86-F01-0141

ARMY STUDY
7489
V.1

(2)

~~SECRET~~

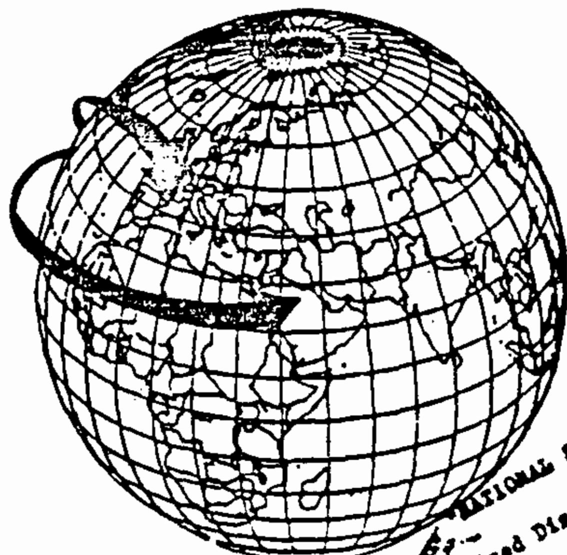
Department of Defense

(12) 431

Congressionally Mandated Mobility Study. (U)

Volume I. Summary. (U) → (8)

AD C026512



"NATIONAL SECURITY INFORMATION"
"Unauthorized Disclosure Subject to Criminal Sanctions"

30 April 1981

FILE COPY

Classified by USDRE
Review on 3 October 1990
Extended by USDRE
Reason: 5200.1R, PARA 2-301c, 6&6

VOLUME 1
SUMMARY

(14) USDRE-81-1318-VOL-1

~~SECRET~~

#109

81 11 05 501

410888

UNCLASSIFIED ~~SECRET~~
(... is unclassified)

CONTENTS

UNCLASSIFIED ~~SECRET~~
(... is unclassified)

FIGURES

VOLUME I

EXECUTIVE SUMMARY

1.1 BACKGROUND

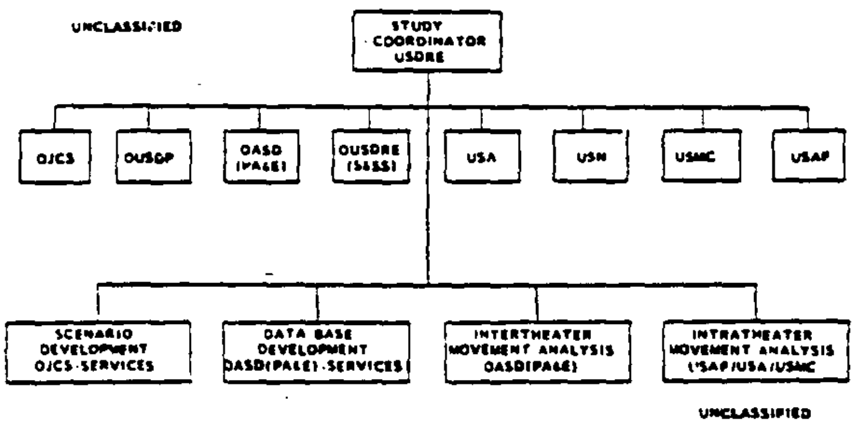
(U) The Department of Defense Authorization Act of 1981 required that the Secretary of Defense conduct a study to determine overall US military mobility requirements including the total mix of airlift, sealift, and prepositioning required for contingencies in the Indian Ocean area and other areas of potential conflict during the 1980s. The study was conducted under the direction of a steering group chaired by the Deputy Secretary of Defense whose members were:

Secretary of the Army
Secretary of the Navy
Secretary of the Air Force
Chairman of the Joint Chiefs of Staff
Under Secretary of Defense (Policy)
Under Secretary of Defense (R&E)
Assistant Secretary of Defense (MRA&L)
Assistant Secretary of Defense (PA&E)

The work was performed by a working group chaired by a representative of the USD(R&E) with members from OSD, OJCS, and the Services. Figure 1.1 shows the division of responsibilities within the working group.

1.2 SCOPE

(U) The study examined four contingencies in detail--two in Southwest Asia, one in NATO, and one in Southwest Asia with a precautionary reinforcement of NATO concurrently. The study considered only non-nuclear warfare. The forces deployed were limited to those programmed to exist in 1986, although in some cases deployment of additional forces would be desirable to have a higher confidence of achieving our objectives. The support forces and supplies deployed are based on the best estimate currently available of the demands of each contingency; however there are significant uncertainties in these estimates particularly for contingencies in Southwest Asia. Separate studies are underway to refine these estimates.



(U) Figure 1.1 (U) Study Organization

(U) Analysis was conducted for 1982, 1986, and 1990, with 1982 chosen to represent "current" capabilities because the situation in that year has largely been determined by funds already appropriated. The forces deployed in each year are essentially the same, but lift demand changes as their composition or equippage changes over the years.

(U) In the movement analysis, units were assumed to be ready to move when lift forces were available to move them. Forces were moved from their peacetime bases to wartime operating locations (deployment was not considered complete until forces were in place at wartime operating locations). Simulations of this total movement process used planning factors for movement within CONUS and within the objective theater. A detailed examination was made of the intratheater movement for those scenarios oriented on Southwest Asia. For the intertheater analysis, adequate POL was assumed to exist at the enroute bases available in each scenario, and reception ports and airfields were assumed to be adequate for the flow of personnel and cargo. Implications of these assumptions were addressed in order to establish meaningful perspectives. The impact of several scenario assumptions--actions taken on receipt of warning but prior to the decision to deploy, the availability of the Suez Canal, and whether the enemy attacks ships and aircraft--were varied if applicable to the contingency. The benefits of aerial refueling airlift aircraft were also examined.

(U) The study evaluated different types of airlift and sealift systems as well as prepositioning ashore and afloat; but, with the exception of specific programs already proposed to Congress, the alternatives are generic. For example, the study evaluated the utility of acquiring more of the sort of airlift provided by commercial freighters but did not examine the relative merits of acquiring such capability through CRAF Enhancement, purchase of KC-10s, purchase of 747s, etc. The specification of systems is part of Defense program development and will be developed by the Services based on the needs established in the study. Existing amphibious lift forces were used in the scenarios, but additional procurement of these forces was not considered. Finally, neither additional forward stationing nor the redesign of equipment to reduce movement demand was examined as an alternative to acquiring more lift.

1.3 SCENARIOS

1.3.1 REGIONAL CONFLICT IN THE PERSIAN GULF (SCENARIO I)

(S) [redacted]

35

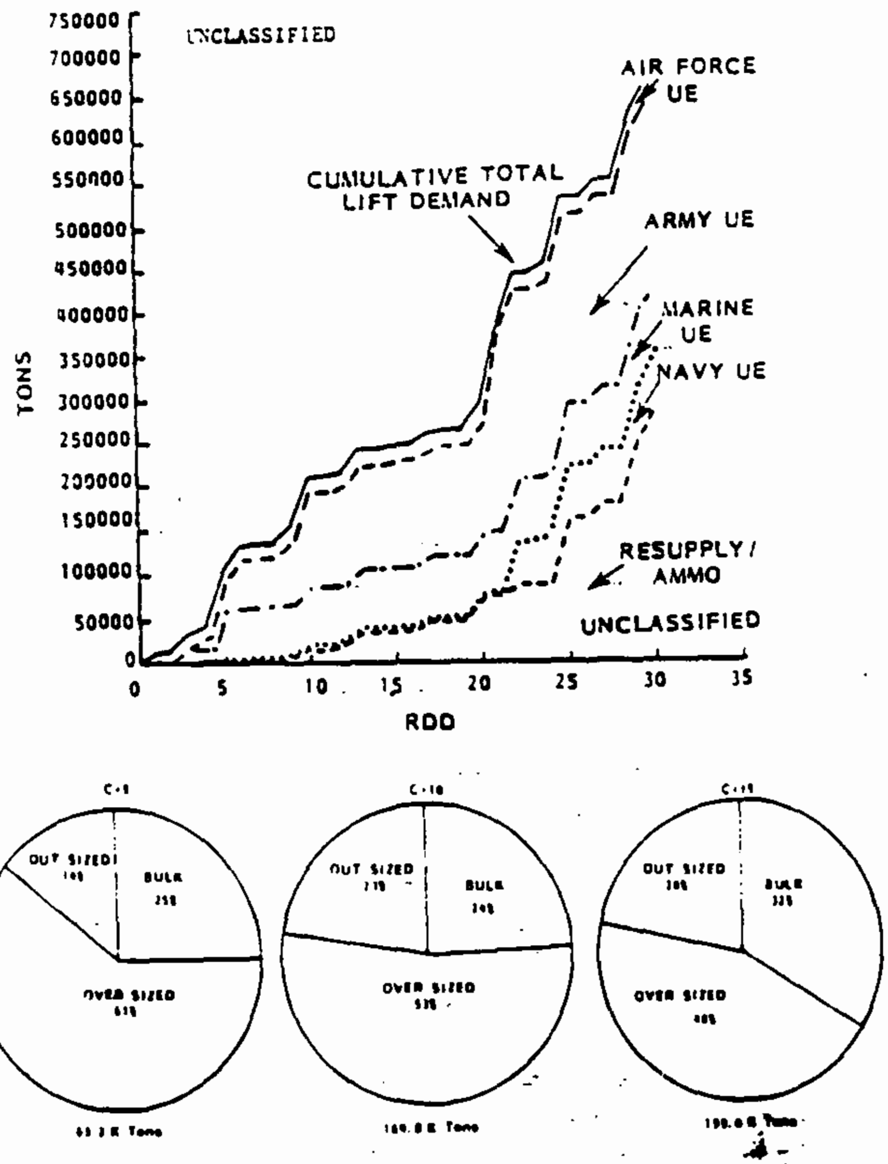
[redacted]

(S) [redacted]

(S) [redacted]

(U) Although the harsh climate on the Arabian peninsula requires no special characteristics in mobility systems, the movement demand is increased by the added needs of personnel support and equipment maintenance. In addition, the limited logistic infrastructure increases the

UNCLASSIFIED



(U) Figure 1.2. (U) Regional Conflict in the Persian Gulf: Lift Demand (All Tonnage) and Distribution of 1986 Potential Common-User Airlift Cargo need to deploy support forces for both combat and mobility operations. The capacity of ports and airfields on the south side of the Persian Gulf is adequate to support deployment even with the expanded mobility forces considered in the alternative programs. If these facilities are significantly damaged or destroyed or if the Soviets succeed in blocking access to the Persian Gulf, we would probably experience port and airfield constraints. In addition, because few roads cross the peninsula, the demand for intratheater airlift would increase substantially, and the ability to move outsized cargo into austere airfields would show a considerable benefit.

1.3.2 SOVIET INVASION OF IRAN (SCENARIO II)

(S) [redacted]

(S) [redacted]

(S) [redacted]

[

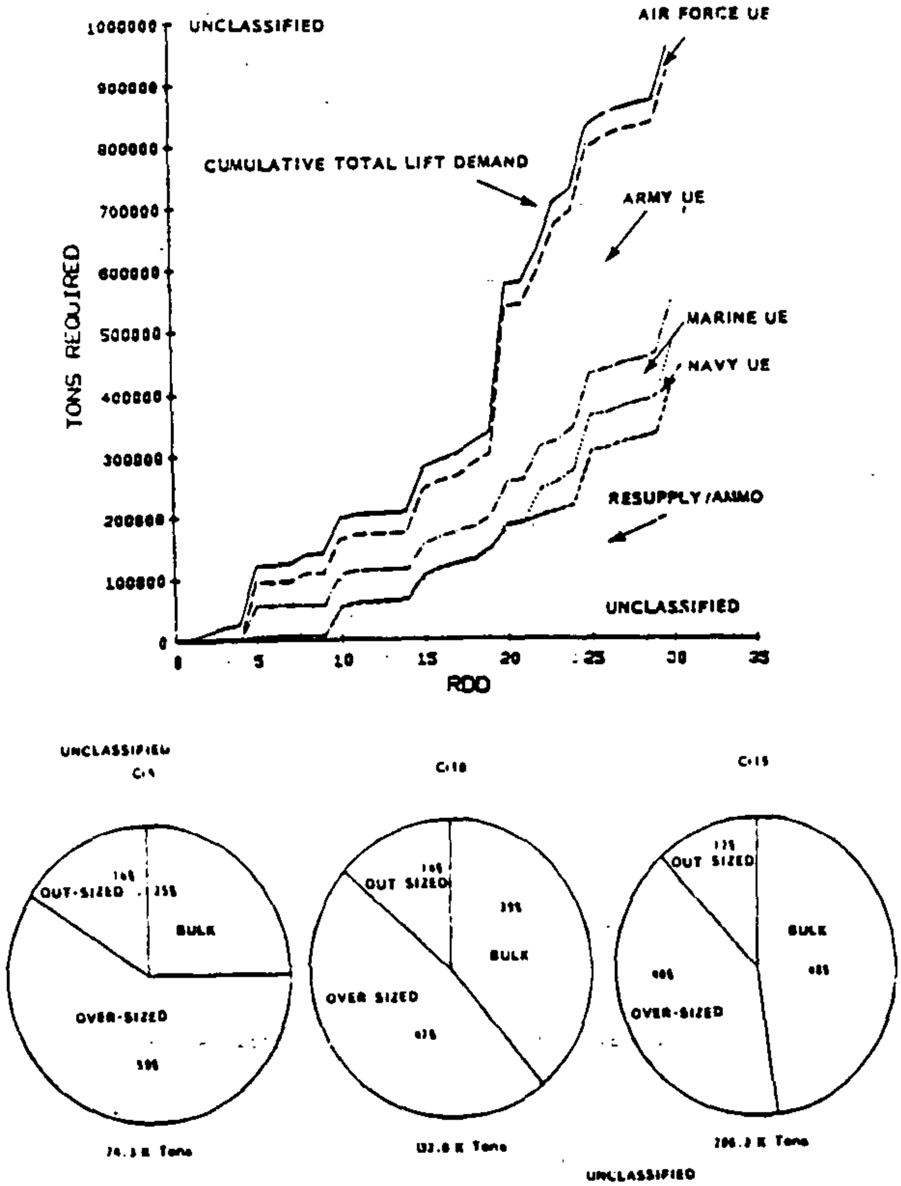
]

(U) As on the Arabian peninsula, the harsh climate and limited logistic infrastructure in Iran increase the numbers of support forces that must be deployed. Port capabilities are quite limited so that we must have a capacity to move cargo over the beach or through austere ports. The substantial distance from ports to some operating locations and the very poor cross-country transportation system makes intratheater airlift essential. In addition, although most destinations are near an airfield that can accommodate most types of cargo aircraft, limits on capacity at some of these airfields gives added importance to the ability to land at austere airfields.

1.3.3 NATO-WARSAW PACT CONFLICT (SCENARIO III)

(S) [

]



(U) Figure 1.3. (U) Soviet Invasion of Iran: Lift Demand (All Tonnage) and Distribution of 1986 Potential Common-User Airlift Cargo

[redacted]

1.3.4 REGIONAL CONFLICT IN THE PERSIAN GULF WITH A PRECAUTIONARY REINFORCEMENT IN EUROPE (SCENARIO IV)

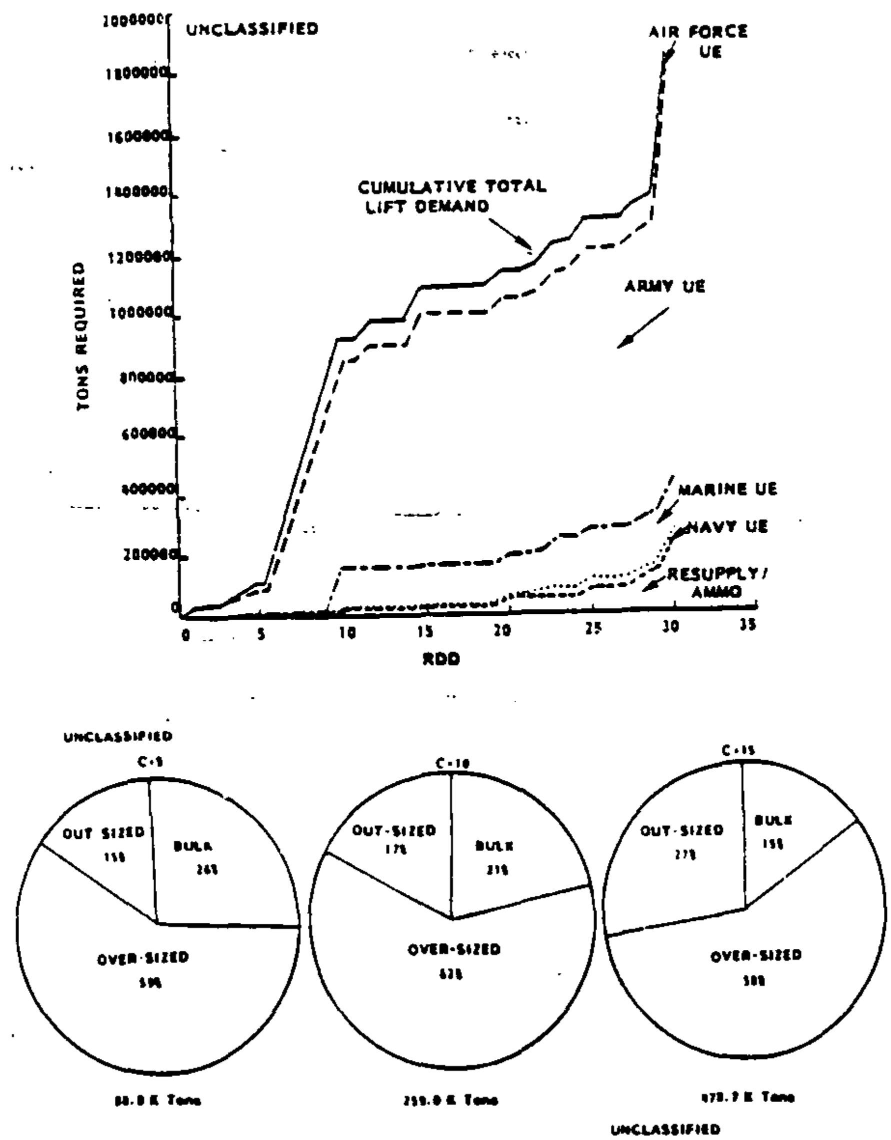
(S) [redacted]

1.4 CAPABILITIES OF CURRENT FORCES

(S) [redacted]

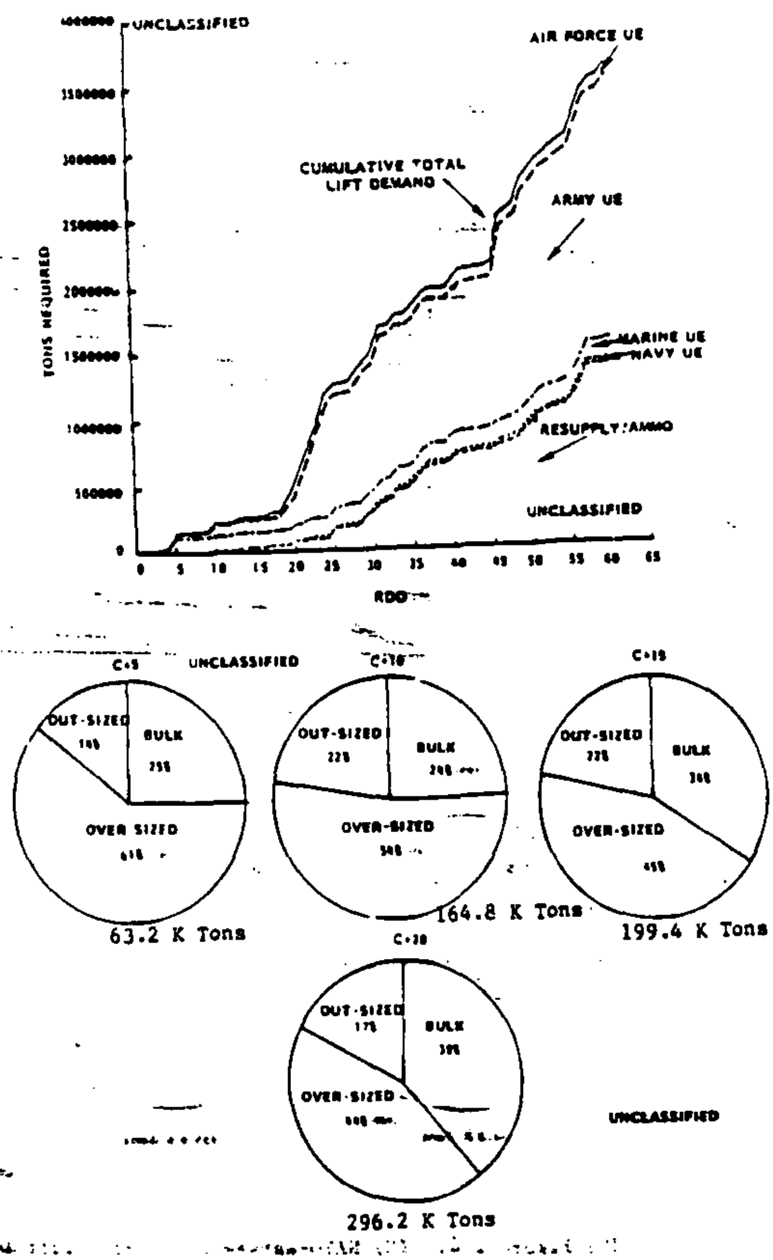
---

[1] (U) Tonnage is one measure of the magnitude of the job to be done compared to the gross capability of mobility systems. Other displays in the complete study show ability to close specific units compared to their required delivery dates.



(U) Figure 1.4. (U) NATO-Warsaw Conflict: Lift Demand (All Tonnage) and Distribution of 1986 Potential Common-User Airlift Cargo

UNCLASSIFIED



(U) Figure 1.5. (U) Regional Conflict in the Persian Gulf with a Precautionary Reinforcement in Europe: Lift Demand (All Tonnage) and Distribution of 1986 Potential Common-User Airlift Cargo

UNCLASSIFIED

(S) Figure 1.6. (U) 1982 Demand, Capability, and Shortfall by Scenario

1.5 CAPABILITIES IN THE 1986 "BASELINE" FORCES

(U) The study took as a baseline those programs presented to Congress in testimony on the FY 81 or earlier budgets that produce capability in 1986. Components of the baseline program are described below. Figure 1.7 shows the capability of the baseline program to meet the demands of each scenario. As is evident, significant shortfalls remain in all cases.

Elements of the Baseline

- Airlift Enhancement (C-5/C-141 modification, utilization rate, and sustainability increases and CRAF enhancement equivalent to 32 747s).
- POMCUS Fill (Completing the fill of six division sets of POMCUS and adding units as necessary to match increases in division structure).
- AF/USMC Prepo in Europe (equipment and supplies for two brigade-sized MAGTFs and numerous AF units).
- Fast Sealift (8 modified SL-7s for rapid deployment of combat and support forces).
- Near Term Prepositioning Ships (NTPS) plus Maritime Prepositioning Ships (MPS)-TAKX ships and unit equipment, ammunition, and resupply for two brigade-sized MAGTFs.

(S) Figure 1.7. 1986 Demand, Baseline Capability, and Shortfall by Scenario

1.6 ALTERNATIVE SYSTEMS

1.6.1 GENERAL

(U) The development and evaluation of alternative programs builds on the assessment of baseline lift demand and capability for each scenario. The effectiveness of the baseline force was evaluated through computer simulation of the deployment of forces over time, where each unit is described in terms of tons of equipment and cargo. The difference in cumulative tonnage between lift demand and capability (or the failure of units to meet their RDDs) represents a shortfall. It is against these scenario shortfalls that alternative programs were evaluated.

(U) The study evaluated a number of airlift, sealift, and prepositioning systems. The first step was to evaluate the contribution of each system in each scenario. The reduction each would make in scenario shortfalls when added to the baseline force was computed; costs were estimated; and other relevant factors were considered. Based on this information, systems were then combined into programs and the shortfall reductions each program would make were computed and evaluated. The result of this process is a preferred and an alternative program.

1.6.2 DESCRIPTION OF ALTERNATIVES

(U) The study examines incremental system alternatives for the three mobility modes: airlift, prepositioning, and sealift. Each mode contains a set of programs with each program structured at several levels of capability. Airlift capability has been normalized to million-ton-miles/day (MTM/D) (e.g., 44 C-5s provide 10 MTM/D of capacity). Sealift and prepositioning programs are expressed in terms of tons of material that can be carried in a single trip or is prepositioned (e.g., 12 Maine Class RO/ROs have a payload of 100 KT). Incremental system alternatives for each mobility mode are described below:

Airlift

- Aircraft capable of carrying the full range of equipment with and without austere airfield capability. This could be a new design or a derivative of an existing aircraft.

Increments of capability from 10 MTM/D to 25 MTM/D were examined.

- Aircraft capable of carrying only oversized and bulk cargo and operating from major airfields. This type of airlift could be obtained by CRAF Enhancement, purchase of KC-10s for their cargo capability, and purchase or lease of a variety of commercial cargo aircraft. Increments of capability from 10 MTM/D to 20 MTM/D were examined.

Prepositioning

(U) For each prepositioning generic alternative 100 KT was used as the base program in Southwest Asia for Scenarios I, II, and IV and in Europe for Scenario III. Increments above or below this value were tested when composing final programs.

- Land-based prepositioning of unit equipment
- Maritime prepositioning of unit equipment in ships similar to those being acquired for the existing MPS program
- Land-based prepositioning of resupply and ammunition
- Maritime prepositioning of resupply and ammunition

Sealift

- Very fast sealift of the sort that might be provided by surface effects ships. Two versions were examined: one with a payload of 3 KT and a speed of 65 knots full or empty and one with a payload of 7 KT with a speed of 35 knots full or 50 knots empty. In each case sufficient ships were procured to move 100 KT per trip.
- Dedicated fast sealift of the sort provided by the SL-7 (enough ships to move 100 KT per trip).
- Dedicated RO/RO ships (enough to move 100 KT per trip).

1.6.3 MEASURES OF EFFECTIVENESS AND COST

(U) This study used three means in conjunction with cost to assess the value of various programs. The first means is characterized by the cumulative tonnage demand, capability, and shortfall graphics as shown earlier (Figs. 1.5 and 1.6). Comparison of these graphic products provides a simple, though not very accurate, interpretation of relative program contributions.

(U) A second means for evaluation is derived from comparison and review of graphics on unit closures. Figure 1.8 provides such an example using a comparison for closure of Army units between 1982 and 1986. This provides the analyst an added dimension as to what is occurring within the mobility system beyond simple aggregated tonnages.

(U) In general, previous studies have usually only measured the value of a program by the extent to which it reduced the cumulative tonnage shortfall (i.e., the shaded area between the demand and capability curves). This method would give equal credit to a program that made a reduction early and one that made a similar reduction later; as long as they made equal reductions in area. As was noted in the scenario descriptions, however, the timely arrival of forces may preclude the need to deploy many more forces later to force entry and recover lost territory and may prevent or limit damage to the territory and population we wish to defend.

(U) If classic attack-defense force ratios are applied in Scenario I, failure to meet the schedule for the approximate four divisions required in the first 25 days to face five enemy divisions could require a 15-division force to drive these enemy forces out at a later time. In Scenario II, the approximate 6-2/3 division force required to face as many as 13 Soviet divisions after 35 days could presumably have to be expanded to about 40 divisions to retake Southern Iran if it were lost. These forces are far beyond what the United States will have available during peacetime. The expense to recruit, train, equip, and maintain such forces would be large. Both the actual expense and the American

SECRET

(S) Figure 1.8. (U) Scenario I, Major Army Unit Movements: 1982 and 1986 disposition favor a relatively small, highly trained force which can be moved rapidly to any trouble spot in the world. (Whether their equipment would be moved with them depends on what prepositioning decisions are made). Consequently, programs that reduce early shortfalls are more valuable than those that make somewhat larger reductions at a later date. A measure of effectiveness was developed for this study which weights the shortfall each day on a decreasing scale, thus increasing the value of programs that reduce early shortfalls. It provides a means to assess not only the value of delivery early, but the value of delivery on time.

(U) The weighted measure of effectiveness was used to compute the value of shortfall reduction that could be achieved by various increments of airlift, sealift, and prepositioning programs in each of the four scenarios. Costs were also estimated for each of these incremental programs, including the cost to procure each system and operate it for 20 years (Table 1.1). The weighted shortfall reduction and costs were then compared to give a relative appreciation for the potential cost effectiveness of such programs across a range of scenarios. Such a measure is scenario dependent, yet the measure makes a significant contribution to our ability to analyze and understand the value of time and timeliness in comparing alternative mobility programs. A detailed discussion of this measure of effectiveness and its application is found in Vol. 2.

(U) The study also conducted a limited evaluation on the value of providing tanker support to airlift aircraft. It did not examine tanker support in the context of self deploying fighter aircraft however. Aerial refueling increases payload in some cases, and decreases cycle time by eliminating enroute stops and permitting more direct routes. In the scenarios in this study, enroute basing and overflight rights are assumed to be available in all allied or normally friendly nations. (All scenarios involve major threats to Persian Gulf oil or the NATO itself.) For the types of units deployed by air in the study, therefore,

TABLE 1.1 (U)

INCREMENTAL MOBILITY PROGRAM ALTERNATIVES COST DATA[1]

	Costs (Billions of 1982 Dollars)			
	R&D	Proc	20 Yr O&S	20 Yr LCC
AIRLIFT				
Outsize, Austere Airfield Capable[2]				
10 MTM/D	0.5-1.3	6.3-6.5	8.0-10.4	14.8-18.2
15 MTM/D	0.5-1.3	8.7-9.3	11.9-15.6	21.1-26.2
20 MTM/D	0.5-1.3	11.0-11.6	15.9-20.9	27.4-33.8
25 MTM/D	0.5-1.3	13.3-14.3	20.0-25.1	33.7-41.7
Oversize, Main Airbase Capable[3]				
10 MTM/D	0-0.5	4.8-5.8	8.4-9.8	13.7-16.1
15 MTM/D	0-0.5	6.5-7.4	12.9-14.2	19.4-22.1
20 MTM/D	0-0.5	8.9-9.9	17.3-18.9	26.2-29.3
PREPOSITIONING[4]				
Land-Based Prepositioning of Unit Equipment (100K tons)	0	1.1-1.3	0.4-0.5	1.5-1.8
Maritime Prepositioning of Unit Equipment (100K tons)	0	1.1-3.6	3.3-2.1	4.4-5.7
Land-Based Prepositioning of Resupply and Ammo (100K tons)	0	0.6-0.7	0.4-0.5	1.0-1.2
Maritime Prepositioning of Resupply and Ammo (100K tons)	0	1.2-1.3	1.3-1.4	2.5-2.7
SEALIFT[5]				
Very Fast Ships (100K tons)	0.5	3.5-9.9	5.6-13.2	9.6-23.0
Dedicated Fast RO/RO Ships (100K tons)	0	1.4-1.6	1.1-1.2	2.5-2.8
Dedicated RO/RO Ships (100K tons)	0	0-2.3	2.9-1.7	2.9-4.0

[1] Except for an austere field capable airlifter, costs do not reflect intratheater movements from APOD/SPOD or prepositioning locations.

[2] The cost depends on whether a new design or a derivative is chosen.

[3] The cost depends on which particular aircraft is procured.

[4] The procurement cost depends on what type of units are prepositioned. Inaddition, total cost for maritime-based alternatives depends on the type of ship used--existing, modified, or new--and whether chartered or operated by MSC.

[5] The cost depends on what particular ship is selected in each category.

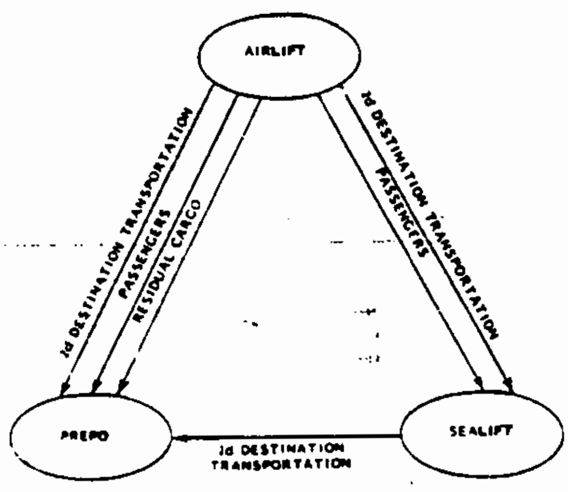
payloads are usually constrained by floorspace not range between bases, and refueling provides little improvement in payload. This would certainly not be the case in all scenarios, however, and other scenarios, particularly those where we might expect base and overflight right denial or where heavier forces are required earlier, should be examined before a conclusion is reached on the merits of procuring tankers to support airlift. For the scenarios used in this study, refueling would provide about a 3-5% increase in productivity through cycle time reductions. Because this improvement is so small, no tanker alternative is included in Table 1.1.

1.6.4 OTHER CONSIDERATIONS

(U) The weighted measure of effectiveness is useful in structuring composite programs, yet we cannot merely find the system that makes the largest reduction per dollar and buy enough of it to eliminate the shortfall. For example, attempts to satisfy all the shortfalls with a program that doesn't contribute very early make little sense (e.g., no matter how much "fast sealift" we buy we cannot satisfy the shortfalls at C+10). On the other hand, attempts to satisfy all the shortfalls with a program that produces early deliveries may be not only unaffordable but also infeasible due to operational limitations. (For example, 130 MTM/D of additional airlift--approximately 600 C-5 equivalents--would be needed to eliminate the shortfall in Scenario II.) Furthermore, because prepositioning is complemented by airlift, combinations of these two systems often produce a greater reduction than the sum of their reductions when considered separately. These points are illustrated in the next two figures.

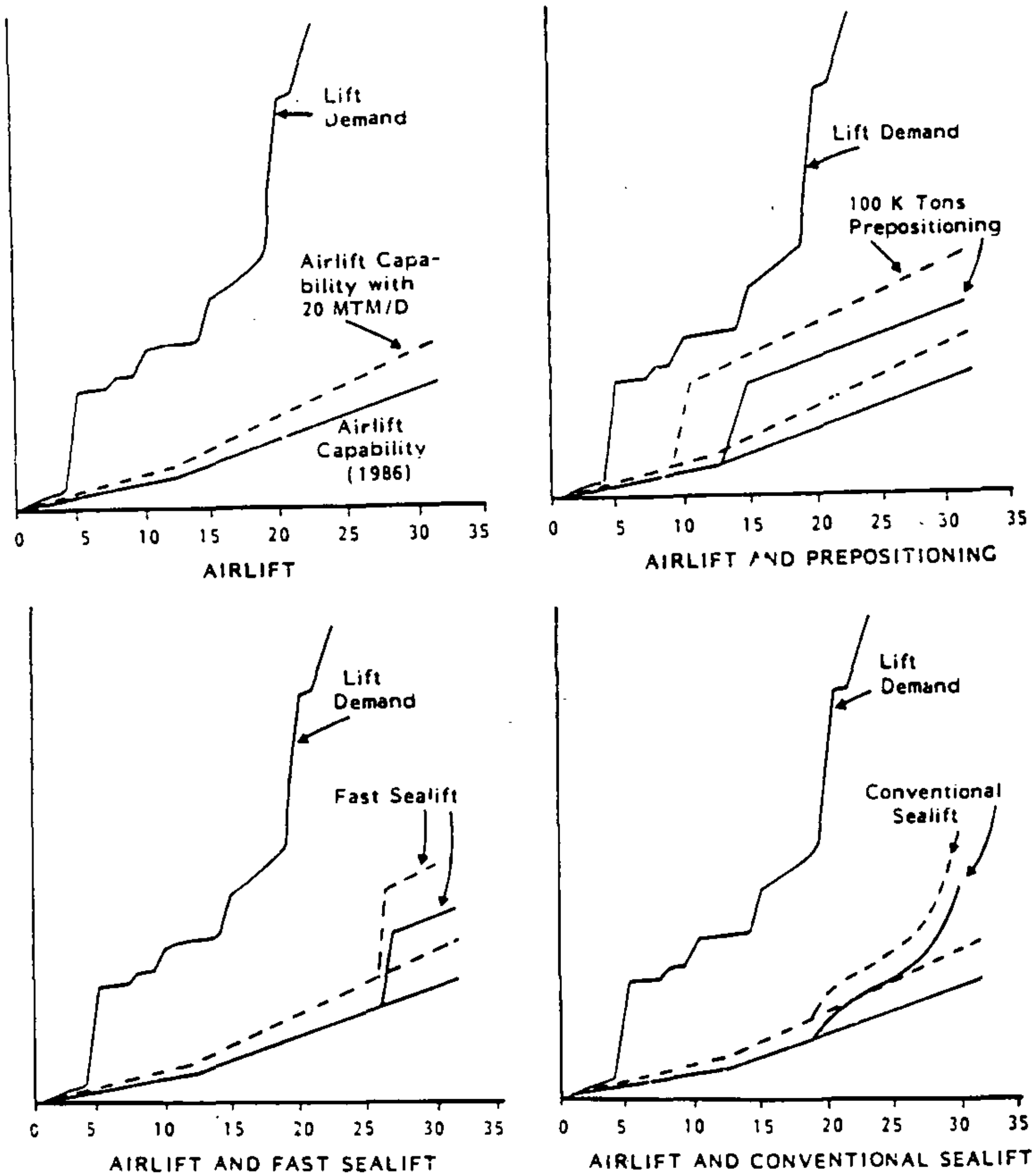
Figure 1.9 depicts the results of the baseline simulation (1986 capability) for Scenario II. The shaded portion identifies the shortfall between force closure capability and lift demand in terms of cumulative tonnage. Along the abscissa, the figure shows the approximate earliest closure possible from the various generic elements of mobility.

(U) The generic elements of mobility not only complement each other over time but also are mutually supporting. Airlift deploys the passengers for prepositioning and sealift, as well as residual cargo for prepositioning—certain items that are quite expensive and difficult to maintain in storage. In addition, when prepositioning sites or ports are distant from operating locations, airlift can provide intratheater transportation. In some instances sealift might also provide intratheater transportation for prepositioning; in a sense this is what maritime-based prepositioning is. Figure 1.10 illustrates these interactions.



(U) Figure 1.10. (U) Mobility Interrelationships

(U) Figure 1.11, extracted from Scenario II results, illustrates the interaction between airlift and other generic alternatives. The upper left frame shows the contribution of 20 MTM/D about 1986 baseline airlift capability. Obviously, an "airlift only" solution would be unaffordable. On the other hand, additional airlift in concert with prepositioning produces major improvements as shown by the frame in the upper right-hand corner. The additional airlift not only accelerates closure of other forces but produces an improvement of over 5 days in closure of



(U) Figure 1.11. (U) Interactions Among Generic Mobility Options

Airlift begins early but delivers relatively small amounts of tonnage. On the other hand, airlift in concert with prepositioning can close substantial amounts of tonnage commencing approximately with the start of the second week of deployment. Although it is possible to achieve earlier closures, certain operational limitations (e.g., the time required for break out and marry up) as well as some scenario assumptions (in this case, not sailing prepositioning ships from Diego Garcia until C-Day) become the limiting factor. Not until approximately the end of the fourth week are substantial amounts of shipping able to arrive. Assuming a preloading of ships during warning time or availability of Suez, closure could be accelerated by 5-7 days. Conventional sealift from CONUS begins to deliver massive tonnage toward the end of the fifth week. Again, with Suez open, closures could begin somewhat earlier. (Earlier deliveries by conventional sealift are from the Western Pacific.)

(S) Figure 1.9. (U) Illustration of Generic Mobility Options the prepositioned forces. With no additional airlift but more prepositioning the closure of the original prepositioned force would still be at C+15 and additional prepositioning programs would close later in increments separated as a function of the number of days it would take the airlift to move the residual cargo.

(U) The lower left-hand frame highlights the contribution of fast sealift in combination with 1986 baseline and expanded airlift capability. It is obvious that additions to sealift would only lengthen the vertical dimension of this system's contribution, but would have little impact on the 3-4 weeks of delay in force closure.

(U) The lower right-hand frame takes this examination to the last step wherein the contribution of conventional sealift is shown added to 1986 baseline and expanded airlift capability. In general, it starts late, but produces massive tonnages commencing after the first month of deployment. (The small early contribution results from deliveries from western Pacific origins.)

(U) If we were concerned with only one conflict and if we had the option of prepositioning at or very near wartime operating locations, then the least cost program for meeting demands that cannot be met by sealift from the civil fleet would be massive land-based prepositioning with just enough airlift to move passengers and residual cargo. We do not always have the option of land-based prepositioning, however, and such a system would not have the flexibility to cover several scenarios. Consequently, the most effective solution, considering cost, will be a mix of airlift, maritime-based prepositioning, military sealift, and reliance on the civil air and sealift fleets—each element sized to meet demands in the time period for which it is the lowest cost system.

(U) The cost and effectiveness data are major factors in choosing specific systems within each category; however other factors are also germane to the decision. Alone among the sealift alternatives, there is some technical risk in the surface effects ship (which showed high productivity values) and a substantial force could not be available before about 1990. Although land-based prepositioning is significantly less expensive than maritime-based, we do not always have that option (e.g., Iran) or cannot now be sure we can develop it.

(U) The proper outsize/oversize mix for airlift is scenario dependent. Over the entire deployment about 30-40% of unit equipment is outsized. Since only about a third of the baseline force airlift capacity is outsized, it would seem that any addition to current lift capability would require a proportional addition to outsize capability. However, for the scenarios considered, cargo requirements in the first 15 days do not have these "standard" outsize fractions. For Scenario I, the outsize fraction is 20%; for Scenario II it is 16%; for Scenario III, it is 27%; and for Scenario IV it is 22%. This means that baseline oversize and bulk capacity could be substantially increased without adding any outsize capability. Achieving added capability by purchasing existing commercial freighters could be economical even considering the additional capacity needed to make up for the lack of austere field capability. On the other hand, there are diminished benefits to adding additional oversize capability without providing adequate balance with outsize capability. In addition, such an option would provide nothing for intratheater airlift and would provide no flexibility to handle a larger outsize fraction in other scenarios which may be of interest in the future. These conclusions are not intended to preempt the source selection process on types of aircraft, but rather provide some rationale supporting acquisiton of derivative systems that could be acquired earlier to be balanced with the later acquisition of an outsize system. Clearly the acquisition of an outsize system that also efficiently carries bulk and oversize cargo produces the greatest benefits.

(U) The question of whether airlift should be able to operate in airfields with relatively short, narrow runways and limited ramp space--qualities which characterize the majority of the world's airfields--has been a matter of some controversy. The primary benefit of being able to use small, austere airfields is a function of the distance from the major ports of debarkation to the forward operating areas. The time saved by direct delivery of material to forward airfields is equal to the time required to close that material between the port and the forward airfield, plus the trans-shipment time avoided by not transiting through the port. Our analysis of the benefits of being able to use austere airfields in Scenarios I and II showed a 7-15% productivity advantage for direct delivery. Since flexibility and timeliness are dominant characteristics of airlift, these advantages are directly transferrable to the amount of airlift which must be purchased to accomplish a given objective. Ability to operate in austere runway environments, particularly with aircraft that can transport cargoes up to outsize, improves the effectiveness of other mobility alternatives which deploy cargo to major air and sea ports of debarkation and thus require transhipment to forward locations.

1.7 CONSTRUCTION OF ALTERNATIVE PROGRAMS

(U) A given mobility program will produce very different results in different scenarios. Thus, the "best" program for one scenario may turn out to be marginal for another scenario. The effects of combination of alternatives may produce results very different from the results achieved by simply summing the effects of each alternative. Not only are there synergistic effects between programs (i.e., airlift and prepositioning), but there are also cases where various mobility components compete for movement of the same material. A detailed examination of the nature of the shortfall in each scenario was made to identify the types and amounts of capability needed in each scenario. The following describes, by scenario, the insights gained.

Scenario I

(S) [

]

(U) Throughout the deployment, the Army dominates the shortfall. However, it is difficult to identify candidates for prepositioning of unit equipment in this scenario, because significant portions of unit equipment are not suitable for prepositioning (i.e., large number of helicopters). In addition, as we accelerate unit closures, sustainability becomes more demanding. Thus, prepositioning of ammunition and resupply, beyond that which accompanies forces, would be very useful. Prepositioning at operational locations may not be feasible, but prepositioning in locations such as Egypt may be viable. Airlift from Egypt (one-sixth the distance to the Persian Gulf from the US) could then be accomplished in significantly less time than airlift from CONUS. Maritime-based prepositioning is also practical. Although about twice as expensive as an equivalent land-based option, it provides added flexibility, and avoids the inherent problems of land-based prepositioning in the Middle East.

(U) This scenario could absorb large increases in airlift and thus several levels were tested. Beyond 15 MTM/D, incremental increases in capability produce substantially smaller benefits per dollar. Twenty MTM/D was selected largely due to the fact that, with this level of airlift and some judicious use of warning to move maritime based prepositioning, shortfalls could be reduced considerably.

(U) Based on the foregoing, the preferred program would contain (beyond 1986 baseline capability) approximately 20 MTM/D of outsize/

oversize cargo aircraft capability, and maritime or land-based prepositioning for up to 150 KT of resupply and ammunition, and up to 100 KT of unit equipment.

Scenario II

[redacted]

Scenario III

[redacted]

Scenario IV

1.8 ALTERNATIVE PROGRAMS

1.8.1 EVALUATION

(U) From the aforementioned considerations, two alternative programs were structured. Both programs preposition 130 KT of munitions and resupply in Southwest Asia, provide for additional MPS for a third brigade-sized MAGTF prepositioning program, and add varying levels of additional airlift and dedicated sealift. Program A adds 20 million-ton-miles/day (MTM/D) of outsize/oversize airlift and 100 KT (payload) of dedicated RO/RO shipping. Program B adds 35 MTM/D of outsize/oversize airlift and 270 KT of dedicated RO/RO shipping. An excursion to Program B adds an additional 100 KT of prepositioning in place of the additional airlift. Figures 1.12, 1.13, and 1.14 show the ability of two programs and the excursion, respectively, to meet the scenario demands. Table 1.2 summarizes the components for each program and the excursion.

(S) Figure 1.12. (U) Program A: Lift Demand, Shortfall, and Shortfall Reduction

~~SECRET~~ ~~SECRET~~

(S) Figure 1.13. (U) Program B: Lift Demand, Shortfall, and Shortfall Reduction

SECRET SECRET

(S) Figure 1.14. (U) Program Excursion: Lift Demand, Shortfall, and Shortfall Reduction

TABLE 1.2 (U)

MOBILITY PROGRAM COMPOSITION (U)

Baseline (1986)

- Current Airlift Enhancement Programs--the C-5 wing modification, additional C-141/C-5 spares and crews, and the CRAF Enhancement Program
- The SL-7 Fast Dedicated Sealift Program (8 fast RO/RO ships)
- Six divisions of POMCUS in NATO
- Additional USAF and USMC Prepositioning in NATO
- Maritime Prepositioning Ship Program--as a follow-on to the current Near Term Program--for two brigade-sized MAGTF

Additions to Baseline

- Program A
  - 130,000 tons of prepositioned munitions and resupply in Southwest Asia
  - MPS for a third brigade-sized MAGTF
  - 20 million-ton-miles per day of additional outsize/oversize airlift capability
  - Dedicated RO/RO shipping with capacity for 100K tons
  - Provision of adequate support to the Army's D-day force in Europe through some combination of prepositioning, host nation support, or other mobility means to be developed after further negotiations with European allies
- Program B. In addition to Program A:
  - 15 million-ton-miles/day of additional outsize/oversize airlift capability
  - Dedicated RO/RO shipping with capacity for 170K tons
- Excursion--In place of all the additional airlift (35 MTM/D) in Program B:
  - 100K tons of prepositioning in Southwest Asia

(U) Neither program fully meets the demands of Scenario I, and Program B does only marginally better than Program A despite a 55-65% increase in costs. In Program A or B performance would be improved slightly by callup of CRAF III (only Stage II is called up in Scenario I), and a large improvement would result from sailing the prepositioning ships from Diego Garcia to the Persian Gulf during warning. In Program B, the additional airlift provides only marginal improvement without substantially more prepositioning and most of the additional sealift goes unused because sealift capacity exceeds the amount of cargo to be moved. In the program excursion there is not enough airlift to realize the full benefits of prepositioning and most of the additional sealift goes unused as in the case of Program B. Callup of CRAF III would not provide enough additional airlift to complement the prepositioning, and early sailing of the prepositioned ships would have little benefit as long as airlift is the constraining factor.

(U) If maritime prepositioning ships had been assumed to sail on warning and the Suez Canal had been assumed open, Program A would better meet the demands for Scenario II. Under these same circumstances Program B would perform only marginally better. The program excursion would essentially meet the demand after C+20, but the early shortfalls would remain because airlift would still be insufficient to realize the full benefits of prepositioning.

(U) Both programs do about equally well in meeting the demands of Scenario III, but the program excursion is unable to close POMCUS units on schedule without additional airlift and thus shows markedly reduced performance.

(U) Both programs and the excursion perform about the same in Scenario IV. The split theaters and shortfall over an extended period diminish some of the importance demonstrated by early arrival in the other scenarios and thus incremental shipping alternatives demonstrate greater productivity.

(U) In general, flexibility, deterrent value, vulnerability, procurement schedule, public acceptability, and operational constraints vary among programs and scenarios. Taken in the order shown, the differences are as follows:

- Flexibility - Slight edge to B in that the additional capability in all categories can be a hedge against obstruction of or attrition in any single mode. Both programs are significantly more flexible than the excursion particularly where destinations are not immediately accessible from oceans.
- Deterrent Value - Slight edge to B, then A, over the excursion due to the increased ability for early response provided by airlift.
- Vulnerability - Very scenario dependent. In Scenario I neither airlift, sealift, nor prepositioning programs are particularly vulnerable. In Scenarios II, III, and IV, the concentration of large quantities of equipment aboard a few ships, as opposed to the small size and large numbers of individual airlifted cargoes, would provide an edge to Program B, then A.
- Procurement Schedule - The airlift programs, in particular, could extend realization of capability for both Programs A and B over the excursion; however, partial capability could occur on a virtually coincident schedule with additional shipbuilding if derivative aircraft are acquired.
- Acceptability - No particular distinction is apparent for any of the programs since there is no domestic or foreign perference.

Operational Constraints - Both programs contain possibilities for operational constraints to detract from capability as greater levels are achieved. At this point though, neither program has an advantage.

1.8.2 COSTS AND SCHEDULES

(U) The exact costs and schedules for Programs A and B will depend on details that have not yet been decided. First, the mix and types of airlift aircraft are uncertain. In all cases, except Scenario I, at least half of the additional aircraft must have outsized cargo capability to avoid an outsized cargo constraint. In all cases, the capability to deliver cargo directly to austere airfields would improve closure times and provide a hedge against loss of the airfields and ports closest to destinations. Table 1.3 displays a range of costs for each program. For airlift components the upper bound consists of a program in which all additional airlift is outsize cargo capable, the lower bound consists of an oversize/outsize mix with at least half outsize capable. For prepositioning components the range is determined by (1) all land-based (low), or (2) maritime-based (high). These schedules are based on fastest feasible schedule from a production standpoint, yet competition for funding with other programs could result in a slower schedule.

(U) For both programs, near term producibility for additional sealift and prepositioning programs would provide nearly full capability well before 1990 and thus serve to shore up some early and mid-term scenario deployment objectives.

1.8.3 ADDITIONAL FINDINGS

(U) The following are additions to any of the Programs above for which this study has shown some positive benefits and that we may wish to adopt, increase, or accelerate after further study.

UNCLASSIFIED

TABLE 1.3 (U)

PROGRAM COST SCHEDULE (TOTAL ACQUISITION AND OPERATIONS COSTS) (U)

	83	84	85	86	87	98	89	90	83-90
PROGRAM A									
Airlift[1]	0.5-0 6	1.5-3.2	2.6-4.1	3.4-4.5	3.1-0.7	3.0-0.6	0.7-0.7	1.0-0.7	15.8-15.1
Sealift[2]	0.1	0.5	0.6	0.6	0.7	0.1	0.1	0.1	2.8
Prepositioning[3]	0.3-0.5	1.3-1.7	1.2-1.8	1.0-1.9	0.4-1.1	0.4-0.5	0.2-0.3	0.2-0.3	5.0-8.1
Total[5]	0.9-1.2	3.3-5.4	4.4-6.5	5.0-7.0	1.8-4.9	1.1-3.6	1.0-1.1	1.0-1.4	22.9-26.7
PROGRAM B									
Airlift[1]	2.1-2.3	4.1-5.2	5.1-6.7	3.6-4.8	3.5-1.1	3.5-1.1	1.2-1.2	1.5-1.2	24.6-23.6
Sealift[2]	0.3	0.8	1.0	1.0	1.0	1.1	1.1	1.2	7.5
Prepositioning[3]	0.3-0.5	1.3-1.7	1.2-1.8	1.0-1.9	0.4-1.1	0.4-0.5	0.2-0.3	0.2-0.3	5.0-8.1
Total[5]	2.7-3.1	6.2-7.7	7.3-9.5	5.6-7.7	2.5-5.6	2.6-5.1	2.5-2.6	2.6-3.0	36.1-40.2
EXCURSION									
Airlift[1]	---	---	---	---	---	---	---	---	---
Sealift[2]	0.3	0.8	1.0	1.0	1.0	1.1	1.1	1.2	7.5
Prepositioning[4]	0.4-0.6	1.4-2.0	1.6-2.4	1.2-1.5	0.6-1.5	0.7-0.8	0.2-0.4	0.2-0.4	6.3-9.6
Total[5]	0.7-0.9	2.2-2.8	2.6-3.4	2.2-2.5	1.6-2.5	1.8-1.9	1.3-1.5	1.4-1.6	13.8-17.1

[1](U) To the extent that CRAF Enhancement could satisfy some of the additional cargo capacity these costs could be reduced.

[2](U) Costs are based on RO/RO ship acquisition. To the extent that ships could be leased/chartered costs could be substantially reduced.

[3](U) Consists of: TAKX for 1 brigade; 130K tons resupply and ammunition (land-based vs. maritime-based); 120K tons for early Army support for NATO.

[4](U) Consists of: TAKX for 1 brigade; 130K tons resupply and ammunition (land-based vs. maritime-based); 220K tons unit equipment (land-based vs. maritime-based)--120K tons for NATO, 100K tons for Persian Gulf.

[5](U) Range for total is sum of highest possible and lowest possible cost for each year.

UNCLASSIFIED

- Enroute and destination base capacity including POL
- Adaptive systems for improved container ship utilization
- Acquisition of systems to improve ship offload in austere regions
- Very fast ships (surface effects ships)
- Acquisition of heavy equipment transporters for armored/ mechanized forces.

(U) The first measure highlights the need to adequately provide base and POL capability for all mobility programs consistent with added capability. Failure to do so could result in an overstatement of mobility capability. Conversely, limiting the type and size of recommended programs to those for which base and POL availability is now certain could preclude implementation of the preferred strategy of forward defense.

(U) The second measure results from a need to better utilize our vast container ship resources. In scenario simulations, despite that shortage of militarily useful ships, large numbers of fast container ships went unused since loading of unit equipment was not readily accommodated. It appears that emphasis on systems that improve container ship utilization (flat racks, SEA SHEDS) merit attention.

(U) We have already proposed initiatives in budgets and programs to improve ship offload capability in austere environments, but additional emphasis may be needed in this area as we enhance our sealift capability. In many regions ports will either be unavailable or inadequate, and thus, logistics over the shore (LOTS) programs should receive heightened visibility. In addition, most of the underutilized container ships identified in the second measure, are also non-self sustaining, hence, programs are also required to enhance our ability to offload these ships in developed ports.

(U) Very fast ships (surface effect ships) demonstrated great productivity in all scenarios. They were not included in Program A or B because cost and technological feasibility are uncertain, and measureable capability may not be achievable before early 1990s. Yet development programs should be continued to reduce these uncertainties in light of the potential for high productivity, reduced vulnerability, and the additional dimension they could provide surface delivery of cargo.

(U) The intratheater analysis highlights the importance of the ability to move forces over potentially extended ground LOCs. Extended ground movement of armor/mechanized forces is slow and increases destructive wear on combat vehicles. The provision of heavy equipment transporters for tracked vehicles could greatly enhance capabilities in the near term, particularly in austere environments.

1.9 RECOMMENDATION

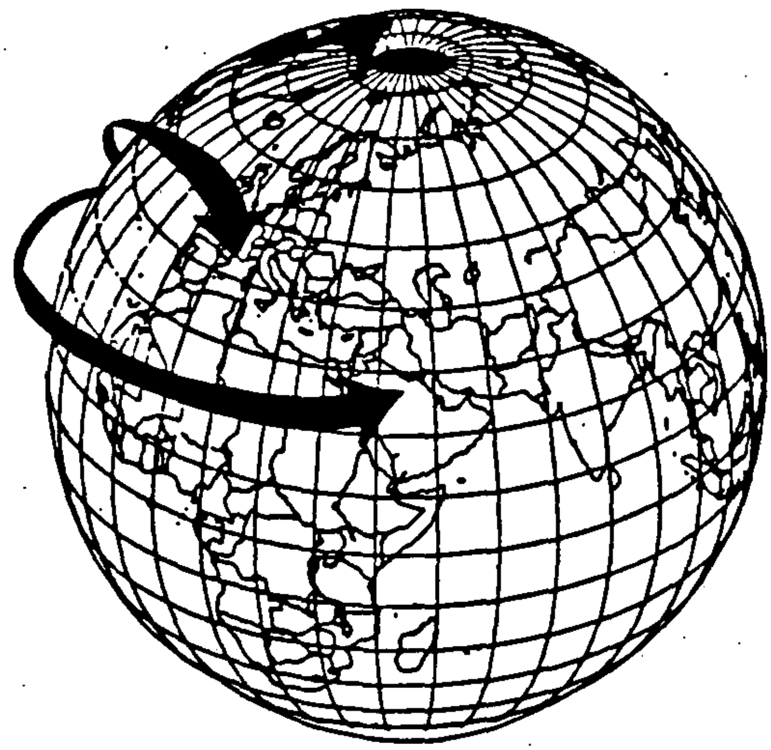
(U) Neither program is able to satisfy all unit closure requirements. Program A is recommended as the preferred program. Although it has somewhat less capability than Program B the cost is significantly less. Although the excursion to Program B is of even less cost than Program A, it fails to provide the rapid deployment necessary to implement the defensive strategies outlined by the Joint Chiefs of Staff in the study scenarios. The extended delay caused by overreliance on shipping in this excursion would probably invalidate the defensive strategy with the level of combat forces specified. Rapid deployment in support of US force projection strategy is essential. The ability of the US to move forces quickly, while maintaining the capability for large reinforcement later not only enhances deterrence, but if deterrence fails, may make the difference between defeat and a successful defense.

END
DATE
FILMED
12-81
DTIC

Annotated Copy for FOI Files

Department of Defense

Congressionally Mandated Mobility Study



30 April 1981

#109

VOLUME 2
REPORT

USDRE 81-0318
SANITIZED

CONTENTS

CONTENTS (Cont.)

CONTENTS (Cont.)

CONTENTS (Cont.)

FIGURES

FIGURES (Cont.)

FIGURES (Cont.)

FIGURES (Cont.)

FIGURES (Cont.)

FIGURES (Cont.)

TABLES

TABLES (Cont.)

TABLES (Cont.)

GLOSSARY

AB	airbase
ABN	airborne
ACE	Allied Command Europe
ACL	allowable cabin load
ACR	armored cavalry regiment
ACVT	armored combat vehicle technology
AFCENT	Allied Forces Central Europe
AFNORTH	Allied Forces Northern Europe
AFSOUTH	Allied Forces Southern Europe
ALCE	airlift control element
ALOC	air line of communication
AM	associated measures
AMB/AMBL	air mobile
AO	area of operations
APOD	aerial port of debarkation
APOE	aerial port of embarkation
AR	air refueling
ARM	armored
ASW	antisubmarine warfare
ATF	amphibious task force
AWACS	Airborne Warning and Control System
AWADS	adverse weather aerial delivery system
BALTAP	Baltic approaches
BDE	brigade
BENELUX	Belgium, Netherlands, Luxembourg
BG	battle group
BLT	battalion landing team
BN	battalion
CAC/CBAC	combat brigade air cavalry
CAS	close air support

GLOSSARY (Cont.)

CAV	cavalry
CBM	confidence building measures
C-day	day that deployments commence
CENTAG	Central Army Group
CEPS	central European pipeline system
CFV	cavalry fighting vehicle
CIP	CEPS improvement program
CJCS	Chairman of the Joint Chiefs of Staff
CMMS	Congressionally Mandated Mobility Study
COB	collocated operating base
CONUS	continental United States
CRAF	Civil Reserve Air Fleet
CS	combat support
CSCE	Conference on Security and Cooperation in Europe
CSS	combat service support
CVS-MET	decommissioned aircraft carrier converted to military equipment transport
C^3	command, control, and communications
C^3CM	C^3 countermeasures
DARCOM	Department of Army Materiel Development and Readiness Command
DD	direct delivery
D-day	day hostilities begin
DIA	Defense Intelligence Agency
DIV	division
DIVAD	division air defense
DMA	Defense Mapping Agency
DOD/DoD	Department of Defense
DOS	days of supply
DRB	Division Ready Brigade
DS	defense suppression

GLOSSARY (Cont.)

ECM	electronic countermeasures
EST	en route support team
EUSC	effective US control
FA	field artillary
FAC	forward air controller
FEBA	forward edge of the battle area
FIE	fly-in echelon
FOB	forward operating base
FOM	figures of merit
FY	fiscal year
GOJ	Government of Japan
HET	heavy equipment transporter
HNS	host nation support
HSTV-L	high-survivability test vehicle - light
I D-Day	day Soviets invade Iran (Scenario II)
IFV	infantry fighting vehicle
INF	infantry
ISDM	Interactive Strategic Deployment Model
JCS	Joint Chiefs of Staff
LAPES	low altitude parachute extraction system
LASH	lighter aboard ship
LAV	light armored vehicle
LCC	life cycle cost
LHA	amphibious assault ship (general purpose)
LKA	amphibious cargo ship
LOC	line of communication
LOTS	logistics over the shore

GLOSSARY (Cont.)

LPD	amphibious transport dock
LPH	amphibious assault ship
LRA	long range aviation
LSD	dock landing ship
LST	tank landing ship
MAB	Marine amphibious brigade
MAC	Military Airlift Command
MAF	Marine amphibious force
MAGTF	Marine Air-Ground Task Force
MARAD	Maritime Administration
MAU	Marine Amphibious Unit
MAW	Marine Air Wing
MBFR	Mutual and Balanced Force Reductions
MCM	mine countermeasures
MCU	mobile construction unit
M-day	mobilization day
MEC	mechanized
MHE	materials handling equipment
MIDAS	Model for Intertheater Deployment by Air and Sea
MOB	main operating base
MOG	maximum on ground
MPS	maritime prepositioning ships
MSC	Military Sealift Command
MTMC	Military Traffic Management Command
NAS	naval air station
NATO	North Atlantic Treaty Organization
NCA	National Command Authority
NCAA	NATO Civil Augmentation Aircraft
NDCI	nondivisional combat increment
NDRF	National Defense Reserve Fleet
NGA	NATO Guidance Area
n mi	nautical mile

20

GLOSSARY (Cont.)

NORAD	North American Aerospace Defense Command
NORTHAG	Northern Army Group
NRF	Navy Reserve Fleet
NSDA	non-self-deploying aircraft
NSS	non-self-sustaining
NTPS	near-term prepositioning ships
OSD	Office of the Secretary of Defense
OWRM	other war reserve materiels
PAA	primary aircraft authorization
PACOM	Pacific Command
PAX	passengers
PCS	permanent change of station
POL	petroleum, oils, and lubricants
POM	preparation for overseas movement
POMCUS	prepositioning of materiel configured to unit sets
R&D	research and development
RDD	required delivery date
RDF	Rapid Deployment Force
RDJTF	Rapid Deployment Joint Task Force
RFP	request for proposal
RFQ	request for quotation
RO/RO	roll-on/roll-off
ROS	reduced operational status
RRF	Ready Reserve Fleet
SAAF	small, austere airfield
SAC	Strategic Air Command
SACEUR	Supreme Allied Commander, Europe
SAG	surface attack group
SAM	surface-to-air missile

GLOSSARY (Cont.)

SDA	self-deploying aircraft
SDEP	sea deployment
SEABEE	barge carrier ship
SES	surface effect ship
SIOP	Single Integrated Operational Plan
SKE	stationkeeping equipment
SLBM	submarine-launched ballistic missile
SLOC	sea line of communication
S M-Day	US mobilization day for Saudi Arabia (Scenario I)
SNA	Soviet Naval Aviation
SOVINDRON	Soviet Indian Ocean Squadron
SOVMEDRON	Soviet Mediterranean Squadron
SPOD	sea port of debarkation
SPOE	sea port of embarkation
SPT	support
SRP	Sealift Readiness Program
SS	submarine
SSBN	ballistic missile submarine - nuclear
SSG	guided missile submarine
SSGN	nuclear-powered SSG
SSN	nuclear-powered submarine
TAC	Tactical Air Command
TAC	transportation account codes
TACAIR	tactical air
TACS	Tactical Air Control System
TAS	tactical airlift squadron
TFS	tactical fighter squadron
TFW	tactical fighter wing
TNF	theater nuclear forces
TPFDL	time phased force deployment list
TRADOC	Training and Doctrine Command
TRS	tactical reconnaissance squadron
TSI	tactical support increment

GLOSSARY (Cont.)

UE	unit equipment
URG	underway replenishment group
USEUCOM	US European Command
USG	US Government
USREDCOM	US Readiness Command
VP	Navy maritime patrol aircraft squadron
WP	Warsaw Pact
WRM	war reserve materiel

SECTION 1

INTRODUCTION

1.1 BACKGROUND

1.1.1 Congressional Directive

(U) The Defense Authorization Act of 1981 required a study detailing overall US mobility requirements to include a determination of the mix of airlift, sealift, and prepositioning programs which will provide an acceptable US response capability for military contingencies in the 1980s. This study is the result. An extract of the relevant portions of the Defense Authorization Act, 1981, comprises Appendix A.

1.1.2 Study Directive

(U) The Deputy Secretary of Defense established the study organization on 27 June 1980. A copy of his implementing instruction comprises Appendix B.

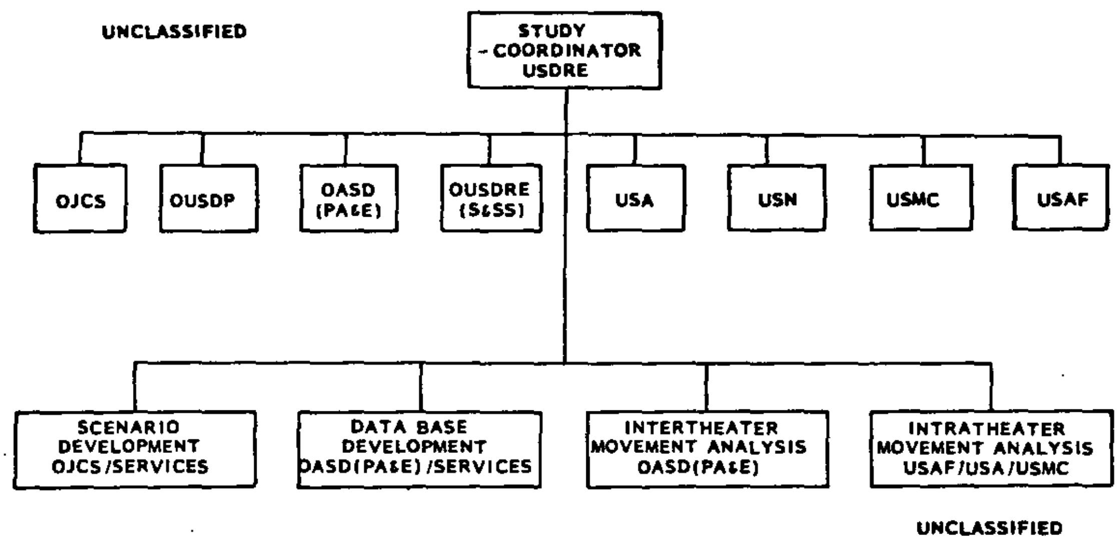
1.1.3 Organization

(U) Overall supervision of the study was provided by a steering group chaired by the Deputy Secretary of Defense and including representatives of:

Secretary of the Army
Secretary of the Navy
Secretary of the Air Force
Chairman of the Joint Chiefs of Staff
Under Secretary of Defense (Policy)
Under Secretary of Defense (R&E)
Assistant Secretary of Defense (MRA&L)
Assistant Secretary of Defense (PA&E)

(U) Responsibility for supervision and coordination of the project was given to the Under Secretary of Defense (R&E), Dr. William J. Perry, who established a working group under the chairmanship of

Brig. Gen. Donald A. Vogt, USAF. The working group was responsible for the execution of all study tasks and included representatives from OSD, OJCS, and the Services. The organization chart is shown in Fig. 1.1.



(U) Figure 1.1 (U) Study Organization

1.1.4 Organization of the Report

(U) The main body of the report is organized into ten major sections. Section 1 introduces the study, and Section 2 provides a general comparative analysis of the five major alternatives for deployment: forward deployment, airlift, sealift, and prepositioning (land-based and maritime). Section 3 discusses the selection of scenarios. Sections 4 through 7 address mobility demands, capabilities, shortfalls, and impacts for four representative scenarios: Regional Conflict in the Persian Gulf, Soviet Invasion of Iran, NATO--Warsaw Pact Conflict, and Conflict in the Persian Gulf with a Precautionary Reinforcement in Europe. Section 8 is the intratheater movement analysis. Section 9 contains a discussion of selected mobility alternatives. Section 10 is an evaluation of mobility alternatives resulting in a preferred and alternative program.

1.2 MOBILITY HISTORY

1.2.1 General

(U) Because Western Europe is vital to our national interests, the United States is committed to its defense. Since World War II, NATO has been the instrument of this commitment, and it has been emphasized. On the other hand, NATO is not our sole concern. There are other regions where our interests are also at risk. Indeed many believe the likelihood of confrontation is greater elsewhere than in Western Europe. The United States has based its conventional forces strategy on its ability to deploy combat units rapidly to reinforce forward deployed forces or support nations requiring our assistance. Our influence world wide has become increasingly dependent upon our ability to project forces in support of our national interests and commitments. Mobility is central to our force projection strategy.

1.2.2 Historical Perspective

(U) In the late 1960s and early 1970s, U.S. defense programming sought to achieve the simultaneous capability to reinforce NATO and another location due principally to pressures of the Vietnam war.

However, neither the forces nor the capability to deploy them materialized.

(U) During the 1970s, because of the monotonic increases in the Soviet-Warsaw Pact threat, estimates of the forces needed for NATO reinforcement grew significantly while estimates of the time available to move these forces decreased. These changes placed a high premium on the speed of our European reinforcement and profoundly altered mobility planning. By the mid-1970s it was generally recognized that our mobility capability was not adequate for NATO reinforcement. Several analyses conducted at that time including a 1976 Joint Chiefs of Staff study conducted at the request of Congress,[1] recommended several mobility initiatives which were subsequently adopted. These included airlift improvements, additional programmed prepositioning and initiatives for augmented host nation support in the form of ships, aircraft, and allied support personnel for the reinforcement of NATO.

(U) During the 1970s, our planning for non-NATO contingencies also changed substantially. Initially, we were concerned primarily with threats to North and Southeast Asia. Later in the decade several factors, including a growing awareness of the Free World's dependence on Persian Gulf oil and an increased Soviet propensity to use force (directly or by proxy) outside the Soviet bloc, caused us to shift our attention to Southwest Asia.

(U) The US policy objective is to be capable of concurrently supporting a major NATO-Warsaw Pact conflict and a lesser non-NATO contingency, with implied emphasis on the Persian Gulf region.

---

[1](U) "Strategic Mobility Requirements and Programs - 1982."

(U) While our present mobility programs, in concert with contributions from our NATO allies, will make substantial improvement in our ability to reinforce and sustain Europe, there are still significant shortfalls. In addition, their adequacy to support deployment to other locations is in question. Furthermore, they do not provide the capacity for simultaneous reinforcement and support of NATO and another region. Yet the dependence of Europe on Persian Gulf oil and the ability of the USSR to threaten Europe and the Persian Gulf simultaneously, demand that we be able to reinforce and support both regions concurrently.

1.3 PURPOSE

(U) The purpose of this study is to identify, through use of representative scenarios, military mobility requirements for deploying and sustaining US forces during the 1980s, and to develop recommended programs to meet these requirements.

1.4 LIMITATIONS OF ANALYSIS

1.4.1 Introduction

(U) From the outset, a deliberate effort was made to develop plausible scenarios and thoroughly debate all assumptions that would affect the analysis. Scenarios developed for the 1986 time frame are the basis for force deployments in the three years studied: 1982, 1986, 1990. We believe that these scenarios, together with the assumptions used, represent a rational basis for analysis and for the development of future mobility programs. Specific assumptions are detailed in the "Catalog of Data and Assumptions" (Appendix C).

(U) The establishment of strategy and the requisite force to accomplish that strategy is an iterative process. This study represents one iteration of that process. Time did not allow reconsideration of the strategy and/or composition and flow of forces.

29

(U) The scenarios, forces, and strategy in this study should not be construed as representing the strategy or war plans which will be used in 1982, 1986 or 1990. The scenarios, forces, and impacts derived here are representative projections to the extent we can forecast them. Furthermore, the time lines we postulate for the forces to move, join up and deploy are reasonable but cannot be accomplished in the real case without considerable planning, training, and exercising.

1.4.2 Items Not Included

(U) From a general perspective the study was bounded by the following considerations:

(U) Forces. Lift demand has been restricted to include only programmed forces and materiel in hand for each period. Thus if more forces are programmed in the future, additional mobility capability must also be provided commensurate with the planned uses of the new forces.

(U) Nuclear Scenarios. Only conventional conflicts are considered. While it is recognized that deployments to contingency areas where interests are vital could result in the use of nuclear weapons, our strategy is designed to provide a credible conventional capability, raising the nuclear threshold.

(U) Detailed Trade-Offs on Lift System Designs. Generic designs and parametric costs for lift systems are discussed. However, the study does not specify detailed hardware requirements, but rather focuses on mission requirements leaving particular hardware solutions to the procurement process.

(U) Refueling for Self-Deploying Aircraft. Refueling considerations were restricted to those associated with airlift aircraft. Results are discussed in Section 10.

1.4.3 Limitations

(U) The following elements were not considered in the analysis, chiefly because of the compressed study schedule or because of difficulties in obtaining reliable data.

- Unit Readiness. Units are considered available for movement when lift is available to move them, consistent with the required time-phased arrival priority within the combat region.

- CONUS Transportation. Detailed evaluation of CONUS transportation systems to support deployments was not made. Standard planning factors based on CONUS location of units were used to provide estimates of unit movements from CONUS origins to ports of embarkation.

- Port Denial. Denial or closure of sea and aerial ports of embarkation and debarkation was not evaluated.

- Support Forces. This study does not evaluate the adequacy of support forces to sustain the combat force. This is the subject of a separate ongoing DoD analysis.

- POL and En Route Basing. The adequacy of POL stocks and en route basing to support force deployments were not considered as constraints. However, their implications have been addressed and are presented in Appendices D and G respectively.

- Equipment Redesign. Although considered as an alternative in developing programs, the redesign of combat forces and their weapon systems to complement lift systems was considered beyond the scope of this study and is the subject of other DoD efforts.

- Movement from SPOD/APOD to Operational Location. With the exception of a simple analysis in Section 8, no detailed analysis of port reception capability nor in-theater transportation capabilty to move forces from debarkation points to the desired operational location was conducted.

- Attrition. Attrition was not evaluated except in NATO scenarios due to the lack of a credible data base. However, the effects of attrition are discussed in Appendix I.

1.4.4 Movement Simulation

(U) The allocation of lift capability and subsequent force closures for all scenarios are determined through a computer simulation model. For intertheater deployment, this simulation does near-optimum allocation and scheduling of mobility resources, attempting to meet the required delivery dates (RDDs) imposed by the scenarios. While it is a plausible representation, the simulation is not necessarily consistent with an actual operational plan. A detailed description of the computer simulation is contained in Appendix E.

1.5 COMMENT ON STUDY ASSUMPTIONS

(U) As pointed out in Section 1.4 and Appendix C, certain assumptions were required to perform the analyses in this study. This situation is different from that of a field commander engaged in operations planning. The commander is constrained by many factors, and must plan for "worst case" situations in going to fight "now." Assumptions generally used in mobility analyses cannot be used by field commanders, or the latter will face greater prospects of an infeasible operations plan. However, mobility analyses, if limited to only those assumptions which could reasonably be made by an operations planner, would fail to accomplish the objective--to measure the potential of current and programmed lift forces, and to quantify additional mobility resources required to meet the estimated lift demand.

(U) Four assumptions made in this study warrant comment. They are: (1) unconstrained en route basing, (2) unlimited POL support, (3) unconstrained port throughput, and (4) no attrition for the Southwest Asia (SWA) cases. Limited sensitivity analyses were accomplished to determine if these assumptions caused over optimistic expressions of current capability and, therefore, underestimates of additional resource requirements. These analyses are contained in Appendices G, D, H and I respectively. Additional work is underway as part of other studies and actions in support of the RDF concept by OSD, JCS, RDJTF and others. A summary discussion of our examination of these assumptions follows.

1.5.1 <u>En Route Basing</u>

Given the many combinations and permutations of base denials, it is virtually impossible to define a guaranteed basing structure. There has been considerable diplomatic effort in recent months attempting to gain the best possible commitments from the countries involved.

It seems, based upon perceptions of the allies' points of view, that they would grant rights if the situation were one of an attack on a SWA nation which threatened the flow of oil to the West. This, of course, is in contrast to the 1973 war wherein the US was helping Israel against the Arab nations which have the closest ties to Europe and control the flow of oil.

There are several routes to SWA which provide considerable flexibility. The most optimistic projections for overflight and basing rights are for

Together, these make a rather substantial route structure. If contribute, routing can be virtually unconstrained. Again, these routes cannot be guaranteed but the chances look good. Other possible options are: Pacific routing, which also presents political difficulties and is longer--but can handle overflow--and also sub-Saharan Africa via

(U) Considerable work is ongoing in NATO and in bi-lateral talks to ensure routes and to improve en route facilities. Additional discussion of en route basing can be found in Appendix G.

1.5.2 <u>POL Availability</u>

The availability of fuels and lubricants is a major consideration in making plans and arrangements for deployments to SWA. Although tanker availability is a major factor, the primary factor is sources of supply. We examined a "realistic" sources case for 1982, Scenario I. The results and assumptions used are at Appendix D. The overall conclusion is that we can support the 1982 force. This indicates the importance of A further conclusion is that a parallel effort is mandatory to insure that POL is made available in concert with mobility improvements. Several efforts- -would help meet these needs.

The POL situation requires the National Command Authorities to be sensitive to the developing situation and to make timely decisions to solicit support of friendly nations, to dispatch military-controlled tankers as early as feasible, and to requisition additional US flag tankers when necessary.

In view of the above, the NCA, confronted with a deployment decision, must:

1.5.3 In-Theater Throughput

A first order analysis of throughput capability in the Persian Gulf area was conducted for Scenario I and for the major sector of Scenario II. The analysis should be viewed in three parts: seaport, airport, and forward movement capability.

(a) Seaport Throughput. The ports analyzed appear to be adequate. Sufficient berths are available to handle the time-phased ship arrivals. Certain peak demands for cargo off-load exceed minimum capacity, but not estimated surge capacity. See Appendix H for a further discussion.

(b) Airport Throughput. There are several major airfields in the area

Since continued access to the major fields is required, they must be provided early protection.

(c) Forward Movement. Our analysis indicates that a combination of intratheater airlift and road movement can accommodate the large movement requirements generated by the intertheater arrivals for the cases analyzed. In addition to our need for outsize intratheater airlift capability, the provision for some sort of heavy equipment transporter is probably necessary to move heavy tracked vehicles over long distances.

1.5.4 Attrition and Protection of Ports and LOC's

(U) Attrition of airlift increases the requirement for aircraft but usually does not have a great effect on equipment requirements, because relatively small increments of equipment or personnel are embarked on any one aircraft. For sealift, however, if a ship is sunk it is not only a major loss of mobility assets but a major portion of a unit's equipment may be lost. There have been no major studies of attrition for SWA scenarios so the effect on mobility forces cannot be fully determined. A rigorous analysis of attrition--especially for SWA cases--would be influenced by major uncertainties in underlying assumptions such as: the likelihood and nature of war-at-sea, the probability that the conflict could be geographically contained, and the degree of allied support. For a major deployment of forces 6,000-13,000 n mi away from the major supply base, protection of the lines of communication is obviously critical. See Appendix I for a further discussion.

SECTION 2
GENERIC ALTERNATIVES FOR FORCE PROJECTION

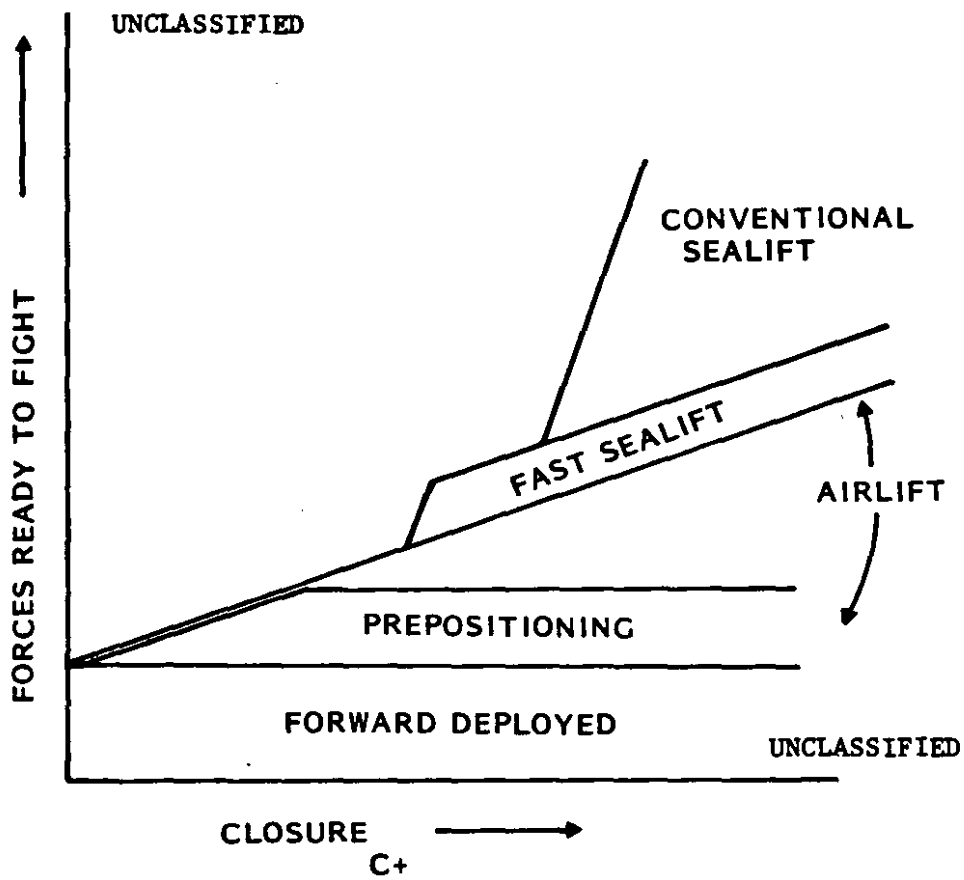
2.1 INTRODUCTION

(U) Rapid deployment in support of national objectives is key to U.S. force projection strategy. The ability of the United States to move forces quickly not only enhances deterrence, but, if deterrence fails, may make the difference between defeat and a successful defense.

(U) The objective of force projection is to be capable of moving an effective combat force into a designated region of the world and sustaining that force for as long as the situation demands. The assessment of our mobility capability is not a simple time-distance-volume transportation problem. The design of an effective force projection system is a complex integration of (1) mobility forces, (2) time-phased force requirements, (3) force configuration, and a host of other considerations such as force readiness, use of warning time, travel constraints, unloading, marry-up, and forward movement that often have a dramatic effect on total system capability. The blend of these considerations is complex, and, in this study, is addressed through the use of simulations adjusted with assumptions derived from other studies. Although this study has been structured to make a quantitative assessment of the contributions of various mobility programs against the lift demand associated with representative scenarios, judgment as to programs or mixes of programs that best satisfy these demands goes beyond a quantitative assessment. Thus, this section is intended to introduce the reader to the mobility process in order to provide a qualitative basis from which judgments can be made. Figure 2.1 provides a graphic portrayal of various generic components and their relative contribution and status as a function of time measured from the day deployment commences (C-Day). These components are discussed individually in subsequent subsections.

37

37



(U) Figure 2.1. (U) Reinforcement System

(U) To appreciate the scope of force projection, consider a force with a manned strength of 150,000. This could be an austere combat force package of approximately four light ground combat divisions (Army and Marine), five tactical fighter wings, (Air Force and Marine) and minimum air/ground supporting forces weighing about 270,000 tons. (If the forces were heavy armored and mechanized the tonnage might be from 150-200% of that amount.) By way of comparison, if the ground component of the light force were marshaled in a parking lot with only 6-inch spacing between vehicles, it would cover more than 60 acres. Assuming that this force has no prepositioned stocks, sustaining support could easily double the tonnage required during the first 30 days of conflict. In addition to these dry cargo requirements, a force will need to be supported with bulk petroleum and perhaps potable water--additional but essential requirements delaying closure of additional combat forces. Figure 2.1 indicates that a combination of forward deployment, prepositioning, and airlift can satisfy timely lift demands. Sealift, once started, produces massive deliveries of forces and sustaining support. In short, forward deployment, prepositioning, sealift and airlift are complementary, and all are necessary elements of our mobility forces.

(U) But solutions to mobility shortfalls should not be restricted to adding only lift capability--both requirements and capabilities are adjustable. From a generic sense, a shortfall can be decreased either through increasing mobility system capability or operating tempo, and the movement requirement can be reduced by forward deployment of troops, prepositioning, host nation support, or simply accepting a relaxed force buildup schedule and its resultant risk.

(U) Before examining the lift demands and capabilities from each of the study scenarios we will review briefly the specific and complementary characteristics provided by different generic alternatives.

(U) Major components of the US mobility programs are forward-deployed forces, airlift and sealift forces, and prepositioned equipment (both land-based and afloat). Obtaining the "right" mix or balance of these elements is a complex problem and is scenario dependent. Factors affecting the mix include: (1) the deterrent value, (2) timeliness and flexibility of response, (3) vulnerability to disruption by political and/or military action, (4) public acceptability at home and abroad, and (5) affordability. Providing a viable reinforcement capability for the US must not only satisfy all the unique, and perhaps, very different lift demands of varying scenarios, but satisfy to one degree or another the above considerations. For instance, a large commitment to forward-stationed forces without an ability to reinforce and sustain them may represent little deterrent value; or commitment to provide the capability to project rapidly a large number of forces worldwide from the CONUS base may represent tremendous flexibility but may be overly costly. Mobility forces are complementary and interdependent and must be kept in that perspective. Military planning must be flexible and affordable and avoid too much reliance on any one option.

2.2 ALTERNATIVES

2.2.1 Forward Deployment

(U) While not a mobility program in the context of this study, the presence or absence of forward stationed forces in the objective area significantly affects the design of the mobility mix.

2.2.1.1 Land Based

(U) Forward deployed forces, such as in NATO and Korea, serve as a strong deterrent to an aggressive enemy. Military action against the host nation virtually guarantees U.S. involvement. The role of forward deployed forces is to halt or delay an enemy advance and to secure reception and logistic facilities for reinforcement. These forces provide the fastest possible response for contingencies in the area where stationed. However, since land-based forces are committed to the host nation, they may not be available for deployment to another crisis or contingency area. In the absence of in-place forces, proper planning, optimal use of warning time, and a rapid reinforcement capability must be used to halt a swift enemy advance. Movement of these forces from peacetime to wartime locations is the least vulnerable to enemy action of all other reinforcement alternatives and is not dependent on consent (political vulnerability) of third nations. However, maintenance of these forces is expensive and large increases are politically sensitive and potentially unacceptable (both at home and abroad). Therefore, the number of in-place forces is usually minimal. The forward deployment of land-based forces will not be further considered as an alternative to satisfy any mobility shortfalls addressed in this study.

2.2.1.2 Afloat

(U) Seaborne ground combat forces embarked aboard amphibious shipping provide the capability for rapid reaction, while maintaining a stand-off presence within potential crisis areas. The rapidity of the reaction of afloat forces is directly related to the use of strategic warning time and the principal conduct of activities is initially limited to littoral areas. Afloat amphibious forces have an inherent logistic support capability for the initial period of operations, as well as a means of projecting power and supply support ashore in undeveloped areas. Forces afloat are approximately as vulnerable as sealift.

2.2.2 Airlift

(U) Speed and flexibility are airlift's major attributes. These characteristics promote a generalized deterrent value, particularly when combined with forces whose movement characteristics and readiness enhance rapid delivery. Although airlift is vulnerable to disruption by military action against aircraft and airfields, the ability to rapidly change ports of debarkation can avoid complete shutdown provided alternative APODs are available in the objective area. On the other hand, denial of base and overflight rights could seriously degrade

 41 41

airlift operations. Airlift is more costly than other lift alternatives given a cost comparison based on ton-miles. Airlift can move only limited tonnage in comparison with other lift modes but is competitive when measured in terms of the premium in time which airlift provides.

2.2.3 Sealift

(U) In a major contingency, commercial sealift will carry most of the follow-on forces and supplies. It is relatively flexible, has massive capability, and is absolutely necessary for sustaining support. It is slower than other mobility alternatives although response time varies primarily with the type of ship. Fast sealift options may reduce transit times significantly. By virtue of its potential capability, and because a limited number of ships might be positioned during periods of heightened warning for reception of early deploying forces, it possesses some deterrent value. It is the least cost means on a per ton-mile basis. Sealift may require weeks to deploy forces, considering the time required for overland movement (both CONUS and in-theater), marshaling of assets, loading, and unloading. In addition, refueling (bunkering), passage of straits or canals, port access, and port facilities may present severe limitations. Sealift is approximately as vulnerable as airlift, but the loss or denial of one ship could result in the destruction of a large materiel tonnage.

2.2.4 Prepositioned Equipment and Supplies

(U) There are two basic types of prepositioning programs, land-based and maritime. Each of these could contain combat unit equipment, war reserve materiel, or materiel for dual-based units. Prepositioning is valuable as a deterrent because the visible evidence implies a national commitment. The deterrent value of land-based prepositioning is limited, however, to the region in which equipment is located.

(U) Timeliness of prepositioning is dependent on airlift to move passengers and residual equipment to the theater. Thus, to have a timely impact, prepositioning must be designed with other airlift demands considered.

(U) Land-based prepositioning equipment is considered vulnerable prior to break-out and marry-up with reinforcing troops, but probably no more vulnerable than the ports of debarkation that would have to receive forces delivered by other modes. In addition, flexibility is less than with other modes since difficulty could be encountered if materiel were needed in a distant region or the host country would not permit removal (political disruption). In general, land-based prepositioning is one of the least-cost mobility program alternatives. It includes not only the cost of the prepositioned equipment, but also construction, controlled storage, and maintenance.

(U) The concept of maritime prepositioning allows some hedging on the location of the crisis and is more flexible than land-based prepositioning. Stationing ships in the vicinity of a crisis provides an in-theater presence and measured deterrent below the provocative level associated with overt physical presence ashore. Maritime prepositioning is vulnerable to disruption by military action, and can be slowed by denial of canal/strait transit and bunkering rights, requires dehumidified salt free storage, and is dependent on an adequate and secure port discharge capability or built-in capability to discharge over-the-shore. It is also dependent on airlift for the timeliness of its contribution.

2.3 THE MIX OF MOBILITY FORCES

(U) The best mix for any particular contingency is scenario dependent. Scenario considerations that influence the mix of mobility forces include: national objectives, crisis location, threat, environment, distance from embarkation sites, deployment force size and composition, urgency associated with deployment, basing and overflight rights, availability of open sea lanes and bunkering, and access in the region to include proximity and capacity of sea and aerial ports of debarkation. The proper mix of future mobility forces must provide a range of capability and flexibility to cover a wide variety of the most probable contingency situations.

2.4 THE VALUE OF EARLY ARRIVAL

(U) The force requirement for any potential conflict scenario is directly related to the expected threat and US objectives. Through forward deployment we hope to have sufficient capability to deter an attack. However, the expense and political acceptability of land-based forward deployment severely restricts the number of locations where we can have in-place deterrent forces and the size of these forces. Further, the vagaries of the strategic warning and response process may not allow for the deployment of a force adequate to deter an aggressor. The logical result is that we must then have the capability, when interests are vital, to move forces quickly to the conflict area to protect these interests.

(U) It is intuitively apparent that timely arrival of forces at the site of an impending conflict, or early reinforcement after hostilities have begun, can have a larger influence on subsequent events than forces delivered later. The decision by an enemy to press an attack may be modified or even abandoned in the face of evident willingness by the defender to commit forces quickly. Most attack plans have narrow time windows for achieving critical goals such as capturing key terrain, resources, or installations. Early reinforcements can frustrate those plans and greatly increase the risk to the enemy of persevering, thus decreasing the requirement to recapture lost territory. To the degree that early reinforcement is adequate and effective, the extent of hostilities may be greatly reduced overall and result in significantly less attrition in lives and equipment.

(U) While the relative force size required to defend versus retake territory is not subject to precise computation, classical force ratios indicate that forces can hold ground even at a 2-to-1 disadvantage and can successfully advance when they enjoy a 3-to-1 advantage.

Thus, the force required to dislodge an enemy from seized territory is six times as large as the force required to defend the area in the first place. Therefore, if we fail to achieve a mobility posture that will permit us to deploy sufficient forces in time to defend that which is vital, we implicitly accept the greatly increased cost of providing a force at least six times as large as that originally required. This alternative would also subject the vital interests to destruction by the enemy. Therefore, regaining the territory would not produce the same benefit as arriving early and achieving a successful defense. This additional cost should be balanced against the cost of mobility forces which can assure timely arrival.

(U) While all of the above benefits are easily recognized intuitively, they are difficult to demonstrate quantitatively. The many possible scenarios complicate the inherent uncertainties; and broader political questions further compound the difficulties. The acquisition of mobility forces to assure early and timely arrival, however, can involve expenditures of tens of billions of dollars. Thus, quantitative measures of the benefits of early arrival could have an important influence on the composition of future forces. A further discussion is contained in Appendix F.

2.5 SUMMARY

(U) The effectiveness of our force projection capability will be dependent on our ability to make available, in a timely manner, that amount of force necessary to satisfy our strategy. The sum of our mobility programs must provide a mix of speed, sustainability, flexibility, and effectiveness at an affordable cost. Each program--airlift, prepositioning, and sealift--complements each other to varying degrees based on the scenario and as such they are interdependent.

SECTION 3
SCENARIO SELECTION

3.1 INTRODUCTION

(U) There are a large number of potential trouble spots in the world which may require rapid deployment of US military forces in the 1980s. The Middle East, Persian Gulf, Europe, Korea, Africa, the Carribbean, and Central and South America are certainly included in this array. The required force levels and speed of deployment vary widely, depending on the scale of the incident and US interest and objectives. The forces to be confronted range from small groups of terrorists, through nationalist troops (either local supported or surrogates), to armed forces of the Soviet Union. The number and capability of these forces could include a few hundred individuals armed only with light automatic weapons, or several divisions with armor, artillery, and logistics support, or a full-scale, multi- division deployment of Soviet airborne, seaborne, and airmobile resources. Geography and Soviet deployment capability would limit the size and the rate of build-up of multi-divisional forces. Because of the general nature of these threats and the volatility of third world political structures, particularly in the Persian Gulf, it is appropriate to consider specific potential threats. To do this, four representative scenarios have been developed in an attempt to bound the mobility problem. Additional scenario development was constrained by time and resources.

(U) There will be far more scenarios of lesser scope to which the United States could respond than the ones shown below. Under these scenarios, most requirements could be satisfied with current or projected mobility forces. Since the selection of scenarios involves predicting the future in some detail for analysis purposes, it provides the scenario selector with the opportunity to stack the deck to force a desired outcome. With this pitfall in mind, the scenarios selected for this analysis are believed to be representative of our most critical international concerns.

(U) The timing of decision making is a prime concern in mobility problems. Obviously, movement of a combat force prior to a crisis permits early application of combat power against an enemy. A decision to move combat units early requires assurance that a potential enemy will behave as predicted despite US actions. There is an inherent danger in preconflict positioning of forces however, since the deployment of US combat forces to an area could be considered preemptive and used as an excuse for another nation to attack. These potentially dangerous concerns that the decision maker must consider prior to displaying military force leave the military planner with little option but to assume that major deployment decisions would occur after the onset of hostilities. Deployment go-aheads may actually occur prior to hostilities, but, in general, plans should not be critically dependent on the availability of specific amounts of warning time. The scenarios used in this study include a variety of deployment actions from 30 days before hostilities begin to 1 day afterward. We used these only to show the impact on combat force build-up, recognizing that varying the timing of activities could alter the international political and military decision processes.

3.2 SCENARIO SELECTION

(U) Four scenarios were developed by the Joint Staff and Services as potential crisis situations to demonstrate mobility requirements for the timely deployment of US forces. The forces used are those programmed for end-FY 1986; thus, forces that are doctrinally necessary but unfunded are not included as lift requirements. In addition, these forces are assumed to have been modernized and would be representative of forces throughout the 1980s and into the 1990s. The scenarios are base cases against which to evaluate DoD mobility programs in three scenario years (1982, 1986, 1990) and to perform sensitivity analysis.

(U) Each scenario was developed assuming the crisis would occur at the end of FY 1986 and reflects DIA projected enemy force capabilities for that year. The political situations were developed from a 1980 viewpoint assuming a static trend until 1986 (i.e., no convulsive internal change in any of the principal players).

The Scenarios are:

Regional Conflict in the Persian Gulf (Scenario I)

In this situation a Soviet-backed indigenous force is attempting to deny access to petroleum resources. After a 1
build-up of tensions, an armed conflict occurs that causes the governments of 2
to ask the United States for support with combat forces.

The force package to be deployed in this scenario is of the approximate size of the original Rapid Deployment Force (RDF) The relatively long build-up period 4
prior to the actual conflict provides time to use naval options fully, thereby demonstrating the benefits of an early decision.

Soviet Invasion of Iran (Scenario II)

In this scenario the Soviets attempt to gain control of Iranian oil fields and Persian Gulf sea lines of communication and to establish a pro-Soviet Iran. Following a series of counterrevolutions, the Soviets introduce military forces into Iran. The ultimate Soviet objectives are to install a Tudeh-led government, capture the Iranian oil fields, position Soviet forces on the Northern shore of the Persian Gulf to control or influence other Persian Gulf nations, and establish a pro-Soviet Iran.

The force package of this scenario is larger than the original RDF as a result of the increased threat to be faced.

Warning time is less than in Scenario I, therefore requiring a reactive decision sequence.

NATO-Warsaw Pact Conflict (Scenario III)

This scenario is the classic conventional Soviet-Warsaw Pact assault against Western Europe. It is based on a warning time of days, full US mobilization, and the rapid introduction of massive US forces. It is not, however, the NATO scenario previously used in defense programming since it assumes a total force commitment.

Regional Conflict in the Persian Gulf with a Precautionary Reinforcement in Europe (Scenario IV)

Scenario IV is a combination of Scenarios I and III. To divert US efforts away from the Persian Gulf, the Soviet Union begins mobilization of Warsaw Pact forces days after the United States begins deploying forces to the Persian Gulf. This scenario tests the US policy objective of simultaneously deploying to a NATO-Warsaw Pact conflict and a lesser non-NATO contingency. Issues of prioritization and allocation between theaters of operation are considered.

(U) All scenarios focus on a particular threat and response independent of other worldwide demands which could cause a reduction of the combat, mobility, and support forces considered here.

(U) In situations requiring partial mobilization, the President is assumed to call up 100,000 reservists/guardsmen.

(U) Political decisions permitting full use of available warning time for positive military actions will enhance the effectiveness of mobility forces in meeting time-phased force deployment requirements. Timeliness of postulated political decisions regarding mobilization and deployment are considered to be optimistic estimates of potential US responses to international events.

(U) The duration of each contingency will be 60 days from the day deployment commences (C-day).

(U) Accomplishment of force deployment objectives will require intratheater as well as intertheater lift capability. Specific intratheater lift requirements are primarily dependent upon the battle situation and the progress of the intertheater deployment; aspects of intratheater movement are addressed only to the degree they impact on intertheater requirements and capabilities.

(U) These scenarios are presented to demonstrate typical deployment, employment, and sustainment demands on programmed US mobility forces. The forces committed may be inadequate to achieve all stated objectives; however, given forces constrained to the programmed level and a political decision to deploy those forces, they represent force dispositions likely to be recommended by the Joint Chiefs of Staff.

SECTION 4

REGIONAL CONFLICT IN THE PERSIAN GULF

(SCENARIO I)

4.1 SITUATION

A Soviet-backed indigenous force is attempting to deny continuous access to petroleum resources. After rising 1
tensions, an armed conflict occurs that causes the Governments of
to ask the 2
United States for support with combat forces.

4.2 THREAT ANALYSIS

A Soviet-backed and Soviet-equipped invading force will attack 2

Their objective may be to obtain more oil for the USSR or simply to deny the oil to Western nations. If the invading force succeeds in its mission and the United States attempts to recapture the oil fields, most petroleum facilities and supplies will likely be destroyed.

4.2.1 Land Forces

The invading force will initially attack with the equivalent of mechanized infantry divisions, armored divisions, and 3
additional divisions will be in reserve.

4.2.2 Air Forces

The invading force will use Soviet-made fighters, 3
helicopters, and fixed-wing transports in the initial attack.

4.2.3 Naval Forces

The indigenous force will use coastal patrol boats and will have a limited amphibious landing force capability. Soviet Indian Ocean 3
Squadron (SOVINDRON), which normally consists of

will probably be augmented [redacted] SOVINDRON, 3
a potential threat to US Navy and sealift forces, could at any time assist the enemy force. Navy force sizing must be able to counter this threat.

4.3 ENVIRONMENTAL CONSIDERATIONS

4.3.1 General

(U) Mobility and logistics considerations in Southwest Asia planning are shaped by the extreme distances to the area from the United States, by the harsh geographic and climatic conditions, by the lack of a modern industralized logistic infrastructure in countries of the region and by the negligible US military access to facilities in nations on the Persian Gulf.

(U) Direct air routes to the Persian Gulf are nearly 6300 n mi from the East Coast of the United States. Sea routes from the East Coast to the Persian Gulf are about 8000 n mi via the Mediterranean-Suez Canal and over 12,000 n mi around the southern tip of Africa. From the West Coast the air distance is about 9000 n mi and the sea distance is over 10,000 n mi. These distances, compared to the more familiar 3500-n mi LOCs to Europe, not only result in greatly extended deployment closure times, but also impose tremendous burdens in establishing and maintaining the LOC. Landing and overflight rights, jet fuel availability, port availability and cargo ship bunkering facilities assume critical importance.

(U) The region is characterized by rugged mountains, sandy deserts, extremes of temperature, and a general lack of potable water sources. These factors not only will affect the number and types of forces which can be employed, but also will require special attention to such things as equipment maintenance, water production and purification, and special climatic or protective clothing.

(U) While each regional country is making headway in developing a logistic infrastructure, and while the major urban centers are taking on an increasingly Western-industrialized flair, none of the countries can be expected to provide a significant portion of US military logistic requirement. Regional transportation networks are of limited capability and many are already overloaded with peacetime requirements. Medical facilities and services range from minimally available in large cities to non-existent in rural sections. The relative lack of excess capabilities, and a generally low level of technological development and experience, limit the extent and nature of host nation support that can be provided.

(U) In summary, there are several problems in planning for acceptable levels of logistic and mobility support for operations in Southwest Asia. The following paragraphs catalogue in greater depth logistic and mobility constraints.

4.3.2 Saudi Arabia

(U) Saudi Arabia is a land of 2 million km^2, 98% of which is desert with less than 5 in. of annual rainfall. There are no perennial streams. Vegetation is sparse and large areas are barren. In the desert plains, dust storms and sand storms are common and severely limit visibility. The abrasive action of sand and dust necessitates frequent repairing of equipment. Extremely high temperatures from May to September ranging from 90 to 115°F (mean daily maximum) reduce personnel efficiency. Surface water commonly is scarce.

(U) Highways are the primary means of surface transportation with Riyadh, the capital, as the focal point of the network. A 5200-mile road system interconnects the more important localities near the Persian Gulf, along the Red Sea, and around Buraydah and Ha'il. Much of the network serves to connect Riyadh with the oil fields and the Persian Gulf seaports. The southeast is virtually without roads. Highways connect all neighboring countries. A construction program annually improves about 600 miles of highways. Even on the highways, moving vehicles produce clouds of dust which limit visibility. A major problem is the blocking of roads by windblown sand.

(U) Only one railroad is in operation, a 4-ft 8 1/2" gauge, US-built line from Riyadh to Ad Damman via oil fields which traverses 352 miles. It has a 34.4 short-ton axle load limit and a 955 ft minimum radius of curvature. General purpose yards lie at either end.

Saudi Arabia has six major Gulf and Red Sea seaports which have been developed primarily to serve the petroleum industry. Located along the east coast of the Arabian Peninsula are the seaports of Ras Tanura, Ad Dammam, and Jubail. Ras Tanura is the principal shipping port of Saudi Arabia but with limited capability for military use. Ad Dammam is a general cargo, deep-water port and is readily adaptable to support naval operations. Jubail is a new port under construction which, when completed, will become Saudi Arabia's largest port.

Red Sea ports, of which Jidda is the most important, are generally less developed. Jiddah is well developed and can support naval operations. Yanbu and Qizan are small ports with large expansion programs underway to be completed within the next 12 months. There are seven minor ports in the country with small cargo handling capacities.

(U) The airfield system has a total of 99 usable airfields. Of these, 20 are not considered available for military airlift operations because they are relatively short and/or narrow, measuring less than 3000 ft long or 90 ft wide. Seventy-nine are at least 3000 ft by 90 feet and are considered militarily useful, and 28 of these are 5000 ft by 148 ft or greater. In terms of surface composition, 35 of the 79 are asphalt, 2 are concrete and the remaining 42 are unpaved (compacted sand, gravel and earth) while 23 of the 5000 ft by 148 ft fields are asphalt and 5 are unpaved. Most airfields have limited parking ramps and narrow taxiways with the exception of those associated with scheduled airlines or routine military operations. Four airfields are categorized for military use only (Khamis-Mushait, Gizan, Nejran, Tabuk) and an additional four (Jiddah, Riyadh, Dhahran, Taif) are jointly used by military and civil aircraft. The three major international airports serving Saudi Arabia are located at Jiddah, Riyadh, and Dhahran.

With the abdication of Iran as the policeman of the Persian Gulf, the Saudis have become increasingly alarmed by the rising influence of Soviet support for the Yemen Arab Republic, the Peoples Democratic Republic of Yemen and the Iran-Iraq War, and by the Soviet invasion of Afghanistan. Despite their wealth and political influence, the Saudis look to the US as the only country with the military capability to defend their sovereignty. Army strength stands at and their marginally effective air force numbers only Her population of 8 million permits them little capacity to mobilize additional defensive units.

For the location of airfields, ports, railroads, and roads see Fig. 4.1.

4.4 ASSUMPTIONS

(a)

(b)

Figure 4.1. (U) Strategic Mobility Map--Arabian Peninsula

(c)

(d)

(e)

(f)

(g)

(h)

4.5 SEQUENCE OF EVENTS

The scenario calls for the following time sequence:

4.6 CONCEPT OF FORCE EMPLOYMENT

1

4

4.7 FORCE RATIONALE

4.7.1 Army and Marine Forces

US Army and Marine Corps force requirements are based on providing sufficient allied combat power to halt the enemy advance as far away as possible from the oil field and to restore prewar boundaries (see Fig. 4.2). Early arrivals of these forces will be critical to a

60 (60)

SCENARIO I

Figure 4.2. (U) Ground Combat Force Deployment and Timing

successful defense given the size and mobility of the threat, the very limited capabilities of forces, and the distances to threat objectives. Failure to stop the enemy attack early would allow the forces easy access to oil field and port facilities. 2

4

4.7.2 Tactical Air Forces

The state of the air threat will afford a high payoff for offensive-oriented operations by friendly local forces. tactical fighter wings will be required to supplement friendly local forces to gain air superiority, conduct an air offensive, provide close air support, and give air defense for vital assets such as oil facilities, ports, and airbases. tactical airlift squadrons will provide intratheater airlift. tactical reconnaissance squadrons will provide tactical reconnaissance, and 4

The Defense Suppression (DS) package will include

4.7.3 Naval Forces

(S) During the period of rising tensions,

would be deployed in the Indian Ocean and Persian Gulf to demonstrate US resolve and deter Soviet involvement.

Prior to the outbreak of hostilities, naval forces would begin reinforcement with 4

Initial amphibious operations would secure vital ports and strategic maritime land areas and support defensive land operations if necessary. additional Marine Air-Ground Task Forces (MAGTF) will be needed to augment Marine forces ashore. 4

4.8 FORCE REQUIREMENTS AND PHASING

(U) Table 4.1 contains the force requirements for Scenario I. Further details are contained in the Catalog of Assumptions and Data (Appendix C).

4.9 RATIONALE FOR FORCE DEPLOYMENT SEQUENCE AND TIME PHASING

US Forces moving to the area will quickly establish an APOD to receive deploying land forces. Fighter and reconnaissance aircraft will deploy 2

Marine forces will deploy afloat will arrive from the US 2 + 4 (east and west coast) and forward-deployed locations and will be immediately available. If the appearance of US forces in the region does not force a settlement,

4

MAF are required where the tactical situation dictates to assist in halting the main attack.

2 + 4

Upon establishment of full logistic support the combined force would be sufficient to begin operations to restore the prewar borders.

4.10 MOBILITY FORCES

(U) Airlift and sealift mobility forces for each scenario are contained in the Catalog of Assumptions and Data (Appendix C).

TABLE 4.1

FORCE REQUIREMENTS (U)

ARMY AND MARINE FORCES

Army Div	USMC MAF	RDD

Totals:

AIR FORCES

Tactical Fighter Wings	Tactical Recon Squadrons	Tactical Airlift Squadrons	RDD

Totals:

NAVAL FORCES (Phasing not applicable)

Battle Groups
Surface Attack Group
Nuclear Attack Submarines
Patrol Aircraft Squadrons
Underway Replenishment Group
Mine Countermeasure Squadrons
Amphibious Task Force

4

64

4.11 RESULTS OF MOVEMENT ANALYSIS

4.11.1 General

(U) This section describes the movement analysis in greater detail than will be the case in similar presentations for each of the three succeeding scenarios (Sections 5.11, 6.11, and 7.6). This is done to acquaint the reader with the general form of data presentation and to emphasize the key insights that can be derived from the various displays.

(U) The movement analysis for each scenario examined the three specific time frames (1982, 1986, and 1990) and the impact of several scenario variations (the availability of the Suez Canal, aerial refueling, convoy policy, and attrition) if applicable to the scenario. Modernized 1986 forces were held constant for each time frame. Volume 3 [available on microfiche from OASD(PA&E)] contains the detailed data base and simulation results of all the cases that were examined. The main body of the report displays the results of a "base line" case and describes significant differences in other variations.

4.11.2 Lift Demand

(U) The "base line" lift demand for each scenario was established from the DoD program for 1986 as presented to Congress in testimony on the FY 81 Budget. Other programs for which DoD has tentative plans are treated as potential program alternatives. Forces forward deployed or deployed on amphibious shipping are not shown as a requirement for common user lift.[1] On the other hand, materiel prepositioned is included in the lift demand.

(U) The simulation model uses passenger aircraft to carry accompanying supplies if they have payload beyond an allotment of 350 or

[1](U) For example, 1 MAF (9/9) deployed aboard amphibious shipping represents approximately 127K tons of dry cargo and 295 kbbls of petroleum.

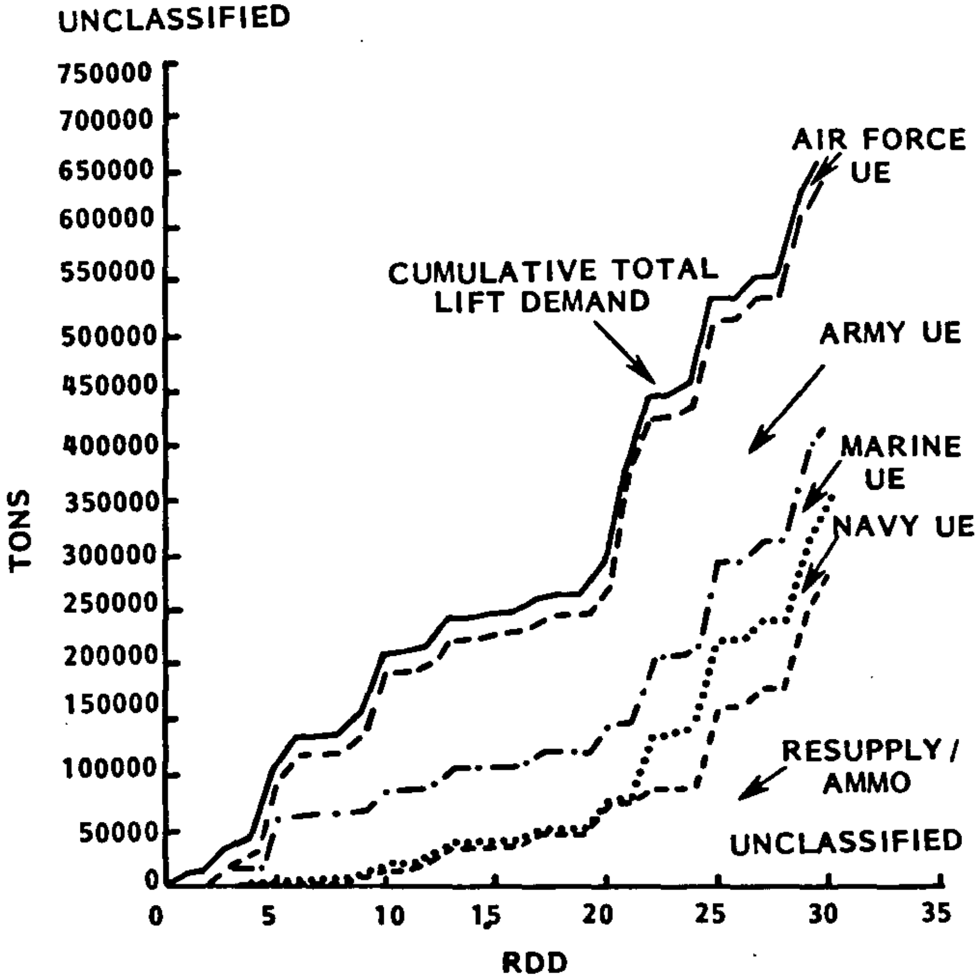
300 lb per passenger (NATO or Persian Gulf respectively), which accounts for the man, his personal equipment, and some small items of unit equipment. The difference between a passenger's body weight and 350 or 300 lb is not included in the lift demand nor shown as lift capability. If, for example, we assume the average passenger weighs 180 lb, the C+30 lift demand and capability would each be increased by 10.7K tons in this scenario.

(U) Figure 4.3 shows the distribution of unit equipment cumulative tonnage demand by service and the aggregated demand for resupply and ammunition. Table 4.2 presents the baseline lift demand and the common-user cumulative demand for 1982, and 1986.

(U) Figure 4.4 displays the bulk, oversized and outsized tonnage distribution for materiel required early but not prepositioned in 1986. Bulk cargoes are those that can be accommodated by palletized loading or placed in storage areas aboard aircraft in a number of configurations. Oversized cargo, such as armored personnel carriers and 2 1/2 ton or smaller trucks, is that cargo which is larger than the usable dimension of an air cargo pallet (104 x 84 x 96 inches high, or a height established by the cabin envelope of a particular aircraft), yet can fit in C-141/C-130 and wide-body CRAF aircraft. Outsize cargo is that cargo which can currently be accommodated only by the C-5 and includes very large trucks, large helicopters, self-propelled artillery, air defense equipment, infantry fighting vehicles, and tanks. In Fig. 4.4 only the first 15 days are shown, after which time other transportation modes also begin to contribute.

4.11.3 Defense Program Capability

(U) Base line lift capability is established under the same rules used for the base line lift demand--namely, it is the capability in each year of the DoD program as presented to Congress during testimony on the FY 81 budget. Demand and capability for 1982 and 1986 are shown in Figs. 4.5 and 4.6, respectively. These include all programmed



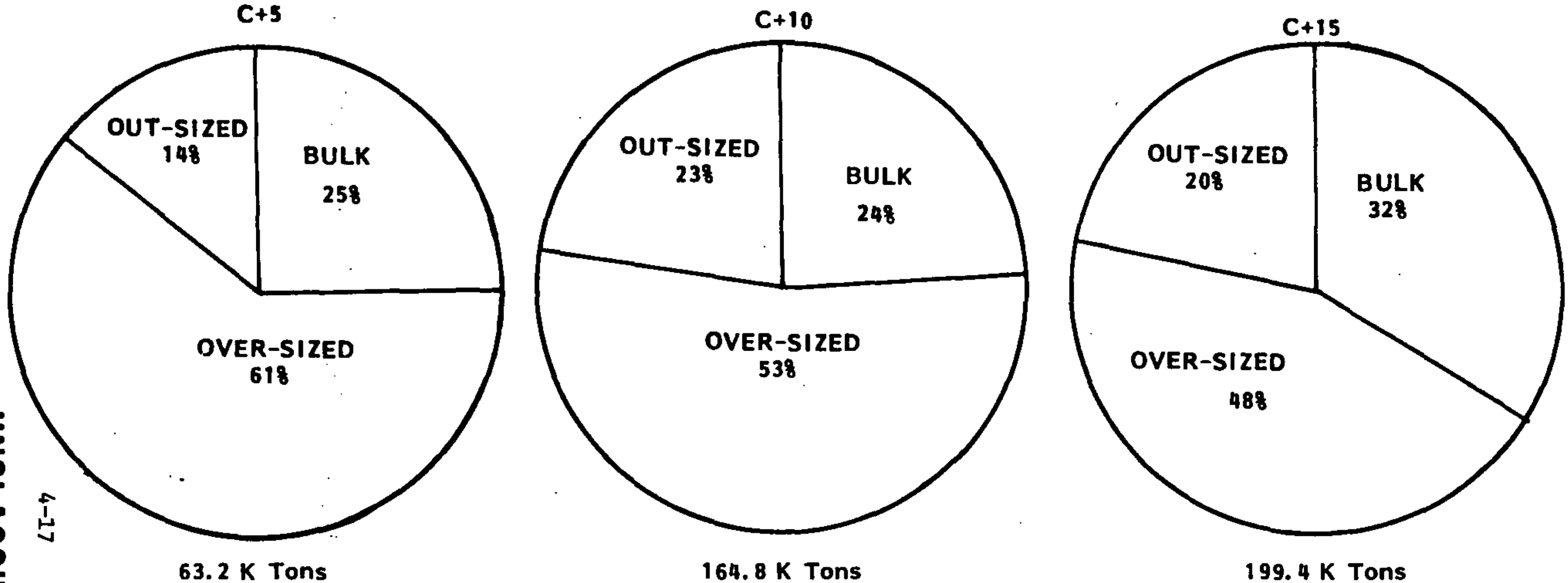
(U) Figure 4.3. (U) Base-Line Cumulative Lift Demand, Scenario I

TABLE 4.2 (U)

CUMULATIVE LIFT DEMAND (U)

	DAY AFTER C-DAY					
	5	10	15	20	25	30
A. BASE LINE						
Passengers (000)	75.8	114.7	124.4	131.8	178.4	178.7
Dry Cargo Tonnage (000)						
Unit Equipment						
Army	26.3	108.4	122.0	126.2	219.4	219.4
Air Force	17.8	19.0	19.3	20.0	20.2	20.4
Marine	60.7	67.1	67.1	67.1	67.1	67.1
Navy	2.1	2.1	2.1	2.1	56.9	58.4
Ammo/Rsup	0.3	29.4	58.7	105.1	203.6	334.8
Total	107.2	226.0	269.2	320.5	576.2	700.1
B. ADJUSTED BASE LINE FOR DOD PROGRAM (Total Dry Cargo 000 Tons)						
1982 (-NTPS)	87.3	202.1	241.3	288.6	531.3	660.2
1986 (-2MPS)	63.2	164.8	199.4	242.1	480.2	684.5

UNCLASSIFIED



UNCLASSIFIED

UNCLASSIFIED

UNCLASSIFIED

(U) Figure 4.4. (U) Distribution of Potential Common-User Airlift Cargo (First 15 Days), 1986, Scenario I airlift enhancements and sealift programs, but do not include the C-X. Details on all the elements of programmed lift capability, and assumptions pertaining thereto are contained in the Catalog of Data and Assumptions (Appendix C).

(U) Satisfaction of lift demand is measured in terms of force closure at units' wartime locations. In this section activities of units after delivery are handled by intratheater movement factors in the ISDM model and represent a consistent basis for intratheater evaluation.

In addition to the warning period activities explicit within the scenario description, the 1986 base line simulation includes accelerated deployment of Army moved by fast sealift ships (SL-7s). In order to capitalize on this system, 1

This is a plausible action in this scenario--recall that substantial naval forces were deployed to the Indian Ocean on warning--and serves to highlight one type of activity that might be considered by the NCA prior to a decision to deploy. The result is to accelerate closure of the Army units 1 + 5

The base line simulation also includes allocation of airlift to support the NTPS (1982) and MPS (1986) programs to insure closure of residual cargo at a time considered operationally feasible within the parameters of the scenario This allocation of lift amounted to 9% and 17% of total airlift for 1982 and 1986, respectively. The impact of this allocation of airlift was a delay for one Army brigade in 1982 and two Army brigades in 1986. This would make available a fully capable Marine air-ground task force (1 brigade in 1982, 2 brigades in 1986) earlier than they would otherwise be available. This is an option available to the theater commander. 5

70 70

For this scenario the base-line case includes no convoying, attrition, or aerial refueling. There is no threat that would require convoying, and attrition of lift assets should be quite limited. Aerial refueling would improve the productivity of military airlift only slightly because in most cases the nature of the cargo (low density) is such that floorspace, not payload, is the limiting factor.

(U) The shaded areas in Figs. 4.5 and 4.6 represent the shortfall against which program alternatives will be measured in Section 10, Evaluation of Alternatives. The area below the capability line has been divided to show the contribution of each major component of the mobility force.

4.11.4 Observations

(a) Major force closure improvements occur between 1982 and 1986 as a function of the following:

- Airlift improvement programs (C5/C141 spares, crews, CRAF enhancements) contribute to an overall 25% improvement in airlift capability.

- In 1986 fast dedicated sealift (SL-7s) provides a 70K ton early boost in sealift delivered cargo

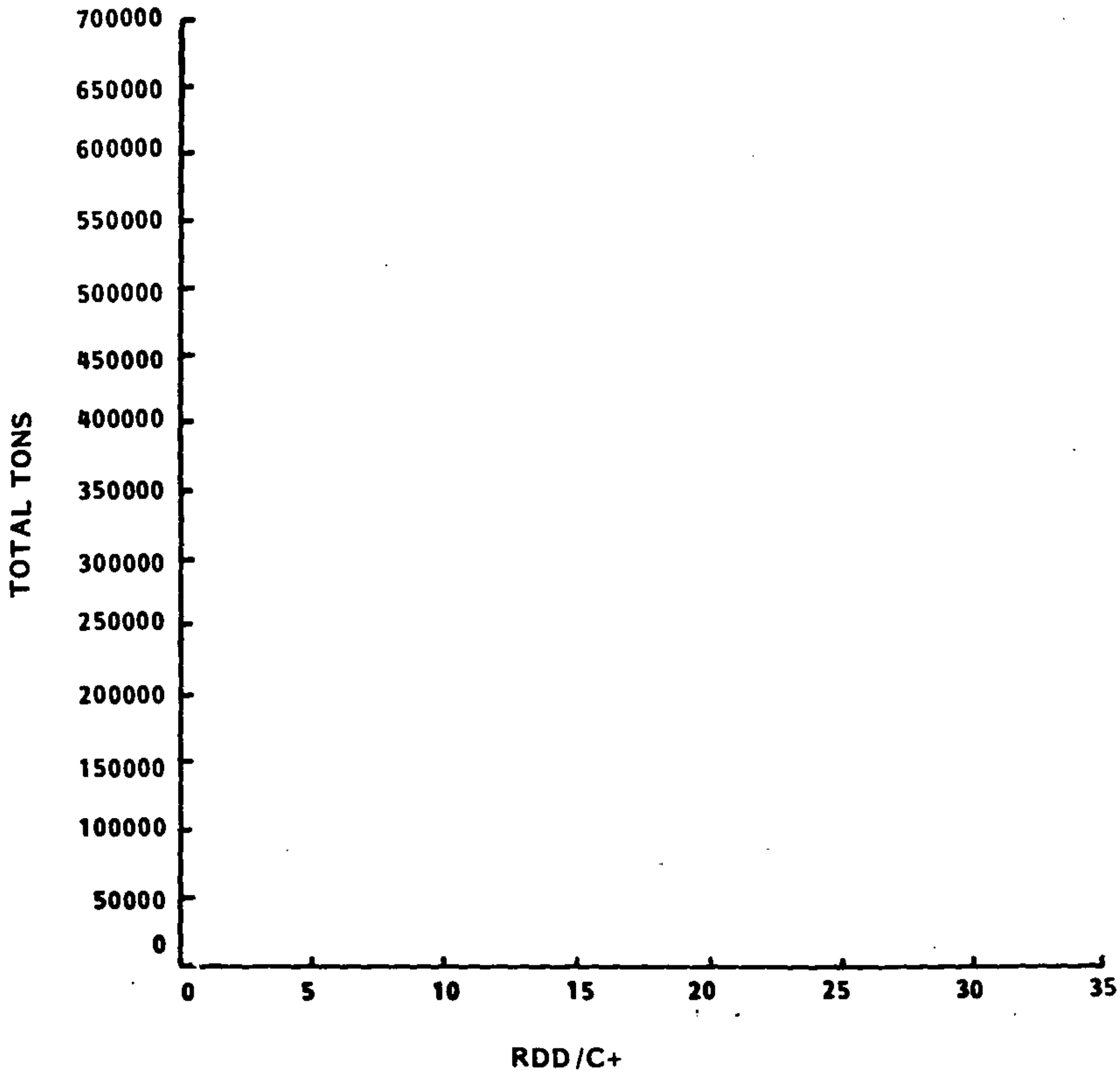


Figure 4.5. (U) Lift Demand, Capability, and Shortfall, 1982, Scenario I

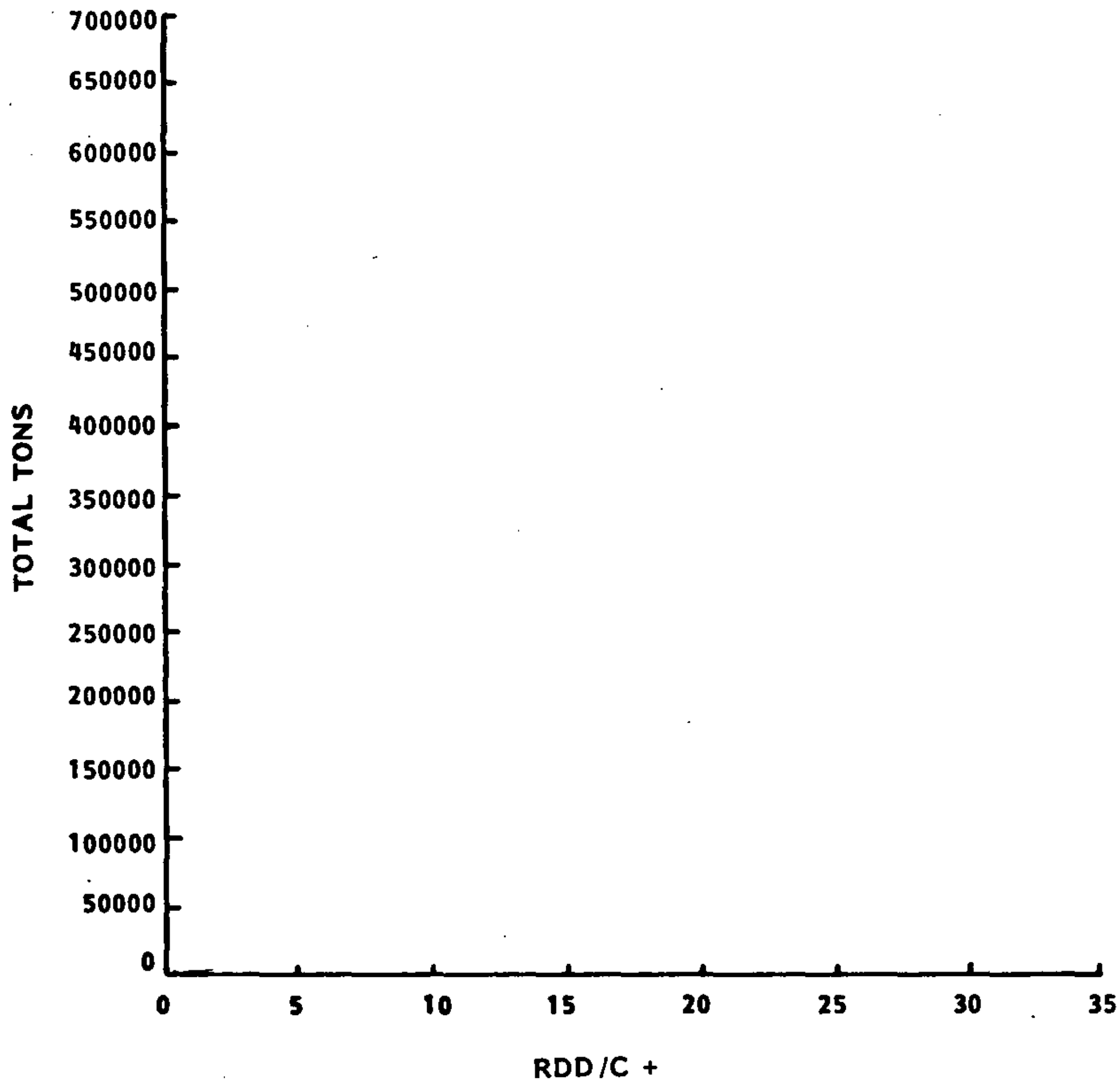


Figure 4.6. (U) Lift Demand, Capability, and Shortfall, 1986, Scenario I

5

A significant contribution to capability over the period is achieved by maritime prepositioning. For 1982, the Near Term Prepositioning Ships program constitutes the equivalent of one brigade-sized Marine Air-Ground Task Force (MAGTF) (19.9K tons) and 20K tons of resupply and ammunition. By 1986 this will grow to two brigade-sized MAGTFs (95.6K tons of unit equipment and supplies) on Maritime Prepositioning Ships (MPS).[1] A third MPS brigade (22.0K tons unit equipment, 25.8K tons resupply, and ammunition) is scheduled for 1987.

4

(b) In the 1986 case the demand is nearly satisfied by after C-day although the shortfall during is on the order of 5

[1](U) Assumes NTPS transitions into the second MPS group as new ships become available for the program.

Figures 4.8 through 4.10 portray the closure of major unit packages and serve as another measure (in addition to tons closed) of the lift system for the 1982 and 1986 closure.

(c) Figure 4.7 provides some useful insights into the activity of the mobility force on various movement demands.

This

Figure 4.7. (U) Lift Demand and Satisfaction, 1986, Scenario I

Figure 4.8. (U) Army Movements, Base Line, Scenario I, 1986

Figure 4.9. (U) Marine Movements, Base Line, Scenario I, 1986

5

Figure 4.10. (U) Air Force Movements, Base Líne, Scenario I, 1986

provides insight into another facet of the system. Ninety percent of the early arriving shipping is containerized and thus, oriented to movement of bulk cargoes (resupply/ammunition). Of the ships available to move unit equipment during this period, 36 were non-container with half of those being slow, breakbulk, which, even when available by M+2, produce deliveries (not closure) in 24-30 days. This only serves to highlight the need to provide a better means to utilize the vast containership resources that we currently expect to be available, as well as provide other militarily useful shipping.

4.11.5 <u>Implications of Warning Assumptions</u>

Each scenario provides some insight into the value of early decisions in response to strategic warning. This scenario has naval and embarked marine forces deploying to the region to show US resolve--much like the current Indian Ocean Task Force operation. These forces are on station at the time of attack. Although not deterring conflict, they allow for early US intervention. This warning period is considered near the minimum time required to establish a presence of this size. Although the movement of amphibious forces is not shown as either a lift demand or capability, the movement of an equivalent force by air to the theater by would have been infeasible.

Placing US forces on alert and prepositioning airlift forces as well as sealift resources permitted increased early aircraft sortie generation and early availability of ships for loading, improving tonnage closure

4.11.6 Passenger Lift

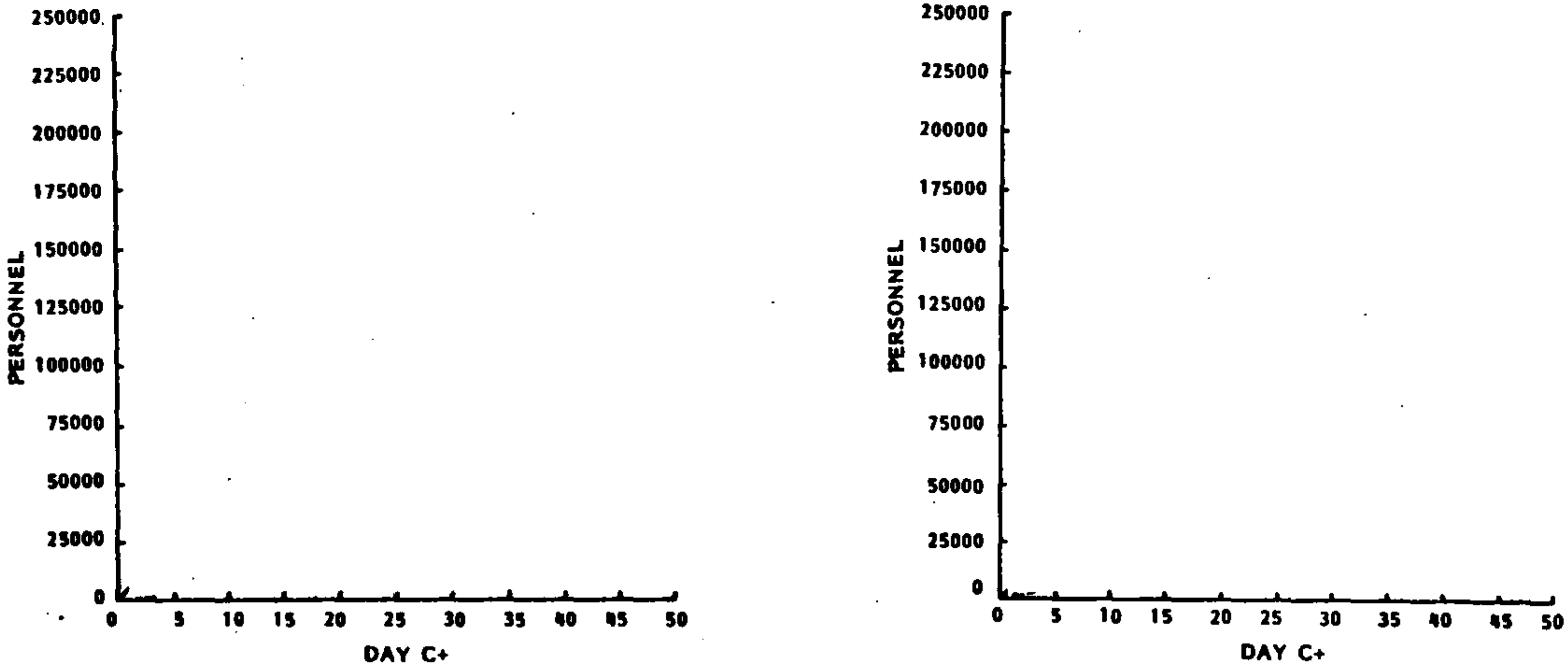
In addition to shortfalls associated with tonnage movement, an analysis was conducted on passenger movement capability to support deployments.

5

Figure 4.11 portrays the passenger requirement (solid line) as a function of required cargo deliveries established by RDDs. The dashed line reflects passenger demand when balanced with the arrival of equipment
associated with those passengers. Passengers delivered by CRAF 1
and passengers accompanying cargo are shown by the dotted line. From the left hand portion of the figure it is observed that the cumulative
shortfalls between capability and cargo constrained demand is 4
approximately passengers. In an actual operation, we could reduce this shortfall by getting additional passenger aircraft or by diverting some cargo aircraft to carry passengers, particularly during periods when other modes begin to contribute. The right hand portion of the figure shows one such case wherein, commencing on of the C-141
and 747 cargo aircraft carry passengers. This level of effort is 5
increased (straight line) to by The result is a relatively small reduction in cargo closures and significant improvement in passenger closure. This example highlights the need for operational flexibility in our mobility planning.

4.11.7 Summary

(U) From the foregoing it becomes apparent that solutions to the shortfall rest not on any one system (airlift, prepositioning, or sealift), but on a mix of several lift system as well as operational programs to enhance system performance.



(a) (b) Excursion

LEGEND:

——— Requirement (as generated by RDD)
- - - - Demand (based on cargo arrival)
········· Arrival (based on pax aircraft capability)

Figure 4.11. (U) Passenger Requirements, Demands and Arrivals, 1986, Scenario I

4.12 IMPACT OF DELAYS IN CLOSURE

(U) Meeting the required deployment sequence in all four scenarios would minimize the military risk to US forces and provide a higher assurance of success. Late closures increase the military risk of achieving the desired scenario outcome and thereby could result in higher casualties, higher force requirements, or battlefield defeat. The impacts of late closures were assessed based on inabilities to achieve necessary force ratios when required at specific key objective areas. Qualitative considerations are also addressed. However, the many imponderables of war pertaining to morale, leadership, organization, abilities to coordinate air and ground forces and logistic operations, etc., and their impact on conflict outcome, although not easily measured, can off-set numerical imbalances. The most difficult aspect of these scenarios to assess, based on force ratios, is the political willingness of an enemy to pursue an attack against a potential threat greater than that which he may have bargained for when the attack began. This study assumes the enemy will continue through with the scenario and only the force of superior opposing arms will stop them.

In halting the attack, the prime early objective, that of gaining air superiority, must be achieved by US forces to allow early delivery of required Army forces, permit Marine amphibious operations, and limit attacks against airfields and seaports.

5

Forces tasked to block approaches through the 2+4
desert regions must be able to halt an enemy advance quickly to minimize interruptions and the dangers to the reinforcement operations, stablize the defense forward of the oil fields, and prevent the capture of

2+5

Enemy air interdiction of airport and seaport facilities
could cause further delays in force arrivals beyond those shown in this mobility analysis. 2

2, 4, 5

Attacks against if coordinated and intensive, could force the movement of the principal APOD farther from the combat zone. This possibility would significantly delay US force introduction and would further tax intratheater airlift force. Delays may be 2 measured in terms of months if US reinforcements must travel overland from surviving port facilities. (Delays may increase the force size from the one used in this scenario to achieve objectives. Higher US casualties are also likely.) Meanwhile, may be captured and key oil facilities may be destroyed and oil production and shipments to Japan, Europe, and the US would be greatly reduced. It could take up to 3 years, if ever, to completely restore the status quo ante.

5

5

2

In 1986, damage to the oil producing facilities will occur but should be less than that in 1982 because the enemy's penetration will not be as deep due to a more rapid force build-up by the US. As a consequence, the industrialized nations could be denied Persian Gulf oil in required amounts for up to 6 months and full production could not be assured for up to 3 years. Damage would be minimal if the objective closure profile could be met.

If force closure objectives could be met, the enemy could be engaged in force because air superiority would have been attained The counter-attack could begin Air interdiction efforts and MAFs and Army divisions, augmented by forces, could force a stalemate along the line depicted in the scenario chart. This could also result in an early withdrawal by the enemy. In any case, there will be minimum disruption of US reinforcement operations by the enemy, permitting a far earlier establishment of full logistics capabilities. This situation would allow sustained, coordinated, and intensive offensive operations. Pre-war boundaries could begin to be restored very soon after Full oil production and shipments could be resumed within weeks.

SECTION 5

SOVIET INVASION OF IRAN

(SCENARIO II)

5.1 SITUATION

The Soviets are attempting to gain control of Iranian oil fields and Persian Gulf SLOCs and to establish a pro-Soviet Iran. The pro-Moscow Tudeh Party attempts a counterrevolution that is initially successful but is subsequently opposed by another counterrevolution (perhaps pro-West, Islamic, or possibly nationalistic). The Soviets then introduce military forces into Iran to restore the failing Tudeh Government and establish control over Persian Gulf oil resources. Soviet objectives are to install a Tudeh-led government, capture the Iranian oil fields, and position Soviet forces on the northern shore of the Persian Gulf to control or influence other Persian Gulf nations.

5.2 THREAT ANALYSIS

3

5.2.1 Land Forces

Of the Soviet divisions nearest Iran, will be employed in the initial attack on Iran. Soviet ground and airborne forces will conduct operations designed to destroy the Iranian Army, capture airfields, and establish positions on the Persian Gulf and Gulf of Oman to prevent sea reinforcement of Iran. 3

5.2.2 Air Forces

Soviet air forces will conduct operations to destroy the Iranian Air Force, disrupt communications, impede or stop enemy surface movements, attack enemy naval forces, and support friendly ground forces. The Soviets will have about fighters, fighter-bombers, and reconnaissance and EW aircraft 3

helicopters which could be employed in Iran. Some of the fighter-interceptors in this area whose mission is to defend Soviet airspace could participate in aerial combat over Iran close to the Soviet border. A Soviet option will include Long Range Aviation (LRA) bomber attacks on Iran. A force of about LRA bombers

could be used for such missions;

5.2.3 Naval Forces

The SOVINDRON, which normally consists of

will probably be augmented

3

The

Soviets will attempt surface and submarine interdiction

portion of Soviet naval

forces will be directed toward countering the movements and reactions of Western naval forces

SNA could attack naval targets in the Persian Gulf, Gulf of Oman, and Arabian Sea. Soviet military operations against Persian Gulf energy resources and oil LOCS

include hostile actions to sabotage oil facilities, to mine or raid ports, and to attack oil tankers on the high seas.

5.3 ENVIRONMENTAL CONSIDERATIONS

5.3.1 General

(U) The general considerations stated for Scenario I are applicable to this scenario as well.

5.3.2 Iran

(U) Covering an area of 628,000 square miles, Iran constitutes a land bridge between the Mediterranean, the Middle East and Southwest Asia. The population exceeds 35 million and is highly concentrated. About 70% of the country, predominantly the mountain and desert regions, is almost uninhabited.

4

(U) In more than three-fourths of Iran fresh water is scarce during most of the year; it is plentiful only in mountainous areas. Ground water is plentiful in more than half of Iran. Biological contamination is common near populated places. The climate of Iran is diversified, primarily because of the influence of topography. Mean annual precipitation varies from over 40 inches along the Caspian Sea coast to less than 8 inches over the interior and southern coast. Winter temperatures can be hot in all sections except at the highest elevations. Visibility, although generally good all year, is occasionally restricted by rain, snow, or low clouds in winter, by showers in spring and autumn, and by sand and dust in summer.

(U) Iran's road network radiates from Tehran to all major cities and ports. Improved surfaced roads total 27,000 miles and range from poor to good condition. Supply and movement of military forces would be limited by the lack of alternate routes and the continuous maintenance effort necessary to sustain heavy military traffic over roads intended only for low traffic volumes. The lack of bypass routes contributes greatly to the vulnerability of the network.

(U) Iran's railroad network radiates from Tehran and serves mainly to move freight between the Gulf ports and the capital. The main line extends south to the port of Bandar-e Shahpur, with branch lines from Ahvaz to Khorramshahr and from Qom southeast through Yazd to Kerman with spur lines to Espahan and the steel mill at Riz. A second line extends west from Tehran then northwest to the Jolfa transloading facility where a connection is made with the Soviet Union. A branch of this line connects with the Turkish railway system. A third line from Tehran extends east to Mashad with a branch to Gorgan.

(U) Iran has 13 ports:

Principal	Secondary	Minor
Abadan (POL)	Bandar Abbas	Asaluych
Bandar-e Shahpur	Bandar-e Mah Shahr (POL)	Bandar-e Lengeh
Khorramshahr	Bushehr	Chah Bahar
	Jazireh-ye Khark (POL)	Ganaveh
		Hormuz
		Jask

(POL)= Developed as POL only ports

(U) All of the principal and secondary ports except Bandar Abbas (at the entrance to the Persian Gulf) are located near the head of the Persian Gulf; the minor ports are scattered along the coast from the head of the Gulf to the Pakistan border.

(U) Iran's airfield system has a total of 149 usable airfields. Of these 33 (22%) are not considered available for military airlift operations because they are relatively short and/or narrow, measuring less than 3000 ft long or 90 ft wide. One hundred sixteen (78%) are at least 3000 ft x 90 ft and are considered militarily useful, and 44 (30%) 5000 ft x 148 ft or greater. In terms of surface composition 68 of the 116 are asphalt, 3 are concrete and the remaining 45 are unpaved (compacted sand, gravel and earth) while 36 of the 5000 ft x 148 ft fields are asphalt, 1 is concrete and 7 are unpaved. Eight airfields are categorized for military use only[1] and 10 are jointly used by military and civil aircraft.[2] To a large extent, geography influences the distribution of airfields since the mountainous terrain in the central portion of the nation prohibits construction in those areas. A majority of the longer airfields (at least 5000 ft) are concentrated along the Persian Gulf Coastal areas and the western-most sectors of the country.

(U) Iran would be unlikely to request immediate assistance should a Soviet invasion occur. However, their naive belief in their own superiority and their largely ineffective armed forces would not withstand a vigorous Soviet thrust. Their mistrust of the US would probably remain paramount until their realization of imminent disaster. Other countries would be expected to support in accordance with existing agreements and/or alliances.

(U) For the location of airfields, ports, roads and railroads, see Figure 5.1

---

[1](U) Bandar Abbas (NAS), Chah Bahar, Jask, Khatami, Shahrokhi, Tehran Doshan Tappeh, Tehran Ghale Morghi, Vahdati.

[2](U) Bandar Abbas, Bushehr, Esfahan, Shiriaz Intl, Tabriz, Mehrabad, Kermanshah, Kish, Mashhad, Masjed Soleiman.

3

Figure 5.1. (U) Strategic Mobility Map--Iran

94

5.4 ASSUMPTIONS

(a)

(b)

(c)

(d)

(e)

(f)

(g)

(h)

(i)

95

95

(j)

(k)

(l)

(m)

(n)

(o)

5.5 SEQUENCE OF EVENTS

The scenario calls for the following time sequence:

5.6 CONCEPT OF FORCE EMPLOYMENT

(U) General-purpose force requirements are based on one objective--to maintain continuous access to petroleum resources.

4

5.7 FORCE RATIONALE

5.7.1 Army and Marine Forces

US Army and Marine forces would be required to counter a Soviet offensive 3

Army divisions, MAF and MAGTFs would be required to hold Soviet forces forward of a defensive line 4

SCENARIO II

Figure 5.2. (U) Ground Combat Forces Deployment and Timing

2 + 4

98

5.7.2 Air Forces

Force requirements for the Persian Gulf region reflect an expanded appreciation for the importance of protecting the critical oil reserves and lines of oil supplies. For counterair, interdiction and close air support missions, tactical fighter wings will be required. These wings will deploy quickly to bases around the Persian Gulf and will begin immediate operations

Tactical air forces will concentrate attacks against

squadrons will provide intratheater airlift support. tactical reconnaissance squadrons will furnish required tactical reconnaissance coverage.

The defense suppression package will include

5.7.3 Naval Forces. Same as for Scenario I.

5.8 FORCE REQUIREMENTS AND PHASING

(U) Table 5.1 contains the force requirements for Scenario II. Further details are contained in the Catalog of Assumptions and Data (Appendix C).

5.9 RATIONALE FOR FORCE DEPLOYMENT SEQUENCE AND TIME PHASING

5.9.1 I D-Day Through I

TABLE 5.1

FORCE REQUIREMENTS (U)

ARMY AND MARINE FORCES

Army Div	USMC MAF	RDD

4

Totals:

AIR FORCES

Tactical Fighter Wings	Tactical Recon Squadrons	Tactical Airlift Squadrons	RDD

Totals:

NAVAL FORCES

Battle Groups
Surface Attack Group
Nuclear Attack Submarines
Patrol Aircraft Squadrons
Underway Replenishment Group
Mine Countermeasures Squadrons
Amphibious Task Force

(100)

5.9.2 After

4

5.9.3 Army and Marine Forces

4

5.9.4 After Field Force Deployment

(U) When the majority of the US expeditionary force is in place, the roles for mobility forces will be sustainment of deployed forces, aeromedical evacuation of the wounded, repositioning of forces to oppose enemy activities, and resupply of forward units and air bases not located near APODs or SPODs.

5.10 MOBILITY FORCES

(U) Airlift and sealift mobility forces for each scenario are contained in the Catalog of Assumptions and Data (Appendix C).

5.11 RESULTS OF MOVEMENT ANALYSIS

5.11.1 General

(U) Caution must be exercised when comparing results of one scenario to another--both lift demand and mobility force capability are sensitive to the scenario. The lift demand is created in response to the scenario threats and the strategy and tactics necessary to achieve scenario objectives. For example, two conflicts could be postulated for the same region and, even though a threat may be twice as great, the movement of threat forces into combat could be at half the pace and levels of response required early might be equal or even less. Inevitably, attempts will be made to compare Scenario II with I. This appears logical by virtue of the nearly coincident destinations. Yet, the level of conflict, as well as the length of the warning period and actions taken during it, could be expected to produce a dramatically different set for demand and capability. Since the total level of response is on the order of 2-3 times that in Scenario I, one might conclude that shortfalls in this scenario ought to be at least twice those in the smaller Persian Gulf contingency. The results that follow do not demonstrate such a case, particularly during the very critical early period of reinforcement. In addition, comparisons of total tonnage over time and unit closures can mask differences in the nature of cargoes.

These differences are not ignored in this study and will be addressed as part of the evaluation of alternatives.

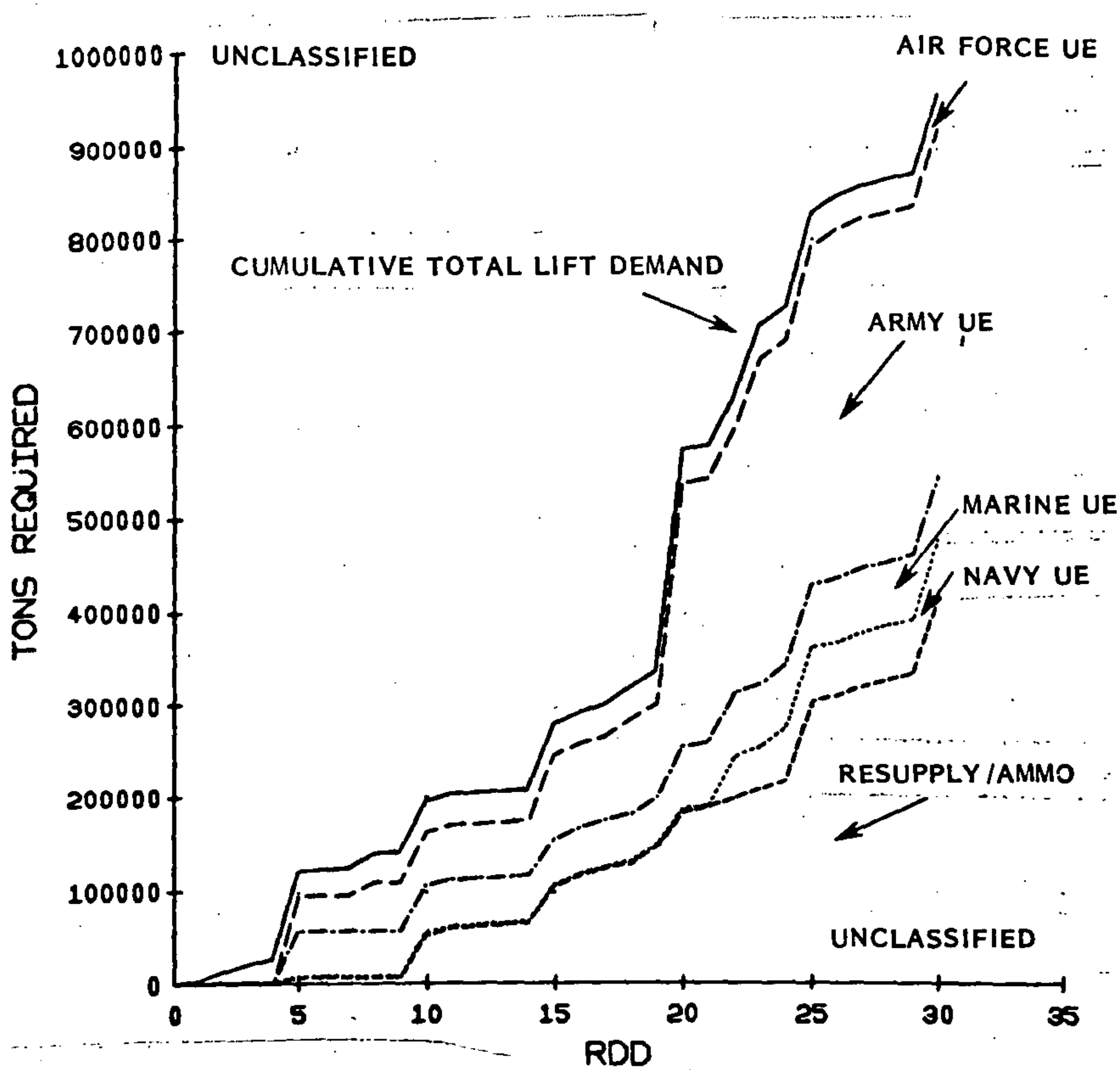
5.11.2 Lift Demand

(U) Figure 5.3 shows the cumulative tonnage lift demand for the first 30 days of deployment of the unit equipment of each of the Services and theater ammunition and resupply. This represents the base line under the same assumptions considered in Section 4.11. Table 5.2 displays data supporting Fig. 5.3, as well as adjusted dry cargo totals for 1982 and 1986. These tonnages represent the common-user lift demand in each year for all cargo not prepositioned.

(U) Table 5.3 compares the 1986 case for Scenarios I and II (this provides the common-user lift demand which excludes tonnage for 2 brigade equivalents of MPS). The net effect for Scenario II is a greater total 30-day lift demand, but the sharp increase begins at the time when productive sealift programs can contribute. Until C+15, the total tonnages are not dramatically different, although there are shifts between Service constituency. Scenario I front-loads ground combat while Scenario II front-loads tactical air power. Figure 5.4 provides cargo distribution (bulk, oversize, and outsize) for 1986. Distribution of tonnage for 1982 is nearly coincident. Of interest is the similarity between Sceanrios I and II of the tonnage distribution during this early period--both are dominated by bulk and oversize (70-80%). The deployment is not constrained for lack of outsize capability, but rather total capability. By C+20 similarities end where this scenario requires larger amounts and heavier Army forces to meet the threat.

5.11.3 Defense Program Capability

Figures 5.5 and 5.6 portray demand, capability, and shortfall for 1982 and 1986. Capability includes all programmed airlift improvements and sealift programs but does not include the C-X. Tonnage associated with prepositioning is credited after the passengers and residual cargo have married with the prepositioned equipment and moved



(U) Figure 5.3. (U) Base-Line Lift Demand, Scenario II

TABLE 5.2 (U)

CUMULATIVE LIFT DEMAND (U)

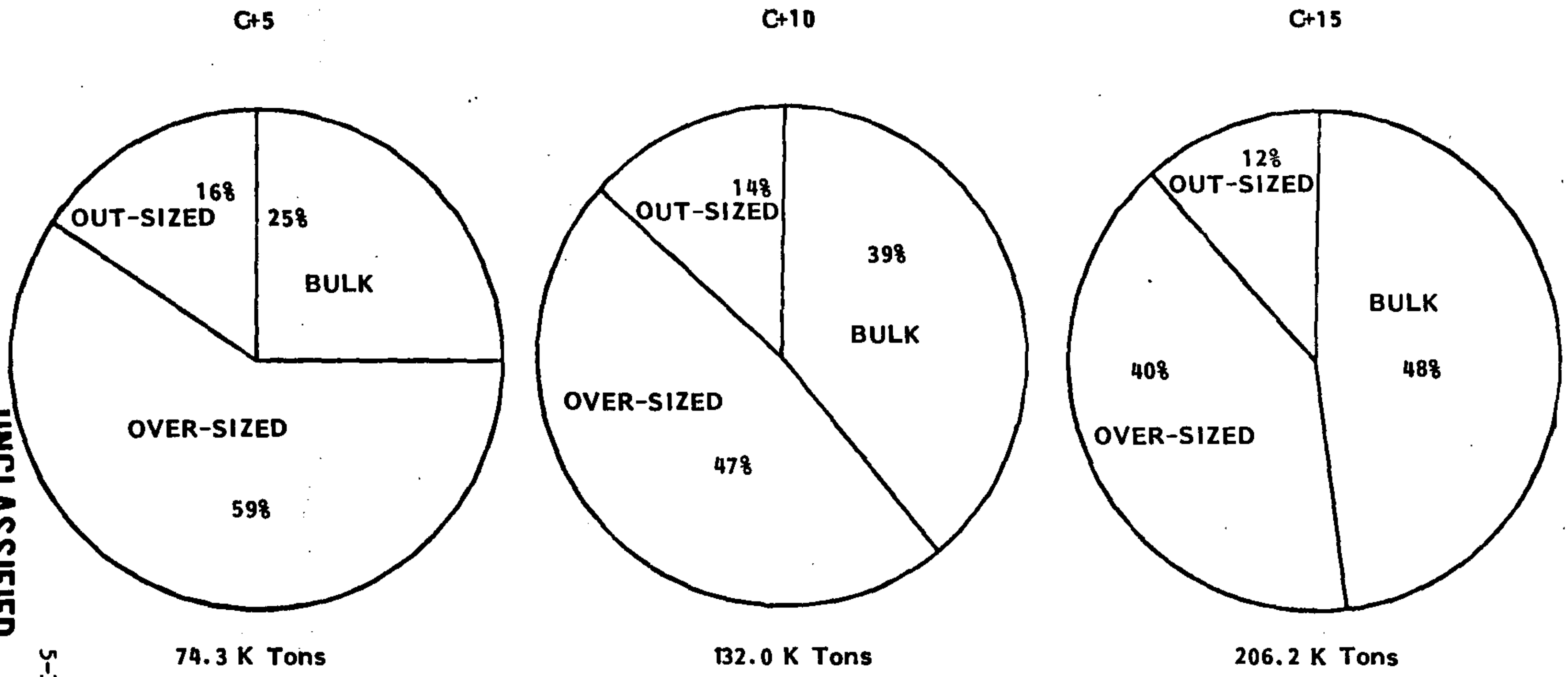
	Day After C-Day					
	5	10	15	20	25	30
A. BASELINE						
Passengers (000)	91.0	113.3	137.7	208.2	251.4	261.2
Dry Cargo Tonnage (000)						
Unit Equipment						
Army	36.6	57.8	89.5	281.9	361.3	373.4
Air Force	26.3	32.7	33.3	35.4	36.7	36.9
Marine	47.9	47.9	47.9	67.1	67.1	67.1
Navy	2.1	2.1	2.1	2.1	56.9	58.4
Ammo/Rsup	5.4	52.7	103.2	182.7	302.8	416.9
Total	118.3	193.2	276.0	569.2	824.8	952.7
B. ADJUSTED BASELINE FOR DOD PROGRAM (Total Dry Cargo 000 Tons)						
1982 (-NTPS)	98.4	169.3	248.1	537.3	788.9	912.8
1986 (-2MPS)	74.3	132.0	206.2	490.8	737.8	857.1

TABLE 5.3 (U)

SCENARIO I & II COMPARISON OF DRY CARGO TONNAGE (U)

	Days After C-Day					
	5	10	15	20	25	30
I	63.2	164.8	199.4	242.1	480.2	684.5
II	74.3	132.0	206.2	490.8	737.8	857.1

UNCLASSIFIED



UNCLASSIFIED

UNCLASSIFIED

UNCLASSIFIED

(U) Figure 5.4. (U) Distribution of Potential Common-User Airlift Cargo, 1986, Scenario II

106

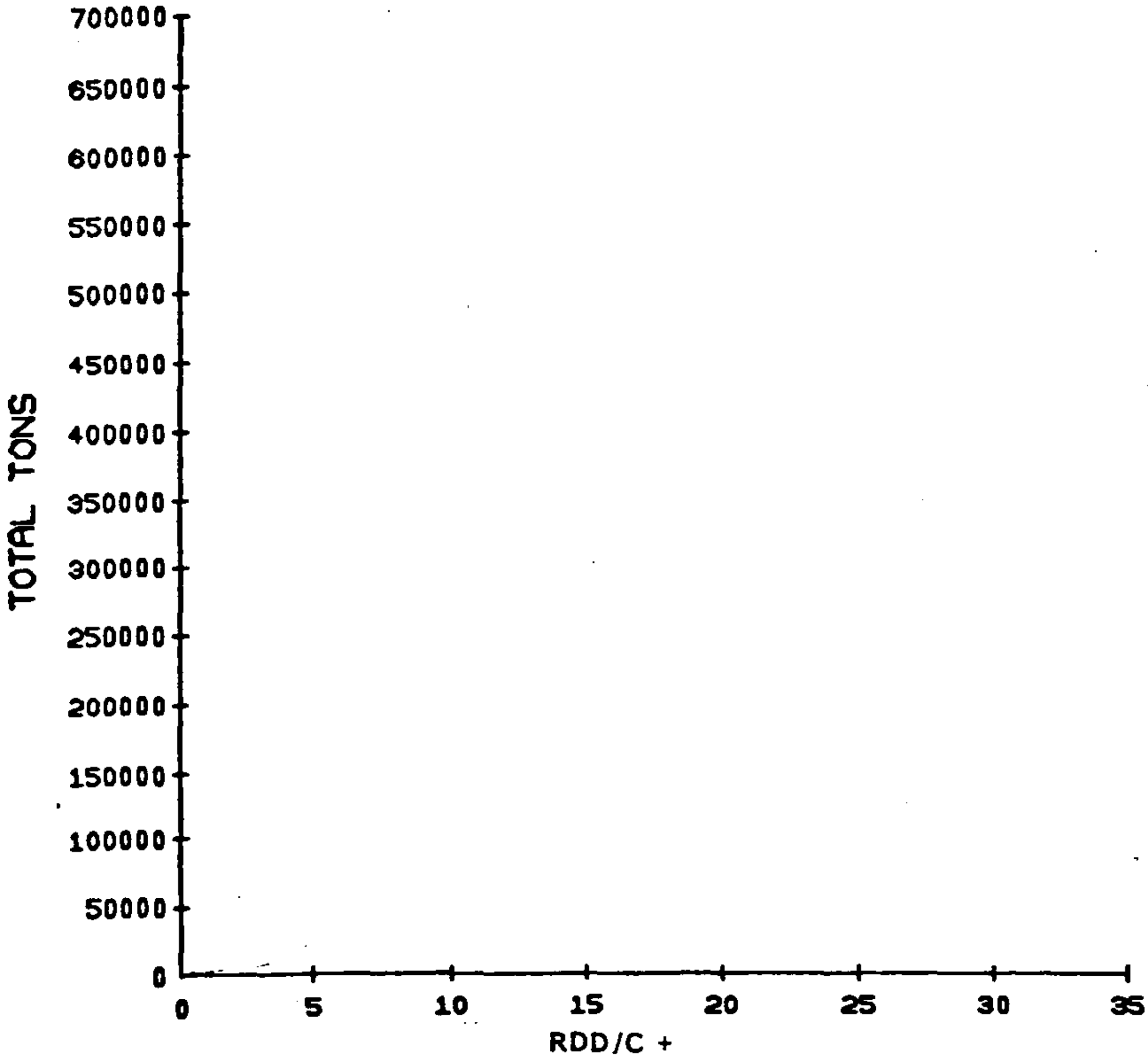
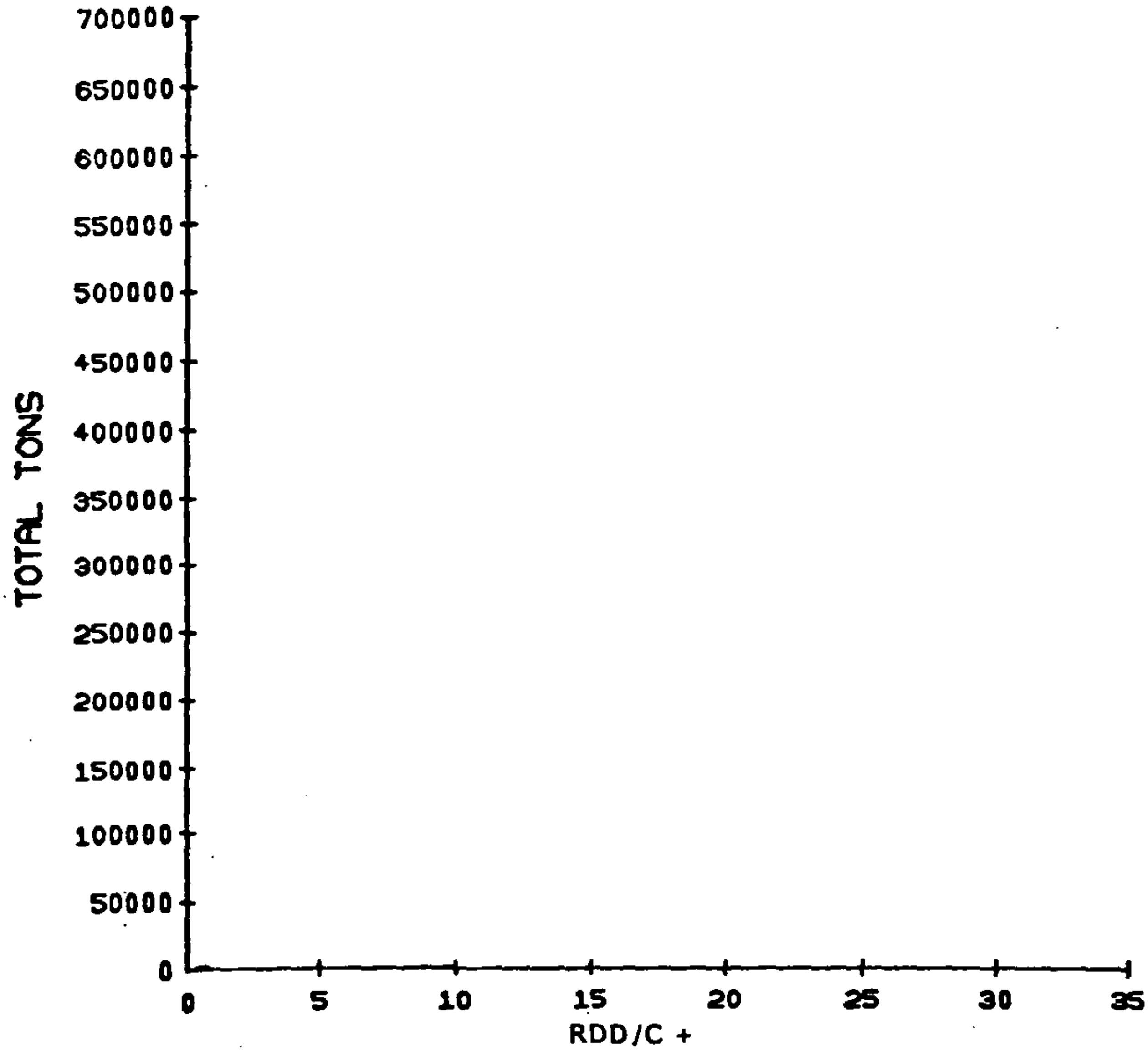


Figure 5.5. (U) Lift Demand, Capability, and Shortfall, 1982, Scenario II

5

107



5

Figure 5.6. (U) Lift Demand, Capability, and Shortfall, 1986, Scenario II

to wartime locations. The major components of lift capability are highlighted. For this scenario, the base line case includes no convoying, attrition, or aerial refueling and

Comparisons of these curves with the similar figure in Section 4 indicates greater airlift productivity due to

but later realization of sealift

The increase in airlift capability has a spin-off benefit not only for general acceleration of all cargoes, but particularly the residual cargo associated with MPS. In addition, these results show a greater productivity for the fast dedicated sealift than Scenario I. This is largely the result of the types of units loaded.

The difference in productivity for Scenario I, if "tons" is the only measure, is about 70% that of Scenario II since cargoes associated with the former are considerably less dense

This is a particularly useful illustration to highlight the importance of warning time activities and sensitivities associated with force selection and lift system compatibility.

Figures 5.7 through 5.9 portray the closure of major unit packages. In general,

are the only ones that come close to meeting RDDs in both 1982 and 1986. Although still tend to miss RDDs

in 1986, the improvement in closure over 1982 is significant, with many improving closure

5

LEGEND

- ▨ Intertheater Travel
- ▭ Intratheater Travel (End of Bar = Closure)
- ◉ RDD
- ▲ 1982 Base Line Closure
- ➤ 1982 Base Line Closure Beyond Range

Figure 5.7. (U) Army Movements, Base Line, Scenario II, 1986

5

LEGEND

- Intertheater Travel
- Intratheater Travel (End of Bar = Closure)
- RDD
- 1982 Base Line Closure

Figure 5.8. (U) Marine Movements, Base Line, Scenario II, 1986

111

5

LEGEND

- ▨ Intertheater Travel (End of Bar = Closure)
- ⦿ RDD
- ▲ 1982 Base Line Closure

Figure 5.9. (U) Air Force Movements, Base Line, Scenario II, 1986

112

As with Scenario I, the Maritime Prepositioning Ships program demonstrates its key role to improving early force closures. But, its effectiveness is still dependent on the total airlift capability

The dependency of prepositioning on airlift and the process of preemption by other service requirements is made apparent by Fig. 5.10 that portrays percent of 1986 cumulative common-user lift satisfaction for each service and commodities of resupply and ammunition (prepositioned tonnages not included).

5.11.4 Observations

(U) Solution of the shortfall associated with this scenario, given a reasonable degree of built-in flexibility, should also satisfy the demand of Scenario I. It is apparent that simple addition of airlift capability does not solve the problem. To meet Persian Gulf contingency requirements will require substantial additional prepositioning and airlift, as well as sealift programs that produce early deliveries.

5.11.5 Implication of Warning Assumptions

This scenario has a shorter warning period and therefore early closure of amphibious forces is not achieved The importance of early recovery and positioning of airlift forces permits rapid availability after C-day. This markedly improves early closure of tactical air forces and some ground combat forces.

5.11.6 Passenger Lift

Figures 5.11 and 5.12 portray cumulative passenger demand as a function of cargo arrivals against capability for 1982 and 1986 respectively. For this scenario,

no shortages develop in any of the years and adjustments are not necessary to shift cargo aircraft to carrying passengers as was proposed in Scenario I.

Note: Two percentage figures are shown for each consumer. The first is the percent of total demand; the second is the percent of satisfaction of that demand.

SECRET

Figure 5.10. (U) Lift Demand and Satisfaction, 1986, Scenario II

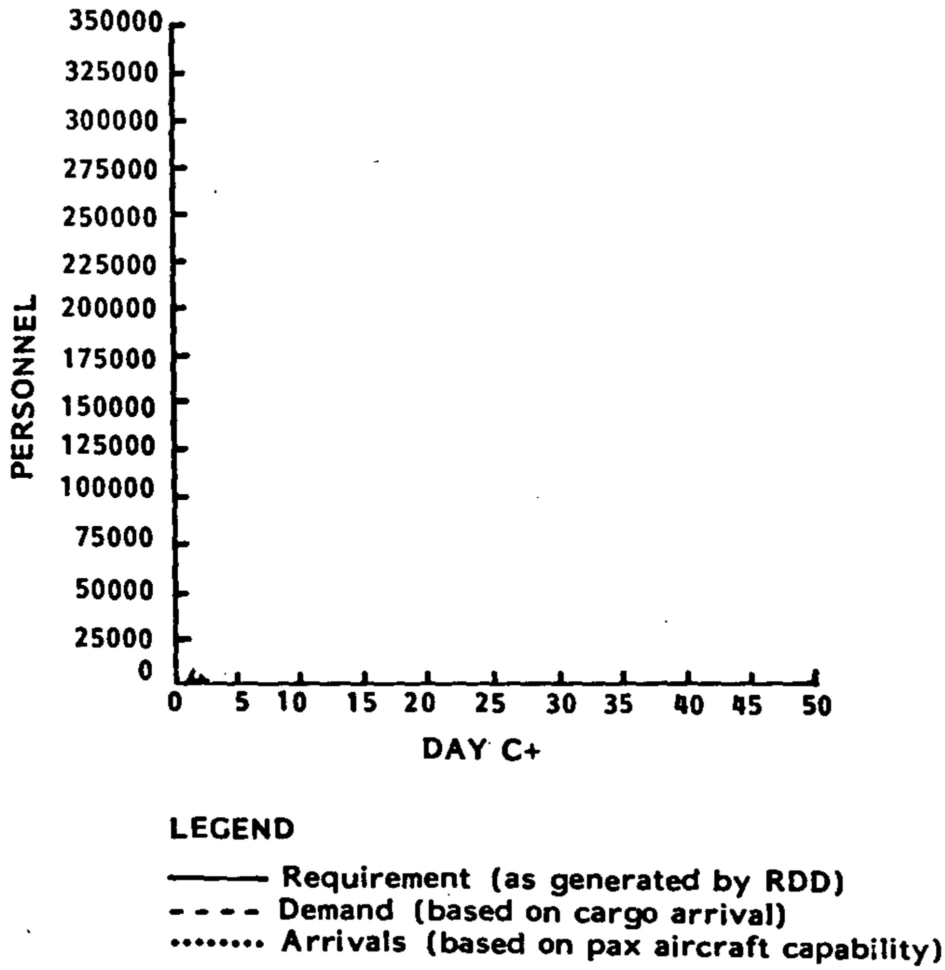


Figure 5.11. (U) Passenger Requirements, Demands, and Arrivals, 1982, Scenario II

5

115

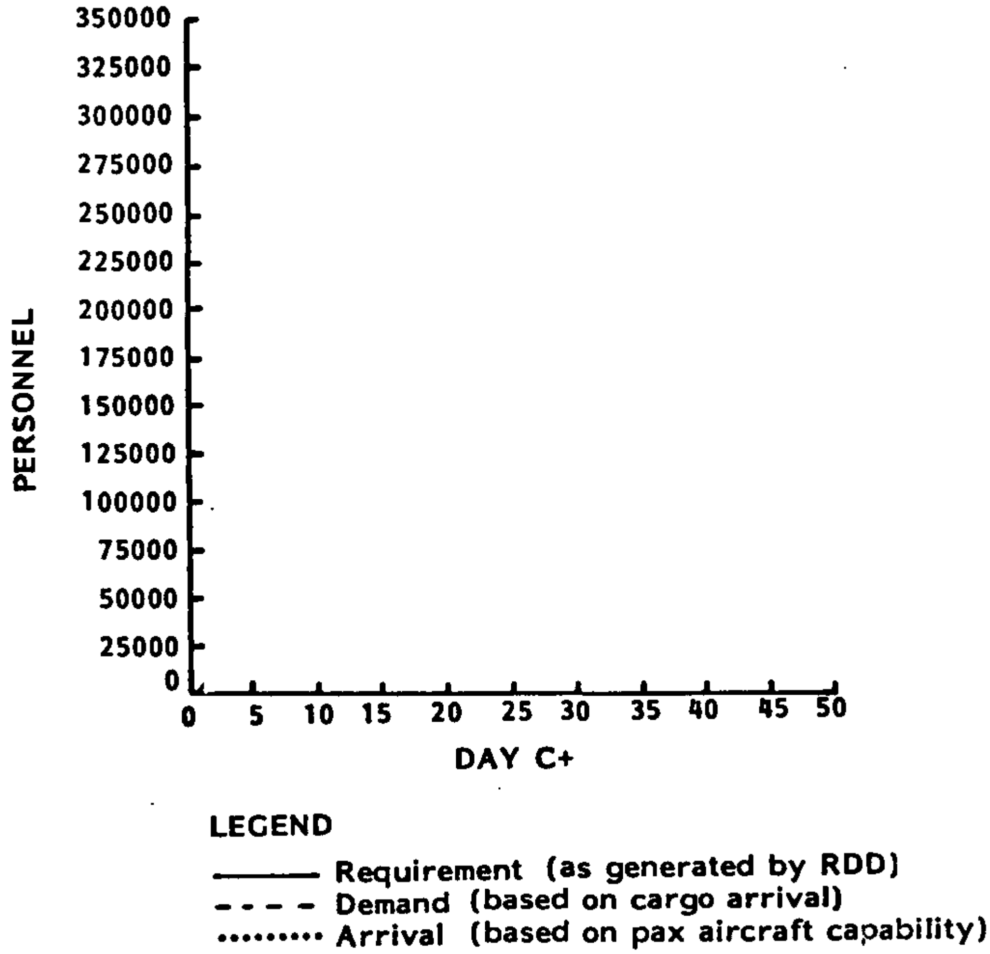


Figure 5.12. (U) Passenger Requirements, Demands, and Arrivals, 1986, Scenario II

116

5.11.7 Summary

The magnitude of the shortfall for this scenario is large despite significant reduction associated with the Maritime Prepositioning Ships and fast sealift initiatives. Further progress can only be achieved by a substantial improvement in airlift capability balanced with additional prepositioning and more fast dedicated sealift.

5.12 IMPACT OF DELAYS IN CLOSURE

3+4

4+5

4+5

The 1986 force closures would raise the potential cost to the Soviets for aggression in Iran. However, as our capability to deploy forces increases, the demands on major port facilities and the overland routes to desirable defensive positions will also increase. Unless there is a corresponding increase in intratheater transportation capabilities, port throughput capacity and road congestion will further delay force arrivals   The main improvements in force closures between 1982 and 1986 would be through the availability of eight SL-7s in full RO/RO configuration, improved airlift utilization rates, and CRAF enhancements.

The air war will cost the Soviets far more than in 1982 and land and Marine forces will be able to make a more credible defense.

Meeting the desired closures would permit the establishment of a viable defensive line neutralization of the airfields and relatively unhindered access through Iranian port facilities to off-load additional forces that could effectively halt the Soviet attack. This could only occur if sufficient intratheater mobility capability is available to support forward movement from the A/SPODs and for redeployment of forces and supplies in response to battlefield needs.

SECTION 6

NATO-WARSAW PACT CONFLICT

(SCENARIO III)

6.1 SITUATION

(U) Soviet-Warsaw Pact forces launch an all-out conventional assault against Western Europe. Their objectives are to defeat NATO military forces and to isolate the theater so that NATO cannot achieve more favorable force ratios.

6.2 THREAT ANALYSIS

The Soviets envision military operations against Allied Command Europe (ACE) occurring in three separate theaters of operations: Central and Western Europe (AFCENT), Scandinavia (AFNORTH), and Southern Europe/Balkans/ Asia Minor (AFSOUTH). 3

6.2.1 Land Forces

Current intelligence estimates indicate a threat of divisions available for employment against AFCENT and the Jutland Peninsula after days of preparation for war. Up to divisions, including most of those in the general reserve, could be available after days. With less time for mobilization, smaller force levels could be applied against NATO forces, gaining surprise or leaving the Alliance with fewer forces to oppose the WP. 3

NATO mobilization activities would probably effect a WP decision to attack and the timing of the attack.

6.2.2 Air Forces 3

The WP will have approximately fixed-wing tactical aircraft, combat helicopters, national air defense fighters, and LRA bombers available for use in Central Europe in 1986. Of these

121

aircraft, about LRA bombers and tactical aircraft could be made available for use in an initial air attack against NATO air, air defense, and nuclear delivery forces in the Central Region. The remaining aircraft could be used to defend WP territory, to provide direct combat support to WP ground forces, and to remain in readiness for transition to nuclear war. The number of aircraft available for the initial air attack would vary according to the extent the WP mobilized and moved additional tactical air units within range of NATO targets.

6.2.3 Naval Forces

Figure 6.1. (U) Probable Axes of WP Ground Attack and NATO Defense Lines in AFCENT

3

6.3 ENVIRONMENTAL CONSIDERATIONS

(U) The mobility and logistics considerations for the reinforcement of Europe are shaped by the combat power of the Soviet Union and its capacity to concentrate extremely large air and land forces in a relatively small but extremely congested geographic area. Western Europe has great variations in terrain from the rolling terrain of the North German Plain to the extremely rugged Alps. Population densities are much higher than in the United States and the region is as heavily industrialized as the Northeast U.S. Although there is extensive agriculture, most farms are small family units.

(U) The area has modern, highly sophisticated road, railroad, and canal systems. They are integral to the economy of the region. However, because the area is so compact and congested, refugee flight in time of conflict will severely disrupt the smooth flow of military goods. The presence of so many towns, cities, and other built-up areas will, on the other hand, also serve to retard the progress of tank forces moving east-west by forcing units to funnel through passable but highly defensible locations.

(U) In Central Europe there are 710 usable airfields. Of these, 274 (39%) are not considered available for military airlift operation, because they are relatively short and/or narrow, measuring less than 3000 ft long or 90 ft wide. Four hundred thirty-six (61%) are at least 3000 ft x 90 ft and are considered militarily useful with 56 (8%) 5000 ft x 150 ft or greater. Major airfields, capable of handling widebody aircraft are limited in number, because the majority of fighter bases were built to suit World War II fighters. Taxiways are narrow and widely dispersed to camouflage them from counter air operations. Frankfurt, a primary wide-body capable airport for central Europe, has 40% of West Germany's wide-body aircraft facilities. The limited number of major airfields raises the potential for disruption of major airlift operations by airfield interdiction.

(U) Host nation support arrangements are being negotiatied to provide logistical support for US military forces to relieve the US of early support requirements.

(U) Port facilities along the west coast of Europe are completely modern and more than adequate to handle any US reinforcement effort. This optimistic view must, however, be tempered with the caution that several ports are located inland on rivers and/or canals and are accessible in some cases through locks.

(U) The southern and northern flanks of Europe are less densely populated and possess additional transportation problems. Northern Europe's sub-Arctic climate creates lengthy periods of poor visibility periodically closing airfields and other facilities. Snow and ice conditions can be expected throughout the winter months. Heavy clothing will be required for all personnel. The region is primarily maritime with most of the population concentrated along the sea coasts.

(U) The southern flank extends over three thousand miles from end to end with no east-west railroads or roads connecting the entire region. Primary movement for forces in this region must be air or sea.

(U) The greatest limitation of the region is its almost total reliance on Middle East oil. Disruption of this supply would be devastating to the region's industrial and military capacity.

(U) Politically, the region consists of 15 relatively stable nations, 11 of which belong to the North Atlantic Treaty Organization (non-members are Spain, Finland, Sweden, and Ireland). Turkey is the only nation not currently governed by democratic principles. However, that nation is expected to return to elective government by the mid-1980s once current economic problems and terrorist activities are brought under control by the present military government. The affinity the United States has for Western Europe makes its defense second in importance only to that of defending our own homeland.

6.4 ASSUMPTIONS

(a)

(b) NATO nations and other nations traditionally friendly to the United States will make their bases, ports, pipelines, and LOCs available to US forces

6.5 SEQUENCE OF EVENTS

The scenario calls for the following time sequence:

6.6 CONCEPT OF FORCE EMPLOYMENT

6.6.1 Conventional Defense

6.6.2 TNF Operations

Through the capability for selective use of nuclear weapons, NATO poses a threat which induces the enemy to recalculate his risks.

6.6.3 Concept of Operations for NATO—AFNORTH

6.6.3.1 Land Operations

(a) Northern Norway.

(b) BALTAP. Enemy aggression across the West German border into Schleswig-Holstein, Hamburg, and Jutland will be opposed with maximum strength and practical far forward positions.

Enemy attempts to land amphibious or airborne forces on the Shaelland group of islands will initially be opposed, possibly at the landing beaches, by land forces supported by air and naval forces.

6.6.3.2 Air Operations

The fundamental principle governing the allocation of the air effort is neutralization of the enemy capability that presents the most critical threat to the Northern Region. Accordingly, Northern Region air forces will be apportioned for air defense, support of land forces, tactical air support of maritime operations, interdiction, attacks against counterair targets, reconnaissance, and electronic warfare.

4

6.6.3.3 Naval Operations

4

Naval forces operating in the northern flank will complicate WP planning, reduce offensive forces and options, increase homeland defense concerns, and deny air and naval bases to the WP advance.

6.6.4 Concept of Operations for NATO-AFCENT

The defense of the Central Region will be conducted in two phases.

4

The objective will be to disrupt the attack and to slow its momentum to minimize loss of territory. Allied forces will defend as far eastward as possible, will destroy enemy forces, and will seek the initiative to restore the territorial integrity of NATO.

6.6.4.1 Land Operations

Barriers, firepower, maneuver, and electronic warfare will be used to defeat the enemy's attack. It will be necessary to redeploy units rapidly in order to concentrate force against the enemy's main axes of attack. The effective use of obstacles, natural or artificial, will be exploited to channel the enemy forces in directions most conducive to their destruction. Intensive fire will be brought to bear on the enemy echelon by main force units within the main battle areas. Local counterattacks by armor and mechanized infantry with supporting forces will be mounted against stalled, disrupted, or disorganized attacking echelons in order to neutralize, capture, or destroy them.

6.6.4.2 Air Operations

The first priority of air operations during Phase I is

Secondary priority is

Air reconnaissance operations of all types will be employed NATO air operations during Phase II will consist of

6.6.4.3 Naval Operations

6.6.5 Concept of Operations for NATO—AFSOUTH

6.6.5.1 Land Operations

6.6.5.2 Air Operations

6.6.5.3 Naval Operations

Basic force employment for all NATO forces will be directed toward expeditiously gaining sea control

4

Naval forces will assist in the land campaign through the employment of naval TACAIR and amphibious assault operations to seize strategic locales, regain lost territory, and reinforce allied forces.

4

6.7 FORCE RATIONALE

6.7.1 Land Forces

4

WP tactics will likely include massive attacks by first-echelon divisions 5

followed by attacks with fresh WP divisions to exploit any successes.

augmentation forces would be required as soon as possible to reduce the division frontages, add depth to the defense, and provide fresh divisions to meet the main WP attacks. 4

Total US Army forces 4 available to stop a large-scale WP attack without major loss of friendly territory in Europe will be This will be in addition to those forces provided by the NATO allies.

6.7.2 Air Forces

6.7.2.1 General

US Air Force TFWs will be com- 4 mitted to NATO tactical air forces to

The TFW force and land forces will be supported by TRSs. 4

6.7.2.2 Tactical Support Forces

(a) Tactical Air Control Systems. To support FAC requirements, a FAC force of aircraft will be available. CH-53C helicopters will be available to provide mobility support for the TACS.

4

(b) Defense Suppression.

(c) Mobility. C-130 squadrons will be available to provide intratheater airlift support.

6.7.3 Naval Forces

Employment of other naval forces would be doubtful. Forces required will include VP squadrons, naval mobile construction units, and AFs.

4

6.8 FORCE REQUIREMENTS AND PHASING

(U) Table 6.1 contains the force requirements for Scenario III. Further details on specific time phasing by unit designation are contained in the Catalog of Assumptions and Data (Appendix C).

6.9 RATIONALE FOR FORCE DEPLOYMENT SEQUENCE AND TIME PHASING

6.9.1 General

The reinforcement sequence is based on the assumption that the allies will have to mobilize and reinforce the front. This assumption does not preclude the possibility that the decision process to mobilize NATO may take longer

6.9.2 First Five Days

4+5

TABLE 6.1

FORCE REQUIREMENTS (U)

ARMY AND MARINE FORCES

Army Div	USMC MAF	RDD

Totals:

*Includes 4 forward deployed.

4

AIR FORCES

Tactical Fighter Wings	Tactical Recon Squadrons	Tactical Airlift Squadrons	RDD

Totals:

NAVAL FORCES

Patrol Aircraft Squadrons
Mobile Construction Units

(The above does not include naval forces that do not require common user lift support)

136

6.9.3 M+6 Through M+10

4 + 5

6.9.4 Intratheater, M-Day Through M+10

4 + 5

6.9.5 Post-D-Day Movement

6.9.5.1 Intertheater Forces

Intertheater mobility forces will continue the force buildup to the maximum extent possible. They will return noncombatants and wounded personnel to CONUS. Emergency airlift of critical munitions, spare parts, or other replacement items will begin to replace key items attrited by enemy activity. Attrition of airlift and sealift forces will begin when the WP offensive starts. Operations will be disrupted by friendly and enemy air activities. APODs can be expected to be attacked and temporarily put out of commission or operate with reduced runway capabilities. Attrition can be expected to decrease if air superiority is gained by NATO TACAIR.

4

6.9.5.2 Intratheater Forces

All forces will be engaged in supporting the theater war. Heavy use of airlift will be required to resupply forces 4 COB and MOB parts and munitions support, aeromedical evacuation missions, and emergency resupply or reinforcement of engaged land forces will have the highest priorities. Unit moves will be necessary to reinforce areas of the FEBA where the Soviets have massed their forces and threaten a breakthrough.

6.10 MOBILITY FORCES

(U) Airlift and sealift mobility forces for each scenario are contained in the Catalog of Assumptions and Data (Appendix C).

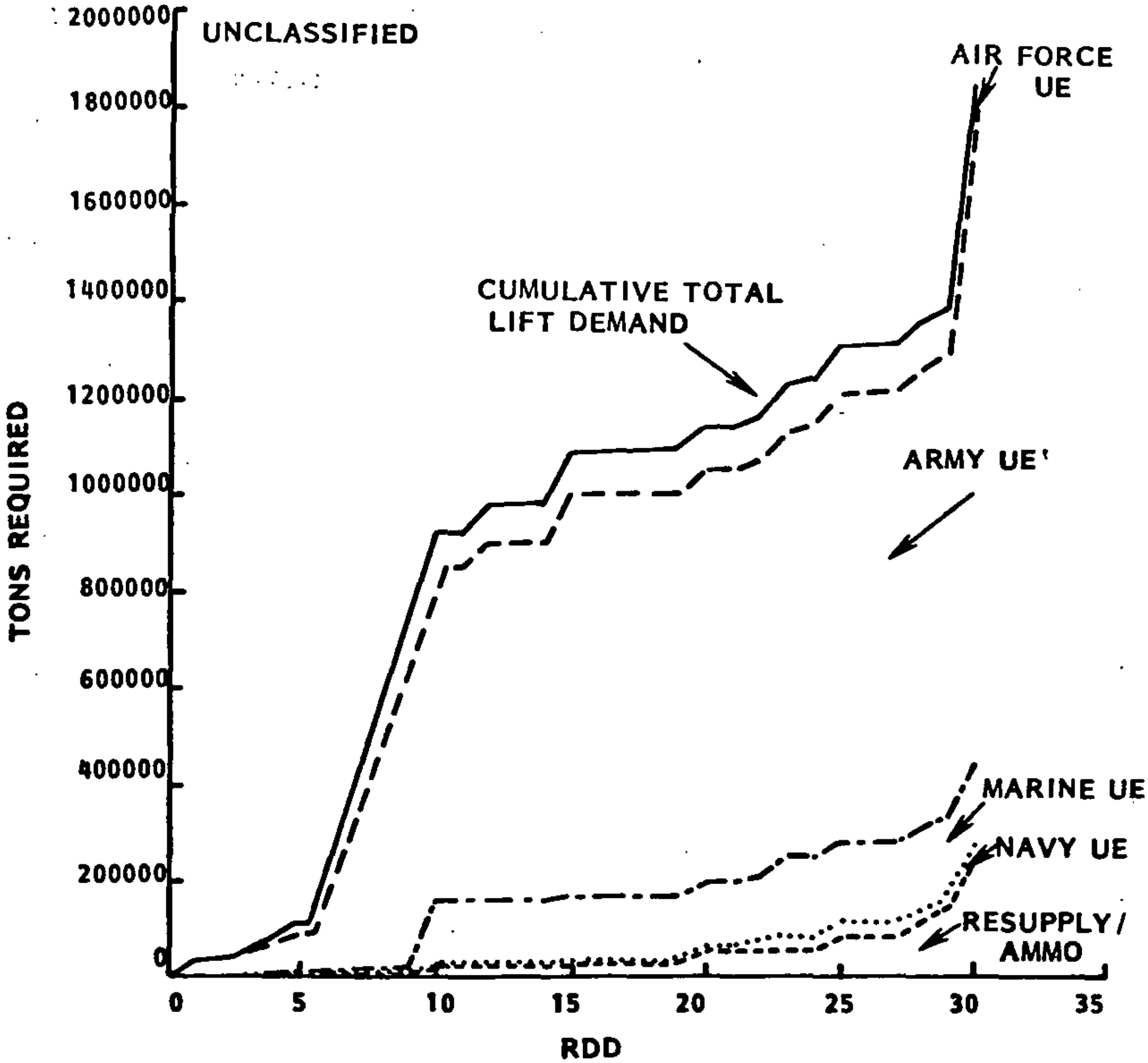
6.11 RESULTS OF MOVEMENT ANALYSIS

6.11.1 General

(U) The results presented in this section, although similar to NATO reinforcement results in other DoD studies, are not comparable. Principal differences stem from the defense planning scenario which has considered deployment to NATO following some lesser conflict elsewhere in the world, normally after some delay (45 to 60 days). In this case NATO reinforcement stands alone and demand is greater since more forces are now available. Caution must be exercised when comparing results.

6.11.2 Lift Demand

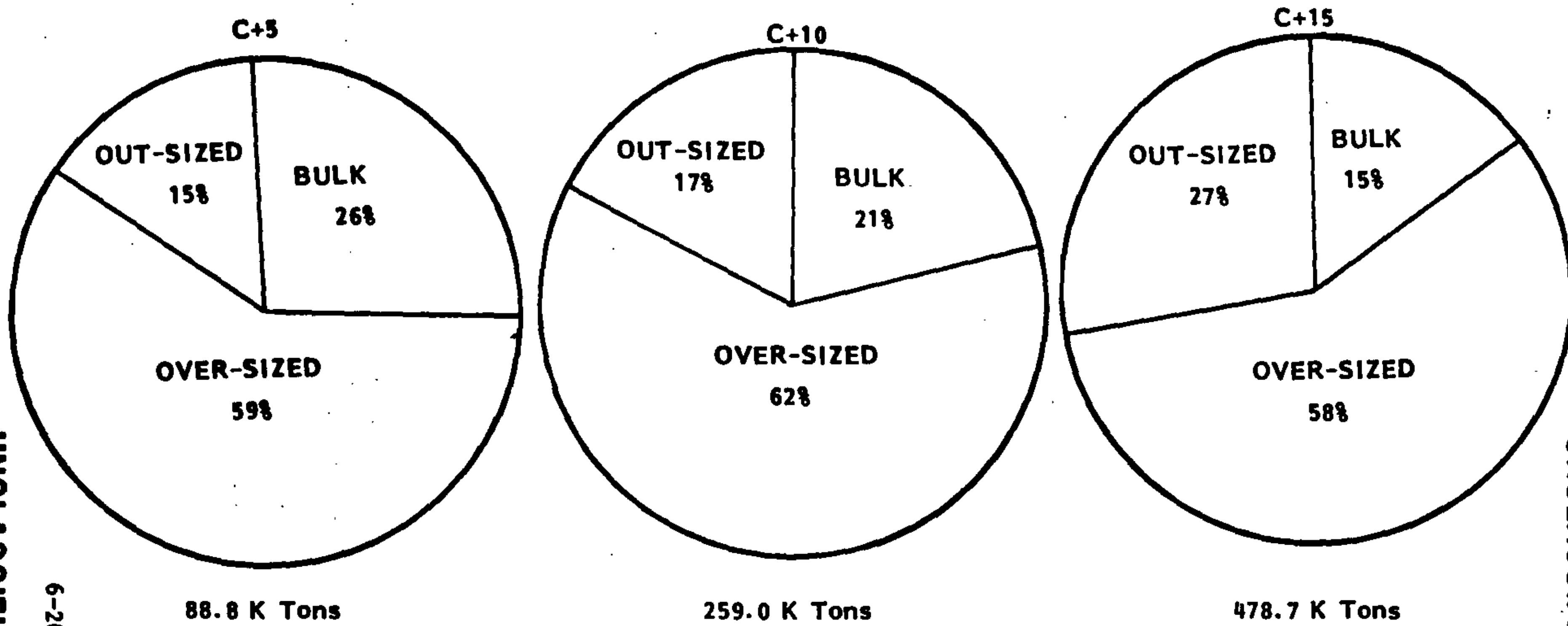
Figures 6.2 and 6.3, and Table 6.2 portray the base line cumulative tonnage demand. Figure 6.3 portrays the 1986 distribution of tonnage (bulk, oversized, outsized) during the first 15 days of reinforcement. Compared with a similar distribution for 1982 there is little difference except for a 4% increase in outsized and comparable decreases in bulk at C+5 and C+10. Army tonnage dominates requirements during the first 30 days. These quantities are large in the base line since they include prepositioned unit equipment which, by and large, is greater than 90% of unit weight. The common-user lift demand is substantially reduced for the early period once prepositioned materiel is subtracted (for C+10 the common-user demand is 30% of the absolute requirement in 1986). Neither the figures nor the table



(U) Figure 6.2. (U) Base-Line Lift Demand, Scenario III

139

UNCLASSIFIED



UNCLASSIFIED

(U) Figure 6.3. (U) Distribution of Potential Common-User Airlift Cargo, 1986, Scenario III

UNCLASSIFIED

UNCLASSIFIED

140

TABLE 6.2 (U)

CUMULATIVE LIFT DEMAND, SCENARIO III (U)

	DAY AFTER C-DAY					
	5	10	15	20	25	30
A. BASELINE						
Passengers (000)	323.5	455.4	535.8	569.0	638.0	787.0
Dry Cargo Tonnage (000)						
Unit Equipment						
Army	24.3	631.7	840.5	859.2	938.1	1313.3
Air Force	67.0	78.3	82.3	92.0	97.4	98.3
Marine	26.6	146.8	146.8	146.8	185.9	185.9
Navy	3.1	5.4	7.6	11.8	26.8	27.1
Ammo/Rsup	0.3	15.3	20.0	45.2	77.3	245.1
Total	121.3	877.5	1097.2	1155.0	1325.5	1869.7
B. ADJUSTED BASELINE FOR DOD PROGRAM (TOTAL DRY CARGO 000 TONS)						
1982[1]	121.3	482.5	702.2	760.0	930.5	1471.7
1986[2]	88.8	259.0	478.7	536.5	707.0	1251.2

1 (U) Less tonnage for: 6 divisions of POMCUS (460K tons) plus shortages (65K tons) Net = -395K tons.

2 (U) Less tonnage for: 6 divisions of POMCUS +2 Separate brigades (shortages assumed satisfied) (490K tons), USMC prepositioning for 1 brigade-sized MAGTF - Norway (20K tons), 2 MPS (96K tons), Air Force prepositioning (12.5K tons).

reflect tonnage associated with amphibious or forward deployed forces, nor do they include prepositioned tonnage associated with war reserve materiel.

4

This issue is treated as a program alternative in Section 10, Evaluation of Alternatives. POMCUS shortages are reflected as a lift demand in 1982, but are assumed satisfied by 1986. There is still some uncertainty regarding the tonnage associated with 1982 shortage--a figure of 65K tons was used in this analysis. The current DoD POMCUS program was designed to eliminate shortages 5

Also included in the lift demand is tonnage associated with passenger movement beyond an allocation of 350 lb per man. An additional tonnage requirement and capability not reflected is associated with passenger movement--170 lb per man (350 less 180 for body weight). This equates to approximately 67K tons by C+30.

6.11.3 Defense Program Capability

(U) Figures 6.4 and 6.5 display lift demand, capability, and shortfall for 1982 and 1986 respectively. Significant improvements are programmed between 1982 and 1986 as a function of the following programs.

- (U) Fast Sealift (SL-7) acquisition and conversion (Note the sharply rising portion of the curve at C+15).

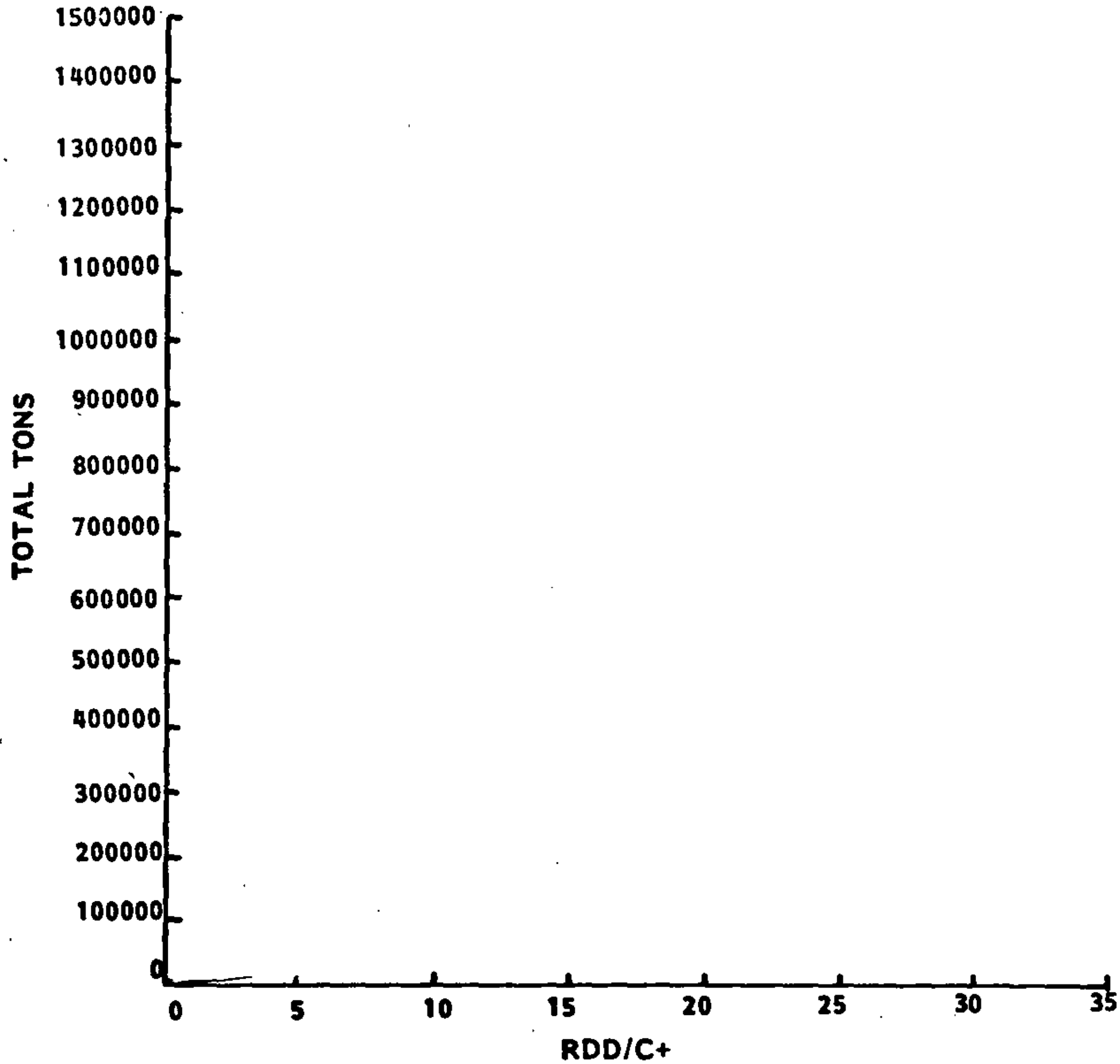


Figure 6.4. (U) Lift Demand, Capability, and Shortfall, 1982, Scenario III

5

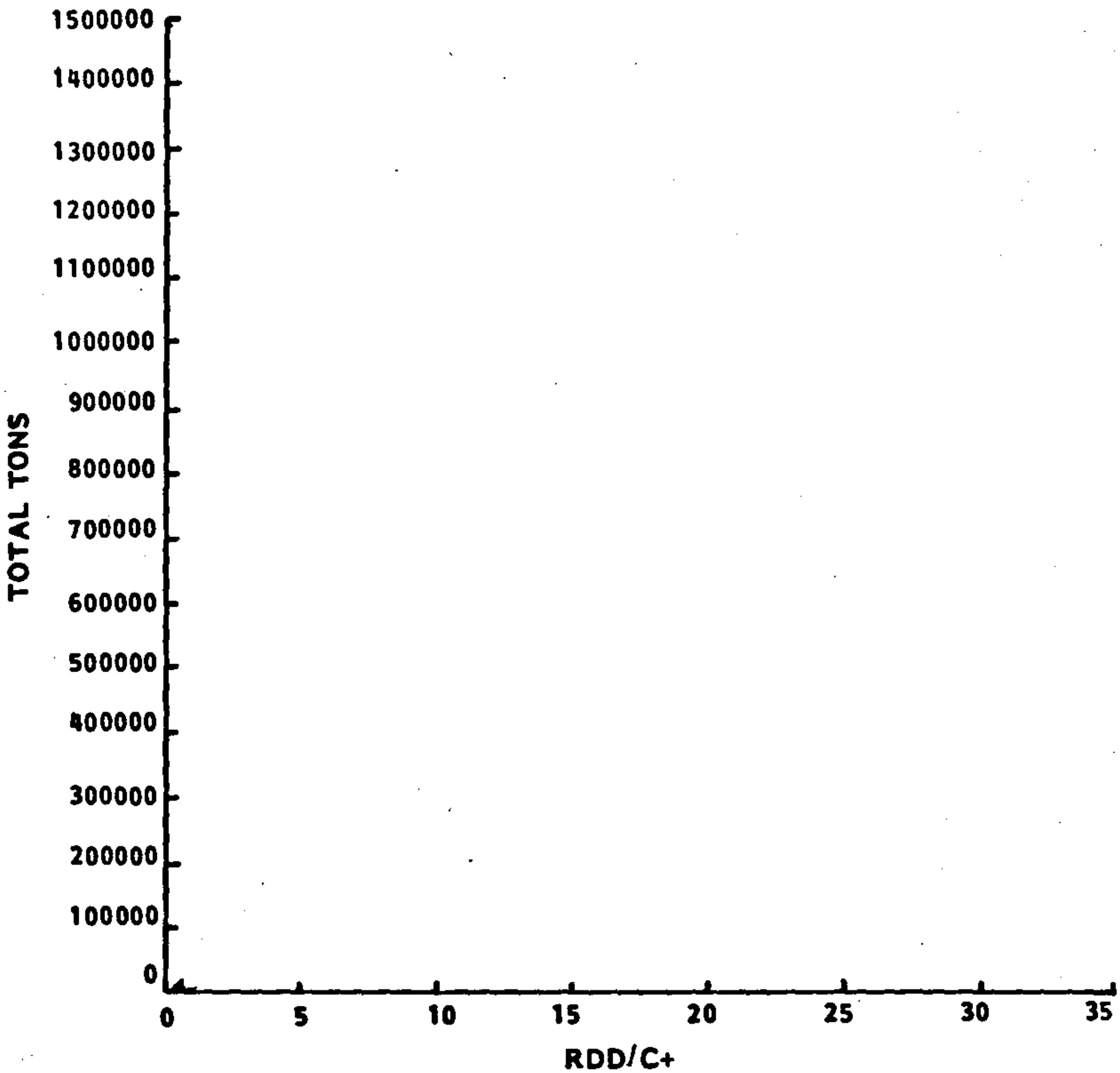


Figure 6.5. (U) Lift Demand, Capability, and Shortfall, 1986, Scenario III

5

- (U) Additional prepositioning for the Air Force, two Army brigades, several hospitals, and one brigade of Marine equipment and 30 days of supplies for a second brigade.

- (U) Airlift Improvement Programs (C-5/C-141 Spares, C-5 wing mod, aircrews, CRAF Enhancement).

- (U) Maritime Prepositioning Ships (2 MPS).

(U) Details on all elements of programmed lift capability, and assumptions pertaining thereto are contained in the Catalog of Data and Assumptions (Appendix C).

The baseline case for this scenario includes sealift and airlift attrition, a convoy policy 4

and no aerial refueling. The impact of attrition is a direct product of the assumed attrition factors. Although these are only estimates, the implications, particularly for sealift, are large. Excursions that varied convoying assumptions with attrition resulted in tonnage lost on the order of 5

Aerial refueling would improve the productivity of military airlift only slightly because in most cases the nature of cargo (bulky and less dense) is such that floorspace, not payload, is the limiting factor. This fact, combined with the aerial refueling requirements for deploying tactical fighter/reconnaissance aircraft and for the higher readiness posture that SAC would have to assume, suggests that limited aerial tanker resources would not be called upon to refuel airlift in this scenario. Completion of the KC-10 and KC-135 reengining programs would help alleviate the constraints on aerial tanker forces.

(U) Figure 6.6 portrays cumulative lift demand and satisfaction (shaded portions) in 10-day periods for the first 30 days, providing insight into which commodities are consuming lift.

Figure 6.6. (U) Lift Demand and Satisfaction, 1986, Scenario III

6.11.4 Observations

The following observations are noted by comparison of Figs. 6.4 through 6.9:

(a) Between 1982 and 1986 airlift enhancement programs nearly double the airlift capability by and contribute significantly to closure of prepositioning programs.

(b)

5

(c) For 1986, fast dedicated sealift (SL-7s) provides a 100K ton boost in closure some 8-10 days earlier than if it was not in the program.

(d) Land-based prepositioning for Air Force and Marine Corps improves 1982 closures substantially, particularly for Marine units 5

(e) Figure 6.6 provides insight into lift contribution to various demands for three periods.

5

5

LEGEND

- Intertheater Travel
- Intratheater Travel (End of Bar = Closure)
- RDD
- 1982 Base Line Closure
- 1982 Base Line Closure Beyond Range

Figure 6.7. (U) Army Movements, Base Line, Scenario III, 1986

LEGEND

- Intertheater Travel
- Intratheater Travel (End of Bar = Closure)
- RDD
- 1982 Base Line Closure

Figure 6.8. (U) Marine Movements, Base Line, Scenario III, 1986

LEGEND

- ▨ Intertheater Travel (End of Bar = Closure)
- ⊙ RDD
- ▲ 1982 Base Line Closure
- ← 1982 Base Line Closure Beyond Range

Figure 6.9. (U) Air Force Movements, Base Line, Scenario III, 1986

6.11.5 <u>Passenger Lift</u>

Figures 6.10 and 6.11 portray passenger movement demand as a function of RDD and cargo arrival, and passenger capability. Passenger lift capability is adequate in 1982 and 1986 to meet cargo movements.

6.12 IMPACT OF DELAYS IN CLOSURE

This scenario indicates the importance to the US of the defense of NATO as well as its inherent difficulties.

war. Our task in Europe is to maintain a credible defense against a Warsaw Pact attack to raise the potential costs of aggression and not be intimidated by an inordinate disparity of arms. Key to a successful defense will be an early, massive reinforcement by the US for a forward defense based on the NATO agreed strategy.

The Warsaw Pact offensive will feature pressure along the entire front using "blitzkrieg" tactics to achieve area breakthroughs. The assault will be made in conjunction with massive strikes against

Using pressure along the front to hold the defense in static positions, they will attempt to achieve a series of massed breakthroughs where their spearheads will have a 6 to 1 advantage over NATO forces. These spearheads will proceed as fast as possible to the

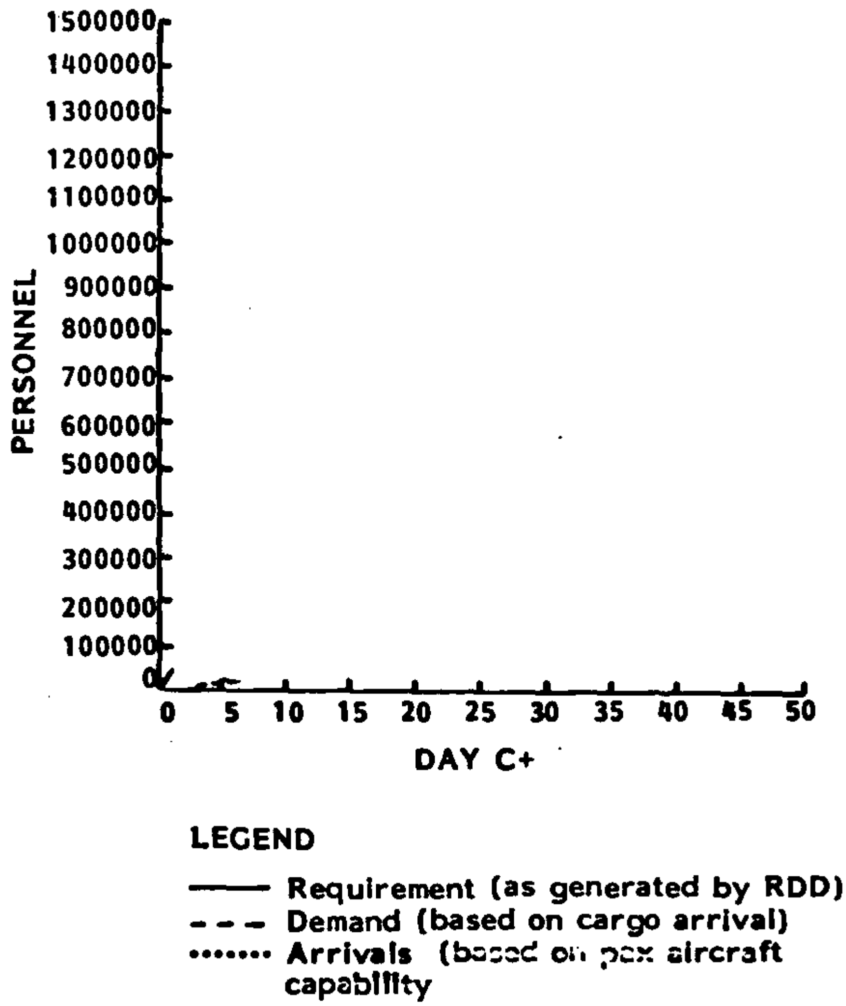


Figure 6.10. (U) Passenger Requirements, Demands, and Arrivals, 1982, Scenario III

5

152

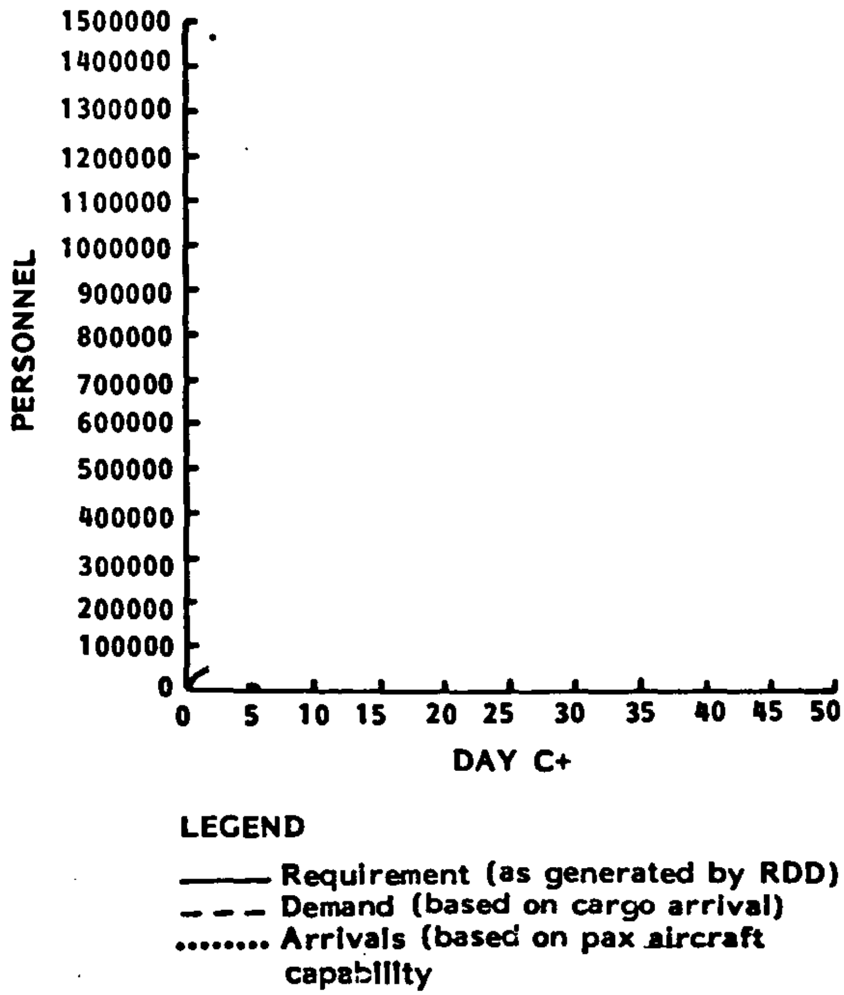


Figure 6.11. (U) Passenger Requirements, Demands, and Arrivals, 1986, Scenario III

5

153

NATO rear. Second-echelon forces will quickly reinforce any breakthrough to maintain the attack's momentum and to envelope NATO defensive positions. The offensive could proceed to the channel ports or stop at their volition when their objectives are gained.

The NATO plan is to stall the Warsaw Pact advance as soon as and as far forward as possible. The forces necessary to achieve that objective include forces deployed from CONUS. It will be necessary to defeat the Soviet air forces so that sectors under attack can be quickly reinforced by tactical air and land forces and second echelon forces can be attacked before they reach the front.

Our reinforcement plan initially deploys, by air, 4

The bulk of follow-on forces would come by sea. If we are unable to meet closure objectives, the need to resort to nuclear weapons for defense is increased. This, in turn, increases the effectiveness of the threat of nuclear blackmail against NATO.

An early Warsaw Pact breakthrough could overrun or bypass many key NATO defensive positions and airfields. The loss not only of territory but forces would greatly weaken NATO's potential for a successful defense.

5

The 1982 and 1986 closure profiles for Scenario III show a significant increase in US reinforcement capability.

The 1982 closures fall considerably short of objectives.

Improvements to completely redress the disparities between the total Warsaw Pact capability and NATO's are beyond the scope of this study. The objectives used in this scenario would provide the capability to make full use of available US force structure to counter aggression in Central Europe.

NATO forward deployed forces, plus whatever the US can quickly deploy, will make the cost of Warsaw Pact aggression extremely high. This has an effective deterrent value against conflict in Central Europe. However, the potential for nuclear blackmail or achievement of goals through surrogates in other regions remains highly likely. It is these concerns that led to the inclusion of Scenario IV in this study.

SECTION 7

CONFLICT IN THE PERSIAN GULF WITH A PRECAUTIONARY REINFORCEMENT IN EUROPE

(SCENARIO IV)

7.1 SITUATION

(a) This scenario involves the commitment of US forces to a Persian Gulf contingency with a subsequent precautionary reinforcement of NATO.

(b) (U) The sequence of events would begin the same as in Scenario I. All assumptions in Scenario I are also the same except as noted below.

(c) (U) The Soviet threat in the Persian Gulf is the same as that noted in Scenario II.

(d) To divert US efforts away from the Persian Gulf, the Soviet Union begins mobilization of WP forces after the United States begins deploying forces to the Persian Gulf.

(e) (U) Activities on NATO M-Day, the Soviet-WP threat, and US force deployment objectives are the same as those described in Scenario III.

(f) Conventional force deployment sequences are based on (1) assuring continuous access to petroleum resources, (2) preventing a hostile power or combination of powers from establishing control of the Persian Gulf, (3) deterring Soviet-WP aggression in Western Europe, and (4) terminating conflict in NATO, should one occur, on terms favorable to the United States and its allies

7.2 THREAT ANALYSIS

(U) The threats for this scenario are the same as shown above for Scenarios I and III.

7.3 ASSUMPTIONS

7.4 SEQUENCE OF EVENTS

The scenario calls for the following time sequence:

7.5 FORCE REQUIREMENTS

(U) Force requirements are shown on Table 7.1. Phasing and rationale are the same as for Scenarios I and III except as modified above. Further details on specific time phasing by unit designation are contained in the Catalog of Assumptions and Data (Appendix C).

TABLE 7.1

FORCE REQUIREMENTS (U)

ARMY AND MARINES FORCES

	Army Div	USMC MAF	RDD
Totals:			

*NATO reinforcement commences.
**Includes 4 forward deployed.

AIR FORCES

	Tactical Fighter Wings	Tactical Recon Squadrons	Tactical Airlift Squadrons	RDD
Totals:				

NAVAL FORCES

Battle Groups
Surface Attack Group
Nuclear Attack Submarines
Mine Countermeasures Squadrons
Amphibious Task Force
Patrol Aircraft Squadrons
Mobile Construction Units

7.6 RESULTS OF MOVEMENT ANALYSIS

7.6.1 General

(U) Presentation of movement analysis results for Scenario IV is more difficult than for the three preceding scenarios. The added dimension imposed by simultaneous deployment to two theaters spawns a host of judgment factors relating to resource allocation. The kinds of decisions made by a commander-in-chief on the relative importance of one theater to another and pace of reinforcement for each theater when resources must be shared can provide a wide range of results. Once NATO reinforcement commences, lift is allocated based on the priority established by the Required Delivery Date (RDD), regardless of theater. Units in the deployment stream or those not yet moved to the Persian Gulf on NATO C-Day continue to be scheduled for Persian Gulf reinforcement. In order to accommodate simultaneous deployment, a new model, MIDAS (Model for Intertheater Deployment in Air and Sea) was developed and used in parallel with ISDM for simulations and analysis. ISDM cannot simulate simultaneity without constraints external to the model process. MIDAS, on the other hand, permits simultaneous lift allocation. Results were carefully compared to insure consistency of results with simulations in other scenarios. A level of lift allocation was selected that restricted either theater (once simultaneous deployment commenced) to no more than 70% of the airlift on any one day and only US Flag sealift was available for Persian Gulf deployment. The fractions of lift to each theater shift as a function of daily competition generated by required delivery dates (RDDs). In order to simplify presentation, graphics portray only the combined scenario demand and capability. This provides a meaningful form against which alternative programs are assessed. The application of programs to satisfy Scenario I and III demands will not necessarily satisfy the combined case.

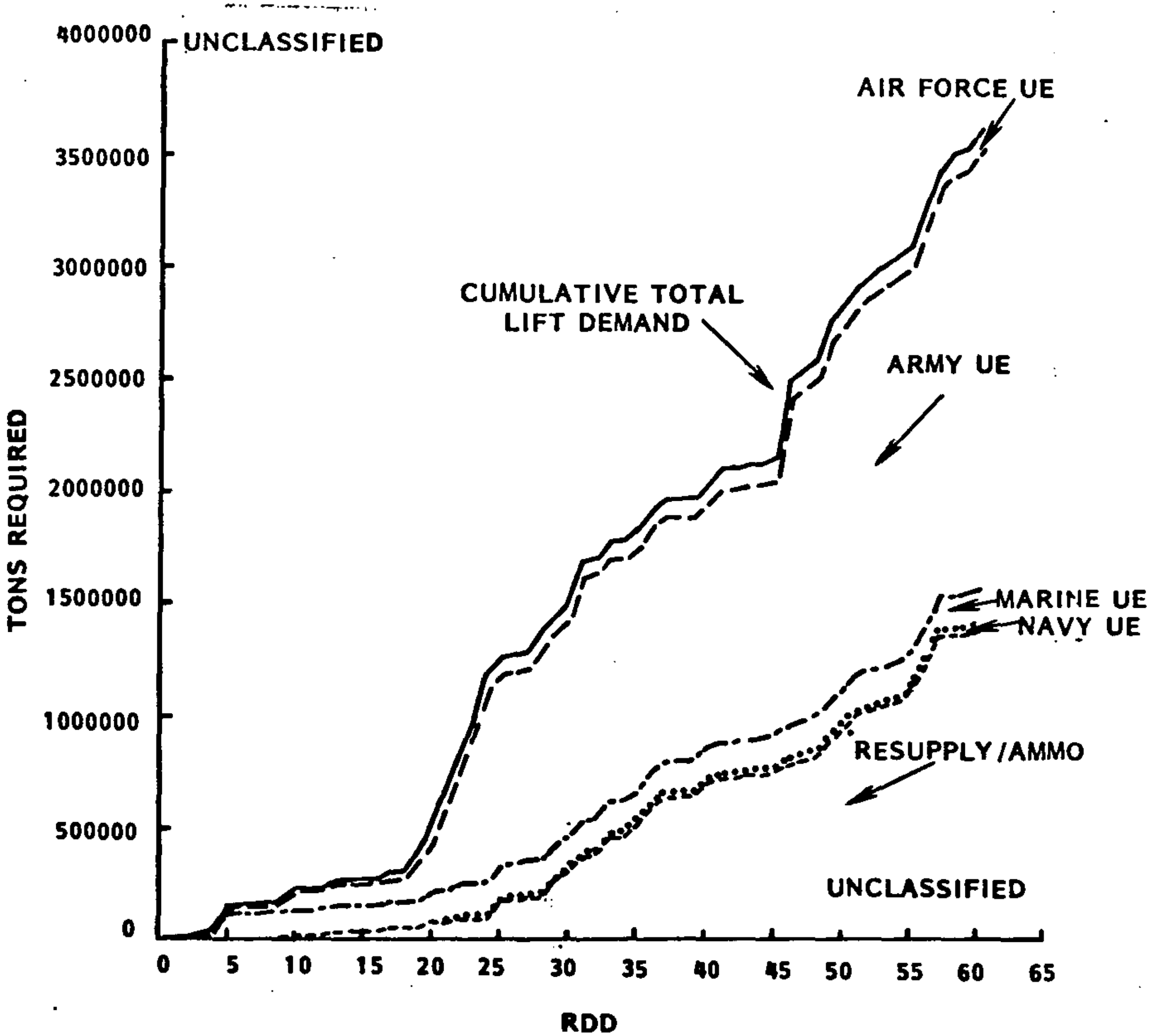
7.6.2 Lift Demand

The base line lift demand is established under the same rules applied to the three previous scenarios and can be conceived as a merge of Scenario I and III data (with units deploying to the Persian Gulf deleted from the NATO sequence). Up to the demand is coincident with Scenario I. Figure 7.1 portrays the cumulative lift demand for the first 60 days of deployment for unit equipment of each Service and ammunition and resupply for both theaters. As was the case in Scenario III, inplace war reserve material, forward deployed, and amphibious forces are not considered in the base line.

(U) Table 7.2 displays data supporting Fig. 7.1 as well as dry cargo totals for 1982 and 1986 for the first 45 days. The tonnages represent the common-user lift demand in each year for all cargo not prepositioned, except as noted above. Totals do not equal a sum of data presented in Sections 4 and 6 (Scenarios I and III, respectively) since units deploying to the Persian Gulf are deleted from the all-NATO sequence of Scenario III. Figure 7.2 portrays the 1986 distribution of potential airlift tonnage during the critical airlift period of combined demand of Persian Gulf and NATO deployments. Again, as with the three preceding scenarios, demand is dominated by oversize and bulk cargos.

7.6.3 Defense Program Capability

The rules established for base line capability remain the same as in Section 4. It is the DoD program (less C-X) as presented to Congress for 1982 and 1986. The base line considers no attrition, convoying to NATO and no aerial refueling. The Persian Gulf portion of this scenario is the same as Scenario I, but the NATO portion, since it is a precautionary reinforcement with no war-fighting, differs markedly from Scenario III. No attrition is experienced although we have hedged against such an eventuality by convoying. Details on all elements of programmed lift capability, and assumptions pertaining thereto are contained in the Catalog of Assumptions and Data (Appendix C).



(U) Figure 7.1. (U) Base-Line Lift Demand, Scenario IV

UNCLASSIFIED

TABLE 7.2 (U)

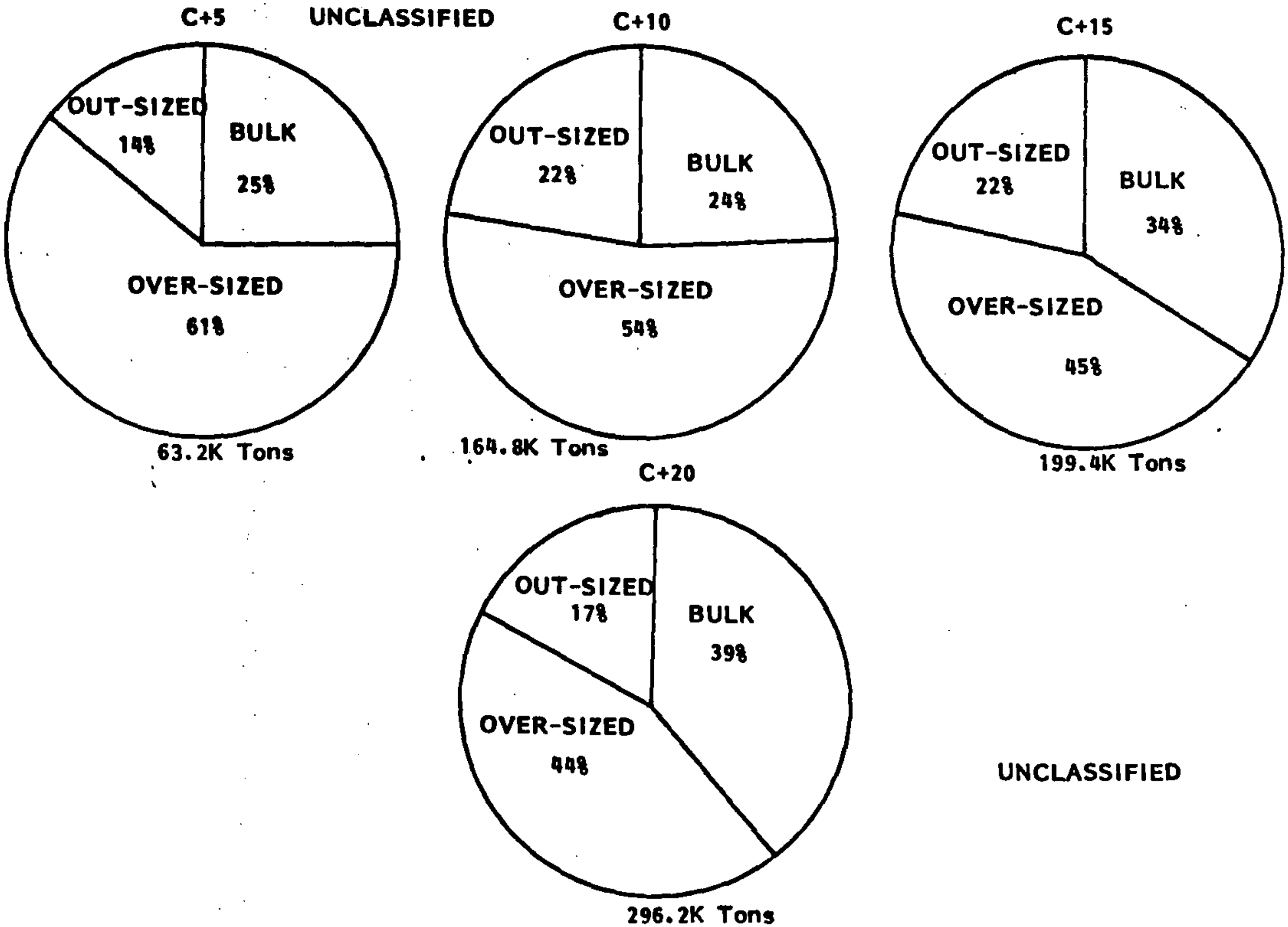
CUMULATIVE LIFT DEMAND (U)

	DAY AFTER C-DAY								
	5	10	15	20	25	30	35	40	45
A. BASE LINE									
Passengers (000)	75.8	114.7	124.4	428.8	569.6	662.0	671.5	687.8	712.9
Dry Cargo Tonnage (000)									
Unit Equipment									
Army	26.3	108.4	122.0	167.2	886.2	1001.1	1116.5	1116.5	1172.1
Air Force	17.8	19.0	19.3	61.8	78.2	83.4	92.8	96.4	99.7
Marine	60.7	67.1	67.1	87.1	91.1	91.1	91.1	91.1	91.1
Navy	2.1	2.1	2.1	3.1	19.2	20.4	22.7	26.8	26.8
Ammo/Resupply	0.3	29.4	58.7	105.1	203.6	339.9	544.7	743.3	801.7
	107.2	226.0	269.2	424.3	1278.3	1535.9	1867.8	2074.1	2191.4
B. ADJUSTED BASE LINE FOR DoD PROGRAM (TOTAL DRY CARGO (000) TONS									
1982	87.3	202.1	241.3	384.4	843.4	1101.0	1432.9	1639.2	1756.5
1986	63.2	164.8	199.4	296.2	660.2	917.8	1249.7	1456.0	1573.3

164

UNCLASSIFIED

UNCLASSIFIED



UNCLASSIFIED

(U) Figure 7.2. (U) Distribution of Potential Common-User Airlift Cargo, 1986, Scenario IV

UNCLASSIFIED

UNCLASSIFIED

165

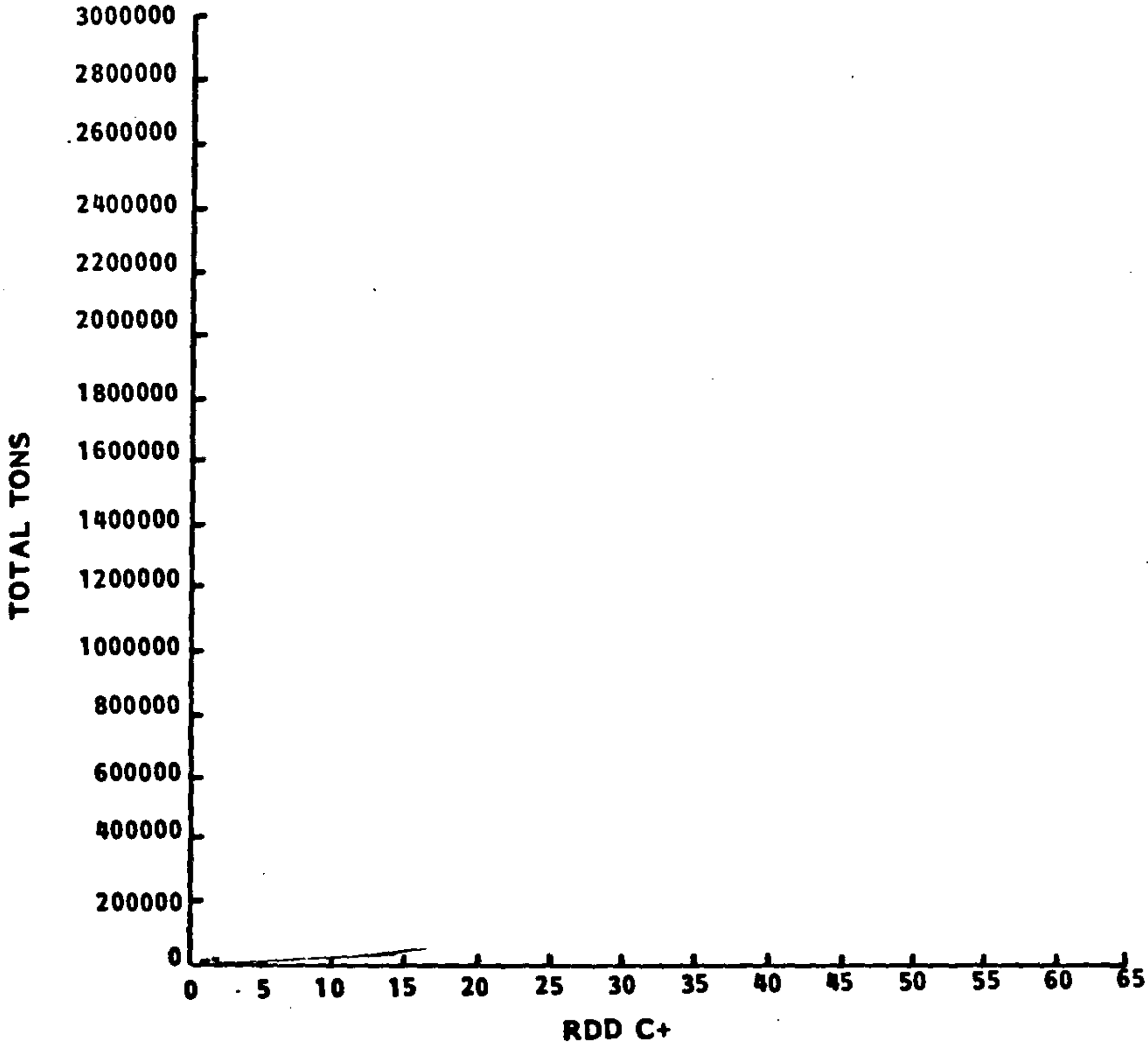
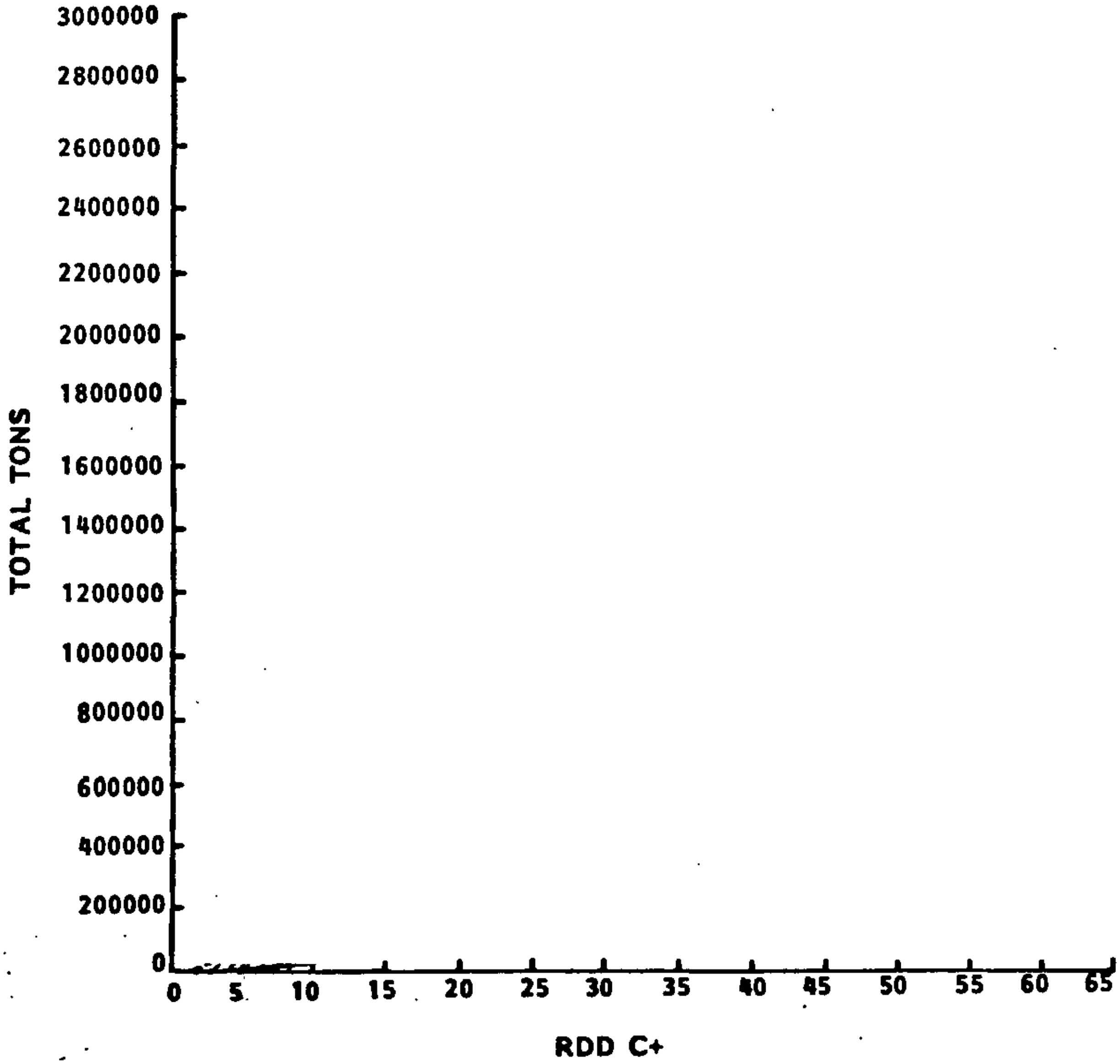


Figure 7.3. (U) Lift Demand, Capability, and Shortfall, 1982, Scenario IV

166



5

Figure 7.4. (U) Lift Demand, Capability, and Shortfall, 1986, Scenario IV

167

(U) Figures 7.3 and 7.4 display lift demand, capability, and shortfall for 1982 and 1986, respectively. The marked improvement from 1982 to 1986 is immediately apparent, with substantial contributions from airlift enhancement and its dependent set of prepositioning programs. Also apparent is the contribution of fast sealift, which not only provides an early closure to the Persian Gulf, but makes a return trip and contributes to NATO.

(U) Figure 7.5 shows lift satisfaction by commodities to be moved.

(U) Figures 7.6 to 7.8 portray major force closures for the combined theaters.

7.6.4 Passenger Lift Capability

(U) As a general rule we would probably not deploy passengers at a rate faster than the delivery of their accompanying cargo. Passenger demand must be assessed from a standpoint of marriage with cargo and not simply against required delivery rates (RDDs).

(U) Figures 7.9 and 7.10 display 1982 and 1986 passenger movement as a function of requirement (RDD), demand based on cargo arrival, and passenger fleet capability to delivery.

Figure 7.9 demonstrates that passenger lift capability for 1982 is more than adequate to balance cargo capability,

Figure 7.10 on the other hand, identifies a passenger shortfall during the period

Shortage over this period is shown in Table 7.3

5

Note: Two percentage figures are shown for each consumer. The first is the percent of total demand; the second is the percent of satisfaction of that demand.

Figure 7.5. (U) Lift Demand and Satisfaction, 1986, Scenario IV

5

LEGEND

- ▨ Intertheater Travel
- ▭ Intratheater Travel (End of Bar = Closure)
- ⦿ RDD
- ▲ 1982 Base Line Closure
- ◄ 1982 Base Line Closure Beyond Range

Figure 7.6. (U) Army Movements, Base Line, Scenario IV, 1986

5

LEGEND

- Intertheater Travel
- Intratheater Travel (End of Bar = Closure)
- RDD
- 1982 Base Line Closure
- 1982 Base Line Closure Beyond Range

Figure 7.7. (U) Marine Movements, Base Line, Scenario IV, 1986

LEGEND

- ▨ Intertheater Travel (End of Bar = Closure)
- ⦿ RDD
- ▲ 1982 Base Line Closure
- ⬅ 1982 Base Line Closure Beyond Range

Figure 7.8. (U) Air Force Movements, Base Line, Scenario IV, 1986

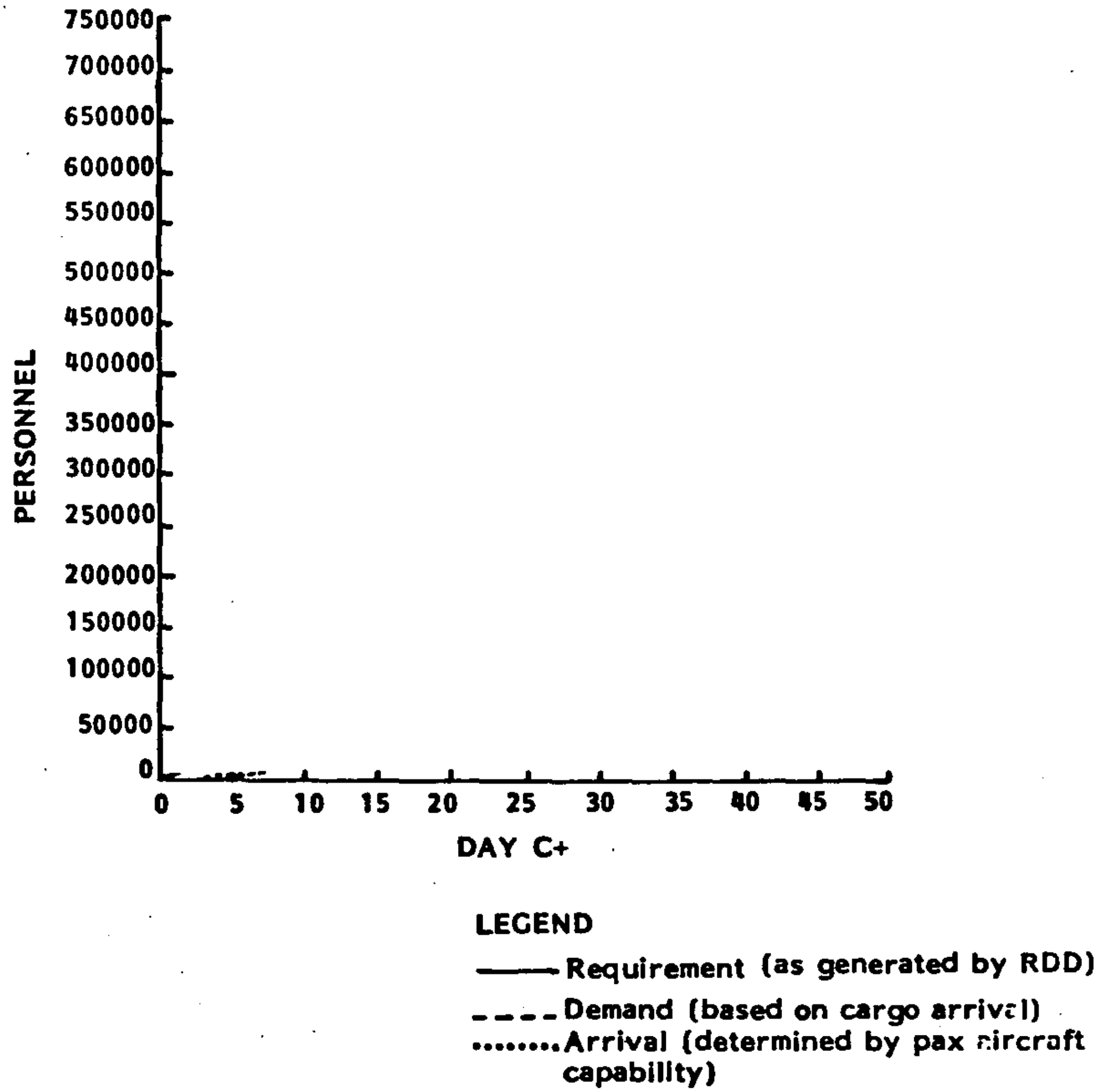
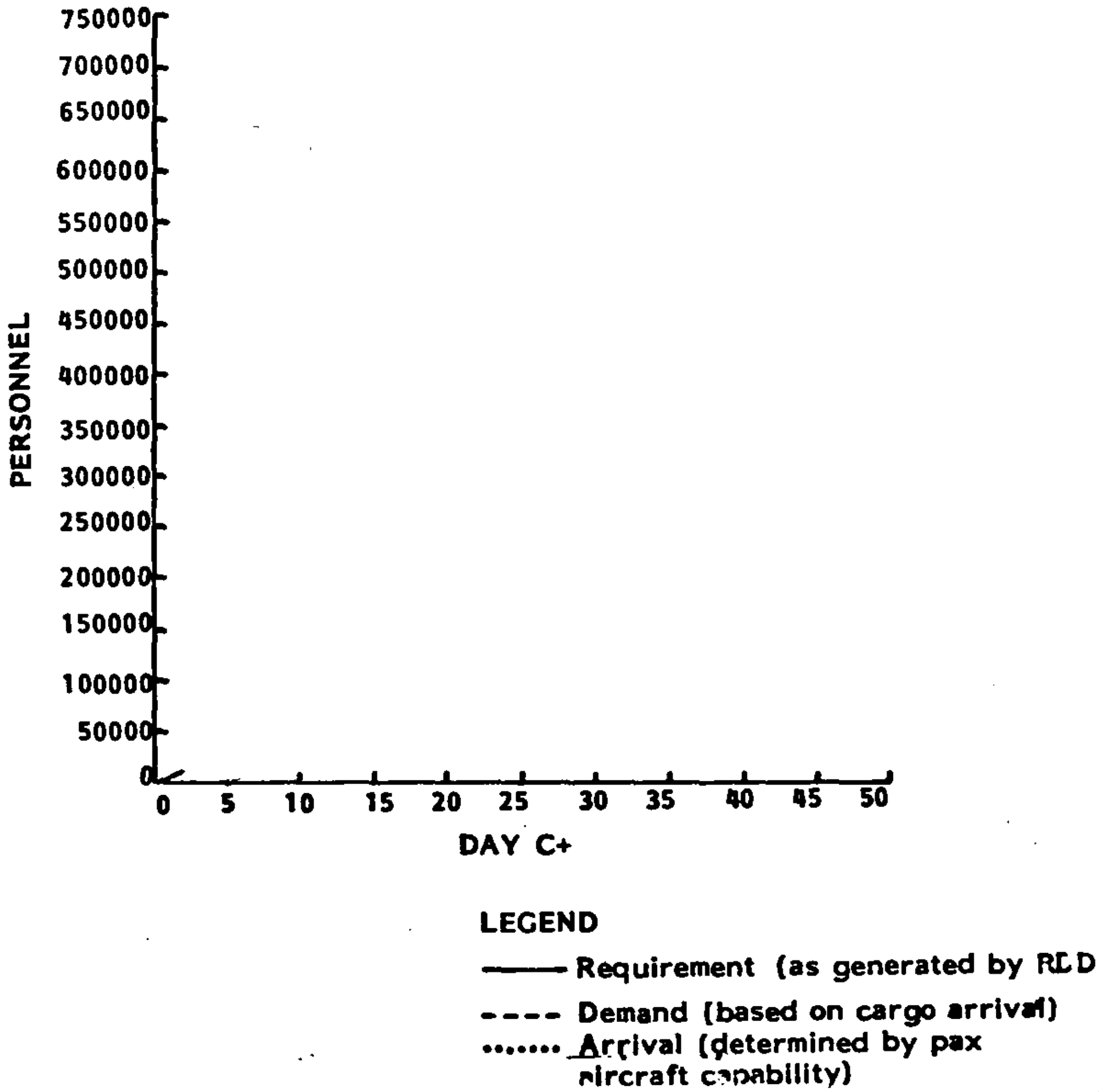


Figure 7.9. (U) Passenger Requirements, Demands, and Arrivals, 1982, Scenario IV

5



5

Figure 7.10. (U) Passenger Requirements, Demands, and Arrivals, 1986, Scenario IV

174

TABLE 7.3

1986 PASSENGER SHORTFALL (U)

Day After C-Day	Passenger Shortfall

This period coincides with the large passenger demand associated with NATO reinforcement of POMCUS. The shortfall could be satisfied for this period with an increase in NCAA of approximately and such a proposal has been presented to the Alliance. Obviously, as additional programs are proposed, the passenger-cargo balance could be expected to require further adjustments.

7.6.5 Summary

(U) This scenario presents the most demanding case for overall mobility reinforcement, yet the character of alternative programs can be expected to differ from previous, less demanding scenarios. For example, solutions to Scenario I shortfall may satisfy early requirements of this scenario, yet fall short once the NATO reinforcement commences. Solutions to only the NATO scenario ignore the split theater requirements as well as the duration of reinforcement imposed in this scenario.

7.7 IMPACT OF DELAYS IN CLOSURE

This scenario raises the question of our capability to fight in more than one region of the world. We chose to use the lesser SWA contingency plus a precautionary NATO reinforcement so as to limit this assessment to the adequacy of mobility forces to deploy and sustain programmed US forces. Developing a more demanding scenario such as a simultaneous crisis involving Soviet forces in the Persian Gulf and Europe would demonstrate the same outcome as it pertains to mobility force capability to project power but would prompt difficult questions on priorities and resource allocations between theaters.

Whether forces are actually engaged on one or both fronts, the military situation would be more serious due to insufficient mobility and other support force structure. Transportation demands already greatly exceed capabilities in either theater. Support forces would be considerably less capable of meeting requirements 5

Theater reception and distribution capabilities and force structure necessary to expedite aircraft and ship off-loading operations would also be spread thinner because multiple lines of communication must be maintained.

Since we cannot adequately support either contingency individually, the choices are between reinforcing Europe which is considered second in importance only to defense of the homeland, or continuing in full strength to prosecute a war in an area whose energy resources, when denied, makes Western Europe's and Japan's industry impotent.

4 + 5

Reducing mobility support to forces deployed to the Persian Gulf could jeopardize those forces and increase the likelihood of losing the oil fields 5

5

On the other hand, significantly reduced US reinforcement capability for Europe could leave the alliance in a precarious position. A minimum reinforcement could cause the allies to question the US commitment.

5

The less capable our mobility forces, the more difficult our situation and the choices to be made.

5

This is a risk US decision makers are presented with should a Persian Gulf war break out. With less than sufficient forces to support a single major contingency, a dual crisis would prohibit the timely deployment and sustainment of forces in both cases. Even if sufficient combat forces were available in US total force structure to meet both crises, without the credible power projection capability to deliver combat and support forces in a timely manner, execution of the national strategy may not be possible.

SECTION 8

INTRATHEATER MOVEMENT ANALYSIS

8.1 INTRODUCTION

(U) The intratheater movement analysis focuses on the interface between intertheater and intratheater lift. It is a mobility study of the final portion of the deployment--moving men and equipment from the aerial/seaport of debarkation (APOD/SPOD) forward to the area of operation (AO). The execution of this final segment of deployment can be most difficult, but must be successful or the entire deployment could fail.

(U) Intratheater movement can be accomplished by surface or by air. The movement of the majority of ground forces may be accomplished through the units' organic movement capability--the units' own vehicles and aviation assets. However, very few units are totally self-mobile and therefore require lift augmentation provided by transportation support units, intratheater airlift, and, where available, host nation resources. The deployment of ground forces within a theater is very much a function of the scenario. The type, sequence and rate of forces being deployed, distances from ports of debarkation to operating areas, port of debarkation throughput capacity, terrain and other environmental factors will determine the mode of intratheater movement.

(U) Intratheater lift assets must simultaneously support three missions. They must continue the deployment by distributing forces in the theater, sustaining the forces with resupply, and participating in the employment of forces. This study does not analyze the employment or warfighting phase--resupply and movement of troops and equipment within the objective area with a spectrum of missions from airland to aerial delivery in response to the exigencies of combat. However, it must be remembered that lift demand for the employment of forces in response to the battle situation could occur simultaneously during the deployment.

This competition for lift intensifies as tactical requirements develop, e.g., repositioning, resupply, and aeromedical evacuation.

8.1.1 The Nature of Intratheater Lift Demand

All the tonnage arriving in theater does not require intratheater movement. Figures 8.1 and 8.2 show cumulative intratheater lift demand that must be moved forward for Scenarios I and II respectively. The designation "lift demand" in this case is the total movement demand from aerial and sea ports of debarkation to the area of operations.

4

The solid lines in Figs. 8.1 and 8.2 indicate the cumulative deliveries which create intratheater lift demand produced by the programmed intertheater assets in 1982 and in 1986. The "dashed lines" show the lift demand created by the RDD's of the forces deployed in the two scenarios.

5

In both scenarios dashed lines represent the upper bound for intratheater lift demand for deployment

The "shaded area" 5
on each figure represents the estimated lift capability of the deployed C-130 units in each scenario. It shows that the major share of intratheater movement must be accomplished by other means.

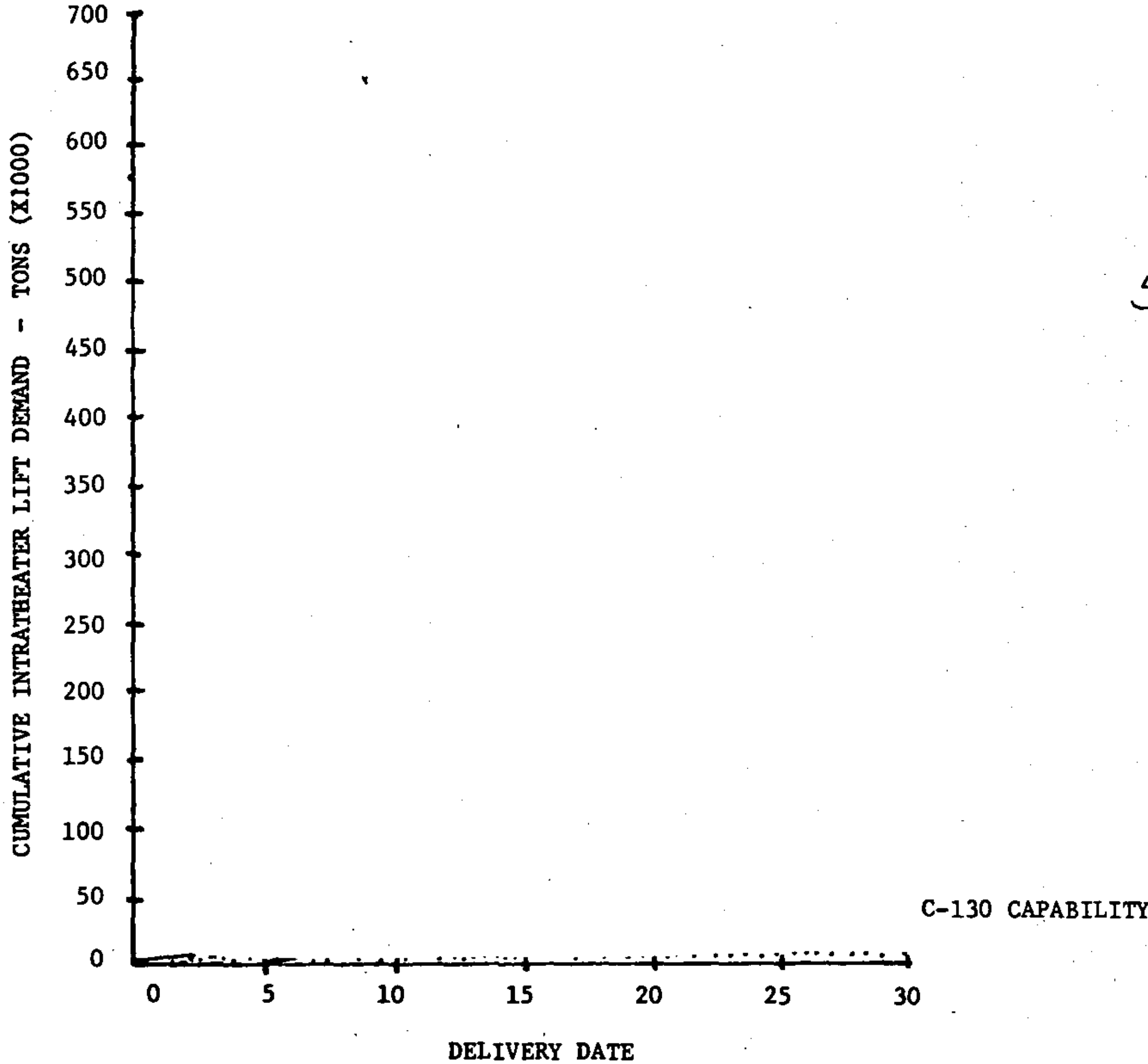


Figure 8.1. (U) Scenario I--Intratheater Lift Demand

5

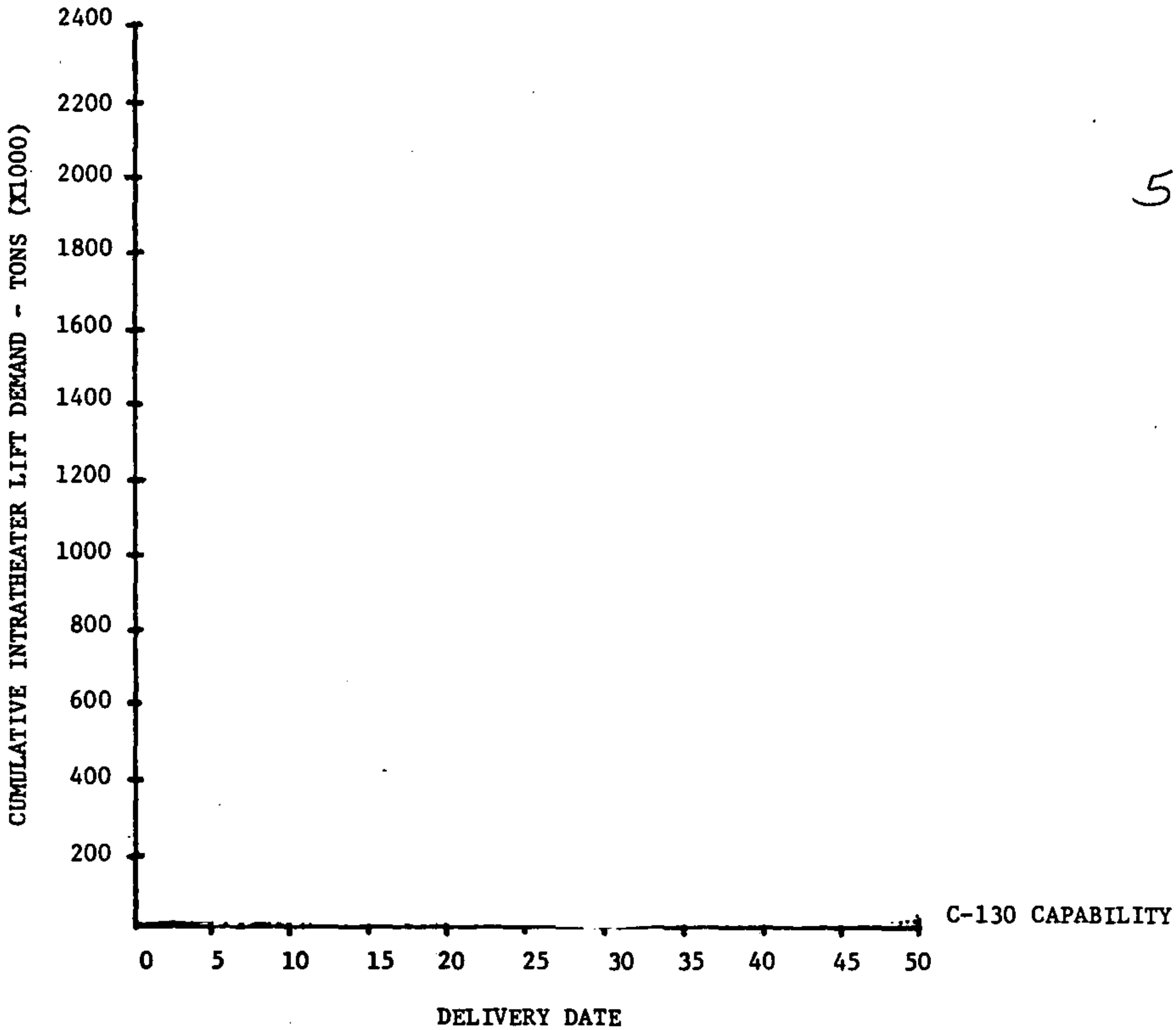


Figure 8.2. (U) Scenario II--Intratheater Lift Demand

182

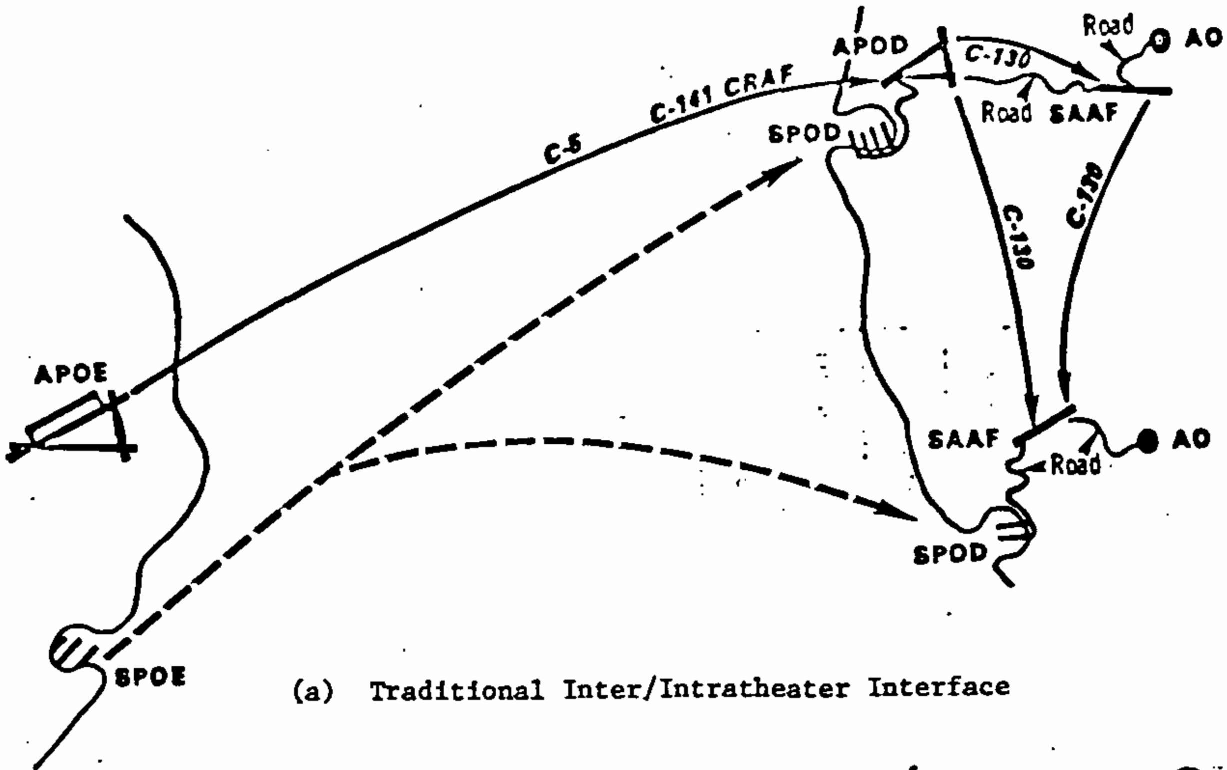
8.2 DESCRIPTION OF INTRATHEATER DEPLOYMENT

(U) A detailed intratheater movement analysis for Scenario I and a portion of Scenario II was accomplished and is discussed in this section. Since no automated models exist for the intratheater portion of a deployment, the results obtained from the Interactive Strategic Deployment Model (ISDM) were used to estimate the magnitude of intratheater movement demand (Figs. 8.1 and 8.2). Using optimistic assumptions concerning APOD/SPOD throughput (see Appendix H for SPOD sensitivity analysis) and line of communications (LOC) availability, calculations were performed to reveal the nature of the intratheater problem. Although the analysis is scenario-dependent, a number of vital factors were revealed.

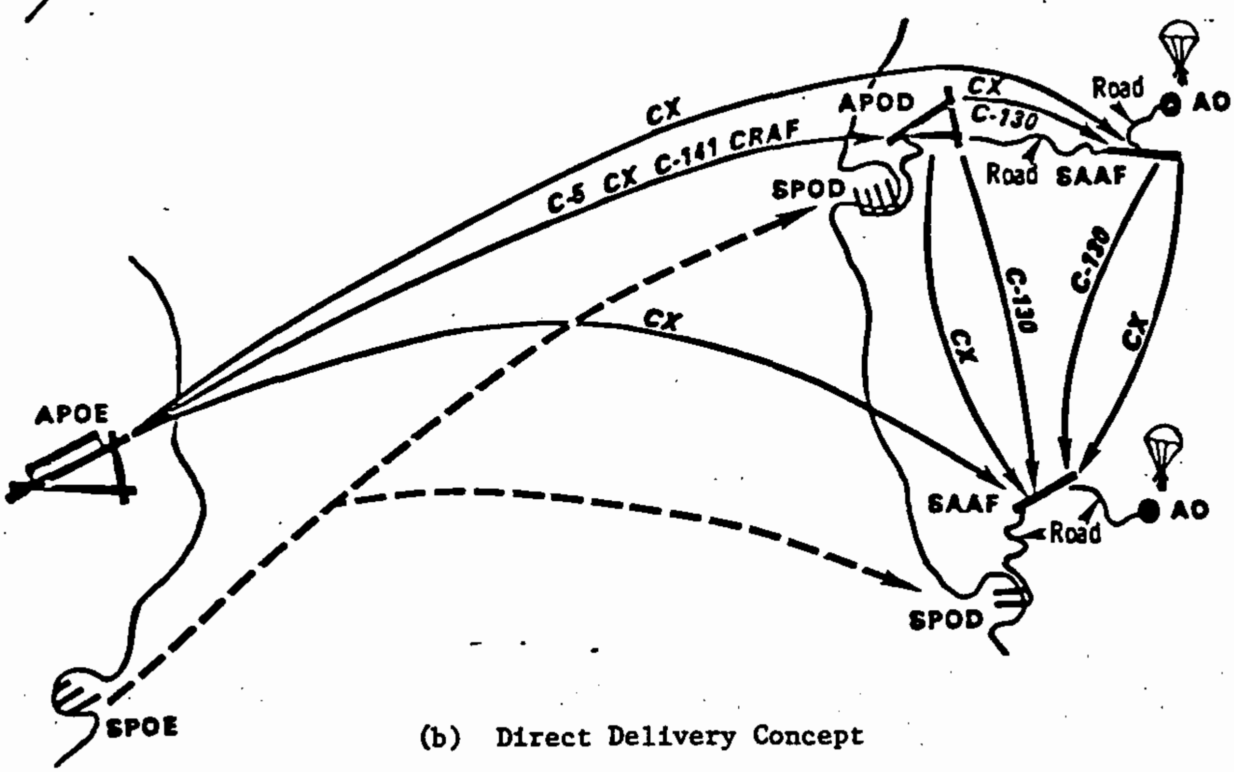
(U) Figure 8.3 shows the normal interface between intertheater and intratheater lift. This interface occurs at the APOD/SPOD, where forces transfer to intratheater airlift or are marshalled for surface movement. An intertheater aircraft capable of direct delivery to forward operating bases (FOBs) provides an alternative to this traditional concept. Using a direct delivery concept, a portion of the tonnage delivered avoids transshipment through the APOD.

8.3 GENERAL DESCRIPTION OF REGIONS

(U) The austere environment with limited surface transportation systems in both Scenarios I and II aggravates intratheater movement. There are few roads and railroads and virtually no bypasses around choke points. The mountainous terrain in southern Iran further adds to the difficulty of surface movement. The critical roads and ports in the area must be defended. If they are interdicted, facilities on the west coast of Saudi Arabia will have to be used in Scenario I, resulting in a road march of over 600 n mi across the desert to the area of operation. If airfields and ports are denied in southern Iran and facilities on the east coast of Saudi Arabia must be used, the Persian Gulf must be transited, compounding an already difficult situation. With only the C-130 for intratheater airlift, all outsized equipment must move by



(a) Traditional Inter/Intratheater Interface



(b) Direct Delivery Concept

(U) Figure 8.3. (U) Deployment Interface

184

surface transportation. It is obvious that a 600 n mi road march, or crossing the Persian Gulf, would pose great difficulty. Attempts were made to examine this impact.

8.4 SCENARIO I - REGIONAL CONFLICT IN THE PERSIAN GULF

8.4.1 General

In Scenario I, the area of operations (AO) is within of both the primary APOD and the major SPOD (See Fig. 8.4.) 2

8.4.2 Intratheater Lift Demand

Figure 8.1 showed the cumulative tonnage requiring intratheater movement, including resupply and ammunition. The following example, however, focuses on unit equipment tonnage (excluding resupply and ammunition) delivered during Scenario I. The 1 total unit equipment tonnage for the forces requiring intratheater movement during this period is 4.

8.4.3 Unit Closure Analysis

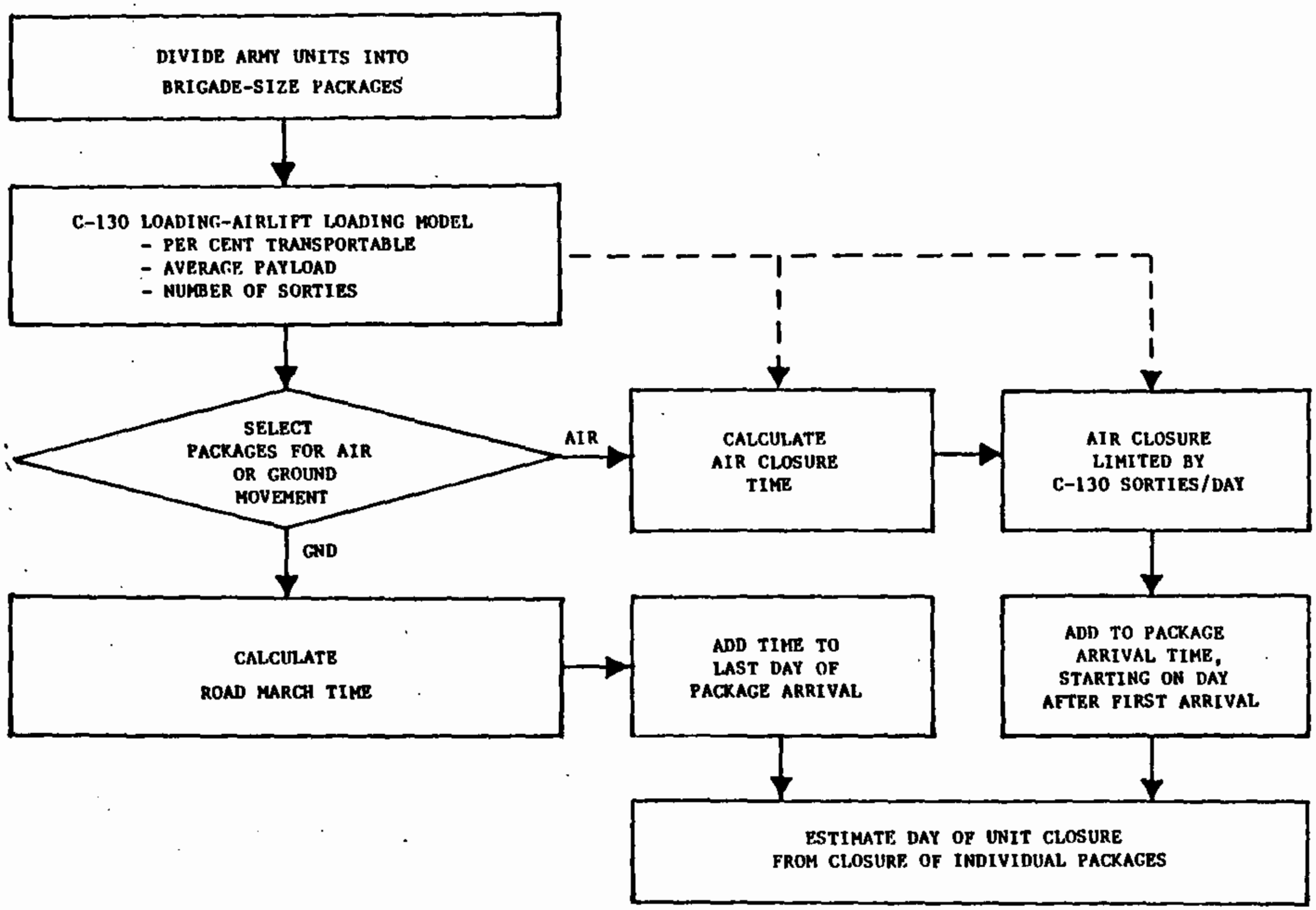
A detailed analysis of unit closure times was performed for this scenario. The general methodology is shown in Fig. 8.5. 1+2

The following is a step-by-step description of the analysis:

185

Figure 8.4. (U) Scenario I--Intratheater Map

UNCLASSIFIED



UNCLASSIFIED

(U) Figure 8.5. (U) Intratheater Closure Time Analysis

UNCLASSIFIED

UNCLASSIFIED

187

- Army units arriving in theater were divided into packages and matched with their destinations. 1 + 2

2

- The packages were "loaded" aboard C-130s using the Airlift Loading Model (ALM) to determine the intratheater airlift "transportability" of each package.

- Based upon the C-130 transportability, the organic movement capability, the destination and the RDD of each package, a decision was made to move the package primarily by air or surface.

- Closure times were calculated for each package by the mode selected. Allowances were made for the assembly and self-deployment of rotary-wing and fixed-wing aviation assets.

  - •• For packages moving by ground, the move began when the last of that package's tonnage arrived at the APOD/SPOD to allow for marshalling of the package prior to its road march. Residual cargo and passengers, for which there was insufficient organic transport, were moved by airlift, or, in the case of packages arriving after the delivery of tansportation support units, by truck. Packages moved at the rate of their slowest vehicles, with allowance for ground halts and the closure of the last vehicle in the package.

- For packages moved by air, any equipment not transportable on the C-130 was assumed to arrive atthe APOD/SPOD early enough to permit it to complete the required road march during the airlift of the remainder of the package. The tonnage arriving on a given day was assumed to be available for intratheater airlift on the following day. The package closure time achieved by the C-130 was based upon the average payload and number of sorties obtained from the ALM, but was limited by the number of sorties which could be generated in a given day.

  Since the proximity of the FOBs to each other allowed them to be used interchangeably, the surge limit on C-130 sorties in 1 day was

  The day-by-day accounting of C-130 workload meant that occasional packages took more than 1 day to close.

- The marshalling time for road march packages was added after the last delivery of tonnage belonging to that package. Airlift tonnage was allowed to move forward before the entire package had arrived.

- From the package closure times, an estimate was made of the closure time for the larger units.

(U) Table 8.1 is an example of the overall closure times obtained in this analysis. It shows that, under the optimistic assumptions used, the intratheater deployment would add only 1 to 2 days to the intertheater delivery of the units in 1986.

8.4.4 The Impact of Mobility Improvements and Direct Delivery

Programs which improve the intertheater delivery rate also increase intratheater lift demand. To demonstrate this an excursion was developed.

It also includes and sealift, airlift, and prepositioning improvements through 1990.

The analysis focused on the impact of sealift arrival and the addition of 200 transport aircraft capable of producing 25 MTM/day of airlift. Figure 8.6 illustrates these impacts. airlift, without the additional 200 aircraft, deploys about tons per day of cargo requiring forward movement. With the addition of 200 intertheater airlift aircraft, the intratheater lift demand nearly doubles

when sealift arrivals begin, intratheater lift demand quadruples.

Figure 8.7 focuses on the intratheater lift demand for the critical period prior to sealift arrival when intertheater airlift capability would have its most pronounced influence on the intratheater demand. This period shows the value of acquiring outsize capable aircraft. By adding 200 outsize aircraft, the entire intertheater airlift force becomes more productive. This is because the overall density of the airlifted cargo increases when which previously moved by sea, now moves by air. The additional aircraft deliver tons but the total intertheater improvement by Day was tons. The additional tons is attributable to denser loads and hence more efficient use of the remainder of the airlift force.

TABLE 8.1

INTRATHEATER CLOSURE EXAMPLE, 1986, SCENARIO I (U)

UNIT	DESTINATION	DELIVERY (DAY)	PRIMARY INTRATHEATER MODE	TIME TO CLOSE (DAYS)	CLOSURE (DAY)

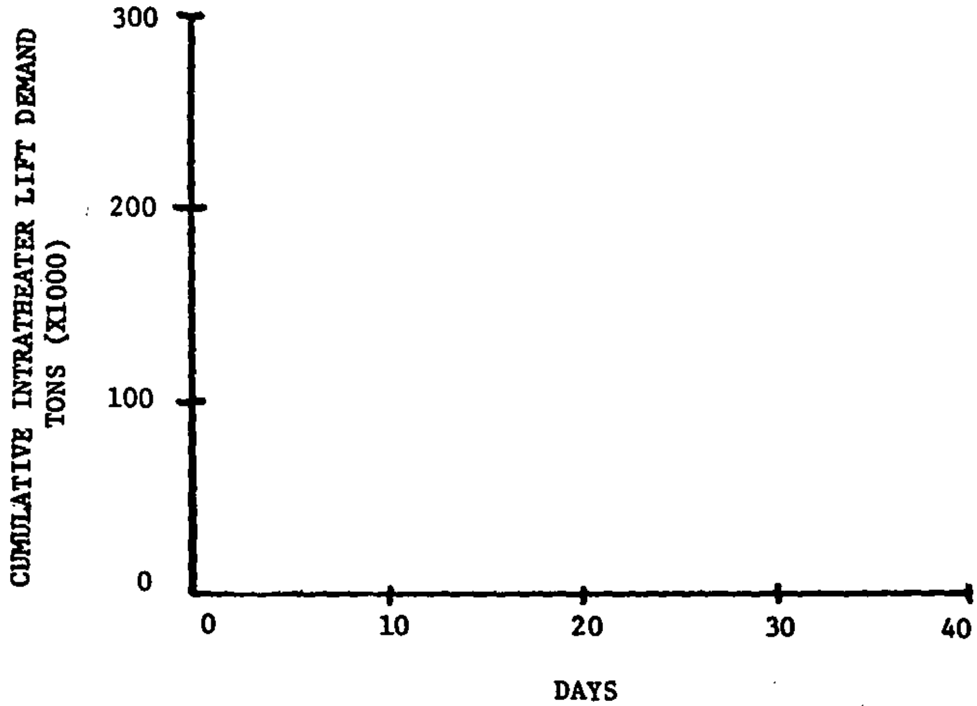
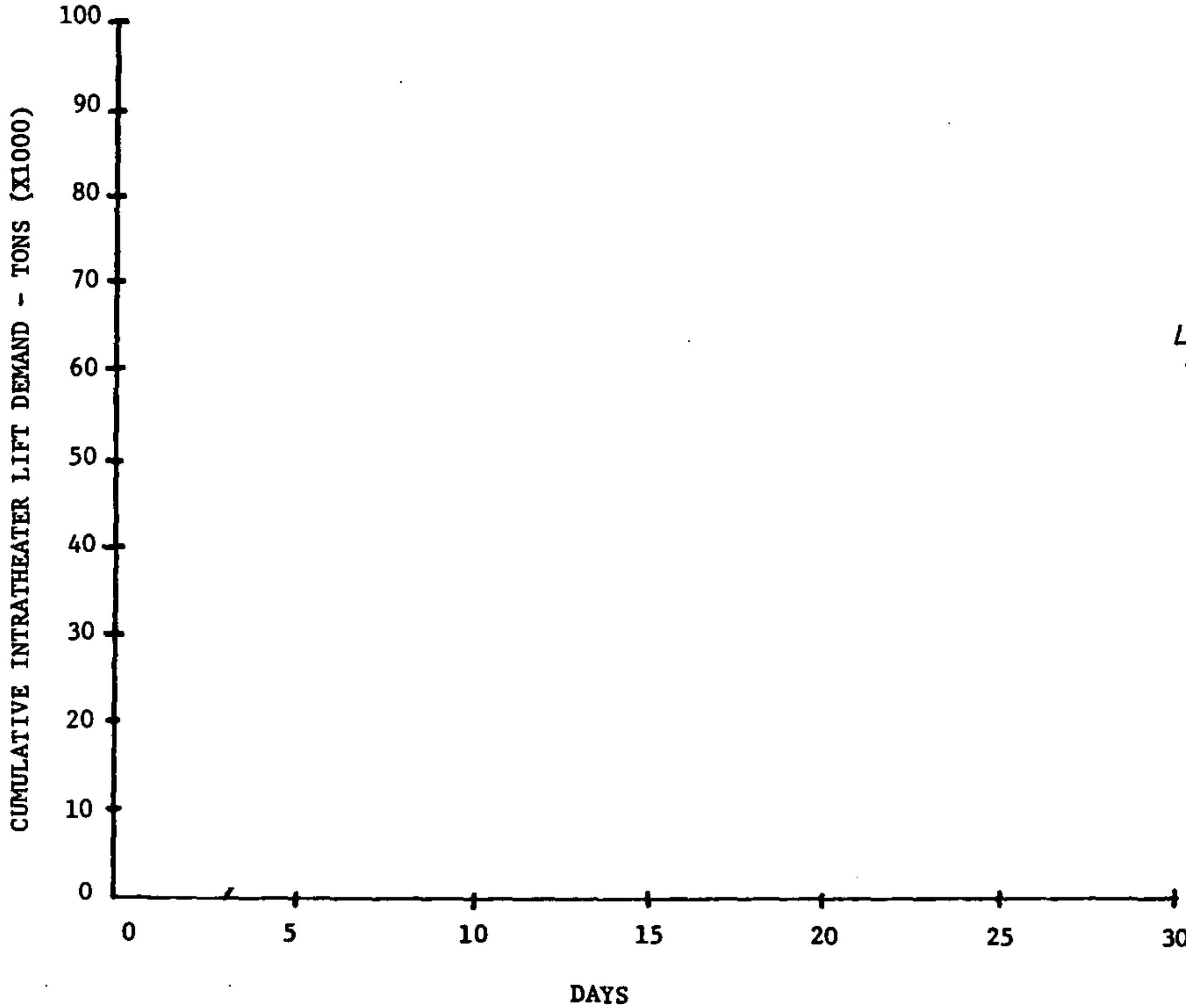


Figure 8.6. (U) Scenario I--Intratheater Lift Demand (Excursion)

If the new aircraft are not capable of direct delivery, the entire additional tons represent additional intratheater lift demand. With direct delivery, the increase is only tons and more firepower could be on-line earlier.

(U) Intertheater analysis optimizes the use of intertheater lift resources. As such, the additional 200 aircraft did not transport complete units. ~~In fact~~, only 20-40% of the tonnage of any one unit was normally transported solely by these aircraft. Therefore, even if the new aircraft is capable of direct delivery to the FOBs, unit closure still depends upon the portion of the unit's tonnage delivered to the APOD/SPOD and requiring forward movement. As such, unit closures still occur 1 to 2 days after the last piece of the unit is delivered in theater.



4

Figure 8.7. (U) Scenario I--Intratheater Lift Demand Prior to Sealift Arrival (Excursion)

193

193

(U) To take advantage of a direct delivery capability, such an aircraft should transport complete units, although this may affect total lift optimization. However, equipment arriving directly at a forward base would close on arrival and thus, net advantages to force build-up in the theater could off-set any sub-optimization of total force usage. The following example provides a simple demonstration of some of the advantages of direct delivery.

When intertheater aircraft deliver a unit to a primary APOD, an additional day is required for intratheater movement and closure. Therefore, the unit would have to arrive at the APOD one or more days earlier to achieve the same closure possible if it were delivered directly to the AO. In this scenario, direct delivery by 200 outsize aircraft would produce the same closure of like forces as 215 similarly sized aircraft delivering to the APOD. If the closure time between the APOD and the AO is 2 days, 231 aircraft delivering to the APOD would be needed. Thus, even with the relatively short intratheater closure times inherent in this scenario, the productivity gain of direct delivery can be 7 to 15% in terms of the number of additional aircraft needed to achieve the same unit closure. This permits a lower aircraft buy to obtain the same capability, reduces the magnitude of the intratheater deployment task, and produces other benefits such as reducing the number of aircraft requiring cargo handling, fuel, and parking space. The remainder of the analysis addresses these other benefits.

8.4.5 APOD/SPOD Considerations

2+5

(U) See Appendix H for SPOD discussion.

194

194

Without austere airfield capability, all airlifters would have to land at major airfields. Since only a few of the major fields of interest have ramp areas large enough to adequately handle the flow, several main bases will be needed by the fully operating airlift force. 2

5

2

Table 8.2 shows the impact of this parking restriction. APOD saturation causes diversions to alternate APODs and increases intratheater lift demand for theater forces.

2

Unless the aircraft are capable of direct delivery to FOBs, the saturation would have to be corrected either through a slowing of the intertheater airlift flow, or through diversion of excess sorties to alternate APODs 2

Table 8.3 indicates the air and road distances between the four primary FOBs and the APOD/SPOD. Also shown are the distances from the alternate APOD and the alternate APOD/SPOD 2 Comparison of these distances reveals the magnitude of the intratheater problem when the primary APOD/SPOD is saturated or not available.

TABLE 8.2

SCENARIO I--APOD PARKING SATURATION (U)

DAY	ARRIVALS					DIVERSIONS[1,2]	
			B-747 EQ			NEW AIRCRAFT	
	C-5 MOD	C-141B	CARGO	PAX	NEW AIRCRAFT	WO/DD	W/DD
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
TOTALS							

[1](U) DD - Direct Delivery.

[2](U) Any sorties carrying Air Force tonnage were assumed to be destined for Air Force beddown bases and were thus not diverted

TABLE 8.3

SCENARIO I - INTRATHEATER DISTANCES (U)

	DISTANCES IN KILOMETERS					
APODs						
Primary FOBs	Air	Road	Air	Road	Air	Road
AVERAGE DISTANCE (km)	246	258	356	490	1131	1482
AVERAGE DISTANCE (n mi)	133	139	192	265	611	801

Increased intratheater lift demand generated by intertheater diversions has a substantial impact upon unit closures. For example, using the average air distance between and the FOBs (see Table 8.3), the average C-130 capability would be reduced by over tons per day and for the FOBs by over tons per day

Figure 8.8 shows the diminishing capability of the C-130s in terms of tons per day, as the APOD is moved farther from the AO. Road travel time for a single vehicle traveling the average road distance from would be nearly double that from and the time from would be more than five times greater. These closure time penalties would be avoided through the use of direct delivery aircraft.

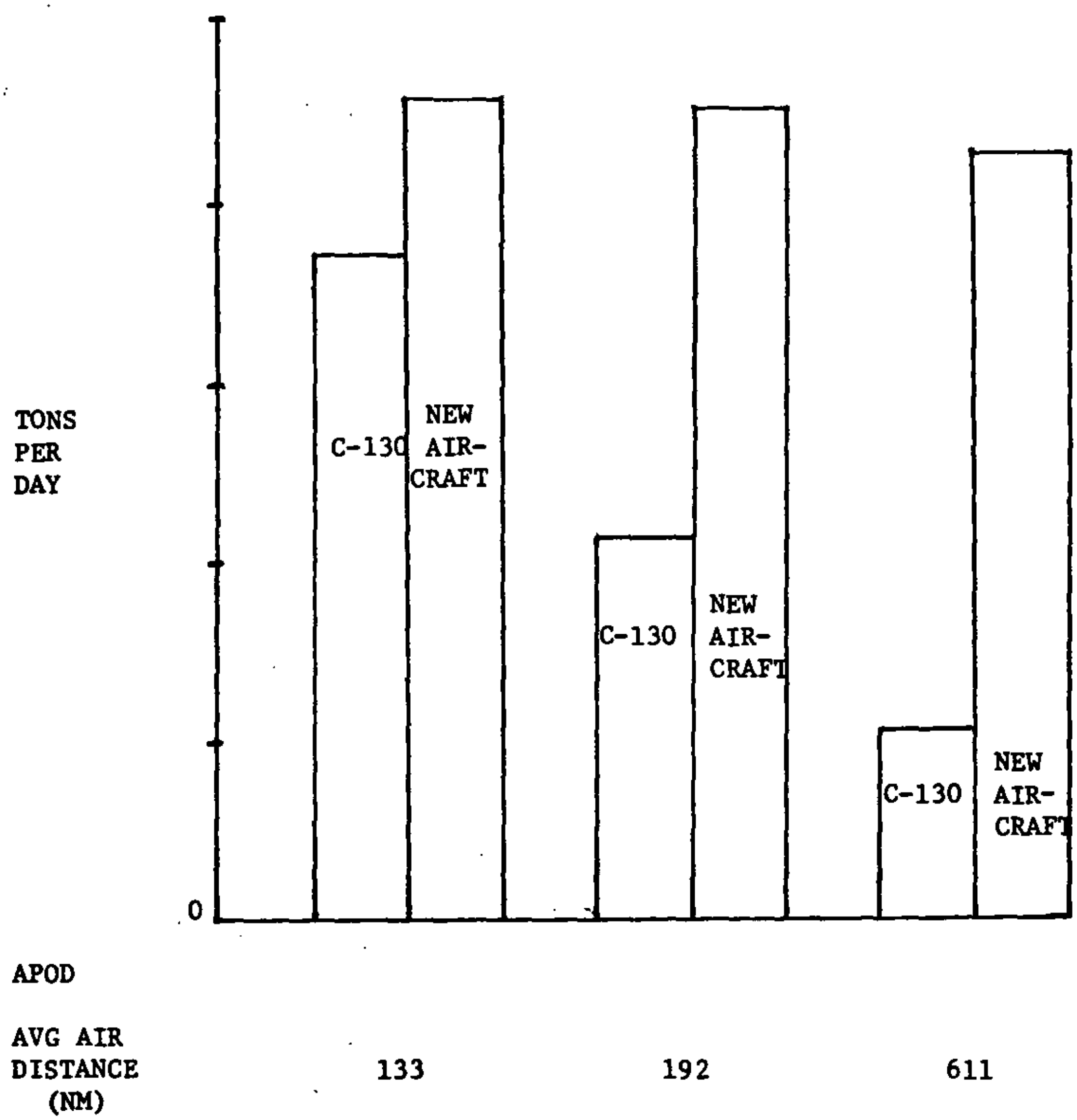
8.4.6 Intratheater Shuttle

Figure 8.8 also illustrates an additional benefit inherent in direct delivery capability--that is the flexibility for the aircraft to transition to an intratheater role when necessary and provide added intratheater airlift. It shows the approximate intratheater capability of 200 new aircraft, based upon each one flying one intratheater shuttle between the FOB and APOD at the end of each intertheater mission.

Using the intertheater deliveries in Fig. 8.7 and the intratheater capabilities in Fig. 8.8, Fig. 8.9 illustrates the total intratheater impact of the direct delivery and shuttle capabilities. In this scenario, tons of ground forces' unit equipment are delivered to the theater by C-5, C-141B, CRAF and 200 new aircraft between day This tons defines an "intratheater lift demand" for forwarding to the area of operation (AO). cannot accept all daily sorties generated by the airlift force after augmentation by 200 new aircraft. Therefore, a portion of the tons would have to be delivered to either if the aircraft were not capable of direct delivery to the FOBs in the AO. 2+5

With C-130s (bedded down as shown in Appendix C) operating from to the FOB's, tons of oversize and bulk cargo can be forwarded by C-130 This would leave tons to be forwarded to the AO by surface means. 2+5

Of the tons, tons were delivered by the 200 new aircraft. If these aircraft were capable of direct delivery to the FOBs, the intratheater lift demand would be reduced by tons. Only tons would be left to be forwarded by intratheater lift assets. This would relieve the saturation problem Since the C-130s can forward tons, there would be tons remaining to be forwarded by surface. 2+5



1. C-130 capability takes into account positioning/depositioning sorties from beddown bases to APOD.
2. New aircraft capability is for one intratheater shuttle per intertheater mission and requires no beddown in theater.

Figure 8.8. (U) Scenario I--Intratheater Airlift Capability

2 + 5

199 (199)

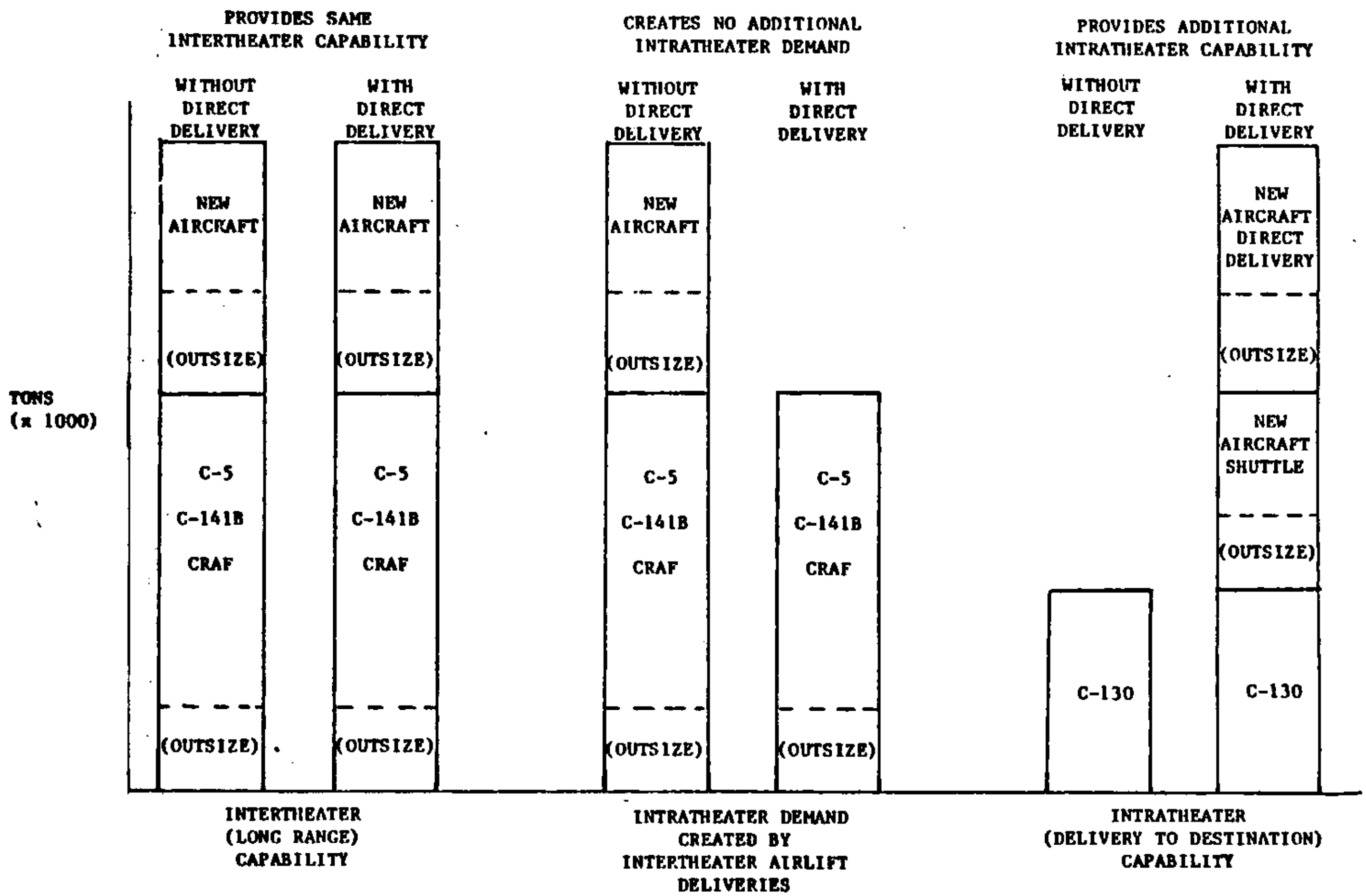


Figure 8.9. (U) Advantages of Direct Delivery to Destination

However, an aircraft with direct delivery capability would provide another option. If the C-5, C-141B and CRAF deliveries were split between and another APOD, the new airlifters could operate from both APODs without causing saturation. They could deliver their tons of outsize, oversize, and bulk intertheater tonnage to the FOBs, and could also be used to shuttle all categories of cargo from APODs to the FOBs. In fact, using one shuttle sortie per intertheater sortie, they would move the remaining tons. This would more than double the intratheater airlift capability and alleviate the need for surface transportation.

The capability for an intertheater aircraft to perform an intratheater shuttle can therefore add substantial intratheater lift. Perhaps more important would be the provision of an outsize intratheater airlift capability. The primary deficiency of the C-130 is that the cargo compartment is too small to accommodate much of the modern firepower equipment in the ground forces units, (e.g., the M-1 main battle tank, the infantry fighting vehicle, the division air defense gun, the Roland air defense missile system, self-propelled artillery and trucks over 2 1/2 tons). An outsized airlifter in shuttle operations would accommodate this outsize equipment. Table 8.4 indicates such an aircraft could carry significantly more individual unit equipment with approximately one-third as many sorties as the C-130s.

Because a shuttle would add time to each intertheater cycle, it would slightly degrade the overall intertheater capability of the airlift force. When the shuttles are over much shorter distances than the intertheater missions, as in Scenarios I and II, this degardation is small. In the example in Scenario I, the addition of one shuttle per intertheater mission only degrades the intertheater capability of these 200 aircraft by about (7.2%).

TABLE 8.4

SCENARIO I--INTRATHEATER AIR TRANSPORTABILITY (U)

Unit	% OF UNIT EQUIPMENT TRANSPORTABLE ON C-130		C-130 SORTIES REQUIRED	% OF UNIT EQUIPMENT TRANSPORTABLE ON C-X		C-X SORTIES REQUIRED
	BY NUMBER OF VEHICLES	BY WEIGHT		BY NUMBER OF VEHICLES	BY WEIGHT	
	95	97	340	100	100	113
	71	79	430	95	97	258
	93	93	1160	98	98	351
	69	42	529	99	99	348
	88	89	1404	100	100	605
	95	86	221	100	100	73
	96	99	164	100	100	52
	81	72	704	99	99	299
	78	65	791	99	99	399

8.5 SCENARIO II - SOVIET INVASION OF IRAN

8.5.1 General

The deployment area in this scenario was divided into four sectors (see Fig. 8.10).

The sectors were designated A, B, C, and D, and deliveries to each sector were based upon the air and ground forces destined for those sectors. Sector A was the most vital in terms of the time criticality and represents the most stressing intratheater lift demand. Therefore, it was chosen for detailed examination.

8.5.2 Intratheater Lift Demand

Figure 8.2 showed the cumulative tonnage requiring intratheater movement, including resupply and ammunition. The following example, however, focuses on unit equipment tonnage (excluding resupply and ammunition) delivered only to Sector A. The unit equipment tonnage requiring intratheater movement is

Figure 8.10. (U) Scenario II--Intratheater Map

Figure 8.11 illustrates the intratheater lift demand before and after the arrival of sealift and with and without the addition of 200 new aircraft. In the analysis base line (defined as fully mobilized and with the same programmed enhancements as in Sec. 8.4.4),

With the addition of 200 new aircraft, arrives in Sector A prior to sealift arrival. Although the new aircraft deliver the total airlift deliveries to Sector A during this period increase by only That is, the rest of the airlift force delivers less tonnage to Sector A. This occurs because Sector A represents only a portion of the tons of unit equipment in the Scenario II deployment. Delivery priorities in other sectors dictate that some of the intertheater airlift capability be used in support of these sectors.

Figure 8.12 shows Sector A tonnage arriving during the critical period prior to sealift arrival. With 200 additional aircraft not capable of direct delivery, the intratheater demand is tons greater than with direct delivery.

(U) As in Scenario I, the distances from the APOD to the FOBs were relatively short. If the APOD remains unsaturated, those units arriving by intertheater airlift would close in 1 to 2 days. However, APOD saturation becomes much more pronounced than in Scenario I.

8.5.3 APOD/SPOD Considerations

(U) See Appendix H for SPOD discussions.

The APOD is Sector A did not have sufficient to support the intertheater sorties. Table 8.5 shows the impact of this restriction in terms of sortie diversions and the added impact of 200 new aircraft. Without a direct delivery capability, out of sorties of these aircraft could not be accommodated

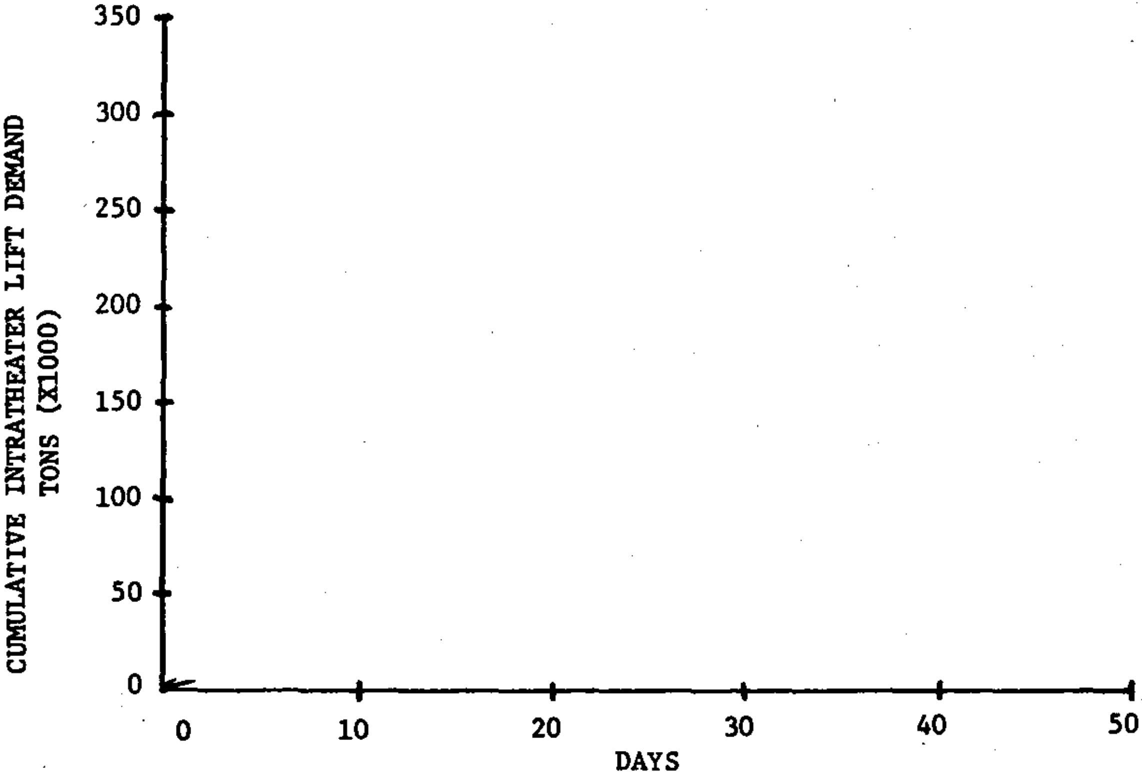


Figure 8.11. (U) Scenario II--Sector A Intratheater Lift Demand for Unit Equipment

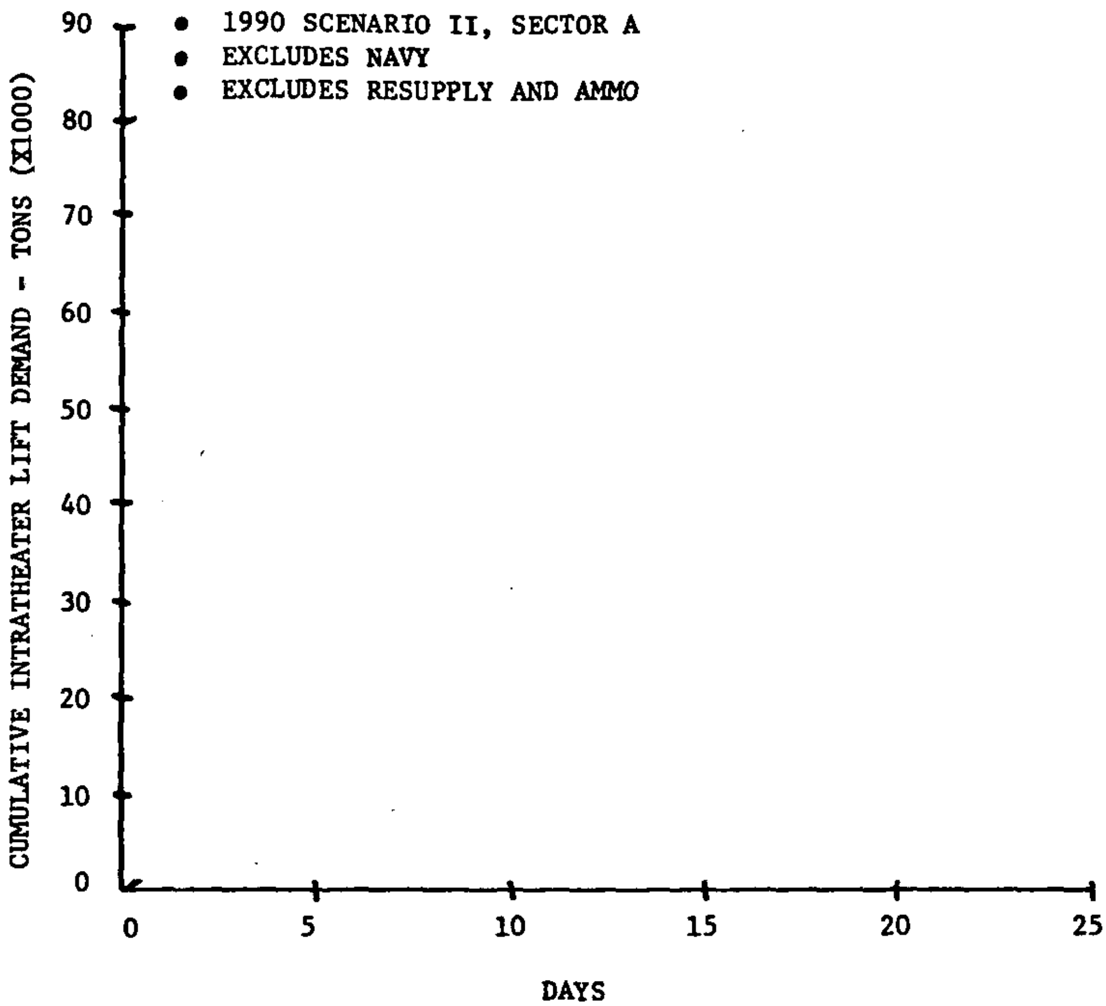


Figure 8.12. (U) Scenario II--Sector A Intratheater Lift Demand for Unit Equipment Prior to Sealift Arrival

4

207

207

TABLE 8.5

SCENARIO II--SECTOR A--APOD PARKING SATURATION (U)

DAY	ARRIVALS					DIVERSIONS[1,2]				
	C-5 Mod	C-141B	B-747 EQ CARGO	B-747 EQ PAX	NEW AIR CRAFT	C-141B	B-747 EQ CARGO	B-747 EQ PAX	NEW AIRCRAFT WO/DD	NEW AIRCRAFT W/DD
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
TOTALS										

[1](U) DD - Direct Delivery.

[2](U) Diverted sorties determined according to the following hierarchy: New Aircraft, B-747 PAX, B-747 Cargo, C-141B, C-5 Mod (i.e., C-5 Mod sorties were the last to be diverted).

208

Direct delivery cannot, however, reduce diversions of other 4
aircraft.

As in Scenario I, intratheater lift demand is increased when intertheater airlift arrivals are diverted to alternate APODs. However, the alternate APODs/SPODs are not as convenient as 2
in Scenario I. Table 8.6 indicates air and road distances between the two primary FOBs and the primary and alternate APODs.

is probably the only alternate APOD capable of absorbing all diversions listed in Table 8.5 but some sorties could be absorbed at the other alternates. Cargo diverted to either 4
would require intratheater airlift to the FOBs, while road march is an option from Diversions of aircraft with just oversize and bulk cargo would create more than C-130 sorties. 5
This amounts to at least days of operation for the entire C-130s deployed in Scenario II. The C-130 could not forward any outsize cargo/equipment.

8.5.4 Intratheater Airlift of Units Arriving by Sea

(U) As in Scenario I, the capability to operate into small, austere airfields would reduce the intratheater lift demand both through direct delivery and through transition to an intratheater role when needed. The separation of the SPOD and the AO in Sector A provides an opportunity to quantify the advantage of an aircraft which could transition to an intratheater role.

Units arriving late in the scenario by sea face 4
km of rail and road travel to reach the AO. C-130s can help move the units from but because much of 4
their equipment is outsize to the C-130, their closure time is primarily dependent upon ship offloading and ground travel.

TABLE 8.6

SCENARIO II--SECTOR A--INTRATHEATER DISTANCES (U)

FOBs IN AO / APODs	DISTANCES IN KILOMETERS (and n mi)			
	AIR	GROUND	AIR	GROUND

*(U) In these instances, ground transit involves travel through Iraq or across the Persian Gulf.

Results for the base line analysis plus 200 additional aircraft indicate that while an armored brigade and an infantry brigade are arriving at the Sector A SPOD, the new aircraft are being used exclusively to transport combat service support tonnage into Sector C. A new SAAF capable aircraft would allow a theater commander the option of dedicating them to move combat units from the SPOD to the AO in Sector A.

Table 8.7 shows comparable movement times for two brigades requiring intratheater deployment from the SPOD to the AO in Sector A. Ground travel times are road march times for the entire unit 1+5

The airlift times are based on using the new aircraft in the intratheater role, but with sortie rates restricted by a maximum on ground (MOG) of 4+5

TABLE 8.7

BRIGADE INTRATHEATER MOVE (U)

Unit	Destination	Closure by Road	Closure by Outsize Aircraft	Number Aircraft Used
Armored Brigade				
Infantry Brigade				

4

[1] Limited by MOG

While the intratheater closure time computed for the armored brigade is nearly the same by ground or air, the use of airlift provides two benefits. Significant parts of the unit arrive in fractions of the total time when airlifted, whereas the lead vehicle would not reach the destination for more than when moving by road. 4 By the time the lead elements could arrive by road, airlift could have delivered more than half the unit. Airlift would also reduce equipment failure and troop fatigue incurred during the ground march.

The time savings for the infantry brigade would be since it is a lighter unit 4 moving to a more distant part of the AO and to a more capable FOB. The benefits of partial closure and the reduced equipment failure and troop fatigue also pertain to this unit.

(U) As in the concept of adding shuttle sorties to intertheater missions, the penalty for using the new aircraft in the intratheater role is a small degradation in intertheater delivery capability. During the later stage of the deployment, after sealift becomes effective, the degradation may be acceptable because it provides important and significant augmentation to intratheater lift capability.

8.6 OPERATIONAL CONSIDERATIONS

(U) The preceeding detailed analysis of the intratheater portion of the deployment illustrates the magnitude of the intratheater requirement. It does no good to lift men and equipment thousands of miles and not be able to lift them the last few hundred miles to the battle area.

(U) Airlift is obviously not the total solution. A combination of airlift, prepositioning, and sealift is required to fill the overall mobility shortfall. But prepositioning lacks validity without airlift, and the prepositioned equipment still must be moved forward to the battle area. Sealift is not available in the early stages of conflict when timeliness is essential. When sealift does arrive there is a quantum increase in intratheater lift demand.

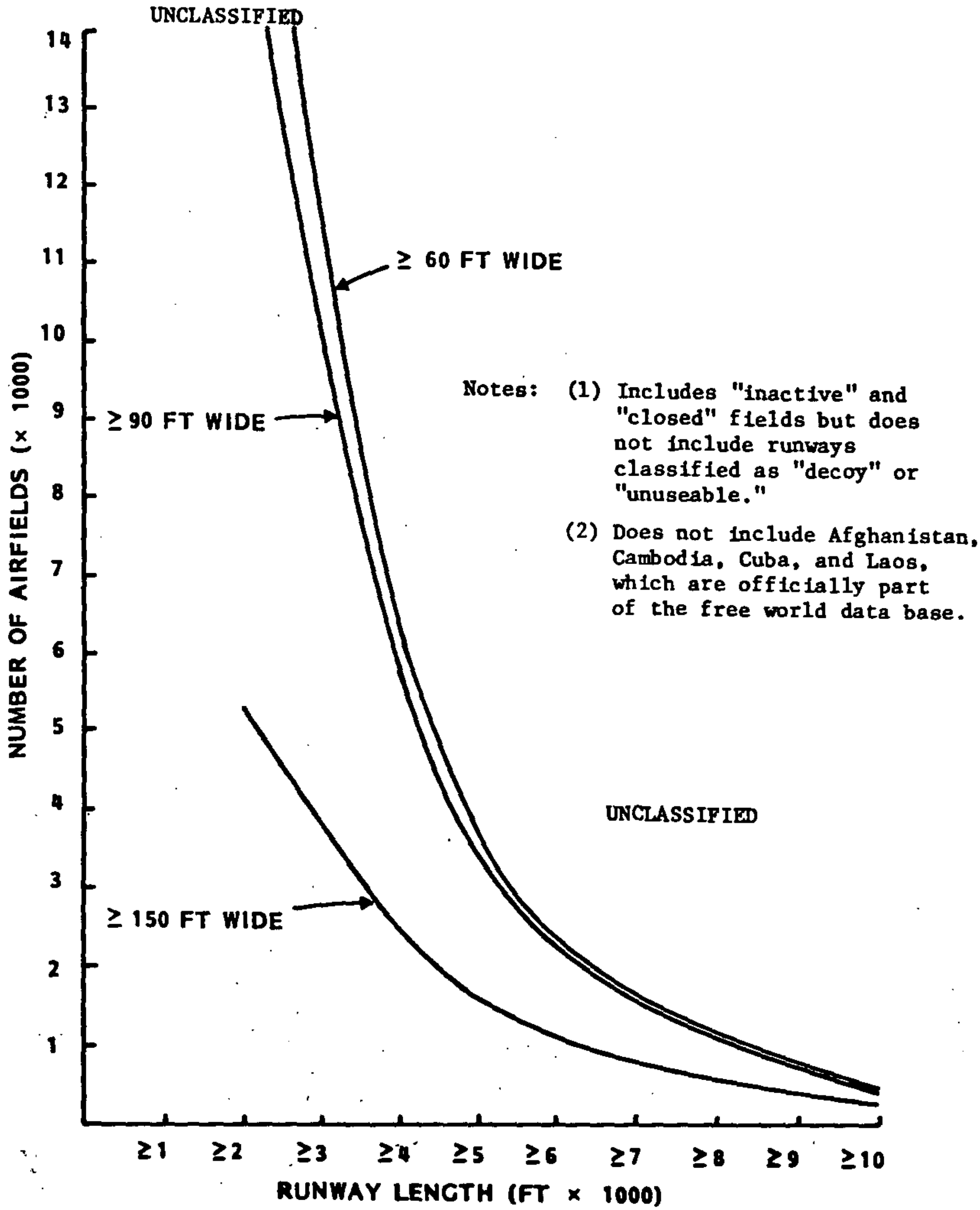
(U) It was not the intent of this analysis to develop an operations plan (OPLAN). It is a mobility study and should be considered in that perspective. Because it is a study, computer peculiar and limited, real world operational problems like weather, equipment breakdowns, human error, etc., were not factored in. If they were, closure times would be even later. Optimistic assumptions were necessary to complete the analysis.

8.6.1 Airfield Analysis

(U) An analysis of available airfields in Saudi Arabia and Iran points to the value of SAAF capability in Scenarios I and II. There are 79 usable airfields in Saudi Arabia. Nineteen are C-5/C-141 capable, however, 69 of the 79 would be capable of supporting a new SAAF outsized airlifter. There are 46 usable airfields in Iran (South of FEBA). Fifteen are C-5/C-141 capable, however, all 46 would be capable of supporting a new SAAF outsized airlifter. (See expanded airfield data in Sections 4.3 and 5.3). While these numbers are substantial, the actual number of available airfields is ultimately determined by their location in relation to the area of operation.

(U) The capability to operate from small, austere fields (SAAF) enhances the flexibility of an airlift force to adapt to congestion, weather, enemy action, and shifts in the destination area. Central to this flexibility is the fact that many more SAAFs exist than major airfields.[1] As shown in Figs. 8.13 and 8.14 the number of available SAAFs is greater by a factor which varies from 3 to over 10 for various regions of the world. On the average therefore austere fields will be closer to any given region where forces might be needed.

[1](U) Those with facilities to handle the C-5, C-141, and CRAF airplanes.



(U) Figure 8.13. (U) Free World Airfields (less US) Cumulative Distribution by Length

UNCLASSIFIED

RUNWAYS LENGTH × WIDTH	AFRICA	CENTRAL EUROPE	SOUTH AMERICA	MIDDLE EAST	FREE WORLD LESS US[2]
≥5000 × ≥150	201	56	157	144	1576
≥5000 × ≥ 90	641	247	535	393	3488
≥4000 × ≥ 90	1059	294	1182	480	5640
≥3000 × ≥ 90	1902	436	2837	586	9887

UNCLASSIFIED

UNCLASSIFIED

UNCLASSIFIED

[1](U) Includes "inactive" and "closed" fields but does not include runways classified as "decoy" or "unuseable."

[2](U) Does not include Afghanistan, Cambodia, Cuba, and Laos which are officially part of the free world data base.

(U) Figure 8.14. (U) Number of Available Runways (Source: DMA Free World Data Base)

265

215

(U) The advantages of an intertheater airlifter with a small, austere airfield (SAAF) capability are threefold: greater probability of finding a place to land in the forward areas (more airfields available), direct delivery and hence reduced delivery times/distance[1] to the battle area (eliminates transshipment) and complication of enemy interdiction efforts.

8.6.2 Airborne Operations

(U) The need for airborne forces to secure selected APODs, SPODs and FOBs by airborne assault was considered but not examined in this analysis. Because of tactical uncertainties, the extended distance from CONUS and the long deployment time, we would likely employ airborne forces to secure arrival areas in advance of deploying forces. Airborne forces do not need secure airfields or ports for introduction of a tailored combined arms force into an area and they provide unique options for location of insertion that no other force does.

8.6.3 Recent Exercises

POSTIVE LEAP 80 - a JCS sponsored worldwide exercise at Fort Bragg, NC 10-15 April 1980,

GALLANT KNIGHT 81 - a JCS coordinated USCINCRED sponsored Command Post exercise conducted at Fort Bragg, NC, 23-30 October 1980, indicated the following:

---

[1](U) In this discussion we focus on the ground transit portion of the intratheater movement. Outsize cargo cannot be carried by C-130s thus it must travel forwad by surface or be delivered directly to forward bases by an austere, field-capable outsize aircraft.

If primary APOD/SPODs are lost because of natural disasters, saturation, or enemy action the distance to the AO increases and the demands on an intratheater airlift become more pronounced. In
Scenario I if becomes the primary APOD/SPOD, the distance to the 2
AO is four times greater than from This requires a road march 2
of more than In Scenario II if 2
Iranian APOD/SPODs are lost and Arabian APOD/SPODs have to be used, the distance to the AO is three and one-half times greater and the Persian Gulf has to be crossed. In both cases more ground transportation units would need to be airlifted into the theater earlier if a new airlifter did not have SAAF capability.

8.6.4 Historical Experience

(U) While this analysis did not address the employment or warfighting phase it would be remiss not to touch on it. For example, resupply at Khe Sanh in 1968 by airland, aerial delivery, and low altitude parachute extraction system (LAPES) permitted several thousand Marines to fend off two enemy divisions for more than 3 months while US offensive airpower decimated the enemy and broke the siege. Of the three intratheater airlifters employed in that campaign, two will soon leave the inventory and the size of Army equipment is growing at a rate that will soon make the third (the C-130) incapable of carrying nearly all Army offensive firepower. During that same year, in response to large scale attacks by the enemy during the Tet offensive, intratheater airlifters repositioned tens of thousands of troops to defeat widespread attacks and routinely delivered, by airdrop and LAPES, thousands of tons of resupply and ammunition to sustain isolated forces. Most often troops were lifted from one small, austere airfield to another--missions the CRAF, C-141, and C-5 are incapable of performing. The successful repulse of the communist attack during January and February 1968 is in large measure the product of the rapid repositioning of US and allied forces.

8.7 CONCLUSIONS

By adding capability to the intertheater lift force, a greater lift demand is placed on the intratheater force. More men and equipment are moved into ports faster but end up moving out slower.

Deployment, employment and resupply sorties will compete simultaneously for limited ramp space at all bases. Rapid expansion of taxiways and parking areas to increase airfield MOGs, could speed up and improve throughput.

This analysis found very serious deficiencies in intratheater capability in both scenarios. The intratheater mobility assets required for the warfighting and sustainability of such a large force in this area of the world warrants and is receiving emphasis.

Forward movement could be enhanced also through earlier delivery of surface transportation assets.

As the Civil Reserve Air Fleet (CRAF) transitions from narrow body to all widebody, intertheater lift capacity will increase. An additional military long range outsized airlifter, not SAAF capable, will further increase this intertheater capacity, allowing some units which formerly moved by sea to be moved by air. All of this increased capacity creates an earlier intratheater lift demand. Furthermore, APODs become saturated faster because large aircraft require more parking space resulting in diversions to APODs farther away from their intended destination. All outsize equipment must currently move by surface means. The longer the distance, the more difficult the problem.

This creates additional strain on limited intratheater assets and magnifies the lack of intratheater outsize lift capability.

(U) A long range, outsized, SAAF capable airlifter provides additional intertheater lift without adding to intratheater lift demand. APOD saturation would be reduced through direct deliveries. It could be used in a shuttle mode providing an intratheater outsize capability that is nonexistent today.

(U) The addition of an airlifter, both outsize and SAAF capable,enhances mobility throughout all phases of the battle. When sealift arrives the demand for intertheater air delivery of outsize cargo is greatly reduced and, conversely, the lift requirement to the forward operating area rapidly increases. The advantage of an airlifter that can transition from intertheater to intratheater roles must be emphasized. When timeliness is of the essence early in the deployment, it could function as an intertheater aircraft and, when responsiveness is critical during the battle, it could serve as an intratheater airlifter. Not only would such an aircraft supplement the present C-130 force, it would provide the outsize capability to forward areas that is non-existent today.

SECTION 9

MOBILITY ENHANCEMENT ALTERNATIVES

9.1 INTRODUCTION

(U) In this section we describe a variety of potential alternatives for mobility enhancement. An evaluation of alternatives and a preferred and alternative program are presented and discussed in Section 10.

9.2 AIRLIFT

9.2.1 General

(U) Airlift is absolutely essential in any contingency because it provides the speed and flexibility needed to deploy and support combat forces. It has significant deterrent value by providing the decision maker the option to quickly respond to unexpected developments worldwide. When early arrival is of the essence, airlift (with the exception of forward deployment) is the only solution. In addition, airlift supports forward deployed forces, fills out and completes prepositioning options, and augments sealift after the sea line of communications is established. A variety of aircraft can be utilized to meet the airlift demands. They must, however, be capable of lifting the complete spectrum of equipment and supplies needed to project and sustain fighting units into all types of destination environments.

(U) Existing airlift capabilities are being improved. For example, C-141 aircraft are being stretched to increase their productivity. An air refueling capability is also being added to reduce its reliance on overflight rights and en route basing. The C-5 wing is being modified to extend its service life by 30,000 hours and permit the aircraft to operate at design gross weights throughout its expected life. Other War Readiness Material (OWRM) spares are being procured to permit the organic fleet to operate at their planned wartime utilization rates. To accommodate the increased delivery capability which higher utilization rates provide, additional reserve aerial port forces, materials handling equipment (MHE), and pallets and nets are also programmed. All additional airlift programs consider the improvements to existing capability currently underway to be complete. These additional airlift programs include the Civil Reserve Air Fleet (CRAF) enhancement, procurement of commercial widebody aircraft or derivatives thereof, and acquisition of a military airlifter (new designs or derivatives of an existing design).

(U) Under the CRAF enhancement program the Air Force is pursuing modification of wide-body passenger aircraft. In addition they are soliciting proposals for the retrofit of existing aircraft and are also evaluating ways to improve incentives for participation in the modification program. If adequate aircraft are volunteered, this is the fastest and cheapest way to provide more bulk and oversize airlift capability.

(U) The second possible program is the acquisition of widebody derivatives (or unmodified) commercial aircraft. To evaluate this program, the Air Force has issued a request for quotation (RFQ) for 10 million ton-miles per day of bulk/oversize airlift to be available as soon as possible. This option could make lift available early because it considers acquisition of aircraft from existing production lines.

(U) The third program is acquisition of an outsize capable military airlifter through the C-X request for proposal (RFP). Derivatives of existing designs and new designs are being considered. This program will determine the long-term costs and value of military lift as well as address a small, austere field capability.

(U) Appropriate solutions for airlift enhancement depend critically on range, payload, refueling, forces to be moved, destination area characteristics, and requirements for airdrop and low altitude parachute extraction. The influence of these factors and some important cost considerations are discussed in general terms herein. Costs shown in Table 9.1 are engineering estimates considered of sufficient quality for understanding of the problem. Refined costs and schedules will become available during the procurement process. Our intent here is to evaluate airlift needs, not choose a specific solution.

9.2.2 Military, Outsize, Austere Airfield Capable

9.2.2.1 General

(U) Two variations of this alternative (C-X) are considered: (1) a derivative of an existing wide-body military airlifter and/or (2) a new intertheater airlifter. One desired feature of the C-X is the ability to operate from small, austere airfields. (An austere airfield is defined as one with runway length and width of 3000-5000 ft and 90 ft, respectively, and with a prepared or semi-prepared surface.) Equally important features are those unique to military aircraft such as a drive-on/off capability, and airdrop/extraction operations. Either the new or derivative aircraft can accommodate the full spectrum of existing and planned combat equipment with a new aircraft having about half the gross weight of a 747 or C-5 but with more than half the payload capability.

9.2.2.2 Development Risk

(U) Development risk for a new airlifter or restart of an existing design is considered minimal. A C-5 restart, for example, would require reopening a line for the TF-39 engine (used only on the C-5) or using an existing commercial engine (this requires a flight test program). A new airlifter would use a commercially available engine and well proven existing transport aircraft technology.

223

(223)

9.2.2.3 Costs and Schedules

(U) It is estimated that a restart of the C-5 could result in first aircraft availability in 44 months from go ahead with appropriate priority and limited modifications. A new airlifter could be available in about 48-54 months depending on the procurement approach and priority. A fleet of new airlifters could cost up to 20-25% more on an acquisition basis but only about 0-10% more on a life-cycle cost basis than a C-5 fleet with equal lift capability. This comparison holds for a range of new airlifter sizes varying in gross weight from 400 to 800 klb.

9.2.2.4 Operational Considerations

(U) Either airlifter (derivative or new) could operate (land and takeoff) on austere airfields. A new airlifter would be designed to maneuver as well on designated runways, taxiways and ramps of austere airfields. This general comparison does not allow for operational judgment considerations (e.g., obstacles, taxiways, ramp area) with respect to operating very large airlifters (e.g., 700-800 klb) into austere airfields.

9.2.3 Commercial, Oversize, Non-Austere Field Capable

9.2.3.1 General

(U) Candidate aircraft considered for this alternative include the full range of commercial aircraft. Emphasis is given, however, to wide-body aircraft since they provide for much more efficient movement of bulk and oversize cargo and some have a limited outsize capability as well.

9.2.3.2 Development Risk

(U) The development risk for this alternative is considered to be very low. Among the candidate aircraft most are in production and readily available.

9.2.3.3 Costs and Schedules

(U) Costs and schedules vary widely depending on the particular aircraft. For example, narrow-body jets currently being replaced by the airlines might be very cheap but not very useful considering that they can carry bulk cargo only. Wide-body aircraft however, are more capable, are in production and could be available in 12-36 months at costs comparable to the current market price.

9.2.3.4 Operational Considerations

(U) There are three principal operational concerns. First, these are limited to usage of main operating bases. While there are more than 1000 such locations in the Free World (less the US) the number of airfields available to austere field capable aircraft is greater than 9000. Second, all commercial aircraft require the use of special handling equipment for loading and unloading. While this equipment is in wide use in the commercial market, additional quantities will be required. In addition, for handling heavy equipment, new loaders would be required. Third, commercial aircraft are not designed to accomplish operations which are militarily unique. These operations include drive-on/off vehicles (requires low cargo floor height), airdrop of personnel and equipment, and parachute extraction of equipment.

9.3 SEALIFT

9.3.1 General

(U) In any contingency involving the commitment of major combat forces, up to 90% of all unit equipment, ammunition and resupply, and virtually all POL will be moved by sealift. In the most likely scenarios current sealift capability is able to satisfy the total lift demand within 40 to 50 days after C-day. Sealift can make a significant contribution to overcoming the lift shortfall which occurs during the early days (15-25) of a contingency through increased availability of fast, properly configured, high capacity ships. This can be achieved by improving existing capability and by acquiring additional capability.

(U) Improvements to existing capability are achieved primarily through buying or chartering new or existing ships and maintaining them in a high state of readiness at or near designated SPOEs or prepositioning such ships, with unit equipment, ammunition and supplies embarked, near potential trouble spots. Existing capability can be further improved through modification of existing ships to enhance their military capacity and productivity.

(U) Additional capability can also be provided through new construction of dedicated strategic sealift vessels. Such new construction should logically focus on the types of ships which can offer the greatest potential contribution during the early days of a contingency.

9.3.2 Improvements to Existing Capability

(U) Existing ships purchased or chartered for employment as dedicated strategic sealift or for maritime prepositioning should, whenever possible, be high capacity, high productivity ships optimized for this mission. Existing Roll-on/Roll-off (RO/RO), Lighter Aboard Ship (LASH), and Sea Barge (SEABEE) ships offer significant potential contributions in this area. Existing ships in other configurations can be modified to enhance their military productivity.

9.3.2.1 Program Description for Acquisition of Existing Ships

(U) Of the existing RO/RO ships, the Maine class is typical and is already making a significant contribution to the Near-Term Prepositioning Ship (NTPS) program. The general characteristics of the Maine class RO/RO are:

Cargo Capacity	13,500 tons[1]
Cargo Area Bulk	152,000 sq ft
POL Storage	212,000 gal
Range Maximum	12,200 n mi
Speed	24 knots

(U) Existing LASH and SEABEE ships also offer significant potential contributions to enhancing the availability of early sealift. These ships, which are particularly well suited to military cargo and operations in undeveloped ports, have not proven as successful on world trade routes as envisioned at the time of their construction. Several are potentially available and could be purchased or chartered and converted to use in either maritime prepositioning or strategic sealift applications with minimal modification.

The ships offer an added dimension when used in the prepositioning role. Additional sets of lighters or barges can be obtained, loaded with ammunition and supplies and prepositioned. The ship could then discharge its initial load of barges in the area of operations, return to the prepositioning port, load another set of barges and carry them to their required destination. The cost of maintaining the lighters or barges at their prepositioning location should be substantially lower than the cost of maintaining ships of equivalent capacity.

(U) The general characteristics of a typical LASH ship are:

Cargo Capacity	29,500 tons[1]
Cargo Area	156,000 sq ft
Maximum Speed	23 knots KTS
Range	9,500 n mi

[1](U) Detailed loading, in general achieves 50-70% of this capacity as a function of material density and space utilization.

(U) Another existing ship class which could be productively employed as a dedicated strategic sealift or maritime prepositioning ship is the SEABEE Barge Carrier. Plans to purchase one such ship have recently been added to the FY 81 DoD program. Like the LASH, the SEABEE can embark and discharge preloaded barges and lighters capable of carrying large amounts of outsize unit equipment, ammunition and supplies. The barges themselves can be dehumidified and are available in various configurations such as RO/RO, container, and bulk cargo.

Another unique capability of the SEABEE class barge carrier is the ability to embark and transport certain DeLong Pier sections. SEABEE type ships can also carry additional cargo, such as a warping tug and lighters. Pier sections could be rapidly deployed to the desired objective area and greatly decrease the dependence of ships upon the availability of a developed port facility. As with the LASH concept discussed above, additional sets of barges could be procured and prepositioned, thus multiplying the capability of this versatile ship in a very cost effective way.

(U) The general characteristics of a SEABEE Barge Carrier are:

Cargo Capacity	35,000 tons[1]
Cargo Area	Varies with barge configuration
Speed	20 knots
Range	9,500 n mi

Purchase or charter of ships such as those discussed above should be undertaken whenever they are available on the market. Such ships are generally available at what amounts to bargain prices (especially when compared with the costs of new construction) and if

[1](U) Detailed loading, in general achieves 50-70% of this capacity as a function of material density and space utilization.

they can be immediately pressed into service in support of DoD peacetime sealift requirements or maritime prepositioning, they will make a cost effective addition to the strategic sealift force when maintained in a reduced operating status at or near the SPOE where they will be employed in a contingency. It is important to note, however, that ships of this type are available only in limited numbers. Aside from the obvious limitation this fact imposes on our ability to improve sealift capacity through acquisition of such ships, it also emphasizes the possibility that when DoD does not buy these ships they can be lost to the sealift force altogether through sale to a foreign buyer.

9.3.2.2 Program Description for Modification of Existing Ships

(U) Ships acquired or owned by the government can be modified to enhance their compatability with military cargo (primarily unit equipment), their capability to load and unload rapidly (and possibly in an undeveloped port), their survivability, communication capability, and if required their abililty to safely store equipment, ammunition and supplies for long periods while prepositioned.

(U) The current SL-7 program provides an excellent example of a program involving acquisition and conversion of existing ships. This program, which envisions the conversion of eight high-speed, high-capacity, container ships to a RO/RO configuration and maintenance of these ships in a reduced operating status near designated SPOEs, demonstrates the significant impact that a single program of this limited magnitude can have on increasing strategic sealift capability during the early days of a contingency.

(U) The general characteristics of a converted SL-7 are:

Cargo Capacity	27,000 tons[1]
Cargo Area	193,000 sq ft
Bulk POL Storage	1,030,000 gal
Range	6000 - 9500 n mi[2]
Maximum Speed	33 knots

(U) The current Maritime Prespositioning Ship (MPS) program also includes provisions for acquisition and conversion to full military usefulness of six ships which will be used in conjunction with an equal number of new construction ships to preposition the unit equipment and first 30 days supplies for three separate Marine Amphibious Brigades. The MPS will have the capability to offload over the beach.

Another possible sealift enhancement can be achieved through modification of existing government owned vessels. A typical program of this type is represented by the CVS Military Equipment Transport Ship (CVS-METS). This program envisions modification of decomissioned CVSs, of which six are in the inactive ship maintenance facility, into RO/RO ships for transport of unit equipment. The ships are available; the reconfiguration costs are relatively low compared to new ship acquisition; once reconfigured such ships would have significant useful military lift capacity.

Typical characteristics for CVS-METS are:

Cargo Capacity	16,600 tons[1]
Cargo Area	131,579 sq ft
Maximum Speed	21 knots
Range	10,000 n mi

---

[1](U) Detailed loading, in general achieves 50-70% of this capacity as a function of material density and space utilization.

[2](U) Range is a function of speed and type fuel used. Higher speed = shorter range. Diesel fuel, marine yields less range than Bunker C fuel.

(U) Another program which can be usefully considered in conjunction with modification of existing ships is the concept of using SEA SHEDS and flatracks to enhance the military usefulness of container ships. The SEA SHED is an open top container, approximately 40'x25'x12' in size with a work-through retractable floor. The flatrack is an open-top container that can be used in combination with the SEA SHED. Flatracks and SEA SHEDs can generally handle outsize military cargo. Onload/offload is accomplished in breakbulk/container ship fashion. Both flatracks and SEA SHED have been designed to fit within standard container hold cell guides.

(U) Also in the context of improving the capability of existing ships, programs which offer the potential of improving the capability of standard configuration merchant ships--particularly container ships--to discharge cargo over the shore or at unimproved port facilities should be fully examined. One promising system is the elevated causeway. In comparison with other ship-to-shore systems, it is less affected by sea state and is more efficient in that it premits direct and rapid roll-off operation. The greatest drawback in such systems is that they require additional shipping for deployment as well as time and manpower to install.

9.3.3 Additions to Existing Capability

(U) The second major means of increasing current capability is through provision of additional ships by new construction. New construction ships should logically be the type of high productivity, high capacity ships which can contribute most efficiently to improving total lift capacity during the early days of a contingency. Such ships should also be suitable for maintenance in reduced operational status or for prepositioning afloat.

(U) New construction will also be required to make improvements to existing capability in areas where there are no existing ships which can be acquired and converted to effectively satisfy military requirements. Examples of such requirements include additional amphibious shipping and very fast sealift vehicles like the surface effects ship (SES).

(U) Additional capability can also be added to the sealift force by programs which encourage civilian shippers to construct militarily useful ships. One possible incentive program could include a DoD guarantee for charter of these ships for some specified period.

(U) A certain amount of new construction can be justified not only on the basis of unique requirements which cannot be met by charter or purchase and conversion of existing ships, but with a view toward the increasing average age of the current sealift force--particularly the NDRF. Many of today's new construction ships will make up the NDRF 30 years from now. If regular new construction programs are not undertaken, the problem of block obsolesence will arise, confronting us with a potential sealift shortfall which cannot be overcome by any reasonably forseeable surge program.

9.3.3.1 Program Description for New Construction of Amphibious Ships

The scenarios presented in this study demonstrate a requirement for additional amphibious lift capability for the deployment of Marine Forces over the next decade. The current active lift force is sized to move 1 MAF assault echelon. Estimates of the minimum requirement range from 1.33 to 1.66 MAF total active amphibious lift capability. A representative new construction amphibious ship program which would provide about 1.5 MAF capability when combined with existing ships looks like this:

FY82	FY84	FY85	FY86	FY87	FY88	FY89
LSD41	LSD41	LSD41	LSD41	LHDX	LHDX	LHDX
LSD41	LSD41	LSD41				
LHA		LHDX				

232

232

This program would also require service life extension of the LPD-4 class ships, and procurement of additional landing craft and assault support helicopters for use aboard these ships.

9.3.3.2 Program Description for New Construction Strategic Sealift Ships

(U) New construction will be undertaken to support the MPS program. Additional strategic sealift ships could be acquired through new construction. This study examines two hypothetical conventional ship construction programs: an equivalent of a Maine class RO/RO and an equivalent of a RO/RO converted SL-7. Neither of these programs presently exist, however, they serve to illustrate the potential contribution of new construction to enhancement of the strategic sealift force.

9.3.3.3 Program Description for Very Fast Sealift

(U) Fast sealift is currently limited to that achievable with conventional ships such as the SL-7. To achieve faster speeds requires an unconventional approach as embodied in the surface effect ship (SES). Current SES designs have evolved from about 15 years of design and testing to establish a technology base.

(U) With the current state of the art, ship designs of 3000-7000 tons cargo capacity with speeds of 30-70 knots appear to be technologically achievable. Development risks reside in the upgrading and subsequent integration of current technologies extant in small test vehicles/platforms to a large ocean-going vehicle. Risks are low to moderate in structures, engines, power transmission, skirts and seals. To further assess these risks, a joint Navy/Coast Guard initiative was begun in September 1980. This initiative includes acquisition and testing of an existing 200 ton SES constructed by Bell-Halter. During 1982-83, the Navy will test this vessel to further assess SES suitability for a medium displacement combatant and/or as a fast logistics ship.

(U) An additional interim step will be required before a full-scale SES combatant or fast logistics ship is built. The Navy is considering construction of a low technology, 1000 ton displacement SES prototype. Lead ship construction may be as early as FY-84. A prototype of this size is needed to verify the military and open ocean effectiveness of SES.

(U) Current estimates of the procurement cost for a 1000 ton prototype fast logistics SES (1/4 scale) range from $100M to $200M. Operation and support costs would likely approximate those for conventional ships retained in a reduced operating status. It is estimated that about $150M of additional development funds will be required prior to production of a full-scale fast logistics SES. Estimates of acquisition costs for a representative 14 ship fleet range from $3B to $4B.

(U) Construction of the lead ship would require about 3 to 4 years following approval of the program. Follow-on units would require about 2.5 years to build. Thus, allowing for simultaneous construction at two units at each of two yards, it would take about 6 or 7 years to build 14 such ships.

(U) The potential contribution of the SES is demonstrated in the analysis conducted during this study. If the prototeyp proves effective, the SES can offer a significant enhancement to the US strategic mobility force. The SES particularly contributes to filling the gap between the early deliveries via airlift and the bulk deliveries which arrive later via conventional sealift.

9.4 PREPOSITIONING

9.4.1 Background

(U) All scenarios contain large quantities of materiel required during the early deployment period that is suitable for prepositioning. An example has been highlighted in Scenario III for support forces that the Army considers necessary in addition to negotiated HNS during the early reinforcement period. The 22K support slice is required in addition to existing and planned HNS. This support cannot be offset by HNS since it comprises maintenance and combat support such as engineers, artillery and medical. These forces are not included in the Defense Program for prepositioning. For consistency with other alternatives this package is normalized to 100,000 tons. In addition to the above support force requirements, this alternative includes the following Persion Gulf subalternatives: (1) prepositioned units (land or sea-based) and (2) prepositioned resupply and ammunition (land and sea-based) for the first 30 days of conflict.

9.4.2 Costs and Schedules

(U) Equipment for prepositioning cannot be simply bought "off-the-shelf." It should be procured in light of other service programs. Estimates shown in Table 9.1 do not reflect these considerations. Rather, they assume that the needed materiel could be procured specifically for the designated program, bypassing potential higher priority claimants for those resources. Construction costs are included although some might be made available through alliance or host nation funding. Resupply and ammunition programs require additional resources beyond those currently programmed for the RDF, i.e., where ammunition is already being procured, costs represent the increment to preposisition.

9.4.3 Operational Considerations

(U) Prepositioning of land-based support forces is based on the assumption that no additional host nation support (manpower and materiel) is forthcoming in NATO beyond current projections. It assumes that host countries will provide real estate (approximately equal to the number of current sites in CENTAG).

(U) Sea-based and land-based programs are identified for the Persian Gulf region. Recognizing the difficulty in predicting where conflict might occur, land-based prepositioning could result in requirements for very substantial intratheater transportation. Similarly, sea-based prepositioning should be approached cautiously since it could constitute a large concentration of ships, difficulties may be encountered in obtaining sufficient offload port facilities, and substantial intratheater lift may be required.

9.5. LIGHTWEIGHT ARMOR

9.5.1 General

(U) While not strictly a mobility alternative, the provision of lighter equipment to selected Army units could increase our overall capability to respond by reducing heavy lift requirements. Conversely, if new lightweight armor is added to some of our present light forces, the addition could increase the movement demands shown for Scenarios I and II. Our current mobility requirements, especially for airlift, are strongly influenced by a concentration (40% to 60% of the total weight of mechanized and armored units) in heavy outsized equipment such as tanks, fighting vehicles and self-propelled artillery. Mechanized units are essential to better counter the threat but can only be airlifted by the C-5. Thus, we are severely constrained today in cases where these heavier units cannot be either prepositioned or deployed in a timely fashion via sealift.

(U) For the foreseeable future, the global interests and responsibilities of the United States require that its military forces be capable of operating in a multitude of geographical areas, under varying conditions, and against Third World indigenous forces, Soviet military power, or a combination of both at various levels of intensity. Primarily because of developments in the Persian Gulf, there is emphasis on improving the capability of transporting both US Army and Marine Corps units to distant areas in the shortest possible time and on obtaining new technology to improve their combat effectiveness after commitment. Development of lightweight armored vehicles for potential introduction into selected Army and Marine Corps units is a specific area which is receiving attention.

(U) The Army does not plan to replace heavier vehicles with lightweight armored vehicles in its heavy divisions. Army heavy divisions are structured and equipped to provide the lethality and survivability necessary to cope with the Soviet threat on the modern battlefield. Lightweight armored vehicles will be incorporated into some Army divisions to optimize their effectiveness in terms of firepower, mobility, survivability and strategic mobility.

9.5.2 Implications

(U) Introduction of lighter armored vehicles in some Army divisions and Marine Corps units will have a definite impact on US flexibility and capability for the timely employment of military strength into areas outside the European continent. However, a more fundamental consideration is the combat effectiveness for this type of operation, considering the implications of lightweight armor on killing power, survivability, and logistics. Effectiveness and survivability on the battlefield are the primary considerations.

(U) Light armored vehicles will provide logistic advantages over heavier tracked vehicles. These include fuel, ammunition, tracks, spare parts, and the transportation assets to move these critical items of supply to areas desired. There will be more crews, but perhaps fewer men per crew.

(U) Another significant implication of lighter weight armor is the increased capability of quickly moving a larger number of vehicles, when required, to meet contingency situations throughout the world. If the effectiveness of a lightweight vehicle is a substantial fraction of that of a present-technology main battle tank, trade-offs may favor the lightweight version for certain contingency operations. However, a favorable trade-off does not augur a lighter weight Army/Marine Corps.

Lift requirements overall might well increase. What the introduction of lightweight armor does promise is the potential to introduce more firepower earlier at the site of a contingency. However since the full capabilities of the lightweight vehicles have yet to be determined by actual tests on the range and in the field, no in-depth comparative analyses are available concerning the combat effectiveness of these lighter vehicles.

(U) To draw conclusions about the effectiveness or employment doctrine of the lightweight vehicles being developed in the Armored Combat Vehicle Technology (ACVT) Program would be premature. Many experienced armored officers, both US Army and Marine Corps, are skeptical of the survivability of lightly armored vehicles in battles such as those of the 1973 war in the Middle East. Additional test and analysis are required.

9.5.3 Current Status

(U) The Department of Defense Armored Combat Vehicle Technology (ACVT) Program will yield data to the Army and Marine Corps to assist in formulating courses of action for the development of future combat systems for common usage. The US Army, with its Training and Doctrine Command (TRADOC) and Materiel Development and Readiness Command (DARCOM), and the US Marine Corps are partners in this endeavor. There are currently no plans for quantity production of vehicles developed under this program. Vigorous technology programs are underway, however.

(U) The High-Survivability Test Vehicle-Lightweight (HSTV-L) is currently being evaluated under this program. Using this test bed, a high mobility/agility and a 75-mm smoothbore automatic cannon--automatic loader combination--are being examined. HSTV-L testing is exploring the ability of two- and three-man crews to perform their duties in a variety of environments, examining the contribution to target servicing of hunter-killer fire control systems, and gathering engineering data peculiar to a vehicle in the 16-20 ton category. Engineering tests were initiated at Aberdeen during May 1980. Upon completion in early August, the HSTV-L was moved to Fort Knox for operational performance testing.

(U) The ACVT program is using the data generated by the HSTV-L tests along with other testing and experimentation to determine the characteristics of vehicles desired in the field during late 1980s.

(U) In addition to the potential introduction of lightweight armor into selected Army and Marine Corps units, the Army has been active in developing two new fighting vehicles for combined arms teams. The XM-2 (IFV) will enable the infantry to work closely with units equipped with XM-1 tanks and the XM-3 (CFV) will provide armored cavalry units with the mobility and firepower needed to accomplish reconnaissance and security missions. Air transportable weight for these vehicles is 20.5 tons. The XM-2 and -3 chassis, at the same or less weight, might be used for derivative vehicles such as forward support vehicles or multiple launch rocket systems.

9.5.4 Prognosis for Introduction

(U) The most significant new development is the possible introduction of a mobile protected gun and mobile protected weapons system into some Army divisions and Marine Corps units. During 1980 the Secretary of Defense directed the Army and Marine Corps to procure lightweight armored vehicles for their respective rapid deployment forces. The Army plans to use the 9th Infantry Division as a "High Technology Light Division" to further evaluate light armor.

(U) The Marine Corps has programmed $617 million for the RDT&E, procurement, and initial provisioning of 742 Light Armored Vehicles (LAVs). The vehicles will be configured for a variety of missions to include direct fire support, command and control, anti-tank, anti-air, engineering support and tactical mobility, among others. Existing production line models, modified to satisfy the specific design requirements, will be used in order to meet an IOC of 1983. The LAV will be transportable by the CH-53E helicopter, thereby limiting its weight to the 14-16 ton range.

9.6. COST DATA

(U) Table 9.1 provides a summary of cost data for the mobility enhancement alternatives discussed above. For aircraft options the unit of capability is millions of ton-miles per day while the measure for prepositioning and for sealift is 100,000 tons of capability for each sub-option.

TABLE 9.1 (U)

INCREMENTAL MOBILITY PROGRAM ALTERNATIVES COST DATA[1]

	Costs (Billions of 1982 Dollars)			
	R&D	Proc	20 Yr O&S	20 Yr LCC
AIRLIFT				
Outsize, Austere Airfield Capable[2]				
10 MTM/D	0.5-1.3	6.3-6.5	8.0-10.4	14.8-18.2
15 MTM/D	0.5-1.3	8.7-9.3	11.9-15.6	21.1-26.2
20 MTM/D	0.5-1.3	11.0-11.6	15.9-20.9	27.4-33.8
25 MTM/D	0.5-1.3	13.3-14.3	20.0-26.1	33.7-41.7
Oversize, Main Airbase Capable[3]				
10 MTM/D	0-0.5	4.8-5.8	8.4-9.8	13.7-16.1
15 MTM/D	0-0.5	6.5-7.4	12.9-14.2	19.4-22.1
20 MTM/D	0-0.5	8.9-9.9	17.3-18.9	26.2-29.3
PREPOSITIONING[4]				
Land-Based Prepositioning of Unit Equipment (100K tons)	0	1.1-1.3	0.4-0.5	1.5-1.8
Maritime Prepositioning of Unit Equipment (100K tons)	0	1.1-3.6	3.3-2.1	4.4-5.7
Land-Based Prepositioning of Resupply and Ammo (100K tons)	0	0.6-0.7	0.4-0.5	1.0-1.2
Maritime Prepositioning of Resupply and Ammo (100K tons)	0	1.2-1.3	1.3-1.4	2.5-2.7
SEALIFT[5]				
Very Fast Ships (100K tons)	0.5	3.5-9.9	5.6-13.2	9.6-23.6
Dedicated Fast RO/RO Ships (100K tons)	0	1.4-1.6	1.1-1.2	2.5-2.8
Dedicated RO/RO Ships (100K tons)	0	0-2.3	2.9-1.7	2.9-4.0

[1]Except for an austere field capable airlifter, costs do not reflect intratheater movements from APOD/SPOD or prepositioning locations.
[2]The cost depends on whether a new design or a derivative is chosen.
[3]The cost depends on which particular aircraft is procured.
[4]The procurement cost depends on what type of units are prepositioned. Inaddition, total cost for maritime-based alternatives depends on the type of ship used--existing, modified, or new--and whether chartered or operated by MSC.
[5]The cost depends on what particular ship is selected in each category.

241

UNCLASSIFIED

SECTION 10
EVALUATION OF ALTERNATIVES

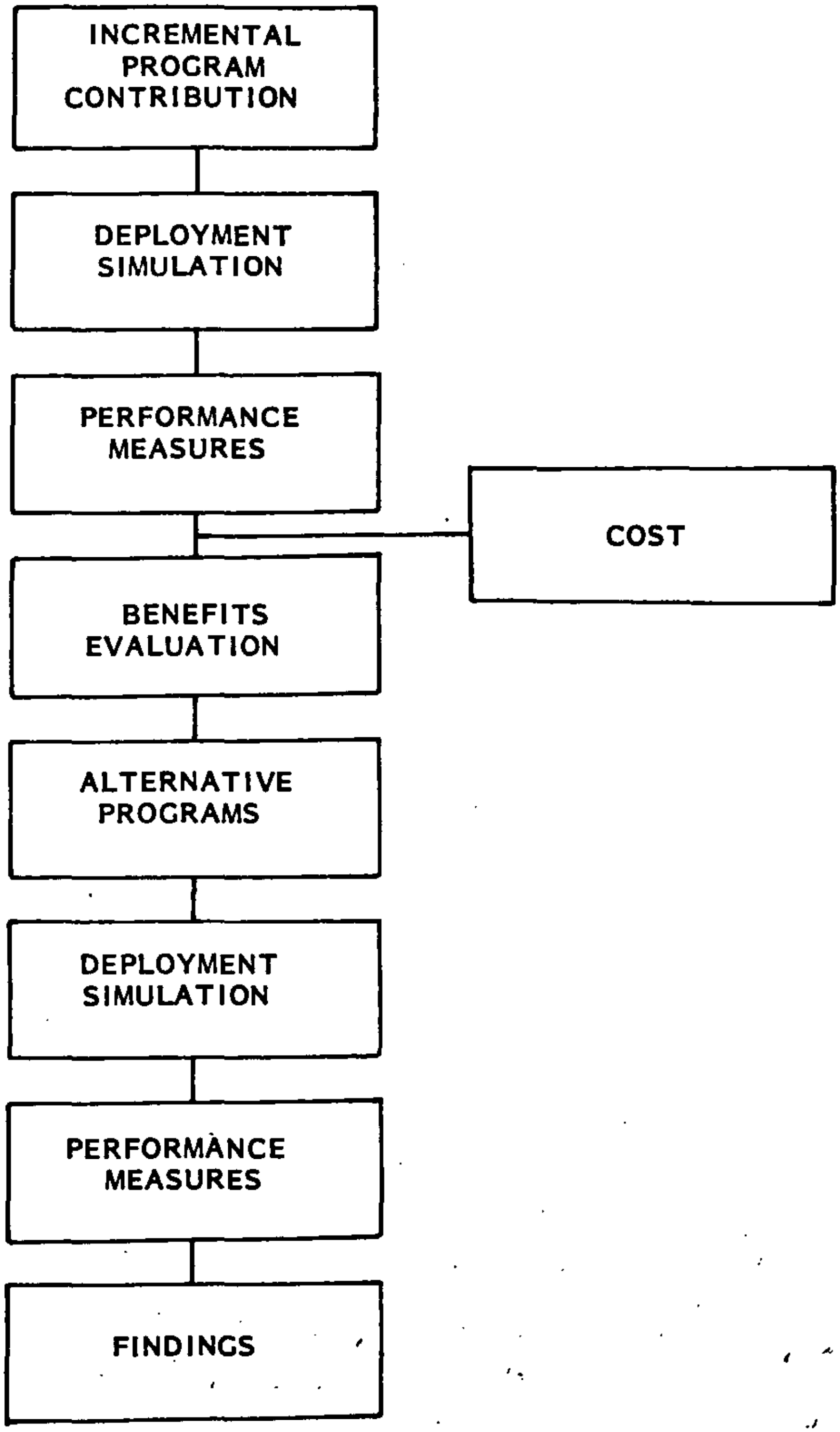
10.1 INTRODUCTION

(U) The development and evaluation of alternative programs builds on the assessment of base line lift demand and capability for each scenario. The effectiveness of the base line force was evaluated through computer simulation of the deployment of forces over time, where each unit is described in terms of tons of equipment and cargo. The difference in cumulative tonnage between lift demand and capability (or the failure of units to meet their RDDs) represents a shortfall. It is against these scenario shortfalls that alternative programs were evaluated.

(U) The study evaluated a number of airlift, sealift, and prepositioning systems. The approach to evaluation is depicted in Fig. 10.1. The first step was to evaluate the contribution of each system in each scenario. The reduction each would make in scenario shortfalls, when added to the base line force, was computed; costs were estimated; and other relevant factors were considered. Based on this information, systems were then combined into programs, and the shortfall reductions each program would make were computed and evaluated. The result of this process is a preferred and an alternative program. Programs are designed to produce a mobility capability that is balanced and cost effective to support US strategies for force projection as defined in study scenarios.

10.2 MEASURES OF EFFECTIVENESS

(U) The evaluation used three performance measures in conjunction with cost to assess the value of programs. The first is a comparison of the cumulative tonnage lift demand and capability. This comparison provides a simple, though somewhat limited, measure of program contributions. The second is comparison of required and actual unit closures.



(U) Figure 10.1. (U) Evaluation Approach

This provides more visibility into what is occurring within the mobility system than simple aggregated tonnages. Both these measures were presented in graphic form in the "Movement Analysis" portions of Sections 4 through 7. The third measure is a weighted measure of effectiveness which considers the value of time and timeliness in force closures.

(U) A major problem with the first measure is that it gives equal credit to a program that makes a reduction early and one that makes a similar reduction later, as long as they make equal sized reductions in shortfall. The second measure does not permit an easy comparison of alternative programs. As was noted in the scenario descriptions, however, the timely arrival of forces may preclude the need to deploy many more forces later to force entry and recover lost territory, and may prevent or limit damage to the territory and population we wish to defend. Conversely, if we are unable to deliver a division (or fighter squadron or the like) when it is needed to stop or deter a threat, we may have to change our strategy. To include the value of timely closure, this study uses a third measure of effectiveness that assigns greatest value to systems that provide early and timely force closure. The following paragraphs provide the fundamentals of how this measure is computed and its practical application with output products presented in earlier sections. The theoretical basis for this weighted function is explained in Appendix F.

10.3 DEVELOPMENT OF THE WEIGHTED SHORTFALL MEASURE OF EFFECTIVENESS (VALUE OF TIME AND TIMELINESS)

(U) Lift demand is derived from time-phased unit deployment schedules and estimates of consumption rates for ammunition and other supplies. Sequencing of units is designed to successfully achieve scenario objectives based on military judgment and war gaming. Review of the time-phased deployment sequence reveals the following general priority:

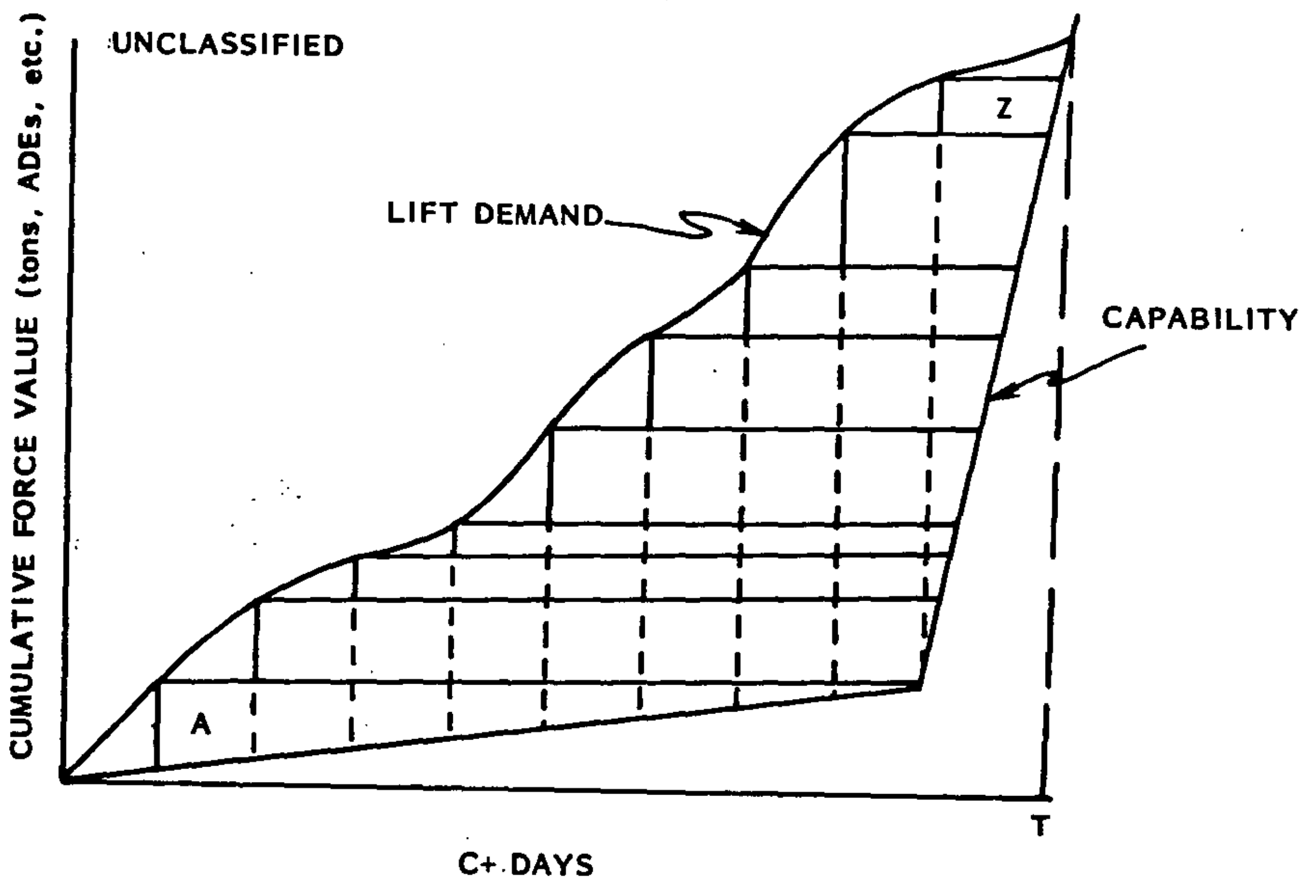
245

Tactical Air Forces (Air Force, Navy, Marine)
    Accompanying support
    Accompanying ammunition and resupply
Ground Forces (including Marine)
    Minimal amounts of accompanying support
    Accompanying ammunition and resupply
Sustaining support forces
Sustaining ammunition and resupply

(U) For the scenarios used in this study, required delivery dates and resultant tonnage movement demand curves are structured to preclude significant loss of territory. If each component is assumed essential to prosecute the straegy at the time it is required, then failure to meet the lift demand may result in a failure in strategy.

(U) If we accept the premise that we can probably hold ground with a force equal to about half of the attacker's, but will probably lose ground if our force is less than one-third of his, then it follows that the longer a shortfall of capability from demand persists (and the larger this shortfall is), the more likely it is that we will be forced to give up ground. Thus, a return to the original demand curve will no longer be adequate. If this is true, then there is greater value in reducing a shortfall that has existed only a short time than in making an equal length reduction in a shortfall of the same magnitude that has existed for a longer time. Similarly, there is greater value in eliminating or reducing a shortfall that occurs early than in eliminating or making an equivalent reduction in a shortfall of equal magnitude that occurs several days later.

(U) These ideas are illustrated in Fig. 10.2, which shows hypothetical demand and capability curves with a shortfall between them. The shortfall has been divided into boxes by day and by the incremental shortfall each day. If the ideas above are true, then the greatest value should be assigned to eliminating the shortfall in box "A", and



(U) Figure 10.2. (U) Relative Force Component Value

value should decline as one moves to the right and up, with the least value assigned to eliminating the shortfall in box "Z".

(U) If each box in the shortfall is assigned a value and these values are summed, the result might be called the "weighted shortfall." This measure of effectiveness (MOE) for programs used in this study is the reduction they make in the weighted shortfall under the 1986 base line DoD program. (This is computed by subtracting the weighted shortfall for each program from the weighted shortfall with the base line program).

If classic attack-defense force ratios are applied in Scenario I, failure to meet the schedule for the approximate divisions required in the first days to face enemy divisions could require a division force to drive the enemy out at a later time. In Scenario II, the approximate division force required to face as many as Soviet divisions after days, could presumably have to be expanded to about divisions (nearly 6 times the amount of force we planned to deploy) to retake Southern Iran if it were lost. These forces are far beyond what the United States will have available during peacetime. The expense to recruit, train, equip, and maintain such forces would be large (20 year life cycle cost for a fully supported mechanized division is approximately $50 billion!). The tradeoff would weigh heavily in favor of additional mobility capability. Both the actual expense and the American disposition favor a relatively small, highly trained force which can be moved rapidly to any trouble spot in the world. 3+4

(U) The weighted shortfall measure of effectiveness provides a useful tool for structuring alternative programs. However, it alone is insufficient to provide all the necessary insights into the potential contribution of such programs. Therefore, once an alternative was developed, it was tested through computer simulation on each scenario with results portrayed in terms of both reduction in shortfall and improvement in unit closures.

10.4 DESCRIPTION OF ALTERNATIVES

(U) The study examined incremental system alternatives for the three mobility modes: airlift, prepositioning, and sealift. For each mode, a set of programs were developed, with each program structured at several levels of capability. Airlift capability has been normalized to million-ton-miles/day (MTM/D)(e.g., 44 C-5s provide 10 MTM/D of capacity). Sealift and prepositioning programs are expressed in terms of tons of materiel that can be carried in a single trip (e.g., 12 Maine Class RO/ROs have a payload of approximately 100K tons), or tons of materiel prepositioned. Incremental system alternatives for each mobility mode are described below.

10.4.1 Airlift

(U) Aircraft capable of carying the full range of equipment with and without austere airfield capability. This could be a new design or a derivative of an existing aircraft. Increments of capability from 10 MTM/D to 25 MTM/D were examined.

(U) Aircraft capable of carrying only oversized and bulk cargo and operating from major airfields. This type of airlift could be obtained by CRAF Enhancement, purchase of KC-10s for their cargo capability, and purchase or lease of a variety of commercial cargo aircraft. Increments of capability from 10 MTM/D to 20 MTM/D were examined.

(U) The study included a limited evaluation of the value of providing tanker support to airlift aircraft. Aerial refueling increases payload in some cases and decreases cycle time by eliminating en route stops. In this study, en route basing and overflight rights were assumed to be available in all allied or normally friendly nations. (All scenarios involve major threats to Persian Gulf oil or NATO.) Cycle time reductions through refueling provided only a 3 to 5% increase in productivity. Payload improvement ranged from 0 to 37% depending on the type of unit and aircraft. The high payload improvement is associated with movement of armored/mechanized forces. However, in the study scenarios, the types of units deployed by air were those with payloads usually constrained by floor space. Thus, refueling provided little improvement. Because improvements were so small, no tanker alternative is included. On the other hand, other studies, with scenarios involving base and overflight right denials and the delivery of heavier forces earlier, have demonstrated greater benefits. In addition, this study did not exmaine tanker support for self-deploying fighter aircraft--benefits of which have been amply demonstrated in other studies.

10.4.2 Prepositioning

(U) For each prepositioning generic alternative, 100K tons was used as the base program in Southwest Asia for Scenarios I, II, and IV, and in Europe for Scenario III. Increments above or below this value were tested when composing final programs.

(U) Land-based prepositioning of unit equipment

(U) Maritime prepositioning of unit equipment in ships similar to those being acquired for the existing MPS program.

(U) Land-based prepositioning of resupply and ammunition.

(U) Maritime prepositioning of resupply and ammunition

10.4.2.1 Sealift

(U) Very fast sealift of the sort that might be provided by surface effects ships. Two versions were examined: one with a payload of 3K tons and a speed of 65 knots full or empty and one with a payload of 7K tons and a speed of 35 knots full or 50 knots empty. In each case sufficient ships were considered to move 100K tons per trip.

(U) Dedicated fast sealift of the sort provided by the SL-7 (enough ships to move 100K tons per trip).

250

250

(U) Dedicated RO/RO ships (enough to move 100K tons per trip).

10.4.3 Weighted Shortfall Reductions

(U) Table 10.1 shows the weighted shortfall reductions, by scenario, that can be attributed to each of the individual systems examined when they are added to the 1986 base line force. All values are scenario dependent, being affected by features of the scenario such as warning time and sequencing priority. Prepositioning programs are particularly sensitive to the amount of airlift available and priority afforded the residual cargo for airlift. For example, if a unit with prepositioned equipment were accorded higher priority (i.e., shifted to earlier RDD or allocated airlift out of sequence), the prepositioned cargo would be "closed" earlier and a higher value would result for the measure of effectiveness. However, tactical feasibility may preclude this. In the table, a range is shown for prepositioning programs. The upper value assumes that sufficient airlift is allocated to move residual cargoes by their RDD; the lower value assumes that residual cargo must wait its turn in the established priority sequence. (This is only true for prepositioning programs with unit equipment; resupply and ammunition has no residual cargo.) Other programs are less sensitive, but effectiveness may vary if systems compete for the movement of materiel. The table also shows the estimated cost to procure each system and operate it for 20 years.

10.5 APPLICATION OF THE WEIGHTED SHORTFALL MEASURE OF EFFECTIVENESS

(U) The weighted measure of effectiveness permits comparison of a wide range of programs on a common scale and is useful in structuring composite programs, but we cannot merely find the system that makes the largest reduction per dollar and buy enough of it to eliminate the shortfall. For example, attempts to satisfy all the shortfalls with a program that doesn't deliver early make little sense (e.g., no matter how much "fast sealift" we buy, we can't satisfy the shortfalls at C+10). On the other hand, attempts to satisfy all the shortfalls with a program that produces early deliveries may be not only unaffordable but also infeasible due to operational limitations. (For example,

TABLE 10.1 (U)

INCREMENTAL MOBILITY PROGRAM ALTERNATIVES COST AND CAPABILITY DATA (U)[1]

	Cost (82 $B)				Reduction in Baseline Shortfall by Scenario (Millions of Weighted Tons)			
	R&D	Proc	20 Yr O&S	20 Yr LCC	I	II	III	IV
Airlift								
Outsize, Austere Airfield Capable[2]								
10 MTM/D	0.5-1.3	6.3-6.5	8.0-10.4	14.8-18.2	0.7	1.2	1.2	3.4[5]
15 MTM/D	0.5-1.3	8.7-9.3	11.9-15.6	21.1-26.2	0.9	2.3	1.6	4.9
20 MTM/D	0.5-1.3	11.0-11.6	15.9-20.9	27.4-33.8	1.1	2.7	2.0	7.8
25 MTM/D	0.5-1.3	13.3-14.3	20.0-26.1	33.8-41.7	1.2	2.9	2.2	9.3
Oversize, Main Airbase Capable[3]								
10 MTM/D	0-0.5	4.8-5.8	8.4-9.8	13.7-16.1	0.8	0.8	0.6	3.8[6]
15 MTM/D	0-0.5	6.5-7.4	12.9-14.2	19.4-22.1	0.9	0.9	0.9	5.5
20 MTM/D	0-0.5	8.9-9.9	17.3-18.9	26.2-29.3	1.2	2.0	1.2	6.2
Prepositioning[4]								
Land-Based Prepositioning of Unit Equipment (100KTons)	0	1.1-1.3	0.4-0.5	1.5-1.8	1.7-1.7	3.2-3.3	0.8-2.6	6.4-6.5
Maritime Prepositioning of Unit Equipment (100KTons)	0	1.1-3.6	3.3-2.1	4.4-5.7	1.7-1.7	3.2-3.3	0.8-2.6	6.4-6.5
Land-Based Prepositioning of Resupply and Ammo (100KTons)	0	0.6-0.7	0.4-0.5	1.0-1.2	1.6	3.8	0.9	3.7
Maritime Prepositioning of Resupply and Ammo (100KTons)	0	1.2-1.3	1.3-1.4	2.5-2.7	1.6	3.8	0.9	3.7
Sealift[5]								
Very Fast Ships (100KTons)[7]	0.5	3.5-9.9	5.6-13.2	9.6-23.6	1.7-1.2	4.4-6.8	2.0-1.4	12.6-9.4
Dedicated Fast RO/RO Ships (100KTons)	0	1.4-1.6	1.1-1.2	2.5-2.8	1.1	1.6	0.5	6.0
Dedicated RO/RO Ships (100KTons)	0	0-2.3	2.9-1.7	2.9-4.0	0.9	0.7	0.4	5.8

[1] (U) Except for an austere field capable airlifter, costs do not reflect intratheater movements from APOD/SPOD or prepositioning locations.

[2] (U) The cost depends on whether a new design or a derivative is chosen.

[3] (U) The cost depends on which particular aircraft is procured.

[4] (U) The procurement cost depends on what type of units are prepositioned. In addition, total cost for maritime-based alternatives depends on the type of ship used--existing, modified, or new--and whether chartered or operated by MSC.

[5] (U) The cost depends on what particular ship is selected in each category.

[6] (U) Comparison of these two figures highlights an anomaly for use of tons as the measure. In this scenario the outsize airlifter, early-on, is carrying outsize cargo that is significantly less dense than the cargo carried by the equally capable oversize fleet. With incremental additions, this difference becomes of lesser importance.

[7] (U) Range for cost and shortfall reduction: left hand figures--7K ton payload ships; right hand figures--3K ton payload ships.

130 MTM/D of additional airlift--approximately 600 C-5 equivalents--would be needed to eliminate the shortfall in Scenario II). Furthermore, because prepositioning is complemented by airlift, combinations of these two systems often produce a greater reduction than the sum of their reductions when considered separately.

Figure 10.3 depicts the results of the base line simulation (1986 capability) for Scenario II. The shaded portion identifies the shortfall between force closure capability and lift demand in terms of cumulative tonnage. Along the abscissa, the figure shows the approximate earliest closure possible from the various generic elements of mobility. Airlift begins early but delivers relatively small amounts of tonnage. On the other hand, airlift, in concert with prepositioning, can close substantial amounts of tonnage commencing approximately with the start of the second week of deployment. Although it is possible to achieve earlier closures, certain operational limitations (e.g., the time required for break-out and marry-up), as well as some scenario assumptions

become the limiting factors. Not until approximately the end of the fourth week are substantial amounts of shipping able to arrive. Assuming a preloading of ships during warning time and/or closure could be accelerated by 5 to 12 days. Conventional sealift from CONUS begins to deliver massive tonnage toward the end of the fifth week. Again, closures could begin somewhat earlier. (Earlier deliveries by conventional sealift are from the Western Pacific.)

(U) The generic elements of mobility not only complement each other over time but also are mutually supporting. Figure 10.4 illustrates these interactions. Airlift deploys the passengers for prepositioning and sealift, as well as residual cargo for prepositioning--certain items that are quite expensive and difficult to maintain in storage. In addition, when prepositioning sites or ports are distant

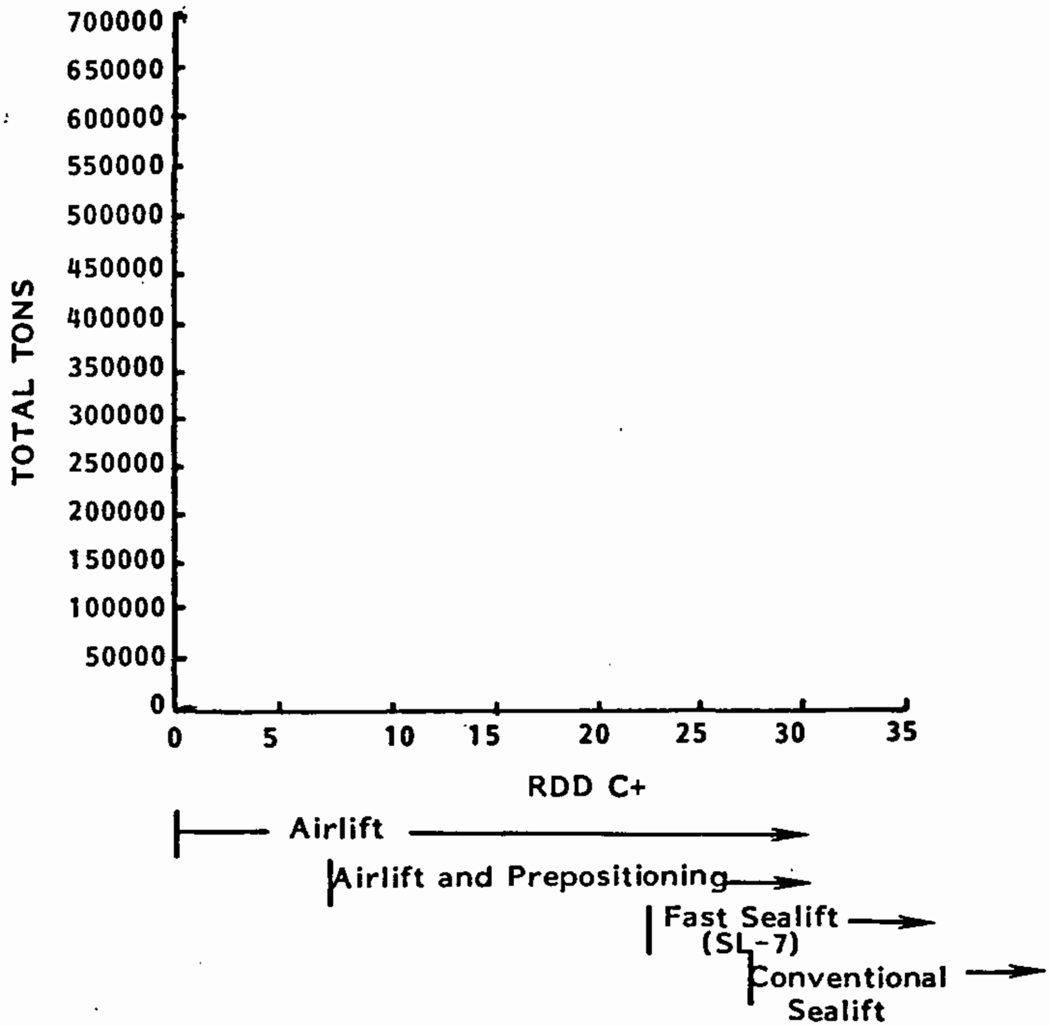
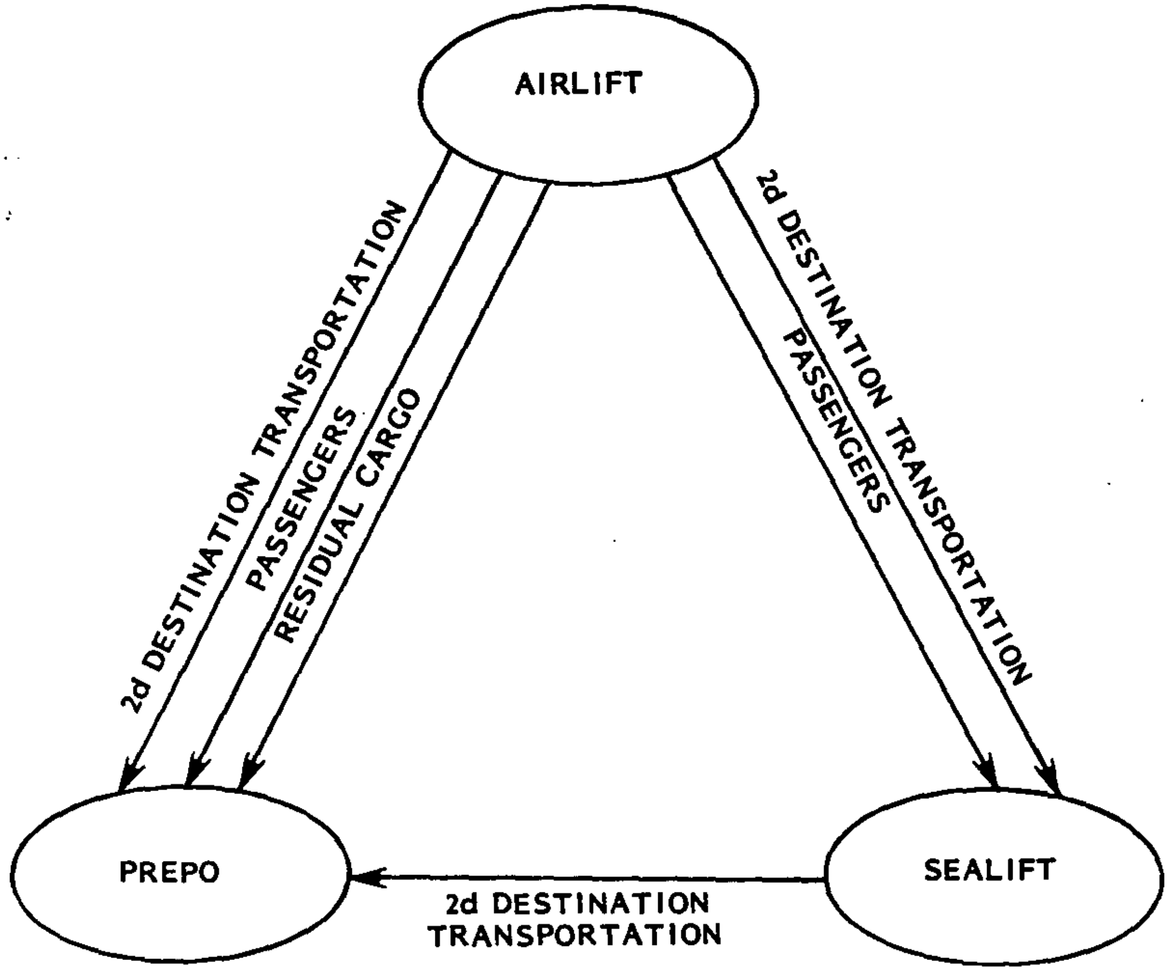


Figure 10.3. (U) Illustration of Generic Mobility Options (from Scenario II)

254

254



(U) Figure 10.4. (U) Mobility Interrelationships from operating locations, airlift can provide intratheater transportation. In some instances, sealift might also provide intratheater transportation for prepositioning; in a sense this is what maritime-based prepositioning is.

(U) The measure is useful (particularly when used in concert with cost data) to compare programs that can compete over similar time frames. For example, in Scenario II, two programs with the same level of total capability (15 million-ton-miles/day)--the first a commercial oversize derivative and the second, a new military outsize cargo aircraft--produce substantially different results, 0.9 and 2.3 million weighted tons of shortfall reduction respectively. Although the outsize carrier may cost more ($21B to $26B in 20 yr LCC vs $19B to $22B for the oversize carrier), the outsize aircraft would appear to be more effective in terms of cost per unit of shortfall reduction. For most of these scenarios, the types of cargo required early are large but not dense. Iterations of various lift levels with this measure indicated, in general, that an outsize carrier providing both outsize and oversize capability is more efficient than an oversize carrier.

10.6 CONSTRUCTION OF ALTERNATIVE PROGRAMS

(U) A given mobility program will produce very different results in different scenarios. Thus, the "best" program for one scenario may turn out to be marginal for another scenario. The effects of a combination of alternatives may produce results very different from the results achieved by simply summing the effects of each alternative. Not only are there synergistic effects between programs (e.g., airlift and prepositioning), but there are also cases where various mobility components compete for movement of the same materiel. A detailed examination of the nature of the shortfall in each scenario was made to identify the types and amounts of capability needed in each scenario. The following describes, by scenario, the insights gained.

10.6.1 Scenario I

The 1986 base line force meets cumulative lift demand by The maximum shortfall persists for until fast sealift, followed by conventional sealift, closes the gap. Additional fast sealift could close the shortfall earlier, but such ships would not be required to achieve lift objectives if programs to eliminate shortfalls in the are provided. The rapid response of SL-7s can produce closures as early as After about there will be sufficient sealift to meet requirements. Without additional airlift and prepositioning, however, we can only deploy of the cargo required in the

(U) Throughout the deployment, the shortfall consists primarily of Army requirements. Candidates for prepositioning of unit equipment exist in this scenario, but might not be feasible because significant portions of equipment in units to be deployed are not suitable for prepositioning (e.g., helicopters). The result is that storage might not be under the same concept as POMCUS in Europe. We might be restricted to storing support equipment (e.g., trucks) rather than complete sets of combat equipment. In addition, as we accelerate unit closures, sustainability becomes more demanding. Thus, prepositioning of ammunition and resupply, beyond that which accompanies forces, would be very useful. Prepositioning at operational locations may not be feasible, but prepositioning in locations such as Egypt may be viable. Airlift from Egypt (one-sixth the distance to the Persian Gulf from the US) could then be accomplished in significantly less time than airlift from CONUS. Maritime-based prepositioning is also practical. Although about twice as expensive as an equivalent land-based option, it provides added flexibility, and avoids the inherent problems of land-based prepositioning in the Middle East.

(U) This scenario could absorb large increases in airlift and thus several levels were tested. Beyond 15 MTM/D, incremental increases in capability produce substantially smaller benefits per dollar. Twenty MTM/D was selected largely due to the fact that, with this level of airlift and some judicious use of warning to move maritime based prepositioning, shortfalls could be reduced considerably.

(U) Based on the foregoing, the preferred program would contain (beyond 1986 base line capability) approximately 20 MTM/D of outsize/-oversize cargo aircraft capability, maritime or land-based prepositioning for up to 150K tons of resupply and ammunition, and up to 100K tons of unit equipment of all Services.

10.6.2 Scenario II

In this scenario, about the same capability is required early to eliminate the shortfalls as in Scenario I. Thus, the same set of alternatives applies. In addition, the requirement for larger reinforcing forces in the can effectively exploit 5
additional RO/RO shipping. Additional capability of approximately 100K tons, in concert with the existing fast ships program (SL-7s), would support deployment of a force (with support). The increase in early capability, plus the contributions of this dedicated sealift force, could significantly reduce the shortfall in the case where Suez is open. Prepositioning, both maritime and land-based, for these forces would be necessary to meet the demand in the case of Suez closed.

10.6.3 Scenario III

Shortfall in this scenario results from the need to deploy early additional forces to support the Army's 10-division D-day force, and the need to reinforce between with additional Army divisions. Neither airlift, prepositioning, nor fast 5
sealift are available in the base line force to satisfy these demands. Additions of tons of prepositioning , or sealift could eliminate the shortfall. Because the land required for that much prepositioning would be

very difficult to obtain, and sealift is needed in other scenarios, sealift becomes a preferred choice for those combat units required beyond C+10 For those units required prior to C+10 some combination of prepositioning, host nation support, or other mobility means will be developed after further negotiations with European allies. The costs associated with this last program are quite uncertain and could range from near zero, if all could be accommodated by host nation support, to higher levels associated with prepositioning, or even higher with additional airlift. For purposes of costing and program evaluation, all the is assumed prepositioned. 5

10.6.4 <u>Scenario IV</u>

For Scenario IV, the shortfall in the Persian Gulf is about the same as in Scenario I and can be eliminated with the same alternatives as previously discussed. It should be noted, however, that these alternatives must be shared with the European reinforcement. Positive benefits are realized for additional dedicated RO/RO shipping. Additional airlift, beyond 20 MTM/D, would be desirable to enhance flexibility to rapidly respond to these divergent contingencies. However, it shows only marginal benefits, particularly since it is competing--once NATO reinforcement commences--with a well mobilized sealift force. 5

10.7 ALTERNATIVE PROGRAMS

10.7.1 <u>Evaluation</u>

(U) From the aforementioned considerations, two alternative programs were structured. Both programs preposition 130K tons of munitions and resupply in Southwest Asia, provide for additional MPS for a third brigade-sized MAGTF prepositioning program, and add varying levels of additional airlift and dedicated sealift. Program A adds 20 million-ton-miles/day (MTM/D) of outsize/oversize airlift and 100K tons (payload) of dedicated RO/RO shipping. Program B adds 35 MTM/D of outsize/oversize airlift and 270K tons of dedicated RO/RO shipping. An excursion to Program B adds an additional 100K tons of prepositioning in place of the additional airlift. Table 10.2 summarizes the components for each program and the excursion.

(U) Figures 10.5 through 10.7 show the ability of two programs and the excursion, respectively, to meet the scenario demands. Table 10.3 shows resultant values of base line and program shortfalls in millions of weighted tons. Unit closure data comparing the performance of each program with capabilities in 1986 are shown on Figs. 10.8 through 10.43 at the end of this section.

Scenario I. Neither program fully meets the demands of Scenario I, and Program B does only marginally better than Program A, despite a 50-60% increase in costs.

In Program B, the additional airlift provides only marginal improvement, without substantially more prepositioning, and most of the additional sealift goes unused because sealift capacity exceeds the amount of cargo to be moved. In the Program Excursion, there is not enough airlift to realize the full benefits of prepositioning, and most of the additional sealift goes unused as in the case of Program B.

Scenario II.

Program A would better meet the demands for Scenario II. Under these same circumstances, Program B would perform only marginally better. The program excursion would essentially meet the demand but the

TABLE 10.2 (U)

MOBILITY PROGRAM COMPOSITION (U)

Baseline (1986)

- Current Airlift Enhancement Programs--the C-5 wing modification, additional C-141/C-5 spares and crews, and the CRAF Enhancement Program
- The SL-7 Fast Dedicated Sealift Program (8 fast RO/RO ships)
- Six divisions of POMCUS in NATO
- Additional USAF and USMC Prepositioning in NATO
- Maritime Prepositioning Ship Program--as a follow-on to the current Near Term Program--for two brigade-sized MAGTF

Additions to Baseline

- Program A
  - 130,000 tons of prepositioned munitions and resupply in Southwest Asia
  - MPS for a third brigade-sized MAGTF
  - 20 million-ton-miles per day of additional outsize/oversize airlift capability
  - Dedicated RO/RO shipping with capacity for 100K tons
  - Provision of adequate support to the Army's D-day force in Europe through some combination of prepositioning, host nation support, or other mobility means to be developed after further negotiations with European allies
- Program B. In addition to Program A:
  - 15 million-ton-miles/day of additional outsize/oversize airlift capability
  - Dedicated RO/RO shipping with capacity for 170K tons
- Excursion--In place of all the additional airlift (35 MTM/D) in Program B:
  - 100K tons of prepositioning in Southwest Asia

Figure 10.5. (U) Program A: Lift Demand, Shortfall, and Shortfall Reduction

5

262

262

5

Figure 10.6. (U) Program B: Lift Demand, Shortfall, and Shortfall Reduction

263

263

5

Figure 10.7. (U) Program Excursion: Lift Demand, Shortfall, and Shortfall Reduction

264

264

TABLE 10.3 (U)

RESULTANT SHORTFALL (MILLIONS OF WEIGHTED TONS) (U)

Program	Scenario I	Scenario II	Scenario III	Scenario IV
1986 Base Line	4.55	12.76	7.06	19.34
Program A	2.87	3.94	4.59	2.16
Program B	1.85	2.81	3.66	1.61
Program Excursion	3.05	6.12	4.58	2.38

265

265

early shortfalls would remain because airlift would still be insufficient to realize the full benefits of prepositioning.

(U) Scenario III. Both programs do about equally well in meeting the demands of Scenario III, but the Program Excursion is unable to close POMCUS units on schedule without additional airlift and thus shows markedly reduced performance.

(U) Scenario IV. Both programs and the excursion perform about the same in Scenario IV. The split theaters and shortfall over an extended period diminish some of the importance demonstrated by early arrival in the other scenarios. Thus incremental shipping alternatives demonstrate greater productivity.

(U) In general, flexibility, deterrent value, vulnerability, procurement schedule, public acceptability, and operational constraints vary among programs and scenarios. Taken in the order shown, the differences are as follows:

- (U) Flexibility - Slight edge to B, in that the additional capability in all categories can be a hedge against obstruction of or attrition in any single mode. Both programs are significantly more flexible than the excursion, particularly where destinations are not immediately accessible from oceans.

- (U) Deterrent Value - Slight edge to B, then A, over the excursion, due to the increased ability for early response provided by airlift.

- (U) Vulnerability - Very scenario dependent. In Scenario I neither airlift, sealift, nor prepositioning programs are particularly vulnerable. In Scenarios II, III, and IV the concentration of large quantities of equipment aboard a few ships, as opposed to the small size and large numbers of individual airlifted cargoes, would provide an edge to Program B, then A.

- (U) Procurement Schedule - The airlift programs, in particular, could extend realization of capability for both Programs A and B over the excursions; however, partial capability could occur on a virtually coincident schedule with additional shipbulding if derivative aircraft are acquired.

- (U) Acceptability - No particular distinction is apparent for any of the programs since there is no domestic or foreign preference.

- (U) Operational Constraints - Both programs contain possibilities for operational constraints to detract from capability as greater levels are achieved. At this point though, neither program has an advantage.

10.7.2 Scenario Dependance

(U) As previously pointed out, the results of any mobility analysis are dependant upon the scenarios. This must be kept in mind when evaluating results because incorrect conclusions could be reached if only one scenario is considered. Since one of the desirable attributes of a mobility force is flexibility, it is necessary to consider multiple scenarios to understand this interplay in detail. One example that demonstrates the impact of scenario dependance is the deployment of the MPS.

The first computer results for Scenario I showed the units from the MPS brigades closing , This was a somewhat surprising result considering the ships were to be close to the debarkation point at the start of the deployment. Investigation

revealed that the delay in closure was due to the late delivery of the residual cargo by air which was in turn caused by the heavy demand for Air Force and Marine fly in echelon equipment movement in the early days. A commander may choose to allocate sufficient airlift to the MPS units to achieve much earlier closure. This scenario change moved the MPS unit closure forward at the expense of delaying two Army 5
brigades

As a further example, consider the following scenario. The national command authorities could conduct a show of resolve prior to hostilities by delivering a brigade of Marines to a port in the Persian Gulf as rapidly as possible. The NTPS could sail during warning and be combat ready in days after arrival in port. After the 5
improved deprocessing of the MPS becomes available, the unit could be combat ready in less than days after ship arrival. Depending upon scenarios, the same unit could be ready for combat in the region well before hostilities commenced or within days thereafter.

10.7.3 Costs and Schedules

(U) The exact costs and schedules for Programs A and B will depend on details that have not yet been decided. First, the mix and types of airlift aircraft are uncertain. In all cases, except Scenario I, at least half of the additional aircraft must have outsized cargo capability to avoid an outsized cargo cosntraint. In all cases, the capability to deliver cargo directly to austere airfields would improve closure times and provide a hedge against loss of the airfields and ports closest to destinations. Table 10.4 displays a range of costs for each program. For airlift components, the upper bound consists of a program in which all additional airlift is outsize cargo capable, the lower bound consists of an oversize/outsize mix with at least half outsize capable. For prepositioning components the range is determined by (1) all land-based (low) or (2) maritime-based (high). These schedules are based on fastest feasible schedule from a production standpoint, yet competition for funding with other program could result in a slower schedule.

TABLE 10.4 (U)

PROGRAM COST SCHEDULE (U)

(Total Acquisition and Operations Costs)

	83	84	85	86	87	88	89	90	83-90
PROGRAM A									
Airlift[1]	0.5-0.6	1.5-3.2	2.6-4.1	3.4-4.5	3.1-0.7	3.0-0.6	0.7-0.7	1.0-0.7	15.8-15.1
Sealift[2]	0.1	0.5	0.6	0.6	0.7	0.1	0.1	0.1	2.8
Prepositioning[3]	0.3-0.5	1.3-1.7	1.2-1.8	1.0-1.9	0.4-1.1	0.4-0.5	0.2-0.3	0.2-0.3	5.0-8.1
Total[5]	0.9-1.2	3.3-5.4	4.4-6.5	5.0-7.0	1.8-4.9	1.1-3.6	1.0-1.1	1.0-1.4	22.9-26.7
PROGRAM B									
Airlift[1]	2.1-2.3	4.1-5.2	5.1-6.7	3.6-4.8	3.5-1.1	3.5-1.1	1.2-1.2	1.5-1.2	24.6-23.6
Sealift[2]	0.3	0.8	1.0	1.0	1.0	1.1	1.1	1.2	7.5
Prepositioning[3]	0.3-0.5	1.3-1.7	1.2-1.8	1.0-1.9	0.4-1.1	0.4-0.5	0.2-0.3	0.2-0.3	5.0-8.1
Total[5]	2.7-3.1	6.2-7.7	7.3-9.5	5.6-7.7	2.5-5.6	2.6-5.1	2.5-2.6	2.6-3.0	36.1-40.2
EXCURSION									
Airlift[1]	---	---	---	---	---	---	---	---	---
Sealift[2]	0.3	0.8	1.0	1.0	1.0	1.1	1.1	1.2	7.5
Prepositioning[4]	0.4-0.6	1.4-2.0	1.6-2.4	1.2-1.5	0.6-1.5	0.7-0.8	0.2-0.4	0.2-0.4	6.3-9.6
Total[5]	0.7-0.9	2.2-2.8	2.6-3.4	2.2-2.5	1.6-2.5	1.8-1.9	1.3-1.5	1.4-1.6	13.8-17.1

[1](U) To the extent that CRAF Enhancement could satisfy some of the additional cargo capacity these costs could be reduced.

[2](U) Costs are based on RO/RO ship acquisition. To the extent that ships could be leased/chartered costs could be substantially reduced.

[3](U) Consists of: TAKX for 1 brigade; 130K tons resupply and ammunition (land-based vs. maritime-based); 120K tons for early Army support for NATO.

[4](U) Consists of: TAKX for 1 brigade; 130K tons resupply and ammunition (land-based vs. maritime-based); 220K tons unit equipment (land-based vs. maritime-based)--120K tons for NATO, 100K tons for Persian Gulf.

[5](U) Range for total is sum of highest possible and lowest possible cost for each year.

UNCLASSIFIED

(U) For both programs, near term produceability for additional sealift and prepositioning programs would provide nearly full capability well before 1990 and thus serve to shore up some early and mid-term scenario deployment objectives.

10.8 ADDITIONAL FINDINGS

(U) The following are additions to any of the programs above for which this study has shown some positive benefits, and that we may wish to adopt, increase, or accelerate after further study.

- (U) En route and destination base capacity including POL.
- (U) Adaptive systems for improved container ship utilization.
- (U) Acquisition of systems to improve ship offload in austere regions.
- (U) Very Fast Ships (Surface Effects Ships).
- (U) Acquisition of heavy equipment transporters for armored/mechanized forces.

(U) The first measure highlights the need to adequately provide base and POL capability for all mobility programs consistent with added capability. Failure to do so could result in an overstatement of mobility capability. Conversely, limiting the type and size of recommended programs to those for which base and POL availability is now certain could preclude implementation of the preferred strategy of forward defense.

(U) The second measure results from a need to better utilize our vast container ship resources. In scenario simulations, despite the shortage of militarily useful ships, large numbers of fast container ships went unused since loading of unit equipment was not readily accommodated. It appears that emphasis on systems that improve container ship utilization (flat racks, SEA SHEDS) merit attention.

(U) We have already proposed initiatives in budgets and programs to improve ship offload capability in austere environments, but additional emphasis may be needed in this area as we enhance our sealift capability. In many regions, ports will either be unavailable or inadequate, and thus, logistics over the shore (LOTS) programs should receive heightened visibility. In addition, most of the underutilized container ships identified in the second measure, are also non-self sustaining, hence, programs are also required to enhance our ability to offload these ships in developed ports.

(U) Very fast ships (surface effect ships) demonstrated great productivity in all scenarios. They were not included in Programs A or B because cost and technological feasibility are uncertain, and measurable capability may not be achievable before early 1990s. Development programs should be continued to reduce these uncertainties in light of the potential for high productivity, reduced vulnerability, and the additional dimension they could provide surface delivery of cargo.

(U) The intratheater analysis highlights the importance of the ability to move forces over potentially extended ground LOCs. Extended ground movement of armor/mechanized forces is slow and increases destructive wear on combat vehicles. The provision of heavy equipment transporters for tracked vehicles could greatly enhance capabilities in the near term, particularly in austere environments.

10.9 RECOMMENDATION

(U) Neither program is able to satisfy all unit closure requirements. Program A is recommended as the preferred program. Although it has somewhat less capability than Program B, the cost is significantly less. Although the excursion to Program B is of even less cost than Program A, it fails to provide the rapid deployment necessary to implement the defensive strategies outlined by the Joint Chiefs of Staff in the study scenarios. The extended delay caused by overreliance on shipping in this excursion would probably invalidate the defensive strategy, with the level of combat forces specified. Rapid deployment in support of US force projection strategy is essential. The ability of the US to move forces quickly not only enhances deterrence; if deterrence fails, it may make the difference between defeat and a successful defense.

"Pages 10-31 through 10-66 are withheld. They are figures in the general form of Figure 1.8 in Volume I. Figure titles are in the list of figures beginning on page v of this volume." 5

APPENDIX A (U)

DEPARTMENT OF DEFENSE AUTHORIZATION ACT, 1981 (Extract) (U)

JOINT EXPLANATORY STATEMENT OF THE COMMITTEE OF CONFERENCE (Extract) (U)

(This section is totally unclassified.)

APPENDIX A

DEPARTMENT OF DEFENSE AUTHORIZATION ACT, 1981

Extract

C-X AIRCRAFT PROGRAM

SEC. 203. (a) None of the funds authorized to be appropriated by this title may be obligated or expended for the full-scale engineering development or procurement of the C-X or any other new transport aircraft until the Secretary of Defense has certified in writing to the Congress--

(1) that the national security requirements of the United States for additional military airlift capability merit initiation of the C-X aircraft program;

(2) that the magnitude and nature of the military cargo and material to be airlifted to the Indian Ocean area and other areas of potential conflict are sufficiently well defined to permit identification of a deficiency in military airlift capability;

(3) that the magnitude and characteristics of military cargo and material to be transported by air to such areas are sufficiently well defined to provide clear justification and design parameters for such aircraft; and

(4) that plans for aircraft are sufficiently well developed to make such full-scale engineering development both economical and technically feasible.

(b) The Secretary of Defense shall conduct a study to determine overall United States military mobility requirements. Such study shall include an analysis of the total mix of airlift, sealift, and prepositioning of war materials required for the United States to respond to military contingencies in the Indian Ocean area and other areas of potential conflict during the decade of the 1980's. The Secretary shall submit a report to the Committees on Armed Services of the Senate and House of Representatives not later than February 1, 1981, on the results of such study, together with such comments and recommendations as the Secretary considers appropriate, including recommendations for specific programs to provide an adequate overall military transportation capacity for the United States.

(c) Not more than $35,000,000, of the funds authorized to be appropriated by this title may be obligated or expended for the C-X aircraft program. Of such amount, not more than $15,000,000 may be obligated or expended before February 1, 1981, and the remainder of such amount may be obligated or expended only after the expiration of 60 days following the submission to the Congress of the report required by subsection (b).

JOINT EXPLANATORY STATEMENT OF THE COMMITTEE OF CONFERENCE

Extract

C-X aircraft (Sec. 203)

The Air Force requested $81.3 million to begin full-scale development of a new strategic airlift aircraft designated C-X. The House authorized no funds for this program, while the Senate authorized $50.0 million.

Because the Air Force estimated that the C-X would require $6.7 billion in R&D and procurement funds for fiscal years 1982 through 1985, and because the conferees share a number of concerns about the C-X program, language was adopted for the bill that:

Restricts the authorization of the $35 million for development of this aircraft agreed to by the conferees. None of these funds may be obligated or expended for full-scale development or procurement of the C-X aircraft until the Secretary of Defense certifies to the Congress:

> that the requirements for additional military airlift capability merit initiation of the C-X program,
>
> that the magnitude and nature of the military cargo and materiel to be airlifted to the Indian Ocean area and other areas of potential conflict are sufficiently well-defined to permit identification of the need for additional airlift capability,
>
> that the magnitude and characteristics of military cargo and materiel to be transported by air to such areas are sufficiently well-defined to provide clear justification and design paramaters for such aircraft, and
>
> that plans for such aircraft are sufficiently well-developed to make such full-scale engineering development both economical and technically feasible.

Requires the Secretary of Defense to perform a study on overall U.S. military mobility requirements. This study is to include an analysis of the total mix of airlift, sealift and prepositioning programs to allow the U.S. to respond to military contingencies during the 1980's--to include contingencies in the Indian Ocean area. The Secretary shall report to the Congress not later than February 1, 1981, on the results of this study, and he shall make recommendations on specific programs to provide an adequate overall military transportation capacity for the United States.

Restricts the funds that can be obligated and expended prior to February 1, 1981, to $15,000,000. Remaining funds may be obligated and expended 60 days following submission of the report required by the Secretary.

The study that provides the basis for the report should focus on lift demands posed by situations of concern to field commanders in the Indian Ocean and Persian gulf regions, but should also treat situations in other theaters (such as those in NATO) as necessary--to explore fully the need for additional investment in long-range lift.

Specifically, for each situation of concern to field commanders that is chosen for study, each of the following should be thoroughly addressed:

The threat to be neuralized by the employment of U.S. military forces;

Those U.S. forces considered necessary to meet the threat--deployed in an operationally sound time sequence;

The lift demand created by deployment of these U.S. forces--in terms of unit equipment, ammunition, support times and resupply items. (Two aspects of time should be shown for lift demand. This demand should be displayed by day or mobilization (day 5, day 10, etc.)--for each year of the decade of the 1980's;

Special considerations imposed by the environment of the areas under consideration such as airfield and port facilities;

The capability of existing lift resources against this need. (These resources should include airlift, sealift and prepositioning-both land-based and maritime);

Where gaps are shown to exist between the lift demand and the capabilities provided by existing lift resources, preferred additions to existing resources that will close these gaps within the following categories:

Incremental airlift and support (including tankers)
Incremental outsize airlift and support (including tankers)
Incremental sealift and support
Incremental prepositioning and support
Other additions;

The cost of the preferred set of additions--as a profile of costs through the 1980's and 1990's to include:

Development costs
Procurement costs
Operating and support costs;

To demonstrate the cost-effectiveness of the preferred set of additions, the capabilities and costs provided by at least one alternative set of additions to present lift forces--in the same format as the preferred set.

APPENDIX B (U)

MEMORANDUM FOR THE SECRETARY OF THE AIR FORCE, CHAIRMAN, JOINT CHIEFS OF STAFF, UNDER SECRETARY OF DEFENSE (R&E), ASSISTANT SECRETARY OF DEFENSE (PA&E)

SUBJECT: CONGRESSIONALLY MANDATED MOBILITY STUDY (U)

(This section is totally unclassified.)

THE DEPUTY SECRETARY OF DEFENSE

WASHINGTON, D.C. 20301

JUN 27 1980

MEMORANDUM FOR THE SECRETARY OF THE AIR FORCE
CHAIRMAN, JOINT CHIEFS OF STAFF
UNDER SECRETARY OF DEFENSE (R&E)
ASSISTANT SECRETARY OF DEFENSE (PA&E)

SUBJECT: Congressionally Mandated Mobility Study

The Senate Armed Services Committee has authorized $50 million for the development of the C-X, of which only $10 million could be spent prior to February 1, 1981. The remainder would be released only 90 days after submission by the Secretary of Defense of a study of the lift requirements for deployments of U.S. military forces, the outline of which is set out in an excerpt from the Committee's Report (Enclosure A).

I assume the requirement for such a study will be sustained in conference, and, of course, it may well be modified. I have two objectives in mind. First, we must complete the study promptly if we are to avoid delays in the critically important C-X program. And second, the study must be totally objective and credible.

I propose that the study be supervised by a steering committee of the above addressees, which I will chair. The Secretary of the Army and the Secretary of the Navy will each be invited to send an observer to steering committee meetings. The overall study coordinator, with responsibility for supervision and coordination of the project, will be USD(R&E). I intend to maintain close supervision of progress by the steering committee, including resolution by that committee, or the chairman where necessary, of any differences that may arise between study participants. Although no one is to be excluded from any specific area of study, primary responsibility will be allocated as follows:

- CJCS: A description of appropriate planning scenarios, together with the first five items on p. 2 of Enclosure A, including for each planning scenario the threat to be dealt with, the U.S. and allied (if any) forces needed, the time-phased deployment demands thereby created (to include all Services), support and resupply requirements, and special considerations imposed by the environment of the area under concern, such as airfield and port facilities. I am particularly anxious to have the Chairman's endorsement of the operational suitability and practicality of the scenarios we are to examine as typical of those he would be likely to recommend should an actual crisis occur.

- ASD(PA&E): For each of the planning scenarios chosen by CJCS, the remaining four items listed on p. 2 of Enclosure A, including estimates of our current ability to meet overall lift requirements, and least-cost mixes of airlift, sealift, and prepositioning to correct deficiencies.

- USD(R&E): Issues involving estimates of technology, including specifically analysis of capability of existing aircraft to meet outsize airlift requirements, equipment performance, development and production leadtimes, and feasible production rates. This includes the responsibility to designate the alternative designs to be considered for the proposed aircraft.

- SEC AF: Coordinate with each of the above, submitting such suggestions and designs as are considered helpful and appropriate.

I will be in contact with each of you shortly to arrange for our initial planning meeting.

W. Graham Claytor, Jr.

W. Graham Claytor, Jr.

Attach: Encl A

Copy to:
Secretary of the Army
Secretary of the Navy

318

C-X

The Air Force requested $81.3 million to begin full-scale development of a new strategic airlift designated C-X. The projected requirements for this program total $6.7 billion in R&D and procurement for fiscal year 1982 through 1985.

Because of a number of concerns about this program, the committee approved language for inclusion in the fiscal year 1981 defense authorization bill that:

--Authorizes $50 million for development of the C-X. None of these funds may be used for full-scale engineering development of this aircraft until the Secretary of Defense certifies to Congress:

(1) That the magnitude and characteristics of the military cargo and material which must be transported by air to the Indian Ocean area in military emergencies are sufficiently well-defined so as to provide a clear justification and design parameters for such aircraft and

(2) That plans for such aircraft are sufficiently well-developed to make such full-scale engineering development both economical and technically feasible;

--Allows $10 million of this amount to be obligated and expended prior to February 1, 1981;

--Allows the remainder of the amount authorized ($40 million) to be obligated and expended after the expiration of 90 days following the submission of a study described below.

The committee believes that the support of commitments to NATO, the Persian Gulf, the Far East and assuring timely and adequate response to contingencies which are increasingly likely in other areas justify the procurement of substantially more long-range strategic lift. Consequently, they support in principle the administration's initiatives toward this goal but they are not convinced that the C-X concept proposed by the Air Force should be supported to meet new long-range strategic lift requirements. The committee believes that fulfillment of these requirements should be based upon a careful analysis of total lift demands, taking into account existing resources and potential enhancements--to include airlift, sealift, and prepositioning.

The committee also believes that identification of necessary long-range lift augmentations requires a thorough analysis of all relevant factors, including anticipated response-time requirements, comparative vulnerability, and relative capacities in situations likely to be of concern to field commanders during the decade of the 1980s. This analysis should form the basis for new airlift and sealift initiatives, as well as for the design of suitable ships, new aircraft or derivatives of existing aircraft. In this regard, the committee is particularly concerned that new-generation aircraft or derivatives should be designed for compatibility with new-generation vehicles and equipment, particularly lightweight armored vehicles now in production and likely to be in production in the future. It is not clear that a concept optimized for strategic airlift of heavy armor into remote, austere fields as envisioned in the Air Force C-X concept is military valid. If not, it may prove desirable to employ sealift or prepositioning for heavy equipment and to employ airlift primarily for the rapid deployment of light units--to include those equipped with lightweight armored vehicles.

To meet the committee's concerns, language was included in the bill requiring the Secretary of Defense to conduct a study of the lift requirements for deployments of US military forces. This study should focus on lift demands posed by situations of concern in the Indian Ocean and Persian Gulf regions, but should also treat situations in other theaters (such as those in NATO) as necessary--to explore fully the need for additional investment in long-range lift.

Specifically, for each situation of concern to field commanders that is chosen for study, each of the following should be thoroughly addressed:

--The threat to be neutralized by the employment of US military forces;

--Those US forces considered necessary to meet the threat--deployed in an operationally sound time sequence;

--The lift demand created by deployment of these US forces--in terms of unit equipment, ammunition, support times and resupply items. (Two aspects of time should be shown for lift demand. This demand should be displayed by day of mobilization (day 5, day 10, etc.)--for each year of the decade of the 1980s);

--Those portions of the demand for transportation capacity which would require special treatment such as large, outsized equipment, flammables, high explosives, and time-urgent replenishment;

--Special considerations imposed by the environment of the areas under consideration such as airfield and port facilities;

--The capability of existing lift resources against this need. (These resources should include airlift, sealift and prepositioning--both land-based and maritime);

--Where gaps are shown to exist between the lift demand and the capabilities provided by existing lift resources, preferred additions to existing resources that will close those gaps within the following categories:
Incremental airlift and support (including tankers)
Incremental outsize airlift and support (including tankers)
Incremental sealift and support
Incremental prepositioning and support
Other additions;

--The cost of the preferred set of additions--as a profile of costs through the 1980s and 1990s to include:
Development costs
Procurement costs
Operating and support costs;

--To demonstrate the cost-effectiveness of the preferred set of additions, the capabilities and costs provided by at least one alternative set of additions to present lift forces--in the same format as the preferred set.

It is recognized that insuring adequate long-range strategic lift is a matter of highest national priority and urgency. Consequently, the committee requests that the study, as outlined above, be conducted with all deliberate speed by the Secretary of Defense to identify the proper approach to new strategic lift and to specify the associated initial operating capability date for any long-range strategic airlift enhancements, to include new aircraft or derivatives of in-service aircraft that may be proposed. The study and associated program recommendations, as required by the bill, shall be forwarded by the Secretary of Defense to the committee no later than December 1, 1980.

APPENDIX C

CATALOG OF ASSUMPTIONS AND DATA FOR CONGRESSIONALLY MANDATED MOBILITY STUDY (U)

323

APPENDIX C

CATALOG OF ASSUMPTIONS AND DATA FOR CONGRESSIONALLY MANDATED MOBILITY STUDY

C.1 INTRODUCTION

C.1.1 GENERAL

(U) The assumptions and data necessary to examine the strategic mobility implications of movement to worldwide theaters of operation are provided in this appendix. The data provided were compiled for use by the Interactive Strategic Deployment Model (ISDM) prior to the study and supplemented as required during its conduct.

C.1.2 TIME PERIOD

(U) Information is provided for current (FY 82), mid-range (FY 86) and long-range (FY 90).

C.1.3 SCENARIOS

(U) The scenarios supplied by the JCS for use in the analysis are listed below. Detailed discussion of each scenario is contained in separate section of this report.

- Regional conflict in the Persian Gulf (Scenario I) Soviet
- Invasion of Iran (Scenario II)
- NATO—Warsaw Pact conflict (Scenario III)
- Conflict in the Persian Gulf with a precautionary reinforcement in Europe (Scenario IV)

C.1.4 GENERAL ASSUMPTIONS

1. (U) Force packages developed by the JCS are constrained and not necessarily considered to be adequate to counter the threat and achieve all US strategy objectives. The JCS reserves the right to continue to update assessments and forces for similar scenarios on

other efforts. Force sizes developed for this study are not to be construed as a "final" JCS position/recommendation. In addition, the Steering Group does not feel that the simultaneous scenario represents the most demanding, plausible case, but for reasons of data base availability and the urgency of this analysis, it is considered acceptable.

2. (U) This study will be neither a force sizing study nor a statement of US policy regarding commitment of forces. No policies or international agreements previously agreed to by the United States will be considered changed in any way by this study, nor will results be in any way treated as indications of changes in policy. The study will focus on military-related capabilities, needs and the total mix of airlift, sealift, and prepositioning programs to support US mobility objectives. The study will demonstrate how mobility resources are employed using representative forces in representative scenarios.

3. (U) For each scenario, forces are specifically identified and will not be available to reinforce other regions in subsequent scenarios.

4. (U) All forces to be moved will be existing or programmed forces consistent with FY 82-86 FYDP as modified by PDM/APDM 82-86. All equipment to be moved will be existing or programmed. Baseline forces will be 1986 for all time periods.

5. (U) Time-phased force deployment data provided by the Services will be the most recently developed data bases from similar planning scenarios and will be used solely for the purposes of this analysis.

6. (U) Mobility Forces Program Assumptions

(a) (U) For FY 82 use forces existing or funded through FY 81.

(b) (U) Projected program changes beyond FY 82:

- POMCUS fill (FY 86)
- C-5/C-141 spares
- USMC prepo in Iceland and Norway (FY 83)
- USAF prepo for NATO reinforcement (FY 83)
- Aerial Tanker Program
- Fast Sealift (SL-7)
- Maritime Prepositioning Ships (MPS)

C.1.5 SECTION CONTENTS

(U) The assumptions and data contained in the following sections are grouped as follows:

- Basic Mobility Assumptions (Sec. C.2.1)
- Air and Sealift Assets, Capabilities, and Operational Variables (Sec. C.2.2)
- Simulation Time and Distance Data and Assumptions (Sec. C.2.3.)
- Program Forces (Sec. C.2.4)
- Detailed CMMS Assumptions by Scenario (Extracted from JCS Scenarios)(Sec. C.2.5)
- Intratheater Deployment Analysis Assumptions (Sec. C.2.6)

C.2 DATA AND ASSUMPTIONS

C.2.1 BASIC MOBILITY ASSUMPTIONS

C.2.1.1 Terms

(a) (U) C-Day. Day deployment commences.

(b) (U) Availability. Days after C-Day that unit/cargo is available to start movement from peacetime locations or mobilization station in order to meet RDD. Units will be available in sufficient time to meet their RDDs.

(c) (U) RDD. For analysis purposes, the Required Delivery Date (RDD) will be considered as the required arrival/closure at the battlefield objective area (relative to C-Day) rather than arrival in theater.

(d) (U) Delivery. Day after C-Day that unit/cargo arrives at a port of debarkation.

(e) (U) Closure. Day after C-Day unit/cargo is in wartime location.

C.2.1.2 Warning Time

Mobilization activities and force deployments relative to C-Day will be used as a variation in this analysis. Warning time prior to C-Day will be used to

C.2.1.3 Unit Integrity

(U) Combat force increments identified for lift will be deployed so as to maintain unit integrity at the level to which it is identified in the data base, (normally battalion, company or squadron level). Each increment will be moved in its entirety before deployment of subsequent increments can begin unless movement of follow-on increments does not delay closure of a preceding unit.

C.2.1.4 Time-Phased Deployment

Forces will be scheduled for deployment so as to ensure a balance of combat and non-divisional support and accompanying supplies. Resupply and ammunition buildup will be scheduled to achieve

4

C.2.1.5 Allied Resources

(U) With the exception of NATO reinforcement, the mobility forces possessed by friendly nations will not be available to move US forces. For NATO reinforcement, allied ships are available after NATO M-day, and NATO Civil Augmentation Aircraft (NCAA) cargo aircraft committed by the Allies on M-Day will be available for on-load in the CONUS at NATO M+3.

C.2.1.6 Convoying

(U) In non-NATO contingencies, US ships will not be convoyed. For scenarios which include NATO, convoys will be employed in accordance with existing convoy policy. Attrition will be treated as a study variation. (See "Convoying Policy and Movement Factors," Sec. C.2.2.2.8.)

C.2.1.7 Suez Canal

(U) For Persian Gulf/Indian Ocean contingencies the availability of the Suez Canal will be treated as a variable in the analysis (both open and closed) to assess impact on mobility force composition and force closures.

C.2.1.8 Prepositioning

(U) Prepositioned shortages, to include POMCUS and PWRMs, will be considered as lift requirements. CONUS based non-POMCUS units will be considered as fully equipped.

C.2.1.9 POL

(U) For the purpose of intertheater mobility analyses to determine the capability of common user transportation assets to deploy US combat and support forces, POL stocks will be considered adequate at en route and objective area bases/ports. However, to underscore the magnitude of the POL requirement, the report will contain a section providing information on estimated POL needs for a representative Persian Gulf contingency.

C.2.1.10 Water

(U) Water will be considered sufficiently available at certain port locations for all forces moved, and will be analyzed as an intratheater movement requirement in the non-NATO contingencies.

C.2.1.11 Aircraft Routing and Overflight

(U) Aircraft routing and the requirements for overflight rights and en route basing will be as described in each scenario.

C.2.1.12 Offload

(U) Aircraft and ships (except amphibious ships) will offload only at locations where appropriate materials handling equipment (MHE) or port facilities are available.

C.2.1.13 Weather

(U) For the purpose of the analysis, weather will not be considered a limiting factor.

C.2.2 AIR AND SEALIFT ASSETS, CAPABILITIES, AND OPERATIONAL VARIABLES

C.2.2.1 Airlift

C.2.2.1.1 General

(U) The following describes the airlift resources programmed for end FY 1982 and 1986. The capability represented by these assets is the baseline upon which increases in capability due to the C-X and other mobility programs will be evaluated. The airlift resources available for air movement of combat forces include assets from the Military Airlift Command (MAC) and the US Civil Reserve Air Fleet (CRAF). For the NATO Scenarios (III and IV), European civil cargo aircraft are also available All tabular data on airlift resources and operating parameters are shown on Tables C.1 through C.11 located at the end of Sec. C.2.2.1.

C.2.2.1.2 Military Airlift Command Intertheater Resources

(a) (U) The military intertheater airlift force of 70 C-5 and 234 C-141 aircraft represents the number of aircraft that are available for operational commitment. The actual inventory is somewhat higher. Those aircraft over and above the available assets are dedicated to special projects, undergoing overhaul, and/or being used in training activities and are not considered readily available for operational commitment.

(b) (U) The aircraft available for planning is dependent upon the scenario and the number of aircraft committed to out-of-theater support. The aircraft used in each scenario are listed in Table C.1 and their time-phased availability shown in Table C.3. Time-phased availability is based on the fact that most airlift aircraft will not be on-alert on C-Day because they will be employed on continuation training and theater resupply missions.

(c) (U) The C-5 and C-141 aircraft are organized into 4 squadrons of C-5s and 13 squadrons of C-141s. Each of these active squadrons is augmented by a colocated reserve associate unit which does not possess aircraft but participates in the operation and maintenance of the active force aircraft. This arrangement is critical to the ability to surge (increase) the aircraft flying hour rates in response to an emergency. The planned phase-in of reserve crew members and maintenance personnel accounts for a portion of the delay in reaching full wartime utilization rates.

(d) The airlift capability contributed by a specific aircraft is a function of payload, speed, and number of hours flown in a given time period. Variations in the level of logistic and operational support available to the airlift force also has a direct influence on the attainable daily utilization rate. The utilization rates shown in Table C.2 represent aircraft capability for FY 1982 and FY 1986. The increase of utilization rates between FY 1982 and FY 1986 is a result of the US Air Force program to acquire needed war readiness material (WRM) spare parts for the C-5 and C-141 aircraft and an increase in C-5 crew ratio from the current 3.25:1 crews per aircraft to 4.0 to 1.

(e) While tanker aircraft are not an airlift resource, they can play a major role in intertheater airlift operations. There are 615 PAA KC-135 tanker aircraft in the existing fleet and 12 KC-10 aircraft becoming available by FY 1983.

(1) The primary role of the KC-135 is to support the Single Integrated Operation Plan (SIOP).

4

(2) (U) To support aerial refueling in a NATO contingency, KC-135 tanker aircraft are needed to support tactical fighter/reconnaissance deployment operations and, when available, provide air refueling support for the C-5s and C-141s. KC-10 aircraft are not committed to the SIOP and will be used as mobility assets (tanker/tanker-cargo).

(3) (U) Tanker support will also be required in the event of a US unilateral military involvement in the Mideast. This support is critical if en route bases and overflight rights are denied.

(4) (U) There is a competing requirement for tanker support. Because total requirements exceed tanker capability, the use of air refueling in each specific situation must be adjudicated according to the demands of the situation and competing requirements.

C.2.2.1.3 <u>Civil Reserve Air Fleet</u>

(a) (U) The actual numbers of aircraft for each CRAF stage have been converted into B-747 and B-707 equivalents for cargo and passengers and are reflected in Table C.1.

(b) (U) CRAF aircraft provide a major portion of passenger and cargo movement capability.

(c) (U) The CRAF can be activated in three stages as a function of the seriousness of the crisis. CRAF Stage I may be implemented by CINCMAC and is provided for expansion of peacetime civil augmentation airlift normally available. CRAF II must be activated by the Secretary of Defense. These aircraft are voluntarily provided by the civil carriers and represent those aircraft required for a minor contingency that would be applied to a national crisis without significantly disrupting economic operation of the civil air industry. CRAF Stage III is activated by the Secretary of Defense with the approval of the President and is usually associated with declaration of a national emergency. The civil air carrier industry will be disrupted by this action since it includes 100 percent of long range civil cargo capability and approximately 60 percent of long range civil passenger capability.

C.2.2.1.4 Military Airlift Command Intratheater Airlift Resources

(a) From FY 1982 through FY 1986, the United States will have 506 PAA C-130 airlift aircraft. These will be available for worldwide intratheater tactical airlift support. Of the total aircraft authorized, 216 are assigned to active duty MAC units. All active duty C-130 aircraft are equipped with Station Keeping Equipment (SKE), and 48 of these are also equipped with the Adverse Weather Aerial Delivery System (AWADS). The active duty aircraft are assigned to 14 squadrons; 13 have 16 PAA and squadron has 10 authorized.

6

(b) (U) The US Air Force Reserve and Air National Guard airlift forces total 288 C-130 aircraft assigned to 31 squadrons located throughout the CONUS.

(c) (U) Augmenting Air Force C-130 airlift aircraft in time of national emergency will be 26 Boeing-727 and 14 DC 8-50F freighter aircraft. These are CRAF short-range international aircraft that would support airlift requirements from the CONUS to close off-shore destinations (Greenland, Caribbean, Alaska).

C.2.2.1.5 Resource Utilization

(a) (U) The current military airlift force (PAA) consists of 234 C-141s, 70 C-5s, and 506 C-130s. Most will be available within a few days regardless of the degree of mobilization.

(b) (U) Consideration must be given to other worldwide airlift requirements.

(c) Under partial mobilization the Joint Chiefs of Staff will allocate for other worldwide needs, leaving available for deployment. 4

(d) Under full mobilization, are available to support the deployment with aircraft allocated for support of other theaters. US civilian aircraft that are specifially identified for military use are in the CRAF. 4

(d) (U) CRAF Stage II aircraft are assumed to be available at their onload bases 24 hours after activation.

(f) (U) CRAF Stage III aircraft are assumed to be available at their onload bases 48 hours (72 hours for NATO Civil Augmentation Aircraft (NCAA) after activation of CRAF Stage III and declaration of NATO/US full mobilization.

(g) (U) CRAF enhancement is treated as study variable.

(h) (U) C-130 aircraft resources are not available for the intertheater movement role. C-130 airlift resources deployed to the Persian Gulf are not available for NATO.

C.2.2.1.6 Airlift Attrition

Airlift attrition will be considered as a variable (attrition as shown in Table C.4 or no attrition) in order to determine its impact on the mobility planning force size. These numbers are valid for the NATO war portion of the scenario only. Aircraft attrition varies with the length of ground time in a hostile environment. Attrition will not be considered for the Persian Gulf - Scenario I, however, it will be a study variable in Scenario II. NATO intertheater attrition for the C-X will use C-141 factors. NCAA aircraft attrition will be assumed same as CRAF.

C.2.2.1.7 Aircraft Cabin Loads

(U) Tables and C.9 C.10 identify average aircraft payloads used for simulations by the types of cargo to be moved. The Airlift Loading Model (ALM) optimizes the loading of aircraft for spaces and payload. Average payloads were determined by loading each aircraft type individually with each unit/commodity. The following assumptions were used to generate this table:

- Units are loaded at battalion level or lower and represent 1986 modernized forces.
- All equipment for the unit level specified is available for loading.

- Passengers were loaded aboard military cargo aircraft on a space available basis (after cargo) with the following maximum limits:

  C-5 73 pax

  C-141 70 pax

- Critical leg of 3100 n mi
- No fuel is required in the objective area.
- Resupply bulk pallets are 2.3 tons each. Ammunition pallets are 3.3 tons each.
- Average payloads are those achieved if each aircraft type is expected to airlift the commodity type (aggregation of units i.e., Air Force) by itself.
- Maximum Allowable Cabin Loads (ACL)(pounds) are as shown in Table C.5.
- Lower lobe capability for B-747 equivalent cargo aircraft was used for bulk cargo. Average lower lobe capacities based upon 15 lb/ft^3 were factored into B-747 average payloads. This allows up to 45 short tons in the lower lobe of the B-747 as limited by the maximum ACL.
- Lower lobe utilization in CRAF passenger aircraft is based on data contained in Tables C.6 and C.7. We use 300 and 350 lb per man for the non-NATO and NATO deployments respectively. (See Section C.2.2.1.9 for expanded explanation of this computation.) Thus the lower lobe capability after the individual's weight and accompanying baggage is subtracted is as shown in Table C.7.

(U) Aircraft block speeds as a function of aerial refueling are as shown in Table C.8.

(U) Aerial refueling will be used as a study variation for military aircraft.

C.2.2.1.8 Airlift Movement Planning Factors.

(U) The factors shown in Table C.11 are used by the Interactive Strategic Deployment Model (ISDM) to compute "closure" when added to the "delivery" date.

TABLE C.1
AIRCRAFT AVAILABLE FOR ANALYSIS[1, 8] (U)

	FY 82		FY 86		FY 90	
MAC	Part. Mob.	Full Mob.	Part. Mob.	Full Mob.	Part. Mob.	Full Mob.
C-5						
C-141B						
C-130						
CRAF						
Wide Body Cargo[3, 4]						
Narrow Body Cargo[5, 6]						
Narrow Body Pax[5]						
Wide-Body Pax[3]						
NATO Civil Augmentation Aircraft (NCAA)						
Wide Body Cargo[3, 4, 7]						
Narrow-Body Cargo[5, 6, 7]						

NOTES:

1 Indicates Primary Authorized Aircraft (PAA) available for employment.

2 will be dedicated to the Persian Gulf and to Iran for intra-theater airlift.

3 B747 equivalents.

4 Used for oversize and bulk cargo.

5 B707 equivalents.

6 Used for bulk cargo only.

7 Assumes percent of forecast NATO capability less France.

8 The number of C-X aircraft required for the mobility force is a study variable.

9 Includes the currently programmed CRAF enhancement aircraft and is predicated on program implementation and continued funding for 43 wide-body aircraft (32-B747 equivalents) by FY 86. Number in ( ) show without CRAF Enhancement (53-B747 equivalents).

10 Assumes CRAF Enhancement funding by FY 86-88 for 22 additional wide-body aircraft to achieve the current objective of 65 CRAF Enhancement aircraft (50-B747 equivalents), and a civil procurement of one B747 and one DC-10 cargo capable aircraft each year from 1987 through 1990 outside the CRAF Enhancement program.

11 Balance of C-130 aircraft support other theaters and are not available for deployment.

TABLE C.2

UTILIZATION RATES (HOURS)[1]
PARTIAL AND FULL MOBILIZATION (U)

FY 1982

C-5 [2] 5

C-141 [2]

CRAF [3]

C-130

FY 1986 and 1990

C-5 [2 4]

C-141 [2 4]

CRAF [3] 5

C-130

C-X [4 5]

NOTES:

1 Represents the average flying hours per day per aircraft attainable for the PAA inventory in Table B-1.

2 Reflects estimated utilization rates that will be attainable with the anticipated level of WRM spares and aircrew/maintenance manning for the Fiscal Year indicated.

3 CRAF and NCAA fleet are both assumed to have the capability to sustain these utilization rates. Assumes CRAF/NCAA self-support is in place and available when needed.

4 FY 86 and 90 predicated on funding of necessary WRM spares and aircrew/maintenance manning to achieve objective utilization rates.

5 C-X utilization rates are applicable to FY 90 only, and are estimates considering known factors regarding current airlift force structure capability. C-X is a variable resource for the analysis.

UNCLASSIFIED

TABLE C.3 (U)

TIME-PHASED AIRCRAFT AVAILABILITY[1 9] (U)

	Scenario I (Deployment to Saudi Arabia) (C-Day = M-Day)				Scenario II (Soviet Invasion of Iran) (C-Day = M+1)				
	C-Day	C+1	C+2	C+3-60	C-Day	C+1	C+2-3	C+4	C+5-60
1982									
C-5	27	47	55	65	47	55	65	64	64
C-141 [2]	87	151	158	199	151	158	199	215	215
B-747 Cargo [3 10]	0	24	24	24	24	24	24	24	49
B-707 Cargo [5 10]	0	63	63	63	63	63	63	63	78
B-707 PAX [5 10]	0	1	1	1	1	1	1	1	97
B-747 PAX [3 10]	0	15	15	15	15	15	15	15	143
1986									
C-5 [6]	27	47	55	65	47	55	65	64	64
C-141 [2]	87	151	158	199	151	158	199	215	215
B-747 Cargo [3 7 10 11]	0	35	35	35	35	35	35	35	85
B-707 Cargo [5 10 11]	0	30	30	30	30	30	30	30	45
B-747 PAX [3 10 11]	0	15	15	15	15	15	15	15	187
1990									
C-5 [6]	27	47	55	65	47	55	65	64	64
C-141 [2]	87	151	158	199	151	158	199	215	215
B-747 Cargo [3 7 8 10 11]	0	45	45	45	45	45	45	45	112
B-707 Cargo [5 10 11]	0	—	—	—	0	—	—	—	—
B-747 PAX [3 10 11]	0	15	15	15	15	15	15	15	187

	Scenario III (NATO-Warsaw Pact Conflict) (C-Day = M-Day)				Scenario IV (Simult, PG & Europe) (C-Day = M-Day)						
	C-Day	C+1	C+2	C+3-60 [4]	C-Day	C+1	C+2	C+3-15	C+16-17	C+18	C+19-60 [4]
1982											
C-5	28	50	58	64	27	47	55	65	64	64	64
C-141 [2]	107	187	199	215	87	151	158	199	215	215	215
B-747 Cargo [3 10]	0	24	49	55	0	24	24	24	24	49	55
B-707 Cargo [5 10]	0	63	78	123	0	63	63	63	63	78	123
B-707 PAX [5 10]	0	1	97	97	0	1	1	1	1	97	97
B-747 PAX [3 10]	0	15	143	143	0	15	15	15	15	143	143
1986											
C-5 [6]	28	50	58	64	27	47	55	65	64	64	64
C-141 [2]	107	187	199	215	87	151	158	199	215	215	215
B-747 Cargo [3 7 10 11]	0	35	85	95	0	35	35	35	35	85	95
B-707 Cargo [5 10 11]	0	30	45	90	0	30	30	30	30	45	90
B-747 PAX [3 10 11]	0	15	187	187	0	15	15	15	15	187	187
1990											
C-5 [6]	28	50	58	64	27	47	55	65	64	64	64
C-141 [2]	107	187	199	215	87	151	158	199	215	215	215
B-747 Cargo [3 7 8 10 11]	0	45	112	122	0	45	45	45	45	112	122
B-707 Cargo [5 10 11]	0	0	0	45	0	—	—	—	—	—	45
B-747 PAX [3 10 11]	0	15	187	187	0	15	15	15	15	187	187

1 All references to C-day assume C-day is 24 hours long.
2 Assumes all C-141s are modified by FY 82.
3 B747 equivalents.
4 Includes NATO Civil Augmentation Aircraft (NCAA).
5 B707 equivalents.
6 Assumes all C-5s are modified by FY 86.
7 Includes the currently programmed CRAF enhanced aircraft, and is predicated on program implementation and continued funding for 43 wide body aircraft by FY 86.
8 Assumes CRAF Enhancement funding FY 86-88 for 22 additional wide body aircraft to achieve the current objective of 65 CRAF enhancement aircraft, and a civil procurement of one B747 and one DC-10 cargo capable aircraft each year from 1987 through 1990 outside the CRAF Enhancement Program.
9 C-? is a variable resource for the analysis.
10 Assumes all CRAF Stage III aircraft are available in 48 hours (72 hours for NCAA) at their designated onload bases as of 0001 hours on C+2 for CRAF and C+3 for NATO (FY 86 + FY 90).
11 Assumes all CRAF Stage II aircraft are available in 24 hours at their designated onload bases as of 0001 hours on C+1 (FY 86 + FY 90).

UNCLASSIFIED

241

TABLE C.4

AIRLIFT MISSION ATTRITION RATES, EUROPE[1 2 3 4] (U)
(FY 82, 86, 90)

Percent of missions attrited per period

	D-day through D+2	D+3 through D+9	D+10 through D+14	D+15 through D+19	D+20 through D+29	D+30 through D+49	D+50 through D+69	D+70 through D+180
C5								
C141								
CRAF								
Avg 4/								

5

1 Mission -- trip to and from a destination by one aircraft.

2 Weighted average based on number of aircraft for each type aircraft. Attrition rate:

$$\frac{\text{Number of missions lost}}{\text{Number of missions in threat area}}$$

3 ISDM permits only one value for attrition; thus the average value is used.

4 Percent of sorties in threat area is

TABLE C.5 (U)

CARGO AIRCRAFT MAXIMUM ALLOWABLE CABIN LOADS (ACL)(Pounds)(U)

	Air Refueled	Non-Air Refueled
C-5A [2] [3]	204,904	198,000
C-5M [2] [4]	242,500	201,000
C-141B [2] [5]	90,200	75,000
C-X [2]	130,000	106,000
CRAF Wide-Body (747 equiv) [6]	—	193,600
CRAF Narrow-Body (707 equiv) [7]	—	59,800

1 3,100nm critical leg.

2 2.25 g load factor + 25kt wind factor, 5% fuel conservation, cruise climb, cruise climb contingency fuel reserves.

3 C-5A takeoff/inflight weight = 769,000 lb.

4 C-5A aircraft with wing modification takeoff weight = 794,000 lb.

5 C-141B takeoff/inflight weight = 334,500 lbs.

6 B-747Eq = B-747-200C.

7 B-707Eq = B-707-300C.

TABLE C.6 (U)

CRAF PASSENGER AIRCRAFT CHARACTERISTICS (U)

Type	Seats	Max ACL (lb)	Max Wt of Each Pax & Baggage (lb)
747-200B	364	146,350	402
707-320B	165	53,900	326

TABLE C.7 (U)

PASSENGER AIRCRAFT LOWER LOBE CAPACITY (U)

	NATO	Non-NATO
B-747	9.5	18.6
B-707	0	2.2

[1](U) Expressed in terms of equivalents (i.e., DC-10 is 0.7 x 747 equivalents)

TABLE C.8 (U)

AIRCRAFT BLOCK SPEEDS (knots) (U)

	Air Refueled	Non-Air Refueled[1]
C-5, C-5M	441	428
C-141B	425	415
C-X	450	432
B-747	-	455
B-707	-	445

[1](U) An error in computation of block speeds was discovered when the study was nearly completed. The values used in simulations (non-air refueled) were: C-5, C-5M-397; C-141B-386; C-X400. The net effect on airlift capability was a 4% reduction through use of the lesser block speeds.

UNCLASSIFIED

TABLE C.9 (U)

AVERAGE PAYLOADS ACHIEVED AT MAXIMUM ACL FOR 3100 n mi CRITICAL LEG FOR MILITARY AND CIVILIAN AIRCRAFT[1 2 3 4] (U)

	C-5A		C-5M		CX		C-141B	B-747EQ	B-707EQ[7]
	Outsize[5]	Oversize[6]	Outsize[5]	Oversize[6]	Outsize[5]	Oversize[6]			
Air Force	49.6 / 49.9	69.2 / 69.5	49.7 / 50.1	69.2 / 71.7	31.3 / 31.6	46.0 / 48.2	23.3 / 23.4	89.3	29.9
Airborne	59.0 / 59.2	71.3 / 71.9	59.0 / 61.4	71.5 / 72.7	33.0 / 33.6	37.8 / 38.9	24.1 / 24.6	89.1	29.9
Airmobile	40.8 / 40.9	68.8 / 68.9	40.8 / 41.2	69.3 / 69.8	22.8 / 22.8	35.2 / 35.9	24.2 / 24.6	89.1	29.9
Ammunition	NA	NA	NA	NA	NA	NA	32.5 / 42.9	96.8	29.9
ACR	85.0 / 85.5	84.2 / 86.3	85.2 / 116.4	86.7 / 95.8	48.7 / 61.5	46.3 / 50.0	31.1 / 33.4	87.7	29.9
Armored	85.0 / 85.5	84.2 / 86.3	85.2 / 116.4	86.7 / 95.8	48.9 / 61.5	46.3 / 50.0	31.1 / 33.4	87.7	29.9
CBAC	37.7 / 37.8	72.6 / 74.8	37.7 / 38.0	73.6 / 76.9	24.9 / 24.9	34.3 / 34.4	28.3 / 29.7	87.7	29.9
CS	92.8 / 95.4	87.4 / 88.6	94.0 / 107.7	87.8 / 94.5	49.7 / 57.1	46.8 / 48.7	32.1 / 34.1	89.0	29.9
CSS	74.2 / 75.0	62.9 / 62.9	74.6 / 78.1	62.9 / 65.2	39.3 / 40.8	33.6 / 34.1	25.6 / 26.2	79.7	29.9
Infantry	82.4 / 83.0	78.4 / 79.0	83.0 / 99.2	78.9 / 83.3	43.0 / 53.0	41.7 / 42.4	28.7 / 29.6	87.5	29.9

UNCLASSIFIED

345

TABLE C.9 (Cont.) (U)

AVERAGE PAYLOADS ACHIEVED AT MAXIMUM ACL FOR 3100 n mi CRITICAL LEG FOR MILITARY AND CIVILIAN AIRCRAFT[1 2 3 4] (U)

	C-5A		C-5M		CX		C-141B	B-747EQ	B-707EQ[7]
	Outsize[5]	Oversize[6]	Outsize[5]	Oversize[6]	Outsize[5]	Oversize[6]			
Marines	90.6 / 92.9	75.7 / 75.8	91.2 / 104.8	76.5 / 76.2	52.0 / 61.4	38.7 / 38.9	26.6 / 26.2	88.0	29.9
Mechanized	83.4 / 86.1	83.3 / 84.3	85.3 / 109.8	83.4 / 92.6	46.6 / 59.1	44.5 / 46.8	30.8 / 32.6	87.1	29.9
Navy	49.6 / 49.9	69.2 / 69.5	49.7 / 50.1	69.2 / 71.7	31.3 / 31.6	46.0 / 48.2	23.3 / 23.4	89.3	29.9
Prepo	42.6 / 42.6	29.8 / 29.8	42.6 / 42.3	29.8 / 30.3	28.7 / 29.2	38.7 / 41.6	14.4 / 14.5	89.1	29.9
Resupply	NA	NA	NA	NA	NA	NA	29.9 / 29.9	96.8	29.9

[1] Average payloads for aircraft capable of aerial refueling are expressed: Without Aerial Refueling / With Aerial Refueling

[2] Payload weight includes: passengers, bulk, oversize, outsize (C5/C-X only) cargo.

[3] Payloads exclude weight of pallets and nets (354 lb) for cargo loading.

[4] All vehicles were loaded to their maximum capacity with bulk cargo after vehicle loading, excess aircraft space/payload was filled with bulk cargo.

[5] Payload when aircraft is moving predominately outsize cargo.

[6] Payload when aircraft is mostly oversize and bulk cargo.

[7] Bulk only.

UNCLASSIFIED

UNCLASSIFIED

TABLE C.10 (U)

PERCENTAGE OF AVERAGE PAYLOAD WEIGHT BY CARGO TYPE (EQUIPMENT LOADED)[2] AND AVERAGE # OF PASSENGERS (NATO/NON-NATO) (U)

	C5A Outsize (AR/Non-AR) C5M Outsize (Non-AR)				C5M Outsize (AR)				C5A C5M Oversize (AR/Non-AR)			C-X Outsize				C-X Oversize AR/Non-AR			C-141B AR/Non-AR			B-747EQ		
	Pax[1]	Bulk	Over	Out	Pax[1]	Bulk	Over	Out	Pax[1]	Bulk	Over	Pax[1]	Bulk	Over	Out	Pax[1]	Bulk	Over	Pax[1]	Bulk	Over	Pax[1]	Bulk	Over
Air Force	47/55	5	9	86	47/45	5	9	86	39/55	16	84	7/8	5	8	87	3/3	10	86	6/7	13	87	-	11	89
Airborne	44/52	5	20	75	46/54	3	21	76	36/42	15	85	13/15	3	27	70	12/14	15	80	11/13	10	90	-	17	83
Airmobile	29/34	5	32	63	29/34	5	33	62	36/42	24	76	13/16	4	40	56	12/14	24	70	12/14	34	76	-	22	78
Ammunition		N/A				N/A				N/A			N/A				N/A		-	100	-	-	100	-
ACR	10/12	4	14	82	10/11	0	7	93	17/20	14	86	8/9	3	15	82	7/9	14	84	8/9	17	83	-	36	64
Armored	10/12	4	14	82	10/20	0	7	93	17/20	14	86	8/9	3	15	82	7/9	14	84	8/9	17	83	-	36	64
CBAC	37/43	5	21	74	37/43	4	23	73	2/3	1	99	14/16	4	42	54	7/8	2	95	10/12	3	97	-	23	77
CS	16/18	1	7	92	21/24	1	11	88	18/21	10	90	5/6	2	12	86	10/12	10	86	8/9	13	87	-	34	66
CSS	20/23	2	19	79	24/28	2	22	76	21/25	8	92	10/12	3	11	86	9/10	7	88	12/14	7	93	-	16	84
Infantry	17/20	3	12	85	20/24	1	8	91	26/31	16	84	11/13	3	17	80	10/11	17	79	14/17	17	83	-	29	71
Marines	13/15	0	4	96	19/22	0	2	98	36/65	47	53	5/6	0	15	85	15/17	61	33	22/26	53	47	-	32	68
Mechanized	11/13	3	13	84	12/14	0	8	92	15/18	13	87	8/9	2	12	86	9/10	15	81	13/15	16	84	-	33	67
Navy	47/55	5	9	86	47/55	5	9	86	36/42	16	84	7/8	5	8	87	3/3	10	86	0/0	13	87	-	11	89
Prepo	51/60	0	23	77	51/60	1	22	77	51/60	3	97	12/14	1	23	76	5/6	2	98	6/7	2	98	-	17	83
Resupply		N/A				N/A				N/A			N/A				N/A		-	100	-	-	100	-

[1] Average number of passengers (NATO/Non-NATO)

[2] Non-mobile unit equipment (UE) and accompanying supplies loaded on unit vehicle where possible. Bulk percentage reflects only palletized bulk cargo.

UNCLASSIFIED

347

TABLE C.11 (U)

AIRLIFT PLANNING FACTORS FOR STRATEGIC DEPLOYMENT ACTIVITY (U)
(Days by Cargo Type)

	Marry-Up	LOC by Country								
		UK	BE-FR	GE	SP	IT	GR	PG	IC	NO
Air Force	0	0	0	0	0	0	0	0	0	0
Prepo	2	2	2	2	2	2	2	2	1	1
Airborne D	1	2	2	2	2	2	2	2	1	2
Armored D	1	2	2	2	2	2	2	2	1	2
Armored B	1	2	2	2	2	2	2	2	1	2
Mech D	1	2	2	2	2	2	2	2	1	2
24th Mech	1	2	2	2	2	2	2	2	1	2
Airmobile D	1	2	2	2	2	2	2	2	1	2
Air Cav B	1	2	2	2	2	2	2	2	1	2
Infantry D	1	2	2	2	2	2	2	2	1	2
Infantry B	1	2	2	2	2	2	2	2	1	2
Arm Cav Rg	1	2	2	2	2	2	2	2	1	2
24th Spt	1	2	2	2	2	2	2	2	1	2
NONDIV Cbt	1	2	2	2	2	2	2	2	1	2
Tac Support	1	2	2	2	2	2	2	2	1	2
Marines	1	2	2	2	2	2	2	2	1	1
Navy	1	2	2	2	2	2	2	2	1	2
Resupply	0	2	2	2	2	2	2	2	1	2
Ammunition	0	2	2	2	2	2	2	2	1	2

NOTE:

POM = Preparation for Movement
LOC = Line of Communication Movement
Country Codes = UK=United Kingdom; BE-FR=Belgium-France; GE=FED. REP. GER.; SP=Spain; IT= Italy; GR=Greece; IC=Iceland, NO=Norway; PG=Persian Gulf--intratheater analysis will be examined in detail outside of computer simulation in this study.

C.2.2.2 Sealift

C.2.2.2.1 General

(U) As was the case for airlift forces, the number of strategic sealift ships available to support US force deployments is dependent upon the scenario under consideration. In a NATO contingency, for example, US shipping assets would be augmented by non-US NATO ships. A deployment such as one to the Persian Gulf cán be supported by several sources of sealift. Under conditions of ship availability which have been labeled for study purposes "nonmobilized" (Scenario I), this study assumes that ships will be drawn from the MSC-controlled fleet, the RRF of the NDRF, voluntary charters from the US Merchant Marine, and assets of the US Merchant Marine committed to the SRP. It should be emphasized that although not included in nonmobilized lift forces for study purposes, selective requisitioning is permitted in accordance with the provisions of public law, on the issuance of a presidential directive stating that such requisitioning is required for the national defense. Under conditions of lift availability labeled "mobilized" (Scenario I, II, and IV), this study assumes use of ships from the MSC-controlled fleet, the NDRF (including the RRF) and requisitioning of US flag and EUSC shipping. All tabular data on sealift resources and operation parameters is shown on Tables C.12 through C.20 at the end of Sec. C.2.2.2.

C.2.2.2.2 Sealift Resources

(a) (U) MSC--Controlled Fleet. This fleet is sized for the peacetime movement of cargo and has a very limited surge capability. For purposes of this study the FY 82 MSC controlled fleet is assumed to be about 20 dry cargo ships and 30 tankers. The MSC maintains about five of these ships in a Reduced Operating Status (RDS). This US Navy funded program maintains in readiness ships not continuously in use so they can be placed on-berth within 3-5 days of notification for a contingency.

(b) (U) US-Flag Merchant Marine Fleet. Other than voluntary charters, availability of ships from this fleet is governed by the Merchant Marine Act of 1936, as amended which permits requisitioning, purchase, or charter of any vessel owned by US citizens or under construction within the US whenever the President declares a national emergency or proclaims that needs of national security make it advisable.

(c) (U) Effective US Control (EUSC) Fleet. The ships in this fleet are US-owned or US-controlled ships of foreign registry (Panama, Honduras, Liberia) of 1000 gross tons or more with agreements with the Maritime Adminisistration (MARAD) and can reasonably be expected to be made available for US use in time of emergency. Although there are over 400 ships currently in this category, only about 15 dry cargo and 52 tankers are suitable for military use.

(d) National Defense Reserve Fleet (NDRF). The NDRF is comprised of preserved merchant and ex-US Navy ships maintained by MARAD. Included are 130 Victory ships, nine Seatrain ships, and nine tankers which have been identified for reactivation and use in a strategic mobility sealift role. The NDRF would normally be available only during periods of national emergency. Breakout time in the event of mobilization is estimated to be 21 days for the first ship, with the last ship becoming available by the 60th day.

(e) (U) Ready Reserve Force (RRF). The RRF has been established as an element of NDRF by the Department of the Navy and MARAD. Ships are placed in the RRF after being upgraded, and they provide a dedicated fleet which can be placed on-berth within 5-10 days of notification.

There are currently about 26 dry cargo ships in the RRF and the program is scheduled to grow to over 40 ships, including some tankers, by FY 1986.

(f) (U) Non-US NATO Shipping. Procedures have been established to make non-US NATO shipping available to the United States for the reinforcement of Europe in the event of a NATO war. Nearly 650 dry cargo ships are earmarked to satisfy a potential requirement for 400 NATO bottoms.

(g) (U) Sealift Readiness Program (SRP). Ships in this program are contractually committed for DoD use in contingencies (nonmobilized). Their callup for military use must be agreed to jointly by the Secretaries of Defense and Commerce. Commitment of ships by owners is a prerequisite to sharing in peacetime DoD cargo lift contracts or to receive certain maritime subsidies. Shipping companies with ships in the SRP are to make their fleets available on the following schedule:

(1) 20% within 10 days.
(2) 50% within 30 days.
(3) 100% within 60 days.

Currently, this program includes about 175 dry cargo ships and 40 tankers.

(h) (U) Amphibious Shipping. Table C.12 shows the type and number of amphibious ships currently available and programmed for FY 1986. The table also reflects the quantity notionally required to lift the AE of a MAF.

C.2.2.2.3 Out-of-Theater and Civil Economy Requirements

(a) (U) General. There exists a workload which competes with the Service requirements for lift resources during a contingency deployment. This workload consists of the materiel needed to support DoD commitments in other parts of the world and to prevent severe restrictions on the US war effort at home. These requirements are constant and recurring. Therefore, for planning purposes, ships and aircraft adequate for the workload are withheld for this mission.

(b) (U) Airlift. The out-of-theater airlift is the planned amount of airlift capability considered necessary to sustain operational activities related to the maintenance of combat readiness in those theaters not involved in combat operations. It is sized at a minimum level of airlift capability on a route structure and frequency-of-service basis established by the Joint Chiefs of Staff. The airlift requirement includes consideration of such items as Embassy support, aeromedical evacuation, and special assignment airlift missions. Transportation requirements for force deployments, redeployments, and contingency operations are not included in the category of additional airlift. Depending on the requirements, and urgency of a given situation, part or all of this airlift may be allocated for support of specific military operations. However, for planning purposes, it is not considered available.

(c) (U) Sealift

(1) (U) Sealift withheld for DoD support is the planned amount of sealift capability considered necessary to support concurrent requirements in support of out-of-theater readiness planning and is sized at a minimum level established by the Joint Chiefs of Staff. This requirement provides for:

- Assured support of essential resupply of DoD forces and bases in overseas theaters not in the geographic areas of contingency operations.

- o Transport of essential military assistance commodities to and from other countries.

(2) (U) Complementary to the out of theater force readiness sealift requirement is the need to consider ship requirements related to the support of the civil wartime economy. The sealift withheld for this purpose is coordinated with the MARAD and relates to inbound, outbound, and coast-wise commercial sea traffic considered necessary to maintain a viable US economic base.

C.2.2.2.4 Resource Availability

The total sealift resources available (less ship withholds) for use in the various scenarios are shown in Table C.13. All ships information used in this study is contained in a data base maintained by OASD(PA&E) called "SHIPS MASTER". This data base was created from characteristics and availability data received by the JCS from MSC during Spring 1980 in support of the JPAM analysis. This study will use the JPAM availability data. Availabilities reflect a "snapshot" of the ships' positions at some point in time. These are a function of position reports received by MSC on a regular basis. They then use these position reports along with average ship speed to determine when the ship may be available at a set of ports. In that we expect trade routes and frequency of shipping to remain essentially the same during the 1980s, these same ship availabilities will be used for all the years (1982, 1986, 1990). NATO shipping availabilities may be considered optimistic since they do not consider priority accorded to nations under whose flag they sail. For this study though, availability is modified as a function of warning period actions, particularly for the SRP, RRF, and MSC controlled fleets. Table C.14 portrays ship availability by ship type for each of the scenarios given the resources identified. Withholds used are shown in Table C.15.

C.2.2.2.5 Application of Sealift Resources

(U) In applying the sealift capability to the common user movement requirements, the decision rules and order of priority are as follows:

(a) (U) SEATRAIN, SEA BARGE, RO/RO, SL-7 and LASH lift capability will be applied entirely against movement of UE. Non-Self Deployment Aircraft (NSDA) movement requirements are included in moving UE. RO/RO, SL-7, LASH, SEATRAIN, or SEA BARGE have priority over the breakbulk ship for UE movements.

(b) (U) Breakbulk cargo ship capability will be applied first to residual UE requirements then to non-containerized general resupply and ammunition requirements.

(c) (U) Containership capability will be applied to the movement of containerized general resupply and ammunition requirements. For containerized cargo self-sustaining ships have priority over non-self-sustaining type.

(d) (U) Faster ships take priority over slower ones within ship classes and within similar ship availability.

C.2.2.2.6 Deployment Planning Factors

(U) Planning factors for movement by sea are contained in Tables C.16 and C.17.

C.2.2.2.7 Attrition (NATO War)

(U) Attrition numbers for sealift are valid for the NATO war portion of the scenario only. As with airlift, sealift attrition will be considered as a variable in order to determine its impact on the programmed mobility force. The current estimate of percent of ships lost per period is shown in Table C.18.

C.2.2.2.8 Convoying Policy and Movement Factors

(a) Dry Cargo Ships.

(b) POL Tankers.

(c) Independent Policy.

4

(d) Convoy Size and Configuration.

(e) Refueling.

(f) Convoy Speed.

(g) Escorts.

355

(h) Convoy Assembly Time.

(i) Convoy Assembly Area.

4

(j) Convoy Dispersing Area.

(k) POE to Assembly Area Distances. See Table C.19.

(l) Assembly to Atlantic High Threat Area.

(m)

(n) Ship Cargo Capacities. Table C.20 shows ship cargo density factors applied against measurement ton capacities specified for each ship type which are derived from input capacities of total bale cube.

356

TABLE C.12 (U)

AMPHIBIOUS SHIP RESOURCES (U)

	FY 1982	FY 1986	MAF(AE) Requirements
LCC-Amphibious Command and Control	2	2	2
LHA-Amphibious Assault Helicopter	5	5	5
LKA-Amphibious Assault Cargo	5[1]	5[1]	4
LPD-Landing Platform Dock	15	15	10
LPH-Landing Platform Helicopter	7	7	5
LSD-Landing Ship Dock	13	12	10
LST-Landing Ship Tank	20[2]	20[2]	15

[1] Includes four LKA in the Navy Reserve Fleet (NRF).

[2] Includes 2 LST in the NRF

TABLE C.13 (U)

AVAILABLE DRY CARGO SEALIFT RESOURCES (U)

FY 82 -- Available Dry Cargo Sealift Resources

Type	MSC	RRF	NDRF	US Flag	NATO	Total
B/B (Fast)	11	13	7	45	77	153
B/B (Slow)	3	7	1	52	239	302
B/B (Victory)	0	0	122	0	0	122
Cont (Fast NSS)	0	0	0	32	17	49
Cont (Fast SS)	0	0	2	5	0	7
Cont (Slow NSS)	0	0	0	4	4	8
Cont (Slow SS)	0	0	0	4	7	11
LASH/SEABEE	0	0	0	20	1	21
RO/RO (Fast)	1	0	0	13	19	33
RO/RO (Slow)	1	0	0	3	36	40
SEATRAIN	0	9	2	0	0	11
SL-7	0	0	0	8	0	8
Total	16	29	134	186	400	765

FY 86 -- Available Dry Cargo Sealift Resources

Type	MSC	RRF	NDRF	US Flag	NATO	Total
B/B (Fast)	14	15	7	45	77	158
B/B (Slow)	3	10	1	52	239	305
B/B (Victory)	0	0	123	0	0	123
Cont (Fast NSS)	0	0	0	39	17	56
Cont (Fast SS)	0	0	2	5	0	7
Cont (Slow NSS)	0	0	0	4	4	8
Cont (Slow SS)	0	0	0	4	7	11
LASH/SEABEE	0	0	0	22	1	23
RO/RO (Fast)	2	0	0	16	19	37
RO/RO (Slow)	1	0	0	3	36	40
SEATRAIN	0	9	2	0	0	11
SL-7	0	0	0	8	0	8
Total	20	34	135	198	400	787

TABLE C.14 (U)

TIME-PHASED SHIP AVAILABILITY (1st TRIP) (U)
(DAYS RELATIVE TO C-DAY)

Scenario	Year	Ship Type	0-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56+	Total
I	82/86/90	Breakbulk	33	51	23	4	17	3	0	0	0	0	0	0	131
		Container	21	9	11	8	0	0	3	1	0	0	0	0	53
		Other	14	5	3	1	0	0	0	0	0	0	0	0	23
		RO/RO	4	3	4	0	0	0	0	0	0	0	0	0	11
		Total	72	68	41	13	17	3	3	1	0	0	0	0	218
II	82	Breakbulk	32	40	32	16	12	14	21	16	16	17	25	29	270
		Container	16	12	8	6	1	4	2	0	0	0	0	0	49
		Other	14	7	5	0	1	1	0	0	0	0	0	0	28
		RO/RO	2	8	3	4	1	0	0	0	0	0	0	0	18
		Total	64	67	48	26	15	19	23	16	16	17	25	29	365
II	86/90	Breakbulk	34	46	32	16	12	14	21	16	16	17	25	30	279
		Container	16	15	9	7	1	4	4	0	0	0	0	0	56
		Other	14	8	5	1	1	1	0	0	0	0	0	0	30
		RO/RO	3	11	3	4	1	0	0	0	0	0	0	0	22
		Total	67	80	49	28	15	19	25	16	16	17	25	30	387
III	82	Breakbulk	18	90	134	80	75	73	29	16	17	25	6	23	586
		Container	28	21	8	6	8	4	2	0	0	0	0	0	77
		Other	9	12	6	1	1	0	0	0	0	0	0	0	29
		RO/RO	17	20	16	14	2	4	0	0	0	0	0	0	73
		Total	72	143	164	101	86	81	31	16	17	25	6	23	765

UNCLASSIFIED

TABLE C.14 (Cont'd) (U)

TIME-PHASED SHIP AVAILABILITY (1st TRIP) (U)
(DAYS RELATIVE TO C-DAY)

Scenario	Year	Ship Type	0-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56+	Total
III	86/90	Breakbulk	20	95	135	80	75	73	29	16	17	25	7	23	595
		Container	28	21	12	7	8	4	2	2	0	0	0	0	84
		Other	9	12	7	2	1	0	0	0	0	0	0	0	31
		RO/RO	17	21	19	14	2	4	0	0	0	0	0	0	77
		Total	74	149	173	103	86	81	31	18	17	25	7	23	787
IV	82	Breakbulk	31	18	17	5	53	134	68	56	75	34	17	77	585
		Container	19	5	1	19	10	10	5	3	3	2	0	0	77
		Other	10	3	1	5	4	2	1	2	0	1	0	0	29
		RO/RO	2	1	0	13	13	18	13	6	7	1	0	0	74
		Total	62	27	19	42	80	164	87	67	85	38	17	77	765
IV	86/90	Breakbulk	31	18	17	7	55	135	68	56	79	35	17	76	594
		Container	20	5	1	18	13	11	6	3	3	3	1	0	84
		Other	14	4	2	2	4	2	2	1	0	0	0	0	31
		RO/RO	2	2	0	16	13	22	12	5	5	1	0	0	78
		Total	67	29	20	43	85	170	88	65	87	39	18	76	787

UNCLASSIFIED

TABLE C.15 (U)

SHIP WITHHOLDS (U)

	DoD	Civil	Maintenance
B/B (Fast)	15	2	4
B/B (Slow)	22		3
B/B (Victory)			4
Cont (Fast NSS)	12	4	2
Cont (Slow NSS)	4	23	2
Cont (Slow SS)		2	1
LASH/SB	3		1
RO/RO			2
SEATRAIN	1		

UNCLASSIFIED

TABLE C.16 (U)

SEALIFT PLANNING FACTORS FOR STRATEGIC DEPLOYMENT ACTIVITY (U)
(DAYS)

Element Description	Independent of Ship Type	Break Bulk	Container	RO/RO	COMBO	Sea Train	LASH	Sea Barge	SL-7[1]
1. Travel to POE (See Section C.2.)									
2. Loading									
a. Ammunition	—	4	2	—	—	—	—	—	1
b. All other units/resupply (All Services)	—	4	1	1	2	2	2	2	1
3. Off-loading									
a. Ammunition	—	4	2	—	—	—	—	—	1
b. All other units/resupply (All Services)	—	4	1	1	1	2	2	2	1
4. Marry-up									
a. USAF	2	—	—	—	—	—	—	—	—
b. All other units (All Services)	2	—	—	—	—	—	—	—	—
5. In-theater LOC Travel									
a. USAF	2	—	—	—	—	—	—	—	—
b. Army	2	—	—	—	—	—	—	—	—
c. All other units	2	—	—	—	—	—	—	—	—
d. Ammunition/Resupply	—	2	2	—	—	—	—	—	—

[1] "Fast Sealift" Program.

362

UNCLASSIFIED

TABLE C.17 (U)

BROKEN STOW (LOSS SPACE) FACTORS (U)

	Administrative Loading[1] (Percent of Capacity Lost)			Combat Loading
	Resupply	UE	Ammo	Percent of Capacity Lost
Breakbulk	20/45 [2]	20/45 [2]	50	50
Containership	20/45 [2]	20/45 [2]	45	45
RO/RO (Sq Ft)	20 [3]	20	N/A	N/A
LASH/SEA BARGE	0/45 [2]	20/45 [2]	N/A	50
SEATRAIN	20	20 [3]	N/A	N/A

1 Applicable to strategic deployments.
2 20 % loss for general cargo and 45 % loss for uncrated vehicles.
3 If capacity is based on measurement tons use note 2.

TABLE C.18

SEALIFT ATTRITION FACTORS, EUROPE (U)

Type Sailing	Percent of Ships at Sea Attributed Per Period
Convoy	
Independent	

Source: CNA, Sealift Attrition on the Atlantic SLOC(SEA WAR 85) (U) (Memorandum, 26 Dec 78)

5

363

TABLE C.19
DISTANCES TO ASSEMBLY ARE
AS (U)

POE	Distances (n mi x 100)
East Coast CONUS	
Gulf Coast CONUS	
West Coast CONUS	
Hawaii	
Pacific	

TABLE C.20 (U)

SHIP CARGO DENSITY FACTORS (U)
(Short Tons/Measurement Ton)
By Ship Type

	Break Bulk	Container	RO/RO	LASH	Sea Barge	SL-7	CUS	SES
Air Force	0.1344	0.0000	0.1384	0.1422	0.1381	0.0000	0.0973	0.1384
Prepo	0.0593	0.0000	0.1384	0.0810	0.0714	0.0000	0.0446	0.0498
Airborne D	0.1009	0.0279	0.1424	0.1113	0.1057	0.0000	0.0731	0.1424
Armored D	0.1873	0.0512	0.2086	0.1852	0.1888	0.0000	0.1361	0.2086
Armored B	0.1873	0.0512	0.2086	0.1852	0.1888	0.0000	0.1361	0.2086
Mech Div	0.1752	0.0477	0.1937	0.1759	0.1763	0.0000	0.1269	0.1937
24th Mech	0.1752	0.0477	0.1937	0.1759	0.1763	0.2329	0.1269	0.1937
Airmobile D	0.0743	0.0230	0.1610	0.0922	0.0833	0.0000	0.0652	0.1610
Air Cav B	0.0743	0.0230	0.1610	0.0922	0.0833	0.0000	0.0652	0.1610
Infantry D	0.1226	0.0352	0.1563	0.1338	0.1297	0.0000	0.0819	0.1563
Infantry B	0.1226	0.0352	0.1563	0.1338	0.1297	0.0000	0.0819	0.1563
Arm Cav Rg	0.1759	0.0446	0.2285	0.1720	0.1750	0.0000	0.1281	0.2285
24th Sup	0.1344	0.0376	0.1426	0.1422	0.1381	0.1757	0.0973	0.1426
NONDIV Cbt	0.1344	0.0376	0.1426	0.1422	0.1381	0.0000	0.0973	0.1426
Tac Support	0.1003	0.0298	0.1436	0.1092	0.1056	0.0000	0.0727	0.1436
Marines	0.1003	0.0000	0.0000	0.1092	0.1056	0.0000	0.0727	0.1436
Navy	0.1003	0.0000	0.0000	0.1092	0.1056	0.0000	0.0727	0.1436
Resupply	0.3206	0.3225	0.0000	0.0000	0.2825	0.0000	0.0000	0.0000
Ammunition	0.6219	0.3960	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

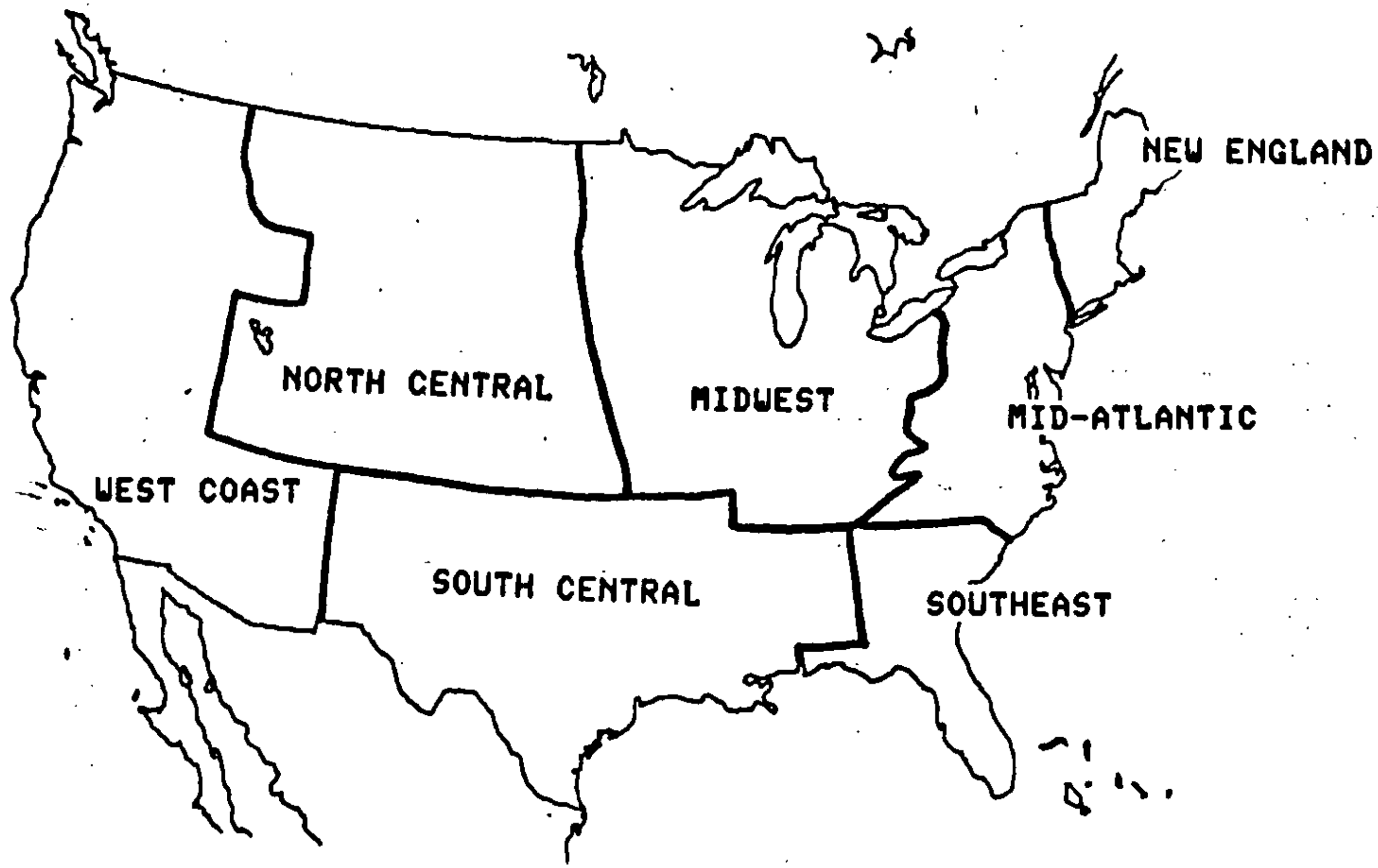
C.2.3 SIMULATION TIME AND DISTANCE DATA AND ASSUMPTIONS

C.2.3.1 Origin/Destination Areas

(U) The origin/destination for each movement requirement will be as specified by the appropriate Service. Air Force units and resupply data will originate from specified CONUS regional aerial POEs (APOE); i.e., east = McGuire AFB, N.J., central = Scott AFB, IL, west = Travis AFB, CA. Army forces (combat, support, and service support), resupply and ammunition, the state of origin will be indicated. Simplification of intra-CONUS movement is achieved by associating movement time delays between regional origin aggregation and POEs. All states except Alaska are aggregated into eight origin areas which are shown in Fig. C.1. Air forces will deploy to specified regional destinations designated as Norway, Germany, Italy, or Persian Gulf. All Army units, resupply and ammunition elements will be assigned destinations by country.

C.2.3.2 Origin to POE Movement Times

(U) For movement to APOEs from any origin within an origin area, travel time is considered to be by surface mode and estimated to take one day with the exception of Air Force units. The times in Table C.21 are prepared for movements to sea POEs (SPOEs) and include installation outloading time, rail or road movement time, and SPOE processing for shipment time. There are three exceptions: non-self-deployable aircraft (NSDA) normally fly to the SPOE; the 24th Infantry Division requires only two days to move to the port of Savannah; and, some Army support forces are located at or near SPOEs. These exceptions require adjustments to the ISDM model. Average installation outloading is considered to take two days for units using organic transportation, and three days for units moving by rail. Movement time is based on the average distance between origin installations within each area and notional SPOEs. The rate is 624 miles per day for rail movement if the distance exceeds 800 miles, or 400 miles per day for highway movement if the distance is 800 miles or less. SPOE processing time is estimated to take one day. This does not include shiploading time.



(U) Figure C.1. (U) CONUS Origin Regions

UNCLASSIFIED

TABLE C.21 (U)

TRAVEL TO SEA PORTS OF EMBARKATION* (U)
(Days)

		CONUS Region						
		Northeast/ Mid-Atlantic	Southeast	Midwest	S. Central	N. Plains	West Coast	Hawaii
SPOE	E. Coast	4	4	5	-	8	8	-
	Gulf Coast	6	4	4	3	6	6	-
	W. Coast	-	-	-	-	3	3	-
	Hawaii	-	-	-	-	-	-	1

*(U) For units designated to deploy on dedicated sealift we assume 2 days.

C.2.3.3 POEs

(U) POEs are generally selected on the basis of closest available to the destination considering the type of transportation required. For scenarios involving NATO (III and IV) general movement demand is from west to east. For example, West Coast based CONUS units may move overland to East Coast ports of embarkation. In the case of Scenario II West Coast and Pacific based units deploy east to west. POEs and PODs are aggregated for the purposes of the inter-theater simulations into notional ports based on geographic proximity. These aggregations are shown in Table C.22 (SPOE to SPOD) and Table C.23 (APOE to APOD) along with deployment distances.

TABLE C.22 (U)

DISTANCES SPOE TO SPOD[1] [2] (U)
(Thousands of Nautical Miles)
Sea Port of Debarkation (SPOD)

	NATO									Non-NATO								
	Europe				Mediterranean			N. Flank		Persian Gulf								
										Iran		Saudi Arabia		UAE		Egypt	Diego	Amphibious
SPOE	UK	Benelux	FRG	Spain	Italy	Greece	Turkey	Norway	Iceland	w/Suez	w/o Suez	w/Suez	w/o Suez	w/Suez	w/o Suez		Garcia	Objective Area
CONUS East (Norfolk)																		
Boston	3.3	3.4	3.4	3.9	4.6	5.2	5.1	3.7	2.3	7.8	12.1	5.7	11.4	7.9	12.2	4.8	8.4	7.8
New York, NY (Earle, NJ ammo)	3.4	3.5	3.5	4.0	4.7	5.3	5.2	3.9	2.5	8.0	12.1	5.8	11.4	8.1	12.3	5.0	8.6	8.0
*Norfolk, VA	3.6	3.9	3.9	4.1	4.6	5.2	5.2	4.6	2.9	8.1	12.1	6.0	11.4	8.3	12.3	5.2	8.8	8.1
Savannah, GA (Sunnypoint, NC ammo)	3.8	3.9	3.9	4.4	4.9	5.5	5.4	4.3	2.9	8.5	12.2	6.3	11.5	8.6	12.3	5.5	9.1	8.5
CONUS Central (Galveston)																		
*Galveston, TX	5.2	5.4	5.4	5.6	6.0	6.6	6.6	6.1	4.6	9.6	12.8	7.4	12.2	9.7	13.0	6.6	10.2	9.6
CONUS West (San Francisco)																		
Oakland, CA (Concord, CA ammo)	8.5	8.6	8.6	8.1	8.0	9.6	9.3	8.4	7.0	10.7	10.7	11.7	11.7	10.9	10.9	9.4	10.0	10.7
*San Francisco, CA	8.3	8.5	8.5	8.5	8.9	9.2	9.3	9.3	7.8	10.7	10.7	11.7	11.7	10.9	10.9	9.4	10.0	10.7
Seattle, WA	9.3	9.4	9.4	8.9	8.8	10.4	10.4	9.2	7.8	10.4	10.4	11.4	11.4	10.4	10.4	10.2	9.3	10.4
Hawaii (Hawaii)																		
*Honolulu, HI	9.7	10.0	10.0	10.0	10.4	11.0	11.1	10.7	9.3	9.3	9.3	10.2	10.2	9.4	9.4	10.9	8.1	9.3
Northwest Asia (Japan)																		
Naha, *Okinawa-Japan	13.7	13.9	13.9	14.0	14.4	15.0	15.0	14.7	13.3	5.5	5.5	6.3	6.2	5.7	5.6	7.3	4.4	5.5

[1] Distances are derived from H.O. Pub 151 + 10% for evasive maneuvering in the Atlantic.

[2] SPOEs identified with asterisk are used as the source for movement computations.

UNCLASSIFIED

TABLE C.23 (U)

DISTANCES - APOE TO APOD[1] (U)
(Thousands of Nautical Miles)
Aerial Port of Debarkation

	NATO								Non-NATO											
	Europe				Mediterranean		N. Flank		Persian Gulf [2] [3]											
APOE	UK	Benelux	FRG	Spain	Italy	Greece	Norway	Iceland	UAE	Qatar	Oman	Bahrain	Kuwait	Saudi Arabia (Dhahran)	Saudi Arabia (Riyadh)	Greece	Egypt	Turkey	Diego Garcia	Iran
McGuire AFB, NJ	3.2	3.5	3.5	3.2	3.9	4.6	3.3	2.4	6.5	6.3	6.7	6.2	6.1	6.2	6.0	4.8	5.2	5.3	8.6	6.5
Wright-Patterson AFB, OH	3.6	3.8	3.9	3.7	4.4	5.0	3.3	2.4	6.9	6.7	7.1	6.6	6.5	6.6	6.4	5.2	5.6	5.8	9.0	7.0
Robins AFB, GA	3.8	3.9	4.1	3.9	4.6	5.2	3.7	2.8	7.1	6.9	7.3	6.9	6.8	6.9	6.7	5.4	5.8	6.0	9.4	7.2
Scott AFB, IL	3.9	4.1	4.3	4.0	4.7	5.4	3.9	3.0	7.2	7.0	7.4	6.9	6.8	6.9	6.7	5.5	5.9	6.1	9.4	7.3
Tinker AFB, OK	4.3	4.5	4.7	4.4	5.1	5.8	4.0	3.1	7.6	7.4	7.8	7.3	7.2	7.3	7.1	5.9	6.3	6.5	9.8	7.7
Ellsworth AFB, SD	4.5	4.6	4.8	4.5	5.2	5.9	4.1	3.2	7.7	7.5	7.9	7.4	7.3	7.4	7.2	6.0	6.4	6.6	9.9	7.8
Travis AFB, CA	5.4	5.5	5.7	5.5	6.2	6.8	4.6	3.7	8.6	8.4	8.8	8.4	8.3	8.4	8.2	6.9	7.3	7.5	10.8	8.7
McChord AFB, WA	5.3	5.5	5.6	5.4	6.1	6.7	4.2	3.3	8.5	8.3	8.7	8.3	8.2	8.3	8.1	6.8	7.2	7.4	10.7	8.6
Hickam AFB, HI	7.5	7.7	7.9	7.6	8.3	9.1	6.7	5.8	10.7	10.5	10.9	10.5	10.4	10.5	10.3	9.1	9.5	9.6	12.9	10.9
Kadena AB, Okinawa	10.1	9.9	10.0	10.0	8.2	8.4	10.3	9.4	6.6	6.5	6.4	6.8	6.7	6.8	7.0	8.4	7.9	8.0	4.4	6.7

1 All routing is east bound except from Kadena to the Mediterranean and the Persian Gulf which is west bound.
2 East bound routing to the Persian Gulf is via Lajes-Gibraltar-Israel.
3 West bound routing to the Persian Gulf is via Straight of Malacca and Diego Garcia.

UNCLASSIFIED

370

C.2.4 PROGRAM FORCES

C.2.4.1 Force Tables

(U) The following data on major unit wartime availability and time-phased required delivery for each of the four study scenarios in the following tables:

Table C.24 thru C.26	Army
Table C.27	USMC
Table C.28	USAF

C.2.4.2 Accompanying Baggage, Resupply, and Ammunition

(U) Table C.29 provides factors for accompanying baggage, supplies and ammunition as a function of (1) the type of unit deployed, (2) prepositioning and (3) the number of days and amount (lbs/man) by class of supply. These weights are in addition to 300 lbs per man, which includes passenger weight, web gear, individual weapon and ammunition, handbag, duffel bag, and TAT organizational equipment. If deployed to NATO or other cold region and 50 lbs of cold weather gear. For Air Force and Navy unit deployments, accompanying supplies and ammunition will be assumed correct as portrayed in the JPAM data bases and are additive to the 300 lbs per man figure.

TABLE C.24 (U)

MAJOR ARMY FORCES (U)

Units	FY 82[1]	FY 86[2]	FY 90
Active Army			
Divisions			
Armored	4	4	4
Mechanized	7	7	7
Infantry	3	3	3
Airborne	1	1	1
Air Assault	1	1	1
Separate Brigades/Regiments			
Armored	1	1	1
Mechanized	—	—	—
Infantry	1	1	1
CBAC	1	1	1
ACR	3	3	3
Theater Defense Bde	3	3	3
Other Separate Units			
Battalions	3	3	3
Reserve Components			
Divisions			
Armored			
Mechanized	1	1	1
Infantry	5	5	5
Separate Brigades/Regiments			
Armored	4	4	4
Mechanized	9	10	10
Infantry	7	6	6
ACR	4	4	4
Theater Defense Bde	4	4	4
Other Separate Units			
Battalions	17	17	17

[1] POMCUS authorized for 6 division sets by FY 82.

[2] In addition to FY 82 POMCUS levels two non-divisional brigades are added in FY 83.

TABLE C.25

PROGRAMMED US ARMY MAJOR UNIT FORCES (U)
(C-Day Station, Availability for Deployment and Required Delivery Date)

Unit	C-Day Station	Availability [1] (days after C-Day)	Scenario I RDD	Scenario II RDD	Scenario III RDD	Scenario IV [3] [4] RDD
I. Division Forces						
A. Active Divisions						
1. 1st Armd Div	Europe					
2. 3d Armd Div	Europe					
3. 3d Inf Div (M)	Europe					
4. 8th Inf Div (M)	Europe					
5. 1st Inf Div (M)(-)	Ft Riley					
3d Bde, 1st Inf Div (M)	Europe					
6. 4th Inf Div (M)	Ft Carson					
7. 2d Armd Div (-)	Ft Hood					
3 Bde, 2d Armd Div	Europe					
8. 1st Cav Div (-)	Ft Hood					
3 Bde, 1st Cav Div	Europe					
9. 101st Abn Div (AASLT)	Ft Campbell					
10. 2d Inf Div (M)(-)	Korea					
11. 7th Inf Div (-)	Ft Ord					
12. 9th Inf Div	Ft Lewis					
13. 24th Inf Div (M)	Ft Stewart					
14. 25th Inf Div (-)	Hawaii					
15. 82d Abn Div	Ft Bragg					
16. 5th Inf Div (M)(-)	Ft Polk					
B. Reserve Component Divisions						
1. 49th Armd Div	Ft Hood					
2. 50th Armd Div	Ft Drum					
3. 40th Inf Div (M)	Cp Roberts and Ft Irwin					
4. 38th Inf Div	Cp Grayling					
5. 26th Inf Div	Ft Devens/Edwards					
6. 28th Inf Div	IGMR					
7. 42d Inf Div	Ft Campbell					
8. 47th Inf Div [2]	Ft Riley/McCoy					
II. Separate Brigades and Regiments						
A. Active						
1. 194th Armd Bde	Ft Knox					
2. 197th Inf Bde	Ft Benning					
3. 2d ACR	Europe					
4. 3d ACR	Ft Bliss					
5. 11th ACR	Europe					
6. 6th CBAC	Ft Hood					

[1] Availability dates reflect the consideration that units will be placed on increased alert status and active units begin preparation for deployment prior to C-Day. Availability for Scenario 4 is ( ).

[2] Strategic reserve to be deployed only if required.

[3] *** indicates Persian Gulf RDD.

[4] Scenario 4 RDD's for NATO are from the start of Persian Gulf deployment

[5] Two brigades on C+10, one brigade on C+15.

[6] One brigade on C+3, one brigade on C+15.

373

4

TABLE C.25 (Cont.)

PROGRAMMED US ARMY MAJOR UNIT FORCES (U)
(C-Day Station, Availability for Deployment and Required Delivery Date)

Unit	C-Day Station	Availability [1] (days after C-Day)	Scenario I RDD	Scenario II RDD	Scenario III RDD	Scenario IV [3] [4] RDD
B. Reserve						
1. 29th Inf Bde [6]	Hawaii					
2. 39th Inf Bde [6]	Ft Chaffee					
3. 41st Inf Bde [6]	Ft Ord					
4. 45th Inf Bde [6]	Ft Chaffee					
5. 58th Inf Bde	Cp Hill					
6. 116th Inf Bde	Ft Pickett					
7. 256th Inf Bde [6]	Ft Polk					
8. 30th Inf Bde (M)	Ft Bragg					
9. 32d Inf Bde (M)	Ft McCoy					
10. 48th Inf Bde (M) [6]	Ft Stewart					
11. 67th Inf Bde (M) [6]	Ft Carson					
12. 69th Inf Bde (M) [6]	Ft Riley					
13. 81st Inf Bde (M) [6]	Ft Lewis					
14. 157th Inf Bde (M)	Cp Pickett					
15. 218th Inf Bde (M)	Ft Stewart					
16. 30th Armd Bde	Cp Shelby					
17. 31st Armd Bde	Cp Shelby					
18. 149th Armd Bde						
19. 73rd Inf Bde	Cp Grayling					
20. 155th Armd Bde	Cp Shelby					
21. 187th Inf Bde [7]	Ft Devens					
22. 107th ACR	Cp Grayling					
23. 116th ACR	Gowen Field					
24. 163d ACR	Ft Carson					
25. 278th ACR	Cp Pickett					

[6] The units become affiliated with active duty units as shown in Table D-3. Upon mobilization, roundout units would deploy with the active unit or as soon as possible thereafter. Augmentation units would deploy as soon thereafter as possible, but not earlier than

TABLE C.26
PROGRAMMED U.S. ARMY FORCES, RESERVE COMPONENT AND ACTIVE COMPONENT AFFILIATIONS (U)

Units	Active Component Affiliate
Round Units[1]	
29th Inf Bde	25th Inf Div (-)
41st Inf Bde	7th Inf Div (-)
256th Inf Bde	5th Inf Div (M) (-)
48th Inf Bde	24th Inf Div (M) (-)
45th Inf Bde (M)	2d Inf Div (-)
100-442d Inf Bn	25th Inf Div (-)
2-120th Inf Bn (M)	1st Cav Div
8-40th Armed Bn	7th Inf Div (-)
2-252 Armd Bn	1st Cav Div
1-263d Armd Bn	1st Cav Div
1-803d Armd Bn	9th Inf Div (M)
D Co, 13 Eng Bn	7th Inf Div (-)
Augmentation Units[2]	
39th Inf Bde	101st Abn Div (Aslt)
69th Inf Bde (M)	1st Inf Div (M)
67th Inf Bde (M)	4th Inf Div (M)
81st Inf Bde (M)	9th Inf Div (M)
149th Armd Bde	2d Armd Div
1-143d Inf Bn (Abn)	82d Abn Div
2-143d Inf Bn (Abn)	82d Abn Div

6

375

TABLE C.27

U.S. MARINE DIVISIONS, C-DAY STATION AND AVAILABILITY FOR DEPLOYMENT (U)

Unit	C-Day Station	Availability (days after C-Day)	Scenario I RDD	Scenario II RDD	Scenario III RDD	Scenario IV RDD[7]
I MAF	California					
3/9	Cp Pendleton/El Toro					
3/9	Cp Pendleton/El Toro					
3/9	Cp Pendleton/El Toro					
II MAF	North Carolina					
1/9	Afloat in Mediterranean					
2/9	Cp Lejeune/Cherry Pt					
3/9	Cp Lejeune/Cherry Pt					
3/9	Cp Lejeune/Cherry Pt					
III MAF						
1/9	Afloat in IO					
1/9	Afloat in Pacific					
4/9	Okinawa/Japan					
3/9	Hawaii					
4th Marine Div/Wing Tm[6]	California					

1 Deployed in amphibious shipping.
2 FY 86/90 MPS used as mobility variation.
3 Prepositioned resupply and ammo in Iceland
4 Prepositioned equipment, resupply, and ammo in Norway.
5 Split Shipment Air/Sea.
6 Approximately 6/9 MAF. Limited CSS and air capability.
7 "*" indicates Persian Gulf RDD.

376

4

TABLE C.28

DEPLOYMENT PHASING FOR USAF PROGRAMMED MAJOR UNITS (U)

	Scenario I			Scenario II			Scenario III			Scenario IV		
	RDD			RDD			RDD			RDD		
Day Relative to C-Day	TFW	TRS	TAS	TFW	TRS	TAS	TFW	TRS	TAS	TFW	TRS	TAS
0												
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
14												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
Total Deployed												

TABLE C.29 (U)

ACCOMPANYING BAGGAGE, SUPPLIES, AND AMMUNITION (U)
(Moderate Intensity Assumed)

Days				Pounds/Man							
				Arty							
Prepo	Non-Prepo	Class	Independent of Units	105T	155	8"	Armor (Incl AR Cav)	Air Cavalry & Cmbt Avn	Infantry Non-MX	Infantry MX	Prepo & All Others
3	5	I	4.5								
--	15	II	3.7								
--	15	III	0.9								
--	15	IV	8.5								
5	5	V	--	346.7	885.4	456.9	50.0	40.0	9.0	40.0	1.2
--	--	VI	--								
--	--	VII	--								
15	15	VIII	0.4								
15	15	XI	3.5[1]								

[1] 0.35 for prepo units.

378

UNCLASSIFIED

C.2.5 DETAILED CMMS ASSUMPTIONS BY SCENARIO

(U) Tables in this section (C.30 through C.33) catalog the assumptions contained in the JCS scenarios for the CMMS.

"Tables C.30 through C.33 (pages C-58 through C-65) are withheld in their entirety."

C.2.6 INTRATHEATER DEPLOYMENT ANALYSIS ASSUMPTIONS

(U) Assumptions were, in all cases, optimistic.

1. (U) All lift assets were used for deployment and none for employment.

2. (U) A single case of the 1990 intertheater analysis was used as the Base Case for the intratheater analysis. In excursions,

200 representative C-X aircraft, with and without small, austere airfield capability, were added to the Base Case. The characteristics of the Base Case were:

a. (U) 1990 airlift and sealift resources, including SL-7S and projected military and CRAF airlift improvements.

b. (U) No aerial refueling.

c. (U) Suez Canal open.

d. (U) Projected Marine Maritime Prepositioning Ships (MPS).

3. (U) Tonnage requiring intratheater deployment was that represented by the ground forces' unit equipment. Resupply, ammunition, and Navy tonnage were not included. Air Force tonnage was not included for Scenario I, in which Air Force units were all bedded down at airfields capable of handling intertheater aircraft.

4. (U) APODs, SPODs, and FOBs remained mission capable throughout deployment. Their full capability was available to US forces 24 hours a day and was not restricted by friendly forces, enemy activity, air traffic control, or weather.

5. (U) Unit intratheater surface travel began after arrival of the full unit.

a. All trucks arrive at the APOD loaded.

b. Marry-up assembly time is 2 hours. Assembly area is very close to airfield offload point.

c. Rates of road march for tracked and wheeled vehicles were computed assuming freedom from congestion, vehicle maintenance, removal of non-operational vehicles, maintenance of roads, interference from civilian traffic and enemy action.

6. Intratheater airlift began on the day following the arrival of the first portion of a unit's tonnage.

a. Average ground times used were as follows:

C-5, B-747 equivalent (cargo)	3.3 hr
C-141B, C-X, B-747 equivalent (pax)	2.3 hr
B-707 equivalent	1.8 hr
C-130 (onload at APOD)	2.0 hr
C-130 (engine running offload at FOB)	0.25 hr
C-X (engine running offload at FOB)	0.50 hr

b. Intratheater airlift capability of C-130s was based on:

(1) aircraft in Scenario I, in Scenario II. 4

(2) flying hours per aircraft per day for days. 5

(3) (U) Average unit equipment payload of 11 tons per sortie.

(4) (U) One positioning/depositioning sortie (between beddown base and APOD) for each three airlift sorties.

(5) (U) Average block speeds of 194 knots for airlift sorties and 226 knots for positioning/depositioning sorties.

c. When C-Xs were capable of small, austere airfield operation, their intratheater capability was based on:

(1) For one intratheater shuttle after each intertheater mission.

(a) Intertheater utilization rate of 5
flying hours per aircraft per day.

(b) (U) Overall non-air-refueled block speed of 400 knots. (See Table C.8)

(c) (U) Average payload of 36.6 tons per sortie.

(2) For dedicated intratheater excursion mission (see Sec. 8.5.4):

(a) Intratheater utilization rate of 5
flying hours per aircraft per day.

(b) (U) Intratheater block speed of 300 knots.

(c) (U) Average payload of 55.4 tons for armored brigade and 52.8 tons for mechanized infantry brigade.

(d) (U) Positioning/depositioning sorties from temporary beddown bases did not effect C-X utilization for the short periods of dedicated intratheater airlift necessary to transport elected units.

7. Air Force and Marine aircraft (both rotary and fixed wing) were bedded down in each scenario by considering their range, mission, ramp space available at the airfields, its distance from the area of operations, and requirements to support intertheater and intratheater airlift. The following is the fixed-wing aircraft beddown for each scenario:

a. Scenario I.

Base	Type Aircraft	Number

4

Base	Type Aircraft	Number

4

Base	Type Aircraft	Number

4

b. Scenario II.

Base	Type Aircraft	Number

4

Base	Type Aircraft	Number

4

Base	Type Aircraft	Number

4

8. Maximum number of airlift aircraft on the ground (MOG) was calculated for APODs and FOBs by using parking space available after beddown and average ground times (para 6a above).

a. Scenario I.

(1) Parking space was sufficient to accommodate C-5/B-747 aircraft or C-141B/C-X aircraft per day. 2 5

(2) C-130/C-X MOG at the primary FOBs was:

(a)
(b) 2 + 5
(c)
(d)

(3) Combined MOG was sufficient to accept all C-130 and C-X sorties 2 + 5

b. Scenario II.

(1) Parking space was sufficient to accommodate C-5/B-747 aircraft or C-141B/C-X aircraft per day. 2 + 5

(2) C-130/C-X MOG at the primary FOBs was:

(a)
(b) 2 + 5

APPENDIX D

SENSITIVITY ANALYSIS: POL REQUIREMENTS (U)

395

APPENDIX D

SENSITIVITY ANALYSIS: POL REQUIREMENTS

D.1 INTRODUCTION

(U) The mobility analyses conducted for this report did not consider the impact of possible POL support problems. The capability of the US to provide or obtain POL in sufficient quantities to deploy and support combat forces to various regions in the world is highly dependent on each specific scenario. If a deployment of forces is made by the US on a unilateral basis (i.e., without the political support of normally friendly/allied governments), all POL must be provided from US assets. Under this type of scenario with the force sizes depicted in this study, the capability to deploy and support our forces would depend on the quantities of prepositioned POL stocks available. Without such assets the deployment would be severely limited,given the current tanker assets of the Military Seaift Command and US flag fleet. However, if the proper combination of good weather, host-nation support, prepositioning, and allied or friendly nation assistance is available, our capability would not be POL constrained.

(U) To limit the type and size of the recommended mobility alternatives to only those for which POL is certain to be available would cause an understatement of future mobility capability needed. This latter case would not be responsive to congressional language which requires recommended programs to give the US adequate mobility capability for any contingency occurring during the decade of the 1980s. In addition, it could also lead to mobility shortfalls at the time a contingency occurred if the US and its Allies exercised emergency powers to provide POL when and where needed.

D.2 PROBLEM

Scenario I. For deployments to Southwest Asia, days are the critical phase of POL support. During this

5

timeframe, various actions can be initiated to acquire and provide for requirements beyond 5

About barrels of petroleum products are 4 estimated to be required during to support deployment of the forces in Scenario I in 1982. Section D.3 discusses in greater detail these requirements and the US capability to meet them.

Scenario II. The requirement for this scenario is about barrels, Under 4 this scenario, a fleet of more than 180 tankers is available, 4

Scenario III. POL requirements for a NATO war are met by a combination of stockpiling in theater and resupply from available sources. NATO's Central European Pipeline System (CEPS) contains about A CEPS Improvement Program (CIP) was recently 6 approved to increase the stockpile to

6

The total stockpile requirement of the US is

6

Scenario IV. This scenario combines Scenario I and a precautionary reinforcement of NATO but without the outbreak of hostilities in Europe. POL demand for the Southwest Asian theater would be approximately the same as that for Scenario I,

1

POL requirements for the European theater would be greater than those for peacetime operating tempo but markedly less than would be the case if hostilities were assumed. These combined requirements were not estimated.

D.3 SCENARIO I - POL DEMAND VERSUS CAPABILITY

D.3.1 REQUIREMENTS

Table D.1. Assumptions used included:

MAC aircraft operate at wartime utilization rates; no airlift aircraft were refueled at the APODs; aircraft routing was as shown in Table D.2; intheater POL needs based on time-phased arrival of force, consumption at "moderate combat" rates,

TABLE D.1

INITIAL 30-DAY POL REQUIREMENTS (U)

(BARRELS)

ALOC	
Combatant Forces (intheater)	
Sealift	
TOTAL	

TABLE D.2

AIRCRAFT ROUTING (U)

Eastbound Route:

Westbound Route:

D.3.2 FUEL REQUIREMENTS/SUSTAINABILITY AT EN ROUTE AIRBASES

(U) See Table D.3 which lists the average daily fuel requirements for each airbase for the first 30 days on the eastbound and westbound route, and the estimated ability of each airbase to sustain the requirement. The sustainability figures are based on 75% of storage capacity and exclude that fuel required to support normal commercial traffic. It should be noted that Lajes and Torrejon are the two en route airbases with the most capable sustainability capability; failure to attain landing rights from Portugal and Spain would have a significant impact.

TABLE D.3

FUEL REQUIREMENTS AT EN ROUTE BASES (U)

Eastbound and Westbound Legs	Average Daily Fuel Requirements (Bbls)	Sustainability Bbls/No. Days

D.3.3 RESUPPLY CAPABILITY

(U) Assumptions. As indicated in Section D.1, scenario assumptions are critical to assuring US POL capability. This section discusses the assumptions inherent in Scenario I, 1982, and their impact on the resulting POL capability.

Scenario I assumes that request US assistance after increasing tension followed by aggressor attack. This assumption implies that host-nation support can be expected to some degree. Quantifying this support, given

the vast POL capability of and the 1
inherent vulnerabilities of refineries and storage tanks, is extremely difficult. For purposes of this study, the following POL availabilities were assumed.

1

The scenario assumed that 1+2

From this assumption, the following POL availabilities were used: 2

This POL analysis was based on the 1982 Scenario I mobility analysis. For 1982, the following POL availabilities are assumed, and are based on continued funding for and completion of FY 1981 POL projects as follows:

[1](U) MMBL-common abbreviation for thousands of barrles of bulk petroleum used in this appendix.

The following additional assumptions were made to facilitate the POL analysis:

- Fifteen Military Sealift Command tankers were used exclusively for support of this deployment. MSC, in support of peacetime operations, normally has between 26 and 32 tankers under direct control (MSC-owned plus spot charters).

- Sealift Readiness Program provided 3 tankers at C+10, and 6 additional tankers at C+20. Of the 6 tankers at C+20, 4 were not able to make deliveries prior to C+30.

- Defense Fuels Supply Center (DFSC) 1980 POL contracts were surged to 125% of contracted amounts to support the contingency.

- Seaport-to-airlift distribution systems were capable of handling POL delivered.

2 + 5

D.3.4 RESULTS

Figure D.1 depicts airlift requirements vs. POL available through C+30. POL available includes the following sources:

•

•

2 + 5

•

•

•

•

Figure D.2 depicts requirements vs POL available for the combat forces in theater. POL available includes the following sources:

•

•

•

•

2 + 5

•

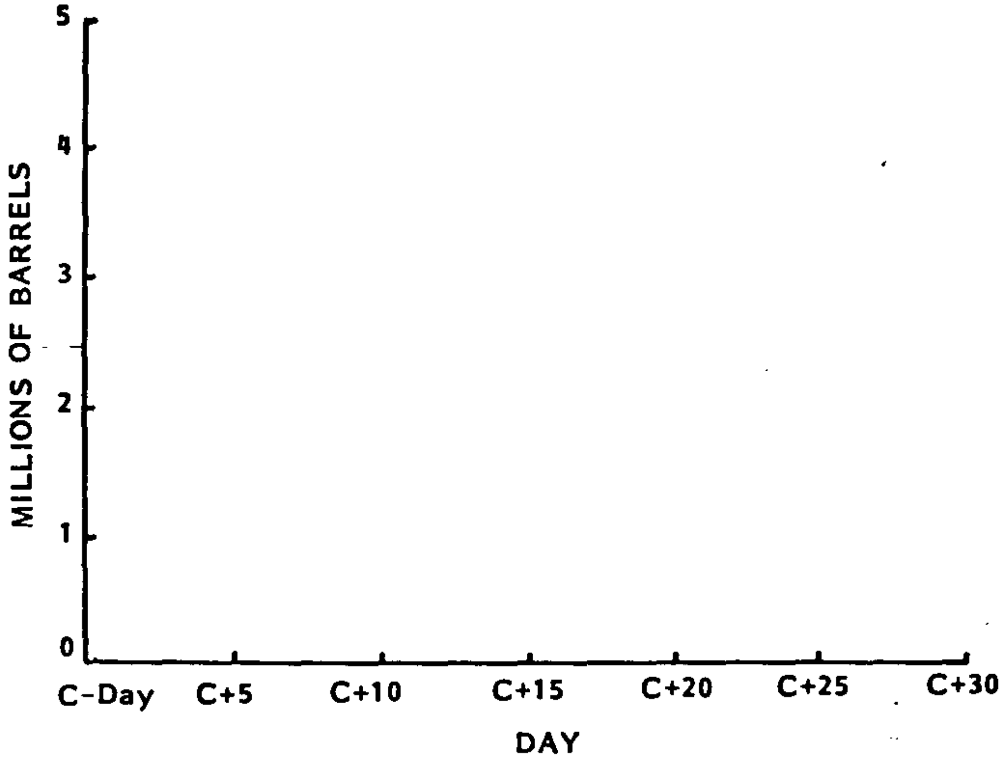


Figure D.1. (U) Airlift Bulk Petroleum Requirements versus Available

5

404

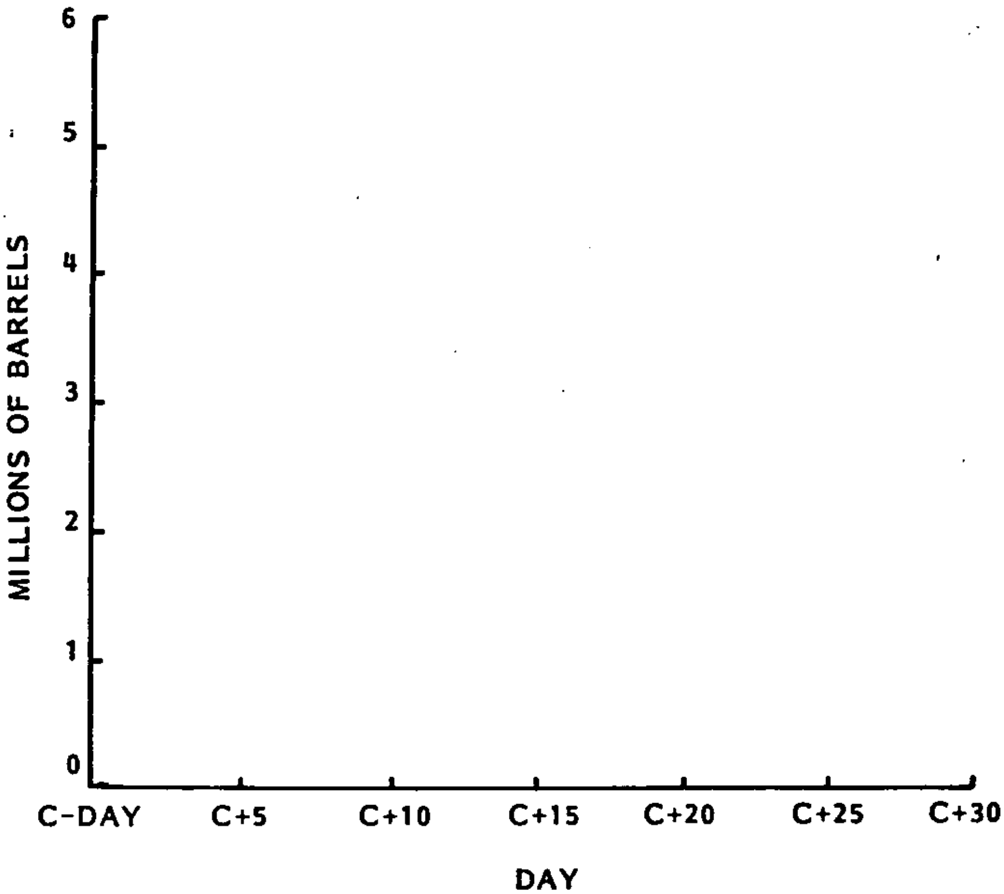


Figure D.2. (U) Combat Force Bulk Petroleum Requirements versus Available

405

Analysis of the sealift sailing rates from Scenario I indicated that this deployment would represent about 6-7% of the normal daily commercial trade on the route. The bunker fuel requirements represent less than 7% of selected seaport capabilities along the route. While the operational requirement for scheduling and contracting for bunkering of the ships used in the deployment could be complicated, sufficient bunker fuel could be made available under the political assumptions of the scenario without requiring the US to dedicate tankers for bunker fuel resupply.

1+4

D.3.5 CONCLUSION

Depending on political assumptions, and on completion of certain 1981 POL projects for regional storage of US product (not currently available), there should be sufficient POL to support 1982 US deployments envisioned in Scenario I. However, excessive reliance on assumptions of host-nation support and on the support of friendly countries and/or allies could severely limit US courses of action. Continued emphasis and procurement is required to provide required mobility capability and the resources to support that capability.

D.4 IMPLICATIONS

The POL situation requires the National Command Authorities to be sensitive to the developing situation and to make timely decisions to solicit support of friendly nations, to dispatch military-controlled tankers as early as feasible, and to requisition additional US flag tankers when necessary.

1, 4, 5

In view of the above, the NCA, confronted with a deployment decision, must:

5

406

5

APPENDIX E (U)

MOVEMENT SIMULATION (U)

(This section is totally unclassified.)

APPENDIX E

MOVEMENT SIMULATION

E.1 GENERAL

The basic computer tool used in this analysis is the Interactive Strategic Deployment Model (ISDM). The ISDM is a heuristic scheduling simulation model of the intertheater deployment process used for solving problems of allocation and resource scheduling in the deployment of forces. The objective of the ISDM formulation is to minimize the time to deploy the forces available each day, subject to constraints on the amount of lift capability available, readiness, preferred movement ordering (priority) of forces, and convoy policy. The schedule of movements which ISDM generates is thus a nearly optimal feasible solution to the problem presented.

E.2 THE ISDM SCHEDULING PROCESS

ISDM schedules movements of requirements by iterating on each day of the modeled time interval until a feasible schedule is found. This feasible schedule represents the movement of as many of the requirements as possible on the current day with the constraint that each requirement must be considered in priority order. Before the scheduling process begins, the movement requirements are used to create two lists. Each list contains requirements that may be moved by aircraft (first list) or ships (second list) sorted by day of availability at an air or sea port of embarkation (APOE/SPOE), and secondarily by priority. Many requirements will be on both lists since they may be moved by either aircraft or ships.

In each scheduling iteration ISDM processes sequentially, in priority order, those requirements that may move either by airlift or sealift until all possible movements have been scheduled. Because the availability of a requirement to begin moving depends on the mode of travel, distinct air and sea mode clocks are created in order to aid in the selection of requirements to be moved. The mode clocks are linked in such a way that no requirement by air will be scheduled which will result in deliveries later than those which can be made by sea. The selection of requirements during an iteration is made by finding the highest priority item available to move by air and the highest priority item available to move by sea. If the two items are different, the one with the highest priority is chosen and an attempt is made to schedule it by its designated mode. If the two items are the same, the requirement can move by either mode and the delivery dates of both modes are compared in order to choose the one with the earliest date.

E.3 MOVEMENT CONSTRAINTS

Simulations concentrate on the intertheater portion of the origin-to-destination movement. Movements and other activities within theaters (CONUS and receiving theaters) are handled through planning factors as contained in the "Catalog of Data and Assumptions (Appendix C).

E.4 ISDM ATTRIBUTES

(a) Dynamically determines the schedule for convoys within constraints on maximum and minimum sizes.

(b) Distinguishes between the uses of fast and slow ships sailing independently and in convoys.

(c) Includes escort constraints in the determination of convoy schedules, and simulates the movement of escorts.

(d) Selects a single port through which to ship a unit.

(e) Uses the distribution of bulk, oversize, and outsize cargo within each unit, instead of using an average distribution for a unit type.

(f) Airlift is allocated to move all of a unit by air simultaneously.

(g) Examines the movements of requirements by air and sea to find the fastest mode.

(h) Does not mix different cargoes on the same ship unless the mix is allowed by the user. (i.e., Moving of ammunition and other cargo can be prevented.)

(i) Does not presuppose the availability of any ship at any particular port. (The model determines the best choice of port for the ship to initially become available.)

(j) Tracks individual ships.

(k) Origins of units may be explicitly defined and at the same time travel times may be given between each origin and POE combination.

(l) Dynamically determines attrition rates and schedules shipping to assure no more than a specified level of attrition losses.

(m) Explicitly models the role of background shipping in determining attrition rates.

(n) Allows the maximum acceptable attrition rates to vary both over time and over the types of shipping. (For instance, the rate for resupply, ammunition, and POL may be different from the rate for combat units.)

(o) Provides graphic and report output, including detailed schedules of movements and tracking of resources.

E.5 ISDM LIMITATIONS

(a) Does not constrain the availability of berths at seaports of embarkation.

(b) Does not constrain the throughput of airfields.

(c) Does not simulate the movement of personnel.

(d) Does not constrain the outloading of cargo at origins.

(e) Does not generate resupply and ammunition requirements to meet demand as determined by the closure date of a unit.

(f) Uses notional ports of embarkation and debarkation.

APPENDIX F (U)

THE VALUE OF EARLY ARRIVAL (U)

(This section is totally unclassified.)

416

APPENDIX F
THE VALUE OF EARLY ARRIVAL

F.1 INTRODUCTION

In this Appendix we use a simple analytical methodology to provide visibility for and appreciation of the value of early arrival at the site of an impending conflict, or early reinforcement after hostilities have begun. We assume that the underlying objective of force projection, should conflict occur, is to defend a given piece of ground. If our arrival is delayed, the enemy is presumed capable of capturing all or a part of this territory. If we could quantify easily the value of loss of this ground, we could use this result to develop values for early arrival. Since we do not know how to make this determination in a readily acceptable manner, we use a surrogate--the need to retake that territory which may be lost through late arrival. In other words, the value of lost territory is the cost to retake it. This is not to say that lost territory must be retaken, necessarily. Indeed, an inability to arrive early and hold may call the strategy into question and result in a decision not to go at all or to seek other means of settling the issue. Nevertheless, recent history provides examples of requirements for larger forces at a later time resulting from an inability or unwillingness to provide lesser forces at an earlier time. Two will suffice. Had the Allies been willing and able to reinforce quickly in France in 1940, the 4-year buildup to reestablish the Allies in Northern Europe would have been unnecessary. The eventual requirement in Korea for an 8+ division force is several times that which, if applied early, could have stopped the North Korean attack in the vicinity of Seoul.

F.2 MOBILITY FIGURE OF MERIT

The traditional figure of merit for lift calculations is a long-term average of the following parameters:

$$\text{FOM} = (\text{Weight} \times \text{Distance}) \div (\text{Cost} \times \text{Time})$$

$$= \text{Weight} \times \text{Speed} \div \text{Cost}$$

F.3 FORCE CAPABILITY REQUIREMENTS

One way to understand the value of timeliness is through classical force capability relationships which, though not without controversy, nevertheless seem to fit a number of battles independent of when they were waged. The simplified result is that forces retreat when at a three-to-one disadvantage, can hold suitably prepared ground positions even when at a two-to-one disadvantage, and can successfully attack when enjoying a three-to-one capability advantage. It is important to bear in mind that force capability is not numbers alone; it includes, but is not limited to, the summation of manpower, firepower, momentum, surprise, and terrain advantages. While there is no claim that these relationships are exact, their broad applicability is generally accepted.

The impact of these relationships is best appreciated with an illustration. Consider a scenario in which an enemy decides to attack with the intent to capture a valuable neighboring area, for example high production oil fields. We wish to hold all possible ground against him since having to recapture the oil fields from him will not only be expensive but may also result in destruction of the facilities and perhaps the wells themselves.

Let us assume that the enemy attacks with an initial force F_0, and after the initial attack will have a force buildup rate of R_1. The enemy force level F at time t is shown in Fig. F.1 as

$$F = F_0 + R_1 t$$

The minimum capability of friendly forces needed to hold ground is, as described above, 1/2 that of the attacker or:

$$C_{min} = 0.5(F_0 + R_1 t)$$

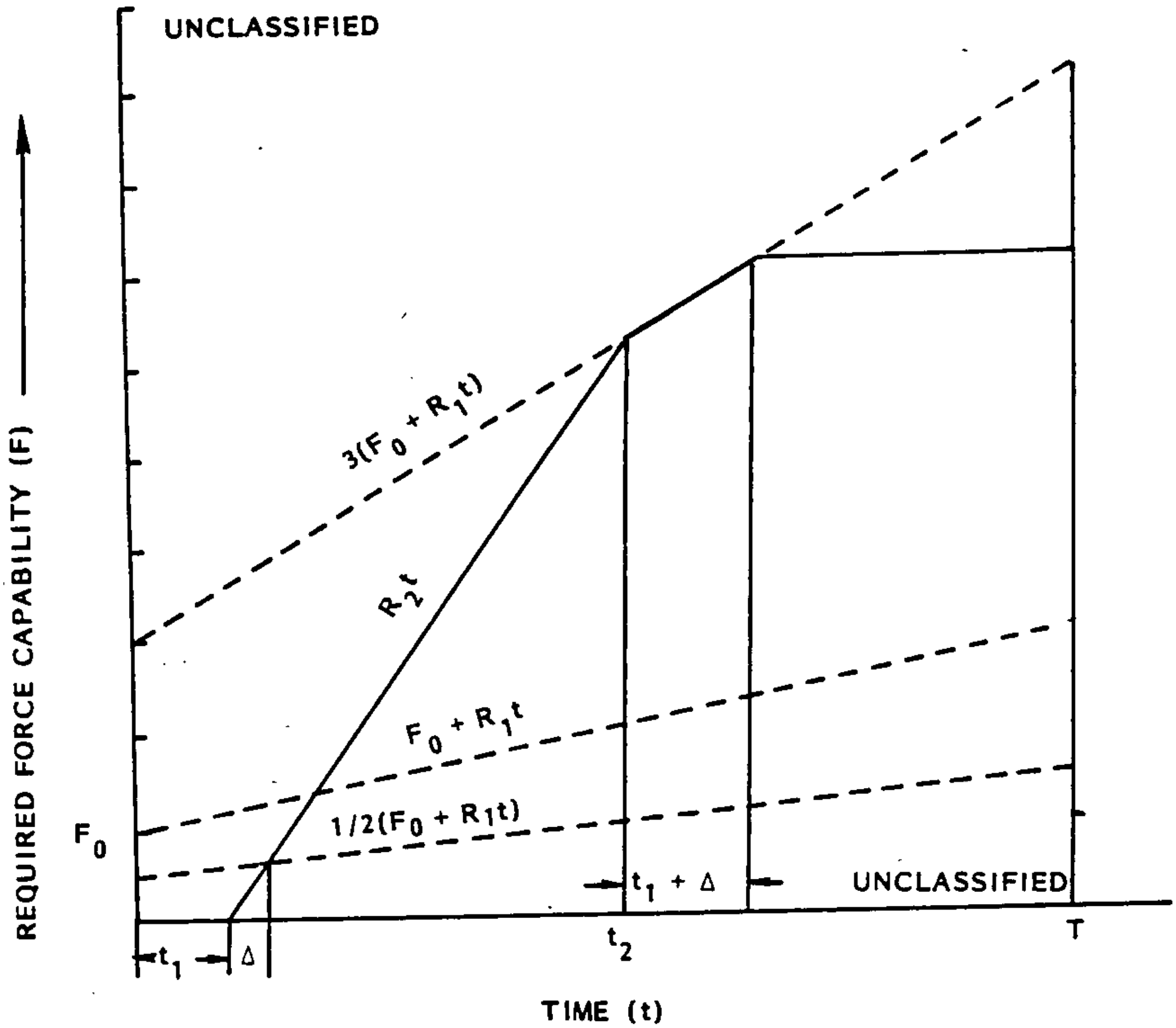


Figure F.1. Generalized Diagram of Required Capability versus Time

Similarly, the maximum capability of forces required to retake ground is:

$$C_{max} = 3(F_0 + R_1 t)$$

There are several ways in which this minimum capability can be provided. First, we could have forward stationed forces in place to deter an attack (an alternative which we have chosen in only a few places throughout the world). Second, we could make use of strategic warning to implement a pre-hostilities deployment. If the time is long, sealift might suffice; if the time is short, airlift (or a combination of pre-positioned equipment supported by airlift) will be required. Since, however, strategic warning and its necessary response may be dominated by political considerations, the pre-hostilities time for deployment may become vanishingly small. Therefore, we must lastly, and most importantly, consider the case where a force is deployed as soon as possible to hold the loss of territory to a minimum, and redress the situation at minimum cost.

On the enemy side, the desire for secrecy to achieve surprise suggests an attack with the smallest seemingly adequate force followed by strong reinforcements. Therefore, very fast mobility modes such as airlift, or a combination of airlift and prepositioned equipment, may be able to deny significant enemy gains prior to the arrival of more substantial reinforcements.

A spectrum of plausible scenarios can be covered in a generalized diagram such as that in Fig. F.1. Regardless of how it is achieved, having adequate forces in place to hold ground against an attacker is undeniably the best situation. This means having force capability in place equal to $F_0/2$ at all times. The next best situation is to quickly reinforce and retake lost ground before the enemy buildup has progressed very far which means having t_1 very short and the buildup rate, R_2, as large as possible. At any given time the force capability required to retake ground is six times as large as that to simply hold ground. To see the value of early arrival in this instance, we compare a massive reinforcement by relatively slow ships at a time T to lesser but faster reinforcement[1] beginning at a time t_1. If the reinforcements delivered by the ships begin retaking ground after arrival at T and have to fight back over the same time span that the enemy requir3d to originally capture the ground, then all ground should be retaken by time 2T. If the enemy had been continually reinforcing during this period, the level of late arriving force capability required to regain the last bit of land is:

$$C_S = 3(F_0 + 2R_1T)$$

Similarly, rapidly deployed forces that initially hold ground after $t_1 + \Delta$ days and retake ground after t_2 days require an ultimate force level of:

$$C_R = 3[F_0 + R_1(t_2 + t_1 + \Delta)]$$

If we rewrite the enemy reinforcement, R_1T as:

$$R_1T = KF_0$$

we can then express the ratio of forces required later (C_S) compared to early reinforcement (C_R) as:

$$\frac{C_S}{C_R} = \frac{1 + 2K}{1 + (t_2 + t_1 + \Delta)\ K/T}$$

[1](U) Faster reinforcement can be by airlift, combined airlift and prepositioned ships, or by fast ships such as SL-7s.

Delta (Δ) and t_2 are conceptually simple though arithmetically complicated functions of R_1, R_2 and t_1. They can be solved in these terms from Fig. F.1. If we then define our reinforcement rate, R_2, in terms of the enemy reinforcement rate, R_1, as:

$$c = R_2/R_1$$

we can then express Δ and t_2 as:

$$\Delta = \frac{T/K + t_1}{2c - 1}$$

$$t_2 = \frac{3T/K + ct_1}{c - 3}$$

The ratio $C_S:C_R$ from above can then be plotted as a function of the early lift delay, t_1, considering the enemy reinforcement capability, K, and our own reinforcement rate relative to the enemy, c, parametrically. This ratio is plotted in Fig. F.2 for several enemy reinforcement levels and several buildup rates for our own forces. The figure shows how the ratios of force requirements for the entire engagement vary as a function of the delay before early lift starts. The value of early arrival, especially when a significant enemy buildup occurs (large K value), and our own buildup rate is high (large c value), is readily seen. For example, we would estimate from Fig. F.2 that rapid reinforcement beginning on day 1 versus on day 20 for slow lift would reduce the forces required by a factor of 2.2 if the enemy quintupled (K = 4) his force in 20 days and our buildup rate was five times his. In other words, delivering one division under these circumstances would be the equivalent of delivering 2.2 divisions via slow lift on day 20. The benefits of high buildup rates, which equate to large early lift capability, are evident. We should note also from the figure that when the enemy commits most of his forces from the start, keeping few in reserve, i.e., K is small, the value of early arrival is low. This is because our methodology assumes that any ground lost through an initial delay must be recaptured, requiring 3 times the enemy's initial and

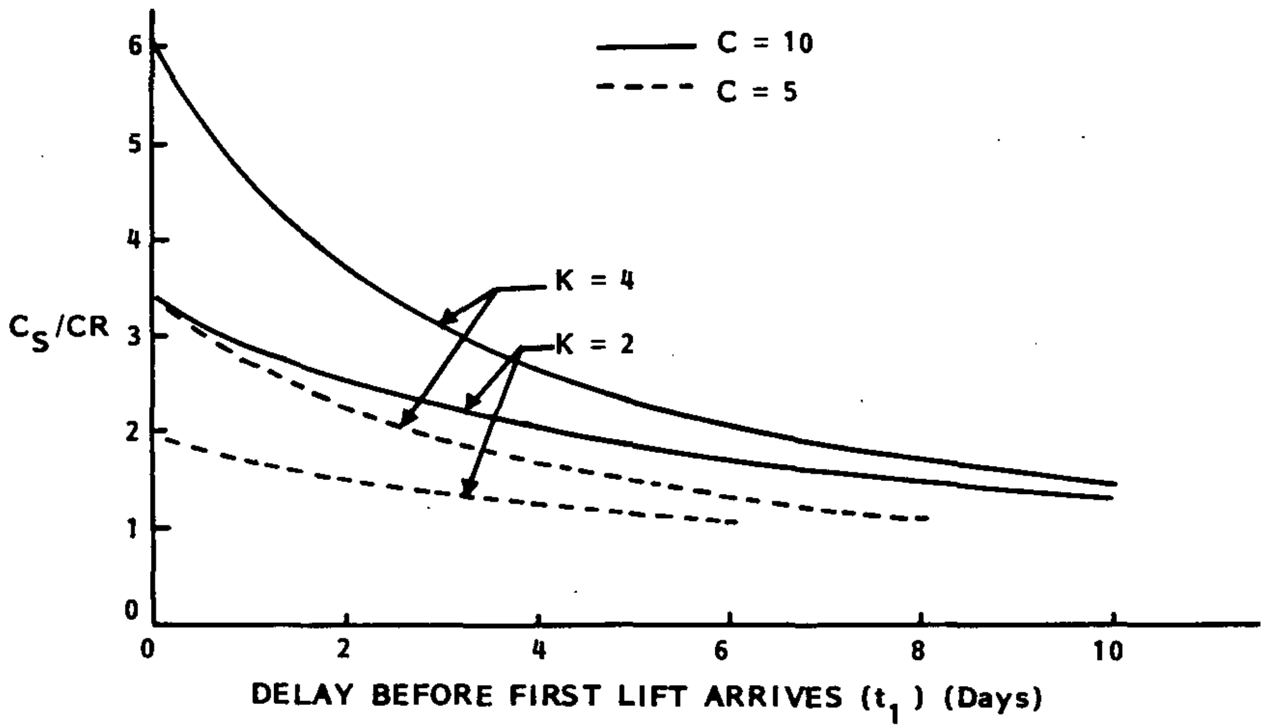


Figure F.2. Ratios of Lift Requirements, Early versus Late Arrival continuing force capability. Force capability ratios of less than one can occur in cases where the buildup rate of the early-arriving lift is so slow as to prevent an adequate force from arriving until after time T, when slow lift arrives. In these cases, early lift would eventually require more forces than would slow lift alone.

A difficulty in attempting early recapture of lost ground is that the buildup rates required, being substantially larger than the enemy buildup rate, may be too large for airlift or even airlift with prepositioned equipment to achieve. In this situation early reinforcement serves to stop the enemy advance quickly, leaving the recapture of lost ground to the large forces brought in later. Here the early lift forces never rise to a level sufficient to recapture lost ground but the amount of lost ground is less than that which would obtain from slow lift alone. The enemy advance in this case is stopped at time $t_1 + \Delta$, recapture begins at T, and is completed at $T + T_1 + \Delta$. The ratio of forces required compared to early reinforcement is unchanged except that t_2, the time when we can achieve a three-to-one advantage, is determined by the very large, late-arriving lift, whereas t_1 and Δ are determined by the rapidly arriving lift. The period $t_1 + \Delta$ days cannot exceed T days, however. The situation is as depicted in Fig. F.3. The theoretical maximum ratio under the described condition is two; the minimum is one. Notice that the results are relatively insensitive to the parameters K and c which are related to buildup rates of both friendly and enemy forces. This means that, even though the potential benefits of a hold and retake strategy may be less, they are applicable over a broader set of assumptions.

F.4 ATTRITION

The above treatment does not include attrition. If attrition is treated in the classical sense, that is, considered to be greater for the attacker than the defender and limited to a few percent per day of the engaged forces, the results discussed above are changed by 10% to 25%. This outcome is not surprising since the attrition extracted early by our forces when they are on the defensive is balanced by the attrition suffered

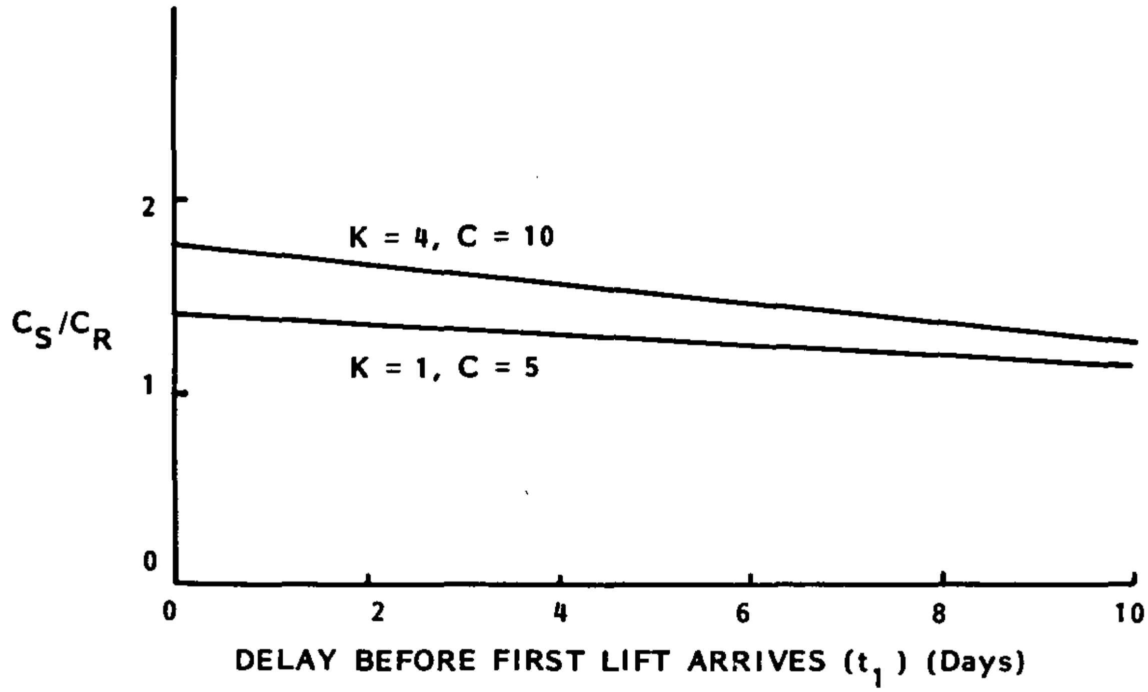


Figure F.3. Employing Early Lift in a Holding Action later when our forces are on the offensive. The reduction in the forces required to go on the offensive is thus offset by the necessity to accommodate the more severe attrition experienced when we switch to the attack.

Since attrition experienced is always sensitive to battle conditions, and these are subject to enormous variation in mobility scenarios, an in-depth treatment of the attrition factor would require extensive simulations which are more a part of operational employment than they are of acquisition.

F.5 FORCE PLANNING TRADE-OFFS

An important concept displayed by this methodology is that early arrival of force capability in a conflict can reduce the ultimate force size required to reestablish the status quo ante. In contrast, the transportation options for delivery of forces generally become much more costly as speed increases. A force planner with a limited budget is thus faced with the trade-off between acquiring faster, more expensive delivery modes and fewer forces, or slower and cheaper delivery of larger forces. However, the cost of these larger forces must also be considered in the trade-off. While costs for a "new" division are uncertain, estimates range upwards of $25B on a 20-year life cycle cost basis. The cost of mobility means to achieve objectives with minimum forces are thus properly offset by the cost of additional combat forces that would be required otherwise. Further, the acquisition of any new mobility capability must take account of existing capabilities to exploit the synergism in the resulting blend.

F.6 OBSERVATIONS

From Fig. F.1 it is obvious that the most effective action we can take is to arrive early and achieve quickly a force capability equal to 1/2 the enemy capability thereby stopping him before significant ground is lost. Failing this, we must eventually build to a force at least six times as great (depending on the enemy reinforcement rate) to recapture lost territory.

From Fig. F.2 we have seen that the value of early arrival (compared to late arrival) decays rapidly within a few days even if our reinforcement rate is much greater than the enemy rate. Also, if the enemy reinforcement rate is very small, the value of early arrival is low. This is so because we assume that any delay results in ground lost which requires a three-to-one advantage to retake. If, on the other hand, the initial ground lost does not require recapture, the value of early arrival is once again a factor of at least 6.

Finally, in Fig. F.3 we have shown the value of early reinforcement based on early lift in a holding action, reserving recapture of lost territory for slow lift arriving at time T. Over a broad range of assumptions concerning enemy and friendly reinforcement rates, the value of this reinforcement varies between a factor of 1 and 2. However, in this case, it should be noted that early arriving forces to hold are less than 1/6 of the total forces required to hold and retake. Once again, if the initial ground lost does not require recapture, the value of early arrival is 6 or more depending on the enemy reinforcement rate.

APPENDIX G

EN ROUTE ACCESS AND OVERFLIGHT OPTIONS FOR A SOUTHWEST ASIAN CONTINGENCY (U)

429

APPENDIX G

EN ROUTE ACCESS AND OVERFLIGHT OPTIONS FOR A SOUTHWEST ASIAN CONTINGENCY

G.1 INTRODUCTION

United States access to foreign bases and the overflight rights necessary to support a major airlift for a Southwest Asian contingency are uncertain. To the countries being approached for assistance the critical factors include: a shared sense of interests being threatened; agreement on the nature of a US military response; and concern over other foreign or domestic political and economic consequences. A saving grace is that we have several options via Atlantic and Pacific routes, although some routes are better than others.

The minimum distance from the East Coast of the US to Saudi Arabia is 6000 miles via the Atlantic route; from the West Coast via the Pacific route it is approximately 12,000 miles. For a range of contingencies, we must lay the groundwork to receive sufficient support from enough of our allies and friends to permit the deployment of adequate forces quickly.

This paper discusses briefly the requirements for en route access and overflight rights to support airlift to Southwest Asian contingencies and assesses those needs vis-à-vis the routes used in this study. The political sensitivities of some key en route states are also noted.

G.2 REQUIREMENTS

The type of support required would be principally airfield parking space and refueling facilities for US military and civilian transport, tanker, and tactical fighter aircraft. In general, our access requirements could require up to   sorties per day for a full-scale airlift. 5
Any country would be hard pressed to handle the majority of the requirements for an extended period. Accordingly, emphasis must be placed on

seeking multiple routes to the Persian Gulf, quite apart from the political advantages of redundancy.

Implicit in the above discussion is the fact that while en route access rights are essential, they alone do not ensure the success of an airlift operation. Fuel availability and distribution are also critical factors. A discussion of the fuel requirement is at Appendix D.

Aerial refueling, with tankers staging from CONUS or overseas bases, could alleviate problems of insufficient fuel and fuel distribution systems at en route facilities. Limited aerial refueling could reduce the sortie rate at capacity-limited bases; more extensive aerial refueling could substitute for one or more bases. However, basing and fuel would have to be available for the tankers. By mid-1982 all C-141s will be capable of in-flight refueling and by 1985 we will have 26 KC-10 tankers with greatly increased range and capacity compared to the KC-135s. CRAF aircraft, however, are not air refuelable.

G.3 BASIC ROUTES

G.3.1 GENERAL CONSIDERATIONS

Deployment to the Persian Gulf can be via the Atlantic or the Pacific. The Atlantic route is by far the more efficient for large-scale deployments, although the Pacific is important 4

Generally, the Atlantic route will require two refuelings, each of which can be spread among a number of countries 2

The second refueling may not be necessary for airlift forces to reach the Persian Gulf, but is critical if POL is not available at Persian Gulf destinations for the initial refueling for the return flight. 2

The Pacific routes can vary substantially. Use of bases in as well as contingency use of bases and overflight privileges in may be essential. 2

G.3.2 POLITICAL AND TECHNICAL ASPECTS--ATLANTIC ROUTE

The remainder of this page and pages G-6 through G-12 discuss potential use of bases in specific countries. They are withheld in their entirety." 2

G.3.3 POLITICAL AND TECHNICAL ASPECTS--PACIFIC AND INDIAN OCEAN ROUTE

Although less efficient for deployment of CONUS-based units (by nearly 50%, especially if fuel were not available at the destination), the Pacific-Indian Ocean route is an alternative to the Atlantic-Mediterranean route and is especially important Use of bases in as well as access to facilities in would be essential. For redundancy in routes, overflight of would also be desirable.

Overflight and access to and territorial waters would ease the deployment on this route, but such cooperation is considered unlikely. Bases in would be needed if there were no fuel at destination or as an en route stopover if only bases were available in Southeast Asia. The bases might also be valuable for transiting TACAIR and tankers, and as a backup for weather or mechanical problems.

The capacities of bases such as those at are well known. The international airport at is capable of handling approximately 100 sorties per day, plus there are other facilities at has several significant facilities whose capacity (over 150 sorties per day) will be doubled with the completion of In March 1979, US C-5A, KC-135 and E-3A aircraft transited and were serviced in

441

2

2

G.4 CONCLUSION

US access to foreign bases and the overflight rights necessary to support a major airlift for a contingency in Southwest Asia are uncertain. Most countries are not willing to grant blanket prior approval for access to help support an unspecified contingency. Host government concerns have centered on both technical and political issues--technically, on issues of safety and overcrowding at their airfields; politically, on US activity which could harm their relations with other nations or subject them to domestic political criticism.

From the preceding, it should be clear that the routing of forces is a highly complicated task dependent upon uncertain factors. Thus, no one can say for certain whether the routing used in this study for strategic airlift going to the Southwest Asian contingencies would be the precise one used for an actual situation--actual routes would have to be negotiated at the time of crisis. In the judgment of the study members, however, the routes used to facilitate analysis in this effort are sufficiently representative to form a fair basis for appraisal.

APPENDIX H

SENSITIVITY ANALYSIS: SEAPORTS OF DEBARKATION (SPODs) (U)

APPENDIX H

SENSITIVITY ANALYSIS: SEAPORTS OF DEBARKATION (SPODs)

H.1 INTRODUCTION AND SUMMARY

(U) This appendix presents the results of a sensitivity analysis on the capabilities of the SPODs to receive cargoes arriving by sea. The SPODs examined were the one for Scenario I and Sector A of Scenario II.

Findings for 1982 are:

- Sufficient berthing spaces are available to handle the peak number of ships arriving in both scenarios 5

- The peak demand for tonnage to be offloaded is well within the minimum offload capability for Scenario I, and within the estimated surge capability of the ports serving Sector A of Scenario II. The ports in Sector A would have to be surged for a period that 5 should allow for adequate preparation time and development of workaround procedures.

The findings for the 1986 analysis are:

- There were sufficient berthing spaces in both scenarios, 5

- The demand for cargo offload exceeded minimum capability, but did not exceed the estimated surge capacity in either scenario. Peak demands for surge occurred sufficiently after the deployment commenced to allow for preparations and development of workaround procedures.

A fully-manned, well-equipped capability for over-the-beach operations is also required to augment port surge capabilities, and to provide a minimum capability for contingencies without suitable port facilities. 5

H.2 METHODOLOGY

(U) Demand for Berths and Discharge. Intertheater ship arrivals were determined from ISDM (see Appendix E). These data were used to determine the numbers of berths required by type of ship--RO/RO, container, breakbulk, LASH, and Sea Barge--which were then compared to the number and type of berths available. In addition, the amount of tonnage arriving via sea was also obtained and compared with the best available data (late 1980) on port throughput capacity. From these two comparisons certain inferences were drawn as to the degree of constraint to deployment capability that would be caused by seaport throughput limitations.

(U) As shown in Sections 4 through 7, lift capability is forecast to improve by 1986. However, it is difficult to estimate accurately improvements to SPODs which may occur by that time. Accordingly, only generalized statements about possible throughput constraints extant in 1986 can be made.

(U) Port Capacity. A range for port capacity was estimated based on certain assumptions. This range is defined as "military" (low-end) and "surge" (high-end).

(U) Military Capacity. The estimated military port capacity is the maximum amount of general cargo--expressed in metric tons--that can be unloaded onto the wharves using ships' gear, and cleared from the wharf aprons during a period of one 24-hour day. Container and RO/RO berths are assumed to handle breakbulk ships.

(U) Surge Capacity. The estimated surge capacity is the maximum amount of containerized cargo that can be unloaded onto the wharves using any available equipment during a 24-hour period. It is assumed that plenty of skilled manpower is available (or made available), and that most cargo is containerized and being unloaded from modern container ships and RO/RO vessels.

H.3 SCENARIO I - REGIONAL CONFLICT IN THE PERSIAN GULF

Port Selection.

Evaluation. As shown in Fig. H.1, the peak demand in 1982 for berths occurs at when the requirement is for berths out of available. This demand consists of The peak for container ships is and totals the combined number of container berths available.

Figure H.2 depicts the tonnage demand for offload or discharge. The peak occurs at and requires a discharge rate of tons/day. This is less than the more pessimistic combined military capacity estimate in Table H.1, and is only of the estimated surge capacity

Although current port capacities are expected to improve by 1986, the 1986 demand for berths and offload were compared to estimated current capacities. There was no significant difference in demand for berths, peaking at of a combined available. However, programmed

TABLE H.1

SCENARIO I – CURRENT PORT CHARACTERISTICS (U)

	Port Capacity Per Day								
	Military		Surge			RO/RO		Container	
SPOD	Metric Tons	Short Tons	Metric Tons	Short Tons	Total Berths	Berths	Quayage	Berths	Cranes (Capacity)

*Metric Tons.

450

2

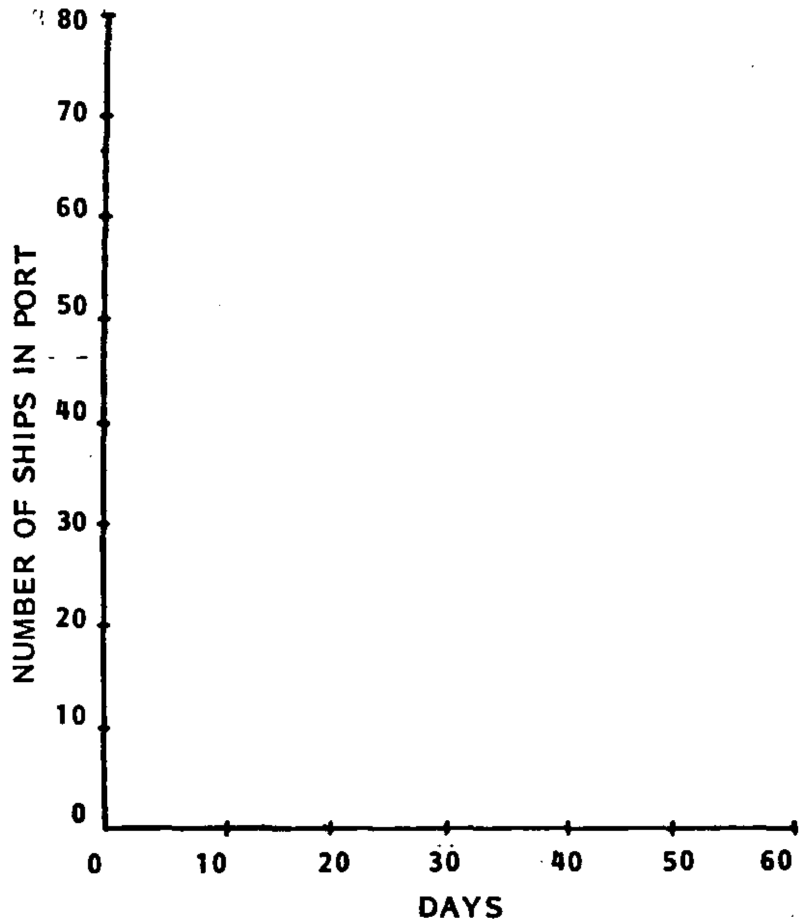


Figure H.1. (U) Scenario I--1982, Number of Ships in Port by Day

5

451

5

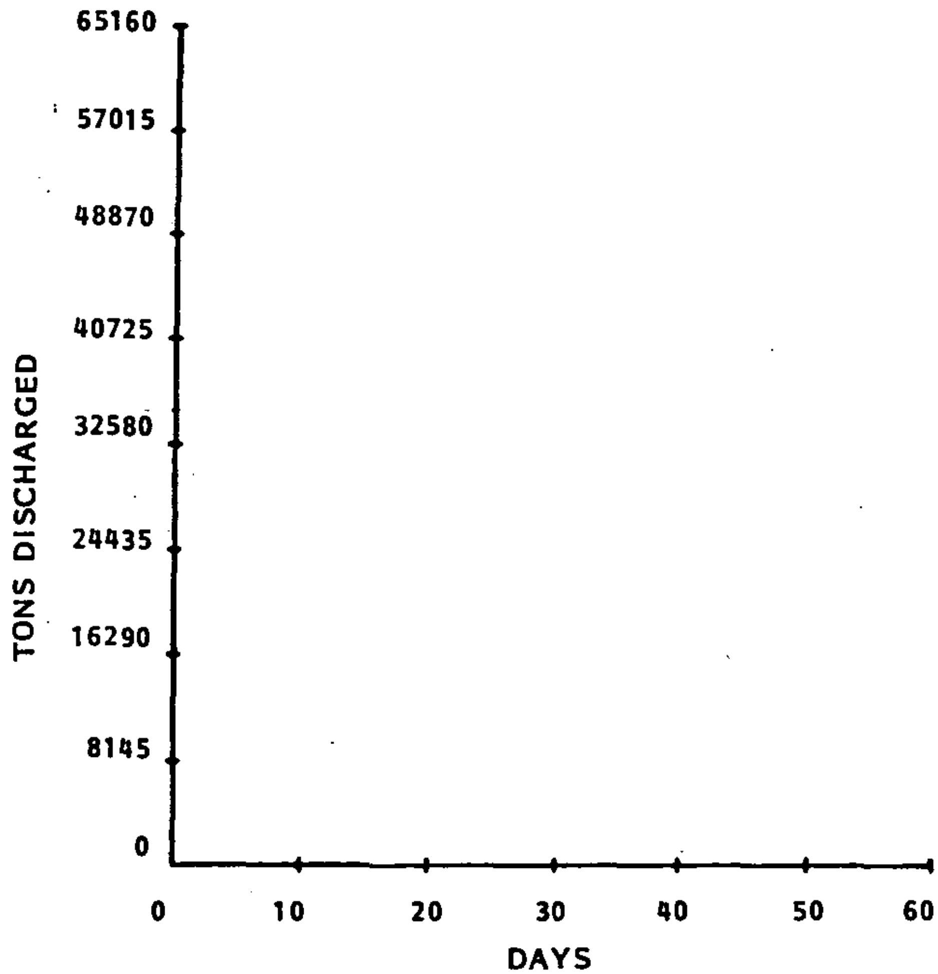


Figure H.2. (U) Scenario I--1982, Discharge Demand/Capability (Tons/Day)

452

improvements in lift capability could create significantly increased discharge demand by 1986. From simulations, the peak was tons/day, as compared to the 1982 case of (See Fig. H.3.) This is greater than the military capacity, but only of estimated surge capacity in Table H.1. Two lesser peaks in discharge 5
demand greater than military capacity occur at tons/day) and tons/day), but these are only respectively of surge. Since these three peaks occur well after deployment commences there is ample time to arrange for the surge and to develop satisfactory workaround procedures.

H.4 SECTOR A, SCENARIO II - SOVIET INVASION OF IRAN

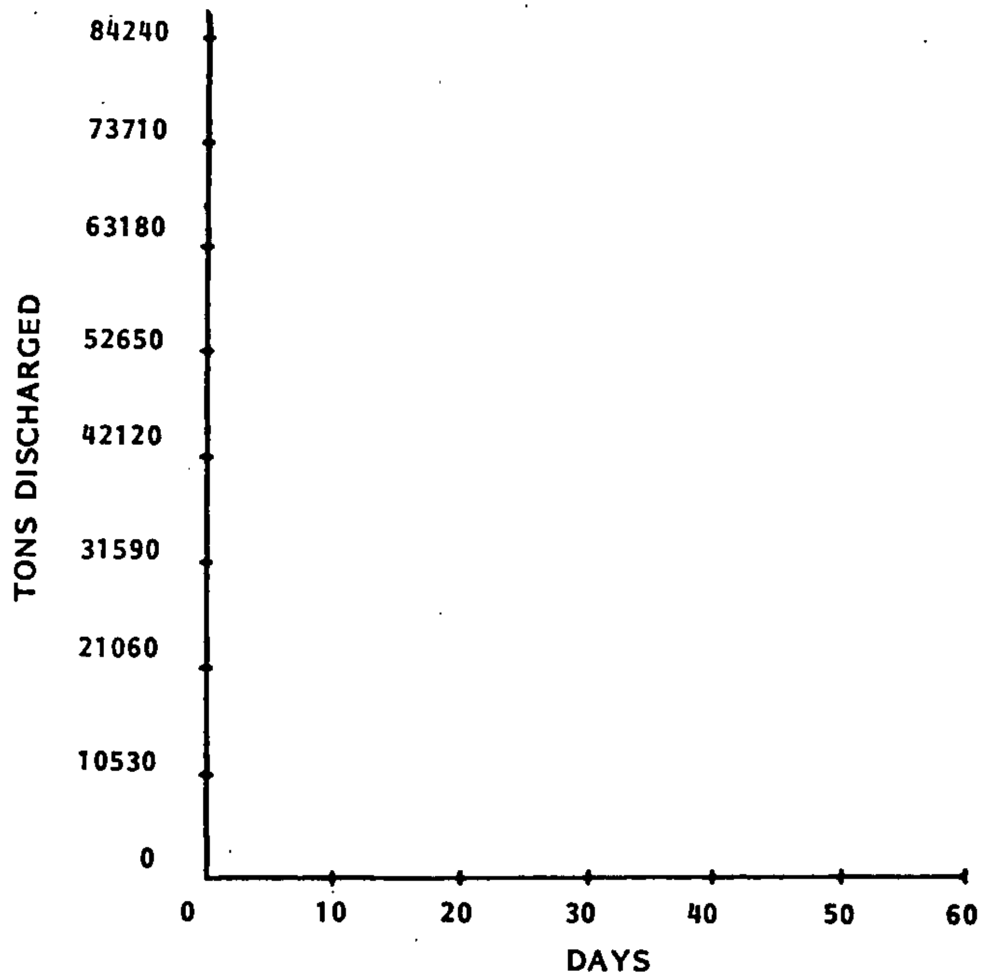
H.4.1. PORT SELECTION

There are three ports in Sector A that are operationally and logistically suitable for the operations to be conducted in this scenario. These are 4
Section 8.4 describes Sector A, which is the most vital in terms of the criticality for meeting RDDs. These ports provide a combined total of berths 5
Table H.2 provides port characteristics. [NOTE: The data in Table H.2 are based upon port status prior to outbreak of the Iran/Iraq war. The precise nature of war damage, if any, and amount of maintenance (dredging) being performed is not known.]

H.4.2 EVALUATION

In the 1982 analysis, the peak demand for berths occurs at (Fig. H.4), when the requirement is for berths out of available. The peak consists of The maximum number of container ships requiring berthing space is and occurs 5
at The number of RO/RO ships in port at any one time is

453



5

Figure H.3. (U) Scenario I--1986, Discharge Demand/Current Capability (Tons/Day)

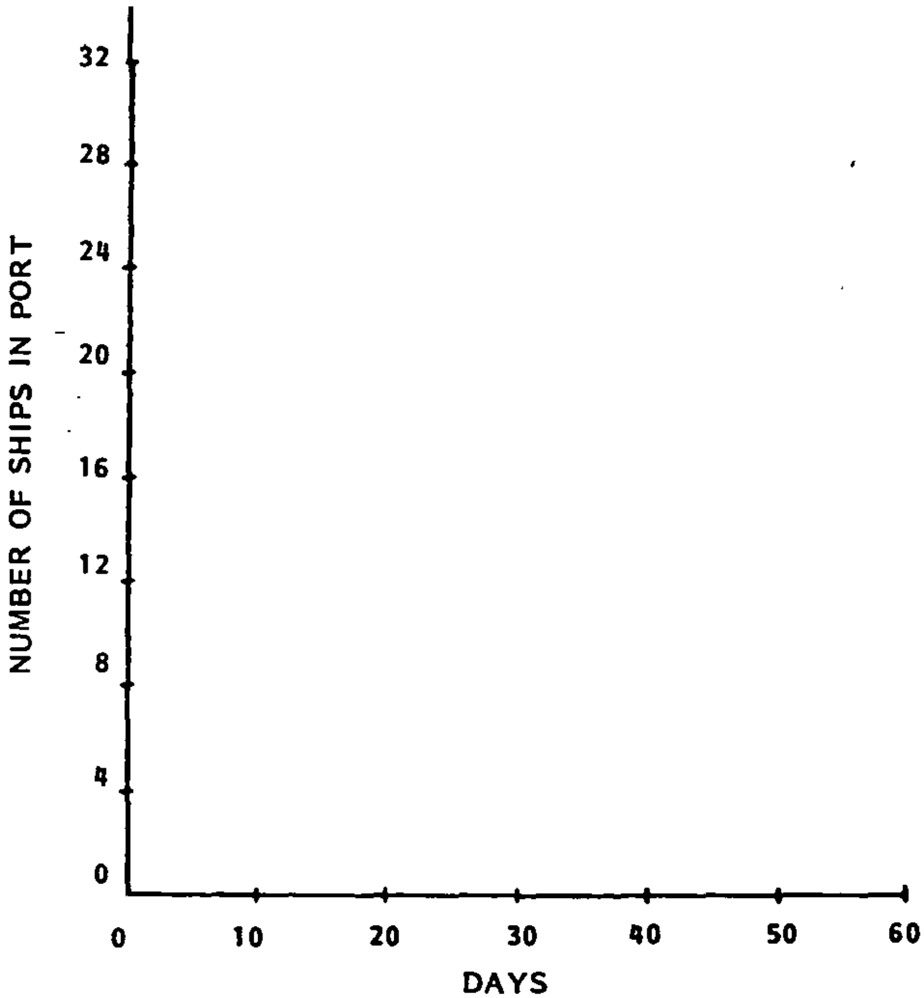
454

TABLE H.2

SECTOR A, SCENARIO II - CURRENT PORT CHARACTERISTICS (U)

	Port Capacity Per Day								
	Military		Surge			RO/RO		Container	
SPOD	Metric Tons	Short Tons	Metric Tons	Short Tons	Total Berths	Berths	Quayage	Berths	Cranes (Capacity)

*Metric Tons.



5

Figure H.4. (U) Sector A Scenario II--1982, Number of Ships in Port by Day

456

Figure H.5 depicts the tonnage demand for discharge. A discharge rate of tons/day is required at the peak day of, While this is greater than the estimated military capacity in Table H.2, it is only of the estimated daily surge capacity. The ports would have to be surged for a period that should allow for adequate preparation time and development of workaround procedures.

In comparing 1986 berth/discharge demand against estimated capacities, berthing space was again found adequate Discharge demand was greater than 1982, with a peak of tons/day at (see Fig. H.6). This is greater than current military capacity, but only of estimated surge. Other lesser peaks above military capacity occur earlier but at the maximum are only greater than military capacity. These peaks occur well-enough after deployment commences, and are interspersed with "valleys" of significantly lower discharge demand, that adequate preparation for short surge periods appear possible.

H.5 ADDITIONAL CONSIDERATIONS

(U) The probabilities that ships arriving at the SPODs can be readily handled without undue queuing or delay are increased if there is a well-equipped, fully manned Logistics Over the Shore (LOTS) system.[1] Historically, more than 90% of the total tonnage requiring deployment for a contingency is moved via sealift. A related additional fact is that the trend in shipping fleets has been towards more container ships. While these ships are usually high speed, carry large payloads, and may be rapidly loaded and unloaded, many depend upon fixed port facilities, creating certain difficulties for flexible military use. They also are not ideal for the total spectrum of military cargo. Therefore, the nature of the Defense LOTS system has had to change, and special effort has been required to maximize the military utility of containerships.

[1]This increased handling capability provided by LOTS is especially important if enemy action or sabotage have impacted the availabiltiy of port facilities.

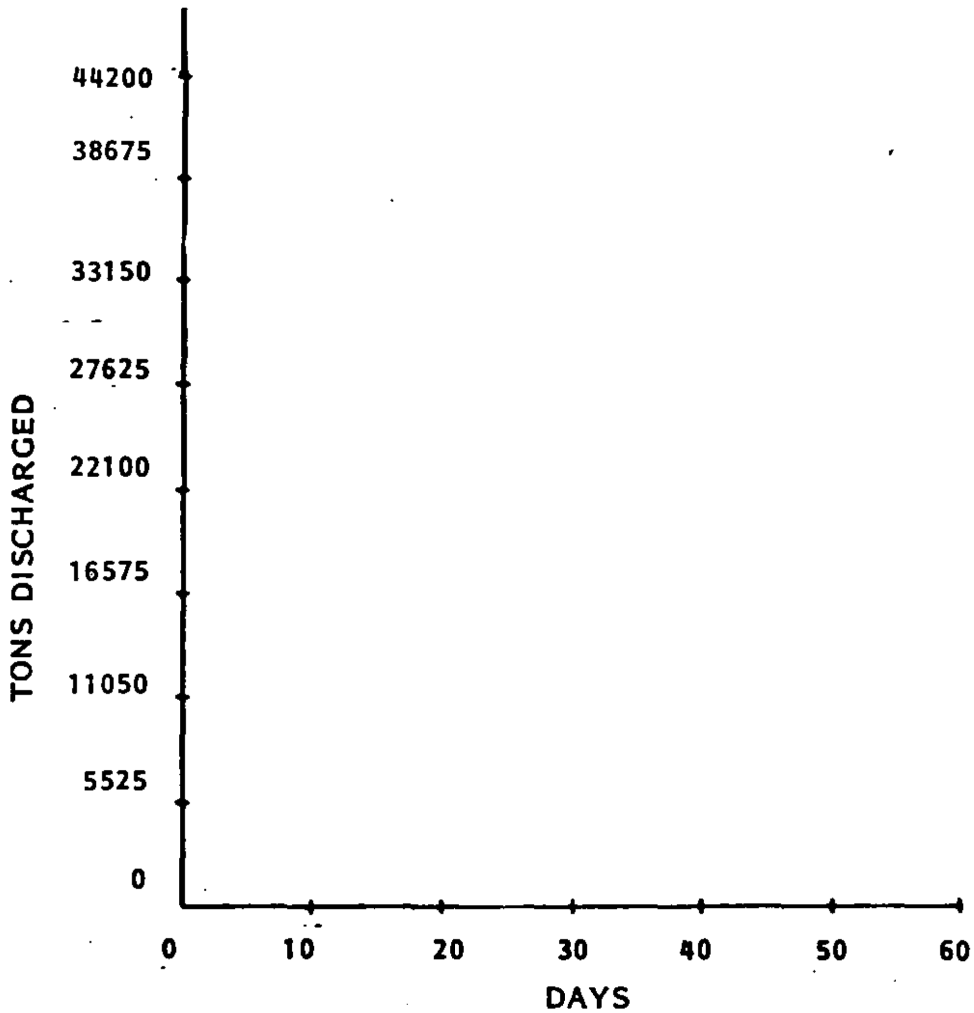


Figure H.5. (U) Sector A Scenario II--1982, Discharge Demand/Capability (Tons/Day)

5

458

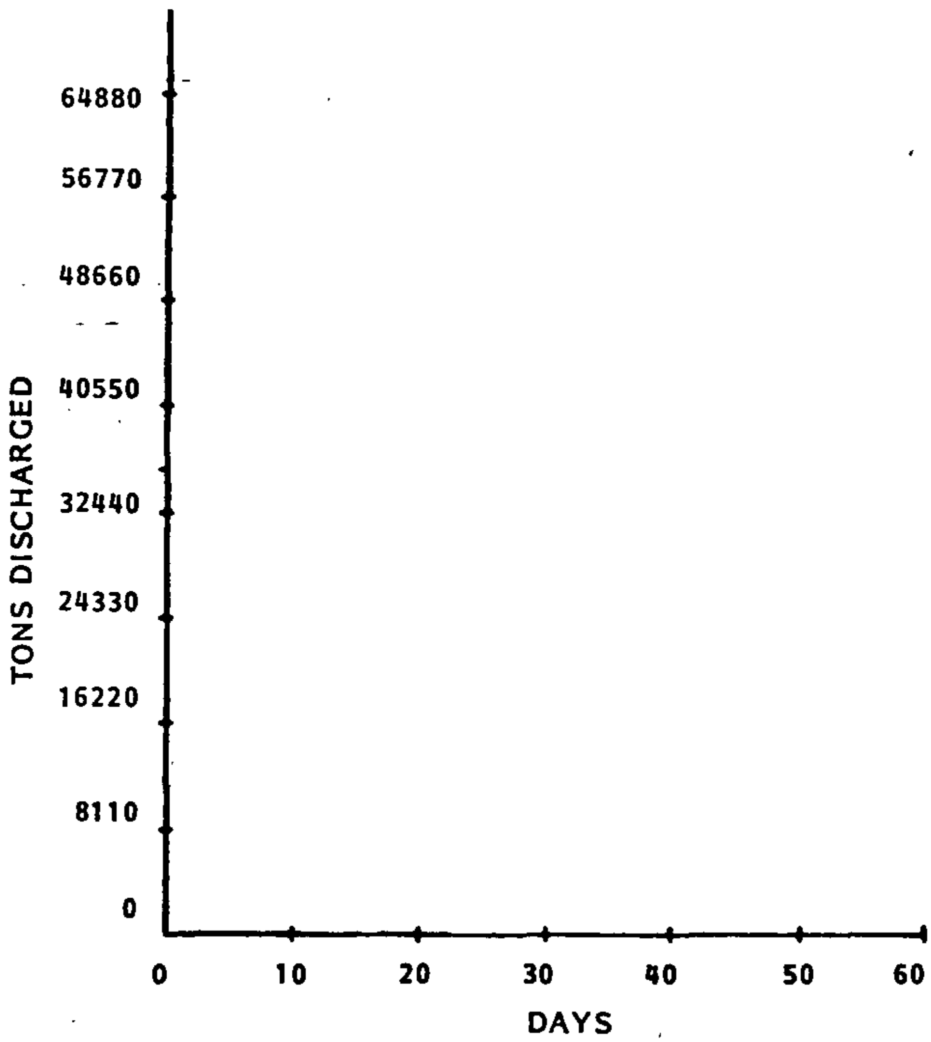


Figure H.6. (U) Sector A Scenario II--1986, Discharge Demand/ Current Capability (Tons/Day)

H.5.1 LOGISTICS OVER THE SHORE (LOTS)

H.5.1.1 Introduction and Background

(U) A LOTS system is required to enable all types of shipping to be unloaded in contingency areas without port facilities, or where ports have been damaged by enemy action, or where the capacity of available ports require augmentation by over-the-beach operations, or where it is tactically desirable to bypass fixed port facilities. LOTS operations involve the following:

- (U) Unloading cargo from ships at sea (ship unloading subsystem).
- (U) Transporting cargo from ship to shore (lighterage subsystem).
- (U) Moving cargo to a designated beach area to await further distribution (shore subsystem).

(U) Because the various subsystems of LOTS capability overlap traditional functions of the military services, responsibilities for conducting logistic support operations over-the-shore in peace and war are outlined in a joint service regulation (AR 55-176, OPNAVINST 4620.6A, and AFR 75-4). This regulation provides that:

- The Army will:

  (U) Provide forces for and will conduct LOTS operations incident to Army and Air Force operations, subject to Navy responsibility for protection of shipping.

  (U) Provide floating and shoreside equipment for Army LOTS operations.

- The Navy will:

  (U) As may be agreed by the Chief of Naval Operations and the Chief of Staff, US Army, provide appropriate Navy forces, as may be available, for support of LOTS operations conducted by the Army.

  (U) In time of war, exercise command over the disposition and operation of ships as necesary to protect them.

  (U) Exercise command as necessary to enable Navy unit commanders, commanding officers, and responsible officers and petty officers to meet their responsibilities with respect to the safe and proper conduct of their ships and boats and with respect to their conduct in action against the enemy.

H.5.1.2 Army LOTS Capability

(U) In 1980 the Army analyzed its LOTS capability to support the CINCs, including the RDJTF. This "worst case" requirement, capability and shortfall are in Table H.3.

TABLE H.3

LOTS REQUIREMENT/CAPABILITY/SHORTFALL (U)

(Short Tons)

	Requirement	Capability	Shortfall
Discharge (Terminal Service)			
Lighterage (Landing Craft and Amphibious)			

5

461

The cost to meet the shortfall, and to achieve much-needed modernization, is estimated to total $508 million. This includes $470 million for activating new units, modernizing equipment, and raising the current capability of active and reserve units to the highest level. [Authorized Level of Organization (ALO)-1.] An additional $38 million is estimated to be required to procure 5

being developed by the Navy. Specific program determinations for overcoming this shortfall have not been made.

H.5.2 CONTAINERSHIP UTILIZATION

(U) There are numerous programs in progress or in the conceptual stage which serve to maximize the military utility of containerships. These include the development of flatracks (open-sided containers) for the containership movement of military equipment not suitable for containers; seasheds (super-size flatracks); construction of container-capable vessel support systems (VSS) at defense ammunition shipping ports; ammunition dunnaging/restraint systems for commercial containers and MILVANs; container handling equipment including rough terrain forklifts, trailers and mobile cranes; and transport equipment including chassis, and tactical truck tractors and semitrailers. Successful definition and completion of these programs should serve to insure that military deployments can be made with the same reliance on the evolving merchant marine fleet as in the past.

APPENDIX I

AIRLIFT AND SEALIFT VULNERABILITY AND ATTRITION (U)

APPENDIX I

AIRLIFT AND SEALIFT VULNERABILITY AND ATTRITION

I.1 INTRODUCTION

(U) The analysis reported in the main body of this study includes attrition of air and sea lift forces (and their cargoes) for Scenario III (the NATO-only scenario) only. Attrition in similar scenarios has been studied in depth. The results of the most recent study efforts formed the basis for attrition rates portrayed in the Catalog of Assumptions and Data, Appendix C. There have been no major studies of attrition for Persian Gulf scenarios so the effects on mobility forces cannot be fully determined. Obviously, attrition might have a significant effect on capability, yet use of any set of attrition values in these other scenarios would be arbitrary at this time and could lead to conclusions for which we would have little analytical basis. Analyses based on arbitrary attrition assessments could produce a substantial overstatement of the additional mobility capaiblity needed with little basis. On the other hand, an appreciation of the impact of attrition and some considerations for vulnerability reductions are considered useful.

I.2 DISCUSSION

I.2.1 GENERAL

(U) This discussion will first describe the various aspects of both sea and air lift attrition separately and then provide some scenario excursion results. Of the three remaining scenarios (other than Scenario III), Scenario II represents the only other plausible case to assume any significant levels of attrition since it considers US opposing Soviet forces. In addition, in all cases where we would deply conventional forces we must assume that the US would maintain air superiority; it is unlikely that we would commit into situations where their destruction is probable.

I.2.2 SEALIFT ATTRITION

(U) The evaluation of sealift attrition is a complex and multi-faceted process. Assumptions and numerous variables dictate the outcome of any analysis in this area. These considerations, while often confusing, are nonetheless important to full development and understanding of sealift attrition factors. Some of the more significant assumptions are highlighted below:

- Length of campaign to include warning time.
- Air and surface threat.
- Threat deployment strategy. (Are they going after carriers, rather than shipping?) (Where will they choose to attack shipping?)
- "Out of Area" resupply of threat submarines. (Are they going through barriers or do they have an "out of area" capability?)
- Sea Control - US naval force deployment and effectiveness.
- Naval protection of shipping - convoy vs independent ship sailings, convoy protection and tactics, and ship/convoy routing and speed.
- Shipping volume - military and economic.

(U) The following summarizes, as an example, some of these aspects as developed in SEAWAR 85, Scenario B (which formed the basis for the attrition factors in Appendix C).

Campaign. Scenario B is a slow buildup of tension with the NATO-Pact conflict arising out of a crisis over the Turkish Straits.

The longer build-up allows NATO days to mobilize while the Soviets commence their mobilization days prior to M-day. The Soviets make an all-out effort to disrupt the NATO SLOC, defend their own position in the Norwegian Sea, and destroy NATO naval forces. The Soviets announce that until only military cargo ships will be sunk using submarines, thereafter, unrestricted warfare on shipping by submarines and Backfires.

<u>NATO Shipping Policy</u>.

<u>NATO Defense of Shipping</u>.

4

4

4

4

Soviet Anti-Shipping Strategy. 3

468

3

3

3

Results. Based upon the foregoing assumptions of Soviet and NATO strategy and the analytic representation of system capabilities, the following results were estimated. These points pertain to the trans-Atlantic SLOC campaign only:

5

470

5

Application to Other Scenarios. Drawing conclusions from these results about attrition in Southwest Asia scenarios is fraught with difficulties. Both parties might choose to limit naval conflict to the SWA region in which case the level of effort would be reduced by the distance of both from major naval bases; the Soviets might choose to attack shipping nearer to its origin and their home bases; or we might choose to attack Soviet naval forces in locations where we can operate more easily. The decision of both parties will be influenced by the willingness of its allies to permit operations from their bases. In a geographically limited war, we might be able to avoid the need for convoying by providing intensive area defenses, but in a wider war we would probably be forced to convoy from CONUS. This not only would slow deliveries by sea but also would increase the possibility of port saturation by concentrating ship arrivals. Furthermore, the need to assemble convoys might negate the effectiveness of dedicated sealift programs. There is not yet a good understanding of how fast such ships must be able to sail to be more survivable sailing independently than in convoy. Finally, although we cannot predict attrition ratios without further study, we would expect the pattern that emerged from <u>Sea War 85</u> and a host of earlier studies--fairly high attrition of early shipments that decreases rapidly as the threat is attritted--to be true in SWA

471

scenarios as well. Consequently, developing adequate plans for protection of ships used for prepositioning and "fast" sealift will be very important, and we cannot assume that these ships will be exempt from attrition.

I.2.3 AIRLIFT ATTRITION

As noted earlier, we will not operate our airlift force for long in an area where we do not have air superiority. But having air superiority does not mean that all enemy air activity is precluded. There is little doubt that an air arm such as that possessed by the Soviets could significantly disrupt our efforts to reinforce and resupply our forces in regions such as Southwest Asia if a significant portion of the threat resource were dedicated to this objective. The question then is not only capability, but also intention--does the enemy place high enough priority on disrupting reinforcement to allocate his forces to this mission?

3

(U) Combat attrition of airlift aircraft can occur in either of two phases of the airlift operation--in-flight or while the aircraft are on the ground in the theater.

a. (U) From what we understand of the Soviet air operations plan for NATO, we expect that the majority of the losses of airlift resources would occur on the ground, although airlift aircraft would not be primary targets during the enemy raids. The number of losses is dependent on the time the aircraft would be exposed to possible attack. This exposure time is a function of ground time, the number of enemy raids, and how the airlift destinations match up with the enemy's targets. This methodology provided the basis for the NATO attrition estimates contained in Table C.4, Appendix C. Similar estimates have not been made for SWA scenarios.

b. (U) A separate case can be made for the attrition of airlift forces in flight, particularly in the forward areas during the postulated mass raids or early intense air combat activities. The success of Soviet fighters against airborne airlift assets is a function of such factors as mission directives and the probabilities of detection, intercept, and kill of airlift aircraft. Detailed studies have not been conducted on this aspect of airlift survivability.

c. (U) Another threat that is likely in SWA would come from small, portable, antiaircraft weapons such as the SA-7. These types of weapons could be used against transport aircraft during the approach and departure into less secure airfields and would be difficult to detect.

(U) Reducing Attrition. A number of actions can be taken to reduce the loss of airlift aircraft but, in most cases, not without some loss in mission effectiveness.

a. (U) Improve early air defense. By improving early air defense capability (both ground and air) the number of attacking aircraft would be reduced, thus indirectly reducing losses of airlift aircraft on the ground during an attack or reducing the opportunities for the enemy to intercept those aircraft in flight.

b. (U) Provide airlift aircraft with countermeasures and detection devices. Although the threat from air-to-air and surface-to-air missiles has not been specifically addressed, an ECM and/or missile detection capability could enhance the survivability of airlift aircraft.

c. (U) Night operation. Operating at night and in other times of reduced visibility would significantly degrade the threat capability and yet, except in extreme cases, would not limit the landing of airlift aircraft; however, restricting arrival times would cause additional scheduling problems and reduce the overall airlift delivery capability.

d. (U) Diversion of air traffic. With sufficient warning, airlift aircraft could be diverted to airbases which were less likely to be attacked. This obviously would cause delays in getting cargo to final destinations.

e. (U) Escorts for airlift aircraft. If the threat set out to intercept inbound airlift aircraft, it would seem rational to supply fighter escorts. It may be possible, rather than providing individual escorts, to establish safe corridors. This again would degrade by some degree overall airlift capability.

f. (U) Reduce ground times. If airlift aircraft destined for hostile areas land with sufficient fuel to return to a recovery base for servicing or ground times are reduced through aerial refueling, the time these aircraft would be exposed to possible enemy attack could be reduced.

g. (U) Increase warning time. Early detection of impending enemy attacks and the relaying of this information may provide airlift aircraft sufficient time to divert to safe areas. This may be achievable with the use of the AWACS with direct communications link to airlift control agencies.

Airfield Denial. Another way for the threat to degrade the airlift mission is by denying the use of the airfields which have been designated as destinations for strategic airlift aircraft. The primary means of airfield denial would be damage to the runways beyond our rapid repair capability.

3

Whether the runways of APODs are primary targets for threat fighter-bomber forces is again a question of allocation of forces and discussed above. One way to reduce the impact of airfield denial is to disperse the airlift deliveries to destinations further from enemy lines. However, this would result in some degradation in closure times and increased command and control problems in maintaining unit integrity for the Army and Marine forces. Another way to reduce airfield denial is by increasing the number of forward destinations through the use of austere airfields. Austere airfield capability would improve flexibility, decrease ground LOC requirements by allowing forward delivery and complicate enemy interdiction efforts because of increased airfield availability.

The results of airlift attrition on loss of cargo are far less dramatic than for sealift. Obviously, the vast quantity of materiel lost when one ship is sunk weighs far greater than the relatively small losses associated with the destruction of even several airlift aircraft. Thus, the measured impact is not terribly revealing from a sheer tonnage basis. On the other hand, if we assume attrition levels similar to those used in the NATO case, the first several days of deployment might experience a degradation in airlift capability of 5

I.3 SUMMARY

(U) For this study, the crucial question stemming from an attrition impact assessment is not one of how much worse off we'd be with higher levels of attrition, but rather, would considerations of attrition influence our selection of mobility systems? As was evident from the foregoing, attrition considerations produce varied results of each of the generic systems. Thus, attrition might provide some basis for program selection. On the other hand, with all the uncertainty of the estimates, we may wish, rather, to develop strategies or acquire additional systems to either reduce vulnerability or provide a hedge against catastrophic losses. For example, with sealift and maritime-based prepositioning initiatives we may wish to insure that units have duplicate sets to insure against large amounts of nearly irreplaceable unit equipment being lost when only a few ships are sunk. We may also want to provide adequate security for fast independent ships or prepositioned ships as they move to objective areas. For land-based prepositioning we would want to have equipment broken out (or off-loaded) and married with airlifted reinforcing troops and cargo prior to commencement of hostilities, or provide sufficient ground and air defense early to insure later use. For airlift, we may wish to make additional investment in rapid runway repair; or perhaps, the ability of aircraft to land at austere airfields (even though they're not at the front) to provide a hedge against airfield denial. On the other hand, equipment losses from airlift attrition are generally small and thus large amounts of duplicative equipment would not be necessary.

I.4 CONCLUSION

(U) The foregoing, far from being an extensive review, serves to highlight that the implications of attrition, at least based on what might be considered "worst case," does not demonstrate a total failure of deployment capability. On the other hand, as we develop additional mobility programs, emphasis must be placed on threat countermeasures in the acquisition of systems and the design operational plans.

476