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Air Force Manpower, Personnel, and Training: Roles and Interactions

Bruce Armstrong, S. Craig Moore

A Project AIR FORCE report
prepared for the
United States Air Force

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Provides the first consolidated summary of the Air Force's Manpower, Personnel, and Training (MPT) system, and compares the officially prescribed functions of the three components with the way they perform in reality. The components obvicusly interact: "Manpower" determines requirements for people and distributes budget-approved authorizations; "Personnel" determines management policies and tries to fill authorized positions with the right people; and "Training" recruits, classifies, and trains enlisted personnel. The report emphasizes links among the components and explains how the system relates to the Planning, Programming, and Budgeting System (PPBS). The Air Force can therefore use the report to identify needed improvements and to introduce newcomers to the MPT system's structure and functions.

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Air Force Manpower, Personnel, and Training: Roles and Interactions

Bruce Armstrong, S. Craig Moore

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PREFACE

This Report describes the Air Force's "Manpower, Personnel, and Training System"—the organizations and procedures it employs to develop and control the form and content of its enlisted manpower force. The need for this description emerged from previous research studies of specific aspects of the system—such as the relevance to job performance of training for aircraft avionics maintenance technicians—which found that system components could not be analyzed satisfactorily in isolation from the rest of the system. For example, the scope and amount of technical training can affect job performance (capability and efficiency) and even occupational classification (and vice versa), which in turn affect manpower requirements and promotion policies.

The system's three primary components (Manpower, Personnel, and Training) were managed separately until mid-1978, when the Air Force merged the first two under a single Deputy Chief of Staff for Manpower and Personnel. The third remains separate as the Air Training Command. Few Air Force personnel have management experience in all three components, and heretofore no comprehensive document has described the components' roles and interactions. There has been no place to go for an integrated overview. Instead, one had to consult numerous Air Force manuals and regulations peculiar to each component, and it was difficult to achieve an understanding of the three and their interrelationships.

Accordingly, this report consolidates general descriptions of the three components and compares their officially prescribed functions with the way they perform in reality, the primary purpose being to enable the Air Force to identify potential system improvements. A secondary purpose is to provide an introduction for newcomers to the system's structure and functions.

This research is part of the Project AIR FORCE "Manpower, Personnel, and Training Dynamics Study," undertaken for the then office of the Deputy Chief of Staff, Personnel, Hq USAF, in 1976. Other phases of that study include preliminary evaluations of the MPT system and are documented in N-1476-AF, "Air Force Manpower, Personnel, and Training System: Volume II—Analysis of the Enlisted Authorization/Assignment and Manpower Requirements/Personnel Objectives Subsystems," May 1980. Follow-on work is developing and testing revised techniques for manpower requirements determination and personnel force structure planning.

SUMMARY

Manpower, Personnel, and Training (MPT) are intricately related components of the system by which the Air Force plans and controls the structure and development of its enlisted force. The Manpower component's primary functions are to establish organization structures, ascertain manpower requirements, and distribute manpower authorizations among occupational areas and commands. The Personnel component establishes short-run and long-run plans and policies for developing, maintaining, and distributing the enlisted force. The Training component mainly recruits and trains the force's members. The system attempts to deliver the right person to the right place at the right time, after determining who the right people are.

The system comprises many organizations, varying from small personnel offices at Air Force installations to an entire command—the Air Training Command (ATC)—and from small Management Engineering Teams that collect detailed data on individual work units' operations to several Headquarters directorates overseen by the Deputy Chief of Staff for Manpower and Personnel. The Air Force's operational commands (for example, the Tactical and Strategic Air Commands) and separate operating agencies work with these organizations to secure the manpower resources employed in their operations. Above them, Congress, the Secretary of Defense, and other high-level defense decisionmakers influence the actions these organizations take.

Figure 1, although much simpler than the integrated diagrams presented in the body of this report, is a summary overview of the MPT system. Let us briefly trace the "flows" indicated by the arrows in the diagram, beginning with the development of manpower requirements depicted at the lower left.

To determine the amounts and kinds of manpower required, Management Engineering Teams collect data on unit operations, such as historical workloads, authorized and assigned manning, available equipment, and estimated man-hours required. They then develop manpower standards and guides that specify the numbers of people of different specialties, skill levels, and pay grades recommended to accomplish different amounts of work. (Among the factors used in determining these manpower "breakdowns" are past authorization patterns and long-run grade percentage targets, the latter based largely on past personnel retention rates.) The using Air Force major commands review these standards and eventually "apply" them to determine manpower changes that would result from their implementation. The major commands return the results of the applied standards to the Management Engineering Teams, which then develop "program estimating equations"; these provide approximate relationships between estimated manpower requirements and workloads (for example, missions and flying rates for different aircraft types), which eventually appear in official program planning documents.

At Headquarters USAF, the Directorate of Manpower and Organization (MPM) uses the program estimating equations to analyze alternative program plans in cooperation with planners in the Office of the Secretary of Defense (OSD).

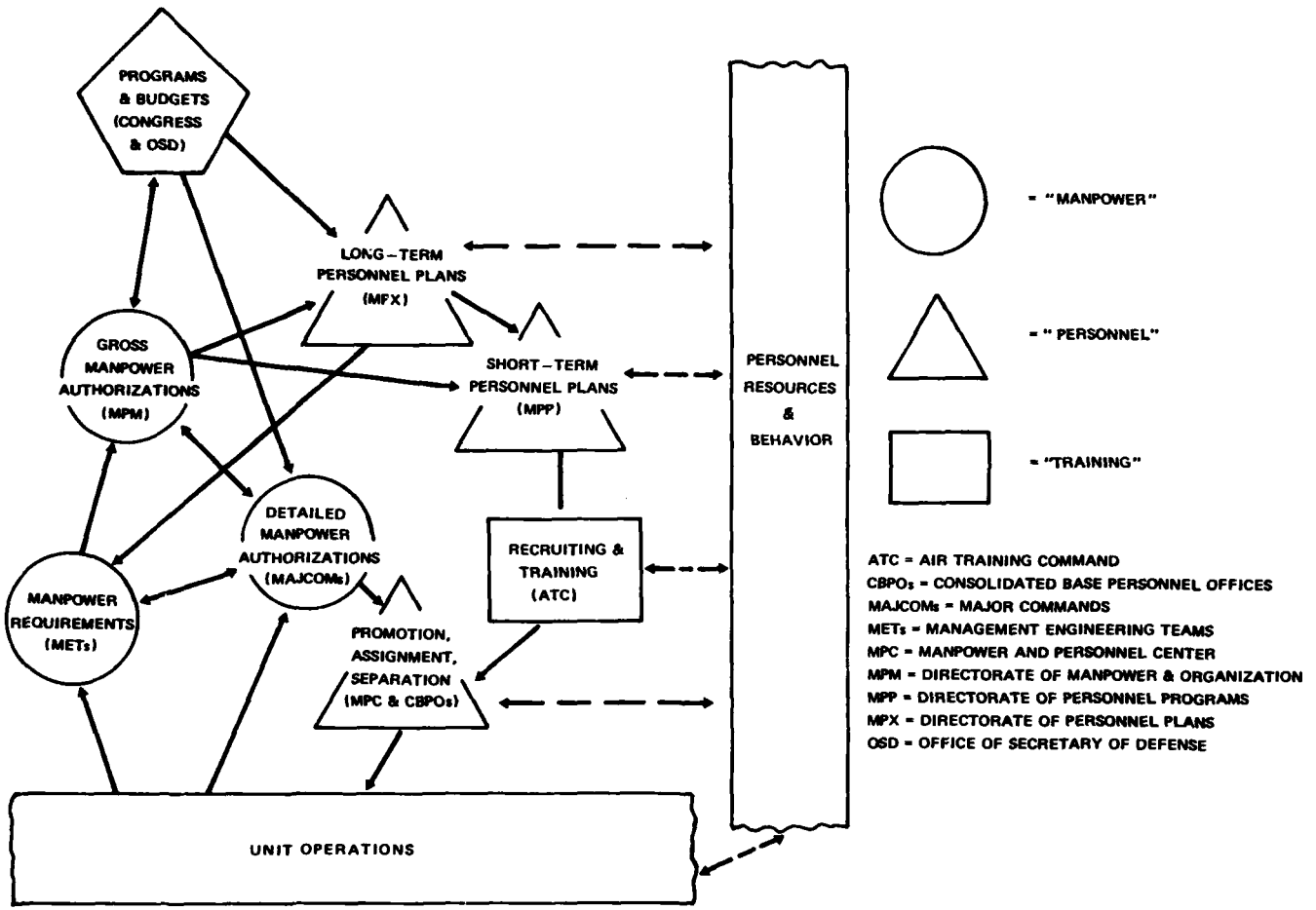

Fig. 1—Summary: USAF enlisted manpower, personnel, and training system

(Both MPM and the commands also use them in allocating approved manpower authorizations to individual work centers.) Executive and legislative decisions in OSD and Congress result in defense program budgets and plans, provided to MPM, and mission requirements, provided to the major commands. MPM provides the commands with gross allocations of the manpower authorized in current program plans and budgets; in turn, the commands use their mission requirements, historical performance data, and manpower standards and guides to determine detailed manpower authorizations for individual bases and work centers. These final detailed authorization levels are "passed" to the Manpower and Personnel Center and constitute its "target"—the positions it should fill with properly qualified personnel.

MPM also provides predictions of eventual personnel authorization levels to long-term personnel planners in the Directorate of Personnel Plans. These planners use the projected requirements for the most highly skilled people, along with historical data regarding personnel behavior (specifically, regarding loss or separation rates and skill upgrading rates), to determine objective or target force structures (in terms of experience, pay grade, and promotion profiles) for various occupational groupings. These overall targets and associated policies from Personnel Plans, anticipated manpower requirements, current personnel resources, and historically based estimates of airman behavior are used by planners in the Directorate of Personnel Programs to develop (1) requirements for newly trained and/or retrained personnel, which help determine workload for the Air Training Command, and (2) control policies (such as reenlistment bonus programs, promotion quotas, and early-release-from-obligation programs), which are administered through the Manpower and Personnel Center and base personnel offices at Air Force installations. The Air Training Command recruits and trains new airmen and, as necessary, retrains experienced airmen in new specialties. Finally, the Manpower Personnel Center, following the control policies provided by Personnel Plans and Personnel Programs, uses available human resources, both experienced and newly trained, to try to fill the positions represented by current manpower authorizations. The final result is the airman personnel force—distinguished by occupational specialties, skill levels, years of experience, pay grades, and training—assigned and working in myriad unit operations worldwide.

Tacit in this summary, of course, is a complex and dynamic structure that constantly responds to these activities as time passes, as well as to the cycles of the Program Planning and Budgeting System (PPBS), which is summarized in the appendix.

ACKNOWLEDGMENTS

The authors wish to acknowledge the continuous support and assistance provided by personnel and organizations in the United States Air Force. In particular, we thank Majors William O'Connor, Ron Kerchner, and Gene Steadman, all of AF/MP. We are also grateful to Tom McNaugher and Robert Paulson of Rand, who made numerous consequential suggestions in the course of their reviews.

CONTENTS

FIGURES

INDEX TO ACRONYMS

AFIT	Air Force Institute of Technology
AFM	Air Force Manual
AFMEA	Air Force Management Engineering Agency
AFROTC	Air Force Reserve Officer Training Corps
AFSC	Air Force Specialty Code
AIMS	Airmen Inventory Management System
ASKIF	Airman Skill Force Model
ATC	Air Training Command
BMT	Basic Military Training
CAREERS	Career Airman Reenlistment Reservations
CBPO	Consolidated Base Personnel Office
CMDS	Command Manpower Data System
CONUS	Continental United States
DCS	Deputy Chief of Staff
DOD	Department of Defense
FTD	Field Training Detachment
FYDP	Five Year Defense Program
GTEP	Guaranteed Enlistment Program
JCS	Joint Chiefs of Staff
JSOP	Joint Strategic Objective Plans
LCOM	Logistics Composite Model
M&O	Manpower and Organizations
MAJCOM	Major Command
MAV	Manpower Authorization Voucher
MET	Management Engineering Team
MP	Deputy Chief of Staff, Manpower and Personnel
MPC	Manpower and Personnel Center
MPF	Master Personnel File
MPM	Directorate of Manpower and Organizations
MPF	Directorate of Personnel Programs
MPT	Manpower, Personnel, and Training
MPX	Directorate of Personnel Plans
MSL	Manpower Source List
NPS	Non-Prior Service
OJT	On the Job Training
OMB	Office of Management and Budgets
OPR	Office of Prime Responsibility
OSD	Office of the Secretary of Defense
PCS	Permanent Change of Station
PEE	Program Estimating Equation
PG	Program Guidance
PM	Program Manpower
PMEL	Precision Measurement Equipment Lab
POM	Program Objective Memorandum

PPBS	Planning, Programming, and Budgeting System
PROMIS	Procurement Management System
PTT	Program of Technical Training
SPM	Skills Projection Model
SMS	Skills Management System
TAC	Tactical Air Command
TFM	Training Flow Management
TOPCAP	Total Objective Plan for Career Airmen Personnel
TPPGM	Tentative Planning and Programming Guidance Memorandum
TPR	Trained Personnel Requirements
UAR	Uniform Airman Record
UAF	Unit Authorization File
UMD	Unit Manpower Document
UDL	Unit Detail Listing
WAPS	Weighted Airman Promotion System
XP	DCS//Plans—TAC
XPMQ	TAC Manpower
YOS	Years of Service

I. INTRODUCTION

To accomplish its mission, the U.S. Air Force must ensure that the proper numbers of enlisted personnel, properly trained, are in the right place at the right time. This is an iterative, continuous task, for the service's needs and resources change in response to a variety of external factors. Annual changes in the Air Force budget force the service to make resource choices among manpower levels, weapons, operational activities, and so forth. Changes in USAF policies and programs regarding force strength, organizational structure, and the like, also necessitate changes in personnel resource levels and mix. Finally, broad changes in the service's missions and weapons demand force structures of differing compositions.

The Air Force breaks the tasks associated with this process into three primary components: "manpower," associated with determining manpower requirements; "personnel," associated with managing personnel in the organization; and "training," associated with properly training Air Force personnel (or retraining them, as the case may be). The three components were managed separately until mid-1978, when the Air Force merged the first two under a single Deputy Chief of Staff for Manpower and Personnel. The third comprises a separate command, the Air Training Command.

Whether separate or grouped together, however, the three components tend to operate as separate entities. Decisionmaking is "vertically directed" within each, and few lines of communication cross organizational boundaries. Heretofore, no comprehensive document has formally described the roles and interactions of the overall Manpower, Personnel, and Training (MPT) system. Instead, one had to consult numerous Air Force manuals and regulations pertaining to each component.

Nonetheless, both the functions and the activities of MPT organizations are intimately related. The actions of one organization often affect those in another. For example, focusing the initial training of avionics technicians on specific aircraft systems might require adding experience identifiers to the job classification scheme, hence influencing personnel rotation or occupational planning; it also might affect the technicians' ability to perform tasks on the job, hence influencing overall manpower needs.

The Air Force, recognizing the need for improving coordination among MPT activities, has convened several working groups for that purpose over the past few years. The merging of the manpower and personnel functions under a single Deputy Chief of Staff in 1978 bears witness to Air Force concern that the components that handle these functions more fully coordinate their activities.

This report is intended to serve the same purpose by supplying, for the first time, an integrated picture of the MPT system as a whole, which the Air force can use as an analytic basis for improving the system's functioning. It should also be useful as an introductory text for Air Force personnel who are new to the MPT system.

APPROACH AND SCOPE OF THE STUDY

The study involved two forms of investigation: a review of formal Air Force documents concerned with how the organizations should function (see Bibliography), and interviews and informal discussions with personnel directly involved with operation and management of the MPT system.[1]

The scope of this analysis is intentionally limited to the enlisted force and the relevant MPT system policies that affect the demand for and supply of airmen. There are obvious conceptual differences in the treatment and management of the officer and enlisted forces. Although recent Rand research has focused primarily on the officer force, we believe that analysis for the enlisted force promises even larger payoffs at this time. This type of analysis can of course be extended to the officer force in the future.

Base-level and command investigations were limited to the Tactical Air Command (TAC) for two reasons. First, the MPT system and TAC appear to interact in a manner representative of other commands. Second, the condition of a command having a combat mobility requirement combined with the introduction of three new weapon systems (F-15, F-16, and A-10) presents an ideal setting for the study of dynamic manpower, personnel, and training problems. We recognize that the dynamics of new weapon system introduction are likely to inspire extraordinary efforts to create and maintain organizational interactions.

Limitations of the Approach

The most important limitation of this report is that the description of functions, roles, and interactions derives from the perceptions of the authors and interviewees. Although the authors based their observations directly on official manuals and the opinions of specialists within the system, readers with different perceptions will disagree with portions of this text.

Another limitation lies in the static nature of the observations. The review of the MPT system presented in this report amounts to a "snapshot" of the system, although it extended from 1976 to 1979. As Air Force and command policies, programs, organizational structures, and functions change, the MPT system will likely change as well.

Roles and Interactions—Working Definitions

Further discussion of MPT functions requires definition of the terms "roles" and "interactions," which recur frequently in the text.

A functional group's role consists of its expected behavior in response to the formal objectives defined in Air Force documents. Specifically, roles derive from officially assigned responsibilities.

Interactions are the mutually influential products of role behaviors. In performing its role, that is, each MPT component must exchange ideas and information

[1]The interviews were conducted with personnel at all levels of Air Force management (Air Staff, command, base, and shop) as well as with personnel in nearly all MPT functional specialties (such as management engineering, personnel plans, and assignment).

with the others. Interactions can occur between groups within the same system (manpower and training, for example), between management levels (the base, the command, the Air Staff, and the Department of Defense), and between systems (the MPT system and, say, the Program Management System). Interactions are based on how the group perceives its objectives and responsibilities. To put it in slightly different terms, interactions may be defined as the adopted interdependent roles of the groups based upon their internal and external group objectives.

In the subsequent discussion, roles should be interpreted as how each group *should* behave. Interactions represent how the groups *actually* behave.

OUTLINE OF THE STUDY

Section II examines each functional component in the MPT system in terms of its roles. Flow diagrams depict its functional activities.

Section III assembles the groups and functions into a composite system and discusses the exchange of information, identification of dependence relationships, determination of the time consumed by various processes, and the effects of budgetary cycles. Finally, Section IV presents some observations and conclusions.

II. ROLES OF MPT COMPONENTS

This section describes the roles of the three functional components of the MPT system. Because the roles differ by management level (even within a component), it is necessary to examine role behavior at the Air Staff, major command, and base-operating levels.

ROLES OF MANPOWER

The manpower component has three fundamental functions: (1) determination of personnel requirements, (2) allocation of budgeted personnel authorizations, and (3) definition of the organizational framework.

Organizational Setting

The Directorate of Manpower and Organization, the Air Staff-level manpower component, reports to the Deputy Chief of Staff, Manpower and Personnel. It supervises and coordinates manpower organizations located at each of the major air commands. In turn, the commands manage several Management Engineering Teams (METs)[1] located at Air Force bases worldwide.

The roles for manpower are defined by Air Force Manuals 26-1 through 26-4 and 25-5.

Manpower Requirements Determination

Air Force manuals describe manpower requirements determination as a "build up" methodology. It begins with task evaluation at the basic production level and is aggregated up through the various organizational levels (work center, unit/base, command). The process is based upon: (1) documented standards and guides containing estimates of the manpower necessary to perform specific tasks, and (2) derived workloads based on interpretation of mission requirements stated in the Program Documents and/or on-site review (e.g., operations audit and work sampling). The results are sets of "rules" for determining how many people are needed —and what their skills, experience, and ranks should be—to accomplish particular amounts of work. The resulting requirements represent ideal unit manning; that is, requirements statements are *not* limited by budgets.

The nucleus of the process is the management engineering function. METs are located at operating bases and report to major command headquarters. Their primary task is prescribed in AFM 25-5, *Management Engineering Procedures,* as the

[1]There are eleven functional METs, which are under the direct control of an organization called the Air Force Management Engineering Agency (AFMEA), a part of the Manpower Personnel Center. Additional METs are located at each major air base under the control of the manpower group at the major command. The roles of these two organizations are discussed below.

development of work center standards and guides that reflect the manpower requirements for performing a number of activities. A work center is defined as a group of people using similar machines, processes, methods, and operations, and performing a homogeneous type of work. Examples are Vehicle Maintenance, Avionics and Flight Instruments Maintenance, Civilian Pay, and Fuels Management.

In November 1975, the Air Force Management Engineering Agency (AFMEA) was established as a separate operating agency directed by the Air Staff (in 1978 it became a part of the Manpower and Personnel Center). AFMEA provides centralized control, evaluation, and management of eleven functional work areas, each being the responsibility of a particular "functional MET." These functional areas are examined across all appropriate commands and represent more than fifty percent of total Air Force manpower. The functional management engineering areas include the following:

1. Engineering and Services
2. Personnel
3. Maintenance and Supply
4. Transportation
5. Security Police
6. Medical
7. Comptroller
8. Special Staff
9. Munitions
10. Data Automation
11. Intelligence

Besides developing manpower standards for the functional work areas, AFMEA coordinates standards development, schedules work measurement and analysis studies, conducts studies of special manpower issues, and maintains liaison with the "personnel component."

Functional METs have leadership responsibilities in the standards development process and concentrate exclusively on the functions they service Air Force-wide. The objectives of the functional MET include:

1. Better service and improved response time to the functional Office of Prime Responsibility (OPR).
2. Increased OPR confidence in MET products.
3. A single focal point for the functional manager in the manpower standards development process.
4. A common baseline "standard of living" among commands.
5. A base of manpower-oriented functional expertise for use by Headquarters, USAF during budget exercises.

For work centers that are not Air Force-wide (that is, which are unique to one or very few commands), major-command METs develop the manpower requirements themselves, sometimes with technical assistance from the functional METs. AFMEA retains review authority even for command-unique manpower requirements.

Forms of Requirements Statements

Several types of manpower requirements estimating equations are employed in the management engineering program. Categorically, these equations vary in their level of sophistication to include engineered standards, statistical standards, and guides. Essential to each approach is identification of missions and functions, identification of tasks related to those missions and functions, estimation of man-hours required to perform the tasks, and quantification of the relationship of man-hours to programmed output.

The level of detail and analysis involved differentiates the three estimating approaches. Engineered standards, the most elaborate, detailed, and expensive estimating approach (using rigidly structured industrial engineering methods to estimate requirements), are used to derive manpower needs of functions that are large, stable, and standardized. Statistical standards are less detailed; they may, for example, be developed from on-site interviews and statistical analyses of historical workloads and man-hour accounting data. Guides—general statements of manpower requirements—may be developed by using manpower surveys, organization studies, and similar techniques. Guides are also used to estimate manpower needs for work areas where it would not be cost-effective to establish more definitive standards. All three methods are based on observations of existing processes.[2] Currently, over 70 percent of the total Air Force manpower requirement is determined by standards and 30 percent by guides.

AFMEA reviews and approves all Air Force-wide and command standards from a technical viewpoint. (Command guides do not require approval above the command level.) Any new or revised standards having policy implications must also be reviewed and approved by the Air Staff. (For example, the Air Staff would have to approve a manpower standard using a nonstandard factor for a person's monthly availability for work—say, a deviation due to a continuing requirement for supplemental training or for exceptionally good physical condition.) Both standards and guides are subject to periodic reviews. Unscheduled reviews are undertaken when changes occur in mission, equipment, organization, or regulations, or when manpower-related difficulties arise in the production process.

A change in manpower requirements is not caused exclusively by a revision of standards; changes in the workload as defined in defense plans and budgets also influence personnel needs. Program documents and objectives developed by OSD, JCS (Joint Chiefs of Staff), and Hq USAF present planned force structure, operating requirements, weapon system procurement, mission objectives, and flying hour definitions. Examination and interpretation of the program documents by the Air Staff and the major commands significantly affect both manpower requirements determination and manpower utilization. Workloads might be measured in terms of the number of military and civilian authorizations (security police, for example), programmed flying hours (most aircraft maintenance functions), the square footage of a base (civil engineering crafts), or other measures that can be directly or indirectly derived from the DoD program documents.

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[2]This linking of standards development to observed experience has both benefits and costs, as will be discussed later. A relatively new method for developing standards is simulation, which is currently being applied to some aircraft maintenance specialties. Inputs for this method are also based on past production experience.

Once the gross manpower requirement has been determined ("multiplying" the work center standards by the workload), then the specialty and skill-level mix for each work center must be determined. The Precision Measurement Equipment Lab (PMEL) standard, for instance, requires one airman specialty (AFSC324XO),[3] with four skill levels: apprentice, journeyman, supervisor/technician, and superintendent. Skill level is denoted by the fourth digit of the AFSC (3, 5, 7 or 9) and depends on formal and informal training (OJT), experience in the job (time), knowledge of the job, demonstrated capabilities, and policy constraints (for example, an airman must be at least an E-5 to qualify for 7-level training). Other functions may require more than one AFSC and different skill-level mixes. Generally, skill-levels requirements are to be based on the required workload mix and organization requirements, but no standard method for skill-level determination seems to exist. Important determinants for skill level and pay grade designations in manpower standards are past authorization patterns and long-run percentage targets. As will be discussed later, these "objective grade percentages" are determined within the personnel component.

The establishment of skill level and grade completes the management engineering portion of manpower requirements determination. Subsequently, a file is established called the Unit Authorization File, which presents the commands' manpower requirements categorized by program, command, base, specialty (AFSC), skill level, and grade. Requirements estimation is controlled by the major commands with coordination and approval by the Air Staff. Requirements represent unconstrained demand for manpower resources by the major commands, based primarily on application of standards and guides to the projected workload.

Allocation of Budgeted Manpower Authorizations

In contrast to manpower *requirements*, which embody what the Air Force thinks it needs, manpower *authorizations* represent what the Air Force is granted, that is, the manpower force actually funded on an annual basis. Total force authorizations are established by Congress, OMB, OSD, and the Air Staff based upon operational objectives tempered by budgetary and political considerations. Two types of differences occur between manpower requirements and authorizations: differences in the *amount* of personnel and differences in the *types* (skills) of personnel.

The authorization process is depicted in Fig. 2 along with the "what if" studies prepared by the Air Staff (with command support).[4] These studies provide a response to the Tentative Planning and Programming Guidance Memorandum (TPPGM) and afford an early opportunity to assess and respond to the quantitative effects of overall policy program changes considered by OSD. The Air Force uses aggregate manpower equations (Program Estimating Equations) in preparing its response. During the TPPGM response, the commands generally provide only

[3]AFSC stands for Air Force Specialty Code. The first three digits indicate specialty area, the fourth indicates skill level, and the fifth is an additional occupational indicator. Suffix designations are added to denote further specialization (e.g., a weapon system specialty).

[4]Figure 2 does not depict all of the manpower functions. Rather, it is presented to clarify only the authorization allocation process.

standards. However, when such studies are conducted during the budget phase, commands frequently submit detailed manpower requirements.

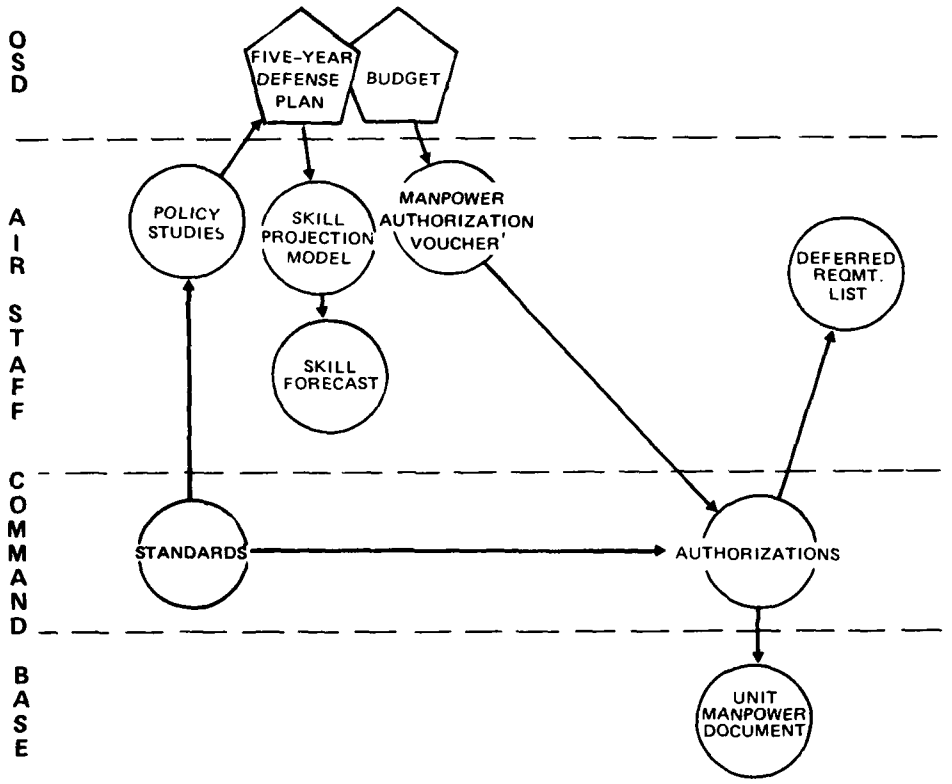

Fig. 2—Allocation of authorizations

The policies and programs that are authorized by Congress, OSD, and OMB are incorporated into the updated Five Year Defense Program (FYDP). The Air Staff and the commands interpret the program and budget documents and convert program requirements into funded manpower resource authorizations. The Air Staff prepares a formal document called the Manpower Authorization Voucher (MAV), which arrays authorized manpower levels by command, program element, and labor type (military, civilian, etc.).[5] The distribution of authorizations among AFSCs is determined by the commands based upon the MAV, standards and guides, and individual management preferences.

This allocation function is one of the Air Staff's most important and difficult tasks. The Air Staff allocates manpower budgets in accordance with policy decisions made by Congress, OMB, OSD, and other Air Staff agencies. Allocations are influenced additionally by mission priorities, functional requirements, command

[5]Thus, the MAV represents a disaggregation of program and category constraints.

demands, and the program needs of several other Air Staff organizations. The Air Staff also must make authorization allocations to accommodate budget adjustments (increases and decreases).

The authorization allocation process is complicated further by "off-cycle" program changes. These changes include such actions as the passing of a supplemental appropriation, directives by the President or OMB, changes in program decisions made by the Air Force or OSD, and special FYDP updates.

To clarify the distinction between authorizations and requirements, note that manpower requirements start at the lower organizational levels and move up to the USAF decisionmakers, while authorizations emanate from the top levels and filter down. In theory, authorizations and requirements for manpower should be identical since the commands and the Air Staff use the same program documents and the same work standards. However, budget constraints, mission demands, readiness requirements, and a host of other factors alter manpower authorization levels. If authorizations are less than requirements as stated in Command/Air Staff budget submissions, the unallocated requirements will be listed in the Air Force Deferred Requirements Register.

Recognition of the distinction between requirements and authorization provides insight into the commands' dilemma when confronted with fewer authorizations than required. Since the Air Staff adjusts to budget reductions by reducing the scope of its activities, a command must attempt either to accomplish its original objective with limited resources or to reduce the level of its planned activity.

The command must distribute its personnel allocation by base, unit, specialty, and skill level to produce the desired level of output efficiently. It bases its distribution upon manpower requirements generated by the MET evaluations, command priorities, and base-level requests.

The MAV represents the maximum program allowance and typically is not open to command negotiation for adjustments. Often, therefore, commands cope with manning changes through trade-offs within programs—so-called "zero balance changes." Commands that do request increases in manpower authorizations on specific programs must recommend sources for the additional authorizations either from within the command or from other commands. Much command and base-level manpower activity is the result of intra-command changes that do not affect the program budgets and, therefore, are not necessarily the concern of the Air Staff.

The allocation process is complete at this point. The command sends each base a Unit Manpower Document (UMD) which specifies that base's authorized manpower by specialty, skill level, and grade. The distribution is based on such factors as past base performance in meeting output requirements, MET studies, requirements (as determined in the "bottom-up" process), and consideration of base-unique programs.

The aggregated command UMDs (called UAF) are sent to the Air Staff on a file called the 7102 file. The Air Staff then aggregates across commands and publishes the Program Manpower document (PM), which reflects manpower authorizations by command, base, and unit in support of the FYDP. Figure 3 summarizes the entire manpower activity, indicating the level of work, the product, and the flow of information.

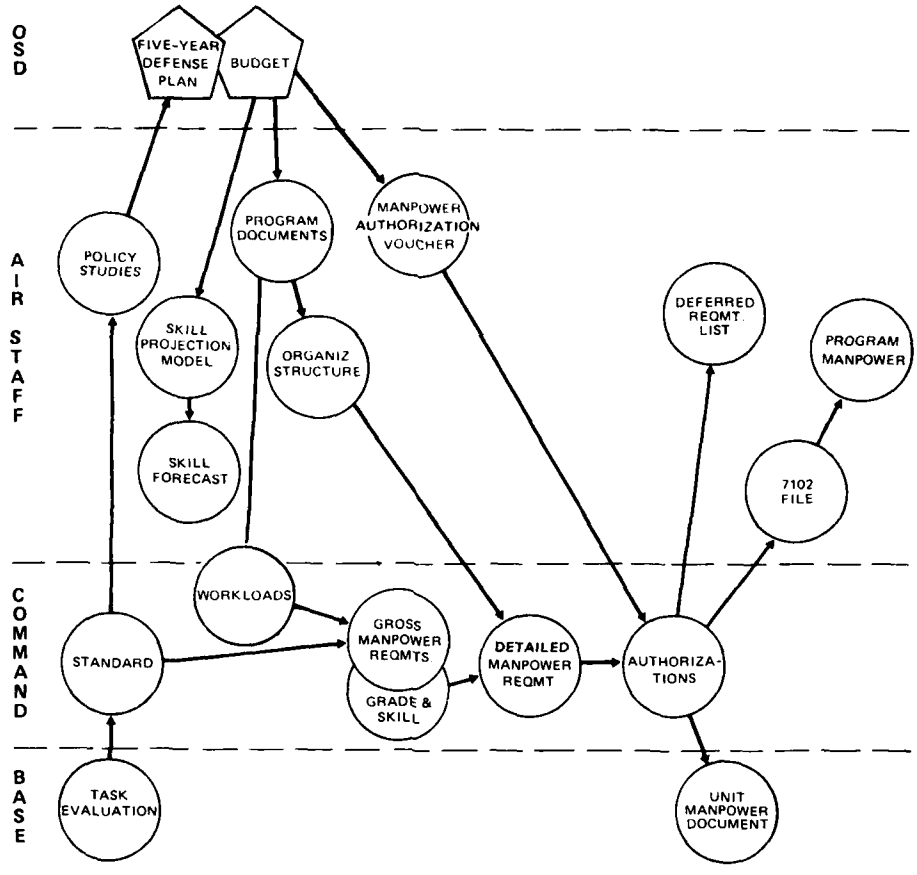

Fig. 3—Manpower roles

Organization

The Manpower role in this category is defined formally in AFM 26-2. The Air Staff has the prime responsibility to organize the commands. The manpower component, in conjunction with other cognizant Air Force organizations, defines the organizational framework, functional responsibilities, and span of control of all USAF commands in an effort "to maintain a structure which is missions capable, . . . to standardize like missions, . . . and to streamline the decisionmaking proces." Recommended organizational structures are published and periodically reviewed by the Air Staff. Commands desiring to deviate from approved structures must request changes and justify them to Hq USAF/MPM. Organizational changes must be justified on the basis of estimated improvements, costs, manpower changes, combat readiness impact, and so on.

This role of Manpower strongly influences manpower requirements. Defining such characteristics as span of control, framework, and responsibility significantly

affects the number of people an organization requires. The manning of many supervisory and management positions is based strictly on the structure of the organization.

ROLES OF PERSONNEL

The Personnel component of the MPT system is concerned basically with the management of personnel resources, which involves the procurement, utilization, support, separation, and retirement of personnel.

Organizational Setting

The Personnel component, like Manpower, reports to the Deputy Chief of Staff, Manpower and Personnel. Personnel activities have become highly centralized, with most policy decisions restricted to the Air Staff. The Air Staff group is responsible for the supervision and control of personnel groups at each of the major commands who, in turn, are responsible for command personnel functions as well as base-level personnel activities (the Consolidated Base Personnel Offices). The personnel roles derive from information provided by the *Air Force Personnel Plan* and Air Force Manual 30-130.

Many of the centralized personnel functions involve management of the manpower inventory and the distribution of airmen. The effort to control and manage the force and grade structure has led to the development of policies and programs to determine career profiles, promotion programs, and retention policy with regard to the airman force.

Management of airmen is based on the TOPCAP objectives. The TOPCAP (Total Objective Plan for Career Airmen Personnel) outlines five essential activities:

1. Establish procurement objectives for prior-service and nonprior-service airmen.
2. Establish reenlistment objectives to attain and sustain the desired objective force and grade structure.
3. Utilize centrally controlled retraining to correct skill overages and shortages.
4. Establish separation and retirement programs.
5. Establish a promotion program that provides predictable promotion opportunity.[6]

TOPCAP objectives are integrated through the TOPCAP Computerized Management System. This system of models and methods closely represents the personnel activities that are critical and relevant to the MPT system description. Therefore, the discussion of force management roles will closely follow the TOPCAP flow diagram. Figure 4 depicts the flow of products and processes in the TOPCAP system.

[6]Predictable in terms of the airmen's years of experience and historically developed probabilities of promotion.

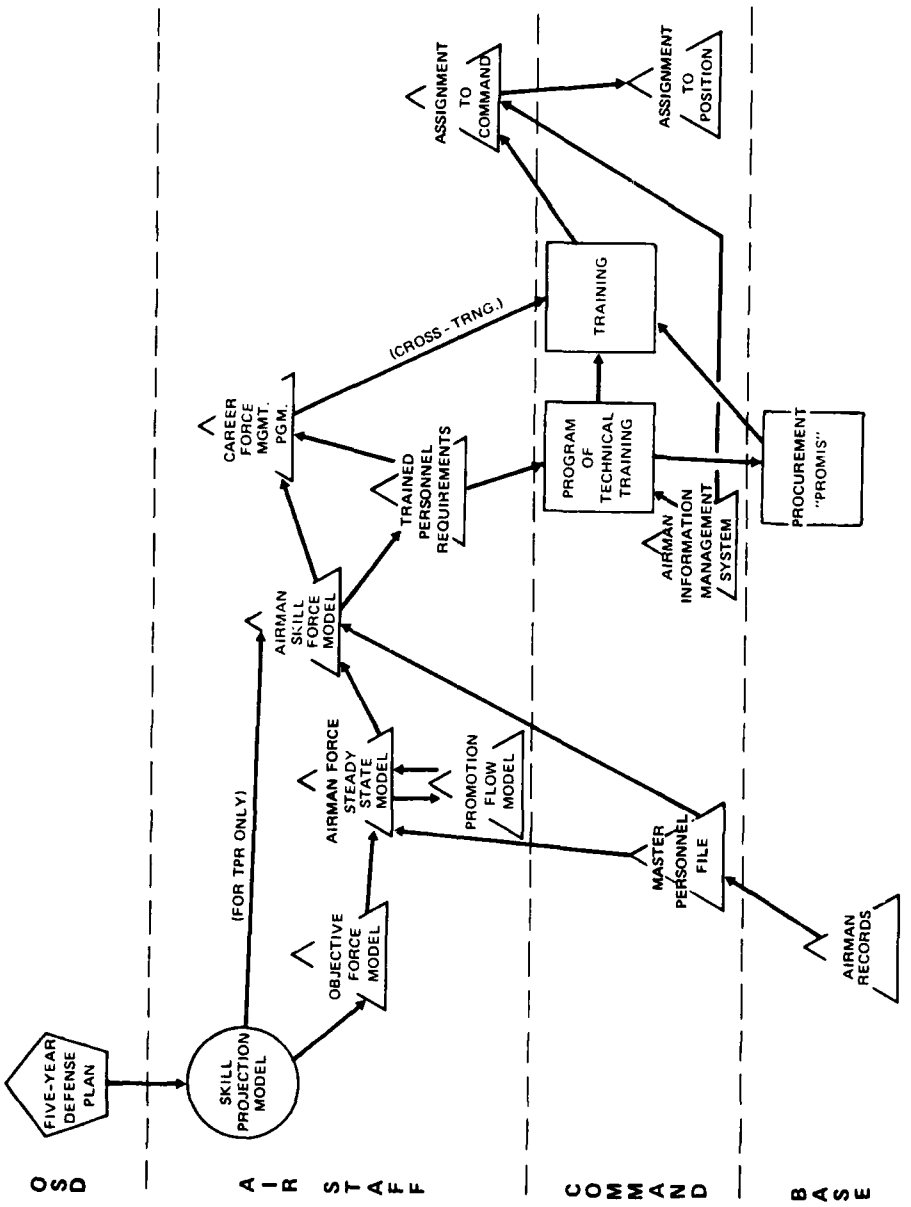

Fig. 4—Personnel roles

Force Structure

The airman force typically is managed by force structure and grade structure. Force structure refers to the total inventory of airmen classified by the year of service (YOS). Career force profiles like those depicted in Fig. 5 are developed in the Directorate of Personnel Plans (MPX) for each of approximately 120 career progression groups (groupings of occupational specialties) as well as for the total force. The dotted line in Fig. 5 represents the "objective" career force profile for a force size of 450,000 to 500,000 members. The solid line represents a current inventory of members by year of service. (Note: The term "career force" typically refers to airmen who are in their second or subsequent terms of enlistment. The "career force" is thus distinguished from the "first-term force.")

Force structure planning was developed primarily to control personnel costs. Given a total force end-strength and manpower budget, the goals are to manage the size of the career force with respect to the skill requirements, ensure career progression, and maintain a force equal in size to the allowable end-strength—all at minimum cost. These goals call for recognition of, and management in accordance with, the different labor costs and productivities of various types of airmen. Since Congress and OSD limit the size of the most experienced career airmen groups (the top two and top six grade ceilings), force structure alternatives are reduced greatly.

The structure of the force is managed through procurement and separations. According to the USAF Personnel Plan, the two principal factors affecting the shape of the enlisted force have been the numbers of nonprior-service (NPS) airmen procured to meet authorized end-strengths, and the annual rate of first-term airman reenlistments into the career force. In deriving nonprior-service personnel objectives, the service (or Air Staff) must remain within fiscally constrained end-strengths while ensuring that it will acquire a large enough pool of first-term personnel to sustain future career force requirements. Retention of airmen is particularly important. The Air Force traditionally allowed most airmen to stay in the service as long as they desired. The need for reenlistment control emerged as the career force became increasingly costly in the late 1950s (particularly because of the large number of airmen procured during the Korean War). Currently, year groups are managed by means of policies dealing with tenure, retirement, reenlistment limitations and bonuses, proficiency pay, and retraining.

The total enlisted personnel force structure is developed beginning from a "career structure." That is, the TOPCAP methodology is designed to develop a career force size to meet the skill requirements by controlling the flow of airmen into, through, and out of the career force. The career force is made up of airmen in skill levels 7 and 9 *and* of airmen in skill level 5 who are needed to sustain the 7 and 9 level requirements. Specifically, personnel planners use, as a guide, the size of the overall airman force permitted in the FYDP in determining career force size. The Skill Projection Model is used—a relatively simple computer model that translates the FYDP Manpower Program into AFSCs, skill levels, and grades. MPM, which maintains and operates the model, provides personnel planners (MPX) with projected authorizations for 7 and 9 skill-level personnel within each occupation. The projected 7 and 9 authorizations are fed into the Objective Force Model, along with projected loss rates and skill-level upgrade rates, to determine the number of

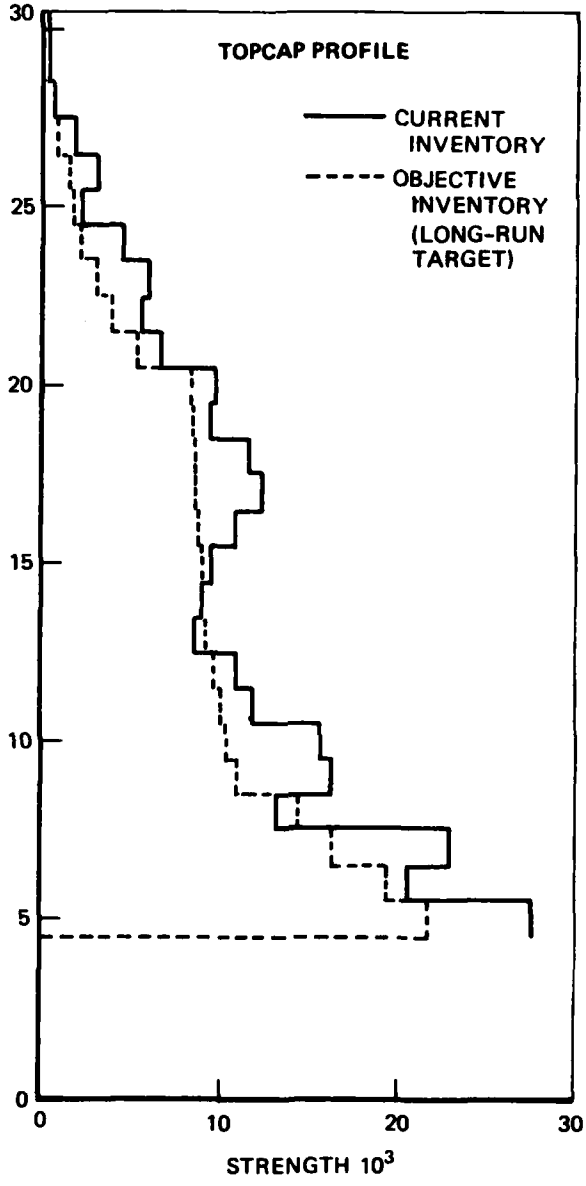

Fig. 5—Typical force profiles

"career" 5 levels required to sustain the objective force (or long-run target force) structure in each career progression group (CPG). Typically, the rates used in the Objective Force Model are derived from historical trends discerned from the Uniform Airmen Record (UAR). The output of this model is fundamentally the force structure plan at a somewhat aggregate level of detail.

Grade Structure

To provide a leadership and pay structure within the determined skill level structure,[7] requirements for people at various skill levels are translated into grade-level requirements. The grade structure is a function of manpower requirements (by skill level), pay grade ratio ceilings,[8] skill-level upgrade rates, and promotion policy. Table 1 presents the current Air Force pay-grade and skill-level correspondence. (Until recently, many enlisted personnel held combinations of skill level and pay grade that are not shown here—E-7, skill 9; E-5, skill 7; and E-3, skill 5.)

Table 1

PAY GRADE/SKILL LEVEL RELATIONSHIP

Skill Level		Pay Grade	
9	(Superintendent)	E-9	CMSGT
		E-8	SMSGT
7	(Supervisor-Technical)	E-7	MSGT
		E-6	TSGT
5	(Journeyman)	E-5	SSGT
		E-4	SGT/Sr Amn
3	(Apprentice)	E-3	A1C
		E-2	AMN
1	(Helper)	E-1	AMN BASIC

SOURCE: *The USAF Personnel Plan*, Vol. III, "Airman Structure Annexes," p. B-11.

The grade structure plan is determined using the Airmen Force Steady State Model. The key input variables are force structure, grade structure (E-9 strength, promotion probabilities, years of grade tenure), and cost factors. To simplify, the grade structure (a breakdown of the force by rank) is superimposed on the force structure (a breakdown of the force by years of service) to ensure consistency in populations and end-strength constraints. The model produces the force grade configuration, promotions, grade requirements, system costs, average years of ser-

[7]As described in the previous subsection: apprentice, journeyman (skill level 5), supervisor/technician (skill level 7), and superintendent (skill level 9).

[8]For example, E-8s and E-9s (see Table 2) legally can constitute no more than 3 percent of the enlisted force.

vice by grade, and average years of service at promotion. Subsequently, a test model is run, the Promotion Flow Model, which is a ten-year simulation of force and grade structure designed to check progress toward the TOPCAP goals. This model is used interactively with the Airmen Force Steady State Model to analyze personnel policy alternatives. Outputs of the Objective Force Model and the Airmen Force Steady State Model are manipulated, using several other models, to determine the objective or long-run-target year-group profiles for individual AFSCs and year-group-by-pay-grade structures for career progression groups. The overall pay grade percentages implicit in the latter are forwarded to the Management Engineering Program, where they are used in the development and/or review of manpower standards, and to personnel programming (see next section), where they are used in developing annual promotion programs. The former also become inputs to personnel programming; they are used in planning the transition from current to targeted year-group profiles. Force and grade structure management can be summarized as control of the stock of airmen in order to provide promotion opportunity within budgeting and manpower constraints.

Both force and grade structure planning are the province of MPX, the Air Staff Directorate of Personnel Plans. Flow management, the subject of the next subsection, is the province of MPP, the Directorate of Personnel Programs.

Flow Management

Using products of the Objective Force Model and the Airmen Force Steady State Model, as noted above, along with the current inventory of airmen (from the UAR), another computer program, the Airman Skill Force Model (ASKIF), matches the projected authorized force against end-strengths projected from the current force to determine imminent training, retraining, and retention requirements. The model projects these requirements for each AFSC for three years into the future; projected requirements are the basis for numerous short-term personnel and training policy decisions. The Trained Personnel Requirements (TPR), published quarterly by MPP, Hq Air Force, is a statement of manpower training requirements based upon beginning inventories, projected losses and gains, and projected manpower requirements (the latter from the Skills Projection Model).

In addition to training requirements, flow management is concerned with procurement levels, retention goals, and cross-training. Because most of the training requirements are filled through nonprior-service recruiting, the establishment of the "Trained Personnel Requirements" significantly affects total recruiting levels and the aptitudes desired. Alternatives to recruiting for occupational shortages include retention and cross-training. Although these alternatives entail budgetary complications, the long-run career structure goal may require their use.

Determining the force and grade structures has far-reaching effects on the size and composition of the airman force. Like these determinations, the TPR definition process, cross-training programs, and retention programs control the supply of airmen (by AFSC and skill level) based upon future projections of historical information rather than actual current command and manpower requirements.

The Air Training Command's (ATC's) output level and mix of trained personnel are established in a document called the Program of Technical Training (PTT),

largely determined by the TPR. While ATC may negotiate changes in the PTT at the Quarterly Training Flow Management Conference, Personnel generates the original TPR and plays a dominant role at the conference. The influence of the manpower components on the TPR is limited to the authorization levels provided for each AFSC in the Skills Projection Model and for transients (airmen changing locations, awaiting assignment, etc.). In fact, until fall 1976, the Air Staff manpower function was not even represented at the conference. Further, through cross-training and retention management, Personnel moves the inventory toward the objective force profile. This type of management directly affects the experience level and, therefore, the productivity level of the force.

Assignment of the Airman Force

The Air Force Manpower and Personnel Center (MPC) assigns personnel and develops manpower standards. (The latter responsibility was transferred from MPM to MPC in a 1978 reorganization.) Working closely with the commands' assignment and training officers, MPC designates command and base assignments for each airman. Thereafter, commands may redirect airman assignments in accordance with internal priorities. Assignment may be thought of as the geographic distribution of trained airmen based upon funded requirements and resource availabilities.

In its assignment responsibility, MPC may be viewed, in the most basic sense, as a clearinghouse for personnel. Each command provides a list of required (or at least requested) inventories, and MPC reviews current and future personnel resources, fills the demands where possible, and backfills shortages with training output. This is not meant to imply that the MPC's tasks are simple—only that the overall purpose of the organization is straightforward. MPC's success in matching supply to demand probably affects long-term motivational levels of airmen, retention probabilities, and base operational capabilities. The distribution of personnel, especially the allocation of scarce manpower skills, is based on the following criteria:

1. Worldwide manning levels within AFSCs,
2. Authorized command priorities,
3. Air force operational efficiency,
4. Career development objectives, and
5. Air Force stability and cost-effectiveness.

Exclusive of priority situations, assignment is based upon proportional demand from the commands. Thus, if Command X requires 20 airmen in the Integrated Avionics occupation and the total Air Force demand is for 200 such airmen, then Command X will likely receive ten percent of the available airmen. Obviously, this process affects the operating capabilities of bases where the limited resource is in a specialty directly supporting its missions.

Career Development

The TOPCAP management philosophy spurred the development of several career-development activities aimed at providing the airman with increased career

visibility and control. While the programs were designed by the Air Staff, the implementation and monitoring of the activities is largely the responsibility of specific commands, the CBPOs, the MPC, and the Recruiting Service. Examples of some career-management activities include the Selected Reenlistment Bonus Program, the Guaranteed Enlistment Program, the weighted Airman Promotion System, and Career Airman Reenlistment Reservations. Briefly, as part of the Selected Reenlistment Bonus Program, the Personnel Programs office at the Air Staff secures and allocates bonuses paid as incentives to induce specialists in selected occupations to reenlist. It takes careful analysis to determine the appropriate bonus amounts and to preserve relatively stable bonus expectations. The Guaranteed Enlistment Program enables the Recruiting Service to guarantee specific training and assignment to recruits. This program offers obvious advantages for recruits, but can seriously constrain flexibility in adjusting the training pipeline[9] to changes in manpower skill requirements.

The Weighted Airman Promotion System, administered at the base level, designates airmen for promotion to grades E-5 through E-7 based upon weighted scores in areas such as knowledge of specialty, knowledge of military and management practices, time in service, time in grade, decorations, and performance. The intent of the system is three-fold: (1) to provide each airman with promotion/career visibility, (2) to provide airmen with an understanding of the selection process, and (3) to ensure equitable selection.

Career Airman Reenlistment Reservations is a system that controls the number of airmen who are allowed to reenlist in each AFSC at the career decision point. It is designed to satisfy the objective of managing the career force structure while providing career planning visibility to airmen. To prevent shortfalls in required skills and surpluses in other skills, MPC maintains a Career Job Requirements File, which identifies the number of reenlistments, by AFSC, needed to fill career force objectives. First-term airmen can apply for career status against these requirements, thereby reserving a career position. (Requirements are filled in the order of date of the application.)

Summary

The roles of the Personnel component (including MPC, MPP, MPX, and command and base personnel organizations) are most strongly influenced by considerations of force and grade structure (that is, via TOPCAP). The management philosophy, therefore, focuses on airman year-group management constrained by a predetermined career force size,[10] statutory limitatons on the E-9/E-8 force, and the top six grade ceiling.

ROLES OF TRAINING

ATC's roles are taken from the Air Force Technical Training Manual and from ATC documents and briefings. ATC is an Air Force command; as such, this report

[9]Pipeline refers to the inventory of airmen currently in training for specific future occupations.
[10]Provided via the FYDP and the manpower authorization level.

has already addressed many of its functions and responsibilities (manpower estimation, assignment, personnel planning, etc.). The following discussion therefore focuses on training, recruiting, and unique command activities.

The Training Process

ATC is the major educational/training institution of the Air Force. It conducts courses in basic military training, technical training, field training, military training for some foreign personnel, and training for some Army and Navy Personnel.[11] After basic training, about 91 percent of the airmen proceed with specialized technical instruction, while the other 9 percent are assigned directly to duty stations where they receive some on-the-job training. The Air Force categorizes technical training requirements as follows:

Category A skills	very technical, requiring that all enlistees receive further technical training.
Category B skills	somewhat technical, requiring some airmen to receive further technical training while some will be available for direct duty assignment.
Category C skills	little technical skill involved, requiring no additional training. After basic training, recruits are available for direct duty assignment.

Airmen with Category A and Category B skills who require technical training typically enter "basic technical training" at one of ATC's technical training centers. This training is often referred to as "3-level" training because most airmen are awarded 3-level skill classifications upon completion. This training typically consists of classroom and laboratory instruction, and progresses from fundamental cognitive areas to instruction relevant to specific equipment. In some specialties, trainees complete "schoolroom" training at a central location and then receive equipment-specific training from a Field Training Detachment (FTD) at an operating base (often their first base of assignment). ATC operates about 70 FTDs, which work with the operating commands to qualify and update maintenance crew skills and provide other on-site training support. The individual commands may also provide formal technical training at this point. For example, TAC operates a training program called Consolidated Aircraft Maintenance Training.)

After receiving a 3-level skill classification, the airman is generally assigned to a duty station where he receives on-the-job training under the direct supervision of a 5- or 7-level airman.

During his first duty assignment, the airman continues a self-study program (Career Development Course). The airman is ready for upgrading to the 5 skill level when the trainer believes he has mastered a given set of tasks (proficiency by performance), when the airman has completed the self-study program, and when he passes an examination on job knowledge.

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[11]ATC has also assumed responsibility for AFIT, AFROTC, PME, etc., due to the realignment of the Air University to ATC in 1978.

Program of Technical Training

Course planning consumes much of the ATC's energy. The planning job requires estimating training loads,[12] manning the courses with qualified instructors, and scheduling classes and class output (number of trained airmen during a specified period). All of this planning work is summarized in the Program Technical Training (PTT) publication.[13] Essentially, the PTT is a three-year training plan, with the projections designed to be responsive to the manpower needs established in the Trained Personnel Requirements (TPR). The schedules present the dates scheduled for each class, the expected class size, and the number of concurrent classes.

Technical training schedule development is complex. The course-planner must consider the required throughput, course duration, anticipated "washout" rates, the availability of instructors, and course content. Course-planners play an important role in manpower supply through control of class size, frequency, and course duration.

ATC claims to influence training production through the following actions:

- Management of the course group size,
- Manipulation of occupational families (e.g., using a Fire Control Radar Maintenance instructor to teach another avionics course should the requirement for his specialty be reduced), and
- Utilization of the commands for technical training of recruits, by increasing on-the-job training and decreasing technical school course requirements.

Through these actions, ATC claims that it can affect the output of students by $\pm$ 20 percent in response to changes in the TPR. These changes are not immediate solutions; they affect student output from one to two years into the future.[14] Course-planners also realize that, because total training output is determined externally, every student trained in a specialty who is not needed in the inventory represents a one-man shortfall in a needed skill.

Recruiting

The PTT provides a guideline and a set of occupational objectives to Air Force recruiters. The Recruiting Service is managed by ATC; its overall objective—and its most difficult task—is to provide a flow of persons with the appropriate aptitudes into training. One phenomenon constantly mentioned by recruiters and training course planners is the characteristic "W" pattern of the recruit supply. Apparently, recruiting is very active in the summer months and then again in January, but slow in between. This causes problems with the scheduling of training activities. Unless recruits can be provided at reasonably even rates, the training schedule must adjust training loads to accommodate the availability of recruits.

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[12]The TPR, along with the course requirements for other services, the AF Reserve, the civilian force, and supplementary training are major considerations in workload estimation at ATC.

[13]The PTT is revised or created as required; publications correspond to actions taken at the Training Flow Management Conference.

[14]The two-year response time is the product of training pipeline commitments, enlistment guarantees, and the strong desire to maintain a stable training requirement.

While the magnitude of this problem is uncertain, the Air Force views the "W" pattern as sufficiently problematic that it has introduced programs to guarantee occupations, schedule recruits for induction (through the Delayed Enlistment Program), and establish retraining reservations to fill in the low months.

Figure 6 depicts the recruiting system. ATC establishes occupational quotas for recruiters by month, based on the PTT.[15] Recruiters take applications for the requirements and attempt to schedule induction dates (so as to flatten the "W" pattern). The quotas and applications are compared using a computerized accession control system. This information is available through a computer network to ATC, MPC, and individual recruiters.

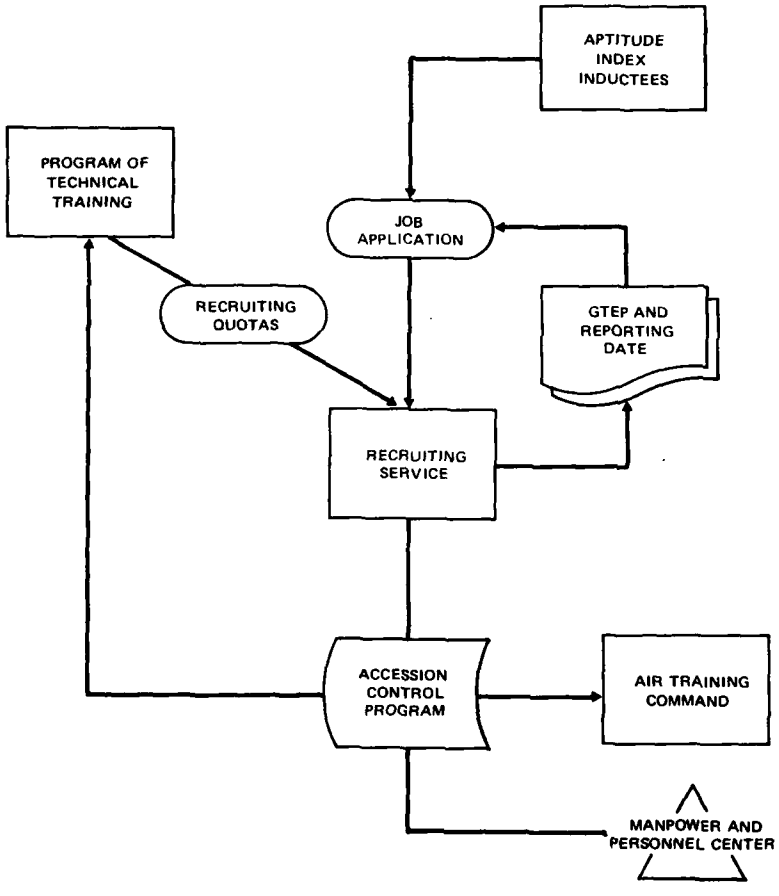

Fig. 6—The recruiting system "PROMIS"

[15]The Airman Program provides the Recruiting Service with an overall monthly objective for nonprior-service accessions. This objective does not necessarily coincide with the objectives specified in the PTT.

The PTT also provides a schedule for training course evaluation by ATC. The responsibility for evaluation belongs to course-planners. The intent is that the evaluation will ensure the relevance of training curricula to specific job skill and knowledge requirements.

Figure 7 depicts the roles of the Training component. The incoming information and requirements from the Personnel component are represented by the triangles, while Training functions are shown as rectangles.

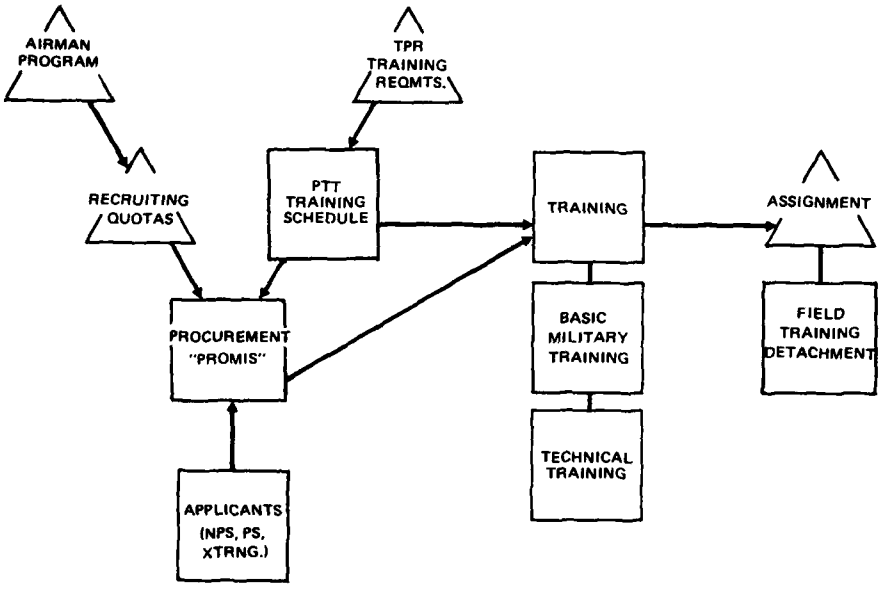

Fig. 7—Training roles

III. INTERACTIONS: THE INTEGRATED FUNCTIONING OF MANPOWER, PERSONNEL, AND TRAINING

INTRODUCTION

Section II explored the tasks and responsibilities of each MPT system component; these were referred to as the "roles" of the functional groups. Although each component's roles were examined separately, the three components have a common objective: to provide the Air Force with a specified quantity of adequately trained and appropriately distributed personnel. Obviously, then, these components cannot work autonomously and without regard for the mutual effects of the policy and program decisions each takes. Dependence may develop, for example, where one component's program decisions hinge on prerequisite information and decisions of other components.

To fully appreciate the intricacy of the MPT system, it is essential to examine the mutual influence of components—referred to as "interaction." The components' formal roles are used here as the baseline for portraying those interactions. By connecting the roles where appropriate, and then adding links to represent communication or some kind of information transfer between components, the overall MPT system can be linked together.

It may clarify the graphical presentation to introduce a few phenomena that significantly influence the overall MPT system. The first is the Planning, Programming, and Budgeting System (PPBS) used by the Department of Defense in preparing both short-term and long-term defense budgets (see Fig. 8). In general, the program and budget decisions made jointly by the Congress, Office of Management and Budget, the Joint Chiefs of Staff, and the Air Force Air Staff determine and constrain the actions of various organizations within the system. (Appendix A presents a detailed explanation of PPBS.) From the PPBS process, the force size, airman grade constraints, program budgets, and mission objectives are all established and passed down for Air Force implementation. The PPBS so strongly affects personnel needs, management, and training that the quarterly update and revision of the PPBS (as depicted in Fig. 8) creates a cycle of MPT system activity. These quarterly or triannual updates of the documents required for the PPBS, called the Five Year Defense Plan (FYDP),[1] motivate the Manpower, Personnel, and Training components to perform their roles and to interact in a manner described in subsequent paragraphs. Each FYDP update changes and redefines various Air Force programs, and this in turn changes budgetary constraints and task assignments. This periodic revision sets the MPT system and its components in motion to revise personnel supply requirements, personnel cost estimates, and training needs.

The second phenomenon that affects the MPT system is scheduling. The system

[1]The FYDP is a budgetary statement of approved defense programs over the current and subsequent four years.

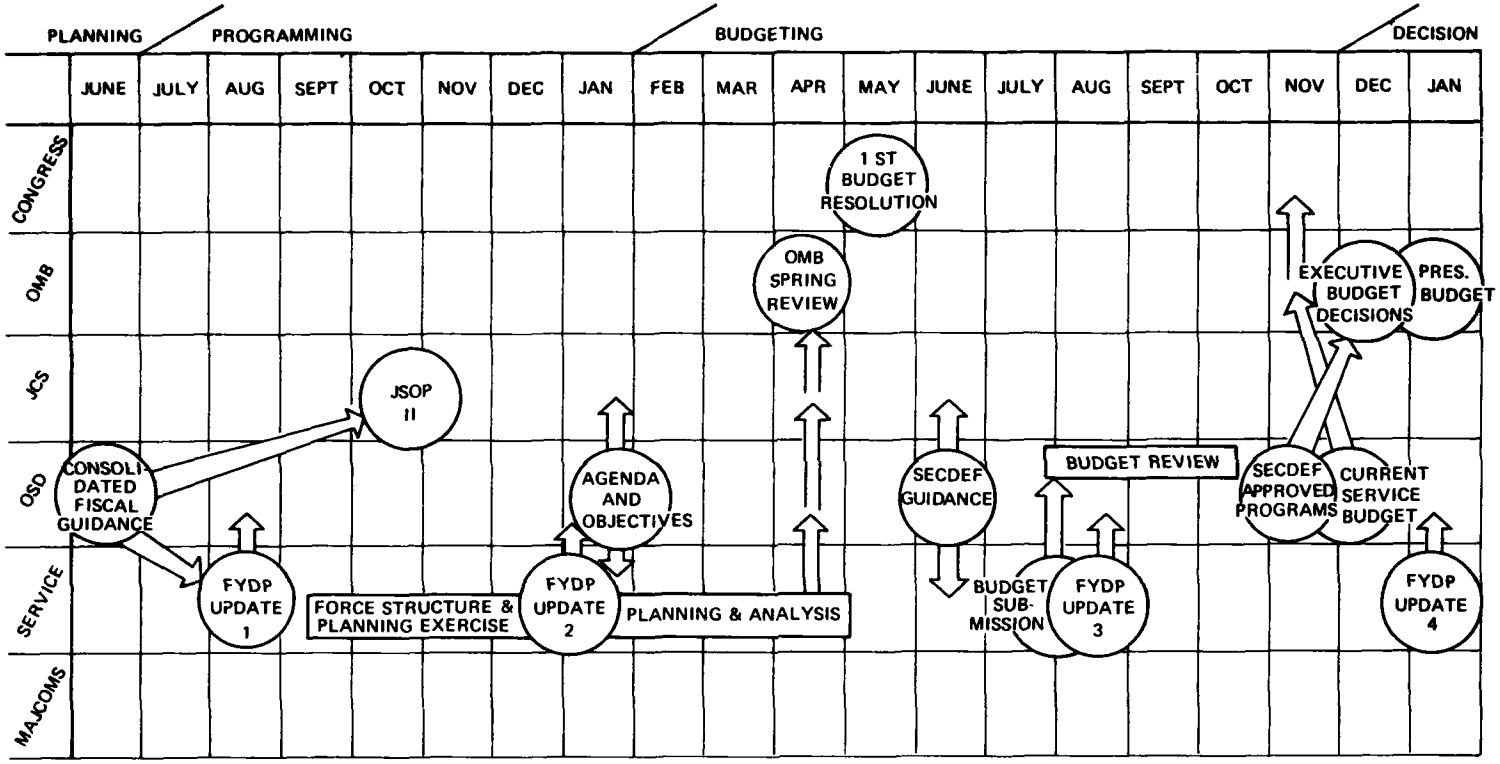

Fig. 8—Overview of the planning, programming, and budgeting system

SOURCE: DEFENSE RESOURCE MGMT STUDY FEBRUARY 1979

operates on a rigidly enforced time schedule. That is, once the FYDP revision process begins, each component is faced with a set of necessary tasks and an objective completion date. For the most part these completion dates allow a reasonable response time to perform the task, given the informational needs of adjacent components. (For example, Personnel planners may need to know the authorized force size from the Manpower component before preparing force structures.) In some cases, however, the scheduled activities of one component conflict with the scheduling requirements of another component. For example, Manpower may be required to produce a detailed manpower requirements listing, say, eleven weeks after the FYDP revision commences. Personnel, which needs the detailed requirements listing to prepare the trained personnel requirements (TPR), may be left with only two or three weeks in its schedule to prepare its plans. Schedule dependencies in the MPT system complicate the rather simplistic view described in the "roles" section of this report. Indeed, immediate deadlines often force the MPT components to operate autonomously when they should be collaborating. Deadlines motivate them to "short-cut" complete procedures, experience excessive work peaks, and, in some instances, duplicate efforts.

The third phenomenon comes about as a kind of "by-product" of PPBS cycles and scheduling deadlines: namely, the informal system operation. Although prescribed interactions between components do exist, it would misrepresent the system to study interactions only at this level. In this section, the formal interactions provide the baseline, but much of what is described is the informal or adopted interactive behavior.

Approach

The approach used to explore interactions is intended to lead the reader from a simplistic view of the MPT system to a comprehensive view. The simplistic presentation is dubbed here as the "static case." The introduction of schedule considerations leads to a more sophisticated system concept called the "single-cycle dynamic case." Finally, incorporation of the PPBS/FYDP updates permits examination of an annualized viewpoint called the "multicycle dynamic case." It should be emphasized that this analysis represents the system "as it was" in 1976 to 1979; changes may have occurred since then.

Format

Diagrams are presented of each "case" as descriptive aids. As with the diagrams presented in the discussion of component roles, the purpose is to illustrate functions, flows of information, management levels of responsibility (base, command, Air Staff, etc.), and, in the dynamic cases, the passage of time. For further clarity, the individual components are identified by shape: Personnel responsibilities are represented by triangles, Manpower by circles, Training by rectangles, and Congress/OMB/OSD by pentagons. Arrows trace the flow of information.

Components interact whenever information is transferred from one component to another (hence, from one shape to a different shape). Management-level interaction occurs both within and among components whenever information is trans-

ferred from one management level to another (for example, from a major command to the Air Staff).

THE DYNAMIC INTERACTIONS OF MANPOWER, PERSONNEL, AND TRAINING

Static Case

The simplest (and, perhaps, least accurate) way to examine interactions is merely to create an "overlay" of the individual role diagrams and then connect the functions where components interact. Figure 9 is such a schematic; similar diagrams appeared in early Air Force studies of the MPT system.

Figure 9 illustrates the trichotomy of the system and the segregation of component involvement. Notice that the components, represented by their respective shapes, tend to be functionally and physically grouped (for example, Manpower functions on the right side of the figure, Personnel and Training functions on the left side). Using this approach, component interaction—a transfer of information among components—appears to be limited to the following:

1. Congress/OMB/OSD provision of budget, mission, defense strategy, and grade ceiling information to the Manpower and Personnel components.
2. Manpower's provision of anticipated authorization levels for subsequent periods as derived from the Skill Projection Model.[2]
3. Personnel's provision to Management Engineering of objective (long-run target) grade percentages for each Career Progression Group (CPG). These are important inputs in determining work center manning breakdowns according to skill and grade levels as found in manpower standards. (Note: These percentages are not direct outputs of the Airman Force Steady State Model, as might be inferred from Fig. 9. Rather, they are determined using a similar model, the CPG Objective Grade Model, whose inputs include the promotion timing, determined using the Airman Force Steady State Model, and CPG objective experience profiles, determined using the Objective Force Model and another model called the Five Level Redistribution Program.)
4. Personnel's provision of the Trained Personnel Requirements (TPR) information and career force decisions to the Training component. This requirement information is used to develop the Program of Technical Training and to determine cross-training loads.
5. Training's provision of scheduled student output for personnel assignment decisions. Assignment decisions are subsequently transmitted to the major command and base manpower components.
6. Manpower's designation of detailed authorization levels in the 7102 File. These are crucial to the Personnel component in its assignment decisions.
7. Personnel's assignment of enlisted people to work centers. These people,

[2]Remember that this is only an estimate of eventual manpower requirements based upon the total authorization level budgeted and the previous period's occupational needs.

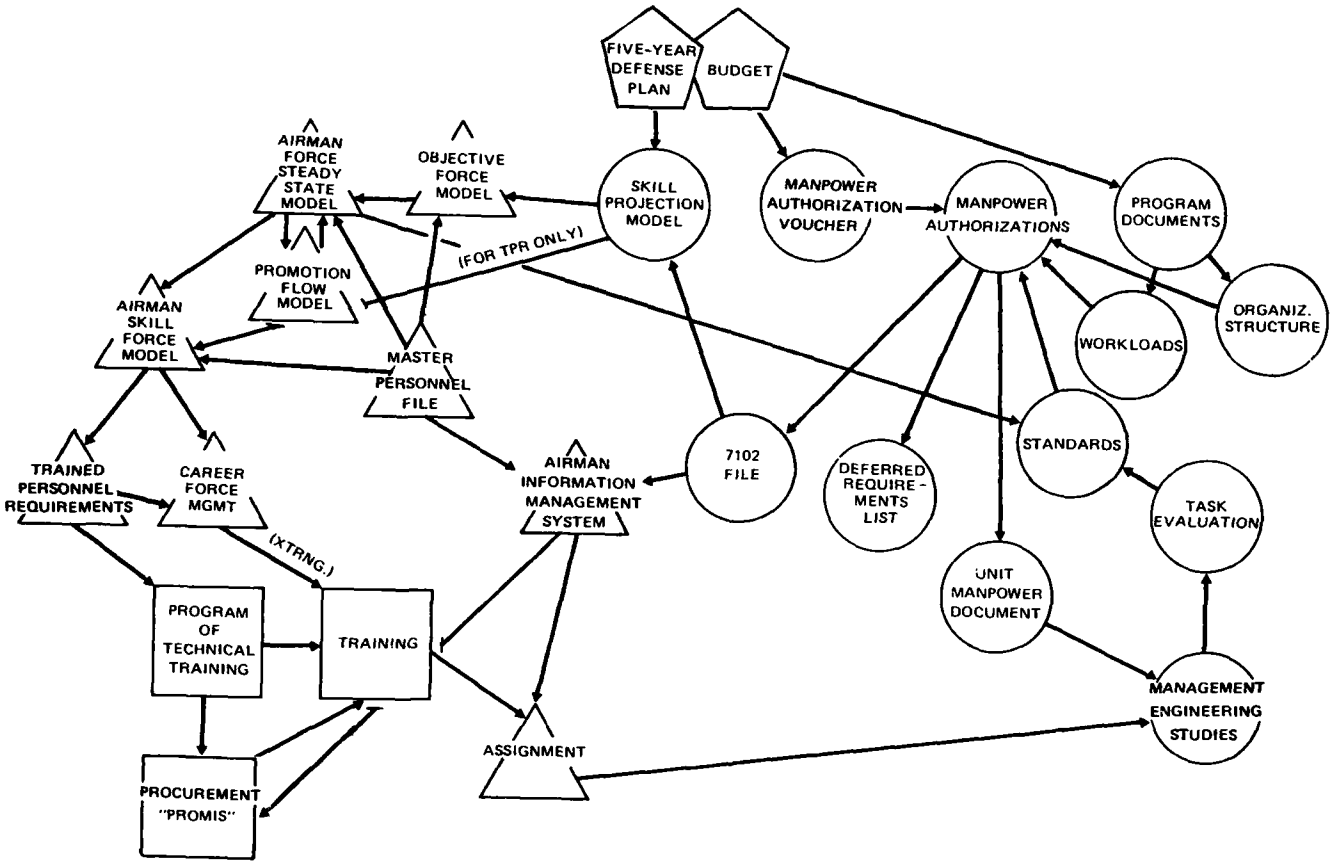

Fig. 9—Manpower, personnel, and training interaction: a static representation

with their associated training, skills, and motivations, become the basis or "norm" for observation by Management Engineering technicians as they collect and analyze data during manpower standards development.

This approach ignores several considerations (management level and time, for example) that are vital for informed analysis of the overall MPT system. Further, this model does not represent the many informal interactions between components or management levels. For these reasons, the analysis of this static representation is purposefully brief.

The Single-Cycle Case

This subsection introduces two additional elements to the discussion of the MPT system: schedule (time) and the management level concerned with various activities. The representation of time-phasing or elapsed time from the beginning of the process is based on Air Force documents, schedules, and estimates made by cognizant Air Force personnel. Naturally, the precise time of occurrence of activities may vary somewhat from cycle to cycle, but the general relation between activities remains fundamentally the same.

The single-cycle dynamic case, depicted in Fig. 10, indicates many more interesting characteristics of the MPT system than were evident in the static case. First, the activities of each component appear more appropriately integrated. This is suggested by the dispersion of activities over the entire cycle and by the manner in which information flows between organizations as the overall process moves toward the objective activity: assignment. Second, the dependence relationships between organizations are more evident. For example, the Manpower component cannot start the requirements determination process (except for standards development and maintenance) until the budget and defense plans are formally approved and passed on. In turn, the Personnel component cannot begin force/grade structure planning until it receives the Manpower component's first estimate of force size and composition (via the Skills Projection Model). Third, weaknesses in the logical structure of the MPT begin to appear. For instance, a TPR is scheduled to be produced in the thirteenth week of the cycle; we recall that the TPR is supposed to be based upon detailed "bottom-up" manpower requirements. But there are only three weeks in which to prepare this document (since manpower authorizations are completed by the Manpower component about the tenth week). Fourth, a perspective is offered of the complexity and length of time involved in establishing a personnel requirement and the actual delivery of the trained enlisted person. In Fig. 10, it appears that at least twenty weeks must pass from the time the base observes a need (week one) until the first assignment of the enlisted man to fill that need, and as many as sixty weeks if the training requirement is extensive.[3] Fifth, this case makes clear the level of management involved in an activity for each component. Power structures, informal both within a particular component and in relation to other components, become more apparent. To illustrate, we notice that most of the Personnel component tasks are Air Staff responsibilities, while the Manpower component's responsibilities are widely shared between the Air Staff

[3]The example assumes that the airman required was not available in the current inventory.

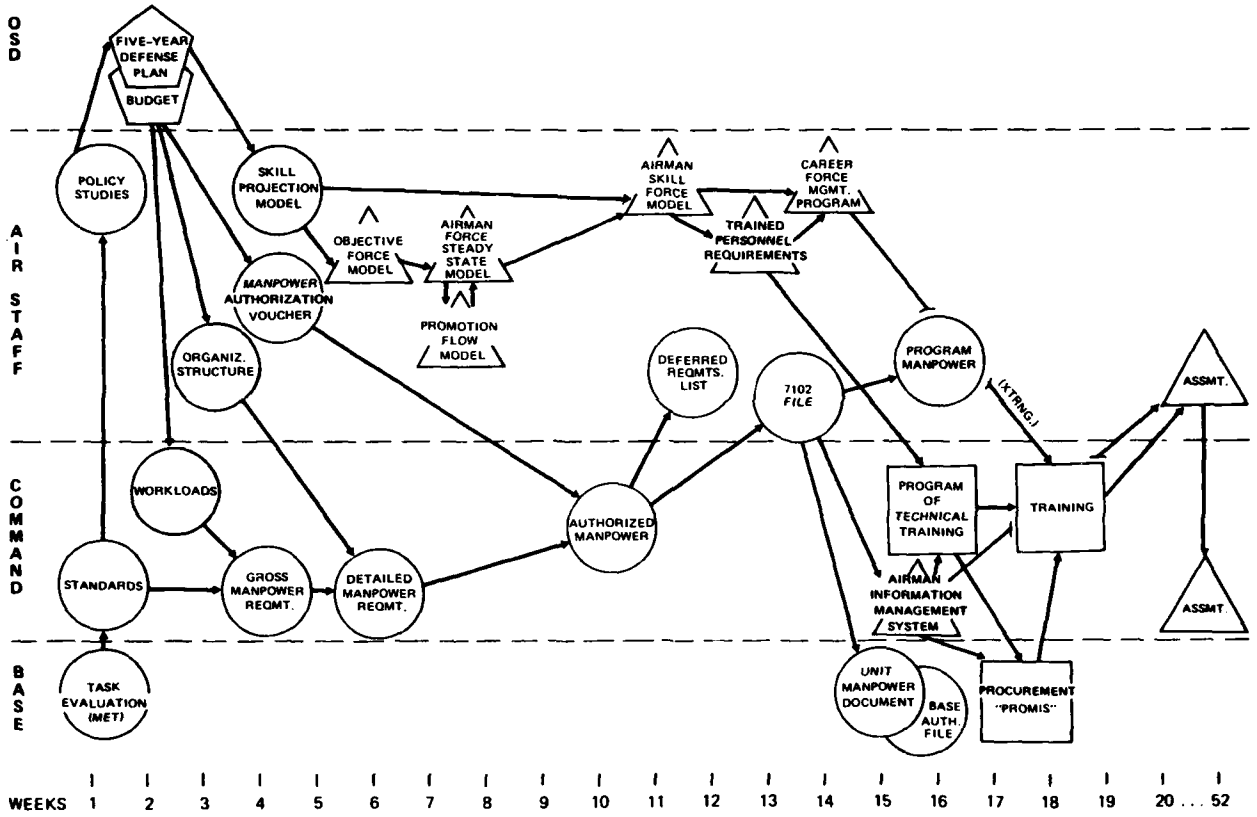

Fig. 10—Manpower, personnel, and training interaction: the single-cycle dynamic case

and the commands. Training activities, meanwhile, are entirely command-level functions (although there are Air Staff groups for liaison/coordination.)

Not all of these characteristics are necessarily problems, but in this representation they become visible, open to question, analysis, and debate. This network representation provides Air Force managers with improved visibility of the system, a visibility they need if they are to improve elements of the MPT system and to appreciate the sensitivity of either the entire system or its parts.

A brief discussion tracing the flow of activities and information depicted in Fig. 10 may elucidate MPT system operation and component/management-level interactions. Starting from the lower left corner of the figure, Management Engineering Team work-evaluations and standards development are continuous and ongoing activities that provide necessary information for (1) the derivation of gross manpower requirements, and (2) the further development of estimating equations used by the Air Staff in evaluating proposed policies and programs affecting Air Force resources. Once the budget and defense plans are established by Congress, OMB, the Joint Chiefs, and the services, manpower budgets are examined by the Air Staff Manpower component, and allocated in gross numbers to the individual commands (using the Manpower Authorization Voucher, or MAV). The program decisions, organization structures, and standards are simultaneously employed by the command-level manpower components to develop their unique and detailed personnel needs.

In approximately the fourth week of the cycle, Air Staff Manpower members are due to provide the Personnel planning staff with a first look at budgeted manpower by occupational specialty and skill level (7 and 9 skill levels only) via the output from the Skill Projection Model. This milestone initiates several personnel activities related to force and grade structuring, eventually resulting in the development of the Trained Personnel Requirements (TPR) and Career Force Management Program. Since the TPR is developed without insight into the detailed command-level personnel needs, it is incumbent upon the Personnel component to make last-minute revisions to the TPR from requirements information provided by the Manpower component contained in the command-generated 7102 file.

The personnel authorizations that cannot be filled from the current personnel inventory are summarized for the Training component to permit develoment of recruiting and training plans. Once approved, the basic Program of Technical Training provides the schedule for technical training activities, procurement, and, eventually, assignment.

The description of this complex system is not yet complete. As previously stated, the element that initiates most of the MPT system activity is the revision or adoption of the FYDP and the Defense budget. This revision occurs triannually or quarterly, and each time creates a single cycle like that depicted in Fig. 10. The following subsection addresses the cyclical situation created by these regular revisions.

The Multicycle Dynamic Case

The introduction of the FYDP/budget cycle results in an MPT system as illustrated in Fig. 11. To maintain as much clarity as possible, yet present a view of

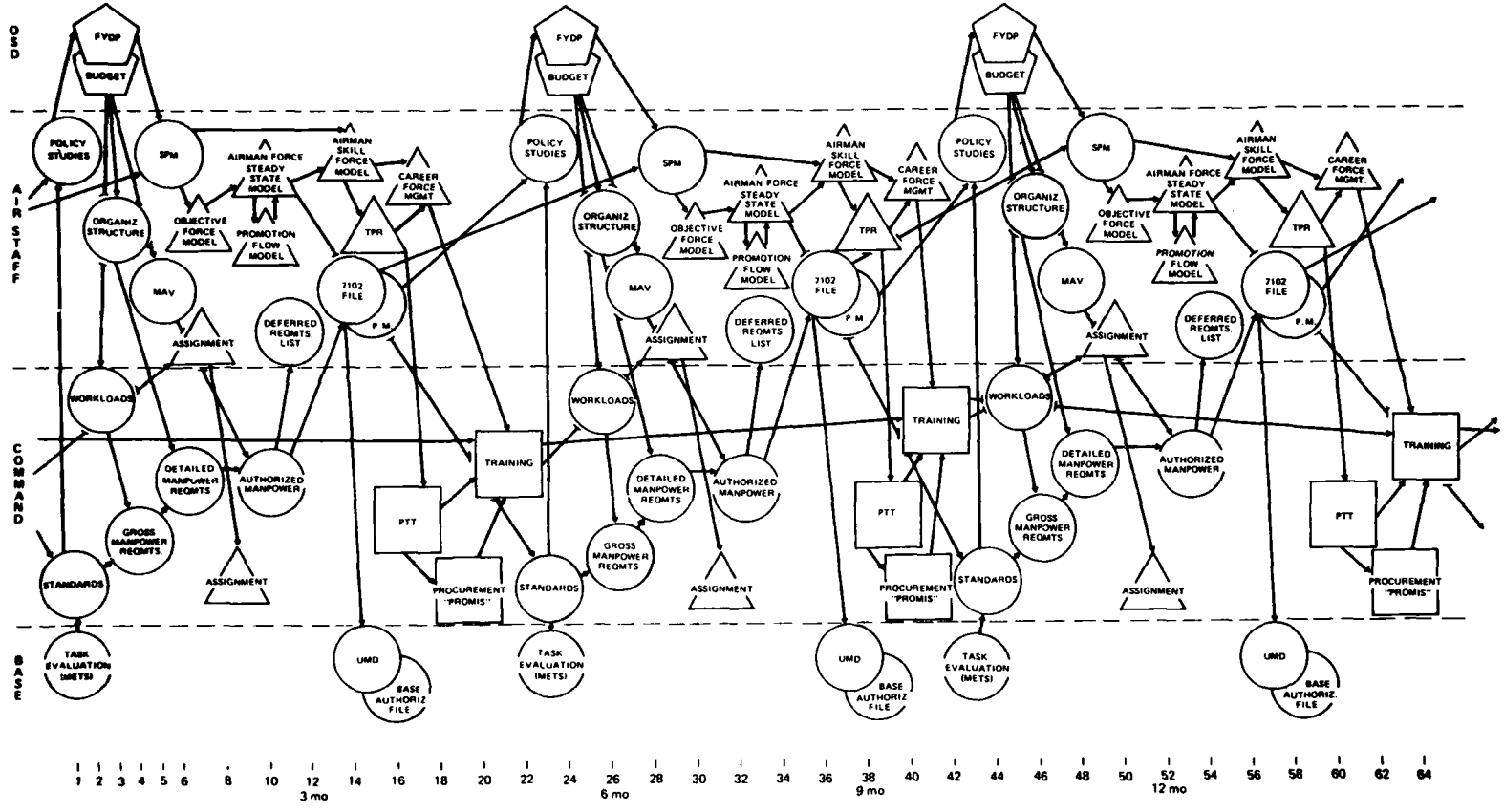

Fig. 11—Manpower, personnel, and training interaction: the multicycle dynamic case

cyclical effects, the figure depicts a triannual cycle of the system: three consecutive single-cycle cases arranged according to the possible schedule requirements of the PPBS.

Notice that the cycles overlap. That is, prior to the completion of the first MPT system cycle, revision of the FYDP is under way and new personnel budgets and requirements are being generated. While the cycle-to-cycle changes may not change most of the personnel needs to any great degree, the changes introduced by revision can be costly. For example, if the product of the first cycle is a requirement for 100 new repairmen, then the system initiates recruitment, training, and assignment activity. However, prior to the completion of the lengthy training course for the new repairmen, the requirement may have changed twice as the result of FYDP/budget revisions. It is possible for the requirement to dwindle or vanish even while the repairmen are being trained.

The overlap of cycles and interruption of the training requirements create the potential for component conflicts (for example, between Training and Manpower); expenditure of additional management energies to keep abreast of changes, adapt to the changing budgeting and planning postures, and defend cycle-to-cycle changes in an attempt to stave off potential conflicts; and frustration on the part of the members of each component. For example, the role of Management Engineering Teams primarily consists of the development and revision of manpower standards. Due to emphasis on providing standards "coverage" (to facilitate the budget/plan revision process for the Manpower component), there is little time for analysis of work or classical industrial engineering activities (methods improvement, skill-level trade-offs, and so on). Major commands perceive themselves as isolated and as victims of continual program and policy changes made by Congress, OMB, OSD, and the Air Staff. Turmoil within the Manpower component, owning to fluctuations in occupational specialty requirements, is attributed to constant changes that appear to the major commands, at least in many cases, to be made without regard for personnel implications.

Planning and budgeting revisions also offer the components opportunities to manipulate their requirements in an attempt to satisfy operational requirements. That is, major commands take advantage of their control over the distribution of manpower authorizations. (As long as program manpower budgets and grade ceilings are not violated, the major commands can allocate authorizations to whichever specialty, skill level, and base locations they wish.) Each cyclical revision, then, affords an opportunity to change this allocation in an attempt to raise the output level of the operations. This flexibility naturally contributes to an unstable manpower requirement and the interruption of training requirements. AFMEA is certainly aware of this instability and is attempting to control these fluctuations.

The Air Staff components are in an unenviable political position: On the one hand, the Air Staff tries to satisfy operational requirements for personnel while, on the other hand, it must interpret and pass on budgetary constraints and program requirements to the operational units. Members of this management level complain of feeling "caught in the middle."

The preceding description provides an analytical framework for the entire MPT process and many of its subprocesses. This framework can stand alone as simple evidence of the complexity of the system. The framework may also be used to educate members of the Manpower, Personnel, and Training components about the

roles of other components and about their interrelationships. Finally, the framework serves as a prototype—the first attempt to synthesize the system. This prototype may serve as a baseline for detailed system analysis and further diagnosis of the role structures.

IV. SOME OBSERVATIONS ON THE MANPOWER, PERSONNEL, AND TRAINING SYSTEM

The purposes of this report, as previously stated, are first to provide the basics of an integrated understanding of the overall MPT system that can facilitate future system improvements, and second, to provide an introduction to the MPT system's structure and functional relationships for newcomers to the Air Force MPT system. It was not one of the original purposes of this report to present a critique of the system or to suggest remedies for problems. It will be appropriate, however, to review four observations that grew out of performing the research tasks underlying the report—document reviews, interviews, structural development, and so on—which afforded the authors an unusual view of the system:

1. Although there is a need to evaluate the roles of each functional component of the MPT system, many problems are not evident until a total systems approach is adopted.
2. Schedule demands placed on the various components to accomplish specific MPT system tasks have instigated the use of "short-cuts" and assumptive approaches.
3. The FYDP/Budget cycle, a triannual occurrence, is the driving force behind recurring MPT activities and behind continuously changing personnel requirements.
4. The occasionally proposed goal of "stability" of personnel requirements may be unrealistic and, in fact, undesirable.

A "SYSTEM" POINT OF VIEW

It is essential to identify each component's role in the MPT system, both for improving the efficiency of the components and for understanding how each one contributes to the system's central goal. There is, doubtless, a need to continue wrestling with the problems and inner workings of each component. There are many opportunities for improving efficiency, quality of product, and response time for each component. However, the "wrestling" should take place in the "system arena." As indicated in Sec. III, the effectiveness of each component is, at some point, dependent on the effectiveness of other components in the system. Further, the goal of the MPT system—to place an appropriately trained enlistee on the job at the time he or she is required—cannot be met without the cooperation and coordination of the components.

This means that procedural, policy, and program changes proposed by one component must be examined in terms of how they affect the processes and products both of the other components and of the system as a whole. For instance, if the Personnel component proposes a change in retention policies, the Manpower component should evaluate its potential effects on manpower requirements, stan-

dards, organization, and performance. The Training component should do the same for possible effects on the training pipeline, instructor load, retraining load, recruiting quotas, and facilities. Further, the proposed change should be evaluated in terms of its overall system effects: productivity, costs, control, stability, and so on.

This argument for a more system-oriented point of view is partly based on the discussion in Sec. III. Recall that the interaction of components produces problems of coordination, timing, conflict, and disruption that were not apparent in the separate descriptions of component roles. Moreover, many anecdotes and examples of intraorganizational thinking were related by various Air Force groups during this research.

SCHEDULE-RELATED DIFFICULTIES

As stated in the previous section, the imposition of a "slackless," abbreviated schedule for completion of the MPT system tasks results in a few necessary activity shortcuts. Prime examples of shortcuts or assumptive approaches include use of the Skill Projection Model and the Trained Personnel Requirements process.

The Skill Projection Model

The Skill Projection Model (SPM) was designed as a simplistic computer model to provide an early indication of manpower requirements by skill. Fundamentally, the model calculates the *current* distribution of airman skills from the authorizations contained in the 7102 file. This distribution is then applied to a new FYDP to approximate the skill distribution of the new personnel requirement. Thus, this allocation model contains characteristics of the current and past manpower authorization allocations.

The projections produced by the SPM are used in personnel planning: developing the objective force profile, defining promotion and separation policies and quotas, and projecting the Trained Personnel Requirements (TPR). In other words, the SPM allocations provide an important baseline to many of the tasks determining personnel supply. Yet the model has a built-in assumption that the current skill distribution is appropriate for future Air Force operations. This assumption may be valid in a static environment, but misleading in a dynamic environment in which, for example, a sharp increase in weapon sophistication could raise an immediate demand for technicians in greater numbers or with higher skills.

Defenders of the SPM claim that the SPM is necessary because the authorization determination process, which culminates with the production of the 7102 file, takes too long. By the time the 7102 file is available for personnel planning, it is too late to affect the procurement, training, and separation functions during that PPBS cycle. This argument has merit, but the model's potential for error must be kept in mind.

Trained Personnel Requirements

The TPR is one of the more obvious points of interaction. This document establishes the amount of manpower that should eventually be supplied to the com-

mands. The development of the TPR and control over its changes rest primarily with the personnel function (chiefly MPP). The development is not based upon command-derived or base-level-derived requirements; commands, in fact, exercise control over TPR levels only in the instance that a command is the sole user of a particular occupational specialty (AFSC). Development *and* implementation of the TPR occur prior to the submission of manpower requirements. The supply of airmen (via the TPR) is determined prior to the actual requirement for airmen.

These examples are cited to illustrate ways in which the components respond to schedule milestones. They are not meant to suggest that these measures are wrong or disruptive. Simply, the SPM and the TPR (based on SPM data) exist out of need; they exemplify the informal structure of the MPT system, developed from needs to respond within the times allowed.

THE FYDP/BUDGET CYCLE EFFECT

The triannual (or quarterly) revision of the FYDP and the Budget is part of the DoD's PPBS. The intent of this system—to "refine" service plans and budgets—creates an opportunity for some groups or components in the MPT system to significantly alter their personnel requirements. The products of this alteration, as previously discussed, are unstable personnel requirements, disruption of the training "pipeline," changing recruiting objectives, and so on. The PPBS is a fact of life for MPT, and it serves a useful purpose. It is the structure/process that generates MPT system schedule requirements and stimulates changes in personnel needs. Chances are that it will not "go away" or be significantly changed. The PPBS challenges MPT system managers to schedule and expedite their own planning and programming processes.

THE SEARCH FOR STABILITY

In 1976, when one of the first Air Force working groups was established to study MPT interactions, the push behind its formation and the intent of its examination was to improve system stability—to reduce variation in personnel requirements, force structure, and training activities. Potential procedural changes were generated during this same period (but not necessarily by the working group), such as holding the training output at certain levels for specified periods of time, increasing the flow of information (and reducing its transmission time) among the MPT components, and allocating manpower requirements by occupation rather than allocating an authorization level. None of these measures has been adopted wholesale.

Over time a general recognition has developed that somewhat unstable personnel requirements may actually be essential to the system. As a result, less energy is spent "fighting" this fluctuation and more energy is directed toward "streamlining" the processes, removing obstacles, increasing coordination, and so on. Budgets, defense programs, operational philosophies, and many other external phenomena are dynamic. Therefore, the personnel force required to satisfy the associated requirements, and indeed the MPT system itself, must be dynamic. Certainly, the

risk of not responding to "real and necessary" personnel needs far outweighs the value of stability.

FUTURE MPT SYSTEM ANALYSIS

The Air Force already recognizes many shortcomings in the MPT system. Its members are certainly aware of the energies required to keep the system efficient and effective, and of the system's sensitivity and volatility. This report should provide additional insights concerning system performance, functions, and problems. It provides, at the least, a frame of reference for discussions and future MPT work.

Both the Air Force and Rand are continuing to work on system improvements, with particular emphasis on communications between functional areas, manpower requirements determination, and force structuring.

Appendix

PLANNING, PROGRAMMING, AND BUDGETING SYSTEM (PPBS)

The PPBS was designed and instituted in the early 1960's to improve DoD resource planning. The first improvement addressed the apparent separation of military planning from the budget process. During the 1950's, threat evaluation was constrained by fiscal ceilings budgeted by the traditional resource categories: personnel, procurement, operation and maintenance, research, and construction. Attempting to reduce the planning/budgeting gap, PPBS established a program structure approach for the budget process.

Based upon threat perception, the services develop a set of program-related options (primarily weapon-system oriented) that are priced to generate budget requirements. The Office of the Secretary of Defense (OSD) can then select programs based upon costs and benefits that will be translated into fiscal budgets. As programs (weapon systems) compete for scarce resources, the issues of cost, scarcity, and threat are explored.

The second major improvement in the budget process introduced by PPBS is the development of a total system cost approach. Emphasis changed from weapon-system procurement-cost analysis (in annual investments) to analysis of procurement, operating, and support costs over the lifetime of a program. In this sense, PPBS was designed to become a multiyear defense plan and budget.

The third and final budgetary improvement is the use of weapon-system lifetime-cost estimates to perform cost-benefit analysis for use in selecting among competing weapon systems.

Figure A.1 depicts the current PPBS process, identifying activities, time frame, and the level of government decisionmaking required.[1] The first phase, planning, results in publication of the Consolidated Guidance. In this document OSD communicates its force, fiscal, and materiel objectives based upon service and OMB inputs. From this document, the first update of the FYDP is developed. As noted in the text, each FYDP update causes a review of force structures, manpower requirements, and system utilization.

In the programming phase, analyses of program costs and benefits are examined by the services with regard to the fiscal and force objectives stated by OSD and the Joint Strategic Objective Plan (JSOP) stated by the Joint Chiefs of Staff (JCS). The JSOP provides statements of military objectives, national security objectives, and global appraisals. Each military department submits a Program Objective Memorandum (POM) to OSD describing programs, program rationale, and the ability of the proposed programs to support the JSOP. A revision of policy and strategic planning guidance as well as the establishment of any new objectives is published by OSD in the January Agenda.

[1]Defense Resource Management Study, 1979.

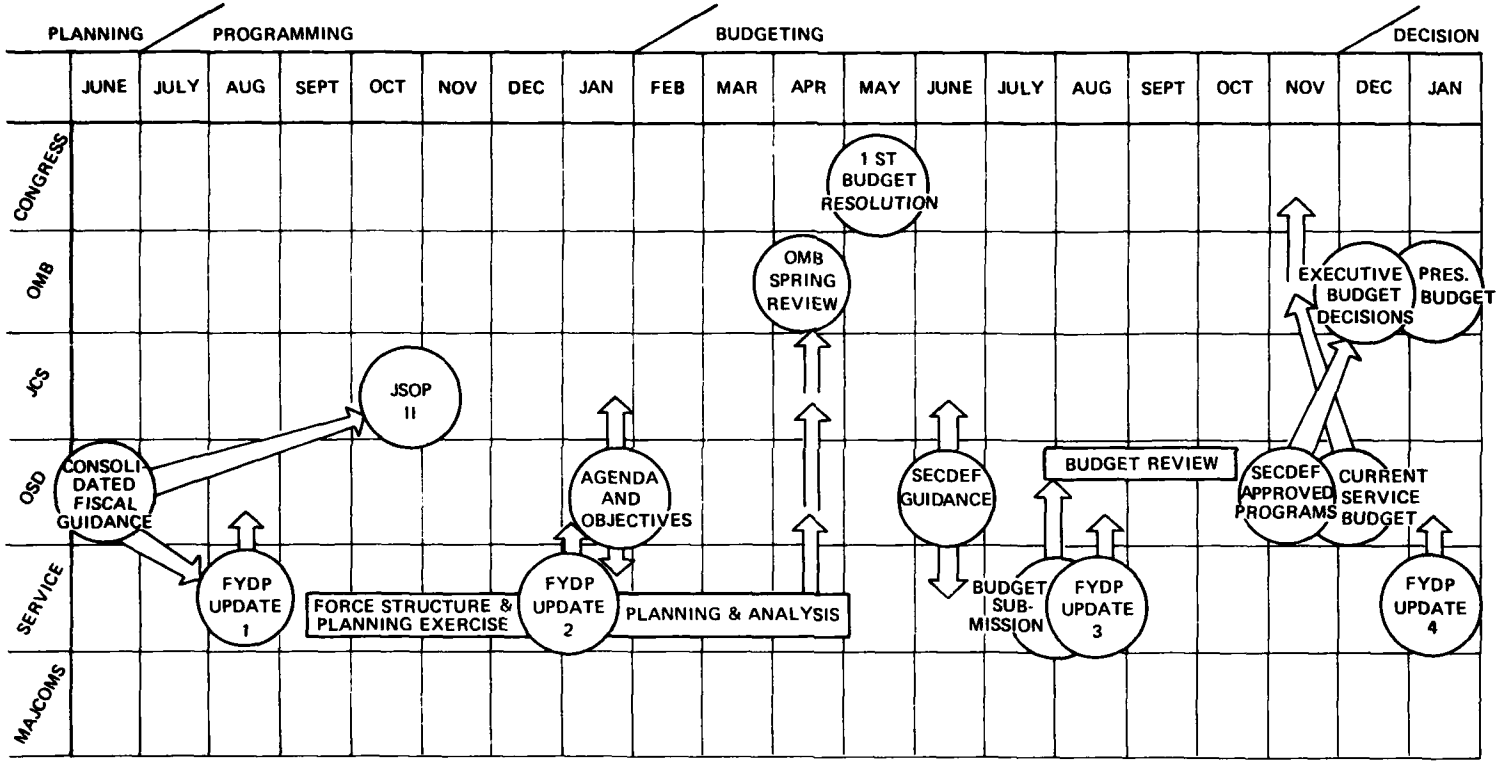

Fig. A-1—Overview of the Planning, Programming, and Budgeting System

SOURCE: DEFENSE RESOURCE MGMT STUDY FEBRUARY 1979

From January to April, activities focus on costing, planning, and analyzing programs in light of requirements and objectives. In April, the Office of Management and Budget (OMB) conducts a Spring Review designed to (1) consider the near-term economic situation, (2) assess the likely budget levels for Presidential consideration, (3) forecast likely budget targets for agency use, and (4) review the previous year's re-priced program costs.

By May 15th, the Congress should complete action adopting the *first concurrent budget resolution.* This sets forth the budget targets for the next fiscal year in total as well as by major functional budget category. This provides an indication of Congressional thinking in program direction and magnitude to OMB, OSD, and the services.

In June, the final revisions to the fiscal guidance and any adjustments to the January Agenda are published in the SECDEF Guidance. This publication results in another formal FYDP update and leads to the service budget submissions to OSD. Until mid-October, the budgets are reviewed iteratively between OSD and the services. In early November, the OSD-approved programs and budget recommendations are sent to OMB, where they are reviewed and submitted to the President.

The documents that primarly affect the Air Force manpower, personnel, and training communities include:

- FYDP updates,
- Program documents issued at POM completion,[2]
- Submissions, and
- *Budget decisions.*

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[2]The program documents include Aerospace Vehicles and Flying Hours (PA), Program Guidance (PG), Manpower and Organization (PM), and Communications Electronics (PC).

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