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Logistics Management Institute

*Linking Force Structure
to the
Support Infrastructure*

AN LMI WHITE PAPER

DAVID V. GLASS

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ARMY INFRASTRUCTURE RESOURCE ANALYSIS

Understanding the costs of the Army support infrastructure is crucial to making the major restructuring decisions now facing the Army. This paper presents a taxonomy for considering the support infrastructure, an analysis of how changes in this infrastructure are linked to changes in the force structure, and a methodology for finding the cost of changes in the infrastructure. The paper shows that not all of the support infrastructure is sensitive to changes in the force structure. It further points out that costs in the support infrastructure are sensitive to policy variables internal to the support infrastructure and illustrates some examples of this sensitivity using the analytical methodology.

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Linking Force Structure to the Support Infrastructure

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AN LMI WHITE PAPER

DAVID V. GLASS

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INTRODUCTION

Purpose of Paper

The purpose of this white paper is to examine the logical linkages between changes in the Army force structure and changes in the Army infrastructure. We first develop a taxonomy for Army commands and a definition of the support infrastructure. We then look at each of the commands in the support infrastructure and describe what the command does and how the resources for those functions may vary with force structure changes. This paper does not fully develop resource relationships between each of the infrastructure elements and the force structure. Nevertheless, it is a necessary first step towards development of resource relationships and provides a starting point for discussion of the support infrastructure and its relation to the force structure.

Taxonomy

The Army force structure can be viewed as a consumer of resources and the commands in it as *consuming* commands.¹ To the extent that these resources such as trained manpower or spare parts are supplied by another Army entity that latter entity can be looked upon as a *producing* command and as part of the Army support infrastructure – the supplier relationship is the "linkage". For example the Training and Doctrine Command (TRADOC) is a producing command. It produces trained troops and doctrine, and supplies them to consuming commands such as Forces Command (FORSCOM). The linkage to the force structure is that as the force structure requires fewer trained troops, TRADOC needs to train fewer troops. Figure 1 illustrates this simple model for several commands. (A complete list of producing and consuming commands is given in Appendix A.)

1. This discussion is based on the description of the Army structure contained in Chapter 8 of the 1991-1992 edition of *Army Command and Management – Theory and Practice* published by the U.S. Army War College, Carlisle Barracks, PA.

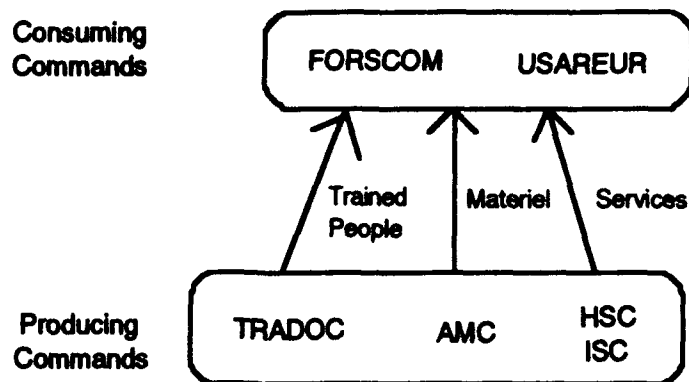


Figure 1. Army Command Supplier Relationships

Producing commands also consume. For example, TRADOC supplies itself with trained people and doctrine, as well as training materials and curricula. On TRADOC owned installations it is supplied by other entities such as the Health Services Command (HSC) and the Information Systems Command (ISC). Also, as part of TRADOC's mission to supply trained soldiers, it is supplied new recruits by the Recruiting Command (USAREC). However, because its final output is not trained units, the basic element of the force structure, we do not characterize it as a consuming command.

Consuming commands supply themselves with Base Operating and Support (BOS) and unit training. For example, at a FORSCOM installation (in addition to the suppliers mentioned above) the Table of Distribution and Allowances (TDA) units on the base provide support to the Table of Organization and Equipment (TOE) units. However, because this is essentially an overhead function intrinsic to creating trained units, it is not part of the support infrastructure, rather it is part of the consuming command. This characterization is apt in that some of these TDA units transfer their people to deploying units; therefore, they are clearly not part of the support infrastructure, but they are linked completely and readily to force size.

A third kind of entity, in addition to producing and consuming commands, is an integrating organization, such as the Headquarters, Department of the Army. These entities can be viewed as overhead to the Army as a whole and are not considered to be part of the support infrastructure.

Definition of Support Infrastructure

We define the support infrastructure to be the TDA units within the basic producing commands. Those units are non-deploying units that supply other units and do not directly constitute fighting power or directly produce trained units.

The *support* infrastructure that we define here and that this paper considers should not be confused with *physical* infrastructure. *Physical* infrastructure refers to the real estate and fixed improvements such as roads and sewers on Army bases. Consuming and producing commands both use the physical infrastructure of the Army. In this paper, however, our interest in the physical infrastructure is limited to how much it costs the support infrastructure to run their portion of it.

This definition of the Army support infrastructure includes among others, the Army Materiel Command (AMC) and the Training and Doctrine Command (TRADOC) both of whose activities occur primarily on their own installations. It also includes commands such as the Health Services Command (HSC) and the Information Systems Command (ISC), whose activities occur for the most part on installations of other commands.

In the remainder of this paper we examine the support infrastructure and see how its components are linked to Army force structure and mission.

CONCEPTUAL LINKAGES

Producing commands make up the support infrastructure. The linkage to force structure changes varies not only by command, but also within a command – depending on the function of each part of the command. We discuss each of the major producing commands in this section and then make some observations about linkages in the last section of the paper.

Army Materiel Command (AMC)

AMC is the largest of the producing commands, projected to have over 100,000 staff by the end of FY92, 95 percent of whom are civilian. As the name implies the major mission of AMC is to acquire and sustain the materiel needed to equip the Army to fulfill its mission.

In the AMC context force structure refers not only to the size of the structure in terms of units and people but more directly to the number and types (model and series) of equipments in the force. Reductions in equipment intensive units such as armored divisions or mechanized infantry brigades would have more impact on AMC than reductions in light infantry units. As the demand for materiel end items, spare parts, and maintenance decreases as a result of decreasing equipment density, use and variety (some older equipment may be retired early), the parts of AMC involved with sustainment will experience a decrease in variable costs. Other parts of AMC are not involved in the sustainment function and will not be linked to changes in force size. We discuss each component of AMC and its role in sustainment and linkage to force size below.

The *Industrial Operations Command* (IOC) will control the Army's maintenance depots (formerly under the Depot Systems Command) and the arsenals and ammunition production and supply activities (formerly under the Armament, Munitions, and Chemical Command). IOC will account for about 45 percent of AMC's manpower and fiscal resources.

The variable costs of the maintenance depots are linked to changes in force structure and operating tempo inasmuch as they change the demand for depot services. Eventually, at some point after force structure has been reduced, the demand for depot services would theoretically stabilize at a level lower than the current level. Before this *steady state* level of demand is reached, however, there will be a *transitional period* as the force structure is reduced. During this transitional period the demand for depot services could change in complex ways. For example, if the force structure decreased and materiel was not reassigned, then the inventory of serviceable

equipment and spares would increase relative to the demand. The depots could then cease overhauling end items and repairing unserviceable spare parts in the near term until the excess inventories were used up. This implies that we would see an amplified effect (even greater reduction in workload) from decreasing force levels beyond what would be expected from a simple extrapolation of current demand rates to a lower base. This effect will be mitigated if large scale equipment transfers from units departing the force structure are made that entail restoring that equipment to a high ready-for-issue standard. (There is also a workload arising from Operation Desert Storm that will be worked off in this transitional period.) However, if Reserve Component units get equipment from departing active units they are presumably losing older equipment which has its own maintenance burden. Depending on how these are disposed of – made ready-for-issue and put in storage, sold after rework, simply sold as is, or junked – there may be some, or no, additional near term depot workload involved. The variable costs of the depots will be linked to decreases in force structure, and these effects may be amplified during the transitional period.

The *commodity commands* account for over 40 percent of AMC's manpower and fiscal resources. Most of the activities and staff of the commodity commands are driven more by the number of different weapon systems supported and the number of new systems being acquired than by the size of the force structure. Development and production engineers for example, are concerned with the early life cycle of a system and would not be linked to changes in the force structure.

People in the Inventory Control Points (ICPs) and those concerned with contracting, however, are involved with sustainment and would have some linkage to changes in force structure and operating tempo. This linkage would result if either demand went down and ordering of spare parts declined, or if force structure changes were accompanied by the elimination of certain systems from the Army (and here we mean *total* Army regardless of component) inventory. Either of these eventualities would lower the variable costs at the ICPs.

The commodity commands might also be affected by changes in the Army mission. If, for example, the Army were to give up or acquire missions to or from another Service, such as the Close Support mission, such changes would affect the breadth of material items acquired and sustained, and therefore have an effect on the commodity commands.

Other parts of AMC are not linked to changes in force structure. The *Combat Material Research Laboratory Command* (CMRL) is focused on the early phases of the acquisition cycle and as such is

more driven by changes in mission and the pace of new acquisitions and technology change than by changes in force structure.

The *Test and Evaluation Command* is also driven more by the pace of acquisition and development and would have little linkage to changes in the force structure.

The *Security Assistance Command* manages Army foreign military sales cases and security assistance and thus has little linkage to force structure.

The remainder of AMC is made up of the headquarters, which is primarily an overhead function, and the *field operating agencies* (FOAs). Some of these FOAs, such as those involved with calibration and test repair might be linked to changes in force structure but most are not. Because they make up a small part of AMC, we will consider them as a group to be insensitive to force structure changes.

Function	IOC	Commodity Commands	CMRL	USASAC	HQ and other	Total	Linkage
Sustainment	35,943	10,335	31	0	3,618	49,927	Force Structure
Security Assistance	1,336	1,082	0	658	58	3,134	Other
Acquisition, R&D	3,285	23,881	3,572	0	2,485	33,223	New starts
Mobilization, Productivity	2,951	6,266	132	25	1,909	11,283	Other
Total	43,515	41,564	3,735	683	8,070	97,567	

Note: IOC estimated by combining AMCCOM and DESCOR resources.

Table 1(a). AMC Summary by Function (Manpower as of 30 December 1990)

Function	IOC	Commodity Commands	CMRL	USASAC	HQ and other	Total	Linkage
Sustainment	6,110	2,857	13	1	255	9,236	Force Structure
Security Assistance	379	62	0	37	3	481	Other
Acquisition, R&D	596	4,335	403	0	709	6,043	New starts
Mobilization Productivity	635	691	10	1	102	1,439	Other
Total	7,720	7,945	426	39	1,069	17,199	

Table 1(b). AMC Summary by Function (FY91 \$ millions)

Tables 1(a) and 1(b) display AMC resources by command and function.² Sustainment accounts for over half of the resources of AMC. Most of these resources are in the Industrial Operations Command and the ICPs in the Commodity Commands. As described earlier, the variable costs of the sustainment portion of these organizations could be linked to changes in force structure and the variety of equipment in the inventory. The variety could be decreased as the force structure decreases if a policy decision is made to do so, or if the Army mission is narrowed. Drivers for the other functions of AMC include the size of the Security Assistance program, the pace of new systems acquisitions, and mobilization policy. The pace of new system acquisition is a policy variable. The pace will decrease as a result of the diminution in the perceived threat and decreases in DoD budgets. Although this may occur at the same time as decreases in force structure, it is not causally linked to it.

Training and Doctrine Command (TRADOC)

The Training and Doctrine Command (TRADOC) has three primary missions – combat developments, doctrine, and training. Combat developments helps identify wartime requirements for new doctrine, training, organizations and material. This function accounts for about seven percent of TRADOC's resources. This activity is not linked to changes in the size of the force structure. However, it is sensitive to changes in the threat, to the Army mission, and to the composition of the force structure. To the extent that changes require new material systems, this function is also sensitive to the number of new system starts. For the purposes of this paper it can be considered not linked to changes in force structure size. Doctrine is coordinated at TRADOC by the DCS for Doctrine and is written by subject matter experts at the schools and integrating centers. Because these personnel also teach, their cost must be allocated between these two functions. The need for new doctrine is not sensitive to the size of the force structure so much as to the mission of the Army.

The training mission is the heart of TRADOC and accounts for the vast majority of its resources. Much training activity and cost is linked to the number of personnel undergoing training. This training load is sensitive to reductions in the demand for trained manpower resulting from decreases in the size of the force structure. The effect of reductions could be amplified during the transition period if the Army chooses to retain trained personnel as force size decreases and cut back on new accessions. It could be mitigated if the reduction were accompanied by retraining troops for new assignments. For example, if there are widespread changes to the

2. U.S. Army Materiel Command Command Briefing, Army Materiel Command, undated.

missions of Reserve component units there would be a demand for retraining.

Other training activities and costs, such as developing training curricula, are a function of the variety of courses offered. These would be linked not to force size but to force complexity. Finally, a major cost factor is the BOS and RPMA of the training installations. Some of this cost is an allocated overhead cost to the individual training program. The remainder of the cost is allocated to other activities at the installation or to the installation itself. (If a TRADOC school is located at a non-TRADOC installation it is currently not assigned any BOS/RPMA cost. When BOS is included in the DBOF however, it will be allocated part of the installations BOS/RPMA costs.) Therefore, although the training activity is sensitive to the size of the force structure, not all of it is equally affected.

Table 2 shows the manpower allocations among TRADOC activities. ROTC, Army Training Center (ATC), and School House training will all be linked to the size of the force structure. Base Operations and Engineering will also be partially linked as overhead to these activities. The other functions (combat developments, training support, and other) will be assumed not linked to force size although they may be linked to changes in Army mission.

FUNCTION	CIVILIAN	MILITARY	TOTAL	LINKAGE
Combat Dev.	1,862	2,110	3,972	Mission only
ROTC	588	2,847	3,435	Force structure
Training	(9,465)	(35,695)	(45,160)	
• ATC	546	8,934	9,480	Force structure
• School House	4,281	15,626	19,907	Force structure
• Tng. Development	1,821	3,062	4,883	Mission only
• Tng. Support	2,817	8,073	10,890	Other
Base Operations	10,813	5,757	16,570	Force structure (partial)
Eng. (RPMA/Family Housing)	5,039	112	5,151	Force structure (partial)
Other	2,903	1,970	4,873	Other
Total	30,670	48,491	79,161	

Source: 15 April 1992, TRADOC summary data.

Table 2. TRADOC Summary

Army Medical Department (AMEDD)

The AMEDD is made up of the TOE units in the active and reserve components and TDA units. The TOE units are not part of the Army

infrastructure as we have defined it. Of the TDA units, the vast majority are in the Health Services Command (HSC). The other medical commands are the 7th and 18th Medical Commands (subordinate to USAREUR and 8th US Army, respectively and thus not treated in this paper) and the Medical R&D Command, a field operating agency of the Surgeon General. There are also six other agencies reporting directly to the Surgeon General. The Medical R&D Command and the other six agencies subordinate to the Surgeon General, a total of 4,450 personnel, can be considered insensitive to changes in the force structure.

Health Services Command (HSC)

The HSC at the end of FY92 will have a total authorized strength of approximately 54,000 (29,000 military and 25,000 civilians). In addition to its primary role of delivering health care to military service members and other eligible beneficiaries, the HSC has a number of other missions. Several of these missions for the medical establishment (i.e. doctrine, combat developments and training) are parallel to TRADOC's missions for the rest of the Army. As is the case for TRADOC, doctrinal development is more sensitive to changes in the mission of the force than to force structure size and combat developments is more sensitive to acquiring new systems. Both functions can thus be considered not linked to force structure size. The training mission might have some linkage to force size if the number of people trained varied directly with force size. However, if the number of people trained is related to the number needed for the health care delivery mission, the linkage is more complicated. This linkage is discussed below.

Linking the health care delivery mission to changes in force structure size is complicated because the medical system provides care not only to the active forces and their dependents, but also to retirees and their dependents and survivors. For example, at the DoD level, by 1997 the total eligible population will decline by 6 percent from the 1992 population. But, this decrease will result from a 13 percent *drop* in active duty personnel and dependents and a 2 percent *increase* in retirees and their dependents and survivors. If the military establishment is sized to accommodate the total population it will not vary directly with changes in the size of the force structure. In fact, Congress has told the DoD not to cut any medical personnel. This is an area where policy variables will have a very great effect. Another complicating factor is that Army hospitals also provide care for beneficiaries from other Uniformed Services (and vice versa). To some extent then, the Army medical establishment is linked to the demands placed on it from the other Services.

If we look at statistics from the quarter ending 31 December 1991, we can see that these are not trivial complications.³ Looking at beds occupied in the Army system for example, only an average of 32 percent were occupied by Active Duty Army personnel. An additional 19 percent were occupied by dependents of Active Duty Army personnel. Thus, only 51 percent of the occupied beds could be linked at all to Active Army force size. Therefore, if the size and cost of the Army medical establishment is linked to the care it delivers, then it is at best, only partially linked to Army force size.

Conversely, if the medical establishment is allowed to size itself to the wartime needs, rather than the care it delivers in peacetime, it may decrease even more rapidly than the force structure. That could occur if the intensity and scale of projected conflicts decreases even more than the force structure does. This effect could be magnified if it were decided that civilian hospitals could handle war casualties. Such a decision (a major policy change) would mean that a large portion of the CONUS medical structure could be closed. Again, this is an area where policy decisions will overwhelm changes linked to the size of the force structure.

Thus, it is critical to know what in fact drives the size of the Army medical system, the peacetime care it delivers, its wartime mission, or some combination. Any determination of linkages to force structure size must be preceded by the answer to this question. To the extent that this is considered a policy question, it once again demonstrates the primacy of policy variables in sizing the Army medical establishment. (Under current policy, the size of the medical establishment is determined primarily by wartime needs, although the law allows it to be expanded for peacetime needs if doing so is cost effective.)

Command	Civilian	Military	Total	Linkage
Health Services Command	25,454	29,285	54,739	Force structure,
The Surgeon General	2,563	1,887	4,450	Policy
Total	28,017	31,172	59,189	Other

Table 3. Authorized Health Service Spaces

Table 3 shows the authorized personnel positions in the AMEDD. It should be noted that although the size of the Army medical structure may decrease under some policy decisions, the amount of resources required for the medical function might not. If all care for active duty dependents for example, were provided by civilians under the CHAMPUS program the number of Army doctors might go down, but the costs to the Army for providing this service might go up.

3. DOD Selected Medical Care Statistics, OSD, Washington Headquarters Services.

Therefore, it is essential to look at not only the size of the Army health infrastructure, but also at the entire cost to the Army (and perhaps DoD and the U.S. Government) of providing health care to all Army beneficiaries.

Information Systems Command (ISC)

The Information Systems Command (ISC) supplies information system services and materiel. Services include operational support, and coordination of interoperability and compatibility. Part of ISC is made up of TOE units that provide communications and information support for echelons above Corps. By definition these deployable TOE units are not part of the support infrastructure and will not be considered further in this paper.

Another major part of ISC is the information systems personnel at installations that report to the installation's Director of Information Management (DOIM). The DOIM and the personnel who report to him will all be transferred to the installation commander and his major command (e.g., AMC, TRADOC, FORSCOM) as of 1 October 1992. About 18,000 ISC employees will be transferred. After the transfer they should be considered part of the base overhead and thus not included as part of the support infrastructure if the base is part of a consuming command. If the installation is part of a producing command then the personnel will become part of that command and thus be part of the support infrastructure.

The remainder of ISC is involved with the development of data standards, ensuring interoperability and compatibility, and acquisition of certain communications and information systems materiel. This work is not sensitive to force size. It is instead sensitive to the pace of modernization of Army information systems and to policy decision as to what extent information systems acquisition and management should be centralized.

Therefore, after the transfer of installation support personnel, the support infrastructure portion of ISC will not be linked to changes in the size of the force structure.

Corps of Engineers (USACE)

The U.S. Army Corps of Engineers (USACE) is organized into divisions (which in turn are made up of districts), a headquarters, and laboratories. Of these three organizations, only the divisions would vary with workload and hence force size. The workforce is almost exclusively civilian, only 800 USACE employees are military. USACE is a unique Army organization in that the majority of its work supports the Civil Works program rather than Defense related programs. USACE also does a substantial amount of work for the Air Force and other Defense customers, in fact, the Army

only accounts for 55 percent of the DoD workload in the divisions. Thus only a small part of USACE could be linked at all to Army force size. Table 4 shows the workload in the divisions by customer in each part of USACE.

USACE elements	Army	Other Military	Civil	Total
Divisions	4,699	3,895	25,671	34,265
Laboratories	1,639	0	859	2,498
Headquarters	500	0	539	1,039
Total	6,838	3,895	27,069	37,802

Source: USACE Reorganization Study Baseline Mar. 1991.

Table 4. USACE Man-years by Customer

If one makes the assumption that the MILCON appropriation, which funds most of the Army work, is proportional to force size, then one could say that the variable cost of this part of USACE workload is linked to force structure. However, in a period of base closures and realignments this assumption may not hold. For example, during the transition, if several bases are consolidated and if units are brought back to CONUS from overseas, more MILCON projects may be undertaken than in a steady state even with a smaller force size.

Another complicating factor is the increasing amount of environmental restoration work that USACE is doing. This work is not linked to force size. In fact, it may increase even more if bases are closed and then have to be cleaned up to make them useful for other purposes.

Therefore, any linkage of Army force size to USACE workload is limited. It could account for, at most, 55 percent of the DoD workload in the divisions which translates to about 4,700 man-years. Because this work is funded out of the projects themselves, no specific program or budget actions are needed to adjust USACE funding to different work levels – the adjustment is automatic as the funded work changes. Changes to the laboratories and headquarters functions, and to the number of districts, however, would require specific action. Changes to these fixed cost elements, although not linked directly to force size, could be considered if unit costs become prohibitive.

Recruiting Command (USAREC)

The U.S. Army Recruiting Command (USAREC) is responsible for recruiting potential Army soldiers and delivering them to Military Entrance Processing Stations. There they are qualified by members of the Military Entrance Processing Command and processed into the Army. Sufficient recruits of the necessary quality are needed to

fill the force structure, both active and U.S. Army Reserve. (USAREC recruits active Army and U.S. Army Reserve soldiers and some officers. Army National Guard soldiers are recruited by the states.)

To fulfill its mission, USAREC is organized into five geographic regions which in turn are divided into districts and areas. The primary "sales" points are 1,700 geographically dispersed recruiting stations where the 6,400 recruiters are based.

The key linkage question is: will all these recruiting stations be retained as the force size, and hence the demand for new recruits decreases? If one simply wished to provide a smaller number of qualified recruits without regard to geographic origin, then, *ceteris paribus*, this could be accomplished with fewer recruiting stations. The least productive stations could be eliminated. If, however, there is a political necessity to retain less productive stations to enable all prospective recruits to have reasonable access to the system, then a larger number of stations than is strictly necessary to provide the required number of recruits may be required. In the case of recruiting for the Army Reserve there may also be a need to reflect the geographic dispersion of the reserve units. Thus, we need an answer to the policy question of geographic dispersion to determine if the number of recruiting stations is linked directly to force size.

Putting aside the geographic dispersion question, from a cost point of view there may be increasing marginal costs for recruiting. That is, attracting the last recruit may be more expensive than attracting the preceding recruits. Thus, if other labor force factors such as the pool of eligibles and the demand for labor from other sources remain constant, then the *variable cost* of recruiting could decrease more rapidly than the number recruited. For example, the reduction in advertising expenditures could be proportionally greater than the reduction in the demand for new recruits.

The "fixed" cost of the recruiting command will also change as command resources and personnel decrease. For example, one of the five regions is already scheduled to be disestablished. This trend may be encouraged by the emphasis being placed on cost per unit output. The unit measure for recruiting will be expressed as total cost of USAREC divided by number of recruiting contracts signed. As the number of contracts decreases, the total costs will have to decrease to keep the unit costs constant.

During the transition period the demand for new recruits could diminish even faster than force size if the Army decides to retain trained soldiers (either to minimize involuntary separations or decrease training costs) and cut back on accessions. Again, this is a policy decision with broad ramifications.

In summary, the variable cost of the recruiting command is linked to the size of the force structure and in particular to the demand for new accessions.

Military Traffic Management Command (MTMC)

The Military Traffic Management Command (MTMC) is a transportation manager, advisor and in some cases operator for the DoD. It manages freight movement in CONUS, all CONUS passenger traffic, Army passenger traffic worldwide, and the worldwide DoD Personal Property Shipment and Storage Program. MTMC operates common -user water terminals world wide and the Defense Freight Railway Interchange Fleet (DFRIF). MTMC advises the JCS and OSD on transportation matters and provides transportation engineering services.

MTMC manages inland traffic for all of the DoD; thus, changes in the Army force size will only influence the traffic load linked to the Army. But traffic load may not be the best predictor of MTMC size. Most of its effort is devoted to contracting with carriers to agree to provide transportation services. Once the contract is let, the amount of traffic it receives may vary but the cost of putting the contract in place is sunk. Therefore, if the number of contracts does not vary, the cost to MTMC might not vary either. For the 34 percent of freight shipments for which MTMC exercises direct routing control, a decrease in the number of movements resulting from smaller force size would be linked to a decrease in MTMC workload. Thus, a decrease in Army force size would lead to a decrease in MTMC's *variable costs*.

Passenger traffic is managed by MTMC in CONUS for all DoD. MTMC's role in contract negotiations for city pair travel and other contracting functions is linked more to the route system than to route traffic. Traffic decreases would be linked to the variable costs of MTMC centralized routing of passengers. MTMC provides this service for groups of 21 or more. MTMC also manages Army international passenger traffic. Decreases in Army force structure and changes in Army deployment patterns would directly affect the workload for this function.

Personal property transportation will decrease as force size decreases (assuming tour length remains constant). Again MTMC manages this program for all of DoD so decreases in the Army force structure would only affect the Army portion of the work load. In this commodity most of the variable costs would be incurred in the personal property shipping offices which are not manned by MTMC

personnel. Thus, changes in workload may not have much effect on MTMC costs.

MTMC manages international surface traffic and operates ocean terminals. If the number of terminals stays constant, a reduction in traffic resulting from a decrease in Army force size would not greatly affect the number of MTMC personnel at the terminals. However, it would decrease the amount of work contracted out for stevedoring and related terminal services.

The size of MTMC headquarters, its mobilization activities (including DFRIF), and its transportation engineering activities would probably not be affected by a decrease in Army force size. What could affect its size would be changes in how work is divided between MTMC and TRANSCOM. As TRANSCOM plays more of a role in peacetime operations there may be a migration of functions and costs from MTMC to TRANSCOM.

In summary, most MTMC activities are not directly linked to the volume of transportation traffic. For functions that are linked, such as where MTMC does the routings for CONUS shipments, then MTMC's variable costs should decrease as traffic decreases. In these cases, the changes resulting from decreases in Army force structure will, of course, be limited to that portion of the traffic which the Army generates.

OBSERVATIONS

General Issues

Certain conditions over the next ten years will affect the entire support infrastructure. Force structure decreases are in store not only for the Army, but also for the other Services and for many of our allies. For the support infrastructure, this implies that extra capacity will be on hand in other Services and in other countries. For example, as our force levels decline and as we close our in-theater depot maintenance facilities, the Army may choose to make use of NATO (specifically the NATO Maintenance and Supply Agency) for maintenance of Army equipment in Europe . Similarly, as workloads decline in CONUS, some depot maintenance might be transferred to other Services . Workload that the Army has done in the past for other Services and other countries may be taken back or disappear. Any of these events will amplify the effect of decreases in the force structure on the support infrastructure.

Another condition that will affect support infrastructure is the implementation of cost per unit output and the increased emphasis on the use of revolving funds.⁴ This will have a profound effect on the entire Army culture, making the buyer-seller relationship between commands more explicit. Cost per unit output accounting is supposed to influence the actions of the buyers by making them aware of the cost of those actions. It is also supposed to influence the suppliers to make the products less costly for the consuming commands. For the producing commands that make up the support infrastructure this implies that they will have to cut their costs or increase their output to lower unit costs. Because all signs point to less demand for the output this means that they will have to cut their costs. To lower unit costs, or even to keep them constant in a declining demand environment the support infrastructure will have to decrease its fixed costs of operation as well as its variable costs. Cutting these fixed costs will require changes in endogenous policy variables.

From a technical costing perspective, cost per unit output will also create difficulties in using historical data. Costs will have to be adjusted to take into account changes such as stock funding of depot reparables, reimbursements for BOS, and fee-per-service for information systems support. At some point these changes might overwhelm attempts to adjust old data in detail. Different methods, perhaps at a higher level of aggregation, will have to be examined.

4. A revolving fund, such as a stock fund, allows an entity providing goods or services to (1) be reimbursed for those goods or services and (2) use those reimbursements to fund its continuing operations.

Transition Issues

Certain issues will be raised as the Army transitions to a smaller force structure and a smaller infrastructure. Analytically it is important to look at these issues because, although the steady state may eventually be feasible, getting there has to be feasible also. Transitional effects can be large, as in our example for depot maintenance described earlier. They can also be long-lasting. For example, if many service personnel retire earlier than expected, or even more so, if personnel that would not normally have been eligible for retirement are allowed to retire, the effects on the demographics of the medical beneficiary population could last for decades.

To some extent, the transition period could be an opportunity to make radical changes in the way the infrastructure operates. For example, if the demand for depot maintenance drops precipitously during the transition period, that could be an opportunity to close government facilities and build up contract maintenance facilities. Whether or not this would be politically feasible (Congress has recently said that at least 60 percent of workload must be accomplished organically) or even desirable from the Army's standpoint, the transition will afford a unique opportunity to do it. Therefore, the desirability of such a change should be analyzed as should other unique transition effects. The possibility of changes such as this again shows the significance of policy variables in determining infrastructure size and mission.

Establishing Resource Relationships

As we have seen, linking changes in force structure to the support infrastructure must be done at a level of detail that is associated with one kind of activity within a command. A crucial cost analysis question is whether or not the accounting system permits identification of costs at that level. If not, proxies may have to be used to develop reasonable cost estimates for each activity.

In this paper, we have taken the first step toward establishing resource relationships between the force structure and the Army support infrastructure – showing what activities within the infrastructure are logically linked to changes in the force structure. To link these activities to the force structure quantitatively, will require the further step of determining fixed and variable costs within each activity. As we have shown, force structure changes often are linked directly only to the variable costs of infrastructure activities. As cost per unit output calculations are made however, the fixed costs of the infrastructure will also need to be reduced if unit costs are not to escalate.

The final step to develop resource relationships for the support infrastructure requires going beyond the linkages to the force structure and understanding what other factors drive those relationships. The pace of modernization, for example, is a factor that drives the resource requirements of parts of AMC. Within the HSC, certain policy decisions will influence what resources are required for that organization. Identifying these factors and quantifying their impact on resource requirements is a challenging, but necessary task. Combined with the linkages and their resource consequences, this final step will provide the Army with a capability to analyze with greater rigor the resource relationships of the Army support infrastructure.

Appendix

TDA Endstrengths (as of end FY92)			
Producing Commands	Military	Civilian	Total
Army Materiel Command (AMC)	6,178	95,368	101,546
Training and Doctrine Command (TRADOC)	50,411	35,642	86,053
Health Services Command (HSC)	29,285	25,454	54,739
Information Systems Command (ISC)	11,791	22,623	34,414
Corps of Engineers (COE)	818	13,647	14,465
Recruiting Command (USAREC)	10,743	1,303	12,046
Intelligence and Security Command (INSCOM)	3,254	1,864	5,118
The Surgeon General (TSG)	1,887	2,563	4,450
Military Traffic Management Command (MTMC)	563	3,157	3,720
Total Army Personnel Command (PERSCOM)	2,009	1,698	3,707
Military Entrance Processing Command (MEPCOM)	1,904	1,578	3,482
United States Military Academy (USMA)	1,074	2,180	3,254
Criminal Investigation Command (CIDC)	1,022	553	1,575
Army Audit Agency (AAA)	7	833	840
Total	120,946	208,463	329,409

TDA Endstrengths (as of end FY92)			
Consuming Commands	Military	Civilian	Total
U.S. Army , Europe (USAREUR)	10,431	71,111	81,542
Forces Command (FORSCOM)	22,084	36,875	58,959
8TH ARMY	2,453	13,339	15,792
U.S. Army Pacific (USARPAC)	2,590	4,784	7,374
U.S. Army Japan (USARJ)	623	3,298	3,921
Military District of Washington (MDW)	1,483	1,854	3,337
U.S. Army South (USARSO)	676	2,304	2,980
Special Operations Forces (SOF)	1,513	810	2,323
Ballistic Missile Defense Command (BMDC)	132	1,333	1,465
Total	41,985	135,708	177,693

TDA Endstrengths (as of end FY92)			
Integrating Commands and other	Military	Civilian	Total
SSA/FOAs	4,092	13,937	18,029
JOINT	4,327	1,381	5,708
DEFENSE	2,832	0	2,832
Chief of Staff of the Army (CSA)	1,167	1,134	2,301
National Guard Bureau (NGB)	1,207	347	1,554
SA JOINT	153	1,152	1,305
Office of the Secretary of the Army (OSA)	326	644	970
Total	14,104	18,595	32,699

Source: Assistant Secretary of the Army (Manpower and Reserve Affairs), The Army Authorization Document System (TADS). Numbers may not agree with those presented in main body from different sources.