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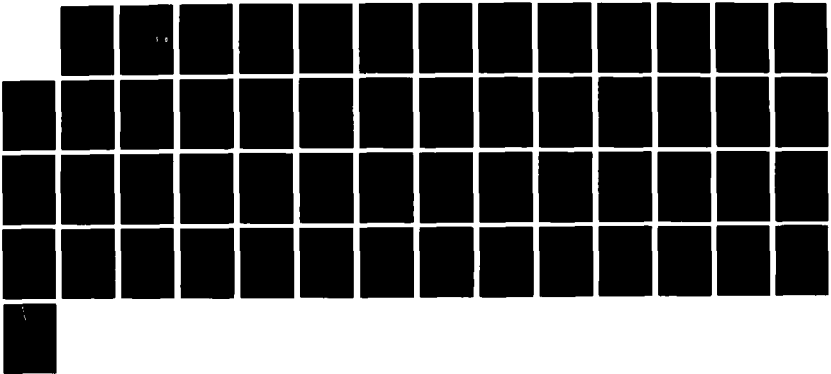
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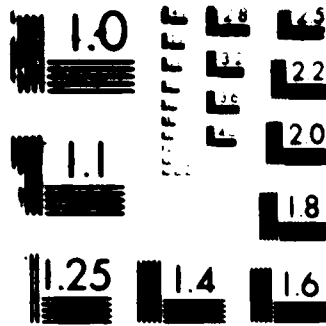
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UPDATING THE INDUCTEE
DELIVERY SCHEDULE

Report FP601R2

March 1987

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PREFACE

This report evaluates the mobilization manpower programs in the Military Services. In our earlier analysis of the Army's system for accession of personnel during full mobilization we found that, of the 80,000 inductees now scheduled for delivery to the training system in the first 30 days after mobilization, only about 44,500 could actually be accepted and begin training.¹ In this analysis, we summarize the results of our Army work and describe the corresponding mobilization manpower programs in the Navy, Air Force, and Marine Corps. We analyze manpower supply and demand factors and training base input capacities early in a major conflict and recommend an appropriate inductee delivery schedule for the first 90 days of full mobilization.

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¹LMI Report FP601R1. *The Army Mobilization Manpower Accession System*. Pickett, Dayton S., et al. Aug 1986.

Executive Summary**UPDATING THE INDUCTEE DELIVERY SCHEDULE**

Since 1980 the Selective Service System has assumed responsibility for delivering 100,000 inductees in the first 30 days following mobilization. That number is outdated. It is excessive. It should be reduced. It should also be accompanied by figures for the second and third months.

If those changes were made, the schedule for receiving inductees would be:

	<u>First month</u>	<u>Second month</u>	<u>Third month</u>
<i>Army</i>	61,700	63,400	73,400
<i>Navy</i>	6,800	24,000	24,000
<i>Coast Guard</i>	8,000	----	----
<i>Air Force</i>	----	----	6,900
<i>Marine Corps</i>	<u>8,100</u>	<u>10,700</u>	<u>10,700</u>
<i>TOTAL</i>	84,600	98,100	115,000

Even these figures may be too large. They do not allow for volunteers. To reduce them, however, by projecting the numbers of volunteers, would be to invite needless errors. They can be adjusted downward as the volunteers come forward.

We urge the Assistant Secretary of Defense (Force Management and Personnel) to take the lead in effecting these modifications to the mobilization manpower accession system.

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CHAPTER 1

INTRODUCTION

MOBILIZATION MANPOWER PLANNING BY THE SERVICES

General

Mobilization manpower planners are responsible for developing procedures that ensure that the proper numbers and types of individuals are available at the proper time to meet the expected demand for manpower. All the Services follow multiple-step processes in this demand and supply analysis.

First, the forces are structured to support an operations plan that has been developed in response to the scenario specified in the Defense Guidance (DG). The numbers and sizes of the forces are constrained to satisfy budgetary and programming limits. Next, a time-phased plan for deployment, by theater, is developed for these structured forces. Casualties are then estimated by countering the deployed forces at risk with the anticipated opposing forces for the expected level of combat intensity. An estimate of the number of individuals who will be transients, patients, or prisoners (and thus temporarily unavailable for missions) completes the calculation of demand for personnel.

To develop planning figures for personnel supply, the Services must forecast the inventories available from the active and reserve components, as well as from other sources of obligated individuals, such as military retirees. These predictions of the availability of trained manpower are then matched against the demand to reveal shortages and overages by grade and skill.

Personnel demand that cannot be met from pretrained sources is met by the Services' training systems. Mobilization training plans usually call for exceptional measures, such as extending the numbers of training hours per week, scheduling multiple shifts of classes per day, and pooling equipment. These measures are designed to expand the capacity of the training facilities and shorten the time required to produce trained assets. The expanded training capacities are important

to manpower planning; they are used in conjunction with demand figures to determine the numbers of volunteers and inductees that are needed and that can be trained.

The Nature of Mobilization Manpower Planning

Mobilization manpower planning is a complex and inexact process. Many of the critical factors – the number of members in the Delayed Entry Program (DEP) who are eligible for activation, for example – vary greatly in the course of the year. Other parameters, such as the percentage of the total Individual Ready Reserve (IRR) that will actually report during mobilization, are very difficult to estimate. Further, virtually all of the planning variables are interrelated in intricate ways, with the final required numbers of volunteers and inductees being a derived result of such interactions.

The challenge of mobilization manpower planning, within this inherently complex environment, is to develop an inductee delivery schedule that satisfies national defense needs yet does not exceed reasonable budgetary, logistic, personnel, and policy guidelines. To meet this challenge it is necessary for OSD to recognize the differences in character and mission of the Army, Navy, Air Force, and Marine Corps and to provide guidance that allows them the latitude to plan their various missions in the most effective manner possible. The Services, in turn, must demonstrate that their policies and methodologies, as well as the plans that result are supportable as part of the DoD planning and programming process.

REPORT ORGANIZATION

In *Chapter 2*, we provide a detailed description of the mobilization manpower planning mechanisms and associated programs of the Services. A section is devoted to each Service; the Coast Guard is included as part of the Navy. The models and systems used in performing the planning function are discussed in the earlier Army report and the appendices. *Chapter 3* presents our recommendations.

CHAPTER 2

SERVICE PROGRAMS FOR MOBILIZATION MANPOWER PLANNING

INTRODUCTION

Each Service approaches mobilization manpower planning differently. The programs that have been developed to make available sufficient manpower to meet the expected force structure, casualty replacement, and personnel overhead requirements are unique to each Service. The differences reflect the variation in both the missions and the philosophies of how best to accomplish them.

Because many active and reserve component Army units and organizations are authorized additional personnel upon full mobilization, the wartime manpower requirements are significantly larger than the peacetime needs. The greatest demand for manpower is expected to occur soon after mobilization begins. This large and immediate requirement for personnel is the most serious problem confronting the Army.

At any given time, the Navy has approximately one-third of its fleet deployed. Another one-third is in port preparing for deployment. It is not likely, assuming a no-warning or short-warning war, that the Ship Augmentation Units of the Naval Selected Reserve would be able to join the early deploying ships they are to augment in time. This condition has led Navy planners to rely on a system of extensive cross-leveling of manpower assets under the direction of the various Commanders-In-Chief (CINCs). In formulating mobilization manpower plans, it has been necessary to account for the expected cross-leveling and the resulting impact on the skill distribution of the Naval Reserve.

The Air Force is organized, trained, and equipped in peacetime to perform its wartime mission. Air Force uses Unit Type Codes, which are groupings of people and equipment, to respond flexibly to contingencies as they arise. As the types and numbers of air missions change in the move from a peacetime to wartime environment, so change the groupings of the Unit Type Codes that constitute the most effective organization for accomplishing these missions. This change will cause

some Air Force Specialty Codes (AFSCs) to have personnel in excess of wartime needs, while shortage will compel other AFSCs to depend on members of the Air Force Reserve (USAFR) and the Air National Guard (ANGUS) to overcome shortages. Additionally the Air Force, to a much greater extent than the other Services, has considered skill deterioration in planning for the use of reserve component personnel.

Marine Corps units in the Fleet Marine Force (FMF) — the combat force — have the same organization in peacetime and wartime. It is the support establishment (bases and stations) that experiences the increase in authorizations during mobilization. The manpower that will be needed to help ensure that all FMF units are brought to 100 percent of authorized strength is predominantly in lower grades. More specially trained and higher grade personnel, in large numbers, are required for the support establishment.

PHILOSOPHY AND PLANS FOR USE OF INDUCTEES

Variations in the Services' missions and approaches to mobilization manpower planning are also reflected in their attitude toward the use of inductees. At one end of the spectrum is the Air Force, where inductees are not required or considered appropriate. The Air Force maintains that by the time inductees could be made ready for deployment, the shortages in certain AFSCs would be filled from other sources. Navy planners expect to need inductees, but not as early as specified in the current DG. In the case of the Marine Corps, plans for using personnel from other sources have actually been adjusted with respect to the inductees who are now scheduled for delivery. As with the other Services, the Marine Corps regards inductees as the least desirable source of manpower. The Marine Corps recognizes the danger of excluding the possibility of using inductees, however, given the uncertain nature of the environment in which mobilization manpower planning occurs. Because of its large requirement for additional personnel, the Army is planning on accepting as many inductees as it can train.

In the remaining sections of this chapter, we review and analyze the mobilization manpower programs of the Army, Navy, Air Force, and Marine Corps. Our analysis concludes with a discussion of the inductee delivery schedule for each Service.

Several factors affect the inductee schedule. The first is the number of untrained people who are already obligated for service. During mobilization, both members of the reserve components who are awaiting their initial military training and personnel in the Delayed Enlistment Program (DEP) can be ordered to training ahead of schedule. Non-prior-service volunteers are a second source of manpower that must be considered in the planning process. Volunteers help meet manpower demand but also use up a portion of the training capacity. The final factor is the mobilization training capacity. All of the Services plan on expanding their training operations to help meet the greater demand for personnel. This expansion either creates sufficient training capacity to meet manpower needs or extends the courses to the limits of available resources.

THE ARMY

General

The Army is the largest of the Military Services and has the greatest requirement for manpower during mobilization. Further, this additional manpower is expected to be needed very soon after mobilization begins. Because of these considerations, the Army has emphasized mobilization planning. Extensive studies have been performed to assess personnel inventories, requirements documents, and training capacities. Our Army report¹ provides detailed discussions and analyses of the Army system and the resulting plans.

The Mobilization Manpower Program

The Mobilization Personnel Structure and Composition System (MOBPERSACS) is the single definitive statement of the Army's personnel need. Active Army, Army National Guard, and U.S. Army Reserve units are represented. Composition Four units – units for which a requirement exists but that do not now exist – are included if they can be supplied with equipment. To incorporate force modernization changes and keep pace with recent decisions by Army leadership, the Army staff and major commands (MAJCOMS) have implemented a regular review and updating process.

¹LMI Report FP601R1. *The Army Mobilization Manpower Accession System* Pickett, Dayton S., et al. Aug 1986.

Twice each year, during the January to March and July to September time periods, the basic authorization documents are updated. This process results in publication of the peacetime authorization document, the Personnel Structure and Composition System (PERSACS). The PERSACS reflects the Army Authorized Level of Organization (ALO) system. The ALO system authorizes, for some units, fewer personnel in peace than would be needed in war. Following generation of the PERSACS, the MOB PERSACS is developed by focusing on the wartime requirements. In the MOB PERSACS, all units are authorized to the level of personnel required in war.

In recent years, the Army has been able to maintain the overall strength of its active component at close to the authorized level. There are, however, overages and shortages within the individual specialties. The Officer and Enlisted Distributed Plans allocate the specialty overages and shortages according to unit priorities established by the Army staff. Reserve component units have overall personnel shortages as well as overages and shortages within individual specialties. Upon mobilization both the specialty shortages and the difference between the peacetime authorized and wartime required levels, in both the active and reserve components, will have to be overcome. The Army has no plan to utilize personnel in overage specialties to help those skills that are short.

To meet the increased demand for manpower, the Army plans on augmenting its active and reserve component unit personnel with both trained and untrained personnel. Trained personnel consists of: Individual Mobilization Augmentees, members of the IRR, and retirees. Sources of untrained personnel are: the DEP, reservists awaiting initial active duty for training (AIADT), zero-skilled IRR,² volunteers, and inductees. The Army also plans to expand the capacity of its training system to accommodate these trainees. In the next section we show how the populations of untrained personnel and training capacity interact to affect the inductee delivery schedule.

²The zero-skilled IRR is a personnel category that is unique to the Army. It is made up of individuals who, because of exceptional personal considerations, had to leave the Army prior to completion of their initial entry training, but after completion of their basic military training. They have been screened by their training battalion commanders and deemed to be potentially useful mobilization assets. Upon leaving active duty these individuals stay in the IRR for the remainder of their mandatory service obligation.

Inductee Delivery Schedule

Prior to calling inductees the Army could accelerate the reporting schedule for members of the DEP, train the reserve component AIADT personnel, accept volunteers, and train the zero-skilled IRR members. In order to estimate the DEP, AIADT, and zero-skilled IRR populations that could be expected to be available upon mobilization, we examined data for the past 12 months. The populations of these personnel groups fluctuate during the year. We recorded the highest and lowest values and computed the mean. Not all members of the DEP are eligible for activation. We based our DEP figures on the number of eligible (high school graduates over 18 years of age and individuals over 21 years of age) members. It is anticipated that 50 percent to 70 percent of those zero-skilled IRR members would report, if called, to active duty. We use 60 percent as the reporting rate for the zero-skilled IRR. The Army uses 8,000 as the estimate of non-prior-service volunteers. This figure is based on the best professional judgment of knowledgeable planners. We cannot provide a more supportable estimate of volunteers and use the Army figure. Tables 2-1, 2-2, and 2-3 list the low, mean, and high estimates of these sources of personnel. During the second and third month following mobilization additional members of the DEP will become eligible to enter training. These estimates are included in the tables.

The number of inductees that the Army can train depends on the training capacity of the Basic Combat Training (BCT) course, the capacity of One Station Unit Training (OSUT), and the populations of the other sources of untrained manpower. Tables 2-4, 2-5, and 2-6 illustrate the calculation for inductee capacity based on the low, mean, and high estimates of available untrained manpower. The first line of the table shows the input capacity of the BCT course and OSUT. Line two is the total of available untrained manpower taken from the appropriate table. Remaining inductee capacity is the difference between input training capacity (line one) and the total available untrained manpower (line two). The Army will also have inductees in their reception centers, waiting to start training the following month. These figures are shown in line four. Line five, total inductee capacity, is the sum of line four and line five. These calculations show that the Army, by any estimate of untrained manpower, has the capacity to train inductees in each of the first 3 months after mobilization. The assumption of 8,000 volunteers is an important part of this calculation. This assumption is discussed in detail in *Chapter 3*.

TABLE 2-1
LOW ESTIMATES OF UNTRAINED MANPOWER AVAILABLE TO THE ARMY

Population	Month 1	Month 2	Month 3
DEP (eligible)	10,300	6,000	6,000
AIADT	13,700	4,500	-----
Zero-skilled IRR	7,800	-----	-----
Volunteers	8,000	8,000	8,000
Total	39,800	18,500	14,000

Sources: FY85 data from Army Reserve Personnel Center, Accessions Division Office of the Deputy Chief of Staff for Personnel, and Defense Management Data Center

TABLE 2-2
MEAN ESTIMATES OF UNTRAINED MANPOWER AVAILABLE TO THE ARMY

Population	Month 1	Month 2	Month 3
DEP (eligible)	16,500	9,600	9,600
AIADT	15,500	5,500	-----
Zero-skilled IRR	9,000	-----	-----
Volunteers	8,000	8,000	8,000
Total	49,000	23,100	17,600

Sources: FY85 data from Army Reserve Personnel Center, Accessions Division Office of the Deputy Chief of Staff for Personnel, and Defense Management Data Center

TABLE 2-3
HIGH ESTIMATES OF UNTRAINED MANPOWER AVAILABLE TO THE ARMY

Population	Month 1	Month 2	Month 3
DEP (eligible)	25,500	14,800	14,800
AIADT	19,500	6,500	-----
Zero-skilled IRR	9,100	-----	-----
Volunteers	8,000	8,000	8,000
Total	62,100	29,300	22,800

Sources: FY85 data from Army Reserve Personnel Center, Accessions Division Office of the Deputy Chief of Staff for Personnel, and Defense Management Data Center.

TABLE 2-4
INDUCTEE CAPACITY BASED ON LOW ESTIMATES OF UNTRAINED MANPOWER
AVAILABLE TO THE ARMY

Manpower and capacity categories	Month 1	Month 2	Month 3
Mobilization input capacity of BCT and OSUT	77,500	72,000	79,400
Available untrained manpower (Table 2-1)	39,800	18,500	14,000
Remaining inductee capacity	37,700	53,500	65,400
Inductees in reception centers	16,000	1,900	-----
Total inductee capacity	53,700	55,400	65,400

Source: Training Base Capacity Study, 1985.

TABLE 2-5
INDUCTEE CAPACITY BASED ON MEAN ESTIMATES OF UNTRAINED MANPOWER
AVAILABLE TO THE ARMY

Manpower and capacity categories	Month 1	Month 2	Month 3
Mobilization input capacity of BCT and OSUT	77,500	72,000	79,400
Available untrained manpower (Table 2-2)	49,000	23,100	17,600
Remaining inductee capacity	28,500	48,900	61,800
Inductees in reception centers	16,000	1,900	-----
Total inductee capacity	44,500	50,800	61,800

Source: Training Base Capacity Study, 1985.

TABLE 2-6
INDUCTEE CAPACITY BASED ON HIGH ESTIMATES OF UNTRAINED MANPOWER
AVAILABLE TO THE ARMY

Manpower and capacity categories	Month 1	Month 2	Month 3
Mobilization input capacity of BCT and OSUT	77,500	72,000	79,400
Available untrained manpower (Table 2-3)	62,100	29,300	22,800
Remaining inductee capacity	15,400	42,700	56,600
Inductees in reception centers	16,000	1,900	-----
Total inductee capacity	31,400	44,600	56,600

Source: Training Base Capacity Study, 1985.

THE NAVY

General

The Navy is made up of two general types of organizations: operational forces and support forces. Operational forces consist of crews and direct support staffs of ships, aircraft, and other organizations intended to deploy to combat. Support forces are more shore-oriented and typically provide administrative, maintenance, supply, training, and personnel services in a permanent installation environment. The support forces, often referred to as the shore establishment, also contain additional peacetime positions that have been created to allow for continuing and smooth rotation of personnel between ship duty and shore duty.

The Mobilization Manpower Program

Mobilization manpower requirements come from the Navy Manpower Mobilization System (NAMMOS). Different procedures are used in developing manpower demand for the operational forces and the support forces.

Figure 2-1 depicts the existing manpower situation for the Navy's operational forces. Total mobilization requirements are the same total of personnel needs specified in Ship Manning Documents (SMDs) and Squadron Manning Documents (SQMDs). Peacetime manning levels, reflected by the Billets Authorized level, are constrained by the budget and fall below the level required in mobilization. Further, the Navy's inventory of active duty personnel does not perfectly match the peacetime billet authorizations, either in number or skill distribution. In order to allocate this shortage (approximately 5 to 8 percent of total billet authorizations), the Navy applies a Navy Manning Plan (NMP), which considers ship and aircraft missions and priorities. The difference between the NMP level and the peacetime billets authorized, as well as the difference between the mobilization requirements and billets authorized, will have to be overcome upon mobilization.

For the shore establishment NAMMOS estimates total mobilization manpower needs for each activity by first establishing the relationship between peacetime workload and associated manpower authorizations and then extrapolating those relationships based on the projected mobilization workload. Each activity then provides grade and skill detail for these total manpower needs and reports the results to the staff of the Chief of Naval Operations.

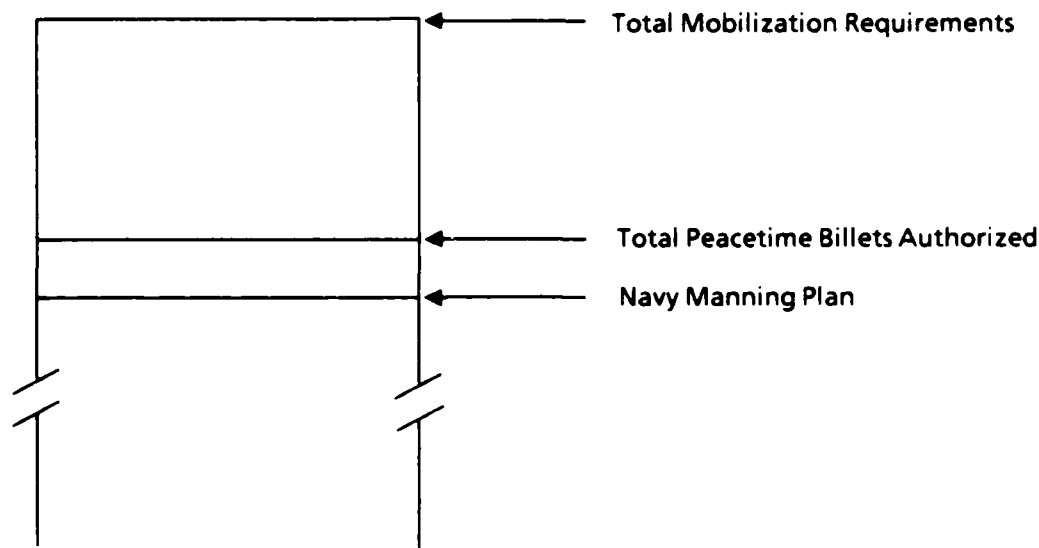


FIG. 2-1. NAVY MANNING FOR THE OPERATIONAL FORCE

The combined mobilization manpower requirements of the ships and squadrons and the shore establishment are to be met by the active and reserve components, retirees, and, if needed, volunteers and inductees. Ship Augmentation Units from the Navy Selected Reserve have been organized specifically to fill the difference between the peacetime billets authorized and the mobilization requirements. However, the Navy recognizes that during mobilization, 30 to 50 percent of the fleet may be deployed before the reserve units could join the ships. An alternate plan has been developed to address this problem.

The Emergency Fleet Augmentation Plan is an orderly cross-leveling of personnel assets controlled by the CINCs. It calls for reassigning active personnel from the shore establishment to ships and, if necessary, from one ship to another in order to man the early-deploying ships as fully as possible. Vacancies thus created in the shore establishment and later-deploying ships will be backfilled by other members of the Selected Reserve, the IRR, retirees, volunteers, and inductees. Ideally, the Emergency Fleet Augmentation Plan will be executed, upon early warning, prior to the actual mobilization. "Peacetime-only" positions in the shore establishment will be abolished to help reduce manpower demand. Navy planners also expect to take actions to increase the capacity of the Recruit Training Course, accelerate the reporting dates of DEP personnel, and accept volunteers and inductees. Our

analyses of the volunteer and inductee plans are discussed next. The models and systems that form the basis for these plans are described in Appendix A.

Inductee Delivery Schedule

The forecast wartime demand for personnel shows that the Navy will have to receive untrained personnel, train them, and place them in the deployed or supporting force. The Navy situation, except for the zero-skilled IRR category, is similar to that of the Army. There are three sources of untrained manpower from which the Navy can obtain personnel prior to calling upon inductees. These sources are the DEP, reservists AIADT, and volunteers. We used the same technique to estimate the populations for sources of manpower. The Navy uses 7,000 as the estimate of non-prior-service volunteers. We use the Navy figure. Tables 2-7, 2-8, and 2-9 list the low, mean, and high estimates of the three sources of personnel. During the second and third month following mobilization additional members of the DEP will become eligible to enter training. These estimates are also included in the tables.

The number of inductees that the Navy can train depends on the training capacity of the Recruit Training Course and the populations of the other sources of untrained manpower. Tables 2-10, 2-11, and 2-12 illustrate the calculation for inductee capacity based on the low, mean, and high estimates of available untrained manpower. The first line of each table shows the mobilization input capacity of the Recruit Training Course. Line two is the total of available untrained manpower taken from the appropriate table. On line three any additional manpower that cannot be trained in a given month is carried forward to the following month. The fourth line totals all available untrained manpower for each of the first 3 months following mobilization. Remaining inductee capacity is the difference between mobilization input training capacity (line one) and the total available untrained manpower (line four).

TABLE 2-7
LOW ESTIMATES OF UNTRAINED MANPOWER AVAILABLE TO THE NAVY

Population	Month 1	Month 2	Month 3
DEP (eligible)	12,000	1,000	1,000
AIADT	1,200	-----	-----
Volunteers	7,000	7,000	7,000
Total	20,200	8,000	8,000

Sources: Center for Naval Analyses and Reserve Components Common Personnel Data System.

TABLE 2-8
MEAN ESTIMATES OF UNTRAINED MANPOWER AVAILABLE TO THE NAVY

Population	Month 1	Month 2	Month 3
DEP (eligible)	14,000	1,300	1,300
AIADT	2,600	-----	-----
Volunteers	7,000	7,000	7,000
Total	23,600	8,300	8,300

Sources: Center for Naval Analyses and Reserve Components Common Personnel Data System.

TABLE 2-9
HIGH ESTIMATES OF UNTRAINED MANPOWER AVAILABLE TO THE NAVY

Population	Month 1	Month 2	Month 3
DEP (eligible)	18,000	1,500	1,500
AIADT	3,400	-----	-----
Volunteers	7,000	7,000	7,000
Total	28,400	8,500	8,500

Sources: Center for Naval Analyses and Reserve Components Common Personnel Data System

TABLE 2-10
INDUCTEE CAPACITY BASED ON LOW ESTIMATES OF UNTRAINED MANPOWER
AVAILABLE TO THE NAVY

Manpower and capacity categories	Month 1	Month 2	Month 3
Mobilization input capacity of recruit training	20,000	25,000	25,000
Available untrained manpower (Table 2-7)	20,200	8,000	8,000
Residual from prior month	-----	200	-----
Total available untrained	20,200	8,200	8,000
Remaining inductee capacity	-----	16,800	17,000

Source: Chief of Naval Education and Training Logistics Support and Mobilization Plan.

TABLE 2-11
INDUCTEE CAPACITY BASED ON MEAN ESTIMATES OF UNTRAINED MANPOWER
AVAILABLE TO THE NAVY

Manpower and capacity categories	Month 1	Month 2	Month 3
Mobilization input capacity of recruit training	20,000	25,000	25,000
Available untrained manpower (Table 2-8)	23,600	8,300	8,300
Residual from prior month	-----	3,600	-----
Total available untrained	23,600	11,900	8,300
Remaining inductee capacity	-----	13,100	16,700

Source: Chief of Naval Education and Training Logistics Support and Mobilization Plan

TABLE 2-12
INDUCTEE CAPACITY BASED ON HIGH ESTIMATES OF UNTRAINED MANPOWER
AVAILABLE TO THE NAVY

Manpower and capacity categories	Month 1	Month 2	Month 3
Mobilization input capacity of recruit training	20,000	25,000	25,000
Available untrained manpower (Table 2-9)	28,400	8,500	8,500
Residual from prior month	-----	8,400	-----
Total available untrained	28,400	16,900	8,500
Remaining inductee capacity	-----	8,100	16,500

Source: Chief of Naval Education and Training Logistics Support and Mobilization Plan.

These calculations show that the Navy, by any estimate of untrained manpower, does not have sufficient capacity to train inductees until the second month after mobilization.

The Coast Guard

Section 3 of Title 14, United States Code, states that, upon declaration of war or when directed by the President, the Coast Guard operates as a service of the Navy. Coast Guard contingency and wartime missions are divided into Federal functions, including regulatory responsibilities; and naval functions as assigned by the Chief of Naval Operations in the Navy Capabilities and Mobilization Plan. For naval functions, Coast Guard organizations will maintain unit integrity and operate under the Coast Guard area commanders and Commander, Activities Europe, but within the Navy chain of command.

Coast Guard planners expect that upon mobilization, the 38,500 positions authorized in the Personnel Allowance List (PAL) will increase to the 65,500 of the Wartime Personnel Allowance List (WPAL). Approximately 12,500 members of the Coast Guard Selected Reserve are available to help offset the difference between the PAL and WPAL. The gap that remains is bridged by other reserve members, retirees, and newly acquired non-prior-service personnel.

Mobilization manpower planning in the Coast Guard is in its early stages. Great emphasis is being placed on documenting the additional 27,000 mobilization positions. No integrated system exists for estimating future personnel inventories, casualties, and training output.

According to the best professional judgment of the Coast Guard, 8,000 inductees will be needed in the first 30 days of mobilization. Since the United States Code provides for interchange of Navy and Coast Guard training resources and trainees, we include the 8,000 figure as part of the Navy requirement for inductees.

THE AIR FORCE

General

Like the other Services, the Air Force tailors its manpower and personnel mobilization programs to support an operations plan that has been developed in response to the DG. Constraints dictated by the allocation of forces in the Joint Strategic Capabilities Plan are also considered. Further, because of a belief that each contingency or war will be unique and that some decisions on personnel actions and policies will have to be made or modified as the situation unfolds, the Air Force has elected to emphasize flexibility over specificity in its program. The manpower and personnel mobilization planning models are discussed in Appendix B.

The Manpower and Personnel Mobilization Program

Annexes G and Z to the Air Force War and Mobilization Plan, Volume One (WMP-1) establishes contingency and general war manpower and personnel policies, guidance, and procedures. The Air Force's Manpower and Personnel Emergency Actions Book describes the management actions that are intended to implement the WMP-1 policies. These policies are manifest in the Air Force's priority system for personnel under mobilization. As an emergency situation develops, the Air Force is prepared to call three groups of personnel in the following order of priority: (1) the Air Force Selected Reserve [guard and reserve units and Individual Mobilization Augmentees (IMAs)], (2) the IRR and active duty retirees, and (3) the Retired Reserve and Standby Reserve.

Upon mobilization, the Air Force establishes the Manpower and Personnel Readiness Center Network as the focal point for preparation for movement, personnel accountability and reporting, and force sustainment. The network is made up of staff agencies, centers, and units, starting at Headquarters, Air Force, and continuing down through the MAJCOMs and bases. This network controls the personnel flow during mobilization. Members of the Selected Reserve are assigned to units with specific mobilization missions and are the first assets used. If the Air Force requires additional manpower it will utilize the Personnel Data System, an extensive computerized data base, to call additional personnel in priority order, by specialty. Pretrained Individual Manpower (PIM) can be called to active duty as

individual assets based on specific requests from MAJCOMs, or in large numbers under the Push-Pull system.

The Push-Pull system is based on early identification of shortfalls in critical skills. It prescribes the anticipation of requirements and return of personnel resources to military control as quickly as possible. The individuals holding the critical skills report to the Technical Training Centers (TTCs) responsible for their particular AFSC. The TTC in-processes the members, determines physical qualification, and either validates skill qualification or provides required refresher training. Once training is complete, the airmen are moved to the locations where they are needed.

According to Air Force estimates, the capacity of the mobilized training base is sufficient to meet the wartime demand for manpower. Further, inductees are not needed, since the supplies of untrained manpower already under military control can more than fill the training system. We review these calculations next.

Inductee Delivery Schedule

Our methodology for estimating the available untrained manpower and resulting capacity for training inductees is identical to that used for the Army and the Navy. Tables 2-13, 2-14, and 2-15 show the low, mean, and high estimates of untrained manpower available to the Air Force. We again display only members of the DEP who are eligible for activation and use the Air Force estimate of 7,500 volunteers per month. Tables 2-13, 2-14, and 2-15 also consider the additional members of the DEP who become eligible during the first 3 months after mobilization. The resulting numbers of inductees who can be accepted into the Air Force Basic Military Training (BMT) course are listed in Tables 2-16, 2-17, and 2-18. Enough untrained manpower is available to fill the mobilized BMT course. This is true even without the 7,500 non-prior-service volunteers assumed for each month.

TABLE 2-13

LOW ESTIMATES OF UNTRAINED MANPOWER AVAILABLE TO THE AIR FORCE

Population	Month 1	Month 2	Month 3
DEP (eligible)	15,800	1,000	1,000
AIADT	2,300	-----	-----
Volunteers	7,500	7,500	7,500
Total	25,600	8,500	8,500

Sources: Accession and Reenlistment Policy Division, Office of the Deputy Chief of Staff for Manpower and Personnel, USAF, and Reserve Components Common Personnel Data System.

TABLE 2-14

MEAN ESTIMATES OF UNTRAINED MANPOWER AVAILABLE TO THE AIR FORCE

Population	Month 1	Month 2	Month 3
DEP (eligible)	19,000	1,100	1,100
AIADT	2,500	-----	-----
Volunteers	7,500	7,500	7,500
Total	29,000	8,600	8,600

Sources: Accession and Reenlistment Policy Division, Office of the Deputy Chief of Staff for Manpower and Personnel, USAF, and Reserve Components Common Personnel Data System.

TABLE 2-15

HIGH ESTIMATES OF UNTRAINED MANPOWER AVAILABLE TO THE AIR FORCE

Population	Month 1	Month 2	Month 3
DEP (eligible)	20,000	1,300	1,300
AIADT	2,700	-----	-----
Volunteers	7,500	7,500	7,500
Total	30,200	8,800	8,800

Sources: Accession and Reenlistment Policy Division, Office of the Deputy Chief of Staff for Manpower and Personnel, USAF, and Reserve Components Common Personnel Data System.

TABLE 2-16

**INDUCTEE CAPACITY BASED ON LOW ESTIMATES OF UNTRAINED MANPOWER
AVAILABLE TO THE AIR FORCE**

Manpower and capacity categories	Month 1	Month 2	Month 3
Mobilization input capacity of BMT	8,800	9,100	9,100
Available untrained manpower (Table 2-13)	25,600	8,500	8,500
Residual from prior month	-----	16,800	16,200
Total available untrained	25,600	25,300	24,700
Remaining inductee capacity	-----	-----	-----

Source: Wartime Manpower Requirements Defense Guidance.

TABLE 2-17

**INDUCTEE CAPACITY BASED ON MEAN ESTIMATES OF UNTRAINED MANPOWER
AVAILABLE TO THE AIR FORCE**

Manpower and capacity categories	Month 1	Month 2	Month 3
Mobilization input capacity of BMT	8,800	9,100	9,100
Available untrained manpower (Table 2-14)	29,000	8,600	8,600
Residual from prior month	-----	20,200	19,700
Total available untrained	29,000	28,800	28,300
Remaining inductee capacity	-----	-----	-----

Source: Wartime Manpower Requirements Defense Guidance.

TABLE 2-18

**INDUCTEE CAPACITY BASED ON HIGH ESTIMATES OF UNTRAINED MANPOWER
AVAILABLE TO THE AIR FORCE**

Manpower and capacity categories	Month 1	Month 2	Month 3
Mobilization input capacity of BMT	8,800	9,100	9,100
Available untrained manpower (Table 2-15)	30,200	8,800	8,800
Residual from prior month	-----	21,400	21,100
Total available untrained	30,200	30,200	29,900
Remaining inductee capacity	-----	-----	-----

Source: Wartime Manpower Requirements Defense Guidance.

THE MARINE CORPS

General

Two types of problems confront the mobilization manpower planners of the Marine Corps. For the FMF, where the peacetime and wartime organizations are identical, the concern is how best to increase the personnel inventory from the 90 percent peacetime manning to the full 100 percent. The support establishment (Marine Corps bases and stations), on the other hand, realizes increases in wartime workload and authorizations. For these bases and stations, the problem is twofold: raise inventories to authorized levels and fill all newly created mobilization positions.

The Mobilization Manpower Program

An automated system monitors the positions that will require filler personnel. The Wartime Authorized Strength Report file contains the official statement of the Marine Corps mobilization manpower structure requirements. Three separate data systems provide information on the individuals available from the active, reserve, and retired lists. These manpower demand and supply files are then matched, by computer, so that vacancies will be revealed. Several sources of personnel are available to meet the initial unfilled demand.

Virtually everyone in the Selected Marine Corps Reserve has a unit position in the 4th Division/Wing Team. Members of the IRR will be used to bring the FMF units to 100 percent of wartime requirements and, to a lesser degree, augment training, logistics, and administrative positions at bases and stations. Though some retirees are designated to occupy positions immediately upon mobilization, most will start being used beginning approximately 30 days after mobilization when personnel from bases and stations are transferred to deployed units and backfill requirements develop. The Marine Corps also expects to draw on untrained people and train them before deployment. Next, we provide our estimates of how the Marine Corps' plans relate to its requirement for inductees. Appendix C describes the models used to support mobilization manpower planning.

Inductee Delivery Schedule

Analysis of the Marine Corps inductee schedule parallels the presentations used in the sections on the Navy and Air Force. Tables 2-19, 2-20, and 2-21 show the

initial estimates of available untrained manpower, while Tables 2-22, 2-23, and 2-24 display the associated inductee capacity figures. Marine Corps estimates of 2,500 non-prior-service volunteers per month are included. The mobilized Marine Corps Recruit Training course can accept and train inductees in each of the first 3 months following mobilization.

TABLE 2-19
LOW ESTIMATES OF UNTRAINED MANPOWER AVAILABLE TO THE MARINE CORPS

Population	Month 1	Month 2	Month 3
DEP (eligible)	2,500	100	100
AIADT	200	-----	-----
Volunteers	2,500	2,500	2,500
Total	5,200	2,600	2,600

Sources: Mobilization Manpower, Code MM, Headquarters, Marine Corps, and Reserve Components Common Personnel Data System.

TABLE 2-20
MEAN ESTIMATES OF UNTRAINED MANPOWER AVAILABLE TO THE MARINE CORPS

Population	Month 1	Month 2	Month 3
DEP (eligible)	5,100	500	500
AIADT	300	-----	-----
Volunteers	2,500	2,500	2,500
Total	7,900	3,000	3,000

Sources: Mobilization Manpower, Code MM, Headquarters, Marine Corps, and Reserve Components Common Personnel Data System.

TABLE 2-21
HIGH ESTIMATES OF UNTRAINED MANPOWER AVAILABLE TO THE MARINE CORPS

Population	Month 1	Month 2	Month 3
DEP (eligible)	6,400	1,000	1,000
AIADT	450	-----	-----
Volunteers	2,500	2,500	2,500
Total	9,350	3,500	3,500

Sources: Mobilization Manpower, Code MM, Headquarters, Marine Corps, and Reserve Components Common Personnel Data System.

TABLE 2-22
INDUCTEE CAPACITY BASED ON LOW ESTIMATES OF UNTRAINED MANPOWER
AVAILABLE TO THE MARINE CORPS

Manpower and capacity categories	Month 1	Month 2	Month 3
Mobilization input capacity of recruit training	10,800	10,800	10,800
Available untrained manpower (Table 2-19)	5,200	2,600	2,600
Remaining inductee capacity	5,600	8,200	8,200

Source: Marine Corps Mobilization Management Plan.

TABLE 2-23
INDUCTEE CAPACITY BASED ON MEAN ESTIMATES OF UNTRAINED MANPOWER
AVAILABLE TO THE MARINE CORPS

Manpower and capacity categories	Month 1	Month 2	Month 3
Mobilization input capacity of recruit training	10,800	10,800	10,800
Available untrained manpower (Table 2-20)	7,900	3,000	3,000
Remaining inductee capacity	2,900	7,800	7,800

Source: Marine Corps Mobilization Management Plan.

TABLE 2-24
INDUCTEE CAPACITY BASED ON HIGH ESTIMATES OF UNTRAINED MANPOWER
AVAILABLE TO THE MARINE CORPS

Manpower and capacity categories	Month 1	Month 2	Month 3
Mobilization input capacity of recruit training	10,800	10,800	10,800
Available untrained manpower (Table 2-21)	9,350	3,500	3,500
Remaining inductee capacity	1,450	7,300	7,300

Source: Marine Corps Mobilization Management Plan.

CHAPTER 3

RECOMMENDATIONS

GENERAL

In our earlier report, entitled *The Army Mobilization Manpower Accession System*,¹ we noted that the Army has developed logical procedures for dealing with the variable factors and complex processes involved in mobilization manpower planning. The other Services, faced with equally challenging situations, have likewise responded by establishing systematic procedures for carrying out this planning function. However, if these procedures are to be as effective as possible in meeting the needs of the separate Services, while collectively supporting the DoD planning effort, some important actions are required.

INDUCTEE DELIVERY SCHEDULE

The inductee delivery schedule contained in the current DG (80,000 to the Army, 5,000 to the Navy, 5,000 to the Air Force, and 10,000 to the Marine Corps during the first 30 days of mobilization) needs to be revised. Many factors have changed since 1980, when the current schedule was developed. Our estimates of training capacity for inductees in *Chapter 2* consider the low, mean, and high estimates of other sources of untrained manpower. We think it best to base inductee requirements on the low estimate of available untrained manpower which yields the highest requirement for inductees. Further, a different approach should be used to account for non-prior-service volunteers. There is no recognized, accepted method for determining the number of mobilization volunteers. Present estimates are based on the best professional judgment of Service planners but remain open to continual debate. Should volunteer totals fall below the levels estimated, the Services would

¹LMI Report FP601R1 *The Army Mobilization Manpower Accession System* Pickett, Dayton S., et al Aug 1986

be short of manpower. Accordingly we recommend that the Assistant Secretary of Defense (Force Management and Personnel):

Establish a practice of using the total demand for inductees and volunteers as the stated requirement for inductees from the Selected Service System. Inform the Military Services of this practice.

Based upon this practice, request that the Military Services adopt the following schedule for inductees for the first 3 months following mobilization:

	<u>First month</u>	<u>Second month</u>	<u>Third month</u>
Army	61,700	63,400	73,400
Navy	6,800	24,000	24,000
Coast Guard	8,000	----	----
Air Force	----	----	6,900
Marine Corps	<u>8,100</u>	<u>10,700</u>	<u>10,700</u>
TOTAL	84,600	98,100	115,000

Develop plans to adjust the flow of inductees to compensate for the actual number of mobilization volunteers.

Advise the Director, Selective Service System, of the revised requirement.

We have adjusted the Army inductee figures from our earlier report to reflect the practice of using the low estimate of untrained manpower available and including the volunteer estimate as part of the inductee requirement.

POLICY

Each of the Services has its own mobilization mission and own personnel management techniques. OSD policy and guidance must give the Services sufficient flexibility to accommodate these necessarily diverse methods. OSD, however, has a responsibility to oversee and coordinate defense activities. There is a need for maintaining consistency on issues common to two or more Services, and all Service plans must be reasonable in terms of budgetary constraints. OSD needs a common and reasonable way to evaluate the Service plans in light of national defense needs and

resources. To these ends, we recommend that the Assistant Secretary of Defense (Force Management and Personnel):

Develop, with the participation of the Services, an integrated network model that characterizes the complex interactions involved in mobilization manpower planning. Such a generalized model would be applicable to DoD as a whole, but could be tailored to represent any of the individual Services separately.

Service participation is important to ensure the accurate representation of activities in the modeling process. If appropriate, the individual Services may find it useful to adopt the model for their separate use. The details of the concept for this model are contained in Appendix D.

OTHER RECOMMENDATIONS

All the Services must continue to improve their methods for developing mobilization manpower plans. The areas meriting the most immediate attention are listed below. We include the most important recommendations from our earlier report on the Army.

- *The Army should develop a program that will assign Reserve Troop Program Unit (TPU) members who are awaiting training directly to designated reception stations in the event of mobilization. Current plans call for TPU members who are awaiting training to report to mobilization stations with their units, be identified as untrained assets, and then be scheduled for and transported to the appropriate training. This plan could delay the start of training for some individuals by up to 60 days.*
- *The Army should formulate a plan to account for and utilize those personnel who will be in overage specialties during mobilization. The latest projections indicate that certain combat support skills will have significant personnel overages by 90 days after mobilization, while combat specialties will be critically short. At this time there is no plan to utilize the individuals in overage specialties to help offset the shortage specialties.*
- *The Navy should require that greater attention and more uniform compliance be given to developing mobilization manpower requirements in the shore establishment. NAMMOS establishes aggregate requirements by installation and function. Each installation then provides the grade and skill detail to these aggregate figures. There are instances when the sum of the function requirements, with grade and skill added, do not equal the original NAMMOS total.*
- *The Marine Corps should conduct an analysis of the activation status of individuals in the Marine Corps DEP. Marine Corps personnel managers are able to maintain the total DEP population at a reasonably constant level. However, the number of individuals actually eligible to be called during mobilization varies significantly throughout the year. This variance*

causes major changes in the inductee requirement which could impact on the Military Entrance Processing Stations and Marine Recruit Training Centers.

- *The Coast Guard should develop an integrated system for developing mobilization manpower plans.* Mobilization manpower planning in the Coast Guard is just beginning. Several actions, such as documenting mobilization positions, reviewing casualty estimation, and analyzing training capacity, are in progress. An overall plan should be formulated to guide these efforts and help take advantage of work already accomplished in the Military Services.

APPENDIX A

MOBILIZATION MANPOWER PLANNING: NAVY

INTRODUCTION

Navy mobilization manpower plans result from basic analysis of demand and supply. Estimates of the total demand for personnel are compared with available manpower to determine vacancies that must be filled by members of the Individual Ready Reserve (IRR), retirees, or newly acquired and trained personnel. This appendix describes the process used to accomplish the planning.

MANPOWER DEMAND

General

A variety of computer-based models help develop estimates for total manpower demand. The first step is to develop a maritime strategy that constitutes the Navy's plan to meet the opposing forces specified in the Defense Guidance (DG) scenario. With the maritime strategy in place, the required force structure, expected casualties, and individuals or personnel overhead account can be deduced.

Force Structure Requirements

In the mobilization planning process, determining force structure requirements for the Navy's operational force entails techniques different from those that are used for the support base – the shore establishment. The Deployment Model is a computer-assisted method of constructing sets of battle groups, task forces, and support forces to meet the maritime strategy. Group composition and deployment schedules define the number and type of ships and aircraft that will be needed over time. Once the number and types of vessels and aircraft are known, the manpower requirements by number, grade, and skill can be extracted from the Ship Manning Documents (SMDs) and Squadron Manning Documents (SQMDs). SMDs and SQMDs are analogous to requirements documents in the other Services.

As part of the Navy Manpower Mobilization System (NAMMOS), personnel requirements for the shore establishment are drawn from NAMMOS. NAMMOS estimates mobilization manpower requirements in three main steps:

- First, the peacetime workload is related to the associated authorizations. To consolidate data analysis, 72 "functional categories" (activities performing similar functions) have been created. When applicable a linear regression analysis yields mathematical formulas that relate workload to authorizations.
- Second, to determine total requirements for each activity, these formulas are correlated with the projected mobilization workload.
- Finally, the aggregate requirements are forwarded to the individual activities, where details of grade and skill are added.

Shore establishment organizations that do not allow for reasonable linear regression analysis have requirements determined either by positional coverage or by professional judgment techniques. Positional coverage applies to activities that must be fully staffed, 24 hours a day. To determine manpower requirements for these activities, the numbers of positions are multiplied by the number of shifts per day. For staff agencies where missions and workloads are highly variable, requirements are estimated, as a last resort, by professional judgment. Final NAMMOS force structure requirements are defined by combining totals from the operational force and analysis of the shore establishment functional categories.

Personnel Casualties

Navy casualties are estimated in a multiple-step process. The maritime strategy in conjunction with the Time Phased Force Deployment Data lists the forces that will be deployed over time. Each unit is then assigned to a risk group (forces afloat, afloat support forces, fixed forces ashore, mobile forces ashore, and Navy forces with Marines) with an associated level of risk. The levels of risk are based on expected combat intensity, as determined by the Commanders-in-Chief's (CINCs') analysis. Killed/Missing in Action (KIA), Wounded in Action (WIA), and Disease and Non-Battle Injuries types of casualties can occur among the deployed forces. The rates for these types of casualties varies depending on the risk group.

As the population at risk is largely aboard ship, most Navy casualty rates are related directly to the number of ships sunk or disabled. Ships that are sunk are assumed to experience 34 percent KIA, 33 percent WIA, and 33 percent unhurt. For ships that are disabled in battle but not sunk the rates are 20 percent KIA,

30 percent WIA, and 50 percent unhurt. Rates for shore-based units are based on data from the Reister Study of the Army's experience in Korea. Casualty rates among naval forces operating in support of Marines are assumed to be the same as those of the Marine unit that they support.

Casualty rates and population data become inputs to the Casualty Replacement Model, where total casualties by type are calculated.

Individuals

During mobilization, as in peacetime, a portion of the Navy force is in transit, in confinement, in training, or in a patient status. Such individuals are not available for missions. To estimate this "individual" account, peacetime rates are adjusted to reflect the mobilization environment.

MANPOWER SUPPLY

General

The Navy relies on its active duty personnel, reserve forces (Selected Reserve, IRR, and Standby Reserve), retirees, and, if necessary, volunteers and inductees to meet total manpower demand. By comparing projected inventories of personnel against the demand computed for the Navy portion of the Wartime Manpower Planning System (WARMAPS), the numbers of individuals to be called from each source of manpower is determined.

Projected Personnel Inventories

A straightforward and simple approach is taken toward projecting personnel inventories. The active Navy personnel inventory is assumed to be equal to the active authorizations for the year of interest. This technique assumes that the Navy has aligned its personnel perfectly. To estimate the available populations from the reserve and retired forces, the Navy multiplies the existing inventory by the expected reporting rate. Any shortages that cannot be filled from these sources are to be filled by newly acquired personnel who must first be trained.

Training Output

The Training Model considers the large number of variables pertinent to training inputs, training populations, and training outputs for the scenario being

studied. Limitations and phased changes in facilities, staff, and equipment as well as course terminations, changes in course length, and early graduations are applied. Required training inputs, attrition, and resulting outputs consistent with resource constraints are reported.

When combined with the estimates of trained personnel, the Training Model output illustrates the status (overages and shortages) of Naval forces by skill during mobilization.

APPENDIX B

MANPOWER AND PERSONNEL MOBILIZATION PLANNING: AIR FORCE

INTRODUCTION

Mobilization manpower planning in the Air Force revolves around a set of computer models and processes that are maintained and operated by the Air Force Wartime Manpower and Personnel Readiness Team. Manpower demand is developed from the Contingency Management Computer Model [(CM)²]. The Contingency Personnel Resource Availability Model (COPRAM) and the Wartime Training Personnel Requirements process (WTPR) yield manpower supply and training requirements. These models and processes interact in the Air Force version of the OSD Wartime Manpower Mobilization Planning System (WARMAPS) to report time-phased personnel shortages and overages. Figure B-1 depicts the process.

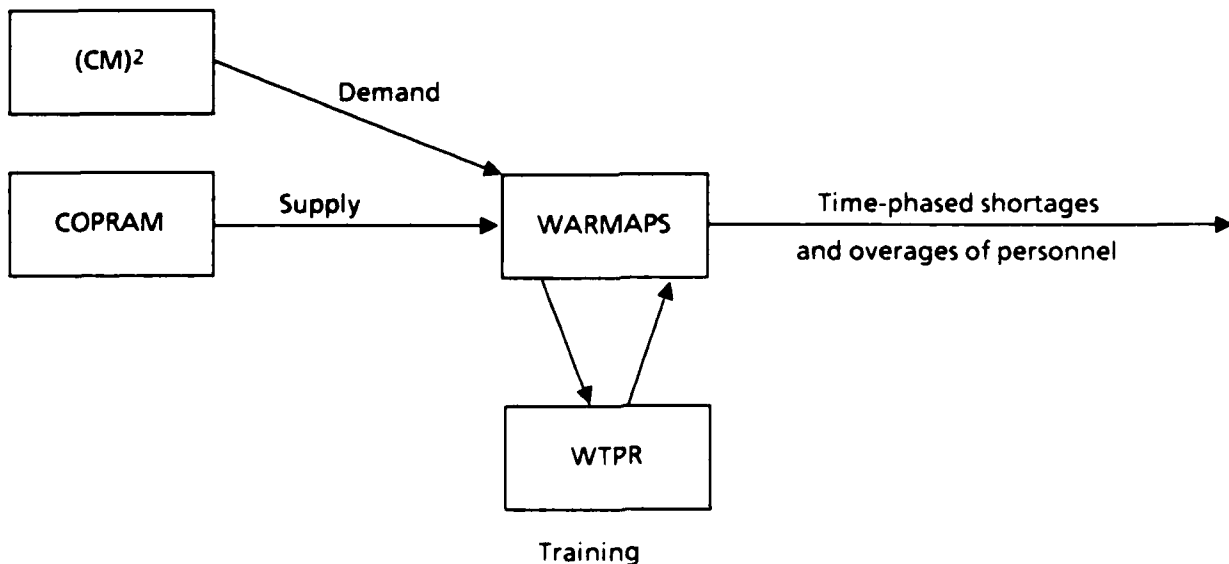


FIG. B-1. THE AIR FORCE MANPOWER MOBILIZATION PLANNING SYSTEM

MANPOWER DEMAND

General

The Air Force total manpower demand consists of force structure requirements, personnel attrition, and the transient account. In addition, (CM)² considers deployment schedules and aircraft loss schedules, to produce time-phased demand for mobilization manpower. The (CM)² process is shown in Figure B-2.

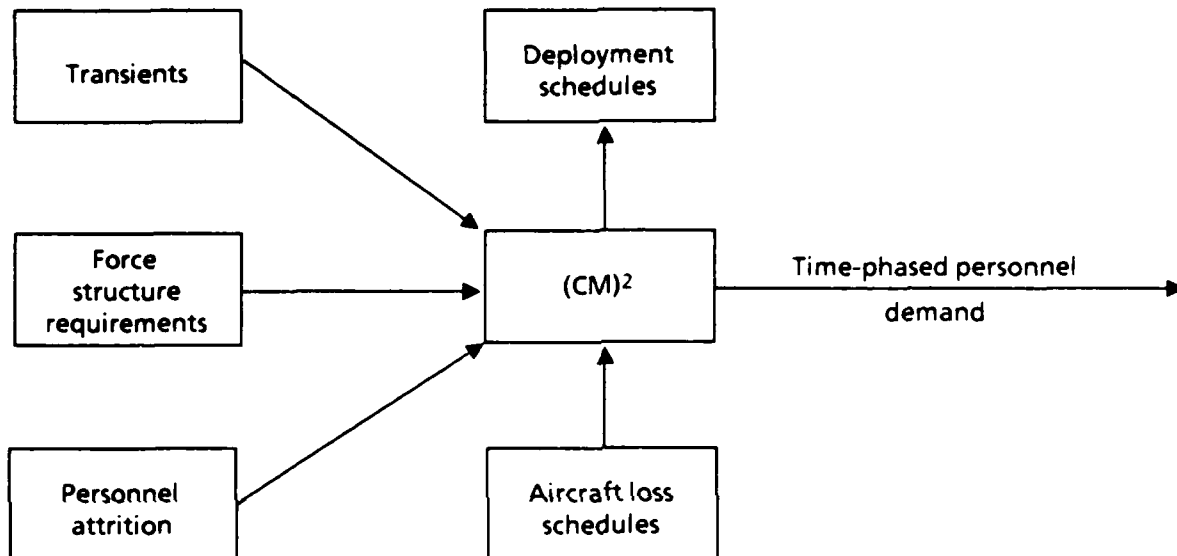


FIG. B-2. THE (CM)² PROCESS

Force Structure Requirements

The starting point for developing force structure requirements is the scenario in the Defense Guidance (DG) and the forces allocated in the Joint Strategic Capabilities Plan. An operations plan, based on the DG scenario, is developed. The size of the resulting combat force, which is heavily dependent on aircraft, is held fixed. Major commands (MAJCOMs) and Commanders-in-Chief (CINCs) provide inputs concerning the size and composition of the support force needed to maintain the combat force in that scenario.

The Support Force Sizing Exercise (FORSIZE) considers the requests of the MAJCOMs and CINCs, along with sizing guidance from Air Force Headquarters to

draw up a set of force structure requirements that best meet the support force demand by base, by function, and by unit.

Personnel Attrition

Three types of personnel attrition are considered in Air Force mobilization planning: casualties incurred on air bases, casualties to crews while flying, and noncombat casualties. The estimating process is directed at casualties incurred on air bases, that being where most personnel losses are likely to occur.

Casualties on air bases are derived from an extensive Rand Corporation analysis of enemy weapons' effects and accuracy, base configurations, and troop locations on base. The study, *Estimates of USAF Personnel Casualties and WRM Losses: A Study of USAFE and Korean Air Bases*, considered four different enemy targeting objectives: attacks against runways and access taxiways, attacks against aircraft shelter areas, mixed attacks, and attacks against support facilities. A set of assumptions is made concerning daily enemy attack objectives and the proportion of enemy aircraft allocated against air bases. These factors are then applied to the following equation:

$$\begin{aligned} & (\# \text{ aircraft}) \times (\text{sortie rate}) \times (\% \text{ aircraft allocated to USAF bases}) \times (\text{weapons effectiveness rate}) \\ & \times (\# \text{ bombs per aircraft}) \\ & \times \frac{1}{432 \text{ bombs per attack}} \times \frac{1}{\# \text{ airbases}} \times \frac{1}{\# \text{ days}} \times \frac{\% \text{ personnel lost}}{\text{attack}} = \% \text{ loss/base/day} \end{aligned}$$

Of the types of individuals on air bases: 80 percent of aircrews, administrative, and supply personnel; and 50 percent of all other personnel are subject to risk of attack. The Rand Study rates are used for the European and Pacific theaters. Separate rates, based on experience in Vietnam, are used for a Southwest Asia contingency.

Air combat strategy and tactics are based on maximizing the numbers of aircraft and aircrews available, as well as the number of sorties per day. Historical experience and estimates of enemy capabilities provide planning figures for the aircraft loss schedule. Casualties among crews while flying are assumed to consist of killed, captured, or missing in action. Since aircraft are also considered destroyed and the aircraft take longer to replace than the length of the scenario allows, no demand is placed on personnel replacement or medical systems due to these crew casualties.

Rates for noncombat casualties vary from theater to theater. These rates are estimated by the Air Force Surgeon General's Office on the basis of historical experience.

All of the personnel casualty rates are combined, then multiplied by the populations at risk in the Medical Planning Module, to produce total casualties by type, time, and location. Other medical requirements involving evacuation demands are also produced.

Transients

Peacetime transient strength is adjusted to reflect mobilization policies. Permanent Change of Station moves are made solely for the convenience of the Government. One day of delay en route for replacements is authorized. A higher percentage of patients returning to duty is anticipated, and their transient time varies according to the level of the evacuation.

Deployment Schedules

The sequence of integrated, time-phased unit deployment priorities is dictated by the Time Phased Force Deployment Data (TPFDD) file. By applying the TPFDD in (CM)², the Air Force can judge, over time, the numbers and type of units in theater, the numbers and type of airmen at risk, and the resulting casualties and transients. This process leads to the total manpower demand over time.

MANPOWER SUPPLY

General

COPRAM is the basic, automated personnel data tool used to support manpower supply planning. Current personnel resources, projected Five Year Defense Plan (FYDP) strengths, skill usability factors, historical manning levels, transfers of personnel among components, and force availability reporting rates are inputs to the model. COPRAM has the capability to calculate the projected total forces personnel supply at any level of skill detail desired. Figure B-3 shows the COPRAM process.

Current Personnel Resources

Current resources are obtained by extraction of personnel inventories from the Master Personnel File for the active Air Force, Air National Guard (ANGUS), and

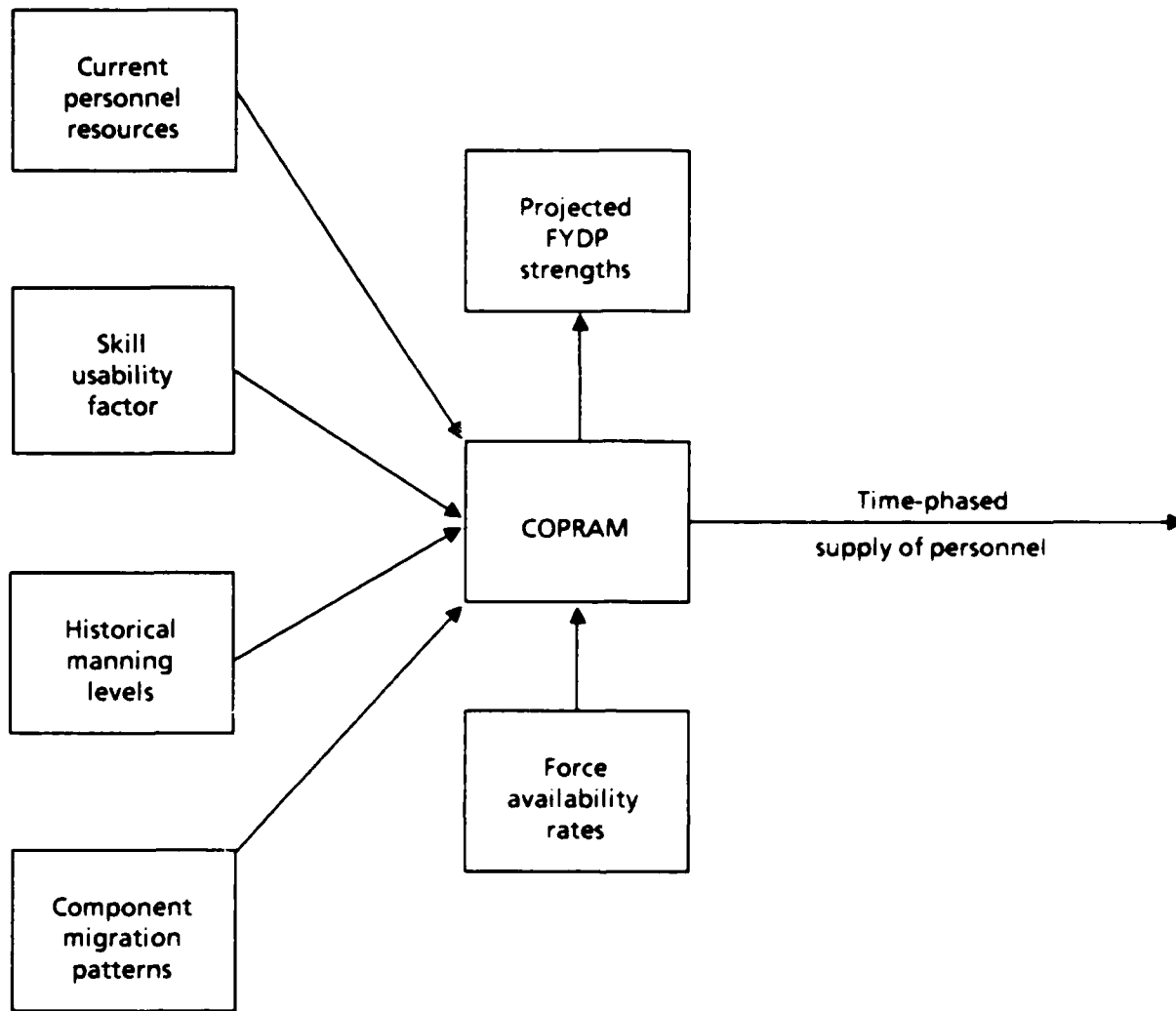


FIG. B-3. THE COPRAM PROCESS

Air Force Reserve (USAFR). For the USAFR, a distinction is made between reservists who belong to units, the Individual Mobilization Augmentee (IMA) program, and the Individual Ready Reserve (IRR). Data on active duty retirees, Retired Reserve, and the Standby Reserve are also collected and maintained. The major items of information collected are grade and Air Force Specialty Code (AFSC).

Historical Manning Levels, Component Migration Patterns

To estimate the expected level of manning (number of positions filled out of total positions authorized), the Air Force maintains manning data for the latest

3 years. The 3-year manning average for active, ANGUS, and USAFR units is computed.

Trends in migration among the three components are also tabulated. These moves are primarily from active to USANG and USAFR, as well as between USANG and USAFR.

Projected FYDP Strengths, Force Availability Rates

The authorized manning level for the year of interest is taken directly from the FYDP. The Air Force is assumed to be manned at the authorized level during mobilization.

Availability rates vary by component and program. The active Air Force is 100 percent available immediately. Rates specified in the DG are used for ANGUS and for all USAFR personnel except for the Pretrained Individual Manpower (PIM) resource. PIM availability rates are based on survey data that the Air Force collects and are published in WMP-1, Annex G.

Skill Usability Factor

Because of the technical nature of many of the AFSCs, a great deal of attention is placed on deterioration of skills. A study conducted by Air Force Headquarters has produced benchmarks for measuring skill currency. For each AFSC, there is a maximum period in which an individual can be away from the skill environment yet still be considered qualified. If that period is exceeded, the individual must receive some degree of formal refresher training. This is true for the total PIM resource.

The COPRAM Process

Mobilization manpower supply is developed in a straightforward manner in the COPRAM process. First, the distribution by grade and AFSC of all active duty and ANGUS and USAFR unit personnel is established. On the basis of the average manning levels for the past 3 years and the FYDP strength levels, the expected total number of active duty personnel and unit personnel in the ANGUS and USAFR is computed. This total figure is then distributed, by grade and AFSC, according to the same proportions in the current force. The result is the projected force for the year of interest.

Current IRR, active duty retiree, Retired Reserve, and Standby Reserve (PIM resource) populations are used as the inventories for the future year of concern. Again, grade and AFSC level of detail are used. To determine how many of these individuals are available for use and how many must be retrained, the PIM is compared by AFSC with the skill usability factors. Finally, the availability rates are used to compute the number of PIM resource members expected to report. Migration among the components is also considered.

TRAINING OUTPUT

General

The Air Force estimates training output on the basis of projected requirements for wartime critical skills, the mix of the available PIM, and the surge capacity of the training base. Expected personnel availability and course length determine the output.

Manpower Requirements Process

Once the (CM)² and COPRAM compute manpower demand and personnel supply, the computer performs a position-by-position comparison of demand and supply. The priorities for filling manpower demand, in decreasing order of call, are: active duty, ANGUS and USAFR unit personnel, IMAs, IRR, active duty retirees, Retired Reserve, and Standby Reserve. Positions that cannot be filled from these sources must be filled by graduates from the Air Force training system.

WTPR Process

The WTPR process uses inputs from WARMAPS and provides outputs for it. The projected remaining requirements for wartime critical skills generated by the MANREQ process are compared with the expected mix by skill of individuals already in the training system. This comparison provides the basis for scheduling additional accessions into the training system. These scheduled trainees (less attrition) become projected trained outputs according to the course lengths of the various AFSC-producing schools, constrained by worst-case assumptions concerning training resources.

APPENDIX C

MOBILIZATION MANPOWER PLANNING: MARINE CORPS

INTRODUCTION

In the Marine Corps, mobilization manpower planning is conducted by a small and closely coordinated group of staff officers assigned to Headquarters, Marine Corps. As in the other Services, the analysis revolves around a comparison of demand and supply.

MANPOWER DEMAND

Force Structure Requirements

The Wartime Authorized Strength Report file contains the official statement of mobilization manpower structure requirements of the Marine Corps. It is generated by the Manning Level Process Model, which accepts troop lists and wartime authorizations [W-series tables of organization (T/Os)] as inputs.

Troop lists contain the mobilization authorizations for the Fleet Marine Force (FMF); they are the same as in peacetime. W-series T/Os, which state mobilization requirements for the bases and stations, do experience growth in authorizations in moving from peacetime to mobilization environments. Command sponsors who are responsible for the support establishment activities develop the W-series T/Os so as to meet their mission requirements. The W-series T/Os are reviewed by Headquarters, Marine Corps, to ensure compliance with overall planning assumptions and guidance.

Personnel Casualties

Casualties are estimated in a straightforward manner, by methods similar to those of the Navy. Forces are assigned to risk groups, with associated levels of risk, based on their location in theater. The same Casualty Replacement Model is used to multiply populations at risk by the risk levels to determine total casualties.

Casualty rates come from the Long Range Medical and Dental Support Study (LRMADSS). LRMADSS begins with five basic threats derived from the Army's experience with amphibious landings in World War II. The results are extrapolated to modern threats and weapon lethalties and scaled to Marine Corps sizes and configurations. Deaths from causes not related to battle are included and are based on historical data.

Patients, Prisoners, Trainees, and Transients

Personnel overhead in the Marine Corps is called Patients, Prisoners, Trainees, and Transients (P²T²). The P²T² account averages about 16 percent in peacetime. During wartime it is expected to remain at approximately the same level but change in composition. Percentages for patients are likely to increase; transient percentages will drop. The Marine Corps estimates the variations in the composition of P²T² for use in planning.

MANPOWER SUPPLY

Projected Personnel Inventories

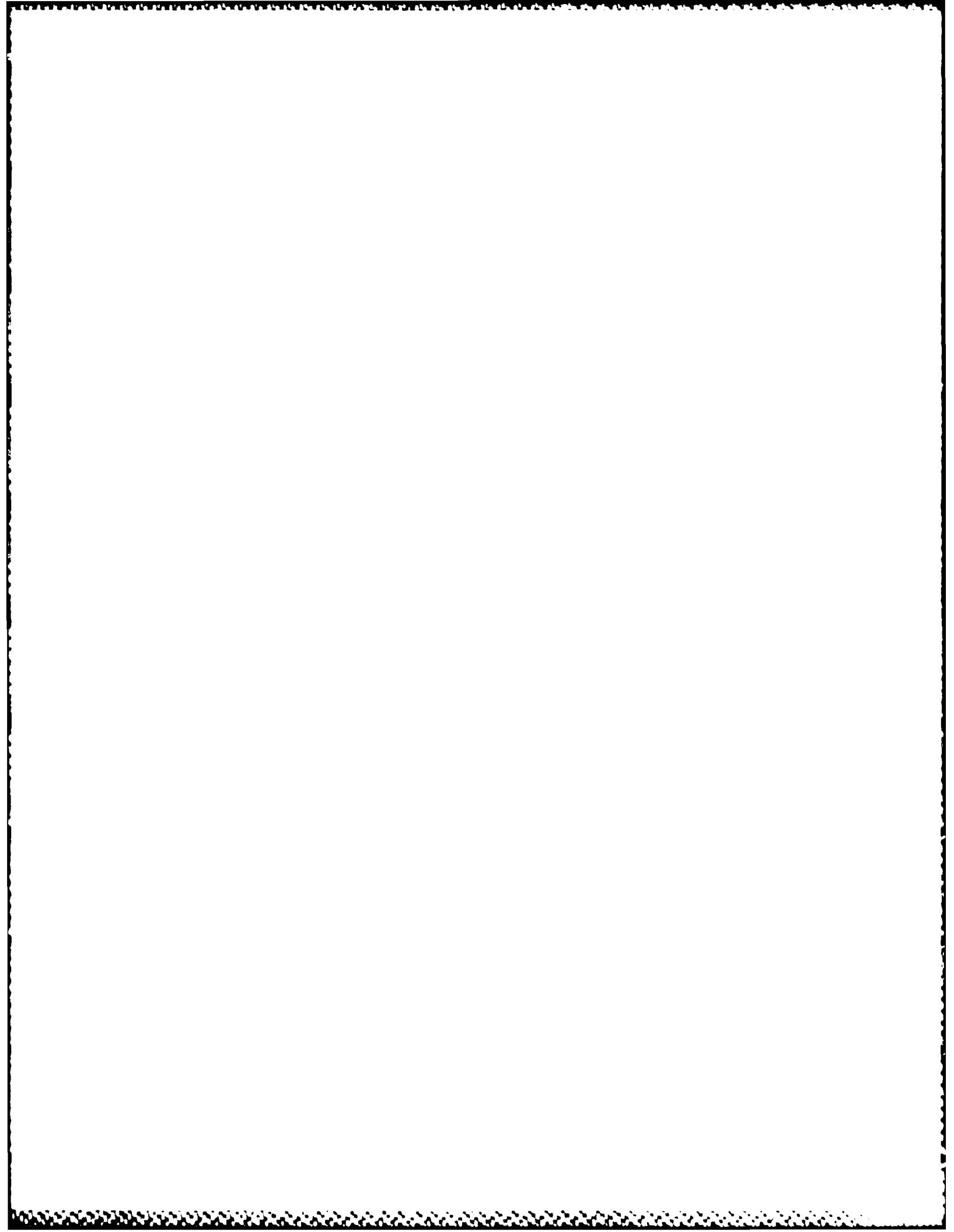
The Marine Corps uses the current populations of active, reserve, and retired individuals for projections of future personnel inventories. This practice is based on the belief that overall Marine Corps manning levels will remain relatively constant over the next 7 to 10 years, and the composition of the personnel inventory will be stable. Current inventories are extracted from finance files by use of the Headquarters Master File for active Marines, the Reserve Manpower Management and Pay System for reserves, and the Retired Pay and Personnel System for retired personnel.

A computer system is used to match the personnel inventory against the structure requirements. After active and Select Marine Corps Reserve members are allocated to their assigned positions, the next priority is in filling FMF positions with the Individual Ready Reserve (IRR). Retirees who have not been preassigned are applied after the IRR.

Training

Any positions that cannot be filled from trained Marines on hand must be filled by new trainees. The Recruit Training Model provides monthly average load and

peak load at the Marine Corps Recruit Depots. Attrition, course length, and input are calculated within the constraints of maximum course capacity. Monthly output is reported.



APPENDIX D

A CONCEPTUAL MODEL

BACKGROUND

In our Army report,¹ we recommended that a network model be developed to help the Army with the complex process of planning for manpower mobilization. The same type of model can serve as a valuable tool with which OSD can interact with the Services to evaluate and coordinate the separate manpower plans as part of the programming process. In this appendix we again provide a basic introduction into the theory of network modeling and describe an application of the theory for OSD use.

NETWORK MODELS

One application that gives rise to a network model is a materials flow process in which materials must move through specific channels whose capacities are restricted. Figure D-1 depicts an example of such a network. The numbered circles or nodes represent sources of material (nodes 1, 2, 3) or processes (nodes 4, 5, 6, 7, 8, 9, 10), and the arrows or directed arcs indicate paths for potential flow. Variables X_1 through X_{13} are the quantities of material flowing along the path. For example, X_2 is the quantity flowing from source 1 to process 5. Many different features of the flow process can be studied from this representation.

We first assign capacities to each of the arcs, based on our knowledge of the process. In our example, the maximum capacities for each arc are: $X_1=5$, $X_2=8$, $X_3=3$, $X_4=4$, $X_5=10$, $X_6=3$, $X_7=6$, $X_8=7$, $X_9=11$, $X_{10}=3$, $X_{11}=8$, $X_{12}=9$, $X_{13}=7$, $X_{14}=7$, $X_{15}=6$, $X_{16}=6$. Suppose we wish to determine the maximum

¹LMI Report FP601R1. *The Army Mobilization Manpower Accession System*. Pickett, Dayton S., et al. Aug 1986.

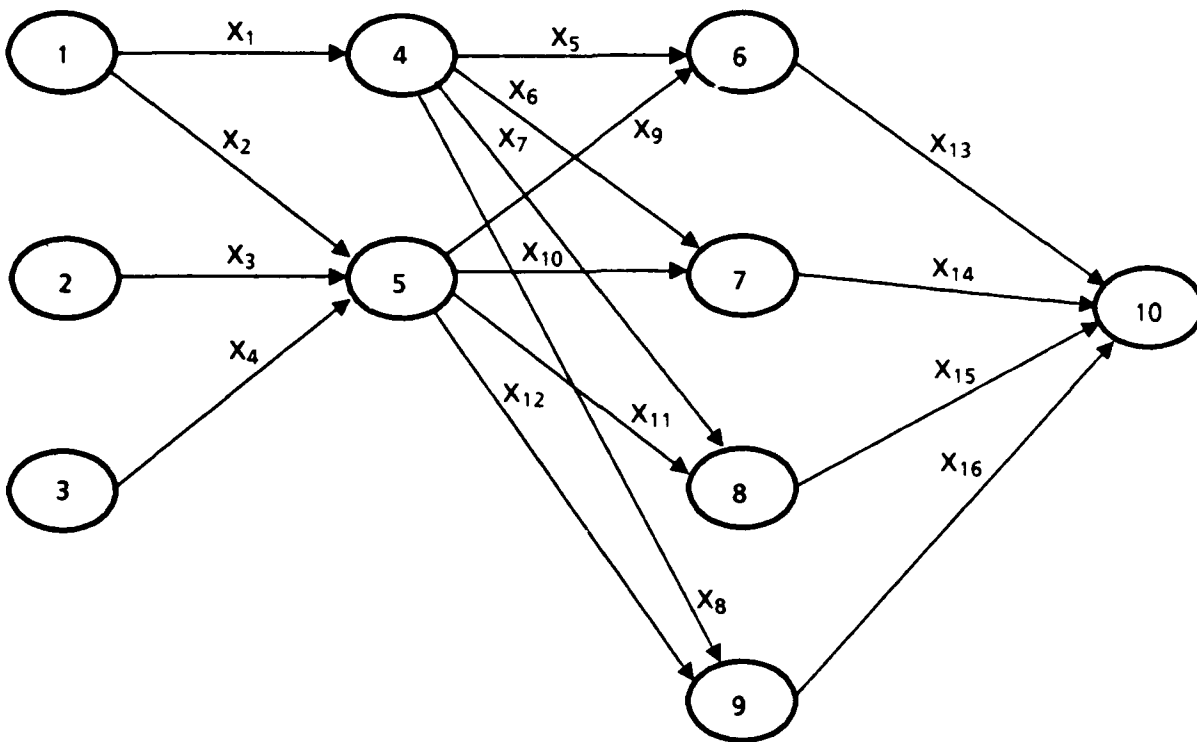


FIG. D-1. EXAMPLE OF MATERIALS FLOW NETWORK

material flow through the network. Since the output comes only from X_{10} , X_{11} , X_{12} , and X_{13} , we want to:

$$\text{Maximize } X_{13} + X_{14} + X_{15} + X_{16}.$$

We call this our objective function.

The maximum flow is limited or constrained by the capacities of the various arcs. There are 16 constraints of the type $X_1 \leq 5$; indicating that the flow from source 1 to process 4 cannot exceed the capacity of that arc. Conservation of flow (inflow equals outflow) must also be preserved. At process 5, for example, this means that $X_2 + X_3 + X_4$ (inflow) equals $X_9 + X_{10} + X_{11} + X_{12}$ (outflow). The equation can be written:

$$X_2 + X_3 + X_4 = X_9 + X_{10} + X_{11} + X_{12} \text{ or } X_2 + X_3 + X_4 - X_9 - X_{10} - X_{11} - X_{12} = 0.$$

There are six equations of this type. When all of these constraints are combined, the model takes the form shown in Figure D-2.

Maximize		$X_{13} + X_{14} + X_{15} + X_{16}$	
Subject to:	X_1		≤ 5
	X_2		≤ 8
	X_3		≤ 3
	X_4		≤ 4
	X_5		≤ 10
	X_6		≤ 3
	X_7		≤ 6
	X_8		≤ 7
	X_9		≤ 11
	X_{10}		≤ 3
	X_{11}		≤ 8
	X_{12}		≤ 9
	X_{13}		≤ 7
	X_{14}		≤ 7
	X_{15}		≤ 6
	X_{16}		≤ 6
X_1	$-X_5 - X_6 - X_7 - X_8$		$= 0$
$X_2 + X_3 + X_4$	$-X_9 - X_{10} - X_{11} - X_{12}$		$= 0$
$X_5 + X_9$	$-X_{13}$		$= 0$
$X_6 + X_{10}$	$-X_{14}$		$= 0$
$X_7 + X_{11}$	$-X_{15}$		$= 0$
$X_8 + X_{12}$	$-X_{16}$		$= 0$

FIG. D-2. FORMULATION OF THE MOBILIZATION MODEL

The model has been formulated as a linear program and is readily solved by any of the software packages available for use on personal computers. By solving this program, we learn that the maximum flow possible is 20, with $X_{13}=5$, $X_{14}=6$, $X_{15}=6$, and $X_{16}=3$.

APPLICATION OF NETWORKS TO MOBILIZATION PLANNING

Our previous example was solved without mention of the specific material that was flowing in the network. In Figure D-3 we have redrawn Figure D-1 and replaced the numbers on the nodes with titles for sources of untrained manpower and Service processes. The network now represents a simplified version of the enlisted manpower accession process during mobilization. The flows on the arcs are the numbers of the different types of untrained manpower over some period – say the first 180 days after mobilization. The capacities from the example would be replaced with the actual populations and process capacities used in mobilization planning. Clearly, Figure D-3 is too simple for a full planning utility. But even in this simple form there are many appealing features:

- The planner is forced to consider the process interrelationships and key parameters more fully.
- Effects of changes in these interrelationships and parameters can be readily examined.
- The model can receive data from – and provide data to – existing systems leading to a more consistent and integrated planning process. Each of the Services can provide information on the training base capacities. In a similar way, OSD can advise the Services of the maximum processing capacity of the Military Entrance Processing Stations, which can, in turn, affect the training plans of the individual Services.
- To study different aspects of the mobilization manpower accession process, we can tailor the objective function and constraints. Rather than maximize output we can set the required output and then seek to determine the minimum capacities needed to support this output level.

EXPANDING THE MODEL

Our initial network model of the mobilization manpower process is designed to provide figures for a 180-day period. The discussion of the network model in the Army report explains how to build additional detail into the model, to capture such features as finer time resolution, personnel attrition, and more complex processes.

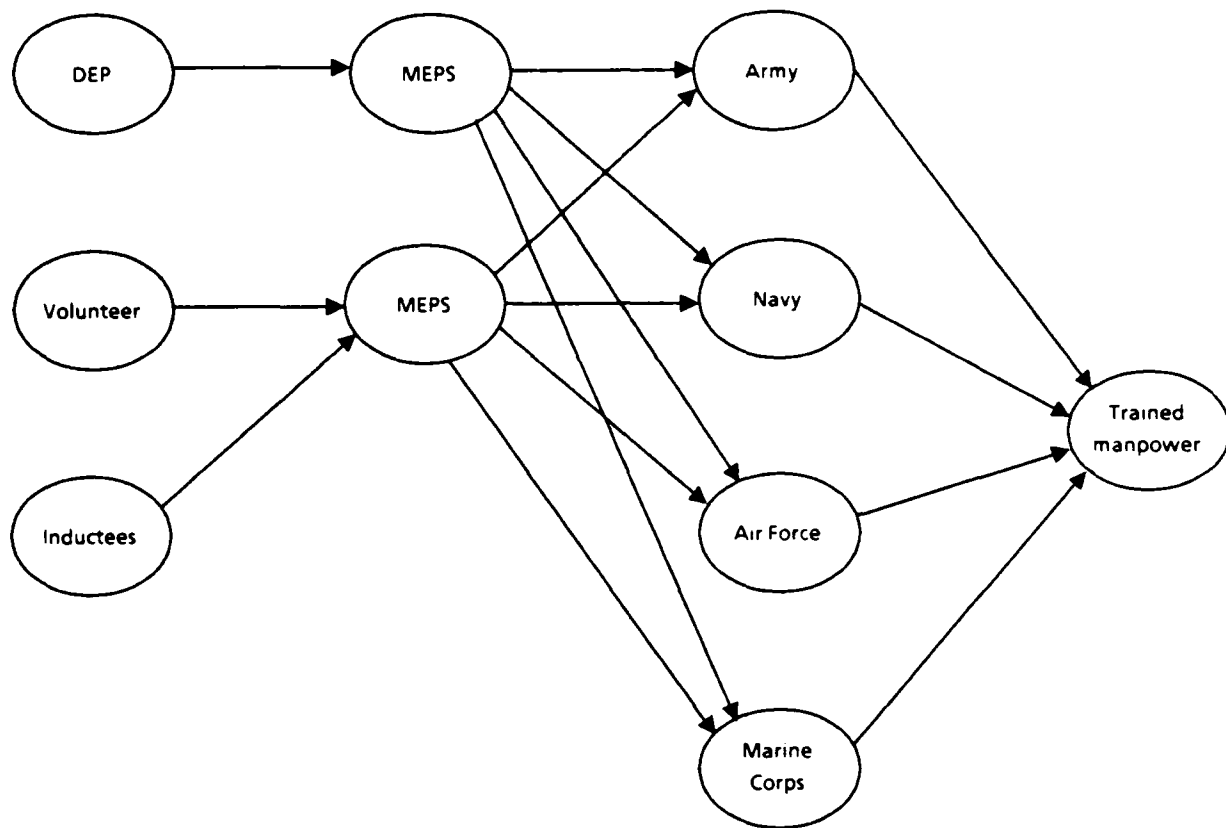


FIG. D-3. ENLISTED MANPOWER PERSONNEL ACCESSION SYSTEM

The levels of detail and types of analyses that can be performed are limited only by the imagination of the modeler. Generally, a rather simple process is developed first. Then, as determined by needs or desires, more sophisticated and complex systems evolve. More involved models do require more variables and constraints. This tradeoff between detail and ease of solution must be considered in model development.

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19. ABSTRACT (Continue on reverse if necessary and identify by block number) This report describes and evaluates mobilization manpower planning in each of the Military Services. It is a complex and inexact process. Many of the critical factors vary greatly in the course of the year. Other important parameters are very difficult to estimate. Further, virtually all of the planning variables are interrelated in intricate ways, with the final required number of volunteers and inductees being a derived result of such interactions. Each Service approaches the process of developing mobilization manpower plans differently. The approaches reflect the different character and missions of the Services. It is necessary for OSD to recognize these necessary differences among the Services and to provide guidance that allows them the latitude to plan their various missions in the most effective manner possible. The Services, in turn, must demonstrate that their policies and methodologies, as well as the plans that result, are supportable as part of the DoD planning and programming process. By modifying existing practices and identifying a common set of assumptions and procedures, OSD can improve the existing mobilization manpower planning process. Under the present arrangement, each Service reduces its demand for inductees by its estimates of the number of volunteers it expects. We think that these calculations should not be based on such unreliable figures. It would be better to plan for no volunteers at all and, instead, to have in place a mechanism that would reduce the flow of inductees as volunteers came forward. There is also a need for a common and reasonable way to evaluate the Service plans in light of national defense needs and resources.					
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20. Abstracts (continued)

We recommend that the Assistant Secretary of Defense (Force Management and Personnel) take the following actions:

Establish a practice of using the total demand for inductees and volunteers as the stated requirement for inductees from the Selected Service System. Inform the Service of this practice.

Based upon this practice, request that the Military Services adopt the following schedule for receiving inductees in the first 3 months after mobilization:

	<u>First month</u>	<u>Second month</u>	<u>Third month</u>
Army	61,700	63,400	73,400
Navy	6,800	24,000	24,000
Coast Guard	8,000	-----	-----
Air Force	-----	-----	6,900
Marine Corps	<u>8,100</u>	<u>10,700</u>	<u>10,700</u>
TOTAL	84,600	98,100	115,000

Develop plans to reduce the flow of inductees by the actual number of mobilization volunteers.

Inform the Director, Selective Service System, of the revised requirements.

We believe also that OSD needs a better means of evaluating and coordinating Service plans. Though OSD guidance must allow the Services the flexibility to execute their varying plans effectively, it must also make sure that the separate plans complement each other in meeting total national defense needs within resource constraints. To those ends, we recommend that the Assistant Secretary of Defense (Force Management and Personnel):

Develop, with the participation of the Services, an integrated network model that characterizes the complex interactions involved in mobilization manpower planning. Such a generalized model would be applicable to DoD as a whole but could also be tailored to the needs of the individual Services.

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