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ECONOMICS OF LOGISTIC SUPPORT: AN ANALYSIS
OF POLICY AND THE COST AND PREPAREDNESS
CONTRIBUTIONS OF PREMIUM TRANSPORT
OF MILITARY CARGOES

DISSERTATION
Presented in Partial Fulfillment of the Requirements
for the Degree Doctor of Philosophy in the Graduate
School of The Ohio State University

By
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* * * * * * *

The Ohio State University
1960

Approved by:

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I. INTRODUCTION

A. The Setting

It is generally accepted that the most immediate aspect of the threat the United States faces today is military in character. In response, national policy calls for assuming a military posture inferior to none, of the highest combat readiness, and capable of deployment any time and anywhere. When these demands are placed on the military establishment to be realized out of a defense budget tempered by "what the economy can afford," it is apparent that each dollar managed must be so expended as to return the highest increment of defense per taxpayer dollar. But as with much of public policy the general goals are quite readily agreed to and the issues become the particular efforts in direction, amount, and rate of attainment. However this may be, accompanying the present state of the art in defense are two forces which make such dollar management more difficult yet even more imperative - time in response and the cost of its complexity. This study undertakes to relate these two forces to the specific problem of transport logistics in the nuclear-missile age, a
problem derived in turn from the broader features of the military response to the threat.

The economic and policy implications for logistics are both unique and substantial, for the logistic response is necessarily bound up with the nature of the response itself. It is not merely patterned after — it must be the direct image of that response. Weaponry capable of thousand-mile-per-hour speeds cannot effectively operate when tied to a logistic system month-long in supply and oxcart in delivery speed. Nor are these multi-million dollar weapons maintainable with few and low cost parts and gear.

Because in emphasis the Department of Defense is largely committed to reliance on the constant readiness of the combat air forces in peacetime, it follows that logistic support must be tailored to enable these forces to sustain themselves to a large extent during the initial phase of the general war situation. Derived from this view that the initial phase and the decisive phase of total war are so compressed in time is the philosophy that any substantial build-up phase is precluded; the forces must fight with what they have.

But while the total war situation has received the greatest emphasis in preparation, the argument grows that a general war is not the most likely to be faced.
Military conflicts below the threshold of total war in intensity, equipment, or geography equally require a ready logistic response - the logistic system must be prepared to support any of many kinds of wars.\(^1\) However, while it is clearly in error to say that the same weapons inventory appropriate to the general war situation is appropriate to limited wars, it may be maintained in principle that a logistic system capable of supporting the former can adequately support the latter.

Increasingly logistics has come to possess equal status with strategy and tactics as one of the three sides of the triangle of military defense. A partial explanation is that the growing complexity of military hardware requires a correspondingly higher level and ratio of support than simpler weapons. Thus logistics gives dynamics to tactics and strategy, for the scope, character, and timing of strategic plans and deployment are limited by logistic support capabilities, both initial and follow-on, i.e., resupply. In turn, this provision of the means for the conduct of military

\(^1\)In this connection, it is important to caution that preparation for emergencies not actually realized often appears subsequently as largely wasted effort. Yet it is just this uncertainty in the myriad nature of the military threat that must be reflected in flexibility in system response.
operations finds its root in and grows out of the economic base.

It has been observed that, "The logistic process is at one and the same time, the military element in the nation's economy and the economic element in its military operations." There could be no more appropriate characterization than this of the particular element of the total logistic system that is the subject of this study -- the transportation segment. Analysis of the increasing dependency of military supply support on private contractors and the military's relations with the civil transport industry is very much policy-oriented toward impact on the economy. On the other hand, analysis of the philosophy of premium transport support in terms of time and technology and reduction of inventory is heavily cost-oriented, constituting the economic element in military operations. Together these analyses of Policy and Cost describe and assess the contribution of premium transport of military cargoes to Responsiveness to the military need.

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B. The Hypotheses

The study is based on two central hypotheses, each tied to two sub-hypotheses. The first treats of the WHAT of the economics of logistic support, the second with the HOW.

It is hypothesized that premium transport of military cargoes now makes the critical contribution to cost and preparedness in total logistic response. At a time when the logistic cycle of Requirements, Procurement, Storage, and Distribution (Transport) consumed, let us say, 200 days, a transport pipeline time of 25 days represented only a small part of the total. But if the cycle were cut in areas other than transport to 50 days, the transport segment would assume a very different proportion. Further, if the total were pared to 15 days, a 9-day pipeline attributable to transport would represent an even more critical portion of the cycle (60 per cent). The time utility of the transport segment takes on increasing importance as the more variable functions of the total logistic cycle are reduced.

Corollary to the first hypothesis are the postulates (1) that since technology and the "second blow"\(^3\)

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\(^3\)The "second blow" philosophy and the "nuclear deterrence" concept have come to mean for the United States that it must be in a position militarily to weather
philosophy have made reaction capability (time) the crucial ingredient to defense, much of the transport logistic task must be accomplished pre-D-Day; and (2) that since technology and complexity have made the price of preparedness (cost) so great, high-speed transport logistics must be substituted for stockpiles. The former is the familiar preparedness theme deriving primarily from the instant readiness concept of all-out war and the subsequent logistic lull in the post-attack period. The latter holds that to modern weaponry, technology has given an obsolescence rate and complexity a unit cost which call for a savings trade-off between inventory and transport. This is to suggest that if transport pipeline time is halved on a stocked item, only half as many may need to be bought to give the same flow of support at the using end.

It is further hypothesized that the nature of the logistic response to the military threat poses unique and substantial issues for public policy in military-industry relations both in transport and manufacture. Since logistics provides the vehicle for the interplay of forces between the military and the economy, it is not surprising that the fulcrum of these forces might

an all-out nuclear strike to the extent of having enough capability remaining to deliver a retaliatory blow of a destructiveness unacceptable to the attacker.
be found to shift from time to time. It has in fact, however, by circumstance and design, become a one-directional shift. Thus the corollary postulates (1) that military preparedness support is being integrated with industry to an extent heretofore not experienced and (2) that the organization and policy for the military use of transport resources are oriented toward "business" economies with lesser concern for military responsiveness. Two quotations elucidate these last postulates. Writing to the first, Walter Millis in *Arms and Men* speaks of the 1950's,

> The Department of Defense had become without question the biggest industrial management operation in the world; the great private operations, like General Motors, du Pont, the leading airplane manufacturers, which the government had evoked to assist it, had assumed positions of monopoly power which, however unavoidable, at least seemed to raise new questions as to the legal and constitutional organization of the state.4

To the second, Admiral Eccles in *Logistics in the National Defense* remarks of organization and readiness,

> There has been a tendency to subordinate the basic principles of the military arts to the terminology and practice of a business world in which the basic criteria are quite different from the criteria of military excellence, or even of success in combat operations.5

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C. Scope, Method, and Sources

There is steady growth in the literature of logistics. Moreover, there is growing recognition that economics and economic analysis "apply here, too," as indicated by the appearance of articles in the various economic journals.\(^6\) However, there has been a relative dearth of published analyses of the particular contribution of premium transportation to preparedness and the economics of logistic support. There has been slight treatment of the actualities of transfer, both conceptually and substantively, of the principles of transportation to the economics of defense. It is with these areas that the present study is concerned.

It takes the current and anticipated spectrum of military threats as the given setting, and thus its time period is NOW with historical development limited to post World War II. Analysis is made of the logistic response as derived from the nature of those threats and runs in terms of philosophy, economics, and policy.

Inasmuch as national defense posture is largely committed to air power, much of the study is devoted to its logistic demands. This requires intensive

\(^6\)Included here are the professional journals of the caliber of the *American Economic Review*, *Econometrica*, *Quarterly Journal of Economics*, and the *Harvard Business Review*. 
analysis of Department of Defense and Department of the Air Force policy and practice with relatively less attention to those of the Departments of Army and Navy. It further requires most concern for the area of air logistic support, though "premium transport" is here considered to mean all high-speed transport (including expedited surface transport) and thus is not limited to air.

The study moves inductively from the military-technological setting and the requirements dictated thereby, to structure and explain the broader time-cost principles that are operative.\footnote{Chapters II and III.} It proceeds deductively from the general philosophy of military and military-civil relations (and resulting policy) as applied to transport to practice and assessment of particular responsiveness.\footnote{Chapters IV, V, and VI.} A critical appraisal is made of what is and some policy suggestions are offered toward what ought.

A portion of the data is derived from the published works in the areas of logistics and transport. These provide the setting in which the military logistic activity takes place. In addition to the economic journals already mentioned, some "facts and figures"
have been gleaned from perusal of the "trade" journals, e.g., Aviation Week, Aeronautical Engineering Review, Armed Forces Management, and Purchasing.

Public documents in the form of Congressional Hearings and Department of Defense directives, memoranda, and reports have been drawn on heavily in getting at the policies which describe the dimensions of transport logistics. The economic-political analysis of the implications of these policies for defense posture and industry contentment comes mainly from these documents.

The statistics and data for the economics of current transport logistics are largely gathered from published and unpublished documents and papers of the Air Materiel Command Headquarters, Wright-Patterson Air Force Base, Ohio. In addition Pentagon visits have supplied raw materials for this aspect of the study.

It seems not inappropriate to mention that the writer's present military status and previous assignment at the Air Materiel Command Headquarters have afforded unusual opportunity for access to policy papers and decision-making which presently comprise a large part of transport logistics.

Besides setting, policy, and economics, there remains a final element -- philosophy. It is an ever-present danger that the technical aspects of a
discipline may become so overwhelming and complex as to obscure the underlying theories and principles that are operative. A conscious and continuous effort is made to identify and subject to critical analysis these strands of philosophy and concept.
II. TIME AND LOGISTIC SUPPORT — A DERIVED RESPONSE TO THE MILITARY THREAT

A. The Image

It has been stated that, "Military strategy and tactics are based on a nation's ability to concentrate men and munitions at points where they are needed and when they are needed." To this must be added, "in the amounts needed." This is merely the military application of time and place utility through transport with the recognition that command flexibility and mobility of the combat forces is dictated by flexibility and mobility of logistic support. Accounts of the supply limitation to the progress of Allied Forces after the Normandy invasion bear out this axiom. But this kind of operational logistics with its tactical immediacy is fairly easy to understand. It is more difficult to appreciate the implications of strategical logistics, for it is longer in point of time, broader in context, "peacetime" in conception, and rests upon the over-all readiness of forces for sustained combat operations in emergency.

Technology having produced weapons approaching total destructiveness and weapon delivery systems measured in scant hours to target, strategic doctrine accommodates to the attendant implications. Thus to the all-out nuclear threat, a prevailing military response of massive retaliation imparts a particular character to the logistic posture. Under dominant doctrine (1) that every day might be D-Day and (2) that the United States will act on a "second-blow" philosophy, it follows that much of the logistic task must be accomplished pre-D-Day.

The combat forces must largely fight with what is "on hand" and be prepared initially to sustain themselves. The implications of this doctrine, it is suggested, give rise to some paradoxes in air transport policy.\(^{10}\)

It would appear that commitment to the foregoing thesis precludes any concept of mobilization. Surely it does imply an obsolescence to mobilization in traditional terms of build-up periods with the diversion and amassing of men and materials and in expectation of limited duration; it does revert to a "hard core" view of defense. A modified meaning of mobilization is, in fact, the key ingredient to the thesis, but it

\(^{10}\)These are discussed in Chapter VI.
is so in an *ex ante* rather than in an *ex post* sense. This is to say that even though the character and timing of mobilization may be altered, it still plays its role, for it permits a high pitch of military industrial preparedness *in advance* of an outbreak of hostilities. Furthermore, if defenses should be developed which would render the initial attack indecisive, continued effective logistic support of the military forces in the post-attack period would be possible and imperative in view of the probable disruption to the economy. Finally, it can be said that in the case of limited war situations the more traditional view of mobilization again takes on validity, for here there is time to respond. Interestingly, this comes very close to suggesting a paradox that appropriate mobilization may be limited for general war and general for limited war.

Because an economy and a military establishment probably cannot operate continuously at a full mobilization level in peacetime, a level must be selected, short of the maximum, which will provide an acceptable degree of defense preparedness in the event of an all-out attack. This requires a retaliatory capability devoid of any mobilization support in the initial period of a nuclear exchange. This eventuality, then, means limited mobilization before the fact. On the other hand
a limited conflict of the Korea type allows time for a mobilization of whatever level is desired. This can mean general mobilization after the fact.

Increasingly strategic doctrine is being called on to comprehend military actions short of general war, encompassing limited nuclear and conventional war and even aggressive probes below the threshold of actual conflict but requiring deployment of force. These kinds of threats and their accompanying military responses are reflected in logistic demands. The Rockefeller Report II concludes on this point,

It is therefore imperative that in addition to our retaliatory force, we develop units which can intervene rapidly and which are able to make their power felt with discrimination and versatility. For this task we require modern sea lift and an airlift capacity we do not now possess.\footnote{11}

For the purposes of this study the issue is not whether or not there is available enough airlift and modern sea lift to support limited war: the official view of the Joint Chiefs of Staff is that the possible deficiencies of the transport fleet present an acceptable

calculated risk.\footnote{Four of the five Joint Chiefs of Staff members agree on this point. Testimony of the Chairman of the Joint Chiefs of Staff, House Subcommittee on Department of Defense appropriations, \textit{Hearings, Department of Defense Appropriations for 1960}, Part I, p. 101. For a good discussion and analysis of limited war logistic capability and cargo calculation, Major Hiram C. Caroom, "Management Responsibilities and National Defense Interests: An Analysis of the practicability of the U.S.-flag international passenger airlines' transporting more military traffic in peace and war" (unpublished Ph.D. dissertation, Graduate School of Business Administration, Harvard University), pp. 107-13.} The point made here is that all sides agree that military situations of less than total war also demand a logistic reaction capability of high speed and flexible transport -- a system in-being and on call.

Such a view of several possible wars suggests two further related ingredients to the logistic system, vulnerability and dispersal. Because concentration makes for vulnerability, the combat forces prepared for general war are presently being dispersed, which means more bases (though fewer air vehicles per base), hence more transport supply. In the case of limited war and possible deployment to remote areas of the world (the same effect as dispersal, though heightened by uncertainty as to location), the resupply requirements again compound the transport task. Finally, the logistic force itself has some degree of vulnerability and may
require dispersal or even hardened installations. It might even be proposed that a portion of the air fleet, for example, be kept aloft to insure its survival. The transport fleet -- crucial to the combat forces -- must itself be supported and protected at a constant readiness level if it is to perform to the fullest.

B. Time in Transport

It can be said of transportation that it is a means toward an end, and hence a derived demand from the nature of the transactions to be carried on. Surely in the case of military requirements the only effective combat items are those which through transport are placed or able to be placed in the hands of the combat forces when and where needed. All other items -- however large the "pile" -- are irrelevant to the combat issue.

This causal connection can as well be stated in reverse, i.e., the nature of the transportation services available dictates the character of transactions carried on. Thus the existence of a global air transport net, for example, has a very real effect on the kind, quantity and value of the resupply transactions of military operations. Here the dimensions of weight and distance

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13Hardened installations are those sites with structural facilities designed to protect from destruction equipment harbored there.
do not provide an accurate measure of transport service, for transportation takes place through time as well as space. Moreover, while availability, reliability, and cost factors are clearly elements of transport, speed is in fact the critical one and does have economic significance. To the military this criticalness and significance is focused in the "pipeline" concept, or more specifically for our purposes in the transport segment of the pipeline.\footnote{Hi-Valu Lo-Valu, The Selective Management of Air Force Materiel, Report No. 7, 1957 (Wright-Patterson Air Force Base, Ohio: USAF Spares Study Group, 1957), p. 2.} Writing to both the cause and consequence of logistic responsiveness, General E. W. Rawlings, Commander, Air Materiel Command states,

\begin{quote}
We must have logistics which can provide, with the resources available, worldwide support as fast and as flexible as the new weapons and strategies of our air-atomic era... Our primary aim is to reduce the logistical pipeline... both the time lapse required for delivery of support to the combat units and the amount of costly materials required to fill the shortened pipelines.\footnote{The "logistic pipeline" involves the flow of materials from a source to user and tied to time through measurement of the lapse from the initiation of a requirement to its delivered satisfaction.}
\end{quote}

Pipeline time or time in transit must be considered a period of suspended satisfactions in terms of defense. This lag in the connection of production with consumption is applicable whether the movement is of materiel or men,
and failure of transport to keep pace with either production or consumption creates substantial problems. For the pipeline flow of supplies does not respond as water through a faucet; rather there is operative a logistic momentum. This is to say that both the amount and the rate of support must be appropriate to the using end of the line. The flow must at once be geared to a level of support adequate for constant readiness in peacetime, and at the same time be capable of rapid expansion lest the surge to the wartime situation find the system technically or organizationally deficient. In economic terms this is analogous to the twofold relationship of the time factor and commodity movements to the market in that, (1) the quality of perishability, i.e., facing of a given market for a limited time is comparable to the advent and subsequent demands of a force emergency, and (2) the size of the market, comparable to the magnitude of the emergency, dictates the amount and rate of flow to it.

What then are the sources of gain from increased speed of transport? Realizing that these gains may be equally applicable to the market situation, the concern
here is to set them out in a military context. First, is the reduction of inventories and prepositioned stocks. The practice of hand-to-mouth buying is based on the ability to replenish stocks rapidly as needed through the availability of high-speed transport service. The Air Force has thus committed its most important arms, the Strategic Air Command world-wide and the Air Defense Command domestically to logistic support through an air pipeline. Direct air supply to overseas units is now accomplished under a time standard of seven days, and daily scheduled airlift into Zone of Interior SAC and ADC bases looks to instant readiness through a two day pipeline time. Since the inception of the domestic air pipeline, both Commands have seen their all-important AOCP rates (Aircraft-Out-of-Commission-Due-Parts) substantially reduced, attesting to the effectiveness of the system. Furthermore, this air logistics net, by


17 Using specific examples, reductions are priced out in dollar terms in Chapter III.

18 In unreleased testimony before the House Appropriations Committee, FY 1959, Brigadier General George E. Keeler, Jr., Deputy Director of Supply, Air Materiel Command, cited as examples one SAC unit experiencing a reduction in AOCP rate from 17 per cent to 2 per cent and another from 7 per cent to 2 per cent.
permitting direct support of our principal weapons, has enabled the gradual phasing down of costly overseas depots. This program is proceeding both in the Far East and European areas under the name of the Improved Logistics Program. Similarly, consolidation and phase-down of domestic depots is taking place.

A second gain is the *reduction of capital frozen in transit*. A paring of the pipeline time itself reduces the quantity of support items that are out-of-service at any one time, that is, in the stream enroute. Likewise, the away-from-station time of personnel is reduced by moving military personnel (and dependents) by air. Present Air Force policy prescribes air transport as the normal mode for such travel, and the other Services may follow this lead.

*Reduction in distribution time* to ultimate destination can be cited as a third gain. Here the concepts of "point to point" and "source to user" airlift may be appropriately introduced. The former describes the bulk of present air cargo military traffic and may be defined as airlift from point A to point C, but involving reworking and transfer of cargoes at point B enroute. This is typified by the movement of cargo by domestic air to the Aerial Ports of Embarkation on both coasts, there to be rehandled and airlifted overseas to final
destination. Source to user airlift, on the other hand, comprises a single air movement from point of origin (producer) to the using installation (consumer). Increasingly, secret cargo, cargo of high sensitivity, and high priority cargo, for example, are found to move direct by air from the point of manufacture to the military customer site.

The fourth area of gain through speed is corollary to, but separate from, the preceding: it is the **widening of the sources of supply**. Here again point to point and source to user airlift principles and practice apply, for rather than a deepening of sources, the flexibility of air transport enables a geographic broadening of suppliers. Fifthly, and at the other end, high-speed transport permits an **increased mobility of the consumer** as summed in the following quoted testimony,

"Coupled with the increase in operational combat readiness of our Air Force units and the reduction of stocks in our overseas depots, the mobility of our combat units has been increased. We now have a flexible resupply line that can be immediately bent to a site of squadron dispersal or deployment. Sustained operation from a distant and minimum facility air field during the decisive phase of an all-out war is now possible."

Here the economists' problem of treating quantifiably the differing characteristics of goods and of services

comes into focus. For while ton-miles or passenger-miles may constitute the product of the transport agencies, it is not accurate to say that different speeds merely represent different rates of production. Rather they represent different products in that there is a qualitative difference between high-speed and low-speed transport, a difference in kind which is distinct from the effect on volume. The difference turns on a distinction in use which allows the satisfaction of demands that are new in character and not merely matters of degree.

Still, as with conventional transportation economics, the demand for speed is not absolute. Even in defense terms, it becomes more elastic at the higher speeds as support requirements are met, i.e., increases in speed of delivery at high levels give readiness returns diminishing as additional speeds are reached. Within considerable bounds, then, the value of speed in transport increases directly with the value of time, but there is a ceiling to time-saving relative to the importance of that additional saving. This principle

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20High-speed or premium transport is again considered to mean principally air transport, but includes also surface modes where expedited service arrangements are provided.
may take on particular significance as ballistic missiles rapidly become a major part of the military arsenal.

Missiles require a support system tailored to the peculiar problems posed by their technical characteristics and planned employment, for optimum mission performance must be built into them and constantly maintained at reliable levels. The logistic responsibility continues to the count-down when the missile is fired on its one-time flight. But it is just this last which may make missile support demands (after the phasing-in period) elastic to speed at the higher levels. That is to say, since the air vehicles are not practice launched there is not the same kind of wear-out rate and repair problem that faces manned aircraft -- rather they must merely be hyper-maintained. What is called for is a one-shot reliable firing, and it seems unlikely that transport support having once enabled this, makes a further comparable contribution.

21 The Air Force takes notice of this in The USAF Ballistic Missiles Logistics Program (Wright-Patterson Air Force Base, Ohio: USAF Spares Study Group, July, 1958), p. 2, in stating, "The logistical responsibility where these weapons are concerned encompasses a much greater period in the total life of the weapon than is the case with manned aircraft." Of obvious significance, too, is the fact that, unlike manned aircraft, missiles possess no inherent transport capability and must be transported from the manufacturer to the operational unit by external transportation sources.
at a still higher speed level. There is little to be gained by being able to launch the missiles "twice-over."

Testimony to this point may be evidenced by the fact that present transport policy, while establishing airlift as the normal mode for the complete missile and initial spares in movement overseas, calls for resupply spares and follow-on support to go either air or surface as operational needs dictate. Within the continental United States either air or surface is used according to pipeline factors and delivery dates.

C. Defense Air Commitment

The Air Force has propounded an air commitment equation in the following terms:

Airlift plus automation equals fast and flexible air logistics. That is the new equation which is at last emerging from our efforts of the past decade to create a global logistics system geared to the speeds of modern air weapons and to the strategy of the jet-atomic age.22

The statement pleads again the case that the inherent mobility of air power can be hamstrung by lack of a compatible logistic formula. Airlift has been viewed as the first vital element of that formula; automation must be viewed as the second, for the transmitting and

processing of paperwork and processing of the material itself not unusually consume three fourths of the support cycle. Thus to achieve the maximum in system response all known accelerators are being applied to this portion of the cycle. Chief among these is an advanced Electronic Data Processing System which is being integrated into the logistic system, linking by high-speed transceiver communications the operational units, depots, and contractor storage sites. This system permits a degree of management of requirements and materiel not heretofore possible and contributes much to the ability to respond quickly in both the routine and the unusual situations.
III. COST AND LOGISTIC SUPPORT

A. Cost Pressures

The cost pressures of logistic support are steadily upward. Not only are military procurements subject to the same inflationary price changes as consumer spending, but more importantly they must suffer the effects of increasing complexity and developing technology which together result in the high initial cost of modern weaponry and the high rate of its obsolescence. The per pound flyaway cost of a modern B-52 weighing 83 tons is commonly cited as three times that of the per pound cost of silver.\(^2^3\) The causes of these growing pressures are several.\(^2^4\) The required weapon performance at fantastically increased speeds has, for example, called for intricate electronic armament systems and elaborate navigational equipment accurate within minute tolerances both pushing unit costs up.


Moreover, with the present complexity of the art such equipment tends to fail more frequently - and erratically - than the less failure-prone predominantly mechanical equipment of the older aircraft. The degree of commonality of parts among weapons is fast approaching zero, and thus the benefits of common use of costly spares is rapidly disappearing. Similarly the diversity of weapons of varying design requires a diversity of support that must include expensive insurance items, i.e., items subject to accidental or unpredictable damage or wear-out, which in most cases would support a large number of weapons as well as a small number.

Rapid technological change makes for high obsolescence costs and thus shorter weapon life, especially at the time of phasing-in of new weapons. Frequent modifications and design instability in the early stages mean maintenance skill and procurement complications in support, and this may increasingly become a cost concern with successive and varied generations of missiles. It normally means less efficient operation, more frequent failure, and increased quantities of support.

Finally, changing war plans and strategic requirements substantially effect the cost of logistic support. Clearly the average cost of maintenance and support is less where there is a large volume of activity at a
single location, e.g., large numbers of similar weapons concentrated at each installation. But the dictate of modern warfare is dispersal of weapons, and thus support equipment and spares must be dispersed with the maintenance operation, again tending toward higher costs.

Economic analysis provides some alternative solutions to the problem of cost and logistic support. Given a level of indifference in terms of equal combat effectiveness there are "trade-offs" which can be made between buying many weapons and supporting them (maintenance, repair, transport resupply) at a low level and buying few items and supporting them at a high level. The decision of the Department of the Air Force is clear on this point, as evidenced by the Air Materiel Command view,

The high cost and rapid rate of obsolescence of modern air materiel forbid, in the long alert ahead of us, the practice of worldwide stockpiling which carried us through the last war. For stockpiling we must substitute a flexible mobility that will allow us to focus quickly an effective stream of our limited materiel support upon any given area of operations.\(^{25}\)

The logistician's problem is not strictly one of policy, of course, but rather an inventory problem of which and what quantities of items to stock in anticipation of future demand: it is a striking of the balance between

\(^{25}\text{Rawlings, op. cit., p. 25.}\)
overstocking and understocking. In the extreme it is the choice, with a limited budget, of buying a part that may never be used or of not buying it and having a weapon out of commission on that account.

The usefulness of economic analysis to treatment of the inventory problem is increasingly recognized. As cases in point Dvoretzky, Kiefer, and Wolfowitz have approached the problems of known and unknown distribution of demand using chance variables and distribution functions. They propose in outline a method for deriving optimal rules of inventory policy in both static and dynamic models. They use "net utility" as the quantity the policymaker seeks to maximize (where the policymaker is the holder of inventories). Then if net utility to any policymaker is a random variable depending on certain conditions some of which can be controlled (e.g., rules of action and strategies), and others which cannot (e.g., those conditions generally defined by joint probability distribution), rational policy consists of fixing the controlled conditions so as to maximize the expected value of net utility, given the probability distribution of the noncontrolled

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conditions. The authors allow only the rate of demand for the policymakers' product to be a noncontrolled random, other noncontrolled conditions being held either constant or in constant relation to one another.

More recently Fred S. Hoffman in the article "The Economic Analysis of Defense: Choice Without Markets" includes a thesis of suboptimization as the operations research analogue of partial equilibrium analysis in economics. It comprises a conceptual framework useful in logistical problems where, for example, specific objectives are to be maximized in terms of inputs.

B. Practice

What, then, of policy and practice during this period where the mix of weapons has become more expensive to support in a unit cost sense? In the Air Force instance - the Department of Defense chief procurer and our main concern - the total cost of support has not in fact increased while supporting almost the same number of flying hours per year. The trend in dollars provided for aircraft initial-replenishment spares has been steadily downward from $1.58 billion in FY 56 to

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$0.96 billion in FY 60 and now may be expected to level off.\(^{28}\) Within these figures it is significant to point out (1) that expenditures on _initial_ spares has dropped from $1.28 billion in FY 56 to $0.36 billion in FY 60, and (2) that expenditures on _replenishment_ spares has increased from $0.31 billion to $0.60 billion over the same period.\(^{29}\) This reflects changes in procurement philosophy to be discussed below. The key instruments for controlling the cost of logistic support have come to be the selective management of materiel, procurement innovations, and the substitution of high-speed transportation for inventories and stockpiles.

Since 1952 the Department of Defense has been turning more and more toward applying scientific supply management techniques in order to minimize its logistic support costs.\(^{30}\) The three services have, however,

\(^{28}\)Spares Study Group, Report No. 9, _op. cit._, p. 9. In comparing flying hour trends with spares funding trends it is reported that the 1959 flying hour program is approximately 89 per cent of the 1956 program while the spares funds provided for 1959 amount to only 66 per cent of the 1956 base.

\(^{29}\)Ibid. "Initial spares" are those parts procured originally with the item of which they are components: "replenishment spares" are those parts procured subsequently.

operated under differing philosophies of inventory management. The Army employs a system based on the number of demands for an item of supply over a specific time period. The Navy too bases its system on rate of turnover, but is more recently coming to a system closer to that of the Air Force.  

The Air Force has instituted the most advanced of supply systems with a program designed for the selective management of materiel in support of aircraft and missiles. Within its more than one million separate items of inventory the Air Force has established two main categories of items for management purposes consisting of "diamonds and popcorn."  

The "diamonds" are items of significant value from the standpoint of cost ($500 or more) or mission importance which justify extra care and attention. The tremendous importance of this classification is seen


32The difficulty of supporting modern weapons effectively and economically in peacetime is obvious where the number of different items in the Air Force catalogue now totals 1.5 million and increases at about 400-500 items per day.

when we note that while less than 1-1/2 per cent of the items of inventory are in this group, those items represent in value approximately one half of the dollar inventory on Air Force shelves. These are the "Hi-Valu" items. The "popcorn" are those items of $10 or less unit cost, amounting to some 885,000 in number, but where the problem is more one of time and management effort involved than dollar value of inventory. The philosophy here is to buy liberally but economically and simplify management controls. Our interest is primarily with the "diamonds."

The Air Force-wide Hi-Valu program, now eight years old, calls for buying a minimum of high value items, then maintaining a strict control over transportation, stockage, issuance and repair until the item is obsolete or ready for discard. In essence the object is to tailor the degree of management effort applied to Air Force materiel to the value of the actual items; the philosophy is one of allocating expenditure of efforts and resources

34Ibid. Principal types of commodities involved are aircraft spare parts, aircraft accessories, aircraft instruments, complete aircraft engines, engines, engine spare parts, airborne electronic components and spare parts, airborne photographic equipment, guided aircraft rocket parts, guided missile parts, ground communication components and parts.

35Ibid.
according to the relative value of the results to be achieved.

This "diamonds' side of the program requires the closest working relationships between the Air Force and the contractor, for both the quantity bought and the rate of buying determine the savings to be had from the system. This approach of phased procurement has been one of the most significant facets of the program. The attempt here is to minimize the initial investment of funds by delaying procurement until more and better operational data are available and programs and designs have become more stabilized.^{36} This becomes particularly important with the introduction of new weapons with their high obsolescence rates into the inventory and the attendant need for initial provisioning of spare parts.

Deferred procurement has not meant "no procurement," but rather "later procurement" phased according to need. During this waiting period item requirements are carefully watched and controlled making for more accurate later procurement. In the case of Boeing Aircraft Company the two years experience 1955-1957 showed some $92 million worth of changes to B-52 spares

^{36}Spares Study Group, Report No. 7, op. cit., p. xi.
requirements over earlier prediction -- $10 million increase and $82 decrease.\textsuperscript{37}

Postponed procurement action does, of course, run some risks of being out-of-stock as unexpected demands on the system occur. The answer to this is now found through the policy of increasing the manufacturer's responsiveness to Air Force needs. This is accomplished by providing "buffer" stocks of raw materials or semi-fabricated parts at the contractor's plant through a token buy. Thus as unpredicted demands for spares arise, response is quickly made from either the contractor's production line or his "bins" of semi-fabricated stocks. In some instances the Air Force has found that a token investment of 8 per cent in raw materials has been sufficient to defer the balance of 92 per cent of the cost approximately half the normal lead time, allowing for optimum use of experience data.\textsuperscript{38}

The effectiveness of the Hi-Valu supply program has been demonstrated. For example, the impact of this newer thinking on the total spares expenditures for the F-101 aircraft as compared to the F-89 aircraft provisioned under pre-Hi-Valu practices is quite significant. Had the same level of spares provisioned for the latter been provisioned for the former, the cost of F-101 spares

\textsuperscript{37}Ibid., p. 28. \textsuperscript{38}Ibid., p. 33.
would have been $43 million more than was actually spent. This means that F-101 spares were provisioned at about 60 per cent of the F-89 level.\(^{39}\)

It is timely that these selective management developments are available for application to ballistic missiles from the start. In particular the necessary heavy investment in missile support will be tempered by the Hi-Valu techniques, for its philosophy is being incorporated in the Ballistic Missiles Logistics Program.\(^{40}\) Provisioning policies for minimum spares build-up during the period of configuration instability include a reduced procurement cycle, minimum essential system stocks, and incremental procurement and production. Criteria for selection of a ballistic missile item for Hi-Valu control is dropped to a minimum unit cost of $200 or more, and thus it is expected that about 3 per cent of the items will represent 50 per cent of the dollar expenditures.\(^{41}\) Clearly the application of Hi-Valu concepts to missile logistics can be expected to yield substantial returns, for in FY 1961 Air Force procurement

\(^{39}\)Ibid., p. 55.  
\(^{40}\)Ibid., p. 1.  
funds devoted to missile systems equals four fifths of the manned aircraft investment. 42

Though the Hi-Valu program and the policy of "short buy" procurement have made major contributions toward control of the cost of complexity, they have placed correspondingly high demands on the delivery portion of the logistic cycle -- a premium on speed in transport. The previous chapter treated pipeline time per se. Here the relation of high-speed transportation to the support program is seen in the relation of quantities to time -- repair time, processing time, lead time, transport time. The more rapidly that these functions can be accomplished the more frequently the same item may be used to satisfy new demands. Since for a substantial portion of any item's life it is not available for use, being repaired, processed, or in transport, it follows that if total time could be reduced, say by 50 per cent, then in simple terms it means that this item can be used to replace failed items twice as frequently. Thus by reducing these time elements the total quantity (cost) of spare items needed for support is reduced.

The transportation segment of this total out-of-service time (pipeline time) has been the area subject

to particularly fruitful efforts at reduction. By utilizing high-speed transportation, principally air, for those items whose mission and monetary worth warrant it, costs have been reduced and reaction time improved. A hypothetical example illustrates that Hi-Speed transportation "makes sense" in terms of reduced quantities of inactive equipment tied up in the pipeline.\textsuperscript{43}

The Air Force has estimated the value of Hi-Valu shipments per day to be $3.69 million for the Zone of Interior (ZI) and $.41 million for overseas. Using the standard of 30 days Conventional and 8 days Hi-Speed pipeline for the ZI and 124 days and 32 days respectively for overseas (O/S) the following comparison can be made:

<table>
<thead>
<tr>
<th></th>
<th>CONVENTIONAL</th>
<th></th>
<th>HI-SPEED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total days pipeline ZI</td>
<td>30</td>
<td>Rate of shipment/day</td>
<td>$3.69 million</td>
</tr>
<tr>
<td>Total days pipeline O/S</td>
<td>124</td>
<td>Rate of shipment/day</td>
<td>$.41 million</td>
</tr>
<tr>
<td>Value of items in ZI pipeline</td>
<td>$110.7 million</td>
<td>$50.8 million</td>
<td></td>
</tr>
<tr>
<td>Value of items in O/S pipeline</td>
<td>$50.8 million</td>
<td>$13.1 million</td>
<td></td>
</tr>
<tr>
<td>Total dollar value of Conventional pipeline stock</td>
<td>$161.5 million</td>
<td>$42.6 million</td>
<td></td>
</tr>
</tbody>
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\textsuperscript{43}This example was extracted from Spares Study Group, Report No. 8, \textit{op. cit.}, p. II-45.
The difference in cost then between filling a conventional pipeline with Hi-Valu items and filling a Hi-Speed pipeline amounts to about $119 million.

The impressive showing of Air Force selective management procedures has recently led the Department of the Navy to initiate a similar program labeled Hi-Pri (High Price).\textsuperscript{44} It embodied the Hi-Valu philosophy and is applied mainly to naval aviation items. Previously it has not classified its item support by importance (or value) but rather by demand turnover. The problem here is that not all demands are of the same criticalness, so that hypothetically a support force might show a 90 per cent gross effectiveness in terms of numbers of supply requests filled but a much lesser combat fleet effectiveness because of the item importance of the remaining 10 per cent of unfilled orders.

Here again the logistic support choices are economic in character. As pointed out in a Navy publication, it may take 2000 men and 10 ships in a mobile support force to fill 85 per cent of the requisition of

\textsuperscript{44}From personal correspondence dated July 22, 1960, and interviews with John D. Maloney, Transportation Representative to the Air Force Spares Study Group, Wright-Patterson Air Force Base, Ohio, it was learned that selective management procedures were adopted by the Aviation Supply Office of the Navy after Air Force Hi-Valu briefings in 1957. Also, the Army Transportation Supply and Maintenance Command received similar briefings in 1959.
a combat fleet and 4000 men and 20 ships to raise the
level of support to 95 per cent.\textsuperscript{45} The economic ques-
tion then becomes whether the commander would be wiser
to accept the lower support level and devote the extra
resources elsewhere or insist on the higher support
level and experience the heavy opportunity cost attendant
thereto. Future naval logistic measures may well en-
tail a combination of self-contained support and aerial
resupply in the continuing effort to avoid reliance on
fixed installations.

The Department of the Army is making limited ap-
plication of selective management principles to its
helicopters and liaison aircraft, but are generally
moving toward a cost-oriented support philosophy.\textsuperscript{46} In
addition the Royal Air Force is studying the Hi-Valu
program, and in early 1960 the North Atlantic Treaty
Organization received an Air Force briefing on its
procedures. Thus while savings from selective manage-
ment of materiel will likely level off for the Depart-
ment of the Air Force, very substantial support
economies may yet be realized by the total military
establishment.

\textsuperscript{45}J. C. Busby, Commander USN, "Refinements in
Mobile Support," U.S. Naval Institute Proceedings,

\textsuperscript{46}Maloney, op. cit.
C. Implications

It is fairly clear that the trend of the military, especially the Air Force, is increasingly toward the concept of direct support -- of tying the contractor ever closer to the user. The Air Materiel Command is well committed to a program which ties individual aircraft and missile firms into a world-wide communication system from combat installation to industrial plant in the interest of close logistical support.47 Prime contractors of the major weapon systems and manufacturers of the vital components are joined together both in hardware and in information.48 In sum there has taken place an integration of industry into the military’s logistic complex on a scale and to a degree not heretofore experienced in peacetime. Moreover, in view of the close support required, it is likely that the missile era will intensify this integration.

Presently the Air Force buys the Thor missile, for example, delivered and erected on site, that is

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to say takes ownership of the weapon in a "package procurement." This is a significant departure in terms of control from buying a machine gun, let's say, and accepting it at the manufacturer's plant. The significance lies in the fact that, in the former case, integration with the private contractor involves delegation of responsibility in anticipation of efficiencies in the accomplishment of the logistic support task. Such a policy may give the best results in terms of efficiency and at the same time be the line of least resistance.

But there are involved in this alignment very formidable "costs," no less real for their elusiveness to ready recognition or orderly quantification. These are the diseconomies of integration and are properly assignable as social costs. They are twofold: (1) an erosion of public (military) responsibility through the gradual abdication of defense support authority to private industry without commensurate delegation of defense support accountability; and (2) by way of current military procurement programs, the fostering of industrial concentration patterns in conflict with other government policies. It may have been to the former that Walter Millis was addressing himself in Arms and Men in writing of our mid-1950's
military posture, "We had created huge industrial complexes almost wholly dependent on government contract but beyond much effective government regulation."\(^{49}\)

In treating civilian versus military decision-making it is common to view the combat aspect as more properly the province of the military and the support activities as more normally that of the civilian side. The streams of influence, military and civilian, are not fixed, however, and have come to vary in force from time to time. Decision-making on the fighting aspect might fairly be presented in the following conceptual spectrum with civilian influences flowing from right to left and probably not dominating military influences beyond the Department of Defense.

<table>
<thead>
<tr>
<th>Military</th>
<th>Military/Civilian</th>
<th>Civilian/Military</th>
<th>Civilian</th>
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<tr>
<td>X--------</td>
<td>X-----------------</td>
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<td>X--------</td>
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Combatt Decision-making Service Decision-making DOD Decision-making Final Decision-making

A similar spectrum on the support side might well appear quite differently in the balance of civilian and military decision-making.

\(^{49}\)Millis, op. cit., p. 321.
Here civilian influence - in fact private industry - "enters early and stays late" in the process and, if the spectrum has validity, is increasingly pressing in on the tactical commander under present defense logistical policy. The point is that it may not be too far-fetched to contemplate a situation where Eli Lilly or Merck & Company representatives, for example, may be called upon to support - even to employ - unconventional chemical weapons in an operation, responsibility for the success of which is charged traditionally and constitutionally to the military.

Of the $46 billion Department of Defense budget proposed for FY 61 about $19 billion is asked for aircraft, missiles, ships, electronics and other hard goods. Furthermore, of this latter figure approximately half ($9 billion) is destined for aircraft and missiles -- which in fact tend to be the same firms. Such a defense budget which takes a substantial part of the product of whole industries carries in its expenditure a vast power to shape the pattern of the

economy. Writing to this point Walton Hamilton in The Politics of Industry asserts,

The Department of Defense, for reasons which in military terms may be sound, prefers to deal with the few rather than the many and to place orders with single concerns for large quantities of materiel. This does not mean that the independents are excluded from Government procurement. They are free to accept such orders as are passed along to them by the primary contractors. So for such a market they must look for orders, not to the Department of Defense, but to the dominant firms in their own or kindred industries. Such a program of procurement sets the stage for the honorable company to extend its dominion far beyond the productive facilities which it owns.

Thus the prime contractor, for example, can wield a dual economic power in deciding with what firms it shall join as part of the "ins" and which it will exclude to become or remain those of the "outs." In the former case there is very real question whether such integration of facilities and information on the part of participating companies for the instant case is compatible with competition of undiminished vigor in their concurrent and subsequent relationships. In the latter it has not normally been public policy to be party to the opportunity of one firm "disciplining" or otherwise exercising preferential or prejudicial

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treatment in its relations with another. Hamilton concludes,

The result is that the largest aggregate of purchasing power in the country is employed as an instrument for the concentration, rather than the diffusion, of economic wealth and power. The size of an order in itself determines what firms and how many can bid... The purchasing program by the Department of Defense is subject to no adequate review to insure that it reflects other than purely military values. And no machinery exists by which the activities of the armed forces are brought into accord with the general lines of public policy.52

There is no suggestion that the defense posture of the country be slackened or otherwise impaired. The point is that an economy which in peacetime is geared to hostile attack carries with it significant social cost implications in the sense of conflicts in policy, and the need is that these be identified, assessed and minimized, lest motives of expediency or inertia become cloaked in the guise of national defense. It seems a safe generalization to set down that judgment

52 Ibid., pp. 98-99. A most pertinent current citation in this connection is found in the New York Times, May 8, 1960, p. 1F, reporting of seven smaller electronic companies pooling manufacturing capabilities and engineering skills in an effort to break into the ranks of the prime contractors in defense bidding. Their reported reason was to end what the members felt was unjust treatment in the withholding of subcontracts by big companies that usually act as prime contractors to the military.
should allow military policy in conflict with public policy only where the requirement is both clear and present.

Finally what does this say for transportation? In the conflicting problems of greater integration to maximize support efficiencies and less integration to minimize the social diseconomies of defense, transportation cannot be said to be neutral. Rather it is itself an integral part of and permits Department of Defense commitment to programs of selective management, deferred procurement, and minimum inventories of materiel.
IV. THE ORGANIZATION FOR TRANSPORT SUPPORT

A. Philosophy and Goals

The transportation segment of the total logistic task of supporting the military forces of the United States is at once gigantic and crucial. With forces of varying size and composition stationed in every part of the world the day-to-day resupply is problem enough, but to support a deployment of forces of any magnitude anywhere in the world on the shortest of notice calls, as has been argued so far, for the most flexible transport response. To provide this level of support the Department of Defense uses both its own organic air and surface transport vehicles and over a billion dollars annually of commercial carriage -- air, bus, truck, rail, and water. The purpose of this chapter is to identify and describe the organization for transport of military cargo and passengers -- the Single Managership. Appraisal

53 Organic transport equipment is government-owned equipment, e.g., MATS aircraft, trucks, cargo ships.

54 Although feasibility studies of this type operation began with the Alameda Supply Support Test in 1951, single manager assignments were not officially promulgated until issuance of Department of Defense
of the concept in practice in terms of economics and responsiveness if left to the concluding chapter.

After World War II, examinations of the organization of the military departments revealed a number of common activities where very substantial duplications of effort were involved. Each service was frequently going its own procurement way securing items which, for all practical purposes, were identical. It was concluded from both Hoover Commission reports that prior approaches to the problem, centering around cross-servicing agreements and the like, had not produced the expected economies.\(^5\)

The approach taken by the Department of Defense to eliminate this duplication and functional overlap of the services in common-use items has been the Single Managership. This concept envisions the assignment to a single military department of the full responsibility

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\(^5\)In 1957 three Senators proposed an amendment to the Department of Defense Appropriations bill for FY 1958 which would have created a "Fourth Service," civilian-managed, under the Secretary of Defense, and responsible for the "procurement, production, warehousing, distribution of supplies or equipment, standardization of inventory control and other supply management functions for common supply items" of the three Services. U.S., Congressional Record, 85th Cong., 1st Sess., 1957, CIll, Part 8, 106782.
for a common item from its procurement to its ultimate consumption. Single Manager assignments have been implemented for several years now in the case of four common commodities.56

The Department of the Army is single manager for subsistence, clothing and textiles; the Department of the Navy is single manager for medical supplies and for petroleum.

Within the management cycle of requirements, procurement, stockage, and supply, another element of commonality is evident -- ancillary but critical to all these -- transportation. The transport services (not to say philosophies) remain substantially the same regardless of the departmental affiliation of the user. Thus in 1956 the transportation segment was set apart for its own single managerships.57 But a most important distinction should be carefully noted between application of the single manager concept to a common commodity, as previously, and application to a

56 The Department of the Air Force successfully resisted assignment to it of a single managership for photographic equipment and supplies. After three years of controversy, the assignment was rescinded in 1959, House Report 624, op. cit., p. 34.

57 The Single Managers for traffic management and ocean transport were designated in May, 1956, while the Single Manager for air transport was designated in December of that year. Assignments were made by the Secretary of Defense.
common service. In the former case of item management the concern is generally one of kind and amount, but in the case of transport service the crucial factors usually are time, place, frequency and reliability. The point is really a part of the economist's familiar distinction between goods and services, particularly the characteristics of being nonstorable and non-capitalizable. Moreover, a high degree of flexibility is required for the most effective transport support of any military operation.

Of the Single Managers in the transportation segment of the logistic cycle, one further distinction must be made. The traditional differentiation between transport and traffic management applies to this case as well. The Department of Defense has established a single manager for traffic management decision-making and single managers for each of the modes: air transportation and water transportation. The former involves, of course, the HOW of traffic movement while

58Probably not unmindful of inter-service political as well as organizational acceptability the Department of Defense assigned a transport single managership to each of the Services: Traffic Management to the Army, Airlift to the Air Force, and Sealift to the Navy. There is no "single manager for land transport," since the Services do not possess a fleet of land transport vehicles as such.
the latter embraces management over the military's organic transport equipment as well as general augmentation of commercial capability. The one is a consultant activity, the other a carrier operation.

B. Single Manager Concept and Assignments

It has been fashionable to emphasize and extoll the divergencies, the "empire-building," the "lack of cooperation" between the military departments. In the transportation area, however, there has been in existence considerably before the initiation of the single manager concept organizational arrangements between the services of substantial importance.

A 1954, joint Army-Air Force regulation outlining current agreements between the two services provides, for example (1) that the Army will operate the water ports of embarkation within the continental United States and overseas -- this to include in the case of passenger movements housing and messing for Air Force personnel, (2) that the Army will provide railway tank cars for the movement of bulk liquid commodities (most importantly, petroleum) both in continental United States and overseas. The Department of the Air Force, for its part, was therein charged with the operation of the aerial ports of embarkation within the United States and overseas -- this to
include provision for local customs, immigration, quarantine, and similar clearances.\textsuperscript{59} For both it required that,

Those common services which one Department funds for and furnishes the other will be according to the same standards and conditions as those which the furnishing Department performs for itself.\textsuperscript{60}

In May, 1956 the consolidation of all departmental traffic management functions into a single agency was presaged by the issuance of Department of Defense Directive Number 5160.14. This directive set forth the authority, functions, responsibilities and relationships of a Single Manager Service Assignment for traffic management within the United States.\textsuperscript{61}

The Secretary of the Army was designated as the Single Manager and as such responsible for the organization and operation of the assignment. The Military Traffic Management Agency (MTMA) was created as the organization which would actually direct, control or perform all the assigned functions of traffic management.


\textsuperscript{60}\textit{Ibid.}, p. 2.

for all military departments. An examination of the principal provisions of the directive gives indication of the extent of its economic (cost saving) and industry orientation. The purpose and pertinent objectives of the assignment are these (emphasis supplied):

(1) To provide the most effective and economical freight and passenger transportation service for the Armed Services from commercial transportation companies (including rail, highway, air, inland waterway, coastwise and intercoastal carriers) operating between points within the United States . . .

(2) To eliminate duplication and overlapping of effort between and among military departments . . .

(4) To assure under all conditions, efficiency and economy within the DOD in the procurement, use, cost and control of commercial transportation services required by military agencies for the movement of freight and passengers between points within the United States. 62

Chief among the general traffic management functions assigned to the Agency are:

(1) Cooperate, by the application of cost, rate and traffic data services, in advising and assisting:
   (a) Procurement agencies in developing the most economical sources of supply;
   (b) Production activities in programming the processing of raw materials . . . and products through government operated facilities;
   (c) Distribution agencies in programming the positioning of stocks;
   (d) Site selection authorities . . .

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62 Ibid.
(2) Control and operate military owned railway rolling stock...

Further, it is charged with,

(1) Determination or establishment of proper freight classification . . . rates, fares, charges, rules and regulations on Department of Defense traffic.
(2) Negotiation . . . with all for-hire commercial carriers of cargo or passengers or their rate-making agencies . . . contemplated by 1 above.63

Working from formal activation by this directive, MTMA became fully operational a year later, July 1, 1957. Two months earlier its field organization was established, consisting of five Regional Traffic Officers scattered across the country.64 These replaced the sixteen field traffic offices maintained by the military departments prior to MTMA.65 Military personnel from each of the services staff the Agency, while civilian personnel, though drawn from the closing of the separate service offices, became employees of the Department of the Army. The military departments remained responsible, of course, for traffic management operations performed by their local installations.

63Ibid., p. 8.

64Regional offices are located at Pittsburgh, Atlanta, St. Louis, Dallas, and Oakland.

Operating as an integral part of the Department of the Army, the Agency's traffic regulations nevertheless are published as joint Army-Navy-Air Force regulations. Further it is important to note that these apply not only to the general traffic management issues of the military department, but also to the supply management operations of commodity single manager agencies. This is to say that the Navy as single manager for petroleum has superimposed on it in the transportation segment of the logistic cycle, MTMA as single manager for the modal movement of the commodity. As stated in the August, 1957 Terms of Reference,

"... the single manager commodity operating agencies ... will be responsible for coordination with the Agency (MTMA) in order to assure that their supply management policies, plans, regulations and procedures reflect proper consideration of traffic management factors throughout the complete supply cycle ..." 66

Finally, MTMA was directed to maintain coordination with the Military Sea Transportation Service of the Navy and the Military Air Transport Service of the Air Force -- organizations which that same year became single manager agencies as the concept was extended to the common transportation services of sealift and airlift.

The Military Sea Transportation Service (MSTS) was established by charter issued by the Secretary of Defense. It placed under one authority the control, operation and administration of ocean transportation of cargo, personnel, and petroleum for all the military departments. Further, as the single manager idea was applied MSTS was assigned the task of planning and negotiating for use of commercial shipping as necessary.

To carry out its assignments MSTS maintains a nucleus fleet of government-owned ships, consisting of transports, cargo vessels, aircraft carriers, and tankers. But it is a nucleus maintained, in the words of its commander, "... at the bare minimum essential for the implementation of the MSTS mission." 67 Thus MSTS must depend upon the commercial shipping industry to satisfy the normal requirements of Department of Defense shippers. The extent of this dependency is evidenced by the statistic that privately-owned ships of the United States Merchant Marine, in regular line services or under time or voyage charter, carry over 70 per cent of the military cargo. 68


68Ibid.
In addition to its headquarters in Washington, D.C., the shoreside establishment of MSTS is comprised of four area headquarters at London, New York, San Francisco, and Yokosuka, Japan; three sub-area staffs at New Orleans, Seattle, and Leghorn, Italy; and some thirty other offices in various ports of the world.69 The MSTS ocean supply task is indeed a formidable one with the current global dispersal of military forces of the United States.

With the issuance of Department of Defense Directive Number 5160.2, December 7, 1956, the Single Manager Assignment for Airlift Service was given to the Secretary of the Air Force.70 The Military Air Transport Service (MATS) became the Single Manager Operating Agency vested with the authority and responsibilities for implementing the assignment, much as MTMA had earlier for the Secretary of the Army. Again a look at the principal provisions of the directive gives a glimpse at its economy-efficiency emphasis.

Included among the purposes and objectives of the assignment were,

(2) To provide that level of military airlift capability and organizational structure required for ... (approved D-Day and wartime

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69Ibid.

(3) To integrate into a single military agency of the Department of Defense all transport type aircraft engaged in scheduled point-to-point service or aircraft whose operations are susceptible of such scheduling, and such organizational and other transport aircraft as may be specifically designated by the Secretary of Defense.  

This last meant that the Agency had transferred to it control of all MATS transport aircraft, heavy transport aircraft from elements of other Air Force commands, and all but a few of the Navy's four engine transport aircraft. In the words of the directive,

> It is the express intent of this Directive that implementation of the Single Manager for Airlift Service will obviate the requirement for any other activity within the Department of Defense to perform airlift service functions which duplicate the functions of the Agency. Accordingly, the Secretary of each Military Department will abolish any organizational unit or part thereof performing functions which duplicate those assigned to the Agency . . .  

While the commercial industry position seemed generally enhanced in the original directive, particular phraseology placed careful qualifications on it. Among the pertinent functions of the Agency were to (emphasis supplied),

2. Augment the airlift capacity of the Agency as required to meet requirements by the use of commercial airlift service in

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71Ibid., p. 1.  
72Ibid., p. 4.
peacetime on a basis which will contribute to the sound economic development of an increased modern civil airlift capacity and enhance the ability of civil carriers to operate with maximum effectiveness in support of the military forces in time of war.

5. Develop an expanded mobilization base through the maximum feasible use of commercial airlift... consistent with military requirements and the efficient employment of Department of Defense Resources.73

In a supplemental regulation the most explicit qualification was imposed,

k. Consistent with the purposes of the Agency... the employment of commercial air transportation to, from, between, and within areas outside the United States, shall not normally take precedence over the efficient and economic utilization of the Controlled Transport Aircraft (organic aircraft).74

C. Practice

If the central theme of the preceding chapter can be characterized as integration, the theme of the present (and following chapter) can be labeled simulation. For the design of the single manager concept applied to the military can be viewed as a part of the oft-encountered efforts to make government function "more like a business." Accordingly this centralizing of functional

73Ibid., pp. 3-4.

activities looks to the realization of "business economies." In their application to common-use items in the commodity area single managements clearly have organizational and economic merit. Single service procurement and supply of medical items, for example, is a common sense arrangement where such items have little correlation with the color of the patient's uniform. Even here, however, some problems can arise with specialized requirements, e.g., Air Force flight lunches to be procured by the Army as food single manager. The procuring agency may not share its customers' sense of urgency.

Tentative appraisal of the single manager arrangement applied to the service area suggest some net cost savings have likely been produced organizationally. In daily practice, however, delegation of authority and function has come to qualify the system significantly.

Identification and appraisal of the paradox in transport public policy that this view presents, particularly in regard to procurement policies, is a main part of the analysis of Chapter VI.

Covering about $2.5 billion in annual military procurement, the dollar savings attributed to the single manager agencies are estimated to be about $8 million per year. These savings derive largely from reductions in storage space, personnel, inventories, and transportation. House Report 674, op. cit., pp. 6, 39.

Note the issue illustrated here is not one of costs and economies, but of responsiveness.
MTMA has, for example, delegated to the Air Force, and it in turn to the Air Materiel Command, the traffic management of its petroleum. It has confined itself generally to contract procurement and delegated to the Services contract administration. Finally, its relationship to the other single managers has not been entirely clear. The implementing directive establishing MTMA provided vaguely that the latter would "maintain coordination" with MSTS and MATS "on matters of mutual interest."  

The comparable directive implementing the Single Manager for Air a month later was more specific in an important respect — responsibility for long term contracts for airlift service within the United States. It divided the responsibility between the two Single Managers, charging MTMA with evaluating the "need or desirability" for long term airlift service and rendering a decision to the requesting Department, while charging MATS with subsequent negotiation of the required contract. This was designed to get at the contract domestic air cargo system known as Logair, which had been contracted for, administered, and

78 AFR 75-96, op. cit., p. 3.
operated since 1954 by the Air Materiel Command. The latter argued that to shift this domestic airlift procurement from itself to MATS would be to puncture the procurement structure of the Air Force, historically done entirely by AMC. Such a shift was made, however, and MATS took over contract procurement officially on July 1, 1958, though operating control was left with AMC. The last word has very likely not been written between the two Single Managers on this jurisdictional question. It seems that the maximum of single management application the Services willingly accept is the unification of logistics within the framework of existing organizational patterns.

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80 Contained in correspondence between Air Materiel Command Headquarters, Military Air Transport Service, and Air Force Headquarters of personal knowledge to the author at Wright-Patterson Air Force Base, Ohio, in 1957.
V. THE FUNDING FOR TRANSPORT

A. Concept and Application

In the preceding chapter the single managership was identified as the organizational arrangement employed by the Department of Defense in accomplishing its transport tasks. While such an arrangement establishes and defines the operations of the carrier agencies, it does not provide by itself a means for their financing. To achieve this last the companion concept of the Industrial Fund was added to the transport single manager activities. Industrial funding is not inherent to the latter, but has, historically been superimposed thereon. It has been quite readily applied to commodity single management, e.g., clothing, and also to laundry and dry cleaning and printing services. 81

The authority for industrial funds is the National Security Act of 1947 as amended by Title IV, Section 405.

of Public Law 216, 81st Congress, 1949.\textsuperscript{82} It authorizes the establishment of working capital funds for the purpose of financing activities which provide common services or products within or among departments and agencies of the Department of Defense. The stated objective is to provide the means of more effective control and accounting for the cost of Department of Defense programs through commercial financial procedures. It can be viewed as another in the continuing efforts toward making the military more like a business.\textsuperscript{83}

By way of description, public funds provide the capital of the industrial fund much the same as funds are placed in the capital structure of a corporation. Operations follow the revolving fund theory in that as services or products are consumed by the using commands, those commands reimburse the industrial fund from their respective appropriations. The industrial fund is also reimbursed for services or products sold to authorized patrons and nonappropriated fund activities, e.g., use of industrially funded transport by

\textsuperscript{82}\textit{U.S. Statutes at Large, Vol. LXIII, Part 1, pp. 587-88.}\n
\textsuperscript{83}\textit{It is not contended, of course, that fund activities are unique to the military establishments. It is recognized that analogous arrangements can be found in government generally, e.g., operation of the Government Printing Office.}
the Atomic Energy Commission and the United Nations. Reimbursements received are used to sustain operations. The chief concern here, of course, is its application to the particular case of transportation.

Unlike most Government agencies the Military Sea Transport Service (MSTS) and the Military Air Transport Service (MATS) as Department of Defense carriers do not operate on Congressional appropriations — rather their fiscal operations resemble that of commercial shipping companies. In the case of MSTS industrial funding provides that each Department, including the Navy, budget for its transport requirement and "pay" MSTS for every movement. This as opposed to direct appropriations to the Navy for the total operation of MSTS and moving the cargo and passengers of the other Services "free."\(^{84}\)

Similarly the Air Force, instead of budgeting for the total Military Air Transport Service operation, budgets only for its airlift needs and is "billed" along with its sister services by the Single Manager Operating Agency, MATS.\(^{85}\) It promotes a shipper-carrier relationship structurally and in an accounting sense. From the point of view of the customer, orders for services constitute valid obligations against the ordering

\(^{84}\)Budget, Fiscal 1961, op. cit., 509.

\(^{85}\)Ibid., p. 512.
appropriation and authorizes provision of the services. On the carrier's side, costs are charged initially to the working capital of the fund and are billed monthly to its customers on the basis of established tariff rates.

The MSTS revolving fund began with a "working capital" appropriation of $100 million designed to permit greater flexibility and control than is possible under fixed annual appropriations. On the basis of ocean shipping requirements projected by the shipper services for the coming fiscal year, MSTS determines and prepares an operating plan for matching these requirements with capability. This plan then forms the costs and a budget is prepared. On the basis of this budget, the MSTS tariff rates are determined and applied to the different categories of cargo and passengers. These rates are calculated to enable MSTS to recover the cost of operations and "break even" at the end of the year.

Likewise the imposition of industrial funding on MATS contemplated that operating costs (out-of-pocket costs) would be the basis on which revenue (tariff rates) 


87Ibid.
would be established. Specifically, Single Manager Airlift Service Industrial Fund is, on the expenditures side, charged for,

1. Direct costs of operation and administration of the Airlift Service.
2. Support and services performed for and material furnished to the Airlift Service by agreement between the Single Manager and the military departments.
3. Petroleum, oil, and lubricants furnished to the Airlift Service.
4. Commercial airlift procured to augment the airlift performed by MATS. 88

On the receipts side, payment is made to the Industrial Fund as follows:

1. Where airlift is required and provided by MATS to the military departments (to include a penalty where airlift service is provided or made available by MATS but is not effectively used by the customer).
2. Tariffs established are designed to recoup to the Fund aggregate revenues equal to the Airlift Service costs charged to the Fund during a given fiscal year. 89

The Agency was given a $75 million "cash working capital" appropriation on deposit with the United States Treasury as of July 1, 1958, and a MATS tariff was published to reflect average costs over the entire system — again to return no-profit-no loss. The dollar

88 AFR 76-33, op. cit., pp. 4-5.
89 Ibid., p. 4.
magnitude and its distribution under the first year's operation may be noted in the following itemization. 90

<table>
<thead>
<tr>
<th>Department</th>
<th>Estimated Procurement FY 1959 (1)</th>
<th>Estimated Net Increase or Decrease Over FY 1958 (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Army</td>
<td>$66,900,000</td>
<td>$59,900,000</td>
</tr>
<tr>
<td>Navy</td>
<td>41,857,000</td>
<td>28,500,000</td>
</tr>
<tr>
<td>Air Force</td>
<td>201,500,000</td>
<td>-36,500,000</td>
</tr>
<tr>
<td></td>
<td>$310,257,000</td>
<td>$51,900,000</td>
</tr>
</tbody>
</table>

Column 1 contains the FY 1959 budget estimates for the procurement of airlift services from the MATS Industrial Fund. Thus on the basis of a $300 million total expenditure, the Fund, as revolving by disbursements and replenishments, would turnover four times (from the $75 million input). Column 2 contains the net changes over FY 1958 in Department of Defense expenditures as an additional $52 million transportation. The Air Force charge is negative, since it no longer funds totally for MATS with Army and Navy increases more than offsetting in that they no longer move their cargoes

"free." Fiscal Year 1959 results, however, showed the Fund's income as $278.5 million as against expenses of $274.3 million or a net operating gain of $4.2 million. This took place despite a $7.4 million net operating loss for the final month of the fiscal year.

This last points up well the great difficulty under the Fund of structuring a tariff that will return no profit and no loss. Running in excess of a $7 million net operating surplus at mid-FY 59, MATS reduced its tariff rates in December, 1958 and again in March, 1959 with a further partial reduction in June, 1959. Similarly in mid-FY 60 the Fund showed a profit of $8 million (Table 1), and MATS announced that the net operating result would have to be reduced by an estimated $10 million -- to come out even. At end of Third Quarter the cumulative figure stood at $6.1 million, held steady in April, but climbed to a high of $8.8 million in May. Therefore substantial operating losses will have to be experienced in the final month to avoid a "profit" for FY 1960.


Ibid., December, 1959.
<table>
<thead>
<tr>
<th>Month</th>
<th>Monthly Operating Revenue (2)</th>
<th>Monthly Operating Expense (3)</th>
<th>Monthly Net Operating Result (4)</th>
<th>Cumulative Operating Result (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>July</td>
<td>26.2</td>
<td>23.9</td>
<td>2.3</td>
<td>2.3</td>
</tr>
<tr>
<td>August</td>
<td>24.1</td>
<td>22.4</td>
<td>1.7</td>
<td>4.0</td>
</tr>
<tr>
<td>September</td>
<td>26.3</td>
<td>23.5</td>
<td>2.8</td>
<td>6.8</td>
</tr>
<tr>
<td>October</td>
<td>22.8</td>
<td>21.6</td>
<td>1.2</td>
<td>8.0</td>
</tr>
<tr>
<td>November</td>
<td>23.2</td>
<td>22.5</td>
<td>.7</td>
<td>8.7</td>
</tr>
<tr>
<td>December</td>
<td>21.2</td>
<td>21.9</td>
<td>- .7</td>
<td>8.0</td>
</tr>
<tr>
<td>January</td>
<td>22.4</td>
<td>24.2</td>
<td>-1.8</td>
<td>6.2</td>
</tr>
<tr>
<td>February</td>
<td>19.5</td>
<td>21.2</td>
<td>-1.7</td>
<td>4.5</td>
</tr>
<tr>
<td>March</td>
<td>28.6</td>
<td>27.0</td>
<td>1.6</td>
<td>6.1</td>
</tr>
<tr>
<td>April</td>
<td>23.2</td>
<td>22.8</td>
<td>.4</td>
<td>6.5</td>
</tr>
<tr>
<td>May</td>
<td>23.3</td>
<td>21.0</td>
<td>2.3</td>
<td>8.8</td>
</tr>
<tr>
<td>June</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
</tr>
</tbody>
</table>

*Data for June are not yet available.

There are several variables at work besides the juggling of the MATS tariff, chief among which is the operation of the fleet. Referring to Chart 1 this is to say that the fleet may be over-flown in the summer and fall months with relatively lesser regard for maintenance, and then stood down in subsequent months for necessary maintenance and/or modifications. In the former period the Fund will thus run an operating surplus; in the latter an operating deficit. Moreover, should MATS use non-industrially funded aircraft, i.e., aircraft not computed in the cost base, to haul industrially funded traffic, the result would be to overstate the operating gains, since the costs incurred would not appear against the Fund. Finally, if, as a result of competitive bidding on MATS contracts, airlift is procured from common carriers at rates lower than the published MATS tariff, the Fund necessarily will show a profit. That is, the Single Manager Agency will have bought airlift in the market at one price and necessarily charged its customers the fixed MATS tariff price. Such in simplified form, are the accounting and operating gymnastics designed to make the Industrial Fund "break-even." 93

93 It is recognized that the goal of breaking even is not normally a business-like goal, but the contention here is that industrial funding is an effort toward
Chart 1
MATS INDUSTRIAL FUND NET OPERATING RESULTS FY 1960*
(In millions of dollars, cumulative monthly)

Net Operating Results
in Millions of Dollars

<table>
<thead>
<tr>
<th>Month</th>
<th>Net Operating Results (in millions of dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>July</td>
<td>+2.3</td>
</tr>
<tr>
<td>Aug.</td>
<td>+1.7</td>
</tr>
<tr>
<td>Sept.</td>
<td>+1.2</td>
</tr>
<tr>
<td>Oct.</td>
<td>+2.8</td>
</tr>
<tr>
<td>Nov.</td>
<td>-.7</td>
</tr>
<tr>
<td>Dec.</td>
<td>-1.8</td>
</tr>
<tr>
<td>Jan.</td>
<td>+1.6</td>
</tr>
<tr>
<td>Feb.</td>
<td>-.7</td>
</tr>
<tr>
<td>Mar.</td>
<td>+.4</td>
</tr>
<tr>
<td>Apr.</td>
<td>+1.6</td>
</tr>
<tr>
<td>May</td>
<td>+.4</td>
</tr>
<tr>
<td>June</td>
<td>+2.3</td>
</tr>
</tbody>
</table>

*Data for June are not yet available.
Source: Table 1.
B. Practice and Appraisal

Actual economies to be derived from the industrial funding of transport are as yet somewhat unclear. At its inception its authors hoped that the arrangement would result in a greater cost consciousness on the part of Department of Defense agencies, a better basis for management decisions through closer financial controls, an integrated accounting and budget system allowing functional appropriations, and establishment of a "normal buyer-seller relationship." Clearly not all of these hopes have been realized -- and probably none to its fullest degree.

It would seem fair to expect that a greater degree of cost control is now possible and that there may be a better screening of materiel offered for shipment

business-like procedures. In this connection the pricing problem is fairly analogous to the case of vertically integrated firms where relative profitability of divisions may depend largely on transfer prices, i.e., the prices charged by one division to another for transfer of its products or services. Joel Dean treats this case in Managerial Economics (New York: Prentice-Hall, Inc., 1951), pp. 42-43, in pointing out that in the absence of ruling market prices in interdivisional sales, transfer prices are set to give goal rates of return to supplying divisions. He concludes significantly that arbitrary transfer prices "destroy a useful criterion for the value of vertical organization, so that decisions about acquisitions and dispositions have to rest on more subjective strategic considerations."

94AMCL 172-57, op. cit., p. 2.
now that using activities have to "pay" for it. Airlift of cargo-mail freight has in fact declined from 872 million ton-miles in FY 1959 to 856 and 716 million ton-miles (estimated) in FY 1960 and FY 1961, respectively. Movement control activities of the military have reported a considerable "purification" of cargo both in kind (priority) and amount, but do not attribute this to the advent of industrial funding. In the case of airlift the view is that since eligibility criteria for movement is relatively unchanged as a result of industrial fund procedures, industrial funding is not considered essential or contributory to the prudent use of airlift resources. Further it is believed that purification of cargo is best accomplished by administrative actions. Chief among these is the arrangement whereby domestic suppliers are now authorized to challenge requisitions in the interest of reconsideration of either amount or criticality (hence mode) of movement.

95Budget, FY 1961, op. cit., p. 511. Over the same years air passenger-miles have moved in the opposite direction, as MSTS passenger carriage declined, reflecting the shift to the airlifting of military personnel and dependents.


97Ibid.
Congressional control is exercised over industrial fund activity in a twofold manner. First in its annual review of the budget, the Congress examines and evaluates the consumption programs of the services as provided by the Fund and its appropriations for these consumable services set the level of operation of the Fund. Second the Congress has the power to appropriate additional funds for working capital or to rescind funds it considers excess and thus controls as well the amount invested. Such Congressional attention has been quite keen, upon the continuing proddings of the commercial airline industry in its going cost controversy with the Department of Defense. But industrial funding has provided no conclusive solution here in that government cost computations, it will be recalled, are significantly incomparable to commercial accounting practices. That is, in all Department of Defense industrial funds certain elements of cost are excluded -- salaries, allowances and retirement contributions of uniformed personnel, charges to capital investment, and insurance. Thus, in the findings of the Military Operations Subcommittee,

Establishment of the industrial fund . . . will not yield the necessary data (military vs.

98AMCL 172-57, op. cit.
commercial) to make such cost comparisons... Thus the industrial fund, whatever advantages it may have, will not put an end to the controversy over comparative costs of MATS and commercial airlift operation.99

Finally it cannot be said that a normal shipper-carrier relationship is established where "normal" is equated with such relationships in the private sector. Here the separate departments are competing for a given amount of service under condition of no alternative sources of supply. This is to say that the departments are by directive captive customers of the Single Managers and must "buy" from them.100 This could raise a formidable issue if, for example, a MATS tariff came to show an average rate higher than published straight commercial rates.101

The chief disadvantages to industrial funding of military transportation are those limitations inherent in


101MATS tariff rates in fact have been close enough to the straight commercial rates as to preclude such issues. A corollary problem might be whether, in the event of insufficient customer transportation expenditures (appropriations), the operation of the Fund would necessarily be a sufficient and appropriate exercise of the fleet.
in the nature of the service and the dissimilarities in the general principles of government and private operations. The transport requirement, particularly the airlift portion, presents the Department of Defense with a very considerable peaks-and-valleys workload problem. MATS cannot operate entirely efficiently in terms of pay-loads and personnel without admitting that it could not meet the surge of demand in an emergency which might be \( X \) times the peacetime rate. Thus its capital equipment of necessity operates "inefficiently" in the off-peak periods. Nor can the system's size be readily squeezed or enlarged in response to changing "production schedules," for the demands for military transport are finally tied to changing world conditions, and these are likely not of a character permitting of delay. Industrial funding is not smoothly adaptable to conditions of considerable changes in requirements and situations of high strategic obsolescence.
VI. PUBLIC POLICY TOWARD THE MILITARY
USE OF TRANSPORT RESOURCES

A. Paradox in Policy

Paradoxes of public policy are not uncommon to the national setting. The purpose of this chapter is to identify a particular paradox of policy in the area of public control of the military, i.e., the continuing efforts to make the military "more like a business" on the one hand, while on the other denying it the latitudes so to act. The case in point is that of public policy toward the military use of transportation. The following is an analysis of the motives involved in both elements of the paradox. These are related to the crucial test of defense posture.102

The pressures for shaping the transportation activity closer to a commercial-type operation are chiefly twofold in motive. The first are efforts to effect economies (cost savings) by organizational arrangements of central (and single agency) procurement, central administration, and central operation in traffic management decision-making and carrier equipment.

102Conclusion and appraisal of the case is left to Chapter VII.
As described earlier the creation of the Single Manager for Traffic Management, the Single Manager for Sealift, and the Single Manager for Airlift attests to the point. 103

The second motive is one of control in an accounting sense of transport dollar expenditures. The design is for a tighter screening on the part of the using services in their transport requests, and for more precise data for Congressional purview in handling Department of Defense budget requests. 104 Support for imposing commercial-type cost and funding practices on military transportation has come as well from the commercial carrier industry, for it is their intent always to show (1) that organic carriage is more costly than commercial carriage, (2) that the commercial carriers are not getting enough of the military cargo and passenger traffic, and (3) that the military traffic they do get is too sporadic and unreliable. 105 The instrument designed to gain this control is the Industrial Fund arrangement.

But what of the other half -- what are the main guidelines which would characterize military

103 Supra, Chapter IV, B.
104 Supra, Chapter V, B.
transportation if it went about its traffic and transport tasks "more like a business?" It could first utilize its organic equipment to the fullest, augmenting where and when excess requirements demanded it; it could generally purchase service from only a few carriers of a given mode without regard to "spreading the traffic;" it could buy from the cheapest carrier consistent with satisfactory service; it could procure carriage by direct negotiation and without advertisement and sealed bidding; and it could hire and fire carriers at will and without recourse or explanation. Each of these "business-like" latitudes is very stringently qualified — if not precluded altogether — in the exercise of Department of Defense transport activities. The motives here also seem to be twofold.

The first has its roots in ideology. Whatever the exceptions and modifications that have been made along the way, the traditional feeling prevails in depth and width that government should not compete with private industry by owning and operating commercial and industrial-type facilities when the goods and services can be satisfactorily produced by private enterprise. In the transportation area this proposition is evidenced by the proviso that such facilities should be allowed only where "it can be clearly demonstrated that private
enterprise cannot perform the service or provide the products as necessary to meet current mobilization requirements, or that in the execution of the military mission operation by the Government is a necessity."\textsuperscript{106} Thus the military is not to operate in the transport area in competition with commercial carriers -- and this obstructs the "best utilization" item above.

The second motive is more mundane and immediate. The commercial carriers, frequently and consistently in financial straits, look to the military as having an obligation to so release, move, and operate its traffic cargoes and transport tasks as to enhance all the industry.\textsuperscript{107} Blessed by Congress, this position is manifested by procurement restrictions, traffic spreading requirements, and traffic formulas (organic vs. commercial carriage). The effect is largely to destroy the remaining managerial freedoms above.

The problem, however, is not primarily one of establishment of military facilities, but rather of the proper utilization of its transport facilities already in existence. For motor transport this has meant that

\textsuperscript{106}Ibid., p. 42. The directive then lists justifiable situations such as absence of private facilities within reasonable distance, urgent military demands of no delay, protection of security information, absence of reasonable prices, and need for training.

\textsuperscript{107}Ibid., p. 3.
military vehicles are permitted to move freight and passengers only within limited areas around a military installation and then not on a scheduled basis. But far more dramatic is the issue as applied to the 550 four-engine transport aircraft operated by the Military Air Transport Service.

Maintained at a size commensurate with its war plans obligations for supporting the combat forces, the MATS fleet "exercises" itself with the carriage of the bulk of Department of Defense day-to-day logistic requirements. In issuing a 1957 statement of policies on USAF transport resources the Air Force covered itself carefully on this point acknowledging that, "policies relating to the use of military airlift invariably impinge on USAF relationships with the civil air transport industry." It included as policy objectives,

2.c. To utilize military air transport resources in peacetime to defray Department of Defense peacetime airlift requirements.

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108 In some instances this has even come to preclude military bus and staff car service to and from nearby commercial airports.

and conversely (emphasis supplied),

2.d. To utilize augmenting civil air transport resources and services:

(1) In peacetime to the maximum practicable extent, consistent with requirements and the efficient employment of military resources; and,

(2) In emergency to the extent that they are available and needed in support of military operations.

In further elaboration of the use of civil air transport resources the statement continued (emphasis supplied),

... the Air Force will use civil air transport resources for those needs which exceed the by-product airlift capability generated by training and exercise of military air transport forces. \(^{110}\)

While the creation of the Single Manager for Airlift, as previously mentioned, seemed generally to enhance the commercial industry position, the quotations above coupled with the 1958 operating regulation\(^{111}\) providing that commercial air transport "shall not normally take precedence" indicated very significant policy qualification. Recent Presidential and Congressional actions, discussed below, have now swung the balance in the other direction.

\(^{110}\)Ibid., p. 2.

\(^{111}\)Supra, Chapter IV, p. 61.
In practice the most explicit limitations on the latitudes of single manager activity are those of procurement policy. These are often most "unbusiness-like." In the first place the fact that the single managers must practice advertised bidding in securing commercial transport service differs from private shipping. The advertisement for bids, collection and evaluation, and awarding of contracts is far more time consuming and expensive than direct negotiation -- and this on an activity which, unlike a commodity, is highly time-oriented.

The most specific restrictions, however, are those that involve allocation of the traffic both as between organic and commercial carriage and among the commercial carriers. Under the Cargo Preference Act it is required that not less than 50 per cent of government-owned or financed dry or petroleum cargoes be transported on privately-owned United States flagships.\footnote{Will, op. cit., p. 25. The bill was actually amended in Committee to delete a 100 per cent proviso.} During Congressional hearings held in early 1958 at the request of the commercial airline industry it was suggested in
testimony that a similar formula be written into law to apply to air cargo.\textsuperscript{113}

The Department of Defense had in fact been directed earlier by the Senate Appropriations Committee to reprogram FY 57 funds into procuring from commercial carriers 40 per cent of MATS passenger and 20 per cent of MATS cargo requirements.\textsuperscript{114} Charging that the actual experience percentages worked out to 20 per cent and 10 per cent respectively, for the year, the industry got Congressional reaffirmation of the formula during the committee hearings mentioned above.\textsuperscript{115} While this requirement seemed to the Department of Defense a more expensive way of doing business, the Committee opined that "the Department of Defense cannot rightfully maintain a position of indifference to the economic conditions of the civil air industry" and concluded that the Air Force,

\ldots should give attention to handling its air transport business in such a way as to

\textsuperscript{113}Testimony of D. W. Rentzel, Chairman, Board of Directors, Slick Airways, Incorporated, in Hearings, Military Air Transportation, \textit{op. cit.}, p. 701.


\textsuperscript{115}House Report No. 2011, \textit{op. cit.}, p. 50.
assist in keeping the nonscheduled and other airlines in a reasonably sound financial and operating condition.\textsuperscript{116}

The shipper restraints placed on the military procurement of tank truck movement of petroleum probably best exemplify the "spreading the traffic" requirement of public policy. Service must be procured from common carriers on the basis of pro rata shares according to number of pieces of equipment. This is to say that if three carriers operate between two given points and have a tank truck fleet of 50, 30, and 20 pieces respectively, petroleum traffic will be allocated as well, 50 per cent to the first, 30 per cent to the second, and 20 per cent to the third.\textsuperscript{117} They thus compete neither in price nor in service. Penalties for unsatisfactory service or equipment provide (1) first offense -- opportunity to correct discrepancies; (2) second offense -- eliminated from routing not more than 60 days; and (3) third offense -- eliminated from routing indefinitely.\textsuperscript{118} All three actions require written notification to the carrier. This, too, is in considerable divergence from the latitudes of

\textsuperscript{116}\textit{Ibid.}, pp. 107, 46, respectively.

\textsuperscript{117}\textit{Air Materiel Command Manual 75-2, Shipments of Aviation Fuels Propellants and Lubricants}, January, 1959, p. 4.

\textsuperscript{118}\textit{Ibid.}, p. 6.
the private shipper. A firm may in fact spread its traffic among several carriers for purposes of public relations or encouragement of competition in service but does so by design and surely is not bound to continuance of the practice.

These then are the sides of the policy paradox in military use of transportation resources: the efforts to commercialize the activity fostered by hopes of economies and control and taking the form of the single managership and industrial fund concepts; and the countervailing pressures to limit the latitudes of military management that are actually necessary to "business-like" operation in the interest of ideology and industry gains.

B. The Case of Airlift -- Military Requirement and Commercial Offering

1. Zone of Interior. Within the Zone of Interior (ZI), the Air Force presently requires airlift service to 88 air bases and contractor sites (Chart 2). This requirement stems again from its philosophy of readiness with minimum stockpiles behind its most expensive and important weapons.119

119The analysis here is almost entirely Air Force oriented as it is by far the largest domestic air shipper among the services. The Army ships little while the Navy does have some transcontinental airlift requirements connecting the water ports for fleet support.
LOGAIR FY 1960

Chart 2

- Denotes commercial all-cargo certificated carrier service.
- Denotes Logair service.

Reference to Chart 2 will make clear the five categories of bases that are eligible for airlift service and comprise an integrated domestic support system. First, and most important, is service from Air Force supply depots to the first line offensive and defensive forces, i.e., Strategic Air Command and Air Defense Command installations. This has called for daily air freight movement in the former case, for example, between Tinker Air Force Base, Oklahoma, and Pease Air Force Base, New Hampshire and, in the latter, traffic from Kelly Air Force Base, Texas to Selfridge Air Force Base, Michigan.

Of next priority of service are the four aerial ports of embarkation, Dover Air Force Base, Delaware and Charleston Air Force Base, South Carolina on the East Coast, and McChord Air Force Base, Washington and Travis Air Force Base, California on the West Coast.  

120 It is at these air bases that domestic military air cargo destined overseas links with the Military Air Transport Service augmented by civil carriers to form the global net of air logistics support. Electronic equipment might move, for example, in addition McGuire Air Force Base, New Jersey is an aerial port for passenger traffic and certain overseas cargo.
from the air depot in New York to the aerial port in California, thence by air to a using activity in Japan.

The third category of installations enjoying air service are the prime research and development activities, like Holloman Air Force Base, New Mexico and Patrick Air Force Base, Florida. It is felt that the mission priority of these bases - atomic energy interest at the former and missile test activity (Cape Canaveral) at the latter - warrant the most expeditious and direct support.

Those bases which are so remote as to be without access to reliable surface transportation, yet have a mission priority requiring daily support, present the fourth class of installation to receive air service. Strategic bases like Loring Air Force Base, Maine and defense activities like Kinross Air Force Base, Michigan provide examples.

There is a fifth category of activity that is now emerging into eligibility for airlift, that of major contractor plants. This comes as an end result of that growing military supply concept which is increasingly slanted toward contractor responsibility under short buys and dependence on short pipeline, manufacturer-to-user support. Indication of this trend can already be noted. Chart 2 includes air cargo flights through
Lowry Air Force Base (Denver), Colorado, San Diego and Long Beach, California by which the Glenn L. Martin, Douglas Aircraft, and Convair companies are served, respectively. As successive generations of missile systems and sites come into being, this type traffic can be expected to increase.

These, then, are the domestic requirements: what are the commercial airline offerings?

Domestically the commercial airlines are largely unsuited to meet the military requirements as presented above. They are unsuited in terms of existing routes and frequencies of service, capacity, and cost, as measured against the military philosophy of airlift -- reliability, flexibility, and central management.

Again reference is made to Chart 2. It will be noted that the points served by the civil all-cargo certificated carriers are very largely not coincident with those installations requiring airlift. This is simply to say that the military activities are generally not located along existing civil carrier routes but are "offline" and would require an air-surface combination service currently unacceptable to Air Force readiness needs.121 The Air Force argues that it is wasteful and

121Of the air bases presented the average distance between commercial termination and the using base is 23 miles as reported by the Air Force in an unreleased
destructive of the airlift advantage to move freight 2000 miles at 200 miles per hour destined Westover Air Force Base, Massachusetts, for example, and offload at East Hartford, Connecticut to await possible splitting or consolidation, or overnight or over-weekend handling for truck delivery the final 20 miles. More extreme examples might be cited, like offloading at Boston, Massachusetts for surface delivery into northern Maine Strategic Air Command bases. It should be mentioned, however, that as the Air Force establishes airlift requirements to activities jointly using municipal airports (as it is now doing, e.g., Duluth Municipal Airport, Niagara Falls Municipal Airport, and Portland International Airport), this particular aspect of the military position regarding non-use of common air carriage is weakened, though its "total system" argument is unaffected.

Besides its destination limitation, civil carrier routes are presently inappropriate to military traffic flows. Historically, passenger demand has largely

122 As a corollary point to the handling-for-onward-movement deficiency, it is noted that the commercial lines treat all air freight alike, while the military has established an air priority system among its cargo eligible for air movement.
governed the service, and as these routes do not parallel the military air freight demand it is expected that broad schedule changes on the part of the industry would not come readily into being. A further factor contributing to a built-in delay over commercial scheduled patterns is the necessity for interchange (transloading) of cargo with connecting lines.

While it is true that the certificated carriers operate with an enormous yearly total of unused capacity, it should not be concluded that this capacity is necessarily appropriate to domestic military airlift requirements.\footnote{The 1958 edition of the \textit{CAA Statistical Handbook of Civil Aviation} (Department of Commerce, Civil Aeronautics Administration, Washington: Government Printing Office, 1958), p. 76, reported an unused capacity of 2.5 million ton-miles for the scheduled domestic air carriers. This resulted in a load factor of under 54 per cent.} Much of it is generated as a residual to passenger flights, with equipment clearly unsuitable to handling the cube and/or weight of military airfreight. Moreover, Air Force experience in offering air cargo to the common carriers is that the average weight of shipments that would be accepted for movement on the same day is four hundred (400) pounds.\footnote{\textit{CONAIR Report}, op. cit., p. IV-3.} This means that cargo in excess of this would probably be
held or split in shipments over succeeding days. Finally, though it has long been recognized in the civil industry that the commercial traffic flow is predominantly west-bound and southbound, making for unused return capacity, these are not the facts of life in the case of military air cargo.  

While the military relies heavily on its philosophy of tailored airlift and system service in rejecting domestic common carriage, it presents a further crucial argument based on costs. Reporting on its airlift management for the months July through November, 1958 the Air Force shows comparative costs per ton for a 950 mile movement over the various air services as Air Freight Forwarder - $852, Air Express - $740, Common Carrier - $360, and Commercial Contract (Logair) - $130. The percentage of tonnage moving over these services then were 0.15, 0.07, 1.78, and 86.56 per cent respectively - this last amounting to 64,000 tons.  

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125 This fact is formally evidenced by the granting of directional freight rates in order to encourage use of backhaul capacity eastward and northward in the Civil Aeronautics Board, Air Freight Rate Investigation (Directional Rates, Vol. XI, CAB Reports, p. 228, 1950).

126 CONAIR Report, op. cit., Tab F.

127 Ibid. The remaining 10 per cent tonnage moved via military aircraft, generally involving special moves, outsized items, and classified cargo.
This indicates that the military attempts to meet its domestic requirement of responsive and reliable airlift service on a lowest cost basis, i.e., by a long term contract operation called Logair.

Logair is a contract airlift system comprising four commercial carriers operating over specified routes on scheduled frequencies under complete operational control of the Air Force. It daily functions as an integrated air support system linked by a communications set-up which allows central management from Air Materiel Command headquarters in Ohio.

Contractually the carriers provide the aircraft (numbering about sixty-four) and crews and major maintenance, while the military furnishes communication facilities, loading and unloading, and gasoline, oil and minor maintenance at cost. As might be imagined, it is these government furnished elements of the operation that make difficult precise cost comparisons with common carriage. Operating at about a 76 per cent load factor, system-wide, Logair reports a 13-14 cent revenue ton-mile direct cost and, when pressed by

128 The present cargo carriers are Resort Airlines, Slick Airlines, AAXICO Airlines, and Capitol Airways. With the exception of Slick, which entered the system for FY 1960, these carriers have held the contracts since Logair's creation in 1954. Contracts are for one year with a yearly option.
Congress or by lobby, admits to about a 2 cent indirect cost. This, of course, still compares very favorably with an acknowledged common carrier rate of at least 20 cents per ton-mile. Furthermore it can be argued that almost no indirect costs are properly allocable to the Logair operation in that even if the system were not in existence, the same volume of traffic would have to be handled by the military installations regardless of carrier or mode.

The magnitude of this contract operation is apparent when its yearly statistics are cited, e.g., 154 million ton-miles in 1958 flown at a direct cost of $21.6 million. It is not surprising, then, to find testimony by industry that only 9 or 10 per cent of the domestic air freight carried by certificated carriers is military traffic and the charge that military policy is "sapping the strength" of the certificated carriers.

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129 CONAIR Report, op. cit., Tab E. Direct cost is here arrived at simply by dividing the contract cost by the used ton-miles. Indirect cost here includes personnel, plant, materials handling equipment, and communications. Note that since the government buys Logair on the basis of a plane-mile rate, the burden of load factor is entirely on the Air Force. The operation reports an available ton-mile rate of about 10 cents.

130 Ibid., p. XI-3.

131 Hearings, Military Air Transportation, op. cit., p. 91.
But to date the Logair system has been successfully defended as an integral part of the weapon system it supports, "... as much as the tanker, fighter, or bomber." Because of its composition of civil carriers, economical operation, and support successes, this instrument attracts less Congressional and industry attention than does military overseas airlift policy. Moreover, it seems reasonable to predict that its rate of expansion will soon slacken considerably, as operational limits are approached. This is to say that the addition of bases (frequency of stops) becomes more marginal to the system as shorter flight lengths reduce the advantage returned from airlift service.

In the all-out war situation the status of any civil domestic airlift does not seem entirely clear. If most of its formal logistic mission is pre-D-Day, whatever the merits of carrier contentions of "peacetime carriage in training for wartime," it seems likely that should the United States homeland be attacked there will be little place in the skies for, say, Delta Airlines as the Air Defense Command becomes airborne. In this case the role of the civil carrier after the initial strike might well be limited to emergency evacuations and the

carriage of whole blood. Yet the immediate post-attack transportation requirement of the military will likely be the redistribution of undamaged assets within the Zone of Interior to support a second strike by the strategic forces. If adequate reliability and flexibility could be assured, the domestic civil carriers might play a crucial role in this important task.

2. Overseas. Consider next the overseas military airlift requirement. As stated earlier, the military has extended the direct support philosophy to "customer" support overseas. The Air Force is by far the greatest user of this overseas airlift. It moves more than three times the Army requirement and five times the Navy requirement. Furthermore, in the case of passenger traffic, the Air Force moves 85 per cent of its personnel and their dependents by air, while the Army, until recently, moved no dependents by air. Presently, a committee under the Joint Chiefs of Staff receives and evaluates monthly airlift requirements submitted by the three military departments and allocates available space on the carrier, the Military Air

133Supra, Chapter II, B.
134Hearings, Military Air Transportation, op. cit., p. 775.
135Ibid.
Transport Service. That tonnage not moved via MATS is handled by the purchase of civil augmentation. It is to an analysis of this last proposition - the civil industry offering and military use of commercial overseas airlift - that attention is now directed.

The role of commercial air carriage as regards the overseas military air requirement is shaped in a quite different setting from the domestic. The chief determining factors are the existence and operation of the giant, government-owned air transport fleet of both cargo and passenger aircraft -- the Military Air Transport Service and the continuing financial problems of the commercial airline industry. MATS exists for the wartime needs, but in its readiness training performs the productive business of hauling Department of Defense cargo in overseas movement. The civil carrier function, it is stated, is twofold: (1) to augment the military air carriage in peacetime, and (2) to provide programmed additional transport capacity in wartime. This last is estimated at 40 per cent of the total requirement in the initial days of general war.  

The size and proportion of overseas military traffic that moves via commercial augmentation is indicated in these statistics for FY 60: after eleven months

operation, commercial supplement to MATS airlift, passenger and cargo, was 233 million ton-miles representing 27 per cent of the total.\textsuperscript{137} MATS obligation of funds for the purchase of this commercial lift was $50 million in FY 57, $70 million in FY 58 and FY 59.\textsuperscript{138} The amounts, it seems, were not enough to satisfy the airline industry, and Congressional hearings were called in 1958 to review the policies, procedures, and operation of the Department of Defense in the transportation of air cargo and passengers: the occasion was clearly described in the Military Operations Subcommittee's opening statement,

\begin{quote}
Commercial air carriers believe that MATS as the largest single air transport activity in the world, is unfairly competitive with their own operations and detrimental to the economic well-being of the industry. Organizations and individuals who represent the commercial air carriers petitioned the Subcommittee to make an inquiry into the MATS operation.\textsuperscript{139}
\end{quote}

\textsuperscript{137}Department of the Air Force, Airlift Service Industrial Fund Data, Statistical Abstract prepared by Statistical Services Division, DCS/Comptroller (Scott Air Force Base, Ill., June, 1960).

\textsuperscript{138}House Report No. 2011, \textit{op. cit.}, p. 19. Moreover, this represents only a portion of military expenditures for commercial airlift service, the domestic and overseas total amounting to $231 million in FY 59.

\textsuperscript{139}\textit{Ibid.}, p. 1.
Highlighting of the arguments and findings in this long term struggle provide understanding of the 1960 "new look" in MATS.

The civil industry complained (1) that it was not receiving its proper share of traffic, and (2) that which it did receive was too erratic. Its arguments were couched in terms of what it envisages as its wartime national defense contribution, but with undisguised reference to the financial straits of the carriers. For if the civil carriers could show that they could satisfy a substantial portion of the wartime airlift requirement, this could mean a reduction in size and/or operation of the military fleet, i.e., greater portion of peacetime traffic to the civil industry. The Civil Reserve Air Fleet plan provides the agent for such efforts. Under industry and Congressional urgings and a Presidential Order to the Secretary of Commerce the Civil Reserve Air Fleet was formed, comprised of designated suitable four-engine aircraft of the several carriers and programmed to mobilization within 48 hours. The government pays

140Ibid., pp. 1, 3.

the cost of modifying each of these designated aircraft to make them structurally convertible to military needs, provides spare equipment and parts, base facilities along overseas routes, and route logistic support.\textsuperscript{142} The cost to the government of direct modification since the beginning of the program in 1953 has been $39 million.\textsuperscript{143}

Whether or not GRAF is a "bargain" as additional capacity, it is fairly clear that the program has been received by the Department of Defense with something less than enthusiasm. There are indications that MATS, which monitors the over-all implementation of the plan, has had serious misgivings over the contribution of GRAF in the light of present war plans and potential eventualities. First, the use of GRAF is limited to the case of a declaration of a national emergency.\textsuperscript{144} Hence, any deployment in advance of a stated emergency could not draw on GRAF support nor could such a maneuver be concealed if the civil carriers were to withdraw equipment from commercial service and schedules.

\textsuperscript{142}House Report No. 2011, \textit{op. cit.}, p. 31.

\textsuperscript{143}Ibid. Two-thirds of the original 331 aircraft have been replaced by newer models.

\textsuperscript{144}Hearings, \textit{Military Air Transportation}, \textit{op. cit.}, p. 510.
Secondly, the Air Force reports that of the 368 aircraft in the fleet only 183 are suitable for long range overwater flight, and these require conversion of radios and equipment and present door configuration and cube problems for certain military cargo.\textsuperscript{145} Finally it is not above question whether the reserve fleet carrier is readily adaptable to the varied -- and hazardous -- wartime tasks. It is pointed out that after six years of planning the carriers have yet to negotiate stand-by contracts with their pilots and crews to assure their availability for emergency service.\textsuperscript{146}

On the other side, the Air Force objected to any characterization of MATS as too large, too costly, inefficient, or competitive for it considers it an integral part of the national defense system. Further it charged the civil carriers with reaching for a "business plum."\textsuperscript{147} The Air Force rationale for MATS peacetime carriage of passenger and cargo for military

\textsuperscript{145}\textit{Ibid.}, p. 508.

\textsuperscript{146}\textit{House Report No. 2011, op. cit.}, p. 6. It is fact that during both the Berlin crisis and the Korean conflict commercial carriers compiled an outstanding record, though most of this was over fixed routes and major bases.

\textsuperscript{147}\textit{Ibid.}, p. 4.
and other government agencies hinges on training and economy.\textsuperscript{148} Starting with a given concept and level of the most extreme wartime airlift mission demands and viewing these demands as unique to itself, the minimum peacetime operating rate generates an airlift potential. Though this lift so generated is enormous, it is still considered a by-product and logically uneconomic and wasteful of the taxpayers' money not to utilize it. Assistant Secretary Sharp stated,

\begin{quote}
These (peacetime) operations represent a necessary recurring cost, and considerations of economy dictate that the airlift so generated must be applied to do useful work.\textsuperscript{149}
\end{quote}

It is this "useful work" which occasions industry-Congressional inquiries.

Given the size of the military fleet and the need for its exercise the Department of Defense case for economy appears valid, for with the planes and crews there the incremental cost of flying loaded instead of empty is not great. These costs are largely out-of-pocket, involving some charges to fuel and maintenance and some share of the outlays for personnel

\textsuperscript{148}Ibid., p. 4.

\textsuperscript{149}Hearings, Military Air Transportation, op. cit., p. 498.
and supporting facilities and services. Nor are reported costs very helpful in attempting any MATS-industry cost comparisons. As is customary in governmental accounting, operating costs for MATS do not include "business cost" items like insurance and taxes, nor costs for depreciation of capital assets. 

Admitting the cost stalemate, the Subcommittee on Military Operations concluded in the 1958 hearings,

The economy arguments of the Air Force and the civil carriers cannot be resolved because their basic premises are different and because, as everyone agrees, there are no valid data for accurate cost comparisons.

The argument must turn, then, to policy and the size and utilization of the military fleet.

The concept has developed that MATS must be of a size and preparedness to meet certain military needs which cannot be supplanted by civil resources regardless of total requirements or civil capacity to expand. When pressed to this position Dudley C. Sharp, Assistant Secretary of the Air Force, confirmed this -

These are hard-core wartime airlift needs of such crucial importance at the outset of war that reliance for their fulfillment upon anything but a seasoned, properly

\[150\] Ibid., p. 684.

equipped, disciplined military force such as MATS would be the height of national folly.\textsuperscript{152}

The utilization rate of the MATS fleet is also a source of apprehension for the commercial industry. At the time of the 1958 hearings the rate was 4.24 flying hours per day.\textsuperscript{153} The military felt this to be too low a rate in terms of preparedness for current war plans and sought a higher daily utilization. The problem is of course that total generated airlift capacity is a function of planes times flying hours, and thus any such increase in utilization of the military fleet is of further concern to the commercial industry.

As a countervailing pressure to these efforts the Senate Appropriations Committee earlier had directed the Department of Defense to reprogram FY 57 funds for procuring from commercial carriers 40 per cent of MATS passenger and 20 per cent of MATS cargo requirements. Citing subsequent experience percentages of 20 per cent passenger and 10 per cent cargo, the commercial carriers complained in the hearings that the 40-20 formula was being ignored.\textsuperscript{154} The investigative committee

\textsuperscript{152}Hearings, \textit{Military Air Transportation}, op. cit., p. 503.

\textsuperscript{153}Ibid., p. 498. Note that commercial air carriers consider it a business necessity to operate their fleets at at least 6-8 hours daily utilization.

\textsuperscript{154}House Report No. 2011, op. cit., p. 2.
responded to the industry position reaffirming its intention of compliance with the 40-20 formula. In reply Secretary Sharp commented,

If we are so instructed, of course, by Congress to do this, it is not at all impossible for us to do it . . . It is only a matter of willingness to recognize the fact that this seems to us to be a more expensive way of doing business, and perhaps it is justified for some other reason.\(^{155}\)

The "other reason" confronts one flatly with the complexities of the ordering of public policy.

More than a glimpse may be gotten of the extent to which the industry plea touched the Committee by noting these findings -- and their tone:

Military air transportation has now become so large a portion of total air transportation that the Department of Defense cannot rightfully maintain a position of indifference to the economic conditions of the civil air industry.\(^{156}\)

They further confidently asserted that military needs, while the professional concern of the military, . . . in the final analysis are satisfied by the airline industry and private enterprise. The judgment that bears upon these needs cannot be exclusively military.

\(^{155}\)Hearings, Military Air Transportation, op. cit., p. 706. As indicated by FY 60 trend figures (Appendix) the Department of Defense is complying at least in passenger carriage augmentation, but continues to be reluctant in cargo augmentation.

particularly when military policies and operations make heavy impact upon given sectors of the civilian economy.\textsuperscript{157}

And finally,

\ldots it is the opinion of this committee that the Air Force should give attention to handling its air transport business in such a way as to assist in keeping the nonscheduled and other airlines in a reasonably sound financial and operating position.\textsuperscript{158}

Having carried high the industry banner the Committee blithely identified and disposed of the Department of Defense policy position as, "the hard-shelled military attitude \ldots that the civil carriers should not expect to be 'subsidized' by the Department of Defense."\textsuperscript{159}

Subsequently, in the summer of 1958, in a memorandum from the President to the Secretary of Defense, the Department of Defense was directed to make a study of the military role performed by MATS in peace and war. This was to include review of "areas where MATS might be performing transportation roles in duplication of commercial enterprises."\textsuperscript{160} The resulting report

\textsuperscript{157}\textit{Ibid.}, p. 3. \textsuperscript{158}\textit{Ibid.}, p. 46. \textsuperscript{159}\textit{Ibid.}, p. 107.

\textsuperscript{160}Presidential Memorandum to the Secretary of Defense dated July 23, 1958 and reprinted as Appendix I to Department of Defense study, \textit{The Role of Military Air Transport Service in Peace and War} (Washington, February, 1960).
set forth proposals "for improving materially national airlift readiness," most of which became known as "Presidentially approved courses of action." They are now being implemented. Examination of the most important of them indicates their tone and direction.

Key among the new policies is the provision, that MATS be equipped and operated in peacetime to insure its capability to meet approved military hard-core requirements in a general war and in situations short of general war, and such other military requirements as cannot be met adequately by commercial carriers on an effective and timely basis. This forces for the first time a delineation of airlift requirements into (1) critical or hard-core and (2) other essential or civil eligible requirements which can move in either military or civil operated aircraft. Here hard-core is defined as those requirements which must be handled by military aircraft and crews because of special military considerations, security, or because of limiting physical characteristics such as size or dangerous properties. Examples of this category are special deployments and the movement of missiles and special munitions.

As to the civil eligible requirements, the report concludes that the commercial carriers do not now possess

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161Ibid., p. 1. 162Ibid., p. 5. 163Ibid.
the cargo capability to accommodate these demands in an emergency situation.\textsuperscript{164} Thus MATS will continue to make up this commercial deficit until the commercial air carriers can provide the assured capability. However, as the airlines equip themselves with appropriate aircraft, downward adjustment in the size of MATS will be made.\textsuperscript{165} Already the Air Force has set a limit to MATS' ton-mile capability and reduced its utilization objective from 6 to 5 hours per day per type of aircraft.\textsuperscript{166} Also, much of its mail carriage is being given over to the international air carriers.

A second important policy provision is,

That commercial augmentation (overseas) airlift procurement policies and practices be better adapted . . . so as to encourage and assist in sound economic growth, development, and maintenance of an increased air cargo capability. . . \textsuperscript{167}

To accomplish this the Department of Defense was directed to explore the feasibility of (1) entering into longer term contracts for MATS traffic, (2) procuring increased commercial cargo airlift from common air carriers at tariff rates filed with the Civil Aeronautics

\textsuperscript{164}Ibid., p. 2.
\textsuperscript{165}Ibid., p. 3. Of note is the fact that there are no aircraft in the commercial carrier industry which were originally designed as cargo aircraft.
\textsuperscript{166}Ibid., p. 17. \textsuperscript{167}Ibid., p. 5.
Board as opposed to the current practice of advertising for bids, and (3) giving preference in the movement of MATS traffic to carriers committed to the CRAF program.\textsuperscript{168}

Also the Department of Defense indicated that it would support legislation, "if proposed," for guaranteeing loans for the purchase of modern cargo aircraft by commercial carriers.\textsuperscript{169}

The background to this development seems to be the fact that MATS uses the bid system for the bulk of its traffic and employs common carriage only when it results in an immediate price advantage to the Air Force or when it is the only means available. Thus, distribution of traffic is based on cost with no preference given to CRAF members, status, route system, equipment operated, or ownership of aircraft. These practices do not enhance the position of the common air carriers and the familiar charge is made that such methods lead to destructive rate practices. The adequacy of service and the apparent solvency of the contract carriers would seem to belie this charge.

The third significant course of action is found in the provision,

\begin{quote}
That the modernization of MATS hard-core military airlift capability be undertaken
\end{quote}

\begin{flushright}
\textsuperscript{168}Ibid., p. 6. \hspace{1cm} \textsuperscript{169}Ibid., p. 20.
\end{flushright}
in an orderly manner consistent with other military requirements. \textsuperscript{170}

The Department of the Air Force has long sought modernization of the MATS fleet. Dependency on intermediate island bases is viewed as a serious limitation in long distance transport support, as is the fact that presently there is not one military jet cargo aircraft in service. Department of Defense assessment of the source of the problem and its solution is revealed in this excerpt from its report to the President:

\begin{quote}
There is . . . strong opposition to any modernization of MATS in its present role. There is good reason to believe that this opposition would be withdrawn if MATS channel traffic operations were reduced and added emphasis placed on hard-core mission. Thus, it appears such a reduction would have public relations advantages as well as being militarily desirable. \textsuperscript{171}
\end{quote}

This third provides the linkage between the other two courses of action -- delineation of airlift requirements and increased use of commercial carriage in exchange for modernization of the military fleet.

\textsuperscript{170}Ibid., p. 5. \textsuperscript{171}Ibid., pp. 13-14.
VII. SUMMARY AND CONCLUSIONS

This study selected the transportation segment of the logistic cycle for critical examination in terms of what the economics of high-speed transportation contribute to defense practice and in turn what a defense posture implies for transportation. It focused attention broadly on the transport area in analyzing the military establishment both as carrier and as shipper. In this way frequent comparisons were drawn between business and Department of Defense policy and practice - and examined as to validity. Finally, some public policy dilemmas attendant to the fact of long term logistic support were identified and treated from the particular view of the economist. It remains to appraise the hypotheses and conclude for policy.

It was hypothesized that premium transport of military cargoes makes the critical contribution to minimizing cost and maximizing preparedness in total logistic response. Premium transport was seen to mean principally airlift with preparedness equated to reaction capability -- in turn a derivation of time. It was
held first that to the extent the United States military response to the military threat is to assume a posture of constant combat readiness of its forces (with emphasis on the all-out strike) -- to that same extent the logistic system that supports it must be its reflection. In accomplishing this the system is striving to react in the shortest possible time to the demands of military forces and to do so from the smallest possible stockpile of material. This does not rule out the concept of mobilization, but suggests that it enters at an earlier point in the defense process -- a partial armament economy geared to the longer term temperature of the Cold War.

There is actively underway in the Department of Defense, particularly in the Air Force, a fundamental change in logistic philosophy. This may properly be said to derive broadly from the impact of technology with its compression of time for response and aggravation of cost in complexity. Substantial relief to both problems is being found in the refinement of procurement techniques and the tailoring of high-speed transport into becoming the normal means of logistic support.

\[^{172}\text{Supra, Chapter II, A.}\]
The concept of pipeline time was introduced and viewed as a period of suspended satisfaction in terms of defense -- of the amount of materials in transit from producer to user and the rate of their flow. This was seen in economic terms to be quite analogous to the twofold relationship of the time factor and commodity movements to a perishable market. The economic gains from speed (time) in transport were conceptually viewed as (1) the reduction of inventories and prepositioned stocks, (2) the reduction of capital frozen in transit, (3) the reduction of distribution time, (4) the widening of the sources of supply, and (5) the increased mobility of the consumer.

Applied to logistics this has meant the substitution of high speed reaction for inventory, enabling substantial reductions in procurements and the aggregation of stocks behind combat important and costly weapon systems. Specifically, under the Hi-Valu concept inventories have been separated into cost categories and management applied accordingly. Information flow and data processing time have been compressed throughout and thus contribute to reduced quantities (investment) of active material in the logistic cycle.

173 supra, Chapter II, B.
174 supra, Chapter III, B.
There are presently available neither the funds nor the production lead time to provide the number of high cost items required under the World War II support concept of long pipelines and vast stockpiles.

The necessity for such measures designed to "hold the line" in the cost trend of logistic support was treated\textsuperscript{175} as a conglomerate of unit cost pressures upward. In addition to inflation of prices, these were identified as (1) demands for improved weapon performance, (2) use of more failure-prone equipment, (3) less interchangeability of parts, (4) the diversity of weapons, (5) a shorter weapon life leading to more rapid obsolescence and instability of design and (6) changing war plans and strategic requirements. The helpfulness of economic conceptualizations -- particularly indifference analysis and opportunity costs -- was cited \textsuperscript{176} in the posing of alternative solutions or trade-offs between weapon numbers and levels of support under a given combat effectiveness. Specific support savings were documented under the selective management of materiel and phased procurement programs.

The effectiveness of the Hi-Valu program of the Air Force is attested to in part by the recent emergence of similar plans in the Departments of Navy and Army and the

\textsuperscript{175}Ibid., A. \quad \textsuperscript{176}Ibid.
current interest expressed in its philosophy on the part of the British and other NATO countries. Having already been applied to both manned and unmanned systems, savings from the program in the case of the Air Force may be expected to level off. Embodiment of selective management principles by other forces should yield additional, though less imposing, returns to controlling the cost of logistic support.

While these increasing movements toward the actuality of direct support, contractor-to-user, in the interest of responsiveness may be advantageous, they are not without undesirable aspects. Analysis of the implications of this integration of industry into the logistic complex provides a bridge to the second hypothesis of this study.

It was hypothesized that the nature of the logistic response to the military threat poses unique and substantial issues for public policy in military-industry relations both in transport and manufacture. These were considered as subtle but very real social costs entailing (1) a significant tilting of the balance between public/private authority, responsibility and

\[177\text{Ibid., C.}\]
accountability, and (2) a contribution to industrial concentration patterns in conflict with general public policies.

The merits of the actual and planned integration of force support with industry were admitted to and documented -- and in fact serve to make possible the validity of the first hypothesis. These negative ramifications of the relationship, while less readily recognizable, are surely of a magnitude requiring general public policy consideration.

The alignment of the military and industry is, of course, not new, but its extent and apparent fixity are. With this industrialization of war, probably the key contributor has been the paramount place of money in defense preparedness. Expenditure of $40 billion into an economy, with at least half of this in direct procurement from the private sector, clearly cannot have neutral effects. As a result of the direction of this procurement, one negative effect, it is concluded, is the creation and hardening of industrial concentration patterns contrary to general public policy and calling for review. A second is the passage of defense authority to private industry without attendant public responsibility. Interestingly enough, this is closely analogous to the earlier governmental practice of
hiring mercenaries to defend the country. The wag's remark of "contracting-out a war" is partially approaching actuality. The famous statement attributed to Georges Clemenceau regarding the matter of war and his generals might now more appropriately be altered to admonish, "War is much too serious a thing to be left to contractors." The cost conflict can be generalized: less perfect integration may sacrifice efficiencies in money costs of defense support, but more perfect integration may generate social costs which public policy should be slow to endorse.

If the first three chapters can be said to have dealt with the military establishment as shipper, the last three chapters can fairly be said to have dealt with the military as carrier. The former activity was characterized by business integration, the latter by business simulation.

In treating the organization for transport support the concept of the Single Manager was introduced first in its application to common commodity areas and then in its subsequent application to the common service, e.g., transport, areas. Single manager assignments


179 Supra, Chapter IV, A.
and operating agencies were described as Department of the Army, for traffic management (Military Traffic Management Agency), Department of the Navy, for sea transport (Military Sea Transport Service), and Department of the Air Force, for air transport (Military Air Transport Service). These creations were viewed as part of the continuing design to make the military more like a business. In the case of MTMA the function is one of staff management, while in the case of MSTS and MATS the function is more the operation of organic (government-owned) transport equipment and augmentation of commercial capability. The structural relationships and responsibilities to each other and to the using agencies were enumerated in detail.\textsuperscript{180} In practice the delegation of authority and functions by one to another was seen as significantly qualifying the system. The fact that the single managements have produced some economies was substantiated.\textsuperscript{181}

Whatever the economies of single managements the national policy consideration must ask, What does it do for responsiveness to the military need, i.e., does it enhance the readiness posture? For if the logistic demands of combat forces are not adequately met in kind,  

\textsuperscript{180}\textit{Ibid.}, B. \textsuperscript{181}\textit{Ibid.}, C.
amount, and flexibility the cost savings are indeed empty victories.

Probably the greatest limitation on the performance of the Single Managers reduces to the problem of conflicting philosophies between Agent and customer. While single managerships may be viewed as a step toward unification their practice may be somewhat divergent. In its application to common-use items in the commodity area the concept clearly has organizational and economic merit. Single service procurement of food, for example, is a common sense arrangement where there is little correlation with service affiliation. As applied to the transport service area, however, the problem is that the Department charged with the responsibility for a kind of support does not necessarily possess a philosophy commensurate to that support, i.e., there may be a breach between the views of urgency and priority between the Agent and the user. It is fair to suspect, for example, that MATS' operations, which are directed primarily toward support of the Strategic Air Command during initial deployment, are not necessarily of the best design for support of the Navy.\textsuperscript{182}

\textsuperscript{182}It was this type of problem that the Director of the Military Traffic Management Agency, charged with Department of Defense-wide traffic management control, referred to in acknowledging, "Each military department had a well-organized traffic organization tailored to
In more general terms this problem of the marriage of responsibility and philosophy is not unlike that evidenced in most university curricula, where a common subject area like statistics is found in the departments of Psychology, Economics, and Sociology; or history in Art and Economics; and even letter writing in the Business Administration, Engineering, and English departments. Proponents of this type of separation would not likely support the single manager principle.

Nor do the single managerships necessarily advance procedural responsiveness. With substantial restrictions as to the employment of government and private transport equipment, the Single Managers do not enjoy the same freedom of action that industry enjoys. Moreover, the quest for "commercial-type" operations in the Department of Defense as expressed by demands for centralization, for instance, may be quite contrary to meet its own particular logistical needs. In fact, one of the major initial problems facing the Military Traffic Management Agency was the Herculean task of devising an organizational structure, and an operating base, which would be completely responsive to these many and often divergent departmental requirements." (Morris, op. cit., p. 15). Writing to this same point Admiral Eccles remarks, "The fact that members of one service are sometimes reluctant to trust the professional judgment and restraint of officers of another service is the one greatest obstacle in the process of reaching agreement as to the manner in which logistic coordination is to be exercised." (Eccles, op. cit., p. 259).
what business is in fact doing. At any rate the pitfalls of too ready analogizing between military and private activities are indeed considerable.

The second key commercial feature which characterizes the military as carrier is the method of financing single managership activities. The problem was viewed as not unique to the military, but a part of the general problem of pricing in the absence of markets. Accordingly, analogy was made with the problem faced by the vertically integrated firm in pricing inter-divisional transfers of products or services. The Industrial Fund concept was introduced as commonly following establishment of single manager arrangements, and in this case imposed on the transport managers. Authority for industrial funding in the Department of Defense was cited as the National Security Act of 1947 as amended and its stated objective described as provision for the means of more effective cost and accounting control over military programs through commercial-financial procedures. Under industrially funded activities public funds are initially appropriated into a cash working capital account and subsequent operations follow revolving fund procedures. The military departments, which are the

183 Supra, Chapter V, pp. 73, 75.
184 Ibid., A.
chief customers, reimburse the Fund from individual appropriations as the services or products of the activity are consumed. The Fund is thus sustained out of current operations.

Applied to transport services (MSTS and MATS) industrial funding was viewed as encountering considerable obstacles by way of the instability of requirements in military transport demands and resultant effects on financial controls. In particular the difficulty of structuring a no-profit-no-loss tariff equal to or below straight commercial rates was pointed up. Efforts to make the MATS Fund break-even in an operating and accounting sense were cited for fiscal year 1959 and 1960. The original expectations in inaugurating the industrial fund arrangement on transport were set out as (1) inducing a greater cost consciousness on the part of Department of Defense agencies, (2) enabling better management decisions through closer financial controls, (3) providing integrated accounting and budget data for appropriation purposes, and (4) establishing a normal buyer-seller relationship between producer and user.185 These were tentatively appraised in light of subsequent practice.186

185Ibid. 186Ibid., B.
Industrial funding itself probably has little impact on responsiveness, though such a conclusion may as yet be premature. Still relatively untested under emergency conditions, the MATS Fund was reportedly in substantial accounting confusion during the Lebanon deployment in 1958, but this may have been attributable to its then recent inception. Current Department of Defense directives covering industrial funding of airlift do not specify duration, but it is likely that in an all-out or large scale emergency, suspension of the Fund's billing procedures will occur.

Ultimately, responsiveness to the military need is the test of any logistic system. Thus national defense policy considerations must be directed toward adequately meeting the myriad and crucial logistic demands of combat forces. Inasmuch as economies can in fact be antagonistic to responsiveness the task of public policy is to secure that balance which fosters the one without incurring orders of risk unacceptable to the other.

In looking to public policy toward the military use of transport resources, a paradox was identified and the

187 The problem was resolved by the Air Force paying the entire bill for the Lebanon and Formosa deployments, though under the Fund the costs should have been distributed among the participating agencies. (Interview with J. J. O'Donovan, op. cit.).
mottoes involved in its elements appraised.\textsuperscript{188} The sides were viewed as efforts on the one hand to commercialize military transport, fostered by hopes of economies and control and taking the form of the single managership and industrial fund arrangements; and countervailing pressures on the other hand to limit the latitudes of military management of its transport resources actually compatible with "business-like" operation, in the interest of ideology and industry financial conditions. The limitations were enumerated as restrictions on utilization of organic equipment, procurement requirements such as spreading the traffic, advertised bidding, and limitations on the hiring and firing of carriers. The problem was seen as the proper utilization of transport facilities already in existence with the MATS-industry controversy the key case in point. The pertinent passages within the Single Manager Directive to MATS and the 1958 Congressional hearing on military air transportation were presented in this assessment.\textsuperscript{189}

The case of airlift as the chief high speed mode of transport was argued in terms of the military requirement and the commercial offering.\textsuperscript{190} Domestically the

\textsuperscript{188}Supra, Chapter VI, A.

\textsuperscript{189}Ibid., B, 2.

\textsuperscript{190}Ibid., B.
categories of installations eligible for regular airlift support were set down and the commercial contract airlift system (Logair) satisfying these requirements was described. Common carrier air service was rejected as unsuited by way of existing routes and frequencies, capacity, and cost, and inappropriate to the military requirements of reliability, flexibility, and central management. 191 The Department of Defense overseas wartime airlift requirements and peacetime training are necessarily bound up with the size, composition, and exercise of the MATS fleet and the accompanying conflict with the commercial industry. The arguments of defense contributions, shares of traffic, unfair competition, and the admission of incomparability of cost data were presented with resort to Congressional hearings and the recently published "Presidentially approved courses of action."

In its continuing duels with the airline industry the Air Force has seemingly wedged itself into a doctrinal dilemma. This is to recall that the Air Force -- probably the most zealous advocate of "short war" thinking -- is author both of the "pre-D-Day" philosophy and the "in-being" view. The former postulates that weapon destructiveness and a "second blow" policy dictate

191 Ibid.  
192 Ibid., B., 2.
that much of the logistic task must be accomplished pre-D-Day; the latter that what is needed is a transport capability ready to go "when the bell sounds." If the former is in fact the expectation, then the industry can strongly plead that it can and should perform the bulk of military peacetime carriage; if the latter is the case, then the airlines can call for military traffic in training for a wartime task. From the examination of the tone and direction of the 1960 courses of action now being implemented it was concluded that in effect a bargain was struck among the contending forces with the Air Force gaining modernization of the MATS fleet and the civil airlines industry garnering a larger share of military traffic. The guise of the latter was its proposed defense contribution; the compelling consideration was its continued financial straits; the instrument of argument was the Civil Reserve Air Fleet.

The foundations for the Department of Defense disclaimer of responsibility for fostering the economic development of the airlines (now partially overcome by events) are to the author basically sound.

In the first place, the planned wartime use of the civil reserve fleet must govern its peacetime role in

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193Ibid.
defense policy. This is merely to recognize that the national defense considerations of public policy as regards the commercial air transportation industry may be quite different from the national development aspects. The military has repeatedly expressed its view of the role of the civil air fleet as one of "insurance." Its most charitable view of GRAF at all is one of readying what is available, i.e., what the civil carriers have to offer without military support, and not of promoting its expansion. More bluntly, MATS must be prepared to carry out its immediate emergency mission with or without GRAF, the latter being tapped for subsequent airlift as it becomes available and necessary. This could importantly include, of course, a role in the redistribution of undamaged assets and key personnel in the post-attack period of general war in reconstituting the strategic forces for a second strike. As the plan now stands, no provision is made for activation of GRAF short of general war, and thus it can be concluded that it is not a readily available resource in all situations.

Second there exist serious questions of exactly what comprises the "fostering of sound economic development" in the airline industry. It is clear that commercial air freight does not now operate "soundly" without
substantial government subsidy, and to tie its existence further to dependency on military traffic is a public policy step of no small proportions.

Finally, whatever "fostering" is done for national policy reasons seems more properly the responsibility of other agencies than the military, especially the Civil Aeronautics Board, which is charged with the promotion of air transportation. The Department of Defense, like other governmental agencies holding Congressionally appropriated funds, has some duty to manage them in an efficient manner which should include, it would seem, productive utilization of its air transport fleet in peacetime.

It seems fair to state that as defense policy must be not only flexible to the current need but readily adaptable to changing needs, so with its image, logistics. There is danger, for example, in logistic as well as strategic preoccupation with general war, if it means neglect of the spectrum of eventualities below that threshold. It is not beyond credibility that as the kinds of support requirements shift in response to war plan changes or weapon inventories, the place of airlift and the relative role of the air carriers may shift as well. With military policy increasingly contemplating the vagaries of the limited war situation
as the most likely to be faced, air logistic roles and adequacies call for continued review. It is possible that some combination of military-civil transport response might be developed for certain contingencies local in character. Further, as the demands of missile support become increasingly determinate with successive generations of missiles, the size and composition of the logistic support fleet could conceivably alter. Any such shift in the nature and importance of the transport segment in logistic cycle will necessarily have an impact on the military establishment both as shipper and as carrier. Similarly, it will have implications for the economist in any analysis of the economics of logistic support.
Table 2 and accompanying Chart 3 are presented in evidence of Department of Defense partial compliance with the Congressionally imposed 40-20 formula (Supra, Chapter VI, p. 87). Since Congressional reaffirmation of its intent to enforce the formula in the 1958 Hearings (Military Air Transportation, op. cit.), the Department of Defense has exceeded the requirement that 40 per cent of its passenger airlift traffic move commercially, as seen in Column 1. It has continued to be reluctant (Column 2) to meet the companion requirement of 20 per cent imposed on its freight traffic.

**TABLE 2**

PER CENT COMMERCIAL CARRIAGE TO TOTAL CARGO/MAIL AND PASSENGER AIR TRAFFIC TRANSPORTED FY 1960* (In nautical ton-miles flown)

<table>
<thead>
<tr>
<th>Month</th>
<th>Cargo/Main (1)</th>
<th>Passenger (2)</th>
<th>Aggregate Average (3)</th>
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<tr>
<td>July</td>
<td>8</td>
<td>45</td>
<td>25</td>
</tr>
<tr>
<td>August</td>
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<td>40</td>
<td>23</td>
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<td>41</td>
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<td>May</td>
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</tr>
<tr>
<td>June</td>
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</tr>
</tbody>
</table>

*Data for June not yet available.

This latter situation may change as MATS relinquishes more of its mail cargo to the international route carriers and other of the 1960 "Presidentially approved courses of action" (Supra, Chapter VI, p. 111) are implemented.
Chart 3

PER CENT COMMERCIAL CARRIAGE TO TOTAL CARGO/MAIL AND PASSENGER AIR TRAFFIC TRANSPORTED FY 1960*

(In nautical ton-miles flown)

Key:
- Passenger
- Cargo

*Data for June not yet available.
Source: Table 2.
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I, Douglas Norin Jones, was born in Concord, New Hampshire, July 14, 1933. I received my secondary school education in the public schools of Concord, New Hampshire, and my undergraduate training at the University of New Hampshire, which granted me the Bachelor of Arts degree in 1955. From The Ohio State University, I received the Master of Arts degree in 1956. While in residence there, I was assistant to Professor Richard A. Tybout during the year 1955-1956. In October, 1958, while an officer in the regular Air Force, I was appointed Mershon Fellow at The Ohio State University, where I specialized in the Department of Economics. I held this position for a year, completing the requirements for the degree Doctor of Philosophy a year later.