male Non-H.S. Grad.	0.067484	
		Female H.S. Grad.	0.097476	
		Female Non-H.S. Grad.	0.009994	
				0.83
		3B		
		Male H.S. Grad.	0.705167	
		Male Non-H.S. Grad.	0.072304	
		Female H.S. Grad.	0.104439	
		Female Non-H.S. Grad.	0.010708	
				0.89
		4 & 5		
		Male H.S. Grad.	0.210313	
		Male Non-H.S. Grad.	0.021564	
		Female H.S. Grad.	0.031148	
		Female Non-H.S. Grad.	0.003193	
				0.27
	AGE 21+			
	1			
		Male H.S. Grad.	0.013679	
		Male Non-H.S. Grad.	0.001402	
		Female H.S. Grad.	0.002026	
		Female Non-H.S. Grad.	0.000207	
				0.02
	2			
		Male H.S. Grad.	0.120528	
		Male Non-H.S. Grad.	0.012358	
		Female H.S. Grad.	0.017850	
		Female Non-H.S. Grad.	0.001830	
				0.15
		3A		
		Male H.S. Grad.	0.098345	
		Male Non-H.S. Grad.	0.010083	
		Female H.S. Grad.	0.014565	
		Female Non-H.S. Grad.	0.001493	
				0.12
		3B		
		Male H.S. Grad.	0.105369	
		Male Non-H.S. Grad.	0.010804	
		Female H.S. Grad.	0.015605	
		Female Non-H.S. Grad.	0.001600	
				0.13

TABLE 4.2-26C % DISTRIBUTION DATA FOR HIERARCHIAL SUBPOPULATION

LEVEL	VARIABLE	CATEGORY	%	PERCENTAGE
		4 & 5		
		Male H.S. Grad.		0.031426
		Male Non-H.S. Grad.		0.003222
		Female H.S. Grad.		0.004654
		Female Non-H.S. Grad.		0.000477
				0.04

(LOB1.WR1)

4.3 ESTIMATE OF LIBRARY SIZE

Table 4.3-1 lists size estimates for each library. Table 4.3-1 lists size estimate for each library. Table 4.3-2 lists the formula that was used to make these size estimates.

Table 4.3-1. Estimate of Library Size

Table#	Table Name	Size
4.2-01	System Types by Mission Area	72
4.2-03	MOS by System Type	1,879
4.2-05	MOS Titles	21,360
4.2-07	MOSs by CMF	2,254
4.2-11	Personnel Variables Summary	3,240
4.2-13	Personnel Variables Descriptions	8,034
4.2-15	Projected Accessions Descriptions	459
4.2-17	Current Cut-Offs by MOS	29,010
4.2-19	CMF Characteristics Priority File	41,622
4.2-21	Project A - Product 1 Linkages	28,371
4.2-23	Project A - Task Description	198,330
4.2-25A	Projected End Strength	150
4.2-25B	Distribution Data for Transition Predictor Variables	480
4.2-25C	Distribution for Hierarchical Subpop.	1,946
	TOTAL:	337,207

Table 4.3-2. Formula for Estimating Data Base Size.

Data Base Size in Bytes:

No. of Tables x (No. of Bytes/Header) + (No. of Records) x (No. of Bytes/Record)

Where: One Alphanumeric Character Field = 1 Bytes
One Numeric Character Field = 4 Bytes

SECTION 5.0 - DESCRIPTION OF INPUT/OUTPUT

5.1 OVERVIEW

Table 5.1-1 lists the major I/O files associated with each PCEA step. These files include input data files from other $(MPT)^2$ products and external sources and the output files each PCEA step produced. The output files will be saved on hard disk where they can be accessed in future user applications of the PCEA. Analysts expect other $(MPT)^2$ products to access a subset of these output files. (see Section 7.1 for a description of the files expected to be used by other Products).

Table 5.1-1. List of Working Files.

STEP	FILE	TABLE
All	Systems (I,O)	Table 5.1-2
0	Product 2 Source MOS File (I)	Table 5.1-3
	Product 3 Source MOS File (O)	Table 5.1-4
1	MOS Input Data Files (I)*	Table 5.1-5A,B
	Total Army Input Data Files (I)	Table 5.1-6 A,B,C
	Product 1 Input Data Files (I)	Table 5.1-7 A,B
2	Initial Inventory Files (O)	Table 5.1-8
	(Intentionally Left Blank)	Table 5.1-9
	Transition Rate File (I,O)	Table 5.1-10
	(Intentionally Left Blank)	Table 5.1-11
	(Intentionally Left Blank)	Table 5.1-12
	(Intentionally Left Blank)	Table 5.1-13
	Projected Inventory File	Table 5.1-14
	Current Distributions File (I,O)	Table 5.1-15
	Projected Distributions File (O)	Table 5.1-16
3	Projected Hierarchical Distribution File (O)	Table 5.1-17
	Characteristic Cut-Off File (O)	Table 5.1-18
	Selected Characteristic Priorities File (O)	Table 5.1-19
	Projected Distribution Summary	Table 5.1-20
2	MOS Change File (I)	Table 5.1-21

*This file is only used by PCEA maintenance organization.

Table 5.1-2.

FILE ID: System List

DESCRIPTION OF CONTENTS: Lists the system description data for all systems.

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
1		Identification Record	10	Alpha
	1	Comment Field	80	Alpha
2 - end		System Description Data	118	Alpha
	1	Mission Area	1	Alpha
	2	System Type	1	Alpha
	3	System Name	30	Alpha
	4	Date Last Accessed	8	XX/XX/XX
	5	Step Last Completed	1	Num

ESTIMATED NO. OF TABLES = 1

ESTIMATED NO. OF RECORDS = 10

FIXED OR VARIABLE LENGTH FILE = VARIABLE

Table 5.1-3.

FILE ID: Product 2 Source MOS File

DESCRIPTION: For each system lists Operator MOS (OPMOS), Number of Operator MOS (NUMMOS), and Maintenance MOS (MAMOS) to support the system.

RECORD 1	DESCRIPTION	LENGTH	DATA TYPE
Field 1	File ID	10	Alphanumeric
Field 2	System Code	1	Alphanumeric
RECORD 2			
Field 1	OPMOS (1)	3	Alphanumeric
Field 2	NUMMOS (1)	2	Numeric
Field 3	OPMOS (2)	3	Alphanumeric
Field 4	NUMMOS (2)	2	Numeric
Field 5	OPMOS (3)	3	Alphanumeric
Field 6	NUMMOS (3)	2	Numeric
Field 7	MAMOS (1)	3	Alphanumeric
Field 8	MAMOS (2)	3	Alphanumeric
↓	↓	↓	↓
Field 19	MAMOS (13)	3	Alphanumeric

ESTIMATED NO. OF TABLES = 1

ESTIMATED NO. OF RECORDS = 1

FIXED OR VARIABLE FILE LENGTH = VARIABLE

Table 5.1-4.

FILE ID: Product 3 Source MOS File

DESCRIPTION: For each system in product 3 lists operator and maintainer MOSs

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
1	1	File ID	10	Alpha
	2	System Code	1	Alpha
2	1	OPMOS 1	3	Alpha
	2	New MOS-OPMOS 1	3	Alpha
	3	OPMOS 2	3	Alpha
	4	New Mos-OPMOS 2	3	Alpha
	5	OPMOS 3	3	Alpha
	6	New OPMOS 3	3	Alpha
	7	MAMOS 1	3	Alpha
	8	New MAMOS 1	3	Alpha
	9	MAMOS 2	3	Alpha
	10	New MAMOS 2	3	Alpha
	↓	↓	↓	↓
	31	MAMOS/3	3	Alpha
	32	New MAMOS/3	3	Alpha
	33			

NO. OF TABLES = 3 (MAXIMUM # OF SYSTEMS)

NO. OF RECORDS = 1

LENGTH = VARIABLE

Table 5.1-5A. MOS Input Data File-EMF

FILE ID: MOS Input Data File-EMF

DESCRIPTION: Lists the input variables to be obtained from EMF.

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
1	1	File ID	10	ALPHA
	2	MOS	3	ALPHA
	3	Year	4	ALPHA
	4	CMF	2	NUMERIC
	5	SSN	9	NUMERIC
2	1	CL COMPOSITE	3	NUMERIC
	2	CO COMPOSITE	3	NUMERIC
	3	EL COMPOSITE	3	NUMERIC
	4	FA COMPOSITE	3	NUMERIC
	5	GM COMPOSITE	3	NUMERIC
	6	MM COMPOSITE	3	NUMERIC
	7	FO COMPOSITE	3	NUMERIC
	8	SC COMPOSITE	3	NUMERIC
	9	ST COMPOSITE	3	NUMERIC
	10	GT COMPOSITE	3	NUMERIC
	11	AFQT SCORE	3	NUMERIC
	12	AFQT MENTAL CATEGORY	1	ALPHA
	13	PULHES-STAMINA	1	NUMERIC
	14	PULHES-UPPER	1	NUMERIC
	15	PULHES-LOWER	1	NUMERIC
	16	PULHES-EYES	1	NUMERIC
	17	PULHES-HEARING	1	NUMERIC
	18	PULHES-SENSES	1	NUMERIC
	19	MEPSCAT	1	NUMERIC
	20	SEX	1	NUMERIC
	21	AUDIO PERL. STANDARD	3	NUMERIC
	22	CIV. ED LEVEL	1	ALPHA
	23	DATE OF BIRTH	6	ALPHA
	24	RACIAL ETHNIC DESCENT GROUP	1	ALPHA
	25	STATE OF HOME RECORD	2	ALPHA
3	-	TRANSITION RATE VARIABLES-TIME PERIOD 1		
	1	PRIMARY MOS	5	ALPHA
	2	PAYGRADE	1	NUMERIC
4	-	TRANSITION RATE VARIABLES-TIME PERIOD 2		
	1	PRIMARY MOS	5	ALPHA
	2	PAYGRADE	1	NUMERIC

MAXIMUM NO. OF TABLES = 217, 267 (MAX. NUMBER OF INDIVIDUALS IN LARGEST MISSION AREA)

MAXIMUM RECORDS = 1

LENGTH = VARIABLE

Table 5.1-5B. MOS Input Data File-ORMF

FILE ID: MOS Input Data File-ORMF

DESCRIPTION: Lists the input variables to be obtained from ORMF.

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
1	1	File ID	10	ALPHA
	2	MOS	3	ALPHA
	3	Year	4	ALPHA
	4	CMF	2	NUMERIC
	5	SSN		
2	1	HEIGHT	2	NUMERIC
	2	BLOOD PRESSURE DIASTOLIC	3	NUMERIC

MAXIMUM NO. OF TABLES = 217, 267 (MAX. NUMBER OF INDIVIDUALS IN LARGEST MISSION AREA)

MAXIMUM RECORDS = 1

LENGTHS = VARIABLE

Table 5.1-6A.

FILE ID: Projected End Strength

DESCRIPTION: Lists the projected end strength listed in current USAREL strategic plan (FY 86-91).

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
1	1	File ID	10	Alpha
2	1	Year	4	Num
	2	End Strength in Hundred Thousands	7	Num

ESTIMATE NO. OF TABLES: 1

ESTIMATED NO. OF RECORDS: 5 (MAX. NUMBER OF YEARS IN END STRENGTH PROJECTION)

LENGTH: FIXED

Table 5.1-6B.

FILE ID: Distribution Data for Transition Predictor Variables

DESCRIPTION: Lists the % distributions of each category associated with each transition predictor variable at the total Army level.

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
1	1	File ID	10	Alpha
	2	Transition Pred. Code	1	Alpha
2				
	1	Category Title	1	Alpha
	2	% Distribution	4	Num

NO. OF TABLES = 5 (SEPARATIONS, PROMOTIONS, ACCESSIONS, MIGRATIONS-IN, MIGRATIONS-OUT)

ESTIMATED NO. OF RECORDS: 5 (MAXIMUM NUMBER OF CATEGORIES WITHIN A TRANSITION PREDICTOR VARIABLE)

LENGTH: FIXED

Table 5.1-6C.

FILE ID: % Distributions for Hierarchical Subpopulations

DESCRIPTION: Lists the % distributions for subpopulations at each level of subpopulation hierarchy.

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
1	1	File ID	10	Alpha
	2	Baseline Year	4	Num
2	1	Subpopulation %	3	Num

ESTIMATED NO. OF TABLES: 1

ESTIMATED NO. OF RECORDS: 160 (MAXIMUM NUMBER OF SUBPOPULATIONS)

LENGTH: FIXED

Table 5.1-7A. Product 1 Input File- Function Performance Criteria.

FILE ID: Functional Performance Criteria

DESCRIPTION: Lists the performance time and accuracy criteria, as well as the accuracy standard, for each function in a given mission.

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
1		Identification Record	10	Alphanum.
	1	System Code	1	Alphanum.
	2	Mission Number	12	Alphanum.
	3	Condition Set Number	12	Alphanum.
2-End		Function Performance		
	1	Function Number	12	Alphanum
	2	Time	XXXXX.XX	Flt. Pt.
	3	Accuracy	XXX.XX	Flt. Pt. (%)
	4	Accuracy Standard	80	Alphanum

MAXIMUM NO. OF TABLES = 10 (MAX NUMBER OF MISSIONS)

MAXIMUM NO. OF RECORDS = 20 (MAX NUMBER OF FUNCTIONS PER MISSION)

FIXED OR VARIABLE LENGTH FILE = VARIABLE

Table 5.1-7B. Product 1 Input Data File- Task Performance Criteria.

FILE ID: Product 1 Input Data File - Task Performance Criteria

DESCRIPTION: Lists the performance time and accuracy criteria, as well as the accuracy standard, for each task in a given function as determined in Product 1.

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
1		Identification Record	10	Alphanum.
	1	System Code	1	Alphanum.
	2	Mission Number	12	Alphanum.
	3	Function Number	12	Alphanum.
	4	Condition Set Number	12	Alphanum.
2-End		Task Performance		
	1	Task Number	12	Alphanum
	2	Time	XXXXX.XX	Flt. Pt. (min)
	3	Accuracy	XXX.XX	Flt. Pt.
	4	Accuracy Standard	80	Alphanum

MAXIMUM NO. OF TABLES = 200 (10 MISSIONS X 20 FUNCTIONS)

ESTIMATED NO. OF RECORDS = 8 (MAXIMUM NUMBER OF TASKS PER FUNCTION)

FIXED OR VARIABLE LENGTH FILE = VARIABLE

Table 5.1-8. Initial Inventory File.

FILE ID: Initial Inventory File

DESCRIPTION: This file lists the % distribution for all hierarchically arranged subpopulations within the MOSs in a functional area for the year upon which the PCEA input data is based.

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
1	1	File ID	10	Alpha
	2	System Code	1	Alpha
	3	Year (In Inventory)	4	Num
	4	MOS	3	Alpha
	5	Subpopulation Code	10	Alpha
2	1	Paygrade	1	Num
	2	Percent Distribution	2	Num

MAXIMUM NO. OF TABLES = 2400 (15 MOS PER FUNCTIONAL AREA X 160 HIERARCHICAL SUBPOPULATIONS)

NO. OF RECORDS = 6 (NUMBER OF PAYGRADE CATEGORIES)

LENGTH - VARIABLE

Table 5.1-9

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Table 5.1-10. Transition Rate File.

FILE ID: Transition Rate

DESCRIPTION: This file lists the transition rates % for all selected subpopulations within system MOSs the current year and for each year in the projection horizon.

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
1	1	File ID	10	Alpha
	2	System Code	1	Alpha
	3	MOS	3	Alpha
	4	Subpopulation Code	10	Alpha
	5	Year	4	Num
2	1	Paygrade	1	Alpha
	2	Promotion Rate	2	Num
		Migration-In Rate	2	Num
		Migration-Out Rate	2	Num
		Separation Rate	2	Num
		Accession Plan	2	Num

MAXIMUM NO. OF TABLES = 26,400 (15 MOS X 160 HIERARCHICAL SUBPOPULATIONS X 11 YEARS X 1 SYSTEM)

MAXIMUM NO. OF RECORDS = 6 (NUMBER OF PAYGRADE CATEGORIES)

LENGTH - VARIABLE

Table 5.1-11

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Table 5.1-12

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Table 5.1-13

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Table 5.1-14. Projected Inventory File

FILE ID: Projected Inventory File.

DESCRIPTION: This file lists the % distribution for all hierarchically arranged subpopulations within the MOSs in a functional area for each year in the projection horizon.

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
1	1	File ID	10	Alpha
	2	System Code	2	Alpha
	3	Year	2	Alpha
	4	MOS	3	Alpha
	5	Subpopulation Code	3	Alpha
2	1	Paygrade	1	Num
	2	Projected Inventory	5	Num

MAXIMUM NO. OF TABLES = 24,000 (160 HIERARCHICAL SUBPOPULATIONS X 10 YEARS X 15 MOS)

MAXIMUM NO. OF RECORDS = 6 (NUMBER OF PAYGRADE CATEGORIES)

LENGTH = VARIABLE

Table 5.1-15. Current Distributions File.

FILE ID: Current Distributions File

DESCRIPTION: This file lists the current distributions file for all selected subpopulations within a system MOS on each personnel characteristic.

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
1	1	File ID	10	Alpha
	2	System Code	1	Alpha
	3	MOS	3	Num
	4	Year	4	Num
	5	Subpopulation Code	10	Alpha
2	1	Percent Distribution	2	Num

MAXIMUM NO. OF TABLES = 105 (15 MOS X 7 CHARACTERISTICS)

MAXIMUM NO. OF RECORDS = 1000 (MAX NUMBER OF SUBCATEGORIES FOR 3 CHARACTERISTICS WITH 5 CATEGORIES EACH, AND 1 WITH 8 CATEGORIES)

LENGTH - VARIABLE

Table 5.1-16. Projected Distributions File.

FILE ID: Projected Distributions File

DESCRIPTION: This file lists the projected distributions for all selected subpopulations within system MOSs in each personnel characteristic for all years in the projection horizon.

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
1	1	File ID	10	Alpha
	2	System Code	1	Alpha
	3	MOS	3	Num
	4	Year	4	Num
	5	Paygrade	1	Num
	6	Pers. Char. Code	2	Num
2	1	Probability	2	Num
	2	Cum. Prob.	2	Num

MAXIMUM NO. OF TABLES = 6300 (15 MOS X 10 YEARS X 6 PAYGRADES X 7 CHARACTERISTICS)

MAXIMUM NO. OF RECORDS = 5 (MAX. NUMBER OF PERSONNEL CHARACTERISTIC SUBCATEGORIES)

Table 5.1-17. Hierarchical Distribution File.

FILE ID: Hierarchical Distributions File

DESCRIPTION: This file lists the projected hierarchical distributions for all selected characteristics categories within an MOS.

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
1	1	File ID	10	Alpha
	2	System Code	1	Alpha
	3	MOS	3	Num
	4	Year	4	Num
	5	Paygrade	1	Num
2	1	% Distribution	2	Num
	2	Cumulative DoD	2	Num

MAXIMUM NO. OF TABLES = 15 (15 MOS)

MAXIMUM NO. OF RECORDS = 1000 (MAX NUMBER OF CHARACTERISTIC SUBCATEGORIES FOR 3 CHARACTERISTICS WITH 5 CATEGORIES EACH AND ONE WITH 8 CATEGORIES)

LENGTH = VARIABLE

Table 5.1-18. Characteristic Cut-Off File.

FILE ID: Characteristic Cut-Off File

DESCRIPTION: This file lists the cut-off levels selected by the PCEA for each selected personnel characteristic.

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
1	1	File ID	10	Alpha
	2	System Code	1	Alpha
	3	MOS	3	Num
	4	Year	4	Num
2	1	Char. Code	2	Num
	2	Cut-Off Value	10	Alpha

MAXIMUM NO. OF TABLES = (15 MOS) = 15

MAXIMUM NO. OF RECORDS = 38 (MAXIMUM NUMBER OF PERSONNEL CHARACTERISTICS)

LENGTH = VARIABLE

Table 5.1-19. Selected Characteristics Priorities File.

FILE ID: Selected Characteristics Priorities File

DESCRIPTION: This file lists the rank ordered priority for each personnel characteristic. These priorities are established by the user during application of the PCEA.

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
1	1	File ID	10	Alpha
	2	System Code	1	Alpha
	3	MOS	3	Num
	4	Year	4	Num
2	1	Characteristic Code	2	Alpha
	2	Characteristic Code	2	Alpha
	3	Characteristic Code	2	Alpha
	4	Characteristic Code	2	Alpha
	5	Characteristic Code	2	Alpha
	6	Characteristic Code	2	Alpha
	7	Characteristic Code	2	Alpha
	8	Characteristic Code	2	Alpha
	9	Characteristic Code	2	Alpha
	10	Characteristic Code	2	Alpha
	11	Characteristic Code	2	Alpha
	12	Characteristic Code	2	Alpha
	13	Characteristic Code	2	Alpha
	14	Characteristic Code	2	Alpha
	15	Characteristic Code	2	Alpha

MAXIMUM NO. OF TABLES = 150 (15 MOS X 10 YEARS)

MAXIMUM NO. OF RECORDS = 1

LENGTH = VARIABLE

Table 5.1-20. Projected Distribution Summary

FILE ID: Projected Distribution Summary.

DESCRIPTION: This file lists the projected distribution of each personnel characteristic within an MOS (characteristics not projected by Step 2 are assumed to be equal to current distribution).

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
1	1	File ID	10	Alpha
	2	System Code	1	Alpha
	3	MOS	3	Num
	4	Year	2	Num
	5	Grade	1	Alpha
	6	Characteristic Code	1	Alpha
2	1	Percent Distribution	2	Num

MAXIMUM NO. OF TABLES = 3330 (15 MOS X 6 PAYGRADES X 37 CHARACTERISTICS)

MAXIMUM NO. OF RECORDS = 8 (MAXIMUM NUMBER OF PERSONNEL CHARACTERISTIC CATEGORIES)

LENGTH = VARIABLE

Table 5.1-21. MOS Change File

FILE ID: MOS Change File.

DESCRIPTION: This file lists the changes to MOS that have occurred during the current year.

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
1	1	File ID	10	Alpha
	2	MOS Code	3	Alpha
	3	Year	4	Num
2	1	Target MOS 1 Title	30	Alpha
	2	Target MOS 2 Code	3	Alpha
	3	Target MOS 2 Title	30	Alpha
	4	Target MOS 2 Code	3	Alpha
	5	Target MOS 3 Title	30	Alpha
	6	Target MOS 3 Code	3	Alpha
	7	Parent MOS 1 Title	30	Alpha
	8	Parent MOS 1 Code	3	Alpha
	9	Parent MOS 2 Title	30	Alpha
	10	Parent MOS 2 Code	3	Alpha
	11	Parent MOS 3 Title	30	Alpha
	12	Parent MOS 3 Code	3	Alpha

MAXIMUM NO. OF TABLES = 100 (MAX. MOS IN FUNCTIONAL AREAS)

MAXIMUM NO. OF RECORDS = 1

LENGTH = VARIABLE

5.3 SIZE ESTIMATES FOR I/O FILES

Table 5.3-1 lists the size estimate for each working file. Separate totals are provided for files that will reside on the microcomputer and files that will reside on the VAX. Table 5.3-2 lists the formula that was used to develop size estimates for each file.

Table 5.3-1. Estimate of Table Size.

Fig. #	Table Name	Size (bytes)
5.1-02	System File	1,710
5.1-03	Product 2 Source MOS File	83
5.1-04	Product 3 Source MOS File	321
5.1-06A	Projected End Strength	230
5.1-06B	Distribution Data for Transition Predictor Variables	480
5.1-06C	% Distribution for Hierarchical Subpopulations	1,946
5.1-07A	Product 1 Input Data - Function Performance Criteria	28,350
5.1-07B	Product 1 Input Data - Task Performance Criteria	233,400
5.1-08	Initial Inventory File	268,800
5.1-10	Transition Rate File	8,184,000
5.1-14	Projected Inventory File	3,936,000
5.1-15	Current Distributions File	844,410
5.1-16	Projected Distributions File	825,300
5.1-17	Hierarchical Distribution File	240,645
5.1-18	Characteristics Cut-Off File	10,575
5.1-19	Selected Characteristics Priorities	10,350
5.1-20	Projected Distribution Summary	320,100
5.1-21	MOS Change File	22,700
Total:		14,929,400

Fig #	VAX Table Name	Size
5.1-05A	MOS Input Data File (EMF) for VAX Only	34,110,919
5.1-05B	MOS Input Data File (ORMF) for VAX Only	9,777,015
Total:		43,887,934

Table 5.3-2. Formula for Estimating Data Base Size.

Data Base Size in Bytes:

No. of Tables * ((No. of Bytes/Header) + (No. of Records) * (No. of Bytes/Record))

Where: One Alphanumeric Character Field = 1 Bytes

One Numeric Character Field = 4 Bytes

SECTION 6.0 - ALGORITHM AND MODEL DESCRIPTIONS

6.1 OVERVIEW

Table 6.1 lists the algorithms and models associated with each PCEA step. The table also gives the locations of detailed algorithm or model descriptions within the text.

The first algorithm, the Personnel Variable Rate Calculation Algorithm, is applied by the PCEA maintenance organization. It calculates both the current subpopulation distributions within each MOS and the current transition rates and personnel characteristic distributions within each subpopulation.

All remaining algorithms and models are applied by the user and are incorporated in the PCEA micro-computer based software.

6.2 ALGORITHM/MODEL DESCRIPTIONS

6.2.1 Personnel Variable Rate Calculation Program

Components:

EMF/ORMF Data Extraction Program (Section 6.2.1.1)
Calculation of Subpopulation Distributions, Transition Rates, and Personnel Characteristic Distributions (Section 6.2.1.2).

Table 6.1. Overview of Algorithms

STEP	ALGORITHM/ MODEL	SECTION AND PAGE #
0	None	
1	None	
2	Personnel Variable Rate Calculation Algorithm	Sect. 6.2-1*
	Accession Projection Algorithm	Sect. 6.2-2
	Transition Rate Modification Algorithm	Sect. 6.2-3
	Transition Rate Extrapolation Algorithm	Sect. 6.2-4
	Subpopulation Distribution Modification Algorithm	Sect. 6.2-6
	Extrapolation Program	Sect. 6.2-5
	Personnel Characteristics Flow Model	Sect. 6.2-7
	Distribution Algorithm	Sect. 6.2-8

* Not incorporated into microcomputer software

Table 6.1. Overview of Algorithms (Continued)

STEP	ALGORITHM/ MODEL	SECTION AND PAGE #
3	Probability Determination Algorithm	Sect. 6.2-9
	Cut-off Level Determination	Sect. 6.2-10
	Hierarchical Distribution Algorithm	Sect. 6.2-11
	Product 1 Comparison Algorithm	Sect. 6.2-12
4	Design Guidance Algorithm	Sect. 6.2-13
5	None	

6.2.1.1 EMF/ORMF Data Extraction Program

- Read the MOS by system type library (Tables 4.2-3 and 4.2-4) to determine MOSs associated with system types within functional areas.

- Read the EMF to identify all individuals in the above MOSs the beginning or end of year.

- For each individual, read the following fields from the EMF record.

  - SSN
  - CL Composite
  - CO Composite
  - EL Composite
  - FA Composite
  - GM Composite
  - MM Composite
  - FO Composite
  - SC Composite
  - ST Composite
  - GT Composite
  - AFQT Score
  - AFQT Mental Category
  - PULHES - Stamina
  - PULHES - Upper
  - PULHES - Lower
  - PULHES - Eyes
  - PULHES - Hearing
  - PULHES - Senses
  - MEPSCAT
  - Sex

- Audio Perc. Standard
- Civ Ed Level
- Date of Birth
- Racial ethnic descent group
- Primary MOS - Time Period 1
- Primary MOS - Time Period 2
- Paygrade - Time Period 1
- Paygrade - Time Period 2

- For each of the above individuals, read the following fields from the ORFM record:

  - SSN
  - Height
  - Blood Pressure

- Store the above data in the MOS Input file associated with each functional area.

6.2.1.2 Calculation of Subpopulation Distributions, Transition Rates, and Personnel Characteristic Distributions:
Components:

- CALCULATE DERIVED VARIABLES
- ASSIGN INDIVIDUALS TO VARIABLE CATEGORIES
- FORM SUBPOPULATION GROUPS
- CALCULATE TRANSITION RATES
- CALCULATE SUBPOPULATION DISTRIBUTIONS
- CALCULATE PERSONNEL CHARACTERISTIC DISTRIBUTIONS

CALCULATE DERIVED VARIABLES

Read the MOS Input File produced by the Data Extraction Program - Level 1. Calculate the ASVAB Quantitative score.

For each individual:

- Read the MK and AR subtest scores from the Input Data File.
- Sum the MK and AR scores.
- Convert the sums to composite scores using Table 6.2.1-1.

Calculate ASVAB Speed

For each individual:

- Read the CS and NO subtest scores from the Input Data File.
- Sum the CS and NO scores.
- Convert the sums to composite scores using Table 6.2.1-2.

Calculate ASVAB Technical

For each individual:

- Read the AS, MC, and EI subtest scores from the Input Data File.
- Sum the AS, MC, and .5 EI scores.
- Convert the sums to composite scores using Table 6.2.1-3.

Table 6.2.1-1 ASVAB Quantitative Composite Conversion Table

To be completed in Phase 3

Table 6.2.1-2 ASVAB Speed Composite Conversion Table

To be completed in Phase 3

Table 6.2.1-3 ASVAB Technical Composite Conversion Table

To be completed in Phase 3

Calculate ASVAB Verbal

For each individual:

- Read the VE and GS subtest scores from the Input Data File.
- Sum the VE and GS scores.
- Convert the sums to composite scores using Table 6.2.1-4.

Calculate Reading Grade level

For each individual:

- Read the GT score from the Input Data File.

- Convert the score to a reading grade level using Table 6.2.1-5.

Calculate High School Grad Status

For each individual:

- Read the Civilian Education Level from the Input Data File.
- If the Civ. Ed equals one (No high school diploma), then set the value equal to 1.
- In all other cases, set the value equal to zero (High School Grad).

Table 6.2-4 ASVAB Verbal Composite Conversion Table

To be completed in Phase 3

Table 6.2-5. Conversion From GT Scores to Reading Grade Level For ASVAB 6/7

Raw Score	GT Score Original Std Score1	GT Score Corrected Std Score2	Converted Grade Level	Raw Score	GT Score Original Std Score1	GT Score Corrected Std Score2	Converted Grade Level
0-5	53	53	3.5*	31	106	98	9.0
6	59	53	3.5	32	107	100	9.4
7	59	53	3.5	33	108	102	9.5
8	59	53	3.5	34	109	104	9.8
9	59	53	3.5	35	110	106	10.3
10	59	53	3.5	36	112	108	10.4
11	62	55	3.7	37	113	109	10.5
12	65	60	4.5	38	115	111	10.8
13	69	61	4.6	39	117	112	11.0
14	72	64	5.2	40	118	113	11.1
15	74	65	5.4	41	120	115	11.4
16	76	67	5.6	42	123	116	11.5
17	80	69	5.7	43	125	117	11.6
18	82	71	6.0	44	127	119	11.7
19	84	73	6.3	45	128	121	11.9
20	85	75	6.6	46	130	123	12.1
21	88	77	6.8	47	133	124	12.2
22	90	78	6.9	48	138	126	12.3
23	92	80	7.2	49	141	131	12.6
24	94	82	7.4	50	147	135	12.7
25	96	85	7.7				
26	97	87	7.9				
27	99	89	8.0				
28	100	92	8.3				
29	103	94	8.6				
30	104	96	8.8				

1 Operational Scores of record from 1 Jan 76 thru 30 Sep 80
2 Official Conversion as of 1 Oct 80.

* Composite (GT=WK+AR)

Calculate age category

For each individual:

- Read the Date of Birth from the Input Data File.
- Subtract the DOB from the current date.
- Assign personnel to age categories using the categories listed in the Personnel Characteristic Variable Description.

Add and save the above calculated variables in the MOS Input Data File.

ASSIGN INDIVIDUALS TO CATEGORIES

Develop categories for the quantitative variable:

- Read the scores for every quantitative variable listed in the Personnel Variables Summary Library (Table 4.2-11) for every individual within an MOS from the MOS Input Data file.

- Assign individuals to categories based on the groups listed in the Personnel Variables Description (see Tables 4.2-13 and 4.2-14).

- Add and save assignments on the MOS Input Data file.

FORM SUBPOPULATION GROUPS

- Form subpopulation groups by making all possible combinations of the five transition predictor variables. Use Table 6.2.1-8 to determine where each variable and category should be listed in the subpopulation group title.

- Read the MOS Input File for each MOS and assign each individual to a subpopulation group based on their category assignments for the individual transition rate predictor variables.

- Add and save the subpopulation assignment on the MOS Input Data File.

CALCULATE TRANSITION RATES

Read the following from the MOS Input file from time periods 1 and 2.

- Subpopulation Group Assignment

- Primary MOS (EMF Pos. 75, Loc. 211-215)

- Paygrade (EMF Pos. 38, Loc. 109)

Determine Impacts of MOS Changes:

- Read the MOS Change file to determine changes to the MOS structure.

Table 6.2.1-8 Order for Forming Subpopulation Groups

Variable	Category
1-Sex	1-Male
	2-Female
2-High School Grad. Status	1-HS Grad
	2-Non-HS Grad.
3 AFQT Group	1-1
	2-2
	3-3a
	4-3b
	5-4+5
4-Age at Entry	1 17-21
	2 21+
5-Racial/Ethnic Descent Group	1-White
	2-Black
	3-Hispanic
	4-Other

- Add equivalent MOS designations to each individual's record in the MOS Input file.

- If the MOS Change file does not exist, then assume no changes.

Set the MOS equal to the PMOS unless the PMOS is not assigned, then set the MOS equal to the Projected MOS.

Set the grade group membership as follows:

- If paygrades equal 1,2, or 3, the grade group is equal to one. Otherwise, the grade group equals the paygrade.

For each MOS/grade groups/subpopulation group:

- Count the number of individuals in the group.

- Calculate the Separation Rate.

  - If the individual exists on the file at the Beginning of Year, but not at the End of Year, add 1 to the Total Separations.

  - Divide the Total Separations by the group total.

- Calculate Promotion Rate:

  - If the paygrade from period is greater than the paygrade from period one, add paygrade one to the Total Promotions figure.

- Divide the Total Promotions by the group total.

- Calculate the Migration-In and Migration-Out Rates:

  - If the MOS has changed between time periods one and two and the change is not due to a change in the MOS structure, then add one to the Total Migrations-In for the current MOS and one to the Total Migrations-Out for the old MOS.

  - Divide the Total Migrations-In and Total Migrations-Out by group totals.

- Store transition rates for each subpopulation within an MOS/grade on Initial Inventory File.

CALCULATE CURRENT SUBPOPULATION DISTRIBUTIONS

For each MOS/grade group:

- Read the subpopulation assignments for each individual from the MOS. Input the Data File.

- Sum the total number in each subpopulation.

- Divide the total number in each subpopulation by the total number in the MOS/grade to obtain the subpopulation percentage.

Calculate Aggregate Population Distributions:

- For each of the transition predictor variables (see Table 6.2.1-8), add together the subpopulations associated with each variable category (for example, add together all the male subpopulations).

- Store subpopulation distributions on the Projected Inventory File.

CALCULATE PERSONNEL CHARACTERISTIC DISTRIBUTIONS

For each MOS/grade:

- Read the MOS-Cutoff file to determine the characteristics associated with each MOS.

- Apply the Hierarchical Distribution Algorithm (see Section 6.2-11) to form a hierarchy of characteristic categories within each subpopulation.

- Read the characteristic category assignments from the MOS Input Data File.

- Count the number of individuals into each characteristic category within the MOS/grade.

- Divide the number of individuals in each category by the total in the MOS/grade.

- Combine grades one to three for each MOS.

- Store the personnel characteristic distributions on the Current Distributions file.

6.2.2 Accession Distribution Algorithm

Components:

- Calculate the Current Accession Distributions.
- Determine Current and Projected Total Army End Strength.
- Determine projected accessions by year.
- Estimate accession distributions for subpopulation groups for the projected years.

CALCULATE CURRENT ACCESSION DISTRIBUTIONS

For each MOS:

- For each subpopulation within an MOS, set the distribution percentage for grade zero (accessions) equals to the distribution percentage for grade one.
- For each personnel characteristic category within a subpopulation, set the distribution percentage for grade zero (accessions) equal to the distribution percentage for grade 1.

DETERMINE CURRENT AND PROJECTED TOTAL ARMY END STRENGTH

- Read the current and projected end strength in the Army by year from the Total Army Input Data File (see Table 5.1.5):

- If the user has entered a projected end strength for a year, then set the projected end strength equal to that value. Otherwise, set the projected end strength for the year equal to the value for the last year in the Total Army Input File.

DETERMINE PROJECTED ACCESSIONS BY YEAR

- If the user has entered a projected accession value for each year, then set the total projected accessions equal to that value

- If the user has entered a projected end strength for the MOSs in a functional area:

  - Read the initial inventory for the MOSs in the functional area from the Initial Inventory File for paygrade 1 (E1/2/3) and for all paygrades combined.

  - Compute the ratio of the E1/2/3 initial inventory to the initial total inventory

  - Apply the ratio to each of the yearly projected end strengths to determine the yearly projected accessions.

- Otherwise, set the projected accessions to the Initial Inventory for paygrade 1 for all years of the projection period.

ESTIMATE MOS ACCESSION DISTRIBUTIONS FOR SUBPOPULATIONS FOR PROJECTED YEARS

- Calculate distribution for female accessions by year.
  - Read the percent of females for paygrade 1 and all other selected subpopulations from the Current Distribution File.
  - Determine the number of female accessions by subpopulation group by multiplying the total accessions for each year by the percent of females in each subpopulation group.
- Calculate distribution of male over 21 year olds accessions by year.
  - Read the percent of males over 21 years at entry for paygrade 1 and all other selected subpopulations from the Current Distributions File.
  - Determine the number of male over 21 years old by subpopulation group by multiplying the total accessions for each year by the percent of male 21 years old in each subpopulation group.
- Calculate distribution of males 21 years and under accessions by year.
  - Read the percent of males 21 years and under at entry for paygrade 1 from the Current Distribution File (combine all subcategories except sex and age at entry).

- Read the percent of males 21 years old and under for the combined mental category and education subgroups included in the Projected Accession Description File.

- Read the propensity to enlist values for all years for males 21 years old and under from the Projected Accession Description File.

- Read total and strength for the MOSs in the functional area for males 21 years old and under from the Initial Inventory File.

- Calculate a ratio of projected strength for the functional area to the total projected Army strength.

- Apply the ratio to each element of the Projected Accession Description File to determine the propensity to enlist for the MOSs in the functional area under analysis.

- Rank order the propensity to enlist values for each year in the order of desired accession quality.

- Fill the accessions required for the MOSs in the functional area from the propensity to enlist values starting with the highest ranked value and filling each mental category/education subpopulation until all are filled.

- Determine the distribution of the remaining subpopulations for the MOSs in the functional area by multiplying the total accessions (by mental category/education) by the percent in each of the remaining subpopulations.

- Store the resulting accession values in the Transition Rate File (accession plans) in shown at Table 5.1-10.

ESTIMATE MOS ACCESSION DISTRIBUTIONS FOR PERSONNEL CHARACTERISTICS VARIABLES FOR PROJECTED YEARS

To Calculate Current Distributions For Each MOS,

- Read the Current Distributions File (see Table 5.1-14).
- Determine both the number of individuals currently falling into each category for the personnel characteristics and the two remaining transition predictor variables (race/ ethnic group, geographic area) within each of the subpopulation groups.
- Divide by the total number of individuals within the subpopulations within the MOS to determine the current percent breakdown of the personnel characteristics categories within each of the subpopulations.
- Multiply the current percent breakdown for the personnel characteristics categories within each subpopulation by the projected subpopulation distribution for the MOS to obtain the projected distribution of each personnel characteristic category at the MOS level.

6.2.3 Transition Rate Modification Algorithm

Components:

- Apply Global Modifications
- Apply Discrete Modifications

APPLY GLOBAL MODIFICATIONS

If the user enters a global percent change, then the new value equals the old value times (one plus or minus a percentage change) for all rate variables and MOSs, grades, and years selected.

If the user enters a specific value, then the new value equals the specific value for all rate variables, grades, and years selected.

APPLY DISCRETE MODIFICATIONS

For a specific combination of year, grade and rate variables selected, the new value equals the value input by the user.

6.2.4 Transition Rate Extrapolation Algorithm

Components:

- Apply Global Extrapolations
- Apply Discrete Extrapolations

APPLY GLOBAL EXTRAPOLATIONS

If the user uses the global extrapolation, then the new year value equals the baseline year value for all rate variables, grades, and new years selected.

If the user enters a specific value, then the new year value equals the specific value for all rate variables, grades, and new years selected.

APPLY DISCRETE EXTRAPOLATIONS

For a specific combination of new years, grade and rate variables selected, the new year value equals the baseline year values time the multiplier entered by the user.

6.2.5 Subpopulation Distribution Modification Algorithm

Components:

- Apply Global Modifications
- Apply Discrete Modifications

APPLY GLOBAL MODIFICATIONS

If the user enters a global percent change, then the new value equals the old value times (one plus or minus percent change) for all subpopulations, MOSs, grades, and years selected.

If the user enters a specific value, then the new value equals the specific value for all subpopulations, MOSs, grades, and years selected.

APPLY DISCRETE MODIFICATIONS

For a specific combination of year, grade, characteristic, and characteristic category selected, the new value equals the value input by the user.

6.2.6 Subpopulation Distribution Extrapolation Algorithm

Components:

- Apply Global Extrapolations
- Apply Discrete Extrapolations

APPLY GLOBAL EXTRAPOLATIONS

If the user uses a global percent extrapolation, then the new year value equals the baseline year value for all subpopulations, MOSs, grades, and new years selected.

If the user enters a specific value, then the new year value equals the specific value for all subpopulations, MOSs, grades, and new years selected.

APPLY DISCRETE EXTRAPOLATIONS

For a specific combination of new years, grade and subpopulations and MOSs selected, the new year value equals baseline year value time the multiplier.

6.2.7 Personnel Characteristics Flow Model (PCFM)

The PCFM projects the inventory through a user-specified year. It calculates new inventories and updates the inventory files. It also calculates separations, migrations, and promotions and updates the separations, migrations, and promotion files. It is run interactively by selecting the Flow Model option from the PCFM main menu. Figure 6.2.7-1 illustrates the flow computations for enlisted personnel. The following paragraphs describe the computations.

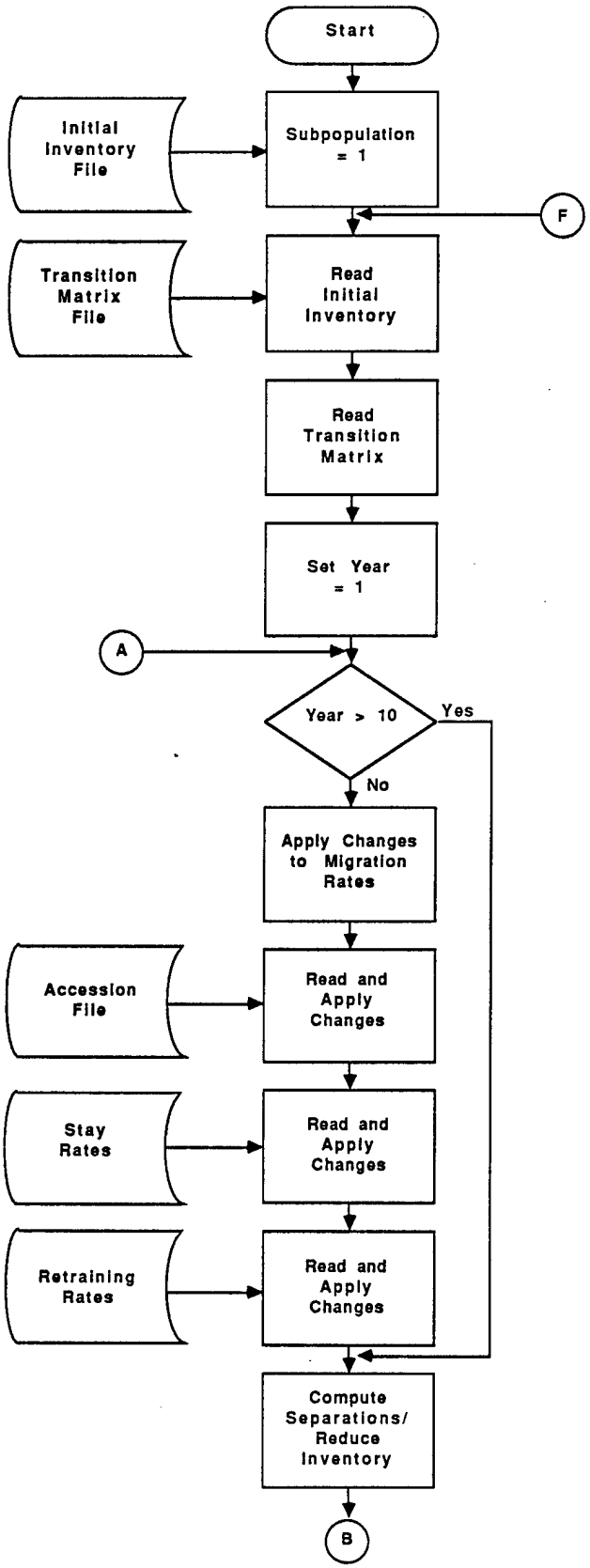


Figure 6.2.7-1. Flow Computations for Enlisted Personnel

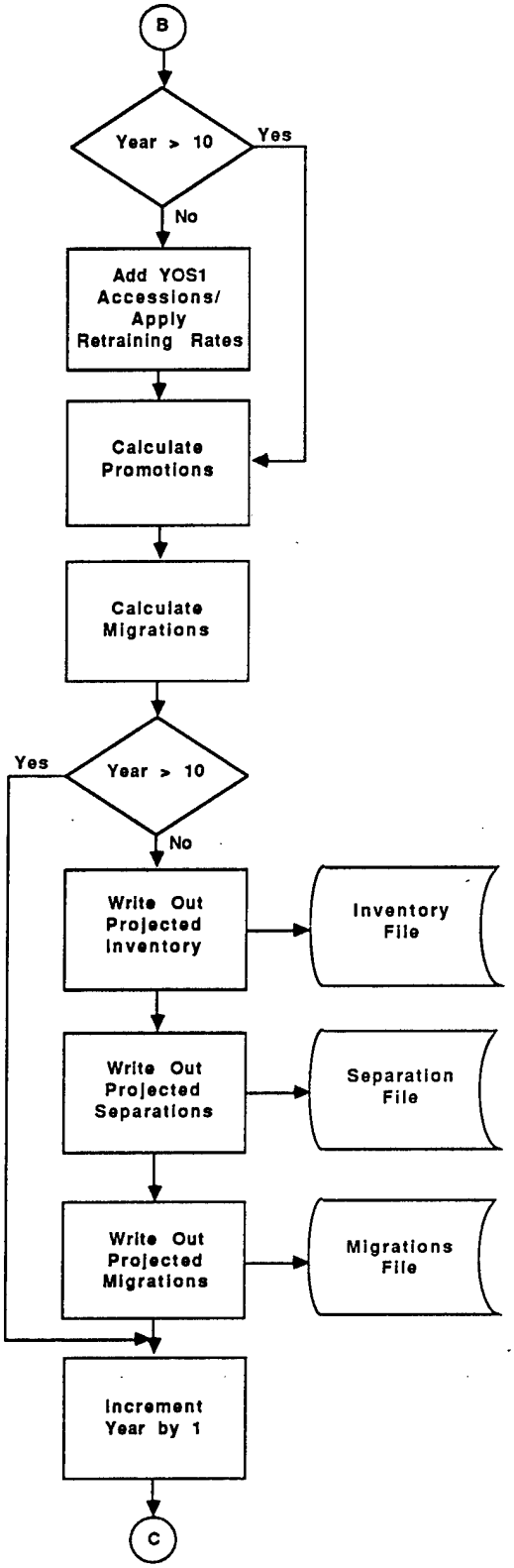


Figure 6.2.7-1. Flow Computations for Enlisted Personnel (Continued)

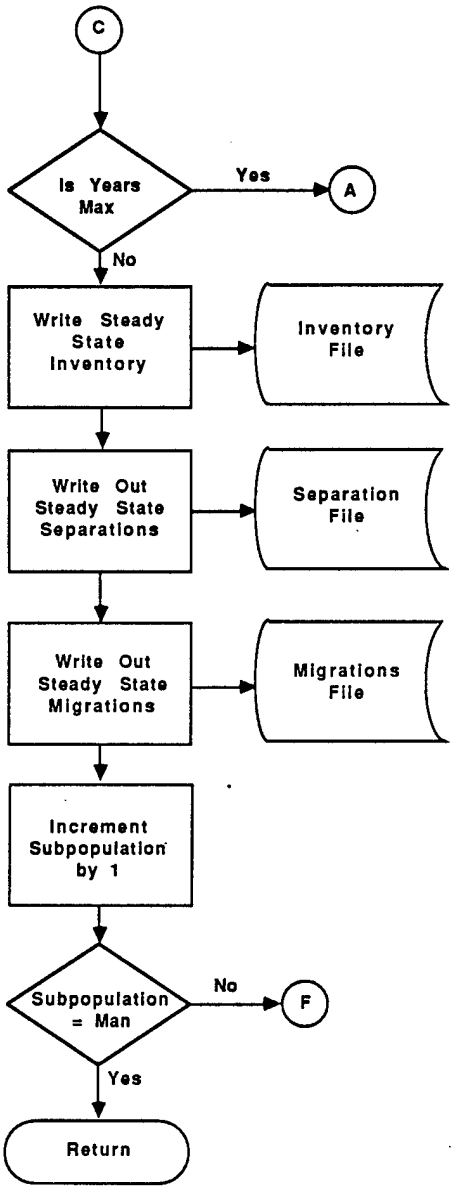


Figure 6.2.7-1. Flow Computations for Enlisted Personnel (Continued)

INDICES

Rank: r = 1,2,...,6 (1/2/3,4,5,6,7,8/9)
MOS: s = 1...M, M=1,...,15
Time Periods: t = 0,...,n
where n = 1,...,10 years
Subpopulation
or Fixed Group: f = 1,...,260

(f and n are selected by the user)

INITIAL DATA

INV(f,0,s,r) Initial inventory at the beginning of year one having rank r and MOS s for fixed group f.

ACC(f,t,s,r) Accessions during year t having rank r and MOS s for fixed group f.

RSEP(f,t,s,r) Rate of separation expressed as a number between zero and one. The fraction of those in the Army at the end of year t-1 who are not in the Army at the end of year t.

RPRO(f,t,s,r) Rate of a promotion from rank r to rank r+1. Given that the rank is rat the end of year t, the rank is r+1 at the end of the year t+1. The following restriction applies for Eqs. (3) and (4) under part (d):

RPRO(f,t,s,7) = 0
where t=0, .. .,10

RMOT(f,t,s,r) Rate of migrations-out as a number between zero and one. The fraction of those in MOSs who will migrate out of that MOS into another during time period t, for rank r and fixed group f.

RMIN(f,t,s,r) Rate of migration-in as a number between zero and one. The fraction of those in MOSs who will migrate into that MOS from another during time period t, for rank r and fixed group f.

VARIABLES COMPUTED

INV(f,t,s,r) The inventory at the end of year t having rank r, MOSs, and fixed group f for t=1,...,10.

SEP(f,t,s,r) Separations from the Army during year t. The number that are in the Army at the end of year t-1, and who leave the Army before the end of year t where t=1,...,10.

MIGO(f,t,s,r) Migrations out of MOSs during year t, with rank r, and fixed group f.

MIGI(f,t,s,r) Migrations into MOSs during year t, with rank r, and fixed group f.

PRO(f,t,s,r) Promotions during the year t into rank r (from rank r-1) for MOSs.

COMPUTATIONS

- The computations proceed by fixing and computing all the years t=1,...,n. "f" is then incremented and the process is repeated. The value of f can range from one to 160. In the equations below, f can be considered to be the same fixed constant in each equation. The other indices (t,s,r) can vary over their given ranges unless otherwise stated.

- The separations are calculated first by multiplying the starting inventories by the separation rates.

  (1) SEP(f,t,s,r) = INV(f,t-1,s,r) * RSEP(f,t-1,s,r)
  where t= 1,...,10

- The starting inventory is then reduced by the separations.

  (2) INV(f,t,s,r) = INV(f,t-1,s,r) - SEP(f,t,s,r)
  where t = 1,...,10

- The promotions are calculated by multiplying the starting inventories by the promotions rates.

  (3) PRO(f,t,s,r) = INV (f,t-1,s,r-1) * RPRO (f,t,s,r)
  where t=1,...,10
  and r=2,...,6

- The inventory is then reduced by the promotions for the losing paygrade and increased by the promotions for the gaining paygrade.

(4) INV (f,t,s,r) = INV (f,t,s,r) + PRO (f,t,s,r)
- PRO (f,t,s,r-1)

where t=1,...,10
and r=2,...,6

- The inventory for the initial paygrade is reduced by the promotions to paygrade 2 (E4).

(5) INV (f,t,s,1) = INV (f,t,s,1) - PRO (f,t,s,2)

- Migrations are then computed by miltiplying the appropriate migration rate by the starting inventory.

(6) MIGO (f,t,s,r) = INV (f,t-1,s,r) * RMOT (f,t,s,r)

(7) MIGI (f,t,s,r) = INV (f,t-1,s,r) * RMIN (f,t,s,r)

- Since the migrations - out must equal the migrations-in or any given time period, paygrade, and fixed group, the migrations-in are normalized in each time period by applying the ratio of the migrations-in to the migrations-out the migrations-in value, for each MOSs.

$$(8)\ MIGI(f,t,s,r) = \frac{\sum_{s} MOT(f,t,s,r)}{\sum_{s} MIN(f,t,s,r)} * MIGI(f,t,s,r)$$

- The inventory is then adjusted for the migrations by adding migrations-in and subtracting migrations out for each inventory cell.

(9) INV (f,t,s,r) = INV° (f,t,s,r) + MIGI (f,t,s,r)
- MIGO (f,t,s,r)

(NOTE: The original inventory must be temporarily stored in INV° to avoid errors in the computations.)

- Accessions are then added into the initial rank cell.

(10) INV(f,t,s,1) = ACC(f,t,s,1)

where t = 1,...,10.

- For each fixed group, f, equations one (1) through six (10) are calculated for each value of t. That is, set t equal to one and the equations one (1) through six (10) are executed. Then set t equal to two and the equations are executed again and so on. The maximum value of t was shown as 10. In actuality, the value of t can vary from one to 10 depending on the last flow year as entered by the user.

6.2.8 Distribution Algorithm

Components:

- Calculate the Projected Subpopulation Distributions.
- Calculate the Projected Personnel Characteristic Distributions Within the MOS.

CALCULATE PROJECTED SUBPOPULATION DISTRIBUTIONS

- Read the projected inventory output created by the Personnel Characteristic Flow Algorithm (see Section 6.2-7).

- Add the total number of projected slots for each MOS/grade and for each subpopulation within each MOS/grade.

- Divide the total in the subpopulation by the total in each MOS/grade to obtain the subpopulation percent of the MOS.

CALCULATE PROJECTED PERSONNEL CHARACTERISTICS DISTRIBUTIONS WITHIN MOS

Calculate the Current percent Within Each Subpopulation Within each MOS/grade

- Read the Initial Inventory file (see Table 5.1-14) to determine the current percent breakdown for each subpopulation within each MOS/grade.

- Read the Current Distributions File to determine the total in each category for each personnel characteristic within each subpopulation within each MOS/grade and the total in each subpopulation.

- Divide the total in each category by the total in the subpopulation to obtain the category percent for each characteristic.

- Multiply category percent for each characteristic by the projected subpopulation percent to obtain the projected category percent within the MOS/grade.

6.2.9 Probability Determination Algorithm

Components:

- Select the Mode of Cut-off Determination.
- Determine the Probability For Independent Characteristics.
- Determine the Probability For Interrelated Characteristics.

SELECT THE MODE OF CUT-OFF DETERMINATION

- Set the mode equal to the independent mode if the user selects the independent mode in Block 6 of Step 3.
- Set the mode equal to the interdependent mode if the user selects the interdependent mode in Block 6 of Step 3.

PROBABILITY DETERMINATION FOR INDEPENDENT CHARACTERISTICS

- For each characteristic selected in Block 4 of Step 3, read the Personnel Variables Description library to determine the rank order of personnel characteristics categories (low rank to categories which have lower value to Army).

- Read the Projected Distributions File saved in Block 71 of Step 2 to determine the percent associated with each category within an MOS.

- Using the rank order of categories, add percentages to calculate the cumulative percentage of people scoring at, or below, each category.

- Subtract these values from one to determine the probability of a person scoring at, or above, each category for every subpopulation and year.

- Store the cumulative probabilities in the Projected Distributions file.

PROBABILITY DETERMINATION FOR INTERDEPENDENT CHARACTERISTICS

- For each characteristic selected in Block 4 of Step 3, read the Personnel Variables Description library to determine the rank order of personnel characteristics categories (low rank to categories which have lower value to Army).

- Read the Hierarchical Distribution File (Table 5.1-16) created by the Hierarchical Distributor Algorithm (see Section 6.2-11) to determine the personnel characteristic subcategories formed by hierarchically linking the categories associated with each characteristic.

- Rank order the personnel characteristics subcategories according to the rank order of their parent categories.

- Read the Hierarchical Distribution File (Table 5.1-16) created in Block 9 to determine a percentage associated with each subcategory within each subpopulation in an MOS.

- Using the rank order of subcategories, add the percentages to calculate the cumulative percentage of people scoring at, or below, each subcategory.

- Subtract these values from one to determine probability of a person scoring at, or above, each subcategory for every subpopulation and year.

- Store the cumulative probabilities in the Projected Hierarchical Distributions File.

6.2.10 Cut-off Level Determination Algorithm

Components:

- Select the Mode of Cut-off Determination.
- Determine the Cut-off For Independent Characteristics.
- Determine the Cut-off For Interrelated Characteristics.

SELECT MODE OF CUT-OFF DETERMINATION

- Set the mode equal to the independent mode if the user selected the independent mode in Block 6 of Step 3.

- Set the mode equal to the interdependent mode if the user selected the interdependent mode in Block 6 of Step 3.

CUT-OFF DETERMINATION FOR INDEPENDENT CHARACTERISTICS

- Read the Projected Distribution files created in Block 16 of Step 3 to determine the cumulative distribution probabilities associated with each personnel characteristic category.

- Starting with the highest-ranked category (i.e., category with highest rank to Army), compare the cumulative probability of getting someone at, or above, the category with the user's desired probability selected in Block 16.

- If the cumulative probability is equal to the desired probability, set the cut-off equal to that category.

- If the cumulative probability is less than the desired probability, continue on to next lower-ranked category.

- If the cumulative probability is greater than the desired probability, then set the cut-off equal to the value for the next highest ranked category.

CUT-OFF DETERMINATION FOR INTERDEPENDENT CHARACTERISTICS

- Read the Projected Hierarchical Distribution File (Table 5.1-16) to determine both the personnel characteristic subcategories formed by hierarchically linking the categories associated with each characteristic and cumulative distribution probabilities associated with each personnel characteristic subcategory.

- Starting with the highest-ranked subcategory (i.e., subcategory with highest value to Army), compare the cumulative probability of getting someone at, or above, the subcategory with the user's desired probability selected in Block 16.

- If the cumulative probability is equal to the desired probability, then set the cut-off equal to the category values that comprise the subcategory.

- If the cumulative probability is less than the desired probability, then continue on to the next lower-ranked subcategory.

- If the cumulative probability is greater than the desired probability, then set the cut-off equal to the value of the category values that comprise the next highest subcategory.

6.2.11 Hierarchical Distribution Algorithm

Components:

- Develop Rank-Ordered Subcategories.
- Calculate Percent Distributions For Each Subcategory.

DEVELOP RANK-ORDERED SUBCATEGORIES

- From the user input provided in Block 4, rank order the characteristics with the highest priority characteristics receiving the highest rank.

- For each characteristic selected in Block 4 of Step 3, read the Personnel Variables Description library (see Tables 4.2-13 and 4.2-14) to determine the rank order of personnel characteristics categories (low rank to categories which have lower value to Army).

- From the user input provided in Block 6, identify characteristics with preselected categories. If a characteristic has a preselected category, then it is treated as if it only had this one category in the remainder of this algorithm.

- Hierarchical subcategories are formed within each subpopulation as follows. The categories within the second-highest ranked characteristic are placed within the categories within the highest ranked characteristic. The categories of the third-ranked characteristic are placed within these categories, etc., until the categories for the lowest ranking characteristic have been placed. The lowest categories within this hierarchy are termed "subcategories."

- The subcategories are rank ordered according to the rank order of the characteristics and characteristic categories associated with them. For example, the highest ranked subcategory would consist of top-ranked categories for all characteristics.

CALCULATE PERCENT DISTRIBUTIONS FOR EACH SUBCATEGORY

- Read the Projected Distributions file (see Table 5.1-15) to determine the projected percent breakdown for each subpopulation within each MOS/grade.

- Multiply the current subcategory percentage within a subpopulation by the projected subpopulation percentage to obtain the projected subcategory percentage within the MOS and subpopulation.

6.2.12 Product 1-Comparison Algorithm

Components:

- Read the Product 1 Input Files.
- Establish Linkages To Project A tasks.
- Compare to the Product 1 Criteria.

READ PRODUCT 1 INPUT FILES

- Read the Product 1 Input files (see Table 5.1-6) to obtain a list of Product 1 functional tasks and associated task time and accuracy criteria for the condition set selected by the user in Block 18 of Step 3.

- Identify MOSs selected by the user in Block 18.

ESTABLISH LINKAGES TO PROJECT A TASKS

Read the Project A-Product 1 Task Linkages library (see Tables 4.2-21 and 4.2-22) to identify Project A task clusters associated with each Product 1 functional task.

- If a new functional task has been added in Product 1, then use all task clusters associated with the function in which the functional task is embedded.

- If a new function has been added in Product 1, then no comparison is possible. The system will note this and print out an appropriate message.

- Compare MOSs selected in Block 18 with MOSs attached to Product 1 functional tasks. Eliminate for additional analyses any Product 1 functional task not associated with an MOS selected in Block 18.

COMPARE WITH PRODUCT 1 CRITERIA

- Read the Project A Task Description library (see Tables 4.2-23 and 4.2-24) to obtain weights for predictors. Read the Personnel Variables Summary library (see Tables 4.2-11 and 4.2-12) to link predictor numbers referenced in Project A Task description library to predictor titles.

- Put weights and cut-off levels selected by the Cut-off Level Determination Algorithm (see Section 6.2-10) in Block 19 of Step 3 into prediction equations.

- Apply prediction equations to develop estimates of expected time and accuracy at the cut-off level for each task cluster.

- Compare results with equivalent Product 1 functional task criteria.

- Calculate absolute differences.

- Calculate percent differences.

6.2.13 Design Guidance Algorithm

- Read the Characteristic Cut-off file (see Table 5.1-17) saved in Block 28 of Step 3 to determine the cut-off values for each characteristic.

- Read the Project A-Product 1 Task Linkages library (see Tables 4.2-21 and 4.2-22) to identify Project A task clusters associated with each Product 1 functional task.

- If a new functional task has been added in Product 1, then use all the task clusters associated with the function in which the functional task is embedded.

- If a new function has been added in Product 1, then no comparison is possible. The system will note this and print out an appropriate message.

- Compare MOSs selected in Block 18 with MOSs attached to the Product 1 functional tasks. Eliminate for additional analyses any Product 1 functional task not associated with an MOS selected in Block 18 of Step 3.

- Read the Project A Task Description library (see Tables 4.2-23 and 4.2-24) to obtain weights for predictors. Read the Personnel Variables Summary library (see Tables 4.2-11 and 4.2-12) to link predictor numbers referenced in the Project A Task description library to predictor titles. If the cut-offs are selected independently, then use weights related to simple correlations. If cut-offs are selected using interrelated characteristics, use weights related to the multiple regression equation.

- Put weights and cut-off levels selected by the Cut-off Level Determination Algorithm (see Section 6.2-10) in Block 19 of Step 3 into the prediction equations. If cut-offs are selected independently, then there will be a separate equation for each characteristic and MOS combination. If cut-offs are selected using set of related characteristics, then only one equation is applied for each MOS/characteristic combination.

- Apply the prediction equations to develop estimates of expected time and accuracy at the cut-off level for each task type.

SECTION 7.0 - EXTERNAL INTERFACES

7.1 INTERFACES WITH OTHER PRODUCTS

7.1.1 Overview

The first four $(MPT)^2$ products, the System Performance Requirements Estimation Aid (SPREA), the Manpower Constraints Estimation Aid (MCEA), the Personnel Constraints Estimation Aid (PCEA), and the Training Constraints Estimation Aid (TCEA), will estimate MPT-related requirements and constraints during Requirements/Technology Base Activities Phase. This phase is one of the earliest acquisition process phases.

The SPREA will assist Army combat developers in identifying comprehensive and unambiguous system performance requirements and missions. The MCEA, the PCEA, and the TCEA will provide tools for estimating Manpower, Personnel, and Training (MPT) constraints, respectively. The system performance requirements produced by SPREA and the MPT constraints produced by the three other aids will be included in Army requirements documents and system specifications. Together, they will provide a comprehensive set of guidelines for prime contractors.

To estimate the personnel characteristic distributions, the PCEA will use the maximum manpower constraints produced by the MCEA as an estimate of the number of operators and maintainers likely to be required for each new system.

The personnel characteristic information the PCEA produces may be used as input for the task time and accuracy estimates in Product 5, the Manpower Determination Aid (MDA).

Product 6, the Personnel Requirements Estimation Aid (PREA), will estimate the personnel characteristic levels each contractor design requires. By comparing these required levels against the personnel characteristic constraints, the personnel characteristic deficits can be identified.

7.1.2 Input/Output Files

Table 7.1.2-1 lists the specific files that are input to the PCEA from other $(MPT)^2$ Products and the PCEA output files that will be used by other products.

7.2 EXTERNAL DATA SOURCES

Table 7.2-1 lists the external files (i.e., files which are not produced by other MPT^2 products) which provide input to the PCEA. All of these files will be generated by the PCEA maintenance organization. The first two files, the Projected End Strength file (Table 5.1-6A) and the Distribution Data for Transition Predictor Variables (Table 5.1-6A) and the Distribution Data for Transition Predictor Variables (Table 5.1-6B), are small files which are readily obtained from existing hardcopy reports which are produced on a yearly basis.

Table 7.1.2-1. Inputs/Outputs to Other Products

INPUTS TO PCEA		
FILE	**PRODUCT**	**DESCRIPTION**
Product 2 Source MOS File (Table 5.1-3)	2	• Lists Source MOSs for New System
Functional Performance Criteria (Table 5.1-7A)	1	• Lists Performance Criteria for System Functions
Task Performance Criteria (Table 5.1-7B)	1	• Lists Performance Criteria for System Functional Tasks
PCEA OUTPUTS TO OTHER PRODUCTS		
FILE	**PRODUCT**	**DESCRIPTION**
Projected Distribution Summary	5,6	• Lists Projected Distributions for Personnel Characteristics Within an MOS/Grade

Table 7.2-1 Inputs Provided By PCEA Maintenance Organization

FILE	DESCRIPTION	SOURCE
Projected. . .End Strength (See Table 3.1-6A)	Lists Total Army End Strength Projected for Four Years	• Obtained From Current USAREL Strategic Plan
Distribution Data for Transition Predictor Variables (Table 5.1-6B)	Distribution Data for Five Transition Predictor Variables at Total Army Level	• Generated by PVRCM or Obtained from Latest Version of I Am the American Soldier
Transition Rate File (Table 5.1-10)	List Transition Rates for Each PCEA Subpopulations Within an MOS	• Generated by Personnel Variable Rate Calculation Model (PVRCM See Section 6.2.1)
Current Distribution File (Table 5.1-15)	Lists Current Distribution of Personnel Characteristics Within Each MOS	• Generated by PVRCM
Initial Inventory File (Table 5.1-8)	Lists Current Distribution of Subpopulation Within An MOS	
MOS Change File (Table 5.1-20)	Lists Changes to MOS Structure Made During Last Year	

Three of the external files (the Transition Date File Initial Inventory file, and Current Distribution file) are generated by the Personnel Variable Rate Calculation Model (see Section 6.2-1) which is applied by the PCEA maintenance organization.

This model will be applied in two stages (see Figure 7.2-1). In the first stage, selected variables will be extracted from the EMF and ORMF for the MOSs related to the PCEA mission areas. These extractions will be made on a yearly basis. The extracted files (the MOS Input Files) will then by input into a second series of programs which will generate the three files needed for PCEA input. The maintenance organization will send an updated copy of these three files, along with all the other external files, to PCEA users on an annual basis. The updates will be sent via floppy diskette.

The organization which is experted to be the PCEA maintenance organization is the:

Personnel Information System Command
200 Stovall Street
Alexandria, VA 22332

This organization is responsible for extracting data from the EMF and the ORMF to support ongoing DA analyses.

7.3 OUTPUT REPORT FORMATS

Table 7.3-1 lists the PCEA output reports associated with each step. The actual format for each report is listed in Tables 7.3-2 to 7.3-14.

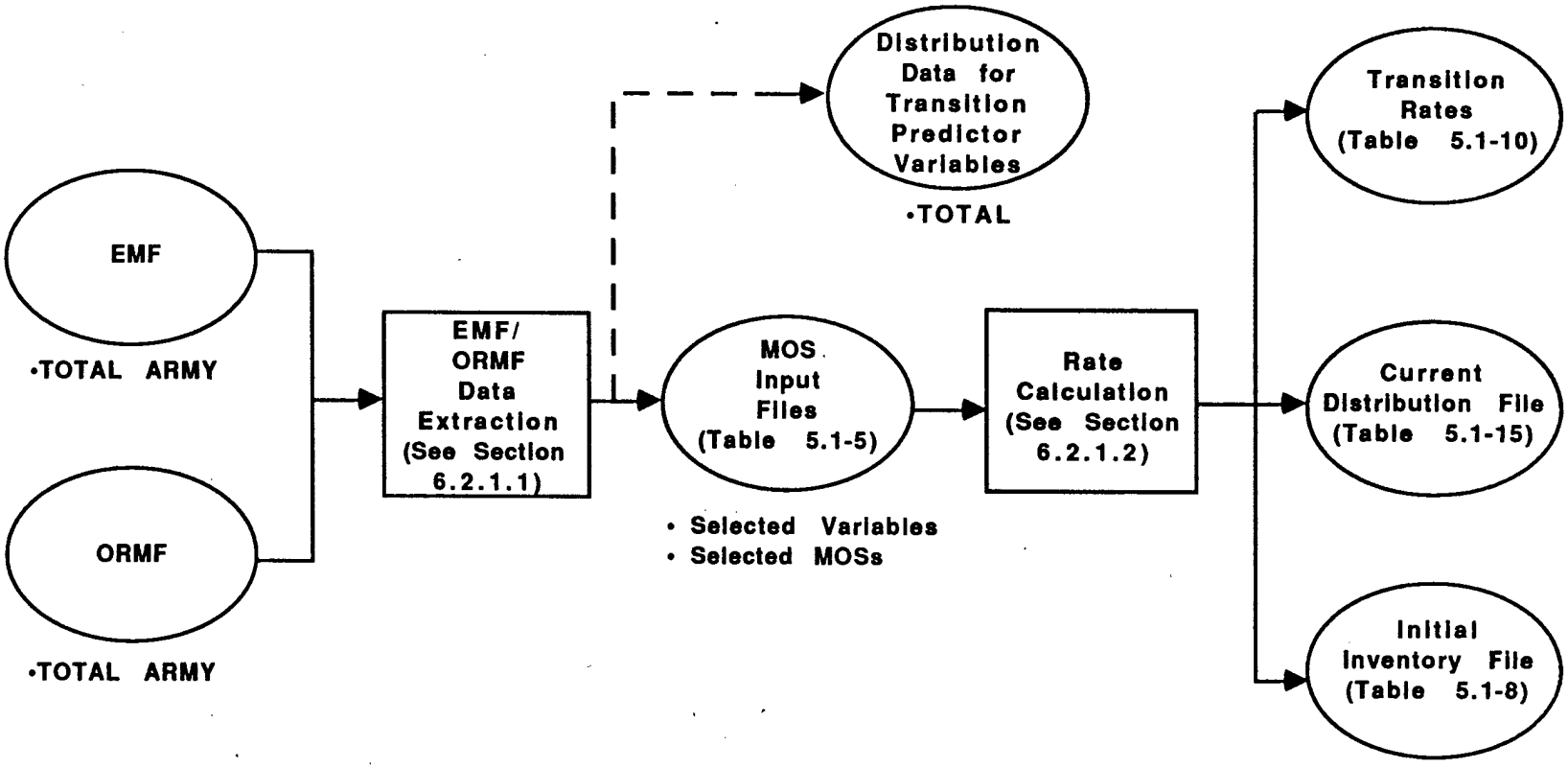


Figure 7.2-1. Overview of PVRCM

Table 7.3-1. Output Reports

STEP	OUTPUT REPORT	TABLE AND PAGE #
0	None	
1	None	
2	Transition Rates Report	Table 7.3-2
	Personnel Characteristics Distribution Report	Table 7.3-3
	Initial Inventory Report	Table 7.3-4
	Projected Inventory Report	Table 7.3-5
	Accessions Report	Table 7.3-6
	Migration-In Rates Report	Table 7.3-7
	Migration-Out Rates Report	Table 7.3-8
	Promotion Rates Report	Table 7.3-9
3	Training Loss Rate	Table 7.3-10
	Projected Personnel Characteristics	Table 7.3-11
	Characteristics Cut-off Report	Table 7.3-12

Table 7.3-1. Output Reports

STEP	OUTPUT REPORT	TABLE AND PAGE #
4	Product 1 Functional Task Criteria Descrepancies Report Format Guidance Report	Table 7.3-13
	Design Guidance Report Format	Table 7.3-14
5	TAD Report	Table 7.3-15
3	Cumulative Probabilities Report	Table 7.3-16
3	Cumulative Probabilities for Hierarchical Distribution Report	Table 7.3-17
	Design Guidance Report Format for Independent Characteristics	Table 7.3-18

Table 7.3-2. Transition Rate Report Format

TRANSITION RATE REPORT System _____ System Type _____
MOS _____ Year _____ Grade _____ Date _____

Paygrades	TRANSITION RATES				
	Separation	Promotion	Migrate In	Migrate Out	Tng Loss
1/2/3					
4					
5					
6					
7					
8/9					

Table 7.3-3. Subpopulation Distribution Report Format

SUBPOPULATION DISTRIBUTION REPORT MOS_____ SYSTEM_____ SYSTEM TYPE_____ YEAR_____ DATE_____									
PAYGRADES	SUBPOPULATION GROUPS								
	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
Accessions									
1/2/3									
4									
5									
6									
7									
8/9									

Table 7.3-4. Initial Inventory Report

INITIAL INVENTORY REPORT SYSTEM _____ SYSTEM TYPE _____ MOS _____ YEAR _____ DATE _____							
Subpopulation	PAYGRADES						
Groups	1/2/3	4	5	6	7	8	9
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							

Table 7.3-5. Projected Inventory Report

PROJECTED INVENTORY REPORT SYSTEM _____ SYSTEM TYPE _____ MOS _____ YEAR _____ DATE _____							
Subpopulation	PAYGRADES						
Groups	1/2/3	4	5	6	7	8	9
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							

Table 7.3-6. Accessions Report

ACCESSIONS REPORT SYSTEM _____ SYSTEM TYPE _____
MOS _____ YEAR _____ DATE _____

Subpopulation Groups	YEAR						
	YYYY	YYYY	YYYY	YYYY	YYYY	YYYY	YYYY
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							

Table 7.3-7. Migration-In Rates Report

MIGRATION-IN RATES REPORT SYSTEM _____ SYSTEM TYPE _____ MOS _____ YEAR _____ DATE _____							
Subpopulation	PAYGRADES						
Groups	1/2/3	4	5	6	7	8	9
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							

Table 7.3-8. Migration-Out Rates Report

MIGRATION-OUT RATES REPORT SYSTEM _____ SYSTEM TYPE _____ MOS _____ YEAR _____ DATE _____							
Subpopulation Groups	PAYGRADES						
	1/2/3	4	5	6	7	8	9
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							

Table 7.3-9. Promotion Rate Report

PROMOTION RATE REPORT SYSTEM _____ SYSTEM TYPE _____ MOS _____ YEAR _____ DATE _____							
Subpopulation Groups	PAYGRADES						
	1/2/3	4	5	6	7	8	9
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							

Table 7.3-10. Training Loss Rate

TRAINING LOSS REPORT MOS _____ YEAR _____ SYSTEM _____ DATE _____ SYSTEM TYPE _____							
Subpopulation Groups	PAYGRADES						
	1/2/3	4	5	6	7	8	9
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							
XXXX							

Table 7.3-11. Projected Personnel Characteristics

Paygrades	CHARACTERISTIC XXX DISTRIBUTION									
	Category 1		Category 2		Category 3		Category 4		Cat. 5	
	%	Value	%	Value	%	Value	%	Value	%	Val
Access.										
1/2/3										
4										
5										
6										
7										
8/9										

Table 7.3-12. Characteristic Cut-Off Report

CHARACTERISTIC CUTOFF REPORT SYSTEM_____ MOS _ 68B____ YEAR _____ SYSTEM TYPE _____ DATE _____	
CHARACTERISTIC	CUT-OFFs
Sex	
High School Graduate Status	
AFQT Group	
Psychomotor (Project A)	
Simple Reaction Accuracy	
PUHLES - Weight Lift	
Height	

Table 7.3-13. Product 1 Functional Task Criteria Discrepancies Report Format

PRODUCT 1 FUNCTIONAL TASK CRITERIA REPORT SYSTEM _____ SYST TYPE _____									
MOS _____ YEAR _____ OPERATOR/MAINTAINER _____ DATE _____									
PRODUCT 1			PROJECT A			DISCREPANCIES			
Functional Task Title	Time	Accur.	Task	Est. Time	Est. Acc	Time Dif	Tm % Dif	Acc. Dif	Acc % Dif

Table 7.3-14. Design Guidance Report Format

DESIGN GUIDANCE REPORT SYSTEM _____ SYSTEM TYPE _____ DATE _____							
MOS _____ YEAR _____			ESTIMATED TASK PERFORMANCE				
Cut-Off Levels			Tsk Type	MOS	Tasks	Est Time	Est Acc.
#	Characteristic	Cut-off					
1							
2							
3							
4							
5							
6							
7							

Table 7.3-15. Target Audience Description

MOS: 68K

Aircraft Components Repair Supervisor

CMF: 67

CMF Description: Aircraft Maintenance

Branch: Aviation

Table 7.3-15. Target Audience Description (Continued)

SECTION A: STATISTICS

1. Manpower Status (As of 01 Mar 87)

Skill Level Grade (s)	1 E3-E4	2 E5	3 E6	4 E7	5 E8-E9	TOTAL
Authorized	NOT INCLUDED IN PCEA					
Operating						
O/A%						

2. Manpower Requirements Projection (As of 08 June 87)

FY 87	FY 88	FY 89	FY 90	FY 91	FY 92	FY 93
NOT INCLUDED IN PCEA						

3. MOS Accession Data

a. Percentage in Mental Categories I - IV (As of 08 Jun 87)

Categories:	I	II	IIIA	IIIB	IV
	5.6	33.8	23.7	20.3	16.5

b. AFQT Mean (As of 24 Jul 87)

56.16

c. Quality Distribution (USAREC)

	1985 (Actual)	1986 (Actual)	1987 (Goal)	PROJECTED 1988	1989	1990	1991	1992	(Out to 10 Yrs.)
CAT I - IIIA	NOT IN PCEA								
CAT IIIB									
CAT IV									

d. Civilian Education Level (As of 08 Jun 87)

		PROJECTED 88	89	90	91	92	(Out to 10 Yrs.)
High School Graduate (or Higher)	86.1%						
GED	13.9%						
Non-High School Graduate	0.0%						

Table 7.3-15. Target Audience Description (Continued)

e. Prerequisite Aptitude Test

(1) Test: Mechanical Maintenance (MM)

(2) Components of the MM Test Include

Numerical Operations (NO)
Electronics Information (EI)
Mechanical Comprehension (MC)
Auto & Shop Information (AS)

(3) Entry Level Test Score 110 PROJECTED

(4) Mean Test Score (As of 08 Jun 87) 114 ___ ___ ___ ___ ___ ___ ___

(5) Distribution (As of Jun 87)

Score	00-74	75-79	80-84	85-89	90-94	95-99
%	.7	.0	.0	.7	2.1	4.8

Score	100-104	105-109	110-114	115-119	120-124	125-160
%	13.1	18.6	11.7	15.2	9.74	23.4

(6) Minimum Reading Grade Level for 95% of MOS Population (As of 9 Jun 87)

NOT IN PCEA

4. Ethnic Background (As of 09 Jun 87)

White	Black	Hispanic	Other
74.22%	17.42%	3.14%	5.23%

5. Gender Mix (As of 09 Jun 87)

	Current	Projected
Male:	100%	———————————
Female:	0%	———————————

6. Retention Data (As of Jan 87)

	Number Reenlisted	Number Eligible
1st Termers Mid-Term Careerists	NOT IN PCEA	

Table 7.3-15. Target Audience Description (Continued)

SECTION B: DESCRIPTIVE INFORMATION

1. **Standards of Grade Authorization**

NOT IN PCEA

2. **MOS/Civilian Designation and Description**

NOT IN PCEA

3. **Anthropometric Data**

Common Working Positions	5th - 95th Percentile Men	Women
a. Weight - clothed (lbs.)	129.1 - 198.8	107.6 - 164.5
b. Stature - clothed (in.)	66.4 - 74.4	61.8 - 70.3

Table 7.3-15. Target Audience Description (Continued)

Common Working Positions	Men	Women
c. Functional reach (in.)	28.6 - 34.0	25.2 - 31.1
d. Functional reach, extended (in.)	33.2 - 39.8	28.9 - 36.5
e. Overhead reach, height (in.)	78.9 - 90.8	73.0 - 84.7
f. Overhead reach, breadth (in.)	13.9 - 16.5	12.4 - 14.9
g. Overhead reach, sitting (in.)	50.3 - 57.9	46.2 - 54.9
h. Functional leg length (in.)	43.5 - 50.3	39.2 - 46.7
I. Kneeling height (in.)	48.0 - 53.9	45.1 - 51.3

Static Muscle Strength Data - All values are in pounds.

	5th - 95th Percentile Men	Women
a. Standing Two-handed Pull: 15 in. Level		
Mean Force	166 - 304	74 - 184
Peak Force	190 - 323	89 - 200
b. Standing Two-handed Pull: 20 in. Level		
Mean Force	170 - 302	73 - 189
Peak Force	187 - 324	84 - 203
c. Standing Two-handed Pull: 39 in. Level		
Mean Force	100 - 209	42 - 100
Peak Force	113 - 222	49 - 111
d. Standing Two-handed Push: 59 in. Level		
Mean Force	92 - 229	34 - 85
Peak Force	106 - 246	42 - 97
e. Standing One-handed Pull: 39 in. Level		
Mean Force	48 - 141	23 - 64
Peak Force	58 - 163	30 - 72
f. Seated One-handed Pull: Centerline, 18 in. Level		
Mean Force	51 - 152	24 - 88
Peak Force	61 - 170	29 - 101

Table 7.3-15. Target Audience Description (Continued)

	5th - 95th Percentile Men	Women
g. Seated One-handed Pull: Side, 18 in. Level		
Mean Force	54 - 136	25 - 76
Peak Force	61 - 148	30 - 89
h. Seated Two-handed Pull: Centerline, 15 in. Level		
Mean Force	134 - 274	54 - 173
Peak Force	157 - 298	64 - 189
i. Seated Two-handed Pull: Centerline, 20 in. Level		
Mean Force	118 - 237	46 - 142
Peak Force	134 - 267	53 - 157

4. Physical Qualifications

   a. PULHES Profile: 323222

   b. METSCAP Rating: _____

   c. Vision Requirements: Normal Color

5. Skills and Knowledge Trained

   NOT INCLUDED IN PCEA

6. Task Performance Information

   NOT INCLUDED IN PCEA

Table 7.3-16. Cumulative Probability Report-Dependent Characteristics

Cumulative Probability Report-Dependent Characteristics

MOS _____ Critical Paygrade _____

Characteristic 1 _____

Characteristic 2 _____

Characteristic 3 _____

Characteristic 4 _____

Characteristic 5 _____

Characteristic 6 _____

Characteristic 7 _____

Char. 1 Categorieis	Char 2 Categories	Char 3 Categories	Char 4 Categories	Char 5 Categories	Char 6 Categories	Char 7 Categories	Probability	Cumulative Probability (% Scoring at or Above Category)

Table 7.3-17. Cumulative Probability Report-Independent Characteristics

Cumulative Probability Report-Dependent Characteristics

MOS _____ Critical Paygrade _____

Characteristic _____

Characteristic Category	Probability	Cumulative Probability (% Scoring at or Above Category)

Table 7.3-18. Design Guidance Report Format for Independent Characteristics

DESIGN GUIDANCE REPORT INDEPENDENT CHARACTERISTICS

SYSTEM TYPE _____ DATE _____ MOS _____ YEAR _____

Task Type	Tasks	MOS	Cut-off Levels											
			Char A: ____ Cut-off Time	Acc.	Char B: ____ Cut-off Time	Acc.	Char C: ____ Cut-off Time	Acc.	Char D: ____ Cut-off Time	Acc.	Char E: ____ Cut-off Time	Acc.	Char F: ____ Cut-off Time	Acc.

SECTION 8 - TECHNOLOGY TRANSFER ISSUES

8.1 TRAINING STRATEGY

The goal of this software specification phase of the $(MPT)^2$ effort is to design a set of automated tools that the user can implement immediately without external training. To accomplish this, we have designed a user interface that will allow the system to be used by analysts who have very little computer experience (see section 3). The primary source of training for the average user will be included in the documentation that is developed for the system.

8.2 DOCUMENTATION SPECIFICATIONS

There are two types of documentation that will be developed for MPT^2 aid: 1) user documentation, and 2) program documentation. User documentation provides the user of the MDA with information on how to use the software and in how to use the overall tool in the aid process. Program documentation will be used to describe the programming conventions and rules that will be used in writing the computer code that makes up the aid. In the following paragraphs, we have included specifications of what will be included in each type of documentation.

8.2.1 User Documentation

User documentation is itself divided into two categories; "on-line help" and the "User's Guide". "On-line" help is documentation that the user can obtain by pressing the <F1> or

<Shift> <F1> function keys while working with the MDA software. When the user presses <F1>, a context specific help message will display. This message will give the user specific information about the screen, menu, template, or prompt the user is currently working with. This information will be brief and will generally focus on what the user is expected to do next. It will inform the user of any rules that may be in effect and will, if appropriate, provide the user with a specific example and step-by-step procedures. When the user presses <F1> while holding down the <Shift> key an alphabetical index of help information will display. From this index, the user can choose to obtain help information on any MDA topic.

The "User's Guide" will contain detailed information on all aspects of the software and the role and use of the aid as a tool in the MPT process. The User's Guide will be divided into the following six sections:

1. Getting Started - This section will provide the user with step-by-step procedures for installing the MDA software on his or her computer system and to gain access to the various components of the software.

2. Tutorial - The tutorial will give the user the background information and underlying philosophy behind the aid and its role in the MPT process. It will provide general training on how to use the software focusing on understanding and using the user interfaces. The tutorial will also provide the user with instruction on how to effectively use the other sections of the User's Guide.

3. Reference Section - This section will be divided into two sub-sections for each step of the aid. Each section will contain an alphabetically listed detailed

description of each feature of the two aids. The descriptions will include detailed explanations of the feature, rules (if any) governing its use, step-by-step procedures, sources of data that are required, and a list of places in the documentation where more information on the feature or related features can be found.

4. Messages - This section will contain a detailed non-technical description of all messages that can presented to the user by the aid. Included is a description of what the message means and exactly what the user can do about it.

5. Glossary - Alphabetically lists terms and acronyms that are used in the MDA software and in the overall MPT process.

6. Index - All features, concepts, and procedures will be thoroughly indexed to key words and page numbers in the User's Guide.

8.2.2 Program Documentation

The programming documention conventions described in the next few paragraphs is included so that the source code written for the aid will be easily understood by current and future programmers. Clearly written and documented code makes the software easier to de-bug, modify, and enhance for future versions. Following are the programming conventions that will be employed in the development of the aid.

Indentation

We will use the following conventions for indentation of C code. Nested code will be indented one tab stop per level. Curly braces should be indented by the same number of tab stops as the code they enclose and should appear alone on a line. Curly braces that match each other will then line up vertically. Figure 8-1 is an example of the indentation style.

In a deeply nested subroutine, the code may want to creep off the right side of the screen. When this happens, it will be conceptually more clear to create a new subroutine out of the offending code.

General Structure

Anything but the simplest programs require a very large number of subroutines. A good way to structure code is to have the main program in one file, and have the subroutines in other files. In the MDA software, subroutines will be grouped by function, with all the file I/O routines together in one place and all the develop routines in another. These modules will be compiled separately and linked together with the DOS Linker. Source code files should be kept to under 1000 lines long in order to make them compile quicker when a small change is needed.

In-line Documentation

In-line documentation is the comments that the programmer puts into the source code. They provide a low-level, detailed description of what the code is doing. In-line comments will be written as the code is written and modified accordingly as the development progresses.

```
int arrayprint(array, numelements)
/*   Function to print out some elements from an array.
inputs:
          array = the array to be printed
          numelements = the number of elements to print,
                    starting at 0
outputs:
          returns TRUE if success, FALSE if failure
                                                              */
int array[]. numelements;

     {
     int i;                                    /* array index */

                                          /* check for bogus input */
     if (numelements > ARRAYSIZE)
          return(FALSE);

                                          /* one element on each line */
     for (i = 0; i < numelements; i++)
          {
          printf("Element number %d is: ", i);
          printf("%d\n", array[i]);
          }

     return(TRUE);
     }
```

Figure 8-1

Each source file will have a short header containing five items of information:

1. The file name
   Otherwise listings are encountered which are difficult to track down because we don't know the name of the file.

2. The date.
   Also to identify listings.

3. The author's name.
   So we can ask questions later. (And to give credit where it's due.)

4. A description of the file's purpose.
   Usually the 8-character file name is not enough to tell what it does. One or two sentences should be enough.

Backups

All of the source code for the MPT^2 software will be backed up early and often. The criteria for backups will be: backups should be able to survive a fire to the office with no more than one week's worth of lost work.

Testing

The MPT^2 programmers will, of course, test their own code as thoroughly as possible when they write it. But, programmers tend to overlook errors in the programs they've written. To combat this, we will follow a procedure known as break-testing before any software is released to the Army. The programmer will give an executable copy of his or her program to the tester, along

with a clean listing of the source code. Then the tester tries to "break it" in every way possible. The tester should force the program to execute every line of code as shown in the source code. This means try all branches, force every if, and produce every error message. If any bugs are found, the programmer fixes them and the tester starts all over again on the new program. When the tester can't break the software, then we know we can deliver it with confidence. We have also found that this procedure often locates bugs in sections of code other than the one being tested.

8.3 MEANS FOR ACHIEVING INSTITUTIONALIZATION

During Option 2 of the $(MPT)^2$ effort, we will produce a detailed plan for fielding the product. This fielding plan will describe the distribution of the aid's methods, hardware, software, documentation, and training programs to specified Army users in specific Army organizations. The plan will be analogous to the Materiel Fielding Plan developed for Army weapon systems.

At the present time, we believe that successful implementation will, as a minimum, require the following activities.

Identification of Specific Users. Specific users of each product must be identified and the specific MAP activities and documents into which the product will feed must be described. This will ensure that the product has a use in the "real world".
Secton 2 describes our approch to this.

Incorporation of Users in Product Development. To ensure that the product meets users' needs, users will be included in the product development process. As a minimum, they should use the product during the external demonstration that will take place during Option 2.

Incorporation of Acceptability/Usability Requirements into Product Specifications. We have incorporated acceptability/usability requirements into the requiremenets specifications for each aid (see Acceptability/Usability Requirements in section 2). The requirements will make sure that the product is easy to use (e.g. clear documentation, on-line help, etc.).

Instruction of Key Personnel. We propose that "key" personnel receive detailed training at ARI headquarters immediately after ARI has accepted the aid. These key personnel will consist of individuals who can be expected to 1) become experts in the use of the aid, 2) become instructors in using the aid, and 3) act as consultants for ongoing applications of the aid. At the present time, we recomment that these key personnel consist of selected staff members from ARI's System's Manning Lab., members of ARI field offices who have been designated as MANPRINT support personnel, and members of the MANPRINT policy office within DCSPER.

Demonstrate Aid at User's Sites. We also recommend that demonstrations of the aid be provided at all primary user's sites. This demonstration could be conducted by contractor personnel or by the key personnel who were trained at ARI headquarters. The demonstration would include hands-on training with the aid software using "real world" examples, describe the benefits of the product, and show how the product can help users produce MAP products.

Software Maintenance. Specific Army organizations must be identified that can continuously update software, documentation, and training to reflect user applications and evolving needs.

Incorporation into Army Training Programs and Regulations. Army training courses for MANPRINT, project management, etc., must be modified to describe how the aid can help users during the MAP. Regulations and pamphlets in these areas must be modified in the same way.

APPENDIX A -

PCEA ROLE IN ACQUISITION PROCESS

A.1 ARMY REQUIREMENTS DOCUMENTS

The PCEA will feed the Justification for Major System New Start (JMSNS), the Operational and Organizational (O&O) Plan, the Letter of Agreement (LOA), and the Required Operational Capability (ROC). The JMSNS, O&O Plan, and the LOA are products of the Requirements/Technology Base Activities Phase of the Materiel Acquisition Process (MAP). The ROC is a product of the Proof-of-Principle Phase.

The Directorate of Combat Development (DCD) within the proponent TRADOC schools and the Army Materiel Command (AMC) proponent usually prepare these four documents.

Appendix B contains specific formats for the requirements documents. The following subsections explain in detail how these requirements documents present personnel constraints.

Operational and Organizational (O&O) Plan. The O&O Plan describes how the new system will be integrated into the force structure, deployed, operated, and supported in peacetime and wartime.

AR 71-9 and DARCOM/TRADOC PAM 70-2, Chapter 3 provide guidance for preparing the O&O Plan. According to TRADOC PAM 70-2, Section 5 of the O&O Plan, Personnel Impact, the plan should

describe the "personnel skills available to operate and maintain the system" (p. 3.6). The description "supports preparation of the Tentative Qualitative and Quantitative Personnel Requirements Information (TQQPRI) and the LSA process" (p. 3.6).

Justification for Major System New Start (JMSNS). The JMSNS is required when the estimated cost of meeting a mission deficiency exceeds specified limits, or when other factors demand a DoD-level review. AR 1000-1, AR 71-9, and DARCOM/TRADOC PAM 70-2, Chapter 4 provide guidance on JMSNS development. According to TRADOC PAM 70-2, Section F of the JMSNS should describe manpower and personnel constraints. Specifically, this section should define "key boundary conditions for satisfying the need, such as survivability, logistics, manpower, and personnel constraints in both quantity and quality . . ." (p. 4.10).

Letter of Agreement (LOA). The LOA defines the proposed system concept and the activities needed to develop and validate it.

AR 71-9, AR 702-3, DARCOM/TRADOC PAM 70-11, and DARCOM/TRADOC PAM 70-2, Chapter 4 provide guidance on preparing the LOA. Paragraphs 6 and 9 of DARCOM/TRADOC PAM 70-2 state that the LOA require manpower and personnel assessments.

Paragraph 9 of the LOA, Manpower/Force Structure Assessment, addresses the system's manpower and force structure implications and alternatives to it. Paragraph 9 requires a description of the estimated manpower requirements per system, using unit, and total Army by component (Active, ARNG, USAR). DARCOM/TRADOC PAM 70-2 indicates that Paragraph 9 also requires "an assessment of force structure implications resulting from system inclusion in the total force by component. If the force structure assessment exceeds current programmed force structure levels, then identifi-

cation of force structure tradeoffs within mission area or mission elements are required. Tradeoff analyses are addressed to the degree necessary to bring the force structure assessment within current programmed levels, if possible. The personnel support plan will be available prior to evaluation during OT I" (p. 5.19).

The LOA does not specifically require a description of the types of people who will be available to man the new system.

Required Operational Capability (ROC). The ROC is a formal requirements document that "states the minimum essential . . . information necessary to initiate the Full-Scale Development Phase or procurement of a materiel system" (DARCOM/TRADOC PAM 70-2, p. 6.1). The ROC addresses many of the same manpower and personnel issues as the LOA. However, because the ROC can tap into more detailed analyses that are conducted after the LOA has been completed, it provides greater detail than the LOA.

The format for Paragraph 9 of the ROC, Manpower/Force Structure Assessment, is almost identical to Paragraph 9 of the LOA. The only difference is that the ROC requires testing of the personnel support package prior to OT II.

A.2 Documents for Presenting Requirements to Contractors

The Army requirements documents described above define system requirements and manpower and personnel constraints for Army organizations. However, these documents are usually not the primary mechanism for presenting requirements and constraints to contractors. Although the Army requirements documents may be included in the RFP package as background information, the contractor is not contractually bound to meet them.

The system specification identifies the requirements the contractor must comply with. MIL-STD-490 contains procedures for describing system specifications. The first system specification developed for a major weapon is the System/Segment Specification (SSS), or Type A Specification. The SSS should be developed during the Requirements/Technology Base Activities Phase of the MAP, and updated in the subsequent phase. Although the combat developer within the proponent school usually develops the SSS, it may also be contracted out. Data Item Description (DID) DI-CMAN-80008 describes the SSS's format. The sections in DI-CMAN-80008 on maintainability and personnel can be used to describe manpower and personnel constraints. Table 1 lists these sections. The SSS also includes qualification requirements describing methods demonstrating that each system requirement, including manpower and personnel constraints, has been met.

In later MAP phases, analysts develop more detailed system specifications (see MIL-STD-490). These specifications require an allocation of functions among system steps and describe requirements at the component level. These specifications are not relevant to the PCEA.

A.3 Role of Manpower/Personnel Constraints in MANPRINT

Currently, two major sources provide MANPRINT regulatory information: (1) AR 602-2, MANPRINT, and (2) the draft chapter on MANPRINT that will be included in the revised TRADOC/AMC PAM 70-2, Materiel Acquisition Handbook (hereafter referred to as the revised TRADOC/AMC PAM 70-2). These sources offer guidance on manpower and personnel constraints and the target audience description (TAD).

Table A-1. Guidelines for Describing MCEA Products from SSS DID (DI-CMAN-80008).

10.2.5.5.4 ***Personnel.*** This subparagraph shall be numbered 3.5.4 and specify personnel requirements which must be integrated into system design. Requirements stated herein shall be in terms of number plus tolerance and shall be the basis for contractor design and development decisions. Requirements stated in this paragraph shall be the basis for ultimate complete determination of system personnel training and training equipment and facility requirements. The following personnel requirements shall be specified:

a. Numbers and skills of support personnel for each operational deployment mode and the intended duty cycle, both normal and emergency.

b. Skills and total numbers of personnel which may be allocated to the operation, maintenance, and control of the system.

c. Other personnel requirements not previously mentioned.

10.2.5.2.9 ***Human Performance/Human Engineering.*** This subparagraph shall be numbered 3.2.9 and specify human engineering requirements for the system, segment, or specific configuration items. This subparagraph shall reference applicable documents (e.g., MIL-STD-1472) and specify any special or unique requirements (e.g., constraints on allocation of functions to personnel and communications, and personnel/interactions). This subparagraph shall include those specific areas, stations, or equipment which would require concentrated human engineering attention due to the sensitivity of the operation or criticality of the task; i.e., those areas where the effects of human error would be particularly serious.

Table 1

Guidelines for Describing PCEA Products from
System/Segment Specification (SSS) DID (DI-CMAN-8-0008)*

Manpower and Personnel Constraints. According to AR 602-2, the following tasks should be completed by the end of the Proof-of-Principle Phase:

> "g. Special human factors engineering characteristics, male and female soldier characteristics, and manpower, personnel, and training considerations peculiar to the system will be addressed as specified in the requirements documents (AR 71-9). The MANPRINT portion of the requirements documents will provide soldier performance specifications and consider maximum and minimum personnel aptitudes and skill that can be required" (p. 28).

The revised TRADOC/AMC PAM 70-2 further defines the MANPRINT input included in the O&O Plan during the MAP's Requirements and Technologies Base Activities Phase:

> "b. Write manpower and personnel constraints for paragraph VII of the O&O Plan. Use MANPRINT objectives in the SMMP as the basis for input to the O&O Plan."

Target Audience Description (TAD). According to AR 602-2 (p. 25), a TAD should be prepared during the Requirements and Technical Base Activities Phase of the MAP. The revised TRADOC/AMC PAM 70-2 indicates that the TAD will

> "a. Describe quantity and quality of the soldiers or civilians who will operate, maintain, and support the system.

b. Describe the range of individual qualifications on all relevant physical, mental, physiological, biographical, and motivational dimensions. Describe how these characteristics relate to their ability to accomplish tasks associated with the operation, maintenance, and support of the weapons system. . . . " (p. 11.56).

According to AR 602-2, the TAD will provide, as a minimum, the following information on each MOS that will operate, maintain, or support a new or improved item of equipment:

(1) Projected force structure authorizations by grade and operating strength percentage, and the standards of grade authorizations

(2) MOS/civilian designation and description

(3) Anthropometric data

(4) Physical qualifications

(5) Aptitude description of the population

(6) Biographical information such as percentage of high school graduates in the population, percentage of individuals who speak English as a second language, and other "special interests and/or abilities of the population"

(7) Skills and knowledges trained

(8) Task performance information

Appendix C describes the TAD in detail.

Relationship Between $(MPT)^2$ Products and Target Audience Description. Table 2 displays the relationship between $(MPT)^2$ products and the TAD. The MCEA, along with other output, will provide information on projected force structure authorizations. It also supplies the MOS/civilian designation and descriptions for TAD Items 1 and 2. The PCEA, in addition to other output, will provide TAD Items 3 through 6. The PCEA will go beyond the purely descriptive information to estimate required cut-off levels for personnel characteristics in these items. The last TAD item, existing task performance information, will supply input to the PREA development.

Table A-2. Relationship Between Target Audience Description (TAD) and $(MPT)^2$ Products.

TAD ELEMENT		ROLE OF $(MPT)^2$ PRODUCT
(1)	Projected authorizations	Collected/output by MCEA
(2)	MOS/civilian designator and description	Collected /output by MCEA
(3)	Anthropometric data	Collected/output by PCEA
(4)	Physical qualifications	Collected/output by PCEA
(5)	Aptitude descriptions	Collected/output by PCEA
(6)	Biographical information	Collected/output by PCEA
(7)	Skills and knowledges trained	None
(8)	Task performance information	Input to PREA

Appendix B

OPERATIONAL AND ORGANIZATIONAL PLAN (O&O PLAN)

OPERATIONAL AND ORGANIZATIONAL PLAN (O&O Plan) FORMAT

The O&O Plan describes how a system will be integrated into the force structure, deployed, operated, and supported in peacetime and wartime. The concept establishes required readiness objectives and is the basis for Integrated Logistic Support planning. Initially, the plan should, as a minimum, describe any deficiencies which were identified in the MAA and any constraints applicable to systems development.

I. Purpose - Describe the need for an operational capability to defeat the threat and eliminate an operational deficiency. State where in the MAA the deficiency is identified and how the need was developed from the described deficiency. (The need should be stated in broad characteristics only (e.g., a capability is needed to defeat enemy armor at "x" kilometers)).

II. Threat/ Deficiency - Describe the threat to be countered and the operational deficiency to be eliminated.

*III. Operational Plan - Describe how, what, when, and where the system will be employed on the battlefield and how it will interface with other systems (attach Operational Mode Summary/Mission Profile as an annex). Communications support requirements should be addressed.

*IV. Organizational Plan - Discuss the type units that will employ and support the system and when appropriate, the system(s) to be replaced. (When the system is decided on, include the number of systems estimated to be provided each type unit). This plan will support preparation of the BOIP, the Integrated Logistic Support Plan and identification of key ancillary items.

*V. Personnel Impact - Design of the system should consider personnel skills available to operate and maintain the system. Generation of new MOS should be avoided where possible. (When the system is decided on, include an estimate of the number of people and skills estimated to operate and maintain the equipment, by type unit.) This plan will support preparation of the Tentative Qualitative and Quantitative Personnel Requirements Information (TQQPRI), the Personnel Support Plan, and assist in the LSA process.

OPERATIONAL AND ORGANIZATIONAL PLAN (O&O PLAN)

OPERATIONAL AND ORGANIZATIONAL PLAN (O&O Plan) FORMAT
(continued)

*VI. Training Impact	-	Design of the equipment should consider type and extent of training required. (When the system is decided on, discuss the type and amount of training required and the need for training devices and simulators.) This plan will support preparation of the Training Support Plan.
*VII. Logistics Impact	-	System must be supportable by the Standard Army Logistics System and use standard tools and TMDE. (When the system is decided on, the proposed levels of maintenance, support concept, Test, Measurement, and Diagnostic Equipment (TMDE), Automatic Test Equipment (ATE), and Built-in Test Equipment (BITE) concepts will be discussed.) This plan will support preparation of the Integrated Logistic Support Plan.

* - Complete information for these paragraphs may not be available when the initial O&O Plan is prepared.

JUSTIFICATION FOR MAJOR SYSTEM NEW START(JMSNS)

JUSTIFICATION FOR MAJOR SYSTEM NEW START (JMSNS) FORMAT

Prepare JMSNS in the format shown below. Do not exceed 3 pages, including annexes. Identify any supporting documentation.

A. Defense Guidance Element. Identify the element of Defense Guidance to which the system responds.

B. Mission and Threat. Identify the mission area (numbers and title) and describe the role of the system in the mission area. Discuss the DIA-validated projected threat and the shortfalls of existing systems in meeting the threat. Comment on the timing of the need and the general priority of this system relative to others in this mission area. The TRADOC school or Integrating Center must obtain a DIA-validated threat from INSCOM early so as not to delay JMSNS preparation. The classification should be as low as possible; NOFORN data should not be included. DIA threat documentation should be referenced in lieu of higher classification. If the need is not threat driven describe the basis for the need (e.g., cost savings).

C. Alternative Concepts. Describe the alternatives which will be considered (including product improvements) and, when appropriate, the alternative selected, the reasons for rejecting those that have not been selected, and any further tradeoffs that remain for the selected system.

D. Technology Involved. Discuss maturity of the technology planned for the selected system design and manufacturing processes, when appropriate, with particular emphasis on remaining areas of risk.

E. Funding Implications. Provide gross estimates of total RDT&E cost, total procurement cost, unit cost and life-cycle cost. Discuss affordability. See Appendix D, this Handbook, for funding format.

F. Constraints. Describe, as applicable, key boundary conditions for satisfying the need, such as survivability; logistics, manpower and personnel constraints in both quantity and quality; standardization or interoperability within NATO or other DOD Components; and critical materials and industrial base required.

G. Acquisition Strategy. Provide summary of salient elements of proposed acquisition strategy -- program structure, competition, contracting, etc.

LETTER OF AGREEMENT (LOA)

LETTER OF AGREEMENT (LOA) FORMAT

The Letter of Agreement (LOA) will be in the format below. Limit information to that necessary for a HQDA decision. The basic document should not exceed four pages. In the LOA, use less detail and broader performance bands than in the ROC, JSOR, LR, and TDR. Terms in each paragraph of the LOA will evolve into more specific terms in the ROC, LR and TDR. Include in the LOA all alternative system concepts recommended for demonstration and validation.

1. TITLE

a. Give a descriptive title for the program.

b. CARDS reference number.

2. NEED/THREAT. State what is needed. Briefly describe the threat and operational/training deficiency need for the system. Include the enemy's capability to detect, identify, locate, avoid, suppress, destroy, or otherwise counter the system. Describe the responsive threat over time to support evolutionary development when applicable.

3. TIMEFRAME AND IOC. State the timeframe in which the new or improved system is needed.

4. OPERATIONAL & ORGANIZATIONAL PLAN: In a brief paragraph state --

a. How the equipment will be used;

b. Geographical areas of use;

c. Weather and climatological factors to be considered during equipment operations;

d. Battlefield conditions (such as ECM, smoke, and dust) in which the system will operate; and

e. The type of units that will use and support the equipment.

Attach the mission profile to the LOA as an Annex.

5. ESSENTIAL CHARACTERISTICS. Describe only main operational features of the system. Included are counter-countermeasure capabilities, health, physical security, safety and human factors engineering requirements, and reliability, availability, and maintainability (RAM) requirements. Performance must be responsive to battlefield environmental conditions of continuous combat (such as full ECM, smoke, aerosols, rain, fog, haze, and dust).

LETTER OF AGREEMENT (LOA)

LETTER OF AGREEMENT (LOA) FORMAT
(continued)

Express performance and reliability characteristics in bands of performance. Those which are not suitable for banding will be stated as single values. During development, commercial, other service, NATO, or other allied nation characteristics of existing or programed systems should be considered for inclusion. This will be with a view toward establishing a basis for interoperability, co-production, or standardization. Bands of performance should be flexible enough to consider competing systems of other services or allied nations. Stated bands of performance, or single value characteristics will be adjusted only after the combat and materiel developers agree that such changes are necessary. DCSOPS will approve changes for documents previously approved by DCSOPS. The requirements and provisions for the following must be considered.

a. Interoperability;

b. Continuity of operations (CONOPS);

c. Security;

d. Reliability, availability, and maintainability (RAM) derived from mission performance parameters.

e. Standardization, including commonalty for hardware and software to which the system will adhere;

f. Nonnuclear/nuclear survivability; NBC contamination/decontamination survivability;

g. Individual/collective protection equipment;

h. Adverse weather and reduced visibility conditions (smoke and obscurants) operations, and military operations on urbanized terrain (MOUT) where applicable;

i. Communications;

j. Operation transportability, such as: transportable in C-141 type aircraft requiring not more than....hours teardown and....hours setup by operator and crew, etc.

6. TECHNICAL ASSESSMENT. In the LOA, divide this paragraph into operational, technical, logistics, training, and manpower subparagraphs. In each, describe what the combat and materiel developers, logistician, trainer, and personnel administrator must do to produce the total system. Include a listing of major events and dates.

LETTER OF AGREEMENT (LOA)

LETTER AGREEMENT OF AGREEMENT (LOA) FORMAT
(continued)

7. LOGISTICS SUPPORT PLAN. Briefly describe the logistics support plan. The logistics support plan will be available for evaluation during OT I.

8. TRAINING ASSESSMENT. Discuss the need for system training devices. When required include description as an annex. (See p. 6.20 for format.) New Equipment Training (NET), operator and maintenance personnel training, and technical manuals and training material requirements will be stated in terms of needs for both the institution and unit training levels. The training support plan will be available for evaluation during OT I.

9. MANPOWER/FORCE STRUCTURE ASSESSMENT. Estimate manpower requirements per system, using unit, and total Army by component (Active, ARNG, USAR). Identify manpower savings resulting from replaced systems, if any. Include a statement to require an assessment of alternatives to reduce manpower requirements and an assessment of force structure implications resulting from system inclusion in the total force by component. If the force structure assessment exceeds current programed force structure levels then identification of force structure tradeoffs within mission area or mission elements are required. Tradeoffs analyses are addressed to the degree necessary to bring the force structure assessment within current programing levels, if possible. The personnel support plan will be available for evaluation during OT I.

10. RATIONALIZATION, STANDARDIZATION, INTEROPERABILITY. Discuss other Services, NATO, and other foreign interest in the program. Identify similar programs contemplated by other services, NATO or other allies.

11. LIFE CYCLE COST ASSESSMENT. See appendix 1.

12. MILESTONE SCHEDULE. A listing of significant events with dates to occur between approval of the LOA and next scheduled milestone review. The following should be included: LOA approval, DT/OT/other test (Market/User Survey for OTS), and next scheduled milestone review.

APPENDIX 1 - Life Cycle Cost Assessment - Provide life-cycle costs using mainly summary parametric estimating techniques. State the major life-cycle phases of R&D, investment, and operation and support. Also include the design to cost goals. As much as possible, show the estimated cost of major items or components below the system level. These data should be consistent with the Materiel System Requirements Specification (MSRS) and Baseline Cost Estimate (BCE).

LETTER OF AGREEMENT (LOA)

LETTER OF AGREEMENT (LOA) FORMAT
(continued)

ANNEX A - Coordination. List all major commands, other Services, allied nations, and activities with whom the LOA was coordinated. Provide full rationale for nonacceptance of comments, if any.

ANNEX B - Operational Mode Summary/Mission Profile Annex. List tasks and conditions for frequency and urgency viewed for system employment in military operations. The mission profile is logically derived from the O&O Plan. It provides the starting point for developing the system characteristics. See p. 5.23 for format for mission profile.

ANNEX C - COEA Annex. Executive summary of the COEA. Classify as required. Withdraw after HQ TRADOC approval of the LOA and handle as a separate document for transmittal as needed.

ANNEX D - Rationale Annex. Support various characteristics stated in the LOA. This provides an audit trail and rationale for determining how the characteristics were derived.

ANNEX E - RAM Rationale Annex. Executive summary of the RAM Rationale Report. Support the stated RAM characteristics with a logical argument that begins with the task frequency, conditions and standards described and analyzed in the MAA. This provides an audit trail and rationale for determining how the characteristics were derived. TRADOC/DARCOM Pamphlet 70-11 contains guidance on the preparation of both the RAM Rationale Report and the RAM Rationale Annex.

ANNEX F - Training Devices. When required, include description of needed training devices in format on p. 6.20. A separate annex is required for each training device.

NOTES:

1. All annexes will accompany the LOA until it has completed TRADOC and DARCOM staffing.

2. Send A, B, and F with the LOA when forwarded to HQDA for approval.

REQUIRED OPERATIONAL CAPABILITY (ROC)

REQUIRED OPERATIONAL CAPABILITY (ROC) FORMAT

The Required Operational Capability (ROC) is in the format below. Limit information to that necessary for a HQDA decision. The basic document should not exceed four pages.

1. TITLE

   a. Give a descriptive title for the program.
   b. CARDS reference number.

2. NEED/THREAT. Briefly describe the operational/training deficiency need for the system and the reactive threat to the system. Include the enemy's capability to detect, identify, locate, avoid, suppress, destroy, or otherwise counter the system. Describe the responsive threat over time to support evolutionary development when applicable.

3. TIMEFRAME AND IOC. State the IOC date including IOCs for successive evolutionary models, when appropriate.

4. OPERATIONAL AND ORGANIZATIONAL PLAN (O&O Plan). In a brief paragraph state:

   a. How the equipment will be used;
   b. Geographical areas of use;
   c. Weather and climatological factors to be considered during equipment operations;
   d. Battlefield conditions (such as ECM, smoke, and dust) in which the system will operate; and
   e. The type of units that will use and support the equipment.

5. ESSENTIAL CHARACTERISTICS. Describe only main operational features of the system. Included are counter-countermeasure capabilities, health, safety and human factors engineering requirements, and reliability, availability, and maintainability (RAM). Performance must be responsive to battlefield environmental conditions of continuous combat (such as full ECM, smoke, aerosols, rain, fog, haze, and dust).

Express performance and reliability characteristics in bands of performance. Those which are not suitable for banding will be stated as single values. During development, commercial, other Service, NATO, or other allied nation characteristics of existing or programed systems should be considered for inclusion with a view toward establishing a basis for interoperability, co-production, or standardization. Bands of performance should be flexible enough to consider competing systems of other Services or allied nations. Stated bands of performance, or single value characteristics are adjusted only after the combat and

REQUIRED OPERATIONAL CAPABILITY (ROC)

REQUIRED OPERATIONAL CAPABILITY (ROC) FORMAT
(continued)

materiel developers agree that changes are necessary. DCSOPS will approve changes for documents previously approved by DCSOPS. The requirements and provisions for the following must be considered:

a. Interoperability;
b. Continuity of Operations (CONOPS);
c. Security;
d. Reliability, availability, and maintainability (RAM) derived from mission performance parameters;
e. Standardization, including commonality for hardware and software to which the system will adhere;
f. Nuclear survivability; NBC contamination survivability;
g. Individual/collective protection equipment;
h. Adverse weather and reduced visibility (smoke and obscurants) operations, and military operations on urbanized terrain (MOUT) where applicable;
i. Communications.
j. Operation transportability requirements, such as: transportable in C-141 type aircraft requiring not more than....hours teardown and....hours set by operator and crew; etc.
k. P3I

6. TECHNICAL ASSESSMENT. In the ROC, include a brief paragraph about the technical effort required. Address major areas for full scale development in terms of scope, technical approach, and associated risks in high, medium, low, or similar categories. For NDI items, briefly outline completed or planned market survey efforts and/or military suitability evaluations.

7. LOGISTICS SUPPORT PLAN. Briefly describe the logistics support concept. The logistics support package will be tested during OT II.

8. TRAINING ASSESSMENT. Discuss the need for system training devices. When required, include description as an annex to the ROC. (See p. 6.16 for format.) New equipment training (NET) operator and maintenance personnel training, and technical manuals and training materiel requirements will be stated in terms of needs for both institution and unit training levels. The training support package will be tested during OT II.

9. MANPOWER/FORCE STRUCTURE ASSESSMENT. Estimate manpower requirements per system, using unit, and total Army by component (Active, ARNG, USAR). Identify manpower savings resulting from replaced systems, if any. Include a statement to require an assessment of alternatives to reduce manpower requirements and an assessment of force structure implications resulting from system inclusion in the total force by component.

REQUIRED OPERATIONAL CAPABILITY (ROC)

REQUIRED OPERATIONAL CAPABILITY (ROC) FORMAT
(continued)

If the force structure assessment exceeds current programed force structure levels then identification of force structure tradeoffs within mission area or mission elements is required. Tradeoffs analysis are addressed to the degree necessary to bring the force structure assessment within current programing levels, if possible. The personnel support package will be tested during OT II.

10. STANDARDIZATION, INTEROPERABILITY. Discuss other Service, NATO, and other foreign interest in the program. Identify similar programs contemplated by other Services, NATO or other allies.

11. LIFE CYCLE COST ASSESSMENT. See appendix 1.

12. MILESTONE SCHEDULE. A listing of significant events with dates to occur between approval of the ROC and next scheduled milestone review. The following should be included: ROC approval, DT/OT/other test (Market/User Survey for OTS), and next scheduled milestone review.

APPENDIX 1 - Life-cycle Cost Assessment. Provide life-cycle costs using mainly summary parametric estimating techniques. State the major life cycle phases of R&D, investment, and operation and support. Also include the design-to-cost goals. As much as possible, show the estimated cost of major items or components below the system level. (These data should be consistent with the Materiel System Requirements Specification (MSRS) and Baseline Cost Estimate (BCE). (See app D, p. D.7, this handbook, for format).

ANNEX A - Coordination. List all major commands, other Services, allied nations and activities with whom the ROC was coordinated. Provide full rationale for nonacceptance of comments, if any.

ANNEX B - Operational Mode Summary/Mission Profile Annex. List tasks and conditions for frequency and urgency viewed for system employment in military operations. The mission profile is logically derived from the operational/training concept. It provides the starting point for developing the system characteristics.

ANNEX C - COEA Annex. Executive summary of the COEA. Classify as required. Withdraw after HQ TRADOC approval of the ROC and handle as a separate document for transmittal as needed.

ANNEX D - Rationale Annex. Support various characteristics stated in the ROC. This provides an audit trail and rationale for determining how the characteristics were derived.

REQUIRED OPERATIONAL CAPABILITY (ROC)

REQUIRED OPERATIONAL CAPABILITY (ROC) FORMAT
(continued)

ANNEX E - RAM Rationale Annex. Executive summary of the RAM Rationale Report. Support the stated RAM characteristics with a logical argument that begins with the task frequency, conditions, and standards described and analyzed in the Mission Area Analysis (MAA). This provides an audit trail and rationale for determining how the characteristics were derived. TRADOC/DARCOM Pamphlet 70-11 contains guidance on the preparation of both the RAM Rationale Report and the RAM Rationale Annex.

ANNEX F - TRAINING DEVICE ANNEX. Include when appropriate. (See p. 6.20 for format.) A separate annex is required for each training device.

NOTES:

1. Send annex A with each requirements document.

2. Annex F (when prepared) must accompany the ROC to HQDA for approval as a package.

3. Send the TBOIP/TQQPRI with the ROC to HQDA for approval. When the TBOIP/TQQPRI are not submitted, the transmittal letter will contain a statement about the projected submission date.

APPENDIX C - TARGET AUDIENCE DESCRIPTION

This appendix describes the content of the Target Audience Description (TAD) and provides an example of the format used to describe MOS 11-H-ATWS Crew Member.

The description refers to characteristics of "the population." Ideally, the parameters describe the population specific to the MOS that will operate or maintain the system being developed. If MOS specific data is not available, then Army, DoD, or even broader population parameters can be used.

(1) Current and Projected Force Structure. The numbers of individuals in the Army population who will operate, maintain and support the weapons system by skill level and experience should be provided in this paragraph. The current and projected force structure can be extracted from the MILPERCEN Force Management Book. The PMAD data base provides additional information on the projected force structure.

(2) MOS/Civilian Designation and Description. Generic MOS descriptions can be extracted from AR 611-201, generic officer descriptions can be extracted from AR 611-101/AR-611-112 and generic civilian classification descriptions can be extracted from OPM "Handbook of Occupational Groups and Series of Classes." This information will give the contractor the general information about the duties performed in that MOS, the entry level qualifications, special information such as security clearance requirements and related civilian occupations. The contractor will have to identify the specific tasks that will be performed in operating, maintaining, and supporting the new weapon system.

(3) Anthropometric Description of the Population. Anthropometric data on the relevant target population should be provided on the dimensions relevant to the MOS duties, and should include the range of physical dimensions, not just the mean value of the population. A good starting point for finding this information is the U.S. Army Human Engineering Laboratory. MIL-STD 1472C, (AMC) MILHDBK 759A, and AR 611-201 also provide information:

(4) Physical qualifications of the population. The PULHES and MEPSCAT profiles of the population should be provided. PULHES refers to the broad physical demands of an MOS and the physical ability required of an individual to perform

within an MOS. The letters stand for Physical capacity of stamina, Upper extremities, Lower extremities, Hearing and ear, Eyes and Psychiatric. MEPSCAT is the Military Entrance Physical Strength Capacity Test. It assesses an applicant's physical strength capacity with the purpose of matching their capacity to the job in which they are being enlisted. MOS are clustered into 5 strength categories. A description of the range of physical abilities on such variables as color vision, lifting and carrying ability should also be provided. Special attention should be paid to differences in male and female scores. AR 611-201 provides this information.

(5) Aptitude description of the population. The aptitude requirements for each specialty should be described with an explanation of what the test scores mean. In addition the education level, reading grade level, and other measures such as psychomotor should be provided. This information can be found in the DDMC data base or MILPERCEN.

(6) Biographical information. Information such as the percentage of high school graduates in the population, percentage of individuals possessing English as a second language and special interests and/or abilities of the population should be provided. Special abilities might include information on the population's familiarity with the metric system or computers.

(7) Skills and knowledges trained. A list of the tasks trained in formal institutions as well as those trained on the job should be included. Reference should be made to TRADOC documents where appropriate. This information can be found in AR 611-201 and in the MOS specific trainer's guide.

(8) Task performance information. Task performance data for operator, maintainer and support tasks should be provided for the population showing how task performance relates to key characteristics of the population. For example, are there key, critical tasks that the contractor should attend to and, if necessary, reduce the difficulty or complexity of those tasks? These data will allow the contractor to assess if there are known task performance requirements which exceed the capabilities of the current population.

An example of a target audience description follows.

Appendix C. Target Audience Description.

NOTIONAL

TARGET AUDIENCE DESCRIPTION

MOS 11B - ATWS CREW MEMBER

1. Projected Force Structure

Grade	Skill Level	Authorized	Operating Strength Percentage
E3-E4	SL1	28349	106.0%
E5	SL2	7675	97.0%
E6	SL3	6949	98.0%
E7	SL4	3945	97.0%
E8-E9	SL4	2598	94.0%

Standards of Grade Authorization

Duty Position	Code	Rank
Light truck Driver	11B10	PFC
Power Generator Oper	11B10	PFC
Security Guard	11B10	PFC
Ammunition Handler	11B10	PFC
Messenger	11B10	PFC
Radio Telephone Oper	11B10	PFC
Pathfinder	11B1Y	PFC
Rifleman	11B10	PFC
Scout	11B10	PFC
Scout	11B10	SP4
Scout Gunner	11B10	SP4
Ammunition Specialist	11B10	SP4
Automatic Rifleman	11B10	SP4
Machinegunner	11B10	SP4
Rifleman	11B10	SP4
Grenadier	11B10	SP4
Pathfinder	11B1Y	SP4
Operations Assistant	11B10	SP4
Operations Sergeant	11B20	SGT
Fire Team Leader	11B20	SGT
Ammo Section Leader	11B20	SGT
Assistant Squad Leader	11B20	SGT
Assistant Team Leader	11B20	SGT
Ammo Chief	11B30	SSG
Instructor	11B30	SSG
Squad Leader	11B30	SSG
Operations Sergeant	11B30	SSG
Team Leader	11B30	SSG
Platoon Sergeant	11B40	PSG
Team Sergeant	11B40	PSG
Operations Sergeant	11B40	SFC

These tasks should be eliminated or simplified.

(1) Range Determination
(2) Grid Location Determination
(3) Tracking Round to Target

c. The following errors are frequently made on the current system:

Failure to uncage safety actuator.

Failure to check backblast area.

Assistant Operations Sergeant	11B40	SFC
Section Sergeant	11B50	MSG

2. MOS/Civilian Designation and Description

a. Operator MOS: 11B - Infantryman
Infantryman
CMF: 11 - Infantryman

b. Additional Skill Identifiers
C2 - Dragon Gunnery
F1 - Operations and Intelligence (Special Forces)
Q8 - Tactical Air Operations
W7 - Special Forces Underwater Operations
W8 - Special Forces Military Free Fall Operations
W9 - Special Forces Military Free Fall and Underwater Operations

c. Security Clearance: Secret

d. Job Description
Major duties at the different skill levels are:

(1) MOSC 11B10. Closes with and destroys enemy personnel, weapons, and equipment. Assists in he performance of reconnaissance.

(2) MOSC 11B20. Leads infantry fire team in combat operations and processes intelligence and operations data. Leads scouts or assists scout leader or reconnaissance team.

(3) MOSC 11B30. Leads infantry squad in combat operations. Leads scout squad or section. Leads reconnaissance team.

(4) MOSC 11B40. Supervises infantry scout or reconnaissance platoon in combat operations ad intelligence information.

(5) MOSC 11B50. Must be able to supervise personnel and perform the duties of infantryman (11B40) , indirect fire infantryman (11C40), heavy antiarmor weapons infantryman (11H40), or fighting vehicle information (11M40).

e. Related Civilian Occupation: There are no related civilian occupations.

3. Anthropometric Data (5th to 95th Percentile Male)

a. Combat Carrying Capacity: 41 to 61 pounds.

b. Shoulder Height, Standing: 133.6 to 154.2 inches.

c. Shoulder Height, Sitting: 54.2 to 65.4 inches.

d. Shoulder Height, Kneeling: 86.1 to 95.6 inches.

e. Functional Arm Reach: 72.6 to 90.9 inches.

NOTE: See MIL STD 1472C for additional Human Engineering Design Data.

4. Physical Qualifications

a. PULHES Profile: 111221 (See AR 40-501, Chapter 9)

b. MEPSCAT Rating: Very Heavy

c. Vision

(1) Color: Red/Green Discrimination
(2) Acuity: Correctable Vision of 20/20 in one eye; 20/100 in the other eye.

5. Aptitude

a. AFQT

(1) Mental Category Distribution

	83	84	85
I	2%	5%	2%
II	24%	25%	8%
IIIA	23%	35%	32%
IIIB	37%	31%	44%
IV	14%	4%	14%

AFQT Mean

(2) Quality Distribution (USAREC Goals)

	84	85	86
I-IIIA	65%	42%	43%
IIIB-IV	35%	58%	57%

b. Prerequisite Area Aptitude Score: Combat (CO)

(1) Components include: Arithmetic Reasoning
Auto & Shop Information
Mechanical Comprehensive
Coding Speed

(2) Entry Level Score: 90

(3) Aptitude Score Distribution: CO

	83	84	85
80-84	0%	0%	0%
85-89	46%	1%	14%
90-94	14%	42%	29%
100-104	17%	17%	24%
105-110	7%	15%	18%
111-114	3%	11%	4%
115-119	6%	5%	5%
120-160	7%	8%	5%

c. Minimum Reading Grade Level: 7th Grade

6. Biographical Information

a. Civilian Education: High School Graduates

	83	84	85
HSG	67%	92%	86%
GED	12%	3%	5%
Non HSG	21%	5%	9%

b. Percentage with English as a Second Language: 21%

c. Gender Mix: No female soldiers.

7. Skills and Knowledge Trained

a. Tasks Trained during Advanced Individual Training

Defends position and self against enemy attack.
Employs individual weapons.
Employs cover, concealment, and camouflage.
Prepares, loads, and fires the weapons system.
Protects self, weapons, and equipment from chemical and other contamination.
Assists in construction of fortifications and barriers, including minefields and obstacles.
Assists in breaching and clearing minefields and obstacles.
Identifies enemy forces and other targets.
Performs preventive maintenance and assists in organizational maintenance on weapons and equipment.

Performs land navigation functions.
Carries, prepares, and stores ammunition.
Administers first aid.
Applies field sanitation methods.
Reacts to oral commands and visual signals.
Applies principles of escape and evasion.
Renders oral reports on enemy activities.
Lays field wire.
Performs basic communications functions and operates communciations equipment.
Applies security and safety measures.
Collects and reports tactical information as member of combat or reconnaissance patrols.
Prepares simple demolitions.
Operates wheeled and tracked vehicles to transport personnel, supplies, and equipment.
Performs drill and ceremonies and other post, camp, and station duties.

b. Tasks Trained During Advanced NCO Education

Leads, supervises, and trains subordinate personnel.
Receives and implements combat orders.
Directs employment of personnel in offensive, defensive, and retrograde combat operations.
Evaluates terrain.
Selects weapons emplacement sties and assigns target areas and fields of fire.
Directs and adjusts fires to destroy enemy targets.
Supervises construction of fortifications, camouflage, and security.
Records operational information on maps.
Reads and interprets maps and aerial photos.
Prepares range cards and field sketches.
Supervises crew training, drills, march order and firing.
Trains crew in day and night firing techniques.
Supervises various work details.

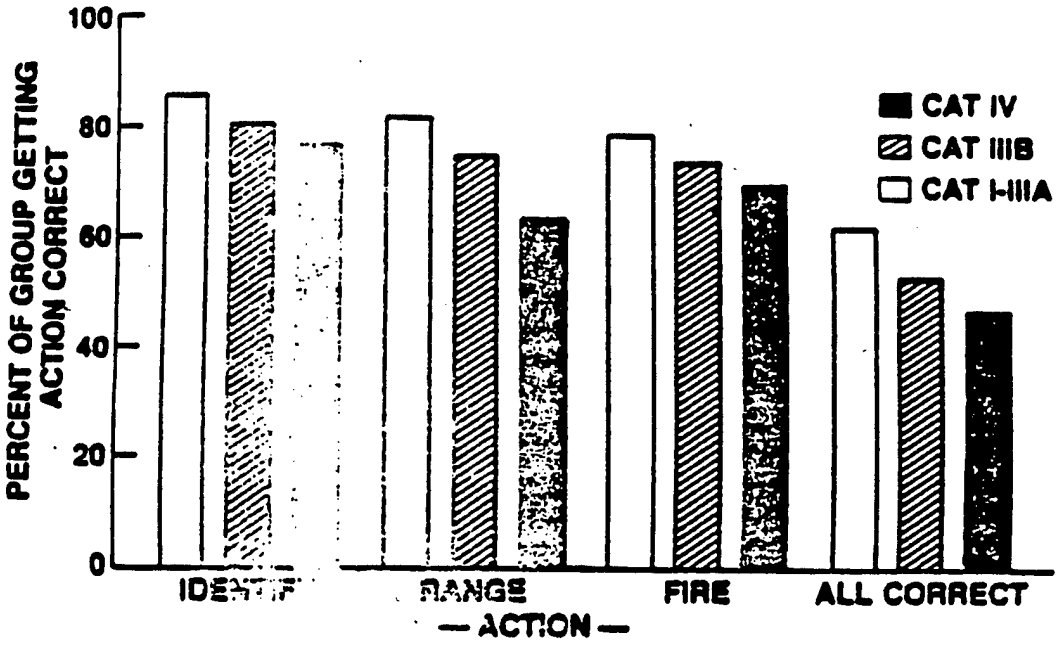
c. In addition to sustainment training of above tasks, the following additional tasks are trained in the units.

Assists in planning, organizing, directing, supervising, training, coordinating, and reporting activities of subordinate sections and squads.
Advises commander on tactival employment of weapons system
Assists in coordination and administration matters, and communications activities.
Receives, issues, and implements combat orders.
Supervises receipt, storage, and distribution of ammunition, supplies, and food.
Establishes observation post.

Orders fire to destroy enemy equipment, positions, and personnel.
Coordinates fire power.
Observes and shifts section fires.
Advises on tactical situation.
Requests and adjusts supporting fires.
Coordinates weapons and vehicle employment.
Supervises maintenance of section weapons and equipment.
Instructs replacement personnel.
Inforces communications procedures.

8. Task Performance Information

a. Testing of engagement functions on the predecessor by test score category yielded results in chart below.



b. The following tasks are "high drivers", i.e., costly in terms of manpower, personnel and training resources.

APPENDIX D-1

LAYOUT FOR ENLISTED MASTER FILE

RECORD LAYOUT

For use of this form, see AR 18-7; the proponent agency is Office of the Assistant Vice Chief of Staff.

PAGE NUMBER	NUMBER OF PAGES
1	21

DATE: 21 February 1985

SYSTEM ID	RECORD LENGTH
EMF	852

PREPARED BY: DAPC-PSS-SE

☐ CARD ☐ DISK ☒ TAPE ☐ OTHER

FILE ID: BM280UD01
BM280UT01, ER280UT01

REC PER BLK	REMARKS
14	Effective 28 February 1985

RELATIVE POSITION	IDENTIFICATION OF ELEMENT (Field)	ABBREVIATION	LENGTH/ CLASS	LOCATION
1	Name, Individual (NAME)	NAME-IND	27A	1-27
2	Social Security Number (SSN)	SSN	9N	28-36
3	Reserved for Future Use		2	37-38
4	Verification Status Social Security Number (VSSN)	VSSSN	1AN	39
5	Military Personnel Class (TYPEM)	MIL-PERS-CLASS	1A	40
6	Record Status Code (RSCD)	PDB-RSI	1N	41
7	Sex (SEX)	SEX	1A	42
8	Race/Population Group (RACE)	RACE-POP-GRP	1A	43
9	Ethnic Group (EGPCD)	ETH-GRP	1AN	44
10	Racial/Ethnic Descent Category (REDCAT)	REDCAT	1A	45
11	Religious Denomination	REL-DENOM	2AN	46-47
12	Citizenship Status, United States, Origin (CITIZ)	CTZSP-STAT-US-ORGN	1A	48
13	Marital Status (MARST)	MARTL-STATS	1A	49
14	Dependents, Number of (DEPN-NBR)	NBR-DEPN	2N	50-51
15	State From Which Entered Active Duty (PLOEN)	STATE-EAD	2N	52-53
16	State of Home of Record Upon Entry on Active Duty (STRD)	STATE-HOR-EAD	2AN	54-55
17	Service Component (COMPT)	SVC-COMP	1A	56

RECORD LAYOUT
For use of this form, see AR 18-7; the proponent agency is Office of the Assistant Vice Chief of Staff.

PAGE NUMBER: 2 | NUMBER OF PAGES: 21

DATE: 21 February 1985

SYSTEM ID: EMF | RECORD LENGTH: 852

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FILE ID: BM280UD01
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BLOCKING FACTOR: 14

REMARKS: Effective 28 February 1985

RELATIVE POSITION	IDENTIFICATION OF ELEMENT (Field)	ABBREVIATION	LENGTH/ CLASS	LOCATION
8	Term of Service, Active Duty (TERMS)	TOS-AD	1AN	57
9	Date of Expiration of Service Agreement, Current (ETSDT)	DATE-ESA-CURR	6N	58-63
0	Delay in Separation Reason (DSC)	DELAY-SEP-RSN	1A	64
1	Reserved for Future Use		2	65-66
2	Civilian Education Level (CIVED)	CIV-EDUC-CERT-COMPL	1AN	67
3	Major Subject of College Education (MADCD)	MAJ-SUBJ-COLLG-EDUC	3A	68-70
4	Physical Category (PHYCA)	PHYS-CAT	1A	71
5	Physical Profile Serial (PHYPR)	PHYS-PRFL-SER	6N	72-77
6	Military Entrance Physical Stamina Category (XFACT)	MEPSCAT	1A	78
7	Additional Pay (ADPAY)	IP-TYPE-SP-PAY	1AN	79
8	Proficiency Pay Category (PROFNCY-PAY-CAT)	PROFNCY-PAY-CAT	1N	80
9	Proficiency Pay Status (PROFNCY-PAY-STATUS)	PROFNCY-PAY-STATS	1N	81
0	Armed Forces Qualification Test Score Groups (AFQG)	AFQT-SCORE-GPS	1AN	82
1	Armed Forces Qualification Test Percentile Score (AFQSC)	AFQT-PCTL	3N	83-85
2	Pay Entry Basic Date (BPEDT)	PEBD	6N	86-91

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33	Basic Active Service Date (BASDI)	BASD	6N	92-97
34	Date of Rank - Permanent Grade (DOR)	DOR-PERM-GRD	6N	98-103
	GRADE			
35	Grade-Title (GRTIT)	GRD-TITLE	3AN	104-106
36	Grade-Code (GRDCD)	GRDCD	1AN	107
37	Reserved for Future Use		1	108
38	Paygrade (PAYGR)	PAY-LEVEL-SER-NBR	1N	109
	LAST GRADE CHANGE			
39	Last Grade Change Transaction (GRDTT)	LAST-GRD-CHG-TRANS	2AN	110-111
40	Date of Promotion/Reduction Change Transaction (GRDDT)	DATE-PRM-RED-CH-TRAN	6N	112-117
41	Control Language (CLANG)	CON-LANG	2A	118-119
42	Defense Language Aptitude Battery Score (DLAB)	DLAB-SCORE	3N	120-122
43	Date of Birth (DOB)	DOB	6N	123-128
	CURRENT ASSIGNMENT			
44	Current Personnel Information System Processing Activity (PIACD)	CURR-PPA	2AN	129-130

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	CURRENT UNIT PROCESSING CODE	CUPR-UPC		
45	Parent Organization Designator (UICCD)	CUPR-PARNT-ORG-DSG	3AN	131-133
46	Descriptive Designator (SUBUN)	CUPR-DSCRTV-DSG	2AN	134-135
47	Assignment Code-Current (ASGTC)	CUPR-COMD-ASG	2AN	136-137
48	Status Code-Current (STATU)	STATU	2AN	138-139
49	Location Abbreviation Current (LOCNI)	LOCNI	3AN	140-142
50	Replacement Activity Code (REPLI)	REPLI	1A	143
51	Central Transient Code (CTACD)	CTACD	1N	144
52	Drill Sergeant Identification (SGTID)	SGTID	2N	145-146
53	Date of Last Permanent Change of Station (DLPCS)	DATE-LAST-PCS	6N	147-152
54	Date Depart/Join Current Command (DJDCC)	CURR-DATE-ARR-SM-CURR-DODPRT-SM	6N	153-158
	GAINING ASSIGNMENT DATA			
55	Potential Gaining Personnel Information System Processing Activity (GAPPA)	POT-GAIN-PPA	2AN	159-160
56	Potential Gaining Parent Organization Designator (GAUIC)	POT-GAIN-PAR-ORG-DSG	3AN	161-163
57	Potential Gaining Descriptive Designator (GASUB)	POT-GAIN-DSCRIV-DSG	2AN	164-165

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RELATIVE POSITION	IDENTIFICATION OF ELEMENT (Field)	ABBREVIATION	LENGTH/ CLASS	LOCATION
58	Assignment Code - Gaining (GAASG)	POT-GAIN-COMD-ASG	2AN	166-167
59	Status Code - Gaining (GASTA)	GASTA	2AN	168-169
60	Location, Abbreviation Gaining (GALOC)	GALOC	3AN	170-172
61	Current Prescribed Reporting Date (GARPT)	CURR-PRESB-REPT-DATE	6N	173-178
	PREVIOUS ASSIGNMENT DATA			
62	Previous Personnel Information Processing Activity (PRPPA)	PREV-PPA	2AN	179-180
63	Parent Organization Designator-Previous (PRUIC)	PREV-PARNT-ORG-DSG	3AN	181-183
64	Descriptive Designator Previous (PRSUB)	PREV-DSCRIV-DSG	2AN	184-185
65	Assignment Code-Previous (PRASG)	PREV-COMD-ASG	2AN	186-187
66	Status Code-Previous (PRSTA)	PRSTA	2AN	188-189
	LAST REASSIGNMENT			
67	Type of Reassignment (TPRSG)	TPRSG	1N	190
68	Latest Reassignment Transaction (RESTT)	LATEST-RSG-TRANS	2AN	191-192
69	Date to Latest Reassignment Transaction (RESDT)	DATE-LATEST-RSG-TRANS	6N	193-198
	AUDIT FLAG			
70	Data Audit Personnel Information System Processing Activity (AUPPA)	DATA-AUDIT-PPA	2AN	199-200

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RELATIVE POSITION	IDENTIFICATION OF ELEMENT (Field)	ABBREVIATION	LENGTH/ CLASS	LOCATION
71	Year Audit Record Submitted (AUDYR)	AUDYR	2N	201
72	Month Audit Record Submitted (AUDMO)	AUDMO	2AN	202
	LAST PMOS CHANGE			
73	Last Change of PMOS Transaction (PMOLT)	PMOLT	2AN	203-204
74	Date of Last Change to Primary Military Occupational Specialty Designator Enlisted (PMOD1)	DATE-LAST-CHG-PMOSD-ENLD	6N	205-210
75	Primary Military Occupational Specialty Designator Enlisted (PMOS)	PMOSD-ENLD	5AN	211-215
76	Primary Additional Skill Identifier-Enlisted (ADSIDP)	ASI-ENLD	2AN	216-217
77	Second Additional Skill Identifier Enlisted (ADSIDS)	SECD-ASI-ENLD	2AN	218-219
	HISTORICAL ADSIS			
78	Previous Additional Skill Identifier Enlisted (ADSID2)	PREV-ASI-ASI-ENLD	2AN	220-221
79	Second Previous Additional Skill Identifier Enlisted (ADSID3)	SECD-PREV-ASI-ENLD	2AN	222-223
80	Third Previous Additional Skill Identifier Enlisted (ADSID4)	THIRD-PREV-ASI-ENLD	2AN	224-225
81	Fourth Previous Additional Skill Identifier Enlisted (ADSID5)	FOURTH-PREV-ASI-ENLD	2AN	226-227
82	Fifth Previous Additional Skill Identifier Enlisted (ADSID6)	FIFTH-PREV-ASI-ENLD	2AN	228-229
83	Secondary Military Occupational Specialty Designator-Enlisted	SMOSD-ENLD	5AN	230-234

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RELATIVE POSITION	IDENTIFICATION OF FIELD (Field)	ABBREVIATION	LENGTH/ CLASS	LOCATION
84	Duty Military Occupational Specialty Designator-Enlisted (DMOS)	DMOSD-ENLD	5AN	235-239
85	First Duty Additional Skill Identifier-Enlisted (DDSID)	FIRST-DY-ASI-ENLD	2AN	240-241
86	Duty Language Identity (DLIC)	DY-LANG-IDENT	2A	242-243
87	Promotion Military Occupational Specialty & Skill Level-Enlisted (PRMOS)	PRM-MOS-SKILL-ENLD	4AN	244-247
88	Projected Military Occupational Specialty and Skill Level-Enlisted (PJMOS)	PROJ-MOS SKILL-ENLD	4AN	248-251
89	Year-Month of Projected Military Occupational Specialty & Skill Level- Enlisted (PRJDT)	YR-MO-PROJ-MOS-SKILL-ENLD	4N	252-255
90	Separation Documentation Issued (SEP-DOC ISSUED)	SEPN-DOC ISSUED	1A	256
91	Separation Program Designator, Military (SPNIS)	SEP-PROG-DESIG-MIL	3AN	257-259
	LAST ACCESSION			
92	Last Entry on Active Duty Transaction (LYPLA)	LAST-EAD-IPARS	2AN	260-261
93	Date of Entry on Active Duty, Current (DATLA)	DATE-EAD-CURR	6N	262-267
	LAST SEPARATION			
94	Latest Separation Transaction (SEPTT)	LATEST-SEP-IPARS	2AN	268-269
95	Date of Separation (SEPDT)	DOS	6N	270-275

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RELATIVE POSITION	IDENTIFICATION OF ELEMENT (Field)	ABBREVIATION	LENGTH/ CLASS	LOCATION
	LAST RETURN MILITARY CONTROL			
96	Last Return From DROP-FROM Rolls (RMCTT)	LAST-RTS-DFR-AD-TRANS	2AN	276-277
97	Date of Last Return from DROP-FROM-Rolls to Active Duty (RMCDT)	DATE-LAST-RTN-DFR-AD	6N	278-283
	LAST DROP FROM ROLLS			
98	Last Drop-From-Rolls of Active Army Transaction (DFRTT)	LAST-DFR-ACT-ARMY-TRANS	2AN	284-285
99	Date of Last Drop-From-Rolls of the Active Army (DFRDT)	DATE-LAST-DFR-ACT-ARMY	6N	286-291
	LAST RETURN FROM AWOL			
100	Lastest Return From AWOL Transaction (AWOTT)	LATEST-RTN-FR-AWOL-TRANS	2AN	292-293
101	Date of Return From Absent Without Leave, Latest (AWODT)	DATE-RTN-FR-AWOL-LATEST	6N	294-299
	LAST AWOL			
102	Latest Absent Without Leave Transaction (LAWTT)	LATEST-AWOL TRANS	2AN	300-301
103	Date of Absent Without Leave, Latest (LAWDT)	DATE-AWOL-LATEST	6N	302-307
	AWOL REPORTING UNIT			
104	Absent Without Leave Personnel Information System Processing Activity (AWPPA)	AWOL-PPA	2AN	308-309

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RELATIVE POSITION	IDENTIFICATION OF ELEMENT (Field)	ABBREVIATION	LENGTH/ CLASS	LOCATION
105	Absent Without Leave Parent Organization Designator (AWUIC)	UFC-SM-AWOL PARNT-ORG-DSG-SM-AWOL	3AN	310-312
106	Absent Without Leave Descriptive Designator (AWSUB)	DSCRIV-DSG-SM-AWOL	2AN	313-314
	LAST FIELD TRANSACTION			
107	Last Field Transaction (STATT)	LAST-FLD-TRANS	2AN	315-316
108	Date of Last Field Transaction (STADT)	DATE-LAST-FLD-TRANS	6N	317-322
109	Control Date (CTLDT)	CONTL-DATE	6N	323-328
	ATTACHED UNIT DATA			
110	PERSINS Processing Activity of Attachment (ATPFA)	PFA-ATCH	2AN	329-330
111	Parent Organization Designator of Attachment (ATUIC)	PARNT-ORG-DSG-ATCH	3AN	331-333
112	Descriptive Designator of Attachment (ATSUB)	DSCRIV-DSG-ATCH	2AN	334-335
113	Attached Unit Assignment Code (ATASG)	ATASG	2AN	336-337
114	Attached Unit Status (ATSTA)	ATSTA	2AN	338-339
115	Attached Unit Location (ATLOC)	ATLOC	3AN	340-342
116	Attached Unit Date (ATDAT)	ATDAT	6N	343-348
117	SIDPERS (SPRSC)	SPF-RSI	1A	349

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RELATIVE POSITION	IDENTIFICATION OF ELEMENT (Field)	ABBREVIATION	LENGTH/ CLASS	LOCATION
	CONFINEMENT DATA			
118	Confinement Transaction (CONTT)	CONF-TRANS	2AN	350-351
119	Confinement Date (CONDT)	CONF-DATE	6N	352-357
120	Confinement Release Transaction (CRLTT)	CONF-RSL-TRANS	2AN	358-359
121	Confinement Release Date (CRLDT)	CONF-RLS-DATE	6N	360-365
122	Reenlistment Eligibility, Regular Army (EREUPP)	REENL-ELIG-RA	2AN	366-367
123	Movement Designator Code (MDCCD)	MDCCD	2AN	368-369
124	Area Previous Foreign Service Tour (APRAS)	APRAS	1AN	370
125	Area of Current Foreign Service Tour (ACFST)	ACFST	1AN	371
126	Continental United States Assignment Preference (CONAP)	CONUS-ASG-PREF	2AN	372-373
127	Overseas Assignment Preference/1 (OS-ASG-PREF1)	OS-ASG-PREF/1	2AN	374-375
128	Overseas Assignment Preference/2 (OS-ASG-PREF2)	OS-ASG-PREF/2	2AN	376-377
129	Overseas Assignment Preference/3 (OS-ASG-PREF3)	OS-ASG-PREF/3	2AN	378-379
130	Assignment Eligibility and Availability (AEACD)	AEA	1 A	380
131	Year-Month of Assignment Eligibility and Availability Termination (AEADT)	YR-MO-AEA-TERM	4 N	381-384

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RELATIVE POSITION	IDENTIFICATION OF ELEMENT (Field)	ABBREVIATION	LENGTH/ CLASS	LOCATION
132	Date Eligible for Return From Overseas (DEROS)	DEROS	6N	385-390
133	Date Returned From Overseas (DROS)	DROS	6N	391-396
134	Permanent Party Type (PPTYP)	PPTYP	1N	397
135	Conus-Overseas Type (COSTY)	COSTY	1N	398
136	Year-Month, Dependents Arrived Overseas (DDARO)	YR-MO-DEPN-APR-OS	4N	399-402
137	Recruiter Flag (RPFLG)	RPFLG	1AN	403
138	Master Record Lock (LOCKM)	LOCKM	1N	404
139	Special Qualification Identifier-First Additional-Enlisted (SQIP1)	SQI-FIRST-ADD-ENLD	1A	405
140	Special Qualification Identifier-Second Additional-Enlisted (SQIP2)	SQI-SECOND-ADD-ENLD	1A	406
141	Special Qualification Identifier-Third Additional-Enlisted (SQIP3)	SQI-THIRD-ADD-ENLD	1A	407
142	Group Identification Code (EPDID)	EPDID	1AN	408
	ON ORDERS DATA			
143	On Orders Date of Assignment Transaction (EPDDT)	OO-DATE-ASG-TRANS	6N	409-414
144	On-Orders Gaining Command of Assignment (EPDGC)	OO-GAIN-COMD ASG	2AN	415-416
145	On Orders Assignment Status (EPDST)	OO-ASG-STATUS	1A	417
146	On Orders Requisition Control Number (EPDCN)	OO-REQN-CONTL-NBR	3AN	418-420

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147	On-Orders Requisition Line Number (EPDLN)	OO-REQN-LINE-NBR	4AN	421-424
148	On-Orders Assignment Classification (EPCLS)	OO-ASG-CLASS	1AN	425
149	On-Orders Military Occupational Specialty Designator - Enlisted (RQMOS)	OO-MOSD ENLD	5AN	426-430
150	On-Orders Gaining Personnel Information System Processing Activity (EPPPA)	OO-GAIN-PPA	2AN	431-432
151	On Orders Gaining Parent Organization Designator (EPUIC)	OO-GAIN-PARNT-ORG-DSG	3AN	433-435
152	On Orders Gaining Descriptive Designator (EPSUB)	OO-GAIN-DSCRTV-DSG	2AN	436-437
153	On Orders Year Month of Requirement (EPRDT)	OO-YR-MO-RQMT	4N	438-441
154	On Orders Gaining Priority Command Code (EPPCC)	OO-GAIN-PRIORITY CMD-CD	2AN	442-443
155	Advanced Individual Training Graduation Day of Year (AITDT)	AIT-GRAD-DAY-of-YR	3N	444-446
156	Advanced Individual Training Commitment Location (AITCC)	AIT-CMT-LOC	2AN	447-448
157	SELF-PACE Flag (PACE)	PACE	1A	449
158	Aerial Port of Embarkation (APOE)	APOE	1N	450
159	Reserved for Future Use		2	451-452
160	Home Base Assignment (HBASMT)	HOME-BASE-ASG	3A	453-455

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161	Aerial Port of Debarkation (APOD)	APOD	1AN	456
162	Reserved for Future Use		2	457-458
163	Deletion or Deferment-on Orders Reason (DDRC)	DEL-DEF-RSN	2A	459-460
164	Date of Loss (DLOS)	DATE-LOSS	6N	461-466
165	DA Directed Change of Station PERSINS Processing Activity (CSPPA)	DA-DIR-CHG-STA-PPA	2AN	467-468
166	First Previous PCS Date (DACS1)	DACS1	4N	469-472
167	Second Previous PCS Date (DACS2)	DACS2	4N	473-476
168	Current Priority Command Code (PCC)	PPC	2AN	477-478
169	Gaining Priority Command Code (GAPCC)	GAPCC	2AN	479-480
170	Career Management Field, Enlisted, United States Army (CMF)	CMF-ENLD-USA	2AN	481-482
171	Area of Last Completed Short Tour (ALCST)	ALCST	1AN	483
172	Year-Month of Return From Last Completed Short tour (DRLST)	YR-MO-RTN-LAST-COMPL-SHORT-TOUR	4N	484-487
173	Year-Month Commenced Current Overseas Tour (DCOST)	YR-MO-COMM-CURR-OS-TOUR	4N	488-491
174	Blank		1	492
175	Enlistment Option Code (ENLOP)	ENLSTMT-PROG-OPTN	4AN	493-496
176	Dual Component Grade Code (DCGRC)	DUAL-COMP-GRD	4AN	497-500

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177	Dual Component Status (DCSTC)	DCSTC	1A	501
178	Dual Component Specialty Code (DCPSC)	DCPSC	2N	502-503
179	SIDPERS Flag (SDPFL)	SDPFL	1N	-504
180.	Year Within Decade of Termination in Exceptional Family Member Program (EFMP)	YWD-TERM-EXFMP	1N	505
181	Veterans Education Assistance Program (VEAP)	VEAP	1A	506
182	Military Entrance Processing Station Identification (AFEES)	MEPS-ENLSTMT	3AN	507-509
183	Protected Personnel Indicator (PPIND)	PPIND	1N	510
184	Enlisted Evaluation Report Year Month (EERDT)	EERDT	4N	511-514
185	Date Latest Vocational Test Completed (ASVDT)	ASVDT	6N	515-520
186	Armed Services Vocational Aptitude Battery Clerical Administrative Aptitude Area Standard Score (CLSCR)	ASVAB-CLER-ADMIN-APT-STD	3N	521-523
187	Armed Services Vocational Aptitude Battery Combat Aptitude Area Standard Score (COSCR)	ASVAB-CO-APT-STD	3N	524-526
188	Armed Services Vocational Aptitude Battery Electronics Aptitude Area Standard Score (ELSCR)	ASVAB-ELECT-APT-STD	3N	527-529
189	Armed Services Vocational Aptitude Battery Field Artillery Aptitude Area Standard Score (FASCR)	ASVAB-FA-APT-STD	3N	530-532

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190	Armed Services Vocational Aptitude Battery General Maintenance Aptitude Area Standard Score (GMSCR)	ASVAB-GM-APT-STD	3N	533-535
191	Armed Services Vocational Aptitude Battery Motor Mechanical Aptitude Area Standard Score (MMSCR)	ASVAB-MTR-MECH-APT-STD	3N	536-538
192	Armed Services Vocational Aptitude Battery Food Operations Aptitude Area Standard Score (OFSCR)	ASVAB-FOOD-OPS-APT-STD	3N	539-541
193	Armed Services Vocational Aptitude Battery Surveillance and Communications Aptitude Area Standard Acore (SCSCR)	ASVAB-SURVL-COMM-APT-STD	3N	542-544
194	Armed Services Volational Aptitude Battery Skilled Techinical Aptitude Area Standard Score (STSCR)	ASVAB-TECH-APT-STD	3N	545-547
195	Auditory Perception Test Standard Score (APSCR)	AUD-PERCEPT TEST-STD	3N	548-550
196	Armed Services Vocational Aptitude Battery General Technical Aptitude Area Standard Score (GTSCR)	ASVAB-GEN TECH-APT STD	3N	551-553
	ENL/RENL BONUS DATA			
197	Selective Re-up Bonus-MOS (VRPMO)	VRPMO	3N	554-556
198	Selective Re-up Bonus-Grade (VRGRD)	REENL-BONUS-PAY-LEVEL	1N	557
199	Selective Re-up Bonus-Multiplier (VRMUL)	VRMUL	1AN	558
200	Selective Re-up Bonus-Payment Number (VRPNR)	ENLSTMT-REENL BONUS-PMT	1N	559

RECORD LAYOUT For use of this form, see AR 18-7; the proponent agency is Office of the Assistant Vice Chief of Staff.		PAGE NUMBER 16	NUMBER OF PAGES 21
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SYSTEM ID EMF	RECORD LENGTH 852	PREPARED BY DAPC-PSS-SE	
☐ CARD ☐ DISK ☒ TAPE ☐ OTHER		FILE ID BM280UD01 BM280UT01, ER280UT01	
REC PER BLK 14	REMARKS Effective 28 February 1985		

RELATIVE POSITION	IDENTIFICATION OF ELEMENT (Field)	ABBREVIATION	LENGTH/ CLASS	LOCATION
201	Selective Re-up Bonus-Term (VRTRM)	MNTHS-CURR-ENLSTMT-BONUS	2N	560-561
202	Selective Re-up Bonus-Date (VRRDT)	YR-MO-ENL-BNS-TERM-RA	4N	562-565
203	Progression MOS-Primary (Target) (PGMOS)	CPMOS-SKILL-ENLD	4AN	566-569
204	Primary Military Occupational Specialty and Skill Level, Last Tested - Enlisted (PQDES)	PMOS-SKILL-LAST-TEST-ENL	4AN	570-573
205	Year-Month Primary Military Occupational Specialty and Skill Level Last Tested - Enlisted (PSQDI)	YR-MO-PMOS-LAST-TEST-ENL	4N	574-577
206	Skill Qualification Test Raw Score, Primary Military Occupation Specialty (PQSCR)	SQT-RAW-SCORE-PMOS	3N	578-580
207	Skill Qualification Test Percentile Score, Primary Military Occupational Specialty (PQPER)	SQT-PCTL-SCORE-PMOS	3N	581-583
208	Previous Military Occupational Specialty and SKill Level, Tested - Enlisted (PRDES)	PREV-PMOS-SKILL-TEST ENL	4AN	584-587
209	Year-Month, Previous Primary Military Occupational Specialty and Skill Level Last Tested - Enlisted (PRQDT)	YR-MO-PREV-PMOS-TEST ENL	4N	588-591
210	Skill Qualification Test Raw Score, Previous Primary Military Occupational Specialty (PRQSC)	SQT-RAW-SCORE-PREV-PMOS	3N	592-594
211	Skill qualification Test Percentile Score, Previous Primary Military Occupational Specialty (PRPER)	SQT-PCTL-SCORE-PREV-PMOS	3N	595-597

RECORD LAYOUT

For use of this form, see AR 18-7; the proponent agency is Office of the Assistant Vice Chief of Staff.

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SYSTEM ID: EMF | RECORD LENGTH: 852

PREPARED BY: DAPC-PS S-SE

☐ CARD ☐ DISK ☒ TAPE ☐ OTHER

FILE ID: BM280UD01 BM280UT01, ER280UT01

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RELATIVE POSITION	IDENTIFICATION OF ELEMENT (Field)	ABBREVIATION	LENGTH/ CLASS	LOCATION
212	Second Military Occupational Specialty and Skill Level, Last Tested - Enlisted (SQDES)	SMOS-SKILL LAST-TEST-ENL	4AN	598-601
213	Year-Month Secondary Military Occupational Specialty and Skill Level Last Tested - Enlisted (SSQDT	YR-MO-SMOS-LAST-TEST-ENL	4N	602-605
214	Skill Qualification Test Raw Score, Secondary Military Occupational Specialty (SQSCR)	SQT-RAW-SCORE-SMOS	3N	606-608
215	Project Development Identifier Code (PDICD)	PDI	2AN	609-610
216	Project Development Sub Code (PDISUB)	PDISUB	1AN	611
217	Project Development Award Date (PDIDT)	YR-MO-PDSI-AWD	4N	612-615
218	Days Leave Authorized Current Reassignment (LVENR)	DAYS-LV-AUTH-CURR-RSG	2N	616-617
219	Day Temporary Duty Authorized Current Reassignment (TDYENR)	DAYS-TDY-AUTH-CURR-RSG	3N	618-620
220	Personnel Mobilization Category (MOBCAT)	PERS-MOB CAT	1A	621
221	Type Tour (TYTUR)	TYTUR	1AN	622
222	Refiled Social Security Number (NSSAN)	NSSAN	9N	623-631
223	Department of Defense Component of Active Duty Spouse (SPBRS)	DOD-COMP-AD-SPOUSE-	1A	632

RECORD LAYOUT
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FILE ID: BM280UD01 BM280UT01, ER280UT01

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REMARKS: Effective 28 February 1985

RELATIVE POSITION	IDENTIFICATION OF ELEMENT (Field)	ABBREVIATION	LENGTH/ CLASS	LOCATION
224	Military Personel Class of Active Duty Spouse (SPMPC)	MIL-PERS-CLASS-AD-SPOUSE	1A	633
225	Social Security Number of Spouse (SPSSN)	SSN-SPOUSE	9N	634-642
226	Top of System Year (TOSYR)	TOSYR	1N	643
227	Top of System Month (TOSMO)	TOSMO	1AN	644
228	Top of System Day (TOSDA)	TOSDA	1AN	645
229	Top of System Transaction (TOSTT)	TOSTT	2AN	646-647
230	AMSCO Paragraph Number (PARANO)	PARANO	4N	648-651
231	AMSCO Line Number (LINENO)	LINENO	3N	652-654
	REGIMENTAL AFFILIATION DATA			
232	Regimental Affiliation Program Unit Home Base (PAHOME)	PAHOME	2AN	655-656
233	Regimental Affiliation Unit Number (PAUNIT)	REGT-DSG UNIT-NBR	4AN	657-660
234	Regimental Affiliation Branch (PABR)	REGT-DSG-UNIT-BR	2AN	661-662
235	Year Last Regimental Affiliation Assignment (YRRAC)	YR-LAST-REGT-AFFIL-COMPL	2N	663-664
236	Number of Regimental Affiliation Assignment (NRRAA)	NBR-REGT-AFFIL-ASG	1N	665
237	Regimental Affiliation Status (PAAS)	REGT-AFFIL-ASG-STAT	1A	666

RECORD LAYOUT

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FILE ID: BM280UD01
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RELATIVE POSITION	IDENTIFICATION OF ELEMENT (Field)	ABBREVIATION	LENGTH/ CLASS	LOCATION
238	Months in Regemental Affiliated Unit (MRAU)	MRAU	3N	667-669
239	Enlistment/Reelistment Waiver (MORWA)	ENLSTMT-PROHBN-WAVR	1AN	670
240	Number Times Enl/Reenl (PSVCI)	NBR-REENL	1N	671
241	NCO Education System (NCOES)	MIL-EDUC STAT	1A	672
242	1st Previous Tour, Oversea area (TOUR1)	TOUR1	1AN	673
243	2nd Previous Tour, Oversea area (TOUR2)	TOUR2	1AN	674
244	Year-Month Current Promotion Points Determined (PROPTDT)	YR-MO-CURR PRM-PT-DETM	4N	675-678
245	Current Promotion Points (PROPT)	CURR-PRM-PT	3N	679-681
246	Year-Month Previous Promotion Points Determined (PRVPTDT)	YR-MO-PREV PRM-PT-DETM	4N	682-685
247	Previous Promotion Points (PRVPT)	PREV-PRM-PT	3N	686-688
248	Personnel Security Investigation Complete (PSINVES-COMPL)	PSINVES-COMPL	1A	689
249	Date Personnel Security Investigation Complete (DATE-PSINVES-COMPL)	DATE-PSINVES-COMPL	6N	690-695
250	Department Determined Personnel Security Status (DEPT-DETM-PSSTAT)	DEPT-DETM-PSSTAT	1A	696

RECORD LAYOUT
For use of this form, see AR 18-7; the proponent agency is Office of the Assistant Vice Chief of Staff.

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DATE: 21 February 1985

SYSTEM ID: EMF | RECORD LENGTH: 852

PREPARED BY: DAPC-PSS-SE

☐ CARD ☐ DISK ☑ TAPE ☐ OTHER

FILE ID: AM280UD01
BM280UT01, ER280LT01

REC PER BLK: 14 | REMARKS: Effective 28 February 1985

RELATIVE POSITION	IDENTIFICATION OF ELEMENT (Field)	ABBREVIATION	LENGTH/ CLASS	LOCATION
251	Personnel Security Investigation Initiated (PSINVES-INIT)	PSINVES-INIT	1A	697
252	Date Personnel Security Investgation Initiated (DATE-PSINVES-INIT)	DATE-PSINVES-INIT	6N	698-703
253	Personnel Reliability Program Assignment Status (PRP-ASG-STAT)	PRP-ASG-STAT	1A	704
254	First Suspension of Favorable Personnel Action Reason (1st-SFPA-RSN)	1ST-SFPA-RSN	1A	705
255	First Type of Suspension of Favorable Personnel Action Report (1ST-TYPE-SFPA-REPT)	1ST-TYPE-SFPA-REPT	1A	706
256	Date of First Report of Suspension of Favorable Personnel Action (1ST-DATE-REPT-SFPA)	DATE-1ST-REPT-SFPA	6N	707-712
257	Second Suspension of Favorable Personnel Action Reason (2D-SFPA-RSN)	2D-SFPA-RSN	1A	713
258	Second Type of Suspension of Favorable Personnel Action Report (2D-TYPE-SFPA-REPT)	2D-TYPE-SFPA-REPT	1A	714
259	Date of Second Report of Suspension of Favorable Personnel Action (2D-DATE-REPT-SFPA)	DATE-2D-REPT-SFPA	6N	715-720
260	Assignment Consideration (ASG-CONS)	ASG-CONS	2AN	721-722
261	Reserved for Future Use		2	723-724
262	Servicing Military Personnel Office (MILPO)	MILPO	4AN	725-728

RECORD LAYOUT For use of this form, see AR 18-7; the proponent agency is Office of the Assistant Vice Chief of Staff.		PAGE NUMBER 21	NUMBER OF PAGES 21
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☐ CARD ☐ DISK ☒ TAPE ☐ OTHER		FILE ID BM280UD01 BM280UT01, ER280UT01	
REC PER BLK 14	REMARKS Effictive 28 February 1985		

RELATIVE POSITION	IDENTIFICATION OF ELEMENT (Field)	ABBREVIATION	LENGTH/ CLASS	LOCATION
263	Type Personnel Security Investigation (SECLN)	PSINVES-1A TYPE		729
264	Year-Month Commenced Current Regimental Affiliation Assignment (YR-MO-COMM-REGT-ASG)	YR-MO-COMM REGT-ASG	4N	730-733
265	Second Language Identity (SECD-LANG-IDENT)	SECD-LANG IDENT	2AN	734-735
266	Previous Weight Control Program Completion Date (PREV-WCP-COMPL-DATE)	PREV-WCP COMPL-DATE	6N	736-741
267	Assignment Category Number (CATNR)	CATNR	6AN	742-747
268	BONUS Indicator (BONIN)	BONIN	1AN	748
269	BONUS Primary Military Occupational Specialty-Enlisted (BOMOS)	BOMOS	3AN	749-751
270	Variable Enlisted Length (VEL)	VEL	2N	752-753
271	Unit Number (UNTNO)	UNIT-NBR-USA	4AN	754-757
272	Unit Designation (UNDES)	UNDES	22AN	758-779
273	Troop Program Sequence Number (TPSN)	TPSN	5AN	780-784
274	Station Name (STANAM)	STANAME	9AN	785-793
275	Station Code (ARLOC)	ARLOC	5AN	794-798
276	Zip Code (ZIPCD)	ZIPCD	9AN	799-807
277	Element Sequence (ELSEQ)	ELSEQ	2AN	808-809
278	Blank		43	810-852

APPENDIX D-2

LAYOUT FOR OPERATIONS REPORTING MASTER FILE

AR-601-210

ORMF LAYOUT

```
OPERATIONS REPORTING SYSTEM DATA ELEMENT DESCRIPTIONS

     1. DATA ELEMENT DESCRIPTIONS ARE LISTED IN THE ORDER IN WHICH
        THEY ARE FOUND ON THE ORMF.

     2. ALL DATES ARE IN THE FORMAT YYMMDD UNLESS OTHERWISE
        SPECIFIED.  ALL FIELDS ARE ALPHANUMERIC
        UNLESS OTHERWISE DEFINED.

     3. FOR FURTHER DEFINITION AND EXPLANATION OF DATA ELEMENTS
        REFER TO MEPCOM REG 18-5, AR 601-210, DA PAM 601-5-1 AND
        DA PAM 601-5-2.

LEGEND:  ORS     -  OPERATIONS REPORTING SYSTEM
         → ORMF  -  OPERATIONS REPORTING MASTER FILE (D18AGM1)
                    THE SAME RECORD DESCRIPTION ALSO APPLIES TO RECORDS
                    ON FILES D18AGM0, D18AGM2, D18AGM5, D18AGM6, D13AGM7
                    & D18AGM8
                    (RECORD SIZE = 712, BLOCKING FACTOR = 10)  7120
           ORDB  -  OPERATIONS REPORTING DATA BASE
           ODIS  -  OFFLINE DATA INFORMATION SYSTEM
           D18AGM2 - REQUEST DOT TRANSACTION FILE
                    (RECORD SIZE = 322, BLOCKING FACTOR = 10)
           D18ADM2 - MEPRS ORS TRANSACTION FILE
                    (RECORD SIZE = 375, BLOCKING FACTOR = 10)
           POS   -  POSITION (CHARACTER POSITION IN RECORD)
           MEPRS -  MILITARY ENTRANCE PERSONNEL REORTING SYSTEM (MEPCOM)
           REQUEST - RECRUIT QUOTA SYSTEM

CONTROL DATA:
    GROUP LEVEL ITEM.
    LOCATION - ORMF POS 1-42
               ODIS NAME CDATA

CONTROL SOCIAL SECURITY NUMBER:
    FILLED FOR NUMERIC CHARACTERS, MUST BE NON-ZERO. THIS IS THE
    "KEY" FIELD WHICH UNIQUELY IDENTIFIES EACH RECORD.
    LOCATION - ORMF POS 1-9
               ODIS/ORDB NAME CSSN
               D18ARM2 POS 4-12
               D18ADM2 POS 1-9

CONTROL TOP OF SYSTEM CHANGE FLAG:
    IDENTIFIES RECORD AS HAVING BEEN CHANGED BY OTHER THAN THE
    NORMAL FEEDER SYSTEMS (MEPRS, REQUEST, MILPERCEN, R77).
    ORS GENERATED DATA ELEMENT.
    VALID CODES:  R = THIS RECORD IS NO LONGER CHECKED FOR
                      MEPRS/REQUEST DISCREPANCIES.  (BASED ON
                      SSN FOUND IN USARECARDCTYPE4 FROM RC)
    LOCATION - ORMF POS 10
               ODIS NAME CTOPSY

CONTROL DATE PROCESSED:
    COMPUTER SYSTEM DATE ON DAY RECORD WAS LAST CHANGED IN ANY WAY.
    ORS GENERATED DATA ELEMENT.
```

```
57          LOCATION - ORMF POS 11-16
58                     ODIS NAME CPROCD
59
60      CONTROL MEPRS DATE PROCESSED:
61          COMPUTER SYSTEM DATE ON WHICH MEPRS DATA WAS LAST PROCESSED
62          ON THIS ORMF RECORD AT USAREC.
63          ORS GENERATED DATA ELEMENT.
64          LOCATION - ORMF POS 17-22
65                     ODIS NAME CMPROC
66
67      CONTROL REQUEST DATE PROCESSED:
68          COMPUTER SYSTEM DATE ON WHICH REQUEST DATA WAS LAST PROCESSED
69          ON THIS ORMF RECORD AT USAREC.
70          ORS GENERATED DATA ELEMENT.
71          LOCATION - ORMF POS 23-28
72                     ODIS NAME CRPROC
73
74      CONTROL DATE OF LAST DATA BASE UPDATE:
75          DATE ON WHICH LAST CHANGE WAS MADE AFFECTING DATA WHICH IS
76          CARRIED ON ORD3.
77          ORS GENERATED DATA ELEMENT.
78          LOCATION - ORMF POS 29-34
79                     ODIS NAME CDBUDT
80
81      CONTROL CONTRACT DATE:
82          ORS GENERATED DATA ELEMENT.
83          LOCATION - ORMF POS 35-40
84                     ODIS NAME CCONDT
85
86      CONTROL MISSION BOX:
87          VALID CODES RANGE FROM 01 TO 18.
88          ORS GENERATED DATA ELEMENT, BASED ON REQUEST OR MEPRS
89                  PRIOR SERVICE SEX ED LEVEL                AFQT   COMP
90          VALID CODES: 01 - NPS  M  9,S                     50+    R,G
91                       01 - NPS  M  9                       50+    V
92                       02 - NPS  M  ALL EXCEPT 1,3,9,S      50+    R,G
93                       02 - NPS  M  ALL EXCEPT 1,3,9        50+    V
94                       03 - NPS  M  9,S                     31-49  R,G
95                       03 - NPS  M  9                       31-49  V
96                       04 - NPS  M  ALL EXCEPT 1,3,9,S      31-49  R,G
97                       04 - NPS  M  ALL EXCEPT 1,3,9        31-49  V
98                       05 - NPS  M  9,S                     16-30  R,G
99                       05 - NPS  M  9                       16-30  V
100                      06 - NPS  M  ALL EXCEPT 1,3,9,S      16-30  R,G
101                      05 - NPS  M  ALL EXCEPT 1,3,9        16-30  V
102                      07 - NPS  M  1,3                     50+    ALL
103                      08 - NPS  M  1,3                     31-49  ALL
104                      09 - NPS  F  9,S                     50+    R,G
105                      09 - NPS  F  9                       50+    V
106                      10 - NPS  F  ALL EXCEPT 1,3,9,S      50+    R,G
107                      10 - NPS  F  ALL EXCEPT 1,3,9        50+    V
108                      11 - NPS  F  9,S                     31-49  R,G
109                      11 - NPS  F  9                       31-49  V
110                      12 - NPS  F  ALL EXCEPT 1,3,9,S      31-49  R,G
111                      12 - NPS  F  ALL EXCEPT 1,3,9        31-49  V
112                      13 - NPS  F  9,S                     16-30  R,G
113                      13 - NPS  F  9                       16-30  V
```

```
                    14 - NPS  F  ALL EXCEPT 1,3,9,S  16-30  R,G
                    14 - NPS  F  ALL EXCEPT 1,3,9    16-30  V
                    15 - NPS  F  1,3                 50+    ALL
                    16 - NPS  F  1,3                 31-49  ALL
                    17 - PS   M
                    18 - PS   F
        LOCATION - ORMF POS 41-42
                   ODIS/ORD8 NAME CMISSN
                   D18A3M2 POS 321-322

FILLER:
    RESERVED FOR FUTURE USE.
    LOCATION - ORMF POS 43-48

REQUEST - DATA2:
    GROUP LEVEL ITEM, 2ND BLOCK OF REQUEST DATA.
    LOCATION - ORMF POS 49-99
               ODIS NAME RDATA2

REQUEST - BT LOCATION:
    NOT RECIEVED BEFORE 9 JUN 85.
    LOCATION - ORMF POS 49-56
               ODIS NAME RBTLOC
               D18A8M2 POS 248-291

REQUEST - TRANSACTION TYPE:
    IDENTIFIES THE TYPE OF REQUEST TRANSACTION.
    VALID CODES:  A - ADD (NEW RECORD, ORIGINAL DATA)
                  S - SSN CHANGE (WITH OR WITHOUT OTHER CHANGES)
                  C - CHANGE (OTHER THAN SSN CHANGE)
                  D - CANCELLATION (BECAUSE OF DEP DISCHARGE
                      OR OTHER REASONS)
    LOCATION - ORMF POS 57
               ODIS NAME RTTYPE
               D13A8M2 POS 1

REQUEST - HOMETOWN RECRUITER AID PROGRAM CODE:
    LOCATION - ORMF POS 58
               ODIS/ORD8 NAME RHRAP
               D18A8M2 POS 241

REQUEST - SPECIAL RECRUITING PROGRAM CODE:
    LOCATION - ORMF POS 59-61
               ODIS NAME RGCODE
               D18A8M2 POS 242-244

REQUEST - SELECTED RESERVE INCENTIVE PROGRAM CODE:
    LOCATION - ORMF POS 62-63
               ODIS NAME RSRIP
               D18A8M2 POS 245-246

REQUEST - USAR CONTROL NUMBER:
    LOCATION - ORMF POS 64-70
               ODIS NAME RVCNTL
               D18A8M2 POS 247-253

REQUEST - UZR:
```

dec - recd 4/9-98

```
171          ACCESS CODE OF GUIDANCE COUNSELOR/USER.
172          LOCATION - ORMF POS 71-73
173                     ODIS NAME RUZK
174                     D18ABM2 POS 254-256
175
176     REQUEST - GUIDANCE COUNSELOR SSN:
177          LOCATION - ORMF POS 74-82
178                     ODIS/ORDB NAME RCNSLR
179                     D18ABM2 POS 257-265
160
181     REQUEST - DATE OF ACTION:
182          DATE REQUEST TRANSACTION ORIGINATED.
183          LOCATION - ORMF POS 83-88
184                     ODIS/ORDB NAME RDOA
185                     D18ABM2 POS 256-271
186
187     REQUEST - TIME OF ACTION:
188          TIME REQUEST TRANSACTION ORIGINATED.
189          LOCATION - ORMF POS 89-94
190                     ODIS NAME RTOA
191                     D18ABM2 POS 272-277
192
193     REQUEST - MEPSCAT OVERIDE CODE:
194          LOCATION - ORMF POS 95
195                     ODIS NAME RMSCOR
196                     D18ABM2 POS 279
197
198     REQUEST - LOAN REPAYMENT PLAN CODE:
199          LOCATION - ORMF POS 96
200                     ODIS NAME RLRP
201                     D18ABM2 POS 280
202
203     REQUEST - ENLISTED GRADE:
204          LOCATION - ORMF POS 97-98
205                     ODIS NAME RENLGR
206                     D18ABM2 POS 281-282
207
208     FILLER:
209          RESERVED FOR FUTURE USE.
210          LOCATION - ORMF POS 99-111
211
212     MILPERCEN - DATA:
213          GROUP LEVEL ITEM, DATA RECEIVED FROM MILPERCEN.
214          LOCATION - ORMF POS 112-120
215                     ODIS NAME PDATA
216
217     MILPERCEN - DATE OF SEPERATION:
218          DATE SERVICE MEMBER LAST SEPERATED FROM ACTIVE SERVICE.
219          LOCATION - ORMF POS 112-117
220                     ORMF/ORDB NAME PSEPDT
221
222     MILPERCEN - SEPERATION PROGRAM DESIGNATOR:
223          CODE THAT IDENTIFIES THE REASON FOR SEPERATION FROM ACTIVE
224          SERVICE (REF AR 635-5-1).
225          LOCATION - ORMF POS 118-120
226                     ODIS/ORDB NAME PSPD
227
```

```
228     MEPRS - DATA:
229         GROUP LEVEL ITEM, DATA RECEIVED FROM MEPRS.
230         LOCATION - ORMF POS 121-478
231                    ODIS NAME MDATA
232
233     MEPRS - NAME4:
234         FIRST FOUR CHARACTERS OF INDIVIDUAL'S LAST NAME.
235         SEE MEPCOM REG 18-5, REF NA-04-UA.
236         LOCATION - ORMF POS 121-124
237                    ODIS NAME MNAME4
238                    D18ADM2 POS 10-13
239
240     MEPRS - NAME:
241         FULL NAME IN LAST FIRST MIDDLE SEQUENCE WITH NO PUNCTUATION.
242         SEE MEPCOM REG 18-5, REF NA-RG-AA.
243         LOCATION - ORMF POS 125-151
244                    ODIS NAME MNAME
245                    D18ADM2 POS 14-40
246
247     MEPRS - SERVICE PROCESSED FOR:
248         A THREE LETTER CODE IDENTIFYING THE SERVICE DEPARTMENT
249         AND COMPONENT FOR WHICH AN APPLICANT IS ENLISTING.
250         CODES ARE IDENTIFIED IN MEPCOM REG 18-5, REF SR-VC-AA.
251         CODES FOUND IN THE ORS ARE:  DAG - NATIONAL GUARD
252                                      DAR - ACTIVE ARMY
253                                      DAV - ARMY RESERVE
254         LOCATION - ORMF POS 152-154
255                    ODIS NAME MSPF
256                    D18ADM2 POS 41-43
257
258     MEPRS - PRIOR SERVICE/NON PRIOR SERVICE INDICATOR:
259         INDICATES THE PRIOR SERVICE STATUS OF AN APPLICANT.
260         SEE MEPCOM REG 18-5, REF PM-SV-AA.
261         VALID CODES:  YY - PRIOR SERVICE
262                       NN - NON PRIOR SERVICE
263         LOCATION - ORMF POS 155-156
264                    ODIS NAME MPSNSP
265                    D18ADM2 POS 44-45
266
267     MEPRS - MILITARY ENTRANCE PROCESSING STATION ID:
268         GROUP LEVEL ITEM, IDENTIFIES EACH MEPS.
269         LOCATION - ORMF POS 157-159
270                    ODIS/ORDB NAME MEPSID
271                    D18ADM2 POS 46-48
272
273     MEPRS - MEPS SECTOR:
274         SEE MEPCOM REG 18-5, REF SC-CD-UA.
275         VALID CODES:  A - EASTERN
276                       B - CENTRAL
277                       C - WESTERN
278         LOCATION - ORMF POS 157
279                    ODIS NAME MEPSEC
280                    D18ADM2 POS 46
281
282     MEPRS - MEPS CODE:
283         IDENTIFIES EACH MEPS WITHIN A SECTOR.
284         SEE MEPCOM REG 18-5, REF AF-ID-UA.
```

LOCATION - ORMF POS 158-159
ODIS NAME MEPSCD
D18ADM2 POS 47-48

MEPRS - PROCESSING STATUS CODE:
IDENTIFIES THE ENLISTMENT/SHIPPED/DISQUALIFICATION
STATUS OF AN INDIVIDUAL.
SEE MEPCOM REG 19-5, REF ST-IN-UA.
LOCATION - ORMF POS 160
ODIS NAME MPSTAT
D18ADM2 POS 49

MEPRS - DATE OF ACTION:
SEE MEPCOM REG 19-5, REF DA-FA-UC.
LOCATION - ORMF POS 161-166
ODIS NAME MDOA
D18ADM2 POS 50-55

MEPRS - CITIZENSHIP CODE:
IDENTIFIES THE US CITIZENSHIP STATUS OF AN INDIVIDUAL
AND HOW THAT STATUS WAS ACQUIRED.
SEE MEPCOM REG 18-5, REF CI-TZ-AA.
LOCATION - ORMF POS 167-168
ODIS NAME MCITZ
D18ADM2 POS 56-57

MEPRS - HOME OF RECORD:
GROUP LEVEL ITEM. IDENTIFIES THE RESIDENCY OF AN INDIVIDUAL
BY GEOGRAPHIC LOCATION CONSISTING OF STATE, COUNTY & ZIP CODES.
LOCATION - ORMF POS 169-178
ODIS NAME MHOR
D18ADM2 POS 58-67

MEPRS - HOME OF RECORD STATE/COUNTY CODE:
GROUP LEVEL ITEM. SEE MEPCOM REG 18-5, REF ST-CO-UA.
LOCATION - ORMF POS 169-173
ODIS NAME MHORSC
D18ADM2 POS 58-62

MEPRS - HOME OF RECORD STATE CODE:
LOCATION - ORMF POS 169-170
ODIS NAME MHORST
D18ADM2 POS 58-59

MEPRS - HOME OF RECORD COUNTY CODE:
LOCATION - ORMF POS 171-173
ODIS NAME MHORCT
D18ADM2 POS 60-62

MEPRS - HOME OF RECORD ZIP CODE:
SEE MEPCOM REG 18-5, REF ZP-CO-UA.
LOCATION - ORMF POS 174-178
ODIS NAME MHORZP
D18ADM2 POS 63-67

MEPRS - PRESENT ADDRESS:
GROUP LEVEL ITEM, SEE DEFINITION OF MEPRS HOME OF RECORD.

```
342         LOCATION - ORMF POS 179-188
343                    ODIS NAME MPADDR
344                    D18ADM2 POS 68-77
345
346     MEPRS - PRESENT ADDRESS STATE/COUNTY CODE:
347         GROUP LEVEL ITEM.  SEE MEPCOM REG 18-5, REF ST-CO-UB.
348         LOCATION - ORMF POS 179-183
349                    ODIS/ORDB NAME MPASC
350                    D18ADM2 POS 68-72
351
352     MEPRS - PRESENT ADDRESS STATE CODE:
353         LOCATION - ORMF POS 179-180
354                    ODIS NAME MPAST
355                    D18ADM2 POS 68-69
356
357     MEPRS - PRESENT ADDRESS COUNTY CODE:
358         LOCATION - ORMF POS 181-183
359                    ODIS NAME MPACT
360                    D18ADM2 POS 70-72
361
362     MEPRS - PRESENT ADDRESS ZIP CODE:
363         SEE MEPCOM REG 18-5, REF CP-CO-UB.
364         LOCATION - ORMF POS 184-188
365                    ODIS/ORDB NAME MPAZIP
366                    D18ADM2 POS 73-77
367
368     MEPRS - MARITAL STATUS:
369         SEE MEPCOM REG 18-5, REF MA-NA-AA.
370         LOCATION - ORMF POS 189
371                    ODIS NAME MMSTAT
372                    D18ADM2 POS 78
373
374     MEPRS - NUMBER OF DEPENDENTS:
375         SEE MEPCOM REG 18-5, REF IO-TT-UB
376         LOCATION - ORMF POS 190-191
377                    ODIS NAME MNDEPS
378                    D18ADM2 POS 79-80
379
380     MEPRS - SEX CODE:
381         SEE MEPCOM REG 18-5, REF SE-XA-AA.
382         VALID CODES:  M - MALE
383                       F - FEMALE
384                       Z - UNKNOWN
385         LOCATION - ORMF POS 192
386                    ODIS NAME MSEX
387                    D18ADM2 POS 81
388
389     MEPRS - RACE CODE:
390         SEE MEPCOM REG 18-5, REF RA-BA-AA.
391         LOCATION - ORMF POS 193
392                    ODIS NAME MRACE
393                    D18ADM2 POS 82
394
395     MEPRS - ETHNIC GROUP CODE:
396         SEE MEPCOM REG 18-5, REF ET-HY-AA.
397         LOCATION - ORMF POS 194
398                    ODIS NAME METHNC
```

```
                D18ADM2 POS 83

MEPRS - DATE OF BIRTH:
    SEE MEPCOM REG 18-5, REF DA-FA-UB.
    LOCATION - ORMF POS 195-200
               ODIS NAME MDOB
               D18ADM2 POS 84-89

MEPRS - EDUCATION CODE:
    GROUP LEVEL ITEM FOR YEARS AND LEVEL OF CIVILIAN EDUCATION.
    LOCATION - ORMF POS 201-203
               ODIS NAME MEDUC
               D18ADM2 POS 90-92

MEPRS - EDUCATION YEARS:
    SEE MEPCOM REG 18-5, REF YE-NQ-AA.
    LOCATION - ORMF POS 201-202
               ODIS NAME MEDYRS
               D18ADM2 POS 90-91

MEPRS - EDUCATION LEVEL:
    SEE MEPCOM REG 18-5, REF ED-UC-AA.
    LOCATION - ORMF POS 203
               ODIS NAME MEDLEV
               D18ADM2 POS 92

MEPRS - PSUEDO ID:
    A REPLACEMENT FOR SSN USED IN IDENTIFYING RECORDS SENT TO
    SERVICES OTHER THAN THE ONE FOR WHICH AN APPLICANT WAS
    PROCESSED.
    SEE MEPCOM REG 18-5, REF PS-ID-UA.
    LOCATION - ORMF POS 204-212
               ODIS NAME MSPID
               D18ADM2 POS 93-101

MEPRS - RELIGION CODE:
    SEE MEPCOM REG 18-5, REF RE-LA-AB.
    LOCATION - ORMF POS 213-214
               ODIS NAME MRELIG
               D18ADM2 POS 102-103

MEPRS - ERROR INDICATOR:
    INDICATES ERROR STATUS FROM MEPRS EDIT CHECKS.
    SEE MEPCOM REG 18-5, REF ER-IN-UA.
    LOCATION - ORMF POS 215
               ODIS NAME MERROR
               D18ADM2 POS 104

MEPRS - DELETION INDICATOR:
    CODE V INDICATES RECORD WAS DELETED FROM MEPRS DATA BASE
    AND EXISTS ON MEPRS HISTORICAL FILES.
    SEE MEPCOM REG 18-5, REF DE-IN-UA.
    LOCATION - ORMF POS 216
               ORMF NAME MDELID
               D18ADM2 POS 105

MEPRS - CYCLE NUMBER:
```

```
456          A FOUR DIGIT JULIAN DATE IN YDDD FORMAT INDICATING THE DATE
457          ON WHICH MEPRS TRANSACTION WAS PROCESSED.
458          SEE MEPCOM REG 18-5, REF CY-NH-UA.
459          LOCATION - ORMF POS 217-220
460                     ODIS/ORDB NAME MCYCLE
461                     D18ADM2 POS 106-109
462
463      MEPRS - RECORD TYPE:
464          IDENTIFIES THE ENLISTMENT STATUS OF AN INDIVIDUAL.
465          SEE MEPCOM REG 18-5, REF RE-ID-UA.
466          VALID CODES:  1 - EXAM RECORD (NOT CARRIED ON ORMF OR ORDB)
467                        2 - DEP
468                        3 - ACCESSION
469                        4 - DEP DISCHARGE
470          LOCATION - ORMF POS 221
471                     ODIS NAME MRTYPE
472                     D18ADM2 POS 110
473
474      MEPRS - TRANSACTION TYPE:
475          IDENTIFIES THE STATUS OF AN INDIVIDUAL'S PROCESSING RECORD
476          AS SUBMITTED BY A MEPS.
477          SEE MEPCOM REG 18-5, REF TY-CD-UA.
478          LOCATION - ORMF POS 222
479                     ODIS NAME MTTYPE
480                     D18ADM2 POS 111
481
482      MEPRS - PROCESSING CODE:
483          IDENTIFIES THE TYPE OF ADMINISTRATIVE PROCESSING COMPLETED
484          BY A MEPS.
485          SEE MEPCOM REG 18-5, REF PR-CD-UA.
486          LOCATION - ORMF POS 223
487                     ODIS NAME MPROCS
488                     D18ADM2 POS 112
489
490      MEPRS - TEST SITE ID:
491          IDENTIFIES THE INSTALLATION AT WHICH MENTAL TESTING WAS
492          ACCOMPLISHED.
493          SEE MEPCOM REG 18-5, REF ST-ID-UA.
494          LOCATION - ORMF POS 224-227
495                     ODIS NAME MTSITE
496                     D18ADM2 POS 113-116
497
498      MEPRS - TEST ID:
499          IDENTIFICATION OF THE STANDARDIZED MENTAL TEST ADMINISTERED.
500          SEE MEPCOM REG 18-5, REF TE-ID-UA.
501          SEE AR 601-210, TABLE 6-1.
502          LOCATION - ORMF POS 228-230
503                     ODIS/ORDB NAME MTSTID
504                     D18ADM2 POS 117-119
505
506      MEPRS - AFQT PERCENTILE SCORE:
507          SEE AR 601-210, TABLE 6-1.
508          SEE MEPCOM REG 18-5, REF TE-ST-AB.
509          LOCATION - ORMF POS 231-232
510                     ODIS NAME NAFQT
511                     D18ADM2 POS 120-121
512
```

```
513     MEPRS - MENTAL CATEGORY:
514         SEE MEPCOM REG 18-5, REF PE-CO-UA.
515         LOCATION - ORMF POS 233-234
516                    ODIS NAME MMENTL
517                    D18ADM2 POS 122-123
518
519     MEPRS - DAFQT:
520         A TWO DIGIT SIGNED NUMERIC VALUE REPRESENTING THE DEVIATION
521         OF AN INDIVIDUAL'S MEPRS AFQT SCORE FROM THE PREDICTED AFQT
522         SCORE.  DEFINED IN USAREC CIRCULAR 611-6.
523         LOCATION - ORMF POS 235-236
524                    ODIS/ORDB NAME MDAFQT
525                    D19ADM2 POS 124-125
526
527     MEPRS - ASVAB RAW SCORES:
528         APTITUDE AREA SCORES FROM MENTRAL TESTS ADMINISTERED TO THE
529         APPLICANT.
530         SEE MEPCOM REG 18-5, REF AP-AR-AA.
531         SEE AR 601-210, TABLE 8-1.
532         LOCATION - ORMF POS 237-268
533                    ODIS NAME MRAWSC
534                    D18ADM2 POS 126-157
535
536     MEPRS - PHYSICAL PROFILE:
537         GROUP LEVEL ITEM FOR PULHES AND X FACTOR.
538         SEE MEPCOM REG 18-5, REF PP-CA-UA.
539         LOCATION - ORMF POS 269-275
540                    ODIS NAME MPULHX
541                    D18ADM2 POS 158-164
542
543     MEPRS - PULHES:
544         SEE MEPCOM REG 18-5, REF PP-CA-UA.
545         SEE AR 601-210, TABLE 8-1.
546         LOCATION - ORMF POS 269-274
547                    ODIS NAME MPULHE
548                    D18ADM2 POS 153-163
549
550     MEPRS - PULHES X FACTOR:
551         SEE MEPCOM REG 18-5, REF PP-CA-UA.
552         LOCATION - ORMF POS 275
553                    ODIS NAME MXFACT
554                    D13ADM2 POS 164
555
556     MEPRS - HEIGHT:
557         APPLICANT HEIGHT IN INCHES.
558         SEE MEPCOM REG 18-5, REF HE-MA-AB.
559         SEE AR 601-210, TABLE 8-1.
560         LOCATION - ORMF POS 276-277
561                    ODIS NAME MHGHT
562                    D18ADM2 POS 165-166
563
564     MEPRS - WEIGHT:
565         APPLICANT WEIGHT IN POUNDS.
566         SEE MEPCOM REG 18-5, REF WE-LA-AA.
567         SEE AR 601-210, TABLE 8-1.
568         LOCATION - ORMF POS 278-280
569                    ODIS NAME MWGHT
```

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                D18ADM2 POS 167-169

MEPRS - BLOOD PRESSURE:
    APPLICANT BLOOD PRESSURE.
    SEE MEPCOM REG 18-5, REF BL-PR-UA.
    SEE AR 601-210, TABLE 6-1.
    LOCATION - ORMF POS 281-286
               ODIS NAME MBPRES
               D18ADM2 POS 170-175

MEPRS - MEDICAL FAILURE CODE:
    IDENTIFIES REASON FOR MEDICAL DISQUALIFICATION.
    SEE MEPCOM REG 18-5, REF MD-FL-UA.
    LOCATION - ORMF POS 287-292
               ODIS NAME MMFAIL
               D18ADM2 POS 176-181

MEPRS - PROJECTED ACTIVE DUTY DATE:
    SEE MEPCOM REG 18-5, REF DA-FA-UX (AT DEP TIME).
    SEE AR 601-210, TABLE 6-1.
    LOCATION - ORMF POS 293-298
               ODIS NAME MPADD
               D18ADM2 POS 182-187

MEPRS - DEP DATE OF ENLISTMENT:
    SEE MEPCOM REG 18-5, REF DA-FA-UY (AT DEP TIME).
    SEE AR 601-210, TABLE 6-1.
    LOCATION - ORMF POS 299-304
               ODIS7ORDB NAME MDEPDT
               D18ADM2  POS 188-193
    ON ORDB THIS DATA ELEMENT MAY CONTAIN MADDE.

MEPRS - DEP RECRUITER ID:
    SSN OF RECRUITER AT DEP TIME.
    SEE MEPCOM REG 18-5, REF RC-ID-UA.
    SEE AR 601-210, TABLE 6-1.
    LOCATION - ORMF POS 305-313
               ODIS NAME MORCTR
               D18ADM2 POS 194-202

MEPRS - ENTRY STATUS:
    IDENTIFIES ACCESSION ENTRY STATUS OF ENLISTEE.
    SEE MEPCOM REG 18-5, REF ET-ST-AA.
    SEE AR 601-210, TABLE 6-1.
    LOCATION - ORMF POS 314
               ODIS NAME MENTRY
               D12ADM2 POS 203

MEPRS - ACCESSION DATE OF ENLISTMENT:
    DATE OF ENLISTMENT INTO ACTIVE DUTY.
    SEE MEPCOM REG 18-5, REF DA-FA-UX (AT ACCESSION TIME).
    SEE AR 601-210, TABLE 6-1.
    LOCATION - ORMF POS 315-320
               ODIS NAME MADOE
               D18ADM2 POS 204-209

MEPRS - ACTIVE DUTY SERVICE DATE (ADSD):
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627          SEE MEPCOM REG 18-5, REF DA-FA-UY.
628          SEE AR 601-210, TABLE 6-1.
629          LOCATION - ORHF POS 321-326
630                     ODIS NAME MADSD
631                     D18ADH2 POS 210-215
632
633      MEPRS - TERM OF ENLISTMENT (TOE):
634          IN YEARS.
635          SEE MEPCOM REG 18-5, REF TM-EN-UA.
636          SEE AR 601-210, TABLE 6-1.
637          LOCATION - ORHF POS 327
638                     ODIS NAME MTERM
639                     D18ADH2 POS 216
640
641      MEPRS - ACCESSION RECRUITER ID:
642          SSN OF RECRUITER AT ACCESSION TIME.
643          SEE MEPCOM REG 18-5, REF RC-ID-UA.
644          SEE AR 601-210, TABLE 6-1.
645          LOCATION - ORHF POS 328-336
646                     ODIS NAME MARCTR
647                     D18ADH2 POS 217-225
648
649      MEPRS - PROGRAM ENLISTED FOR:
650          GROUP LEVEL ITEM OF ENLISTMENT OPTION CODES.
651          SEE AR 601-210, TABLE 6-1.
652          SEE MEPCOM REG 18-5, REF PR-EN-UA.
653          LOCATION - ORHF POS 337-341
654                     ODIS NAME MPRGM
655                     D18ADH2 POS 226-230
656
657      MEPRS - INCENTIVE OPTION:
658          SEE AR 601-210, TABLE 6-1.
659          LOCATION - ORHF POS 337
660                     ODIS/ORDB NAME MINCEN
661                     D13ADH2 POS 226
662
663      MEPRS - DESIGNATED OPTION:
664          SEE AR 601-210, TABLE 6-1.
665          LOCATION - ORHF POS 338
666                     ODIS/ORDB NAME MDESIG
667                     D18ADH2 POS 227
668
669      MEPRS - ENLISTMENT OPTION:
670          SEE AR 601-210, TABLE 6-1.
671          LOCATION - ORHF POS 339-341
672                     ODIS NAME MENLOP
673                     D18ADH2 POS 228-230
674
675      MEPRS - RESERVE PROCUREMENT PROGRAM NUMBER:
676          GROUP LEVEL ITEM FOR RESERVE PPN.
677          SEE AR 601-210, TABLE 5-4.
678          SEE MEPCOM REG 18-5, REF PR-EN-UA.
679          LOCATION - ORHF POS 337-341
680                     ODIS NAME MVPPNM
681                     D13ADH2 POS 226-230
682
683      FILLER:
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684         CONTAINS THE LITERAL "PPN" FOR RESERVE RECORDS ONLY.
685         LOCATION - ORMF POS 337-339
686                    D13ADM2 POS 226-228
687
688     MEPRS - RESERVE PROCUREMENT PROGRAM NUMBER CODE:
689         LOCATION - ORMF POS 340-341
690                    ODIS NAME MVPPN
691                    D18ADM2 POS 229-230
692
693     MEPRS - TRAINING/ENLISTMENT MOS CODE:
694         GROUP LEVEL ITEM.
695         SEE MEPCOM REG 18-5, REF TR-OS-UA.
696         SEE AR 601-210, TABLE 6-1.
697         LOCATION - ORMF POS 342-346
698                    ODIS NAME MTMOSC
699                    D18ADM2 POS 231-235
700
701     MEPRS - TRAINING/ENLISTMENT MOS:
702         LOCATION - ORMF POS 342-344
703                    ODIS NAME MTMOS
704                    D13ADM2 POS 231-233
705
706     MEPRS - TRAINING/ENLISTMENT MOS SKILL LEVEL:
707         LOCATION - ORMF POS 345
708                    ODIS NAME MTMOSG
709                    D18ADM2 POS 234
710
711     MEPRS - TRAINING/ENLISTMENT MOS SPECIAL QUALIFICATION IDENTIFIER:
712         LOCATION - ORMF POS 346
713                    ODIS NAME MTMOSQ
714                    D13ADM2 POS 235
715
716     MEPRS - ENLISTMENT WAIVER INFO:
717         SEE MEPCOM REG 18-5, REF EN-WV-AA.
718         SEE AR 601-210, TABLE 6-1.
719         LOCATION - ORMF POS 347-349
720                    ODIS/ORDB NAME MENLWV
721                    D18ADM2 POS 236-238
722
723     MEPRS - PAY GRADE:
724         SEE MEPCOM REG 18-5, REF PA-SN-UA.
725         SEE AR 601-210, TABLE 6-1.
726         LOCATION - ORMF POS 350-352
727                    ODIS NAME MPAYGR
728                    D13ADM2 POS 239-241
729
730     MEPRS - PAY ENTRY BASE DATE (PEBD):
731         DATE USED FOR COMPUTATION OF TIME IN SERVICE FOR PAY
732         PURPOSES.
733         SEE MEPCOM REG 18-5, REF DA-FA-UZ (AT DEP TIME).
734         SEE AR 601-210, TABLE 6-1.
735         LOCATION - ORMF POS 353-358
736                    ODIS NAME MPEBD
737                    D13ADM2 POS 242-247
738
739     MEPRS - DATE OF GRADE:
740         DATE OFFICIALLY PROMOTED/DEMOTED TO PAY GRADE.
```

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741         SEE MEPCOM REG 18-5, REF DA-FA-UG.
742         SEE AR 601-210, TABLE 6-1.
743         LOCATION - ORMF POS 359-364
744                    ODIS NAME MDOG
745                    D184DM2 POS 248-253
746
747     MEPRS - PMOS/AFS:
748         SEE MEPCOM REG 18-5, REF PM-OS-UA.
749         SEE AR 601-210, TABLE 6-1.
750         LOCATION - ORMF POS 365-370
751                    ODIS NAME MPMOS
752                    D184DM2 POS 254-259
753
754     MEPRS - ENLISTMENT OPTION ANALYSIS CODE:
755         CONSISTS OF TWO SUB-ELEMENTS: ENLISTMENT GUARANTEES SUB-OPTION,
756         AND ENLISTMENT BONUS SUB-OPTION.
757         SEE MEPCOM REG 18-5, REF OP-AN-AA.
758         SEE AR 601-210, TABLE 6-1.
759         LOCATION - ORMF POS 371-372
760                    ODIS NAME MENLOA
761                    D184DM2 POS 260-261
762
763     MEPRS - TRANSFER-TO UNIT IDENTIFICATION CODE:
764         SEE MEPCOM REG 18-5, REF TR-TC-UA.
765         SEE AR 601-210, TABLE 6-1.
766         LOCATION - ORMF POS 373-378
767                    ODIS NAME MTTUIC
768                    D184DM2 POS 262-267
769
770     MEPRS - YOUTH PROGRAM IDENTIFICATION:
771         SEE MEPCOM REG 18-5, REF YT-PR-UA.
772         SEE AR 601-210, TABLE 6-1.
773         LOCATION - ORMF POS 379-381
774                    ODIS NAME MYTHID
775                    D184DM2 POS 268-270
776
777     MEPRS - DEP DISCHARGE REASON CODE:
778         CODE INDICATING REASON FOR DEP DISCHARGE.
779         SEE MEPCOM REG 18-5, REF DD-NL-UA.
780         SEE AR 601-210, TABLE 6-1.
781         LOCATION - ORMF POS 382-384
782                    ODIS/ORDB NAME MDEPDC
783                    D184DM2 POS 271-273
784
785     MEPRS - DEP DISCHARGE DATE:
786         DATE DISCHARGED FROM DELAYED ENTRY PROGRAM.
787         SEE MEPCOM REG 18-5, REF DA-FA-UZ (AT DEP DISCHARGE TIME).
788         GROUP LEVEL ITEM.
789         LOCATION - ORMF POS 385-390
790                    ODIS/ORDB NAME MDEPDD
791                    D184DM2 POS 274-279
792
793     MEPRS - REGULAR ARMY SERVICE REQUIRED DATA:  (RA)
794         GROUP LEVEL ITEM WHEN SERVICE PROCESSED FOR (SPF) = "DAR"
795         SEE AR 601-210, TABLE 6-1.
796         LOCATION - ORMF POS 391-460
797                    ODIS NAME MRREQD
```

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                D13ADM2 POS 280-349

MEPRS - ADDITIONAL SKILL INDICATOR (ASI):  (RA)
    SEE AR 601-210, TABLE 6-1.
    LOCATION - ORMF POS 391-392
               ODIS NAME MASI
               D13ADM2 POS 280-281

MEPRS - MOVEMENT DESIGNATOR CODE (MDC):  (RA)
    SEE AR 601-210, TABLE 6-1.
    LOCATION - ORMF POS 393-395
               ODIS NAME MMDC
               D13ADM2 POS 282-284

MEPRS - ABBREVIATION AND GRADE:  (RA)
    SEE AR 601-210, TABLE 6-1.
    LOCATION - ORMF POS 396-399
               ODIS NAME MGR499
               D18ADM2 POS 285-288

MEPRS - BREAK IN ACTIVE PRIOR SERVICE CODE:  (RA)
    SEE AR 601-210, TABLE 6-1.
    LOCATION - ORMF POS 400
               ODIS NAME MBKSRV
               D18ADM2 POS 289

MEPRS - ARNG/USAR PERSONNEL CODE:  (RA)
    SEE AR 601-210, TABLE 6-1.
    LOCATION - ORMF POS 401
               ODIS NAME MNGAR
               D18ADM2 POS 290

MEPRS - GRADE:  (RA)
    SEE AR 601-210, TABLE 6-1.
    LOCATION - ORMF POS 402
               ODIS NAME MREFER
               D13ADM2 POS 291

MEPRS - CONVERTED TEST SCORES:  (RA)
    STRING OF 11 ARMY STANDARD TEST SCORES.
    SEE AR 601-210, TABLE 6-1.
    LOCATION - ORMF POS 403-435
               ODIS NAME MCONVR
               D18ADM2 POS 292-324

MEPRS - HOMETOWN RECRUITER AID PROGRAM (HRAP) CODE:  (RA)
    SEE AR 601-210, TABLE 6-1.
    LOCATION - ORMF POS 436
               ODIS 70RDB NAME MHRAP
               D18ADM2 POS 325

MEPRS - RECRUITING STATION IDENTIFICATION (RSID) CODE:  (RA)
    GROUP LEVEL ITEM.
    SEE AR 601-210, TABLE 6-1.
    LOCATION - ORMF POS 437-440
               ODIS NAME MRSID
               D12ADM2 POS 325-329
```

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MEPRS - RSID BRIGADE/BATTALION:  (RA)
    FIRST TWO CHARACTERS OF RECRUITING STATION IDENTIFICATION CODE.
    LOCATION - ORMF POS 437-438
               ODIS NAME MBDE&N
               D18ADM2 POS 326-327

MEPRS - RSID COMPANY/STATION:  (RA)
    LAST TWO CHARACTERS OF RECRUITING STATION IDENTIFICATION CODE.
    LOCATION - ORMF POS 430-440
               ODIS NAME MCOST
               D18ADM2 POS 328-329

MEPRS - LOAN REPAYMENT PLAN CODE:  (RA)
    LOCATION - ORMF POS 441
               ODIS NAME MLOAN
               D18ADM2 POS 344

MEPRS - HRAP AIT LOCATION CODE:  (RA)
    SEE AR 601-210, TABLE 6-1.
    LOCATION - ORMF POS 442-445
               ODIS NAME MHAITL
               D18ADM2 POS 331-334

MEPRS - AIT GRADUATION YEAR AND MONTH:  (RA)
    SEE AR 601-210, TABLE 6-1.
    LOCATION - ORMF POS 446-449
               ODIS NAME MHGROT
               D18ADM2 POS 335-338

MEPRS - NUMBER OF ENLISTMENTS:  (RA)
    NUMBER OF TIMES ENLISTED OR REENLISTED.
    LOCATION - ORMF POS 450
               ODIS NAME MNMENL
               D18ADM2 POS 339

MEPRS - ACCESSIONS TO ACTIVE ARMY STRENGTH CODE: (RA)
    SEE AR 601-210, TABLE 6-1.
    LOCATION - ORMF POS 451-452
               ODIS NAME MSOURC
               D13ADM2 POS 340-341

MEPRS - MILITARY APPLICANT PROFILE (MAP) SCORE:  (RA)
    SEE AR 601-210, TABLE 6-1.
    LOCATION - ORMF POS 453-454
               ODIS NAME MMAP
               D13ADM2 POS 342-343

FILLER:  (RA)
    LOCATION - ORMF POS 455-460
               D13ADM2 POS 345-349

MEPRS - ARMY RESERVE SERVICE REQUIRED DATA:  (USAR)
    GROUP LEVEL ITEM WHEN SERVICE PROCESSED FOR (SPF) = 'DAV'
    SEE AR 601-210, TABLE 6-1.
    LOCATION - ORMF POS 391-460
               ODIS NAME MVREQD
```

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                D18ADM2 POS 280-349

MEPRS - ARMY AND ARCOM/GOCOM COMMAND CODE:  (USAR)
    GROUP LEVEL ITEM.
    SEE AR 601-210, TABLE 6-1.
    LOCATION - ORMF POS 391-392
               ODIS NAME AVCMD
               D18ADM2 POS 280-281

MEPRS - ARMY COMMAND CODE:  (USAR)
    FIRST CHARACTER OF ARMY AND ARCOM/GOCOM COMMAND CODE.
    LOCATION - ORMF POS 391
               ODIS NAME AVCMD1
               D18ADM2 POS 280

MEPRS - ARCOM/GOCOM COMMAND CODE:  (USAR)
    SECOND CHARACTER OF ARMY AND ARCOM/GOCOM COMMAND CODE.
    LOCATION - ORMF POS 392
               ODIS NAME AVCMD2
               D18ADM2 POS 231

MEPRS - UNIT IDENTIFICATION CODE:  (USAR)
    SEE AR 601-210, TABLE 6-1.
    LOCATION - ORMF POS 393-398
               ODIS NAME AVUIC
               D18ADM2 POS 282-287

MEPRS - TRAINING/PAY CATEGORY:  (USAR)
    SEE AR 601-210, TABLE 6-1.
    LOCATION - ORMF POS 399
               ODIS NAME AVTPC
               D18ADM2 POS 288

MEPRS - RESERVE INCENTIVE PROGRAM CODE:  (USAR)
    SEE AR 601-210, TABLE 6-1.
    LOCATION - ORMF POS 400
               ODIS NAME AVINCN
               D18ADM2 POS 229

MEPRS - IADT RETURN DATE:  (USAR)
    SEE AR 601-210, TABLE 6-1.
    LOCATION - ORMF POS 401-406
               ODIS NAME AVIADT
               D13ADM2 POS 290-295

MEPRS - MILITARY APPLICANT PROFILE (MAP) TEST SCORE:  (USAR)
    SEE AR 601-210, TABLE 6-1.
    LOCATION - ORMF POS 407-408
               ODIS NAME AVMAP
               D18ADM2 POS 296-297

MEPRS - GAIN TRANSACTION CODE:  (USAR)
    SEE AR 601-210, TABLE 6-1.
    LOCATION - ORMF POS 409-410
               ODIS NAME AVGAIN
               D19ADM2 POS 298-299
```

MEPRS - RANK: (USAR)
SEE AR 601-210, TABLE 6-1.
LOCATION - ORMF POS 411
ODIS NAME MVRANK
D18ADM2 POS 300

MEPRS - DUTY MOS: (USAR)
LOCATION - ORMF POS 412-416
ODIS NAME MVDMOS
D18ADM2 POS 301-305

MEPRS - DUTY MOS QUALIFICATION CODE: (USAR)
SEE AR 601-210, TABLE 6-1.
LOCATION - ORMF POS 417
ODIS NAME MVMOSQ
D18ADM2 POS 306

MEPRS - RECRUITING STATION IDENTIFICATION CODE: (USAR)
SEE AR 601-210, TABLE 6-1.
LOCATION - ORMF POS 418-421
ODIS NAME MVRSID
D18ADM2 POS 307-310

MEPRS - RSID BRIGADE/BATTALION: (USAR)
FIRST TWO CHARACTERS OF RSID.
LOCATION - ORMF POS 418-419
ODIS NAME MVBDBN
D18ADM2 POS 307-308

MEPRS - RSID COMPANY/STATION: (USAR)
LAST TWO CHARACTERS OF RSID.
LOCATION - ORMF POS 420-421
ODIS NAME MVCOST
D18ADM2 POS 309-310

MEPRS - DATE OF LAST PHYSICAL: (USAR)
SEE AR 601-210, TABLE 6-1.
LOCATION - ORMF POS 422-424
ODIS NAME MVDOLP
D18ADM2 POS 311-313

MEPRS - STREET ADDRESS: (USAR)
SEE AR 601-210, TABLE 6-1.
LOCATION - ORMF POS 425-446
ODIS NAME MVSTAD
D18ADM2 POS 314-335

MEPRS - CITY: (USAR)
SEE AR 601-210, TABLE 6-1.
LOCATION - ORMF POS 447-460
ODIS NAME MVCITY
D18ADM2 POS 336-349

MEPRS - REFERENCE SSN:
PREVIOUS SSN IF SSN HAS BEEN CHANGED.
SEE MEPCOM REG 18-5, REF SO-CA-A8.
LOCATION - ORMF POS 461-469

```
                ODIS NAME MRFSSN
                D18ADM2 POS 350-358

MEPRS - REFERENCE NAME4:
    PREVIOUS NAME4 IF NAME/SSN HAS BEEN CHANGED.
    SEE MEPCOM REG 18-5, REF NA-04-UA.
    LOCATION - ORMF POS 470-473
                ODIS NAME MRFNM4
                D18ADM2 POS 359-362

MEPRS - PRIOR SERVICE VERIFICATION DATA:
    GROUP LEVEL ITEM.  THIS DATA IS RECEIVED BY MEPCOM FROM
    THE DEFENSE MANPOWER DATA CENTER.
    LOCATION - ORMF POS 474-483
                ODIS NAME MPVS
                D18ADM2 POS 363-372

MEPRS - PRIOR SERVICE CHARACTER OF SERVICE CODE:
    SEE MEPCOM REG 18-5, REF CH-SV-UA.
    LOCATION - ORMF POS 474
                ODIS NAME MPSCSC
                D18ADM2 POS 363

MEPRS - PRIOR SERVICE INTERSERVICE SEPERATION CODE:
    SEE MEPCOM REG 18-5, REF IN-SP-UA.
    LOCATION - ORMF POS 475-476
                ODIS NAME MPSISC
                D18ADM2 POS 364-365

MEPRS - PRIOR SERVICE MATCH CODE INDICATOR:
    INDICATES THE EXTENT TO WHICH MEPCOM DATA ELEMENTS MATCHED
    THOSE OF THE DEFENSE MANPOWER DATA CENTER.
    VALID CODES:  1 - MATCH ON SSN ONLY
                  2 - MATCH ON SSN AND NAME4
                  3 - MATCH ON SSN, NAME4 AND SERVICE
    LOCATION - ORMF POS 477
                ODIS NAME MPSMCI
                D18ADM2 POS 366

MEPRS - PREVIOUS SERVICE INDICATOR:
    SEE MEPCOM REG 18-5, REF PV-SV-UA.
    LOCATION - ORMF POS 478
                ODIS NAME MPSPSI
                D18ADM2 POS 367

MEPRS - PRIOR SERVICE SEPERATION PROGRAM DESIGNATOR (SPD):
    SEE AR 635-5-1.
    LOCATION - ORMF POS 479-481
                ODIS NAME MPSSPD
                D18ADM2 POS 368-370

MEPRS - PRIOR SERVICE REENLISTMENT ELIGIBILITY CODE:
    LOCATION - ORMF POS 482-483
                ODIS NAME MPSRE
                D18ADM2 POS 371-372

F    R:
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1083          LOCATION - ORMF POS 434-436
1084                     D18ADM2 POS 373-375
1085
1086      REQUEST - DATA:
1087          GROUP LEVEL ITEM.  DATA RECEIVED FROM REQUEST.
1088          LOCATION - ORMF POS 487-706
1089                     ODIS NAME RDATA
1090
1091      REQUEST - PREVIOUS EDUCATION CODE:
1092          GROUP LEVEL ITEM.
1093          IF EDUCATION CODE HAS CHANGED SINCE RECORD WAS ESTABLISHED
1094          ON THE REQUEST SYSTEM THIS CONTAINS THE OLD EDUCATION CODE.
1095          LOCATION - ORMF POS 487-489
1096                     ODIS NAME RPEDUC
1097                     D18ABM2 POS 205-206
1098
1099      REQUEST - PREVIOUS EDUCATION YEARS:
1100          SAME DESCRIPTION AS REQUEST EDUCATION YEARS.
1101          LOCATION - ORMF POS 487-488
1102                     ODIS/ORDB NAME RPEDYR
1103                     D18ABM2 POS 205-206
1104
1105      REQUEST - PREVIOUS EDUCATION LEVEL:
1106          SAME DESCRIPTION AS REQUEST EDUCATION LEVEL.
1107          LOCATION - ORMF POS 489
1108                     ODIS/ORDB NAME RPEDLV
1109                     D18ABM2 POS 207-208
1110
1111      REQUEST - ASSOCIATED OPTIONS:
1112          GROUP LEVEL ITEM.
1113          LOCATION - ORMF POS 490-504
1114                     ODIS NAME RAOPT
1115                     D18ABM2 POS 209-223
1116
1117      REQUEST - ASSOCIATED OPTION 1:
1118          LOCATION - ORMF POS 490-492
1119                     ODIS/ORDB NAME RAOPT1
1120                     D15ABM2 POS 209-211
1121
1122      REQUEST - ASSOCIATED OPTION 2:
1123          LOCATION - ORMF POS 493-495
1124                     ODIS/ORDB NAME RAOPT2
1125                     D18ABM2 POS 212-214
1126
1127      REQUEST - ASSOCIATED OPTION 3:
1128          LOCATION - ORMF POS 496-498
1129                     ODIS/ORDB NAME RAOPT3
1130                     D18ABM2 POS 215-217
1131
1132      REQUEST - ASSOCIATED OPTION 4:
1133          LOCATION - ORMF POS 499-501
1134                     ODIS/ORDB NAME RAOPT4
1135                     D18ABM2 POS 218-220
1136
1137      REQUEST - ASSOCIATED OPTION 5:
1138          LOCATION - ORMF POS 502-504
1139                     ODIS/ORDB NAME RAOPT5
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                    D13ABM2 POS 221-223

REQUEST - NAME :
    LOCATION - ORMF POS 505-532
               ODIS/ORDB NAME RNAME (FIRST FOUR CHARACTERS OF LAST NAME
                                     ARE ALSO ON ORDB AS NAME4)
               D18ABM2 POS 13-40

REQUEST - SERVICE COMPONENT:
    VALID CODES:  G - NATIONAL GUARD
                  R - ACTIVE ARMY
                  V - ARMY RESERVE
    LOCATION - ORMF POS 533
               ODIS/ORDB NAME RCOMP
               D18ABM2 POS 3

REQUEST - RECORD TYPE:
    VALID CODES:  2 - RESERVATION (DEP)
                  3 - CONFIRMED ENLISTMENT (ACCESSION)
                  4 - CANCELLATION (DEP DISCHARGE)
    LOCATION - ORMF POS 534
               ODIS/ORDB NAME RRTYPE
               D18ABM2 POS 2

REQUEST - SEX:
                    ORDB            ALL OTHER FILES
    VALID CODES:  Z - UNKNOWN - 0
                  M - MALE    - 1
                  F - FEMALE  - 2
    LOCATION - ORMF POS 535
               ODIS/ORDB NAME RSEX
               D18ABM2 POS 41

REQUEST - CITIZENSHIP:
    VALID CODES:  0 - OTHER THAN U.S.
                  1 - U.S.
    LOCATION - ORMF POS 536
               ODIS NAME RCITZ
               D13ABM2 POS 42

REQUEST - RACE:
                    D18ABM2              ALL OTHERS
    VALID CODES:       5 - CAUCASIAN - C
                      10 -   ASIAN   - M
                      15 -   NEGRO   - N
                      20 -  INDIAN   - R
                      25 -   OTHER   - X
                      30 -  UNKNOWN  - Z
    LOCATION - ORMF POS 537
               ODIS/ORDB NAME RRACE
               D18ABM2 POS 224-225

REQUEST - EDUCATION CODE:
    GROUP LEVEL ITEM.
    LOCATION - ORMF POS 538-540
               ODIS NAME REDUC
```

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1197      REQUEST - EDUCATION YEARS:
1198          NUMBER OF YEARS OF EDUCATION COMPLETED.
1199          LOCATION - ORMF POS 538-539
1200                     ODIS/ORDB NAME REDYRS
1201                     D18ABM2 POS 44-45
1202
1203      REQUEST - EDUCATION LEVEL:
1204          HIGHEST LEVEL OF EDUCATION COMPLETED.
1205                       D18ABM2              ALL OTHERS
1206          VALID CODES:     5  -  NHSG  -  1
1207                          10  -  GEDH  -  3
1208                          15  -  CIHS  -  9
1209                          20  -  COMP  -  6
1210                          25  -  ATTN  -  6
1211                          30  -  HSSR  -  5
1212                          35  -  HSDG  -  2
1213                          40  -  CLEP  -  A
1214                          43  -  COLL  -  C
1215                          45  -  ASSC  -  D
1216                          50  -  NURS  -  G
1217                          55  -  BACC  -  K
1218                          60  -  MAST  -  N
1219                          65  -  PHAS  -  R
1220                          70  -  DOCT  -  U
1221                          75  -  PROF  -  W
1222          LOCATION - ORMF POS 540
1223                     ODIS/ORDB NAME REDLEV
1224                     D18ABM2 POS 226-227
1225
1226      REQUEST - DATE OF BIRTH:
1227          LOCATION - ORMF POS 541-546
1228                     ODIS/ORDB NAME RDOB
1229                     D18ABM2 POS 47-52
1230
1231      REQUEST - AFQT SCORE:                    percentile score ?
1232          LOCATION - ORMF POS 547-548
1233                     ODIS/ORDB NAME RAFQT
1234                     D18ABM2 POS 53-54
1235
1236      REQUEST - ARMY STANDARD TEST SCORES:
1237          THIRTEEN TEST SCORES, EACH THREE CHARACTER FIELDS, IN THE
1238          FOLLOWING ORDER:  GT - GENERAL TECHNICAL
1239                            GM - GENERAL MECHANICAL
1240                            EL - ELECTRONICS
1241                            CL - CLERICAL
1242                            MM - MECHANICAL MAINTENANCE
1243                            SC - SURVEILLANCE COMMUNICATIONS
1244                            CO - COMBAT
1245                            OF - OPERATORS & FOOD
1246                            ST - SKILLED TECHNICAL
1247                            AP - AUDITORY PERCEPTION
1248                           MVB - MOTOR VEHICLE BATTERY
1249                          DLAB - DEFENSE LANGUAGE APTITUDE BATTERY
1250          LOCATION - ORMF POS 548-587
1251                     ODIS NAME RSCORE
1252                     D18ABM2 POS 55-93
1253
```

```
1254      REQUEST - PRIOR SERVICE INDICATOR:
1255          THIS DATA ELEMENT IS NOT ACTUALLY RECEIVED FROM REQUEST, BUT
1256          IS GENERATED IN THE ORS-8 BASED ON REQUEST ENLISTMENT TYPE.
1257          VALID CODES:  0 - NON PRIOR SERVICE
1258                        1 - PRIOR SERVICE
1259          LOCATION - ORMF POS 588
1260                     ODIS/ORDB NAME RPSNPS
1261
1262      REQUEST - RECRUITING STATION IDENTIFICATION (RSID) CODE:
1263          GROUP LEVEL ITEM.  ALSO KNOWN IN REQUEST AS CREDIT CODE.
1264          LOCATION - ORMF POS 589-592
1265                     ODIS NAME RRSID
1266                     D13ABM2 POS 95-98
1267
1268      REQUEST - RSID BRIGADE/BATTALION:
1269          GROUP LEVEL ITEM.  FIRST TWO CHARACTERS OF RSID.
1270          LOCATION - ORMF POS 589-590
1271                     ODIS/ORDB NAME RBDEBN
1272                     D18A8M2 POS 95-96
1273
1274      REQUEST - RSID BRIGADE:
1275          FIRST CHARACTER OF RSID.
1276          LOCATION - ORMF POS 589
1277                     ODIS/ORDB NAME RBDE
1278                     D19A5W2 POS 95
1279
1280      REQUEST - RSID BATTALION:
1281          SECOND CHARACTER OF REQUEST RSID.
1282          LOCATION - ORMF POS 590
1283                     ODIS NAME RBN
1284                     D18A3M2 POS 96
1285
1286      REQUEST - RSID COMPANY/STATION:
1287          LAST TWO CHARACTERS OF REQUEST RSID.
1288          LOCATION - ORMF POS 591-592
1289                     ODIS/ORDB NAME RCOST
1290                     D19A8M2 POS 97-98
1291
1292      REQUEST - TERMINAL LOCATION IDENTIFICATION (LOCID):
1293          LOCATION - ORMF POS 593-596
1294                     ODIS/ORDB NAME RLOCID
1295                     D18A8M2 POS 99-102
1296
1297      REQUEST - DATE OF ENLISTMENT:
1298          FOR A DEP THIS IS A PROJECTED DATE, ACTUAL DATE OF ENLISTMENT
1299          FOR AN ACCESSION.
1300          LOCATION - ORMF POS 597-602
1301                     ODIS/ORDB NAME RDOE
1302                     D13ABM2 POS 103-108
1303
1304      REQUEST - DRIVERS LICENSE CODE:
1305          VALID CODES:  0 - NO
1306                        1 - YES
1307          LOCATION - ORMF POS 603
1308                     ODIS NAME RDRIVE
1309                     D18A8M2 POS 109
1310
```

```
REQUEST - RECRUITER IDENTIFICATION:
    SSN OF RECRUITER.
    LOCATION - ORMF POS 604-612
               ODIS/ORDB NAME RRCTR
               D18A8M2 POS 110-118

REQUEST - TERM OF ENLISTMENT:
    NUMBER OF YEARS ENLISTED FOR.
    LOCATION - ORMF POS 613
               ODIS/ORDB NAME RTERM
               D18A8M2 POS 119

REQUEST - DELAYED ENTRY INDICATOR:
    VALID CODES:  0 - NO
                  1 - YES
    LOCATION - ORMF POS 614
               ODIS NAME RDEI
               D18A8M2 POS 120

REQUEST - MOS PRIORITY:
    VALID CODES:  1 THRU 15
    LOCATION - ORMF POS 615-616
               ODIS NAME RMOSPR
               D18A8M2 POS 232-233

REQUEST - MATH LEVEL CODE:
                D18A8M2                          ALL OTHER FILES
    VALID CODES:      5  -  GENERAL      -  1
                     10  -  ALGEBRA     -  2
                     15  -  GEOMETRY    -  3
                     20  -  TRIGNOMETRY -  4
    LOCATION - ORMF POS 617
               ODIS NAME RMATH
               D18A8M2 POS 121-122

REQUEST - SCIENCE LEVEL CODE:
                D18A8M2                          ALL OTHER FILES
    VALID CODES:      5  -  GENERAL    -  1
                     10  -  BIOLOGY    -  2
                     15  -  CHEMISTRY  -  3
                     20  -  PHYSICS    -  4
    LOCATION - ORMF POS 618
               ODIS NAME RSCIEN
               D18A8M2 POS 123-124

REQUEST - ENLISTMENT OPTION:
    LEFTMOST CHARACTER (OF 3) MISSING ON ALL BUT D18A8M2 FILE.
    LOCATION - ORMF POS 619-620
               ODIS/ORDB NAME RENOPT
               D18A8M2 POS 125-127

REQUEST - PHYSICAL PROFILE AND X FACTOR (PULHESX):
    LOCATION - ORMF POS 621-627
               ODIS NAME RPULHX
               D18A8M2 POS 128-134

REQUEST - PHYSICAL PROFILE WITHOUT X FACTOR (PULHES):
```

```
1366          LOCATION - ORMF POS 621-626
1369                     ODIS NAME RPULHE
1370                     D18A8M2 POS 128-133
1371
1372     REQUEST - PULHES X FACTOR:
1373          TAKEN FROM REQUEST MEPSCAT CODE.
1374          LOCATION - ORMF POS 627
1375                     ODIS NAME RXFACT
1376                     D18A8M2 POS 278 (MEPSCAT)
1377
1378     REQUEST - COLOR PERCEPTION CODE:
1379                     D18A8M2                    ALL OTHER FILES
1380          VALID CODES:     5  -  NONE       -  1
1381                          10  -  RED/GREEN  -  2
1382                          15  -  NORMAL     -  5
1383          LOCATION - ORMF POS 628
1384                     ODIS NAME RCOLOR
1385                     D18A8M2 POS 228-229
1386
1387     REQUEST - TRAINING MOS CODE:
1388          GROUP LEVEL ITEM.
1389          LOCATION - ORMF POS 629-632
1390                     ODIS/OROB NAME RTMOSC
1391                     D18A8M2 POS 135-138
1392
1393     REQUEST - TRAINING MOS:
1394          LOCATION - ORMF POS 629-631
1395                     ODIS NAME RTMOS
1396                     D18A8M2 POS 135-137
1397
1398     REQUEST - TRAINING MOS SKILL LEVEL:
1399          LOCATION - ORMF POS 632
1400                     ODIS NAME RTMOSG
1401                     D18A8M2 POS 138
1402
1403     FILLER:
1404          LOCATION - ORMF POS 633
1405
1406     REQUEST - RENEGOTIATION CODE:
1407          VALID CODES:  0 - NO
1408                        1 - YES
1409          LOCATION - ORMF POS 634
1410                     ODIS NAME RRENO
1411                     D18A5M2 POS 46
1412
1413     REQUEST - RESERVATION DATE:
1414          LOCATION - ORMF POS 635-640
1415                     ODIS/OROB NAME RRESDT
1416                     D18A8M2 POS 140-145
1417
1418     REQUEST - SHIP DATE:
1419          THE DATE AN ENLISTEE IS TO LEAVE THE MEPS.
1420          DOES NOT APPLY TO RA.
1421          LOCATION - ORMF POS 641-646
1422                     ODIS/OROB NAME RSHPDT
1423                     D18A8M2 POS 146-151
1424
```

REQUEST - RECEPTION STATION DATE:
THE DATE ON WHICH AN ENLISTEE IS TO REPORT TO THE RECEPTION STATION.
LOCATION - ORMF POS 647-652
ODIS/CROB NAME RRECDT
D18ABM2 POS 152-157

REQUEST - BCT/BT LOCATION:
THIS CODE DISCONTINUED EFFECTIVE 9 JUN 85. REPLACED BY BT LOCATION.

VALID CODES:	MALES	FEMALES
	1 - DIX	1 - JACKSON
	2 - JACKSON	2 - MCCLELL
	3 - LWOOD	
	4 - KNOX	4 - LWOOD
		5 - DIX
	6 - BLISS	6 - SILL
	7 - SILL	7 - BLISS
	8 - MCCLELL	
	14 - BENN	9 - BENN
	21 - PS BT-AIT AT SAME LOCATION	
	30 - OSUT BT-AIT AT SAME LOCATION	
	40 - PSR NO-BT - NO AIT	

LOCATION - ORMF POS 653-654
ODIS/ORDB NAME RBCTL
D18ABM2 POS 158-159

REQUEST - BCT/BT START DATE:
LOCATION - ORMF POS 655-660
ODIS NAME RBCTST
D18ABM2 POS 160-165

REQUEST - AIT LOCATION CODE:
VALID CODES:
1 - GORDON
2 - DIX
3 - LWOOD
4 - KNOX
5 - SILL
6 - RUC/HUCH
7 - JACKSON
8 - MCCLELL
9 - LWOOD
10 - OJT
11 - BELVOIR
12 - BENHARR
13 - REDSTONE
14 - BLISS
15 - APG/SILL
16 - LEE
17 - EUSTIS
18 - MCCL
19 - HUACHUCA
20 - JACK
21 - APG
22 - FITZS
23 - SHEPPARD
24 - BEAUMONT
25 - MADIGAN

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26 - LETTER
27 - WREED
28 - HOUSTON
29 - RUCKER
30 - CHANUTE
31 - BLIS
32 - JAX7
33 - WOMACK
34 - BROOKE
35 - 193I
36 - HEAD
37 - FT.DEVEN
38 - WASHNAVY
39 - DRUM
40 - FT.SILL
41 - FT.HUACH
42 - HUACH/AZ
43 - MONMOUTH
44 - LOWRY
45 - JAX/SILL
46 - JAX7HOUS
47 - DIX/BENN
48 - FTRDSTNE
49 - FT.9LISS
50 - JX8N
51 - DIX/SILL
52 - JAX7GORD
53 - DEVENS
54 - GDFLWAF8
55 - USNCORRY
56 - OLI
57 - JX/8N/LE
58 - TOOELE
59 - JX/GD/8N
60 - BLISS7BN
61 - JX/HU/8N
62 - JX7RS78N
63 - JX/JX/3N
64 - JX7LE78N
65 - LACKL
66
67 - WOOD/BEL
68 - JX78L78N
69 - BENNING
70 - LWOOD
71 - SAM
72 - POLK
73 - SHER
74 - RILY
75 - PSF
76 - USAFSOH
77 - BENN(JX)
78
79 - E
80 - LWOOD78V
81 - JX/8H/8N
82 - BENN/LEE

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                    83 - FSI
                    84 - FT.LEE
                    85 - JAX/BENN
                    86 - WNTC
                    87 - DENN
                    88 - JAX
                    89 - FT.KNOX
                    90 - WOOD
                    91 - MCCL
                    92 - HUCH
                    93 - RUCK
                    94 - HAFB
                    95 - MONMOUTH
                    96 - BLIS
                    97 - 101A
                    98 - KX/4INF
                    99 - KX/7INF
                   100 - PANCITY (PROBABLY TRUNCATED TO "00")
        LOCATION - ORMF POS 661-662
                   ODIS NAME RAITL
                   D18A8M2 POS 165-167

REQUEST - AIT START DATE:
        LOCATION - ORMF POS 663-668
                   ODIS/ORD8 NAME RAITST
                   D18A8M2 POS 168-173

REQUEST - 2NC AIT LOCATION CODE:
        VALID CODES ARE THE SAME AS REQUEST AIT LOCATION CODE.
        LOCATION - ORMF POS 669-670
                   ODIS NAME R2AITL
                   D18A8M2 POS 174-175

REQUEST - 2ND AIT START DATE:
        LOCATION - ORMF POS 671-676
                   ODIS NAME R2AITS
                   D18A8M2 POS 175-181

REQUEST - BASIC AIRBORNE TRAINING (BAT) START DATE:
        LOCATION - ORMF POS 677-682
                   ODIS NAME R3ATST
                   D18A8M2 POS 182-187

REQUEST - RESERVE UNIT IDENTIFICATION CODE (UIC):
        ON RESERVE COMPONENT RECORDS ONLY.
        LOCATION - ORMF POS 683-688
                   ODIS/ORD3 NAME RVUIC
                   D18A8M2 POS 234-240

REQUEST - 1ST ASSIGNMENT CODE:
        FOR ACTIVE ARMY RECORDS ONLY.
        LOCATION - ORMF POS 689-690
                   ODIS/ORD8 NAME R1ASGN
                   D18A8M2 POS 190-193

REQUEST - REASON FOR CANCELLATION CODE:
        CODES VARY DEPENDING ON SERVICE COMPONENT.
```

	RA	ARNG
VALID CODES:	1 - CHANGE IN RECSTA	1 - DECLINED ENLISTMENT
	2 - CHANGE IN MOS	2 - POLICE RECORD
	3 - CHANGE IN OPTION	3 - MEDICAL DISQUALIFICATION
	4 - CHANGE IN 1ST ASSGN	4 - JOINED ANOTHER COMPONENT
	5 - CHANGE IN TERM	5 - CHANGED MOS
	6 - MEDICAL/OTHER DISQUALIFICATION	6 - CHANGED START DATE
	7 - DECLINED ENLISTMENT	7 - FRAUDULENT ENLISTMENT
	8 - OTHER REASON, ENTERED BY USER	8 - DOUBLE ALLOCATION
		9 - TRADOC DISCHARGE
		10 - UNQUALIFIED
		11 - NO SHOW
		12 - OTHER
		13 - CONFLICT WITH CIVILIAN EMPLOYMENT

LOCATION - ORMF POS 639-690
ODIS/ORDB NAME RCANCL
D18A8M2 POS 194-195

REQUEST - REFERENCE SSN:
OLD (INCORRECT) SSN IF SSN HAS BEEN CHANGED.
LOCATION - ORMF POS 691-699
ODIS NAME RRFSSN
D18A8M2 POS 196-204

FILLER:
LOCATION - ORMF POS 700-703

REQUEST - ENLISTMENT TYPE:

VALID CODES:		ACTIVE	RESERVE	GUARD
1	-	NPS*	NPS*	NPS*
2	-	PS	IRR*	
3	-	IS	IS	IS
4	-	CAS*	CAS*	CAS*
5	-	RET	RET	RET
6	-		SP1*	SP1
7	-		SP2*	SP2*
8	-	NPSR*	PST	ES*
9	-	PSR	PSN	
10	-	PCAS	PSR	
11	-		TRR	
12	-		TNG	
13	-		RSE	
14	-		RST	
15	-		ISS	
16	-		OFF	

SPLIT 1
SPLIT 2

F, P — Yes.

0, 4 no

* CONSIDERED NON PRIOR SERVICE (AS PER USARCRO-01

LOCATION - ORMF POS 704-705
ODIS/ORDB NAME RETYPE
D18A8M2 POS 230-231

REQUEST - RESERVE UNIT PRIORITY CODE:
LOCATION - ORMF POS 706
ODIS/ORDB NAME RVUNPR
D18A8M2 POS 283

REQUEST SENT DATE:

APPENDIX E

SUMMARY OF CHANGES TO MLRPS

E.1. Task 1B. Technical Changes to MLRPS. The MLRPS was selected by MA&D and DRC for inclusion in the concept paper due to its capability to produce the projected inventory for MOSs selected by the user. Furthermore, the model presents a relatively straightforward methodology that meets the needs of the PCEA computations. The model, however, contains technical capabilities not required by the PCEA and does not contain other capabilities which are critical to the PCEA methodology. The technical changes that must be considered for the MLRPS to meet the PCEA requirements are described in the following paragraphs.

(1) Elimination of the Optimization Model. The Optimization Models of the MLRPS are not required for the PCEA design concept. Rather, the Flow Model of the MLRPS is to be used as the Personnel Characteristics Flow Model.

(2) Elimination of the Cost Programs. The costing capability of the Flow Model of the MLRPS is not required for the PCEA design concept. The costing programs and the associated data base and data update programs are also not required.

(3) Revise Dimensions. The dimensions of the MLRPS Flow Model are skill, grade, years-of-service, and fixed group (where the fixed groups emcompass gender, race, mental category, and education for enlisted personnel). The

be redefined based upon the users selection. This dimension, however, could remain variable, as it is for the current MLRPS configuration.

(4) Rate Generation Programs. The rate generation programs of MLRPS do not provide for direct rate generation. (For the MLRPS, the transition rates are generated as part of the data collection process.) The generation of distribution percentages is conducted only for the commissioned officer additional specialities as a function of control branch. (Although the process for the current MLRPS distribution percentage generator could be adapted for the generation of distribution percentages for enlisted personnel characteristics.)

(5) Component. The MLRPS Flow Model provides for computation of the projected inventory for commissioned officer, warrant officer, and enlisted components of the Active Army. The PCEA requires projected inventory and distributions only for the enlisted force. On the other hand, it may be beneficial to offer ARI the ability to conduct similar analyses within the PCEA for officer personnel. (This is an important part of the LHX program, where the helicopter pilots are warrant officers.)

(6) Variable MOSs. The MLRPS uses a fixed number of MOSs (currently set at 34). The skill dimension, however, can be easily changed by simply changing the skill dimension in a single "include" program and recompiling the entire model. This procedure, however, may be impractical for the PCEA application. The user may require some method to reduce the number of MOS below the maximum level to reduce the data entry requirements and the model run time.

(7) Addition of the Distribution Capability. The MLRPS Flow Model provides a limited distribution capability, but only for the commissioned officer additional specialities. This capability is a key part of the PCEA design concept and must be included in the PCPM design.

E.2 Task 2. Describe Software Changes to MLRPS. The adaptation of the MLRPS for use within the PCEA will require five major areas of computer software development. First, the existing MLRPS must be revised to remove the computer code for those porgrams and capabilities not needed by the PCEA. Secondly, those computer programs which are relatively close to the requirements of the PCEA must be revised to meet the required capabilities. Third, the additional capabilities currently not available in the MLRPS must be designed, developed, and tested and then merged with the current MLRPS programs. Fourth, the revised MLRPS, now described as the PCPM, must be transferred to the PC environment. (The last two steps could be reversed so that the revised MLPRS could be transferred to the PC before the new developments begin and the new capabilities would be designed, developed, and implemented on the PC.). Finally, the interface with the PCEA data base must be completed so that the updated data provided to the PCPM on PC disk (either floppy or hard disk cartridge) may be accessed by the new programs.

(1) Software Deletions from MLRPS. The following software and capabilities must be deleted from the MLRPS software to convert the MLRPS to the PCEA requirements:

- Eliminate the entire Optimization Program - a stand-alone set of programs.

- Eliminate the Cost Program from the Flow Model - several subroutines and the associated call statements.

- Eliminate the Cost Data Revision Program from the Data Processing Program - a stand-alone program with a single call from a CLIST.

- Eliminate the Commissioned and Warrant Officer Capabilities - consists of numerous programs and/subroutines that are embedded in the Flow Model and Data Processing Subsystem code--a relatively large effort but relatively easy to complete.

- Eliminate the Steady State Capability - consists of deleting a major section of code within the Flow Program and the associated changes to the files and position flags.

- Eliminate the Years-of-Service Dimension - an imbedded loop in virtually every program. The most cost effective procedure may be to set the year-of-service dimension level to one and leave the loops in the model. The proper way would be to remove each of the loops, a time consuming and error-prone task.

(2) Software Revisions to MLRPS. The following software and capabilities used by MLRPS must be revised to make them compatible with the PCEA requirements.

- Revise the Menus to the PCEA Standard - The menus of the MLRPS use an assorted set of selection-type menus which must be redesigned to match the standard menus selected by the PCEA design (and the entire project menu standard).

- Revise the Report Programs - The report program must reflect the output required by the PCEA (the distribution reports are addressed in the following paragraph). The current report program must have the officer, cost, and requirement reports deleted, and the fixed group reports revised.

- Revise the Fixed Group Dimension - The fixed group dimension, currently set at 24 predefined categories, would be redefined to include two gender categories and four additional user-defined categories. Since the MLRPS maintenance programmer has the capability to change the Flow Model dimension, the revision to the Flow Model would be relatively easy. The changes to the several Data Processing Programs are set to the fixed group dimension of either 24 or four. They could be easily changed to eight (two times four).

- Store Transition Rates Changes during the Execution of the Modify Program in the PCFM - The current Flow Model does not allow the user to permanently store the transition rates developed while in the Modify Program of the Flow Program. The revision would require a minor change to the Stop Program to allow for the Change Files to be merged with the Transition Data Files.

(3) Software Additions to MLRPS. The following software and capabilities must be added to the MLRPS to make it compatible with the PCEA requirements.

- Addition of the Personnel Characteristics Distribution Model - This model must be completely designed, developed, and tested to provide the capability to convert

the inventory projections (expressed as persons in the inventory) into percentages by personnel characteristic by level and to provide the appropriate output reports and data files for the PCEA.

- Addition of the Personnel Characteristics Rate Generation Model (PCGM) - This model must be completely designed, developed, and tested to provide the capability to generate transition rates and personnel characteristics distribution percentages. The rates and percentages will be made available to the programs which already exist within the Data Processing Subsystem of MLRPS (to be transferred into the PCGM).

- Development of the Data Structures within the PCPM. The PCPM requires a complete data base to serve the PCPM. The data base receives the initial data from the PCEA data base and stores it for use in the PCPM. The PCGM uses this data to generate the required transition rates and distribution precentages which must be stored for future use. The PCFM uses the rates and the initial inventory to determine the projected strengths and transitions which must be stored. The PCDM uses the projected strengths and distribution percentages to compute the Personnel Characteristics Distributions which must be stored for use in the later steps of the PCEA.

(4) Conversion of the Upgraded MLRPS to the PC. The MLRPS currently operates on an AMDAHL 5860 computer using IBM VS FORTRAN as the primary language with CLISTs used for many menus. Sigma Systems is currently investigating the conversion of the Optimization Models to a PC environment.

However, this portion of the MLRPS is not included in the PCEA requirement. The conversion of the Flow Model of the MLRPS could be conducted in several ways. Two viable alternatives are as follows:

- Transfer Source Code to PC and Develop Additions on PC. The minor modifications and deletions would be completed on the current mainframe computer located at USAISC-P. The source code would then be transferred to the PC environment where the remaining code would be developed. The entire model would then be integrated into the PC environment. This alternative requires that the PC be compatible with the existing MLRPS or that the existing code be modified to make it compatible. The transferred code would remain FORTRAN, requiring the receiving hardware to possess the necessary software to operate in the FORTRAN environment. The remaining development could be completed in any desired language.

- Rewrite Source Code in New Language. The existing capability could be completely rewritten in the desired PCEA language, such as C. During the rewrite process, all the necessary modifications, additions, and deletions would be accomplished. This alternative ensures the most efficient and state-of-the-art code, meeting the standards for the PCEA but would require the greatest amount of additional programming effort and associated testing.

(5) Interface with the PCEA Data Base. The PCEA Data Base will provide for the storage of all data required by the several programs within the PCEA. The primary points within the process where information is stored is illustrated at Figure E-1.

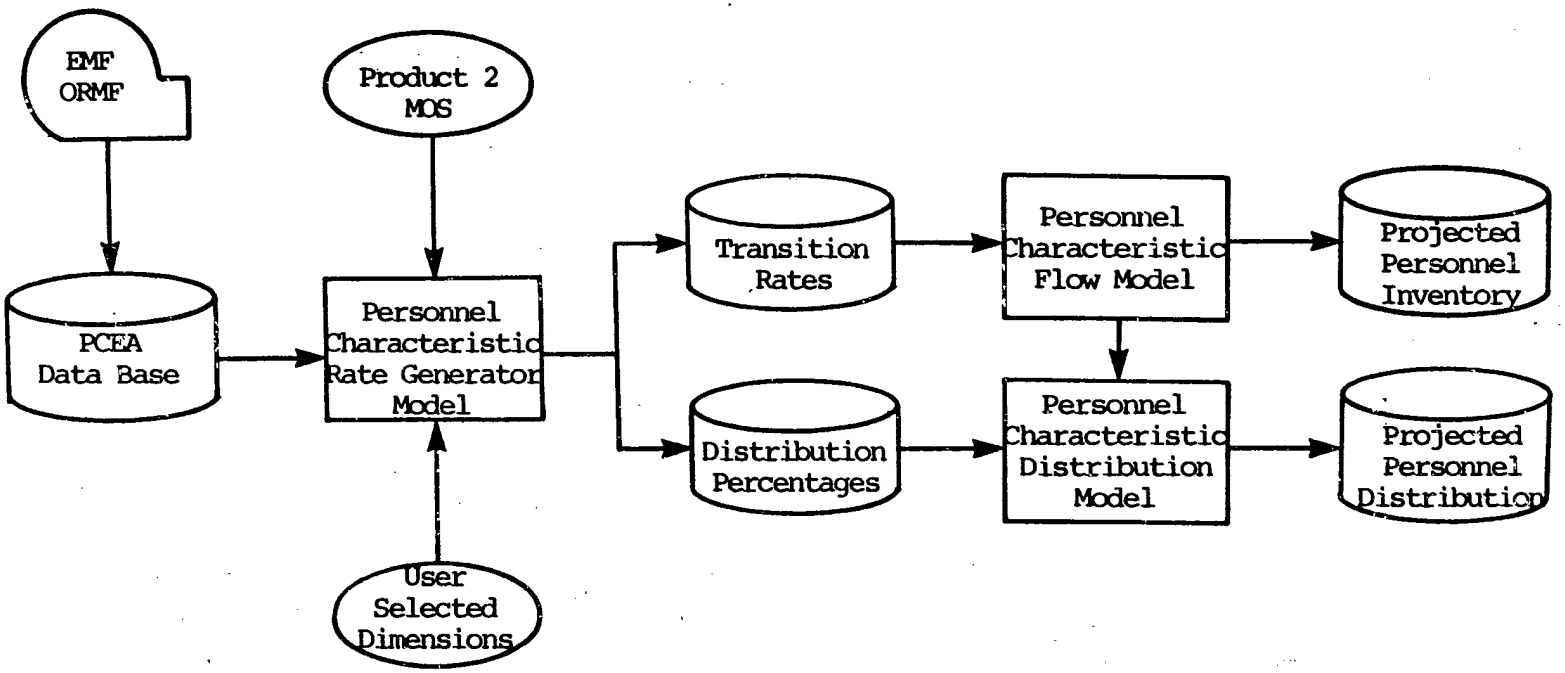

Figure E-1. Data Storage Requirements

- PCEA Data Base. The PCEA Data Base provides historical data regarding transitions and strength data by personnel characteristics and demographic variables. The data is provided by the PCEA data extract programs external to the PCEA process. The user must request the desired data from the developing agency, specifying the period of the data and the MOSs desired. A single data file is provided for each MOS selection set. The data is updated annually by the maintenance organization.

- Transition and Distribution Rates. The output of the Personnel Characteristics Rate Generator Model consists of two data files containing the transition rates and distribution percentages related to an analysis under study. The user may generate multiple data sets for each scenario within the study. Therefore, the data base must maintain and distinguish between the several alternatives. The number of alternatives will be a function of the size of the files and the number of data sets that may be permanently stored.

- Personnel Characteristics Projected Flow and Distribution Data. The output of the two computational models are maintained on permanent storage devices for recall for report generation purposes and for use in subsequent steps of the PCEA process. As with the Transition and Distribution Rate Files, these files may contain multiple data sets, one set for each alternative conducted by the analyst. The number of files that are permanently stored is a function of the size of the files and the total storage capacity. Unlike the Rate Generation Files, the data on these files can be easily regenerated by rerunning either or both of the models. Therefore, the user may be less concerned about creating a data set for each alternative studied.

Working Paper MSG 88-01

PRODUCT 6: PERSONNEL REQUIREMENTS

ESTIMATION AND DESIGN SPECIFICATIONS

Prepared By:

Micro Analysis and Design
and
Dynamics Research Corporation

31 December 1987

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This working paper is an unofficial document intended for limited distribution to obtain comments. The views, opinions, and/or findings contained in this document are those of the author(s) and should not be construed as the official position of ARI or as an official Department of the Army position, policy, or decision, unless so designated by other official documentation.

FINAL

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PRODUCT 6: PERSONNEL REQUIREMENTS ESTIMATION AID

SECTION 1 - INTRODUCTION

1.1 OBJECTIVE OF PAPER

This document describes detailed design specifications for an aid that will estimate the minimum level of personnel characteristics needed to achieve required system performance for a given contractor design. The Personnel Requirements Estimation Aid (PREA) is one of six automated products being developed in the Army Research Institute's (ARI) Manpower, Personnel, and Training aids for the MANPRINT integration $(MPT)^2$ project.

This concept paper is the second phase in a three-phase development process. In the third phase, we will produce and demonstrate software, documentation, and training for the aid.

1.2 OVERVIEW OF $(MPT)^2$ PRODUCTS

Figure 1 displays the six $(MPT)^2$ products and their expected role in the Army's new streamlined Materiel Acquisition Process (MAP). The first four products, the System Performance Requirements Estimation Aid, the Manpower Constraints Estimation Aid, the Personnel Constraints Estimation Aid, and the Training Constraints Estimation Aid, will estimate MPT-related requirements and constraints during the Requirements/Technology Base Activities Phase of the MAP. These requirements and constraints will guide subsequent contractor design activities.

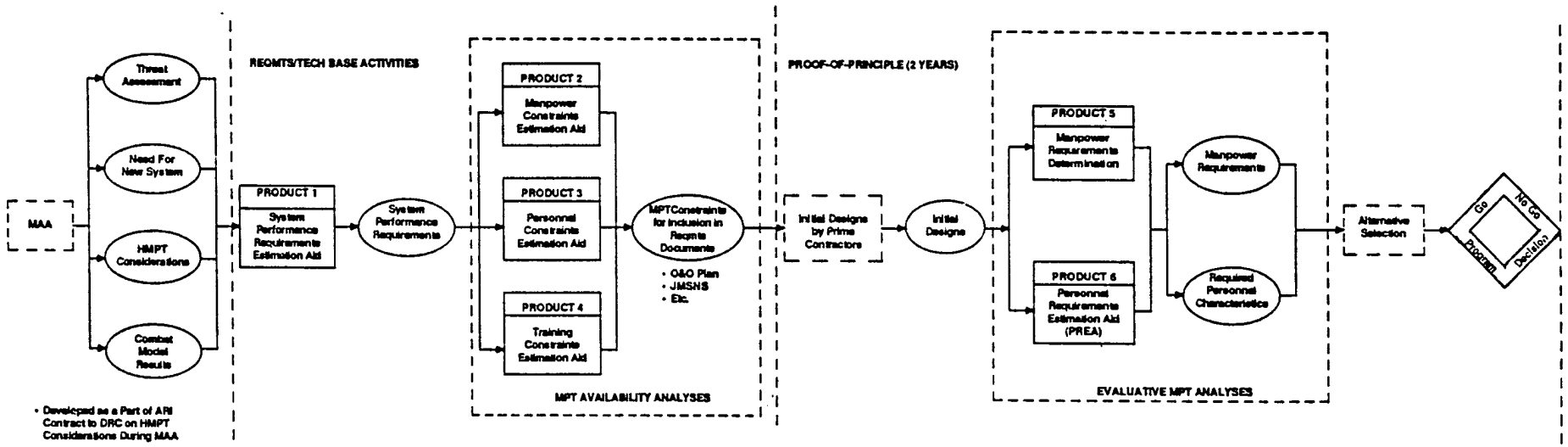


Figure 1-1. Expected Role of Six $(MPT)^2$ Products.

The System Performance Requirements Estimation Aid (SPREA) will help Army combat developers identify comprehensive and unambiguous system performance requirements needed to accomplish various missions.

The next three $(MPT)^2$ products will determine MPT constraints. The Manpower Constraints Estimation Aid (MCEA) will identify the maximum crew size for operators and maintainers and the Maximum Direct Productive Annual Maintenance Manhours (DPAMM) for maintainers. These constraints will be based on assessments of the manpower likely to be available to man the new system.

The Personnel Constraints Estimation Aid (PCEA) will estimate the significant personnel characteristics that describe and limit the capabilities of the probable soldier population from which the new system's operators and maintainers will be drawn. The PCEA will identify the minimally acceptable boundaries for these characteristics.

The Training Constraints Estimation Aid (TCEA) will identify what the training program for the new system is likely to look like. It will also determine the maximum time needed to train the new system's operators and maintainers, given available training resources.

The last two aids help evaluate contractor designs. The Manpower Determination Aid and the Personnel Requirements Estimation Aid (PREA) will be used during the Proof-of-Principle Phase after initial contractor designs have been submitted, but before one design is chosen for development into a prototype. These products will evaluate initial contractor designs and assist in the development of MPT alternatives that minimize personnel characteristic deficits. (Personnel characteristic deficits are

discrepancies between the type and number of people required and the number of these people likely to be available when the system is fielded.)

The Manpower Determination Aid (MDA) will determine the tasks, jobs, and quantitative manpower requirements associated with each contractor design.

The Personnel Requirements Estimation Aid (PREA) will determine the type and level of personnel characteristics required to perform each task associated with a contractor design effectively.

1.3 ORGANIZATION OF PAPER

Seven sections comprise the remainder of the design specifications. The second section provides an overview of the PCEA and its outputs, functional requirements, users, role in the acquisition process, and our approach to design specification.

The third section describes the steps the user would go through in applying the PCEA. Included in this description is a listing of the screens the user would go through in applying the PCEA.

The PCEA will contain two types of files--libraries that describe "hardwired" input data and "input/output" files used to store input or results related to a particular application of the PCEA. The fourth and fifth sections describe the structure of these two types of files. The description of the libraries also includes the actual values for the "hardwired" input data.

The sixth section describes the algorithms and models that will be used in the PCEA to calculate and/or modify data.

The seventh section describes interfaces with other $(MPT)^2$ products and external data bases and lists the format for all PCEA output reports.

The eighth section describes technology transfer issues.

This concept paper also contains one appendix which provides a more detailed description of PREA's role in the acquisition process.

SECTION 2 - PRODUCT REQUIREMENTS

2.1 OBJECTIVES

The objective of the Personnel Requirements Estimation Aid (PREA) is to identify the personnel characteristic requirements for each contractor design. In so doing, the PREA identifies what "quality" of personnel will be needed to support a given contractor design.

The PREA is the most important MANPRINT $(MPT)^2$ aid because it integrates the results of the other five $(MPT)^2$ products. The relationship between the PREA and Product 5, the Manpower Determination Aid (MDA), is particularly critical. These two aids are used in conjunction to evaluate contractor designs.

2.2 MAJOR OUTPUT

The PREA's major output is the minimum level of personnel characteristics needed to achieve required system performance for a given contractor design. Separate levels will be identified for each task associated with a contractor design. The levels will also reflect the conditions under which the tasks were performed and the amount of practice provided to the personnel performing each task.

2.3 ROLE OF PRODUCT OUTPUT IN ACQUISITION PROCESS

By identifying the personnel requirements associated with a given contractor design, the PREA will play a key role in manpower, personnel, and training and design tradeoffs conducted during the acquisition process.

Manpower, personnel, and training and design tradeoffs feed three types of acquisition documents/processes. These documents/processes include system-level documents/processes, Integrated Logistic Support Analysis documents/processes, and MANPRINT processes. Appendix A describes the PREA's role in feeding these documents.

2.4 USER

2.4.1 Overview of Users and Their Functions

Primary Users. Primary PREA users are expected to be (1) the Directorate of Combat Development (DCD) personnel within the proponent school who provide manpower/personnel input to the COEA and ILS/LSA process and (2) the Directorate of Training Development (DTD) personnel within the proponent school overseeing the CTEA. More specifically, the organizations within DCD likely to use this aid are the Studies Division, Materiel Logistics Support Division, or Requirements Division. Within DTD, the Unit Training Division will probably use the PREA.

Secondary Users. Secondary users will be the personnel within the AMC major subordinate command who help the TRADOC proponent prepare the COEA and CTEA. The AMC personnel who are responsible

for ILS/LSA will also probably use the PREA. Usually, ILS responsibility for a major system is assigned to the Logistics Division or Group in the Program Manager's staff.

Since each AMC major subordinate command is organized differently, the specific organization that uses the PREA will vary.

Other potential users. Other users include personnel who review the COEA at HQ TRADOC (DCSCD), HQ AMC (AMCDRE), and the Requirements Division (DAMOFOR) within DCSCOPS, and the reviewers of the BOIP/QQPRI including HQ TRADOC (DCSOPS); the Organizational Integrator, or Force Integration Staff Officer (FISO); the personnel at the Human Engineering Laboratory who conduct HFEAs; Soldier Support Center-National Capitol Region (SSC-NCR); HQ AMC (AMCDRE); the MANPRINT Policy Office within ODCSPER (DAPE-ZAM), the MANPRINT points-of-contact within the TRADOC proponent schools and AMC subordinate command; and the ARI and HEL field office representatives who provide MANPRINT support to TRADOC schools or AMC subordinate commands.

2.4.2 Job Type

The PREA will be developed specifically for the primary users listed in the overview of users and their functions. These primary users are the combat developers within the TRADOC proponent school who produce COEA input. The personnel who actually perform these functions within the assigned DCD division are usually Army majors or captains.

2.5 ASSUMPTIONS

The following assumptions underlie the development of the PREA:

2.5.1 Major System Focus

The PREA will describe personnel characteristic requirements for major weapon systems. Although the PREA's general logic is applicable to other types of systems, its automated tools will be developed for major systems.

2.5.2 Limitation on Data Collection

The PREA estimates the required levels of personnel characteristics needed to support a given contractor design using either existing performance data or expert judgment techniques. No additional hands-on performance data will be collected during the development of the PREA.

2.5.3 Input from Other Products

Product 1, the SPREA, will provide an estimate of system requirements. The estimate will describe the overall mission time and accuracy requirements and the time and accuracy requirements for the mission's individual operational functions. We assume that these functions will be broken out to the level where they can be mapped onto human operator tasks on a one-to one basis. Thus, Product 1 can be thought of as describing task time and accuracy requirements for operator tasks. We are not assuming that Product 1 will break out time and accuracy for individual maintenance tasks. (See section on "Steps" in the Product Overview for the rationale underlying this assumption).

Product 5, the MDA, will list all the operator and maintainer tasks for each contractor design, and the duty positions associated with these designs. It will provide initial estimates of the time to perform each task given mean levels of characteristics and sustainment training.

2.5.4 Resources Available for Development

We assume that approximately forty-eight person-months are available for software coding.

2.6 HIGH-LEVEL FUNCTIONAL REQUIREMENTS

2.6.1 Technical Requirements

The major PREA output is the minimum level of personnel characteristics needed to achieve required system performance for a specific contractor design. The PREA will identify separate levels for each task associated with a contractor design. The levels will reflect the conditions under which the tasks were performed and the type and amount of training the personnel performing each task received.

Role in Acquisition Process. The PREA trade-off results must feed directly into the COEA, MANPRINT, and ILS/LSA trade-off processes (see the "Role of Product Output in Acquisition Process").

Users. The PREA must be designed for the Directorate of Combat Development personnel within the proponent school who provide manpower/personnel input to the COEA, MANPRINT, and ILS/LSA processes (see "Users").

2.6.2 Acceptability/Usability Requirements

The previous subsection presented an overview of the technical requirements that the PREA must meet. This section describes the acceptability and usability requirements that these tools also must meet.

Describe "How To" Procedures. Whenever possible, procedures should be automated to reduce user analysis requirements. The PREA should present procedures for obtaining input data and interpreting results for these automated tools.

Minimize Organizational Impacts. The PREA must fit the user; not vice versa. Consequently, they must not require additional personnel or restructuring of existing Army organizations to apply; they must use computer hardware available at user locations or via secure lines. Furthermore, they should use existing software whenever possible. If they require new software packages, the cost of these packages must be within the user's typical software acquisition budget.

Minimize User Training. The members of the MAP community expected to use the PREA are already overburdened and understaffed. In addition, they are trying to meet increasing acquisition requirements such as MANPRINT within the context of the streamlined acquisition process. Consequently, training time for the (MPT) products must be minimized. This requires developing user interfaces that do not require prior computer experience. For example, user interfaces should contain built-in job aids (e.g., help commands).

Security. Since the PREA may be required to accept classified data, it must provide acceptable levels of security.

2.7 OVERVIEW OF TECHNICAL APPROACH

2.7.1 PREA Complexity and Challenges

The PREA's goal is ambitious. It will attempt to estimate the characteristic levels needed to achieve required system performance given a specific system design, set of conditions, and amount of training. This requires developing an aid that we believe will be much more complex than the other five $(MPT)^2$ aids. Although we can construct a user interface that will make this complexity transparent to the user, we cannot find a simple way to describe this aid or how we will develop it. Therefore, we ask readers to bear with us.

We believe we have constructed a design specification that will allow the PREA to accomplish its goal. However, resource constraints prohibit us from developing our "ideal" version of the PREA. In many cases, we were required to limit the number of variables the PREA will consider or the scope of its functional capabilities. Despite these limitations, we believe the PREA we describe has capabilities well beyond the minimum needed to achieve the goal stated in the (MPT) SOW. However, we recognize that readers with more ambitious goals may feel a need for an expanded version of the PREA.

Perhaps more than any other $(MPT)^2$ aid, the PREA can be viewed as an evolving tool. Our version of the PREA incorporates results from current state-of-the-art performance measurement. However, future studies will produce new data and results. We have constructed a version of the PREA that will readily facilitate the incorporation of data and results from these future studies.

2.7.2 Overview of the Problem Facing PREA

The PREA will attempt to identify the minimum level of personnel characteristics needed to achieve required system performance given (a) a specific contractor design, (b) a specific set of conditions, and (c) specific amounts of training. The key to achieving this objective is understanding the relationship among these five variables -- performance, personnel characteristics, equipment design, conditions, and training. We can represent this relationship as follows:

$$\text{Performance} = f(P, C, T, D)$$

where personnel characteristics (P), conditions (C), training (T), and equipment design (D) are represented as predictors of human performance. The objective of the PREA is to find a value for P that will meet the system performance requirements produced by Product 1, given fixed values for C, T, and D.

2.7.3 Overview of Our Approach

The PREA will use a set of performance shaping functions to estimate task performance for a given set of personnel characteristic levels and amount of training. Initially, mean or typical levels of characteristics and training will be used to predict performance. The PREA will then apply a set of degradation algorithms which will lower task performance to reflect the presence of six critical environmental stressors--heat, humidity, cold, noise, MOPP gear, and continuous operations (loss of sleep). The revised task performance estimates will then be input into MicroSAINT-based operator and maintainer models which will produce estimates of system performance. The estimates of task and system performance will then be compared to the task and system performance requirements set by Product 1.

If the estimates equal the requirements, the PREA will stop. If they do not, the PREA will increment the characteristic levels, reapply the performance shaping functions, degradation algorithms, and operator and maintainer models, and again compare estimated and required performance. The process will continue until acceptable performance is achieved or until the characteristic levels exceed maximum realistic values set by the user.

2.7.4 Need for Tools for Estimating System Performance

Product 1 will set performance requirements at several levels. At the highest level, it will set performance requirements for each mission associated with the new system. At the lowest level, it will set performance requirements for low-level functional tasks. Operational activities will be broken out to the lowest functional task level while maintenance activities will be described only at a high level. (The rationale for this approach is presented below).

We assume that the low-level functional tasks for operations can be mapped onto operator tasks produced by Product 5 on a one-for-one basis. Given this assumption, it is possible to use the Product 1 operational task performance requirements as the criteria that must be satisfied in setting personnel characteristic levels. However, it will also be desirable to compare estimated operational performance with operational requirements set at the function and mission level. In many cases, the requirements set at these higher levels can be reviewed as "firm" requirements while requirements set at the functional task level can be viewed as recommendations and not firm requirements.

Comparing performance with low-level requirements is most problematic for maintenance tasks. We now know that Product 1 will not be able to estimate performance requirements for low-level maintenance functions--functions at the maintenance task level. Product 1 will recommend a percentage breakout of maintenance man-hours for generic maintenance actions associated with generic functional system (e.g., airframe). The major reason why this approach was taken in Product 1 is that it is difficult to identify maintenance tasks until operational functions have been allocated to particular types of equipment. The performance requirements for maintenance tasks, and even the maintenance tasks themselves, will depend on what must be maintained. One of the requirements of Product 1 is that it must estimate functional performance requirements without any function allocation.

The bottom line of this discussion of Product 1 performance requirements is that we believe that the PREA must be able to predict not only performance for human tasks, but also higher-level system performance. In this way, the PREA can compare the system performance associated with a particular contractor design to mission- or system-level performance requirements from Product. To accomplish this objective, the PREA will use a set of Micro-SAINT based simulation models.

2.7.4.1 Micro SAINT

MA&D has designed and developed a task network modeling tool called Micro SAINT to simplify and accelerate the development and use of task network models. Micro SAINT is a simulation language that allows easy building and modification of task networks.

We emphasize Micro SAINT's efficiency because it is an essential PREA component. Micro SAINT, developed for JWGD3 MILPERF at the Walter Reed Army Institute of Research, is an Army-owned Product.

An enhanced version of Micro SAINT has recently been completed under another Army contract. The enhanced version produces graphic printouts of model diagrams that pictorially represent performance data.

Micro Analysis and Design has already applied Micro SAINT to analyze operator workload and crew size in the LHX helicopter (Laughery, Drews, & Archer, 1986; Kramme, Laughery, Drews, & Archer, 1985), tank crew performance (Drews & Laughery, 1985, the Cobra helicopter aircrew training system (Archer, Dahl, & Laughery, 1985), and an aircraft maintenance manning system (Archer, Drews, Laughery, Dahl, & Hegge, 1986).

2.7.4.2 Use of Micro SAINT in $(MPT)^2$

Micro SAINT has been developed under contract to the Army to provide a general tool for simulating human/machine performance and its impact on system performance. In the PREA, we will use Micro SAINT as a tool for combining the estimates of individual task performance into estimates of system performance. To meet the unique requirements of the PREA, we will expand and modify the basic Micro SAINT software to include the following features:

Separate performance models will be developed for operators and maintainers, since the cues initiating operator tasks and maintainer tasks are very different. Operator tasks are initiated by the initiation of a mission. Maintainer tasks are initiated by the presence of a failure (corrective maintenance) or the requirement for periodic maintenance (preventive maintenance).

The operator simulation model will simulate the tasks the system's operators perform during an operational mission. The model will keep track of the time required to perform the mission

and calculate a measure of the overall "accuracy" of the mission by combining the accuracy measures of the tasks that comprise the mission.

The maintainer performance model in the PREA will model the maintenance requirements of each component in the new system being evaluated and estimate the system's reliability, availability, and maintainability. Unlike operator tasks, whose logic among tasks varies considerably from system to system, the logic among maintenance tasks is basically the same for all systems. Consequently, it is possible to embed a great deal of this basic logic into a single generic maintenance performance model.

Sections 6.8 and 6.9 provide a detailed discussion of the operator, and maintainer models is provided in Section 7.

2.7.5 Performance Shaping Functions

In our concept of the PREA, performance shaping functions will be used to predict the the performance level that can be expected for a given set of personnel characteristics levels and amount of training. The PREA performance shaping functions will actually predict a relative change from a baseline value rather than absolute performance. The performance shaping functions will describe generic predictor-performance relationships for types of tasks rather than specific tasks.

Table 2.7-1 displays the general form of the PREA performance shaping functions. Note that the functions predict a Z score. We will convert the Z score into the raw score using the standard algorithm for converting Z scores to raw scores except that as the mean score we will use the user's estimate of the expected accuracy level for each task associated with the specific contractor's design given that the people who perform the task have mean levels of personnel characteristics and mean amounts of

Table 2.7-1. General Form of Performance Shaping Functions*

$$\hat{Z} = \text{Personnel Characteristics} + \text{Practice} + \text{Practice} \times \text{Characteristics}$$

P_o = oth Personnel Characteristic

BF + BR

F = Frequency of Task Performance

R = Recency of Task Performance

Interactions Between Personnel Characteristics + Practice

Z = Predicted $\hat{Z}$ Score for Task Performance Measure

B = Standardized Regression Weights

* This is the initial form of the equation that we would start out at the beginning of our statistical analyses. Results of statistical analyses are expected to greatly simplify the equations.

training. (The time estimates produced by Product 5 are also based on these same assumptions.) This approach allows us to use generic prediction equations associated with different types of tasks to predict performance on a particular task associated with a specific contractor's design. The mean estimate provided by the user captures the unique design features associated with a particular task. This approach is admittedly fraught with assumptions--some statistical and some conceptual. We will discuss these assumptions during our briefing.

2.7.5.1 Task Taxonomy

Table 2.7-2 displays the PREA task taxonomy. The taxonomy is primarily an expansion of Berliner's (1966) task taxonomy. However, an attempt was also made to incorporate Wicken's (1981) structure for processing resources. These two structures are quite congruent with one another. We eliminated task types which while possible to imagine on a theoretical basis seldom occur in the Army.

2.7.5.2 Personnel Characteristics

Both our PCEA and PREA concepts are based on the following definition of a design-related personnel characteristic:

> A design-related personnel characteristic is an enduring human attribute that has a significant impact on operator or maintainer performance and has information available to estimate its current distribution within the Army.

Table 2.7-2. Task Taxonomy

PERCEPTUAL

- Far Visual
- Near Visual - Non Verbal
- Near Visual - Verbal

COGNITIVE

- Information Processing - Numerical
- Information Processing - Verbal
- Problem Solving - Planning
- Problem Solving - Troubleshooting
- Problem Solving - Selecting

PSYCHOMOTOR

- Discrete
- Typing
- Aiming/Shooting
- Driving
- Piloting
- Aligning

GROSS MOTOR

- Carrying
- Lifting/Lowering
- Torquing
- Light Gross Motor

COMMUNICATION

- Face to Face
- Non-Face to Face

The implications of this definition are significant. Personnel characteristics should be restricted to enduring human attributes: otherwise the concept of an availability-based personnel constraint is not meaningful. For the same reason, a personnel characteristic must either have data available to describe its distribution within each Army MOS, or we must be able to identify another existing data base (e.g., the Project A database) that can be "reasonably" generalized to Army MOSs. If we cannot describe a characteristic's distribution, we have no basis for describing its availability and thus have no basis for setting a constraint in Product 3.

To be a design-related personnel characteristic, a characteristic must be related to operator and maintainer performance--namely, task performance time and/or task accuracy. If a characteristic is not related to these two types of task performance measures, there is little a contractor can do to design his or her system to accommodate a given characteristic level. Four general types of characteristics meet the criteria described above -- cognitive, perceptual, psychomotor, and physical characteristics.

Table 2.7-3 lists the personnel characteristics that we have selected for inclusion in the PREA. Table 2.7-4 lists the personnel characteristics we propose to use as predictors for each task type.

2.7.5.3 Our Approach to Training

Originally, we intended to use the amount of initial training as the training variable in our performance shaping functions. However, two problems with this variable were identified. First, there was a lack of data or data bases which would be used to relate this variable to task performance. Second, and perhaps

Table 2.7-3. Personnel Characteristics

COGNITIVE

ASVAB Quantitative
ASVAB Speed
ASVAB Technical
ASVAB Verbal
Numerical Speed and Accuracy (Project A)

PERCEPTUAL

Complex Perceptual Accuracy (Project A)
Complex Perceptual Speed (Project A)
Pulhes - Hearing
Pulhes - Eyes

PSYCHOMOTOR

Psychomotor (Project A)
Simple Reaction Accuracy (Project A)
Simple Reaction Speed (Project A)

PHYSICAL

Sex
Height
Weight
Mepscat/Pulhes Exp. Weight Lift
Blood Pressure - Diastolic

Table 2.7-4. Data for Task Characteristic Map

		PERFORMANCE MEASURE TYPES			
CATEGORY*	PERSONNEL CHARACTERISTICS	PRIMARY MEASURES	TYPE	SECONDARY MEASURES	TYPE
Far Visual	18, 19, 28, 22, 23	% Correct Identifications Time to Identify	A T	False ID Rate	A
Near Visual-Non-Verbal	18, 19, 28, 22, 23, 14	% Correct Identifications Time to Identify	A T	False ID Rate	A
Near Visual-Verbal	16, 22, 23, 28	% Items Correctly Read	A	• Time to Read Materiel • % Items Incorrectly Read	T A
Auditory Sound Perception	NOT INCLUDED - SELDOM USED				
Information Pro. Numerical	20, 13	• Deviation from Correct Value	A	Time to Perform % Items Correct	T A
Information Pro. Verbal Symbolic	16	% Items Correct % Steps Correct	A A	Time to Perform	T
Problem Solving-Troubleshooting	15, 16, 13	% Problems Correctly Identified Time to Peform	A T	% Correct Steps	
Problem Solving Planning	16, 15, 13	% Steps Correct	A	Time to Perform	T
Problem Solving Selecting	14, 22, 23, 16	% Solutions Correctly Chosen % Steps Correct	A A	Time to Select Cost/Benefit of Choice	T A
Psychomotor Discrete	15, 18, 19, 21	% Step/Actions Correct Time to Perform	A T	Rate of Performance	T
Phychomotor Aiming-Shooting	21, 15, 22, 23, 14	• % Hits • Rate of Fire	A T	Time to Fire Time to First Hit	T T
Psychomotor Driving	21, 15, 22, 23, 14	• RM's From Ideal Path • Speed	A T	% Steps Correct Accident Rate	A A
Psychomotor Piloting	21, 15, 22, 23, 14	• RM's From Ideal Path • Speed	A T	Accident Rate	A
Psychomotor Aligning	21, 15, 22, 23, 14	• Deviation From Correct Value • Time to Perform	A T	———	
Psychomotor Throwing	NOT INCLUDED - UNRELATED TO SYSTEM DESIGN				
Gross Motor (HU) Carrying	31, 40	Rate	T	% Steps Correct	A
Gross Motor Lifting	40	Rate	T	% Steps Correct	A
Gross Motor Torquing	31, 40	Rate	T	% Steps Correct	A
Gross Motor Light	NOT INCLUDED				
Communication Face to Face	27, 22, 23, 16	% Items Correctly Received % Items Correctly Transmitted	A A	Transmission Rate	A
Communication Not Face to Face	27, 22, 23, 16	% Items Correctly Received % Items Correctly Transmitted	A A	Transmission Rate	A
Psychomotor Discrete Typing	22, 23, 21, 16	% Words Correct Words Per Minute	A T		

PERSONNEL CHARACTERISTICS LEGEND

13 - ASVAB Quantitative
14 - ASVAB Speed
15 - ASVAB Technical
16 - ASVAB Verbal
18 - Complex Perceptual Accuracy
19 - Complex Perceptual Speed
20 - Numerical Speed & Accuracy
21 - Psychomotor
22 - Simple Reaction Accuracy
23 - Simple Reaction Speed
27 - PULHES Hearing
28 - PULHES Eyes
29 - PULHES Experimental Wt. Left (?)
30 - MEPSCAT
31 - SEX
32 - Height
33 - Blood Pressure Diastolic
40 - Weight

NOTE:
For Tasks falling into "not included," we will assume 100% accuracy. Task time estimates for Product 5 for these tasks will not be modified.

most importantly, to use this variable we had to assume that all soldiers had just graduated from initial training since development of models to predict the impact of intervening variables was very complex.

Because of these problems, it looked like we may have to leave training completely out of our models. However, in the course of examining the results of various Project A analyses, we learned that Project A had data, in a little used data base, on how frequently and recently within the last six months a soldier had performed a task prior to the hands-on test. Together these two variables can be reviewed as describing the amount and recency of practice given to a particular task. Since practice is one of, if not the key, training variables, we decided to use these variables as measures of the amount of sustainment training--sustainment training being broadly defined to include both practice on the job as well as practice in formal training.

Through some simple assumptions and algorithms, we were able to develop an approach for converting estimates of frequency of performance on the job and frequency of sustainment training into the Project A frequency metrics. This allowed us to use input variables (frequency of performance on the job, and sustainment training frequency) that were much more meaningful to PREA users.

2.7.5.4 Data For Performance Shaping Functions

Project A will be the primary data source for the development of performance shaping functions. Project A has data on accuracy, personnel characteristics, and task frequency and recency. Some of the Project A tasks also have time measures. Table 2.7-5 lists the number of tasks in the Project A data base falling into each of the categories in our task taxonomy. In cases where there are no Project A tasks falling into a particular task type, it may still be possible to develop performance shaping functions by looking at performance at the task element rather than the

Table 2.7-5. Distribution of Project A Tasks by Task Types

		PROJECT A MOS										
		11B	13B	19E	31C	63B	64C	71L	91A	95B	TOTAL	CONGRUENCE WITH DESIRED PERFORMANCE MEASURE
PERCEPTUAL		-									-	
P1	Far Visual	1									1	HIGH
P2	Near Visual - Non Verbal						1				1	LOW
P3	Near Visual - Verbal								1		1	MODERATE
COGNITIVE		-									-	
C1	Information Processing - Numerical		2	1	1	1	2	1	1	5	14	MODERATE
C2	Information Processing - Verbal	1		1	3						8	MODERATE
C3	Problem Solving - Planning										0	NA
C4	Problem Solving - Troubleshooting				1	3					4	MODERATE
C5	Problem Solving - Selecting										0	NA
PSYCHOMOTOR		-									-	
P1	Discrete	8	12	10	9	10	11	10	16	9	95	HIGH
P2	Typing							1			1	HIGH
P3	Aiming/Shooting	1	1								2	LOW
P4	Driving						1				1	LOW
P5	Piloting										0	
P6	Aligning	1	2	1							4	LOW
GROSS MOTOR		-									-	
G1	Carrying	PERFORMANCE SHARING FUNCTIONS DEVELOPED WITH ALTERNATIVE SOURCES										
G2	Lifting/Lowering		↓		↓			↓	↓	↓	↓	NA
G3	Torquing		↓		↓			↓	↓	↓	↓	NA
G4	Light Gross Motor	1		1							2	
COMMUNICATION		-									-	
C1	Face to Face			1	1	1				1	4	MODERATE
C2	Non-Face to Face									1	1	MODERATE

task level. Some of the task elements may fall into these task categories. Some task types (e.g., piloting) are simply not included in the Project A data base. Performance shaping functions for these task types could be developed by subject matter experts or by collecting new performance data; however, we believe that the current PREA development budget and schedule precludes both of these activities. We propose to assume 100% accuracy for these tasks and use the time estimates produced by Product 5. This will still permit us to apply the stressor degradation algorithms and allow us to calculate impacts on system performance. Performance shaping functions for the remaining task types can then be incorporated at a later date.

There is another potential limitation of the Project A data with respect to our performance shaping functions which is worth mentioning. For the most part, the primary accuracy measure used in Project A is "% go"--that is, the number of steps in a task the soldier got a "go" on divided by the total number of steps in the task. Table 2.7-4 list the types of performance measures that are most appropriate for each task type. Note that the Project A measure, % steps correct, is highly appropriate for complex psychomotor discrete tasks but may be less appropriate for other task types. The last column in Table 2.7-5 summarizes the congruence of the Project A measures with our conceptualization of the ideal performance measure for each task type. At the present time, we propose to use the Project A data for a task type despite its lack of congruence with our ideal measures since the only alternative is to forego developing a performance shaping function for the task type. It should be noted that the form and substance of the performance shaping functions for the three gross motor task types involving heavy physical effort (carrying, lifting/lowering, and pulling/ torquing) will be quite different than the other task types. Examining existing literature we were able to identify equations which predict the amount of physical energy that is expended

while different types of people (sex and body weight are the major predictors) perform these tasks with different design features (e.g., weight of object to be lifted or carried) at different rates. There is also a body of literature which describes the maximum amount of energy that can be expended by humans in a fixed period of time. Together these two bits of data allow us to predict the maximum possible rate at which these tasks can be performed. Thus, we can predict a time measure for these tasks. (We must assume 100% accuracy but this is probably a very realistic assumption for these types of tasks). The performance shaping functions for the heavy physical tasks are embedded in the Stressor Degradation Algorithm since these functions are heavily dependent on environmental stressors.

2.7.5.5 Our Approach to Conditions

Product 1 will identify the conditions impacting system performance. The Product 1 list of conditions will be detailed and extensive. However, not all of the conditions that impact system performance impact human performance. In addition, the data that can be usefully included in a human performance model can be restricted even further, since empirical data on the relationships between conditions and performance are available only for a relatively small set of conditions. Our approach is to include only the conditions for which there are extensive existing empirical data demonstrating their impacts on performance. (There are not sufficient funds to collect data to describe new condition-performance relationships.) Table 2.7-6 lists the conditions we propose to include in the PREA and their required input variables. We attempted to select the environmental stressors that had demonstrated impacts on human performance. We believe that this set contains most of the conditions important to Army combat and materiel developers.

Table 2.7-6. Data for Stressor-System Condition Linkages

STRESSOR	SYSTEM CONDITIONS	OTHER INPUT DATA	COMMENTS
Heat Humidity	• Temperature • Wind Velocity • % Relative Humidity • MOPP Level	Initial Task Time (From Product 5)	——
		Vehicle Temperature (User Input)	Minimum and Maximum Values Entered Once for Entire system
		Vehicle % Relative Humidity (User Input)	Minimum and Maximum Values Entered Once for Entire System
		Maximum Allowable System Task Performance Rate(User Input)	Entered for Tasks Which Have Rate Performance Measures Associated with Them
MOPP	• MOPP Level • Temperature • % Relative Humidity	Vehicle Temperature (User Input)	See Above
		Vehicle % Relative Humidity (User Input)	See Above
Cold	• Wind Velocity • Temperature • MOPP Level	Gloves On/Off (User Input)	Entered Once for Entire System
		Other Exposed Flesh (User Input)	Only Entered if MOPP Gear not Worn, Default Value (Face Exposed). Entered Once for Entire System
		Vehicle Temperature (User Input)	See Above
Noise		Constant Ambient Noise (In SPL) - Outside Vehicle (User Input)	Entered Once for Entire System Default Value Will be 55db
		Constant Ambient Noise (In SPL) - Inside Vehicle (User Input)	Entered Once for Entire System Default Value Will be 70db
		Constant Internal Noise Associated with Vehicle Operation (User Input)	Entered Once for Entire System
		Variable Internal Noise Associated with Vehicle Operation (User Input)	Only Entered if Vehicle Operational Noise Changes with Speed Up, Maneuvering etc. Entered Once for Entire System
		Time Duration of Variable Noise Associated with Vehicle Operation (User Input)	Entered Once for Entire System. Only Entered if Variable Internal Noise Present.
		Maximum Rate of Fire (User Input)	Entered for Each Firing Task
		Noise Level Associated with Each Firing (User Input)	Entered for Each Firing Task
		Average Speaker Listener Distance (User Input)	Only Entered for Communicating Face-To-Face Tasks
Continuous Operations		Number of Hours in Last Sleep Before Mission (User Input)	Only Entered Once for Entire System. Default Value = 6.
		Number of Days Without Sleep (User Input)	Only Entered Once for Entire System. Default Value = 0.
		Mission Length (From Product 5)	——

The impacts of the environmental stressors will be incorporated into a set of Stressor Degradation Algorithms which will degrade performance to reflect the presence of the stressors. The concept of using degradation factors for environmental stressors has been extensively used by the Army's Ballistic Research Lab (BRL). In fact we use some of the same data and equations used in BRL models and we use the BRL algorithm for aggregating multiple degradation factors across stressors. However, we have significantly expanded upon the BRL models by adding algorithms for a number of additional stressors.

2.7.5.6 Assessment of Static Design Features

Our concept of the PREA focusses on dynamic task performance issues (how well can a soldier perform a task) rather than on static design performance issues (can the soldier perform the task). However, we have included a step in the PREA (Step 2) which assists the user in assessing three types of static design features--reach, visual access, and strength. Unlike other procedures which require extensive user input to assess these measures, we have attempted to develop an aid that will allow the user to quickly identify and document static design problems with very little input. Thus, the user can flag static design problems and attempt to deal with them before he begins the process of dynamic task performance assessment.

2.8 HARDWARE/SOFTWARE CONFIGURATION

The hardware system which the PCEA will be installed on consists of the following characteristics:

a. Enhanced graphics display - The EGA will support high resolution color graphics.

b. Enhanced graphics board with 256 K bytes RAM

c. 80286 processor

d. Hard disk with a minimum of 20 M bytes of storage

e. Up to 4 M bytes of enhanced memory

f. Bernoulli Box or its functional equivalent with two removable 20M disks

g. 80287 Math Co-processor

h. 1200/2400 baud Hayes-compatible internal modem

i. One or more floppy drives that can read and write 360K floppy diskettes

j. Dot matrix printer capable of printing 132 characters per line. This printer will be capable of outputting IBM graphics.

k. IBM AT-compatible keyboard.

All the PCEA software will be developed under the most recent version of Microsoft C. At the present time, the operating system for the products will be DOS 3.2.

The data libraries in the PCEA will be built using R-Base V. We will sort, retrieve and store information in these files using code developed in-house via dbC library routines. These library functions do not require any licensing fees and will be fully integrated into the PCEA code.

All of the data files which will be used by other $(MPT)^2$ products will be in delimited fixed ASCII format.

2.9 OVERVIEW OF INTERFACE DESIGN

The PREA will use the keyboard as the input device. All user queries, responses, and requests will be entered via the AT compatible keyboard.

There are 4 types of menus in the product. The first type of menu interface is the command bar. In this interface style, the commands will be listed horizontally across the top of the computer screen. The user will use the horizontal arrow keys to position the cursor and a carriage return to select the desired option. The command menu bar will be displayed on the third and fourth line of each display.

The main menu bar will present a list of single one word commands. Positioning the cursor on a particular command will highlight that command and a more detailed description will appear on the bottom line of the main menu bar. Further explanation will be available in HELP.

The command menu bar is always presented across the top of the display and has a dark blue background. More detailed information about the command menu bar can be found in the section on commands.

A command can be selected by keying in the first letter or hitting the return key.

There will be more than one level of command menus. Only the commands appropriate to the current process or display will be presented on the menu bar.

Three types of commands will be presented using the command bar interface:

(1) General action commands: enable the user to perform some process on the data

List: Insert Copy Paste Delete Sort Report Save Switch

(2) GoTo commands: enables the user to access a data library

(3) Specialized commands: commands which are specific to a process or step

The second type is a pull-down menu design. In this type of menu, the user will use the vertical arrow keys to position a highlighted menu bar at the desired menu choice. This results in a color change, as the highlighted bar moves through the menu. The user will press the carriage return after he/she has used the cursor keys to select an option from the List.

These menus can be presented anywhere on the screen and are color coded by level. The first level has a light blue background and the second level has a green background.

Items will be presented within a menu according to logical order or frequency of use. Items will be presented in a numbered list. Only 10 items will be presented at one time on any data menu. Items will be selected from the menu by keying in the number associated with that item.

The third type of menu is a spreadsheet interface. In this menu style, the user will use a combination of cursor keys and keyboard input. The cursor keys will be used to position the cursor in a cell of the spreadsheet. The keyboard will then be used to edit the information that is in the cell. If the entire spreadsheet does not fit on a screen, the user will be able to move from cell to cell in any direction.

All spreadsheet menus have a brown background with white lettering. The area for data entry will be visually defined on a spreadsheet by a gray background and black lettering.

The fourth type of menu interface is a command prompt. In this case, the user will respond to a specific prompt using the keyboard. For instance, the prompt "Confirm the system information? (Y/N)" The user will use the keyboard to enter 'y', 'n', 'Y', or 'N'.

All of these interfaces will be used appropriately in the product. If the user does not know how to respond to a prompt or an interface the function key 'F1' will always give the user a context-specific help screen. The help screen will provide a discussion of the information which is being requested. At any time, the user may also press the escape key. This will always take the user to the menu which immediately precedes the current menu. In this manner, the user can "back out" of the PCEA application.

At the top of every menu, there will be a "PATH" line. This line will keep the user informed as to his/her current location in the hierarchical levels of the product. The mode will be displayed on the top line in the right hand corner. There are three modes: work, wait and help.

The PREA interface also provides the user with a mechanism for resuming work at the last step that was complete before the system was turned off. This will consist of the software periodically updating a status File which will be referred to when a user powers up the system and accesses the PREA.

Color specifications:

Type of interface	Background/Lettering	Highlight
Command Bar	Drk bl/Wht	Lt Bl/Blk
First level pop-up	Lt bl/Blk	Lt Bl/yel
Second level pop-up	Grn/Bl	Gr/Yellow
Template (Data entry)	Brw/Wht	Gry/Blk
Libraries	Blk/Wht	Gry/Blk
Help	Drk Bl/Wht	Blk/White
Message	Red/White	

Keystroke specifications:

Following is a list of the general specifications for the functionality of global function and editing keys for the PREA.

Function Keys

F1 Help - This key will always switch the system into the help mode. When this key is pressed, the system will display the first page of context specific help information explaining the current menu, screen, or prompt.

Shift F1 Help Index - When the F1 function key is pressed while holding down the shift key, the user is presented with an index of help information.

F2 Move-by-cell/Edit toggle - This key controls the function of the arrow cursor keys when the user is working in a spreadsheet-like template. In the default state, the arrow keys will move the cursor from cell to cell in the first character position. When the F2 key is pressed, the arrow keys move the cursor character by character (left and right) or line by line (up and down) within a cell. If the cursor is currently in the last character position in the cell for any particular direction, the cursor will move to the next cell in that direction. For example, if the cursor is in the first character position of a cell and the left arrow is pressed, the cursor will move to the next cell to the left of the current cell. If the cursor is in the topmost line of a particular cell and the up arrow is pressed, the cursor will move to the cell above the current cell. Repeated pressing of the F2 key will toggle between the move-by-cell and move-by-character states.

F3 Search - When this key is pressed, the user will be prompted for a string of characters or keystrokes that the system will search for. The string of keystrokes is terminated by pressing the F3 key a second time. After terminating the string, the system will search the current library, template, or list for a match for the input string. If a match is found, the cursor is moved to the matched input string. If no match is found, the cursor remains where it is and a message indicating no match found is displayed.

At times when the F3 key is not active, the user will receive a message indicating such.

F4 NOT USED AT THIS TIME

F5 NOT USED AT THIS TIME

F6 NOT USED AT THIS TIME

F7 NOT USED AT THIS TIME

F8 NOT USED AT THIS TIME

F9 Menu - Displays the active menu bar while working in a spreadsheet-like template.

F10 Save - Saves the current working file to the appropriate permanent file then returns to the current working status.

ESC Quit - Always returns to the most recent previous state such as the most recent menu, screen, or prompt.

Backspace This key is only active when the system is allowing for input by the user. The backspace key moves the cursor one space to the left of its current position and erases any character from that position.

Return Terminates variable length user input.

Caps Lock Toggles the keyboard from a normal state to one that displays characters as if the shift key was being held down. When the keyboard is in the "shift key" state and the user holds down the shift key while pressing another key, the normal (non-shift) character displays.

Ins — Insert - Toggles the system from character insert for user input to typeover. When the state is character insert, the characters input by the user are inserted to the left of the current cursor position. When the state is typeover, characters are displayed at the current text cursor position. Any characters currently displayed at that position will be replaced.

Del — Delete - Deletes characters that are displayed at the current text cursor position.

Home — Moves the menu cursor to the top or the left most menu selection. Moves the cell cursor to the upper left corner of a spreadsheet-like template. Moves the text cursor to the upper left most typing position of the current input area (i.e., cell, field, etc.). See cursor definitions below.

End — The end key works the exact opposite of the home key. It moves the menu cursor to the bottom or the right most menu selection. It moves the cell cursor to the lower left corner of a spreadsheet-like template. It moves the text cursor to the lower right most typing position of the current input area. See cursor definitions below.

PgUp — Page Up - If the cursor (menu, text, of cell) position is not at the top of the current visible display or window, the cursor is moved to that position. If the cursor position is at the top of the current visible display or window, the cursor is moved to the top of the previous full screen or window-full of information.

PgDn

Page Down - If the cursor (menu, text, or cell) position is not at the bottom of the current visible display or window, the cursor is moved to that position. If the cursor position is at the bottom of the current visible window, the cursor is moved to the bottom of the next full screen or window-full of information.

Up Arrow - Moves the cursor (menu, text, or cell) up one position (line or cell).

Down Arrow - Moves the cursor (menu, text, or cell) down one position (line or cell).

Left Arrow - Moves the cursor left one position (character or cell).

Right Arrow - Moves the cursor right one position (character or cell).

Ctrl Up Arrow - Moves the cursor (menu, text, or cell) up one full screen or window-full of information to its same relative horizontal position.

Ctrl Down Arrow - Moves the cursor down one full screen or window-full of information to its same relative horizontal position.

Ctrl Left Arrow - Moves the cursor to the left by one screen or window-full of information to its same relative vertical position.

Ctrl Right Arrow - Moves the cursor to the right by one full screen or window-full of information to its same relative vertical position.

2.10 APPROACH TO SOFTWARE DESIGN SPECIFICATIONS

The key to understanding the design specifications are the user interface diagrams listed in Section 3. These diagrams provide an overview of the action sequence a user would go through in using the PCEA. Separate diagrams are provided for each of the eight major steps in the PREA. The diagrams break each step down into a series of blocks which describe "logical chunks" of user interaction. Each block may have one or more screens associated with it. A textual description accompanies each block and references the following items associated with each sequence.

- Screens
- Libraries and Input/Output Files
- Algorithms and Models
- Output Reports

More specifically, the block description lists which of the above elements are related to each block and lists the sections, tables, etc., where detailed descriptions of these items can be found. Table 2.10-1 provides an example block description from our PCEA design specification.

Screen Descriptions. Wherever possible, the actual screen expected to be used in the PREA is listed. In some cases, the content of a screen is variable--it depends on previous user input. In these cases whenever possible, we provide an example of what the screen will look like using the most complex and/or longest version of the screen.

Table 2.10-1. Example Block Description.

12-see Screens 52 to 55. The system will begin by asking the user to select the operator MOSs for the system. To query the user, a menu will be presented describing the recommended operator MOSs for the system type at the top of the screen and other MOSs in the same CMF as the recommended operator MOS. The system will read the recommended MOSs from the MOS by System Type file (see Tables 4.2-3 and 4.2-4) and other MOSs within the CMF from the MOS by CMF file and access titles from the MOS Title file. (see Tables 4.2-5 and 4.2-6). The user can continue if he agrees with the recommended MOS or select that one/or others from the CMF using menu selection procedures.

Libraries and Input/Output Files. The structure of each library File is described using the format described in Table 2.10-2. The libraries will contain prerecorded data. These data values are listed after the description of the library file structure. The I/O files describe files saved on the hard diskette. These files either provide input to, or are output from, one of six PCEA steps. Sections four and five describe libraries and I/O files.

ALGORITHM. Algorithms are described in one of two ways. Algorithms that are primarily logical operations are described in pseudocode or flowcharts. Quantitative algorithms, or models, are described via equations. Section 6 describes algorithms and models.

Output Reports. The seventh section lists printed output reports. (Screen displays are listed in this section along with the other screen descriptions).

Table 2.10-2. Example of Data Structure Format

FILE ID: MOSs by CMF

DESCRIPTION: For each CMF associated with PCEA system types, this file lists all associated MOSs.

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
1	1	File ID	5	Alpha
	2	CMF Code	2	Num
2		MOS Code	3	Alpha

ESTIMATED NO. OF TABLES: = 14 (ONE FOR EACH CMF)

ESTIMATED NO. OF RECORDS: 31 (MAXIMUM NUMBER OF MOSs WITHIN A CMF)

LENGTH: VARIABLE

SECTION 3 - STEPS IN APPLYING PREA

Figure 3-1 provides an overview of the steps that the user will go through to apply the PREA. These are discussed in much greater detail in the section entitled "Steps in Applying PREA," pp. 59-152.

Step 0: Introduction

During this step, the user can use DOS commands to manipulate files, select options for continuing analysis of an existing system or start an analyses of a new system and input the files from other $(MPT)^2$ products which are needed to apply the PREA.

Step 1: Assign Tasks to Task Types

During this step, each task associated with a contractor design will be assigned to one or more of the task types in the $(MPT)^2$ task taxonomy. In subsequent steps, the PREA will use performance shaping functions to adjust performance to take into account the effects of personnel characteristic levels and the frequency and recency of sustainment training. Separate stressor degradation algorithms will also be provided for different task types.

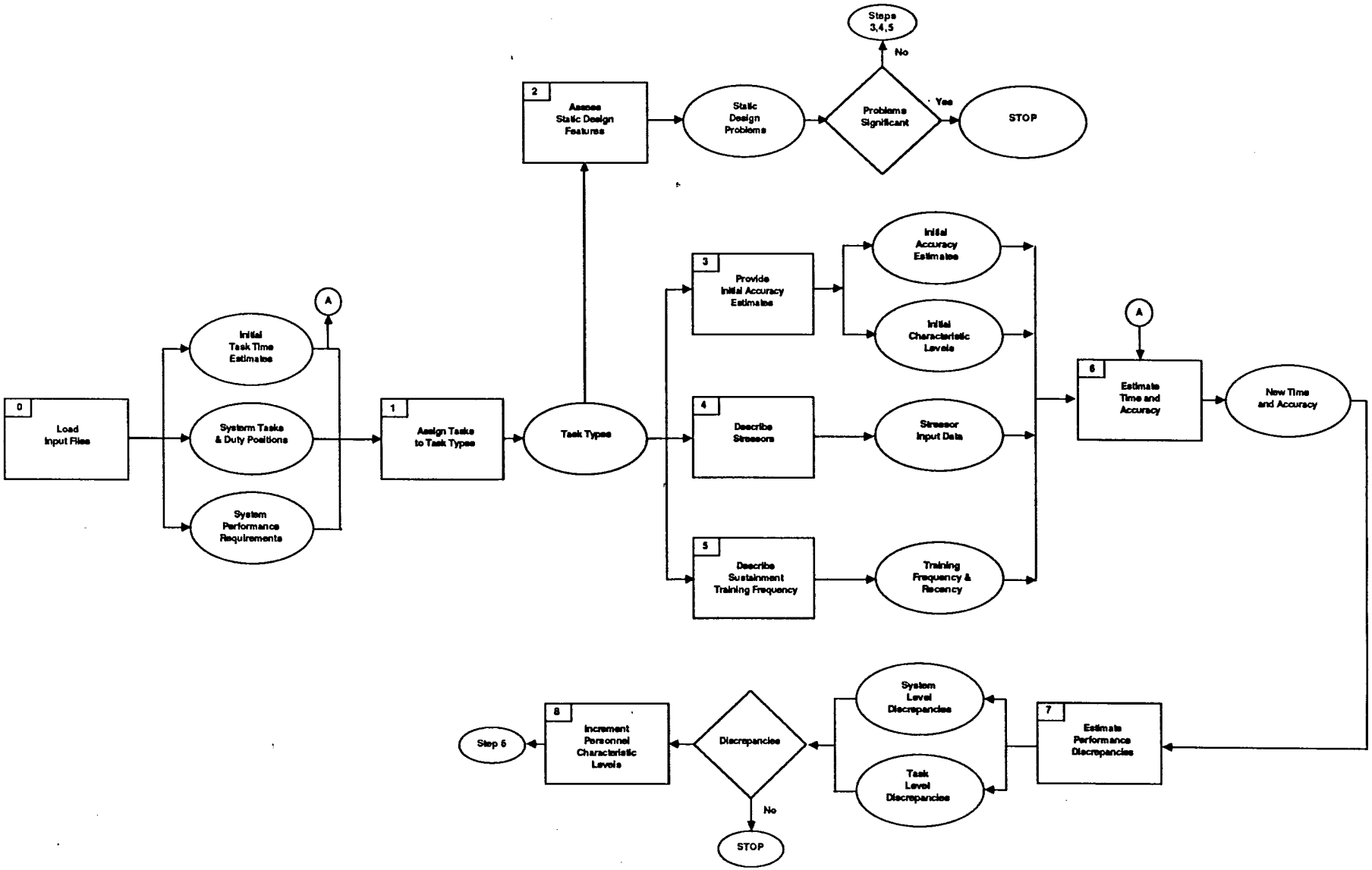


Figure 3-1. Overview of PREA Steps.

Step 2: Assess Static Design Features

During this step, the user will first describe each component with a significant human interface (e.g., controls, displays).

The system then assists the user in assessing static design features (reach, visual access, and strength). The step will identify the static measures relevant to each control or display associated with a particular design, identify the standards for these measures at critical population percentiles, and allow the user to document controls or displays which fall outside these standards.

Step 3: Provide Initial Accuracy Estimates

During this step, the personnel characteristics that apply to each task associated with the contractor design are identified. To accomplish this, a Task Characteristics Map is applied. This map lists the characteristics associated with each type of task.

Also during this step, an initial estimate of the personnel characteristics for the new system are developed. The initial estimate is the mean for the task type. This initial estimate will be used to develop an initial estimate of task and system performance in Steps 6 and 7. In Step 8, this initial estimate will be modified until the required level of performance is reached.

Also during this step, the user provides estimates of the mean level of accuracy that can be expected for a given task at mean level of characteristics and sustainment training frequency. This mean estimate is used to convert the Z score predictions

which are output by the performance shaping functions into raw score estimates of task performance.

Step 4: Describe Conditions

This step will provide the input data needed by the stressor degradation algorithms. Only a relatively small amount of input data will be required since most of the needed input values come from the description of conditions Product 1 produces.

Step 5: Describe Sustainment Training

During this step, the user enters the estimates of the frequency with which each task will be (a) performed on the job, and (b) trained in sustainment training. Once entered, the system applies an algorithm to convert these frequency estimates in into the frequency and recency scale estimates needed by the PREA performance shaping functions.

Step 6: Estimate Task Time and Accuracy

The output of this step will be estimates of task time and accuracy for every task associated with a contractor design. These estimates will be developed by applying (1) a set of performance shaping functions that estimate task performance as a function of personnel characteristic levels and training and (2) algorithms which degrade performance to reflect the presence of critical stressors.

Step 7: Determine Performance Discrepancies

In this step, estimated performance for the new system is compared to performance requirements generated by Product 1 and discrepancies are identified. The user will be given the option of examining performance discrepancies at either the task or system level. If the user decides to use the system level, the system performance models developed in Product 5 will be run to determine what the combined impact of individual task performances will be on overall system performance. As part of this process, separate system performance measures will be developed for overall mission time and accuracy and for RAM. If the user decides to examine discrepancies at the task level, the task performance estimates produced by applying the performance shaping functions in Step 6 will be compared to the Product 1 functional task criteria.

Step 8: Change Characteristics and Iterate Steps 6 and 7

In Step 7, performance discrepancies are identified using the initial values for personnel characteristics produced by Step 3. In this step, the characteristic levels are changed, and the impact on performance is calculated by reapplying Steps 6 and/or 7. This process continues until a set of characteristic levels is found that will produce the desired performance. Automated procedures are provided to (1) select which characteristic to modify, (2) make the modifications, and (3) reapply Steps 6 and 7.

3.2 STEP 0

3.2.1 Output

During step 0, the user will select the system design to which the PREA will be applied and the PREA step in which to start the analysis. Also, the system assists the user in determining if all required input files have been entered. The system will instruct the user on how to obtain and enter any missing input data files.

3.2.2 Input

External Input. None.

Internal Input. The library file providing input to this step is the System Types By Mission Area File (Tables 4.2-1 and 4.2-2). Another input File is the System File (Table 5.1-1), which describes the current PCEA steps completed for a particular system.

Product 1 will provide the following input files to the PREA: System Conditions (Table 5.1-10), System Missions (Table 5.1-11), Function Performance Criteria (Table 5.1-11), Function Performance Criteria (Table 5.1-11), Function Performance Criteria (Table 5.1-22), Function Accuracy Weights (Table 5.1-23), Mission Performance File (Table 5.1-26), and the Corrective Maintenance Criteria File (Table 5.1-27).

Product 5 will provide the following input files to the PREA: Maintenance Manpower Requirements File (Table 5.1-23), Mission

Completion File (Table 5.1-24), and the Component Maintenance Parameter File (Table 5.1-25).

Product 3 will provide one input file to the PREA -- the Projected Distribution Summary File (Table 5.1-19).

3.2.3 Process

The user is first given an opportunity to perform various DOS file manipulations (e.g., format disks, copy floppy diskettes, format/examine directory). Next, the user opts to either continue a PREA application for an existing system design, or start an application for a new system. When an application for a new system is started, the system searches to see that all input files have been entered. The system then instructs the user on how to obtain or enter the missing files.

3.2.4 User Interface Diagram

Figure 3.2.4-1 displays the User Interface Diagram for STEP 0. Logical sets of user interactions are grouped into blocks. Listed below are descriptions of the screens, files, algorithms, and output reports associated with each block.

BLOCK 1 - Refer to Screens 1-1 and 1-2.

BLOCK 2 - See Screens 2-1 - 2-12. The system will lead the user through DOS options including options for formatting disks, copying and deleting files, and examining or structuring a directory.

BLOCK 3 - See Screens 3-1 and 3-2.

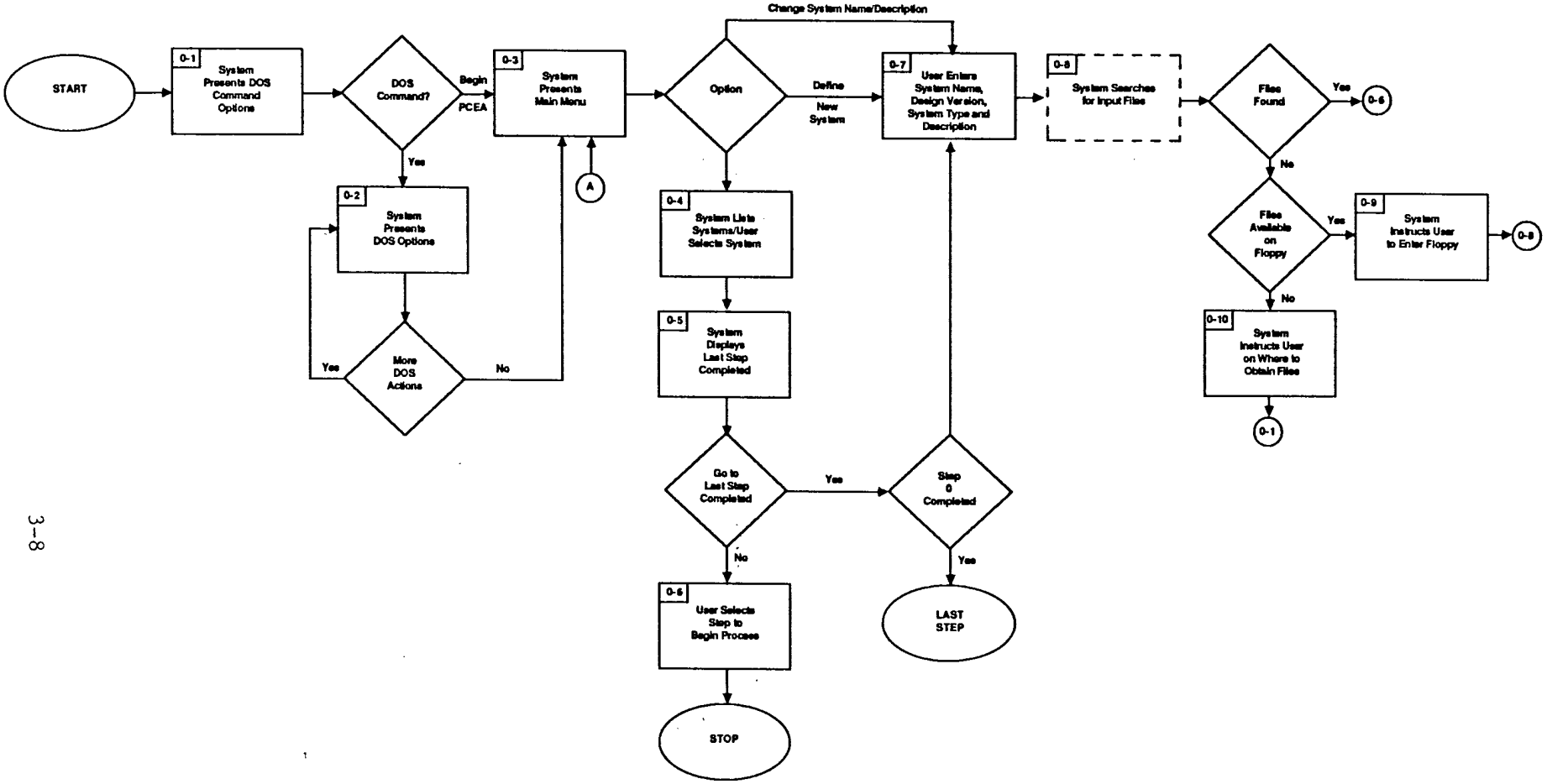


Figure 3.2.4-1. Step 0 - Load Input Files.

BLOCK 4 - Refer to Screen 4-1. The system will read systems from the Systems File (see Table 5.1-1).

BLOCK 5 - See Screen 5-1. The system will read from the Systems File (Table 5.1-1).

BLOCK 6 - See Screens 6-1 to 6-3. The system will read from the System File (Table 5.1-1).

BLOCK 7 - See Screens 7-1 - 7-6. The system will read from the System File. The user will describe the system name, system design name area, and system type.

BLOCK 8 - See Screens 8-1 and 8-2.

BLOCK 9 - See Screens 9-1 and 9-2.

BLOCK 10 - See Screen 10-1.

Block 1 Screen 1-1

MODE: WORK

PERSONNEL REQUIREMENTS ESTIMATION AID

P R E A

Press <CR> to continue.....

Block 1 Screen 1-2

PATH: PREA>STEP 0>COMPLETE MODE: WORK
Continue Esc
Select Step

Personnel Requirements Estimation Aid Main Menu

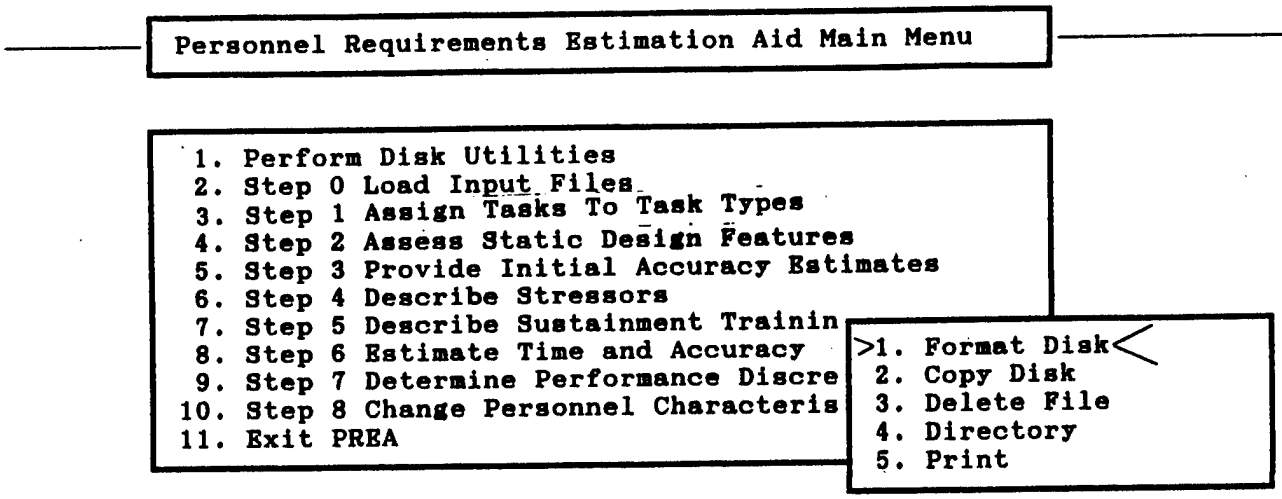
>1. Perform Disk Utilities<
2. Step 0 Load Input Files
3. Step 1 Assign Tasks To Task Types
4. Step 2 Assess Static Design Features
5. Step 3 Provide Initial Accuracy Estimates
6. Step 4 Describe Stressors
7. Step 5 Describe Sustainment Training Frequency
8. Step 6 Estimate Time and Accuracy
9. Step 7 Determine Performance Discrepancies
10. Step 8 Change Personnel Characteristic Levels
11. Exit PREA

NOTE:

> < USED TO DENOTE HIGHLIGHTING

BLOCK 2 SCREEN 2-1

PATH: PREA>UTILITIES>FORMAT MODE: WORK



Select choice with cursor control arrows and press <CR> when ready...

PATH: PREA>UTILITIES>FORMAT MODE: WORK

FORMAT DISK

Enter disk to be formatted in drive A: and press <CR> when ready

Block 2 screen 2-3

PATH: PREA>UTILITIES>FORMAT MODE: WAIT

FORMAT DISK

Enter disk to be formatted in drive A: and press <CR> when ready

Disk Formatting .....

BLOCK 2 SCREEN 2-4

PATH: PREA>UTILITIES>FORMAT MODE: WORK

FORMAT DISK

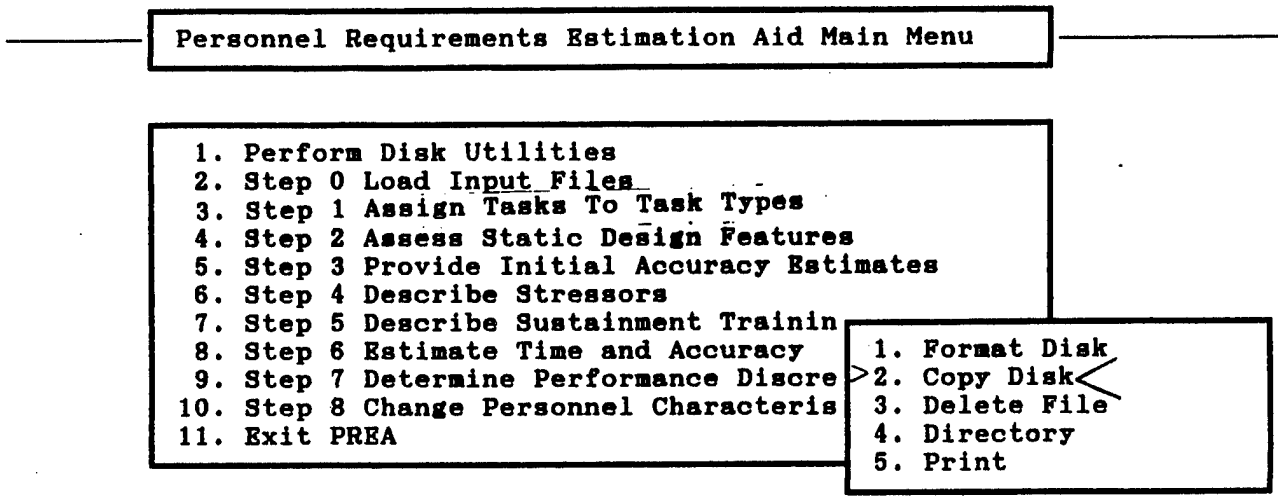
Enter disk to be formatted in drive A: and press <CR> when ready

Disk Formatting ..... completed

Format another disk (Y/N)

BLOCK 2 SCREEN 2-5

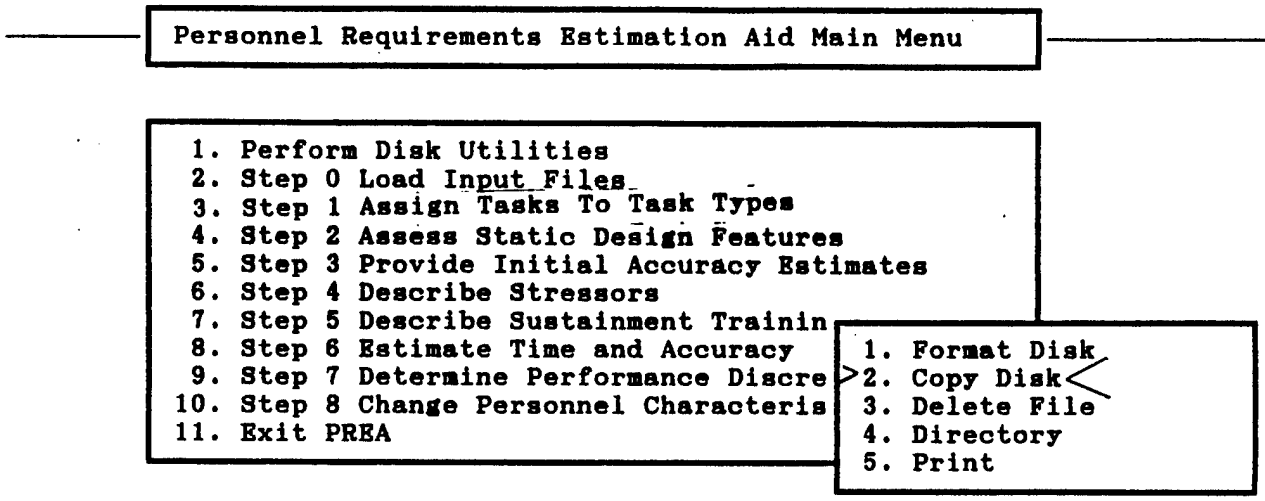
PATH: PREA>UTILITIES>FORMAT MODE: WORK



Select choice with cursor control arrows and press <CR> when ready...

BLOCK 2 SCREEN 2-6

PATH: PREA>UTILITIES>FORMAT MODE: WORK



Select choice with cursor control arrows and press <CR> when ready...

BLOCK 2 SCREEN 2-7

PATH: PREA>UTILITIES>DELETE MODE: WORK

DIRECTORY

	ARMOR.SPC	2157	09/25/87
>	UH-60A.SPC	1867	09/01/87
	M109D.SPC	10163	07/30/87
	TRUCK1.DOC	810	05/09/87
	TRUCK.DOC	1017	05/11/87

Select File to be deleted using cursor controls then press <CR>...

BLOCK 2 SCREEN 2-8

PATH: PREA>UTILITIES>DELETE MODE: WORK

DIRECTORY

ARMOR.SPC	2157	09/25/87
UH-60A.SPC	1867	09/01/87
M109D.SPC	10163	07/30/87
TRUCK1.DOC	810	05/09/87
TRUCK.DOC	1017	05/11/87

Delete this file ? (Y/N)

BLOCK 2 SCREEN 2-9

PATH: PREA>UTILITIES>FORMAT MODE: WORK

Personnel Requirements Estimation Aid Main Menu

1. Perform Disk Utilities
2. Step 0 Load Input Files
3. Step 1 Assign Tasks To Task Types
4. Step 2 Assess Static Design Features
5. Step 3 Provide Initial Accuracy Estimates
6. Step 4 Describe Stressors
7. Step 5 Describe Sustainment Trainin
8. Step 6 Estimate Time and Accuracy
9. Step 7 Determine Performance Discre
10. Step 8 Change Personnel Characteris
11. Exit PREA

1. Format Disk
2. Copy Disk
3. Delete File
>4. Directory<
5. Print

Select choice with cursor control arrows and press <CR> when ready...

BLOCK 2 SCREEN 2-10

PATH: PCEA>UTILITIES>DIRECTORY MODE: WORK

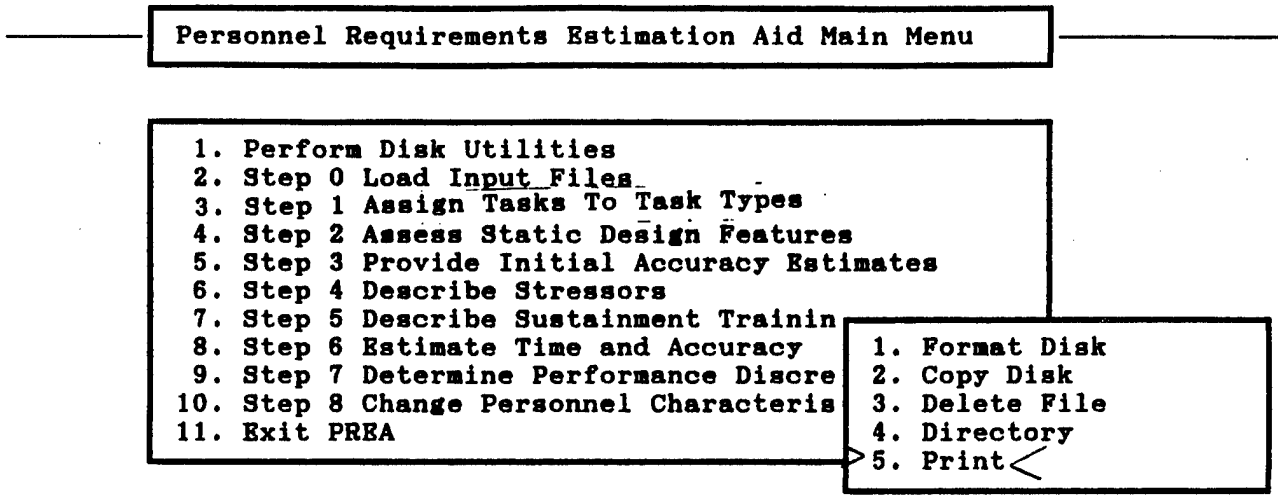
DIRECTORY

ARMOR.SPC	2157	09/25/87
UH-60A.SPC	1867	09/01/87
M109D.SPC	10163	07/30/87
TRUCK1.DOC	810	05/09/87
TRUCK.DOC	1017	05/11/87

Press <CR> to return to Utilities Menu...

BLOCK 2 SCREEN 2-11

PATH: PREA>UTILITIES>FORMAT MODE: WORK



Select choice with cursor control arrows and press <CR> when ready...

BLOCK 2 SCREEN 2-12

PATH: PCEA>UTILITIES>PRINTING MODE: WORK

DIRECTORY

ARMOR.SPC	2157	09/25/87
UH-60A.SPC	1867	09/01/87
M109D.SPC	10163	07/30/87
TRUCK1.DOC	810	05/09/87
TRUCK.DOC	1017	05/11/87

Select file to print using cursor controls then press <CR> when ready...

PATH: PREA>STEP 0>COMPLETE MODE: WORK

Continue Esc

Select Step

Personnel Requirements Estimation Aid Main Menu

1. Perform Disk Utilities
2. Step 0 Load Input Files
3. Step 1 Assign Tasks To Task Types
4. Step 2 Assess Static Design Features
5. Step 3 Provide Initial Accuracy Estimates
6. Step 4 Describe Stressors
7. Step 5 Describe Sustainment Training Frequency
8. Step 6 Estimate Time and Accuracy
9. Step 7 Determine Performance Discrepancies
10. Step 8 Change Personnel Characteristic Levels
11. Exit PREA

PREA>STEP 0>CHANGE MODE: WORK

Personnel Requirements Estimation Aid Main Menu

1. Perform Disk Utilities
2. Step 0 Load Input Files
3. Step 1 Describe Equipment
4. Step 2 Assess Static Design Features
5. Step 3 Provide Initial Accuracy Estimates
6. Step 4 Describe Stressors
7. Step 5 Describe Sustainment Training Frequency
8. Step 6 Estimate Time and A
9. Step 7 Determine Performan
10. Step 8 Change Personnel Ch
11. Exit PREA

>Define New System<
Load Files
Resume Work in Progress
Change System Name/Description

Select choice with cursor control arrows and press <CR> when ready....

BLOCK 7 SCREEN 7-1

```
PATH: PREA>STEP 0>NEW                                    MODE: WORK
>Enter<   Esc
  Enter System Name, then press <CR>
```

```
Enter System Name: UH-60A Blackhawk
```

PATH: PREA>STEP 0>NEW MODE: WORK

>Enter< Esc

Enter Design Version, then press <CR>

Enter System Name: UH-60A Blackhawk
Enter Design Version:

BLOCK 7 SCREEN 7-3

PATH: PREA>STEP 0>NEW MODE: WORK

>Enter< Esc

Enter System Type, then press <CR>

Enter System Name: UH-60A Blackhawk
Enter Design Version:
Enter System Type: Attack Helicopter

PATH: PREA>STEP 0>NEW MODE: WORK

>Enter< Confirm Esc

Enter System Description, then press <CR>

Enter System Name: UH-60A Blackhawk
Enter Design Version:
Enter System Type: Attack Helicopter
Enter System Description:

BLOCK 7 SCREEN 75

PATH: PREA>STEP 0>NEW MODE: WORK

Enter >Confirm< Esc

Confirm correctness of information entered (press <CR> if OK, else press F2)

Enter System Name: UH-60A Blackhawk
Enter Design Version:
Enter System Type: Attack Helicopter
Enter System Description:

BLOCK 7 SCREEN 7-6

PATH: PREA>STEP 0>NEW MODE: WORK

Enter Confirm Esc

Confirm correctness of information entered (press <CR> if OK, else press F2)

Enter System Name: UH-60A Blackhawk
Enter Design Version:
Enter System Type: Attack Helicopter
Enter System Description:

PREA has saved system input information.

BLOCK 3 SCREEN 3-2

PREA>STEP 0>CHANGE MODE: WORK

Personnel Requirements Estimation Aid Main Menu

1. Perform Disk Utilities
2. Step 0 Load Input Files
3. Step 1 Describe Equipment
4. Step 2 Assess Static Design Features
5. Step 3 Provide Initial Accuracy Estimates
6. Step 4 Describe Stressors
7. Step 5 Describe Sustainment Training Frequency
8. Step 6 Estimate Time and A
9. Step 7 Determine Performan
10. Step 8 Change Personnel Ch
11. Exit PREA

Define New System
Load Files
>Resume Work in Progress<
Change System Name/Description

Select choice with cursor control arrows and press <CR> when ready....

BLOCK 41 SCREEN 4-1

PATH: PREA>STEP 0>RESUME MODE: WORK

>Select< Esc

Select System from list below

Systems available for resuming PREA:
>1. UH-60A Blackhawk
2. M109D Self-propelled Howitzer
3. M102F Towed Howitzer
4. M1 Abrams Tank
5. M45 Cargo Vehicle

BLOCK 5 SCREEN 5-1

PATH: PREA>STEP 0>RESUME MODE: WORK

>Last Step< Select Step Esc

Go to last step completed in previous session

Systems available for resuming PREA:
1. UH-60A Blackhawk 2. M109D Self-propelled Howitzer 3. M102F Towed Howitzer 4. M1 Abrams Tank 5. M45 Cargo Vehicle

In previous session, Step X was last step completed.

PATH: PREA>STEP 0>RESUME MODE: WORK
Last Step >Select Step< Esc
Select step of PREA at which to resume work

Systems available for resuming PREA:

>1. UH-60A Blackhawk<
2. M109D Self-propelled Howitzer
3. M102F Towed Howitzer
4. M1 Abrams Tank
5. M45 Cargo Vehicle

1. Step 1: Assign Tasks To Task Types
2. Step 2: Assess Static Design Features
3. Step 3: Provide Initial Accuracy Estimates
4. Step 4: Describe Stressors
5. Step 5: Describe Sustainment Training Frequency
6. Step 6: Estimate Time and Accuracy
7. Step 7: Determine Performance Discrepancies
8. Step 8: Change Personnel Characteristic Levels

BLOCK 6 SCREEN 6-2

PREA>STEP 0>CHANGE MODE: WORK

Personnel Requirements Estimation Aid Main Menu

1. Perform Disk Utilities
2. Step 0 Load Input Files
3. Step 1 Describe Equipment
4. Step 2 Assess Static Design Features
5. Step 3 Provide Initial Accuracy Estimates
6. Step 4 Describe Stressors
7. Step 5 Describe Sustainment Training Frequency
8. Step 6 Estimate Time and A
9. Step 7 Determine Performan
10. Step 8 Change Personnel Ch
11. Exit PREA

Define New System
Load Files
Resume Work in Progress
>Change System Name/Description<

Select choice with cursor control arrows and press <CR> when ready....

BLOCK 6 SCREEN 6-3

PATH: PREA>STEP 0>NEW MODE: WORK
Change Confirm Esc
Change system data as required, then press <CR>

Enter System Name: UH-60A Blackhawk
Enter Design Version:
Enter System Type: Attack Helicopter
Enter System Description:

BLOCK 8 SCREEN 8-1

PREA>STEP 0>CHANGE MODE: WORK

```
Personnel Requirements Estimation Aid Main Menu

  1. Perform Disk Utilities
  2. Step 0 Load Input Files
  3. Step 1 Describe Equipment
  4. Step 2 Assess Static Design Features
  5. Step 3 Provide Initial Accuracy Estimates
  6. Step 4 Describe Stressors
  7. Step 5 Describe Sustainment Training Frequency
  8. Step 6 Estimate Time and A
  9. Step 7 Determine Performan
 10. Step 8 Change Personnel Ch
 11. Exit PREA

                    Define New System
                   >Load Files<
                    Resume Work in Progress
                    Change System Name/Description
```

Select choice with cursor control arrows and press <CR> when ready....

BLOCK 8 SCREEN 8-2

PATH : PREA>STEP0>LOAD MODE:WORK

Please wait . . . . searching for input files . . .

PRODUCT 1 INPUT FILES
Systems Conditions . . found . . loading . . ready
System Missions . . found . . loading . . ready
Function Performance Criteria. . found . . loading . . ready
System RAM Criteria. . found . . loading . . ready
Function Accuracy Weights. . found . . loading . . ready
Mission Performance File. . found . . loading . . ready
Corrective Maintenance Criteria. . found . . loading . . ready

PRODUCT 5 INPUT FILES
Product 5 Task Data . . found . . loading . . ready
Maintenance Manpower Requirements. . found . . loading . . ready
Mission Completion. . found . . loading . . ready
Component Maintenance Parameter. . found . . loading . . ready

PRODUCT 3 INPUT FILE
Projected Characteristic Dist. . found . . loading . . ready

All PREA input files ready.

BLOCK 9 SCREEN 9-1

```
PATH : PREA>STEP0>LOAD                          MODE:WORK

Please wait . . . . searching for input files . . .

PRODUCT 1 INPUT FILES
Systems Conditions  file not found.

Is Systems Conditions file available on floppy diskette (Y/N)
```

1

BLOCK 4 SCREEN 9-2

PATH : PREA>STEP0>LOAD MODE:WORK

Please wait . . . . searching for input files . . .

PRODUCT 1 INPUT FILES
Systems Conditions file not found.

Is Systems Conditions file available on floppy diskette (Y/N)

Insert diskette and press <cr>

BLOCK 10 SCREEN 10-1

PATH : PREA>STEP0>LOAD MODE:WORK

Please wait . . . . searching for input files . . .

PRODUCT 1 INPUT FILES
Systems Conditions file not found.

Is Systems Conditions file available on floppy diskette (Y/N)

NOTE: System Conditions file must obtained from the combat developer . . .

3.3 STEP 1: ASSIGN TASKS TO TASK TYPES

3.3.1 Output

The primary output of this step is the assignment of each task to one or more categories in the task taxonomy.

3.3.2 Input

External Input. The PREA will automatically identify the generic task associated with each new system task and their associated task category assignments. The user must identify the task category assignments associated with the new system. The user must make assignments for the new system tasks.

Internal Input. Product 5 will provide a Task List (Table 5.1-5), and a Job List (Table 5.1-6), and may provide a general Equipment List (see Table 5.1-2).

Libraries providing input to this step are Baseline Task Parameter Library (Tables 2.4.2-15 and 4.2-16) Generic Task Category Assignments (Tables 4.2-9 and 4.2-10), and the Task Characteristic Map (Tables 4.2-11 and 4.2-12). The latter also contains the task taxonomy.

3.3.3 Process

The system will automatically identify generic tasks and display the assignments associated with these generic functional tasks.

The user must then modify these initial assignments to reflect the new system tasks. For each task with task elements, the user must also assign task elements to task categories.

3.3.4 User Interface

Figure 3.3.4-1 displays the user interface diagram for Step 1. Listed below are the descriptions of each block, including descriptions of screens, files, algorithms, and output reports associated with each block.

BLOCK 1 - See Screen 1-1. Menu would allow user to identify generic tasks, generate task category assignments, print/display reports, or save results.

BLOCK 2 - See Screen 2-1. System would consult the task parameter file to identify the generic functional task associated with each task. It would then consult the Functional Task Assignments (Tables 4.2-9 and 4.2-10) to identify the task category assignments for each generic functional task.

BLOCK 3 - See Screens 3-1 and 3-2. The user will select a duty position and a task within the duty position.

BLOCK 4 - See Screens 4-1 to 4-3. The user can edit, delete, or add task categories or the weights associated with each category. The user may access a pop-up menu containing a detailed description of each task type category. This detailed description will define the category and provide examples of task which fall into this category.

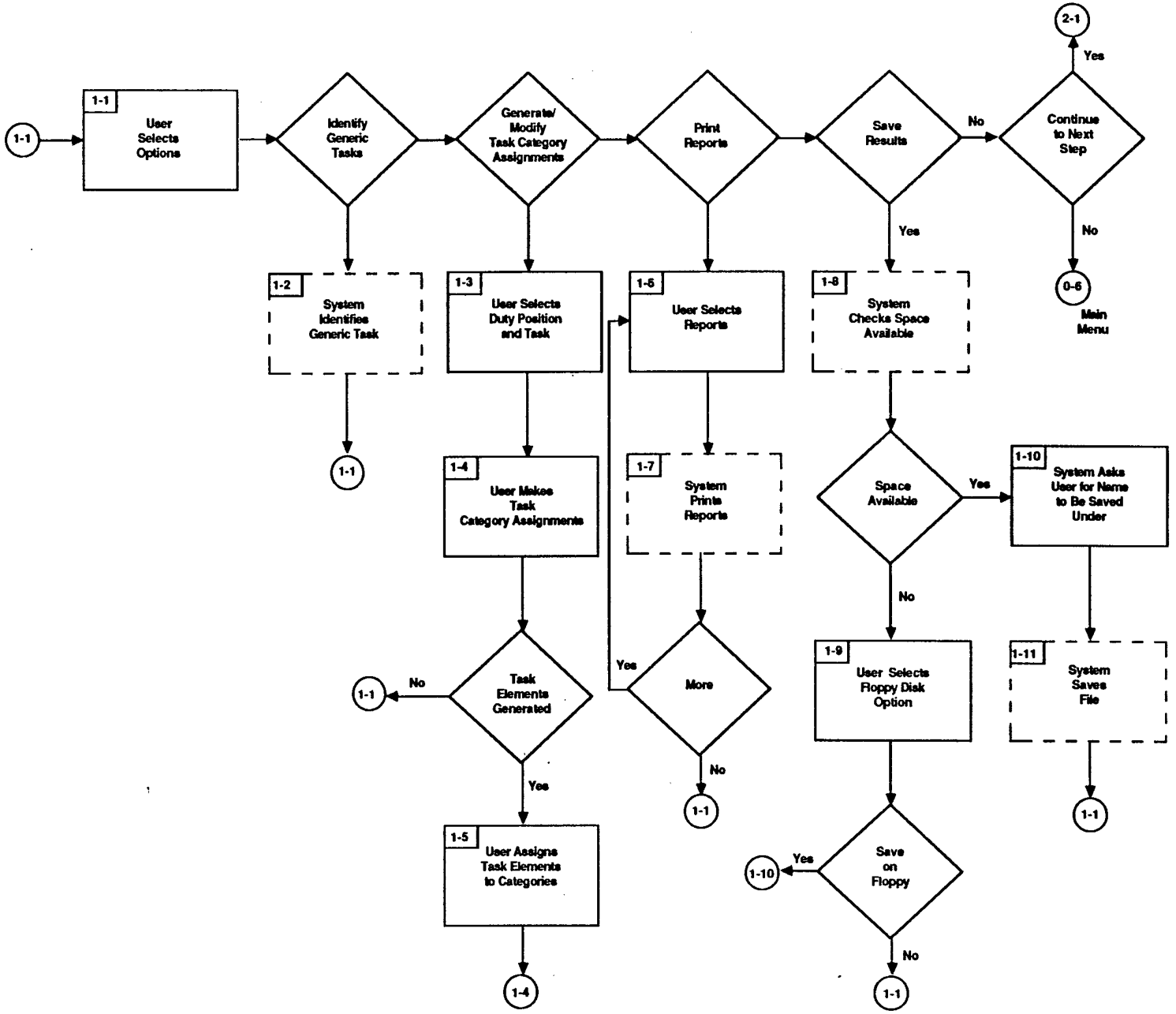


Figure 3.3.4-1. Step 1: Assign Tasks to Task Types.

BLOCK 5 - See Screens 5-1 to 5-3. Screens for task elements are similar to those used for tasks.

BLOCK 6 - See Screens 6-1 and 6-2. Possible reports are the System Conditions and Task Description. (see Tables 7.3-7 and 7.3-16 for a Description of these reports).

BLOCK 7 - See Screens 7-1 to 7-4.

BLOCK 8 - See Screen 8-1.

BLOCK 9 - See Screens 9-1 and 9-2.

BLOCK 10 - See Screen 10-1.

BLOCK 11 - See Screen 11-1. Files saved will include the System List, and the Baseline Task List. (see Tables 5.1-1 and 5.1-2 for a Description of the structure of these files).

Task-task category assignments will be stored on the Task Parameter Library (5.1-16).

BLOCK 0-6 SCREEN 6-1

PATH: PREA>STEP 0>COMPLETE MODE: WORK

Continue Esc

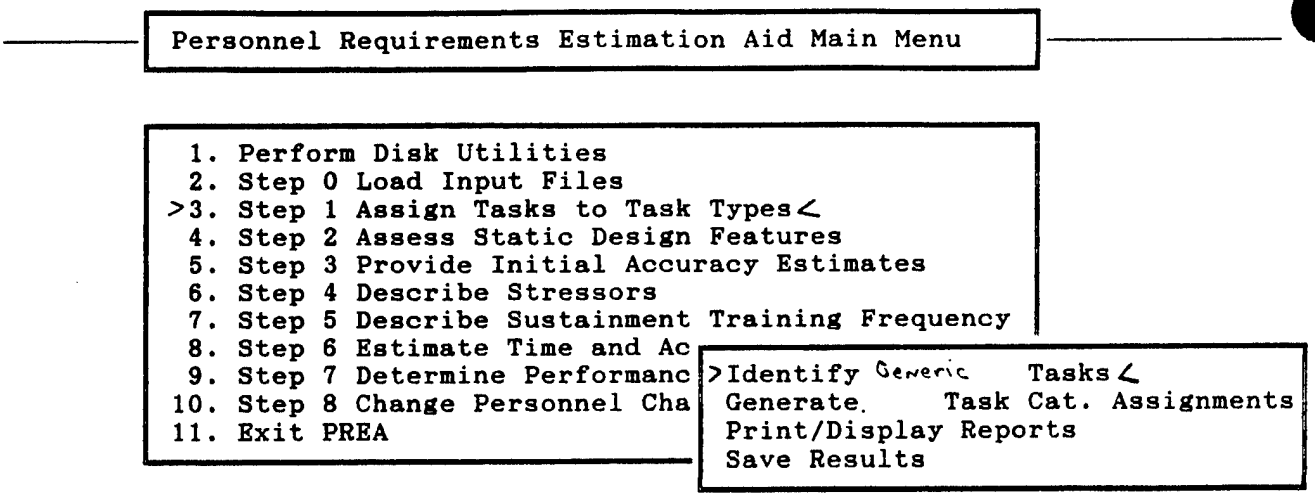
Select Step

Personnel Requirements Estimation Aid Main Menu

1. Perform Disk Utilities
2. Step 0 Load Input Files
>3. Step 1 Assign Tasks To Task Types<
4. Step 2 Assess Static Design Features
5. Step 3 Provide Initial Accuracy Estimates
6. Step 4 Describe Stressors
7. Step 5 Describe Sustainment Training Frequency
8. Step 6 Estimate Time and Accuracy
9. Step 7 Determine Performance Discrepancies
10. Step 8 Change Personnel Characteristic Levels
11. Exit PREA

BLOCK 1 SCREEN 1-1

PATH: PREA>STEP 1>BASE> MODE: WORK



Select choice with cursor control arrows and press <CR> when ready...

BLOCK 2 SCREEN 2-1

PATH: PREA>STEP 1>BASE>

MODE: WAIT

System is identifying generic tasks.....

BLOCK SCREEN 2-2

PATH: PREA>STEP 1>BASE>

MODE: WAIT

System is identifying generic tasks.....

Identification is complete.

BLOCK 1 SCREEN 1-1

PATH: PREA>STEP 1>BASE> MODE: WORK

Personnel Requirements Estimation Aid Main Menu

```
  1. Perform Disk Utilities
  2. Step 0 Load Input Files
 >3. Step 1 Assign Tasks to Task Types<
  4. Step 2 Assess Static Design Features
  5. Step 3 Provide Initial Accuracy Estimates
  6. Step 4 Describe Stressors
  7. Step 5 Describe Sustainment Training Frequency
  8. Step 6 Estimate Time and Ac
  9. Step 7 Determine Performanc
 10. Step 8 Change Personnel Cha
 11. Exit PREA
```

```
 Identify Generic    Tasks
>Generate.     Task Cat. Assignments
 Print/Display Reports
 Save Results
```

Select choice with cursor control arrows and press <CR> when ready...

BLOCK 3 SCREEN 3-1

PATH: PREA>STEP 1>

MODE: WORK

>Select↙ Esc
Select a duty position

Duty Positions available:
>Gunner↙ Cannon Crewmember Driver Task Cat Assignments Complete

BLOCK 4 SCREEN 4-1

PATH: PREA>STEP 1>
MODE: WORK

>Enter< Another Instructions Definitions
Enter data

Duty Position: Gunner Generic Task: Identify Targets
Task: Identify targets

Assignment	Task Category	% Weighting
1st Category	P1	100
2nd Category		
3rd Category		

TASK CATEGORIES:

Perceptual
P1: Far Visual
P2: Near Visual non-verbal
P3: Near Visual Verbal

Cognitive
C1: Info process - numerical
C2: Info process - verbal
C3: Problem solving - planning
C4: Prob solv. - troubleshoot
C5: Prob solv. - selecting

Psychomotor
S1: Discrete
S2: Typing
S3: Aiming/shooting
S4: Driving
S5: Piloting
S6: Aligning

Gross Motor
G1: Carrying
G2: Lifting/Lowering
G3: Torquing
G4: Light Gross Motor

Communication
M1: Face-to-face
M2: non Face-to-face

BLOCK 3 SCREEN 3-2

PATH: PREA>STEP 1>

MODE: WORK

>Select< Complete Esc
>Select a task<

Duty Positions available:

>Gunner<
Cannon Crewmember
Driver
Task Cat Assignments Complete

Select Task

Identify Targets
Select Targets
Determine Target Range
Determine Target Lead
Select Ammunition
Aim/Sight Weapon
Fire Weapon
Task Cat Assign. Complete

BLOCK 4 SCREEN 4-2

PATH: PREA>STEP 1> MODE: WORK

Enter Another >Instructions< Definitions
View Instructions

Duty Position:
Task:

Assignment	Task Category	% Weighting
1st Category		
2nd Category		
3rd Category		

TOTAL 100

Assign each task to one, two, or three task categories listed on the screen. When you have finished making the task category assignments, assign percentage weights (%) to describe what percentage of the activities associated with the task involve each task category. If you only assign the task to one task category, you need not enter a weight since the system will assume the task category is weighted 100%.

PATH: PREA>STEP 1> MODE: WORK
Enter Another Instructions >Definitions<
View task category definitions

Duty Position:
Task:

Assignment	Task Category	% Weighting
1st Category	G1	80
2nd Category	M1	20
3rd Category		
TOTAL		100

Carrying: Lifting an object, moving it from one point to another and lowering it. Example: Load ammunition onto howitzer.

Communicating - Face-to face: Talking or listening directly to another without the use of phone, radio, etc.
Example: Receive March Order.

BLOCK 5 SCREEN 5-1

PATH: PREA>STEP 1>

MODE:

>Enter< Another Instructions Definitions

Enter data for task element

Task	1st Cat Assignment Category	%	2nd Cat Assignment Category	%	3rd Cat Assignment Category	%
Land Aircraft	S5	60	P2	30	S1	20

Assignment	Task Category	% Weighting
1st Category	G1	100
2nd Category		
3rd Category		
TOTAL		100

Task Element:
Determine Wind Direction

TASK CATEGORIES:

Perceptual
P1: Far Visual
P2: Near Visual non-verbal
P3: Near Visual Verbal

Cognitive
C1: Info process - numerical
C2: Info process - verbal
C3: Problem solving - planning
C4: Prob solv. - troubleshoot
C5: Prob solv. - selecting

Psychomotor
S1: Discrete
S2: Typing
S3: Aiming/shooting
S4: Driving
S5: Piloting
S6: Aligning

Gross Motor
G1: Carrying
G2: Lifting/Lowering
G3: Torquing
G4: Light Gross Motor

Communication
M1: Face-to-face
M2: non Face-to-face

BLOCK 5 SCREEN 5-2

PATH: PREA>STEP 1>

MODE: WORK

Enter Another >Instructions< Definitions
View Instructions

Task	1st Cat Assignment Category	%	2nd Cat Assignment Category	%	3rd Cat Assignment Category	%
Land Aircraft	S5	60	P2	30	S1	20

Assignment	Task Category	% Weighting
1st Category		
2nd Category		
3rd Category		
TOTAL		100

Task Element:
Determine Wind Direction

Assign each task to one, two, or three task categories listed on the screen. When you have finished making the task category assignments, assign percentage weights (%) to describe what percentage of the activities associated with the task involve the task category.

BLOCK 5 SCREEN 5-3

PATH: PREA>STEP 1> MODE: WORK
Enter Another Instructions >Definitions<

Task	1st Cat Assignment Category	%	2nd Cat Assignment Category	%	3rd Cat Assignment Category	%
Land Aircraft	S5	60	P2	30	S1	20

Assignment	Task Category	% Weighting
1st Category	G1	80
2nd Category	M1	20
3rd Category		
TOTAL		100

Carrying: Lifting an object, moving it from one point to another and lowering it. Example: Load ammunition onto howitzer.

Communicating - Face-to face: Talking or listening directly to another with-

BLOCK 1 SCREEN 1-1

```
PATH: PREA>STEP 1>BASE>                                    MODE: WORK

        Personnel Requirements Estimation Aid Main Menu

  1. Perform Disk Utilities
  2. Step 0 Load Input Files
>3. Step 1 Assign Tasks to Task Types<
  4. Step 2 Assess Static Design Features
  5. Step 3 Provide Initial Accuracy Estimates
  6. Step 4 Describe Stressors
  7. Step 5 Describe Sustainment Training Frequency
  8. Step 6 Estimate Time and Ac
  9. Step 7 Determine Performanc
 10. Step 8 Change Personnel Cha
 11. Exit PREA

  Identify Generic    Tasks
  Generate.      Task Cat. Assignments
 >Print/Display Reports<
  Save Results

Select choice with cursor control arrows and press <CR> when ready...
```

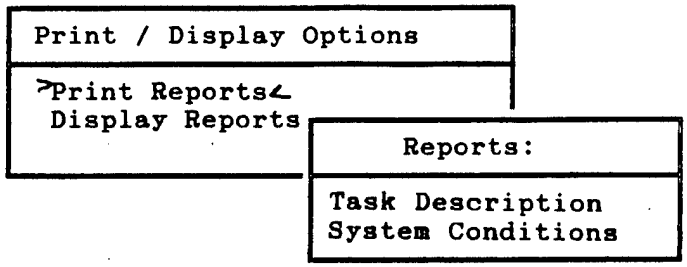
BLOCK 6 SCREEN 6-1

```
PATH: PREA>STEP 1>DISPLAY>                                    MODE: WORK
>Select↙   Esc
 Select a print, display, or save option from list, then press <CR>
```

Print / Display Options
>Print Reports↙ Display Reports on Monitor

BLOCK 6 SCREEN 6-2

```
 PATH: PREA>STEP 1>DISPLAY>                                    MODE: WORK
>Select↙   Esc
  Select a report for printing, then press <CR>
```

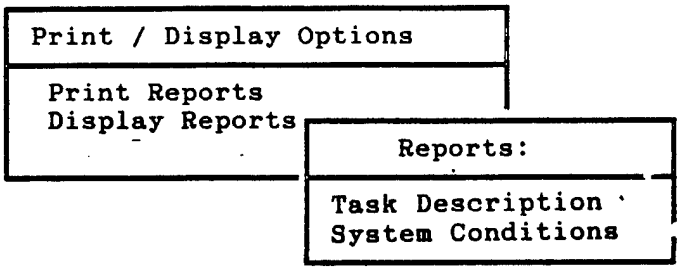


BLOCK 7 SCREEN 7-1

PATH: PREA>STEP 1>DISPLAY> MODE: WAIT

Select Esc

Select a report for printing, then press <CR>



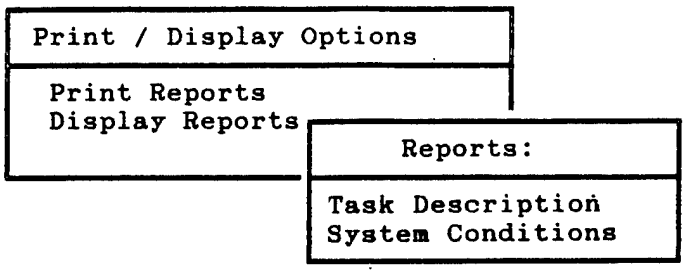
Report is being printed.....

BLOCK 7 SCREEN 7-2

PATH: PREA>STEP 1>DISPLAY> MODE: WORK

Select Esc

Select a report for printing, then press <CR>



Report is being printed..... ready.

Task Description

System _____ System Design _____ Date _____

Duty Position _____ MOS/Skill Level _____

TASK DESCRIPTION								Baseline Task	Task Element Description				
Task	System Function	Task Types							Task Types				
		Type	%	Type	%	Type	%		Elements	Type	%	Type	%

BLOCK 7 SCREEN 7-3

System Conditions

System _____ System Design _____ Date _____

Condition Set _____ Mission _____

Condition	Value

BLOCK 6 SCREEN 6-1

PATH: PREA>STEP 1>DISPLAY> MODE: WORK

>Select< Esc

Select a print, display, or save option from list, then press <CR>

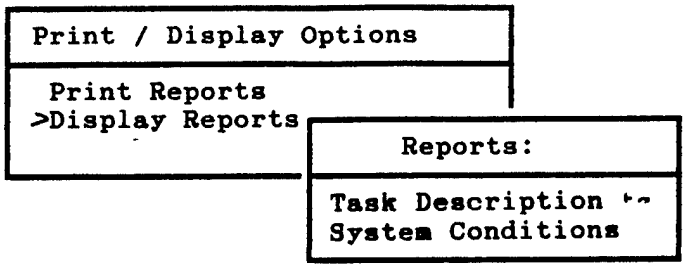
Print / Display Options
Print Reports >Display Reports on Monitor<

BLOCK 6 SCREEN 6-2

PATH: PREA>STEP 1>DISPLAY> MODE: WORK

>Select↵ Esc

Select a report for displaying, then press <CR>



BLOCK 1 SCR

PATH: PREA>STEP 1>BASE>

MODE: WO

Personnel Requirements Estimation Aid Main Menu

1. Perform Disk Utilities
2. Step 0 Load Input Files
>3. Step 1 Assign Tasks to Task Types<
4. Step 2 Assess Static Design Features
5. Step 3 Provide Initial Accuracy Estimates
6. Step 4 Describe Stressors
7. Step 5 Describe Sustainment Training Frequency
8. Step 6 Estimate Time and Ac
9. Step 7 Determine Performanc
10. Step 8 Change Personnel Cha
11. Exit PREA

Identify Generic Tasks
Generate Task Cat. Ass
Print/Display Reports
>Save Results<

Select choice with cursor control arrows and press <CR> when ready...

BLOCK 8 SCREEN 8-1

PATH: PREA>STEP 5>SAVE>

MODE: WORK

NOTE: System is checking availability of memory for saving data

BLOCK 9 SCREEN 9-1

PATH: PREA>STEP 5>SAVE
Floppy Quit
Save report to floppy diskette

MODE: WAIT

NOTE: System is checking availability of memory for saving data.

NOTE: Insufficient memory available for saving.

BLOCK 9 SCREEN 9-2

PATH: PREA>STEP 5>SAVE MODE: WAIT

>Floppy< Quit
Save report to floppy diskette

Insert Floppy diskette and hit <cr>,

Report(s) are being saved on floppy diskette.

BLOCK 10 SCREEN 10-1

PATH: PREA>STEP 5>SAVE>

MODE: WORK

Insert name of file to be saved: uh-60a.doc

BLOCK 11 SCREEN 11-1

PATH: PREA>STEP 5>SAVE>

MODE: WORK

Insert name of file to be saved: uh-60a.doc

System is saving file UH-60A.doc.

3.4 STEP 2: ASSESS STATIC DESIGN FEATURES

3.4.1 Output

This step assists the user in assessing static design features (reach, visual access, and strength). The step will identify both the static measures relevant to each control or display associated with a particular design, and the standards for these Measures at critical population percentiles. The user can then identify which components are not in compliance with these standards.

3.4.2 Input

External Input. The user must identify the components which do not meet the standards on key measures and input the actual values for key static design measures associated with these problem components.

Internal Input. Files providing input are the System List, (Table 5.1-1) the Equipment List, (Table 5.1-2) and the Task Description File (see Table 5.1-16)

The Static Design Measures Population Library (Tables 4.2-13 and 4.2-14) will list the distributions for key static design measures within three key populations: male non-aviators, male aviators, and females. Reach, visual access, and strength measures related to different types of components are stored in the Human Interface Component Library (See Tables 4.2-7 and 4.2-8). Some static strength measures are pertinent even when no controls are involved. These strength measures can be related to task types. The strength variables relevant to particular task types are also stored in the Human Interface Component Library.

3.4.3 Process

The user will first identify which components are human interface components, assign the components to component types and assign the components to individual tasks.

The user will select the types of static measures and the duty positions and tasks he or she wishes to examine. The system will read the Task Parameter Library to identify the type of components associated with each task. The system will use information from the Human Interface Component Library to identify the static design measures relevant to each type of component. The user selects the populations and percentile criteria (defaults are 5th and 95th), he will use to set his standards. The system will then use information in the Human Interface Component Library and the Task Characteristic Map to identify the static design measures relevant to each component. The user will enter the values for these measures for any component which does not meet the standards. The system will then estimate what percentage of the population(s) can be accommodated for these values.

3.4.4 User Interface

Figure 3.4.4-1 displays the user interface diagram for Step 2. Listed below are the descriptions of each block, including descriptions of screens, files, algorithms, and output reports associated with each block.

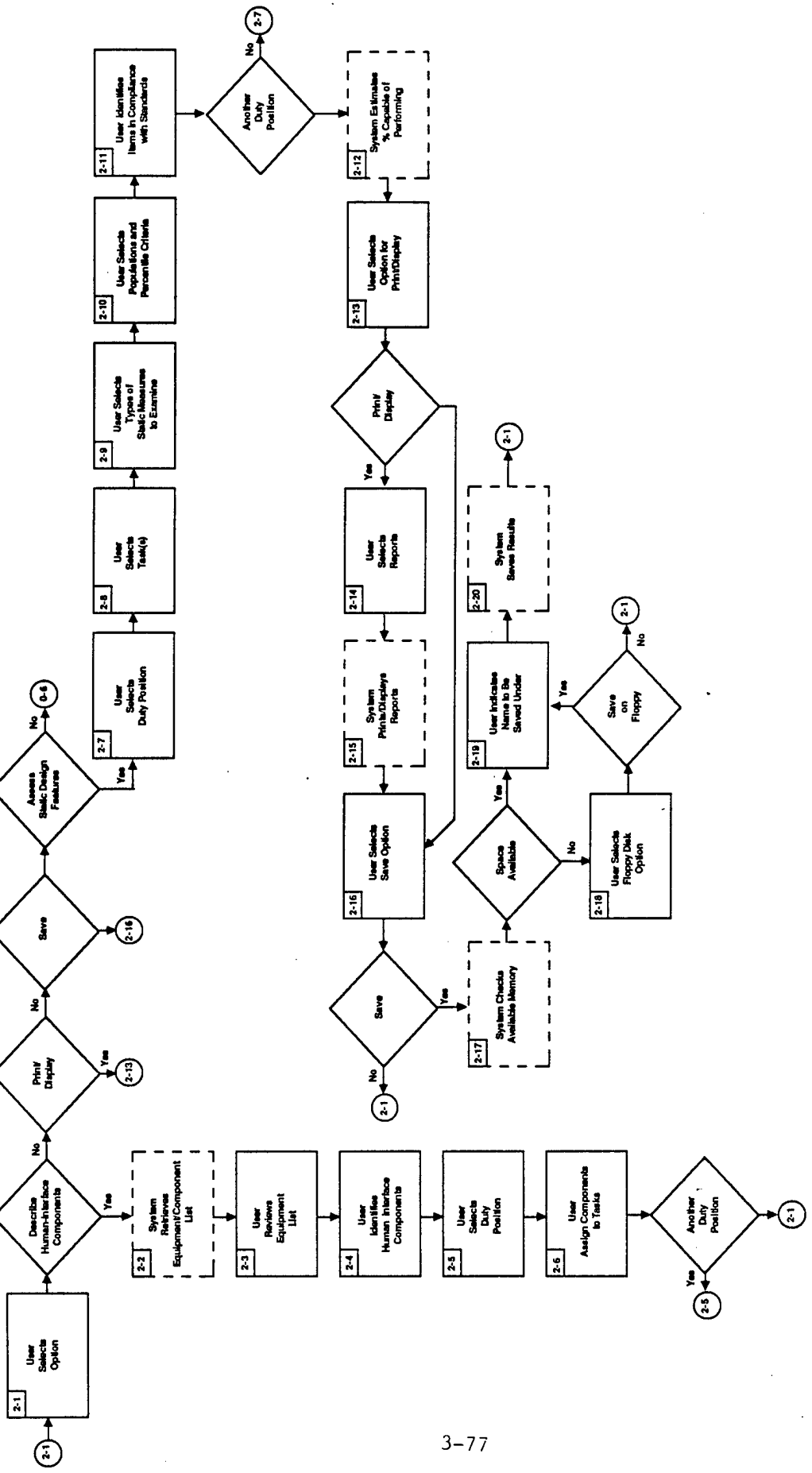


Figure 3.4.4-1. Step 2: Assess Static Design Features.

BLOCK 1 - See Screen 1-1. Options are: describe human-interface components, assess static design features, print/ display reports or save data.

BLOCK 2 - See Screen 2-1.

BLOCK 3 - See Screen 3-1. User reviews the equipment list and indicates which functional equipment system do not have an operator interface.

BLOCK 4 - See Screens 4-1 to 4-4. User identifies which components are controls and displays and assigns each control/display to one or more categories in the control/display taxonomy.

BLOCK 5 - See Screen 5-1.

BLOCK 6 - See Screen 6-1 to 6-3. the user assigns the human interface components to tasks.

BLOCK 7 - See Screen 7-1. A single menu will be presented listing operator duty positions and maintainer MOS/skill levels.

BLOCK 8 - See Screen 8-1 for an example. The user may select one, many or all of the tasks associated with each duty position.

BLOCK 9 - See Screen 9-1. A menu will allow the user to select from three types of measures: reach, visual access, or strength.

BLOCK 10 - See Screens 10-1 and 10-2. The first menu will allow selection from following populations: male ground troops, male aviators, and women. The second menu will allow the user the option of using default values for static measure population

percentile criteria (typically 5th and 95th percentiles). If the user opts to enter his or her own criteria, he or she will be presented with a screen that will guide him or her in inputting these criteria.

BLOCK 11 - See Screens 11-1 to 11-7. The user would identify which components are not in compliance with the standards and enter in the actual values for these components on the key static design measures.

BLOCK 12 - See Screen 12-1 for the message that will appear during this process. The system consults the Static Design Measure Population Library to identify the percentage of each population that can accommodate the new system design given the static design. Measures input in BLOCK 11.

BLOCK 13 - See Screen 13-1.

BLOCK 14 - See Screen 14-1.

BLOCK 15 - See Screen 15-1 to 15-7. Reports would include the Static Assessment Report (Table 7.3-5), the Equipment List (Table 7.3-1), the Human Interface Components List (7.3-2), and the Task-Component Assignments List (Table 7.3-4).

BLOCK 16 - See Screen 16-1.

BLOCK 17 - See Screen 17-1.

BLOCK 18 - See Screens 18-1 and 18-2.

BLOCK 19 - See Screen 19-1.

BLOCK 20 - See Screen 20-1. The file saved will be the Static Assessment file (see Table 5.1-8). The Task Description File (Table 5.1-16) would be updated to include the assignments of human interface components to tasks.

BLOCK 0-6 SCREEN 6-1

PATH: PREA>STEP 2> MODE: WORK

Personnel Requirements Estimation Aid Main Menu

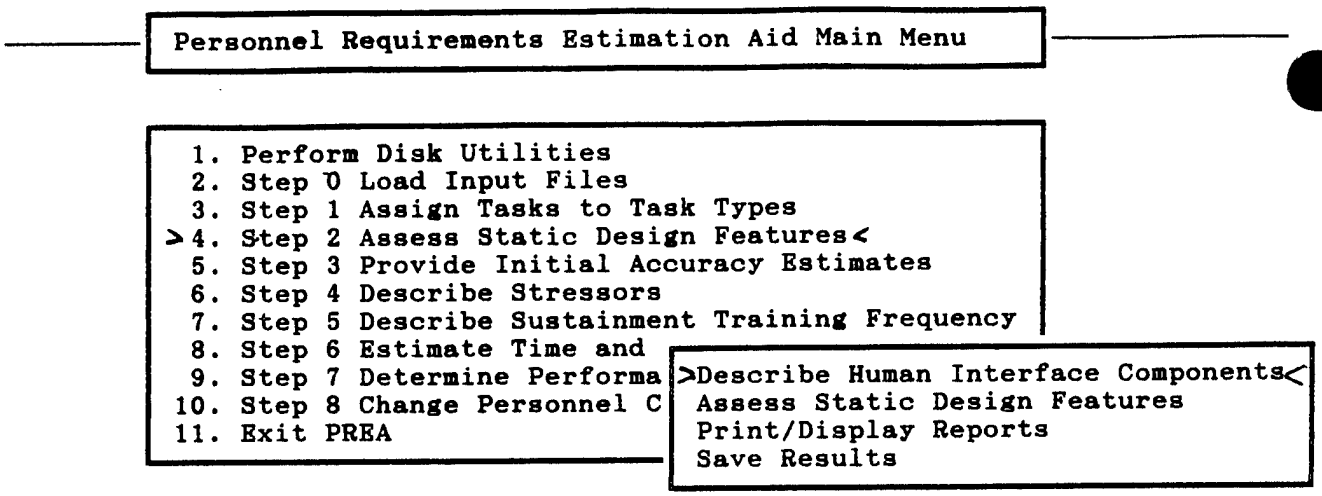
1. Perform Disk Utilities
2. Step 0 Load Input Files
3. Step 1 Assign Tasks to Task Types
4. Step 2 Assess Static Design Features <
5. Step 3 Provide Initial Accuracy Estimates
6. Step 4 Describe Stressors
7. Step 5 Describe Sustainment Training Frequency
8. Step 6 Estimate Time and Accuracy
9. Step 7 Determine Performance Discrepancies
10. Step 8 Change Personnel Characteristic Levels
11. Exit PREA

Select choice with cursor control arrows and press <CR> when ready...

BLOCK 1 SCREEN 1-1

PATH: PREA>STEP 2>

MODE: WORK



Select choice with cursor control arrows and press <CR> when ready...

BLOCK 2 SCREEN 2-1

PATH: PREA>STEP 2>COMP>

MODE: WAIT

System is retrieving equipment-component list.

PATH: PREA>STEP 2>COMP>
MODE: WAIT

>Select↙ Esc
Select functional systems having operator controls and displays

Functional Systems:
Airframe
Armament
Avionics
Electrical
Fuel System
>Flight Control<
>Instruments<
Landing Gear
Tools
Test Equipment

BLOCK 4 SCREEN 4-1

PATH: PREA>STEP 2>
>Select< Esc
Select items

MODE: WORK

Functional System: Instruments

Component	Controls(C) Displays(D)/Other(O)
Radar Altimeter	
Barimetric Altimeter	
Vertical Speed Indicator	
Wiring Harness XYZ	
Wiring Harness ABC	

Indicate which components in the Instruments functional system are operator controls (C), displays (D), or other (O).

BLOCK 4 SCREEN 4-a

PATH: PREA>STEP 2>
MODE: WORK

Select Complete
All components have been designated C, D, or O.

Functional System: Instruments

Component	Controls(C) Displays(D)/Other(O)
Radar Altimeter.	D
Barimetric Altimeter	D
Vertical Speed Indicator	D
Wiring Harness XYZ	O
Wiring Harness ABC	O

Indicate which components in the Instruments functional system are operator controls (C), displays (D), or other (O).

BLOCK 4 SCREEN 4-3

PATH: PREA>STEP 2>
MODE: WORK

Enter Esc

Enter appropriate code in highlighted blocks

Functional System: Instruments

Component	Controls(C) Displays(D)/Other(O)	Control/Display Type
Radar Altimeter	D	
Barimetric Altimeter	D	
Vertical Speed Indicator	D	

Control / Display Types	
Displays:	Controls:
Visual Displays	C1 Rotary
V 1 Transilluminated Displays	C2 Linear Discrete
V 2 Scale Indicators	C3 Linear Continuous
V 3 CRT Display	C4 Touch Screen
V 4 Other Visual Displays	C5 High Force
A. Audio Displays	C6 Miniature

PATH: PREA>STEP 2>
Enter Complete Esc
All codes have been entered

Functional System: Instruments

Component	Controls(C) Displays(D)/Other(O)	Control/Display Type
Radar Altimeter	D	V 1
Barimetric Altimeter	D	V 2
Vertical Speed Indicator	D	V 2

Control / Display Types

Displays:
Visual Displays
V 1 Transilluminated Displays
V 2 Scale Indicators
V 3 CRT Display
V 4 Other Visual Displays
A. Audio Displays

Controls:
C1 Rotary
C2 Linear Discrete
C3 Linear Continuous
C4 Touch Screen
C5 High Force
C6 Miniature

BLOCK 5 SCREEN 5-1

PATH: PREA>STEP 2>
>Select< Esc
Select a duty position

MODE: WORK

Duty Positions available:
Pilot >Co-pilot<

BLOCK 6 SCREEN 6-1

PATH: PREA>STEP 2>
>Select< Esc
Select a task

MODE: WORK

Duty Positions available:
Pilot >Co-pilot<

Tasks:
Transmit/Receive Messages Perform before-landing checks Perform landing approaches Land aircraft

BLOCK 6 SCREEN 6-2

PATH: PREA>STEP 2>

MODE: WORK

>Select↙ Esc
Select components associated with task

Duty Position: Co-Pilot
Task: Perform before-landing checks

Human Interface Components	Type
Radar Altimeter	D
Barometric Altimeter	D
Vertical Speed Indicator	D

BLOCK 6 SCREEN 6-3

PATH: PREA>STEP 2>

MODE: WORK

>Select↵ Position Esc

Select another duty position for component-task assignment

Duty Position: Co-Pilot

Task: Perform before-landing checks

Human Interface Components	Type
> Radar Altimeter	D<
> Barometric Altimeter	D<
Vertical Speed Indicator	D

BLOCK 1 SCREEN #1

PATH: PREA>STEP 2> MODE: WORK

Personnel Requirements Estimation Aid Main Menu

1. Perform Disk Utilities
2. Step 0 Load Input Files
3. Step 1 Assign Tasks to Task Types
>4. Step 2 Assess Static Design Features<
5. Step 3 Provide Initial Accuracy Estimates
6. Step 4 Describe Stressors
7. Step 5 Describe Sustainment Training Frequency
8. Step 6 Estimate Time and
9. Step 7 Determine Performa
10. Step 8 Change Personnel C
11. Exit PREA

Describe Human Interface Components
>Assess Static Design Features<
Print/Display Reports
Save Results

Select choice with cursor control arrows and press <CR> when ready...

Block 7 screen 7-1

PATH: PREA>STEP 2>

MODE: WORK

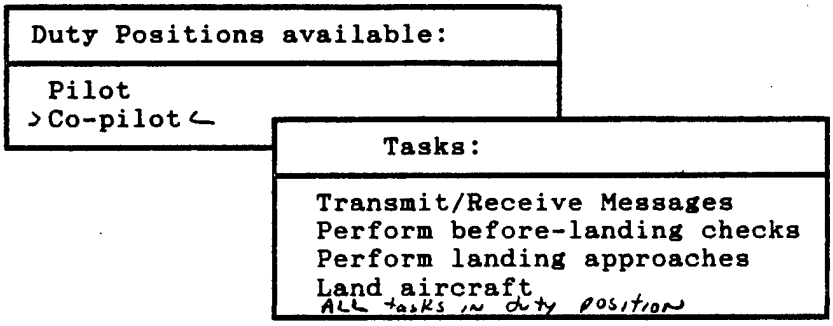
>Select↵ Esc
Select a duty position

Duty Positions available:
Pilot Co-pilot

BLOCK 8 SCREEN 8-1

PATH: PREA>STEP 2>
>Select↵ Esc
Select tasks

MODE: WORK

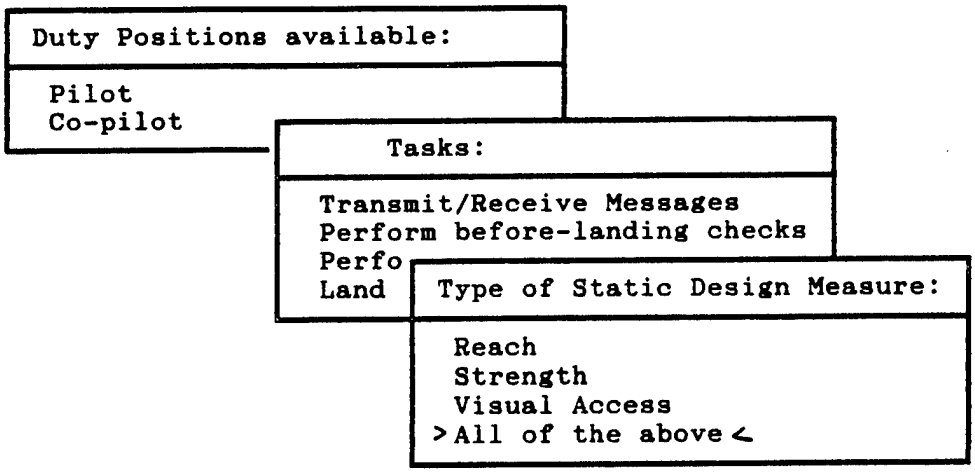


BLOCK 9 SCREEN 9-1

PATH: PREA>STEP 2>

MODE: WORK

>Select< Esc
 Select static design measures



BLOCK 10 SCREEN 10-1

PATH: PREA>STEP 2> MODE: WORK

>Select< Esc

Select a reference subpopulation for the duty position shown

Duty Position: Co-Pilot

Reference Populations:
Male (non-Aviator)
Female
>Aviator<

BLOCK 10 screen 10-2

PATH: PREA>STEP 2>

MODE: WORK

>Enter↙ Esc

Enter data in matrix as required

Population Definition

Enter the maximum and minimum percentile values for each population group, or type 'N' to make the population not applicable.

Population	Minimum Percentile	Maximum Percentile
Females	N	N
Males	N	N
Aviators	5	95

BLOCK 11 SCREEN 11-1

PATH: PREA>STEP 2> MODE: WORK

>Select<

Select displays not in compliance

GENERAL STATIC DESIGN EVALUATION - Visual Access	
Crew Position: Co-Pilot	Displays
Criteria	Radar Altimeter Barometric Altimeter Vertical Speed Indicator >Stabilator Indicator<
Displays should not be more than 25 cm below eye height	

BLOCK 11 SCREEN 11-2

PATH: PREA>STEP 2>

MODE: WORK

>Enter<

Enter actual values in column next to non-compliant displays

GENERAL STATIC DESIGN EVALUATION - Visual Access		
Crew Position: Co-Pilot	Displays	Actual Values
Criteria Displays should not be more than 25 cm below eye height	Radar Altimeter Barometric Altimeter Vertical Speed Indicator >Stabilator Indicator<	_____

BLOCK 11 SCREEN 11-3

PATH: PREA>STEP 2> MODE: WORK

>Select↵
Select displays not in compliance

GENERAL STATIC DESIGN EVALUATION - Visual Access	
Crew Position: Co-Pilot	Displays
Criteria	Radar Altimeter Barometric Altimeter Vertical Speed Indicator Stabilator Indicator
Displays should not be more than 35 cm above eye height	

BLOCK 11 SCREEN 11-4

PATH: PREA>STEP 2>

MODE: WORK

>Select<
Select controls, not in compliance

GENERAL STATIC DESIGN EVALUATION - Reach	
Crew Position: Co-Pilot	Controls
Criteria	Radar Altimeter Barometric Altimeter Vertical Speed Indicator Stabilator Indicator >Throttle<
Sitting functional reach should not be less than 134 cm nor greater than 153 cm	

BLOCK 11 SCREEN 11-5

PATH: PREA>STEP 2> MODE: WORK

>Enter<

Enter actual values in column next to non-compliant controls

GENERAL STATIC DESIGN EVALUATION - Reach		
Crew Position: Co-Pilot	CONTROLS	Act. Distances
Criteria		
Sitting functional reach should not be less than 134 cm nor greater than 153 cm	Radar Altimeter Barometric Altimeter Vertical Speed Indicator Stabilator Indicator >Throttle<	———

NOTE: Actual distances are not required inputs. Place a "?" in the highlited box if you want to forego entering a value.

Block 11 screen 11-6

PATH: PREA>STEP 2>

MODE: WORK

>Enter

Enter data in highlited blocks

STATIC DESIGN EVALUATION - Strength	
Task Category: Carrying/Load Bearing Crew Position: Gunner	
Tasks	**Acceptable (Y/N)**
1. Load cannon	Y
2. Unload cannon	N

Criteria: Design Weight Limits

Height of lift from ground (m)	1.8	1.5	1.2	0.9	0.6	0.3
Maximum weight (kg)	13	16	23	29	36	39

BLOCK 11 SCREEN 11-7

PATH: PREA>STEP 2>
Enter Complete

MODE: WORK

Enter actual height and weight values in highlited blocks

STATIC DESIGN EVALUATION - Strength			
Task Category: Carrying/Load Bearing Crew Position: Gunner			
Tasks	**Acceptable (Y/N)**	**Act. Height**	**Act. Weight**
1. Load cannon	Y		
2. Unload cannon	N		
		NOTE: Height and weight not required. Input "?" to indicate no available value.	

Criteria: Design Weight Limits

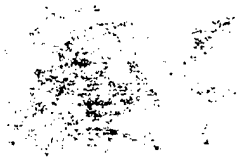
Height of lift from ground (m)	1.8	1.5	1.2	0.9	0.6	0.3
Maximum weight (kg)	13	16	23	29	36	39

BLOCK 12 SCREEN 12-1

PATH: PREA>STEP 2>

MODE: WAIT

The system is estimating the percentage of the population that can be accomodated given the actual values on the static design measures.



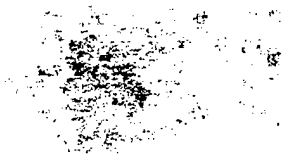
PATH: PREA>STEP 2> MODE: WORK

Personnel Requirements Estimation Aid Main Menu

1. Perform Disk Utilities
2. Step 0 Load Input Files
3. Step 1 Assign Tasks to Task Types
4. Step 2 Assess Static Design Features
5. Step 3 Provide Initial Accuracy Estimates
6. Step 4 Describe Stressors
7. Step 5 Describe Sustainment Training Frequency
8. Step 6 Estimate Time and
9. Step 7 Determine Performa
10. Step 8 Change Personnel C
11. Exit PREA

Describe Human Interface Components
Assess Static Design Features
>Print/Display Reports<
Save Results

Select choice with cursor control arrows and press <CR> when ready...



BLOCK 17 SCREEN 13-1

PATH: PREA>STEP 2>DISPLAY> MODE: WORK

Select Esc

Select a print, display, or save option from list, then press <CR>

Print / Display Options
Print Reports Display Reports on Monitor

Block 14 Screen 14-1

PATH: PREA>STEP 2>DISPLAY> MODE: WORK

Select Esc

Select a report for printing, then press <CR>

Print / Display Options
Print Reports
Display Reports

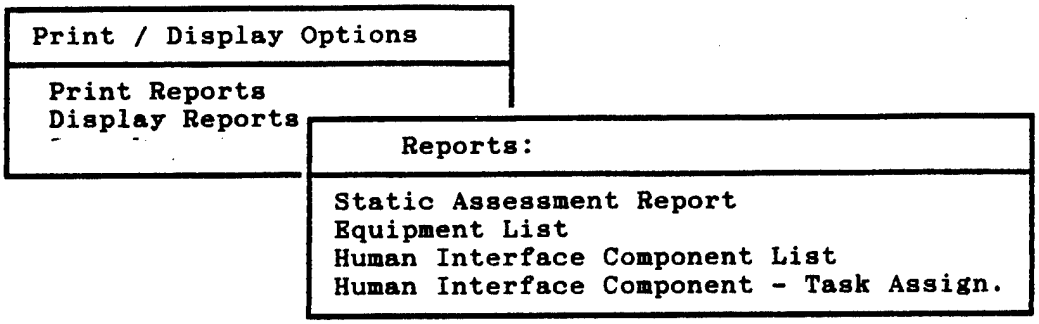
Reports:
Static Assessment Report
Equipment List
Human Interface Component List
Human Interface Component - Task Assign.

BLOCK 15 SCREEN 15-1

PATH: PREA>STEP 2>DISPLAY> MODE: WAIT

Select Esc

Select a report for printing, then press <CR>



Report is being printed.....

Block 15 Screen 15-2

PATH: PREA>STEP 2>DISPLAY> MODE: WORK

Select Esc

Select a report for printing, then press <CR>

Print / Display Options
Print Reports
Display Reports

Reports:
Static Assessment Report
Equipment List
Human Interface Component List
Human Interface Component - Task Assign.

Report is being printed..... ready.

Static Design Assessment Report

System _____ Design Version _____ Date _____

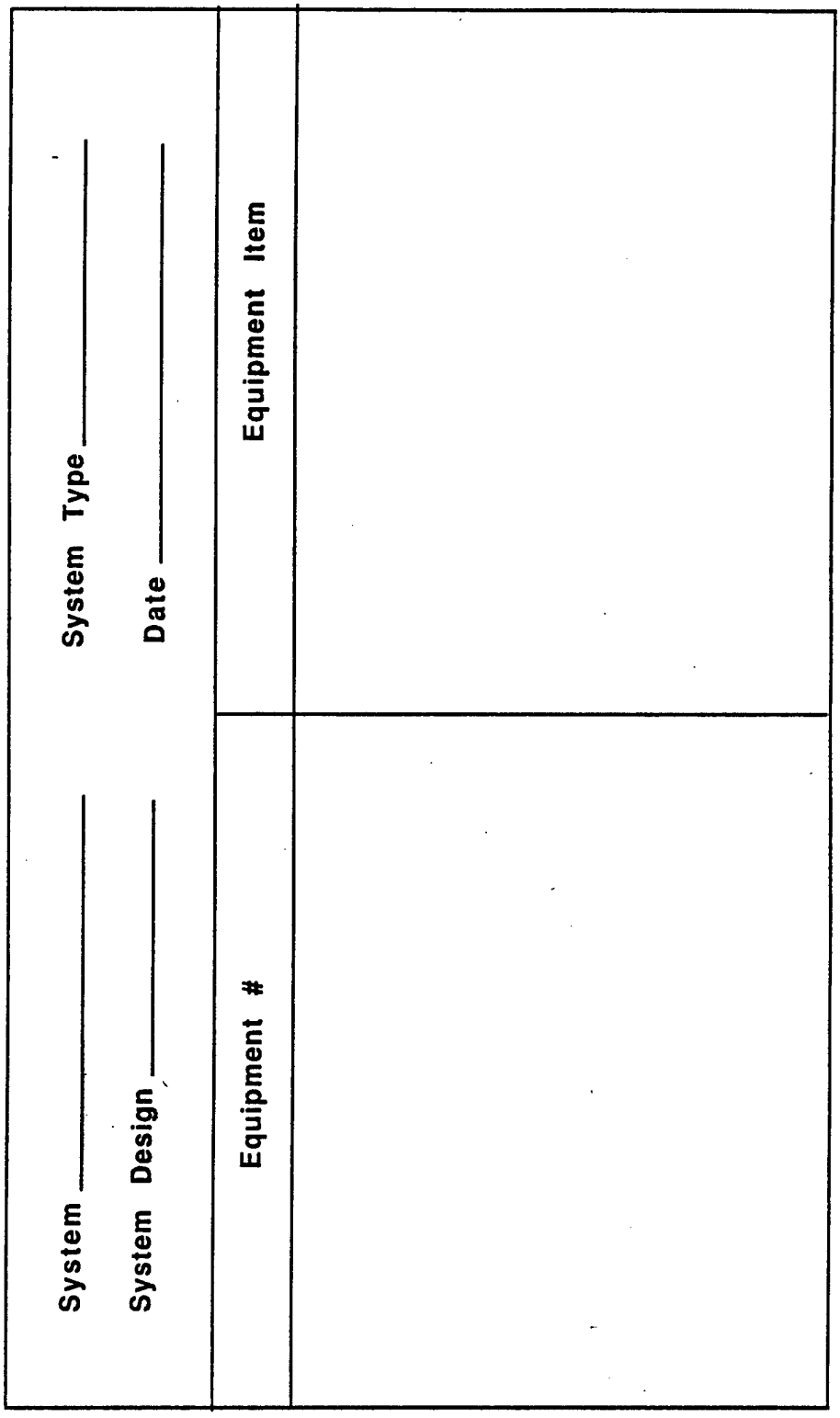
Duty Position _____ MOS/Skill Level _____

Control/ Display	Tasks	Static Design Measure	Actual Value	Standard	Population % Accommodated			
					Pop. A	Pop. B	Pop. C	Pop. D

BLOCK 15 SCREEN 15-3

BLOCK 15 SCREEN 15-4

Equipment List



Human Interface Components List

System _____ System Type _____

System Design _____ Date _____

Equipment #	Equipment Item	Component #	Component	Component Type(s)

BLOCK IS SCREEN 15-6

Human Interface Component-Task Assignments

System _____ System Type _____

System Design _____ Date _____

Task	Duty Position	Component	Component Type(s)

BLOCK 15 SHEET K-7

BLOCK 13 Screen 13-1

PATH: PREA>STEP 2>DISPLAY> MODE: WORK

Select Esc

Select a print, display, or save option from list, then press <CR>

Print / Display Options
Print Reports >Display Reports on Monitor

Blo CIL 14 Screen 14-1

PATH: PREA>STEP 2>DISPLAY> MODE: WORK

Select Esc

Select a report for displaying, then press <CR>

Print / Display Options
Print Reports
Display Reports

Reports:
Static Assessment Report
Equipment List
Human Interface Component List
Human Interface Component - Task Assign.

Block 16 Screen 16-1

PATH: PREA>STEP 2> MODE: WORK

Personnel Requirements Estimation Aid Main Menu

1. Perform Disk Utilities
2. Step 0 Load Input Files
3. Step 1 Assign Tasks to Task Types
4. Step 2 Assess Static Design Features
5. Step 3 Provide Initial Accuracy Estimates
6. Step 4 Describe Stressors
7. Step 5 Describe Sustainment Training Frequency
8. Step 6 Estimate Time and
9. Step 7 Determine Performa
10. Step 8 Change Personnel C
11. Exit PREA

Describe Human Interface Components
Assess Static Design Features
Print/Display Reports
>Save Results<

Select choice with cursor control arrows and press <CR> when ready...

BLOCK 17 SCREEN 17-1

PATH: PREA>STEP 5>SAVE>

MODE: WORK

NOTE: System is checking availability of memory for saving data

BLOCK 18 SCREEN 18-1

PATH: PREA>STEP 5>SAVE MODE: WAIT

Floppy : Quit

Save report to floppy diskette

NOTE: System is checking availability of memory for saving data.

NOTE: Insufficient memory available for saving.

BLOCK 18 SCREEN 18-2

PATH: PREA>STEP 5>SAVE MODE: WAIT

>Floppy< Quit
Save report to floppy diskette

Insert Floppy diskette and hit <cr>,

Report(s) are being saved on floppy diskette.

BLOCK 19 SCREEN 19-1

PATH: PREA>STEP 5>SAVE>

MODE: WORK

Insert name of file to be saved: uh-60a.doc

BLOCK 20 SCREEN 20-1

PATH: PREA>STEP 5>SAVE>

MODE: WORK

Insert name of file to be saved: uh-60a.doc

System is saving file UH-60A.doc.

3.5 STEP 3: PROVIDE INITIAL ACCURACY ESTIMATES

3.5.1 Output

During this step, the system will first identify initial levels for personnel characteristics and sustainment training. These estimates will be set equal to the mean values for these variables within a particular task type. The user must then estimate mean accuracy for each new system task given the initial values of the personnel characteristics and sustainment training. To assist the user in making these judgments, data for the baseline tasks and/or mean values for all tasks on the library falling into the task type are presented.

3.5.2 Input

External Input. The user must input estimates of mean accuracy levels given the initial characteristic and training levels.

Internal Input. The files providing input to this step are the Job List. The Task Parameter File (Table 5.1-16) which lists the new system tasks, their task types, their baseline task and their functional task and the Projected Characteristic Distribution Summary (Table 5.1-19) which lists the expected distribution of each characteristic.

Libraries providing input to this task are the Baseline Task Parameter Library (Tables 4.2-15 and 4.2-16) that describes the data associated with every baseline task, including information on the task types to which they have been assigned, and accuracy data (means and standard deviations). Also providing input is the Performance Shaping Function Parameter Library (Tables 4.2-27 and 4.2-28) which lists the mean accuracy values associated with

each task type, the Personnel Variable Description Library (Table 4.2-21 and 4.2-22) and the Personnel Variable Summary Library (Tables 4.2-25 and 4.2-26).

3.5.3 Process

System would automatically identify initial levels for personnel characteristics and training. To do this, system would first consult the Task Characteristic Map to identify the personnel characteristics relevant to each task type and the Task Description file to identify the task types associated with each task. The system would then consult the Performance Shaping Function Parameter Library to identify the mean characteristic and sustainment training levels for each task type.

The user would then provide estimates of the accuracy mean for each new system task.

3.5.4 User Interface

Figure 3.5.4-1 displays the user interface diagram for Step 3. Listed below are the descriptions of each block, including descriptions of screens, files, algorithms, and output reports associated with each block.

BLOCK 1 - See Screen 1-1. User could input initial accuracy measures, print/display reports, or save data.

BLOCK 2 - See Screen 2-1.

BLOCK 3 - See Screen 3-1.

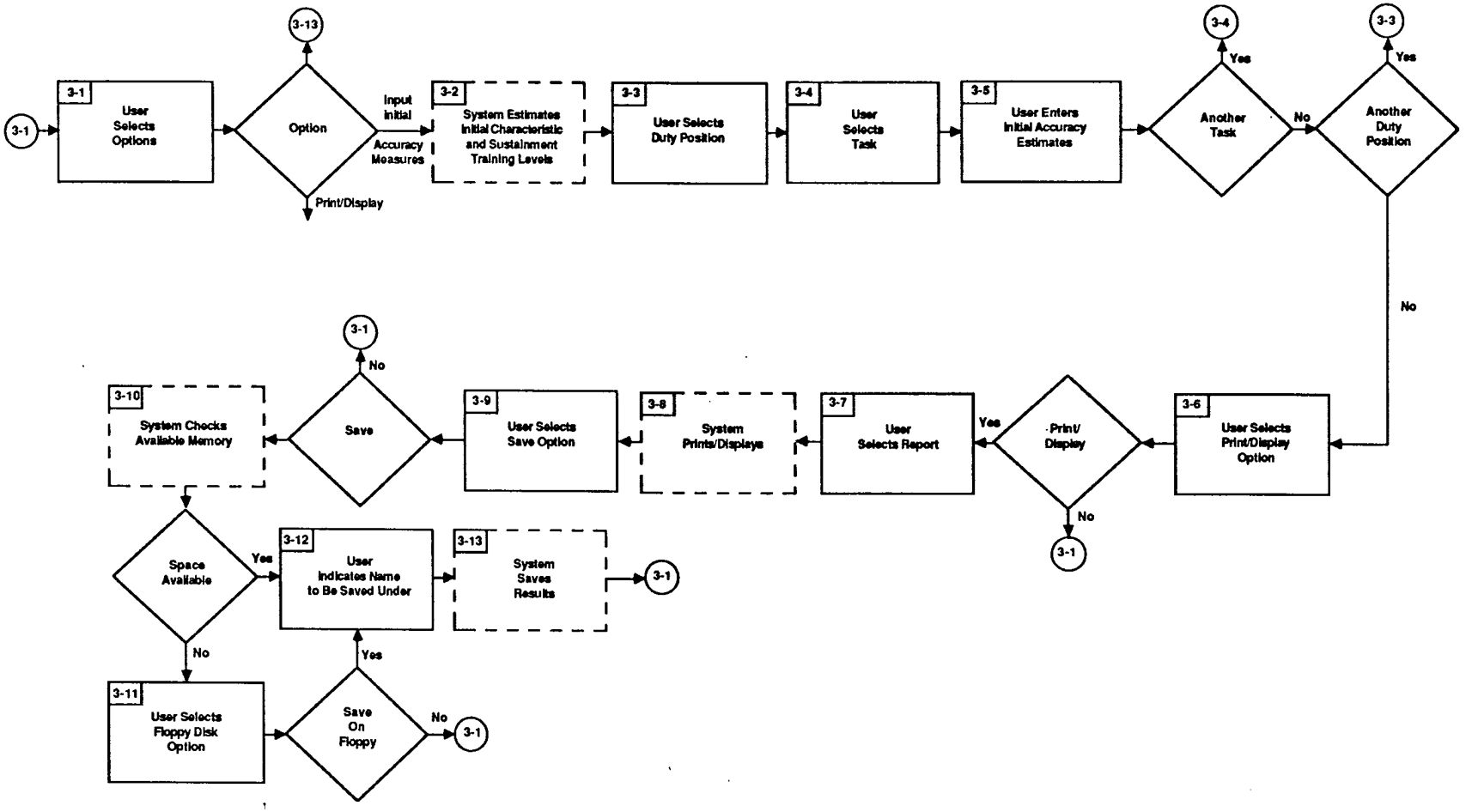


Figure 3.5.4-1. Step 3: Provide Initial Accuracy Estimates.

BLOCK 4 - See Screen 4-1.

BLOCK 5 - See Screen 5-1 to 5-3. User enters initial estimates of accuracy for each task. To assist him/her, values for specific baseline tasks or for the task type in general are displayed.

BLOCK 6 - See Screen 6-1.

BLOCK 7 - See Screen 7-1. Reports will be the Task Personnel Characteristic and Training (Table 7.3-19) and the Task Performance Data (Table 7.3-18).

BLOCK 8 - See Screens 8-1 to 8-4.

BLOCK 9 - See Screen 9-1.

BLOCK 10 - See Screen 10-1.

BLOCK 11 - See Screens 11-1 and 11-2.

BLOCK 12 - See Screen 12-1.

BLOCK 13 - See Screen 13-1. The Task Description File (Table 5.1-16) would be updated to include descriptions of initial characteristics and sustainment training levels and the initial accuracy estimates.

BLOCK 0-6 STEP 6-1

PATH: PREA>STEP 3>

MODE: WORK

Personnel Requirements Estimation Aid Main Menu

1. Perform Disk Utilities
2. Step 0 Load Input Files
3. Step 1 Assign Tasks to Task Types
4. Step 2 Assess Static Design Features
>5. Step 3 Provide Initial Accuracy Estimates<
6. Step 4 Describe Stressors
7. Step 5 Describe Sustainment Training Frequency
8. Step 6 Estimate Time and Accuracy
9. Step 7 Determine Performance Discrepancies
10. Step 8 Change Personnel Characteristic Levels
11. Exit PREA

Select choice with cursor control arrows and press <CR> when ready...

BLOCK 1 SCREEN 1-1

PATH: PREA>STEP 3> MODE: WORK

Personnel Requirements Estimation Aid Main Menu

1. Perform Disk Utilities
2. Step 0 Load Input Files
3. Step 1 Assign Tasks to Task Types
4. Step 2 Assess Static Design Features
>5. Step 3 Provide Initial Accuracy Estimates<
6. Step 4 Describe Stressors
7. Step 5 Describe Sustainment Training Frequency
8. Step 6 Estimate Time and Ac
9. Step 7 Determine Performanc
10. Step 8 Change Personnel Cha
11. Exit PREA

Input Initial Accuracy Measures
Print/Display Reports
Save Results

Select choice with cursor control arrows and press <CR> when ready...

BLOCK 2 SCREEN 2-1

PATH: PREA>STEP 3> MODE: WAIT

System is estimating initial characteristic and sustainment training levels.

BLOCK 3 SCREEN 3-1

PATH: PREA>STEP 3>

MODE: WORK

>Select< Esc
Select a duty position

Duty Positions available:
>Gunner< Cannon Crewmember Driver

Block 4 Screen 4-1

PATH: PREA>STEP 3>

MODE: WORK

Select Esc
Select a task

Duty Positions available:
Gunner Cannon Crewmember Driver

Select Tasks:
Identify Targets Select Targets Determine Target Range Determine Target Lead Select Ammunition Aim/Sight Weapon Fire Weapon Trans/Receive Messages Perf. Op/Maint M2B Gun

BLOCK 5 SCREEN 5-1

PATH: PREA>STEP 3>

MODE: WORK

>Enter↙ Instructions Esc

Enter mean accuracy data, press <CR> when complete.

Characteristics	Assumed Percentile Level
ASVAB Technical	55
Complex Perceptual Accuracy	48
Complex Perceptual Speed	53
Psychomotor	45

Assumed Sustainment Training Frequency: Once a quarter
Assumed job performance frequency: Once a week
Primary Task Type: Complex Psychomotor Discrete

Task:	Standard	Estimated mean accuracy (%)
Perform operator maint. on M2B machine gun	100% steps correct	

REFERENCE DATA:

Baseline Task:	Syst.	Stnd.	Estimated Accuracy at above
Perform operator maint. on M2 machine gun	M109A	100% STEPS CORRECT	.85

Estimated accuracy for all complex psychomotor tasks in library for MOS 13B at characteristic + task frequency levels = .65.

BLOCK 5 SCREEN 5-2

PATH: PREA>STEP 3>
MODE:WORK

Enter >Instructions< Esc
View Instructions

Estimate the mean (average) accuracy for the task given the listed levels of job performance frequency, sustainment training frequency, and personnel characteristics. Assume each task is performed under normal conditions with no stressors. To assist you, the mean level of accuracy for the baseline task(s) associated with your task are listed. Also listed is the mean level of accuracy for all tasks in the PREA library which are the same task type as your task.

BLOCK 5 SCREEN 5-3

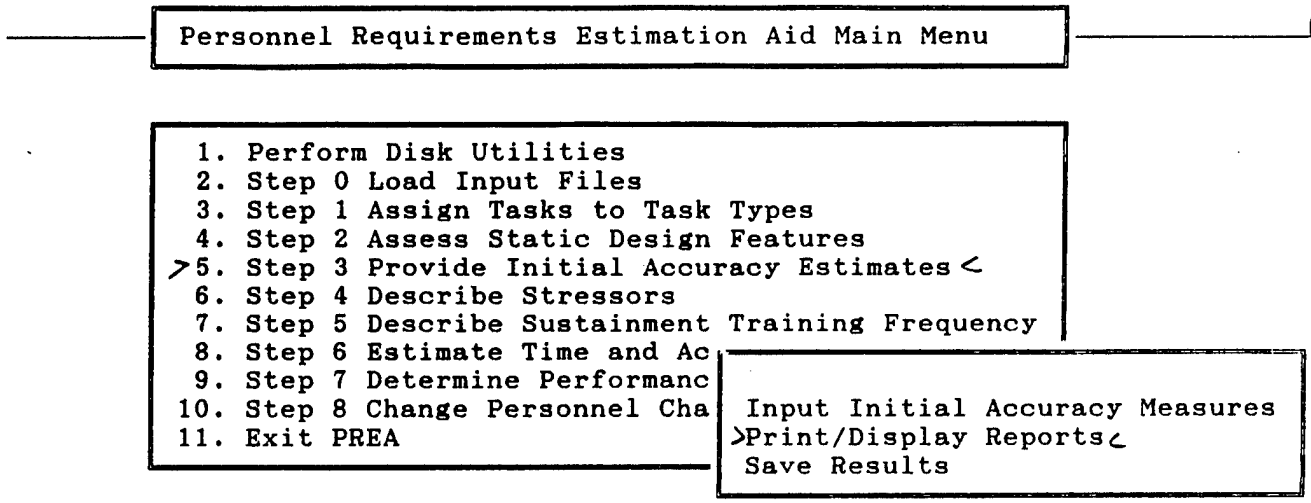
PATH: PREA>STEP 3> MODE: WORK

Another Task Another Position /Continue<

>Continue with next step of the PREA<

BLOCK 1 SCREEN 1-1

PATH: PREA>STEP 3> MODE: WORK



Select choice with cursor control arrows and press <CR> when ready...

BLOCK 6 SCREEN 6-1

PATH: PREA>STEP 3>DISPLAY> MODE: WORK

>Select↵ Esc

Select a print, display, or save option from list, then press <CR>

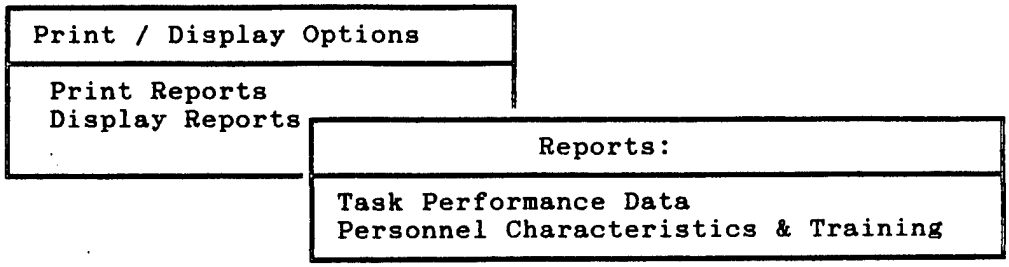
Print / Display Options
Print Reports Display Reports on Monitor

BLOCK 7 SCREEN 7-1

PATH: PREA>STEP 3>DISPLAY> MODE: WORK

Select Esc

Select a report for printing, then press <CR>

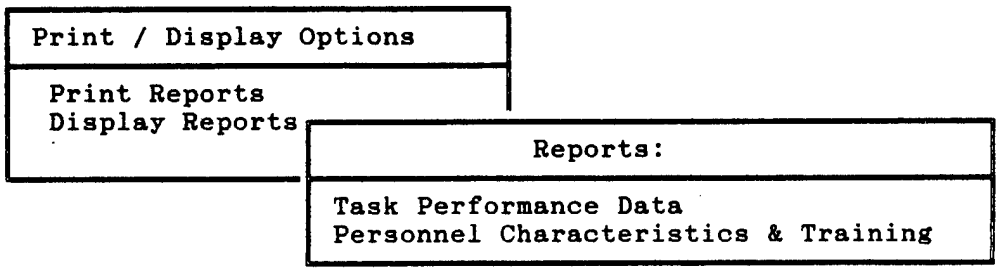


Block 8 screen 8-1

PATH: PREA>STEP 3>DISPLAY> MODE: WAIT

Select Esc

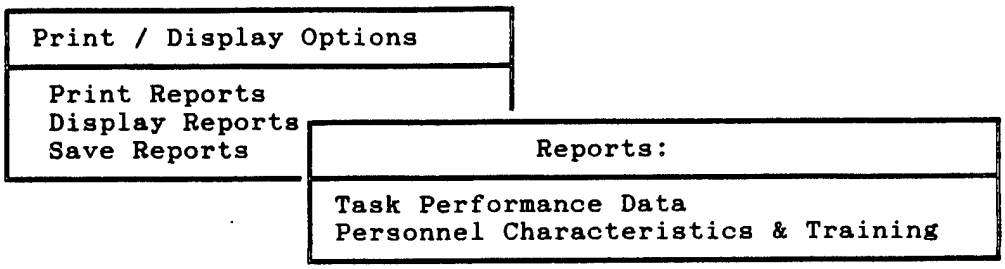
Select a report for printing, then press <CR>



Report is being printed.....

BLOCK 8 SCREEN 8-2

PATH: PREA>STEP 3>DISPLAY> MODE: WORK
Select Esc
Select a report for printing, then press <CR>



Report is being printed..... ready.

Task Performance Data

System _____ System Design _____ Date _____

Duty Position _____ Condition Set _____ Mission _____

Performance Requirements						Current Time and Accuracy Estimates		Equipment Task Element Data				
									Time		Accuracy	
Task	Parent Function	Function Accuracy Weight	Time	Accuracy Standard	Criteria	Time	Accuracy	Equip. Element	LAG	Max. Rate	Inherent Standard	Accuracy Criteria

		Current Time and Accuracy Estimates		Equipment Task Element Data				
					Time		Increment Accuracy	
Task Element	Parent Task	Time	Accuracy	Equip. Element	LAG	Maximum Rate	Standard	Criteria

BLOCK 8 SCREEN 8-3

Task Personnel Characteristics and Training

System _____ System Design _____ Date _____

Duty Position _____ MOS/Skill Level _____

Task/ Task Element	Level	Parent Task Function	Characterisitc	Level	Sustainment Training Frequency	Job Training Frequency

Block 8 Screen 8-4

Block 6 Screen 6-1

```
 PATH: PREA>STEP 3>DISPLAY>                                    MODE: WORK
>Select↵   Esc
  Select a print, display, or save option from list, then press <CR>
```

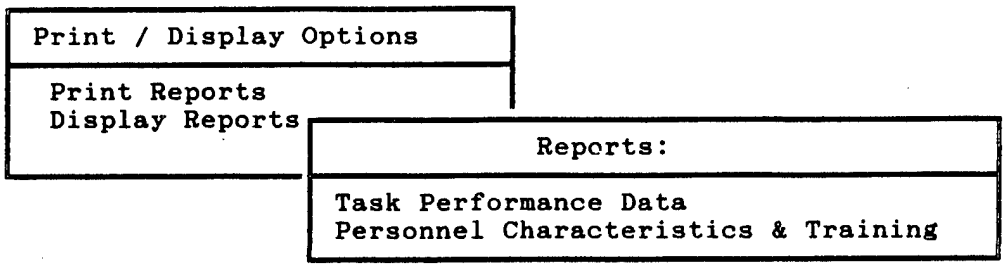
Print / Display Options
Print Reports >Display Reports on Monitor↵

Block 7 screen 7-1

PATH: PREA>STEP 3>DISPLAY> MODE: WORK

>Select< Esc

Select a report for displaying, then press <CR>



BLOCK 9 SCREEN 9-1

PATH: PREA>STEP 3>

MODE: WORK

Personnel Requirements Estimation Aid Main Menu

1. Perform Disk Utilities
2. Step 0 Load Input Files
3. Step 1 Assign Tasks to Task Types
4. Step 2 Assess Static Design Features
>5. Step 3 Provide Initial Accuracy Estimates<
6. Step 4 Describe Stressors
7. Step 5 Describe Sustainment Training Frequency
8. Step 6 Estimate Time and Ac
9. Step 7 Determine Performanc
10. Step 8 Change Personnel Cha
11. Exit PREA

Input Initial Accuracy Measures
Print/Display Reports
Save Results

Select choice with cursor control arrows and press <CR> when ready...

NOTE: System is checking availability of memory for saving data

-BLOCK 11 SCREEN 11-1

PATH: PREA>STEP 5>SAVE
Floppy : Quit
Save report to floppy diskette

MODE: WAIT

NOTE: System is checking availability of memory for saving data.

NOTE: Insufficient memory available for saving.

BLOCK 11 SCREEN 11-2

PATH: PREA>STEP 5>SAVE MODE: WAIT

>Floppy⊆ Quit
Save report to floppy diskette

Insert Floppy diskette and hit <cr>,

Report(s) are being saved on floppy diskette.

BLOCK 12 SCREEN 12-1

PATH: PREA>STEP 5>SAVE>

MODE: WORK

Insert name of file to be saved: uh-60a.doc

BLOCK 13 SCREEN 13-1

PATH: PREA>STEP 5>SAVE>

MODE: WORK

Insert name of file to be saved: uh-60a.doc

System is saving file UH-60A.doc.

3.6 STEP 4: ASSESS STRESSORS

3.6.1 Output

During this step, all of the input data needed to assess the impact of six key stressors on task performance is collected. These stressors are heat, humidity, MOPP gear, cold, noise, and lack of sleep.

3.6.2 Input

External Input. The user may be required to input data on a small number of input variables needed to assess stressor impacts. Most of the input variables needed to make these assessments will be derived from the System Conditions File produced by Product 1. However, there a small number of additional variables on which information is needed to assess stressor impact. In addition, the users of Product 1 may not have provided input on all the conditions variables needed to determine stressor impacts. Table 3.6.2-1 summarizes the inputs needed to assess each stressor and the expected sources for these inputs.

Internal Input. Files providing input to this step are the System Condition Set Description (see Table 5.1-10) and the System Missions (see Table 5.1-11) which are produced by Product 1; Product 5, Task Parameter Description File, that lists the condition sets associated with each design task as well as initial estimates of task time and accuracy, the Task Parameter File that lists the task types associated with each task, and the Mission Completion File, provided by Product 5, that provides an initial estimate of Mission length.

Table 3.6.2-1. Data for Stressor-System Condition Linkages

STRESSOR	SYSTEM CONDITIONS	OTHER INPUT DATA	COMMENTS
Heat Humidity	• Temperature • Wind Velocity • % Relative Humidity • MOPP Level	Initial Task Time (From Product 5)	——
		Vehicle Temperature (User Input)	Minimum and Maximum Values Entered Once for Entire system
		Vehicle % Relative Humidity (User Input)	Minimum and Maximum Values Entered Once for Entire System
		Maximum Allowable System Task Performance Rate(User Input)	Entered for Tasks Which Have Rate Performance Measures Associated with Them
MOPP	• MOPP Level • Temperature • % Relative Humidity	Vehicle Temperature (User Input)	See Above
		Vehicle % Relative Humidity (User Input)	See Above
Cold	• Wind Velocity • Temperature • MOPP Level	Gloves On/Off (User Input)	Entered Once for Entire System
		Other Exposed Flesh (User Input)	Only Entered if MOPP Gear not Worn, Default Value (Face Exposed). Entered Once for Entire System
		Vehicle Temperature (User Input)	See Above
Noise		Constant Ambient Noise (In SPL) - Outside Vehicle (User Input)	Entered Once for Entire System Default Value Will be 55db
		Constant Ambient Noise (In SPL) - Inside Vehicle (User Input)	Entered Once for Entire System Default Value Will be 70db
		Constant Internal Noise Associated with Vehicle Operation (User Input)	Entered Once for Entire System
		Variable Internal Noise Associated with Vehicle Operation (User Input)	Only Entered if Vehicle Operational Noise Changes with Speed Up, Maneuvering etc. Entered Once for Entire System
		Time Duration of Variable Noise Associated with Vehicle Operation (User Input)	Entered Once for Entire System. Only Entered if Variable Internal Noise Present.
		Maximum Rate of Fire (User Input)	Entered for Each Firing Task
		Noise Level Associated with Each Firing (User Input)	Entered for Each Firing Task
		Average Speaker Listener Distance (User Input)	Only Entered for Communicating Face-To-Face Tasks
Continuous Operations		Number of Hours in Last Sleep Before Mission (User Input)	Only Entered Once for Entire System. Default Value = 6.
		Number of Days Without Sleep (User input)	Only Entered Once for Entire System. Default Value = 0.
		Mission Length (From Product 5)	——

Also providing input to this step is the Stressor-System Condition library that lists the input data needed to assess each stressor and the Task Characteristic Map that lists the stressors associated with each task type.

3.6.3 Process

The user first selects a condition set and mission. The system then examines the Stressor-System Condition Library to determine the data needed to assess each stressor. It then examines the System Condition File (Table 5.1-10), the Product 5 Task Parameter Description File (Table 5.1-14), the Task Parameter Description File (Table 5.1-16) to determine what data is available in existing files. The user is then required to enter data for any missing input variables.

3.6.4 User Interface

Figure 3.6.4-1 displays the user interface diagram for Step 4. Listed below are the descriptions of each block, including descriptions of screens, files, algorithms, and output reports associated with each block.

BLOCK 1 - See Screen 1-1. The options presented are: (a) describe stressor conditions, (b) print or display reports, or (c) save results.

BLOCK 2 - See Screens 2-1 and 2-2. The first menu will allow the user to a condition set from one of those menus listed in the System Conditions File (see Table 5.1-10). The second menu will allow the user to select a mission from one of the missions listed in the System Missions File (see Table 5.1-11).

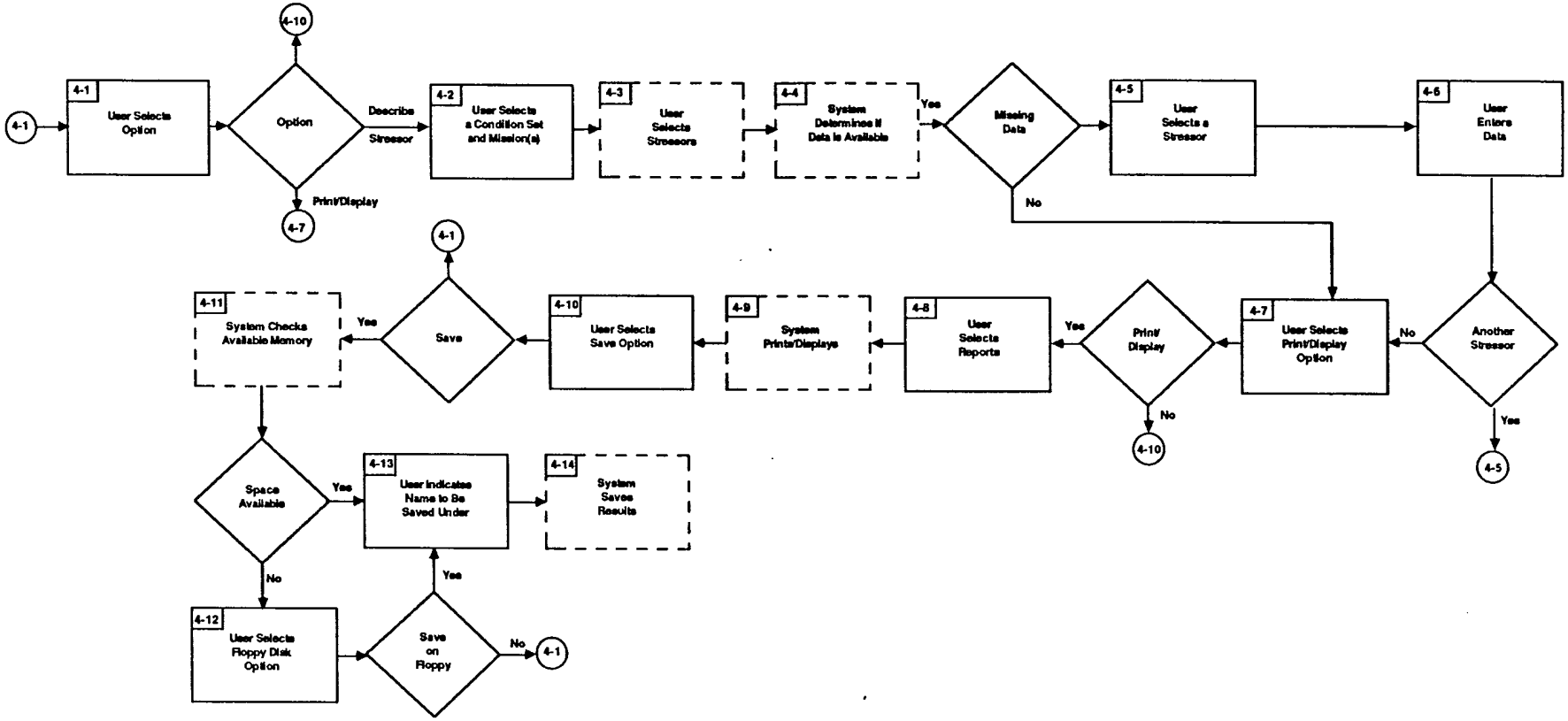


Figure 3.6.4-1. Step 4: Describe Stressor Conditions.

BLOCK 3 - See Screen 3-1.

BLOCK 4 - See Screens 4-1 and 4-2. The system will then determine what data is required for each stressor and determine if this data is available in existing data files.

BLOCK 5 - See Screen 5-1.

BLOCK 6 - See Screens 6-1 to 6-4. Input forms will be presented to ask the user to fill in any missing input values needed for the Stressor Degradation Algorithm (see Section 6.7). There should be few of these values missing since most of the input data can be derived from system conditions. Input data will be grouped under the appropriate stressor.

BLOCK 7 - See Screen 7-1.

BLOCK 8 - See Screen 8-1. Reports include the System Conditions (See Table 7.3-7) and the Stressor Condition List (see Table 7.3-8).

BLOCK 9 - See Screens 9-1 to 9-4.

BLOCK 10 - See Screen 10-1.

BLOCK 11 - See Screen 11-1.

BLOCK 12 - See Screens 12-1 and 12-2.

BLOCK 13 - See Screen 13-1.

BLOCK 14 - See Screen 14-1. The File saved will be the Stressor-Condition Description (see Table 5.1-12). The Task Parameter

Description Library (See Table 5.1-16) will also be updated to record the stressor conditions associated with particular tasks. The System List File (Table 5.1-1) will also be updated to record step completion.

BLOCK 0-6 SCREEN 6-1

PATH: PREA>STEP 4> MODE: WORK

Personnel Requirements Estimation Aid Main Menu

1. Perform Disk Utilities
2. Step 0 Load Input Files
3. Step 1 Assign Tasks to Task Types
4. Step 2 Assess Static Design Features
5. Step 3 Provide Initial Accuracy Estimates
>6. Step 4 Describe Stressors<
7. Step 5 Describe Sustainment Training Frequency
8. Step 6 Estimate Time and Accuracy
9. Step 7 Determine Performance Discrepancies
10. Step 8 Change Personnel Characteristic Levels
11. Exit PREA

Select choice with cursor control arrows and press <CR> when ready...

Block 1 screen 1-1

PATH: PREA>STEP 4> MODE: WORK

Personnel Requirements Estimation Aid Main Menu

1. Perform Disk Utilities
2. Step 0 Load Input Files
3. Step 1 Assign Tasks to Task Types
4. Step 2 Assess Static Design Features
5. Step 3 Provide Initial Accuracy Estimates
6. Step 4 Describe Stressors
7. Step 5 Describe Sustainment Training Frequency
8. Step 6 Estimate Time and Ac
9. Step 7 Determine Performanc
10. Step 8 Change Personnel Cha
11. Exit PREA

>Describe Stressors<
Print/Display Reports
Save Results

Select choice with cursor control arrows and press <CR> when ready...

BLOCK 2 SCREEN 2-1

PATH: PREA>STEP 4> MODE: WORK

>Select↵ Esc

Select a condition set, press <CR> when complete

Condition Sets Available:
>Middle East↵ Central Europe

Block 2 Screen 2-2

PATH: PREA>STEP 4> MODE: WORK

>Select< Esc

Select a mission; press <CR> when complete

Condition Sets Available:
>Middle East< Central Europe

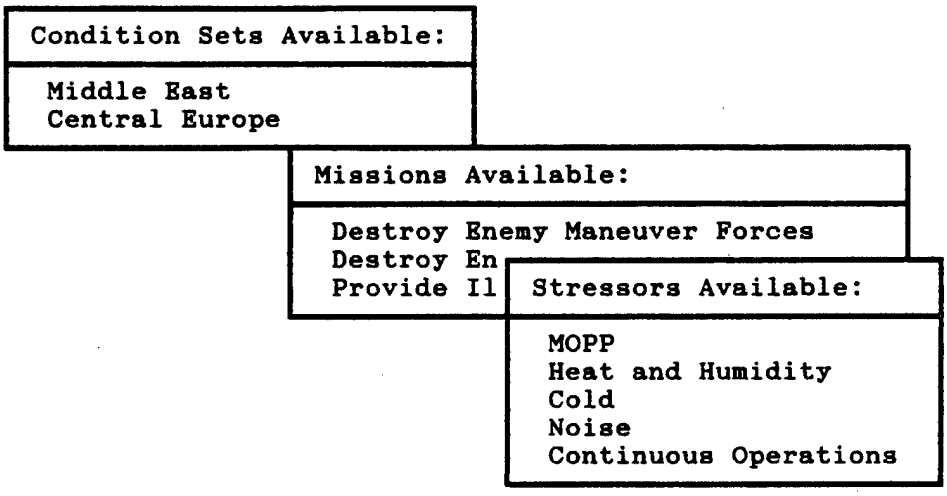
Missions Available:
>Destroy Enemy Maneuver Forces < Destroy Enemy Fire Support Forces Provide Illunimation

BLOCK 3 SCREEN 3-1

PATH: PREA>STEP 4> MODE: WORK

>Select< Esc

Select one or more stressors, then press <CR> when complete



Block 4 screen 4-1

PATH: PREA>STEP 4>

MODE: WAIT

System is determining if data are available.

BLOCK 4 SCREEN 4-2

PATH: PREA>STEP 4>
>Select ESC

MODE: WAIT

System is determining if data are available.

Some data are missing. Press <CR> to view screens for inputting data, press ESC to quit.

<CR>

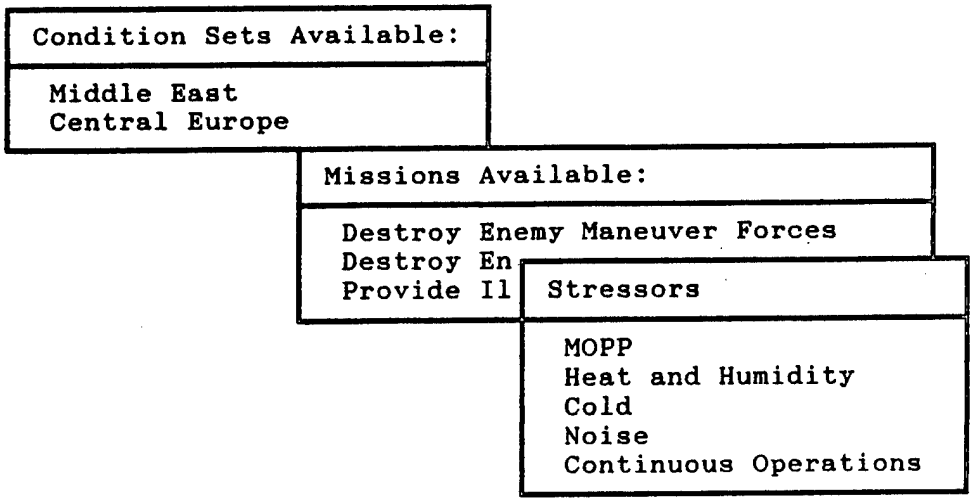
BLOCK 5 SCREEN 5-1

PATH: PREA>STEP 4>

MODE: WORK

>Select< Esc

Select stressor with missing data, then press <CR> when complete



BLOCK 6 SCREEN 6-1

PATH: PREA>STEP 4>
>Enter< Esc
Enter data

MODE: WORK

Stressor: Heat / Humidity

Vehicle Temperature (in degrees F) _____

Vehicle Relative Humidity (%) _____

BLOCK 6 SCREEN 6-2

PATH: PREA>STEP 4>

MODE: WORK

>Enter< Esc
Enter data

Stressor: MOPP

Vehicle Temperature (in degrees F) _____

Vehicle Relative Humidity (%) _____

BLOCK 6 SCREEN 6-3

PATH: PREA>STEP 4>
MODE:WORK

>Enter< Esc
Enter data

Stressor: Heat / Humidity or MOPP

Listed below are the carrying, lifting or lowering tasks associated with your system. Please enter the data associated with each task

CARRYING Tasks	Load Wt (kg)	Width (cm)
Load ammunition	_____	_____

LIFTING Tasks	Load Wt. (kg)	Width (cm)	Length(cm)	Height (cm)
Load cannon	_____	_____	_____	_____
Unload cannon	_____	_____	_____	_____

TORQUING Tasks	Torque (ft. lbs)	# hands	Max. Displacement (cm)
Replace battery	_____	_____	_____
Replace tire	___	_____	_____

BLOCK 6 SCREEN 6-4

PATH: PREA>STEP 4>
Enter Esc
Enter data

MODE: WORK

Stressor: Cold

Is face exposed? (Y/N) Y

Are gloves worn during mission? (Y/N) Y

Block 6 screen 6-5

PATH: PREA>STEP 4> MODE: WORK

>Select< Esc

Select tasks in which gloves are worn

Stressor: Cold

Is face exposed? (Y/N) Y

Are gloves worn during mission? Y

Tasks:
Identify Targets
Select Targets
Determine Target Range
Determine Target Lead
Select Ammunition
Aim/Sight Weapon
Fire Weapon
Trans/Receive Messages

BLOCK 6 SCREEN 6-7

PATH: PREA>STEP 4>

MODE: WORK

> Enter↙ Esc
Enter data

Stressor: Continuous Operations

Number of days without sleep _____

Number hours of sleep, last sleep period before mission _____

Block 6 Screen 6-8

PATH: PREA>STEP 4> MODE: WORK
Enter Esc
Enter data, press <CR> when complete

Stressor: Noise

Constant ambient noise (in SPL) outside vehicle _____

Constant ambient noise (in SPL) while inside vehicle _____

Constant internal noise (in SPL) associated w/ normal vehicle operations. _____

Variable internal noise (in SPL) associated w/ vehicle accelerating, thrusting, etc. _____

Time duration of variable noise listed above (in minutes) _____

Maximum rate of fire (in rounds per minute) _____

Noise (in SPL) associated with each firing _____

Avg. speaker-listener distance (in feet) for face-to-face communication _____

Is noise protection gear worn (Y/N) _____

BLOCK 6 SCREEN 6-9

PATH: PREA>STEP 4>
MODE:WORK
Enter Esc
Enter data

Stressor: Noise

Select type of noise protection gear to be worn

QPL MUFFS[2]
TYPE I
Amer. Optical 1200
Amer. Optical 1700
David Clark 117
MSA Mark II
TYPE II
DAVID CLARK E-310
Over the Head
Behind the Head
Under the Chin
MSA MARK IV
Over the Head
Behind the Head
Under the Chin
GN — 900
Over the Head
Behind the Head
Under the Chin
INSERTS
V-51R
Flents
Comfit (Triple Flange)
COMBINATIONS
Amer. Optical 1200 plus V-51R
Amer. Optical 1700 plus V-51R
David Clark 117 plus V-51R
MSA Mark II plus V-51R
HELMETS
HGU-26/P with H-154(A)
HGU-26/P with 17P
HGU-26/P with Custom Liner
COMMUNICATIONS
H-133 (ground)
H-157 (in flight)
H-78C (in flight)*

BLOCK 1 SCREEN 1-1

PATH: PREA>STEP 4>DISPLAY> MODE: WORK

Personnel Requirements Estimation Aid Main Menu

1. Perform Disk Utilities
2. Step 0 Load Input Files
3. Step 1 Assign Tasks to Task Types
4. Step 2 Assess Static Design Features
5. Step 3 Provide Initial Accuracy Estimates
6. Step 4 Describe Stressors
7. Step 5 Describe Sustainment Training Frequency
8. Step 6 Estimate Time and Ac
9. Step 7 Determine Performanc
10. Step 8 Change Personnel Cha
11. Exit PREA

Describe Stressors
>Print/Display Reports<
Save Results

Select choice with cursor control arrows and press <CR> when ready...

Block 7 Screen 7-1

PATH: PREA>STEP 4>DISPLAY> MODE: WORK

Select Esc

Select a print, display, or save option from list, then press <CR>

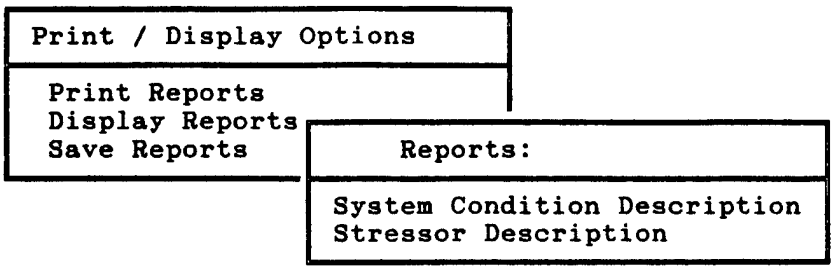
Print / Display Options
Print Reports Display Reports on Monitor

Block 8 Screen 8-1

PATH: PREA>STEP 4>DISPLAY> MODE: WORK

Select Esc

Select a report for printing, then press <CR>

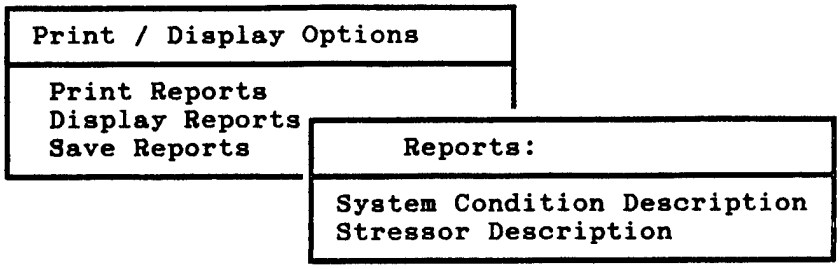


BLOCK 9 SCREEN 9-1

PATH: PREA>STEP 4>DISPLAY> MODE: WAIT

Select Esc

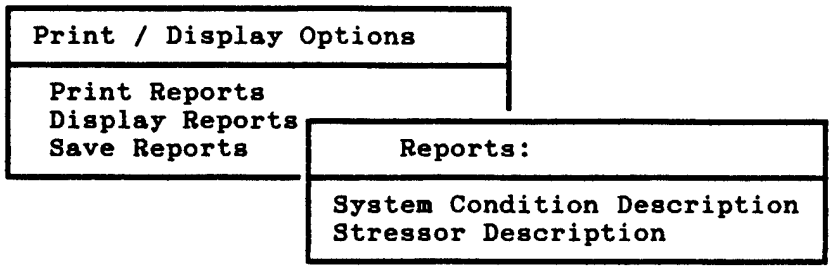
Select a report for printing, then press <CR>



Report is being printed.....

Block 9 Screen 9-2

PATH: PREA>STEP 4>DISPLAY> MODE: WORK
Select Esc
Select a report for printing, then press <CR>



Report is being printed..... ready.

System Conditions

System _____ System Design _____ Date _____

Condition Set _____ Mission _____

Condition	Value

BLOCK 9 SCREEN 9-3

Stressor Description

System _____ System Design _____ Date _____

Condition Set _____ Mission _____

Stressor	Related System Condition	System Condition Value	Additional Input Variable	Value

BLOCK 9 SCREEN 9-4

BLOCK 7 screen 7-1

PATH: PREA>STEP 4>DISPLAY> MODE: WORK
Select Esc
Select a print, display, or save option from list, then press <CR>

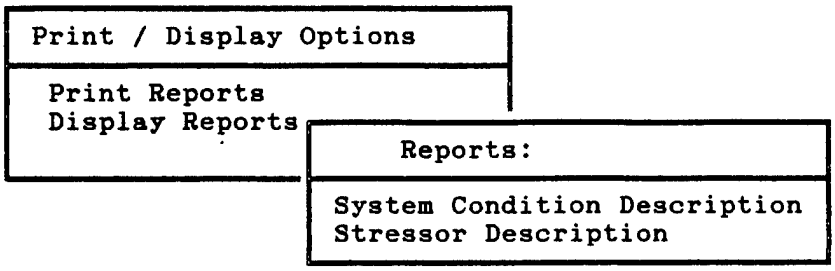
Print / Display Options
Print Reports >Display Reports on Monitor<

BLOCK 8 SCREEN 8-1

PATH: PREA>STEP 4>DISPLAY> MODE: WORK

Select Esc

Select a report for displaying, then press <CR>



Block 10 Screen 10-1

PATH: PREA>STEP 7>SAVE>

MODE: WORK

Personnel Requirements Estimation Aid Main Menu

1. Perform Disk Utilities
2. Step 0 Load Input Files
3. Step 1 Assign Tasks to Task Types
4. Step 2 Assess Static Design Features
5. Step 3 Provide Initial Accuracy Estimates
6. Step 4 Describe Stressors
7. Step 5 Describe Sustainment Training Frequency
8. Step 6 Estimate Time and Ac
9. Step 7 Determine Performanc
10. Step 8 Change Personnel Cha
11. Exit PREA

Describe Stressors
Print/Display Reports
>Save Results

Select choice with cursor control arrows and press <CR> when ready...

NOTE: System is checking availability of memory for saving data

Block 12 Screen 12-1

PATH: PREA>STEP 5>SAVE MODE: WAIT
Floppy : Quit
Save report to floppy diskette

NOTE: System is checking availability of memory for saving data.

NOTE: Insufficient memory available for saving.

BLOCK 12 SCREEN 12-2

PATH: PREA>STEP 5>SAVE MODE: WAIT
>Floppy< Quit
Save report to floppy diskette

Insert Floppy diskette and hit <cr>,

Report(s) are being saved on floppy diskette.

Block 13 screen 13-1

PATH: PREA>STEP 5>SAVE>

MODE: WORK

Insert name of file to be saved: uh-60a.doc

BLOCK 14 SCREEN 14-1

PATH: PREA>STEP 5>SAVE>

MODE: WORK

Insert name of file to be saved: uh-60a.doc

System is saving file UH-60A.doc.

3.7 STEP 5: DESCRIBE SUSTAINMENT TRAINING FREQUENCY

3.7.1 Output

The output of this step is a description of sustainment-task training frequency and recency for each task in the new system design. These elements are used in the performance shaping functions which predict task performance.

3.7.2 Input

External Input. The user estimates the frequency of sustainment training and the frequency of performance on the job.

Internal Input. Files providing input to this step are the Task List (Table 5.1-4), Job List (Table 5.1-7), and Task Parameter Description (Table 5.1-16).

The Baseline Task Parameter File (Tables 4.2-15 and 4.2-16) will also provide input to this step.

3.7.3 Process

The user would enter the sustainment training and job performance frequency estimates. The user can examine baseline task values to assist him or her in identifying these values. Once entered, the system will apply the Training Frequency and Recency Estimation Algorithm (section 6.4) to convert the frequency estimates into the frequency and recency scale estimates needed by the PREA performance shaping functions.

3.7.4 User Interface

Figure 3.7.4-1 displays the user interface diagram for Step 6. Listed below are the descriptions of each block, including descriptions of screens, files, algorithms, and output reports associated with each block.

BLOCK 1 - Refer to Screen 1-1. The menu will allow the user to generate a description of sustainment training frequency, save results and print or display a report.

BLOCK 2 - See Screen 2-1.

BLOCK 3 - See Screen 3-1. User would enter sustainment training and on-the-job frequency estimates.

BLOCK 4 - See Screen 4-1 and 4-2. The system will apply the Sustainment Training Frequency and Recency Estimation Algorithm (see Table 6.4). When calculations are completed, users will be asked if they want to enter data for another duty position.

BLOCK 5 - See Screen 5-1.

BLOCK 6 - See Screen 6-1. The reports would be the Sustainment Training By Task report (See Table 7.3-13) and the Task Description Report (Table 7.3-16).

BLOCK 7 - See Screens 7-1 and 7-2.

BLOCK 8 - Refer to Screen 8-1.

BLOCK 9 - Refer to Screen 9-1.

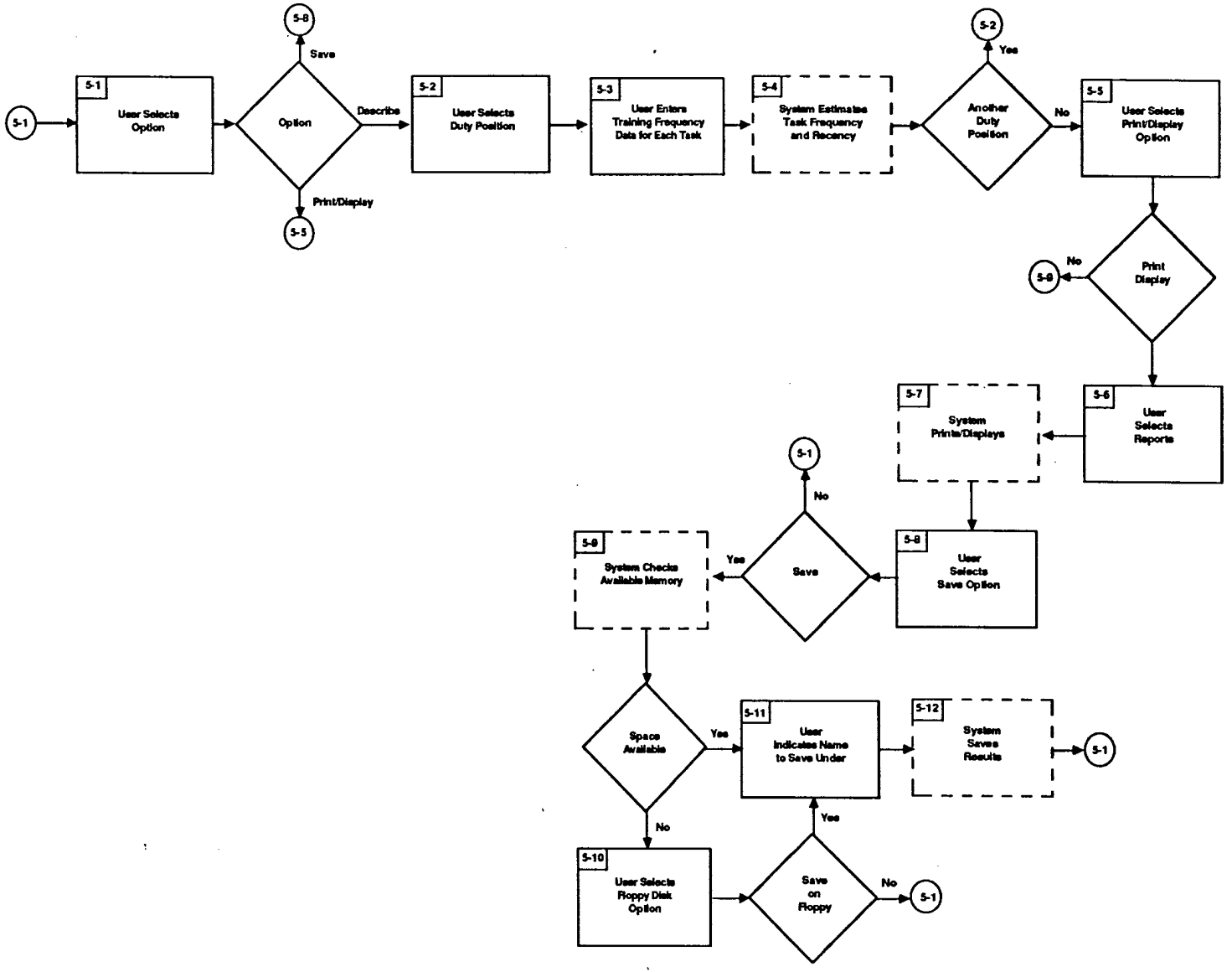


Figure 3.7.4-1. Step 5: Describe Sustainment Training.

BLOCK 10 - Refer to Screens 10-1 and 10-2.

BLOCK 11 - Refer to Screen 11-1.

BLOCK 12 - Refer to Screen 12-1. The Task Parameter Description Library (See Table 5.-16) will be updated to record sustainment training frequency and recency for each task. The system list will be updated to record completion of the step.

BLOCK 0-6 SCREEN 6-1

PATH: PREA>STEP 0>COMPLETE MODE: WORK

Continue Esc

Select Step

Personnel Requirements Estimation Aid Main Menu

1. Perform Disk Utilities
2. Step 0 Load Input Files
3. Step 1 Assign Tasks To Task Types
4. Step 2 Assess Static Design Features
5. Step 3 Provide Initial Accuracy Estimates
6. Step 4 Describe Stressors
>7. Step 5 Describe Sustainment Training Frequency<
8. Step 6 Estimate Time and Accuracy
9. Step 7 Determine Performance Discrepancies
10. Step 8 Change Personnel Characteristic Levels
11. Exit PREA

BLOCK 1 SCREEN #1

PATH: PREA>STEP 5>

MODE: WORK

Personnel Requirements Estimation Aid Main Menu

1. Perform Disk Utilities
2. Step 0 Load Input Files
3. Step 1 Assign Tasks To Task Types
4. Step 2 Assess Static Design Features
5. Step 3 Provide Initial Accuracy Estimates
6. Step 4 Describe Stressors
7. Step 5 Describe Sustainment Training Frequency
8. Step 6 Estimate Time and Ac
9. Step 7 Determine Performanc
10. Step 8 Change Personnel Cha
11. Exit PREA

>Describe Sust. Training<
Print/Display Results
Save Results

Select choice with cursor control arrows and press <CR> when ready...

BLOCK 2 SCREEN 2-1

PATH: PREA>STEP 5>

MODE: WORK

>Select↙ Esc

Select Duty Position, then press <CR>

Duty Positions:
Gunner Cannon Crewmember Driver

PATH: PREA>STEP 5>
>Frequency< Esc
Estimate Task Frequency

MODE: WORK

Frequency Scale:
a. Once a week b. Once a month c. Once every two months d. Once a quarter e. Once every six months f. Once a year g. Less than once a year

BASELINE TASK:

Identify Targets M190A)

DUTY POSITION:

Gunner

Task	Job Perf. Freq.	Sust. Training Freq.
>Identify Targets	a	b
Select Targets		
Determine Target Range		
Determine Target Lead		
Select Ammunition		
Arm / Sight Weapon		
Fire		

Baseline task values listed where available

BLOCK 4 SCREEN 4-1

PATH: PREA>STEP 5>

MODE: WORK

System is estimating task frequency and recency.

BLOCK 4 SCREEN 4-2

PATH: PREA>STEP 5> MODE:

>Position< Continue Esc

Select another duty position

PATH: PREA>STEP 5> MODE: WORK

Personnel Requirements Estimation Aid Main Menu

1. Perform Disk Utilities
2. Step 0 Load Input Files
3. Step 1 Assign Tasks To Task Types
4. Step 2 Assess Static Design Features
5. Step 3 Provide Initial Accuracy Estimates
6. Step 4 Describe Stressors
7. Step 5 Describe Sustainment Training Frequency
8. Step 6 Estimate Time and Ac
9. Step 7 Determine Performanc
10. Step 8 Change Personnel Cha
11. Exit PREA

Describe Sust. Training
>Print/Display Results<
Save Results

Select choice with cursor control arrows and press <CR> when ready...

BLOCK 5 SCREEN 5-1

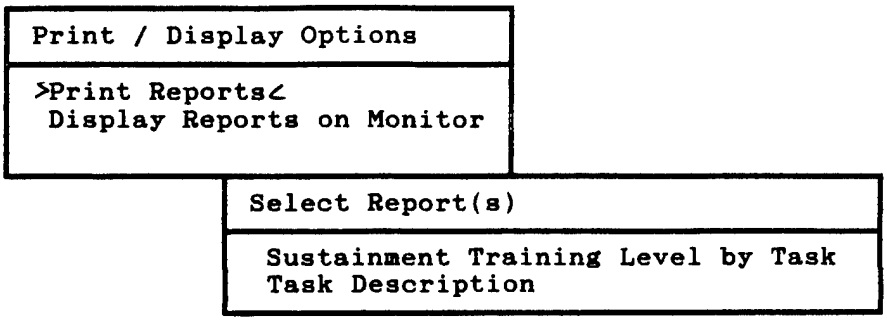
```
PATH: PREA>STEP 5>DISPLAY>                                    MODE: WORK
>Select<   Esc
  Select a print, display, or save option from list, then press <CR>
```

Print / Display Options
>Print Reports< Display Reports on Monitor

PATH: PREA>STEP 5>DISPLAY> MODE: WORK

>Select↙ Esc

Select a print, display, or save option from list, then press <CR>



Sustainment Training Level by Task

System _____ System Design _____

Duty Position _____ Date _____

Task	Sustainment Training Frequency	Job Performance Frequency

BLOCK 7 SCREEN 7-1

Task Description

System _____ System Design _____ Date _____

Duty Position _____ MOS/Skill Level _____

TASK DESCRIPTION								Baseline Task	Task Element Description				
Task	System Function	Task Types							Task Types				
		Type	%	Type	%	Type	%		Elements	Type	%	Type	%

Block 7 Screen 7-2

Block 5 Screen 5-1

PATH: PREA>STEP 5>DISPLAY> MODE: WORK

>Select↵ Esc

Select a print, display, or save option from list, then press <CR>

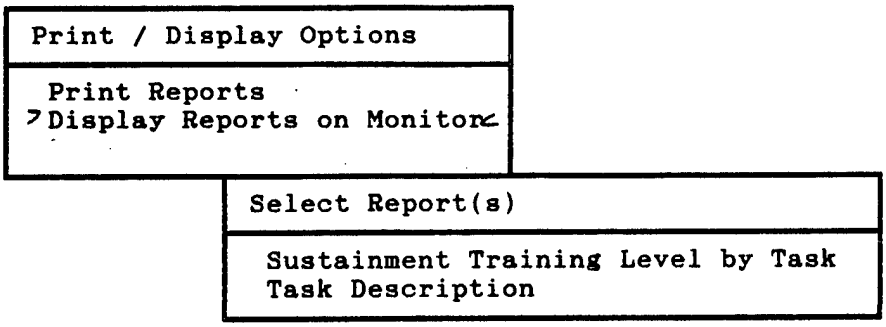
Print / Display Options
Print Reports >Display Reports on Monitor<

Block 6 screen 6-1

PATH: PREA>STEP 5>DISPLAY> MODE: WORK

>Select< Esc

Select a print, display, or save option from list, then press <CR>



Block 8 screen 8-1

PATH: PREA>STEP 5>SAVE> MODE: WORK

Personnel Requirements Estimation Aid Main Menu

1. Perform Disk Utilities
2. Step 0 Load Input Files
3. Step 1 Describe Equipment
4. Step 2 Assess Static Design Features
5. Step 3 Provide Initial Accuracy Estimates
6. Step 4 Describe Stressors
7. Step 5 Describe Sustainment Training Frequency
8. Step 6 Estimate Time and Ac
9. Step 7 Determine Performanc
10. Step 8 Change Personnel Cha
11. Exit PREA

Change Character. Levels
Print/Display Results
>Save Results<

Select choice with cursor control arrows and press <CR> when ready...

BLOCK SCREEN 9-1

PATH: PREA>STEP 5>SAVE>

MODE: WORK

NOTE: System is checking availability of memory for saving data

BLOCK 10 SCREEN 10-1

PATH: PREA>STEP 5>SAVE MODE: WAIT

Floppy : Quit
Save report to floppy diskette

NOTE: System is checking availability of memory for saving data.

NOTE: Insufficient memory available for saving.

BLOCK 10 SCREEN 10-2

PATH: PREA>STEP 5>SAVE MODE: WAIT

>Floppy< Quit

Save report to floppy diskette

Insert Floppy diskette and hit <cr>.

Report(s) are being saved on floppy diskette.

BLOCK 11 SCREEN 11-1

PATH: PREA>STEP 5>SAVE>

MODE: WORK

Insert name of file to be saved: uh-60a.doc

BLOCK 12 SCREEN 12-1

PATH: PREA>STEP 5>SAVE>

MODE: WORK

Insert name of file to be saved: uh-60a.doc

System is saving file UH-60A.doc.

3.8 STEP 6: ESTIMATE TIME AND ACCURACY

3.8.1 Output

During this step, the system will produce estimates of time and accuracy that reflect personnel characteristic levels, sustainment training frequency, and stressor conditions.

Also during this step, the user will describe "independent" equipment task elements and their impact on task time and accuracy. These independent equipment task elements are task elements which cannot be affected by human task performance or the human task interface. For example, the system may have a time lag built into the equipment. Even if the human performs his/her job perfectly, this time lag cannot be eliminated. Independent equipment task elements must be identified so that they are not modified by the performance shaping functions or stressor degradation algorithms.

3.8.2 Input

External Input. The user must enter in the description of independent equipment task elements (that is equipment functions whose performance is independent of human task performance). For all tasks that have task elements, the user must describe the contribution that each of these task elements makes to overall task performance time or accuracy. The system will automatically estimate time and accuracy by applying the performance shaping functions.

Internal Input. Files providing input to this step are the Task List (Table 5.1-4), Job List (Table 5.1-7), the Task Parameter

Description (Table 5.1-16), Product 5 Task Parameter Description (Table 5.1-14), Stressor Condition Description (Table 5.1-12), and Characteristic List by Duty Position (Table 5.1-18).

Libraries providing input to this step are the Baseline Task Parameter Library (Tables 4.2-15 and 4.2-16), the Task Element Structure File (Tables 4.2-23 and 4.2-24), and the Performance Shaping Function Parameter Library (Tables 4.2-27 and 4.2-28).

3.8.3 Process

The user first determines if he or she wants to estimate time and accuracy, or describe the contribution of independent equipment task elements.

If the user decides to estimate time and accuracy, the system will first determine if all input data needed to make these accuracy estimates is present. If it is, the system will then apply the Performance Shaping Functions (see Section 6.6) and the Stressor Degradation Algorithms (see Section 6.7). If there is missing data, the user is directed back to the appropriate step where data must be entered.

If the user decides to describe independent equipment task elements, the system will first identify which tasks are likely to have independent equipment task elements by identifying independent equipment elements typically associated with the system functions associated with each task. The user must then describe the contribution of these independent equipment task elements to overall task time and accuracy.

3.8.4 User Interface

Figure 3.8.4-1 displays the user interface diagram for Step 6. Listed below are the descriptions of each block, including descriptions of screens, files, algorithms, and output reports associated with each block.

BLOCK 1 - Refer to Screen 1-1. The menu will allow the user to estimate time and accuracy by applying the performance shaping functions, describe contribution of independent equipment task elements, print or display reports, or save data.

BLOCK 2 - See Screens 2-1 and 2-2.

BLOCK 3 - See Screen 3-1.

BLOCK 4 - Turn to Screen 4-1. The system will apply the New System Design Missing Data Algorithm (see Section 6.12) to determine if any of the data needed to apply the Performance Shaping Functions (6.6) and the Stressor Degradation Algorithm (6.8) is missing. If there is no missing data, the system will display this message to the user.

BLOCK 5 - See Screen 5-1. The system will display the type(s) of missing data that are missing. The user must then select which type of missing data he would like to deal with first.

BLOCK 6 - See Screen C-1.

BLOCK 7 - See Screens 7-1 and 7-2.

BLOCK 8 - See Screen 8-1. The system will apply Performance Shaping Functions (Section 6.6) that estimate time and accuracy given particular values for characteristics levels, sustainment training, and equipment design.

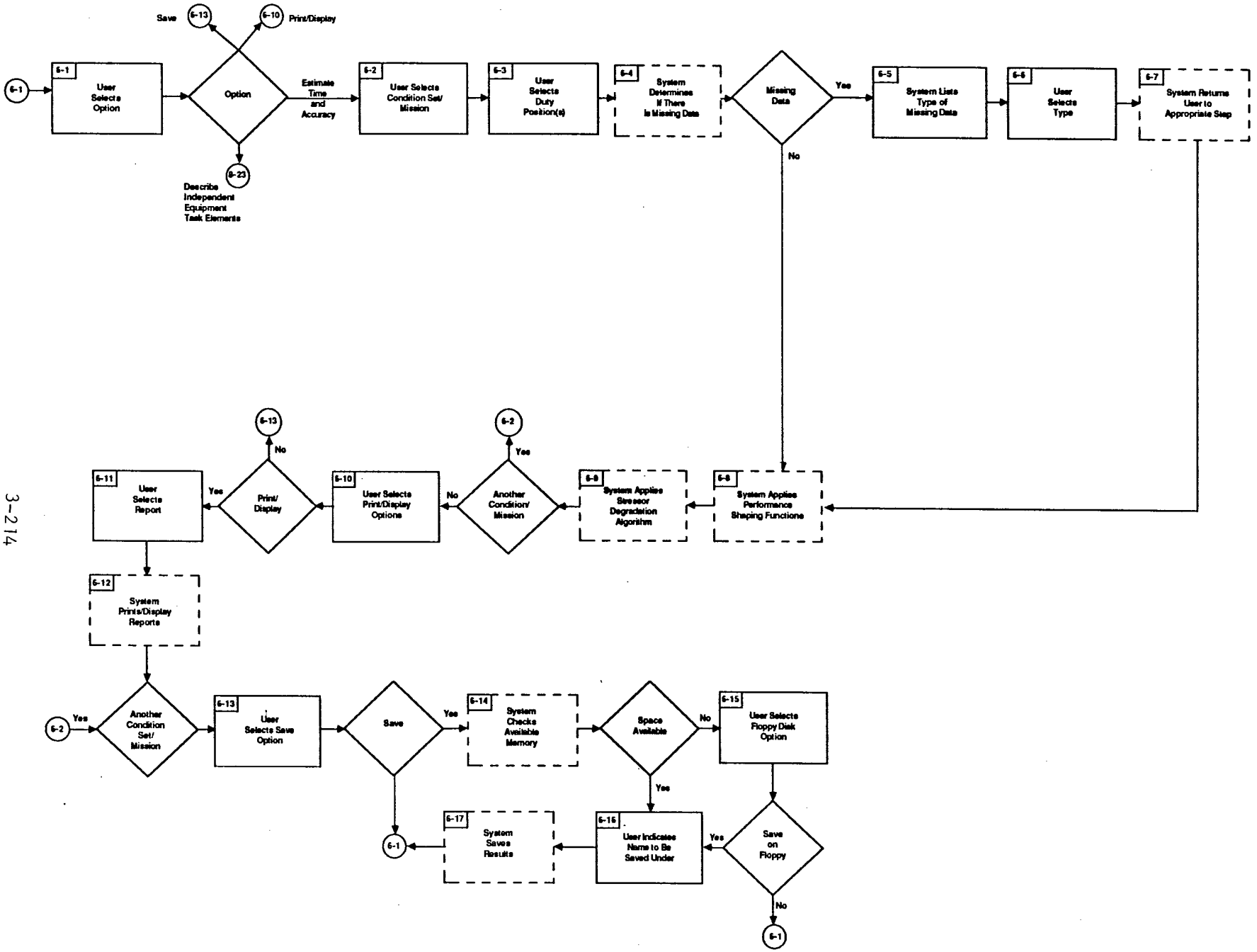


Figure 3.8.4-1. Step 6: Estimate Task Time and Accuracy.

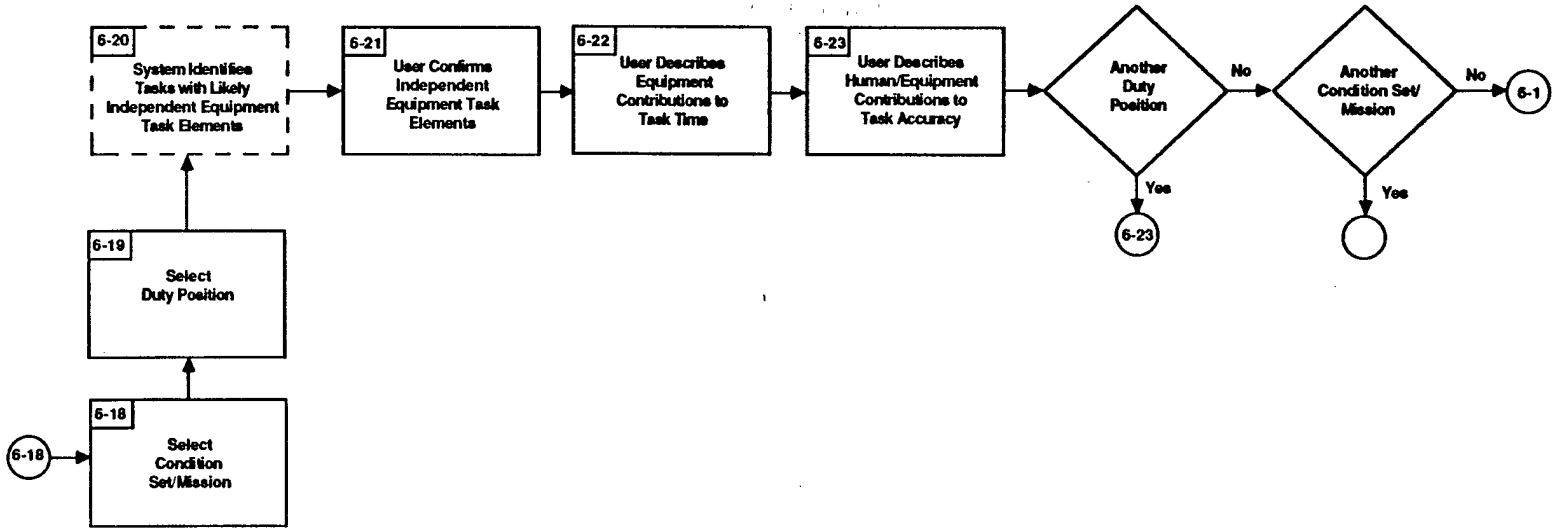


Figure 3.8.4-1. Step 6: Estimate Task Time and Accuracy (Continued).

BLOCK 9 - See Screens 9-1 - 9-4. The system will apply Stressor Degradation Algorithms (see Section 6.7) that will degrade time and accuracy to reflect the presence of stressors. The user may then select another condition set, mission, or duty position.

BLOCK 10 - See Screen 10-1.

BLOCK 11 - See Screen 11-1. Reports will be Product 5 Task Description (see Table 7.3-10); Task Performance Data (Table 7.3-18); and Task Personnel Characteristics and Training (Table 7.3-19), and Stressor Description (Table 7.3-8).

BLOCK 12 - See Screens 12-1 - 12-4.

BLOCK 13 - See Screen 13-1.

BLOCK 14 - See Screen 14-1.

BLOCK 15 - See Screens 15-1 and 15-2.

BLOCK 16 - See Screen 16-1.

BLOCK 17 - See Screen 17-1. The Task Parameter Description (See Table 5.1-16) will be updated to include time and accuracy estimates and updates to other task data made during this step. The System List (see Table 5.1-1) will be updated to record completion of this step.

BLOCK 18 - Refer to Screens 18-1 and 18-2.

BLOCK 19 - Refer to Screen 19-1.

BLOCK 20 - Refer to Screen 20-1. The system will examine the Task Parameter file (5.1-16) to identify the functional task

associated with each system task. It will then access the Functional Task Assignment library (Tables 4.2-9 and 4.2-10) to identify if there are equipment elements typically associated with the functional task and whether or not they typically impact task time and/or accuracy. The system will then identify which tasks are likely to have independent equipment task elements.

BLOCK 21 - See Screen 21-1. All tasks in the duty position would be listed along with a column (yes/no) indicating if there was an independent equipment element associated with the task. User could change initial assignments made by system.

BLOCK 22 - See Screen 22-1. User describes the equipment task element impacting time and inputs value for either time lag or maximum rate constraint associated with this element.

BLOCK 23 - See Screens 23-1 - 23-5. User describes task element impacting accuracy and the inherent accuracy of this element (that is the accuracy of this element given perfect human performance). The user may then select another duty position, condition set, or mission.

BLOCK 0-6 SCREEN 6-1

PATH: PREA>STEP 0>COMPLETE MODE: WORK

Continue Esc

Select Step

Personnel Requirements Estimation Aid Main Menu

1. Perform Disk Utilities
2. Step 0 Load Input Files
3. Step 1 Assign Tasks To Task Types
4. Step 2 Assess Static Design Features
5. Step 3 Provide Initial Accuracy Estimates
6. Step 4 Describe Stressors
7. Step 5 Describe Sustainment Training Frequency
8. Step 6 Estimate Time and Accuracy
9. Step 7 Determine Performance Discrepancies
10. Step 8 Change Personnel Characteristic Levels
11. Exit PREA

BLOCK 1 SCREEN 1-1

PATH: PREA>STEP 6>

MODE: WORK

Personnel Requirements Estimation Aid Main Menu

1. Perform Disk Utilities
2. Step 0 Load Input Files
3. Step 1 Assign Tasks To Task Types
4. Step 2 Assess Static Design Features
5. Step 3 Provide Initial Accuracy Estimates
>6. Step 4 Describe Stressors
7. Step 5 Describe Sustainment Training Frequency
8. Step 6 Estimate Time and Ac
9. Step 7 Determine Performanc
10. Step 8 Change Personnel Cha
11. Exit PREA

Est. Task Time/Accuracy
Describe Ind. Equip. Task Elements
Print/Display Results
Save Results

Select choice with cursor control arrows and press <CR> when ready...

Block 2 Screen 2-1

PATH: PREA>STEP 6>CHANGE> MODE: WORK

>Select↵ Esc

Select Condition Set from list below, then press <CR>

Condition Sets available:
>Middle-East↵ Central Europe

Block 2 screen 2-2

PATH: PREA>STEP 6>CHANGE> MODE: WORK

>Select↙ Esc

Select Mission from list below, then press <CR>

Condition Sets available:
Middle-East
Central Europe

Missions Available:
>Destroy Enemy Maneuver Forces ↙
Provide Illumination
Destroy Enemy Fire Support Forces

BLOCK 3 SCREEN 3-1

PATH: PREA>STEP 6>

MODE: WORK

>Select< Esc
Select a duty position

Duty Positions Available:
>Gunner<
Cannon Crewmember
Driver

BLOCK 4 SCREEN 4-1

PATH: PREA>STEP 6>

MODE: WAIT

The system is determining whether there are data missing.

BLOCK 5 SCREEN 5-1

PATH: PREA>STEP 6>
Select Complete Esc
Select a missing data type

MODE: WORK

The system cannot estimate time and accuracy because the types of data listed below are missing. Select a data type and the system will return you to the step where those data are entered. When data entry is complete, the system will return you to the place where you left off in this step.

Missing Data Types:	Completed
Initial Time Estimates	
Initial Accuracy Estimates	
Sustainment Training Estimates	
Initial Personnel Characteristic Levels	
Stressor Input Data	

Use cursor to slect data type, then press <CR>. NOTE: System can estimate time and accuracy without stressor input data, however, system will assume stressors have no impact.

BLOCK 6 SCREEN 6-1

PATH: PREA>STEP 6>
>Select Complete Esc
Select a missing data type

MODE: WORK

The system cannot estimate time and accuracy because the types of data listed below are missing. Select a data type and the system will return you to the step where those data are entered. When data entry is complete, the system will return you to the place where you left off in this step.

Missing Data Types:	Completed
> Initial Time Estimates	
Initial Accuracy Estimates	
Sustainment Training Estimates	
Initial Personnel Characteristic Levels	
Stressor Input Data	

Use cursor to slect data type, then press <CR>. NOTE: System can estimate time and accuracy without stressor input data, however, system will assume stressors have no impact.

BLOCK 7 SCREEN 7-1

PATH: PREA>STEP 6>

MODE: WORK

THE USER RETURNS
TO A PREVIOUS PREA
STEP TO ENTER DATA.

BLOCK 7 SCREEN 7-2

PATH: PREA>STEP 6> MODE: WORK
Select Complete Esc
Press <CR> if all missing data types have completed.

The system cannot estimate time and accuracy because the types of data listed below are missing. Select a data type and the system will return you to the step where those data are entered. When data entry is complete, the system will return you to the place where you left off in this step.

Missing Data Types:	Completed
Initial Time Estimates	X
Initial Accuracy Estimates	X
Sustainment Training Estimates	X
Initial Personnel Characteristic Levels	X
Stressor Input Data	X

Use cursor to slect data type, then press <CR>. NOTE: System can estimate time and accuracy without stressor input data, however, system will assume stressors have no impact.

BLOCK 8 SCREEN 8-1

PATH: PREA>STEP 6>

MODE: WAIT

The system is applying the performance shaping functions.

BLOCK 9 SCREEN 9-1

PATH: PREA>STEP 6>

MODE: WAIT

The system is applying the stressor degradation algorithm.

Block 9 screen 9-2

```
PATH: PREA>STEP 6>                                          MODE: WORK
>Conditions<   Missions     Continue     Esc
  Select another conditions set?
```

Block 9 Screen 9-3

PATH: PREA>STEP 6> MODE: WORK
Conditions >Missions< Continue Esc
Select another mission?

BLOCK 9 SCREEN 9-4

PATH: PREA>STEP 6>

MODE: WORK

Conditions Missions Continue Esc

Continue with Step 6

BLOCK 1 SCREEN 1-1

PATH: PREA>STEP 6>

MODE: WORK

Personnel Requirements Estimation Aid Main Menu

1. Perform Disk Utilities
2. Step 0 Load Input Files
3. Step 1 Assign Tasks To Task Types
4. Step 2 Assess Static Design Features
5. Step 3 Provide Initial Accuracy Estimates
>6. Step 4 Describe Stressors
7. Step 5 Describe Sustainment Training Frequency
8. Step 6 Estimate Time and Ac
9. Step 7 Determine Performanc
10. Step 8 Change Personnel Cha
11. Exit PREA

Est. Task Time/Accuracy
Describe Ind. Equip. Task Elements
>Print/Display Results
Save Results

Select choice with cursor control arrows and press <CR> when ready...

BLOCK 10 SCREEN 10-1

PATH: PREA>STEP 6>DISPLAY> MODE: WORK

Select Esc

Select a print, display, or save option from list, then press <CR>

Print / Display Options
>Print Reports Display Reports on Monitor

BLOCK 11 SCREEN 11-1

PATH: PREA>STEP 6>DISPLAY> MODE: WORK

>Select Esc

Select a print, display, or save option from list, then press <CR>

Print / Display Options
>Print Reports Display Reports on Monitor

Select Report(s)
Product 5 Task Parameter Description Task Performance Data Personnel Characteristics and Training Stressor Description

BLOCK 10 SCREEN 10-1

PATH: PREA>STEP 6>DISPLAY> MODE: WORK

>Select Esc

Select a print, display, or save option from list, then press <CR>

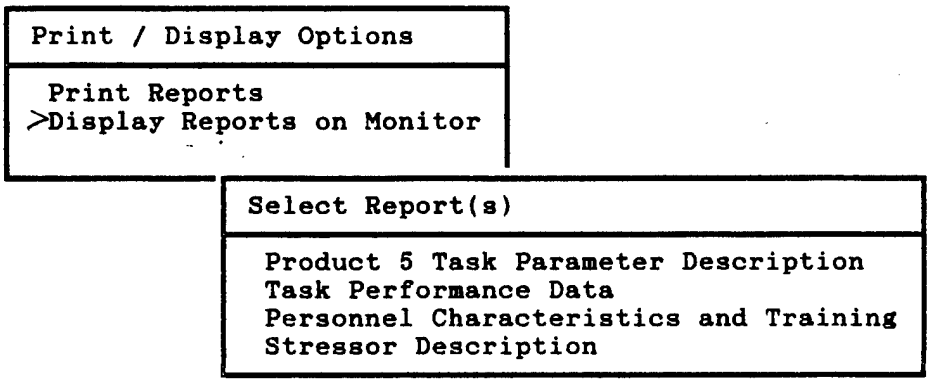
Print / Display Options
Print Reports > Display Reports on Monitor

BLOCK 11 SCREEN 11-1

PATH: PREA>STEP 6>DISPLAY> MODE: WORK

>Select Esc

Select a print, display, or save option from list, then press <CR>



Product 5 Task Parameter Description

System _____ System Design _____ Date _____

Condition Set _____ Mission _____

Task/ Task Element	Level/ (T/TE)	Parent Task/ Function	Duty Position	Time Estimate	Time Standard Deviaiton	Visual Workload	Auditory Workload	Psychomotor Workload	Cognitive Workload	Total Workload

BLOCK 12 SCREEN 12-1

Task Performance Data

System _____ System Design _____ Date _____

Duty Position _____ Condition Set _____ Mission _____

Performance Requirements						Current Time and Accuracy Estimates		Equipment Task Element Data				
									Time		Accuracy	
Task	Parent Function	Function Accuracy Weight	Time	Accuracy Standard	Criteria	Time	Accuracy	Equip. Element	LAG	Max. Rate	Inherent Standard	Accuracy Criteria

		Current Time and Accuracy Estimates		Equipment Task Element Data				
					Time		Increment Accuracy	
Task Element	Parent Task	Time	Accuracy	Equip. Element	LAG	Maximum Rate	Standard	Criteria

BLOCK 12 SCREEN 12-8

Task Personnel Characteristics and Training

System _____ System Design _____ Date _____

Duty Position _____ MOS/Skill Level _____

Task/ Task Element	Level	Parent Task Function	Characterisitc	Level	Sustainment Training Frequency	Job Training Frequency

BLOCK 12 SCREEN 12-3

Stressor Description

System _____ System Design _____ Date _____

Condition Set _____ Mission _____

Stressor	Related System Condition	System Condition Value	Additional Input Variable	Value

BLOCK 12 SCREEN 12-5

BLOCK 13 SCREEN 13-1

PATH: PREA>STEP 6>

MODE: WORK

Personnel Requirements Estimation Aid Main Menu

1. Perform Disk Utilities
2. Step 0 Load Input Files
3. Step 1 Assign Tasks To Task Types
4. Step 2 Assess Static Design Features
5. Step 3 Provide Initial Accuracy Estimates
>6. Step 4 Describe Stressors
7. Step 5 Describe Sustainment Training Frequency
8. Step 6 Estimate Time and Ac
9. Step 7 Determine Performanc
10. Step 8 Change Personnel Cha
11. Exit PREA

Est. Task Time/Accuracy
Describe Ind. Equip. Task Elements
Print/Display Results
>Save Results

Select choice with cursor control arrows and press <CR> when ready...

BLOCK 14 SCREEN 14-1

PATH: PREA>STEP 5>SAVE>

MODE: WORK

NOTE: System is checking availability of memory for saving data

BLOCK 15 SCREEN 15-1

PATH: PREA>STEP 5>SAVE MODE: WAIT

Floppy : Quit

Save report to floppy diskette

NOTE: System is checking availability of memory for saving data.

NOTE: Insufficient memory available for saving.

BLOCK 15 SCREEN 15-2

PATH: PREA>STEP 5>SAVE
>Floppy⊂ Quit
Save report to floppy diskette

MODE: WAIT

Insert Floppy diskette and hit <cr>,

Report(s) are being saved on floppy diskette.

Block 16 Screen 16-1

PATH: PREA>STEP 5>SAVE>

MODE: WORK

Insert name of file to be saved: uh-60a.doc

Block 17 Screen 17-1

PATH: PREA>STEP 5>SAVE>

MODE: WORK

Insert name of file to be saved: uh-60a.doc

System is saving file UH-60A.doc.

BLOCK 1 SCREEN 1-1

PATH: PREA>STEP 6>

MODE: WORK

Personnel Requirements Estimation Aid Main Menu

1. Perform Disk Utilities
2. Step 0 Load Input Files
3. Step 1 Assign Tasks To Task Types
4. Step 2 Assess Static Design Features
5. Step 3 Provide Initial Accuracy Estimates
>6. Step 4 Describe Stressors
7. Step 5 Describe Sustainment Training Frequency
8. Step 6 Estimate Time and Ac
9. Step 7 Determine Performanc
10. Step 8 Change Personnel Cha
11. Exit PREA

Est. Task Time/Accuracy
>Describe Ind. Equip. Task Elements
Print/Display Results
Save Results

Select choice with cursor control arrows and press <CR> when ready...

BLOCK 18 SCREEN 18-1

PATH: PREA>STEP 6>CHANGE> MODE: WORK

>Select Esc

Select Condition Set from list below, then press <CR>

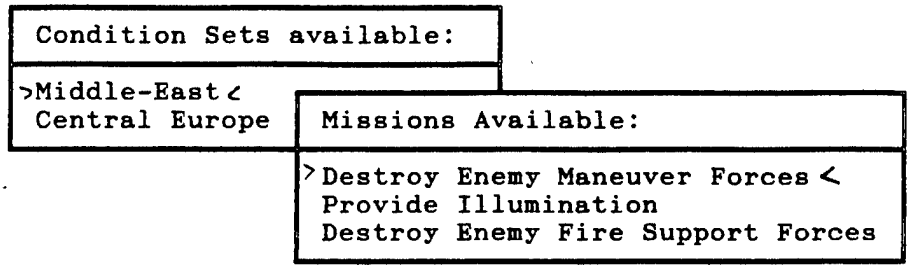
Condition Sets available:
>Middle-East<
Central Europe

Block 18 Screen 18-2

PATH: PREA>STEP 6>CHANGE> MODE: WORK

>Select< Esc

Select Mission from list below, then press <CR>



BLOCK 19 SCREEN 19-1

PATH: PREA>STEP 6>

MODE: WORK

>Select↙ Esc
Select a duty position

Duty Positions Available:
Gunner Cannon Crewmember Driver

Block 20 Screen 20-1

PATH: PREA>STEP 6>

MODE: WAIT

System is identifying tasks with likely Independent Equipment Task Elements.

BLOCK 21 SCREEN 21-1

System: M109D Condition Set: Central Europe

Duty Position: Gunner Mission: Destroy Enemy Maneuver Forces

Listed below are the independent equipment task elements typically associated with your system type. Please confirm which tasks have equipment task elements. New elements may be added by changing column 2 to Y (yes) and adding additional data. Complete highlited areas.

Task	Equipment Element (Y/N)	TIME				
			LAG		MAX RATE	
		Elem.	Measure/ Units	Value	Measure/ Units	Value
Identify Targets	N					
Select Targets	N					
Determine Tgt Range	N					
Determine Tgt Lead	N					
Select Ammunition	N					
Aim/Sight Weapon	N					
Fire Weapon	Y	Rate				
Trans/Receive Msg	Y	Rate				

Task	INHERENT ACCURACY		
	Element	Standard	Accuracy
Identify Targets			
Select Targets			
Determine Tgt Range			
Determine Tgt Lead			
Select Ammunition			
Aim/Sight Weapon			
Fire Weapon	Firing Accuracy		
Trans/Receive Msg			

BLOCK 22 SCREEN 22-1

System: M109D Condition Set: Central Europe

Duty Position: Gunner Mission: Destroy Enemy Maneuver Forces

Listed below are the independent equipment task elements typically associated with your system type. Please confirm which tasks have equipment task elements. New elements may be added by changing column 2 to Y (yes) and adding additional data. Complete highlited areas.

Task	Equipment Element (Y/N)	TIME				
		Elem.	LAG Measure/ Units	LAG Value	MAX RATE Measure/ Units	MAX RATE Value
Identify Targets	N					
Select Targets	N					
Determine Tgt Range	N					
Determine Tgt Lead	N					
Select Ammunition	N					
Aim/Sight Weapon	N					
Fire Weapon	Y	Rate			Rounds/minute	100
Trans/Receive Msg	Y	Rate			BAUD	1200

Task	INHERENT ACCURACY		
	Element	Standard	Accuracy
Identify Targets			
Select Targets			
Determine Tgt Range			
Determine Tgt Lead			
Select Ammunition			
Aim/Sight Weapon			
Fire Weapon	Firing Accuracy		
Trans/Receive Msg			

BLOCK 23 SCREEN 23-1

System: M109D Condition Set: Central Europe

Duty Position: Gunner Mission: Destroy Enemy Maneuver Forces

Listed below are the independent equipment task elements typically associated with your system type. Please confirm which tasks have equipment task elements. New elements may be added by changing column 2 to Y (yes) and adding additional data. Complete highlited areas.

Task	Equipment Element (Y/N)	TIME				
		Elem.	LAG Measure/ Units	LAG Value	MAX RATE Measure/ Units	MAX RATE Value
Identify Targets	N					
Select Targets	N					
Determine Tgt Range	N					
Determine Tgt Lead	N					
Select Ammunition	N					
Aim/Sight Weapon	N					
Fire Weapon	Y	Rate			Rounds/minute	100
Trans/Receive Msg	Y	Rate			BAUD	1200

Task	INHERENT ACCURACY		
	Element	Standard	Accuracy
Identify Targets			
Select Targets			
Determine Tgt Range			
Determine Tgt Lead			
Select Ammunition			
Aim/Sight Weapon			
Fire Weapon	Firing Accuracy	DIRECT HIT	.8
Trans/Receive Msg			

BLOCK 23 Screen 23-2

PATH: PREA>STEP 6>

MODE: WORK

>Position Condition Mission Continue

Select another duty position

BLOCK 23 SCREEN 23-3

PATH: PREA>STEP 6> MODE: WORK

Position >Condition< Mission Continue

Select another condition set

Block 23 Screen 23-4

PATH: PREA>STEP 6>
MODE: WORK

Position Condition >Mission< Continue
Select another mission

BLOCK 23 SCREEN 23

PATH: PREA>STEP 6> MODE: WORK

Position Condition Mission >Continue

Continue with PREA (return to main menu)

3.9 STEP 7: DETERMINE PERFORMANCE DISCREPANCIES

3.9.1 Output

During this step, discrepancies between required and estimated performance are identified at both the task and system level. At the system level, discrepancies between required and estimated operational mission time and accuracy are identified as are discrepancies between required and estimated availability and maintainability.

3.9.2 Input

External Input. The user must identify the level (task or system) at which he or she wants to examine performance discrepancies. In Step 8, the system will attempt to identify a set of personnel characteristic levels that will eliminate these discrepancies. If he or she selects the system level, the user must also indicate if he wants to examine maintenance or operational performance discrepancies.

Internal Input. Internal files providing input to this step are the Task List (Table 5.1-4), Job List (Table 5.1-7), the Task Parameter Description (Table 5.1-16), and Stressor-Condition Description (Table 5.1-12). Product 1 files providing input to this step are the Function Performance Criteria (5.1-20), System RAM Criteria (Table 5.1-21), Function Accuracy Weights (Table 5.1-22), and System Missions (5.1 10). Product 5 files providing direct input to this step are the Product 5 Task Parameter Description (Table 5.1-14), Maintenance Manpower Requirements file (Table 5.1-23), Mission Completion file (Table 5.1-24), and Component Maintenance Parameter file (Table 5.1-25). Also providing input are additional input files needed by the Product 5

Operator and Maintenance Models. The Library files providing input to this step are the Baseline Task Parameter Library (Tables 4.2-15 and 4.2-16), and the Performance Shaping Function Parameter Library (Tables 4.2-27 and 4.2-28).

3.9.3 Process

The user first selects the level (task or system) at which he or she wants to examine performance discrepancies. If he or she selects the system level, the user must also indicate if he or she wants to examine maintenance or operational performance discrepancies. Depending on the above selections, the system will apply the Product 5 Maintenance and Operator Models (see Sections 6.8 and 6.9) and the Performance Discrepancy Estimation Algorithm (see Section 6.10). The Maintenance Model estimates system availability and maintainability given the new task time estimates produced in Step 6. The Operator Model estimates mission time and identifies tasks on the critical path. The Performance Discrepancy Estimation Algorithm estimates mission accuracy and compares estimated values for availability, maintainability, mission time and accuracy, function time and accuracy with requirements set for these parameters in Product 1.

3.9.4 User Interface

Figure 3.9.4-1 displays the user interface diagram for Step 7. Listed below are the descriptions of each block, including descriptions of screens, files, algorithms, and output reports associated with each block.

BLOCK 1 - See Screen 1-1. The first menu will allow the user to determine discrepancies, print/display reports, or save data.

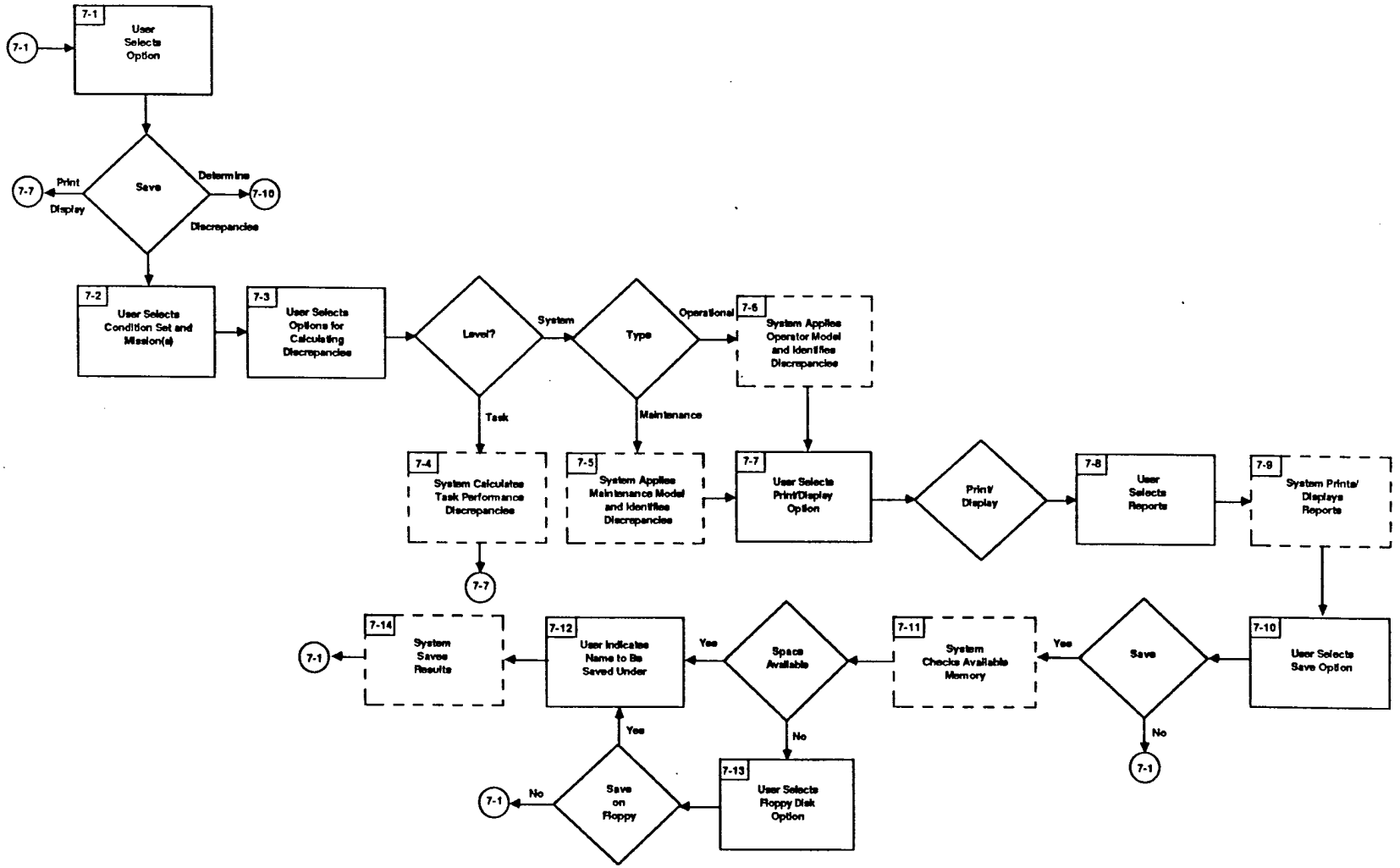


Figure 3.9.4-1. Step 7: Determine Performance Discrepancies.

BLOCK 2 - See Screens 2-1 and 2-2.

BLOCK 3 - See Screens 3-1 and 3-2.

BLOCK 4 - See Screen 4-1. The system will apply the Performance Discrepancy Estimation Algorithm (see Section 6.10). This algorithm will (1) combine task element accuracy into a measure of human task accuracy, (2) where appropriate, combine human task element performance with independent equipment task element performance to provide estimates of overall task performance, and (3) compare overall task performance with required functional task performance as listed in the System Performance Criteria file (see Table 5.1-22).

BLOCK 5 - See Screen 5-1. The system will apply both the Maintainer Model (see Section 6.9) that will develop RAM estimates and the Performance Discrepancy Estimation Algorithm (see Table 6.9) that will compare these estimates with the values in the System RAM criteria file (see Table 5.1-21).

BLOCK 6 - See Screen 6-1. The system will apply both the Operator Model (see Section 6.8) that will develop estimates of mission time and the Performance Discrepancy Estimation Algorithm (see Table 6.9) that will estimate functional task accuracy and mission accuracy and compare the estimated values with required values in the System Performance Criteria file (see Table 5.1-21).

BLOCK 7 - See Screen 7-1.

BLOCK 8 - See Screens 8-1 - 8-3. Reports will include the Task Performance Discrepancies Summary (see Table 7.3-20), Task Performance Discrepancies (see Table 7.3-21), Mission Time Discrepancies (see Table 7.3-22), Maintenance Maintainability and

Availability Discrepancies Report (see Table 7.3-23), and Mission Accuracy Discrepancies Report (Table 7.3-26).

BLOCK 9 - See Screens 9-1 - 9-5.

BLOCK 10 - See Screen 10-1.

BLOCK 11 - See Screen 11-1.

BLOCK 12 - See Screen 12-1.

BLOCK 13 - See Screens 13-1 and 13-2.

BLOCK 14 - See Screen 14-1. The Mission Performance Discrepancies File (see Table 5.1-23) will be updated to describe estimated mission performance and discrepancies with mission performance requirements. The RAM Performance Discrepancies file (see Table 5.1-27) will be updated to describe estimated RAM and Discrepancies with RAM requirements. The Task Parameter file (5.1-16) will be updated to describe task performance Discrepancies.

BLOCK 0-6 SCREEN 6-1

PATH: PREA>STEP 0>COMPLETE MODE: WORK

Continue Esc

Select Step

Personnel Requirements Estimation Aid Main Menu

1. Perform Disk Utilities
2. Step 0 Load Input Files
3. Step 1 Assign Tasks To Task Types
4. Step 2 Assess Static Design Features
5. Step 3 Provide Initial Accuracy Estimates
6. Step 4 Describe Stressors
7. Step 5 Describe Sustainment Training Frequency
8. Step 6 Estimate Time and Accuracy
> 9. Step 7 Determine Performance Discrepancies
10. Step 8 Change Personnel Characteristic Levels
11. Exit PREA

BLOCK 1 SCREEN 1-1

PATH: PREA>STEP 7>DISCREP> MODE: WORK

Personnel Requirements Estimation Aid Main Menu

1. Perform Disk Utilities
2. Step 0 Load Input Files
3. Step 1 Assign Tasks To Task Types
4. Step 2 Assess Static Design Features
5. Step 3 Provide Initial Accuracy Estimates
6. Step 4 Describe Stressors
7. Step 5 Describe Sustainment Training Frequency
8. Step 6 Estimate Time and Ac
9. Step 7 Determine Performanc
10. Step 8 Change Personnel Cha
11. Exit PREA

>Determine Discrepancies<
Print/Display Results
Save Results

Select choice with cursor control arrows and press <CR> when ready...

BLOCK 2 SCREEN 2-1

PATH: PREA>STEP 7>DISCREP> MODE: WORK

>Select< Esc

Select Condition Set from list below, then press <CR>

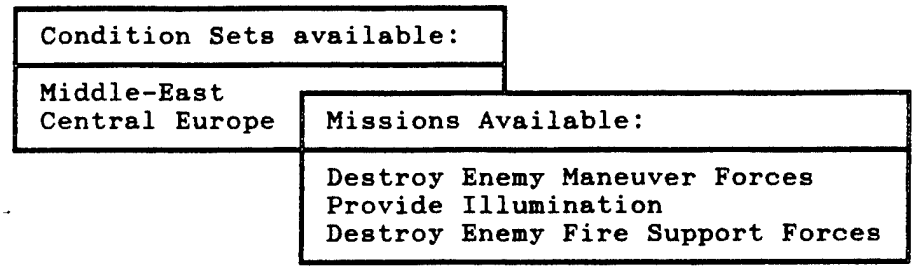
Condition Sets available:
Middle-East
Central Europe

Block 8 Screen 3-2

PATH: PREA>STEP 7>DISCREP> MODE: WORK

>Select↵ Esc

Select Mission from list below, then press <CR>



PATH: PREA>STEP 7>DISCREP> MODE: WORK

>Select< Esc

Select option for examining discrepancies, then press <CR>

At what level will you examine performance discrepancies:

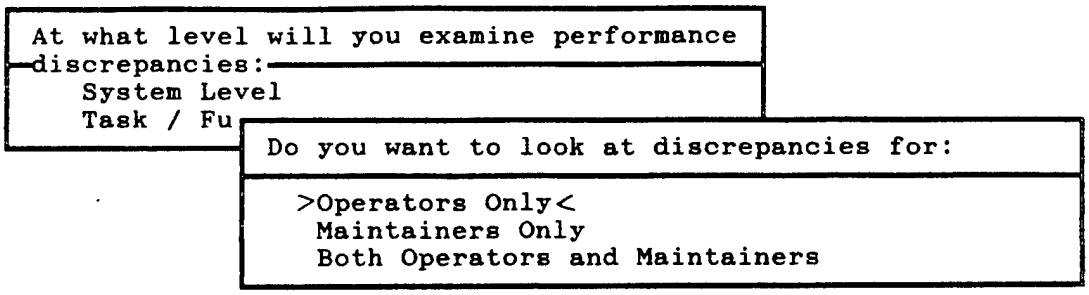
>System Level<

Task / Functional Task Level

PATH: PREA>STEP 7>DISCREP> MODE: WORK

>Select< Esc

Select option for identifying discrepancies, then press <CR>



BLOCK 3 SCREEN 3-3

PATH: PREA>STEP 7>DISCREP>

MODE: WORK

>Select↙ Esc

Select option for calculating discrepancies, then press <CR>

Select Level for calculating discrepancies
System Level >Task / Functional Task Level↙

BLOCK 4 SCREEN 4-1
BLOCK 5 SCREEN 5-1
BLOCK 6 SCREEN 6-1

PATH: PREA>STEP 7>DISCREP> MODE: WAIT

Select Esc

Select option for calculating discrepancies, then press <CR>

Select Level for calculating discrepancies
System Level Task / Functional Task

NOTE: System is calculating Performance Discrepancies.

BLOCK 1 SCREEN 1-1

PATH: PREA>STEP 7>DISPLAY>

MODE: WORK

Personnel Requirements Estimation Aid Main Menu

1. Perform Disk Utilities
2. Step 0 Load Input Files
3. Step 1 Assign Tasks To Task Types
4. Step 2 Assess Static Design Features
5. Step 3 Provide Initial Accuracy Estimates
6. Step 4 Describe Stressors
7. Step 5 Describe Sustainment Training Frequency
8. Step 6 Estimate Time and Ac
9. Step 7 Determine Performanc
10. Step 8 Change Personnel Cha
11. Exit PREA

Determine Discrepancies
>Print/Display Results<
Save Results

Select choice with cursor control arrows and press <CR> when ready...

Block 7 Screen 7-1

PATH: PREA>STEP 7>DISPLAY> MODE: WORK

>Select< Esc

Select a print, display, or save option from list, then press <CR>

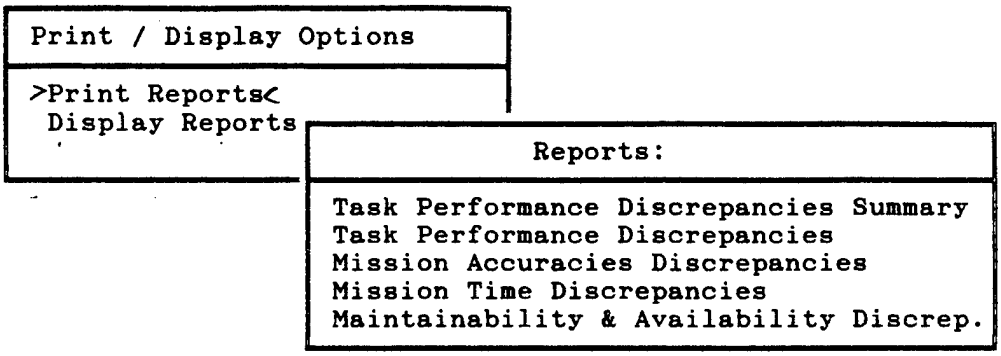
Print / Display Options
>Print Reports< Display Reports on Monitor

BLOCK 8 SCREEN 8-1

PATH: PREA>STEP 7>DISPLAY> MODE: WORK

>Select< Esc

Select a report for printing, then press <CR>

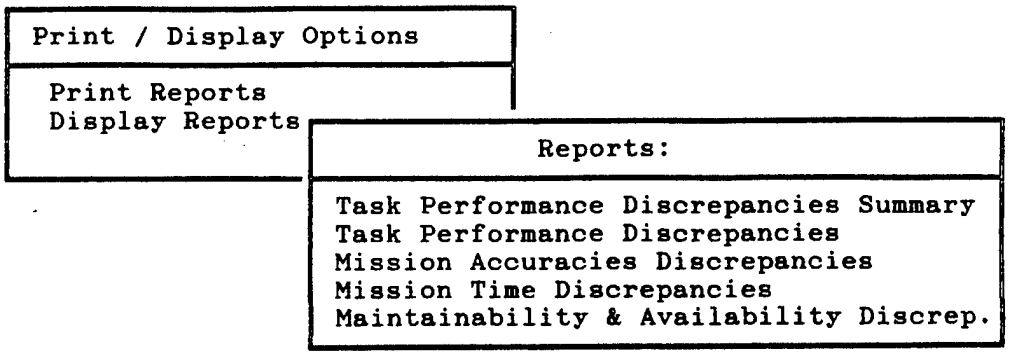


BLOCK 8 SCREEN 8-2

PATH: PREA>STEP 7>DISPLAY> MODE: WAIT

Select Esc

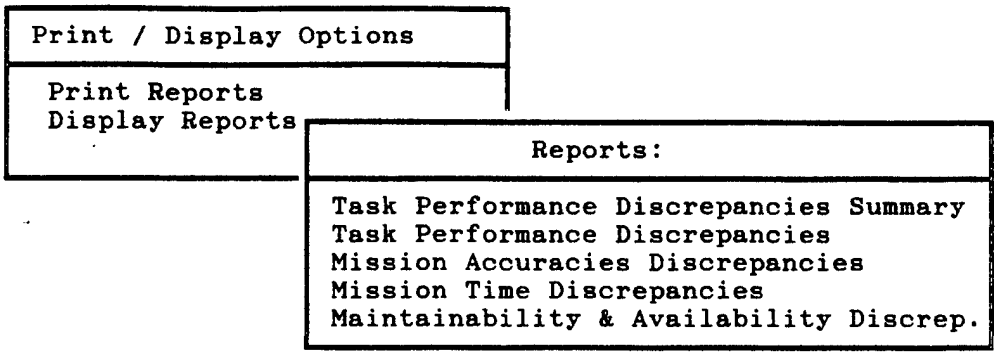
Select a report for printing, then press <CR>



Report is being printed.....

BLOCK 8 SCREEN 8-3

PATH: PREA>STEP 7>DISPLAY> MODE: WORK
Select Esc
Select a report for printing, then press <CR>



Report is being printed..... ready.

Task Performance Discrepancies Summary

System _____ Design Version _____ Date _____

Condition Set _____ Mission _____

Duty Position _____ MOS/Skill Level _____

Total Tasks _____

Number of Time Discrepancies _____

Number of Accuracy Discrepancies _____

Total Discrepancies _____

Block 9 screen 9-1

Task Performance Discrepancies

System _____ Design Version _____ Date _____

Condition Set _____ Mission _____

Duty Position _____ MOS/Skill Level _____

Task	Char 1 Level	Char 2 Level	Char 3 Level	Time Estimate	Accuracy Estimate	Function	Time Criteria	Accuracy Standard	Criteria	Discrepancies			
										Time		Accuracy	
										Value	%	Value	%

Bucci 4 screen 9-2

Mission Accuracy Performance Report

System _____ Design Version _____ Date _____

Condition Set _____

Mission _____ Required Mission Accuracy _____

Estimated Mission Accuracy _____

Task	Accuracy Estimates		Task Element Accuracy			Function Performance Requirements			
	Standard	Criteria	Task Element	Standard	Criteria	Function	Accuracy Weight	Standard	Criteria

Block 4 screen 4-3

Mission Time Discrepancies

System _____ Design Version _____ Date _____

Condition Set _____ Mission _____

Required Mission Time _____ Estimated Time _____

Tasks in Critical Path	Duty Position	Time Estimate	Function	Time Criteria	Discrepancies	
					Value	%

BLOCK 9 SCREEN 9-4

Maintenance Maintainability and Availability Discrepancies

System _____ Design Version _____ Date _____

Condition Set _____ Mission _____

System-Level Manhours

	REQUIRED	ESTIMATED
Level 1		
Level 2		
Level 3		
Level 4		
TOTAL		

System-Level Availability

REQUIRED _____

ESTIMATED _____

General Equipment Item	General Maintenance Function	Recommended % for Manhours	Estimated % for Manhours	Discrepancies	
				Value	%
	_____	_____	_____	_____	
	_____	_____	_____	_____	
	_____	_____	_____	_____	
	_____	_____	_____	_____	
	TOTAL _____				
	TOTAL _____				
	TOTAL _____				

BLOCK 9 SCREEN 9-5

BLOCK 10 SCREEN 10-1

PATH: PREA>STEP 7>DISCREP>

MODE: WORK

Personnel Requirements Estimation Aid Main Menu

1. Perform Disk Utilities
2. Step 0 Load Input Files
3. Step 1 Assign Tasks To Task Types
4. Step 2 Assess Static Design Features
5. Step 3 Provide Initial Accuracy Estimates
6. Step 4 Describe Stressors
7. Step 5 Describe Sustainment Training Frequency
8. Step 6 Estimate Time and Ac
9. Step 7 Determine Performanc
10. Step 8 Change Personnel Cha
11. Exit PREA

Determine Discrepancies
Print/Display Results
>Save Results<

Select choice with cursor control arrows and press <CR> when ready...

Block 11 Screen 11-1

PATH: PREA>STEP 5>SAVE>

MODE: WORK

NOTE: System is checking availability of memory for saving data

PATH: PREA>STEP 5>SAVE MODE: WAIT
Floppy : Quit
Save report to floppy diskette

NOTE: System is checking availability of memory for saving data.

NOTE: Insufficient memory available for saving.

Block 13 Screen 13-2

PATH: PREA>STEP 5>SAVE MODE: WAIT

>Floppy< Quit

Save report to floppy diskette

Insert Floppy diskette and hit <cr>,

Report(s) are being saved on floppy diskette.

Block 12 Screen 12-1

PATH: PREA>STEP 5>SAVE>

MODE: WORK

Insert name of file to be saved: uh-60a.doc

BLOCK 14 SCREEN 14-1

PATH: PREA>STEP 5>SAVE>

MODE: WORK

Insert name of file to be saved: uh-60a.doc

System is saving file UH-60A.doc.

3.10 STEP 8: INCREMENT PERSONNEL CHARACTERISTIC LEVELS

3.10.1 Output

The output of this step is the minimum level of personnel characteristics needed to achieve required system performance for a given contractor's design.

3.10.2 Input

External Input. The user must identify the minimum and/or maximum acceptable levels for each characteristic and the scope (individual task or tasks within a duty position) to be used in incrementing characteristic levels.

Internal Input. Internal files providing input to this step are the Task List (Table 5.1-4), Job List (Table 5.1-7), the Task Parameter Description (Table 5.1-16), Stressor-Condition Description (Table 5.1-12). Product 1 files providing input to this step are the Function Performance Criteria (5.1-20), System RAM Criteria (Table 5.1-21), Function Accuracy Weights (Table 5.1-22), and System Missions (5.1 10). Product 5 files providing direct input to this step are the Product 5 Task Parameter Description (Table 5.1-14), Maintenance Manpower Requirements file (Table 5.1-23), Mission Completion file (Table 5.1-24), and Component Maintenance Parameter file (Table 5.1-25). Also providing input are additional input files needed by the Product 5 Operator and Maintenance Models. The only library providing input to this step is the Performance Shaping Function Parameter Library (Tables 4.2-27 and 4.2-28).

3.10.3 Process

The user identifies the minimum and/or maximum characteristic levels for each duty position and the level at which characteristics will be incremented (the individual task level or the duty position level). The system then applies the Personnel Characteristic Level Incrementation Algorithm which increments the levels of one or more characteristics. The system will then reapply the Performance Shaping Functions (see Section 6.6) and the Stressor Degradation Algorithm (Section 6.7) to develop new estimates of time and accuracy. It will then apply the Operator Model (Section 6.8), the Maintainer Model (section 6.9), and the Performance Discrepancy Estimation Model (section 6.10) to estimate impacts on system performance measures. The system will continue to iterate until acceptable performance was achieved or until min/max characteristic levels are reached.

3.10.4 User Interface

Figure 3.10.4-1 displays the user interface diagram for Step 8. Listed below are the descriptions of each block, including descriptions of screens, files, algorithms, and output reports associated with each block.

BLOCK 1 - See Screen 1-1. The first menu will allow the user to change levels, print/display reports, or save data.

BLOCK 2 - Refer to Screens 2-1 and 2-2.

BLOCK 3 - Refer to Screens 3-1- 3-6. The first menu will allow the user to determine if he or she wants to use default min/max values for characteristic levels. If he or she decides to input his or her own, he would then change the default values. In the

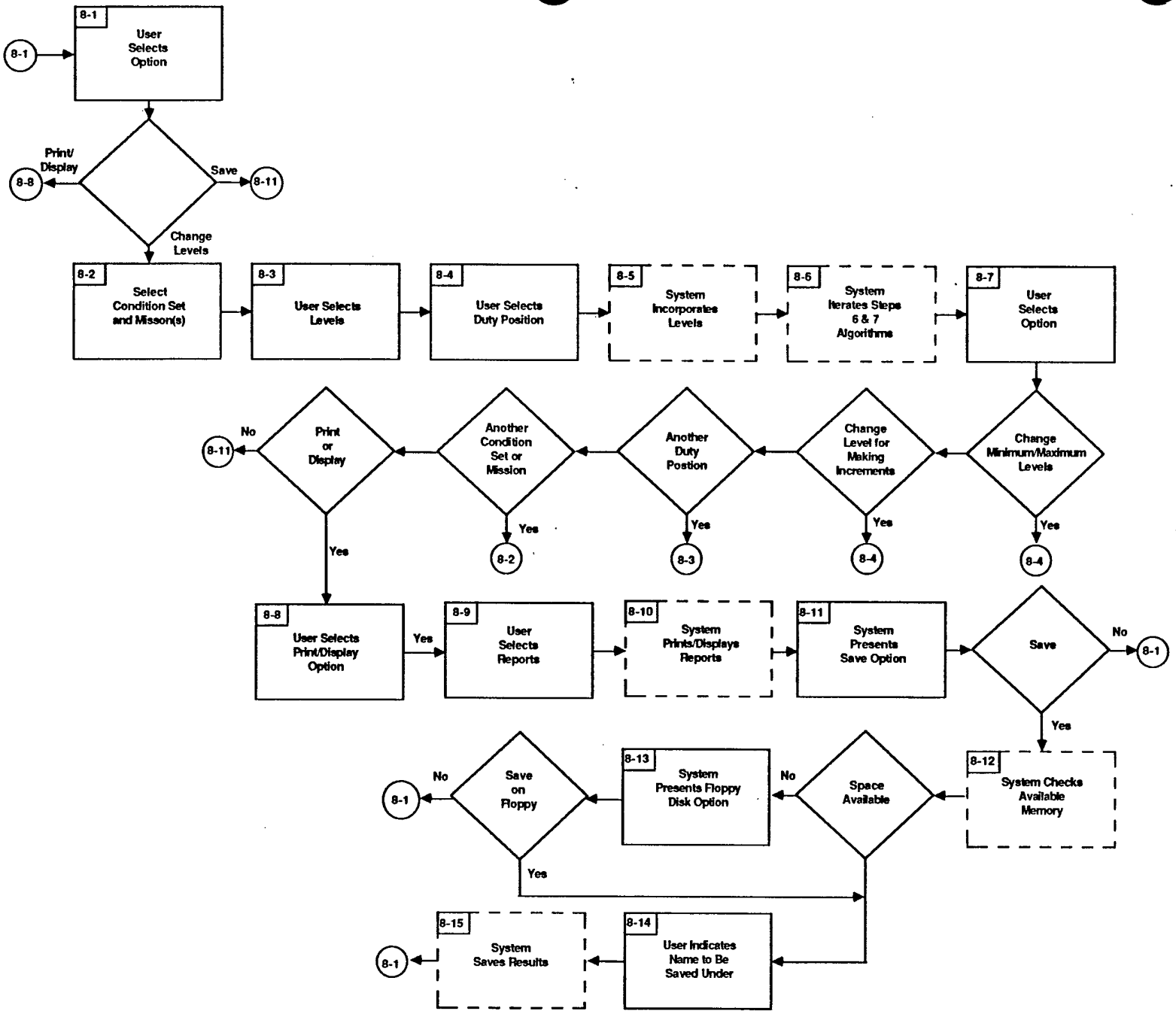


Figure 3.10.4-1. Step 8: Increment Characteristic Levels.

second menu, the user would select the level at which characteristics would be incremented--individual task level (characteristics for each task incremented independently) or duty position (characteristics for all tasks in duty position incremented at the same time). If the user selects the individual task level there will be a third menu asking the user to indicate if he/she wants to increment the levels for all tasks or a subset of tasks.

BLOCK 4 - See Screens 4-1 and 4-2.

BLOCK 5 - See Screen 5-1. The system will increment personnel characteristics levels using the Personnel Characteristics Incrementation Algorithm (see Section 6-11).

BLOCK 6 - See Screen 6-1. The system will then reapply the Performance Shaping Functions (see Section 6.6) and the Stressor Degradation Algorithm (Section 6.7) to develop new estimates of time and accuracy. It will then apply the Operator Model (Section 6.8), the Maintainer Model (section 6.9), and the Performance Discrepancy Estimation Model (section 6.10) to estimate impacts on system performance measures. The system will continue to iterate until acceptable performance is achieved or until min/max levels are reached. The user will be informed when one of these two results are achieved.

BLOCK 7 - See Screens 7-1 - 7-4.

BLOCK 8 - See Screens 8-1 and 8-2.

BLOCK 9 - See Screen 9-1. Reports will include the Task Performance Discrepancies Summary (see Table 7.3-20), Task Performance Discrepancies (see Table 7.3-21), Mission Time Discrepancies (see Table 7.3-22), Maintenance Maintainability

and Availability Discrepancies Report (see Table 7.3-23), and Mission Accuracy Discrepancies Report (see Table 7.3-26).

BLOCK 10 - Refer to Screens 10-1 - 10-5.

BLOCK 11 - Refer to Screen 11-1.

BLOCK 12 - Refer to Screen 12-1.

BLOCK 13 - Refer to Screens 13-1 and 13-2.

BLOCK 14 - Refer to Screen 14-1.

BLOCK 15 - Refer to Screen 15-1. The Task Parameter Description file (See Table 5.1-16) will be updated to describe the final set of characteristic levels and any remaining task discrepancies. The Mission Performance Discrepancies File (see Table 5.1-23) will be updated to describe estimated mission performance and discrepancies with mission performance requirements. The RAM Performance Discrepancies file (see Table 5.1-27) will be updated to describe estimated RAM and discrepancies with RAM requirements.

BLOCK 0-6 SCREEN 6-1

PATH: PREA>STEP 0 MODE: WORK

Continue Esc

Select Step

Personnel Requirements Estimation Aid Main Menu

1. Perform Disk Utilities
2. Step 0 Load Input Files
3. Step 1 Assign Tasks To Task Types
4. Step 2 Assess Static Design Features
5. Step 3 Provide Initial Accuracy Estimates
6. Step 4 Describe Stressors
7. Step 5 Describe Sustainment Training Frequency
8. Step 6 Estimate Time and Accuracy
9. Step 7 Determine Performance Discrepancies
>10. Step 8 Change Personnel Characteristic Levels<
11. Exit PREA

BLOCK 1 SCREEN 1-1

PATH: PREA>STEP 8>

MODE: WORK

Personnel Requirements Estimation Aid Main Menu

1. Perform Disk Utilities
2. Step 0 Load Input Files
3. Step 1 Assign Tasks To Task Types
4. Step 2 Assess Static Design Features
5. Step 3 Provide Initial Accuracy Estimates
6. Step 4 Describe Stressors
7. Step 5 Describe Sustainment Training Frequency
8. Step 6 Estimate Time and Ac
9. Step 7 Determine Performanc
10. Step 8 Change Personnel Cha
11. Exit PREA

>Change Character. Levels
Print/Display Results
Save Results

Select choice with cursor control arrows and press <CR> when ready...

BLOCK 2 SCREEN 2-1

PATH: PREA>STEP 8>CHANGE>
>Select↙ Esc
Select Condition Set from list below, then press <CR>

MODE: WORK

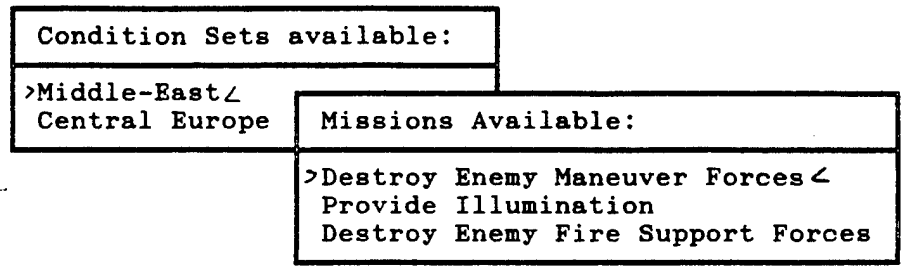
Condition Sets available:
Middle-East Central Europe

BLOCK 2 SCREEN 2-2

PATH: PREA>STEP 8>CHANGE> MODE: WORK

>Select< . Esc

Select Mission from list below, then press <CR>



BLOCK 3 SCREEN 3-1

PATH: PREA>STEP 8>CHANGE> MODE: WORK

Default Change Esc

>Select default values for min and max percentile levels, then <CR>

Maximum percentile level: 95

Minimum Percentile level: 5

BLOCK 3 SCREEN 3-2

PATH: PREA>STEP 8>CHANGE> MODE: WORK
Default Change Esc
?Select default values for min and max percentile levels, then <CR>

Maximum percentile level: 95

Minimum Percentile level: 5

Default values have been selected. Confirm ? (Y/N)

BLOCK 3 SCREEN 3-3

PATH: PREA>STEP 8>CHANGE> MODE: WORK
Default · >Change ↵ Esc
Input other than default values for percentile levels, then <CR>

Input maximum percentile level: 99

Input minimum percentile level: 2.5

99 and 2.5 percentile levels have been input. Confirm ? (Y/N)

BLOCK 3 SCREEN 3-4

PATH: PREA>STEP 8>CHANGE> MODE: WORK

>Select↵ Esc

Select option for incrementing characteristic levels, then <CR>

>Duty Position↵	(same increment for all tasks in position)
Task	(separate increments for each task)

BLOCK 3 SCREEN 3-5

PATH: PREA>STEP 8>CHANGE> MODE: WORK

Select Esc

Select option for incrementing characteristic levels, then <CR>

Duty Position >Task<	(same increment for all tasks in position) (separate increments for each task)

BLOCK 3 SCREEN 3-6

PATH: PREA>STEP 8>CHANGE>

MODE: WORK

Select Esc

Select option for incrementing tasks, then <CR>

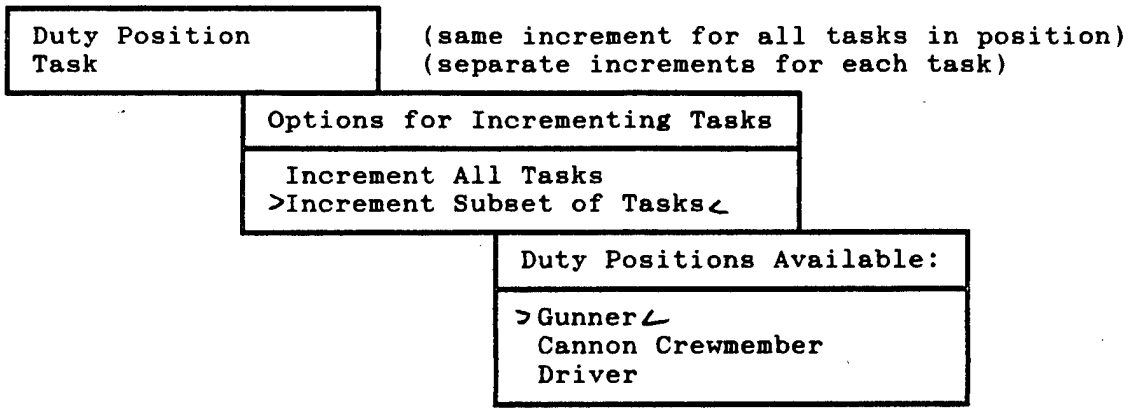
Duty Position
>Task<

(same increment for all tasks in position)
(separate increments for each task)

Options for Incrementing Tasks
Increment All Tasks
>Increment Subset of Tasks<

BLOCK 4 Screen 4-1

PATH: PREA>STEP 8>CHANGE> MODE: WORK
Select Esc
Select duty position, then <CR>



Block 4 Screen 4-2

PATH: PREA>STEP 8>CHANGE>
MODE:WORK

Select Esc
Select tasks for selected duty position, then press <CR>

Duty Position: Gunner
Identify Targets Select Target Determine Target Range Select Ammunition Aim / Sight Weapon Fire Weapon Transmit / Receive Messages

BLOCK 5 SCREEN 5-1

PATH: PREA>STEP 8>CHANGE>

MODE:WORK

System is INCREMENTING levels.

BLOCK 6 SCREEN 6-1

PATH: PREA>STEP 8>CHANGE>

MODE:WORK

System is iterating steps and algorithms.

BLOCK 7 SCREEN 7-1

PATH: PREA>STEP 8>CHANGE MODE: WORK

>Levels< Increments Position Condition Mission Print

Change Minimum / Maximum Levels

Block 7 Screen 7-2

PATH: PREA>STEP 8>CHANGE MODE: WORK

Levels >Increments< Position Condition Mission Print

Change Level for making Increments

Block 7 Screen 7-3

PATH: PREA>STEP 8>CHANGE MODE: WORK

Levels Increments >Position< Condition Mission Print

Select Another Duty Position

Block 7 screen 7-4

PATH: PREA>STEP 8>CHANGE MODE: WORK

Levels Increments Position >Condition< Mission Print

Select Another Condition Set

Block 7 Screen 75

PATH: PREA>STEP 8>CHANGE MODE: WORK

Levels Increments Position Condition >Mission< Print

Select Another Mission

BLOCK 7 SCREEN 7-6

PATH: PREA>STEP 8>CHANGE MODE: WORK

Levels Increments Position Condition Mission >Print<

Print or Display Results

BLOCK 8 SCREEN 8-1

PATH: PREA>STEP 8> MODE: WORK

Personnel Requirements Estimation Aid Main Menu

1. Perform Disk Utilities
2. Step 0 Load Input Files
3. Step 1 Assign Tasks To Task Types
4. Step 2 Assess Static Design Features
5. Step 3 Provide Initial Accuracy Estimates
6. Step 4 Describe Stressors
7. Step 5 Describe Sustainment Training Frequency
8. Step 6 Estimate Time and Ac
9. Step 7 Determine Performanc
10. Step 8 Change Personnel Cha
11. Exit PREA

Change Character. Levels
>Print/Display Results<
Save Results

Select choice with cursor control arrows and press <CR> when ready...

BLOCK 8 SCREEN 8-2

```
PATH: PREA>STEP 8>DISPLAY>                                    MODE: WORK
>Select↵ . Esc
 Select a print, display, or save option from list, then press <CR>
```

Print / Display Options
>Print Reports ↵ Display Reports on Monitor

Task Performance Discrepancies Summary

System _____ Design Version _____ Date _____

Condition Set _____ Mission _____

Duty Position _____ MOS/Skill Level _____

Total Tasks _____

Number of Time Discrepancies _____

Number of Accuracy Discrepancies _____

Total Discrepancies _____

BLOCK 10 SCREEN 10-1

Task Performance Discrepancies

System _____ Design Version _____ Date _____

Condition Set _____ Mission _____

Duty Position _____ MOS/Skill Level _____

Task	Char 1 Level	Char 2 Level	Char 3 Level	Time Estimate	Accuracy Estimate	Function	Time Criteria	Accuracy Standard	Criteria	Discrepancies			
										Time		Accuracy	
										Value	%	Value	%

Block 10 Screen 10-2

Mission Time Discrepancies

System _____ Design Version _____ Date _____

Condition Set _____ Mission _____

Required Mission Time _____ Estimated Time _____

Tasks in Critical Path	Duty Position	Time Estimate	Function	Time Criteria	Discrepancies	
					Value	%

BLOCK 10 SCREEN 10-3

Mission Accuracy Performance Report

System _____ Design Version _____ Date _____

Condition Set _____

Mission _____ Required Mission Accuracy _____

Estimated Mission Accuracy _____

Task	Accuracy Estimates		Task Element Accuracy			Function Performance Requirements			
	Standard	Criteria	Task Element	Standard	Criteria	Function	Accuracy Weight	Standard	Criteria

BLOCK 10 SCREEN 10-4

Maintenance Maintainability and Availability Discrepancies

System _____ Design Version _____ Date _____

Condition Set _____ Mission _____

System-Level Manhours

	REQUIRED	ESTIMATED
Level 1		
Level 2		
Level 3		
Level 4		
TOTAL		

System-Level Availability

REQUIRED _____

ESTIMATED _____

General Equipment Item	General Maintenance Function	Recommended % for Manhours	Estimated % for Manhours	Discrepancies	
				Value	%
	TOTAL _____				
	TOTAL _____				
	TOTAL _____				

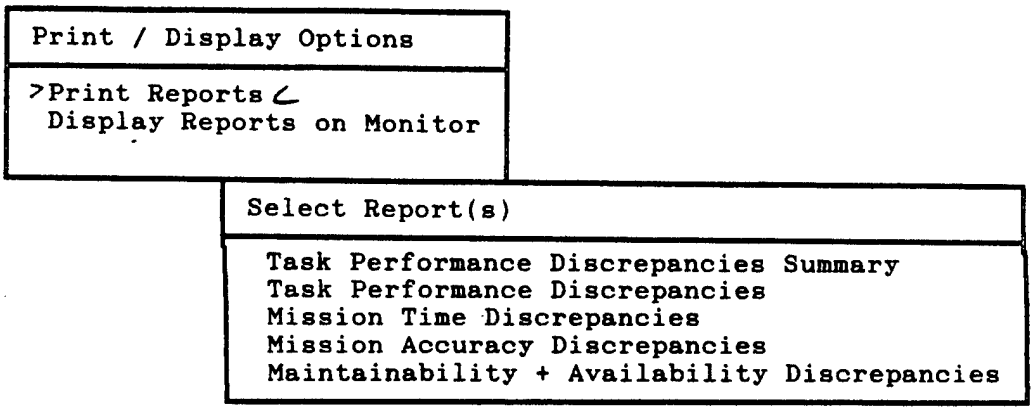
Block 10 Screen 10-5

BLOCK 9 SCREEN 9-1

PATH: PREA>STEP 8>DISPLAY> MODE: WORK

>Select↵ · Esc

Select a print, display, or save option from list, then press <CR>



BLOCK 8 SCREEN 8-1

PATH: PREA>STEP 8>DISPLAY> MODE: WORK

Select Esc

Select a print, display, or save option from list, then press <CR>

Print / Display Options
Print Reports >Display Reports on Monitor

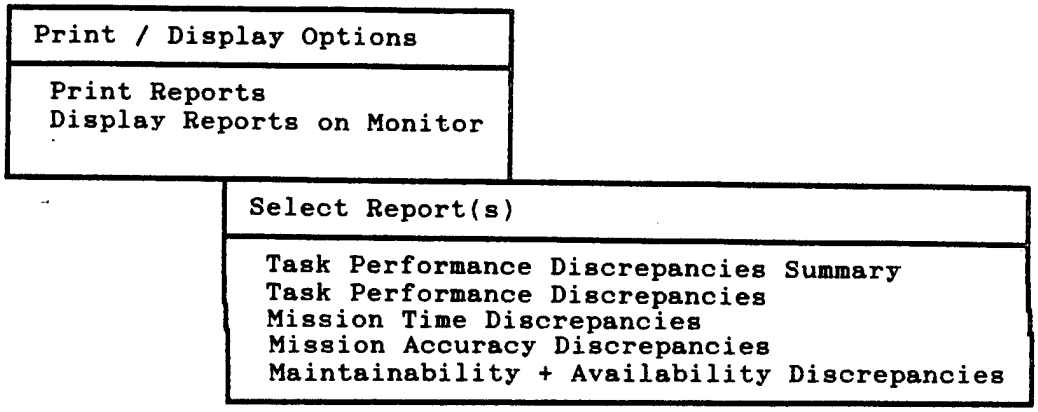
Block 9 Screen 9-1

PATH: PREA>STEP 8>DISPLAY>

MODE: WORK

Select Esc

Select a print, display, or save option from list, then press <CR>



Block 11 Screen 11-1

PATH: PREA>STEP 5>DISPLAY> MODE: WORK

Personnel Requirements Estimation Aid Main Menu

1. Perform Disk Utilities
2. Step 0 Load Input Files
3. Step 1 Describe Equipment
4. Step 2 Assess Static Design Features
5. Step 3 Provide Initial Accuracy Estimates
6. Step 4 Describe Stressors
7. Step 5 Describe Sustainment Training Frequency
8. Step 6 Estimate Time and Ac
9. Step 7 Determine Performanc
10. Step 8 Change Personnel Cha
11. Exit PREA

Change Character. Levels
Print/Display Results
>Save Results<

Select choice with cursor control arrows and press <CR> when ready...

Block 12 screen 12-1

PATH: PREA>STEP 5>SAVE>

MODE: WORK

NOTE: System is checking availability of memory for saving data

BLOCK 13 SCREEN 13-1

PATH: PREA>STEP 5>SAVE MODE: WAIT
Floppy : Quit
Save report to floppy diskette

NOTE: System is checking availability of memory for saving data.

NOTE: Insufficient memory available for saving.

- BLOCK 13 SCREEN 13-2

PATH: PREA>STEP 5>SAVE
>Floppy< Quit
Save report to floppy diskette

MODE: WAIT

Insert Floppy diskette and hit <cr>.

Report(s) are being saved on floppy diskette.

BLOCK 14 SCREEN 14-1

PATH: PREA>STEP 5>SAVE>

MODE: WORK

Insert name of file to be saved: uh-60a.doc

BLOCK 15 SCREEN 15-1

PATH: PREA>STEP 5>SAVE>

MODE: WORK

Insert name of file to be saved: uh-60a.doc

System is saving file UH-60A.doc.

SECTION 4 - DESCRIPTION OF LIBRARIES

4.1 OVERVIEW

Table 4.1-1 lists the libraries associated with each Step of the PREA.

4.2 DESCRIPTION OF LIBRARIES FILE STRUCTURE AND DATA

In the pages that follow, two tables are presented to describe each library file. The first table presents the data dictionary that describes the structure of the file. The second table describes the actual data elements in the library.

Table 4.1-1. List of Library Files

STEP	FILE	STRUCTURE	DATA
2	Generic Equipment List	4.2-1	4.2-2
2	Intentionally Left Blank	4.2-3	4.2-4
2	Human Interface Component Taxonomy	4.2-5	4.2-6
1	Intentionally Left Blank	4.2-7	4.2-8
1,6	Functional Task Assignments	4.2-9	4.2-10
1,3	Task Characteristic Map	4.2-11	4.2-12
2	Static Design Measure Population Library	4.2-13	4.2-14
1,3,5	Baseline Task Parameter Library	4.2-15	4.2-16
0	System Types by Mission Area	4.2-17	4.2-18
4	Stressor-System Condition Linkages	4.2-19	4.2-20
3,6,7,8	Personnel Variables Description	4.2-21	4.2-22
3,6,7,8	Personnel Variables Summary	4.2-23	4.2-24
	Intentionally Left Blank	4.2-25	4.2-26
6	Performance Shaping Function Parameters	4.2-27	4.2-28

Table 4.2-1.

FILE ID: MOS Titles

DESCRIPTION: Lists titles for every MOS in Army as of 1987.

RECORD	FILE	DESCRIPTION	LENGTH	DATA TYPE
1	1	File ID	10	Alpha
2	1	MOS Code	3	Alpha
	2	MOS Title	50	Alpha
	3	MOS CMF	2	Num

ESTIMATED NO. OF TABLES: 1

ESTIMATED NO. OF RECORDS: 350 (NO. OF MOSs)

LENGTH: FIXED

Table 4.2-2. Data for MOS Titles

Table 1-4 Alphabetical list of MOS by title.		
Title	MOS	SQI
Accounting specialist	75D	71
Administrative specialist	71L	71
Aerial intelligence specialist	96H	96
Assistant Observer	96B	96
AH 1 attack helicopter technical inspector	68Y	67
AH 64 attack helicopter repairer	67R	67
AH 64 attack helicopter technical inspector	68R	68
Airdrop repairer (Positive Force)	88R	88
Aircraft armaments technical inspector	68J	67
Aircraft components repair supervisor	68K	67
Aircraft electrician	68P	67
Aircraft fire control repairer	68J	67
Aircraft maintenance senior sergeant	67Z	67
Aircraft pneudraulics repairer	68H	67
Aircraft powerplant repairer	68B	67
Aircraft powertrain repairer	68D	67
Aircraft structural repairer	68G	67
Aircraft weapon systems repairer	68M	67
Air defense artillery operations and intelligence assistant	16H	16
Air defense artillery senior sergeant	16Z	16
Air defense radar repairer	26H	23
Air traffic control radar controller	93J	93
Air traffic control systems, subsystems and equipment repairer	93D	93
Air traffic control tower operator	93H	93
Ammunition inspector	55X	55
Ammunition specialist	55B	55
Ammunition stock control and accounting specialist	55R	55
Ammunition supervisor	55Z	55
Animal care specialist	91T	91
AN/TSQ 73 air defense artillery command & control system operator/repairer	26L	23
Armament/fire control maintenance supervisor	45Z	63
Armor senior sergeant	19Z	19
Artillery repairer	46L	69
Atomic demolition munitions specialist	12E	12
Attack helicopter repairer	67Y	67
Audio/television specialist	84F	25
Audio/visual chief	25Z	25
Audio/visual equipment repairer	41E	25
Automatic data communications switching center specialist	72G	31
Automatic digital message switch equipment repairer	29H	29
Automatic test equipment operator/maintainer	29B	29
Avionic communication equipment repairer	29L	29
Avionic equipment maintenance supervisor	29P	29
Avionic mechanic	29K	29
Avionic navigation and flight control equipment repairer	29M	29
Avionic special equipment repairer	29R	29
Bands senior sergeant	02Z	97
Baritone or euphonium player	02C	97

Table 4.2-2. Data for MOS Titles (Continued)

Bassoon player	02K	97
Behavioral sciences specialist	91G	91
Biological sciences assistant	01H	91
Biomedical equipment specialist, advanced	35U	91
Biomedical equipment specialist, basic	35G	91
BRADLEY fighting vehicle system mechanic	45T	88
BRADLEY fighting vehicle system turret mechanic	45T	88
Bridge crewmember	12C	12
Broadcast journalist	71R	46
Calibration specialist	35H	89
Cannon crewmember	13B	13
Cannon fire direction specialist	13E	13
Cardiac specialist	91N	91
Cargo specialist	88H	88
Carpentry and masonry specialist	51B	91
Cartographer	81C	81
Cavalry scout	19D	19
CHAPARRAL Crewmember	14P	14
CHAPARRAL/REDEYE repairer	27G	27
CHAPARRAL system mechanic	24N	28
Chaplain Assistant	71M	71
Chemical Operations Sp	54B	54
Clarinet player	02J	97
Club manager	08J	71
College trainee	00C	-
Combat engineer	12B	12
Combat engineering senior sergeant	12Z	12
Combat signaler	31K	31
Command sergeant major	00Z	-
Commissioned officer candidate	00B	-
Communications-electronics maintenance chief	29Z	29
Communications-operations chief	31Z	31
Communications-electronics radio repairer	29E	29
Communications equipment maintenance chief	29X	29
Communications maintenance support chief	29W	29
Communications systems/ circuit controller	25D	31
Communications systems/ circuit control supervisor	31X	31
Communications systems supervisor	31Y	31
Computer/machine operator	74D	74
Computerized Systems Maintenance Chief	29V	29
Counter Signals Intelligence Specialist	97B	96
COMSEC maintenance chief	29P	29
Concrete and asphalt equipment operator	62H	91
Construction engineering supervisor	51H	51
Construction equipment repairer	62B	96
Construction equipment supervisor	62R	62
Construction surveyor	82B	81
Cornet or trumpet player	02B	97
Correctional specialist	95C	95
Counterintelligence agent	97B	96
Counterintelligence/ Human Intelligence Senior Sergeant	97Z	96
Computerized Systems Maintenance Chief	29V	29
Counter Signals Intelligence Specialist	97B	96
Court reporter	71E	71
Crane operator	62F	91
Cytology specialist	91E	91
DAIS Computer Systems Repairer	29D	29
Data processing NCO	74Z	74
Defense acquisition radar operator	16J	16
Dental laboratory specialist	46D	81
Dental specialist	91E	91
Digital communications equipment repairer	29G	29
Digital equipment maintenance chief	29U	29
Diver	00B	91
Engineer tracked vehicle crewman	12K	12
Ear nose throat specialist	91U	91
Equipment records and parts specialist	76C	76
Electric bass player	02U	97
Electronic equipment maintenance chief	29X	29
Electronic Warfare/ Intercept Aerial Sensor Repairer	29V	96
Electronic Warfare/ Intercept Aviation System Repairer	29R	96
Electronic Warfare/ Intercept Strategic System Analyst and Command and Control Subsystem Repairer	29M	96
Electronic Warfare/ Intercept Strategic Receiving Subsystems Repairer	29P	96
Electronic Warfare/ Intercept Strategic Processing and Storage Subsystems Repairer	29Q	96
Electronic Warfare/ Intercept Tactical System Repairer	29T	96
Electronic Warfare/ Intercept Systems Maintenance Supervisor	29Z	96
Electronic warfare/signal intelligence analyst	96C	96
Electronic warfare/signal intelligence chief	96Z	96
Electronic warfare/signal intelligence center supervisor	96D	96
Electronic warfare/signal intelligence morse interceptor	96H	96
Electronic warfare/signal intelligence systems maintenance interceptor	96J	96
Electronic warfare/signal intelligence non-morse interceptor	96K	96
Electronic warfare/signal intelligence voice interceptor	96G	96
Electronics equipment maintenance chief	29X	29
Executive administrative assistant	71C	71
Explosive ordnance disposal specialist	55D	55
Eye specialist	91Y	91
Fabric repair specialist	46M	76
Field Artillery digital repairer	29L	29
Field artillery firefinder radar operator	13R	13
Field artillery meteorological crewmember	35F	13
Field artillery radar crewmember (Reserve Forces)	17B	13
Field artillery senior sergeant	13Z	13
Field artillery surveyor	82C	13
Field Artillery tactical fire direction repairer	29Y	29
Field COMSEC equipment repairer	29S	29
Fighting vehicle infantryman	11M	11
Finance senior sergeant	75Z	71
Finance specialist	75C	71
Fire control instrument repairer	41C	96
Fire control systems repairer	45Q	96
Firefighter	51M	51
Fire support specialist	13F	13
Fixed COMSEC equipment repairer	29F	29
Flight operations coordinator	93P	96
Flute or piccolo player	02G	97
Food service specialist	94B	94
Forward area alerting radar repairer	27H	27
French horn player	02D	97

Table 4.2-2. Data for MOS Titles (Continued)

Fuel and electrical systems repairer	63G	67
General construction equipment operator	62J	51
General engineering supervisor	51Z	51
Graves registration specialist	57F	76
Ground controlled approach radar repairer	26D	26
Ground surveillance systems operator	96R	96
Guitar player	02T	97
HAWK continuous wave radar repairer	24K	27
HAWK fire control crew member	16E	16
HAWK fire control mechanic	24E	26
HAWK fire control repairer	24H	27
HAWK firing section mechanic	24C	26
HAWK information coordination central mechanic	24G	23
HAWK launcher/ mechanical systems repairer	24L	27
HAWK maintenance chief	24V	27
HAWK master mechanic	24R	26
HAWK missile crewmember	16D	16
HAWK pulse radar repairer	24J	27
Health physics specialist	91X	91
Heavy antiarmor weapons infantryman	11H	11
Heavy construction equipment operator	62E	51
Heavy lift helicopter repairer	67X	67
Heavy lift helicopter technical inspector	68X	67
Heavy wheel vehicle mechanic	63S	63
Hospital food service specialist	94F	94
IBM automatic data processing systems repairer	36K	29
Illustrator	81E	25
Imagery analyst	96D	96
Indirect fire infantryman	11C	11
Infantryman	11B	11
Infantry Senior SGT	11Z	11
Intelligence analyst	96B	96
Intelligence senior sergeant	96Z	96
Interior electrician	51R	51
Interrogator	97E	96
Journalist	71Q	46
LANCE Crewmember	13N	13
LANCE systems repairer	27L	27
Land combat/ air defense systems maintenance chief	27Z	27
Land combat support system test specialist/ LANCE repairer	27S	27
Laundry and bath specialist	57E	25
Legal specialist	71D	71
Light air defense artillery crewmember (Reserve Forces)	16F	16
Light wheel vehicle mechanic	63B	63
Locomotive electrician (Reserve Forces)	88S	88
Locomotive operator (Reserve Forces)	88U	88
Locomotive repairer (Reserve Forces)	88P	88
Machinist	44E	89
MANPADS crewmember	16S	16
Marine senior sergeant	98Y	98
Material control and accounting specialist	76P	76
Material storage and handling specialist	76V	76
Material quality specialist	51G	51
Mechanical maintenance supervisor	63Z	63
Medical laboratory specialist	66B	91
Medical NCO	91B	91
Medical specialist	91A	91
Medical supply specialist	76J	91
Medium helicopter repairer	67U	67
Medium helicopter technical inspector	68U	67
Metal worker	44B	65
Military police	95B	95
Mobile Subscriber Equipment (MSE) Communications Chief	31W	31
Mobile Subscriber Equipment (MSE) Network Switching Systems Operator	31F	31
Mobile Subscriber Equipment (MSE) Transmission System Operator	31D	31
Motion picture specialist	84C	84
Motor transport operator	88M	88
Multichannel communications equipment operator	31M	31
Multiple launch rocket system/LANCE operation/fire direction specialist	15J	13
Multiple launch rocket system crewmember	13M	13
Multiple launch rocket system repairer	27M	27
M1 ABRAMS armor crewman	19K	19
M1 ABRAMS tank systems mechanic	63E	63A
M1 ABRAMS tank turret mechanic	45E	63
M48 M60 armor crewman	19E	19
M60A1/AS tank system mechanic	63N	63
M60 tank turret mechanic	45N	63
NIKE-HERCULES guidedal mechanic	24U	23
Nuclear medicine specialist	91W	91
Nuclear weapons maintenance specialist	55G	55
Oboe player	02H	97
Observation airplane repairer	67H	67
Observation airplane technical inspector	68H	67
Observation/scout helicopter repairer	67V	67
Observation/scout helicopter/technical inspector	68V	67
Occupational therapy specialist	91L	91
Office machine repairer	41J	69
Operating room specialist	91D	91
Optical laboratory specialist	48E	91
Orthopedic specialist	91H	91
Orthotic specialist	48C	91
Parachute rigger	43E	76
Patient administration specialist	71G	91
PATRIOT missile crewmember	16T	16
PATRIOT Operator and system mechanic	24T	23
Percussion player	02M	97
PERSHING electrical-mechanical repairer	45N	27
PERSHING electronics material specialist	21G	27
PERSHING electronics repairer	21L	27
PERSHING missile crewmember	16E	16
Personnel actions specialist	76E	71
Personnel administration specialist	76B	71
Personnel information system management specialist	76F	71
Personnel management specialist	76C	71
Personnel records specialist	76D	71
Personnel sergeant	76Z	71
Petroleum laboratory specialist	77L	77
Petroleum supply specialist	77F	77
Pharmacy specialist	91Q	91
Photo and layout specialist	81E	81
Physical activity specialist	69C	71
Physical therapy specialist	91F	91
Piano player	02N	97
Plumber	51K	51

Table 4.2-2. Data for MOS Titles (Continued)

Power generation equipment repairer	56D	05
Practical nurse	91C	91
Preventive Medicine Specialist	91S	91
Programmer/analyst	74F	74
Prime power production specialist	52E	51
Printing and bindery specialist	59F	81
Psychiatric specialist	91F	91
Psychological-operations specialist	96F	96
Public affairs-chief	54Z	46
Quarrying specialist	56G	51
Quartermaster and chemical equipment repairer	55J	05
Radar/special electronic devices maintenance chief	36W	35
Radio/television systems specialist	25T	25
Railway car repairer (Reserve Forces)	88Q	88
Railway movement coordinator (Reserve Forces)	88W	88
Railway section repairer (Reserve Forces)	88T	88
Railway senior sergeant (Reserve Forces)	88X	88
Recruiter (Reserve Forces)	00E	79
Recruiter/retention NCO	00R	79
Reenlistment NCO (Reserve Forces)	79D	79
Remotely piloted vehicle crewmember	13T	16
Reserve Forces reporting code	00T	-
Respiratory specialist	91V	91
ROLAND system crewmember	16Q	16
ROLAND system field maintenance test sets repairer	27D	27
ROLAND system mechanic	24S	29
ROLAND system repairer	27C	27
Satellite communications systems repairer	29Y	29
Satellite/microwave communications chief	29T	29
Saxophone player	02L	97
Scout helicopter repairer (NSH)	67S	67
Scout helicopter technical inspector (NSH)	68S	67
Self-propelled field artillery turret mechanic	45D	05
Senior supply sergeant	76Z	76
Simultaneous membership program	00R	-
Single channel radio operator	31C	31
Small arms repairer	45B	05
Special agent	95D	95
Special handpersen	00S	97
Special duty assignment	00D	-
Special electronic devices repairer	35E	29
Special Operations Communications Sergeant	18E	18
Special Operations Engineer Sergeant	18C	18
Special Operations Intelligence Sergeant	18F	18
Special Operations Medical Sergeant	18D	18
Special Operations Senior Sergeant	18Z	18
Special Operations Weapons Sergeant	18B	18
Special purpose equipment repairer	05X	05
Still photographic specialist	84B	25
Strategic microwave systems repairer	29V	29
Subsistence supply specialist	76K	76
Switching Systems Operator	36M	31
Tactical circuit controller	31N	31
Tactical communications chief	31Q	31
Tactical computer systems repairer	29T	29
Tactical fire operations specialist	19C	19
Tactical satellite/ microwave repairer	29M	29
Tactical satellite/ microwave systems operator	31Q	31
Tactical transport helicopter repairer	67T	67
Tactical transport helicopter technical inspector	68T	67
Tactical telecommunications center operator	72E	31
Tank turret repairer	45K	05
Target Acquisition Surveillance Radar Repairer	29C	29
Technical drafting specialist	81B	81
Technical engineering supervisor	51T	81
Telecommunications center operator	72E	31
Telephone central office repairer	29N	29
Teletypewriter equipment repairer	29J	29
Television/radio broadcast operations chief	84T	25
Terrain analyst	81Q	81
Topographic engineering supervisor	81Z	81
Topographic instrument repair specialist	41B	81
Topographic surveyor	82D	81
TOW/DRAGON repairer	27E	27
Track vehicle mechanic	63Y	05
Track vehicle repairer	63H	05
Traffic management coordinator	55N	05
Train crewmember (Reserve Forces)	88V	05
Transmission and distribution specialist	62B	51
Transportable automatic switching systems operator/maintainer	36L	31
Transportation center sergeant	88Z	88
Trombone player	02E	97
Tuba player	02F	97
Turbine engine driven generator repairer	52F	05
Unit level communications maintainer	31V	31
Unit supply specialist	76Y	76
Utilities equipment repairer	52C	05
Utility/cargo airplane repairer	67G	67
Utility/cargo airplane technical inspector	68G	67
Utility helicopter repairer	67N	67
Utility helicopter technical inspector	68N	67
Veterinary food inspection specialist	91R	91
VULCAN crewmember	16R	16
VULCAN repairer	27F	27
VULCAN system mechanic	24M	29
Warrant officer candidate	00W	-
Watercraft engineer	88L	88
Watercraft operator	88K	88
Water treatment specialist	77W	77
Wheel vehicle repairer	63W	05
Wire systems installer	31L	31
X-ray specialist	91P	91

Table 4.2-3.

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Table 4.2-4.

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Table 4.2-5. Human Interface Component Taxonomy

FILE ID: Component Taxonomy

DESCRIPTION: This file lists the Human Interface Component Taxonomy

FILE	RECORD	DESCRIPTION	LENGTH	TYPE
1	1	File ID	10	Alpha
2		Component Type Title	3	Alpha
		Component Type Code	3	Alpha
3		Applicable Reach Measures	2	Alpha
4		Applicable Strength Measures	2	Alpha
5		Applicable Visual Access Measures	2	Alpha

ESTIMATED NO. OF TABLES: 1

ESTIMATED NO. OF RECORDS:

2	50	(MAXIMUM NO. OF CATEGORIES IN TAXONOMY)
3	5	(MAXIMUM NO. OF REACH MEASURES)
4	60	(MAXIMUM NO. STRENGTH MEASURES) ASSIGNED TO TYPE)
5	5	(MAXIMUM NO. OF VISUAL ACCESS MEASURES)

LENGTH: VARIABLE

Table 4.2-6. Data for Human Interface Taxonomy*

CONTROL/DISPLAY TYPES	APPLICABLE REACH MEASURE	APPLICABLE STRENGTH MEASURE	APPLICABLE VISUAL ACCESS
Displays	—	—	—
	—	—	—
VDX Visual Displays			
V11 Transilluminated Displays	None	None	V1 - V2
V12 Scale Indicators	None	None	V1 - V2
V13 CRT Displays	None	None	V1 - V2
V14 Other Visual Displays	None	None	V1 - V2
AD Audio Displays	None	None	None
Controls	—	—	—
C1 Rotary	R1 to R5	S21 to S80	V1 - V2
C2 Linear Discrete	R1 to R5	S81 to S88	V1 - V2
C3 Linear Continuous	R1 to R5	S81 to S88	V1 - V2
C4 Touch Screen	R1 to R5	S81 to S88	V1 - V2
C5 High Force	R1 to R5	S81 to S88	V1 - V2
C6 Miniature	R1 to R5	S81 to S88	V1 - V2

* Legend Attached.

NOTE: Lift Measures are only applicable when a lifting/lowering task is involved (Gross-Motor-Lifting). Arm Strength measures are also applicable to Torquing Tasks (Gross Motor-Torquing).

Table 4.2-6. Static Design Measures Legend (Continued))

#	VARIABLE DESCRIPTION REACH	
R1	Functional Reach Standing	
R2	Functional Reach Sitting	
R3	Eye Height-Sitting	
R4	Overhead Reach-Sitting	
R5	Overhead Reach-Standing	

#	STRENGTH	
S11	Maximum Weight Lift	6 Ft
S12	Maximum Weight Lift	5 Ft
S13	Maximum Weight Lift	4 Ft
S14	Maximum Weight Lift	3 Ft
S15	Maximum Weight Lift	2 Ft
S16	Maximum Weight Lift	1 Ft

	ARM	ANGLE	PULL	PUSH	UP	DOWN	IN	OUT
ARM STRENGTH*	Left	180	S21	S31	S41	S51	S61	S71
	Left	150	S22	S32	S42	S52	S62	S72
	Left	120	S23	S33	S43	S53	S63	S73
	Left	90	S24	S34	S44	S54	S64	S74
	Left	60	S25	S35	S45	S55	S65	S75
	Right	180	S26	S36	S46	S56	S66	S76
	Right	150	S27	S37	S47	S57	S67	S77
	Right	120	S28	S38	S48	S58	S68	S78
	Right	90	S29	S39	S49	S59	S69	S79
	Right	60	S30	S40	S50	S60	S70	S80

* Number of each Measure listed in Cell

HAND AND THUMB STRENGTH		
MOMENTARY HOLD	Hand Grip Right	S81
	Hand Grip Left	S82
	Thumb-Finger Palmar	S83
	Thumb-Finger Tips	S84
MOMENTARY HOLD	Hand Grip Right	S85
	Hand Grip Left	S86
	Thumb-Finger Palmar	S87
	Thumb-Finger Tips	S88

Table 4.2-6. Static Design Measures (Continued)

V1	Horizontal Line of Sight Angle
V2	Vertical Line of Sight Angle
V3	Horizontal Viewing Distance
V4	Vertical Viewing Distance

Table 4.2-7.

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Table 4.2-8.

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Table 4.2-9. Functional Task Assignments

FILE ID: Functional Task Assingments

DESCRIPTION: This file lists the task taxonomy assignments, equipment task elements, and types of performance measures associated with the generic functional tasks associated with each system type.

RECORD	FILE	DESCRIPTION	LENGTH	DATA TYPE
1	1	File ID	10	Alpha
	2	System Type	2	Alpha
	3	Functional Task Code	3	Alpha
2	1	Presence of Equipment Task Element	1	Alpha
	2	Impact of Equipment Element on Time and Accuracy	1	Alpha
	3	Time Measure Type	1	Alpha
	4	Accuracy Measure Type	1	Alpha
	5	Task Type 1 Code	1	Alpha
	6	Task Type 1 Wt	2	Num
	7	Task Type 2 Code	1	Alpha
	8	Task Type 2 Wt	2	Num
	9	Task Type 3 Code	1	Alpha
	10	Task Type 3 Wt	2	Num
	11	Task Type 4 Code	1	Alpha
	12	Task Type 4 Wt	2	Num
	13	Task Type 5 Code	1	Alpha
	14	Task Type 5 Wt	2	Num
	15	Task Type 6 Code	1	Alpha
	16	Task Type 6 Wt	2	Num
	17	Task Type 7 Code	1	Alpha
	18	Task Type 7 Wt	2	Num
	19	Task Type 8 Code	1	Alpha
	20	Task Type 8 Wt	2	Num
	21	Task Type 9 Code	1	Alpha
	22	Task Type 9 Wt	2	Num
	23	Task Type 10 Code	1	Alpha
	24	Task Type 10 Wt	2	Num

NO. OF TABLES = 925 (MAXIMUM NO. OF FUNCTIONAL TASKS IN LIBRARY)

NO. OF RECORDS = 1

LENGTH = VARIABLE

Table 4.2-10A. Data Describing Equipment Task Elements and Performance Measure Types

Tables which follow describe the following for each functional task.

a. Indication of whether or not the functional task typically has an independent equipment task element.

   Equipment Element - Yes/No

b. If there is an equipment task element, an indication of whether that element impacts time or accuracy.

c. A description of the types of time measures typically associated with the functional task.

d. A description of the types of performance measures typically associated with the functional task.

Table 4.2-10A.

OPERATIONAL FUNCTIONS FOR INFANTRY FIGHTING VEHICLES, CAVALRY FIGHTING VEHICLES, ANTI-TANK VEHICLES & TANKS

Y/N	T/A	TIME MEASURE	PERF MEAS	
				1 Plan & Prepare Mission
N	-	T2	P4	- Receive/Review Order
N	-	T2	P4	- Adjust/Boresight Weapon System
N	-	T2	P4, P5	- Adjust/Inspect Other Systems
N	-	T2	P4	- Enter Data onto Onboard Computers
N	-	T2	P5	- Prepare for NBC Environment
N	-	T2	P4	
				2 Execute Movement
N	-	T2	P4	- Start Engine
N	-	T2	P4	- Check Controls/Instruments
Y	T	T4	P6	- Perform non-Tactical Movement
Y	T	T4	P6	- Perform Tactical Movement
N	T	T2	P4	- Perform Water Crossing
				3 Execute Maneuver
Y	T	T4	P6	- Perform Evasive Maneuvers
Y		T2	P1	- Move to Cover
Y	T	T4	P6	- Negotiate Obstacles
N		T2	P4	- Employ Smoke Screen
N		T2	P4	- Move Into Firing Position
N		T2	P4	- Move Out of Firing Position
				4 Navigate
N		T2	P5	- Identify Present Location
N		T2	P1	- Identify Destination
N		T2	P1	- Select Travel Route
N		T2	P5	- Estimate Time of Arrival and Fuel Requirements
N		T2	P1	- Identify Terrain Features
N		T2	P5	- Use Instruments (i.e. Compass) to Select Correct Heading

PERFORMANCE MEASURE TAXONOMY

T1 - TIME
T2 - [illegible]
T3 - [illegible] = OF REPETITIONS OUTPUTS)
T4 - SPEED
T5 - [illegible] TO CORRECT RESPONSE

ACCURACY STANDARDS

P1 - CORRECT RESPONSE /ITEM
P2 - Hit within Range
P3 - TARGET HIT
P4 - PER CENT CORRECT STEPS /ITEMS
P5 - DEVIATION FROM CORRECT VALUE
P6 REM - FROM IDEAL PATH

Table 4.2-10A. (Continued)

OPERATIONAL FUNCTIONS FOR INFANTRY FIGHTING VEHICLES, CAVALRY FIGHTING VEHICLES, ANTI-TANK VEHICLES & TANKS
(Continued)

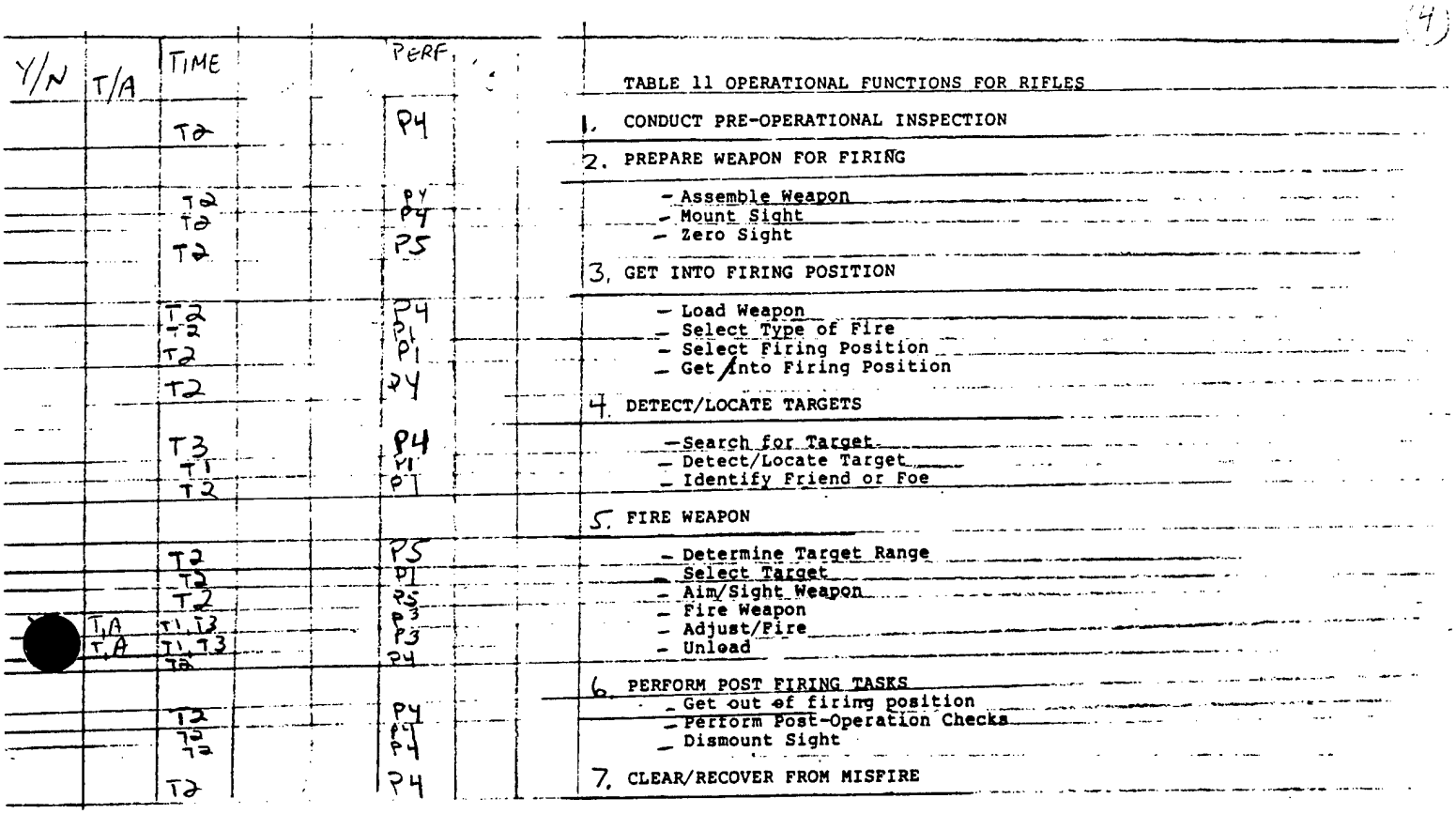
Y/N	T/A	Time	Acc.		
				5	Communicate
Y	T	T3	P4	-	Transmit/Receive Messages
		T3	P4	-	Encode/Decode Messages
		T2	P7	-	Use Counter Measure Procedures
		T3	P4	-	Relay Messages
		T2	P5	-	Obtain Line of Signal
				6	Acquire Targets
		T3	P1,P2	-	Search for Targets
		T1	P1	-	Detect/Locate Targets
		T1	P1	-	Identify Friend or Foe
		T2	P1	-	Identify/Locate Sources of Enemy Fire
				7	Engage Targets
		T2	P1,P2	-	Select Target(s)
		T2	P1	-	Select Weapon & Ammo
		T2	P5	-	Aim/Sight Weapon
		T2	P6	-	Track Target
Y	A,T	T3	P3	-	Fire Weapon
Y	A,T	T3	P3	-	Adjust Fire
		T2	P4	-	Assess Damage
				8	Occupy Defensive Position
		T2	P4	-	Select Position
		T2	P4	-	Camouflage Position
		T2	P4	-	Improve Cover
		T2	P4	-	Select Reference Points
		T2	P4	-	Develop Range Cards
		T2	P4	-	Coordinate With Adjacent Vehicles/Personnel

Table 4.2-10A. (Continued)

OPERATIONAL FUNCTIONS FOR INFANTRY FIGHTING VEHICLES, CAVALRY FIGHTING VEHICLES, ANTI-TANK VEHICLES & TANKS
(Continued)

Y/N	T/A	TIME	ACC		
		T2	P4,P5	9	Call for/Adjust Supporting Fire
		T2	P4,P5		- Call for/Adjust Artillery/Mortar Fire
		T2	P4,P5		- Call for/Adjust Aerial Fire
					- Adjust Tank/Other Fighting Vehicle Fire
		T2	P4	10	Transport Combat Troops
		T2	P4		- Load Troops/Equipment
		T2	P4		- Secure Troops/Equipment
					- Unload Troops/Equipment
		T2	P1	11	Compensate for Equipment Malfunctions & Emergencies
Y	A	T2	P1		- Identify Malfunction
		T2	P4		- Identify Source of Malfunction
		T2	P4		- Compensate for Malfunction/Execute Emergency Procedures
					- Evacuate Vehicle (if appropriate)
		T2	P4	12	Perform Post Operations Tasks
		T2	P4		- Shut Down Engine
		T2	P4		- Power Down Other Systems
		T2	P4		- Perform Checks

Table 4.2-10A. (Continued)



Y/N	T/A	TIME	PERF	TABLE 11 OPERATIONAL FUNCTIONS FOR RIFLES
		T2	P4	1. CONDUCT PRE-OPERATIONAL INSPECTION
				2. PREPARE WEAPON FOR FIRING
		T2	P4	- Assemble Weapon
		T2	P4	- Mount Sight
		T2	P5	- Zero Sight
				3. GET INTO FIRING POSITION
		T2	P4	- Load Weapon
		T2	P1	- Select Type of Fire
		T2	P1	- Select Firing Position
		T2	P4	- Get into Firing Position
				4. DETECT/LOCATE TARGETS
		T3	P4	- Search for Target
		T1	P1	- Detect/Locate Target
		T2	P1	- Identify Friend or Foe
				5. FIRE WEAPON
		T2	P5	- Determine Target Range
		T2	P1	- Select Target
		T2	P5	- Aim/Sight Weapon
	T,A	T1,T3	P3	- Fire Weapon
	T,A	T1,T3	P3	- Adjust/Fire
		T2	P4	- Unload
				6. PERFORM POST FIRING TASKS
		T2	P4	- Get out of firing position
		T2	P4	- Perform Post-Operation Checks
		T2	P4	- Dismount Sight
		T2	P4	7. CLEAR/RECOVER FROM MISFIRE

Table 4.2-10A. (Continued)

Y/N	T/A	TIME	PERF
		T2	P4
		T2	P4
		T2	P4
		T2	P5
		T2	P5
		T2	P4
		T2	P1
		T2	P1
		T2	P4
		T3	P1,P2
		T1	P1
		T2	P1
		T2	P5
		T3	P1
		T2	P5
Y	A	T1	P3
Y	A	T1	P3
		T2	P4
		T2	P4
		T2	P4
		T2	P4
		T2	P4
		T2	P4

TABLE 12 OPERATIONAL FUNCTIONS FOR GRENADE LAUNCHERS

1. CONDUCT PRE-OPERATIONAL INSPECTION

2. PREPARE WEAPON FOR FIRING
   - Assemble Weapon
   - Mount Sight
   - Zero Weapon
   - Zero Sight

3. GET INTO FIRING POSITION
   - Load Weapon
   - Select Type of Fire
   - Select Firing Position
   - Get into Firing Position

4. DETECT/LOCATE TARGETS
   - Search for Target
   - Detect/Locate Target
   - Identify Friend or Foe

5. FIRE WEAPON
   - Determine Target Range
   - Select Target
   - Aim/Sight Weapon
   - Fire Weapon
   - Adjust/Fire
   - Unload

6. PERFORM POST FIRING TASKS
   - Get out of firing position
   - Perform Post-Operation Checks
   - Disassemble Weapon
   - Dismount Sight

7. CLEAR/RECOVER FROM MISFIRE

Table 4.2-10A. (Continued)

(6)

Y/N	T/A	TIME	PERF	PERF	TABLE 13 OPERATIONAL FUNCTIONS FOR MAN-PORTABLE ANTI-TANK WEAPONS
		T2		P4	1. CONDUCT PRE-OPERATIONAL INSPECTION
					2. PREPARE WEAPON FOR FIRING
		T2		P4	- Assemble Round
		T2		P4	- Mount Tracker
					3. GET INTO FIRING POSITION
		T2		P4	- Select Firing Position
		T2		P4	- Get into Firing Position
					4. DETECT/LOCATE TARGETS
		T3		P4	- Search for Target
		T1		P1	- Detect/Locate Target
		T2		P1	- Identify Friend or Foe
					5. FIRE WEAPON
		T2		P5	- Determine Target Range
		T2		P1	- Select Target
		T2		P5	- Aim/Sight Weapon
Y	A	T1		P3	- Fire Weapon
Y	A	T1		P6	- Track Target
					6. PERFORM POST FIRING TASKS
		T2		P4	- Get out of firing position
		T2		P4	- Disassemble Weapon
		T2		P4	7. CLEAR/RECOVER FROM MISFIRE

Table 4.2-10A. (Continued)

Y/N	T/A	TIME	PER
		T2	P4
		T2	P4
		T2	P4
		T2	P5
		T2	P5
		T2	P6/
		T2	P1
		T2	P1
		T2	P4
		T3	P4
		T1	P1
		T2	P1
		T2	P5
		T2	P1
		T2	P5
Y	A	T1	P3
Y	A	T2	P3
		T2	P4
		T2	P4
		T2	P4
		T2	P4
		T2	P4
		T2	P4
		T2	P4

TABLE 14 OPERATIONAL FUNCTIONS FOR AUTOMATIC WEAPONS

1. CONDUCT PRE-OPERATIONAL INSPECTION

2. ~~PREPARE WEAPON POSITION~~
   - ~~Select Position~~
   - Prepare
   - ~~Camouflage Position~~
   - Prepare Target Range Card
   - ~~Emplacing/Aiming Stakes~~

3. PREPARE WEAPON FOR FIRING
   - Assemble Weapon
   - Mount Sight
   - Zero Weapon
   - Zero Sight

4. GET INTO FIRING POSITION
   - Load Weapon
   - Select Type of Fire
   - Select Firing Position
   - Get Into Firing Position

5. DETECT/LOCATE TARGETS
   - Search for Target
   - Detect/Locate Target
   - Identify Friend or Foe

6. FIRE WEAPON
   - Determine Target Range
   - Select Target
   - Aim/Sight Weapon
   - Fire Weapon
   - Adjust/Fire
   - Unload

7. PERFORM POST FIRING TASKS
   - Get out of firing position
   - Remove aiming stakes
   - Perform Post-Operation Checks
   - Disassemble Weapon
   - Dismount Sight

8. CLEAR/RECOVER FROM MISFIRE

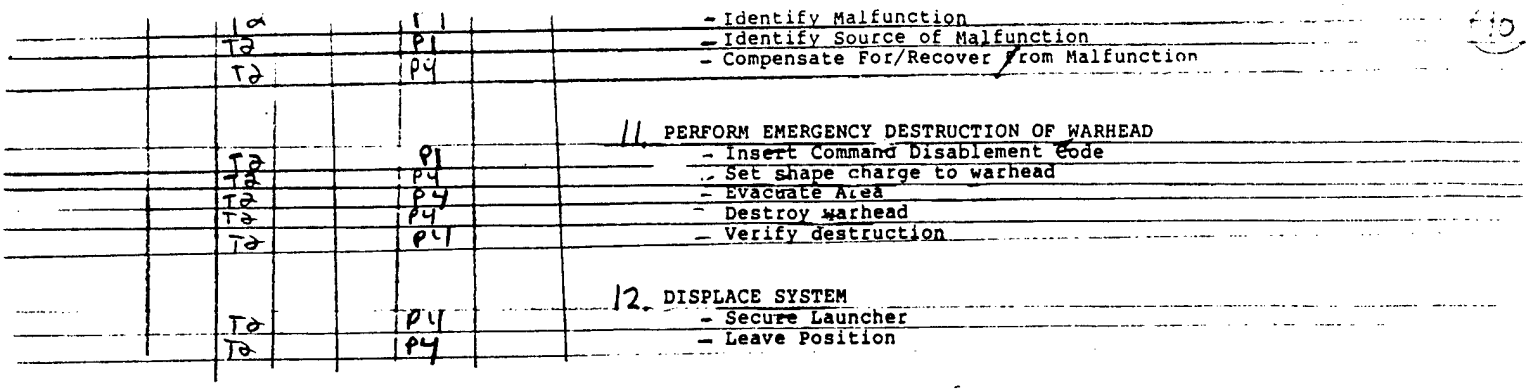
Table 4.2-10A. (Continued)

Y/N	T/A	TIME	PER	TABLE 15 OPERATIONAL FUNCTIONS FOR MAN-PORTABLE INDIRECT FIRE INFANTRY WEAPONS (MORTARS)
		T2	P4	1. PERFORM PRE-OPERATIONAL CHECKS
				2. ~~PREPARE POSITION~~ ~~Select Position~~ ~~Prepare Position~~ ~~Camouflage Position~~ ~~Emplace Aiming Posts~~
				23. PREPARE MORTAR FOR FIRING
		T2	P4	– Assemble Mortar
		T2	P5	– Lay Mortar
		T2	P5	– Boresight Mortar
		T2	P4	– Perform Pre-Fire Checks
				34 FIRE MORTAR AT INDIRECT FIRE TARGETS
		T	P4	– Receive Firing Order
		T2	P4	– Prepare Ammunition for Firing
		T2	P5	– Set Elevation and Deflection
		T3	P4	– Load Mortar
		T3	P3	– Fire Mortar
				49. FIRE MORTAR AT DIRECT FIRE TARGETS
		T1	P1	– Identify Target
		T1	P3	– Select Target
		T2	P4	– Point Mortar at Target
		T2	P4	– Prepare Ammunition for Firing
		T3	P4	– Load Mortar
		T3	P5	– Aim Mortar
4	A	T3	P3	– Fire Mortar
Y	A	T3	P3	– Adjust Fire
				56. PERFORM POST-FIRING TASKS
		T2	P4	– Perform Post-Operation Checks
		T2	P4	– Disassemble Weapon
		T	P4	– Displace Aiming Posts
		T2	P4	67. CLEAR/RECOVER FROM MISFIRE

Table 4.2-10A. (Continued)

Y/N	T/A	TM	PER	TABLE 18 OPERATIONAL FUNCTIONS FOR MEDIUM RANGE MISSILE ARTILLERY SYSTEMS (Assumes Missile is on Self Propelled Launcher)
				1. PREPARE FOR MARCH ORDER
		-	P4	- Receive March Order
		-	P4	- Receive Weapon from Assembly and Transport Section
		T2	P4	- Prepare Self-Propelled Launcher (SPL) for Movement
		T2	P4	- Ensure Firing Point is Surveyed
				2. MOVE TO FIRING POINT
		T2	P4	- Start Engine
		T2	P4	- Perform Pre-Operational Vehicle Check
Y	T	T4	P6	- Drive SPL
				3. NAVIGATE
		T2	P5	- Identify Present Location
		T2	P5	- Identify Destination
		T2	P5	- Select Travel Route
		T2	P5	- Estimate Time of Arrival and Fuel Requirements
				4. COMMUNICATE
Y	T	T3	P4	- Transmit/Receive Messages
		T3	P4	- Encode/Decode Messages
		T2	P4	- Communicate Using Countermeasure Procedures
				5. EMPLACE SYSTEM
		T2	P4	- Position SPL over Launch Stake
		T2	P4	- Shut Down Vehicle
		T2	P4	- Prepare Vehicle for Firing Mode
		T2	P4	- Inspect Main Missile Assembly (MMA) and Warhead Section (WHS) for Damage
		T2	P4	- Release tie down straps, release traverse, and lockpins
		T2	P4	
				6. PREPARE WEAPON FOR FIRING
		T2	P4	- Receive Firing Data
		T2	P4	- Turn on Monitor-Programmer
Y	T	T2	P4	- Conduct self test
		T2	P5	- Lay/sight weapon
		T2	P4	- Remove protective covers
				7. FIRE WEAPON
		T2	P4	- Arm WHS
		T2	P4	- Insert WHS Settings
		T2	P5	- Move Firing Device to Firing Pit
		T2	P4	- Elevate Missile
		T2	P4	- Place Selector in Launch Position
		T2	P4	- Clear Area
		T2	P4	- Fire Missile
		T1	P4	
		T2	P4	8. CONDUCT POST FIRING INSPECTIONS
		T2	P4	
		T2	P4	9. EXECUTE FAILURE TO FIRE PROCEDURES
		T2	P4	- Lower Launcher
		T2	P4	- Safe the WHS
		T2	P4	- Disconnect Firing Device
		T2	P4	- Reorient Launcher
		T2	P5	- Obtain new orientation from remote theodolite
		T2	P4	
				10. COMPENSATE FOR EQUIPMENT MALFUNCTIONS AND EMERGENCIES

Table 4.2-10A. (Continued)



			- Identify Malfunction
T2		P1	- Identify Source of Malfunction
T2		P4	- Compensate For/Recover from Malfunction
			11. PERFORM EMERGENCY DESTRUCTION OF WARHEAD
T2		P1	- Insert Command Disablement Code
T2		P4	- Set shape charge to warhead
T2		P4	- Evacuate Area
T2		P4	- Destroy warhead
T2		P4	- Verify destruction
			12. DISPLACE SYSTEM
T2		P4	- Secure Launcher
T2		P4	- Leave Position

Table 4.2-10A. (Continued)

TABLE 19 OPERATIONAL FUNCTIONS FOR TOWED HOWITZERS

Y/N	T/A	TIME	PER	
				1. PREPARE FOR MARCH ORDER
		-	P4	- Receive March Order
		T2	P4	- Perform Pre-Operational Checks
		T2	P4	- Perform Fire Control Alignment
		T2	P4	Test Gunner's Quadrants
				2. DRIVE/MOVE CANNON
Y	T	T9	P6	- Drive Vehicle(Non-tactical march)
Y	T	T4	P6, P4	- Conduct Tactical March
		T1	P4	- Perform Water Crossing
				3. EMPLACE CANNON
		T2	P4	- Uncouple cannon from vehicle
		T2	P1	- Select Position
		T2	P4	- Prepare Position
		T2	P5, P4	- Emplace/Align Collimator
		T2	P5, P4	- Emplace/Align Aiming Posts
				4. DISPLACE CANNON
		T2	P4	- Recover Collimator
		T2	P4	- Recover Aiming Posts
		T2	P4	- ~~Uncouple cannon~~ COUPLE CANNON TO VEHICLE
		T2	P4	- Leave Position
				5. PREPARE CANNON FOR FIRING
		T2	P5, P4	- Set Up Aiming Circle
		T2	P5	- Establish Azimuth of the Orienting Line
		T2	P5	- Lay Weapon
		T2	P4, P5	- Establish Aiming Points
		T2	P5	- Determine Site to Crest
		T2	P5	- Boresight Weapon/Telescopes
		T2	P4	- Emplace Azimuth Markers
		T2	P4	- Perform Prefire Checks
		T2	P4	- Prepare Range Card
				6. FIRE CANNON
		←	P4	- Receive Firing Order
		T2	P4	- Prepare Ammunition for Firing
		T2	P5	- Set Elevation and Deflection
Y	T	T3	P4	- Load Cannon
Y	T,A	T3	P3	- Fire Cannon
Y	T	T3	P4	- Unload Cannon

Table 4.2-10A. (Continued)

Y/N	T/A	TIME	PER	
				7. FIRE CANNON AT DIRECT FIRE TARGETS
		T1	P1	- Identify Target(s)
		T1	P1	- Select Target
		T2	P5	- Determine Target Range
		T2	P5	- Determine Target Lead
		T1	P5	- Select Ammunition
Y	T	T3	P4	- Load Ammunition
		T2	P5	- Aim/Sight Weapon
Y	T/A	T3	P3	- Fire
Y	T	T3	P4	- Unload Cannon
				8. NAVIGATE
		T2	P5	- Identify Present Location
		T2	P5	- Identify Destination
		T2	P6	- Plot Travel Route
		T2	P5	- Estimate Time of Arrival and Travel Requirements
				9. COMMUNICATE
Y	T	T3	P4	- Transmit/Receive Messages
		T3	P4	- Encode/Decode Messages
		T3	P4	- Communicate Using Countermeasure Procedures
				10. DEFEND AGAINST ATTACK
		T2	P4	- Deploy to Cover
		T2	P4	- Evade Threat
				11. COMPENSATE FOR EQUIPMENT MALFUNCTIONS AND EMERGENCIES
		T2	P4	- Clear Misfire on Cannon
				12. CONDUCT POST-MISSION TASKS
		T2	P4	- Complete Forms
		T2	P4	- Perform Post-Operation Checks

Table 4.2-10A. (Continued)

Y/N	T/A	TIME	PER	TABLE 20 OPERATIONAL FUNCTIONS FOR SELF-PROPELLED HOWITZERS
				1. PREPARE FOR MARCH ORDER
			P4	- Receive March Order
		T2	P4	- Perform Pre-Operational Checks
		T2	P4	- Perform Fire Control Alignment
		T2	P4	- Test Gunner's Quadrants
		T2	P4	- Prepare Vehicle/personnel for NBC environment
				2. DRIVE/MOVE CANNON
Y	T	T4	P6	-Drive Vehicle
Y	T	T4	P6, P4	- Conduct Tactical March
		T1	P4	- Perform Water Crossing
				3. EMPLACE CANNON
		T2	P1	- Select Position
		T2	P4	- Prepare Position
		T2	P5, P4	- Emplace/Align Collimator
		T2	P5, P4	- Emplace/Align Aiming Posts
				4. DISPLACE CANNON
		T2	P4	- Recover Collimator
		T2	P4	- Recover Aiming Posts
		T2	P4	- Leave Position
				5. PREPARE CANNON FOR FIRING
		T2	P5, P4	- Set Up Aiming Circle
			P5	- Establish Azimuth of the Orienting Line
			P5	- Lay Weapon
			P4, P5	- Establish Aiming ~~Points~~ Posts
			P5	- Determine Site to Crest
			P5	- Boresight Weapon/Telescopes
			P4	- Emplace Azimuth Markers
			P4	- Perform Prefire Checks
		↓	P4	- Prepare Range Card
				6. FIRE CANNON
		~	P4	- Receive Firing Order
		T2	P4	- Prepare Ammunition for Firing
		T2	P5	- Set Elevation and Deflection
Y	I	T3	P4	- Load Cannon
Y	I A	T3	P3	- Fire Cannon
Y	T	T3	P4	- Unload Cannon

Table 4.2-10A. (Continued)

Y/N	T/A	T, MF	PER	
				7. FIRE CANNON AT DIRECT FIRE TARGETS
		T1	P1	– Identify Target(s)
		T1	P1	– Select Target
		T2	P5	– Determine Target Range
		T2	P5	– Determine Target Lead
		T1	P5	– Select Ammunition
Y	T	T3	P4	– Load Ammunition
		T2	P5	– Aim/Sight Weapon
Y	T	T3	P3	– Fire
		T3	P4	– Unload Cannon
				8. FIRE CREW SERVED WEAPONS
Y	T	T3	P4	– Load Ammunition
		T1	P1	– Identify Target(s)
		T1	P1	– Select Target
		T2	P5	– Determine Target Range
		T2	P5	– Aim/Sight Weapon
Y	T	T3	P3	– Fire Weapon
Y	T	T3	P3	– Adjust Fire
		T3	P4	– Unload Weapon
				9. NAVIGATE
		T2	P5	– Identify Present Location
		T2	P5	– Identify Destination
		T2	P6	– Plot Travel Route
		T2	P5	– Estimate Time of Arrival and Travel Requirements
				10. COMMUNICATE
		T3	P4	– Transmit/Receive Messages
		T3	P4	– Encode/Decode Messages
		T3	P4	– Communicate Using Countermeasure Procedures
				11. DEFEND AGAINST ATTACK
		T2	P4	– Deploy to Cover
		T2	P4	– Evade Threat
				12. COMPENSATE FOR EQUIPMENT MALFUNCTIONS AND EMERGENCIES
		T2	P1	– Identify Malfunction
		T2	P1	– Identify Source of Malfunction
		T2	P4	– Compensate/Recover from Malfunction
		T2	P4	– Evacuate Vehicle
		T2	P4	– Extinguish Fire
		T2	P4	– Clear Misfire on Crew Served Weapon
		T2	P4	– Clear Misfire on Cannon
				13. CONDUCT POST-MISSION TASKS
		T2	P4	– Complete Forms
		T2	P4	– Perform Post-Operation Checks

Table 4.2-10A. (Continued)

(15)

TABLE 21 OPERATIONAL FUNCTIONS FOR ROCKET FIELD ARTILLERY SYSTEMS

-TBD

Table 4.2-10A. (Continued)

Y/N	T/A	TIME	PER	TABLE 22 OPERATIONAL FUNCTIONS FOR AIR DEFENSE - MOBILE GUN SYSTEM
				1. PREPARE FOR MARCH ORDER
		T	P4	— Receive March Order
		T2	P4	— Prepare Weapon System for Travel
		T2	P4	— Perform Pre-Operational Vehicle Checks
		T2	P4	— Prepare Vehicle/Personnel for NBC Environment
				2. MOVE VEHICLE
		T2	P4	— Start/Stop Engine
				~~Couple Weapon To Vehicle~~
Y	T	T4	P6	— Drive Vehicle
Y	T	T4	P6	— Perform Tactical Movement
Y	T	T2	P4	— Perform Water Crossing
				3. EMPLACE SYSTEM
		T2	P1	— Select Position
		T2	P4	— Move Vehicle Onto Position
		T2	P4	— Camouflage Vehicle
				4. PREPARE WEAPON FOR ENGAGEMENT
		T2	P4	— Designate Observation and Command Posts Primary Target Lines and Sectors of Search
		T2	P4	— Establish Observation and Command Posts
		T2	P4	— Emplace/Start Auxiliary Power Unit
		T2	P4	— Perform Prefire Checks
		T2	P4	— Determine Aiming Points
		T2	P5	— Emplace Target Alert System
		T2	P4	— Boresight Weapon
		T2	P5	
				5. LOAD/RELOAD WEAPON
		T2	P4	— Prepare Ammunition
		T2	P4	— Prepare Weapon for Firing
Y	T	T3	P4	— Load Ammunition
				6. ACQUIRE TARGET
		T3	P4	— Search for Target
		T1	P1	— Detect/Locate Target
		T1	P1	— Identify Friend or Foe

Table 4.2-10A. (Continued)

Y/N	T/A	TIME	PER	
				7. ENGAGE AIRCRAFT TARGETS
		T1	P1	- Select Target
		T2	P5	_ Determine Target Speed and Range
		T2	P5	_ Aim/Sight Weapon
		T2	P6	_ Track Target
Y	T,A	T3	P3	_ Fire Weapon
Y	T,A	T3	P3	_ Adjust Fire
		T2	P4	_ Reset Target Alert System
				8. ENGAGE GROUND TARGETS
		T1	P1	- Select Target
		T2	P5	_ Determine Target Range
		T2	P5	_ Aim/Sight Weapon
Y	T,A	T3	P3	_ Fire Weapon
	T,A	T3	P3	_ Adjust Fire
				9. NAVIGATE
		T2	P5	- Identify Present Location
		T2	P5	_ Identify Destination
		T2	P5	_ Plot Travel Route
		T2	P5	_ Estimate Time of Arrival and Fuel Requirements
				10. COMMUNICATE
Y	T	T3	P4	- Transmit/Receive Messages
		T3	P4	_ Encode/Decode Messages
		T2	P4	_ Communicate Using Countermeasure Procedures
				11. DEFEND AGAINST ATTACK
		T2	P4	- Deploy to Cover
		T2	P4	_ Evade Threat
				12. DISPLACE SYSTEM
		T2	P4	- Remove APU
		T2	P4	_ Disconnect/Remove Target Alert System
		T2	P4	_ Leave Position
				13. PERFORM POST-MISSION TASKS
		T2	P4	_ Perform Post-Operational Checks

Table 4.2-10A. (Continued)

Y/N	T/A	TIME		PER			
							14. COMPENSATE FOR EQUIPMENT MALFUNCTIONS AND EMERGENCIES
		T2		P1			- Identify Malfunction
				P4			- Identify Source of Malfunction
				P4			- Compensate/Recover from Malfunction
				P4			- Evacuate Vehicle
		↓		P4			- Extinguish Fires

Table 4.2-10A. (Continued)

Y/N	T/A	Time			PER				TABLE 23 OPERATIONAL FUNCTIONS FOR MAN PORTABLE AIR DEFENSE SYSTEMS
		T2			P4				1. CONDUCT PRE-OPERATIONAL INSPECTION
									2. PREPARE WEAPON FOR FIRING
		T2			P4				- Prepare Round
		I2			P4				- Ready Weapon for Firing
									3. GET INTO FIRING POSITION
		T1			P1				- Select Firing Position
		T2			P4				- Get Into Firing Position
									4. DETECT/LOCATE TARGET
		I3			P4				- Search for Target
		T1			P1				- Detect Target
		T1			P1				- Identify Friend or Foe
									5. FIRE WEAPON
		T2			P5				- Aim Weapon
		I2			P6				- Track Target
		I2			P3				- Determine Target Range
		T2			P5				- Set Superelevation and Lead
X	TA	T3			P3				- Fire Weapon
		I2			P4				6. CLEAR/RECOVER FROM MISFIRE
		T2			P4				7. PERFORM POST-FIRING TASKS
		T2			P4				- Discard Expended Launch Tube

Table 4.2-10A. (Continued)

Y/N	T/A	TIME			PER			TABLE 24 OPERATIONAL FUNCTIONS FOR ATTACK HELICOPTERS
								1. PLAN AND PREPARE FOR MISSION
		T2			P4			- Plan Flight
		T2			P4			- Check Load
		T2			P5			- Calculate Weight and Balance Bearing
		T2			P4			- Prepare Performance Planning Card
		T2			P1			- Enter Preflight Data
		T2			P4			- Conduct Preflight Inspection
		T2			P4			- Perform Engine Start, Run-Up, and Before Take-Off Checks
		T2			P4			- Prepare Vehicle/Personnel For NBC Environment
								2. TAXI AND TAKEOFF
		T2			P4			- Perform Ground Taxi (1015)
		T2			P4			- Perform Hover Power Check (1017)
		T2			P4			- Perform Hovering Flight (1017)
Y	T	T2			P6			- Perform Takeoff
								3. FLY AIRCRAFT TO/FROM MISSION AREA
Y	T	T4			P6			- Cruise (Non-Tactical Flight)
Y	T	T4			P7			- Perform Tactical Flight
					P4			- Monitor Instruments
		T2			P6			- Perform Holding Procedure
								4. NAVIGATE
Y	A	T2			P5			- Identify Present Location
		T2			P1			- Identify Destination
		T2			P1			- Select Travel Route
		T2			P5			- Estimate Time of Arrival and Fuel Requirements
								5. COMMUNICATE
Y	T	T3			P4			- Transmit/Receive Messages
		T3			P4			- Encode/Decode Messages
		T2			P4			- Communicate Using Countermeasure Procedures
								6. APPROACH AND LAND AIRCRAFT
		T2			P4			- Perform Before Landing Checks
Y	T	T4			P6			- Approach
Y	T	T4			P6			- Land
					P4			- Taxi
								7. PERFORM AFTER LANDING TASKS
		T2			P4			- Conduct Engine Shutdown
		T2			P4			- Conduct Post Flight Checks
		T2			P4			- Complete Reports and Forms
		T2			P4			- Conduct Briefing
								8. COMPENSATE FOR INFLIGHT EQUIPMENT MALFUNCTIONS AND EMERGENCIES
		T2			P1			- Identify Malfunction
		T2			P1			- Identify Source of Malfunction
		T2			P4			- Compensate/Recover from Malfunction
		T2			P4			- Extinguish Fire
		T2			P4			- Clear Weapon Misfire
		T2			P4			- Evacuate Aircraft

Table 4.2-10A. (Continued)

Y/N	I/A	Time			PCR		
							9. ACQUIRE TARGETS
		T1			P1		- Detect/Locate Targets
Y	A	T1			P1		- Identify Friend or Foe
							10. ATTACK TARGET
Y	T	T2			P6		- Maneuver for Attack
		T2			P1		- Select Target(s)
		T2			P1		- Select Weapon
		T2			P5		- Aim/Sight Weapon
		T2			P6		- Track Target
Y	T	T3			P3		- Fire Weapon
Y	T	T3			P3		- Adjust Fire
Y		T2			P6		- Egress From Attack Position
							11. DEFEND AGAINST ATTACK
		T2			P4		- Deploy to Cover
		T2			P5		- Identify/Locate Source of Threat/Fire
		T2			P5		- Identify/Locate Threat Target Tracking
Y	T	T2			P6		- Perform Evasive Maneuvers
		T2			P4		- Employ ECCM
					P4		- Dispense/Disperse Smoke
							12. PERFORM RECONNAISSANCE
Y	T	T4			P6		- Move to Recon Area
		T2			P4		- Obtain Tactical Information
							~~- Transmit Tactical Report~~
							13. CALL FOR DIRECT SUPPORT
		T2			P4,5		- Call for and Adjust Indirect Fire
		T2			P4,5		- Request/Adjust Illumination

Table 4.2-10A. (Continued)

Y/N	T/A	TIME	PER	TABLE 25 OPERATIONAL FUNCTIONS FOR CARGO HELICOPTERS
				1. PLAN AND PREPARE FOR MISSION
		T2	P4	- Plan Flight
			P4	- Check Load
			P5	- Calculate Weight and Balance Bearing
			P4	- Prepare Performance Planning Card
			P1	- Enter Preflight Data
			P4	- Conduct Preflight Inspection
			P4	- Perform Engine Start, Run-Up, and Before Take-Off Checks
		↓	P4	- Prepare Vehicle/Personnel For NBC Environment
				2. TAXI AND TAKEOFF
		T2	P4	- Perform Ground Taxi (~~1015~~)
		T2	P4	- Perform Hover Power Check (~~1017~~)
		T2	P4	- Perform Hovering Flight (~~1017~~)
Y	T	T2	P6	- Perform Takeoff
				3. FLY AIRCRAFT TO/FROM MISSION AREA
Y	T	T4	P6	- Cruise (Non-Tactical Flight)
Y	T	T4	P6	- Perform Tactical Flight
			P4	- Monitor Instruments
		T2	P6	- Perform Holding Procedure
				4. NAVIGATE
Y	A	T2	P5	- Identify Present Location
		T2	P1	- Identify Destination
		T2	P1	- Select Travel Route
		T2	P5	- Estimate Time of Arrival and Fuel Requirements
				5. COMMUNICATE
Y	T	T3	P4	- Transmit/Receive Messages
		T3	P4	- Encode/Decode Messages
		T2	P4	- Communicate Using Countermeasure Procedures
				6. APPROACH AND LAND AIRCRAFT
		T2	P4	- Perform Before Landing Checks
Y	T	T4	P6	- Approach
			P4	- Land
				- Taxi
				7. PERFORM AFTER LANDING TASKS
		T2	P4	- Conduct Engine Shutdown
		T2	P4	- Conduct Post Flight Checks
		T2	P4	- Complete Reports and Forms
		T2	P4	- Conduct Briefing
				8. COMPENSATE FOR INFLIGHT EQUIPMENT MALFUNCTIONS AND EMERGENCIES
		T2	P1	- Identify Malfunction
		T2	P1	- Identify Source of Malfunction
		T2	P4	- Compensate/Recover from Malfunction
		T2		- Extinguish Fire
		↓	↓	- Clear Weapon Misfire
				- Evacuate Aircraft

Table 4.2-10A. (Continued)

Y/N	T/A	TIME		FEL	
					9. ACQUIRE TARGETS
		T1		P1	
Y	A	T1		P1	– Detect/Locate Targets
					– Identify Friend or Foe
					10. ATTACK TARGET
Y	T	T2		P6	– Maneuver for Attack
		T2		P1	– Select Target(s)
		T2		P1	– Select Weapon
		T2		P5	– Aim/Sight Weapon
		T2		P6	– Track Target
Y	T	T3		P3	– Fire Weapon
Y	T	T3		P3	– Adjust Fire
		T2		P6	– Egress From Attack Position
					11. DEFEND AGAINST ATTACK
		T2		P4	– Deploy to Cover
				P5	– Identify/Locate Source of Threat/Fire
				P5	– Identify/Locate Threat Target Tracking
				P6	– Perform Evasive Maneuvers
				P4	– Employ ECCM
				P4	– Dispense/Disperse Smoke
					12. LOAD/UNLOAD INTERNAL LOADS
		T2		P4	– Brief Passengers
		T2			– Load Passengers/Cargo
		T2			– Unload Passengers/Cargo
					13. RAISE/LOWER EXTERNAL LOADS
		T2		P4	– Attach Load
		T2			– Raise Load
		T2			– Lower Load
		T2		P4	14. PERFORM PARADROP
		T2		P4	15. RAPPEL TROOPS
					16. PERFORM RECONNAISSANCE
Y	I	T4		P6	– Move to Recon Area
		T2		P4	– Obtain Tactical Information
					~~– Transmit Tactical Report~~
					17. CALL FOR DIRECT SUPPORT
		T2		P4,P5	– Call for and Adjust Indirect Fire
					– Request/Adjust Illumination
					– Adjust Attack Helicopter Fire

Table 4.2-10A. (Continued)

Y/N	T/A	TIME	~~Hostile~~	~~Enemy~~	PER	~~Hostile~~	~~Enemy~~	TABLE 24 OPERATIONAL FUNCTIONS FOR ~~A~~ UTILITY ~~HELICOPTERS~~
								1. PLAN AND PREPARE FOR MISSION
		T2			P4			- Plan Flight
		T2			P4			- Check Load
		T2			P5			- Calculate Weight and Balance Bearing
		T2			P4			- Prepare Performance Planning Card
		T2			P1			- Enter Preflight Data
		T2			P4			- Conduct Preflight Inspection
		T2			P4			- Perform Engine Start, Run-Up, and Before Take-Off Checks
		T2			P4			- Prepare Vehicle/Personnel For NBC Environment
								2. TAXI AND TAKEOFF
		T2			P4			- Perform Ground Taxi ~~(1015)~~
		T2			P4			- Perform Hover Power Check ~~(1017)~~
		T2			P4			- Perform Hovering Flight ~~(1017)~~
Y	T	T2			P6			- Perform Takeoff
								3. FLY AIRCRAFT TO/FROM MISSION AREA
Y	T	T4			P6			- Cruise (Non-Tactical Flight)
Y	T	T4			P7			- Perform Tactical Flight
		T4			P4			- Monitor Instruments
		T2			P6			- Perform Holding Procedure
								4. NAVIGATE
Y	A	T2			P5			- Identify Present Location
		T2			P1			- Identify Destination
		T2			P1			- Select Travel Route
		T2			P5			- Estimate Time of Arrival and Fuel Requirements
								5. COMMUNICATE
Y	T	T3			P14			- Transmit/Receive Messages
		T3			P14			- Encode/Decode Messages
		T2			P4			- Communicate Using Countermeasure Procedures
								6. APPROACH AND LAND AIRCRAFT
		T2			P4			- Perform Before Landing Checks
Y	T	T4			P6			- Approach
Y	T	T4			P6			- Land
		T4			P4			- Taxi
								7. PERFORM AFTER LANDING TASKS
		T2			P4			- Conduct Engine Shutdown
		T2			P4			- Conduct Post Flight Checks
		T2			P4			- Complete Reports and Forms
		T2			P4			- Conduct Briefing
								8. COMPENSATE FOR INFLIGHT EQUIPMENT MALFUNCTIONS AND EMERGENCIES
		T2			P1			- Identify Malfunction
		T2			P1			- Identify Source of Malfunction
		T2			P4			- Compensate/Recover from Malfunction
		T2			P4			- Extinguish Fire
		T2			P4			- Clear Weapon Misfire
		T2			P4			- Evacuate Aircraft

Table 4.2-10A. (Continued)

								9. ACQUIRE TARGETS
		T1			P1			— Detect/Locate Targets
Y	A	T1			P1			— Identify Friend or Foe
								10. ATTACK TARGET
Y	A	T2			P6			— Maneuver for Attack
		T2			P1			— Select Target(s)
		T2			P1			— Select Weapon
		T2			P5			— Aim/Sight Weapon
		T2			P6			— Track Target
Y	I,A	T3			P3			— Fire Weapon
Y	I,A	T3			P3			— Adjust Fire
	I,A	T2			P6			— Egress From Attack Position
								11. DEFEND AGAINST ATTACK
		T2			P4			— Deploy to Cover
					P5			— Identify/Locate Source of Threat/Fire
					P5			— Identify/Locate Threat Target Tracking
					P6			— Perform Evasive Maneuvers
					P4			— Employ ECCM
		↓			P4			— Dispense/Disperse Smoke
								12. LOAD/UNLOAD INTERNAL LOADS
		T2			P4			— Brief Passengers
		T2						— Load Passengers/Cargo
		T2			↓			— Unload Passengers/Cargo
								13. RAISE/LOWER EXTERNAL LOADS
		T2			P4			— Attach Load
		T2						— Raise Load
		T2			↓			— Lower Load
		T2			P4			14. PERFORM PARADROP
		T2			P4			15. RAPPEL TROOPS
								16. PERFORM RECONNAISSANCE
Y	I,A	T4			P6			— Move to Recon Area
		T2			P4			— Obtain Tactical Information
								~~— Transmit Tactical Report~~
								17. CALL FOR DIRECT SUPPORT
		T2			P4,P5			— Call for and Adjust Indirect Fire
		↓			↓			— Request/Adjust Illumination
								— Adjust Attack Helicopter Fire

Table 4.2-10A. (Continued)

T/N	T/A	TIME	[redacted]	[redacted]	PER	[redacted]	[redacted]	27 SCOUT (24) TABLE 24 OPERATIONAL FUNCTIONS FOR [redacted] HELICOPTERS
								1. PLAN AND PREPARE FOR MISSION
		T2			P4			— Plan Flight
		T2			P4			— Check Load
		T2			P5			— Calculate Weight and Balance Bearing
		T2			P4			— Prepare Performance Planning Card
		T2			P1			— Enter Preflight Data
		T2			P4			— Conduct Preflight Inspection
		T2			P4			— Perform Engine Start, Run-Up, and Before Take-Off Checks
		T2			P4			— Prepare Vehicle/Personnel For NBC Environment
								2. TAXI AND TAKEOFF
		T2			P4			— Perform Ground Taxi ~~(1015)~~
		T2			P4			— Perform Hover Power Check ~~(1017)~~
		T2			P4			— Perform Hovering Flight ~~(1017)~~
Y	T	T2			P6			— Perform Takeoff
								3. FLY AIRCRAFT TO/FROM MISSION AREA
Y	T	T4			P6			— Cruise (Non-Tactical Flight)
Y	T	T4			P7			— Perform Tactical Flight
					P4			— Monitor Instruments
		T2			P6			— Perform Holding Procedure
								4. NAVIGATE
Y	A	T2			P5			— Identify Present Location
		T2			P1			— Identify Destination
		T2			P1			— Select Travel Route
		T2			P5			— Estimate Time of Arrival and Fuel Requirements
								5. COMMUNICATE
Y	T	T3			P4			— Transmit/Receive Messages
		T3			P4			— Encode/Decode Messages
		T2			P4			— Communicate Using Countermeasure Procedures
								6. APPROACH AND LAND AIRCRAFT
		T2			P4			— Perform Before Landing Checks
Y	T	T4			P6			— Approach
Y	T	T4			P6			— Land
		T4			P4			— Taxi
								7. PERFORM AFTER LANDING TASKS
		T2			P4			— Conduct Engine Shutdown
		T2			P4			— Conduct Post Flight Checks
		T2			P4			— Complete Reports and Forms
		T2			P1			— Conduct Briefing
								8. COMPENSATE FOR INFLIGHT EQUIPMENT MALFUNCTIONS AND EMERGENCIES
		T2			P1			— Identify Malfunction
		T2			P1			— Identify Source of Malfunction
		T2			P4			— Compensate/Recover from Malfunction
		T2			P4			— Extinguish Fire
		T2			P4			— Clear Weapon Misfire
		T2			P4			— Evacuate Aircraft

Table 4.2-10A. (Continued)

					9. ACQUIRE TARGETS
		T1		P1	— Detect/Locate Targets
Y	A	T1		P1	— Identify Friend or Foe
					10. ATTACK TARGET
Y	A	T2		P6	— Maneuver for Attack
		T2		P1	— Select Target(s)
		T2		P1	— Select Weapon
		T2		P5	— Aim/Sight Weapon
		T2		P6	— Track Target
Y	T,A	T3		P3	— Fire Weapon
Y	T,A	T3		P3	— Adjust Fire
	A	T2		P6	— Egress From Attack Position
					11. DEFEND AGAINST ATTACK
		T2		P4	— Deploy to Cover
				P5	— Identify/Locate Source of Threat/Fire
				P5	— Identify/Locate Threat Target Tracking
				P6	— Perform Evasive Maneuvers
				P4	— Employ ECCM
		↓		P4	— Dispense/Disperse Smoke
					12. PERFORM RECONNAISSANCE
Y	F	T4		P6	— Move to Recon Area
		T2		P4	— Obtain Tactical Information
					~~— Transmit Tactical Reports~~
					13. CALL FOR DIRECT SUPPORT
		T2		P4,5	— Call for and Adjust Indirect Fire
		↓		↓	— Request/Adjust Illumination
					— Adjust Attack Helicopter Fire

Table 4.2-10A. (Continued)

(28)

Y/N	T/A	TIME	PER	TABLE 28 OPERATIONAL FUNCTIONS FOR LIGHT AND HEAVY CARGO TRANSPORT TRUCKS
				1. PLAN AND PREPARE MISSION
			P4	— Receive/Review Order
		T2	P4	— Complete Vehicle Record Forms
		T2	P4	— Perform Pre-Operational Checks
		T2	P4	— Camouflage Vehicle
		T2	P4	— Mark Vehicle
				2. PREPARE LOAD
		T2	P4	— Observe/Check Loading of Cargo/Passengers
		T2	P4	— Brief Passengers
		T2	P4	— Secure Load
		T2	P4	— Couple Trailer
		T2	P4	— Load Vehicle
				3. DRIVE VEHICLE
			P4	— Start Vehicle
Y	T	T4	P4,P6	— Drive Vehicle
Y	T	T4	P4,P6	— Drive Vehicle in Motor March or Convoy
				4. DEFEND AGAINST ATTACK
		T2	P4	— Deploy to Cover
	T	T4	P6	— Perform Evasive Maneuvers
				5. COMPENSATE FOR EQUIPMENT MALFUNCTIONS AND EMERGENCIES
		T2	P4	— Perform Self-Recovery of Vehicle
				6. LOAD/UNLOAD VEHICLE
		T2	P4	— Load Cargo/Passengers
		T2	P4	— Unload Cargo/Passengers
				7. PERFORM POST-MISSION PROCEDURES
		T2	P4	— Park Vehicle
		T2	P4	— Perform Post-Operational Checks
		T2	P4	— Complete Vehicle Record Forms

Tables 4.2-10B, C, and D

Task Category Assignments for Generic Functional Tasks

Tables 4.2-10B, C, and D

Table 4.2-10B lists the task taxonomy codes. Table 4.2-10C describes the task taxonomy assignments for the Project A tasks. Table 4.2-22D lists: (a) the task taxonomy assignments for the functional tasks associated with each system type and (b) the Project A tasks assigned to each functional task. In cases where there is no appropriate Project A task type, only the appropriate task taxonomy type is listed. At the present time, it is assumed that functional tasks with an assigned Project A task will have the same task type assignments as the Project A tasks. Both the task taxonomy assignments and the Project A functional task linkages must be validated by subject matter experts during Phase 3.

Table 4.2-10B. Task Taxonomy

WORDS	CODES
I. PERCEPTUAL	
A. Visual	
1. Far Visual	VI-FR
2. Near Visual	VI-NR
a. Non-Verbal	VI-Nr (Non)
b. Verbal	VI-Nr (Ver)
B. Auditory	
1. Sound Perception	Au-So
II. COGNITIVE	
A. Information Processing	
1. Numerical	IP-NOM
2. Verbal Symbolic	IP-VER
B. Problem Solving	
1. Diagnosis/Troubleshooting	PS-DIA
2. Planning	PS-PLAN
3. Selecting/Choosing	PS-SEL
III. MOTOR	
A. Complex Psychomotor	
1. Discrete	CP-DIS
2. Continuous	CP-CON
a. Aiming/Shooting	CP-CON (AIM)
b. Driving	CP-CON (DRI)
c. Piloting	CP-CON (PIL)
d. Tracking/Aligning	CP-CON (TRA)
e. Throwing	CP-CON (THRO)

Table 4.2-10B. Task Taxonomy (Continued)

WORDS	CODES
III. MOTOR	
B. Gross Motor	
1. Heavy	GM-HVY
a. Carrying/Load Bearing	GM-HVY (CAR)
b. Lifting/Loading	GM-HVY (LIF)
c. Torquing/Pulling	GM-HVY (TOR)
2. Light	GM-LITE
IV. SPEECH COMMUNICATION	
1. Face to Face	CM-V
2. Not Face to Face	CM-NF

Table 4.2-10C.

SYSTEM 1 - OPERATIONAL FUNCTIONS FOR INFANTRY FIGHTING VEHICLES

1. PLAN AND PREPARE MISSION

1. (CMF) Receive/Review Order
2. (11B-FHL1) Adjust/Boresight Weapon Systems
3. (11B-FHBB) Adjust/Inspect Other Systems
4. (11B-FHBB) Enter data onto Onboard Computer(s)
5. (, 19E-EHD7) Prepare Vehicle/Personnel For NBC Environment

2. EXECUTE MOVEMENT

1. (19E-EHH1) Start Engine
2. (11B-FHBB) Check Controls/Instruments
3. (64C-CHH5) Perform Non-Tactical Movement
4. (64C-CHH5) Perform Tactical Movement
5. (64C-CHH5) Perform Water Crossing

3. EXECUTE MANEUVER

1. (64C-CHD5) Perform Evasive Maneuvers
2. (64C-CHH5) Move to Cover
3. (64C-CHH5) Negotiate Obstacles
4. (CRDS) Employ Smoke Screen
5. (64C-CHH5) Move into Firing Position
6. (64C-CHH5) Move out of Firing Position

4. NAVIGATE

1. (13B-XHC4) Identify Present Location
2. (13B-XHC5) Identify Destination
3. (13B-XHC5) Select Travel Route
4. (PS-plan) Estimate Time of Arrival and Fuel Requirements
5. (19E-XHC2) Use instruments (i.e Compass) to Select Correct Heading
6. (13B-XHC4) Identify Terrain Features

5. COMMUNICATE

1. (11B-FHE4) Transmit/Receive Messages
2. (11B-FHBB) Encode/Decode Messages
3. (31C-GHJ6) Communicate Using Countermeasure Procedures
4. (31C-GHJ6) Use Counter Measure Procedures
5. (CM-F, IP-VER) Relay Messages
6. (PS-SEL) Obtain Line of Signal

Table 4.2-10C. (Continued)

6. ACQUIRE TARGET

1. (11B-FHB9) Search for Target
2. (11B-FHB9) Detect/Locate Target
3. (13B-DH12) Identify Friend or Foe
4. (13B-DHI2) Identify/Locate Sources of Enemy Fire

7. ENGAGE TARGET

1. (PS-SEL) Select Target(s)
2. (PS-SEL) Select Weapon(s) and Ammo
3. (11B-FHBC) Aim/Sight Weapon
4. (11B-FHBC) Track Target
5. (CP-D.S) Fire Weapon
6. (11B-FHBC) Adjust Fire
7. (11B-FHBB) Assess Damage

8. OCCUPY DEFENSIVE POSITION

1. (PS-SEL) Select/Position
2. (19E-EHH3) Camouflage Vehicle
3. (19E-EHH3) Improve Cover
4. (13B-XHC4) Select Reference Points
5. (11B-FHBB) Develop Range Cards
6. (CM-F) Coordinate with Adjacent Vehicles/ Personnel

9. CALL FOR DIRECT SUPPORT

1. (CM-NF) Call for/Adjust Indirect Fire
2. (CM-NF; IP-SPA; VI-FM) Call for/Adjust Illumination/Smoke
3. (CM-NF; IP-SPA; VI-FM) Adjust Tank/Other Fighting Vehicle Fire

Table 4.2-10C. (Continued)

10. TRANSPORT COMBAT TROOPS

    1. (19E-EHH3) Load Troops/Equipment
    2. (19E-EHH3) Secure Troops/Equipment
    3. (19E-EHH3) Unload Troops/Equipment

11. COMPENSATE FOR EQUIPMENT MALFUNCTIONS AND EMERGENCIES

    1. (19E-EHK5) Identify Malfunction
    2. (PS-DIA) Identify Source of Malfunction
    3. (PS-SEL) Compensate For Malfunction/Execute Emergency Procedure
    4. (19E-EHJ2) Evacuate Vehicle (if appropriate)

12. PERFORM POST-MISSION TASKS

    1. (19E-EHH1) Shut Down Engine
    2. (19E-EHH1) Power Down Other Systems
    3. (11B-FHBB) Perform Checks

Table 4.2-10C. (Continued)

SYSTEM 2 - OPERATIONAL FUNCTIONS FOR ANTI-TANK VEHICLES

1. PLAN AND PREPARE MISSION

1. (CM-F) Receive/Review Order
2. (11B-FHL1) Adjust/Boresight Weapon Systems
3. (11B-FHBB) Adjust/Inspect Other Systems
4. (11B-FHBB) Enter data onto Onboard Computer(s)
5. (19E-EHD7) Prepare Vehicle/Personnel For NBC Environment

2. EXECUTE MOVEMENT

1. (19E-EHH1) Start Engine
2. (11B-FHBB) Check Controls/Instruments
3. (64C-CHH5) Perform Non-Tactical Movement
4. (64C-CHH5) Perform Tactical Movement
5. (64C-CHH5) Perform Water Crossing

3. EXECUTE MANEUVER

1. (64C-CHD5) Perform Evasive Maneuvers
2. (64C-CHH5) Move to Cover
3. (64C-CHH5) Negotiate Obstacles
4. (MCPD) Employ Smoke Screen
5. (64C-CHH5) Move into Firing Position
6. (64C-CHH5) Move out of Firing Position

4. NAVIGATE

1. (13B-XHC4) Identify Present Location
2. (13B-XHC5) Identify Destination
3. (13B-XHC5) Select Travel Route
4. (PS-PLAN) Estimate Time of Arrival and Fuel Requirements
5. (19E-XHC2) Use instruments (i.e Compass) to Select Correct Heading
6. (13B-XHC4) Identify Terrain Features

5. COMMUNICATE

1. (11B-FHE4) Transmit/Receive Messages
2. (11B-FHBB) Encode/Decode Messages
3. (31C-GHJ6) Communicate Using Countermeasure Procedures
4. (31C-GHJ6) Use Counter Measure Procedures
5. (CM-F; IP-VER) Relay Messages
6. (PS-SEL) Obtain Line of Signal

Table 4.2-10C. (Continued)

6. ACQUIRE TARGET

1. (11B-FHB9) Search for Target
2. (11B-FHB9) Detect/Locate Target
3. (13B-DH12) Identify Friend or Foe
4. (13B-DHI2) Identify/Locate Sources of Enemy Fire

7. ENGAGE TARGET

1. (PS-SEL) Select Target(s)
2. (PS-SEL) Select Weapon(s) and Ammo
3. (11B-FHBC) Aim/Sight Weapon
4. (11B-FHBC) Track Target
5. (@P-DIS) Fire Weapon
6. (11B-FHBC) Adjust Fire
7. (11B-FHBB) Assess Damage

8. OCCUPY DEFENSIVE POSITION

1. (PS-SEL) Select/Position
2. (19E-EHH3) Camouflage Vehicle
3. (19E-EHH3) Improve Cover
4. (13B-XHC4) Select Reference Points
5. (11B-FHBB) Develop Range Cards
6. (@M-F) Coordinate with Adjacent Vehicles/ Personnel

9. CALL FOR DIRECT SUPPORT

1. (@M-NF;IP-SPA;VI-NR) Call for/Adjust Indirect Fire
2. (CM-NF;IP-SPA;VI-NR) Call for/Adjust Illumination/Smoke
3. (CM-NF;IP-SPA;VI-NR) Adjust Tank/Other Fighting Vehicle Fire

Table 4.2-10C. (Continued)

10. TRANSPORT COMBAT TROOPS

    1. (19E-EHH3) Load Troops/Equipment
    2. (19E-EHH3) Secure Troops/Equipment
    3. (19E-EHH3) Unload Troops/Equipment

11. COMPENSATE FOR EQUIPMENT MALFUNCTIONS AND EMERGENCIES

    1. (19E-EHK5) Identify Malfunction
    2. (PS-DIA) Identify Source of Malfunction
    3. (PS-DIA) Compensate For Malfunction/Execute Emergency Procedure
    4. (19E-EHJ2) Evacuate Vehicle (if appropriate)

12. PERFORM POST-MISSION TASKS

    1. (19E-EHH1) Shut Down Engine
    2. (19E-EHH1) Power Down Other Systems
    3. (11B-FHBB) Perform Checks

Table 4.2-10C. (Continued)

SYSTEM 3 - OPERATIONAL FUNCTIONS FOR MAN-PORTABLE ANTI-TANK WEAPONS

1. (CP-DIS-GM LITE) CONDUCT PRE-OPERATIONAL INSPECTION

2. PREPARE WEAPON FOR FIRING

   1. (11B-FHBA) Assemble Round
   2. (11B-FHBA) Mount Tracker

3. GET INTO FIRING POSITION

   1. (PS-SEL) Select Firing Position
   2. (GM-HVY (CAR)) Get Into Firing Position

4. DETECT/LOCATE TARGETS

   1. (11B-FHG9) Search for Target
   2. (11B-FHG9) Detect/Locate Target
   3. (13B-DHI2) Identify Friend or Foe

5. FIRE WEAPON

   1. (11B-FHBB) Determine Target Range
   2. (PS-SEL) Select Target
   3. (11B-FHBC) Aim/Sight Weapon
   4. (CP-DIS) Fire Weapon
   5. (11B-FHBC) Track Target

6. PERFORM POST FIRING TASKS

   1. (GM-HVY (CAR)) Get out of firing position
   2. (11B-XHB4) Disassemble Weapon

7. (11B-XHB4) CLEAR RECOVER FROM MISFIRE

Table 4.2-10C. (Continued)

SYSTEM 5 - OPERATIONAL FUNCTIONS FOR GRENADE LAUNCHERS

1. (CP-DIS; GM-LITE) CONDUCT PRE-OPERATIONAL INSPECTION

2. PREPARE WEAPON FOR FIRING

    1. (11B-XHB4) Assemble Weapon
    2. (CP-DIS) Mount Sight
    3. (CP-DIS) Zero Weapon
    4. (11B-FHL1) Zero Sight

3. GET INTO FIRING POSITION

    1. (CP-DIS; GM-LITE) Load Weapon
    2. (PS-SEL) Select Type of Fire
    3. (PS-SEL) Select Firing Position
    4. (GM-LITE; GM HVY (CAR)) Get Into Firing Position

4. DETECT/LOCATE TARGETS

    1. (11B-FHG9) Search for Target
    2. (11B-FHG9) Detect/Locate Target
    3. (13B-DHI2) Identify Friend or Foe

5. FIRE WEAPON

    1. (11B-FHBB) Determine Target Range
    2. (PS-SEL) Select Target
    3. (11B-FHBC) Aim/Sight Weapon
    4. (CP-DIS) Fire Weapon
    5. (11B-FHBC) Adjust/Fire
    6. (11B-XHB4) Unload

6. PERFORM POST FIRING TASKS

    1. (D GM-LITE) Get out of firing position
    2. (D-CP DIS) Perform Post-Operation Checks
    3. (USE 3.2.1) Disassemble Weapon
    4. (CP-DIS) Dismount Sight

7. (11B-XHB5) CLEAR RECOVER FROM MISFIRE

Table 4.2-10C. (Continued)

SYSTEM 6 - OPERATIONAL FUNCTIONS FOR AUTOMATIC WEAPONS

1. (CP-DIS; GM LITE) CONDUCT PRE-OPERATIONAL INSPECTION

2. PREPARE WEAPON POSITION

   1. (PS-SEL) Select Position
   2. (GM-LITE; CP-DIS) Prepare Position
   3. (GM-LITE) Camouflage Position
   4. (11B-FHBB) Prepare Target Range Card
   5. (13B-DHI4) Lay Firing/Aiming Stakes

3. PREPARE WEAPON FOR FIRING

   1. (11B-XHB6) Assemble Weapon
   2. (11B-FHL1) Mount Sight
   3. (CP-DIS) Zero Weapon
   4. (11B-FHL1) Zero Sight

4. GET INTO FIRING POSITION

   1. (11B-XHB5) Load Weapon
   2. (PS-SEL) Select Type of Fire
   3. (PS-SEL) Select Firing Position
   4. (GM-LITE) Get Into Firing Position

5. DETECT/LOCATE TARGETS

   1. (11B-FHG9) Search for Target
   2. (11B-FHG9) Detect/Locate Target
   3. (VI-FO) Identify Friend or Foe

6. FIRE WEAPON

   1. (95B-BHG8) Determine Target Range
   2. ( ) Select Target
   3. (11B-FHBC) Aim/Sight Weapon
   4. (11B-FHBC) Fire Weapon
   5. (11B-FHBC) Adjust/Fire
   6. (CP-DIS) Unload

7. PERFORM POST FIRING TASKS

   1. (GM-LITE) Get out of firing position
   2. (13B-DHI4) Remove aiming stakes
   3. (CP-DIS) Perform Post-Operation Checks
   4. (CP-DIS) Disassemble Weapon
   5. (CP-DIS) Dismount Sight

8. (11B-XHB5) CLEAR RECOVER FROM MISFIRE

Table 4.2-10C. (Continued)

SYSTEM 7 - OPERATIONAL FUNCTIONS FOR MAN-PORTABLE INDIRECT FIRE INFANTRY WEAPONS (MORTARS)

1. ((CP-DIS; GM (LITE)) PERFORM PRE-OPERATIONAL CHECKS

2. PREPARE POSITION

   1. (PS-SEL) Select Position
   2. (GM-HVY (LIF)) Prepare Position
   3. (GM-HVY (CAR)) Camouflage Position
   4. (13B-DHI4) Emplace Aiming Posts

3. PREPARE MORTAR FOR FIRING

   1. (CP-DIS) Assemble Mortar
   2. (PS-SEL) Lay Mortar
   3. (11B-FHBA) Boresight Mortar
   4. (CP-DIS; GM LITE) Perform Pre-Fire Checks

4. FIRE MORTAR AT INDIRECT FIRE TARGETS

   1. (CM-NF) Receive Firing Order
   2. (11B-FHBA) Prepare Ammunition for Firing
   3. (CP-DIS; IP-NVM) Set Elevation and Deflection
   4. (CP-DIS) Load Mortar
   5. (CP-DIS) Fire Mortar

5. FIRE MORTAR AT DIRECT FIRE TARGETS

   1. (13B-DHI2) Identify Target
   2. (PS-SEL) Select Target
   3. (CP-DIS) Point Mortar at Target
   4. (CP-DIS) Prepare Ammunition for Firing
   5. (CP-DIS) Load Mortar
   6. (CP-DIS) Aim Mortar
   7. (CP-DIS) Fire Mortar
   8. (CP-DIS) Adjust Fire

6. PERFORM POST-FIRING TASKS

   1. (CP-DIS) Perform Post-Operation Checks
   2. (11B-FHBA) Disassemble Weapon
   3. (13B-DHI4) Displace Aiming Posts

7. (11B-XHB5) CLEAR RECOVER FROM MISFIRE

Table 4.2-10C. (Continued)

SYSTEM 8 - OPERATIONAL FUNCTIONS FOR TANKS

1. PLAN AND PREPARE MISSION

1. (CM-F) Receive/Review Order
2. (19E-EHK1) Adjust/Boresight Weapon Systems
3. (IP, 11B-FHBB) Adjust/Inspect Other Systems
4. (IP, 11B-FHBB) Enter data onto Onboard Computer(s)
5. (IP, 19E-EHD7) Prepare Vehicle/Personnel For NBC Environment

2. EXECUTE MOVEMENT

1. (19E-EHH1) Start Engine
2. (11B-FHBB) Check Controls/Instruments
3. (64C-CHH5) Perform Non-Tactical Movement
4. (64C-CHH5) Perform Tactical Movement
5. (64C-CHH5) Perform Water Crossing

3. EXECUTE MANEUVER

1. (64C-CHD5) Perform Evasive Maneuvers
2. (64C-CHH5) Move to Cover
3. (64C-CHH5) Negotiate Obstacles
4. (MCPD) Employ Smoke Screen
5. (64C-CHH5) Move into Firing Position
6. (64C-CHH5) Move out of Firing Position

4. NAVIGATE

1. (13B-XHC4) Identify Present Location
2. (13B-XHC5) Identify Destination
3. (13B-XHC5) Select Travel Route
4. (PS-Plan) Estimate Time of Arrival and Fuel Requirements
5. (19E-XHC2) Use instruments (i.e Compass) to Select Correct Heading
6. (13B-XHC4) Identify Terrain Features

5. COMMUNICATE

1. (19E-EHE8) Transmit/Receive Messages
2. (19E-EHE6) Encode/Decode Messages
3. (31C-GH56) Communicate Using Countermeasure Procedures
4. (31C-GH56) Use Counter Measure Procedures
5. (CM-F; IP-VER) Relay Messages
6. (PS-SEL) Obtain Line of Signal

Table 4.2-10C. (Continued)

6. ACQUIRE TARGET

1. (11B-FHB9) Search for Target
2. (11B-FHB9) Detect/Locate Target
3. (13B-DH12) Identify Friend or Foe
4. (13B-DHI2) Identify/Locate Sources of Enemy Fire

7. ENGAGE TARGET

1. (PS-SEL) Select Target(s)
2. (PS-SEL) Select Weapon(s) and Ammo
3. (11B-FHBC) Aim/Sight Weapon
4. (11B-FHBC) Track Target
5. (CP-DIS) Fire Weapon
6. (11B-FHBC) Adjust Fire
7. (11B-FHBB) Assess Damage

8. OCCUPY DEFENSIVE POSITION

1. (PS-SEL) Select/Position
2. (19E-EHH3) Camouflage Vehicle
3. (19E-EHH3) Improve Cover
4. (13B-XHC4) Select Reference Points
5. (11B-FHBB) Develop Range Cards
6. (CM-F) Coordinate with Adjacent Vehicles/ Personnel

9. CALL FOR DIRECT SUPPORT

1. (CM-NF;IP-SPA;VI-FR) Call for/Adjust Indirect Fire
2. (CM-NF;IP-SPA;VI-FR) Call for/Adjust Illumination/Smoke
3. (CM-NF;IP-SPA;VI-FR) Adjust Tank/Other Fighting Vehicle Fire

Table 4.2-10C. (Continued)

10. TRANSPORT COMBAT TROOPS

1. (19E-EHH3) Load Troops/Equipment
2. (19E-EHH3) Secure Troops/Equipment
3. (19E-EHH3) Unload Troops/Equipment

11. COMPENSATE FOR EQUIPMENT MALFUNCTIONS AND EMERGENCIES

1. (19E-EHK5) Identify Malfunction
2. (PS-DIA) Identify Source of Malfunction
3. (PS-SEL) Compensate For Malfunction/Execute Emergency Procedure
4. (19E-EHJ2) Evacuate Vehicle (if appropriate)

12. PERFORM POST-MISSION TASKS

1. (19E-EHH1) Shut Down Engine
2. (19E-EHH1) Power Down Other Systems
3. (11B-FHBB) Perform Checks

Table 4.2-10C. (Continued)

SYSTEM 9 - OPERATIONAL FUNCTIONS FOR CAVALRY FIGHTING VEHICLES

1. PLAN AND PREPARE MISSION

1. (0H-F) Receive/Review Order
2. (19E-EHK1) Adjust/Boresight Weapon Systems
3. (IP, 11B-FHBB) Adjust/Inspect Other Systems
4. (IP, 11B-FHBB) Enter data onto Onboard Computer(s)
5. (IP, 19E-EHD7) Prepare Vehicle/Personnel For NBC Environment

2. EXECUTE MOVEMENT

1. (19E-EHH1) Start Engine
2. (11B-FHBB) Check Controls/Instruments
3. (64C-CHH5) Perform Non-Tactical Movement
4. (64C-CHH5) Perform Tactical Movement
5. (64C-CHH5) Perform Water Crossing

3. EXECUTE MANEUVER

1. (64C-CHD5) Perform Evasive Maneuvers
2. (64C-CHH5) Move to Cover
3. (64C-CHH5) Negotiate Obstacles
4. (MCPD) Employ Smoke Screen
5. (64C-CHH5) Move into Firing Position
6. (64C-CHH5) Move out of Firing Position

4. NAVIGATE

1. (13B-XHC4) Identify Present Location
2. (13B-XHC5) Identify Destination
3. (13B-XHC5) Select Travel Route
4. ( ) Estimate Time of Arrival and Fuel Requirements
5. (19E-XHC2) Use instruments (i.e Compass) to Select Correct Heading
6. (13B-XHC4) Identify Terrain Features

5. COMMUNICATE

1. (19E-EHE8) Transmit/Receive Messages
2. (19E-EHE6) Encode/Decode Messages
3. (31C-GHJ6) Communicate Using Countermeasure Procedures
4. (31C-GHJ6) Use Counter Measure Procedures
5. (CMF, IP-VEQ) Relay Messages
6. ( ) PS-SEQ) Obtain Line of Signal

Table 4.2-10C. (Continued)

6. ACQUIRE TARGET

1. (11B-FHB9) Search for Target
2. (11B-FHB9) Detect/Locate Target
3. (13B-DH12) Identify Friend or Foe
4. (13B-DHI2) Identify/Locate Sources of Enemy Fire

7. ENGAGE TARGET

1. (DS-SEL) Select Target(s)
2. (DS-SEL) Select Weapon(s) and Ammo
3. (11B-FHBC) Aim/Sight Weapon
4. (11B-FHBC) Track Target
5. (CP_DIS) Fire Weapon
6. (11B-FHBC) Adjust Fire
7. (11B-FHBB) Assess Damage

8. OCCUPY DEFENSIVE POSITION

1. (DS-SEL) Select/Position
2. (19E-EHH3) Camouflage Vehicle
3. (19E-EHH3) Improve Cover
4. (13B-XHC4) Select Reference Points
5. (11B-FHBB) Develop Range Cards
6. (CM-F) Coordinate with Adjacent Vehicles/ Personnel

9. CALL FOR DIRECT SUPPORT

1. (CM-NF; IP-SPA; VI-NR) Call for/Adjust Indirect Fire
2. (CM-NF; IP-SPA; VI-NR) Call for/Adjust Illumination/Smoke
3. (CM-NF; IP-SPA; VI-NR) Adjust Tank/Other Fighting Vehicle Fire

Table 4.2-10C. (Continued)

10. TRANSPORT COMBAT TROOPS

1. (19E-EHH3) Load Troops/Equipment
2. (19E-EHH3) Secure Troops/Equipment
3. (19E-EHH3) Unload Troops/Equipment

11. COMPENSATE FOR EQUIPMENT MALFUNCTIONS AND EMERGENCIES

1. (19E-EHK5) Identify Malfunction
2. (PS-JIA) Identify Source of Malfunction
3. (PS-JEL) Compensate For Malfunction/Execute Emergency Procedure
4. (19E-EHJ2) Evacuate Vehicle (if appropriate)

12. PERFORM POST-MISSION TASKS

1. (19E-EHH1) Shut Down Engine
2. (19E-EHH1) Power Down Other Systems
3. (11B-FHBB) Perform Checks

Table 4.2-10C. (Continued)

SYSTEM 10 - OPERATIONAL FUNCTIONS FOR MEDIUM RANGE MISSILE ARTILLERY SYSTEMS (Assumes Missile is on Self Propelled Launcher)

1. PREPARE FOR MARCH ORDER

    1. (CM-NF) Receive March Order
    2. (CP-DIS; IP (Num)) Receive Weapon from Assembly and Transport Section
    3. (CP-DIS; CP-IP (Veh) CM HWY (LHE)(TOR)) Prepare Self-Propelled Launcher (SPL) for Movement
    4. (CP-DIS; C-IP (Num); IP (Near)) Ensure Firing Point is Surveyed

2. MOVE TO FIRING POINT

    1. (19E-EHH1) Start Engine
    2. (95B-BHH1) Perform Pre-Operational Vehicle Check
    3. (64C-CHH5) Drive SPL

3. NAVIGATE

    1. (13B-XHC4) Identify Present Location
    2. (13B-XHC5) Identify Destination
    3. (13B-XHC5) Select Travel Route
    4. (M PS-PL4N) Estimate Time of Arrival and Fuel Requirements

4. COMMUNICATE

    1. (M CM-NF) Transmit/Receive Messages
    2. (19E-EHE6) Encode/Decode Messages
    3. (19E-EHE6) Communicate Using Countermeasure Procedures

5. EMPLACE SYSTEM

    1. (64C-CHH5) Position SPL Over Launch Stake
    2. (19E-EHH1) Shut Down Vehicle
    3. (IP-NUM; CP-DIS; CM-F) Prepare Vehicle For Firing Mode
    4. (VI-NR (Num); CP-DIS) Inspect Main Missile Assembly (MMA) and Warhead Section (WHS) for Damage
    5. (M-CP-DIS) Release tie down straps, release traverse, and lockpins

6. PREPARE WEAPON FOR FIRING

    1. (CP-DIS; IP (Num); PS (PLAN) Receive Firing Data
    2. (M CP-DIS) Turn on Monitor-Programmer
    3. (19E-EHL2) Conduct self test
    4. (13B-Bor.) Lay/sight weapon
    5. (19E-EHH3) Remove protective covers

Table 4.2-10C. (Continued)

7. FIRE WEAPON

1.	(CP-DIS)	Arm WHS
2.	(CP.DIS (TAPE))	Insert WHS Settings
3.	(13B-Bre.)	Move Firing Device to Firing Pit
4.	(CP-DIS)	Elevate Missile
5.	(CP-DIS)	Place in Launch Position
6.	(CM-F; GM-HV4(LITE))	Clear Area
7.	(CP-DIS)	Fire Missile

8. (CP-DIS) CONDUCT POST FIRING INSPECTIONS

9. EXECUTE FAILURE TO FIRE PROCEDURES

1.	(CP-DIS)	Lower Launcher
2.	(CP-DIS)	Safe the WHS
3.	(CP-DIS)	Disconnect Firing Device
4.	(IP-NOM; CP-DIS)	Reorient Launcher
5.	(19E-XHC2)	Obtain new orientation from remote theodolite

10. COMPENSATE FOR EQUIPMENT MALFUNCTIONS AND EMERGENCIES

1.	(PS-DIA)	Identify Malfunction
2.	(PS-DIA)	Identify Source of Malfunction
3.	(PS-SEL)	Compensate For/Recover From Malfunction

11. PERFORM EMERGENCY DESTRUCTION OF WARHEAD

1.	(CP-DIS (TAPE))	Insert Command Disablement Code
2.	(CP-DIS)	Set shape charge to warhead
3.	(GM-LITE)	Evacuate Area
4.	(CP-DIS)	Destroy warhead
5.	(VI-FR)	Verify destruction

12. DISPLACE SYSTEM

1.	(CP-DIS)	Secure Launcher
2.	(CP-CAT (DRC))	Leave Position

Table 4.2-10C. (Continued)

SYSTEM 11 - OPERATIONAL FUNCTIONS FOR TOWED HOWITZERS

1. PREPARE FOR MARCH ORDER

1.	(M-CM-NF)	Receive March Order
2.	(95B-BHH1)	Perform Pre-Operational Checks
3.	(CP-DIS)	Perform Fire Control Alignment
4.	(CP-DIS)	Test Gunner's Quadrants

2. DRIVE/MOVE CANNON

1.	(64C-CHH5)	Drive Vehicle(Non-tactical march)
2.	(64C-CHH5)	Conduct Tactical March
3.	(64C-CHH5)	Perform Water Crossing
	(	if including engineering for a bridge)

3. EMPLACE CANNON

1.	(64C-CHH4)	Uncouple cannon from vehicle
2.	(PS-SEL)	Select Position
3.	(GM-HVY (LIF))	Prepare Position
4.	(13B-Emp.)	Emplace/Align Collimator
5.	(13B-Emp.)	Emplace/Align Aiming Posts

4. DISPLACE CANNON

1.	(13B-Emp.)	Recover Collimator
2.	(13B-Emp.)	Recover Aiming Posts
3.	(64C-CHH4)	Uncouple cannon
4.	(64C-CHH5)	Leave Position

5. PREPARE CANNON FOR FIRING

1.	(CP-DIS)	Set Up Aiming Circle
2.	(13B-XHC4)	Establish Azimuth of the Orienting Line
3.	(13B-Lay.)	Lay Weapon
4.	(CP-DIS)	Establish Aiming Points
5.	(CP-DIS, IP(NBH))	Determine Site to Crest
6.	(13B-Bor.)	Boresight Weapon/Telescopes
7.	(13B-DHI4)	Emplace Azimuth Markers
8.	(19E-EHL2)	Perform Prefire Checks
9.	(11B-FHBB)	Prepare Range Card

6. FIRE CANNON

1.	(CM-NF)	Receive Firing Order
2.	(GM-HVY(LIF);CP-DIS)	Prepare Ammunition for Firing
3.	(CP-DIS)	Set Elevation and Deflection
4.	(GM-HVY (LIF))	Load Cannon
5.	(CP-DIS)	Fire Cannon
6.	(GM-HVY (LIF))	Unload Cannon

Table 4.2-10C. (Continued)

7. FIRE CANNON AT DIRECT FIRE TARGETS

1. (13B-DHI2) Identify Target(s)
2. (PS-SEL) Select Target
3. (11B-FHBB) Determine Target Range
4. (PS-PLAN) Determine Target Lead
5. (PS-SEL) Select Ammunition
6. (GM-HV4(UF);CP-DIS) Load Ammunition
7. (13B-m102) Aim/Sight Weapon
8. (CP-DIS) Fire
9. (GM-HV4(UF);CP-DIS) Unload Cannon

8. NAVIGATE

1. (13B-XHC4) Identify Present Location
2. (13B-XHC5) Identify Destination
3. (13B-XHC5) Plot Travel Route
4. (PS-PLAN) Estimate Time of Arrival and Travel Requirements

9. COMMUNICATE

1. (CM-NF) Transmit/Receive Messages
2. (19E-EHE6) Encode/Decode Messages
3. (19E-EHE6) Communicate Using Countermeasure Procedures

10. DEFEND AGAINST ATTACK

1. (64C-CHH5) Deploy to Cover
2. (64C-CHH5) Evade Threat

11. COMPENSATE FOR EQUIPMENT MALFUNCTIONS AND EMERGENCIES

1. (CP-DIS; GM-HV4 (UF)) Clear Misfire on Cannon

12. CONDUCT POST-MISSION TASKS

1. (VI-NR(VER); IP VER) Complete Forms
2. (VI NR(VER); IP VER) Perform Post-Operation Checks

Table 4.2-10C. (Continued)

SYSTEM 12 - OPERATIONAL FUNCTIONS FOR SELF-PROPELLED HOWITZERS

1. PREPARE FOR MARCH ORDER

1. (MCM-NF) Receive March Order
2. (95B-BHH1) Perform Pre-Operational Checks
3. (CP-DIS) Perform Fire Control Alignment
4. (CP-DIS) Test Gunner's Quadrants
5. (19E-EHD7) Prepare Vehicle/Personnel for NBC Environment

2. DRIVE/MOVE CANNON

1. (64C-CHH5) Drive Vehicle(Non-tactical march)
2. (64C-CHH5) Conduct Tactical March
3. (64C-CHH5) Perform Water Crossing
(if including engineering for a bridge)

3. EMPLACE CANNON

1. (MPS-SEL) Select Position
2. (MGN-HVY(LHT)) Prepare Position
3. (13B-Emp.) Emplace/Align Collimator
4. (13B-DHI4) Emplace/Align Aiming Posts

4. DISPLACE CANNON

1. (13B-Emp.) Recover Collimator
2. (13B-DHI4) Recover Aiming Posts
3. (64C-CHH5) Leave Position

5. PREPARE CANNON FOR FIRING

1. (CP-DIS) Set Up Aiming Circle
2. (13B-XHC4) Establish Azimuth of the Orienting Line
3. (13B-Lay.) Lay Weapon
4. (CP-DIS) Establish Aiming Points
5. (CP-DIS) Determine Site to Crest
6. (13B-Bor.) Boresight Weapon/Telescopes
7. (13B-DHI4) Emplace Azimuth Markers
8. (19E-EHL2) Perform Prefire Checks
9. (11B-FHBB) Prepare Range Card

6. FIRE CANNON

1. (MCM-NF) Receive Firing Order
2. (GM-HVY(LHT);CP-DIS) Prepare Ammunition for Firing
3. (CP-DIS) Set Elevation and Deflection
4. (GM-HVY(LHT)) Load Cannon
5. (CP-DIS) Fire Cannon
6. (GM-HVY(LHT)) Unload Cannon

Table 4.2-10C. (Continued)

7. FIRE CANNON AT DIRECT FIRE TARGETS

1. (13B-DHI2) Identify Target(s)
2. (PS-SEL) Select Target
3. (11B-FHBB) Determine Target Range
4. (PS-PLAN) Determine Target Lead
5. (PS-SEL) Select Ammunition
6. (CM-HV4(LIF);CP-DIS) Load Ammunition
7. (13B-m102) Aim/Sight Weapon
8. (CP-DIS) Fire
9. (CM-HV4 (LIF); CP-DIS) Unload Cannon

8. FIRE CREW SERVED WEAPONS

1. (CP-DIS) Load Ammunition
2. (13B-DHI2) Identify Target(s)
3. (PS-SEL) Select Target
4. (11B-FHBB) Determine Target Range
5. (CP-CON(AIM); VI-FIR) Aim/Sight Weapon
6. (CP-DIS) Fire Weapon
7. (CP-CON(AIM)) Adjust Fire
8. (13B-XHB5) Unload Weapon

9. NAVIGATE

1. (13B-XHC4) Identify Present Location
2. (13B-XHC5) Identify Destination
3. (13B-XHC5) Plot Travel Route
4. (PS-PLAN) Estimate Time of Arrival and Travel Requirements

10. COMMUNICATE

1. (CM-NF) Transmit/Receive Messages
2. (19E-EHE6) Encode/Decode Messages
3. (19E-EHE6) Communicate Using Countermeasure Procedures

11. DEFEND AGAINST ATTACK

1. (64C-CHH5) Deploy to Cover
2. (64C-CHH5) Evade Threat

12. COMPENSATE FOR EQUIPMENT MALFUNCTIONS AND EMERGENCIES

1. (PS-DIA) Identify Malfunction
2. (PS-DIA) Identify Source of Malfunction
3. (PS-SEL) Compensate/Recover from Malfunction
4. (19E-EHJ2) Evacuate Vehicle
5. (CP-DIS) Extinguish Fire
6. (13B-XHB7) Clear Misfire on Crew Served Weapon
7. (CP-DIS) Clear Misfire on Cannon

Table 4.2-10C. (Continued)

13. CONDUCT POST-MISSION TASKS

1. (Vl-Nr(ver); IP-ver) Complete Forms
2. (Vl-Nr(ver); IP-ver) Perform Post-Operation Checks

Table 4.2-10C. (Continued)

SYSTEM 14 - OPERATIONAL FUNCTIONS FOR AIR DEFENSE MOBILE GUN SYSTEM

1. PREPARE FOR MARCH ORDER

    1. (CM-NF) Receive March Order
    2. (CP-DIS-VI-NR (NBC)) Prepare Weapon System for Travel
    3. (31 C - GHH1) Performs Pre-Operational Vehicle Checks
    4. (19E-EHD7) Prepare Vehicle/Personnel for NBC Environment (if personal MOPP is only req's, as in VULCAN)

2. MOVE VEHICLE

    1. (19E-EHH1) Start/Stop Engine
    2. (64C-CHH3) Couple Weapon To Vehicle
    3. (64C-CHH5) Drive Vehicle
    4. (64C-CHH5) Perform Tactical Movement
    5. (64C-CHH5) Perform Water Crossing

3. EMPLACE SYSTEM

    1. (PS-SEL) Select Position
    2. (64C-CHH5) Move Vehicle Onto Position
    3. (19E-EHH5) Camouflage Vehicle

4. PREPARE WEAPON FOR ENGAGEMENT

    1. (PS-SEL; CM-F) Designate Observation and Command Posts Primary Target Lines and Sectors of Search
    2. (CP-DIS; IP(NBC); PS(NBC)) Establish Observation and Command Posts
    3. (GN-HVY(LIA); CP-DIS) Emplace/Start Auxiliary Power Unit
    4. (19E-EHL2) Perform Prefire Checks
    5. (PS-SEL) Determine Aiming Points
    6. (CP-DIS) Emplace Target Alert System
    7. (13B-Bor.) Boresight Weapon

5. LOAD/RELOAD WEAPON

    1. (GN-HVY(LIF); CP-DIS) Prepare Ammunition
    2. (11B-FHBA) Prepare Weapon for Firing
    3. (CP-DIS; GN-HVY(LIF)) Load Ammunition

6. ACQUIRE TARGET

    1. (11B-FHG9) Search for Target
    2. (13B-DHI2) Detect/Locate Target
    3. (13B-DHI2) Identify Friend or Foe

Table 4.2-10C. (Continued)

14. COMPENSATE FOR EQUIPMENT MALFUNCTIONS AND EMERGENCIES

1. (PS-DIA; PS(PLAN); PS-SEL) Identify Malfunction
2. (PS-DIA) Identify Source of Malfunction
3. (PS-SEL) Compensate/Recover from Malfunction
4. (19E-EHJ2) Evacuate Vehicle
5. (GN-LITE; OP-DIJ) Extinguish Fires

Table 4.2-10C. (Continued)

SYSTEM 15 - OPERATIONAL FUNCTIONS FOR MAN-PORTABLE AIR DEFENSE SYSTEMS

1. (CP-DIS; GM LITE) CONDUCT PRE-OPERATIONAL INSPECTION

2. PREPARE WEAPON FOR FIRING

   1. (CP-DIS) Prepare Round
   2. (11B-FHBA) Ready Weapon for Firing

3. GET INTO FIRING POSITION

   1. (PS-SEL) Select Firing Position
   2. (GM-LITE) Get Into Firing Position

4. DETECT/LOCATE TARGET

   1. (VI-FR) Search for Target
   2. (VI-FR) Detect Target
   3. (13B-DHI2) Identify Friend or Foe

5. FIRE WEAPON

   1. (CP-CON (AIM)) Aim Weapon
   2. (11B-FHBC) Track Target
   3. (IP-SPA) Determine Target Range
   4. (CP-DIS) Set Superelevation and Lead
   5. (CP-DIS) Fire Weapon

6. (CP-DIS) CLEAR RECOVER FROM MISFIRE

7. PERFORM POST-FIRING TASKS

   1. (CP-DIS) Discard Expended Launch Tube

Table 4.2-10C. (Continued)

SYSTEM 16 - OPERATIONAL FUNCTIONS FOR ATTACK HELICOPTERS

1. PLAN AND PREPARE FOR MISSION

1 (PS-PLAN	) Plan Flight
2 (VI-NR(NON)	) Check Load
3 (IP-NUM	) Calculate Weight and Balance Bearing
4 (PS-PLAN	) Prepare Performance Planning Card
5 (IP-NUM; CP-DIS (TYPE)	) Enter Preflight Data
6 (VI-NR(NON) CP-DIS	) Conduct Preflight Inspection
7 (IP-VER; CP-DIS	) Perform Engine Start, Run-Up, and Before Take-Off Checks
8 (IGF-EHD-7	) Prepare Vehicle/Personnel For NBC Environment

2. TAXI AND TAKEOFF

1 (CP-CON; DRI (PIL)	) Perform Ground Taxi (1015)
2 (CP-DIS	) Perform Hover Power Check (1017)
3 (CP-CON (PIL)	) Perform Hovering Flight (1017)
4 (CP-CON (PIL	) Perform Takeoff

3. FLY AIRCRAFT TO/FROM MISSION AREA

1 (CP-CON (PIL)	) Cruise (Non-Tactical Flight)
2 (CP-CON (PIL)	) Perform Tactical Flight
3 (VI-NR(NON) CP-DIS	) Monitor Instruments
4 (CP-CON (PIL)	) Perform Holding Procedure

4. NAVIGATE

1 (IP-NUM; VI-NR (VER)	) Identify Present Location
2 (IP-NUM; VI-NR (VER)	) Identify Destination
3 (PS-SEL	) Select Travel Route
4 (IP-NUM	) Estimate Time of Arrival and Fuel Requirements

5. COMMUNICATE

1 (CM-NF	) Transmit/Receive Messages
2 (IP-VER; IP-NUM	) Encode/Decode Messages
3 (CM-NF	) Communicate Using Countermeasure Procedures

6. APPROACH AND LAND AIRCRAFT

1 (CP-DIS	) Perform Before Landing Checks
2 (CP-CON (PIL)	) Approach
3 (CP-CON (PIL)	) Land
4 (CP-CON (DRI)	) Taxi

Table 4.2-10C. (Continued)

7. PERFORM AFTER LANDING TASKS

1 (CP-DIS	) Conduct Engine Shutdown
2 (VI-NR (NVN) CP-DIS	) Conduct Post Flight Checks
3 (QSB BHIB	) Complete Reports and Forms
4 (CM-F	) Conduct Briefing

8. COMPENSATE FOR INFLIGHT EQUIPMENT MALFUNCTIONS AND EMERGENCIES

1 (M-PS-DIA	) Identify Malfunction
2 (PS-DIA	) Identify Source of Malfunction
3 (PS-SEL	) Compensate/Recover from Malfunction
4 (IPE-EHSZ	) Extinguish Fire
5 (HB-XH BJ	) Clear Weapon Misfire
6 (IPE EHSZ	) Evacuate Aircraft

9. ACQUIRE TARGETS

1 (VI-FR	) Detect/Locate Targets
2 (VI-FR	) Identify Friend or Foe

10. ATTACK TARGET

1 (CP-CON (PIL)	) Maneuver for Attack
2 (PS-SEL	) Select Target(s)
3 (PS-SEL	) Select Weapon
4 (CP-CON (AIM)	) Aim/Sight Weapon
5 (CP-CON (AIM)TPA	) Track Target
6 (CP-DIS	) Fire Weapon
7 (CP-CON (AIM)	) Adjust Fire
8 (CP-CON (PIL)	) Egress From Attack Position

11. DEFEND AGAINST ATTACK

1 (CP-CON (PIL)	) Deploy to Cover
2 (VI-FR	) Identify/Locate Source of Threat/Fire
3 (VI-FR	) Identify/Locate Threat Target Tracking
4 (CP-CON (PIL)	) Perform Evasive Maneuvers
5 (31C-EHJ6	) Employ ECCM
6 (CP-DIS	) Dispense/Disperse Smoke

12. PERFORM RECONNAISSANCE

1 (CP-CON (PIL)	) Move to Recon Area
2 (VI-FR; IP (VER)	) Obtain Tactical Information
3 (CM-NF; IP-VER	) Transmit Tactical Report

13. CALL FOR DIRECT SUPPORT

1 (CM-F; VI-FR	) Call for and Adjust Indirect Fire
2 (CM-F; VI-FR	) Request/Adjust Illumination

Table 4.2-10C. (Continued)

SYSTEM 17 - OPERATIONAL FUNCTIONS FOR CARGO HELICOPTERS

1. PLAN AND PREPARE FOR MISSION

1. (PS-Plan) Plan Flight
2. (VI-NR(NON)) Check Load
3. (IP-NUM) Calculate Weight and Balance Bearing
4. (PS-PLAN) Prepare Perfmance Planning Card
5. (IP-NUM ;CP-DIS (TIME)) Enter Preflight Data
6. (VI-NR(NON) CPDIS) Conduct Preflight Inspection
7. (IPVER ;CP-DIS) Perform Engine Start, Run-Up, and Before Take-Off Checks
8. (IGF-EHD-7) Prepare Vehicle/Personnel For NBC Environment

2. TAXI AND TAKEOFF

1. (CP-CON;DRI(PI)) Perform Ground Taxi (1015)
2. (CP-DIS) Perform Hover Power Check (1017)
3. (CP-CON-(PI)) Perform Hovering Flight (1017)
4. (CP-CON (PIL)) Perform Takeoff

3. FLY AIRCRAFT TO/FROM MISSION AREA

1. (CP-CON (PI)) Cruise (Non-Tactical Flight)
2. (CP- CON(PIL)) Perform Tactical Flight
3. (VI-NR(NON);CP-DIS) Monitor Instruments
4. (CP-CON (PIL)) Perform Holding Procedure

4. NAVIGATE

1. (IP-NUM;VI-NR(VER)) Identify Present Location
2. (IP-NUM;VI-NR(VER)) Identify Destination
3. (PS—SEL) Select Travel Route
4. (IP-NUM) Estimate Time of Arrival and Fuel Requirements

5. COMMUNICATE

1. (CM-NF) Transmit/Receive Messages
2. (IP-VER;IP-NUM) Encode/Decode Messages
3. (CM-NF) Communicate Using Countermeasure Procedures

6. APPROACH AND LAND AIRCRAFT

1. (CP-DIS) Perform Before Landing Checks
2. (CP-CON (PIL)) Approach
3. (CP- CON (PIL)) Land
4. (CP- CON (DRI)) Taxi

Table 4.2-10C. (Continued)

7. PERFORM AFTER LANDING TASKS

1. (CP-Dis) Conduct Engine Shutdown
2. (VI-NT (NAV); CP-Dis) Conduct Post Flight Checks
3. (QSB - BAI3) Complete Reports and Forms
4. (QM-F) Conduct Briefing

8. COMPENSATE FOR INFLIGHT EQUIPMENT MALFUNCTIONS AND EMERGENCIES

1. (M PS-DIA) Identify Malfunction
2. (PS-DM) Identify Source of Malfunction
3. (PS-SEL) Compensate/Recover from Malfunction
4. (19E - EHJ2) Extinguish Fire
5. (HB - XHBJ) Clear Weapon Misfire
6. (19E - EHJ2) Evacuate Aircraft

9. ACQUIRE TARGETS

1. (VI-FR) Detect/Locate Targets
2. (VI-FR) Identify Friend or Foe

10. ATTACK TARGET

1. (CP-CON (PIL)) Maneuver for Attack
2. (PS-SEL) Select Target(s)
3. (PS-SEL) Select Weapon
4. (CP-CON (AIM)) Aim/Sight Weapon
5. (CP-CM-AIM)TRK) Track Target
6. (CP-DIS) Fire Weapon
7. (CP-CON (AIM)) Adjust Fire
8. (CP-CON (PIL)) Egress From Attack Position

11. DEFEND AGAINST ATTACK

1. (CP-CON (PIL)) Deploy to Cover
2. (VI-FR) Identify/Locate Source of Threat/Fire
3. (VI-FR) Identify/Locate Threat Target Tracking
4. (CP-CON (PIL)) Perform Evasive Maneuvers
5. (31C - EHJ6) Employ ECCM
6. (CP-DIS) Dispense/Disperse Smoke

12. LOAD/UNLOAD INTERNAL LOADS

1. (CM-F) Brief Pasengers
2. (CM-F; GM HM (LIF)) Load Passengers/Cargo
3. (CM-F; GM HM (LIF)) Unload Passengers/Cargo

13. RAISE/LOWER EXTERNAL LOADS

1. (VI-FR, CP-CON (PIL) Attach Load
2. (VI-FR), CP-CON (PIL) Raise Load
3. (VI-FR; CP-CON (PIL) Lower Load

Table 4.2-10C. (Continued)

14. (CP-CON (PIL); CM-F) PERFORM PARADROP

15. (CP-CON (PIL), CM-F) RAPPEL TROOPS

16. PERFORM RECONNAISSANCE

1. (CP-CON (PIL)) Move to Recon Area
2. (VI-FIR; IP-VER) Obtain Tactical Information
3. (CM-NF; IP-VER) Transmit Tactical Report

17. CALL FOR DIRECT SUPPORT

1. (CM-F; VI-FIR) Call for and Adjust Indirect Fire
2. (CM-F; VI-FIR) Request/Adjust Illumination
3. (CM-F; VI-FIR) Adjust Attack Helicopter Fire

Table 4.2-10C. (Continued)

SYSTEM 18 - OPERATIONAL FUNCTIONS FOR UTILITY HELICOPTERS

1. PLAN AND PREPARE FOR MISSION

1 (PS-PLAN)	Plan Flight
2 (VI-NT (NON))	Check Load
3 (IP-NUM)	Calculate Weight and Balance Bearing
4 (PS-PLAN)	Prepare Performance Planning Card
5 (IP(NUM);@B-DIS (TYPE))	Enter Preflight Data
6 (VI-NT (NON); CP (DIS))	Conduct Preflight Inspection
7 (IP-VER; CP-DIS)	Perform Engine Start, Run-Up, and Before Take-Off Checks
8 (IPE-END7)	Prepare Vehicle/Personnel For NBC Environment

2. TAXI AND TAKEOFF

1 (CP-CON; DRI (PIL))	Perform Ground Taxi (1015)
2 (CP-PCS)	Perform Hover Power Check (1017)
3 (CP-CON (PIL))	Perform Hovering Flight (1017)
4 (CP-CON (PIL))	Perform Takeoff

3. FLY AIRCRAFT TO/FROM MISSION AREA

1 (CP-CON (PIL))	Cruise (Non-Tactical Flight)
2 (CP-CON (PIL))	Perform Tactical Flight
3 (VI-NR (NON); CP-DIS)	Monitor Instruments
4 (CP-CON (PIL))	Perform Holding Procedure

4. NAVIGATE

1 (IP-NUM; VI-NT (VER))	Identify Present Location
2 (IP-NUM; VI NT (VER))	Identify Destination
3 (PS-SEL)	Select Travel Route
4 (IP-NUM)	Estimate Time of Arrival and Fuel Requirements

5. COMMUNICATE

1 (CM-NF)	Transmit/Receive Messages
2 (IP-VER; IP-NUM)	Encode/Decode Messages
3 (CM-NF)	Communicate Using Countermeasure Procedures

6. APPROACH AND LAND AIRCRAFT

1 (CP-DIS)	Perform Before Landing Checks
2 (CP-CON (PIL))	Approach
3 (CP-CON (PIL))	Land
4 (CP-CON (DRI))	Taxi

Table 4.2-10C. (Continued)

7. PERFORM AFTER LANDING TASKS

1 (CP-DIS	) Conduct Engine Shutdown
2 (VI-NR(NVN);CP-DIS	) Conduct Post Flight Checks
3 (9SB-BHIB	) Complete Reports and Forms
4 (CM-F	) Conduct Briefing

8. COMPENSATE FOR INFLIGHT EQUIPMENT MALFUNCTIONS AND EMERGENCIES

1 (DPS-DIA	) Identify Malfunction
2 (PS-DIA	) Identify Source of Malfunction
3 (PS-SEL	) Compensate/Recover from Malfunction
4 (IAE-EHJ2	) Extinguish Fire
5 (HB-XHBJ	) Clear Weapon Misfire
6 (IAE-EHJ2	) Evacuate Aircraft

9. ACQUIRE TARGETS

1 (VI-FR	) Detect/Locate Targets
2 (VI-FR	) Identify Friend or Foe

10. ATTACK TARGET

1 (CP-CON(PIL)	) Maneuver for Attack
2 (PS-SEL	) Select Target(s)
3 (PS-SEL	) Select Weapon
4 (CP-CON(AIR)	) Aim/Sight Weapon
5 (CP-CON-(AIM)TDA	) Track Target
6 (CP-DIS	) Fire Weapon
7 (CP-CON(AIM)	) Adjust Fire
8 (CP-CON(PIL)	) Egress From Attack Position

11. DEFEND AGAINST ATTACK

1 (CP-CON(PIL)	) Deploy to Cover
2 (VI-FR	) Identify/Locate Source of Threat/Fire
3 (VI-FR	) Identify/Locate Threat Target Tracking
4 (CP-CON(PIL)	) Perform Evasive Maneuvers
5 (31C-EHJ6	) Employ ECCM
6 (CP-DIS	) Dispense/Disperse Smoke

12. LOAD/UNLOAD INTERNAL LOADS

1 (CM-F	) Brief Pasengers
2 (CM-F;GM HVY(LIF)	) Load Passengers/Cargo
3 (CM-F;GM HVY(LIF)	) Unload Passengers/Cargo

13. RAISE/LOWER EXTERNAL LOADS

1 (VI-FR;CP-CON(PIL)	) Attach Load
2 (VI-FR;CP-CON(PIL)	) Raise Load
3 (VI-FR;CP-CON(PIL)	) Lower Load

Table 4.2-10C. (Continued)

14. (CP-CON(PIL); CM-F) PERFORM PARADROP

15. (CP-CON (PIL); CH-F) RAPPEL TROOPS

16. PERFORM RECONNAISSANCE

1 (CP-CON (PIL)) Move to Recon Area
2 (VI-FR; IP-VER) Obtain Tactical Information
3 (CH-NF; IP-VER) Transmit Tactical Report

17. CALL FOR DIRECT SUPPORT

1 (CM-F; VI-FR) Call for and Adjust Indirect Fire
2 (CM-F; VI-FR) Request/Adjust Illumination
3 (CM-F; VI-FR) Adjust Attack Helicopter Fire

Table 4.2-10C. (Continued)

SYSTEM 19 - OPERATIONAL FUNCTIONS FOR SCOUT HELICOPTERS

1. PLAN AND PREPARE FOR MISSION

1 (PS-PLAN	) Plan Flight
2 (VI-NR (NON)	) Check Load
3 (IP-NUM	) Calculate Weight and Balance Bearing
4 (PS-PLAN	) Prepare Performance Planning Card
5 (IP-NUM; CP-DIS (TYPE)	) Enter Preflight Data
6 (VI-NR (NON); CP-DIS	) Conduct Preflight Inspection
7 (IP-VER; CP-DIS	) Perform Engine Start, Run-Up, and Before Take-Off Checks
8 (IPF-ENTD-7	) Prepare Vehicle/Personnel For NBC Environment

2. TAXI AND TAKEOFF

1 (CP-CON; DRI (PIL)	) Perform Ground Taxi (1015)
2 (CP-DIS	) Perform Hover Power Check (1017)
3 (CP-CON (PIL)	) Perform Hovering Flight (1017)
4 (CP-CON (DIL)	) Perform Takeoff

3. FLY AIRCRAFT TO/FROM MISSION AREA

1 (CP-CON (PIL)	) Cruise (Non-Tactical Flight)
2 (CP-CON (PIL)	) Perform Tactical Flight
3 (VI-NR (NON); CP-DIS	) Monitor Instruments
4 (CP-CON (PIL)	) Perform Holding Procedure

4. NAVIGATE

1 (IP-NUM; VI-NR (VER)	) Identify Present Location
2 (IP-NUM; VI-NR (VER)	) Identify Destination
3 (PS-SEL	) Select Travel Route
4 (IP-NUM	) Estimate Time of Arrival and Fuel Requirements

5. COMMUNICATE

1 (CM-NF	) Transmit/Receive Messages
2 (IP-VER; IP-NUM	) Encode/Decode Messages
3 (CM-NF	) Communicate Using Countermeasure Procedures

6. APPROACH AND LAND AIRCRAFT

1 (CP-DIS	) Perform Before Landing Checks
2 (CP-CON (PIL)	) Approach
3 (CP-CON (PIL)	) Land
4 (CP-CON (DIL)	) Taxi

Table 4.2-10C. (Continued)

7. PERFORM AFTER LANDING TASKS

1 (CP-DIS	) Conduct Engine Shutdown
2 (VI-NR (NVN); CP-DIS	) Conduct Post Flight Checks
3 (95B-BH-13	) Complete Reports and Forms
4 (CM-F	) Conduct Briefing

8. COMPENSATE FOR INFLIGHT EQUIPMENT MALFUNCTIONS AND EMERGENCIES

1 (M-PS-DIA	) Identify Malfunction
2 (PS-DIA	) Identify Source of Malfunction
3 (PS-SEL	) Compensate/Recover from Malfunction
4 (19E-EHJ2	) Extinguish Fire
5 (HB-XHBJ	) Clear Weapon Misfire
6 (19E-EHJ2	) Evacuate Aircraft

9. ACQUIRE TARGETS

1 (VI-FR	) Detect/Locate Targets
2 (VI-FR	) Identify Friend or Foe

10. ATTACK TARGET

1 (CP-CON (PIL)	) Maneuver for Attack
2 (PS-SEL	) Select Target(s)
3 (PS-SEL	) Select Weapon
4 (CP-CON (AIM)	) Aim/Sight Weapon
5 (CP-CON (AIM) TPA	) Track Target
6 (CP-DIS	) Fire Weapon
7 (CP-CON (AIM)	) Adjust Fire
8 (CP-CON (PIL)	) Egress From Attack Position

11. DEFEND AGAINST ATTACK

1 (CP-CON (PIL)	) Deploy to Cover
2 (VI-FR	) Identify/Locate Source of Threat/Fire
3 (VI-FR	) Identify/Locate Threat Target Tracking
4 (CP-CON (PIL)	) Perform Evasive Maneuvers
5 (31C-EHJ6	) Employ ECCM
6 (CP-DIS	) Dispense/Disperse Smoke

12. PERFORM RECONNAISSANCE

1 (CP-CON (PIL)	) Move to Recon Area
2 (VI-FR; IP (VER)	) Obtain Tactical Information
3 (CM-NF; IP (VER)	) Transmit Tactical Report

13. CALL FOR DIRECT SUPPORT

1 (CM-F; VI-FR	) Call for and Adjust Indirect Fire
2 (CM-F; VI-FR	) Request/Adjust Illumination
3 (CM-F; VI-FR	) Adjust Attack Helicopter Fire

Table 4.2-10C. (Continued)

SYSTEM 20 OPERATIONAL FUNCTIONS FOR LIGHT CARGO TRANSPORT TRUCKS

1. PLAN AND PREPARE MISSION

    1. (IP-Ver) Receive/Review Order
    2. (VI-NR (Ver)) Complete Vehicle Record Forms
    3. (95B-BHH1) Perform Pre-Operational Checks
    4. (19E-EHH3) Camouflage Vehicle
    5. (DAP-DIS) Mark Vehicle

2. PREPARE LOAD

    1. (VI-FR; GN LTF) Observe/Check Loading of Cargo/Passengers
    2. (MCN-F) Brief Pasengers
    3. (19E-EHH3) Secure Load
    4. (64C-CHH3) Couple Trailer
    5. (19E-EHH3) Load Vehicle

3. DRIVE VEHICLE

    1. (19E-EHH1) Start Vehicle
    2. (64C-CHH5) Drive Vehicle
    3. (64C-CHH5) Drive Vehicle in Motor March or Convoy

4. DEFEND AGAINST ATTACK

    1. (CP-CON (DRI)) Deploy to Cover
    2. (64C-CHH5) Perform Evasive Maneuvers

5. COMPENSATE FOR EQUIPMENT MALFUNCTIONS AND EMERGENCIES

    1. (GN HWY (LIF)(TOR)) Perform Self-Recovery of Vehicle
    CP-DIS

6. LOAD/UNLOAD VEHICLE

    1. (19E-EHH3) Load Cargo/Passengers
    2. (19E-EHH3) Unload Cargo/Passengers

7. PERFORM POST-MISSION PROCEDURES

    1. (64C-CHHS) Park Vehicle
    2. (CP-DIS, VI-NR (VER)) Perform Post-Operational Checks
    3. (IP-VER, VI-NR (VER)) Complete Vehicle Record Forms

Table 4.2-10C. (Continued)

SYSTEM 21 OPERATIONAL FUNCTIONS FOR HEAVY CARGO TRANSPORT TRUCKS

Same as SYSTEM 20 - Light Cargo Trucks

Table 4.2-10D. Project A Tasks, Taxons, Weights, and Descriptions

MOS	CODE	Description	W1	Primary Taxon	W2	Secondary Taxon	W3	Tertiary Taxon
11B	FHBC	Engage Targets with LAW (M72A2)	70.00	CP-Con(Aim)+	15.00	CP-Dis	15.00	VI-Fr
	FHB9	Engage Enemy Target with Hand Grenades	80.00	CP-Con(Thro)+	20.00	CP-Dis		
	FHL1	Zero an AN/PVS-4 to an M16A1 Rifle	45.00	CP-Con(Tra)+	40.00	CP-Dis	15.00	VI-Fr
	XHB5	Load, Reduce a Stoppage, and Clear an M60 Machinegun	100.00	CP-Dis				
	XHD1	Put On, Wear, Remove M17 Protective Mask With Hood	100.00	CP-Dis				
	XHB6	Set Headspace and Timing on an M2 Caliber .50 Machinegun (Mech)	100.00	CP-Dis				
	XHA4	Put On Field Or Pressure Dressing	100.00	CP-Dis				
	FHBA	Prepare a Dragon for Firing	100.00	CP-Dis				
	FHB4	Operate Radio Set AN/PRC-77 - Manpack Operations (or AN/PRC-25 (AN/GRC-160 or AN/GRC-125))	100.00	CP-Dis				
	XHI1	Install and Fire/Recover an M18A1 Claymore Mine	85.00	CP-Dis+	15.00	VI-Nr(Non)		
	XHB4	Perform Operator Maintenance On an M16A1 Rifle, Magazine, and Ammunition	90.00	CP-Dis+	10.00	VI-Nr(Non)		
	FHJ1	Techniques of Movement in Urban Terrain	90.00	GM-Lite+	10.00	VI-Fr		
	FHBB	Prepare Range Card for M60 Machinegun	50.00	IP-Ver+	30.00	IP-Num	20.00	VI-Fr
	FHG9	Conduct Day and Night Surveillance Without Aid of Electronic Devices	100.00	VI-Fr				

Table 4.2-10D. Project A Tasks, Taxons, Weights, and Descriptions (Continued)

MOS	CODE	Description	W1	Primary Taxon	W2	Secondary Taxon	W3	Tertiary Taxon
13B	DHI-	Sight on a Target With Direct Fire Telescope (M102-DHIP, M109-DHI6, M110-DHIB, M198-DHIN)	80.00	CP-Con(Aim)+	20.00	VI-Fr		
	DHI-	Lay Howitzer for Initial Direction of Fire (M100 Series-DHIL, M100-DHI7)	50.00	CP-Con(Tra)+	40.00	IP-Num	10.00	VI-Nr(Non)
	DHI-	Boresight Direct Fire Telescope Using DAP (Distant Aiming Point; M102-DHIQ, M109-DHI5, M110-DHIA, M198-DHIM)	70.00	CP-Con(Tra)+	30.00	VI-Fr		
	XHB7	Perform Operator Maintenance on a Caliber .50 M2 Machinegun	100.00	CP-Dis				
	XHE3	Install and Operate a Field Telephone	100.00	CP-Dis				
	XHD1	Put On, Wear, Remove M17 Protective Mask with Hood	100.00	CP-Dis				
	XHB6	Set Headspace and Timing on an M2 Caliber .50 Machinegun	100.00	CP-Dis				
	DHJ-	Disassemble/Assemble Breech Mechanism (M102-DHJ8, M109-DHJ1, M110-DHJ4, M198-DHJ6)	100.00	CP-Dis				
	XHB3	Load, Reduce a Stoppage, and Clear an M16A1 Rifle	100.00	CP-Dis				
	XHA3	Administer Nerve Agent Antidote to Self (Self-Aid)	100.00	CP-Dis				
	XHD3	Put On and Wear Protective Clothing	100.00	CP-Dis				
	DHI-	Emplace/Recover Collimator (M102-DHI3, M198-DHIJ)	85.00	CP-Dis+	15.00	CP-Con(Tra)		
	DHI4	Emplace/Recover Aiming Posts	75.00	CP-Dis+	15.00	CP-Con(Tra)	10.00	VI-Fr
	XHA2	Perform Cardiopulmonary Resuscitation (CPR) on an Adult Using the One-Man Method	60.00	CP-Dis+	40.00	PS-Dia		
	DHI2	Use Visual Signals to Control Movement (Mounted)	80.00	CP-Dis+	20.00	VI-Fr		
	XHC4	Determine an Azimuth Using an M2 Compass	80.00	IP-Num+	20.00	VI-Fr		
	XHC5	Measure an Azimuth on a Map with a Protractor	60.00	IP-Num+	40.00	VI-Nr(Ver)		

Table 4.2-10D. Project A Tasks, Taxons, Weights, and Descriptions (Continued)

MOS	CODE	Description	W1	Primary Taxon	W2	Secondary Taxon	W3	Tertiary Taxon
19E	XHE7	Send a Radio Message	100.00	CM-F				
	BHK1	Boresight and System Calibrate an M60A3 Tank	70.00	CP-Con(Tra)+	30.00	VI-Fr		
	BHBC	Perform Operator Maintenance on M3A1 Submachinegun	100.00	CP-Dis				
	BHL1	Prepare Loader's Station for Operation (on an M48A5/M60-Series Tank)	100.00	CP-Dis				
	BHJ1	Operate Gas Particulate Filter Unit (on an M60-Series	100.00	CP-Dis				
	BHE8	Operate Radio Set AN/VRC-64 or AN/GRC-160 (AN/VRC-53 or AN/GRC-125)	100.00	CP-Dis				
	BHK5	Perform Operator Maintenance on an M240 Machinegun	100.00	CP-Dis				
	BHD7	Put On M25A1 Protective Mask With Hood	100.00	CP-Dis				
	BHH3	Remove and Install Track Blocks [Measure Track Tension] (on an M48A5/M60-Series Tank)	100.00	CP-Dis				
	XHA4	Put On Field or Pressure Dressing	100.00	CP-Dis				
	BHH1	Start/Stop Tank Engine (on an M48A5/M60)	100.00	CP-Dis				
	BHL2	Perform Gunner's and Loader's Prepare-to-Fire Checks [LRF Self-Test] (on an M60A3 Tank)	70.00	CP-Dis+	30.00	VI-Nr(Non)		
	BHJ2	Escape from Tank (an M48A5/M60-Series Tank)	100.00	GM-Lite				
	XHC2	Determine Grid Coordinates of a Point on a Military Map Using the Military Grid Reference System	80.00	IP-Num+	20.00	VI-Nr(Ver)		
	BHE6	Use an Automated CEOI	60.00	IP-Ver+	40.00	CM-F		

Table 4.2-10D. Project A Tasks, Taxons, Weights, and Descriptions (Continued)

MOS	CODE	Description	W1	Primary Taxon	W2	Secondary Taxon	W3	Tertiary Taxon
31C	GHJ1	Establish, Enter and Leave a Radio Net	100.00	CM-NF				
	XHD3	Put On and Wear Protective Clothing	100.00	CP-Dis				
	XHA4	Put on Field or Pressure Dressing	100.00	CP-Dis				
	XHB3	Load, Reduce a Stoppage, and Clear an M16A1 Rifle	100.00	CP-Dis				
	GHJ6	Recognize Electronic Countermeasures (ECM) and Implement Electronic Counter-Countermeasures (ECCM)	70.00	CP-Dis+	30.00	AU-So		
	GHI7	Install Radio Set AN/GRC-106	80.00	CP-Dis+	20.00	VI-Nr(Non)		
	GHIA	Install Radio Teletypewriter Set AN/GRC-142 or AN/GRC-122	80.00	CP-Dis+	20.00	VI-Nr(Non)		
	GHI1	Operate Radio Teletypewriter Set AN/GRC-142 or AN/GRC-122	80.00	CP-Dis+	20.00	VI-Nr(Ver)		
	GHH2	Operate Generator Set PU-620	80.00	CP-Dis+	20.00	VI-Nr(Ver)		
	GHH1	Perform PMCS on Cargo Truck [M1028] (1-1/4 Ton, with Communication Shelter M1028)	60.00	CP-Dis+	20.00	VI-Nr(Ver)	20.00	VI-Nr(Non)
	XHC2	Determine Grid Coordinates of a Point on a Military Map Using the Military Grid Reference System	80.00	IP-Num+	20.00	VI-Nr(Ver)		
	GHJ4	Prepare a Message in 16-Line Format	100.00	IP-Ver				
	GHJ3	Use the KTC 1400 D Numerical Cipher/Authentication System	70.00	IP-Ver+	30.00	CM-NF		
	GHI3	Operate Terminal Communications AN/UGC-74A	60.00	IP-Ver+	20.00	VI-Nr(Ver)	20.00	CP-Dis
	GHH3	Perform Operator's Troubleshooting Procedures on Generator Set [PU-620]	60.00	PS-Dia+	30.00	CP-Dis	10.00	VI-Nr(Non)

Table 4.2-10D. Project A Tasks, Taxons, Weights, and Descriptions (Continued)

MOS	CODE	Description	W1	Primary Taxon	W2	Secondary Taxon	W3	Tertiary Taxon
63B	XHG5	Use Challenge and Password	100.00	CM-F				
	XHB3	Load, Reduce a Stoppage, and Clear an M16A1 Rifle	100.00	CP-Dis				
	XHA4	Put On Field or Pressure Dressing	100.00	CP-Dis				
	XHD1	Put On, Wear, Remove M17 Protective Mask With Hood	100.00	CP-Dis				
	HHN1	Replace Fuel Pump [Truck, Cargo, 2 1/2-ton, 6 x 6]	80.00	CP-Dis+	20.00	VI-Nr(Non)		
	HHJ2	Repair Electrical Wiring [Truck, Cargo, 1 1/4-Ton, 4 x 4]	80.00	CP-Dis+	20.00	VI-Nr(Non)		
	HHM2	Replace Air Hydraulic Cylinder [Truck, Cargo, 2 1/2-Ton, 6 x 6]	80.00	CP-Dis+	20.00	VI-Nr(Non)		
	HHH1	Replace Wheel Bearings [Truck, Cargo, 2 1/2-Ton, 6 x 6]	80.00	CP-Dis+	20.00	VI-Nr(Non)		
	HHM1	Replace Service Brakes [Truck, Utility, 1/4-Ton, 4 x 4]	80.00	CP-Dis+	20.00	VI-Nr(Non)		
	HHK1	Adjust Clutch Pedal Free Travel [Truck, Utility, 1/4-Ton, 4 x 4]	80.00	CP-Dis+	20.00	VI-Nr(Non)		
	HHI1	Maintain Assigned Toolkit	80.00	CP-Dis+	20.00	VI-Nr(Non)		
	XHC1	Determine a Magnetic Azimuth Using a Compass	60.00	IP-Num+	20.00	IP-Ver	20.00	VI-Fr
	HHM3	Troubleshoot Service Brake Malfunctions [Truck, Utility, 1/4-Ton, 4 x 4]	60.00	PS-Dia+	30.00	CP-Dis	10.00	VI-Nr(Non)
	HHJ1	Troubleshoot Electrical System [Truck, Cargo, 5-Ton, 6 x 6]	60.00	PS-Dia+	30.00	CP-Dis	10.00	VI-Nr(Non)
	HHN3	Troubleshoot Fuel System Malfunctions [Truck, Cargo, 2 1/2-Ton, 6 x 6]	60.00	PS-Dia+	30.00	CP-Dis	10.00	VI-Nr(Non)

Table 4.2-10D. Project A Tasks, Taxons, Weights, and Descriptions (Continued)

MOS	CODE	Description	W1	Primary Taxon	W2	Secondary Taxon	W3	Tertiary Taxon
64C	CHH5	Operate Tractor and Semitrailer	100.00	CP-Con(Dri)				
	XHB3	Load, Reduce a Stoppage, and Clear an M16A1 Rifle	100.00	CP-Dis				
	XHB5	Load, Reduce a Stoppage and Clear an M60 Machinegun	100.00	CP-Dis				
	CHH3	Couple Semitrailer	100.00	CP-Dis				
	XHA3	Administer Nerve Agent Antidote	100.00	CP-Dis				
	CHH4	Uncouple Semitrailer	100.00	CP-Dis				
	XHA1	Administer First Aid to Nerve Agent Casualty (Buddy Aid)	100.00	CP-Dis				
	XHA4	Put On Field or Pressure Dressing	100.00	CP-Dis				
	XHD3	Put on and Wear Protective Clothing	100.00	CP-Dis				
	CHD5	Decontaminate Equipment Using the ABC M11 Decontaminating Apparatus	100.00	CP-Dis				
	XHA2	Perform Cardiopulmonary Resuscitation (CPR) on an Adult Using the One-Man Method	60.00	CP-Dis+	40.00	PS-Dia		
	XHB4	Perform Operator Maintenance On an M16A1 Rifle, Magazine, and Ammunition	90.00	CP-Dis+	10.00	VI-Nr(Non)		
	XHC3	Measure Distance on a Map	90.00	IP-Num+	10.00	VI-Nr(Non)		
	XHC2	Determine Grid Coordinates of a Point on a Military Map Using the Military Grid Reference System	80.00	IP-Num+	20.00	VI-Nr(Ver)		
	CHD6	Use M8 Paper to Identify a Chemical Agent	80.00	VI-Nr(Non)+	20.00	CP-Dis		

Table 4.2-10D. Project A Tasks, Taxons, Weights, and Descriptions (Continued)

MOS	CODE	Description	W1	Primary Taxon	W2	Secondary Taxon	W3	Tertiary Taxon
71L	XHA4	Put On Field or Pressure Dressing	100.00	CP-Dis				
	XHD1	Put On, Wear, Remove M17 Protective Mask With Hood	100.00	CP-Dis				
	AHJ5	Type Straight Copy Material	60.00	CP-Dis(Typ)+	30.00	VI-Nr(Ver)	10.00	CP-Dis
	AHJ4	Type a Joint Message Form (DD Form 173/1)	50.00	CP-Dis+	30.00	CP-Dis(Typ)	20.00	VI-Nr(Ver)
	AHJ7	Type a Basic Comment to a Disposition Form	50.00	CP-Dis+	30.00	CP-Dis(Typ)	20.00	VI-Nr(Ver)
	AHJ6	Type a Memorandum	50.00	CP-Dis+	30.00	CP-Dis(Typ)	20.00	VI-Nr(Ver)
	AHJ9	Type a Military Letter	50.00	CP-Dis+	30.00	CP-Dis(Typ)	20.00	VI-Nr(Ver)
	AHJ3	Type a Second or Subsequent Comment to a Disposition Form	50.00	CP-Dis+	30.00	CP-Dis(Typ)	20.00	VI-Nr(Ver)
	AHJ2	Type Military Orders	50.00	CP-Dis+	30.00	CP-Dis(Typ)	20.00	VI-Nr(Ver)
	XHB4	Perform Operator Maintenance On an M16A1 Rifle Magazine, and Ammunition	90.00	CP-Dis+	10.00	VI-Nr(Non)		
	AHK2	Receipt/Transfer Classified Material	50.00	CP-Dis+	40.00	VI-Nr(Ver)	10.00	IP-Ver
	XHC2	Determine Grid Coordinates of a Point on a Military Map Using the Military Grid Reference System	80.00	IP-Num+	20.00	VI-Nr(Ver)		
	AHH1	File Documents/Correspondence	70.00	IP-Ver+	30.00	VI-Nr(Ver)		
	AHH3	Prepare a Requisition for Publications/BlankForms using AUTODIN (DA Form 4569)	60.00	IP-Ver+	30.00	VI-Nr(Ver)	10.00	CP-Dis(Typ)

Table 4.2-10D. Project A Tasks, Taxons, Weights, and Descriptions (Continued)

MOS	CODE	Description	W1	Primary Taxon	W2	Secondary Taxon	W3	Tertiary Taxon
91A	XHA4	Put On a Field or Pressure Dressing	100.00	CP-Dis				
	IHA6	Open the Airway	100.00	CP-Dis				
	IHI1	Initiate an Intravenous Infusion	100.00	CP-Dis				
	IHI3	Measure and Record a Patient's Pulse	100.00	CP-Dis				
	IHI9	Maintain a Sterile Field & Change a Sterile Dressing	100.00	CP-Dis				
	IHI4	Measure and Record a Patient's Respiration	90.00	CP-Dis+	10.00	IP-Num		
	IHI5	Measure and Record a Patient's Bloodpressure	90.00	CP-Dis+	10.00	IP-Num		
	XHA2	Perform Cardiopulmonary Resuscitation (CPR) on an Adult Using the One-Man Method	60.00	CP-Dis+	40.00	PS-Dia		
	IHIA	Assemble Needle and Syringe (Vial)	90.00	CP-Dis+	10.00	VI-Nr(Non)		
	IHI8	Administer an Injection (Ampule)	90.00	CP-Dis+	10.00	VI-Nr(Non)		
	IHI7	Change Sterile Dressing	90.00	CP-Dis+	10.00	VI-Nr(Non)		
	IHI6	Assemble Needle and Syringe (Ampule)	90.00	CP-Dis+	10.00	VI-Nr(Non)		
	IHIB	Administer an Injection (Vial)	90.00	CP-Dis+	10.00	VI-Nr(Non)		
	IHAB	Splint a Suspected Fracture	90.00	CP-Dis+	10.00	VI-Nr(Non)		
	IHI7	Change Sterile Dressing	90.00	CP-Dis+	10.00	VI-Nr(Non)		
	IHJ1	Decontaminate Mercury Thermometers	90.00	CP-Dis+	10.00	VI-Nr(Non)		
	XHC2	Determine Grid Coordinates of a Point on a Military Map Using the Military Grid Reference System	80.00	IP-Num+	20.00	VI-Nr(Ver)		
	IHA9	Initiate a Field Medical Card	70.00	VI-Nr(Ver)+	30.00	IP-Ver		

Table 4.2-10D. Project A Tasks, Taxons, Weights, and Descriptions (Continued)

MOS	CODE	Description	W1	Primary Taxon	W2	Secondary Taxon	W3	Tertiary Taxon
95B	BHM1	Operate a Dismount Point	100.00	CM-F				
	BHE1	Prepare/Operate FM Radio Sets	100.00	CM-NF				
	XHB2	Operate and Maintain a .38 Caliber Revolver	100.00	CP-Dis				
	XHA4	Put On Field or Pressure Dressing	100.00	CP-Dis				
	XHB3	Load, Reduce a Stoppage, and Clear an M16A1 Rifle	100.00	CP-Dis				
	XHD1	Put On, Wear, Remove M17 Protective Mask With Hood	100.00	CP-Dis				
	XHB5	Load, Reduce a Stoppage and Clear M60 Machinegun	100.00	CP-Dis				
	XHB1	Operate and Maintain a .45 Caliber Pistol	100.00	CP-Dis				
	XHA2	Perform Cardiopulmonary Resuscitation (CPR) on an Adult Using the One-Man Method	60.00	CP-Dis+	40.00	PS-Dia		
	BHL6	Use Hand and Arm Signals to Direct Traffic	80.00	CP-Dis+	20.00	VI-Fr		
	BHH1	Perform Operator/Crew Preventive Maintenance Checks and Services	70.00	CP-Dis+	30.00	VI-Nr(Non)		IP-Ver
	XHC6	Call For/Adjust Indirect Fire	60.00	IP-Num+	40.00	CM-NF		
	BHG8	Estimate Range	70.00	IP-Num+	30.00	VI-Fr		
	XHC1	Determine a Magnetic Azimuth Using a Compass	80.00	IP-Num+	20.00	VI-Fr		
	XHC7	Navigate From One Point On the Ground To Another Point	60.00	IP-Num+	40.00	VI-Nr(Ver)		
	XHC2	Determine Grid Coordinates of a Point on a Military Map Using the Military Grid Reference System	80.00	IP-Num+	20.00	VI-Nr(Ver)		
	BHL3	Prepare Military Police Reports and Forms	70.00	IP-Ver+	30.00	VI-Nr(Ver)		
Average:			84.29		23.50		15.24	

Table 4.2-11. Task Characteristic MAP

FILE ID: Task Characteristic MAP

DESCRIPTION: This file lists the personnel characteristics associated with each task type. It also lists the types of performance measures typically associated with each task type.

RECORD	FILE	DESCRIPTION	LENGTH	DATA TYPE
1	1	File ID	10	Alpha
		Task Type Code	2	Alpha
2	1	Title	60	Alpha
	2	Characteristic 1 Code	2	Alpha
	3	Characteristic 2 Code	2	Alpha
	4	Characteristic 3 Code	2	Alpha
	5	Characteristic 4 Code	2	Alpha
	6	Characteristic 5 Code	2	Alpha
	7	Included in Predictions	1	Alpha

NO. OF TABLES = 24 (NO. OF TASK TYPES)

NO. OF RECORDS = 1

LENGTH = VARIABLE

Table 4.2-12. Data for Task Characteristic MAP

PERFORMANCE MEASURE TYPES

CATEGORY*	PERSONNEL CHARACTERISTICS	PRIMARY MEASURES	TYPE	SECONDARY MEASURES	TYPE
Far Visual	18, 19, 28, 22, 23	% Correct Identifications Time to Identify	A T	False ID Rate	A
Near Visual-Non-Verbal	18, 19, 28, 22, 23, 14	% Correct Identifications Time to Identify	A T	False ID Rate	A
Near Visual-Verbal	16, 22, 23, 28	% Items Correctly Read	A	• Time to Read Material • % Items Incorrectly Read	T A
Auditory Sound Perception	NOT INCLUDED - SELDOM USED				
Information Pro. Numerical	20, 13	• Deviation from Correct Value	A	Time to Perform % Items Correct	T A
Information Pro. Verbal Symbolic	16	% Items Correct % Steps Correct	A A	Time to Perform	T
Problem Solving-Troubleshooting	15, 16, 13	% Problems Correctly Identified Time to Peform	A T	% Correct Steps	A
Problem Solving Planning	16, 15, 13	% Steps Correct	A	Time to Perform	T
Problem Solving Selecting	14, 22, 23, 16	% Solutions Correctly Chosen % Steps Correct	A A	Time to Select Cost/Benefit of Choice	T A
Psychomotor Discrete	15, 18, 19, 21	% Step/Actions Correct Time to Perform	A T	Rate of Performance	T
Phychomotor Aiming-Shooting	21, 15, 22, 23, 14	• % Hits • Rate of Fire	A T	Time to Fire Time to First Hit	T T
Psychomotor Driving	21, 15, 22, 23, 14	• RM's From Ideal Path • Speed	A T	% Steps Correct Accident Rate	A A
Psychomotor Piloting	21, 15, 22, 23, 14	• RM's From Ideal Path • Speed	A T	Accident Rate	A
Psychomotor Aligning	21, 15, 22, 23, 14	• Deviation From Correct Value • Time to Perform	A T		
Psychomotor Throwing	NOT INCLUDED - UNRELATED TO SYSTEM DESIGN				
Gross Motor (HU) Carrying	31, 40	Rate	T	% Steps Correct	A
Gross Motor Lifting	40	Rate	T	% Steps Correct	A
Gross Motor Torquing	31, 40	Rate	T	% Steps Correct	A
Gross Motor Light	NOT INCLUDED				
Communication Face to Face	27, 22, 23, 16	% Items Correctly Received % Items Correctly Transmitted	A A	Transmission Rate	A
Communication Not Face to Face	27, 22, 23, 16	% Items Correctly Received % Items Correctly Transmitted	A A	Transmission Rate	A
Psychomotor Discrete Typing	22, 23, 21, 16	% Words Correct Words Per Minute	A T		

PERSONNEL CHARACTERISTICS LEGEND

13 - ASVAB Quantitative
14 - ASVAB Speed
15 - ASVAB Technical
16 - ASVAB Verbal
18 - Complex Perceptual Accuracy
19 - Complex Perceptual Speed
20 - Numerical Speed & Accuracy
21 - Psychomotor
22 - Simple Reaction Accuracy
23 - Simple Reaction Speed
27 - PULHES Hearing
28 - PULHES Eyes
29 - PULHES Experimental Wt. Left (?)
30 - MEPSCAT
31 - SEX
32 - Height
33 - Blood Pressure Diastolic
40 - Weight

NOTE:
For Tasks falling into "not included", we will assume 100% accuracy. Task time estimates for Product 5 for these tasks will not be modified.

Table 4.2-13. Static Design Measures Population Library

FILE ID: Static Design Measures

DESCRIPTION: This file lists the distribution of key reach and strength measures for 3 Populations-Army Men, Army Aviators, and Army Women..

FILE	RECORD	DESCRIPTION	LENGTH	TYPE
1	1	File ID	10	Alpha
		Population	1	Alpha
2		1st Percentile	6	Num
		2nd Percentile	6	Num
		5th Percentile	6	Num
		10th Percentile	6	Num
		25th Percentile	6	Num
		50th Percentile	6	Num
		75th Percentile	6	Num
		90th Percentile	6	Num
		95th Percentile	6	Num
		98th Percentile	6	Num
		99th Percentile	6	Num

ESTIMATED NO. OF TABLES: = 3 (3 POPULATIONS)

ESTIMATED NO. OF RECORDS: = 88 (NO. OF REACH AND STRENGTH MEASURES)

LENGTH: = FIXED

Table 4.2-14. Data for Static Design Measures Populations

Attached are reach measures for U.S. Army Men, U.S. Army Aviator, and U.S. Army Women. Strength measures for these populations will be obtained in phase 3.

Table 4.2-14. Data for Static Design Populations US Army Women (1977): Sitting, Depth, and Breadth Measurements

No.	Measurements	Percentiles in Centimeters											
		1st	2nd	5th	10th	25th	Median 50th	75th	90th	95th	98th	99th	Range (1st-99th)
	SITTING MEASUREMENTS												
21	Sitting Height	76.3	77.4	79.0	80.4	82.7	85.2	87.6	89.7	90.8	92.0	92.7	16.4
22	Eye Height, Sitting	65.3	66.2	67.7	69.1	71.4	73.8	76.0	77.9	79.1	80.6	81.6	16.3
23	Shoulder-Elbow Length	29.8	30.2	30.8	31.4	32.3	33.5	34.7	35.9	36.6	37.2	37.6	7.8
24	Elbow-Grip Length			29.6	30.1	31.0	32.1	33.4	34.6	35.4			
25	Elbow-Fingertip Length	38.7	39.2	40.0	40.7	41.9	43.4	45.0	46.6	47.5	48.5	49.2	10.5
26	Elbow Rest Height			16.1	17.1	18.9	20.8	22.6	24.1	25.0			
27	Thigh Clearance Height			13.2	13.7	14.6	15.4	16.2	17.0	17.5			
28	Knee Height, Sitting	45.5	46.0	46.9	47.7	49.2	50.9	42.7	54.4	55.5	56.6	57.3	11.8
29	Popliteal Height	36.4	37.0	38.0	38.8	40.1	41.6	43.2	44.8	45.7	46.7	47.3	10.9
30	Buttock-Knee Length	51.1	51.9	53.1	54.0	55.7	57.7	59.9	62.0	63.2	64.5	65.3	14.2
	DEPTH AND BREADTH MEASUREMENTS												
31	Bust Depth	18.6	19.0	19.6	20.2	21.4	22.7	24.3	25.8	26.8	28.1	29.1	10.5
32	Waist Depth	14.4	14.8	15.3	15.9	16.8	18.0	19.4	21.0	22.2	23.9	25.1	10.7
33	Abdom. Ext. Depth, Sitting			18.4	19.0	20.1	21.5	23.2	25.3	26.9			
34	Chest Breadth	24.5	24.8	25.4	26.0	27.0	28.2	29.4	30.6	31.4	32.4	33.2	8.7
35	Waist Breadth	21.2	21.5	22.1	22.7	23.9	25.3	26.9	28.7	30.0	31.7	33.1	11.9
36	Bispinous Breadth			20.1	20.8	21.8	23.0	24.6	26.3	27.4			
37	Hip Breadth, Standing	30.1	30.7	31.5	32.3	33.7	35.2	36.9	38.5	39.5	40.9	41.9	11.8
38	Biacromial Breadth			33.0	33.6	34.6	35.7	36.8	37.8	38.3			
39	Shoulder (Bideltoid) Breadth	37.3	37.7	38.4	39.2	40.5	42.0	43.5	44.8	45.7	46.7	47.5	10.2
40	Abdom. Ext. Breadth, Sitting			25.6	26.4	27.8	29.7	31.8	34.0	35.4			
41	Thigh-to-Thigh Breadth, Sitting			33.0	34.0	36.0	38.2	40.4	42.5	43.9			

Table 4.2-14. Data for Static Design Populations(Continued)

US Army Women (1977): Standing Measurements

No.	Measurements	Percentiles in Centimeters											
		1st	2nd	5th	10th	25th	Median 50th	75th	90th	95th	98th	99th	[illegible] (cm)
1	Weight (kilograms)	42.7	44.0	46.6	49.3	54.1	59.6	65.1	70.7	74.5	79.7	83.8	41.1
	STANDING MEASUREMENTS												
2	Stature	148.2	150.0	152.6	154.8	158.4	162.8	167.3	171.6	174.1	176.8	178.4	30.2
3	Cervicale Height			130.0	132.3	136.4	140.5	144.0	147.3	149.8			
4	Shoulder (Acromiale) Height	120.4	121.8	123.9	125.8	129.3	133.3	137.6	141.5	143.7	146.0	147.5	27.1
5	Axilla Height	110.8	112.2	114.3	116.2	119.6	123.1	127.1	130.7	132.8	134.9	136.2	25.4
6	Suprasternale Height			123.4	125.3	129.8	132.6	136.3	139.7	142.0			
7	Bustpoint Height	106.0	107.3	109.3	111.1	114.4	118.2	122.1	125.7	127.8	130.1	131.5	25.5
8	Substernale Height			105.8	107.5	110.6	113.9	117.2	120.2	122.2			
9	Elbow (Radiale) Height			94.9	96.4	99.1	102.4	105.8	108.9	110.7			
10	Knuckle Height			64.6	66.0	68.3	70.9	73.7	76.1	77.5			
11	Wrist Height	89.7	91.1	93.2	95.0	97.8	101.2	104.8	108.2	110.3	112.7	114.2	24.5
12	Crotch Height	66.8	67.9	69.5	70.9	73.3	76.1	79.3	82.2	83.9	85.7	86.8	20.0
13	Hip (Trochanteric) Height			78.7	80.1	82.7	85.8	88.9	91.5	93.2			
14	Buttock Height	74.0	74.8	76.4	77.9	80.5	83.6	86.8	89.8	91.8	94.1	95.9	21.9
15	Gluteal Furrow Height			67.9	69.2	71.4	73.9	76.6	79.3	81.0			
16	Kneecap Height	42.1	42.8	43.8	44.6	46.0	47.8	49.7	51.5	52.5	53.6	54.2	12.1
17	Tibiale Height			40.0	40.9	42.4	44.0	45.6	47.2	48.2			
18	Calf Height	27.8	28.2	29.0	29.7	30.9	32.4	34.1	35.6	36.6	37.6	38.3	10.5
19	Acromion-Radiale Length			28.1	28.7	29.8	30.9	31.9	32.8	33.4			
20	Radiale-Stylion Length			22.1	22.6	23.3	24.2	25.3	26.4	27.0			

Table 4.2-14. Data for Static Design Populations(Continued)

US Army Aviators (1970): Standing and Sitting Measurements

No.	Measurements	Percentiles in Centimeters											Range (1st-99th)
		1st	2nd	5th	10th	25th	50th	75th	90th	95th	98th	99th	
1	Age (years)	19.6	19.9	20.7	21.1	22.1	24.5	28.7	33.9	37.5	41.7	44.3	24.7
2	Weight (kilograms)	55.5	57.2	60.4	63.7	69.9	77.4	84.9	91.8	96.0	101.0	104.4	48.9
	STANDING MEASUREMENTS												
3	Stature	160.5	161.8	164.2	166.4	170.3	174.6	178.8	182.6	185.0	188.0	190.2	29.7
4	Cervicale Height	136.4	137.6	139.8	141.9	145.6	149.7	153.7	157.2	159.5	162.3	164.3	27.9
5	Shoulder Height	129.9	131.2	133.3	135.4	139.0	143.1	147.1	150.6	152.8	155.3	157.0	27.1
6	Waist Height	94.8	95.8	97.6	99.4	102.6	106.1	109.4	112.4	114.3	116.5	118.2	23.4
7	Crotch Height	72.6	73.3	74.7	76.2	78.8	81.9	85.0	87.7	89.4	91.4	92.8	20.2
8	Kneecap Height	45.3	45.9	46.8	47.8	49.3	51.2	53.0	54.7	55.7	56.9	57.7	12.4
9	Calf Height	29.7	30.1	30.9	31.6	33.0	34.4	35.8	37.1	38.0	39.3	40.3	10.6
10	Functional Reach	70.9	71.8	73.1	74.3	76.4	79.1	82.0	84.9	86.8	89.0	90.5	19.6
	SITTING MEASUREMENTS	Percentiles in Centimeters											
11	Vert. Arm Reach, Sitting	130.2	131.7	134.0	136.0	139.5	143.4	147.4	151.1	153.2	155.7	157.3	27.1
12	Sitting Height	83.3	84.3	85.7	86.8	88.8	90.9	93.1	95.1	96.3	97.7	98.6	15.3
13	Eye Height, Sitting	71.3	72.2	73.6	74.8	76.7	78.8	80.9	82.8	84.0	85.5	86.5	15.2
14	Mid-Shoulder Height	56.3	57.2	58.3	59.4	61.0	62.9	64.8	66.5	67.5	68.6	69.3	13.0
	Shoulder Height (derived)	52.3	53.3	54.6	55.6	57.4	59.4	61.4	63.2	64.3	65.3	65.9	13.6
15	Trunk Height, Sitting	52.4	53.1	54.1	55.0	56.6	58.4	60.2	61.8	62.8	64.0	64.8	12.4
16	Shoulder-Elbow Length	32.7	33.1	33.8	34.4	35.5	36.7	37.9	39.0	39.7	40.5	41.1	8.4
17	Elbow-Fingertip Length	43.4	43.9	44.7	45.4	46.7	48.1	49.5	50.8	51.6	52.7	53.5	10.1
18	Elbow Rest Height	16.5	17.4	18.7	19.8	21.4	23.1	24.8	26.4	27.4	28.6	29.4	12.9
19	Thigh Clearance Height	11.6	11.9	12.4	12.9	13.8	14.7	15.6	16.5	17.0	17.7	18.2	6.6
20	Knee Height, Sitting	47.2	47.9	48.9	49.8	51.3	52.9	54.6	56.3	57.4	58.7	59.7	12.5
21	Popliteal Height	36.8	37.4	38.4	39.2	40.6	42.3	44.0	45.6	46.6	47.8	48.6	11.8
22	Buttock Knee Length	54.3	54.9	55.9	56.8	58.4	60.2	61.9	63.6	64.6	65.8	66.6	12.3
23	Buttock-Popliteal Length	43.7	44.1	44.9	45.7	47.2	49.1	50.9	52.5	53.4	54.4	55.0	11.3
24	Buttock-Heel Length	101.1	102.1	103.9	105.7	108.8	112.2	115.5	118.5	120.4	122.8	124.6	23.5

Table 4.2-14. Data for Static Design Populations (Continued)

US Army Men (1966): Standing and Sitting Measurements

No.	Measurements	Percentiles in Centimeters											Range (1st-99th)
		1st	2nd	5th	10th	25th	50th	75th	90th	95th	98th	99th	
1	Weight (kilograms)	52.6	54.5	57.4	60.0	64.8	71.0	78.4	86.3	91.6	98.3	103.0	50.4
	STANDING MEASUREMENTS												
2	Stature	158.9	160.9	163.8	166.2	170.1	174.4	178.9	183.0	185.6	188.4	190.3	31.4
3	Cervicale Height	134.4	136.5	139.3	141.6	145.3	149.5	153.8	157.8	160.2	162.6	164.1	29.7
4	Shoulder Height	129.3	131.1	133.6	135.8	139.5	143.6	147.8	151.8	154.1	156.8	158.6	29.3
5	Waist Height	93.6	95.1	97.5	99.5	102.8	106.4	109.9	113.1	115.2	117.5	119.2	25.6
6	Crotch Height	72.8	74.2	76.3	78.0	80.8	83.9	87.0	89.9	91.7	93.7	95.1	22.3
7	Kneecap Height	45.5	46.4	47.6	48.7	50.6	52.8	55.0	57.1	58.4	59.8	60.7	15.2
8	Calf Height	29.3	30.0	31.1	32.0	33.6	35.4	37.2	38.9	40.0	41.2	41.9	12.6
9	Functional Reach	71.9	73.1	74.9	76.5	79.3	82.4	85.8	89.0	90.9	93.1	94.6	22.7
	SITTING MEASUREMENTS	Percentiles in Centimeters											
10	Vert. Arm Reach, Sitting	124.7	126.3	128.7	130.9	134.4	138.2	142.0	145.5	147.8	150.6	152.6	27.9
11	Sitting Height	82.0	83.0	84.5	85.9	88.2	90.8	93.2	95.4	96.7	98.2	99.2	17.2
12	Eye Height, Sitting	70.1	71.2	72.8	74.1	76.4	78.8	81.2	83.3	84.6	86.1	87.0	16.9
13	Mid Shoulder Height	54.5	55.6	57.1	58.4	60.3	62.4	64.5	66.5	67.6	68.9	69.7	15.2
15	Shoulder Elbow Length	32.6	33.1	33.8	34.5	35.6	36.8	38.1	39.3	40.0	40.8	41.3	8.7
16	Elbow Fingertip Length	42.7	43.4	44.3	45.1	46.4	47.9	49.4	51.0	51.9	53.0	53.8	11.1
19	Knee Height, Sitting	47.7	48.5	49.7	50.7	52.2	54.0	55.9	57.6	58.7	59.9	60.6	12.9
20	Popliteal Height	38.8	39.6	40.6	41.5	42.9	44.5	46.3	47.9	48.8	49.8	50.4	11.6
21	Buttock Knee Length	52.9	53.7	54.9	55.9	57.5	59.4	61.3	63.2	64.3	65.6	66.5	13.6
22	Buttock Popliteal Length	44.0	44.7	45.8	46.6	48.1	49.8	51.5	53.1	54.0	55.1	55.8	11.8

Table 4.2-15. Baseline Task Parameter Library

FILE ID: Baseline Task Parameter Library

DESCRIPTION: This file lists task parameter data for the baseline tasks associated with a particular system type within a mission area.

RECORD	File	DESCRIPTION	LENGTH	DATA TYPE
1	1	File ID	10	Alpha
	2	Task Code	4	Alpha
	3	Task Level (Task/Element)	1	Alpha
	4	Basic Descriptive Data		
	5	Task Title	80	Alpha
	6	Parent Function/Task	4	Alpha
	7	System	2	Alpha
	8	Duty Position	2	Alpha
	9	MOS/Skill Level	4	Alpha
	10	Task Type 1	2	Alpha
	11	Weight-Task Type 1	2	Num
	12	Task Type 2	2	Alpha
	13	Weight-Task Type 2	2	Num
	14	Task Type 3	2	Alpha
	15	Weight Task Type 3	2	Num
	16	Sustainment Training Recency	1	Alpha
	17	Sustainment Training Frequency	1	Alpha
	18	Personnel Char. 1-Code	2	Alpha
	19	Personnel Char. 1-Value	6	Num
	20	Personnel Char. 2-Code	2	Alpha
	21	Personnel Char. 2-Value	6	Num
	22	Personnel Char. 3-Code	2	Alpha
	23	Personnel Char. 3-Value	6	Num
2		Performance Data		
	1	Type of Time Measure	1	Alpha
	2	Time Measure Units	1	Alpha
	3	Time to Perform Value	6	Num
	4	Time to Perform Standard	6	Num
	5	Standard Deviation		
	6	Type of Accuracy Measure	1	Alpha
	7	Accuracy Standard Measure	30	Alpha
	8	Accuracy Standard Value	6	Num
	9	Standard Deviation - Standard	6	Num
	10	Criteria Measure	30	Alpha
	11	Criteria Value	6	Num

Table 4.2-16. Baseline Task Parameter Library

We will initially load this library with the Project A tasks. Each task description will include data on task peformance (time and accuracy), personnel characteristics, and task performance recency and frequency. This library will be constructed at the beginning of Phase 3.

Table 4.2-17.

FILE ID: System Types by Mission Area

DESCRIPTION: Lists the system types associated with each mission area that have library data in the PCEA.

RECORD	FILE	DESCRIPTION	LENGTH	TYPE
1	1	File ID	10	Alpha
	2	Mission Area	1	Alpha
2		System Type	1	Alpha

ESTIMATED NO. OF TABLES: 6 (6 MISSION AREAS)

ESTIMATED NO. OF RECORDS: 1

LENGTH: FIXED

Table 4.2-18. Data for System Types By Mission Area

MISSION AREA	SYSTEM TYPE
CLOSE COMBAT LIGHT (INFANTRY)	Vehicles -infantry fight veh.√ -antitank vehicles√ Man-Portable Weapons -indirect fire (mortars)√ -direct fire√ -grenade launchers√ -rifles√ -auto. weapons√ -antitank√
CLOSE COMBAT HEAVY (ARMOR)	Tanks√ Cavalry Fighting vehicles√
FIRE SUPPORT (FIELD ART)	Missile Artillery -med. range missiles√ Tube Artillery√ -towed howitzers√ -self-pro. howitzers√ Rocket Systems√
AIR DEFENSE	Forward area A.D. Sys. -mobile gun systems√ -man-portable systems√
AVIATION	Attack Helicopters√ Cargo Helicopters√ Utility Helicopters√ Scout Helicopters√
COMBAT SERVICE SUPPORT	Transport Vehicles -light cargo trucks√ -heavy cargo trucks√

√ = System Type

Table 4.2-19. System Conditions-Stressor Linkages

FILE ID: Stressor-System Conditions Linkages

DESCRIPTION: This file describes the input data needed to assess each stressor condition.

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
1	1	File ID	10	Alplha
	2	Stressor	1	Alpha
2	1	Input Measure		
	2	Scale		
	3	Default Valve		
	4	Source		
	5	Level of Entry		
	6	Applicable Functional Task	4	
	7	Applicable Functional Task	2	
	8	Applicable Functional Task	3	
	9	Applicable Task Types	1	
	10	Applicable Task Type	2	
	11	Applicable Task Type	3	
	12	Applicable Derf. Measure	1	
	13	Applicable Derf. Measure	2	
	14	Applicable Derf. Measure	3	

ESTIMATED NO. OF TABLES: = 5 (NO. OF STRESSORS)

ESTIMATED NO. OF RECORDS: = 10 (MAXIMUM INPUT MEASURE FOR EACH STRESSOR)

LENGTH: = VARIABLE

Table 4.2-20. Data for Stressor-System Condition Linkages

STRESSOR	SYSTEM CONDITIONS	OTHER INPUT DATA	COMMENTS
Heat Humidity	• Temperature • Wind Velocity • % Relative Humidity • MOPP Level	Initial Task Time (From Product 5)	——
		Vehicle Temperature (User Input)	Minimum and Maximum Values Entered Once for Entire system
		Vehicle % Relative Humidity (User Input)	Minimum and Maximum Values Entered Once for Entire System
		Maximum Allowable System Task Performance Rate(User Input)	Entered for Tasks Which Have Rate Performance Measures Associated with Them
MOPP	• MOPP Level • Temperature • % Relative Humidity	Vehicle Temperature (User Input)	See Above
		Vehicle % Relative Humidity (User Input)	See Above
Cold	• Wind Velocity • Temperature • MOPP Level	Gloves On/Off (User Input)	Entered Once for Entire System
		Other Exposed Flesh (User Input)	Only Entered if MOPP Gear not Worn, Default Value (Face Exposed). Entered Once for Entire System
		Vehicle Temperature (User Input)	See Above
Noise		Constant Ambient Noise (in SPL) - Outside Vehicle (User Input)	Entered Once for Entire System Default Value Will be 55db
		Constant Ambient Noise (in SPL) - Inside Vehicle (User Input)	Entered Once for Entire System Default Value Will be 70db
		Constant Internal Noise Associated with Vehicle Operation (User Input)	Entered Once for Entire System
		Variable Internal Noise Associated with Vehicle Operation (User Input)	Only Entered if Vehicle Operational Noise Changes with Speed Up, Maneuvering etc. Entered Once for Entire System
		Time Duration of Variable Noise Associated with Vehicle Operation (User Input)	Entered Once for Entire System. Only Entered if Variable Internal Noise Present.
		Maximum Rate of Fire (User Input)	Entered for Each Firing Task
		Noise Level Associated with Each Firing (User Input)	Entered for Each Firing Task
		Average Speaker Listener Distance (User Input)	Only Entered for Communicating Face-To-Face Tasks
Continuous Operations		Number of Hours in Last Sleep Before Mission (User Input)	Only Entered Once for Entire System. Default Value = 6.
		Number of Days Without Sleep (User Input)	Only Entered Once for Entire System. Default Value = 0.
		Mission Length (From Product 5)	——

Table 4.2-21. Personnel Variables Description

FILE ID: Personnel Variables Description

DESCRIPTION: Provides a description of key features of each personnel characteristic.

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
1	1	File ID	10	Alpha
2	1	Short Title	10	Alpha
	2	Char. #	2	Num
	3	Characteristic Type	1	Alpha
	4	Distribution Type	1	Alpha
	5	Preselect (Yes/No)	3	Alpha
	6	Preselect Level	10	Alpha
	7	Minimum Value	6	Num
	8	Maximum Value	6	Num
	9	Cat 1 Title	10	Alpha
	10	Cat 1 Code	1	Num
	11	Cat 2 Title	10	Alpha
	12	Cat 2 Code	1	Num
	13	Cat 3 Title	10	Alpha
	14	Cat 3 Code	1	Num
	15	Cat 4 Title	10	Alpha
	16	Cat 4 Code	1	Num
	17	Cat 5 Title	10	Alpha
	18	Cat 5 Code	1	Num
	19	Cat 6 Title	10	Alpha
	20	Cat 6 Code	1	Num
	21	Data Source	1	Num
	22	Data Source Title	15	Alpha
	23	Data Source Length	3	Num
	24	Relative Position	3	Num
	25	Location	7	Num

ESTIMATED NO. OF TABLES: 1

ESTIMATED NO. OF RECORDS: 38 (NUMBER OF PERSONNEL CHARACTERISTICS)

LENGTH: VARIABLE

Table 4.2-22. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: ASVAB Clerical Administrative Aptitude Area Score

SHORT TITLE: CL COMP

VARIABLE #: 1

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL: Varies by MOS

MINIMUM VALUE: 40

MAXIMUM VALUE: 155

CATEGORIES	CODE
86-90	1
91-95	2
96-100	3
101-105	4
106+110	5
110+	6

DATA SOURCE DESCRIPTION

_X_ EMF _____ ORMF _____ PROJECT A

TITLE/ID: CLSCR

VARIABLE TYPE: Numeric

LENGTH: 3

RELATIVE POSITION: 186

LOCATION: 521-523

Table 4.2-22. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: ASVAB Combat Area Standard Score

SHORT TITLE: CO COMP

VARIABLE #: 2

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL: Varies by MOS

MINIMUM VALUE: 40

MAXIMUM VALUE: 155

CATEGORIES	CODE
85 or Below	1
86-90	2
91-95	3
96-100	4
101-105	5
106+	6

DATA SOURCE DESCRIPTION

__X__ EMF _____ ORMF PROJECT A

TITLE/ID: COSCR

VARIABLE TYPE: Numeric

LENGTH: 3

RELATIVE POSITION: 187

LOCATION: 524-526

Table 4.2-22. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: ASVAB Electronics Area Composite

SHORT TITLE: EL COMP

VARIABLE #: 3

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL: Varies by MOS

MINIMUM VALUE: 40

MAXIMUM VALUE: 155

CATEGORIES	CODE
85 or Less	1
86-90	2
91-95	3
96-100	4
101-105	5
106-110	6
111-115	7
115+	8

DATA SOURCE DESCRIPTION

__X__ EMF _____ ORMF PROJECT A

TITLE/ID: ELSCR

VARIABLE TYPE: Numeric

LENGTH: 3

RELATIVE POSITION: 188

LOCATION: 527-529

Table 4.2-22. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: ASVAB Field Artillery Aptitude Area Score

SHORT TITLE: FA COMP

VARIABLE #: 4

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL: Varies by MOS

MINIMUM VALUE: 40

MAXIMUM VALUE: 155

CATEGORIES	CODE
80 or Less	1
81-85	2
86-90	3
91-95	4
96-100	5

DATA SOURCE DESCRIPTION

__X__ EMF _____ ORMF PROJECT A

TITLE/ID: FASCR

VARIABLE TYPE: Numeric

LENGTH: 3

RELATIVE POSITION: 189

LOCATION: 530-532

Table 4.2-22. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: ASVAB Generic Maintenance Aptitude Area Score

SHORT TITLE: GM COMP

VARIABLE #: 5

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL: Varies by MOS

MINIMUM VALUE: 40

MAXIMUM VALUE: 155

CATEGORIES	CODE
80 or Less	1
81-85	2
86-90	3
91-95	4
96-100	5
100+	6

DATA SOURCE DESCRIPTION

_X_ EMF _____ ORMF PROJECT A

TITLE/ID: GMSCR

VARIABLE TYPE: Numeric

LENGTH: 3

RELATIVE POSITION: 190

LOCATION: 533-535

Table 4.2-22. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: ASVAB Motor Mechanical Aptitude Area Score

SHORT TITLE: MM COMP

VARIABLE #: 6

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL: Varies by MOS

MINIMUM VALUE: 40

MAXIMUM VALUE: 155

CATEGORIES	CODE
85 or Less	1
86-90	2
91-95	3
96-100	4
100+	5

DATA SOURCE DESCRIPTION

_X_ EMF _____ ORMF PROJECT A

TITLE/ID: MMSCR

VARIABLE TYPE: Numeric

LENGTH: 3

RELATIVE POSITION: 191

LOCATION: 536-538

Table 4.2-22. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: ASVAB Food Operations Aptitude Area Score

SHORT TITLE: FO COMP

VARIABLE #: 7

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL: Varies by MOS

MINIMUM VALUE: 40

MAXIMUM VALUE: 155

CATEGORIES	CODE
85 or Less	1
86-90	2
91-95	3
96-100	4
100+	5

DATA SOURCE DESCRIPTION

__X__ EMF _____ ORMF PROJECT A

TITLE/ID: OFSCR

VARIABLE TYPE: Numeric

LENGTH: 3

RELATIVE POSITION: 192

LOCATION: 539-541

Table 4.2-22. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: ASVAB Surveillance & Communications Apt. Area Score

SHORT TITLE: SC COMP

VARIABLE #: 8

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL: Varies by MOS

MINIMUM VALUE: 40

MAXIMUM VALUE: 155

CATEGORIES	CODE
85 or Less	1
86-90	2
91-95	3
96-100	4
100+	5

DATA SOURCE DESCRIPTION

__X__ EMF _____ ORMF PROJECT A

TITLE/ID: SCSCR

VARIABLE TYPE: Numeric

LENGTH: 3

RELATIVE POSITION: 193

LOCATION: 542-544

Table 4.2-22. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: ASVAB Skilled Technical Aptitude Area Score

SHORT TITLE: ST COMP

VARIABLE #: 9

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL: Varies by MOS

MINIMUM VALUE: 40

MAXIMUM VALUE: 155

CATEGORIES	CODE
80 or Less	1
81-85	2
86-90	3
91-95	4
96-100	5
101-105	6
106-110	7
110+	8

DATA SOURCE DESCRIPTION

_X_ EMF _____ ORMF PROJECT A

TITLE/ID: ST SCR

VARIABLE TYPE: Numeric

LENGTH: 3

RELATIVE POSITION: 194

LOCATION: 545-547

Table 4.2-22. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: ASVAB Generic Technical Composite

SHORT TITLE: GT COMP

VARIABLE #: 10

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL: Varies by MOS

MINIMUM VALUE: 40

MAXIMUM VALUE: 155

CATEGORIES	CODE
85 or Less	1
86-90	2
91-95	3
96-100	4
100+	5

DATA SOURCE DESCRIPTION

_X_ EMF _____ ORMF PROJECT A

TITLE/ID: GTSCR

VARIABLE TYPE: Numeric

LENGTH: 3

RELATIVE POSITION: 196

LOCATION: 551-553

Table 4.2-22. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: Armed Forces Qualification Test Percentage Score

SHORT TITLE: AFQT SCORE

VARIABLE #: 11

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): No

PRE-SELECT LEVEL: NA

MINIMUM VALUE: 10

MAXIMUM VALUE: 99

CATEGORIES	CODE
NA	

DATA SOURCE DESCRIPTION

__X__ EMF _____ ORMF PROJECT A

TITLE/ID: AFQSC

VARIABLE TYPE: Numeric

LENGTH: 3

RELATIVE POSITION: 31

LOCATION: 83 - 85

Table 4.2-22. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: AFQT Mental Category Group

SHORT TITLE: AFQT Group

VARIABLE #: 12

CHARACTERISTIC TYPE: Personnel Characteristic Transition Type

DISTRIBUTION TYPE: Categorical

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL: NA

MINIMUM VALUE: NA

MAXIMUM VALUE: NA

CATEGORIES	CODE
1	1
2	2
3A	3
3B	4
4A+5	5

DATA SOURCE DESCRIPTION

_X_ EMF _____ ORMF PROJECT A

TITLE/ID: AFQG

VARIABLE TYPE: Alpha

LENGTH: 1

RELATIVE POSITION: 30

LOCATION: 82

Table 4.2-22. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: ASVAB Quantitative

SHORT TITLE: ASVAB Quant.

VARIABLE #: 13

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): No

PRE-SELECT LEVEL: NA

MINIMUM VALUE: 50

MAXIMUM VALUE: 180

CATEGORIES	CODE
74 or Less	1
75-77	2
78-83	3
84-86	4
87+	5

DATA SOURCE DESCRIPTION

_____ EMF _____ ORMF PROJECT A __X__ DERIVED

TITLE/ID:

VARIABLE TYPE:

LENGTH:

RELATIVE POSITION:

LOCATION:

DESCRIPTION: This variable is a composite of ASVAB subtest standardized scores MK and AR where both scores are unit weighed.

Table 4.2-22. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: ASVAB - Speed

SHORT TITLE: ASVAB - Speed

VARIABLE #: 14

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): No

PRE-SELECT LEVEL: NA

PRIORITY FOR SETTING CUT-OFF's

MINIMUM VALUE: 50

MAXIMUM VALUE: 180

CATEGORIES	CODE
70 or Less	1
71-76	2
77-84	3
85-89	4
89+	5

DATA SOURCE DESCRIPTION

_____ EMF _____ ORMF PROJECT A __X__ DERIVED

TITLE/ID:

VARIABLE TYPE:

LENGTH:

RECORD/FILE:

RELATIVE POSITION:

LOCATION:

DESCRIPTION: This variable is a composite of ASVAB subtest standardized scores CS and ND where both scores are unit weighed.

Table 4.2-22. Data for Personnel Variables Description.

CHARACTERISTIC TITLE:

SHORT TITLE: ASVAB - Technical

VARIABLE #: 15

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): No

PRE-SELECT LEVEL: NA

MINIMUM VALUE: 50

MAXIMUM VALUE: 180

CATEGORIES	CODE
90 or Less	1
91-94	2
95-103	3
104-108	4
109-118	5

DATA SOURCE DESCRIPTION

_____ EMF _____ ORMF PROJECT A __X__ DERIVED

TITLE/ID:

VARIABLE TYPE:

LENGTH:

RELATIVE POSITION:

LOCATION:

DESCRIPTION: This variable is a composite of ASVAB test scores AS, ML. The equation for calculating is as follows: ASVAB = AS + MC + .5 EI

Table 4.2-22. Data for Personnel Variables Description.

CHARACTERISTIC TITLE:

SHORT TITLE: ASVAB - Verbal

VARIABLE #: 16

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): No

PRE-SELECT LEVEL: NA

PRIORITY FOR SETTING CUT-OFF's

MINIMUM VALUE: 50

MAXIMUM VALUE: 180

CATEGORIES	CODE
68 or Less	1
69-71	2
72-78	3
79-83	4
84-92	5

DATA SOURCE DESCRIPTION

_____ EMF _____ ORMF PROJECT A __X__ DERIVED

TITLE/ID:

VARIABLE TYPE:

LENGTH:

RECORD/FILE:

RELATIVE POSITION:

LOCATION:

DESCRIPTION: This variable is a composite of ASVAB subtest scores AS, VE, and GS where both subtest scores are unit weighted.

Table 4.2-22. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: Reading Grade Level

SHORT TITLE: Reading GR.

VARIABLE #: 17

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): No

PRE-SELECT LEVEL: NA

MINIMUM VALUE: 3.5

MAXIMUM VALUE: 12.7

CATEGORIES	CODE
6.6 or Less	1
6.7-6.9	2
7.-7.5	3
7.6-8.3	4
8.3+	5

DATA SOURCE DESCRIPTION

_____ EMF _____ ORMF _____ PROJECT A __X__ DERIVED

TITLE/ID:

VARIABLE TYPE:

LENGTH:

RELATIVE POSITION:

LOCATION:

DESCRIPTION: This variable is derived from a GT score (Position = 196, location 551-553) using an attached conversion table.

CONVERSION FROM GT SCORES TO READING GRADE LEVEL FOR ASVAB 6/7

Raw Score	GT Score Original Std Score1	GT Score Corrected Std Score2	Converted Grade Level	Raw Score	GT Score Original Std Score1	GT Score Corrected Std Score2	Converted Grade Level
0-5	53	53	3.5	31	106	98	9.0
6	59	53	3.5	32	107	100	9.4
7	59	53	3.5	33	108	102	9.5
8	59	53	3.5	34	109	104	9.8
9	59	53	3.5	35	110	106	10.3
10	59	53	3.5	36	112	108	10.4
11	62	55	3.7	37	113	109	10.5
12	65	60	4.5	38	115	111	10.8
13	69	61	4.6	39	117	112	11.0
14	72	64	5.2	40	118	113	11.1
15	74	65	5.4	41	120	115	11.4
16	76	67	5.6	42	123	116	11.5
17	80	69	5.7	43	125	117	11.6
18	82	71	6.0	44	127	119	11.7
19	84	73	6.3	45	128	121	11.9
20	85	75	6.6	46	130	123	12.1
21	88	77	6.8	47	133	124	12.2
22	90	78	6.9	48	138	126	12.3
23	92	80	7.2	49	141	131	12.6
24	94	82	7.4	50	147	135	12.7
25	96	85	7.7				
26	97	87	7.9				
27	99	89	8.0				
28	100	92	8.3				
29	103	94	8.6				
30	104	96	8.8				

1 Operational Scores of record from 1 Jan 76 thru 30 Sep 80
2 Official Conversion as of 1 Oct 80.

Composite (GT=WK+AR)

Table 4.2-22. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: Project a Complex Perceptual Accuracy

SHORT TITLE: Complex Perc. Acc.

VARIABLE #: 18

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): No

PRE-SELECT LEVEL: NA

MINIMUM VALUE: 60

MAXIMUM VALUE: 195

CATEGORIES	CODE
77 or Less	1
78-87	2
88-112	3
113-126	4
126+	5

DATA SOURCE DESCRIPTION

_____ EMF _____ ORMF __X__ PROJECT A

TITLE/ID: B3CC PAC

VARIABLE TYPE: Numeric

LENGTH: 3

RELATIVE POSITION:

LOCATION:

Table 4.2-22. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: "Project A" Complex Perceptual Speed

SHORT TITLE: Complex Perc SD

VARIABLE #: 19

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): No

PRE-SELECT LEVEL: NA

MINIMUM VALUE: -135.00

MAXIMUM VALUE: 0

CATEGORIES	CODE
-105 or Less	1
-106 to -113	2
-112 to -91	3
-90 to -82	4
-81+	5

DATA SOURCE DESCRIPTION

_____ EMF _____ ORMF __X__ PROJECT A

TITLE/ID: B3CCCPSP

VARIABLE TYPE: Numeric

LENGTH: 3

RECORD/FILE: NA

LOCATION:

Table 4.2-22. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: Project a Numerical Speed/Accuracy

SHORT TITLE: Num. Speed/Acc

VARIABLE #: 20

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): No

PRE-SELECT LEVEL: NA

MINIMUM VALUE: -305.00

MAXIMUM VALUE: -40.00

CATEGORIES	CODE
-170 or Less	1
-179 to -171	2
-146 to -178	3
-134 to -145	4
-134+	5

DATA SOURCE DESCRIPTION

_____ EMF _____ ORMF __X__ PROJECT A

TITLE/ID: B3CCNMSA

VARIABLE TYPE: Numeric

LENGTH: 3

RELATIVE POSITION:

LOCATION:

Table 4.2-22. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: Project A: Psychomotor

SHORT TITLE: Psychomotor

VARIABLE #: 21

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): No

PRE-SELECT LEVEL: NA

MINIMUM VALUE: -360.00

MAXIMUM VALUE: -95.00

CATEGORIES	CODE
-290 or Less	1
-298 to -289	2
-268 to -297	3
-250 to -267	4
-250+	5

DATA SOURCE DESCRIPTION

_____ EMF _____ ORMF __X__ PROJECT A

TITLE/ID: B3CCPSYM

VARIABLE TYPE: Numeric

LENGTH: 3

RELATIVE POSITION:

LOCATION:

Table 4.2-22. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: Project A: Simple Reaction Accuracy

SHORT TITLE: Simple Reaction Accuracy

VARIABLE #: 22

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): No

PRE-SELECT LEVEL: NA

MINIMUM VALUE: 20

MAXIMUM VALUE: 110

CATEGORIES	CODE
35 or Less	1
36-38	2
39-76	3
77-87	4
88-98	5

DATA SOURCE DESCRIPTION

_____ EMF _____ ORMF __X__ PROJECT A

TITLE/ID: B3CCSRAC

VARIABLE TYPE: Numeric

LENGTH: 3

RELATIVE POSITION:

LOCATION:

Table 4.2-22. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: Project A: Simple Reaction Speed

SHORT TITLE: Simp React SPD

VARIABLE #: 23

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): No

PRE-SELECT LEVEL: NA

MINIMUM VALUE: -210.00

MAXIMUM VALUE: 20.00

CATEGORIES	CODE
-65 or Less	1
-58 to -64	2
-22 to -57	3
-13 to -21	4
-13+	5

DATA SOURCE DESCRIPTION

_____ EMF _____ ORMF __X__ PROJECT A

TITLE/ID: B3CCSRSP

VARIABLE TYPE: Numeric

LENGTH: 3

RELATIVE POSITION:

LOCATION:

Table 4.2-22. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: PULHES - Physical Stamina

SHORT TITLE: P - STAMINA

VARIABLE #: 24

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Categorical

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL: Varies by MOS

MINIMUM VALUE: NA

MAXIMUM VALUE: NA

CATEGORIES	CODE
1 - No Limitations	1
2 - No Significant Limitations	2
3 - Has Significant Limitations	3
4 - Below Prescribed Criteria for Retention	4

DATA SOURCE DESCRIPTION

_X_ EMF _____ ORMF _____ PROJECT A

TITLE/ID: PHYCA (1st Character)

VARIABLE TYPE: Numeric

LENGTH: 1

RELATIVE POSITION: 5

LOCATION: 72

Table 4.2-22. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: PULHES - Upper Extremities

SHORT TITLE: P - UPPER

VARIABLE #: 25

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Categorical

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL: Varies by MOS

MINIMUM VALUE: NA

MAXIMUM VALUE: NA

CATEGORIES	CODE
1- No Limitations	1
2- No Significant Limitations	2
3- Has Significant Limitations	3
4- Below Prescribed Criteria for Retention	4

DATA SOURCE DESCRIPTION

_X_ EMF _____ ORMF _____ PROJECT A

TITLE/ID: PHYCA (3rd Character)

VARIABLE TYPE: Numeric

LENGTH: 1

RELATIVE POSITION: 5

LOCATION: 74

Table 4.2-22. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: PULHES - Lower Extremities

SHORT TITLE: P - LOWER

VARIABLE #: 26

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Categorical

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL: Varies by MOS

MINIMUM VALUE: NA

MAXIMUM VALUE: NA

CATEGORIES	CODE
1- No Limitations	1
2- No Significant Limitations	2
3- Has Significant Limitations	3
4- Below Prescribed Criteria for Retention	4

DATA SOURCE DESCRIPTION

__X__ EMF _____ ORMF _____ PROJECT A

TITLE/ID: PHYCA (2nd Character)

VARIABLE TYPE: Numeric

LENGTH: 1

RELATIVE POSITION: 5

LOCATION: 73

Table 4.2-22. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: PULHES - Eyes

SHORT TITLE: P - Eyes

VARIABLE #: 27

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Categorical

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL: Varies by MOS

MINIMUM VALUE: NA

MAXIMUM VALUE: NA

CATEGORIES	CODE
1- No Limitations	1
2- No Significant Limitations	2
3- Has Significant Limitations	3
4- Below Prescribed Criteria for Retention	4

DATA SOURCE DESCRIPTION

_X_ EMF _____ ORMF _____ PROJECT A

TITLE/ID: PHYCA (5th Character)

VARIABLE TYPE: Numeric

LENGTH: 1

RELATIVE POSITION: 5

LOCATION: 76

Table 4.2-22. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: PULHES - Hearing

SHORT TITLE: P - Hearing

VARIABLE #: 28

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Categorical

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL: Varies by MOS

MINIMUM VALUE: NA

MAXIMUM VALUE: NA

CATEGORIES	CODE
1- No Limitations	1
2- No Significant Limitations	2
3- Has Significant Limitations	3
4- Below Prescribed Criteria for Retention	4

DATA SOURCE DESCRIPTION

_X_ EMF _____ ORMF _____ PROJECT A

TITLE/ID: PHYCA (4th Character)

VARIABLE TYPE: Numeric

LENGTH: 1

RELATIVE POSITION: 5

LOCATION: 75

Table 4.2-22. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: PULHES -Experiment Weight Liftt

SHORT TITLE: P- Wt. Lift

VARIABLE #: 29

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Categorical

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL: Varies by MOS

MINIMUM VALUE: NA

MAXIMUM VALUE: NA

CATEGORIES	CODE
?	?

DATA SOURCE DESCRIPTION

_X_ EMF _____ ORMF _____ PROJECT A

TITLE/ID: PHYCA (6th Character)

VARIABLE TYPE: Numeric

LENGTH: 1

RELATIVE POSITION: 5

LOCATION: 77

Table 4.2-22. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: Military Entrance Physical Stamina Category

SHORT TITLE: MEPSCAT

VARIABLE #: 30

CHARACTERISTIC TYPE: Personnel Characteristic

DISTRIBUTION TYPE: Categorical

PRE-SELECTION LEVEL (Yes/No): no

PRE-SELECT LEVEL: NA

MINIMUM VALUE: NA

MAXIMUM VALUE: NA

CATEGORIES	CODE
?	?

DATA SOURCE DESCRIPTION

_X_ EMF _____ ORMF _____ PROJECT A

TITLE/ID: XPACT

VARIABLE TYPE: Alpha

LENGTH: 1

RELATIVE POSITION: 26

LOCATION: 78

Table 4.2-22. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: SEX

SHORT TITLE: SEX

VARIABLE #: 31

CHARACTERISTIC TYPE: Personnel Char. Transition Predictor

DISTRIBUTION TYPE: Categorial

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL: Varies by MOS

PRIORITY FOR SETTING CUT-OFF's

MINIMUM VALUE: NA

MAXIMUM VALUE: NA

CATEGORIES	CODE
Male	1 (M)
Female	2 (F)

DATA SOURCE DESCRIPTION

_X_ EMF _____ ORMF _____ PROJECT A

TITLE/ID: Sex

VARIABLE TYPE: Alpha

LENGTH: 1

RECORD/FIELD: NA

RELATIVE POSITION: 7

LOCATION: 42

Table 4.2-22. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: Height

SHORT TITLE: HEIGHT

VARIABLE #: 32

CHARACTERISTIC TYPE: Personnel Characteristics

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL:

PRIORITY FOR SETTING CUT-OFF's

MINIMUM VALUE: 54

MAXIMUM VALUE: 80

CATEGORIES	CODE
56	1
60	2
64	3

DATA SOURCE DESCRIPTION

_____ EMF __X__ ORMF _____ PROJECT A

TITLE/ID:

VARIABLE TYPE: Numeric

LENGTH:

RECORD/FILE:

RELATIVE POSITION: 276-277

LOCATION:

DESCRIPTION: Describes Height in Inches

Table 4.2-22. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: Blood Pressure - Diastolic

SHORT TITLE: DIA BLOOD PR

VARIABLE #: 33

CHARACTERISTIC TYPE: Personnel Characteristics

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL: NA

PRIORITY FOR SETTING CUT-OFF's

MINIMUM VALUE: 40

MAXIMUM VALUE: 110

CATEGORIES	CODE
45 or Below	1
46-60	2
61-75	3
76-90	4
90+	5

DATA SOURCE DESCRIPTION

_____ EMF __X__ ORMF _____ PROJECT A

TITLE/ID:

VARIABLE TYPE:

LENGTH:

RECORD/FILE:

RELATIVE POSITION: 284-286

LOCATION:

Table 4.2-22. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: Auditory Perception Standard Score

SHORT TITLE: AUDIO PERC

VARIABLE #: 34

CHARACTERISTIC TYPE: Personnel Characteristics

DISTRIBUTION TYPE: Quantitative

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL: NA

PRIORITY FOR SETTING CUT-OFF's

MINIMUM VALUE: ?

MAXIMUM VALUE: ?

CATEGORIES	CODE
?	

DATA SOURCE DESCRIPTION

__X__ EMF _____ ORMF _____ PROJECT A

TITLE/ID: APSCR

VARIABLE TYPE: Numeric

LENGTH: 3

RECORD/FILE: NA

RELATIVE POSITION: 195

LOCATION: 548-550

Table 4.2-22. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: High School Graduation Status

SHORT TITLE: HS GRAD

VARIABLE #: 35

CHARACTERISTIC TYPE: Personnel Char, Transition Predictor

DISTRIBUTION TYPE: Categorical

PRE-SELECTION LEVEL (Yes/No): Yes

PRE-SELECT LEVEL: HS (1)

PRIORITY FOR SETTING CUT-OFF's

MINIMUM VALUE: 0

MAXIMUM VALUE: 1

CATEGORIES	CODE
No High School Grad	1
High School Grad	0

DATA SOURCE DESCRIPTION

__X__ EMF _____ ORMF PROJECT A __X__ DERIVED

TITLE/ID: Education Certification

VARIABLE TYPE: Alpha
LENGTH: 1
RECORD/FILE: NA
RELATIVE POSITION: 195
LOCATION: 548-550

DESCRIPTION: This variable is derived from EMF variable titled "Civilian Education Level" (CIVED Position = 22, Location = 67)

EDUCATION CERTIFICATION	HIGH SCHOOL DEGREE STATUS
D - Associates Degree	High School Graduate
K - Bachelor	
2 - HS Diploma	
3 - HS Equiv	
1 - No HS Diploma	Non-High School Grad.
6 - Compl No Diploma	
Other	

Table 4.2-22. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: Age at Entry

SHORT TITLE: AGE

VARIABLE #: 36

CHARACTERISTIC TYPE: Personnel Char.,Transition Pred.

DISTRIBUTION TYPE: Categorical

PRE-SELECTION LEVEL (Yes/No): No

PRE-SELECT LEVEL:

PRIORITY FOR SETTING CUT-OFF's

MINIMUM VALUE: 17

MAXIMUM VALUE: 65

CATEGORIES	CODE
17-21	1
21-25	2
25-30	3
30-35	4
35 and over	5

DATA SOURCE DESCRIPTION

_____ EMF _____ ORMF PROJECT A __X__ DERIVED

TITLE/ID:

VARIABLE TYPE:

LENGTH:

RECORD/FILE:

DESCRIPTION: This variable is derived from the date of birth file on the EMF (Relative position = 43, location 123-128). The date of birth is subtracted from the entry date to obtain age at entry. Age is then assigned to the categories described above.

Table 4.2-22. Data for Personnel Variables Description.

CHARACTERISTIC TITLE: Racial/Ethnic Descent Categories

SHORT TITLE: Racial/Eth Grp

VARIABLE #: 37

CHARACTERISTIC TYPE: Transition Predictor

DISTRIBUTION TYPE: Categorical

PRE-SELECTION LEVEL (Yes/No): No

PRE-SELECT LEVEL:

PRIORITY FOR SETTING CUT-OFF's

MINIMUM VALUE: NA

MAXIMUM VALUE: NA

CATEGORIES	CODE
White	1
Black	2
Hispanic	3
Other	4

DATA SOURCE DESCRIPTION

_X_ EMF _____ ORMF _____ PROJECT A

TITLE/ID: REDCAT

VARIABLE TYPE: Alpha

LENGTH: 1

RECORD/FILE:

RELATIVE POSITION: 10

LOCATION: 45

Table 4.2-23.

FILE ID: Personnel Variables Summary

DESCRIPTION: Lists the personnel characteristics in PCEA, describes the data source where characteristics can be obtained, indicates if variable is derived or used as is indicated if variable commonly has a level selected by Army, and lists the task taxonomy type commonly associated with the variable.

RECORD	FILE	DESCRIPTION	LENGTH	TYPE
1	1	File ID	10	Alpha
2	1	Char. #	2	Num
		Char. Title	50	Alpha
		Avail on EMF	1	Num
		Avail on ORMF	1	Num
		Other Data Source	10	Alpha
		Char Type	1	Num
		Preselect (Yes/No)	1	Num
		Preselect Level	10	Alpha
		Taxonomy Type	1	Alpha

ESTIMATED NO. OF TABLES: 1

ESTIMATED NO. OF RECORDS: 37 (NUMBER OF PERSONNEL CHARACTERISTICS)

LENGTH: FIXED

Table 4.2-24. Data for Personnel Variables Summary

		1 AVAIL. ON EMF	2 AVAIL. ON ORMF	3 OTHER DATA SOURCE	4 CHAR. TYPE	5 PRE SELECT LEVEL (YES/NO)	6 PRE SELECT LEVEL	7 TASK TAXONOMY TYPE
1	ASVAB CL COMPOSITE	Y			PC	YES	BY MOS	COGNITIVE
2	ASVAB CO COMPOSITE	Y			PC	YES	BY MOS	COGNITIVE
3	ASVAB EL COMPOSITE	Y			PC	YES	BY MOS	COGNITIVE
4	ASVAB FA COMPOSITE	Y			PC	YES	BY MOS	COGNITIVE
5	ASVAB GM COMPOSITE	Y			PC	YES	BY MOS	COGNITIVE
6	ASVAB MM COMPOSITE	Y			PC	YES	BY MOS	COGNITIVE
7	ASVAB OF COMPOSITE	Y			PC	YES	BY MOS	COGNITIVE
8	ASVAB SC COMPOSITE	Y			PC	YES	BY MOS	COGNITIVE
9	ASVAB ST COMPOSITE	Y			PC	YES	BY MOS	COGNITIVE
10	ASVAB GT COMPOSITE	Y			PC	YES	BY MOS	COGNITIVE
11	AFQT PERCENTILE SCORE	Y			PC	NO		COGNITIVE
12	AFQT GROUP	Y			PC,TP	YES	CAT IV	COGNITIVE
* 13	ASVAB QUANT.	N		DERIVED	PC	NO		COGNITIVE
* 14	ASVAB SPEED	N		DERIVED	PC	NO		COGNITIVE
* 15	ASVAB TECH.	N		DERIVED	PC	NO		COGNITIVE
* 16	ASVAB VERBAL	N		DERIVED	PC	NO		COGNITIVE
17	READING GRADE LEVEL	N		DERIVED	PC	NO		COGNITIVE
* 18	COMP. PERC ACC	N		PROJ. A	PC	NO		PERCEPTUAL
* 19	COMP. PERC SPEED	N		PROJ. A	PC	NO		PERCEPTUAL
* 20	NUM. SPEED & ACC	N		PROJ. A	PC	NO		COGNITIVE
* 21	PSYCHOMOTOR	N		PROJ. A	PC	NO		MOTOR
* 22	SIMPLE REACTION ACC	N		PROJ. A	PC	NO		COMPLEX PSYCHOMOTOR CONTINUOUS
* 23	SIMPLE REACTION SPEED	N		PROJ. A	PC	NO		COMPLEX PSYCHOMOTOR CONTINUOUS
24	PULHES-PHYSICAL STAMINA	Y			PC	YES	BY MOS	MOTOR-GROSS MOTOR
25	PULHES-UPPER EXTREMITIES	Y			PC	YES	BY MOS	MOTOR
26	PULHES-LOWER EXTERMITIES	Y			PC	YES	BY MOS	MOTOR
* 27	PULHES-HEARING	Y			PC	YES	BY MOS	COMMUNICATION PERCEPTUAL SEARCHING NON-VISUAL
* 28	PULHES-EYES	Y			PC	YES	BY MOS	PERCEPTUAL-SEARCHING-NEAR VISUAL
29	PULHES-EXP. WT. LIFT	Y			PC	YES	BY MOS	PERCEPTUAL-SEARCHING-FAR VISUAL
30	MEPSCAT	Y			PC	YES	BY MOS	ALL
* 31	SEX	Y			PC,TP	YES	BY MOS	MOTOR-GROSS MOTOR
* 32	HEIGHT	N	Y		PC	YES	80 INCHES	MOTOR-GROSS MOTOR
* 33	BLOOD PRESSURE-DIAS.	N	Y		PC	YES	?	MOTOR-GROSS MOTOR
34	AUDITORY PERCEPTION STANDARD	Y			PC	YES	?	MOTOR-GROSS MOTOR
35	HIGH SCHOOL GRAD STATUS	N	N	DERIVED	TP,PC	YES	HS GRAD.	COMMUNICATION,PERCEPTUAL-SEARCHING NON-VISUAL
36	AGE AT ENTRY INTO SERVICE	N		DERIVED	TP	YES	17	COGNITIVE
37	RACIAL/ETHNIC PERCENT CATEGORY	Y			TP	NO		

* Potential Predictor in Product 6 Performance Shaping Functions

Table 4.2-25.

This table intentionally left blank.

Table 4.2-26.

This table intentionally left blank.

Table 4.2-27. Performance Shaping Functions

FILE ID: Performance Shaping Functions

DESCRIPTION: List the variables and paramaters in the performance shaping functions for each task type.

RECORD	FILE	DESCRIPTION	LENGTH	TYPE
1	1	File ID	10	Alpha
	2	Task Type	2	Alpha
2	1	Variable ID	10	Alpha
	2	Variable Wt./Value	8	Num

ESTIMATED NO. OF TABLES: = 21 (NO. OF TASK TYPES)

ESTIMATED NO. OF RECORDS: = 12 (MAXIMUM NUMBER OF VARIABLES IN PERFORMANCE SHAPING FUNCTION

LENGTH: = VARIABLE

Table 4.2-28. Data for Performance Shaping Function Parameters

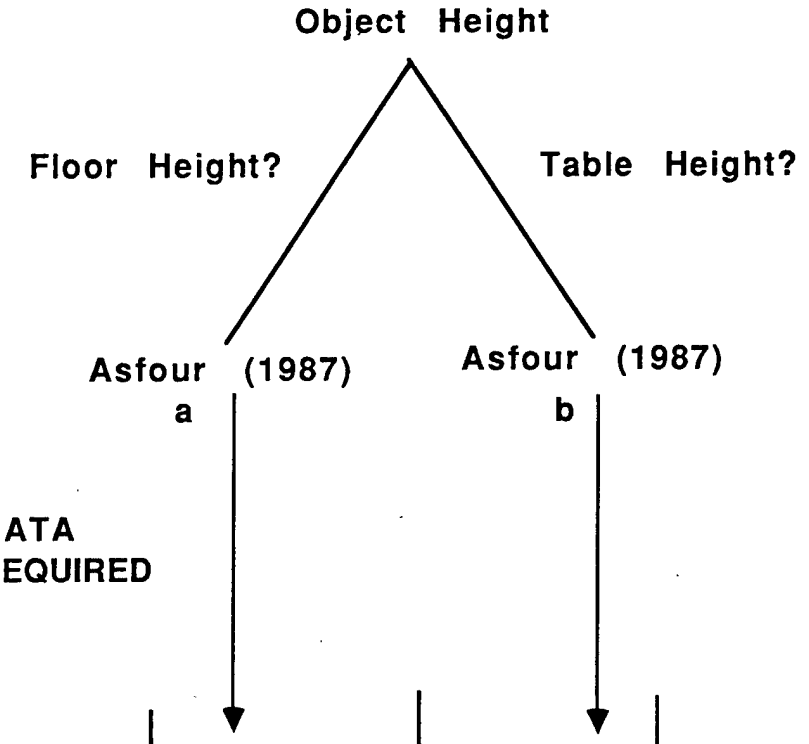
This table will list separate regression equations for each task type with available Project A data. The equations will predict task performance (either time or accuracy) as a function of personnel characteristics and task performance frequency and recency. Since we did not receive the frequency and recency data until two weeks before the due date for the design specifications, we were not able to complete development of the regression equations. However, preliminary results are enclosed in Attachment A.

We have included the prediction equations for the three gross motor task types (Gross-Motor-Carrying, Gross-Motor-Lifting, and Gross-Motor-Torquing). These equations are derived from the literature, not from Project A analyses. They predict energy expenditure when used in conjunction with the Stressor Degradation algorithm, and they can be used to predict the rate of task performance.

Table 4.2-28. (Continued)

LIFTING OR LOWERING*

I MODEL SELECTION



DATA REQUIRED

Asfour (1987) a	Asfour (1987) b	
√	√	Frequency (Times/Minute) (F)
√	√	Load Handled (lbs.) (L)
√	√	Height of Lift or Lower (inches) (H)
√	o	Box Width (inches) (W)
√	√	Box Length (inches) (LEN)
√	√	Angle of Twist (O°, 90°,) (ANG)
√	√	Body Weight (lbs.) (W)

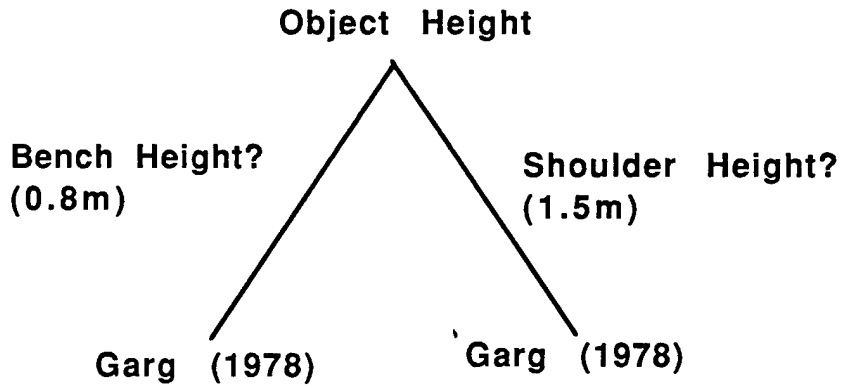
NOTE: √ Indicates that the data are required
O Indicates that the data are not required

Reference = Genaidy, A.M. & Asfour, S.S. (1987). Review and evaluation of physiological cost prediction Models for Manual Materials Handling. Human Factors, 19 (4), 465-476.

Table 4.2-28. (Continued)

PUSHING OR PULLING

I MODEL SELECTION



DATA REQUIRED

√	√	Horizontal Movement of Piece (M)	(X)
√	o	Body Weight (Kg)	(W)
√	√	Average Push/Pull Force	(F)
√	√	Gender	(G)
√	√	No. of Pushes/Minute	(P)

Carrying

Liou & Morrissey (1985)

Body Weight (kg)
Walking Speed (Km/Hr.)
Load Carried (kg)
Gender (M/F)
Container Width (cm)

Table 4.2-28. (Continued)

Carry Task Input Variables

- Body Weight (Kg)
- Walking Speed (Km/hr)
- Load Carried (Kg)
- Gender
- Container Width (cm)

Table 4.2-28. (Continued)

Source	Dependent Variable	Type of Task	Model
Asfour (1980)	Oxygen consumption (mL/min)	Lifting that starts at floor and lowering that ends at floor	VO2 = [illegible] + 10** - [illegible] - 350.8*CL) + 17.47* 10 ** - 6*F*L*H*WID*LEN*ANG + 18435.22*10** - 6*W*F**2
Asfour (1980)	Oxygen consumption (mL/min)	Lifting that starts at table height and lowering that ends at table height	VO2 = 371.9055 - 51.9573*TA + 10* - 6*W*F**2 (31980.94 - 2332.8*F) + 12084.91*10** - 6*F*L**2 + 18.31*10** - 6*F*H*L*W*LEN*ANG
Lipo and Morrissey (1985)	Metabolic rate (watts)	Carrying loads in front of body with both hands	MR = 25.4 + 24.1*G - 0.43*Z*V**2 + (W + L)*(3.16 + 2.54*V**2 + 16*((L/W)**2) - 3.25*V)
[illegible]	Net metabolic rate (kcal/push)	Pushing/pulling at bench height (0.8 m)	NMR = 0.00112*X*W + 0.115*F + 0.00505*F*G
[illegible]	Net metabolic rate (kcal/push)	Pushing/pulling at 1.5 m height	NMR = X*(0.086 + 0.036*F)

Key: NMR — net metabolic rate for activity performed
MR — metabolic rate
VO2 — oxygen consumption
L — load carried (kg)
W — body weight (kg)
TG — treadmill grade level (%)
Z — container width with location of hands in front of body (cm)
P — percent of normal stature
G — gender (male = 1, female = 0)
V — walking speed (km/h)
All models are valid for a duration of less than one hour.

Key: TEE — energy expenditure/hour
NMR — net metabolic rate for the activity performed
VO2 — oxygen consumption (L/min for all studies except Asfour in mL/min)
CVO2 — change of oxygen consumption with time (*)
W — body weight (kg in Garg et al. and Mital et al.; pounds in Asfour)
L — amount of load handled (kg in Garg et al. and Mital et al.; pounds in Asfour)
G — gender (Garg et al.: male = 1, female = 0; Mital et al.: male = 1, female = 2)
h1 — vertical height from floor (m), starting point for lift
h2 — vertical height from floor (m), end point for lift
TA — type of task (lifting = 1, lowering = 2)
F — frequency of handling (times/min)
H — height of lift or lower (inches)
WID — box width (inches)
LEN — box length (inches)
ANG — angle of twist (0 deg twist = 1, 90 deg twist = 2)
T — shift duration (minutes)
All anthropometric measurements in cm
Isometric strengths in kg
Lifting capability in kg
Box size in inches
Age in years
All models are valid for a duration of less than one hour, except those of Mital, which are valid up to 12 hours.

Key: NMR — net metabolic rate for activity performed
W — body weight (kg)
L — amount of load lowered (kg)
G — gender (male = 1, female = 0)
h1 — vertical height from floor (m), end point for lower
h2 — vertical height from floor (m), starting point for lower
All models are valid for a duration of less than one hour.

4.3 Remaining Library Development Activities

Table 4.3-1 lists the development status of each PREA library. As Table 4.3-1 indicates, only two libraries, the Baseline Task parameter Library Tables (4.2-16 and 4.2-16) and the Performance Shaping Function Parameter Library (Table 4.2-27 and 4.2-26) have not been completed. Delays in receiving all required Project A data (sustainment training frequency and recency data were not received until 2 weeks before the due date for this design specification) delayed construction of these libraries. We hope to complete these libraries early in Phase 3 of this project.

Preliminary results from analysis of the Project A data are provided in Attachment 1. These analyses will be used to produce the performance shaping functions. As noted in Section 2, the Project A data may not permit development of performance shaping functions for certain types of tasks.

Table 4.3-1. Status of Libraries

Library	Status
Generic Equipment List	Completed
Human Interface Component Taxonomy	Completed
Functional Task Assignments	Completed
Task Characteristic Map	Completed
Static Design Measure Population Library	Reach Completed. Strength to be Completed in Phase 3
Baseline Task Parameter Library	Project A Tasks to be Loaded Into Data Base in Phase 3
System Types by Mission Area	Completed
Personnel Variables Description	Completed
Personnel Variables Summary	Completed
Performance Shaping Function Parameters	Functions for the 3 Heavy Gross-Motor Tasks (Carrying, Lifting, Torquing) Completed. Functions for Other Task Types with Available Project A Data to be Completed during Phase 3

SECTION 5 - DESCRIPTION OF INPUT/OUTPUT FILES

5.1 OVERVIEW

Table 5.1-1 lists the major I/O files associated with each Step of the PREA. These files include input data files from other $(MPT)^2$ products and external sources and the output files produced by each step of the PREA. The output files would be saved on hard disk where they could be accessed in future user applications of the PREA.

5.2 FILE DESCRIPTIONS

Master List

STEP	FILE	TABLE
All	Systems List (O)	5.1-1
0	None	——
1	(Intentionally Left Blank)	5.1-2
1,2	Human Interface Component List (O)	5.1-3
	(Intentionally Left Blank)	5.1-4
	(Intentionally Left Blank)	5.1-5
	(Intentionally Left Blank)	5.1-6
	(Intentionally Left Blank)	5.1-7
2	Static Assessment File (O)	5.1-8
3-5	Baseline Task List (O)	5.1-9
6,7,8	System Conditions (I)	5.1-10
6,7,8	System Missions (I)	5.1-11
4	Stressor Condition Description (O)	5.1-12
	(Intentionally Left Blank)	5.1-13
3,6	Product 5 Task Parameter Description (I)	5.1-14
	(Intentionally Left Blank)	5.1-15
1-8	Task Parameter Description (O)	5.1-16
	(Intentionally Left Blank)	5.1-17

Master List (Continued)

STEP	FILE	TABLE
7	(Intentionally Left Blank)	5.1-18
3	Projected Characteristics Distribution Summary (I)	5.1-19
7,8	Function Performance Criteria (I)	5.1-20
7,8	System RAM Criteria (I)	5.1-21
7,8	Function Accuracy Weights (I)	5.1-22
7,8	Maintenance Manpower Requirements File (I) (I,O)	5.1-23
7,8	Mission Completion File (I,O)	5.1-24
7,8	Component Maintenance Parameter File (I,O)	5.1-25
7,8	Mission Performance File (I)	5-1-26
7,8	Corrective Maintenance Criteria (I)	5.1-27

I = Input File
O = Output File

Table 5.1-1. Systems List (O)

FILE ID: System List

DESCRIPTION OF CONTENTS: Lists the system description data for all systems.

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
1		Identification Record	10	Alpha
	1	Comment Field	80	Alpha
2 - end		System Description Data	118	Alpha
	1	Mission Area	1	Alpha
	2	System Type	1	Alpha
	3	System Name	30	Alpha
	4	Date Last Accessed	8	XX/XX/XX
	5	Step Last Completed	1	Num

ESTIMATED NO. OF TABLES = 1

ESTIMATED NO. OF RECORDS = 10

FIXED OR VARIABLE LENGTH FILE = VARIABLE

Table 5.1-2.

This table intentionally left blank.

Table 5.1-3. Human Interface Components List (O)

FILE ID: Component List

DESCRIPTION: This file lists the controls and displays associated with the system.

RECORD	FILE	DESCRIPTION	LENGTH	TYPE
1	1	File ID	10	Alpha
2	2	System	2	Alpha
2	1	Control/Display Title	60	Alpha
	2	Type 1	3	Alpha
	3	Type 2	3	Alpha
	4	Type 3	3	Alpha
	5	Type 4	3	Alpha
	6	Type 5	3	Alpha
	7	Type 6	3	Alpha
	8	Type 7	3	Alpha
	9	Type 8	3	Alpha
	10	Type 9	3	Alpha
		Type 10	3	Alpha

NO. OF TABLES = 1 (ONE PER SYSTEM)

NO. OF RECORDS = 120 (MAXIMUM NO. OF CONTROLS/DISPLAYS)

LENGTH = VARIABLE

Tables 5.1-4 to 5.1-7.

These tables intentionally left blank.

Table 5.1-8. Static Assessment File (O)

FILE ID: Static Assessment File

DESCRIPTION: This file lists the controls and displays which do not meet the static assessment design standards.

RECORD	FILE	DESCRIPTION	LENGTH	TYPE
1	1	File ID	10	Alpha
	2	System	1	Alpha
2	1	Control/Display Code	3	Alpha
	2	Static Measure Code	2	Alpha
	3	Actual Value	6	Num
	4	Minimum Standard	6	Num
	5	Maximum Standard	6	Num

NO. OF TABLES = 1 (1 PER SYSTEM)

NO. OF RECORDS = 120 (MAXIMUM NO. OF CONTROLS/DISPLAYS)

LENGTH = VARIABLE

Table 5.1-9. Baseline Task List (O)

FILE ID: Baseline Task List

DESCRIPTION: This file lists the baseline tasks associated with each system task.

RECORD	FILE	DESCRIPTION	LENGTH	TYPE
1	1	File ID	10	Alpha
	2	System	1	Alpha
2	1	Task Code	3	Alpha
	2	Baseline Task Code	3	Alplha

NO. OF TABLES = 1

NO. OF RECORDS = 600

LENGTH = FIXED

Table 5.1-10. System Conditions (I)

FILE ID: System Conditions

DESCRIPTION: Lists the condition settings for a specific condition set name and number.

RECORD	FILE	DESCRIPTION	LENGTH	TYPE
1	1	Identification Record	10	Alpha
	2	Condition Set Name	80	Alpha
	3	Condition Set Number	12	Alpha
2	1	Environmental (Basic)	120	Alpha
3	1	Terrain (Basic)	120	Alpha
4	1	Target/Threat (Basic)	120	Alpha
5	1	Friendly Force (Basic)	120	Alpha
6	1	Environmental (Add'l)	120	Alpha
7	1	Terrain (Add'l)	120	Alpha
8	1	Target/Threat (Add'l)	120	Alpha
9	1	Friendly Force (Add'l)	120	Alpha

ESTIMATED NO. OF TABLES = 3 (3 CONDITION SETS)

ESTIMATED NO. OF RECORDS = 2-9 = 1

FIXED OR VARIABLE LENGTH FILE = VARIABLE

Table 5.1-11. System Missions (I)

FILE ID: System Missions

DESCRIPTION: Lists the missions for a specific system which have Product 1 files.

RECORD	FILE	DESCRIPTION	LENGTH	TYPE
1	1	Identification Record	10	Alpha
	2	Mission Area Code	1	Alpha
	3	System Type Code	2	Alpha
	4	System Code	2	Alpha
	5	Date Created	8	xx/xx/xx
2 - end	1	Mission Number	1	Alpha
	2	Mission Name	80	Alpha

ESTIMATED NO. OF TABLES = 3 (3 SYSTEM TYPES)

ESTIMATED NO. OF RECORDS = 10 (MAXIMUM NO. OF MISSIONS)

FIXED OR VARIABLE LENGTH FILE = VARIABLE

Table 5.1-12. Stressor Condition Description (O)

FILE ID: Stressor Condition Description

DESCRIPTION: This file lists the input data values associated with a particular stressor.

RECORD	FILE	DESCRIPTION	LENGTH	TYPE
1	1	Identification Record	10	Alpha
	2	Stressor	1	Alpha
2	1	Input Measure Code	2	Alpha
	2	Input Measure Type	1	Alpha
	3	Scale	10	Alpha
	4	Value	6	Num
	5	Level of Entry	1	Alpha
3	1	Applicable Task Codes	3	Alpha

NO. OF TABLES = 5 (NUMBER OF STRESSORS)

NO. OF RECORD 2 = 10 (MAXIMUM NO. OF INPUT MEASURES)

NO. OF RECORD 3 = 100 (MAXIMUM NO. OF TASKS UNIQUELY TIED TO A STRESSOR)

Table 5.1-13.

This table intentionally left blank.

Table 5.1-14. Product 5 Task Parameter Description

DATA DICTIONARY FORM

File Identification: Task Data File
Description of Contents: All information pertaining to tasks and sequencing

Record	Field	Description	Length	Data Type
1		Identification record	80	Alphanum.
	1	Comment field	80	Alphanum.
2 to n + 1 (n tasks total)		Task descriptors	var	
	1	Task name	80	Alphanum.
	2	Task condition set number	2	Alphanum.
	3	Average task performance time	6	Numeric
	4	Minimum task performance time	6	Numeric
	5	Maximum task performance time	6	Numeric
	6	Task workload in each of six possible channels (only four currently used)	6	Numeric
	7	Job assignment	10	Alphanum.
	8	Task notecard information	var	Alphanum.
	9	Task sequencing type	1	Numeric
	10	Following tasks	var	Numeric
	11	Following task probabilities	var	Numeric
	12	On/Off task interval		
	13	Date last accessed	8	xx/xx/xx
n+1 to n+1+m (m jobs total)		Job descriptors	var	
	1	Identification record	80	Alphanum
	2	MOS from which baseline estimate was developed	8	Alphanum.
	3	Job notecard information	var	Alphanum.

Estimated Number of Records = 200
Fixed or Variable Length File = Variable

Table 5.1-15.

This table intentionally left blank.

Table 5.1-16. Task Parameter Description (O)

FILE ID: Task Parameter Library

DESCRIPTION: This file lists the tasks and tasks data for the new system.

RECORD	FILE	DESCRIPTION	LENGTH	TYPE
1	1	File ID System	10	Alpha
2	1	Task Code	4	Alpha
	2	Task Level (Task/Element)	1	Alpha
	3	Basic Description Data	80	Alpha
	4	Task Title	4	Alpha
	5	Parent Function/Task System	2	Alpha
	6	Duty Position	2	Alpha
	7	MOS/Skill Level	4	Alpha
	8	Task Type-1	2	Alpha
	9	Weight-Task Type	2	Num
	10	Task Type 2	2	Alpha
	11	Weight-Task Type 2	2	Num
	12	Task Type 3	2	Alpha
	13	Weight-Task Type 3	2	Num
	14	Baseline Task Title	80	Alpha
	15	Baseline Task Number	10	Alpha
	16	Baseline Task Source	10	Alpha
		Performance Data		
3	1	Condition Set	1	Alpha
	2	Mission	1	Alpha
	3	Type of Time Measure	1	Alpha
	4	Time to Perform Measure Units	1	Alpha
	5	Time to Perform Value	6	Num
	6	Time to Perform Standard Deviation	6	Num
	7	Equipment Task Element Time Lag	6	Num
	8	Maximum Eq. Rate/Measure	1	Alpha
	9	Maximum Eq. Rate/Value	4	Alpha
	10	Type of Accuracy Measure	1	Num
	11	Accuracy Standard Measure	30	Alpha
	12	Accuracy Standard Valve	6	Num
	13	Criteria Measure	30	Num
	14	Criteria Measure Value	6	Num
	15	Accuracy Standard Deviation	6	Num

Table 5.1-16. Task Parameter Description (Continued)

FILE ID: Task Parameter Library

DESCRIPTION: This file lists the tasks and tasks data for the new system.

RECORD	FILE	DESCRIPTION	LENGTH	TYPE
3	16	Equipment Task Element	2	Num
		Characteristics Data	___	
4	1	Characteristic Code	1	Alpha
	2	Level	4	Num
		Controls/Display	___	
5	1	Control/Display Code	1	Alpha
	2	Type	2	Alpha
		Task Element Description		
6	1	Task Element Code	4	Alpha
7		Practice		
		Job Performance Frequency	1	Alpha
		Sustainment Training Frequency	2	Alpha

NO. OF TABLES = 1

NO. OF RECORD 2 = 600 (NO. OF TASKS AND TASK ELEMENTS WITHIN A SYSTEM TYPE)

NO. OF RECORD 3 = 24 (3 CONDITION SETS BY 8 MISSIONS)

NO. OF RECORD 4 = 6 (6 PERSONNEL CHARACTERISTICS)

NO. OF RECORD 5 = 20 (10 CONTROLS/DISPLAYS)

NO. OF RECORD 6 = 10 (10 TASK ELEMENTS)

NO. OF RECORD 7 = 1

LENGTH = VARIABLE

Table 5.1-17.

This table intentionally left blank.

Table 5.1-18.

This table intentionally left blank.

Table 5.1-19. Projected Characteristics Distribution Summary (I)

FILE ID: Projected Characteristics Distribution

DESCRIPTION: This file describes the projected characteristics distribution for each MOS related to a particular system type.

RECORD	FILE	DESCRIPTION	LENGTH	TYPE
1	1	File ID	10	Alpha
	2	System Type	2	Alpha
	3	MOS Code	3	Alpha
	4	Personnel Char. Code	2	Alpha
2	1	Personnel Char. Category Code	1	Alpha
	2	Category Value	6	Num
3	1	Mean	6	Num
	2	Median	6	Num
	3	Standard Deviation	6	Num

NO. OF TABLES = 225 (15 MOSs X 15 CHARACTERISTICS)

NO. OF RECORD 2 = 8 (MAXIMUM NO. OF CATEGORIES WITHIN A CHARACTERISTIC

NO. OF RECORD 3 = 1

LENGTH = VARIABLE

Table 5.1-20. Function Performance Criteria (I)

FILE ID: Function Performance Criteria

DESCRIPTION: Lists the performance time and accuracy criteria, as well as the accuracy standard, for each function in a given mission.

RECORD	FILE	DESCRIPTION	LENGTH	TYPE
1		Identification Record	10	Alpha
	1	System Code	1	Alpha
	2	Mission Number	2	Alpha
	3	Condition Set Number	2	Alpha
2 - end				
	1	Function Number	4	Alpha
	2	Time	xxxxx.xx	flt. pt. (min)
	3	Accuracy	xxx.xx	flt.pt (%)
	4	Accuracy Standard	80	Alpha
	5	Comment	160	Alpha

NO. OF TABLES = 48 (10 MISSIONS X 3 CONDITION SETS)

NO. OF RECORDS = 8

LENGTH = VARIABLE

Table 5.1-21. System RAM Criteria (I)

FILE ID: System RAM Criteria

DESCRIPTION: Lists the reliability, availability, and maintainability criteria for the system.

RECORD	FILE	DESCRIPTION	LENGTH	TYPE
1		Identification Record	10	Alpha
	1	System Code	2	Alpha
	2	System Type	1	Alpha
	3	Condition Set	2	Alpha
2		Availability	6	Alpha
	1	Operational Availability	xxx.xx	(%)
3		Maintainability	14	Hr.Op Hr
	1	Maintenance Ratio	xxx.xx	Hours
	2	MTTR	xxxxx.xx	
4		Reliability	18	
	1	Mobility	xxxxx.xx	
	2	Measure	5	Miles/km/ Flthr
	3	Usage (Daily)	xxxxx	
5		Reliability	18	Rnds
	1	Armaments	xxxxx.xx	
	2	Measure	5	
	3	Usage (Daily)	xxxxx	
6		Reliability	18	Hours/Mins.
	1	Communication	xxxxx.xx	
	2	Measure	5	
	3	Usage (Daily)	xxxxx	

ESTIMATED NO. OF TABLES = 3 (3 CONDITION SETS)

ESTIMATED NO. OF RECORDS = 2-6 = 1

LENGTH = FIXED

Table 5.1-22. Function Accuracy Weights (I)

FILE ID: Function Accuracy Weights

DESCRIPTION: Lists the amount of weight assigned to each function accuracy in order to calculate mission accuracy (i.e., the probability of mission success).

RECORD	FILE	DESCRIPTION	LENGTH	TYPE
1		Identification Record	10	Alpha
	1	System Code	2	Alpha
	2	Mission Number	2	Alpha
	2	Condition Set Number	2	Alpha
2 - end				
	1	Function Number	4	Alpha
	2	Accuracy Weight	xxx.xx	flt. pt. (%)

NO. OF TABLES = 30 (10 MISSION + 3 CONDITION SETS)

ESTIMATED NO. OF RECORDS = 10

LENGTH = VARIABLE

Table 5.1-23. Maintenance Manpower Requirements File (I) (I,O)

FILE ID: Maintenance Manpower Requirements

DESCRIPTION: Contains the results of the Maintenance Requirements Simulation Model in terms of the total amount of time spent per maintenance action, the type of maintenance that was performed, and the type of personnel required to perform the maintenance.

RECORD	FILE	DESCRIPTION	LENGTH	TYPE
1		Identification Record	10	Alpha
	1	Mission Area Code	1	Alpha
	2	System Type Code	1	Alpha
	3	System Code	1	Alpha
	4	Mission Code	1	Alpha
	4	Date Created	8	XX/XX/XX
2 - end				
	1	Functional Code	3	Alpha
	2	Component Code	3	Alpha
	3	Maintenance Action	2	Integer
	4	Maintenance Type	1	Integer
	5	Maintenance Category	1	Integer
	6	MOS/Skill Level	5	Alpha
	7	Headcount	2	Integer
	8	Total Maintenance Time	14	Real

NO. OF TABLES = 10 (NO. OF MISSIONS)

NO. OF RECORDS = 3000 (600 COMPONENTS X 5 MAINTENANCE ACTIONS)

FILE LENGTH = VARIABLE

Table 5.1-24. Mission Completion File (I,O)

FILE ID: Mission Completion Data File

DESCRIPTION: Contains the number of missions started, the number of missions missed due to maintenance activities, and the number of missions aborted.

RECORD	FILE	DESCRIPTION	LENGTH	TYPE
1		Identification Record	231	Alpha
	1	Mission Area Code	50	Alpha
	2	System Type Code	30	Alpha
	3	System Code	30	Alpha
	4	Mission Code	50	Alpha
	5	Date Created	8	XX/XX/XX
2	1	Missions Started	5	Integer
	2	Missions Missed	5	Integer
	3	Missions Aborted	5	Integer
	4	Mean Rounds Between Failure	10	Integer
	5	Mean Miles Between Failure	10	Integer
	6	Mean Time Between Failure (Time Metric Components Only)	14	Real
	7	Mean Time Between Failure (All Components)	14	Real

NO. OF TABLES = 10 (NO. OF MISSIONS)

NO. OF RECORDS = 1

LENGTH = FIXED

Table 5.1-25. Component Maintenance Parameter File (I,O)

FILE ID: Component Maintenance Parameters

DESCRIPTION: Contains both contractor and government estimates of maintenance parameters for each component in the system under evaluation.

RECORD	FILE	DESCRIPTION	LENGTH	TYPE
1		Identification Record	10	Alpha
	1	Mission Area Code	2	Alpha
	2	System Type Code	1	Alpha
	3	System Code	1	Alpha
	4	Date Created	8	XX/XX/XX
2 - end		Maintenance Parameters	138	
	1	Functional System Code	3	Alpha
	2	Component Name	30	Alpha
	3	Maintenance Action (c)	2	Integer
	4	Maintenance Action (g)	2	Integer
	5	MOS/Skill Level (c)	5	Alpha
	6	MOS/Skill Level (g)	5	Alpha
	7	Maintenance Type (c)	1	Alpha
	8	Maintenance Type (g)	1	Alpha
	9	Mean Op Units Between Failure (c)	14	Real
	10	Mean Op Units Between Failure (g)	14	Real
	11	Operational Unit Metric (c)	1	Integer
	12	Operational Unit Metric (g)	1	Integer
	13	Maintenance Category (c)	1	Integer
	14	Maintenance Category (g)	1	Integer
	15	Mean Time to Repair (c)	14	Real
	16	Mean Time to Repair (g)	14	Real
	17	Mission Abort (c)	1	Alpha
	18	Mission Abort (g)	1	Alpha

NO. OF TABLES = 1 (ONE SYSTEM)

NO. OF RECORDS = 600 (900 COMPONENTS)

LENGTH = VARIABLE

Table 5.1-26. Mission Performance File (I)

FILE ID: Mission Performance Criteria

DESCRIPTION: Lists the performance time and accuracy criteria, as well as the accuracy standard, for the mission.

RECORD	FILE	DESCRIPTION	LENGTH	TYPE
1	1	Identification Record	10	Alpha
	2	System Code	2	Alpha
	3	Mission Number	1	Alpha
	4	Condition Set Number	1	Alpha
2	1	Mission Code	1	Alpha
	2	Mission Time	xxxxx.xx	flt. pt. (min)
	3	Mission Accuracy	xxx.xx	flt. pt. (%)
	4	Accuracy Standard	80	Alpha
	5	Comment	160	Alpha

NO. OF TABLES = 10 (MAXIMUM NO. OF MISSIONS)

ESTIMATED NO. OF RECORDS = 8

LENGTH = VARIABLE

Table 5.1-27. Corrective Maintenance Criteria (I)

FILE ID: Corrective Maintenance Criteria

DESCRIPTION: Lists the maintenance ratios and MTTR by equipment by maintenance task.

RECORD	FILE	DESCRIPTION	LENGTH	TYPE
1		Identification Record	10	Alpha
	1	System Code	1	Alpha
	2	System Type Code	1	Alpha
2 - end		MRs and MTTRs	266	Alpha
	1	Equipment Type	23	Alpha
	2	Overall MR	xxx.xx	Flt. Pt.
	3	Overall MTTR	xxxxx.xx	Flt. Pt.
	4	Inspection ORG MR	xxx.xx	Flt. Pt.
	5	Inspection ORG MTTR	xxxxx.xx	Flt. Pt.
	6	Inspection DS MR	xxx.xx	Flt. Pt.
	7	Inspection DS MTTR	xxxxx.xx	Flt. Pt.
	8	Inspection GS MR	xxx.xx	Flt. Pt.
	9	Inspection GS MTTR	xxxxx.xx	Flt. Pt.
	10	Repair ORG MR	xxx.xx	Flt. Pt.
	11	Repair ORG MTTR	xxxxx.xx	Flt. Pt.
	12	Repair DS MR	xxx.xx	Flt. Pt.
	13	Repair DS MTTR	xxxxx.xx	Flt. Pt.
	14	Repair GSF MR	xxx.xx	Flt. Pt.
	15	Repair GS MTTR	xxxxx.xx	Flt. Pt.
	16	Replace ORG MR	xxx.xx	Flt. Pt.
	17	Repalce ORG MTTR	xxxxx.xx	Flt. Pt.
	18	Replace DS MR	xxx.xx	Flt. Pt.
	19	Replace DS MTTR	xxxxx.xx	Flt. Pt.
	20	Replace GS MR	xxx.xx	Flt. Pt.
	21	Repalce GS MTTR	xxxxx.xx	Flt. Pt.
	22	Test ORG MR	xxx.xx	Flt. Pt.
	23	Test ORG MTTR	xxxxx.xx	Flt. Pt.
	24	Test DS MR	xxx.xx	Flt. Pt.
	25	Test DS MTTR	xxxxx.xx	Flt. Pt.
	26	Test GS MR	xxx.xx	Flt. Pt.
	27	Test GS MTTR	xxxxx.xx	Flt. Pt.

Table 5.1-27. Corrective Maintenance Criteria (Continued)

FILE ID: Corrective Maintenance Criteria

DESCRIPTION: Lists the maintenance ratios and MTTR by equipment by maintenance task.

RECORD	FIELD	DESCRIPTION	LENGTH	DATA TYPE
2 - end				
	28	Troubleshoot ORG MR	xxx.xx	Flt. Pt.
	29	Troubleshoot ORG MTTR	xxxxx.xx	Flt. Pt.
	30	Troubleshoot DS MR	xxx.xx	Flt. Pt.
	31	Troubleshoot DS MTTR	xxxxx.xx	Flt. Pt.
	32	Troubleshoot GS MR	xxx.xx	Flt. Pt.
	33	Troubleshoot GS MTTR	xxxxx.xx	Flt. Pt.

ESTIMATED NO. OF TABLES = 1 (ONE SYSTEM)

ESTIMATED NO. OF RECORDS = 13

LENGTH = VARIABLE

SECTION 6 - ALGORITHM AND MODEL DESCRIPTIONS

Table 6.1 lists the algorithms and models associated with each step. This table gives the locations of the algorithm or model descriptions within the text.

6.1 BASELINE TASK SELECTION

For each new system task

- Read the Task Parameter Description File (Table 5.1-16) to identify the task, its associated functional task, and the its task type assignments.

- Read the Baseline Task Parameter Library (Tables 4.2-15 and 4.2-10) to determine if there is task in the library with same functional task assignment (that is a task with the same parent geneure function).

- If there is a task with the same functional task assignment compare its primary task type with the primary task type for the new system task.

    - If the primary task types are the same, then use the library task as the baseline task for the new system.

Table 6.1. Overview of Algorithms

STEP	FILE	SECTION
3	Baseline Task Selection	6.1
2	Static Assessment Algorithms	6.2
2,6,7,8	Stressor Data Identification	6.3
5	Trained Frequency and Recency Estimation	6.4
6	Missing Data Identification Algorithm	6.5
6,7,8	Performance Shaping Functions	6.6
6,7,8	Stressor Degradation Algorithms	6.7
7,8	Mission Simulation Model	6.8
7,8	Maintenance Model	6.9
7,8	Performance Discrepancy Estimation Model	6.10
8	Personnel Characteristics Level Incrementation	6.11

- If the primary task type for the new system task is the same as the secondary task type for the baseline task and the weights for these task types are within .20 of each other, then use the library task as the baseline task for the new system task.

- Otherwise, no single task can be used as the baseline. In this case, use as baseline tasks, all tasks in the library which are associated with the same (1) task type (2) CMF (3) system type (4) MOS, and (5) duty position.

- If there are no tasks meeting these five criteria, use all tasks meeting first four criteria.

- If there are no tasks meeting the first four criteria use all tasks meeting first three criteria.

Continue identification process with relaxed criteria until a set of tasks are identified.

If there are not tasks of the same task type in the Baseline Task Parameter Library, then provide user with message indicating that an appropriate baseline task is not available.

6.2 STATIC ASSESSMENT ALGORITHMS

Components:

6.2.1 User Input
6.2.2 Identification of Standard Values
6.2.3 Estimation of Percent of Subpopulation that Can Be Accommodated

6.2.1 User Input

User inputs the following during Step 2:

- Static measures to be used in analysis
- Upper and lower percentiles to be used (standards)
- Populations to be used as reference

Also, the user later enters in values on a static measure for a particular control/display when the value is outside the standard values determined in 6.2.2.

6.2.2 Identification of Standard Values

For all reach and strength measures selected by the user, the system consults the Static Design Measure Library (Tables 4.2-13 and 4.2-14) to convert percentiles into values.

For visual access, the standard values are set equal to the standard values listed in the Static Design Measure Library.

6.2.3 Estimation of Percent of Subpopulation that Can Be Accommodated

For all reach and access measure selected by user, the system consults the Static Design Measure Library (Tables 4.2-13 and 4.2-14) to identify the percent of population that can be accommodated for each subpopulation.

6.3 STRESSOR DATA IDENTIFICATION

- Read Stressor-System Condition Linkages File (Tables 4.2-19 and 4.2-20) to identify the condition variables needed as input for each stressor.

- Read the System Conditions Files (Table 5.1-10) to determine if values for conditions, variables have been included in system condition sets.

- If they have not been included, then include conditions in data set to be input by the user.

- Read the Product 5 Task Parameter File (Table 5.1-14) to obtain initial task times estimates needed for use in heat and humidity degradation algorithms.

- Read Stressor-System Conditions Linkages (Table 4.2-19 and 4.2-10) to determine additional input data variables for each stressor.

- If input data is only required for certain types of tasks, read the Task Parameter File (Table 5.1-16) to identify the tasks calling into each of these types.

6.4 TRAINING FREQUENCY AND RECENCY ESTIMATION

Convert data on the job frequency and sustainment training frequency entered by user into frequency per six month using the following scale.

	Frequency Metric # per Six Month
Once a week	24
Once a month	6
Once a quarter	2
Once every six months	1
Once a year	.5
Less than once a year	0

- Sum job frequency and the training frequency.
- Convert the sum to Project A job frequency using the following scale:

Project A Scale Value	Job Frequency Value
Not at all	
1-2 times (per six months)	1-2
3-5 times (per six months)	3-5
6-10 times (per six months)	6-10
More than 10 times (per six months)	10 or greater

Convert the sum to Project A Recency Scale using the following:

Project A Scale	Task Frequency (#/six months)
During past month	≥ 6.0
1-3 months ago	2 to 5.9
4-6 months ago	1.0 to 1.9
More than six months ago	.5 to 1.0
Never	< .5

6.5 MISSING DATA IDENTIFICATION ALGORITHM

- Read the Task Parameter File (Table 5.1-16) to identify task types.

- If task type is:

  (1) Gross Motor-Carrying
  (2) Gross Motor-Lifting
  (3) Gross Motor-Torquing

  - Read Performance Shaping Function Parameter Library to identify personnel characteristics and design variables which must be input into performance shaping functions.

  - Read Stressor System Condition Linkages Library (Tables 4.2-14 and 4.2-20) to identify input data associated with stressors related to energy expenditure (head humidity, and MOPP gear).

  - Read Product 5 Task Parameter-File (Table 5.1-14) to obtain an initial estimate of task rate/time.

- If task type is:

  (4) Auditory sound perception
  (5) Psychomotor-Throwing
  (6) Gross Motor-Light
  (7) Any other task type without regression equations in performance function library

- Only required input is the initial task time estimate stored in the Product 5 input file (Table 5.1-14). Accuracy is assumed to be 100% for these tasks.

- For all other task types

  - Read Task Characteristic Map (Tables 4.2-11 and 4.2-12) to identify personnel characteristics requiring input data.

  - Read Task Parameter File (Table 5.1-16) to obtain task frequency and recency estimates.

  - Read Product 5 Task Parameter Library (Table 5.1-14) to obtain initial estimates of task time and task time standard deviation.

  - Read temporary file to obtain initial estimate of task accuracy and accuracy standard deviation.

6.6 PERFORMANCE SHAPING FUNCTIONS

6.6.1 Read Task Parameter Data

- Read the Task Parameter File (Table 5.1-16) to determine task type weights, personnel characteristic values and training frequency and recency values.

- Read Product 5 Task Parameter Description File (Table 5.1-14) to obtain initial time estimates.

- Read initial accuracy estimates from temporary file

6.6.2 Selection of Strategy

- If the primary task type for a task is:

  Gross Motor-Carrying
  Gross Motor-Lifting
  Gross Motor-Torquing
  Do not change time/rate estimate. Task time/rate estimates for these task types will be set during application of the Stressor Degradation Algorithm (See Section 6.7)

For all other tasks, apply algorithms listed in Section 6.6.3 and 6.6.4.

6.6.3 Application of Regression Equations for Each Task Type

For each task type associated with task, apply the regression equation listed in the Performance Shaping Function Parameter Library (see Tables 4.2-27 and 4.2-28)

The general form of these equations is displayed in Figure 6.6.3-1.

If a regression equation is not available for a particular task type, then set task time or accuracy estimate for that task type equal to initial value.

The output of the regression equation prediction will be an estimated Z score for either time or accuracy.

6.6.4 Convert Estimated Z Score to Raw Score to Raw Score

- Read Product 5 Task Parameter File (3.1-14) to obtain estimate of standard deviation and initial mean estimate of task time.
- Read temporary file to determine standard deviation and initial mean value for accuracy.
- Convert estimated Z scores produced by regression equation to raw values using following formula:

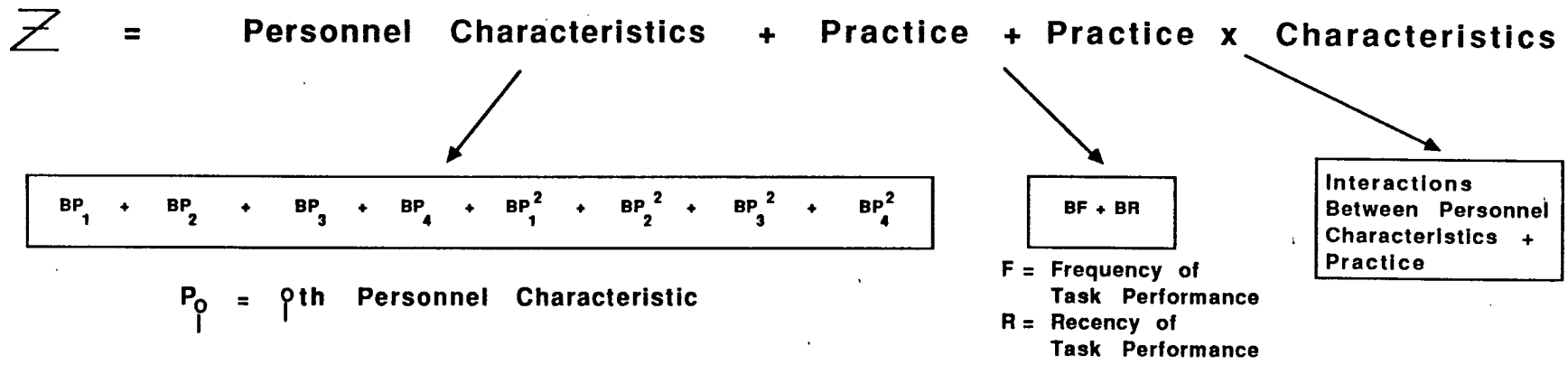
  $Z * (Sd) + \bar{X}$ = estimated time or accuracy x

  Sd = Standard deviation

  $\bar{X}$ = Initial mean estimate

6.6.5 Combine Estimated Values Across Types

$$Ti = \sum_{j}^{3} Wj\ Xij$$



* This is the initial form of the equation that we would start out at the beginning of our statistical analyses. Results of statistical analyses are expected to greatly simplify the equations.

Figure 6.6.3-1. General Form of Performance Shaping Functions*

where Ti = estimated time or accuracy value for ith task

W_i Weight for jth task type

X_i Estimated value for jth task type on ith task

Then divide Ti by j -- the number of task times

6.7 STRESSOR DEGRADATION ALGORITHM

6.7.0 Input Data
6.7.1 MOPP Module
6.7.2 Heat and Humidity Module
6.7.3 Cold Stress Module
6.7.4 Noise Module
6.7.5 Continuous Operations Module
(Time without Sleep)
6.7.6 Integration Module

6.7.0 Input Data

Obtain data needed for stressor degradation algorithms from System Conditions file (Table 5.1-10), which describes system conditions, the Task Parameter file (Table 5.1-16) which describes current estimates of task time and accuracy, the Mission Completion file (Table 5.1-24) which lists the current mission length, and unique human stressor condition data entered by the user during Step 4. (This data is stored on a temporary file). A more detailed description of the unique input data requirements of each stressor is provided in Table 6.7.-1.

6.7.1 MOPP

6.7.1.1 Determine MOPP Level
6.7.1.2 Determine MOPP Effects

6.7.1.1 Determine MOPP Level

If MOPP level is 0, set degradation factor =1

Otherwise, determine MOPP effects (Section 6.7.2)

6.7.1.2 Determine MOPP effects

Assign each task to a BRL task type using the information in Table 6.7-2 which relates BRL task type to PREA task type.

Obtain MOPP degradation factor for each task type from Table 6.7-3.

Calculate weight for BRL task type by summing weights for all associated PREA task types.

Table 6.7-1. Data for Stressor-System Condition Linkeages Input Data

STRESSOR	SYSTEM CONDITIONS	OTHER INPUT DATA	COMMENTS
Heat Humidity	• Temperature • Wind Velocity • % Relative Humidity • MOPP Level	Initial Task Time (From Product 5)	——
		Vehicle Temperature (User Input)	Minimum and Maximum Values Entered Once for Entire system
		Vehicle % Relative Humidity (User Input)	Minimum and Maximum Values Entered Once for Entire System
		Maximum Allowable System Task Performance Rate (User Input)	Entered for Tasks Which have Rate Performance Measures Associated with Them
MOPP	• MOPP Level • temperature • % Relative Humidity	Vehicle temperature (User Input)	See Above
		Vehicle % Relative Humidity (User Input)	See Above
Cold	• Wind Velocity • Temperature • MOPP Level	Gloves On/Off (User Input)	Entered Once for Entire System
		Other Exposed Flesh (User Input)	Only Entered if MOPP gear not Worn, Default Valve (Face Exposed). Entered Once for Entire System
		Vehicle Temperature (User Input)	See Above
Noise		Constant Ambient Noise (In SPL) - Outside Vehicle (User Input)	Entered Once for Entire System Default Valve Will be 85db
		Constant Ambient Noise (In SPL) - Inside Vehicle (User Input)	Entered Once for Entire System Default Valve Will be 70db
		Constant Internal Noise Associated with Vehicle Operation (User Input)	Entered Once for Entire System
		Variable Internal Noise Associated with Vehicle Operation (User Input)	Only Entered if Vehicle Operational Noise Changes with Spped Up, Maneuvering etc. Entered Once for Entire System
		Time Duration of Variable Noise Associated with Vehicle Operation (User Input)	Entered Once for Entire System. Only Entered if Variable Internal Noise Present.
		Maximum Rate of Fire (User Input)	Entered for Each Firing Task
		Noise Level Associated with Each Firing (User Input)	Entered for Each Firing Task
Conditions Operations		Average Speaker Listener Distance (User Input)	Only Entered for Communication Face-To-Face Tasks
		Number of Hours in Last Sleep Before Mission (User Input)	Only Entered Once for Entire System. Default Value = 6.
		Number of Days Without Sleep (User Input)	Only Entered Once for Entire System. Default Value = 0.
		Mission Length (From Product 5)	——

Table 6.7-2. Relationship Between PREA Task Types and BRL Task Types

BRL Task Types	Corresponding PREA Task Types
Near Visual	Perceptual Far Visual
Far Visual	Perceptual Near Visual
Oral/Aural	Communication
Manual Dexterity	Psychomotor
Psychological	Cognitive
Mobility Encumbrance	Gross Motor

Table 6.7.-3. BRL Degraded Ability Matrix

	PHYSIOLOGICAL FACTOR	MOPP LEVEL 0	I	II	III	IV
MOPP Only	Near Visual Acuity	1.0	1.0	1.0	0.5	0.4
	Far Visual Acuity	1.0	1.0	1.0	0.4	0.3
	Oral/Aural	1.0	1.0	1.0	0.5	0.3
	Manual Dexterity	1.0	1.0	1.0	1.0	0.3
	Psychological	1.0	.95	.90	.85	.80
	Mobility Encumbrance	1.0	0.9	0.6	0.5	0.5
MOPP Heat & Humidity	Heat Buildup 0°C	1.0	1.0	1.0	1.0	1.0
	10°C	1.0	0.9	0.9	0.9	0.9
	20°C	1.0	0.9	0.9	0.7	0.6
	30°C (low/high humid)	1/.9	.8/.65	.8/.65	.7/.55	.6/.4
	40°C (low/high humid)	8/.3	.5/.15	.5/.15	.4/.10	.3/.05

Determine the aggregated impact of MOPP across task types using the algoritm listed in Table 6.7-4.

6.7.2 HEAT STRESS AND HUMIDITY

6.7.2.1 Determine Heat Level Data
6.7.2.2 Determine Moderate Heat Effects
6.7.2.3 Determine Extreme Heat Effects
6.7.2.2.1 Determine Appropriate Model
6.7.2.2.2 Manual Task Models
6.7.2.2.3 Sedentary Task Models

6.7.2.1 Determine Heat Level Data

If soldier is in vehicle, set ambient temperature to vehicle temperature, humidity to vehicle humidity (user inputs), and set wind velocity to zero.

Set Heat Exposure Time = Current Mission Length in Product 5 Mission Completion file (5.1-24).

Compute Standard Effective Temperature (SET*) using the Algorithm derived from the effective temperature nomogram in Table 6.7-5.

6.7.2.2 Determine Moderate Heat Effects

6.7.2.2.1 Determine Appropriate Model

System calls up all system tasks

System identifies which tasks are likely to be manual or

Table 6.7-4. Modified BRL Algorithm for MOPP

(1) Calculate the degradation for task type

$$T_{o_i} = W_{o_i} \times D_{o_i}$$

Where

T_{o_i} is the Degradation for $^{o}_{i}$th task type

W^{o}_{i} is the for BRL task type

D_{o_i} is degradation for $^{o}_{i}$ th BRL task type

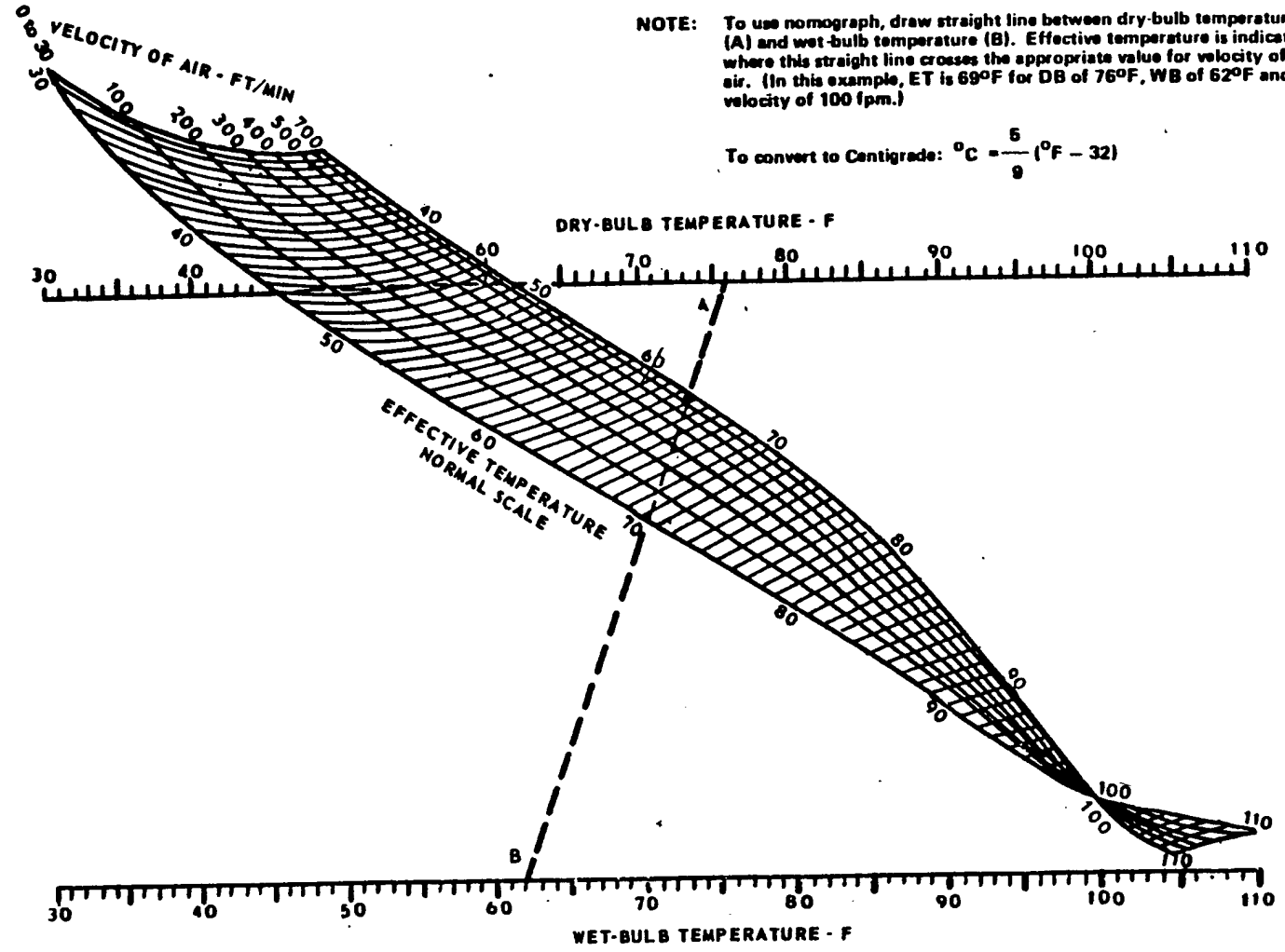
(2) Rank order the T_{o_i}

$T_1 >, \quad T_2 >, \quad T_3 >, \quad T_4 > \ldots.$

(3) Calculate total impact of MOPP on tasks across task types CTT_{o_i} using following formula

$$TT_{o_i} = \prod_{^{o}_{i}=1}^{N} \left[(1 - T_{o_i})^{N} \right]$$

Table 6.7-5. Maximum Metabolic Cost (Effective Temperature)



NOTE: To use nomograph, draw straight line between dry-bulb temperature (A) and wet-bulb temperature (B). Effective temperature is indicated where this straight line crosses the appropriate value for velocity of air. (In this example, ET is 69°F for DB of 76°F, WB of 62°F and air velocity of 100 fpm.)

To convert to Centigrade: $^{\circ}C = \frac{5}{9}(^{\circ}F - 32)$

Clothing: *Customary indoor clothing.* Activity: *Sedentary or light muscular work.* Heating Methods: *Convection type, i.e., warm air, direct steam or hot water radiators, plenum systems.*

sedentary tasks for each task:

If task is Gross Motor-Lifting, Gross Motor-Carrying, or Gross Motor-Pulling/ Torquing

Then,

Declare Manual Task

Apply Manual Task models (Sec. 6.7.2.2.2)

Otherwise,

Declare Sedentary task

Apply Sedentary Task models (Sec. 6.7.2.2.3)

6.7.2.2.2 Manual Task Models

Read Performance Shaping function library to obtain model for each of three types of manual tasks. Identify input data and obtain from appropriate files. Table 6.7-6 describes this input data.

Apply models to determine metabolic cost of task

Convert oxygen consumption rate produced by lifting/lowering model to metabolic cost using the following conversion:

1 liter of oxygen (O_2) = 5 calories of heat.

Table 6.7-6. Input Data for Manual Task Models

Source	Dependent Variable	Type of Task	Model
[illegible]	Oxygen consumption (mL/min)	Lifting that starts at floor and lowering that ends at floor	VO2 = [illegible]
Asfour (1986)	Oxygen consumption (mL/min)	Lifting that starts at table height and lowering that ends at table height	VO2 = [illegible]
[illegible] and Morrissey (1985)	Metabolic rate (watts)	Carrying loads in front of body with both hands	MR = 25.4 + 24.1*G + 0.43*Z*V**2 + (W + L)*(3.16 + 2.54*V**2 + 16*((L/W)**2) - 3.25*V)
[illegible]	Net metabolic rate (kcal/push)	Pushing/pulling at bench height (0.8 m)	NMR = 0.00112*X*W + 0.115*F + 0.00505*F*G
[illegible]	Net metabolic rate (kcal/push)	Pushing/pulling at 1.5 m height	NMR = X*(0.066 + 0.036*F)

Key: NMR — net metabolic rate for activity performed
MR — metabolic rate
VO2 — oxygen consumption
L — load carried (kg)
W — body weight (kg)
TG — treadmill grade level (%)
Z — container width with location of hands in front of body (cm)
P — percent of normal stature
G — gender (male = 1, female = 0)
V — walking speed (km/h)
All models are valid for a duration of less than one hour

Key: TEE — energy expenditure/hour
NMR — net metabolic rate for the activity performed
VO2 — oxygen consumption (L/min for all studies, except Asfour in mL/min)
CVO2 — change of oxygen consumption with time (%)
W — body weight (kg in Garg et al. and Mital et al., pounds in Asfour)
L — amount of load handled (kg in Garg et al. and Mital et al., pounds in Asfour)
G — gender (Garg et al.: male = 1, female = 0; Mital et al.: male = 1, female = 2)
h1 — vertical height from floor (in), starting point for lift
h2 — vertical height from floor (in), end point for lift
TA — type of task (lifting = 1, lowering = 2)
F — frequency of handling (times/min)
H — height of lift or lower (inches)
WID — box width (inches)
LEN — box length (inches)
ANG — angle of twist (0 deg twist = 1, 90 deg twist = 2)
T — shift duration (minutes)
All anthropometric measurements in cm
Isometric strengths in kg
Lifting capability in kg
Box size in inches
Age in years
All models are valid for a duration of less than one hour except those of Mital which are valid up to 12 hours

Key: NMR — net metabolic rate for activity performed
W — body weight (kg)
L — amount of load lowered (kg)
G — gender (male = 1, female = 0)
h1 — vertical height from floor (in), end point for lower
h2 — vertical height from floor (in): starting point for lower
All models are valid for a duration of less than one hour

6.7.2.2.2.1 Maximum Metabolic Cost Sustainable module

For each Manual Task:

Calculate the Maximum Metabolic Cost sustainable in Kcals/hr (work intensity) given SET*. Table 6.7-7 describes the maximum cost in Kcals/hr for SET*.

If metabolic costs of performing task at Initial Task Performance Rate > = Maximum Metabolic Cost sustainable

Then,

reduce task performance rate until metabolic costs can be sustained

Otherwise,

increase task performance rate up to the Maximum Allowable Task Performance Rate or Maximum Metabolic Cost sustainable (whichever comes first)

Calculate degradation value using following

1-new rate/old rate

If MOPP Level Gear is used

Then,

Obtain heat and humidity with MOPP degradation factor for each task type from Table 6.7-3.

Table 6.7-7. Maximum Metabolic Cost (Work Intensity) Given Effective Temperature

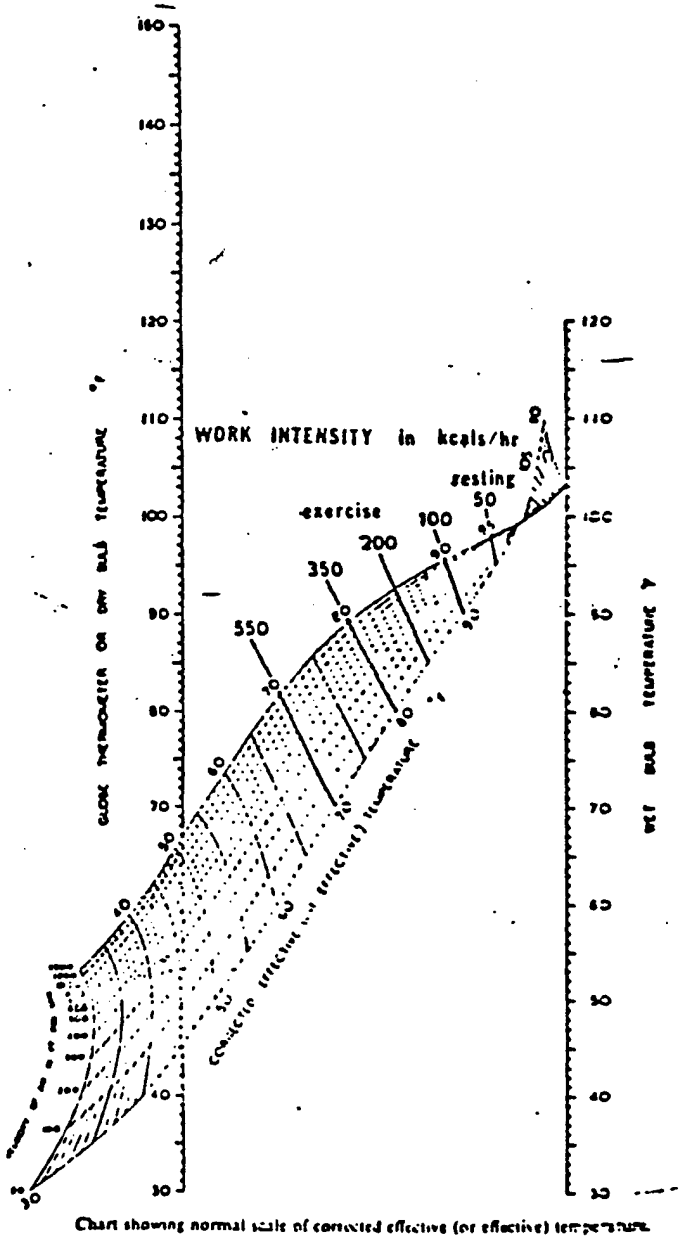


Chart showing normal scale of corrected effective (or effective) temperature.

The normal effective temperature (ET) chart showing recommended maximum industrial ET's for various work intensity levels

Until no tasks remain

Until no Manual Tasks Remain

6.7.2.2.3 Sedentary Tasks

Set degradation factor for all sedentary tasks = 1.0

6.7.2.3 Determine Extreme Heat Effects

Determine Mean Body Temperature:

Determine Core Body Temperature

Determine Core Body temperature using Algorithm from Berlin, Stroschein, and Goldman (1975), and metabolic costs determined in 6.7.2.2.2.1. The critical equations for the algorithm are in Table 6.7-8.

Determine Skin Temperature

Set Current Skin Temperature =

Old Skin Temperature +

((26.15 + 0.235*(Ambient Dry Bulb)) -
Old Skin Temperature) *
(1 - Exp(.05*Time in Current
Temperature))

Where time in current temperature = mission length and old temperature = ambient temperature

Table 6.7-8. Core Body Temperature Productive Equations (Rectal Temperature)

Rectal Temperature Predictive Equations.

The combined effect of metabolic and environmental heat stress on rectal temperature of acclimatized men is evaluated[6] by the final equilibrium rectal temperature

$$T_{ref} = 36.75 + T_{re}(M) + T_{re}(R+C) + T_{re}(E)$$

Equation 12 is comprised of four components:

(1) basal metabolic rate temperature (36.75°C)

(2) added temperature due to metabolic load,

$$T_{re}(M) = 0.004\ (M - 0.098 m_t vG),\ °C$$

(3) change (+ or -) in temperature due to radiation and convection of the environment,

$$T_{re}(R+C) = \left(\frac{0.014A}{clo^*}\right)(T_a - T_s)$$

and

(4) added temperature due to evaporation

$$T_{re}(E) = 0.8 \exp[0.0047(E_{req} - E_{max})]$$

NOTE: Steps 3 and 4 will use average values of environment and evaporation constants for an average soldier with either climate appropriate garb, or MOPP level gear.

Determine Mean Body Temperature (From Parker & West, 1973)

Set Mean Body Temperature = (2/3) Core Temperature + (1/3) Skin Temperature

Determine if Mean Body Temperature indicates Heat Impairment or Heat Casualty:

If Mean Body Temperature is above (108) degrees F

Then,

Declare Heat Casualty, set degradation factor = 0 and provide warning (extreme physiological distress, Parker & West, 1973).

Otherwise,

Apply Determine Moderate Heat Effects (Sec. 6.7.2.3)

6.7.3 Cold Stress Module

6.7.3.1 Determine Cold Stress Data
6.7.3.2 Determine Extreme Cold Effects
6.7.3.3 Determine Moderate Cold Effects

6.7.3.1 Determine Cold Stress Data

Set Heat Exposure Time = Current Mission Length in Product 5 Mission Completion file (5.1-24).

6.7.3.2 Determine Extreme Cold Effects

6.7.3.2.1 Determine if Mean Body Temperature indicates Cold Impairment or Cold Casualty:

If Mean Body Temperature is below 85 degrees F

Then,

Declare Cold Casualty and set task degradation factor to 0 (possible lethal condition, Parker & West, 1973)

Determine if Windchill Condition exists

If gloves are off, or flesh is exposed during mission

Then,

Determine Wind Chill Value (From Parker & West, 1973)

Wind Chill = (Wind Velocity * 100 + 10.45 - Wind Velocity) (33 - Ambient Temperature)

Otherwise,

Apply/Determine Moderate Cold Effects module (Sec. 6.7.3.3)

If Wind Chill value exceeds 1700 Kg-cal/m sq./hr

Then,

Declare Cold Casualty and set degradation factor to zero ("exposed flesh freezes in 1 minute, Parker & West, 1973")

Apply Determine Moderate Cold Effects module (Sec. 6.7.3.3)

6.7.3.3 Determine Moderate Cold Effects

If adequately clothed to suit the environment, and gloves are on to perform the task

Case 1 (task_type = complex psychomotor)

Use % decrement factor for time to perform from Table 6.7-9 (Teichner, 1958)

Case 2 (task_type = gross motor)

Use % decrement factor for time to perform
from Table 6.7-9 (Teichner ,1958)

Convert to degradation factor using following

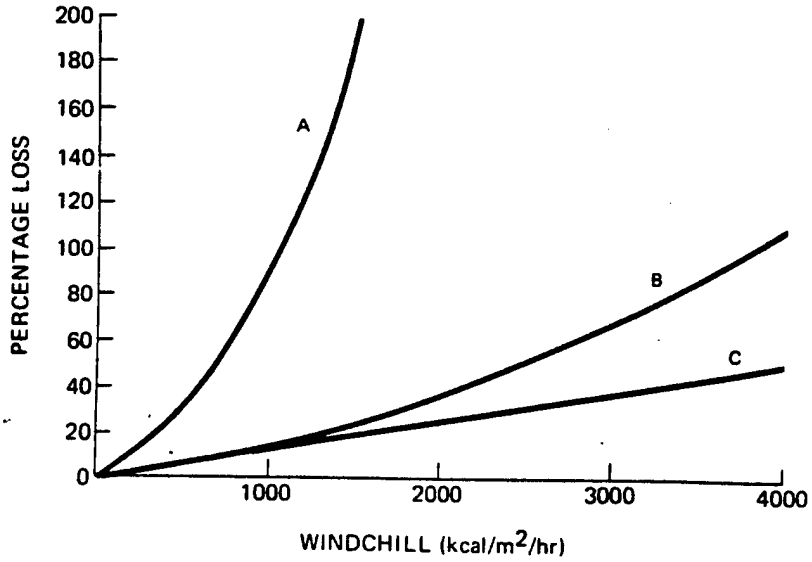
1- decrement

Otherwise,

Set cold degradation factor to 1.0

If adequately clothed to suit the environment, and hands are bare to the environment

Table 6.7-9. Teichner Degradation Factors for Moderate Cold



Minimum effects of the cold on selected functions. Each curve is an estimated percentage loss of the indicated type of performance for appropriately dressed but unacclimatized men. A: tactual sensitivity of the bare hand; B: simple visual reaction time; C: manual skill. (After Teichner, 1958; copyright 1957 by the American Psychological Association and reprinted with their permission)

Select the appropriate task type:

Case 1 (task_type = complex psychomotor-continous)

Time to perform = (Baseline Time to perform) * (1.0 / (1.012 - .607 * EXP (-0.003 * ((Current Skin Temperature) **2)))

Case 2 (task_type = psychomotor discrete and gross motor lite)

Use % decrement factor for time to perform from Table 6.7-9 (Teichner ,1958)

Otherwise,

Set degradation factor = 1.0

6.7.4 NOISE MODULE

6.7.4.1 Determine Data about Noise Conditions
6.7.4.2 Determine Extreme Noise Effects
6.7.4.3 Determine Moderate Heat Effects

6.7.4.1 Determine Data about Noise Conditions

Determine if Noise is Continuous, Variable, or Impulse

Select the case that applies:

Case 1 (Noise is Continuous in Amplitude):

Set Noise Conditions = data input value scaled in spl or dbA units (from Systems Conditions)

Case 2 (Noise is Variable in Amplitude over time):

Determine each time duration

Determine spl level for each time duration

Case 3 (Noise is Impulses of sound pressure):

Determine number of impulses

Determine Peak pressure level per impulse

Apply Determine Extreme Noise Effects (Sec 6.7.4.2)

6.7.4.2 Determine Extreme Noise Effects

Determine if non-hearing sound pressure level (spl) casualties exist:

If Peak spl for any duration > = 191 dbA

Then,

Assume possible lethal condition, set degradation factor = 0 and provide warning

Determine if Noise Exposure Gear are worn:

If noise exposure gear are worn,

Then,

Determine the attenuation factor in dbA of the protection gear using Table 6.7-10, and subtract attenuation factor in dbA from each of the spl and peak pressure estimates

If Peak spl > = 185 dbA

Then,

Assume acute physical damage, set degradation factor = 0 and provide warning

Determine Effective Exposure Time (EET) for Continuous and Variable sound pressure levels:

Retrieve the sound pressure level and time duration estimates

If there exists only one sound pressure level,

Then,

Apply the Effective Exposure Time (EET) values from Table 6.7-11

Table 6.7-10. Alteration Factors for Noise Protection Gear

Mean Hearing Protection Minus One Standard Deviation (dB)[1]									
	FREQUENCY (Hz)								
DEVICES	**125**	**250**	**500**	**1K**	**2K**	**3K**	**4K**	**6K**	**8K**
QPL MUFFS[2]									
TYPE I									
Amer. Optical 1200	6	19	25	38	38	44	34	36	30
Amer. Optical 1700	10	19	26	36	36	36	38	42	27
David Clark 117	13	21	36	37	33	34	35	33	39
MSA Mark II	11	21	31	29	37	31	37	33	29
TYPE II DAVID CLARK E-310									
Over the Head	8	14	23	34	32	33	36	34	30
Behind the Head	7	17	25	32	32	32	36	29	26
Under the Chin	8	17	24	30	30	31	35	30	28
MSA MARK IV									
Over the Head	7	14	21	31	34	37	37	35	30
Behind the Head	8	14	20	30	31	33	39	33	29
Under the Chin	8	11	21	29	32	32	28	35	30
GLENDALE N-900									
Over the Head	8	13	24	32	38	38	37	33	31
Behind the Head	9	12	24	35	40	39	36	35	30
Under the Chin	8	11	21	33	38	37	36	32	30
INSERTS									
V-51R	22	20	22	24	33	34	29	33	31
Flents	20	19	22	25	32	36	34	32	30
Comfit (Triple Flange)	21	20	20	21	25	22	21	30	30
COMBINATIONS									
Amer. Optical 1200 plus V-51R	27	36	41	39	47	44	52	43	39
Amer. Optical 1700 plus V-51R	29	37	39	36	47	46	55	40	40
David Clark 117 plus V-51R	29	36	35	36	38	48	52	46	48
MSA Mark II plus V-51R	23	36	38	30	39	43	45	41	29
HELMETS									
HGU-26/P with H-154(A)	6	4	17	20	30	38	43	42	32
HGU-26/P with 17P	0	0	10	17	20	28	37	39	31
HGU-26/P with Custom Liner	0	0	3	4	14	26	38	31	29
COMMUNICATIONS									
H-133 (ground)	17	26	39	26	29	24	33	32	31
H-157 (in flight)	6	10	20	26	25	25	32	31	27
H-78C (in flight)	3	2	4	18	24	26	32	33	27

NOTE[1] Values represent the amount of hearing protection expected for 85% (mean minus one standard deviation) of the wearers.

NOTE[2] QPL Items — Those items currently listed on the USAF Qualified Products List for earmuffs.

Table 6.7-10. Alteration Factors for Noise Protection Gear (Continued)

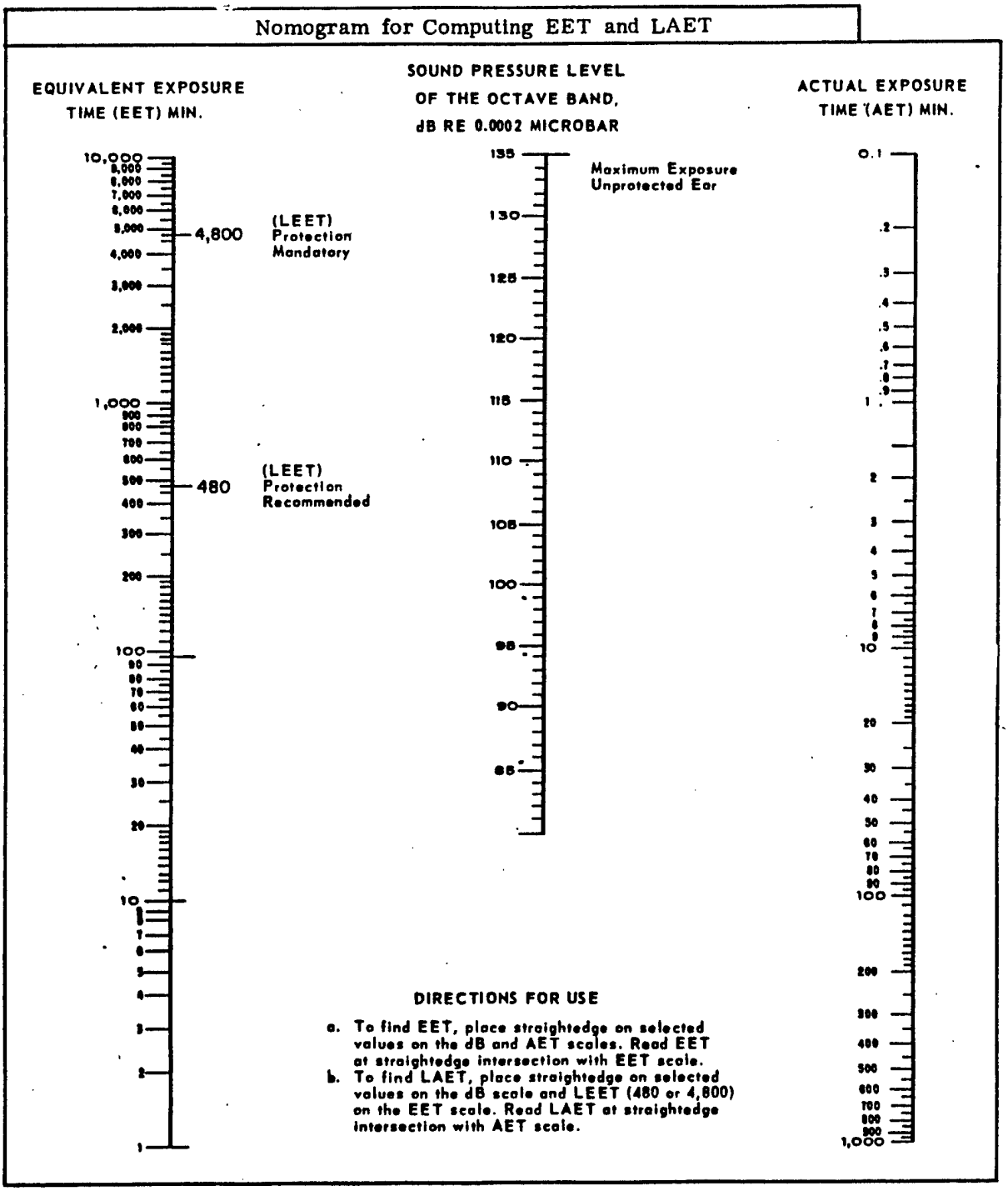
Single Number Attenuation Factors (dBA)[1]					
	C — A VALUES				
DEVICES	**-2 to 0**	**1 to 3**	**4 to 7**	**8 to 12**	**13 or >13**
QPL MUFFS[2]					
TYPE I					
Amer. Optical 1200	30	26	22	17	10
Amer. Optical 1700	31	28	25	20	14
David Clark 117	33	30	27	23	17
MSA Mark II	31	28	25	21	16
TYPE II					
DAVID CLARK E-310					
Over the Head	28	25	21	17	11
Behind the Head	28	25	22	17	12
Under the Chin	28	25	22	18	12
MSA MARK IV					
Over the Head	27	24	21	16	10
Behind the Head	27	24	21	17	11
Under the Chin	26	23	20	16	10
GN — 900					
Over the Head	27	24	21	16	10
Behind the Head	28	25	21	16	10
Under the Chin	26	23	20	15	9
INSERTS					
V-51R	27	26	25	23	21
Flents	27	26	24	22	20
Comfit (Triple Flange)	23	22	22	21	20
COMBINATIONS					
Amer. Optical 1200 plus V-51R	43	41	39	36	32
Amer. Optical 1700 plus V-51R	41	40	38	36	34
David Clark 117 plus V-51R	39	38	37	35	33
MSA Mark II plus V-51R	36	34	33	31	29
HELMETS					
HGU-26/P with H-154(A)	20	17	14	10	5
HGU-26/P with 17P	15	13	9	5	0
HGU-26/P with Custom Liner	9	7	5	3	0
COMMUNICATIONS					
H-133 (ground)	29	28	27	25	23
H-157 (in flight)	24	21	18	14	9
H-78C (in flight)*	13	11	9	6	2

*Approximated

NOTE[1] Values represent the amount of hearing protection in dBA expected for 85% (mean minus one standard deviation) of wearers. Values to be subtracted from measured dBA.

NOTE[2] QPL Items — Those items currently listed in USAF Qualified Products List for earmuffs.

Table 6.7-11. Effective Exposure Time Estimates



Determine the EET for the single exposure time and intensity combination

Otherwise,

For each sound pressure level and time duration:

Apply the Effective Exposure Time (EET) from Table 6.7-11

Add the new EET value to the old EET value and continue set EET = EET + this determined EET

Until no sound pressure level and time durations remain

If EET >= (4800)

Then,

Declare Noise casualty, set degrdation factor = 0, abort task, and provide warning

Determine if Noise Exposure indicates Temporary Threshold Shift:

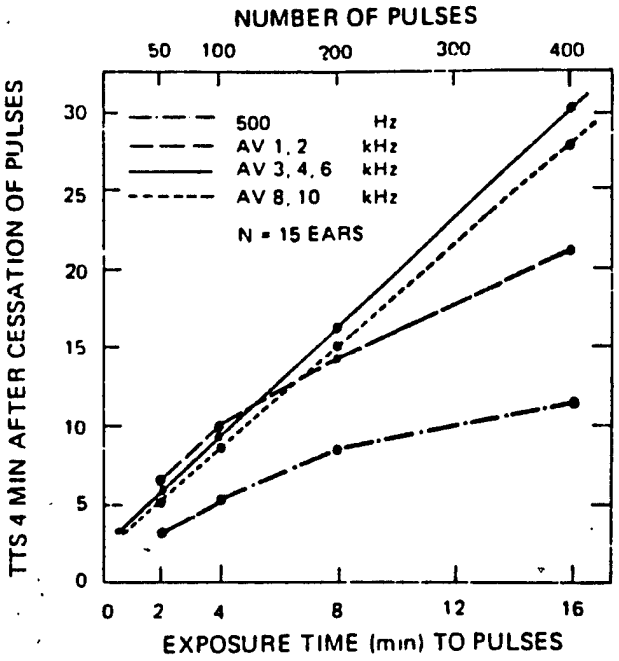
Select type of noise model:

Case 1 (Impulse)

Apply TTS4 model listed in Table 6.7-12 to determine dbA loss after exposure, Sec. 6.7.4.2.1 (MIL 759A - B-21)

Case 2 (Continuous)

Table 6.7-12. Temporary Threshold Shift (TTS) for Impulse Noise



Average Growth of TTS from Pulses as a Function of Exposure Time (lower abscissa), or of Number of Pulses (upper abscissa) When Pulses are Presented at a Constant Rate (TTS from impulses increases linearly with time or with number of pulses. (Ward, et al., 1961))

Retrieve exposure time

Apply TTS(db) listed in Table 6.7-13, Sec. 6.7.4.2.1 model to determine dbA loss after exposure

If TTS(db) > 40 db[1]

Then,

Declare Noise casualty, set degradation factor = 0, and provide warning

Case 3 (Variable)

Perform time-weighted average to determine average dbA over the durations

Determine EET in minutes for the time-weighted value

Apply the TTS(db) model, Sec 6.7.4.2.1 using the dbA slope that is close to the time-weighted average

If TTS(db) > 40

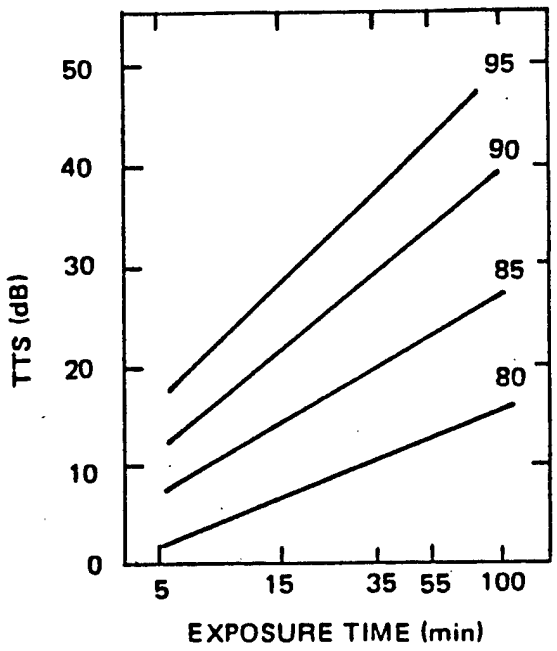
Then,

Declare Noise casualty, set degradation factor = 0, and provide warning

---

[1] At 40db, recovery time becomes unacceptably long. See Ward, 1970, in MIL759A

Table 6.7-13. Temporary Threshold Shift (TTS) for Continuous Noise



TTS at 4 kHz from Exposure to 2-4 kHz Octave Band Noise. Parameters is Noise Level in SPL. (Shoji, et al., 1966)

6.7.4.2.1 TTS(db) model (MIL 759A -B-14)

Select the constant db level:

Case 1 (dbA >= 95

Apply 95 dbA slope TTS(db) function
from Table 6.7-13

Case 2 (dbA >= 90)

Apply 90 dbA slope TTS(db) function
from Table 6.7-13

Case 3 (dbA >= 85)

Apply 85 dbA slope TTS(db) function
from Table 6.7-13

Case 4 (dbA >= 80)

Apply 80 dbA slope TTS(db) function
from Table 6.7-13

Otherwise,

Set degradation factor = 1.0

Apply determine moderate noise effects (Sec. 6.7.4.3)

If TTS(db) > 40db

Then,

Declare Noise casualty, set degradation factor = 0, and provide warning

6.7.4.3 Determine Moderate Noise Effects

6.7.4.3.1 Determine Appropriate Task Models

Determine the appropriate task_type:

Select the model for each task:

Case 1 (task_type = face to face aural communication)

Determine the speaker-to-listener distance

Apply the Speech Intelligibility model listed in Table 6.7-14 to determine the probability of correct communications (see MIL-STD-1472C, MIL-HDBK-759A, and AFSC DH 1-3).

Set the Probability of Correct Communication = 0.0, 0.5, or 1.0 , determining upon shaded area in Table 6.7-14.

Case 2 (task_type = aural communication not face to face)

Calculate the Articulation Index (AI) for the type of noise encountered from Table 6.7-15 (see MIL-HDBK-759A, AFSC DH 1-3, Boff 26-44).

Table 6.7-14. Speech Intelligibility Model

Heavy Shaded = Prob = 0.0
Lightly Shaded = Prob = 0.50
Unshaded = Prob = 1.00

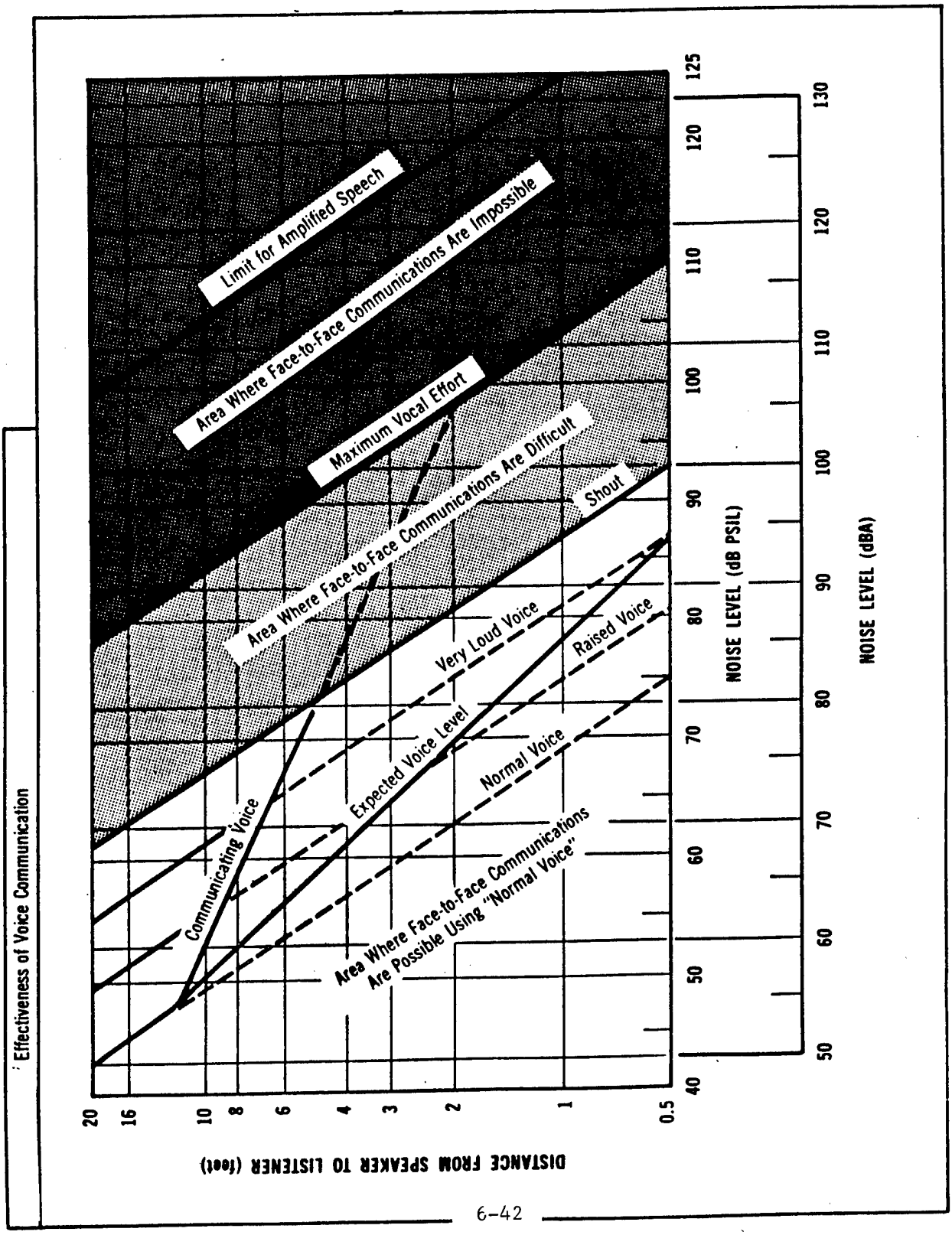


Table 6.7-15. Articulation Index Calculation

$$\sum_{i=1}^{5} (\text{dB Speech} - \text{dB Noise}) - K_i$$

Where: dB Noise = User Input Value
dB Speech = Average dB of Speech Communication

K_i = Octave Band Weighting Factors (for 5 Octaves)

i = Index 1 through 5

Set the Probability of Correct Communications = percentage of syllables likely perceived for Sentences - first presented to listeners) (from Table 6.7-16 and MIL-HDBK-759, Boff 26-47)

Case 3 (task_type = "match with any remaining type")

Set decrement value = 0

Convert to degradation factor using following

1 - old speech accuracy/new speech accuracy

Until no tasks remain

6.7.5 Continuous Operations

Determine the appropriate Task Model for each task:

Select the appropriate model for each task using the input data from the ARI Continuous Operations Data parameters, listed in Table 6.7-17:

Case 1 (task_type = Gross Motor)

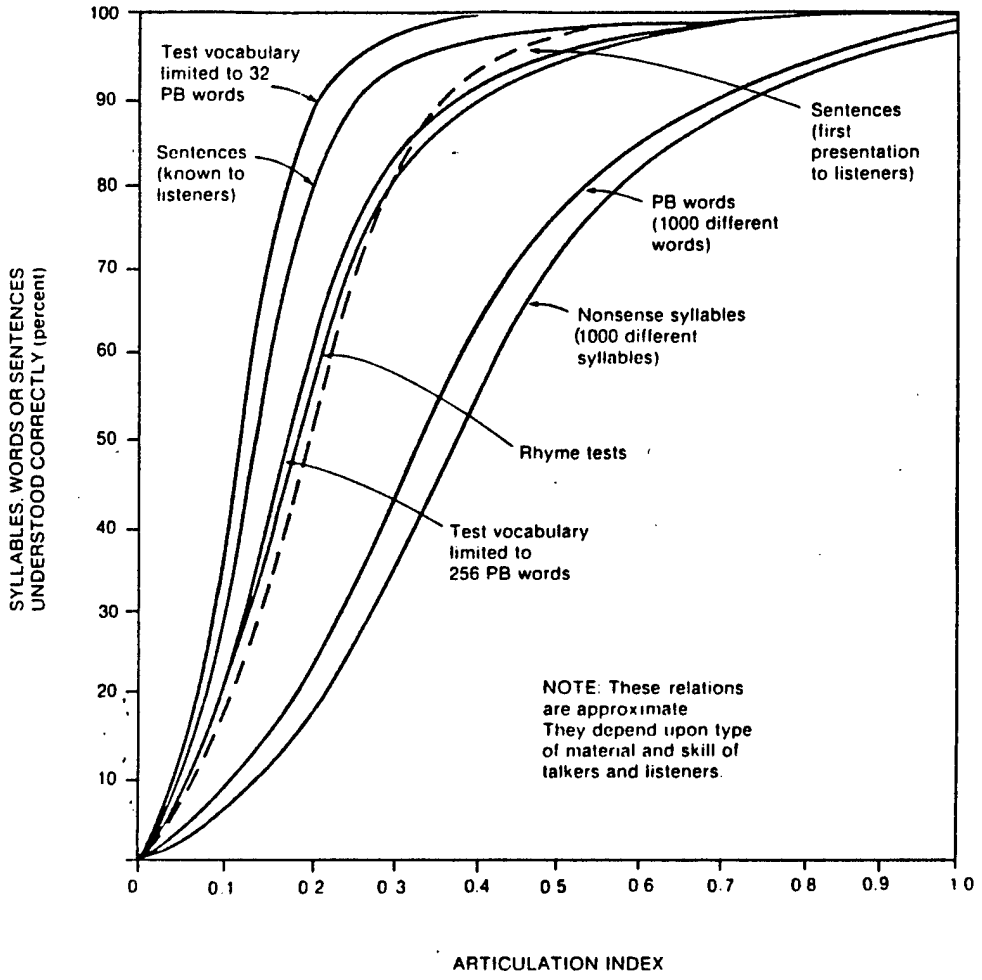
Determine accuracy decrement from Table 6.7-18 (General Physical Effort Decrement)

Case 2 (task_type = Tracking Task)

Determine accuracy decrement from Table 6.7-19 (Tracking Task Decrement)

Table 6.7-16. Articulation Index and Probability of Communication

AUDITORY INFORMATION PROCESSING



The percentage of syllables, words, or sentences actually correctly reported and the corresponding articulation index (AI) for a variety of message set types. The articulation index is a prediction of articulation performance calculated from the signal intensity levels in 20 frequency bands. Test items in this correlation of AI with performance included phonetically balanced (PB) words of varying message set size, known sentences, novel sentences, nonsense syllables, and rhyme test words. The figure shows that there is a systematic relationship between AI and performance, supporting the usefulness of the AI. The meaning of a given AI, however, depends upon the nature of the semantic auditory signals. (From K. D. Kryter, The effects of noise on man, Academic Press, Inc., 1970. Reprinted with permission.)

Table 6.7-17. ARI Continuous Operations Data

Variable Name	Description
X O (1)	Operator Variable: The number of consecutive nights for which the duration of operator's sleep per night is known: Not used to calculate.
X O (2)	Operator Variable: The number of hours of last sleep.
X O (3)	Operator Variable: The number of days since last sleep.
X O (4)	Operator Variable: The number of days of duty.

Table 6.7-18. General Physical Effort Decrement (for All GM Tasks)

I. Fatigue Level based upon the number of hours of last sleep [XO(2)]:

If XO(2) $\leq$ 8 hours

Then,

(1 - Fatigue Factor) = 0.125 * XO(2)

Else,

Fatigue Factor = 0.0

II. Fatigue Level based upon the time since the operator last slept in days, or fractional parts of days [XO(3)]:

If XO(3) < 0.21

Then,

(1 - Fatigue Factor) = 0.36 * XO(3)

If 0.21 $\leq$ XO(3) $\leq$ 0.83

Then,

(1 - Fatigue Factor) = -0.3 + 1.44 * XO(3)

If XO(3) > 0.83

Then,

(1 - Fatigue Factor) = 0.83 + 0.096 * XO(3)

Table 6.7-19. Tracking Task Decrement (for All Tracking Tasks)

Fatigue Level based upon the number of days without sleep [XO(3)]:

NME = NME + 1

NIV (NME) = 2

RM = - 69.855 + 57.66 * XO(3) + 0.010 * Current Time in Military Format

Prob (Complete) = RM * Baseline Probability of Task Completion

Case 3 (task_type = Numeric Task)

Determine Accuracy decrement from Table 6.7-20 (Numeric Ability Decrement)

Otherwise

Set degradation factor = 1.0

Calculate total continous operations decrement for task type using algorithm listed in Table 6.7-21.

Convert to degradation factor using following

1-decrement

Until no tasks remain

6.7.6 Integration Module

Combine degradation factors for individual stressors using the algorithm listed in Table 6.7-22.

Table 6.7-20. Numeric Ability Decrement (for All IP-Num Tasks)

Time to Complete Numberic Ability Tasks Based upon the Number of Days of Duty [XO(4)]:

$$\text{Time} = \text{Baseline Time} * ((1.0 + 123.45/((\text{Baseline Time}) * (1.65 - 0.095 * XO(4))) + (\text{Baseline Time} \wedge 2\ (-0.07 + .005 * XO(4))) + (120.9 - 0.0085 * XO(4))))$$

Table 6.7-21. Algorithm for Determining Continuous Operations Decrement

(1) Calculate the decrement for the task type

$$T_{0_i} = W_{0_i} \times D_{0_i}$$

(2) Rank order the T_{0_i}

$$T_1 > T_2 > T_3 > \ldots T_N$$

(3) Calculate the total decrement across task types

$$TT = \frac{N}{\sum_{i=1}^{0_i = 1}} [(1 - T_{0_i})^N]$$

Table 6.7-22. Formula for Integrating Impacts of Stressors

$S_{o_i o_j}$ is the degraduation valve for the o_i th stressor on the o_jth task

Rank order the stressors in terms of their size

$$S_{1 o_j} > S_{2 o_j} > S_{3 o_j} \ldots S_{N o_j}$$

Calculate total degradation for task (T_{o_j}) using following formula

$$T_{o_j} = \prod_{o_i = 1}^{N} [(1 - S_{o_i o_j})^{N}]$$

6.8 MISSION SIMULATION MODEL

The Mission Simulation Model will be developed by the PREA Applications Manager from the data that the user entered and subsequently filed in the libraries and working files. This simulation model will be based on Micro SAINT simulation, although the model development portion of Micro SAINT will be transparent to the user.

In this product, the mission performance will be analyzed using a hierarchical task network model. In the model, the mission is the top-level network. This mission network is composed of functions (sub-networks). Each of the functions in the mission is composed of a network of tasks.

As the user proceeds through the steps defined in this product, he/she will be defining the mission, its composite functions and tasks, the sequence of the functions and tasks, and the performance estimates for the functions and tasks. All of this information will be combined to build a task network model of the mission.

Model execution will be accomplished using the Micro SAINT program "Exe.exe." This software program is DoD-owned, and is currently maintained by MA&D. For this reason, the software which actually controls the progression of the mission simulation model is already complete and will not need to be modified. Since this document is the design specification for the code that must be developed to support the product, we will not discuss the Micro SAINT executable program in any detail.

When the mission performance models are executed, the user will control the number of times that the model will be run. The

software will save the results of each run so that they can be compared to each other in frequency distributions or other reports. This feature is also currently available in Micro SAINT and will not need to be developed.

Micro SAINT input and output files are in ASCII format. This allows our MPT products to access the Micro SAINT output without significantly modifying Micro SAINT, itself. This will be a great time saver.

Executing the mission performance model is an iterative procedure that can be described as an eight step process. A flow diagram of this process is presented in Figure 6.8-1.

In the remainder of this subsection, we will discuss each step in detail.

Step 1 - Identify the first task in the model. This step is very simple because the first task in the model will be recognized by first identifying the first function in the model. The first function in the model is the function which is listed first on the function sequence table (See Section 3, Step 6). The first task of the model, then, is the task which is listed first on the task sequence table which is associated with the first function.

Step 2 - Compute the task's completion time. The completion time for a task will be computed by adding the estimated task time to the current system clock time.

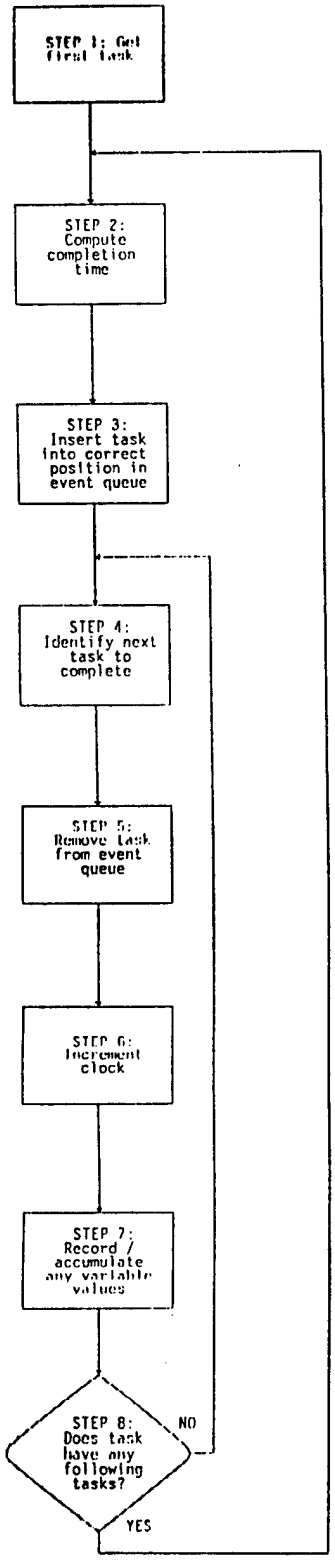


Figure 6.8-1. Performance Model Execution

Step 3 - Insert the task into the correct position in the event queue. Since the Micro SAINT model is event driven, there is an "event queue". The event queue is a linked list data structure which contains an ordered list of all the tasks in the model which are currently executing. Each task is positioned in the event queue (i.e., the linked list) in the order that the tasks will complete. In other words, the next task to complete will be the task that is positioned at the top of the event queue. The event queue storage area contains a description of the task. This description includes the name of the task, the number of the task, any tasks which will follow this task, and the clock time at which the task will complete.

Step 4 - Identify the next task to complete. As stated in Step 3, the next task to complete will be positioned at the top of the event queue (i.e., will be the first element in the linked list).

Step 5 - Remove the next task to complete from the event queue. This consists of moving the pointer of the linked list down one position, so that it will be pointing at the second item in the event queue. This procedure establishes the second task as the "top of the queue." The description of the first item in the queue is then stored as the current execution event.

Step 6 - Increment the clock. The system clock is then updated by incrementing its value to the time at which the new task is scheduled to complete.

Step 7 - Record/accumulate any variable values. The purpose of the model is to estimate the mission/function performance. This requires that any variables which are being monitored throughout the simulation be recorded. In this step, any variable storage or calculations will be completed. If necessary, the variable values can be stored for analysis upon model completion.

Step 8 - Does the task have any following tasks? One of the descriptor fields for each task is the following task(s). If the task does have a following task, then control will be transferred to Step 2 for the new task. If the task does not have any following tasks, then control will be transferred to Step 4.

As stated previously, even though the user will not use the Micro SAINT user interface as it presently exists, we will incorporate portions of the Micro SAINT simulation language within the SPREA. Micro SAINT is currently capable of accepting ASCII data files, compiling any arithmetic expressions and functions, and building a linked discrete simulation model using the procedures discussed above. Micro SAINT is also capable of drawing network diagrams of the model and building timeliness of task execution. The interface that the user will use to communicate with Micro SAINT will be MPT^2-Specific and will enable the user to learn how to use the tool quickly and easily, without confusing him/her with simulation terminology and other extraneous issues.

6.9 THE MAINTENANCE REQUIREMENTS SIMULATION MODEL

The Maintenance Requirements Simulation Model will model the maintenance requirements of each component in the new system being evaluated. It will estimate the total system maintenance requirements and system reliability and availability. Figure 6.9-1 is a block diagram of the top level network in the Maintenance Requirements Simulation model. The next few pages will explain the logic, algorithms, and data collection techniques used in the model. All of the techniques and algorithms described in this section are within the current functional capabilities of the Micro SAINT simulation software that will be used to build the embedded computer model.

Each oval or rectangular shape in the Figure 6.9-1 represents a task in the top level network. The arrows between the nodes indicate the sequence of execution. The simplicity of this top level network is apparent. However, the rectangular nodes labeled "calculate maintenance schedule" and "perform maintenance" represent sub-networks of tasks.

The following paragraphs discuss the individual tasks in the model.

Sub-network 1.0 - Calculate Maintenance Schedule

The node labeled 1.0 represents a sub-network of tasks that will calculate a schedule for the first corrective and planned maintenance action for each component in the system. Figure 6.9-2 is an illustration of the tasks in the "Calculate Maintenance Schedule" sub-network.

Task 1.1 in Figure 6.9-2 will be used to perform the calculations that will determine the corrective maintenance schedule. The number of operational units before the first failure requiring corrective maintenance for each component will be determined by a Micro SAINT function that will search the component parameter matrix that was input by the analyst for each maintenance action whose "type" is "corrective". The function will then calculate an exponentially distributed random number using the "mean operational units between failure" for that action and component. The actual number of operational units to be used for the simulated first corrective maintenance for each component will be stored in a two-dimensional variable array along with the binary value from the Component Maintenance Parameter File (see Table 5.1-25) that indicates whether or not that particular component failure is critical enough to cause the mission to be aborted. The current number of operational units in the simulation (at this point zero) will also be stored. The last

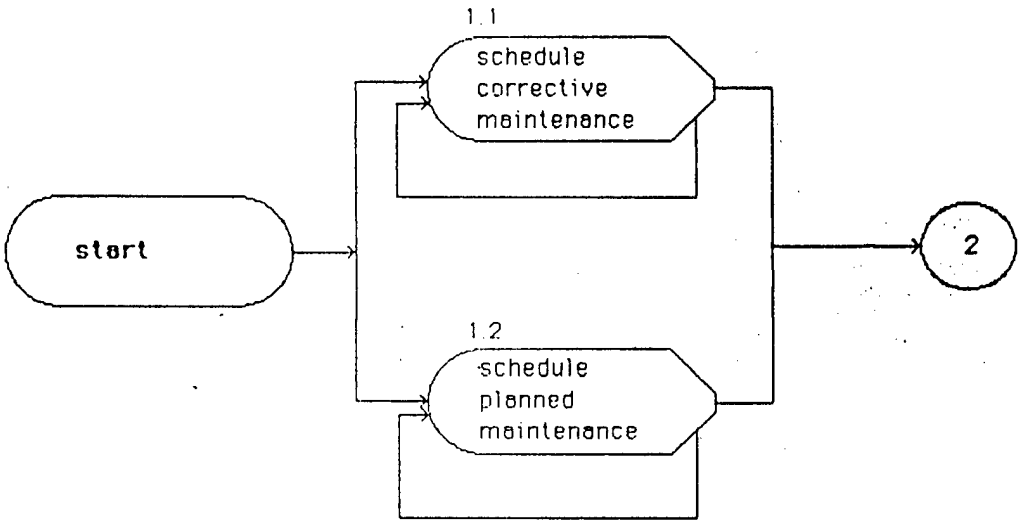


Figure 6.9-2. Calculate Maintenance Schedule

element for each component in the array is a binary value that indicates when the current number of operational units has reached the value calculated for the first component failure. Figure 6.9-3 is an illustration of the elements in the corrective maintenance array.

A second variable array will contain values to be used for simulating planned maintenance. Task 1.2 in Figure 6.9-2 will be used to assign the values to the planned maintenance array for each component. The number of operational units between maintenance actions that are "planned" will be taken directly from the Component Maintenance Parameter file since planned maintenance is scheduled on a regular basis. The variation in the time that planned maintenance is actually conducted is modeled by performing planned maintenance only between missions. This array will also contain an element that indicates the current number of operational units since the last occurrence of this planned maintenance action and a binary "flag" (1 or 0) to indicate when the component is ready for the planned maintenance.

Task 2 - Perform Mission

The function of this task is to increment variables that indicate the current state of the simulation model. Following is a list of variables that are incremented in task 2:

1. A counting variable that keeps track of the number of missions started is incremented by one.

2. The number of operational units for each component per mission according to the mission scenario information that was entered by the analyst.

Name	actual units for next fail	current operational units	critical component	maintenance required
Component 1	456	23	1	0
Component 2	112	16	0	1
Component 3	1300	18	0	1
Component 4	2345	12	1	0
Component 5	720	100	1	0

Figure 6.9-3. Corrective Maintenance Variable Array

3. The mission mean time and standard deviation are used to calculate a normally distributed random number representing the actual (simulated) execution time for "Perform Mission".

4. The "current number of operational units" elements of the maintenance schedule arrays for planned and corrective maintenance (discussed above) for each component are incremented by the number of operational units per mission obtained from the mission scenario data. For example, if the mission scenario data indicates that a component is operated for 50% of a mission, and the simulated mission time is 2.5 hours, the current number of operational units for that maintenance action is incremented by 1.25 hours.

5. For planned and non-critical corrective maintenance actions, the current number of operational units is compared to the number of operational units for the next failure (or planned maintenance). If the current operational units is greater than or equal to the value for the next failure, the flag element indicating a need for maintenance is changed from 0 to 1.

   Corrective maintenance that causes the mission to be aborted will cause task 2 to be interrupted and the maintenance will be performed immediately (refer to the dotted line on the network diagram). In this case, the operational units per mission for the other components in the system will only be incremented by the percent of the mission that was completed.

6. Three variables will keep track of the total number of operational units for each operational unit metric throughout the simulation (i.e. time, rounds, miles). These variables will be used to calculate the aggregate mean operational units between failures for all components that use the same metric.

7. When a mission is aborted, a variable counting the total number of aborted missions is incremented by one. The value of this variable will be used to calculate a measure of mission reliability using the following equation:

$$reliability = (TS - TA) / TS$$

where:
TS = total missions started
TA = total missions aborted

Reliability in the above equation is the probability of the mission being completed without aborting.

8. System reliability will be the probability that the system will be able to perform a single mission with out a component failure. System reliability will be determined from the Mean Operational Units Between Failure for each operational unit metric (discussed above). The system reliability per mission for each metric will be calculated using the following equation:

reliability per mission = $e^{-TO/MOUBF}$

where: e = base of natural logarithms

TO = total number of operational units per mission.

MOUBF = mean operational units between failure for all components with the same metric.

This calculation assumes an exponential distribution for all component failures.

The overall system reliability will be the product of the reliability probabilities for all three metrics.

Task 3 - Maintenance Required

This is a zero time task whose function is to sort through the variable arrays to determine if any of the planned or non-critical maintenance flags are equal to 1 (one). Task 3 is a decision task. If any of the component flags equals one, it is followed by the "Perform Maintenance" network and by the task labeled "Standby Time". This is to establish a "window" of time within which all maintenance must be completed to avoid missing the next scheduled mission.

If all of the component flags in the two variables are equal to 0 (zero), only task 5 ("Standby Time") is executed next.

Sub-network 4.0

This sub-network simulates the performance of all maintenance activities. The maintenance for each component whose "flag" in the planned or corrective maintenance variable array is performed in parallel. To calculate the actual number of people needed for each maintenance job, the model will first generate the maintenance times for each task and then sum all of the tasks that are to be performed by a single maintenance job. This value is compared to the time allotted for the maintenance window to determine the number of people needed for each job. Figure 6.9-4 is a block diagram of the tasks in the perform maintenance sub-network.

When the maintenance for a component has been completed, the variable array element containing the cumulative operational units between maintenance is re-set to zero. If the corrective maintenance was performed, a new exponentially distributed random number is generated for the number of operational units until the next failure and assigned to that array element in the corrective maintenance array.

Task 4.1 is a "dummy" task used to start each of the component maintenance tasks that have flag values equal to 1 (one). Task 4.1 also assigns the value of 1 (one) to another flag (referred to later as the "overall maintenance flag") indicating that maintenance (of some kind) has started. Task 9999 will not execute until all of the maintenance tasks have completed. It is a zero time task that resets the maintenance flag to 0 (zero) to indicate that all maintenance has been completed.

The time it takes to perform each individual maintenance action is obtained from the mean values for repair times that are stored in the Component Maintenance Parameter File. The mean time to repair is also used to increment the variables that represent the cumulative number of manhours for the appropriate:

- Maintenance job (MOS/skill level/category).
- Maintenance type.
- Maintenance level
- System component

Task 5 - Standby Time

This task simulates the time between scheduled missions. It follows task 3 whether or not maintenance is required. The execution time for task 5 is generated from a function that uses the following Maintenance Scenario file values:

- Mean time between missions
- Standard deviation between missions (this value is calculated from the + - deviation value that is entered by the analyst by dividing that value by 2).
- Number of missions per day

The main purpose for the "Standby Time" task is to establish "windows" of time within which all maintenance must be completed without missing the next scheduled mission. At the end of task 5 the value of the "overall maintenance flag" is checked. If the value of the flag is 1 (one), it indicates that some maintenance is still being performed.

When this is the case two things happen:

1) A variable storing the number of missed missions is incremented by one.

2) A new window is established by generating an execution time for the mission that was missed and adding it to another randomly generated standby time.

Task 5 keeps following itself until all of the maintenance has been completed. Then it is followed by the performance of the next mission.

An estimate of inherent availability for the system will be calculated by aggregating the mean time between failures for all components and the mean time to repair for all maintenance actions using the following equation:

inherent availability = (MTBF / (MTBF + MTTR)

where: MTBF = mean time between failure for all components

MTTR = mean time to repair for all components

When the system clock is greater than or equal to the number of days covered by the simulation, as indicated in the mission scenario data, task 5 is followed by the last task in the model.

When the last task is executed, the values of all of the variables used to store maintenance manhour requirements will be stored in a Simulation Results File data base. The analyst can access this data base through the Maintenance Reports Generator

to generate reports of the maintenance manhour requirements calculated in the simulation model.

The output of the computer simulation model will be a relational data base of maintenance manhour requirements that can be queried to report various combinations of maintenance requirements such as:

- Maintenance jobs required.
- Maintenance tasks (maintenance action by component) per maintenance job.
- Manhours by maintenance job.
- Maintenance headcount data per job.
- Manhours by system component.
- System reliability.
- Mission reliability.
- System inherent availability.

6.10 PERFORMANCE DISCREPANCY ESTIMATION

Components

- Aggregation of Task Element Estimates Into Task Estimates
- Comparison of Task Performance Requirements
- Comparison of Required Mission Time and Accuracy With Estimated Values

- Comparison of Required Mission Maintainability and Availability With Estimated Values
- Comparison of Required Mission Maintainability and Availability With Estimated Values

6.10.1 Aggregation of Task Element Estimates

- Calculation of Task Time

  Task Time = Sum of Task Element Task Times (Including Equipment Task Elements)

- Calculation of Task Accuracy

  - If there are no equipment task elements, task accuracy is the product of task element accuracies

  - If there are equipment task element, first calculate the product of the human task elements. Then calculate task performance time using the following equations:

    $$T = E * H$$

  Where T = task accuracy
  E = inherent equipment task element accuracy given perfect human performance
  H = product of accuracies of the human task elements

- Store estimated task time and accuracy values in task parameter file (Table 5.1-16)

6.10.2 Comparison of Task Performance With Functional Task Performance Requirements

- Read Functional Task Performance Requirements from Table 5.1-20.
- Read Estimated Task Time and Accuracy from Table 5.1-16.
- Compare requirements with estimates, calculate discrepancies and percentage discrepancies.

6.10.3 Comparison of Required and Estimated Mission Time and Accuracy

- Apply Operator Model (Section 6.8).
- Read required mission time and accuracy from Mission Performance File (Table 5.1-28).
- Read estimated mission time and accuracy from Mission Completion File (Table 5.1-24) that is produced during application of operator and maintenance model.
- Compare requirements with estimates, calculate discrepancies and percentage discrepancies.

6.10.4 Comparison of Required Mission Maintainability and Availability With Estimated Values

- Apply Maintainer Model (Section 6.9).

- Read the following from System RAM Criteria File (Table 5.1-21): Total maintenance man-hour requirements per system, maintenance man-hour requirements at each maintenance level, maintenance man-hour requirements for each major equipment item, maintenance man-hour requirements for each major equipment-maintenance task combination, and system level availability.

- Read estimated values for above measures from Maintenance Manpower Requirements File (Table 5.1-23).

- Compare requirements, calculate discrepancies and percentage discrepancies.

6.11 PERSONNEL CHARACTERISTICS LEVEL INCREMENTATION ALGORITHM

Components

6.11.1 Incrementation When Performance Comparison is Made at the Task Level

6.11.2 Incrementation When Performance Comparison Is Made at System Level

6.11.1 Incrementation-Task Level

6.11.1.1 If user has decided to make separate increments for each task:

a. Identify the performance measure (time or accuracy) with the greatest performance discrepancy. Use this measure in the next steps.

b. Read the Performance Shaping Function library (Tables 4.2-27 and 4.2-28) to determine the personnel characteristic with the highest simple correlation with the performance measure.

c. Increment existing characteristic level by .10 standard deviations.

d. Apply the Performance Shaping Functions (Section 6.6) Stressor Degradation Algorithm (6.7) and the Personnel Discrepancy Estimation Model (Section 6.10).

e. If performance is still not adequate, increment characteristic with next highest simple correlation and conduct steps c-e.

f. Continue until all characteristics have been incremented. Then go back and apply steps d to f again this time incrementing by another .10 standard deviations.

g. Continue incrementing by step size of .1 and applying Steps c-e until performance is met or until maximum/minimum levels set by the user are reached.

h. Compare estimated value on other remaining performance measure with requirements. If requirements are met, incrementation for task is complete. If requirements are not met, reapply steps b-h. Continue until performance requirements are met or until min/max level is reached.

6.11.1.2 If user has decided to make incrementation at duty position level

a. Same as 6.11.1.1 a

b. Same as 6.11.1.1 b

c. Same as 6.11.1.1 c

d. Apply the Performance Shaping Functions (Section 6.6) and the Personnel Discrepancy Model (Section 6.10) to all tasks associated with duty position.

e. If performance on any task in the duty position is not adequate, increment characteristic with next highest simple correlations and conduct steps c-g.

f. Same as 6.11.1.1 f

g. Same as 6.11.1.1 g except performance requirements on all task in duty position must be met before algorithm may stop.

h. Same as 6.11.1.1 h

6.11.2 Incrementation-System Level

6.11.2.2 If user has decided to make separate increments for each task, perform the following for the critical task

6.11.2.1 Identification of Critical Task

a. If there is a mission time discrepancy, critical task is longest task on critical path.

b. If there is a mission accuracy discrepancy, set critical task equal to task with lowest accuracy.

c. If there is a maintenance man-hour or system availability discrepancy, set critical task equal to task with largest maintenance man-hour requirement.

d. Set critical duty position equal to duty position with critical task.

a. Same as 6.11.1.1 b

b. Same as 6.11.1.1 c

c. Apply the Performance Shaping Functions (Section 6.6), Stressor Degradation Algorithm (Section 6.7) and the Personnel Discrepancy Estimation Model (Section 6.10)

d. If system performance is still not adequate, increment characteristic with next highest simple correlation and conduct steps a-c.

e. Same as 6.11.1.1 f

f. Continue incrementing by step size or .1 (a-d) until performance is met or until max/min levels are reached

g. Reapply 6.11.2.1 to identify next critical task. If there are no more critical tasks (i.e., no more system performance discrepancies) or if min/max levels for all characteristics have been reached for all critical task stop process.

6.11.2.3 If user has decided to make increments for all tasks in a duty position

a. Same as 6.11.1.1 a

b. Same as 6.11.1.1 b

c. Apply Performance Shaping Functions (Section 6.6), and Stressor Degradation Algorithm (Section 6.7) for all tasks in duty position. Then apply the Personnel Discrepancy Estimation Model (Section 6.10)

d. Same as 6.11.2.2 d

e. Same as 6.11.2.2 e

f. Continue incrementing by step size until performance on critical task is met or until max/min is reached.

g. Reapply 6.11.2.1 to identify next critical task. If there are no more critical tasks (i.e., no more system performance discrepancies) or if min/max levels for all characteristics have been reached for all critical tasks, stop process.

SECTION 7 - EXTERNAL INTERFACES

7.1 INTERFACES WITH OTHER PRODUCTS

7.1.1 Integration with Other $(MPT)^2$ Products

The first four $(MPT)^2$ products, the System Performance Requirements Estimation Aid (SPREA), the Manpower Constraints Estimation Aid (MCEA), the Personnel Constraints Estimation Aid (PCEA), and the Training constraints Estimation Aid (TCEA), will estimate MPT-related constraints during the earlier phases of the acquisition process, the Requirements/Technology Base Activities Phase.

The (SPREA) will help Army combat developers identify comprehensive, clear system performance requirements. The PREA will use these performance requirements to determine the personnel characteristics levels needed to support a specific contractor design. The PREA will seek to identify a set of characteristic levels that will produce the performance requirements levels set by the SPREA.

The MCEA, PCEA, and TCEA will provide tools for estimating manpower, personnel, and training constraints, respectively. The PCEA will also estimate the current and future distributions of each personnel characteristic. The PREA will use these distributions to help select an initial starting point for the characteristic levels.

The PREA Product 5, the Manpower Determination Aid (MDA), are closely related. The MDA, like the PREA, will be used to evaluate a specific contractor design. The MDA will determine the impact of a particular manning level on system performance and compare this estimate to the system performance requirements set in Product 1.

In addition to estimating manpower requirements, the MDA will also identify all the operator and maintainer tasks for each job, identify duty positions, and provide initial estimates of the time to perform each task. All three of these data elements are critical PREA inputs.

7.1.2 Input/Output Files

Table 7.1.2-1 lists the specific files that are input to the PREA from other $(MPT)^2$ Products and the PREA output files that will be used by other products.

7.2 EXTERNAL DATA SOURCES

The PREA will not require linking into any external data bases apart from those provided by other MPT^2 products.

7.3 OUTPUT REPORT FORMATS

Table 7.3-1 lists the PREA output reports associated with each step. The actual format for each report is listed in Tables 7.3-2 to 7.3-24.

Table 7.1.2-1. Files Input by Other PREA Products

FILE	PRODUCT	COMMENTS
System Conditions (Table 5.1-10) System Missions (Table 5.1-11) Function Performance Criteria (5.1-20) System RAM Criteria (5.1-22) Function Accuracy Weights (5.1-22) Mission Performance File (5.1-26) Corrective Maintenance Criteria (5.1-27)	1	
Product 5 Task Parameter File (5.1-14) Maintenance Manpower Requirements File (5.1-23) Mission Completion File (5.1-24) Component Maintenance Parameter File (5.1-25)	5	These Files (Except 5.1-14) are Updated During Application of the PREA
Projected Characteristic Distribution Summary File (Table 5.1-19)	3	

Master List

STEP	OUTPUT REPORT	TABLE
2	Equipment List	7.3-1
2	Human Interface Components List	7.3-2
2	Human Interface Components-Task Assignments	7.3-3
	Intentionally Left Blank	7.3-4
2	Static Design Assessment Report	7.3-5
1	System Baseline Task List	7.3-6
4	System Conditions	7.3-7
4,6	Stressor Description	7.3-8
	Intentionally Left Blank	7.3-9
6	Product 5 Task Parameter Description	7.3-10
	Intentionally Left Blank	7.3-11
	Intentionally Left Blank	7.3-12
5	Sustainment Training Level by Task	7.3-13

Master List (Continued)

STEP	OUTPUT REPORT	TABLE
	Intentionally Left Blank	7.3-14
	Intentionally Left Blank	7.3-15
5,6,7	Task Description	7.3-16
	Intentionally Left Blank	7.3-17
3,6	Task Performance Data	7.3-18
3,6	Task Personnel Characteristics and Training	7.3-19
7,8	Task Performance Discrepancies Summary	7.3-20
7,8	Task Performance Discrepancies	7.3-21
7,8	Mission Time Discrepancies	7.3-22
7,8	Maintenance Maintainability and Availability Discrepancies	7.3-23
7,8	Mission Accuracy Performance Report	7.3-24

Table 7.3-1. Equipment List

System _____ System Type _____

System Design _____ Date _____

Equipment #	Equipment Item

Table 7.3-2. Human Interface Components List

System _____ System Type _____

System Design _____ Date _____

Equipment #	Equipment Item	Component #	Component	Component Type(s)

Table 7.3-3. Human Interface Component-Task Assignments

System _____ System Type _____

System Design _____ Date _____

Task	Duty Position	Component	Component Type(s)

Table 7.3-4.

This table intentionally left blank.

Table 7.3-5. Static Design Assessment Report

System _____ Design Version _____ Date _____

Duty Position _____ MOS/Skill Level _____

Control/ Display	Tasks	Static Design Measure	Actual Value	Standard	Population % Accommodated			
					Pop. A	Pop. B	Pop. C	Pop. D

Table 7.3-6. System Baseline Task List

System _____ System Design _____

Baseline System _____ Date _____

System Task	Duty Position	MOS/ Skill Level	Baseline Tasks	Baseline System	MOS/ Skill Level

Table 7.3-7. System Conditions

System _____ System Design _____ Date _____

Condition Set _____ Mission _____

Condition	Value

Table 7.3-8. Stressor Description

System _____ System Design _____ Date _____

Condition Set _____ Mission _____

Stressor	Related System Condition	System Condition Value	Additional Input Variable	Value

Table 7.3-9.

This table intentionally left blank.

Table 7.3-10. Product 5 Task Parameter Description

System _____ System Design _____ Date _____

Condition Set _____ Mission _____

Task/ Task Element	Level/ (T/TE)	Parent Task/ Function	Duty Position	Time Estimate	Time Standard Deviaiton	Visual Workload	Auditory Workload	Psychomotor Workload	Cognitive Workload	Total Workload

Table 7.3-11.

This table intentionally left blank.

Table 7.3-12.

This table intentionally left blank.

Table 7.3-13. Sustainment Training Level by Task

System _____ System Design _____

Duty Position _____ Date _____

Task	Sustainment Training Frequency	Job Performance Frequency

Table 7.3-14.

This table intentionally left blank.

Table 7.3-15.

This table intentionally left blank.

Table 7.3-16. Task Description

System _____ System Design _____ Date _____

Duty Position _____ MOS/Skill Level _____

TASK DESCRIPTION								Baseline Task	Task Element Description				
Task	System Function	Task Types							Task Types				
		Type	%	Type	%	Type	%		Elements	Type	%	Type	%

Table 7.3-17

This table intentionally left blank.

Table 7.3-18. Task Performance Data

System _____ System Design _____ Date _____

Duty Position _____ Condition Set _____ Mission _____

Performance Requirements						Current Time and Accuracy Estimates		Equipment Task Element Data				
									Time		Accuracy	
Task	Parent Function	Function Accuracy Weight	Time	Accuracy Standard	Criteria	Time	Accuracy	Equip. Element	LAG	Max. Rate	Inherent Standard	Accuracy Criteria

		Current Time and Accuracy Estimates		Equipment Task Element Data				
					Time		Increment Accuracy	
Task Element	Parent Task	Time	Accuracy	Equip. Element	LAG	Maximum Rate	Standard	Criteria

Table 7.3-19. Task Personnel Characteristics and Training

System _____ System Design _____ Date _____

Duty Position _____ MOS/Skill Level _____

Task/ Task Element	Level	Parent Task Function	Characterisitc	Level	Sustainment Training Frequency	Job Training Frequency

Table 7.3-20. Task Performance Discrepancies Summary

System _____ Design Version _____ Date _____

Condition Set _____ Mission _____

Duty Position _____ MOS/Skill Level _____

Total Tasks _____

Number of Time Discrepancies _____

Number of Accuracy Discrepancies _____

Total Discrepancies _____

Table 7.3-21. Task Performance Discrepancies

System _____ Design Version _____ Date _____

Condition Set _____ Mission _____

Duty Position _____ MOS/Skill Level _____

Task	Char 1 Level	Char 2 Level	Char 3 Level	Time Estimate	Accuracy Estimate	Function	Time Criteria	Accuracy Standard	Criteria	Discrepancies			
										Time		Accuracy	
										Value	%	Value	%

Table 7.3-22 Mission Time Discrepancies

System _____ Design Version _____ Date _____

Condition Set _____ Mission _____

Required Mission Time _____ Estimated Time _____

Tasks in Critical Path	Duty Position	Time Estimate	Function	Time Criteria	Discrepancies	
					Value	%

Table 7.3-23. Maintenance Maintainability and Availability Discrepancies

System _____ Design Version _____ Date _____

Condition Set _____ Mission _____

System-Level Manhours

	REQUIRED	ESTIMATED
Level 1		
Level 2		
Level 3		
Level 4		
TOTAL		

System-Level Availability

REQUIRED _____

ESTIMATED _____

General Equipment Item	General Maintenance Function	Recommended % for Manhours	Estimated % for Manhours	Discrepancies	
				Value	%
	TOTAL				
	TOTAL				
	TOTAL				

Table 7.3-24. Mission Accuracy Performance Report

System _____ Design Version _____ Date _____

Condition Set _____

Mission _____ Required Mission Accuracy _____

Estimated Mission Accuracy _____

Task	Accuracy Estimates		Task Element Accuracy			Function Performance Requirements			
	Standard	Criteria	Task Element	Standard	Criteria	Function	Accuracy Weight	Standard	Criteria

SECTION 8 - TECHNOLOGY TRANSFER ISSUES

8.1 TRAINING STRATEGY

The goal of this software specification phase of the $(MPT)^2$ effort is to design a set of automated tools that the user can implement immediately without external training. To accomplish this, we have designed a user interface that will allow the system to be used by analysts who have very little computer experience (see section 3). The primary source of training for the average user will be included in the documentation that is developed for the system.

8.2 DOCUMENTATION SPECIFICATIONS

There are two types of documentation that will be developed for MPT^2 aid: 1) user documentation, and 2) program documentation. User documentation provides the user of the MDA with information on how to use the software and in how to use the overall tool in the aid process. Program documentation will be used to describe the programming conventions and rules that will be used in writing the computer code that makes up the aid. In the following paragraphs, we have included specifications of what will be included in each type of documentation.

8.2.1 User Documentation

User documentation is itself divided into two categories; "on-line help" and the "User's Guide". "On-line" help is documentation that the user can obtain by pressing the <F1> or

<Shift> <F1> function keys while working with the MDA software. When the user presses <F1>, a context specific help message will display. This message will give the user specific information about the screen, menu, template, or prompt the user is currently working with. This information will be brief and will generally focus on what the user is expected to do next. It will inform the user of any rules that may be in effect and will, if appropriate, provide the user with a specific example and step-by-step procedures. When the user presses <F1> while holding down the <Shift> key an alphabetical index of help information will display. From this index, the user can choose to obtain help information on any MDA topic.

The "User's Guide" will contain detailed information on all aspects of the software and the role and use of the aid as a tool in the MPT process. The User's Guide will be divided into the following six sections:

1. Getting Started - This section will provide the user with step-by-step procedures for installing the MDA software on his or her computer system and to gain access to the various components of the software.

2. Tutorial - The tutorial will give the user the background information and underlying philosophy behind the aid and its role in the MPT process. It will provide general training on how to use the software focusing on understanding and using the user interfaces. The tutorial will also provide the user with instruction on how to effectively use the other sections of the User's Guide.

3. Reference Section - This section will be divided into two sub-sections for each step of the aid. Each section will contain an alphabetically listed detailed

description of each feature of the two aids. The descriptions will include detailed explanations of the feature, rules (if any) governing its use, step-by-step procedures, sources of data that are required, and a list of places in the documentation where more information on the feature or related features can be found.

4. Messages - This section will contain a detailed non-technical description of all messages that can be presented to the user by the aid. Included is a description of what the message means and exactly what the user can do about it.

5. Glossary - Alphabetically lists terms and acronyms that are used in the MDA software and in the overall MPT process.

6. Index - All features, concepts, and procedures will be thoroughly indexed to key words and page numbers in the User's Guide.

8.2.2 Program Documentation

The programming documention conventions described in the next few paragraphs is included so that the source code written for the aid will be easily understood by current and future programmers. Clearly written and documented code makes the software easier to de-bug, modify, and enhance for future versions. Following are the programming conventions that will be employed in the development of the aid.

Indentation

We will use the following conventions for indentation of C code. Nested code will be indented one tab stop per level. Curly braces should be indented by the same number of tab stops as the code they enclose and should appear alone on a line. Curly braces that match each other will then line up vertically. Figure 8-1 is an example of the indentation style.

In a deeply nested subroutine, the code may want to creep off the right side of the screen. When this happens, it will be conceptually more clear to create a new subroutine out of the offending code.

General Structure

Anything but the simplest programs require a very large number of subroutines. A good way to structure code is to have the main program in one file, and have the subroutines in other files. In the MDA software, subroutines will be grouped by function, with all the file I/O routines together in one place and all the develop routines in another. These modules will be compiled separately and linked together with the DOS Linker. Source code files should be kept to under 1000 lines long in order to make them compile quicker when a small change is needed.

In-line Documentation

In-line documentation is the comments that the programmer puts into the source code. They provide a low-level, detailed description of what the code is doing. In-line comments will be written as the code is written and modified accordingly as the development progresses.

```
int arrayprint(array, numelements)
/*   Function to print out some elements from an array.
inputs:
          array = the array to be printed
          numelements = the number of elements to print,
          starting at 0
outputs:
          returns TRUE if success, FALSE if failure
                                                        */
int array[]. numelements;

     {
     int i;                              /* array index */

                                 /* check for bogus input */
     if (numelements > ARRAYSIZE)
          return(FALSE);

                                 /* one element on each line */
     for (i = 0; i < numelements; i++)
          {
          printf("Element number %d is: ", i);
          printf("%d\n", array[i]);
          }

     return(TRUE);
     }
```

Figure 8-1

Each source file will have a short header containing five items of information:

1. The file name
   Otherwise listings are encountered which are difficult to track down because we don't know the name of the file.

2. The date.
   Also to identify listings.

3. The author's name.
   So we can ask questions later. (And to give credit where it's due.)

4. A description of the file's purpose.
   Usually the 8-character file name is not enough to tell what it does. One or two sentences should be enough.

Backups

All of the source code for the MPT^2 software will be backed up early and often. The criteria for backups will be: backups should be able to survive a fire to the office with no more than one week's worth of lost work.

Testing

The MPT^2 programmers will, of course, test their own code as thoroughly as possible when they write it. But, programmers tend to overlook errors in the programs they've written. To combat this, we will follow a procedure known as break-testing before any software is released to the Army. The programmer will give an executable copy of his or her program to the tester, along

with a clean listing of the source code. Then the tester tries to "break it" in every way possible. The tester should force the program to execute every line of code as shown in the source code. This means try all branches, force every if, and produce every error message. If any bugs are found, the programmer fixes them and the tester starts all over again on the new program. When the tester can't break the software, then we know we can deliver it with confidence. We have also found that this procedure often locates bugs in sections of code other than the one being tested.

8.3 MEANS FOR ACHIEVING INSTITUTIONALIZATION

During Option 2 of the $(MPT)^2$ effort, we will produce a detailed plan for fielding the product. This fielding plan will describe the distribution of the aid's methods, hardware, software, documentation, and training programs to specified Army users in specific Army organizations. The plan will be analogous to the Materiel Fielding Plan developed for Army weapon systems.

At the present time, we believe that successful implementation will, as a minimum, require the following activities.

Identification of Specific Users. Specific users of each product must be identified and the specific MAP activities and documents into which the product will feed must be described. This will ensure that the product has a use in the "real world".
Secton 2 describes our approach to this.

Incorporation of Users in Product Development. To ensure that the product meets users' needs, users will be included in the product development process. As a minimum, they should use the product during the external demonstration that will take place during Option 2.

Incorporation of Acceptability/Usability Requirements into Product Specifications. We have incorporated acceptability/usability requirements into the requirements specifications for each aid (see Acceptability/Usability Requirements in section 2). The requirements will make sure that the product is easy to use (e.g. clear documentation, on-line help, etc.).

Instruction of Key Personnel. We propose that "key" personnel receive detailed training at ARI headquarters immediately after ARI has accepted the aid. These key personnel will consist of individuals who can be expected to 1) become experts in the use of the aid, 2) become instructors in using the aid, and 3) act as consultants for ongoing applications of the aid. At the present time, we recommend that these key personnel consist of selected staff members from ARI's System's Manning Lab., members of ARI field offices who have been designated as MANPRINT support personnel, and members of the MANPRINT policy office within DCSPER.

Demonstrate Aid at User's Sites. We also recommend that demonstrations of the aid be provided at all primary user's sites. This demonstration could be conducted by contractor personnel or by the key personnel who were trained at ARI headquarters. The demonstration would include hands-on training with the aid software using "real world" examples, describe the benefits of the product, and show how the product can help users produce MAP products.

Software Maintenance. Specific Army organizations must be identified that can continuously update software, documentation, and training to reflect user applications and evolving needs.

Incorporation into Army Training Programs and Regulations. Army training courses for MANPRINT, project management, etc., must be modified to describe how the aid can help users during the MAP. Regulations and pamphlets in these areas must be modified in the same way.

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APPENDIX A:

PREA's ROLE IN ACQUISITION PROCESS

System-Level Documents

MPT/design tradeoff are a subset of the overall system tradeoffs and are part of the Cost and Operational Effectiveness Analysis (COEA). According to TRADOC PAM 70-2, the COEA compares the effectiveness of alternatives for meeting a need/requirement. It also analyzes the validity of a need/requirement in a scenario approved by HQDA and HQ TRADOC; and the cost of developing, producing, distributing, and sustaining each alternative in a military environment. The COEA is conducted during both the Requirements/Technology Base Activities Phase and the Proof-of-Principle Phase of the MAP. The COEA results are incorporated into higher-level program management documents such as the Concept Formulation Package, the System Concept Paper, the Decision Coordinating Paper, and the Integrated Program Summary. According to TRADOC PM 70-2, the COEA incorporates the results of the following analyses:

TRADE-OFF DETERMINATION (TOD), prepared by DARCOM, with input from TRADOC, provides (1) a description of the individual technical approaches; (2) evidence that the proposed technical approach is engineering rather than experimental, giving the technical risks; (3) trade-offs for the suggested approach; (4) estimated life-cycle costs and scheduling estimates; and (5) the recommended technical approach. Included are technical analysis or trade-offs, risks, capabilities needed, costs, schedules,

integrated logistic support requirements, estimated total Army manpower requirements, health, safety and human factors engineering requirements, and environmental and ecological factors.

TRADE-OFF ANALYSIS (TOA), prepared jointly by TRADOC and DARCOM, contains (1) mission and performance envelopes with justification and rationale; (2) analysis of system trade-offs, risks, capabilities, estimated total Army manpower requirements, costs, schedules, and logistic support; and (3) selection of the "best" approach considering the integrated impacts of operational, integrated logistic support, environmental, health, safety, and human factors engineering factors.

BEST TECHNICAL APPROACH (BTA), prepared jointly by DARCOM and TRADOC, contains (1) a description of the "best" technical approach and integrated logistics support concepts based on the results of the TOD and TOA; (2) evidence that the proposed "best" technical approach is engineering rather than experimental; (3) estimated cost (RDT&E, OMA, MCA), total Army manpower requirements, and procurement and scheduling estimates; (4) recommendation on whether the development should be project managed; and (5) a draft Environmental Impact Statement.

COST AND OPERATIONAL-EFFECTIVENESS ANALYSIS (COEA) (Milestone I), prepared by TRADOC, describes (1) tasks and missions to be performed; (2) threat and conditions under which the task must be performed; (3) programmed capabilities to perform tasks and resulting deficiencies; (4) extent to which alternatives remedy mission deficiencies; (5) logistic support concept; (6) manpower, personnel, and training support concept; and (7) a resource summary using broad estimates of R&D and investment costs with unit costs specified for the alternatives selected.

TRADOC PAM 70-2 specifically requires that a Cost and Training Effectiveness Analysis (CTEA) be included in the COEA process.

Integrated Logistic Support Documents/Processes

MIL-STD-1388-1A describes the Logistic Support Analysis (LSA) process. Task 303 of the LSA requires that support alternatives be evaluated and trade-off analyses be conducted. As part of this task personnel requirements must be assessed.

Task 303.2.5 and 303.2.6 describe these assessments as follows:

303.2.5 Estimate and evaluate the manpower and personnel implications of alternative system/equipment concepts in terms of total numbers of personnel required, job classifications, skill levels, and experience required. This analysis shall include organizational overhead requirements, error rates, and training requirements.

303.2.6 Conduct evaluations and trade-offs between design, operations, training, and personnel job design to determine the Optimum solution for attaining and maintaining the required proficiency of operating and support personnel. Training evaluations and trades shall be conducted and shall consider shifting of job duties between job classifications, alternative technical publications concepts, and

alternative mixes of formal training, on-the-job training, unit training, and use of training simulators."

MANPRINT Documents/Processes

Currently, there are two major sources of MANPRINT regulatory information. The first source is AR 602-2, MANPRINT. The second is the draft chapter on MANPRINT that will be included in the Revised TRADOC/AMC PAM 70-2, Materiel Acquisition Handbook.

This handbook will be referred to in the rest of this concept paper as the revised TRADOC/AMC PAM 70-2.

Manpower and Personnel Constraints. According to AR 602-2 (p. 28), the following tasks should be completed by the end of the Requirements Technology Base Activities Phase of the MAP:

"g. The plan for trade-off studies and analyses must be carefully prepared. Missions and mission environments must be analyzed to determine design drivers. Trade-off studies must focus on human performance and reliability associated with each technology."

AR 602-2, indicates that during the Proof-of-Principle Phase

"MANPRINT analyses must be accomplished in sufficient detail prior to initiation of concept exploration to provide a baseline to which technical approach alternatives and their resulting MANPRINT implications

can be compared. For materiel with a prominent human interface, it is critical to collect and evaluate human performance reliability data to determine whether the proposed system concept will deliver the expected performance using personnel with no greater aptitudes and no more training than planned."

Input to Cost and Operational Effectiveness Analysis (COEA). The revised TRADOC/AMC PAM 70-2, Chapter 11 specifically identifies the role of MANPRINT in feeding the COEA process.

According to 70-2, MANPRINT must

a. Provide estimates of manpower implications of each suggested alternative. Cost will be in terms of manpower.

b. Provide estimates of personnel impact of each alternative, the personnel, manpower and monetary costs of the impact, e.g., the manpower cost of training, monetary cost of training, and personnel implication of changing characteristics of an MOS.

Human Factors Engineering Analysis (HFEA). The human factors engineering analysis (HFEA) is the central integrating analysis in MANPRINT. The HFEA reviews the status of human factors engineering (HFE) in an acquisition program. The HFEA identifies critical/major HFE, manpower, personnel, training, health hazards, or safety issues that would delay the next phase of the materiel acquisition life cycle. The HFEA also identifies issues that might not be critical to program decisions, but can be resolved and must be addressed during the next phase of the acquisition process.

The manpower and personnel issues that the HFEA must address are described in the revised TRADOC PAM 70-2. According to this document, the principal personnel issue that must be addressed is whether the military personnel proposed to operate and maintain the system have adequate aptitude and skills for the tasks they will be assigned. If there are

> "no data to indicate otherwise, and particularly if the human performance requirements of the system are similar to those of another system on which soldiers of the same or similar aptitudes perform satisfactorily, that statement may be made without further amplification. However, if tne system tasks are new or difficult, the author should request some analyses to verify whether the soldiers who are required to operate and maintain the system can perform its critical tasks with the required speed and accuracy. Relevant manpower issues should be identified."