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LOGISTICS HANDBOOK FOR STRATEGIC MOBILITY PLANNING



SEPTEMBER 1992



**MILITARY TRAFFIC MANAGEMENT COMMAND
TRANSPORTATION ENGINEERING AGENCY
NEWPORT NEWS, VA**

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FOREWORD

MTMCTEA Reference 92-700-2, Logistics Handbook for Strategic Mobility Planning, provides a broad range of vital transport information and guidance for planning purposes. Such data are essential for the successful mobilization, deployment, and sustainment of US Forces worldwide.

The goal of this publication is to standardize transportation information to provide continuity in planning throughout the Joint Deployment Community.

This report is designed to guide and assist staff and unit officers in planning unit mobilizations and deployments. The information in this report is not directive in nature and should be used only for planning purposes.

TABLE OF CONTENTS

	<u>Page</u>
LIST OF TABLES.....	7
I. INTRODUCTION.....	9
A. Purpose and Scope.....	9
B. Transport Sections Format.....	9
C. Data Sources.....	9
D. References.....	9
E. Suggested Improvements.....	10
II. STRATEGIC MOBILITY.....	11
A. General.....	11
B. Responsibilities.....	11
C. Movement Planning.....	12
III. MODE SELECTION FOR CONUS MOVEMENTS.....	15
A. General.....	15
B. CONUS Movement of Passengers.....	15
C. CONUS Movement of Unit Equipment.....	16
D. CONUS Movement of Resupply Cargo.....	16
IV. HIGHWAY TRANSPORT.....	19
A. General.....	19
B. Background.....	19
C. Transport Assets.....	20
D. Transit Data.....	20
E. State Highway Limits.....	21
F. Unit Movement Requirements.....	21
G. Commercial Bus.....	21
V. RAIL TRANSPORT.....	23
A. General.....	23
B. Background.....	23
C. Transport Assets.....	23
D. Transit Data.....	23
E. Unit Movement Requirements.....	24
VI. INLAND WATERWAY TRANSPORT.....	26
A. General.....	26
B. Background.....	26
C. Transport Assets.....	29
D. Transit Data.....	29
E. Unit Movement Requirements.....	30
VII. SEA TRANSPORT.....	31
A. General.....	31
B. Background.....	31
C. Transport Assets.....	31
D. Transit Data.....	33
E. Unit Movement Requirements.....	43

TABLE OF CONTENTS - cont

	<u>Page</u>
F. Special Planning Consideration.....	43
G. Port Characteristics.....	44
VIII. AIR TRANSPORT.....	50
A. General.....	50
B. Background.....	50
C. Transport Assets.....	50
D. Transit Data.....	51
E. Unit Movement Requirements.....	57
IX. CONTAINER TRANSPORT.....	58
A. General.....	58
B. Container Inventory.....	58
C. Container Characteristics.....	58
D. Flatrack Characteristics.....	58
E. Unit Movement Requirements.....	61
APPENDIXES	
A - References.....	63
B - Abbreviations and Acronyms.....	67
C - Surface (Land) Mileage Between CONUS Military Activities and Major US Ports.....	69
D - Distance Between Ports.....	119
DISTRIBUTION	
BUSINESS REPLY CARD	

LIST OF TABLES

<u>Table</u>		<u>Page</u>
1	Unit Characteristics.....	10
2	Routing Authority for CONUS Movement of Passenger.....	15
3	Resupply Mode Selection and Loading Criteria.	17
4	Unit Movement Requirements - Convoy/Motor....	22
5	DFRIF Railcar Inventory and Characteristics..	24
6	Unit Movement Requirements - Rail.....	24
7	Unit Movement Requirements - Convoy/Rail.....	25
8	Mobilization Station to Inland Waterway Dock Mileage.....	28
9	Inventory of Flat Deck Barges.....	30
10	Unit Movement Requirements - Inland Waterway.	30
11	Inventory of US Flag Dry Cargo Vessels.....	34
12	Vessel Characteristics - Breakbulk.....	35
13	Vessel Characteristics - RORO.....	36
14	Vessel Characteristics - Barge Carrier.....	37
15	Vessel Characteristics - Container.....	38
16	Vessel Characteristics - Special.....	39
17	Average Shiploading and Unloading Times.....	40
18	Desert Storm Average Shiploading and Unload- ing Times, Deployment (Unit Equipment).....	41
19	Desert Storm Average Shiploading and Unload- ing Times, Redeployment (Unit Equipment)...	42
20	Desert Storm Average Shiploading and Unload- ing Times, Deployment/Redeployment (Ammunition).....	43
21	Unit Movement Requirements, Air Assault Division.....	44
22	Unit Movement Requirements, Airborne Division	45
23	Unit Movement Requirements, Armored Division	45
24	Unit Movement Requirements, Infantry Division.....	46

TABLE OF CONTENTS - cont

<u>Table</u>		<u>Page</u>
25	Unit Movement Requirements, Light Infantry Division.....	46
26	Unit Movement Requirements, Mechanized Division.....	47
27	Unit Movement Requirements, Armored Cavalry Regiment.....	47
28	Unit Movement Requirements, Marine Expeditionary Brigade - East Coast.....	48
29	Unit Movement Requirements, Marine Expeditionary Brigade - West Coast.....	48
30	USAF Aircraft Performance Data.....	52
31	USAF Maximum Payload (Pounds).....	53
32	USAF Average Payload (Pounds).....	53
33	USAF Aircraft Equipment Dimensional Limits...	54
34	USAF Air Transport Restrictions - Tracked Vehicles.....	54
35	CRAF Long-Range International Cargo Planning Factors.....	55
36	CRAF Long-Range International Passenger Planning Factors.....	56
37	Unit Movement Requirements, C-141/C-17 Mix...	57
38	Unit Movement Requirements, C-141/C-5 Mix....	57
39	Typical Dry Cargo Container Characteristics..	59
40	Typical Flatrack and Seashed Characteristics.	60
41	Containerizable Unit Equipment.....	62
C-1	Surface (Land) Mileage Between CONUS Military Activities and Major North Atlantic Ports..	70
C-2	Surface Mileage Between CONUS Military Activities and Major South Atlantic Ports..	82
C-3	Surface Mileage Between CONUS Military Activities and Major Gulf Ports.....	94
C-4	Surface Mileage Between CONUS Military Activities and Major West Coast Ports.....	106
D-1	Distance Between Ports (Nautical Miles).....	119
D-2	Estimated Transit Times.....	123

I. INTRODUCTION

A. PURPOSE AND SCOPE

This report provides a broad range of transportation planning data and guidance for mobilizing, deploying, and sustaining US Forces worldwide.

This publication contains the following information:

1. General discussions of mobility planning considerations.
2. Discussions and specific planning guidance for five transportation modes (highway, rail, inland waterways, sea, and air).
3. Unit movement requirements.
4. Containerization discussion and guidance.
5. Supplemental transportation appendixes.

The information in this report is not directive in nature. It should be used only for planning purposes. While more accurate data may exist for each specific application, exercise, or mission being planned, this report can be used in the absence of such data. Also, more definitive data associated with detailed transportation analyses and the shipment of hazardous cargoes are beyond the scope of this report.

B. TRANSPORT SECTIONS FORMAT

The format of this report has been arranged to provide continuity between the five transport sections (highway, rail, inland waterway, sea, and air). Each of these sections contains a discussion of general and background information; an inventory of transport assets; a discussion of transit data, loading criteria and restrictions; and a discussion of unit movement requirements for six Army-type divisions and an armored cavalry regiment (table 1). Some minor deviation may occur from this format per transport mode because of the specific characteristics of that mode. However, for the most part, these sections are uniform in structure.

C. DATA SOURCES

The data in this report are derived from several sources. One major source is the analyses of actual unit moves. Included are unit moves associated with Operation Desert Storm. Other sources of data include historical movement experiences, Joint Chiefs of Staff (JCS)-sponsored exercises, and Military Traffic Management Command Transportation Engineering Agency (MTMCTEA) transportation and transportability studies.

D. REFERENCES

Source references are provided for the data contained in this report. References for supplemental information can be found in the body of the text and in appendix A. These references should aid the user when information beyond the scope of this publication

is required. If the data in this report conflict with the data in the Department of the Army (DA) or Department of Defense (DOD) publications, the data in the latter publications take precedence, pending resolution of the conflict. Conflicts should be reported to the Director, MTMCTEA (address below). Also, requests for any MTMCTEA publications named in this report should be sent to MTMCTEA.

TABLE 1
UNIT CHARACTERISTICS

Type Unit	Number of Personnel	Total Square Feet	Total STON	Total MTON
<u>Division:</u>				
Air Assault	16,170	996,781	32,546	168,594
Airborne	13,109	858,492	21,943	100,212
Armored	16,921	1,427,996	96,580	275,273
Infantry	16,938	1,169,664	59,508	210,006
Light Infantry	10,871	445,598	14,436	71,938
Mechanized	17,235	1,422,844	95,010	274,518
<u>Regiment:</u>				
Armored Cavalry	4,663	425,147	30,763	82,905
Source: MTMCTEA Report OA 90-4f-22, <u>Deployment Planning Guide</u> , Aug 91.				

E. SUGGESTED IMPROVEMENTS

For improvement of this publication, we encourage user recommendations, comments, and corrections. Address all correspondence to:

Director
Military Traffic Management Command
Transportation Engineering Agency
ATTN: MTTE-OA
720 Thimble Shoals Boulevard - Suite 130
Newport News, VA 23606-2574

The point of contact at this agency is Mr. Joe Joines, MTTE-OA, AUTOVON 927-5266 or commercial (804) 599-1671. Address electrically transmitted messages to DIRMTMCTEA FT EUSTIS VA//MTTE-OA//.

II. STRATEGIC MOBILITY

A. GENERAL

Strategic mobility is the capability to deploy and sustain military forces worldwide in support of national strategy.

B. RESPONSIBILITIES

The major players in the movement of forces, equipment, and supplies are the US Transportation Command (USTRANSCOM) and its transportation component commands (TCCs), the Military Traffic Management Command (MTMC), the Military Sealift Command (MSC), and the Air Mobility Command (AMC). Other players include transportation management officers (TMOs) or installation transportation officers (ITOs) and unit movement personnel.

1. USTRANSCOM. The mission of USTRANSCOM is to provide air, land, and sea transportation for the DOD in time of peace and war. In performing its transportation single-manager responsibilities, USTRANSCOM orchestrates the transportation aspects of worldwide mobility planning and execution. It ensures the effective and efficient use and control of Government and commercial strategic mobility assets. Further, it operates and maintains the Joint Operation Planning and Execution System (JOPES) and provides centralized traffic management.

2. MTMC. MTMC provides three services: traffic management, operation of common-user ocean terminals, and transportation and transportability engineering. It manages the movement of personnel and equipment from home bases, depots, or factories to CONUS destinations, Air Mobility Command (AMC) airplanes, MSC ships, or commercial carriers, for shipment overseas.

MTMC also monitors the nation's transportation infrastructure, to ensure it meets DOD needs and transportability criteria.

3. MSC. MSC is part of the operating forces of the US Navy. It is also the USTRANSCOM component command for waterborne common-user transportation operations. MSC is responsible for the preparation of employment plans for, and the expansion of, MSC common-user sealift transportation in time of war or national emergency.

4. AMC. The mission of AMC is to provide air transportation for DOD and other Government agencies. AMC's mission includes aerial deployment, employment, and redeployment of combat forces and their support equipment; logistical resupply of these forces; aeromedical evacuation; presidential airlift; aerial search, rescue, and recovery of downed flyers; and aerial refueling.

5. TMO/ITO. TMOs and ITOs provide guidance and assist assigned and supported units in preparing, maintaining, and executing movement plans. TMOs and ITOs also coordinate and monitor unit movements, provide assistance to units in or traversing the installation support area, and coordinate airlifts. Some of the TMO/ITO administrative duties include preparing movement reports and processing convoy clearances and special hauling permits.

6. Unit Movement Personnel. Unit movement personnel prepare and maintain unit movement plans and standing operating procedures (SOP). Their duties also include: reviewing unit plans to ensure they meet requirements, preparing and maintaining documentation needed for unit movement and unit load plans, and coordinating operational and logistical requirements for unit moves.

C. MOVEMENT PLANNING

Commanders in Chief (CINCs) of unified and specified commands develop operation plans (OPLANS) and joint time-phased force deployment data (TPFDD). These data identify units to support each OPLAN and provide data concerning routing from origin to destination. USTRANSCOM and the TCCs hold conferences to refine the match of validated requirements of warfighting CINCs with the capabilities of supporting CINCs and the allocated transportation resources. Refinement conferences result in a deployment movement plan based on apportioned forces, apportioned strategic airlift and sealift, and available nonunit supplies and equipment. USTRANSCOM reformats information contained in the TPFDD and loads it in the JOPES deployment data base.

Movement plans are prepared using reverse planning. This helps to keep accurate latest arrival dates (LADs) and required delivery dates (RDDs).

Figure 1 illustrates the concept of reverse planning. It shows the various locations a unit must transit during a deployment. Planning should begin with the date the unit is required at its ultimate destination. Subtract the number of days required to move from the aerial/sea port of debarkation (A/SPOD) to the ultimate destination. Continue in this manner until the date of departure from the origin station is determined.

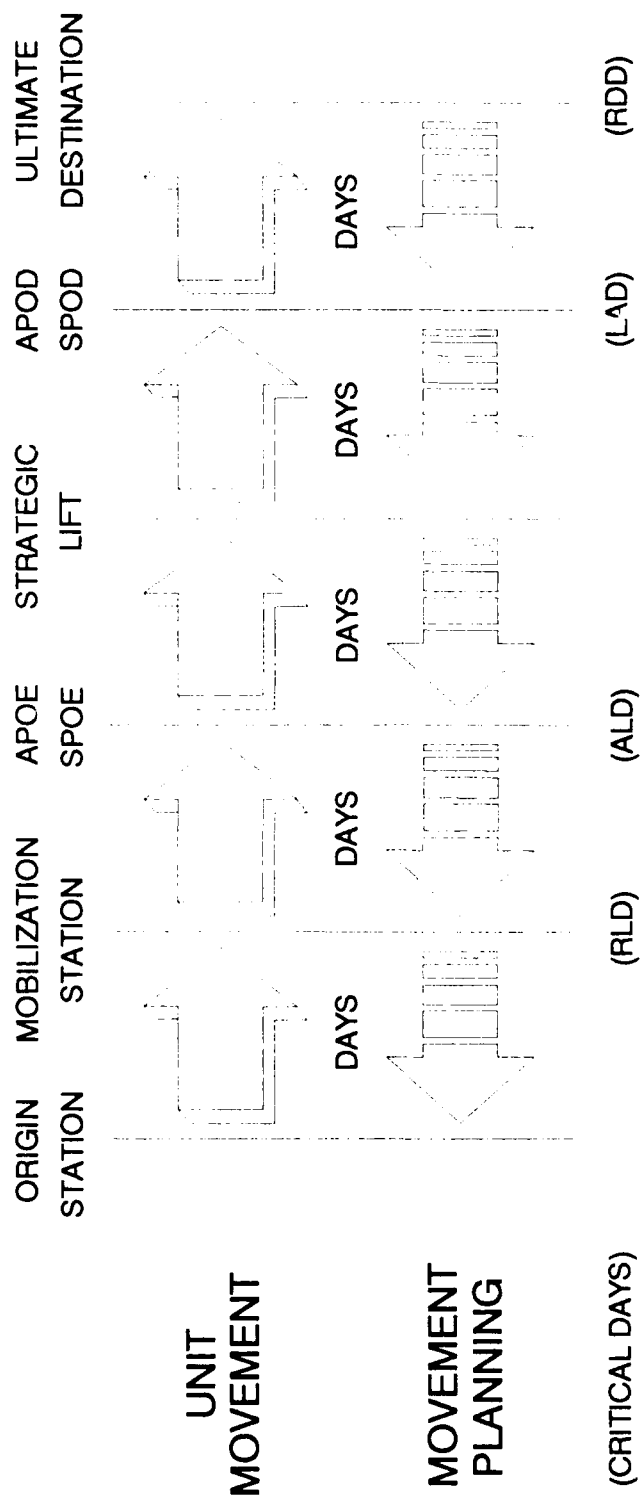
Arrival times for the locations shown in figure 1 are assigned by various sources:

1. Ultimate Destination. The ultimate destination is selected by the supported commander, based on mission requirements. The supported commander also determines the desired destination arrival time based on mission requirements. Actual arrival times will vary with the lift asset availability and movement priorities established by the supported commander.

2. A/SPOD. The A/SPOD, as well as any ports between the aerial/sea port of embarkation (A/SPOE) and A/SPOD, is selected by the supporting or supported commander, as appropriate. It is selected based on the mission, port capabilities and location, ship and aircraft characteristics, cargo type, and hostile threat assessment.

The A/SPOD departure time is calculated by subtracting the expected transit time to the ultimate destination from the RDD. The A/SPOD arrival time is calculated by subtracting the expected offloading, staging, and marshaling times for all cargo from the A/SPOD departure time.

3. Strategic Lift. AMC and MSC select and provide the supported or supporting commander with the required air and sea transportation assets. Section VIII and table 29 provide the data necessary to estimate air transit times. Appendix D provides a



READY TO LOAD DATE (RLD): UNIT PREPARED FOR DEPLOYMENT
 AVAILABLE TO LOAD DATE (ALD): UNIT ARRIVAL FOR STRATEGIC LIFT
 LATEST ARRIVAL DATE (LAD): UNIT ARRIVAL IN AREA OF OPERATIONS
 REQUIRED DELIVERY DATE (RDD): UNIT CONFIGURED FOR MISSIONS AT
 TACTICAL ASSEMBLY AREA

Figure 1. Reverse planning.

mileage guide with distances between ports and an estimate of ship speeds to calculate transit time between CONUS SPOEs and overseas SPODs.

4. A/SPOE. AMC selects the APOE for all airlifts it performs. MTMC, in coordination with MSC, designates the SPOE for all CONUS ocean terminals (commercial and military), based on the supported/supporting commander's RDD, vessel transit time, estimated load time, and port/berth availability. Cargo arrival times at SPOEs are mandated by MTMC in the port call.

A/SPOEs are selected based on the mission, port capabilities and location, aircraft and/or ship's characteristics and availability, cargo type, and hostile threat assessment.

A/SPOE departure times are requested by the supported commander, but ultimately are selected by AMC for airlift and MSC for sealift. The only exception is that the supported or supporting commander may sometimes select the departure times, where appropriate. The departure time can normally be estimated by subtracting the air or surface overseas transit time from the scheduled-to-arrive date at the intermediate location or A/SPOD, as applicable.

The A/SPOE arrival times are selected by MTMC. The times are based on lift asset availability and the estimated aircraft or ship departure times. The arrival time is calculated by subtracting the time required to process and load vehicles and equipment from the air or ship departure time. Vehicle and equipment processing at the A/SPOE may require vehicle reduction, defueling, maintenance, washing, documentation, marking, weighing, and staging. Standard planning times for arrival at the APOE prior to takeoff are 6 hours for cargo and 3 hours for passengers.

5. Mobilization Station. Units are often assigned a permanent mobilization station. When a CONUS-based unit is not permanently assigned to a CONUS installation (as is the case with some Reserve units), the unit deploys through a mobilization station selected by Forces Command (FORSCOM). This selection is based on the mission, station capabilities, transportation assets, unit requirements, and location.

The mobilization station departure time is selected by the supported or supporting commander. It can be estimated by subtracting the inland transit time to the A/SPOE from the A/SPOE arrival time. Appendix C lists the mileage for land transport between major US Army installations and major US sea ports. For units conveying to an SPOE, the mobilization station departure time calculation should include estimates of anticipated time spent in FORSCOM marshaling areas.

The mobilization station arrival time, for units not permanently assigned to that station, is selected by the supported or supporting commander. It can be estimated by subtracting the processing time from the mobilization station departure time. The processing time should include the time required to receive railcars and/or commercial trucks and the time to load them, as applicable.

6. Origin Station. The origin station departure time is also selected by the supported or supporting commander. It can be estimated by subtracting the transit time from the mobilization station arrival time.

III. MODE SELECTION FOR CONUS MOVEMENTS

A. GENERAL

This section provides general planning criteria for selecting the mode and method of transport for passengers, unit equipment, and resupply cargo in CONUS. For resupply cargo, transportation options associated with each supply class are listed. Additional information for CONUS movements can be found in AR 55-355.

B. CONUS MOVEMENT OF PASSENGERS

Mode selection (for CONUS passenger movements) should reflect the most economical means that meet DOD operational requirements. As in all movements, the mission may dictate deviation from the mode selection criteria outlined in this section. MTMC will determine the commercial carrier equipment to be used. MTMC retains routing authority in some instances and delegates the authority to local ITOs or division transportation officers (DTOs) in other instances. Table 2 lists the routing authority criteria for CONUS movement of passengers.

TABLE 2
ROUTING AUTHORITY FOR CONUS MOVEMENT OF PASSENGERS

Routing Authority	Number of Passengers per Mode		
	Rail	Bus	Air
(450 Miles or Less)			
MTMC	None	None	21 or More
ITO	Any Number	Any Number	20 or Less
(451 Miles or More)			
MTMC	21 or More	21 or More	21 or More
ITO	20 or Less	20 or Less	20 or Less
Source: AR 55-355, chapter 306, 31 Jul 86.			

CONUS transport of passengers is by bus, rail, emergency military transportation, commercial air, chartered commercial aircraft, or chartered airtaxi. No noteworthy physical limitations exist for passenger movements on these conveyances, other than passenger quantity and baggage limits. Consult AR 55-355, chapter 47, for additional information on passenger movements.

C. CONUS MOVEMENT OF UNIT EQUIPMENT

Mode selection for CONUS unit equipment movements should reflect time constraints, economic requirements, asset availability, hostile threat assessment, and special movement requirements. The mission may dictate deviations from the mode selection criteria outlined in this section. MTMC will determine the transport mode for commercial movements, except as delegated to the ITOS and DTOS.

Transport options for CONUS movement of unit equipment include highway, rail, and inland waterways. Inland waterways are a new option worth considering. Although no formal guidance for inland waterways exists, in recent years successful unit moves have been made via this transport system (see section VI). Air transport within CONUS is unlikely for any significant quantities of unit equipment. Helicopters normally are expected to self-deploy to the APOE and SPOE for transport by airlift or sealift. For helicopter delivery procedures, see US Army Aviation Systems Command Report, US Army Aircraft Delivery Procedures (Instructions for Delivery Pilots), October 1987.

The general guidance for the use of commercial transport (motor and rail) of unit equipment in CONUS is as follows:

1. Commercial transport assets will be used in CONUS for moving unit equipment during mobilization and deployment.
2. Commercial assets must be available to support the non-organic move and to satisfy the RDD.
3. The commercial movement capability must be validated by MTMC, and the commercial movement must be approved by the major command (MACOM).

Exceptions to this guidance are units located within a 1-day road march (400 miles) to the mobilization station or POE. These units can move over the road organically when the unit commander determines that such a movement will not adversely affect equipment readiness and adequate en route support is available.

The transport mode selected must meet the physical dimensions and weight requirements of the cargo to be moved. Consult sections IV through VIII for details pertaining to each transport mode.

D. CONUS MOVEMENT OF RESUPPLY CARGO

Mode selection for CONUS movement of resupply cargo in significant quantities should reflect consideration of economic factors, RDD, asset availability, hostile threat assessment, and specific movement requirements. The mission may dictate deviations from the mode selection criteria outlined in this section. Resupply cargoes should be containerized to the maximum degree, to take advantage of commercial container transport and intermodal systems (trucks, containers on flatcars (COFC), and container-ships). The standard length container for resupply cargoes is 40 feet. The average short tons (STON) per container, for all classes of resupply, range from 16 to 24 STON. Table 3 lists the resupply mode selection criteria MTMC uses to determine the transport modes.

TABLE 3
RESUPPLY MODE SELECTION AND LOADING CRITERIA

Supply Class/ Subclass	STON Per Vehicle				Mileage			
	Motor	Rail		Tank	0 to 400		401 to 800	
		Box	Flat		STON	Mode	STON	MODE
								Mode
1. <u>Subsistence</u>	18	34	0	0	0	Motor	0-24 >24	Motor Rail
Refrigerated	15	0	0	20	0	Motor	0-24 >24	Motor Rail
2. <u>General Support Items</u>	17	30	20	0	0	Motor	0-24 >24	Motor Rail
3. <u>POL</u>								
Bulk	24	0	0	0	66	Motor	All	Motor Rail
Packaged	22	24	25	20	0	Motor	0-24 >24	Motor Rail
4. <u>Construction Materials</u>	17	32	20	0	0	Motor	0-24 >24	Motor Rail
5. <u>Ammunition</u>	24	60	0	0	0	Motor	0-24 >24	Motor Rail
6. <u>Personal Demand</u>	16	30	24	0	0	Motor	0-24 >24	Motor Rail

TABLE 3 - cont

Supply Class/ Subclass	STON Per Vehicle					Mileage					
	Motor	Rail				0 to 400		401 to 800		More than 800	
		Box	Flat	Reefer	Tank	STON	Mode	STON	MODE	STON	Mode
7. <u>Major End Items</u>	16	30	20	0	0	All	Motor	0-240 >240	Motor Rail	0-48 >48	Motor Rail
Administrative/ General Support Vehicles	12	0	12	0	0	All	Motor	0-48 >48	Motor Rail	All	Rail
Tactical/Special- Purpose Vehicles	0	0	50/100*	0	0	All	Rail	All	Rail	All	Rail
Missiles	10	0	18	0	0	All	Motor	0-10 >10	Motor Rail	All	Rail
8. <u>Medical Material</u>	15	30	24	0	0	All	Motor	0-24 >24	Motor Rail	0-12 >12	Motor Rail
9. <u>Repair Parts</u>	16	30	20	0	0	All	Motor	0-240 >240	Motor Rail	0-48 >48	Motor Rail
Ground Support Materials	16	30	20	0	0	All	Motor	0-240 >240	Motor Rail	0-48 >48	Motor Rail
10. <u>Materials to Support Nonmilitary Programs</u>	16	30	20	0	0	All	Motor	0-240 >240	Motor Rail	0-48 >48	Motor Rail
*50 STON per commercial railcar or 100 STON per DFRIF railcar.											

IV. HIGHWAY TRANSPORT

A. GENERAL

This section provides transport planning data for CONUS highway movement of unit equipment and military cargo. It discusses background information pertaining to military convoys, motor transport types and selection criteria, commercial transit data, State highway limits and restrictions, and unit movement requirements. Also provided at the end of this section is a discussion of transporting personnel by commercial bus.

B. BACKGROUND

1. Highway Transport Sources. Sources of highway transport assets include commercial carriers with equipment for lease or hire and organic assets of the mobilizing unit.

2. Commercial Transport. For distances greater than 400 miles, the Army's standard practice is to maximize the use of commercial lift (rail, motor, or barge) capabilities in CONUS to reduce wear and tear on tactical wheeled vehicles, minimize requirements for en route support, and reduce maintenance requirements at marshaling points. However, at times when situations exist where this is not practical or feasible, a unit must move by way of a military convoy.

3. Military Convoys. Roadable vehicles of units located within a 1-day (400 miles) road march to the mobilization station or A/SPOE will move via organic mode. Exceptions will be made to this policy when, in the commander's opinion, organic movement would adversely affect equipment readiness or en route support would be inadequate to support an organic movement. Commercial assets must still be available to support the movement of any non-roadable equipment.

4. Military Convoy Planning. To improve planning and coordination of Active and Reserve unit moves to mobilization stations and A/SPOEs, MTMC, in coordination with FORSCOM, developed a mobilization movement control (MOBCON) program. The program is currently being implemented by FORSCOM and the National Guard Bureau (NGB). Under the concept, a Defense Movement Coordinator (DMC) has been established for each State. DMCs will assemble, analyze, and coordinate movement plans for all moves that originate in their State and will assist in coordinating moves that originate elsewhere and traverse their State. The DMC will establish master movement files for each State, obtain State clearances based on the master files, execute master movement plans, monitor and coordinate moves, resolve problems, and reroute moves as necessary. DMCs and their State highway civilian counterparts are listed in the MTMCTEA Report, Directory of Highway Permit Officials and Mobilization Movement Control (MOBCON) Coordinators, August 1991.

Detailed military convoy information can be found in AR 55-29, AR 55-162, FM 55-30, and FM 55-312. Military convoy routing information can be obtained from MTMCTEA Reports SE 89-4b-59, Strategic Highway Corridor Network (STRAHNET) Connector Atlas, September 1991, and SE 89-4b-27, Strategic Highway Corridor Network, January 1991.

C. TRANSPORT ASSETS

1. Motor Transport Types. The type selection of military or commercial motor transport assets for a unit move is based upon the size and weight limitations of the cargo. The criteria below should be used to select the best type of motor transport:

a. Motor Van and Containers. Motor vans and containers (either commercial or military) are the highway assets for items not more than 472 inches long, 90 inches wide, 84 inches high, and 40,000 pounds (excluding any wheeled or tracked vehicles). The criteria for containers are somewhat more restrictive. See section IX for specific guidance.

b. Flatbed Semitrailer. The flatbed semitrailer, commercial or military, is the highway asset for items that exceed the motor van or container criteria but do not exceed 474 inches in length, 144 inches in width, 116 inches in height, and 40,000 pounds.

c. Lowbed Trailer. The lowbed trailer, commercial and military, is the highway asset for items that exceed the flatbed semitrailer criteria but do not exceed 474 inches in length, 144 inches in width, 128 inches in height, or 52,000 pounds.

d. Heavy-Equipment Transporter (HET) System. The Army's HET, or a commercial equivalent, is the highway asset for items up to 70 tons. MTMC does not plan for the use of military HETs during a mobilization and deployment, because the size and weight of the combinations possible with this system and its cargo generally exceed the limits for State highway permits.

2. Motor Transport Inventories. It can be assumed that commercial motor transport assets are of sufficient quantities that an inventory listing is not necessary.

D. TRANSIT DATA

1. Military Convoy Speeds. The maximum speed for military vehicles convoying on interstate highways or expressways is 50 miles per hour (mph). Military vehicles moving on controlled access highways will maintain the minimum posted speed or 40 mph, if a minimum speed is not posted. Military vehicles that cannot maintain the minimum posted speed must be routed over an alternate noncontrolled access route.

2. Military Convoy Transit Times. For general planning purposes, military vehicles convoying on controlled access highways are programmed to average 400 miles per day, calculated on a roadtime of 10 hours a day. FM 55-30 dictates a 10-minute rest stop every 2 hours and a 1-hour refueling and lunch period.

3. Commercial Truckload. Commercial motor truckload service is planned to average 46 mph for a distance of 1,000 miles per day (using two drivers per prime mover). A truckload is defined as the quantity of freight that will fill a truck, the quantity of freight weighing the maximum legal amount for a particular truck, or, when used in connection with freight rates, the quantity of freight necessary to qualify a shipment for a truckload rate. The Interstate Commerce Commission (ICC) considers a truckload as any shipment of 10,000 pounds or more.

E. STATE HIGHWAY LIMITS

Two principal sets of State highway limits exist. These include limits that apply to routes on the national network and routes that are not on the national network.

1. Routes on the National Network. This network of routes (for longer, wider trucks), established as a result of the 1982 Surface Transportation Assistance Act, consists of the interstate highway system and about 140,000 miles of other principal highways. The dimensions and weight restrictions established by the act are as follows:

a. Length: 48 to 60 feet for semitrailers (varies by State); 28 feet for each trailer in a double-trailer combination.

b. Width: 102 inches.

c. Height: 13 feet 6 inches.

d. Weight: 20,000 pounds for single axles; 34,000 pounds for tandem axles; 80,000 pounds for gross vehicle weight.

2. Routes not on the National Network. These routes are subject to dimension and weight restrictions imposed by the individual States. The restrictions vary from State to State.

These are the legal limits for movement of military-sponsored cargo without a permit. Since actual limits vary from State to State, the limits shown are for planning purposes only. Specific limits and permits may be obtained by contacting the appropriate State highway departments. State points of contact are identified in the Directory of Highway Permit Officials and Mobilization Movement Control (MOBCON) Coordinators, which is prepared and distributed by MTMCTEA. The directory also contains State-by-State summaries of legal and maximum permissible limits. Larger and heavier loads are commonly moved by permit under the provisions of AR 55-355, chapter 28, and AR 55-162.

F. UNIT MOVEMENT REQUIREMENTS

Table 4 lists the highway transport requirements (convoy/motor) for six Army-type divisions and an armored cavalry regiment. It also lists the number of DODX flatcars required to move equipment not meeting highway transporter weight and dimensional criteria.

G. COMMERCIAL BUS

1. Routing Authority. The authority to route passengers by commercial bus is outlined in table 2. For more detailed information on commercial bus service, refer to AR 55-355.

2. Loading Criteria. Commercial buses can be used for movement requirements when it is determined that their use is mission essential. Commercial bus travel is planned to average 50 mph for 18 hours, for a total of 900 miles per day. The average commercial bus load is 43 passengers per bus.

TABLE 4
UNIT MOVEMENT REQUIREMENTS - CONVOY/MOTOR

Type Unit	Motor Transport Type		Number of Vehicles Driven	Number of Vehicles Towed	Number of 20-ft Containers	Number of 68-ft DODX Flatcars
	40-ft Flatbed	HET				
<u>Division:</u>						
Air Assault	687	40	3,453	2,158	874	0
Airborne	1,640	30	2,731	1,504	973	0
Armored	814	1,150	3,662	2,222	651	72
Infantry	547	502	4,151	2,336	574	24
Light Infantry	360	29	1,987	1,092	484	0
Mechanized	832	1,148	3,654	2,231	661	72
<u>Regiment:</u>						
Armored Cavalry	234	365	1,056	520	175	24
Note: The containers in this table are simulated as loaded on the 40-ft flatbeds (2 per truck).						
Legend: HET - heavy-equipment transporter						
Source: MIMCTEA Report OA 90-4f-22, <u>Deployment Planning Guide</u> , Aug 91.						

V. RAIL TRANSPORT

A. GENERAL

This section provides transport planning data for rail movements of CONUS-based forces. Only rail transport assets that are militarily useful for the mobilization and deployment of forces from installations to SPOEs will be examined. This section includes a summary of commercial rail assets, the Defense Freight Railway Interchange Fleet (DFRIF) inventory, and rail deployment planning data.

B. BACKGROUND

Sources of rail transport assets include commercially owned and operated railcars and MTMC-owned DODX railcars. The DODX cars make up the DFRIF.

The main purpose of the DFRIF is to supplement commercial railcar capability, where:

1. Commercial railcars are not available in the quantities or at the time required.
2. A requirement exists for a specialized car type that is not available from commercial rail sources.

C. TRANSPORT ASSETS

1. Railcar Types - Desert Storm. About 89 percent of the railcars used in the CONUS rail deployment of unit equipment during Desert Storm were flatcars. Of these flatcars, 98 percent were the chain-tiedown type. For detailed information concerning rail deployments during Desert Storm, see MTMC TEA Report OA 91-4a-26, Rail Deployment at CONUS Installations - Operation Desert Storm, July 1992.

2. Commercial Rail Inventory. An inventory of militarily useful commercial railcars can be extracted from the Universal Machine Language Equipment Register (UMLER) railcar data base. UMLER lists railcar characteristics and quantities. For the analytical purposes of this section, the commercial railcar type used was the 89-foot flatcar.

3. DFRIF Inventory. The only DFRIF railcars available for mobilization purposes are 68-foot heavy-capacity flatcars (see table 5). DFRIF heavy-capacity flatcars are the chief means of transporting the main battle tanks (M60A3 and M1 series) and similar equipment from military installations to SPOEs. Other equipment not requiring heavy-capacity flatcars may also use the DFRIF heavy-capacity cars with the permission of the car manager.

D. TRANSIT DATA

The criteria below are provided to assist in selecting the appropriate method of rail transport:

TABLE 5
DFRIF RAILCAR INVENTORY AND CHARACTERISTICS

Type	Capacity (STON)	Length (ft)	Width (ft-in.)	Quantity
Flatcar	140	68	10-5	566

1. Unit Equipment Trains. Unit equipment railcars will normally move as a unit train. The number of railcars in a unit equipment train varies. Regardless of the number of railcars, all unit trains are planned to average 22 mph, for a distance of 528 miles per day.

2. Carload (CL) Shipments. CL shipments totaling 49 or fewer railcars will normally move in regular train service at an average speed of 13 mph, for a distance of 312 miles per day.

E. UNIT MOVEMENT REQUIREMENTS

Railcar requirements for the movement of the six Army-type divisions and armored cavalry regiment are shown in table 6. Table 7 lists a convoy/rail option for the same Army-type units.

For specific railcar loading guidance, see TM 55-2200-001-12 and MTMCTEA Pamphlet 55-19, Tiedown Handbook For Rail Movements, June 1991.

TABLE 6
UNIT MOVEMENT REQUIREMENTS - RAIL

Type Unit	Railcar Type		Number of 20-ft Containers
	89-ft Flatcar	68-ft DODX Flatcar	
<u>Division:</u>			
Air Assault	1,463	27	874
Airborne	1,337	21	973
Armored	1,656	650	651
Infantry	1,634	297	574
Light Infantry	764	24	484
Mechanized	1,659	639	661
<u>Regiment:</u>			
Armored Cavalry	450	190	175
Note: The containers in this table are simulated as loaded on the 89-foot flatcars.			
Source: MTMCTEA Report OA 90-4f-22, <u>Deployment Planning Guide</u> , Aug 91.			

TABLE 7
UNIT MOVEMENT REQUIREMENTS - CONVOY/RAIL

Type Unit	Rail Transport Type		Number of Vehicles Driven	Number of Vehicles Towed	Number of 20-ft Containers
	89-ft Flatcar*	68-ft DODX Flatcar			
<u>Division:</u>					
Air Assault	344	27	3,453	2,158	874
Airborne	820	21	2,731	1,504	973
Armored	407	650	3,662	2,222	651
Infantry	274	297	4,151	2,336	574
Light Infantry	180	24	1,987	1,092	484
Mechanized	416	639	3,654	2,231	661
<u>Regiment:</u>					
Armored Cavalry	117	190	1,056	520	175
*Data interpolated from MTMCTEA Report OA 90-4f-22, <u>Deployment Planning Guide</u> , Aug 91.					
<u>Legend:</u>					
HET - heavy-equipment transporter					
Source: MTMCTEA Report OA 90-4f-22, <u>Deployment Planning Guide</u> , Aug 91.					

VI. INLAND WATERWAY TRANSPORT

A. GENERAL

This section provides information about the national inland waterway system. In light of recent successful inland waterway moves by Army armored, artillery, and engineer units, the information presented is an effort to make planners aware of this practical and very feasible transport option. Because of the limited amount of inland waterway data available for analysis, the data listed are more comparative than analytical in nature.

The following topics about inland waterways are discussed in this section: background information and the role of the Army Corps of Engineers, characteristics and quantities of barges, barge transit data, and unit movement requirements.

B. BACKGROUND

1. Inland Waterway System Characteristics. The contiguous States are served by about 25,000 miles of inland and coastal waterways. This waterway system consists of several key segments (see fig 2). These segments include inland rivers, the lower Mississippi River, Great Lakes, and offshore coastal shipping lanes. However, the traditional concept of the inland waterway system is inland rivers and the lower Mississippi River.

Upper inland rivers average 9 feet in depth. This depth is maintained by the use of locks and dams. No locks or dams are needed for flow augmentation of the Mississippi River, where depths can reach 27 feet. Of the 25,000 miles of inland waterways, 15,500 miles can be served with a 5-foot draft. Since a loaded, flat deck barge draws less than 5 feet, such barges can transit all major segments of the inland waterway system. The drafts of barges used to transport military equipment average 3 feet.

2. Inland Waterway Access. Eighty-five military installations are located within 100 miles of a navigable waterway, for which the use of the inland waterway system may represent a viable transport option. Of course, this option is the most viable for those installations that actually, or nearly, abut such waterways. For example, 48 military installations are designated as mobilization stations. Eleven of these installations have some sort of access to the inland waterway system. Table 8 lists these installations and their respective distances from an inland waterway dock. The remaining 37 installations either have no access to the system or are already close to an SPOE.

3. Advantages of the Inland Waterway System. Some distinct advantages associated with using the inland waterway system for the movement of unit equipment include:

- a. Abundance of waterway transport assets.
- b. Fast roll-on/roll-off (RORO) loading and discharge times.
- c. Unimproved loading sites as well as improved loading docks can be used.

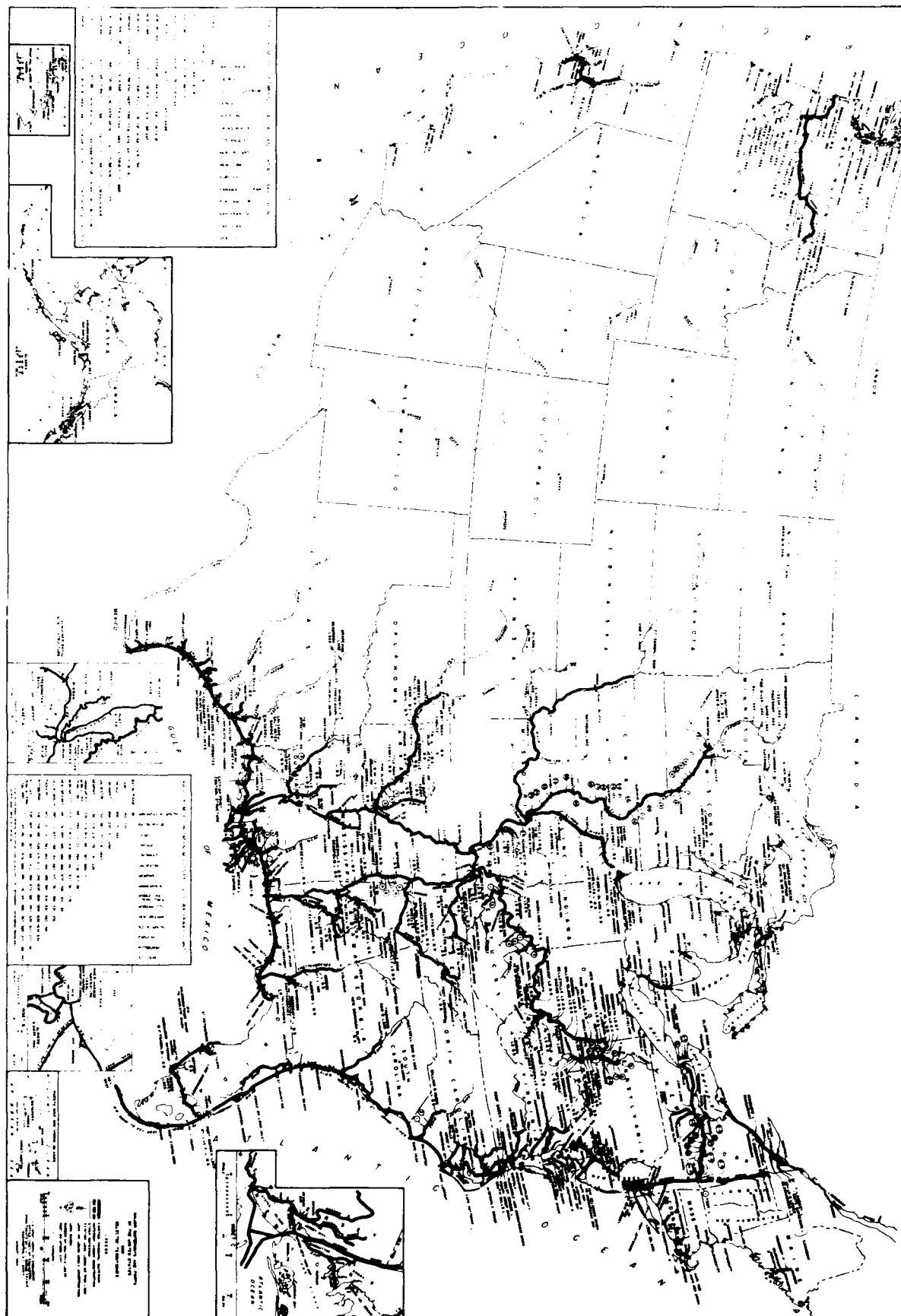


Figure 2. Inland waterway system.

TABLE 8
MOBILIZATION STATION TO INLAND WATERWAY DOCK MILEAGE

Installation	Installation Location	Inland Waterway Dock Location	Miles to Dock	Waterway Serving Dock
Camp Atterbury	Columbus, IN	Louisville, KY	80	Ohio River
Camp Grayling	Grayling, MI	Traverse City, MI	52	Lake Michigan
Camp Ripley	Little Falls, MN	Little Falls, MN	126	Mississippi River
Camp Robinson	Little Rock, AR	Little Rock, AR	5	Arkansas River
Fort Campbell	Clarksville, KY-TN	Clarksville, KY-TN	15	Cumberland River
Fort Chaffee	Fort Smith, AR	Fort Smith, AR	10	Arkansas River
Fort Drum	Watertown, NY	Oswego, NY	80	Erie Canal
Fort Knox	Muldraugh, KY	Louisville, KY	27	Ohio River
Fort McCoy	Sparta, WI	Lacrosse, WI	30	Mississippi River
Fort Riley	Junction City, KS	Kansas City, MO	118	Missouri River
Gowen Field	Boise, ID	Lewiston, ID	200	Snake River

- d. Simultaneous loading of barges.
- e. Minimum lashing gear requirements.
- f. No dimensional or weight restrictions on individual pieces of cargo.
- g. No reduction and restricted fuel requirements for vehicles.
- h. Enhanced security; less threat of theft and vandalism.

4. Army Corps of Engineers. The Army Corps of Engineers is the single-agency manager of the national inland waterway system. This role includes the operation and maintenance of 258 locks, 220 main facilities, and 170 dams for navigation purposes.

5. References. All data, conclusions, and assumptions in this section are findings taken directly from the limited number of inland waterway movements of unit equipment that have taken place thus far. Sources include reports, briefings, interviews, unit lessons learned, and afteraction reports. For detailed information concerning inland waterway operations, see US Army Corps of Engineers Reports: Interim Report, Military Waterborne Movement, September 1987; IWR Report 88-R-7, The 1988 Inland Waterway Review, November 1988; and CY 1989 Estimated Waterborne Commerce Statistics National Totals and Inland Waterways, June 1990. MTMC sources include: HQMTMC Inland Traffic Directorate Report, Military Utilization of The Inland Waterway System, August 1990, and MTMCTEA Report OA 77-11, An Analysis of CONUS Inland Waterways For National Defense, September 1978. Information concerning inland waterways is also contained in FM 55-50.

C. TRANSPORT ASSETS

The inland waterway system is served by about 800 companies that operate about 31,000 barges and 5,188 towboats and tugboats. Of these waterway transport assets, the most militarily useful are flat deck barges. Table 9 provides an inventory and the characteristics of these barges.

D. TRANSIT DATA

1. Sample Loading Averages. Average loading rates for the actual unit movements examined are as follows:

- a. Two barges loaded per hour.
- b. Thirty-three pieces of equipment per hour.
- c. Twenty-three pieces of equipment per barge.

2. Sample Speeds. The transit speed for these same unit moves depended upon the direction of travel. For travel up river, speeds averaged between 5 and 6 mph, while down river speeds averaged between 7 and 8 mph. Average lockage time is 25 minutes. Towboats in transit operate on a 24-hour basis.

TABLE 9
INVENTORY OF FLAT DECK BARGES

Average Length (ft)	Number of Barges	Average Capacity (STON)
<170	1,589	510
170-180	120	1,378
180-190	21	1,584
190-200	506	1,423
200-225	28	1,810
225-250	69	2,470
250-300	16	4,436
>300	3	21,600

E. UNIT MOVEMENT REQUIREMENTS

Not enough data currently exist to determine the number of barges required to move the six Army-type divisions and armored cavalry regiment, as shown in the four other transport sections. Instead, the assets used during actual unit moves are shown in table 10. These figures can only be used for comparative purposes.

TABLE 10
UNIT MOVEMENT REQUIREMENTS - INLAND WATERWAY

Battalion-Size Unit	Pieces of Equipment	Total STON	Number of Barges
Infantry	141	480	7
Tank	230	4,309	9
Armored Cavalry	252	1,033	9
Mechanized Infantry	276	1,539	9
Engineer	356	2,603	13
Combat Engineer	562	5,232	21

VII. SEA TRANSPORT

A. GENERAL

This section provides transport planning data for the strategic sealift of unit equipment and military cargo. Because of the unique nature of sea transport assets, this section is somewhat more extensive than the previous transport sections.

This section contains background information about strategic sealift, sealift sources, vessel types, current vessel inventories, vessel characteristics, unit movement data, special planning considerations, and ports.

B. BACKGROUND

1. Sealift Sources. The vessels referenced in this section comprise the dry cargo vessels of the MSC Strategic Sealift Forces. Two primary sources make up these forces: direct Government ownership and leased commercial vessels.

a. Government-Owned Vessels. Government-owned vessels fall under the control of the Department of Transportation (DOT) or DOD. The administrators of these fleets are the Maritime Administration (MARAD), representing DOT, and MSC, representing DOD. Such fleets include the Ready Reserve Force (RRF), the Fast Sealift Ships (FSS), the Pre-positioning Force, and the Maritime Pre-positioning Force (MPF). The readiness of these forces ranges from 4 to 20 days.

b. Commercial Vessels. Because of the current shortage of Government-owned ships necessary to support a large-scale operation, such as Desert Storm, chartered vessels are crucial sealift assets. Sources of commercial charters for Government hire include US and foreign flag vessels. These vessels are usually hired under a time or voyage charter.

2. References. The ship data in this section and corresponding tables were obtained from the following sources: Lloyd's Register of Ships 1991-92; Jane's Containerization Directory 1990-91; MARAD Report, Reserve Fleet Inventory Highlights, May 1992; MARAD Report, Characteristics and Index of Maritime Administration Ship Design, January 1991; MSC Report, Ship Register, July 1990; MSC Report 3110-4, Commander MSC Force Inventory, June 1992; MTMCTEA Pamphlet 700-4, Vessel Characteristics for Shiploading, September 1991; and MTMCTEA's dry cargo ship files.

C. TRANSPORT ASSETS

1. General Vessel Types. In planning a unit move by sea transport, a variety of ship types will most likely be encountered. The four conventional ship types are breakbulk, container, barge carriers, and RORO. In addition, various combinations of these four basic types may be encountered. Also, other vessels with unique characteristics or special support missions are available and are combined under the heading of Special. A brief description of each ship type follows:

a. Breakbulk. Breakbulk vessels fall under the category of general cargo ships. They are so designated because of their ability to carry a variety of cargoes in various forms. For example, these vessels can transport bagged, boxed, palletized, refrigerated, and limited containerized cargoes. The configuration of a conventional breakbulk vessel is a weather deck with a series of cargo holds beneath. The cargo holds are divided by tween decks and accessed by a series of hatches. Cargo operations on a breakbulk vessel are lift on/lift off (LOLO). Since each hold on a breakbulk vessel is serviced by ship's gear (booms, cranes, winches, and so forth), these vessels are considered to be self-sustaining. Although used out of necessity, breakbulk vessels are not the ideal ship type to transport unit equipment. The normal constraints encountered with breakbulk vessels are low overhead clearances, limited deck strengths, limited lifting capability of ship's gear, and slow speed.

b. Container. Containerships are designed to carry their entire cargo load in containers (usually 20 or 40 feet long). The full cellular stowage within their holds allows the containers to be secured without the use of dunnage. Containerships are configured for the stacked stowage of containers. Since most containerships are non-self-sustaining, cargo operations require the use of shoreside cranes or auxiliary crane ships (T-ACS).

Because of the nature of its design, a containership does not readily lend itself to the transportation of anything other than containers. However, a few commercial containerships have been modified to accept flatracks and military seasheds. The flatracks and seasheds fit in the containership's cell guides and create a false deck system. This system allows containerships to transport a limited number of oversized, wheeled, and heavy tracked equipment, which would normally be transported by RORO vessels. Flatracks and seasheds are also used onboard the FSS and T-ACS.

c. Barge Carriers. Barge carriers are designed to transport barges in which cargoes have been loaded. Such barges are loaded or discharged at berths by shore-based cranes. When cargo operations are complete, the barges are pushed or towed to the barge carrier, where the barges are brought aboard the vessel. The two types of barge carriers are the lighter aboard ship (LASH) and the sea barge (SEABEE). Both types are self-sustaining.

The basic differences between the two types are their methods of discharging, retrieving, and stowing barges. The LASH system employs a gantry crane for these tasks. The LASH barges are stowed in a series of large holds and stacked one upon the other. LASH vessels have a carrying capacity of between 46 and 89 barges. The SEABEE system uses an elevator to accomplish the loading and discharging of barges aboard the vessel. In contrast to LASH barges, SEABEE barges are pulled from the elevator by a transporter and stowed in one of three decks upon barge pedestals. SEABEE vessels have a carrying capacity of 38 barges. However, currently only 24 barges are available per vessel. Typically, barges are loaded on the two lower tween decks and heavy, oversized cargoes and watercraft are loaded on the weather deck.

d. RORO. RORO ships are designed as primary vehicle transports. Cargoes include helicopters and wheeled, tracked, self-propelled, and towed vehicles. RORO vessels are characterized by large cargo capacities and rapid cargo loading and

discharge rates. The rapid movement of cargoes is accomplished by a series of external and internal ramps. The cargo holds are typically large, open bays where equipment may be driven into, parked, and lashed down. Most RORO ships have external ramps that rest on the apron of the berth, allowing access to the cargo holds. For this reason, RORO ships are considered to be self-sustaining. Because of the versatility of these vessels, they are ideally suited for the movement of unit equipment.

e. Combination. A combination vessel employs the cargo operation features of the combined ship types making up its configuration. For example, a combination RORO and container vessel may have a stern ramp, RORO decks, and holds configured for the stowage of containers.

f. Special. The category of Special is comprised of special-mission and support vessels. Such vessels include semi-submersible, heavy lift, integrated tug and barge (ITB) units, and T-ACS. These ships are referenced because most have a secondary mission of providing auxiliary sealift capability. For example, the primary mission of the T-ACS is to offload non-self-sustaining cargo (container) vessels moored alongside. Typically, these operations can be conducted at anchor, instream, or in austere or damaged ports. However, these vessels can also be employed to carry certain Army watercraft on the weatherdeck and a limited amount of unit equipment below deck in flatracks and seasheds.

2. Current Vessel Inventory. A baseline inventory of available and militarily useful US flag dry cargo vessels is shown in table 11. This table lists the vessels by type, component, and quantity.

D. TRANSIT DATA

1. Vessel Characteristics. Basic vessel characteristics necessary for planning vessel cargo operations are shown in tables 12 through 16. These tables list vessel characteristics by type and include the following data: MARAD/MSC classification (when applicable) or name, number of vessels in class, length, maximum draft, speed, cargo deadweight, available square feet, and single-lift capability, by type. For deck strengths of individual vessels see MTMCTEA Pamphlet 700-4, Vessel Characteristics for Shiploading, September 1991.

One of the most important planning elements found in these tables is the available square feet for loading cargo. The listed stowage areas represent the maximum available area. This figure cannot be used as is, but must be reduced. This reduction takes into account obstructions found in the cargo hold, dead space around the cargo, the area required for lashing gear or blocking and bracing, fire lanes, and so forth. The ratio between a ship's capacity and the actual amount of cargo that can be loaded is the stow factor. Stow factors are expressed in the form of percentages. For planning purposes, the available square feet must be multiplied by a stow factor, to arrive at a proper planning cargo capacity of a vessel. Stow factors vary according to the type of cargo and vessel. In the absence of pertinent cargo and vessel information, a stow factor of 75 percent can be used for general planning purposes. Tables 17 through 20 list average stow factors that can be applied to individual ship types.

TABLE 11
INVENTORY OF US FLAG DRY CARGO VESSELS

Ship Type	Component			Total by Ship Type
	MSC	RRF	US Flag	
Breakbulk	1	49	29	79
Container	4		62	66
RORO	10	17	18	45
Barge Carrier	4	7	11	22
Special:				
Auxiliary Crane		9		9
Heavy Lift			2	2
FLOFLO	1			1
MPS	13			13
ITB			4	4
Note: Combination vessels are grouped with their primary type. Legend: MSC - Military Sealift Command RRF - Ready Reserve Force FLOFLO - float on/float off MPS - Maritime Pre-position Ship ITB - integrated tug and barge unit Source: MARAD Report <u>Reserve Fleet Inventory Highlights</u>, May 92; MSC Report 3110-4, <u>Commander MSC Force Inventory</u>, Jun 92.				

TABLE 12
VESSEL CHARACTERISTICS - BREAKBULK

Class	Length (ft-in.)	Maximum Draft (ft-in.)	Speed (knots)	Cargo Deadweight (LTON)	Available Square Feet	Maximum Boom Capacity (LTON)
Breakbulk						
C3-S-33a	483-3	31-5	17.75	9,880	54,898	75
C3-S-37c	494-8	29-6	17.75	9,030	52,539	60
C3-S-37d	494-8	30-1	17.75	8,264	54,907	60
C3-S-46a	493-0	30-6	18.50	10,450	73,833	60
C3-S-46b	493-0	30-6	18.50	10,700	73,833	60
C4-S-1u	565-0	31-7	19.80	9,875	73,597	60
C4-S-57a	560-6	31-6	20.75	11,880	65,182	70
C4-S-58a	572-0	30-7	20.00	8,800	57,052	60
C4-S-66a	540-0	31-7	20.00	9,160	72,044	88
Breakbulk/Container						
C3-S-38a	492-6	28-2	18.50	8,600	60,670	50
C3-S-76a	522-0	31-1	18.60	8,700	60,201	75
C4-S-64b	544-0	31-11	21.00	10,990	69,507	70
C5-S-37e	592-6	30-1	16.00	11,950	69,273	60
C5-S-37f	592-6	30-1	16.00	11,950	69,273	60
C5-S-75a	605-0	35-1	19.50	17,950	100,547	70
C6-S-60c	665-9	31-7	20.50	9,930	120,000	75
Green Ridge	507-2	26-8	17.00	9,388	51,006	21
Green Wave	507-2	26-8	17.00	9,388	51,006	21

TABLE 13
VESSEL CHARACTERISTICS - RORO

Class	Length (ft-in.)	Maximum Draft (ft-in.)	Speed (knots)	Cargo Deadweight (LTON)	Available Square Feet	Maximum Ramp Capacity (LTON)
C3-ST-14a	499- 0	27- 0	18.00	8,730	88,757	60.0
C4-S-67a	540- 0	29- 1	20.00	9,030	116,526	56.0
C5-S-78a	601- 6	34- 1	23.75	12,450	81,181	70.0
C7-S-95a	684- 9	32- 1	23.00	14,767	135,924	100.0
G0-Diesel (Cape E)	652-11	31- 5	17.00	17,902	150,400	220.0
G1-Diesel (Cape D)	681- 0	33- 0	18.00	21,650	180,868	65.0
G2-Diesel (Cape H)	749- 8	35- 5	17.00	26,742	178,948	63.9
Adm. W. M. Callaghan	694- 3	29- 1	25.00	9,519	168,000	55.8
Ambassador	533-10	21- 2	17.00	7,030	79,558	59.1
American Eagle	635- 3	30- 3	19.50	18,219	183,178	91.6
Cape Lambert	682- 0	30- 6	19.00	10,065	184,000	30.0
FSS (NASSCO)	946- 1	36- 8	27.00	25,500	190,547	65.0
FSS (Avondale)	946- 1	36-10	27.00	25,500	208,685	65.0
FSS (PENNSHIP)	946- 1	36-10	27.00	25,506	200,241	65.0
Lyra	634- 3	28- 3	19.00	11,386	121,000	160.0
Maersk Constellation	598- 0	32- 0	18.50	17,369	84,599	80.0
Senator	533-10	21- 2	17.00	7,030	79,558	59.1
Legend:						
RORO - roll on/roll off						

TABLE 14
VESSEL CHARACTERISTICS - BARGE CARRIER

Class	Length (ft-in.)	Maximum Draft (ft-in.)	Speed (Knots)	Cargo Deadweight (LTON)	Available Square Feet	Maximum Lift Capacity (LTON)
SEABEE						
C8-S-82a	873-9	39-1	19.25	29,780	95,109	2,000 Elevator
LASH						
C8-S-81b	820-0	35-1	20.00	30,020	127,256	446 Gantry Crane
C9-S-81d	893-4	38-1	19.10	36,650	203,324	455 Gantry Crane
C8-S-81h	820-0	40-9	19.75	33,000	127,256	446 Gantry Crane
Legend: SEABEE - sea barge LASH - lighter aboard ship						

TABLE 15
VESSEL CHARACTERISTICS - CONTAINER

Class	Length (ft-in.)	Maximum Draft (ft-in.)	Speed (knots)	Cargo Deadweight (LTON)	Total TEU
C5-S-73b	610- 0	31- 7	20.00	10,960	928
C6-S-85a	669- 8	33- 0	22.50	14,400	1,186
C6-S-85b	669- 3	33- 0	21.00	14,050	1,186
C6-M-F146a	675-10	38- 2	19.00	28,260	2,411
C6-M-F147a	659- 7	25-11	17.00	10,060	1,104
C7-S-68c	700- 6	32- 0	22.25	12,800	1,178
C7-S-68d	700- 6	32- 0	22.25	12,080	1,210
C7-S-68e	704- 6	32- 9	22.25	11,380	1,434
C7-S-69c	663-11	30- 8	22.25	8,530	886
C7-S-88a	720- 6	34- 0	23.00	20,320	1,328
C7-M-F145a	643- 0	36- 0	18.00	26,000	1,928
C8-S-81e	820- 0	40- 9	21.00	24,500	1,902
C8-S-F81e	820- 0	40- 9	21.50	24,600	1,920
C8-S-85c	813- 3	33- 0	21.00	22,340	1,708
C8-S-85d	813- 3	33- 0	21.00	21,880	1,708
C9-M-132b	863- 2	35- 0	23.75	18,360	2,492
C9-M-F141a	950- 0	38- 3	19.00	32,140	4,238
C9-M-F148a	853-10	41- 0	22.00	34,850	2,284
C9-M-F151a	849- 9	39- 0	21.00	29,500	3,006
C10-M-F150a	903- 0	41- 0	24.00	45,000	4,300
Legend: TEU - twenty-foot equivalent unit					

TABLE 16
VESSEL CHARACTERISTICS - SPECIAL

Class	Length (ft-in.)	Maximum Draft (ft-in.)	Speed (knots)	Cargo Deadweight (LTON)	Available Square Feet	Maximum Lift Capacity (LTON)
Auxiliary Crane						
C6-S-1qd (T-ACS 1-3)	668- 8	33- 3	19.50	10,370	42,560	105.0
C5-S-MA73c (T-ACS 4-6)	610- 0	31- 6	20.00	9,090	52,000	120.0
C6-S-MA1xb (T-ACS 7-8)	668- 0	33- 4	20.00	9,400	38,000	120.0
C6-S-MA60d (T-ACS 9)	665- 9	31- 7	20.00	6,564	*	120.0
Heavy-lift						
C1-MT-123a	300- 2	16-10	12.80	2,730	14,615	425.2
FLOFLO						
American Cormorant	738- 4	44- 5	13.00	47,230	52,401	47,230.0
MPS						
C7-S-133a (Squadron 1)	821- 0	33- 6	18.00	25,000	152,200	100.0
Maersk (Squadron 2)	755- 5	32-10	17.20	23,000	121,600	132.0
AmSea (Squadron 3)	673- 2	32- 1	18.00	25,384	152,200	100.0
ITB						
Hawk	417- 2	13- 2	8.00	8,486	78,000	65.0
Falcon	417- 2	13- 2	8.00	8,486	78,000	65.0
Strong American	568- 0	24- 0	16.00	6,450	88,260	68.0
Strong Texan	268- 0	18- 0	12.00	6,450	21,000	315.0
*Information not available at time of publication.						
Legend:						
FLOFLO - float on/float off						
MPS - Maritime Pre-positioned Ship						
ITB - integrated tug and barge						

TABLE 17
AVERAGE SHIPLOADING AND UNLOADING TIMES

Ship Type	Percent Stow	Load Time (days)	Unload Times (days)
Breakbulk	75	4	4
Breakbulk/Container	75	4	4
Barge Carrier (LASH) ¹	75	12	12
Barge Carrier (SEABEE) ¹	75	7	7
RORO	80	2	2
FSS	75	2	2
MPS	80	3	3/5 ²

¹Includes barge cargo operation times (4 hours per LASH barge and 6 hours per SEABEE barge).

²Pierside/instream

Legend:

- LASH - lighter aboard ship
- SEABEE - sea barge
- RORO - roll on/roll off
- FSS - fast sealift ship
- MPS - Maritime Pre-positioned Ship

TABLE 18
DESERT STORM AVERAGE SHIPLOADING AND UNLOADING TIMES,
DEPLOYMENT (UNIT EQUIPMENT)

Ship Type	Available Square Feet	Percent Stow	Usable Square Feet	Load Time (days)	Square Feet per Hour	Number of Pieces	Pieces per Hour	Unload Time (days)
Breakbulk	52,081	84	43,748	3	583	366	5	3
Breakbulk/Container	71,676	71	50,890	3	719	435	6	3
FSS	200,906	73	146,661	2	2,834	850	16	3
Barge Carrier-LASH	127,256	56	71,263	10	309	757	3	11
Barge Carrier-SEABEE*	95,109	68	64,674	3	812	400	5	6
RORO (small)	37,265	90	33,538	1	1,761	227	12	1
RORO (medium)	75,650	83	62,789	2	1,569	392	9	2
RORO (medium/large)	124,282	73	90,726	2	2,244	539	13	2
RORO (large)	183,788	70	128,652	2	2,701	709	15	2
MPS	152,200	71	108,062	3	1,659	692	10	5
Auxiliary Crane (T-ACS)	45,500	89	40,495	13	134	270	1	3

*Loading times reflect lift on/lift off cargo operations of vehicles and combination cargoes, and not barge operations.

Legend:

- FSS - fast sealift ship
- LASH - lighter aboard ship
- SEABEE - sea barge
- RORO - roll on/roll off
- MPS - Maritime Pre-position Ship

TABLE 19
DESERT STORM AVERAGE SHIPLOADING AND UNLOADING TIMES,
REDEPLOYMENT (UNIT EQUIPMENT)

Ship Type	Available Square Feet	Percent Stow	Usable Square Feet	Load Time (days)	Square Feet per Hour	Number of Pieces	Pieces per Hour	Unload Time (days)
Breakbulk	59,769	64	38,252	4	404	254	3	1
Breakbulk/Container	76,095	61	46,418	4	478	293	3	2
FSS	200,090	73	146,066	4	1,642	788	8	2
Barge Carrier-LASH	177,670	30	53,301	11	200	344	1	4
Barge Carrier-SEABEE ¹	95,109	76	72,283	4	865	478	6	10
RORO (small)	37,821	88	33,282	1	1,142	190	6	1
RORO (medium)	74,274	87	64,618	2	1,162	324	6	1
RORO (medium/large)	127,258	73	92,898	3	1,368	484	7	1
RORO (large)	187,408	64	119,941	3	1,720	590	9	2
MPS	152,200	82	124,804	5	1,407	1,153 ²	9	3
Auxiliary Crane (T-ACS)	45,500	95	43,225	4	456	305	3	3

¹Loading times reflect lift in/lift off cargo operations of vehicles and combination cargoes, and not barge operations.

²Marine Corps equipment only.

Legend:

- FSS - fast sealift ship
- LASH - lighter aboard ship
- SEABEE - sea barge
- RORO - roll on/roll off
- MPS - Maritime Pre-positioned Ship

TABLE 20
DESERT STORM AVERAGE SHIPLOADING AND UNLOADING TIMES,
DEPLOYMENT/REDEPLOYMENT (AMMUNITION)

Ship Type	Available MTON	Percent Stow	Load Time (days)	MTON per Hour	Unload Time (days)
<u>Deployment:</u>					
Breakbulk	9,349	70	9	30	8
Breakbulk/Container	8,800	64	9	27	8
Barge Carrier-LASH	23,500	66	13	49	9
<u>Redeployment:</u>					
Breakbulk	9,750	83	16	38	12
Breakbulk/Container	9,000	80	21	14	9

2. Vessel Loading and Discharge Times. Table 17 lists average cargo loading and discharge times by ship type. These are general shiploading planning factors. Tables 18 through 20 list average Desert Storm cargo loading and discharge times. These tables are the result of an extensive analysis of actual Desert Storm vessel cargo operations.

3. Port Time. Tables 17 through 20 in no way reflect the total time a ship is in port. Other factors besides loading and discharge operations affect the total port time of a vessel. Examples of such factors are piloting and docking procedures, tides and weather, bunkering operations, receiving ship's stores, and castoff procedures. For planning the port time of a vessel, 1 day has to be added to the vessel loading or discharge time.

E. UNIT MOVEMENT REQUIREMENTS

The sea transport assets necessary to deploy or redeploy six Army-type divisions and an armored cavalry regiment are shown in tables 21 through 27. These tables list sample ship mixes and quantities and types of vessels required to move each unit.

The Amphibious Marine Expeditionary Brigade (MEB), Assault Follow-on Echelon (AFOE) sealift support requirements are listed in tables 28 and 29. This Marine unit is listed because it requires the use of RRF assets.

F. SPECIAL PLANNING CONSIDERATIONS

The sea transport arena is not a static environment. Planning personnel must be able to react and adjust to sudden asset and schedule changes. Special planning considerations that could have a drastic impact upon the planning and execution of a sea transport cargo operation are listed below:

1. Availability of Required Sea Transport Assets. It cannot be assumed that required types and quantities of vessels will be readily available. Close coordination with MSC is required.

2. Availability of Port Assets. It cannot be assumed that all assets at a particular port are at the disposal of operations personnel. For this reason, it is very important that available port assets, such as staging areas, berths, cranes, and materials handling equipment (MHE), necessary to support a sealift operation, be identified.

A more detailed discussion of these and related issues can be found in FM 55-65; MTMC TEA Pamphlet, Marine Terminal Lifting Guidance, 1989; and MTMC Regulation 56-69, Surface Transportation Terminal Operations, August 1989.

G. PORT CHARACTERISTICS

Compatibility between vessels chosen for a sealift operation and the SPOE is essential. Berthing capability and other such specific characteristics about individual CONUS ports and specific marine terminals are in MTMC Report SE 89-3d-31, Ports for National Defense (PND), October 1990. Figure 3 shows the location of major ports described in this report.

TABLE 21
UNIT MOVEMENT REQUIREMENTS,
AIR ASSAULT DIVISION

Loading Condition/ Sample Ship Mix	Vessel Types			
	FSS (RORO/Comb)	Cape H (RORO/Comb)	C3/C4 (Breakbulk)	C6/C7/C8 (Container)
<u>Minimum Containerization:</u>				
All FSS	6.83			
FSS and Cape H	3.46	3.00		
All Breakbulk			25.47	
<u>Maximum Containerization:</u>				
FSS and Container	4.51			2.00
FSS, Cape H, and Container	1.14	3.00		2.00
Breakbulk and Container			16.39	2.00
Legend: RORO - roll on/roll off FSS - fast sealift ship				
Source: MTMC TEA Report OA 90-4f-22, <u>Deployment Planning Guide</u> , Aug 91.				

TABLE 22
UNIT MOVEMENT REQUIREMENTS,
AIRBORNE DIVISION

Loading Condition/ Sample Ship Mix	Vessel Types			
	FSS (RORO/Comb)	Cape H (RORO/Comb)	C3/C4 (Breakbulk)	C6/C7/C8 (Container)
<u>Minimum Containerization:</u>				
All FSS	4.25			
FSS and Cape H	0.97	3.00		
All Breakbulk			15.84	
<u>Maximum Containerization:</u>				
FSS and Container	2.10			2.00
Cape H and Container		1.95		2.00
Breakbulk and Container			7.95	2.00
Legend: RORO - roll on/roll off FSS - fast sealift ship				
Source: MTMCTEA Report OA 90-4f-22, <u>Deployment Planning Guide</u> , Aug 91.				

TABLE 23
UNIT MOVEMENT REQUIREMENTS,
ARMORED DIVISION

Loading Condition/ Sample Ship Mix	Vessel Types			
	FSS (RORO/Comb)	Cape H (RORO/Comb)	C3/C4 (Breakbulk)	C6/C7/C8 (Container)
<u>Minimum Containerization:</u>				
All FSS*	8.00	1.93		
FSS and Cape H	6.69	3.00		
All Breakbulk			37.88	
<u>Maximum Containerization:</u>				
FSS and Container	7.95			2.00
FSS, Cape H and Container	4.67	3.00		2.00
Breakbulk and Container			29.61	2.00
*Only eight FSS are available. Unit shipping requirements exceed the capacity of these eight vessels. Other vessel types are required to make up the FSS shortfall (Cape H). Legend: RORO - roll on/roll off FSS - fast sealift ship				
Source: MTMCTEA Report OA 90-4f-22, <u>Deployment Planning Guide</u> , Aug 91.				

TABLE 24
UNIT MOVEMENT REQUIREMENTS,
INFANTRY DIVISION

Loading Condition/ Sample Ship Mix	Vessel Types			
	FSS (RORO/Comb)	Cape H (RORO/Comb)	C3/C4 (Breakbulk)	C6/C7/C8 (Container)
<u>Minimum Containerization:</u>				
All FSS*	8.00	0.24		
FSS and Cape H	5.00	3.00		
All Breakbulk			30.96	
<u>Maximum Containerization:</u>				
FSS and Container	5.87			2.00
FSS, Cape H and Container	2.57	3.00		2.00
Breakbulk and Container			21.97	2.00
*Only eight FSS are available. Unit shipping requirements exceed the capacity of these eight vessels. Other vessel types are required to make up the FSS shortfall (Cape H).				
Legend: RORO - roll on/roll off FSS - fast sealift ship				
Source: MTMCTEA Report OA 90-4f-22, <u>Deployment Planning Guide</u> , Aug 91.				

TABLE 25
UNIT MOVEMENT REQUIREMENTS,
LIGHT INFANTRY DIVISION

Loading Condition/ Sample Ship Mix	Vessel Types			
	FSS (RORO/Comb)	Cape H (RORO/Comb)	C3/C4 (Breakbulk)	C6/C7/C8 (Container)
<u>Minimum Containerization:</u>				
All FSS	2.97			
All Cape H		2.78		
All Breakbulk			11.34	
<u>Maximum Containerization:</u>				
FSS and Container	1.62			1.00
FSS, Cape H and Container		1.49		1.00
Breakbulk and Container			6.05	1.00
Legend: RORO - roll on/roll off FSS - fast sealift ship				
Source: MTMCTEA Report OA 90-4f-22, <u>Deployment Planning Guide</u> , Aug 91.				

TABLE 26
UNIT MOVEMENT REQUIREMENTS,
MECHANIZED DIVISION

Loading Condition/ Sample Ship Mix	Vessel Types			
	FSS (RORO/Comb)	Cape H (RORO/Comb)	C3/C4 (Breakbulk)	C6/C7/C8 (Container)
<u>Minimum Containerization:</u>				
All FSS*	8.00	1.90		
FSS and Cape H	6.64	3.00		
All Breakbulk			37.70	
<u>Maximum Containerization:</u>				
FSS and Container	7.90			2.00
FSS, Cape H, and Container	4.62	3.00		2.00
Breakbulk and Container			29.58	2.00
*Only eight FSS are available. Unit shipping requirements exceed the capacity of these eight vessels. Other vessel types are required to make up the FSS shortfall (Cape H).				
Legend: RORO - roll on/roll off FSS - fast sealift ship				
Source: MTMCTEA Report OA 90-4f-22, <u>Deployment Planning Guide</u> , Aug 91.				

TABLE 27
UNIT MOVEMENT REQUIREMENTS,
ARMORED CAVALRY REGIMENT

Loading Condition/ Sample Ship Mix	Vessel Types			
	FSS (RORO/Comb)	Cape H (RORO/Comb)	C3/C4 (Breakbulk)	C6/C7/C8 (Container)
<u>Minimum Containerization:</u>				
All FSS	3.00			
All Cape H		2.77		
All Breakbulk			11.29	
<u>Maximum Containerization:</u>				
FSS and Container	2.51			0.42
Cape H and Container		2.30		0.51
Breakbulk and Container			9.35	0.51
Legend: RORO - roll on/roll off FSS - fast sealift ship				
Source: MTMCTEA Report OA 90-4f-22, <u>Deployment Planning Guide</u> , Aug 91.				

TABLE 28
UNIT MOVEMENT REQUIREMENTS,
MARINE EXPEDITIONARY BRIGADE - EAST COAST

Vessel Type	Vessel Class	Number of Vessels	Recommended Outporting Location
Breakbulk	C5-S-75a	1	Wilmington, NC, or Norfolk, VA
Breakbulk	C4-S-1u	1	Charleston, SC
Breakbulk	C4-S-66a	1	Norfolk, VA
Breakbulk/Cont	C6-S-60c	1	Norfolk, VA
RORO	Cape H	1	Wilmington, NC
RORO	C3/C4	1	Charleston, SC
RORO	Cape I	1	Norfolk, VA
SEABEE	Cape M	1	Jacksonville, FL
T-ACS	C6-S-MA1qd	1	Wilmington, NC or Norfolk, VA
T-ACS	C5-S-MA73c	1	Norfolk, VA
Tanker	RRF	1	Charleston, SC
Tanker	OPDS 2-5	1	Norfolk, VA
Legend: Breakbulk/Cont - combination breakbulk and container RORO - roll on/roll off SEABEE - sea barge T-ACS - auxiliary crane ship			

TABLE 29
UNIT MOVEMENT REQUIREMENTS,
MARINE EXPEDITIONARY BRIGADE - WEST COAST

Vessel Type	Vessel Class	Number of Vessels	Recommended Outporting Location
Breakbulk	C5-S-75a	1	Los Angeles or San Diego, CA
Breakbulk	C4-S-1u	1	Los Angeles or San Diego, CA
Breakbulk	C4-S-66a	1	Los Angeles or San Diego, CA
Breakbulk/Cont	C6-S-60c	1	San Francisco, CA
RORO	Cape H	1	Los Angeles or San Diego, CA
RORO	C3/C4	1	Los Angeles or San Diego, CA
RORO	Cape I	1	Port Hueneme, CA
SEABEE	Cape M	1	Port Hueneme, CA
T-ACS	C6-S-MA1qd	1	Los Angeles or San Diego, CA
T-ACS	C5-S-MA73c	1	Port Hueneme, CA
Tanker	RRF	1	San Francisco, CA
Tanker	OPDS 2-5	1	San Francisco, CA
Legend: Breakbulk/Cont - combination breakbulk and container RORO - roll on/roll off SEABEE - sea barge T-ACS - auxiliary crane ship			

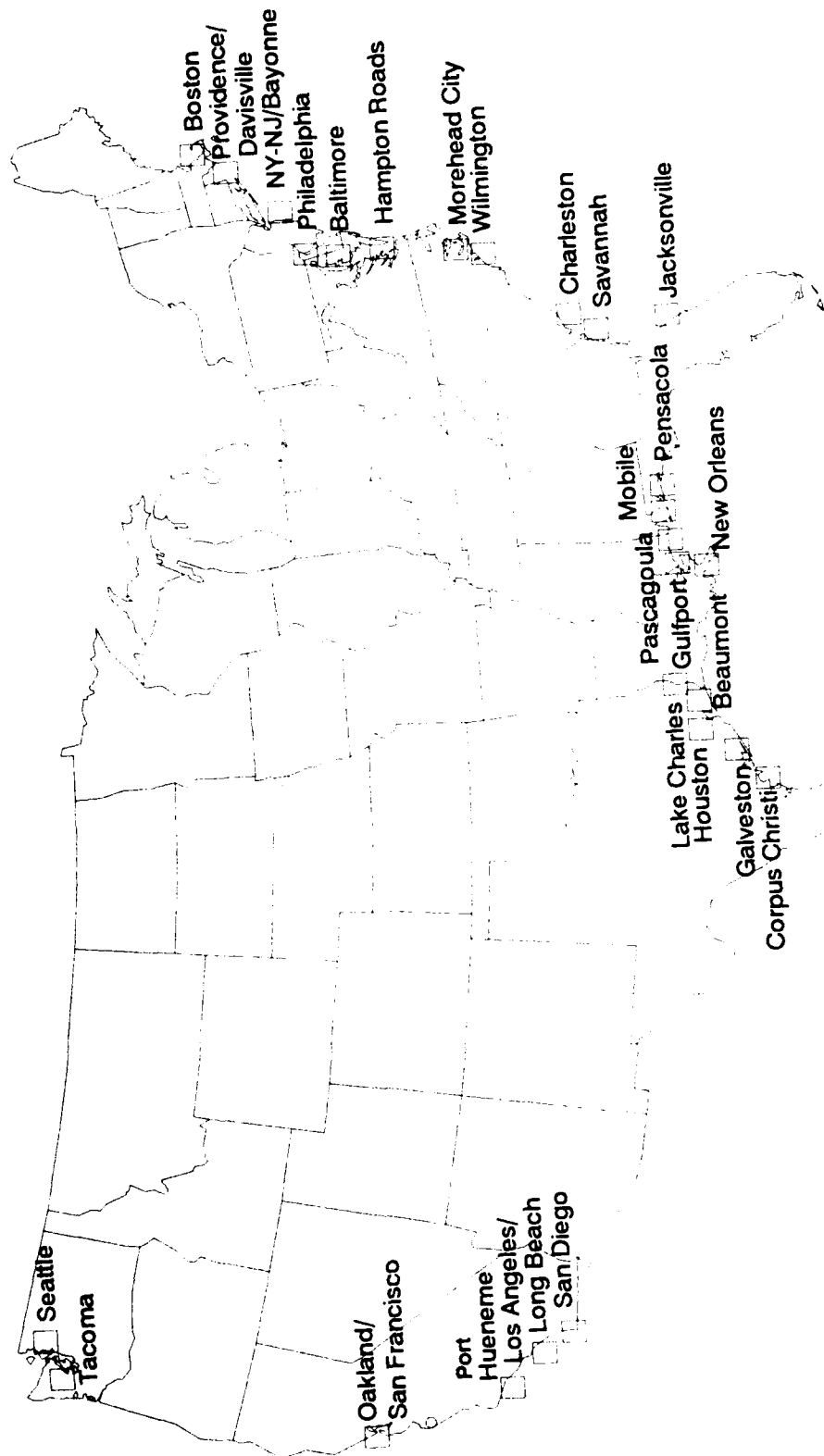


Figure 3. Ports for National Defense (PND).

VIII. AIR TRANSPORT

A. GENERAL

This section provides data useful for notional planning for air transport by fixed-wing aircraft. Air Force Pamphlet (AFP) 76-2 should be consulted for specific details for planning actual movement of unit equipment (including vehicles) and supplies.

B. BACKGROUND

Air transport assets are derived from two sources: military air assets operated by AMC and civil aircraft.

Certification and/or qualification procedures for air movement of equipment transportable on the different US Air Force (USAF) and Civil Reserve Air Fleet (CRAF) aircraft are in TB 55-45, AFP 76-19, and TB 55-46-1. MIL-STD-1791, Designing for Internal Aerial Delivery in Fixed-Wing Aircraft, contains specific criteria for the design of air transportable unit equipment.

C. TRANSPORT ASSETS

1. USAF Assets. The fixed-wing aircraft available for strategic airlift are the US Air Force C-130, C-141, C-5, and KC-10. The C-17 will soon join the inventory. The maximum allowable cabin load (ACL) for each aircraft depends upon a number of variables, such as weather, runway length, altitude, and mission range. AFP 76-2 provides broad planning factors that are useful for mission planning.

a. C-130 Hercules. The C-130 is chiefly a tactical, intratheater aircraft. It is not intended to be used for long-haul strategic deployment. However, it is capable of long-range, over-ocean flight, and for some missions, it may be the most desirable lift asset.

b. C-141 Starlifter. The C-141 is the workhorse of the strategic airlift fleet. It is used mainly for worldwide strategic intertheater deployment and sustainment. It can also be configured for passenger movement, aeromedical evacuation, and air-drop delivery.

c. C-5 Galaxy. The C-5 is used for worldwide strategic deployment of outsize equipment. It has a troop compartment with 73 seats available, even when the cargo compartment is full.

d. KC-10 Extender. The KC-10 is mainly a mobility enhancement air-to-air refueling aircraft. It can also carry 25 or 27 463L pallets or 14 to 70 passengers.

e. C-17 (Unnamed). The C-17 will be a complement to the airlift fleet and capable of both high capacity strategic deployment and tactical forward airfield delivery. It will occupy about the same ramp space as the C-141, be able to generate the same unconstrained cargo throughput capacity as the C-5, and be able to land at numerous austere airfields accessible to the C-130, but not to either the C-141 or C-5. Also, the cargo compartment will be designed for the side-by-side loading of two 99-inch-wide vehicles or ISO containers.

2. CRAF. The CRAF program is a voluntary civil and military partnership that uses commercial aircraft to support DOD airlift requirements during airlift emergencies. For the DOD to efficiently use this resource with minimum disruption to civil commercial services, the CRAF is activated in three stages, as shown:

a. Stage I - Committed Expansion. Stage I may be activated by the Secretary of Defense to perform airlift services when the AMC airlift force cannot meet both deployment and other airlift requirements simultaneously. This expansion only applies to the long-range international CRAF segment.

b. Stage II - Airlift Emergency. Stage II may be activated by the Secretary of Defense when additional airlift is required for a major contingency airlift emergency that does not warrant national mobilization. This stage applies to the domestic, Alaskan, and long- and short-range international CRAF segments.

c. Stage III - National Emergency CRAF Activation. Stage III may be activated by the Secretary of Defense in time of war, during a defense-oriented national emergency declared by the President, in a national emergency declared by the Congress, or in a national security situation prior to a declared defense-oriented national emergency. This provides the total CRAF capability for DOD operations involving US Forces.

Once activated, carriers have 48 hours to respond to mission requirements. The exact number and type of aircraft in each stage varies from month to month because of airline inventories and policies. AMC publishes a monthly CRAF Capability Summary.

D. TRANSIT DATA

1. Terminology. The following is a list of general air loading terms and definitions:

a. 463L Pallet. A 463L pallet is an aluminum-surfaced, balsa wood core pallet designed for rollerized handling in and around cargo aircraft. With cargo restraining nets and straps, each pallet weighs 354 pounds and takes up 2.25 inches of the aircraft headroom. The usable space on a pallet is 104 inches wide by 84 inches long. Each pallet can carry 10,000 pounds of cargo. Height restrictions vary by the aircraft and the cargo weight of the pallet. The design height limit is 96 inches. However, for the C-130 and C-141 aircraft, if the pallet load does not exceed 8,000 pounds, the height limit is 100 inches. Pallets can be trained (linked) to carry items that exceed the length limit of a single pallet.

b. Passenger Planning Weights:

(1) With web gear and weapon or carry on baggage - 210 pounds.

(2) With web gear, weapon, and rucksack or combat equipment/tools - 350 pounds.

(3) With web gear, weapon, and rucksack or equipment/tools, and duffle bag - 400 pounds.

c. Non-Air-Transportable Cargo. Any single piece of cargo that exceeds the capabilities of the C-5 aircraft.

d. Outsize Cargo. Any single piece of cargo that is more than 1,090 inches long, 111 inches wide, or 103 inches high in any one dimension and requires the use of C-5 aircraft. In essence, outsize cargo is any piece of cargo exceeding the capabilities of the C-141 aircraft.

e. Oversize Cargo. Cargo that exceeds any of the following dimensions: 104 inches long, 84 inches wide, or 96 inches high, but is equal to or less than 1,090 inches long, 117 inches wide, and 105 inches high.

f. Bulk Cargo. General cargo (including the 463L pallet) that is within the usable dimensions of a 463L pallet and within the height and width requirements established by the cargo envelope of the particular aircraft.

2. USAF Planning Factors. Tables 30 through 34 provide characteristics, capabilities, and restrictions for the aircraft of the military airlift fleet.

TABLE 30
USAF AIRCRAFT PERFORMANCE DATA

Aircraft Type	Cruise Speed (knots)	Block Speed (knots) ¹	Ferry Range (mi) ²	Inventory	
				Active	R/NG ³
C-5	450	428	6,238	70	39
C-17	450	TBD	6,300	102 ⁴	0
C-141	425	415	4,531	210	24
C-130	300	288	3,962	160	281
KC-10	480	462	8,190	38	0
¹ Average speed, including takeoff, climb to cruise, cruise, descent, and taxi, based on 3,000-nautical mile leg. ² Maximum range (nautical miles) for pre-positioning the aircraft with no payload, without refueling. ³ Reserve/National Guard. ⁴ The C-17 fleet will not reach full operational capability (102 aircraft) until FY2001. Initial operational capability of 1 squadron of 12 aircraft is anticipated in the fall of 1994. Source: AF Pamphlet 76-2, <u>Airlift Planning Factors</u> , May 87.					

TABLE 31
USAF MAXIMUM PAYLOAD
(POUNDS)

Aircraft Type	Condition	Leg Length (nautical mi)			Maximum 463L Pallets	Maximum Troops
		250	2,000	3,000		
C-5	Peacetime	291,000	225,400	174,600	36	73
	Wartime					340
C-17	Peacetime	172,200	172,200	145,000*	18	102
	Wartime					
C-141	Peacetime	68,600	68,600	51,800	13	143
	Wartime	89,000	88,520	66,600		153
C-130H	Peacetime	44,800	32,400	19,800	6	74
	Wartime	50,000	41,600	NA		91
KC-10	Peacetime	170,000	166,000	166,000	27	75
	Wartime					

*Estimate from preproduction data.

Legend:
NA - not applicable

Source: AF Pamphlet 76-2, Airlift Planning Factors, May 87.

TABLE 32
USAF AVERAGE PAYLOAD
(POUNDS)

Aircraft Type	Condition	Leg Length (nautical mi)	
		2,000	3,000
C-5	Peacetime	149,000	138,200
	Wartime	149,000	138,200
C-17	Peacetime	TBD	TBD
	Wartime	TBD	
C-141	Peacetime	52,000	47,800
	Wartime	53,000	52,800
C-130H	Peacetime	22,800	17,400
	Wartime	25,000	NA
KC-10	Peacetime	118,000	118,000
	Wartime	118,000	118,000

Note: Calculated for oversize cargo, except for the KC-10, which is for bulk cargo. Includes weight of the 463L pallets, except on C-130's and KC-10's. Based on worldwide fleet usage.

Legend:
TBD - to be determined
NA - not applicable

Source: AF Pamphlet 76-2, Airlift Planning Factors, May 87.

TABLE 33
USAF AIRCRAFT EQUIPMENT DIMENSIONAL LIMITS

Aircraft Type	Equipment Limits		
	Height (in.)	Width (in.)	Length (in.)
C-5	156 ¹	216 ²	1,434
C-17	142 ³	204	812
C-141	103	111	1,000
C-130	102	107 ⁴	480
¹ For item widths up to 144 inches. ² For item widths up to 108 inches. ³ Aft of wing box, height is 156 inches. ⁴ Maximum practical width at floor for roll on/roll off of tracked vehicles is 100 inches. Source: AF Pamphlet 76-2, <u>Airlift Planning Factors</u> , May 87.			

TABLE 34
USAF AIR TRANSPORT RESTRICTIONS - TRACKED VEHICLES

Vehicle Design Characteristics					
Maximum Height (in.)	Maximum Width (in.)	Single Axle Load (lb)	Maximum Concentrated Load (lb per sq in.)	Maximum Linear Load (lb per lin ft)	Gross Weight (lb)
102	105 ¹	10,000 ²	50 ³	3,000	44,000
¹ Practical maximum width at the floor is 100 inches for the C-130. Limitation is to a height of 5.5 inches. ² Three inches of parking shoring is required on the C-141. ³ For the C-141, loads between the treadways are limited to 25 lb per sq in. Source: AF Pamphlet 76-2, <u>Airlift Planning Factors</u> , May 87.					

3. CRAF Planning Factors. AMC Pamphlet 55-41, Civil Reserve Air Fleet (CRAF) Load Planning Guide, gives detailed information and guidance on use of CRAF cargo aircraft. This pamphlet should be used during the initial stage of establishing CRAF cargo loads. Narrow-body aircraft, like the B-707 and DC-8, are limited mainly to bulk cargo, while wide-body aircraft, like the B-747 and DC-10, carry bulk and oversize cargo. Tables 35 and 36 provide basic planning factors for the use of CRAF resources.

TABLE 35
CRAF LONG-RANGE INTERNATIONAL CARGO PLANNING FACTORS

Aircraft Type	Maximum ACL (STON)	Pallets	Range with Maximum ACL (nautical mi)	Maximum ACL (STON) per Leg Length (nautical mi)			Ferry Range No Cargo (nautical mi)
				2,000	2,500	3,000	3,500
B707-300C	43.0	13	3,600	43.0	43.0	43.0	43.0
DC-8-51F/52F	30.0	13	2,500	30.0	30.0	25.5	21.0
DC-8-54F/55	48.5	13	2,200	48.5	46.5	40.0	32.2
DC-8-61F	41.0	18	3,000	41.0	41.0	41.0	30.5
DC-8-62F/CF	45.0	14	2,800	45.0	45.0	44.0	40.9
DC-8-63F/CF	51.0	18	2,300	51.0	44.5	42.8	32.8
DC-8-71F	48.0	18	1,700	47.2	46.0	45.0	39.7
DC-8-73F/CF	53.1	18	2,800	53.1	53.1	51.8	47.0
DC-10-10CF	41.5	30	2,250	41.5	38.0	31.0	24.0
DC-10-30CF	74.3	30	3,300	74.3	74.3	74.3	71.0
DC-10-30F	90.0	30	1,530	88.5	88.0	86.5	82.0
B747-100F	108.5	36	1,700	107.5	106.5	100.0	89.5
B747-100C	105.5	30	2,600	105.5	105.5	97.0	86.0
B747-200F	128.6	36	2,425	128.6	126.7	121.6	111.6
B747-200C	107.6	30	2,150	107.6	106.0	101.8	91.8
MDII-F	94.0	35	3,500	94.0	94.0	94.0	94.0
Legend: ACL - allowable cabin load							

TABLE 36
CRAF LONG-RANGE INTERNATIONAL PASSENGER PLANNING FACTORS

Aircraft Type	Maximum Seats	Range with Maximum Troops (nautical mi)	Maximum Troops per			Ferry Range No Troops (nautical mi)
			Leg Length 2,000	2,500	3,000	3,500
B707-300	126	3,950	126	126	126	126
DC-8-62	115	4,700	115	115	115	115
DC-8-63	170	3,500	170	170	170	170
DC-8-71	141	3,250	141	141	141	125
DC-10-10	221	2,000	221	180	143	103
DC-10-30	260	3,800	260	260	260	260
DC-10-40	208	3,200	208	208	208	183
B747-SP	202	5,100	202	202	202	202
B747-10C	404	2,950	404	404	395	346
B747-200	365	3,680	365	365	365	365
B747-400	315	5,950	315	315	315	315
B767-200ER	173	3,700	173	173	173	173
B767-300ER	207	4,000	207	207	207	207
L1011-50	194	2,560	194	194	159	126
L-1011-100/200	203	3,400	203	203	203	178
L-1011-500	205	4,300	205	205	205	205
NOTE: Troop weights are compared at 400 pounds each, which includes personal equipment and field gear for combat operations.						

E. UNIT MOVEMENT REQUIREMENTS

Tables 37 and 38 list the aircraft required for strategic deployment of the unit equipment for six Army-type divisions and an armored cavalry regiment. Also shown are the number of passengers not accompanying the unit equipment.

TABLE 37
UNIT MOVEMENT REQUIREMENTS,
C-141/C-17 MIX

Type Unit	Aircraft Type		Passengers Flown	Residual Passengers
	C-141	C-17		
<u>Division:</u>				
Air Assault	1,221	119	8,337	7,833
Airborne	900	26	6,292	6,817
Armored	1,247	1,063	11,690	5,231
Infantry	1,328	430	8,870	8,068
Light Infantry	622	25	6,073	4,798
Mechanized	1,206	1,058	11,653	5,582
<u>Regiment:</u>				
Armored Cavalry	339	371	4,357	306
Source: MTMCTEA Report OA 90-4f-22, <u>Deployment Planning Guide</u> , Aug 91.				

TABLE 38
UNIT MOVEMENT REQUIREMENTS,
C-141/C-5 MIX

Type Unit	Aircraft Type		Passengers Flown	Residual Passengers
	C-141	C-5		
<u>Division:</u>				
Air Assault	1,222	82	8,329	7,841
Airborne	893	21	6,394	6,715
Armored	1,032	787	12,343	4,578
Infantry	1,220	329	9,011	7,927
Light Infantry	618	18	6,282	4,589
Mechanized	1,065	757	12,352	4,883
<u>Regiment:</u>				
Air Cavalry	301	251	3,844	819
Note: Sortie requirements based on 3,000-nautical mile critical leg with the following ACLs: C-5, 184,000 lb; C-141, 64,000 lb; C-17, 121,000 lb.				
Legend: ACLs - allowable cabin loads				
Source: MTMCTEA Report OA 90-4f-22, <u>Deployment Planning Guide</u> , Aug 91.				

IX. CONTAINER TRANSPORT

A. GENERAL

This section provides planning information on the use of dry cargo containers, flatracks, and seasheds. It lists and discusses references for current container inventories; container, flatrack, and seashed characteristics; and unit movement requirements.

B. CONTAINER INVENTORY

With such large numbers of containers currently in use, it would be impractical to list these assets. The Official Intermodal Equipment Register, published annually by the Intermodal Publishing Company, contains detailed information on container ownership and inventory.

C. CONTAINER CHARACTERISTICS

Table 39 lists typical 20- and 40-foot container dimensions and capacities. Special length and height containers are also listed. Special containers are referenced by the vessels or shipping lines that use or offer them for hire. All figures are average measurements and capacities. Slight variations may be found between manufacturers for the same type of container. The 1991 Container System Hardware Status Report, DD-M(A)1592, produced by the US Army Belvoir Research, Development, and Engineering Center, gives a good overview of containers and Army equipment associated with containerization.

D. FLATRACK CHARACTERISTICS

Flatracks are portable, open-top, open-side containers. They have the capability to stow aircraft, vehicles, oversized, and breakbulk cargo that cannot normally be stowed in containers. Flatracks may be used as individual units or combined horizontally in sets. They create a false deck effect within a containership hold. Military flatracks, when placed side by side, have an integral folding flap that is positioned between the flatracks, to create a flush deck. However, this folding flap is not available on most commercial flatracks. This flap provides the capability to drive from one flatrack to the other or to stow cargo that spans more than one flatrack. Table 40 lists the standard dimensions and capabilities of commercial and military flatracks.

Seasheds are large, open-top cargo containers that fit into the container cells of a containership. They provide the capability to carry heavy or oversized cargo, such as tanks or helicopters. Each seashed occupies the space (cells) of three 40-foot containers. A seashed set consists of a stack of one to three seasheds that rest upon a containership cargo stowage adapter (CCSA). The CCSA consists of two elements: the adapter frame and three pontoon flats. The CCSA provides the same stowage capability as a seashed. The floor of the seashed opens to allow cargo to be lowered through to the seashed or CCSA below. Table 40 lists the dimensions and cargo capacity of a seashed.

TABLE 39
TYPICAL DRY CARGO CONTAINER CHARACTERISTICS

Exterior Dimensions Length x Width x Height (ft-in.)	Interior Dimensions Length x Width x Height (in.)	Door Opening Dimensions Width x Height (in.)	Interior Cubic Feet Capacity	Interior Square Feet	Interior MTON	Maximum Weight Capacity (lb)*
20' x 8' x 8'	230" x 92" x 87"	89" x 84"	1,066	147	27	40,000
20' x 8' x 8'-6"	230" x 92" x 93"	89" x 89"	1,139	147	28	40,000
40' x 8' x 8'	473" x 92" x 87"	89" x 84"	2,192	302	55	50,000
40' x 8' x 8'-6"	473" x 92" x 93"	90" x 89"	2,343	302	59	55,000
FSS, Matson, Sea-Land:						
35' x 8' x 8'-6"	415" x 92" x 93"	90" x 90"	2,055	265	51	45,000
American President Lines:						
45' x 8' x 8'-6"	534" x 92" x 93"	90" x 89"	2,645	341	66	64,300
48' x 8' x 9'	570" x 92" x 99"	90" x 96"	3,005	364	75	68,000
Sea Containers: (20' half heights)						
20' x 8' x 4'-3"	228" x 92" x 51"	(top loaded)	619	147	15	44,800
Legend: FSS - fast sealift ship *Actual allowable loading weights are governed by individual State highway legal limits. See appendix A, Summary of Legal size and Weight Limits, <u>Directory Of Highway Permit Officials And Mobilization Movement Control (MOBOON)</u> <u>Coordinators</u> , Aug 91.						

TABLE 40
TYPICAL FLATRACK AND SEASHED CHARACTERISTICS

Exterior Dimensions Length x Width x Height (ft-in.)	Interior Dimensions Length x Width x Height (in.)	Interior Cubic Feet Capacity	Interior Square Feet	Interior MTON	Maximum Weight Capacity (lb)
Commercial Flatracks:					
20' x 8' x 8'- 6"	229" x 94" x 92"	1,146	149	29	49,600
40' x 8' x 8'- 6"	474" x 87" x 76"	1,813	286	45	67,388
Military Heavy-Duty Flatrack:					
40' x 8' x 8'- 6"/13'	462" x 96" x 126"	3,234	308	81	134,400
FSS Flatracks:					
35' x 8' x 15'- 3"	405" x 96" x 162"	3,645	270	91	134,000
35' x 8' x 12'	405" x 96" x 123"	2,768	270	69	134,000
35' x 8' x 10'- 3"	405" x 96" x 102"	2,295	270	57	134,000
Seasheds:					
40' x 24' x 12'- 6"	432" x 273" x 130"*	11,000	1,000	275	220,000
*The clear floor opening for a seashed is 360 in. x 216 in.					
Legend: FSS - fast sealift ship					

For a detailed analysis of flatrack and seashed operations and the movement of unit equipment aboard a commercial containership, see MTMCTEA Report OA 89-4b-33, Display Determination 89 Containership Force Deployment Exercise Afteraction Report, March 1990.

E. UNIT MOVEMENT REQUIREMENTS

Table 41 lists the quantity of unit equipment, per Army-type division and armored cavalry regiment, that can be containerized. Included is the number of 20-foot containers required to move this equipment.

TABLE 41
CONTAINERIZABLE UNIT EQUIPMENT

Type Unit	Total Square Feet	Total STON	Total MTON	Containerizable Equipment			Number of 20-foot Containers
				Square Feet	STON	MTON	
<u>Division:</u>							
Air Assault	996,781	32,546	168,594	425,647	13,047	60,044	3,849
Airborne	858,492	21,943	100,212	582,894	12,067	50,051	3,441
Armored	1,427,996	96,580	275,273	340,792	10,407	49,603	3,152
Infantry	1,169,664	59,508	210,006	383,122	11,519	54,123	3,561
Light Infantry	445,598	14,436	71,938	244,076	6,705	33,966	2,260
Mechanized	1,422,844	95,010	274,518	342,585	10,503	49,908	3,169
<u>Regiment:</u>							
Armored Cavalry	425,147	30,763	82,905	81,711	2,630	11,709	753
Note: The container stuffing model of TARGET*Plus determines what unit equipment can be loaded into standard containers. Maximum containerization simulates containerization of all eligible equipment, including vehicles. Container eligible cargo dimensions: 232.5 in. long by 90 in. wide by 96 in. high.							
Source: MTMCTEA Report OA 90-4f-22, <u>Deployment Planning Guide</u> , Aug 91.							

APPENDIX A

REFERENCES

1. AIR FORCE PUBLICATIONS

AFP 76-2	Airlift Planning Factors
AFP 76-19	Certification of Military Equipment for Transport in MAC/CRAF Aircraft
AFSC HB 1-11	AFSC Design Handbook; Air Transportability
AMC Pam 55-41	Civil Reserve Air Fleet (CRAF) Load Planning Guide

2. ARMY FIELD MANUALS

FM 55-2	Division Transportation Operations
FM 55-9	Unit Air Movement Planning
FM 55-10	Movement Control in a Theater of Operations
FM 55-12	Movement of Units in Air Force Aircraft
FM 55-15	Transportation Reference Data
FM 55-30	Army Motor Transport Units and Operations
FM 55-50	Army Water Transport Operations
FM 55-60	Army Terminal Operations
FM 55-65	Strategic Deployment by Surface Transportation
FM 55-312	Military Convoy Operations in CONUS
FM 101-10-1/2	Staff Officers Field Manual, Organization, Technical, and Logistical Data
FM 101-20	United States Army Aviation Planning

3. ARMY REGULATIONS

AR 55-4	CONUS Military Installation Materiel Outloading and Receiving Capability Report (Report Control Symbol MTMC-7)(R-2)
AR 55-29	Military Convoy Operations in CONUS
AR 55-60	Transportation and Travel Official Table of Distances
AR 55-113	Movement of Units Within Continental United States
AR 55-162	Permits for Oversize, Overweight, or Other Special Movements on Public Highways in the United States

AR 55-355	Defense Traffic Management Regulation
AR 55-355 Vol 2	Transportation Facilities Guide, US Army
AR 55-355 Vol 3	Transportation Facilities Guide, US Navy, Marine Corps, and Coast Guard
AR 55-359	Terminal Facilities Guide, US Air Force
AR 220-10	Preparation for Oversea Movement of Units
AR 700-120	Materiel Distribution Management

4. ARMY TECHNICAL BULLETINS

TB 55-45	Certification of Military Equipment for Transport in MAC/CRAF Aircraft (Microfiche) (AFP 76-19)
TB 55-46-1	Standard Characteristics (Dimensions, Weight, and Cube) for Transportability of Military Vehicles and Other Outsize/Overweight Equipment (In TOE Line Item Number Sequence)
TB 55-46-2	Standard Transportability Characteristics (Dimensions, Weight, and Cube) for Military Vehicles and Equipment

5. ARMY TECHNICAL MANUALS

TM 55-603	Movement of Military Impedimenta by Commercial Carriers (NAVSUPINST 4600.24B; AFR 75-5; MCO P4600.24C)
TM 55-1520- 237-23-2	Aircraft General Information Manual, UH-60A Helicopter (AVUM and AVIM)
TM 55-1520- 400-14	Transportability Guidance, Marine Transport of US Army Helicopter
TM 55-2200- 001-12	Application of Blocking , Bracing, and Tiedown Materials for Rail Transport

6. DEFENSE MAPPING AGENCY

Pub 150	World Port Index
Pub 151	Distance Between Ports

7. MARAD PUBLICATIONS

MAR-743	Reserve Inventory Highlights
Unnumbered	A Shipper's Guide to Stowage of Cargo in Marine Containers
Unnumbered	Characteristics and Index of Maritime Administration Ship Designs
Unnumbered	Merchant Fleets of the World

Unnumbered	Ships in the Ready Reserve Force
Unnumbered	US Merchant Marine Data Sheet
Unnumbered	Vessel Inventory Report

8. MSC PUBLICATIONS

MSC P504	Military Sealift Command Ship Register
MSC Rpt 3110-4	Military Sealift Command Force Inventory

9. MTMC PUBLICATIONS

MTMC Reg 56-69	Terminal Operations
MTMCTEA Rpt OA-88-4a-33	Unit Movement Requirement Simulation Model For Sealift
MTMCTEA Rpt OA 88-5c-18	Analysis of Containerization on Unit Strategic Deployment
MTMCTEA Rpt OA 89-4b-33	Display Determination 89 Containership Force Deployment Exercise Afteraction Report
MTMCTEA Rpt OA 90-4f-22	Deployment Planning Guide
MTMCTEA Rpt OA 91-4a-26	Rail Deployment At CONUS Installations, Operation Desert Storm
MTMCTEA Rpt SE 89-4b-27	Strategic Highway Corridor Network
MTMCTEA Rpt SE 89-4b-59	Strategic Highway Corridor Network (STRAHNET) Connector Atlas
MTMCTEA Rpt SE 90-3d-31	Ports for National Defense, an Analysis of Unit Deployments Through US Ports
MTMC Pam 55-3	Barge-Ship Systems: Description, Guidance, and Transporting of Military Cargo
MTMCTEA Pam 55-19	Tiedown Handbook for Rail Movements
MTMCTEA Pam 56-1	Marine Terminal Lifting Guidance
MTMCTEA Pam 70-1	Transportability For Better Strategic Mobility
MTMCTEA Pam 700-4	Vessel Characteristics Pamphlet for Shiploading
Unnumbered	Directory of Highway Permit Officials and Mobilization Movement Control (MOBCON) Coordinators

10. MISCELLANEOUS PUBLICATIONS

DD-M(A)1592	1991 Container System Hardware Status Report
FC 55-50	Fast Sealift Ship Users' Manual
FORSCOM Reg 55-1	Unit Movement Planning
MIL-HDBK-138	Container Inspections
MIL-STD-1366C	Transportability Criteria
MIL-STD-1791	Designing for Internal Aerial Delivery in Fixed-Wing Aircraft
Unnumbered	US Army Aircraft Delivery Procedures (Instructions For Delivery Pilots)
Unnumbered	Official Intermodal Equipment Register
Unnumbered	Official Railway Equipment Register
Unnumbered	Guide to Port Entry, 1991/92
Unnumbered	Jane's Containerization Directory
Unnumbered	Lloyd's List of Ship Owners
Unnumbered	Lloyd's Maritime Guide
Unnumbered	Lloyd's Register of Ships
Unnumbered	Maritime Directory and Industry Census

APPENDIX B

ABBREVIATIONS AND ACRONYMS

ACL	allowable cabin load
AFOE	Assault Follow-on Echelon
AMC	Air Mobility Command
APF	Afloat Pre-positioning Force
APOD	aerial port of debarkation
APOE	aerial port of embarkation
BB	breakbulk
CINC	Commander in Chief
CL	carload
Cml	commercial
CONUS	continental United States
CRAF	Civil Reserve Air Fleet
CSM	container stuffing model
DA	Department of the Army
DFRIF	Defense Freight Railway Interchange Fleet
DMC	Defense Movement Coordinator
DOD	Department of Defense
DOT	Department of Transportation
DTO	Division Transportation Office(r)
DTS	Defense Transportation System
FLOFLO	float on/float off
FORSCom	Forces Command
FSS	fast sealift ship
HET	heavy-equipment transporter
HL	heavy-lift
HQ	Headquarters
HQMTMC	Headquarters, Military Traffic Management Command
ICC	Interstate Commerce Commission
ISO	International Standards Organization
ITB	integrated tug and barge unit
ITO	installation transportation office(r)
JCS	Joint Chiefs of Staff
JDC	Joint Deployment Community
JOPES	Joint Operation Planning and Execution System
LAD	latest arrival date
LASH	lighter aboard ship
LOLO	lift on/lift off
MACOM	major Army command
MARAD	Maritime Administration
MEB	Marine Expeditionary Brigade
MHE	materials handling equipment
MOBCON	mobilization movement control
MPF	Maritime Pre-positioning Force
MPS	Maritime Pre-position Ship
MSC	Military Sealift Command
MTMC	Military Traffic Management Command
MTMCTEA	Military Traffic Management Command Transportation Engineering Agency
MTON	measurement ton(s)
NGB	National Guard Bureau
OPLAN	operation plan
PND	Ports for National Defense
POD	port of debarkation
POE	port of embarkation
RDD	required delivery date
R/NG	Reserve/National Guard

RORO	roll on/roll off
RRF	Ready Reserve Force
SEABEE	sea barge
SOP	standing operating procedure
SPOD	sea port of debarkation
SPOE	sea port of embarkation
SSF	strategic sealift force
STON	short ton(s)
STRAHNET	Strategic Highway Network
T-ACS	Auxiliary Crane Ship
TARGET	Transportability Analysis Reports Generator
TCC	transportation component command
TEU	twenty-foot equivalent unit
TL	truckload
TMO	traffic management office(r)
TPFDD	time-phased force deployment data
UMLER	Universal Machine Language Equipment Register
USTRANSCOM	United States Transportation Command

APPENDIX C

SURFACE (LAND) MILEAGE BETWEEN CONUS MILITARY ACTIVITIES AND MAJOR US PORTS

	Table
<u>1. MILEAGE TO MAJOR NORTH ATLANTIC PORTS</u>	C-1
Providence, RI	
Davisville, RI	
New York, NY	
Newark, NJ	
Bayonne, NJ	
Earle, N J	
Philadelphia, PA	
Baltimore, MD	
Norfolk, VA	
<u>2. MILEAGE TO MAJOR SOUTH ATLANTIC PORTS</u>	C-2
Wilmington, NC	
Sunny Point, NC	
Charleston, SC	
Kings Bay, GA	
Savannah, GA	
Jacksonville, FL	
Fort Lauderdale, FL	
West Palm Beach, FL	
Pensacola, FL	
<u>3. MILEAGE TO MAJOR GULF PORTS</u>	C-3
Mobile, AL	
Pascagoula, MS	
Gulfport, MS	
New Orleans, LA	
Port Arthur, TX	
Beaumont, TX	
Houston, TX	
Galveston, TX	
Corpus Christi, TX	
<u>4. MILEAGE TO MAJOR WEST COAST PORTS</u>	C-4
San Diego, CA	
Long Beach, CA	
Oakland, CA	
Alameda, CA	
San Francisco, CA	
Concord, CA	
Portland, OR	
Tacoma, WA	
Seattle, WA	

TABLE C-1
SURFACE (LAND) MILEAGE BETWEEN CONUS
MILITARY ACTIVITIES AND MAJOR NORTH ATLANTIC PORTS

	Providence, RI	Davisville, RI	New York, NY	Bayonne, NJ	Newark, NJ	Philadelphia, PA Earle, NJ	Baltimore, MD	Norfolk, VA	
ALABAMA									
Alabama AAP	1154	1148	977	971	971	956	935	791	695
Anniston Depot	1114	1108	937	931	931	916	855	751	655
Fort McClellan	1118	1112	941	937	931	922	861	757	672
Fort Rucker	1261	1255	1084	1078	1078	1063	999	898	805
Maxwell AFB	1187	1178	1010	1004	1004	989	925	824	739
Redstone Arsenal	1097	1087	920	917	910	902	841	737	698
ARIZONA									
Davis-Monthan AFB	2579	2573	2402	2402	2392	2399	2339	2277	2259
Fort Huachuca	2570	2564	2393	2393	2383	2390	2330	2268	2239
Luke AFB	2667	2661	2490	2490	2480	2487	2427	2368	2361
USMC Air Station.	2819	2813	2642	2642	2632	2639	2584	2517	2488
Navajo Depot	2518	2512	2341	2341	2331	2338	2278	2219	2212
Williams AFB	2632	2626	2455	2455	2445	2452	2392	2333	2318
ARKANSAS									
Blytheville AFB	1261	1255	1084	1084	1074	1081	1019	918	900
Camp Robinson	1394	1388	1217	1214	1207	1199	1138	1034	1005
Fort Chaffee	1535	1529	1358	1355	1348	1340	1276	1175	1157
Little Rock AFB	1394	1388	1217	1214	1207	1199	1135	1034	1016
Pine Bluff Arsenal	1413	1399	1236	1233	1226	1218	1149	1053	1019
CALIFORNIA									
Alameda Nav Fac	3099	3093	2931	2931	2921	2944	2899	2825	2958
Beale AFB	3012	3006	2844	2844	2834	2857	2797	2739	2891
Camp Obispo	3139	3133	2969	2969	2959	2966	2911	2847	2829
Camp Roberts	3144	3138	2974	2974	2964	2971	2911	2852	2837
Castle AFB	3114	3108	2946	2946	2936	2959	2899	2840	2850
Fort Baker	3102	3096	2934	2934	2924	2947	2892	2828	2956
Fort H. Liggett	3199	3193	3027	3027	3019	3023	2960	2901	2896
Fort Irwin	2893	2887	2723	2723	2713	2720	2660	2601	2586
Fort MacArthur	3001	2995	2824	2822	2814	2821	2755	2696	1910

TABLE C-1 - cont

	Providence, RI	Davisville, RI	New York, NY	Bayonne, NJ	Newark, NJ	Philadelphia, PA	Baltimore, MD	Norfolk, VA	
CALIFORNIA - cont									
Fort Ord	3200	3194	3032	3032	3022	3045	2985	2926	2917
George AFB	2896	2893	2723	2723	2713	2720	2660	2601	2594
Letterman AMC	3105	3096	2937	2937	2927	2950	2890	2831	2959
McClellan AFB	3001	3003	2833	2833	2823	2846	2786	2727	2880
USMC Air Station	2976	2970	2799	2799	2789	2796	2736	2677	2659
29 Palms USMC	2841	2835	2664	2664	2654	2661	2606	2542	2524
Camp Pendleton	3000	2994	2823	2823	2813	2820	2765	2701	2694
Barstow USMC	2858	2852	2681	2681	2671	2678	2623	2559	2552
San Diego USMC	2999	2993	2822	2822	2812	2819	2764	2699	2681
Alameda NAS	3099	3093	2931	2931	2921	2944	2889	2825	2958
Lemoore NAS	3083	3077	2913	2913	2903	2910	2855	2791	2773
Los Alamitos NAS	2976	2974	2806	2806	2796	2803	2748	2684	2667
Miramar NAS	2999	2993	2822	2822	2812	2819	2764	2700	2673
Moffett Fld NAS	3137	3131	2969	2969	2959	2982	2927	2863	2927
Long Beach NSC	2990	2984	2816	2816	2806	2813	2758	2694	2687
Oakland NSC	3097	3091	2929	2929	2919	2942	2887	2823	2956
San Diego NSC	2999	2993	2822	2822	2812	2819	2764	2699	2681
Concord NWS	3084	3078	2916	2916	2906	2929	2874	2810	2947
Seal Beach NWS	2982	2976	2806	2806	2796	2803	2734	2684	2677
Norton AFB	2931	2925	2754	2754	2744	2751	2691	2632	2625
Oakland Base	3097	3093	2931	2931	2921	2944	2889	2825	2958
Presidio of Mont	3208	3202	3040	3040	3030	3047	2987	2928	2921
Presidio of SF	3105	2999	2937	2937	2927	2950	2890	2831	2962
Riverbank AAP	3154	3148	2986	2986	2976	2999	2939	2880	2890
Sacramento Depot	3009	3003	2841	2841	2831	2854	2794	2735	2888
Sharpe Depot	3059	3053	2891	2891	2881	2904	2844	2785	2896
Sierra Depot	2929	2923	2761	2761	2751	2774	2714	2655	2808
Tracy Def Depot	3055	3049	2896	2896	2886	2906	2843	2772	2916
Travis AFB	3053	3047	2885	2885	2875	2898	2838	2779	2932
Rio Vista Area	3076	3070	2918	2918	2908	2876	2876	2812	2935

TABLE C-1 - cont

	Providence, RI	Davisville, RI	New York, NY	Bayonne, NJ	Newark, NJ	Philadelphia, PA	Baltimore, MD	Norfolk, VA	
COLORADO									
Camp West	1963	1957	1795	1795	1785	1808	1748	1689	1763
Fitzsimons AMC	1955	1949	1787	1787	1777	1800	1740	1681	1743
Fort Carson	1984	1978	1807	1807	1797	1804	1744	1685	1740
Lowery AFB	1953	1945	1785	1785	1798	1798	1738	1679	1744
Peterson AFB	1973	1972	1796	1796	1786	1793	1733	1674	1729
Pueblo Depot	2005	1999	1828	1828	1818	1825	1765	1706	1761
Rocky Mtn Arsenal	1945	1939	1777	1777	1767	1790	1730	1671	1746
WASH DC									
Bolling AFB	403	397	226	220	220	205	141	40	191
Fort McNair	401	395	224	218	218	203	139	38	189
Walter Reed AMC	399	393	216	216	201	137	137	36	197
FLORIDA									
Camp Blanding	1158	1152	981	975	975	958	899	795	662
Def Fuel SP, Jack.	1120	1114	943	937	937	920	861	757	624
Def Fuel SP, PC	1316	1310	1139	1133	1133	1118	1057	953	846
Eglin AFB	1334	1324	1157	1151	1151	1136	1072	971	886
Homestead AFB	1508	1505	1345	1339	1339	1339	1245	951	966
MacDill AFB	1310	1304	1147	1141	1141	1141	1047	1129	902
Cecil Fld NAS	1135	1129	958	952	952	935	876	772	636
Jacksonville NAS	1132	1126	955	949	949	932	873	769	644
Pensacola NAS	1362	1356	1185	1179	1179	1164	1103	999	903
Key West NAS	1621	1615	1444	1438	1438	1421	1362	1258	1122
Mayport Naval Station	1141	1135	964	958	958	941	882	778	642
Orlando NTC	1262	1256	1085	1079	1079	1062	1003	899	763
Patrick AFB	1288	1282	1111	1105	1105	1088	1029	925	789
Tyndall AFB	1328	1310	1151	1145	1145	1130	1066	965	861
Whiting Fld NAS	1341	1335	1164	1158	1158	1143	1082	978	882
GEORGIA									
Def Fuel SP, Atl	1023	1017	846	840	840	825	764	660	564
Dobbins AFB	1030	1024	853	847	847	832	768	667	582
Fort Benning	1141	1135	964	958	958	943	882	778	682

TABLE C-1 - cont

	Providence, RI	Davisville, RI	New York, NY	Bayonne, NJ	Newark, NJ	Philadelphia, PA	Baltimore, MD	Norfolk, VA	
<u>GEORGIA - cont</u>									
Fort Gillem	1023	1017	846	840	840	825	764	660	564
Fort Gordon	950	944	773	767	767	752	691	587	469
Fort McPherson	1027	1025	850	844	844	829	765	664	571
Fort Stewart	1024	1020	847	841	841	824	762	661	528
Hunter AAF	986	980	809	803	803	786	724	623	487
USMC Log Base	1200	1194	1023	1017	1017	1000	941	837	701
Moody AFB	1143	1117	966	960	960	943	881	780	635
Marietta NAS	1033	1027	856	850	850	835	774	670	574
Kings Bay NSB	1097	1091	920	914	914	897	838	734	598
Brunswick NAS	1058	1039	881	875	875	858	796	695	562
Robins AFB	1090	1084	913	907	907	892	828	727	624
<u>IDAHO</u>									
Gowen Field	2649	2643	2481	2481	2471	2494	2439	2375	2531
Mtn Home AFB	2613	2605	2445	2445	2435	2458	2398	2339	2492
<u>ILLINOIS</u>									
Army Area SUPCOM	956	950	788	788	778	810	750	691	877
Fort Sheridan	983	977	815	815	805	837	777	718	912
Joliet AAP	970	964	802	802	792	815	760	696	885
Glenview NAS	975	969	807	807	797	829	774	710	899
Great Lakes NSD	991	985	823	823	813	845	790	726	915
Great Lakes NTC	991	985	823	823	813	845	790	726	915
Rock Island Ars	1114	1108	946	946	936	959	904	840	1014
St. Louis ASC	1142	1136	965	965	955	962	907	843	896
Savanna Depot	1109	1103	941	941	931	963	908	844	1033
Scott AFB	1134	1128	957	957	947	954	899	825	883
<u>INDIANA</u>									
Camp Attebury	903	897	726	726	716	723	668	604	674
Crane Ammo Actv	969	963	792	792	782	789	734	670	740
Fort B. Harrison	894	888	717	717	707	714	659	595	702

TABLE C-1 - cont

	Providence, RI	Davisville, RI	New York, NY	Bayonne, NJ	Newark, NJ	Philadelphia, PA Earle, NJ	Baltimore, MD	Norfolk, VA	
INDIANA - cont.									
Grissom AFB	866	860	698	698	688	709	619	590	755
Indiana AAP	926	922	751	751	741	748	693	627	654
Crane NWC	969	963	792	792	782	789	734	670	740
Newport AAP	954	948	777	777	766	774	719	655	755
IOWA									
Camp Dodge	1278	1272	1110	1110	1123	1123	1068	1004	1174
Iowa AAP	1173	1167	1005	1005	995	1018	963	899	1008
KANSAS									
Fort Leavenworth	1418	1412	1241	1241	1231	1238	1183	1119	1183
Fort Riley	1519	1513	1342	1342	1332	1339	1279	1220	1275
Kansas AAP	1440	1484	1313	1313	1303	1310	1255	1191	1244
McConnell AFB	1581	1575	1404	1404	1394	1401	1341	1282	1337
Sunflower AAP	1402	1396	1225	1225	1215	1222	1167	1103	1161
KENTUCKY									
Fort Campbell	1102	1096	925	925	915	916	855	751	722
Fort Knox	948	942	771	771	761	768	713	645	672
Lexington Depot	886	880	709	709	699	706	649	545	572
LOUISIANA									
Barksdale AFB	1591	1585	1414	1411	1404	1396	1332	1231	1171
Camp Beauregard	1562	1556	1385	1382	1375	1367	1306	1202	1131
England AFB	1568	1562	1391	1388	1381	1373	1309	1208	1140
Fort Polk	1616	1699	1439	1436	1429	1421	1357	1256	1188
Louisiana AAP	1579	1573	1402	1399	1392	1384	1321	1219	1151
MAINE									
Camp Keyes	221	241	376	384	433	433	469	561	721
Loring AFB	471	478	626	634	635	683	716	811	968
Brunswick NAS	188	208	343	351	352	400	436	528	688
MARYLAND									
Aberdeen PG	337	331	160	154	154	144	78	28	251
Andrews AFB	402	396	225	219	219	204	143	39	188

TABLE C-1 - cont

	Providence, RI	Davisville, RI	New York, NY	Bayonne, NJ	Newark, NJ	Philadelphia, PA	Baltimore, MD	Norfolk, VA	
MARYLAND - cont.									
Edgewood Ars	345	339	168	162	162	147	86	22	245
Fort Richie	418	411	241	239	231	224	157	61	261
Fort Detrick	414	408	237	231	231	216	155	51	240
Fort Holabird	362	356	185	179	179	164	103	6	226
Fort Meade	380	374	203	197	197	182	121	17	211
Bethesda NMC	402	396	225	219	219	204	143	39	201
Pax River NAS	440	434	263	257	257	242	181	79	184
MASSACHUSETTS									
Fort Devens	69	88	204	212	213	261	297	389	549
Hanscom AFB	55	66	214	222	223	271	304	399	556
S Weymouth NAS	43	63	219	227	228	276	309	404	561
Otis AFB	56	75	234	242	243	291	327	418	579
Westover AFB	90	109	148	156	157	205	241	333	493
MICHIGAN									
Tank-Auto Cmd	721	740	617	617	607	644	589	525	714
Camp Grayling	882	901	799	787	787	819	776	700	848
Detroit Arsenal	721	740	617	617	607	644	581	525	714
K.I. Sawyer AFB	1091	1110	1027	1025	1017	1083	1004	964	1129
USA Stg Fac	728	747	645	645	635	675	615	556	742
Michigan AM ²	721	740	617	617	607	644	589	525	714
Army Eng Plant	889	908	778	778	768	805	750	786	875
Mt Clemens NAF	747	766	643	643	633	670	615	551	740
Selfridge AN ² B	707	733	624	624	614	662	611	552	738
Wurtsmith AFB	870	890	787	787	777	819	759	700	886
MINNESOTA									
Camp Ripley	1468	1529	1300	1300	1290	1322	1262	1203	1389
Fort Snelling	1360	1354	1192	1192	1182	1214	1154	1095	1281
Twin Cities AAP	1369	1384	1201	1201	1191	1223	1163	1104	1290
MISSISSIPPI									
Camp Shelby	1373	1365	1196	1193	1186	1178	1114	1013	945
Columbus AFB	1265	1249	1088	1075	1078	1060	1006	905	845

TABLE C-1 - cont

	Providence, RI	Davisville, RI	New York, NY	Bayonne, NJ	Newark, NJ	Philadelphia, PA	Baltimore, MD	Norfolk, VA	
MISSISSIPPI - cont.									
Keesler AFB	1420	1421	1243	1250	1237	1235	1158	1070	964
Mississippi AAP	1428	1427	1251	1248	1238	1233	1230	1068	1000
Meridian NAS	1306	1300	1129	1119	1111	1050	946	875	875
Nav Const Bn Ctr	1434	1428	1157	1251	1251	1236	1175	1071	975
MISSOURI									
Camp Clark	1412	1406	1235	1235	1225	1232	1172	1113	1163
Fort Leonard Wood	1129	1251	1102	1102	1092	1099	1039	980	1030
Gateway AAP	1142	1136	965	965	955	962	902	843	893
Lake City AAP	1389	1383	1212	1212	1202	1209	1154	1090	1148
R-Gebaur AFB	1398	1388	1221	1221	1211	1218	1158	1099	1154
USA Spt Ctr	1142	1136	965	965	955	962	902	843	892
Whiteman AFB	1348	1342	1171	1171	1162	1168	1108	1049	1104
MONTANA									
Malmstrom AFB	2328	2332	2164	2170	2154	2186	2126	2067	2253
NEBRASKA									
Cornhusker AAP	1562	1556	1394	1394	1384	1407	1552	1288	1444
Offutt AFB	1421	1415	1253	1253	1243	1266	1211	1147	1300
Sioux Army Depot	1815	1809	1653	1653	1643	1666	1611	1547	1703
NEVADA									
Hawthorne AAP	2866	3011	2698	2698	2688	2711	2651	2592	2743
Mc Lake Meade	2696	2699	2528	2528	2518	2541	2481	2422	2462
Nellis AFB	2696	2699	2528	2528	2518	2541	2481	2422	2462
NEW HAMPSHIRE									
Pease AFB	113	132	286	276	277	325	358	453	610
NEW JERSEY									
Belle Meade GD	216	208	37	32	27	52	66	159	312
Burlington AAP	255	249	78	72	72	57	16	120	290
Fort Dix	246	240	69	63	63	53	39	131	288
Fort Monmouth	225	219	48	42	42	10	76	168	302
Camp Kilmer	214	205	37	30	31	36	69	160	323
McGuire AFB	246	240	69	63	63	40	37	131	288
Naval Wpns Station	235	229	58	52	52		73	165	299

TABLE C-1 - cont

	Providence, RI	Davisville, RI	New York, NY	Bayonne, NJ	Newark, NJ	Philadelphia, PA	Baltimore, MD	Norfolk, VA	
NEW MEXICO									
Cannon AFB	2022	2016	1847	1845	1835	1842	1782	1723	1707
Fort Wingate	2333	2326	2156	2156	2146	2153	2093	2034	2019
Holloman AFB	2252	2246	2075	2075	2065	2072	2012	1950	1932
Kirtland AFB	2193	2189	2016	2016	2006	2013	1958	1894	1876
White Sands MR	2292	2286	2115	2115	2105	2112	2052	1990	1972
NEW YORK									
Army Pictorial Ctr	178	172	-	8	10	58	94	186	346
Fort Drum	353	347	355	363	365	370	341	437	606
Fort Hamilton	179	173	2	10	12	60	96	188	348
Schenectady Dpt	193	187	8	18	10	52	88	180	340
Fort Wadsworth	198	192	8	10	10	42	89	185	334
Griffiss AFB	279	296	255	263	255	304	284	349	554
Hancock Field	312	306	258	258	248	296	261	483	528
Plattsburgh AFB	331	325	307	314	307	356	389	365	644
Seneca Depot	366	360	271	279	271	299	260	329	523
Stewart AFB	176	170	69	77	69	118	151	245	399
Watervliet Arsenal	180	174	156	164	156	205	238	374	490
NORTH CAROLINA									
Fort Bragg	728	722	551	545	551	535	469	365	235
New River MCAS	713	707	536	530	536	489	464	380	190
Cherry Pt MCAS	691	685	514	508	514	467	442	383	168
Camp Lejeune	714	708	537	531	537	490	465	383	191
Pope AFB	727	715	551	551	551	530	466	365	238
S. Johnson AFB	676	664	500	500	500	479	415	314	177
NORTH DAKOTA									
Camp Grafton	1764	1763	1601	1601	1601	1622	1597	1508	1694
Fraine Barracks	1789	1787	1625	1625	1625	1647	1592	1528	1717
Grand Forks AFB	1626	1629	1531	1531	1531	1553	1493	1434	1620
Minot AFB	1833	1838	1713	1713	1713	1735	1675	1616	1802

TABLE C-1 - cont

	Providence, RI	Davisville, RI	New York, NY	Bayonne, NJ	Newark, NJ	Philadelphia, PA Earle, NJ	Baltimore, MD	Norfolk, VA	
<u>OHIO</u>									
Camp Perry	699	693	531	531	531	559	499	440	629
Def Const Spt Ctr	716	710	539	539	539	536	481	417	586
Def Elect Spt Ctr	797	791	620	620	620	617	562	498	613
Lima Tank Ctr	762	756	594	594	594	605	550	486	675
Ravenna AAP	587	581	419	419	419	448	388	334	515
Rickenbacker Bur	719	713	542	542	542	539	479	420	572
W-Patterson AFB	780	774	603	603	603	600	545	481	617
<u>OKLAHOMA</u>									
Altus AFB	1797	1786	1615	1615	1605	1612	1557	1493	1472
Fort Sill	1732	1726	1555	1555	1545	1552	1497	1433	1412
McAlester AAP	1640	1634	1463	1463	1453	1460	1405	1341	1320
Tinker AFB	1650	1644	1473	1473	1463	1470	1415	1351	1330
Vance AFB	1664	1656	1487	1487	1477	1484	1424	1365	1383
<u>OREGON</u>									
Kingsley Field	3019	3013	2851	2851	2841	2864	2804	2745	2898
Roberts Field	2964	2958	2796	2796	2786	2897	2754	2655	2843
Umatilla AD Actv	2878	2872	2710	2710	2703	2723	2668	2602	2757
<u>PENNSYLVANIA</u>									
Army Spt Det	553	547	380	380	370	377	317	258	444
Carlisle Barracks	361	355	184	184	174	183	127	87	281
Fed Cold Storage	541	535	368	368	358	365	305	246	432
F. I. G.	375	369	198	198	188	196	135	102	324
Frankford Arsenal	268	262	91	91	85	70	10	101	268
Hayes AAP	541	535	368	368	358	365	305	246	432
Letterkenny Depot	392	386	215	215	205	212	152	81	287
Willow Grove NAS	264	258	87	81	81	66	17	118	288
Phila Naval Sup	268	262	91	85	85	73	5	104	271
New Cumberland Dpt	345	339	168	158	158	166	106	72	297
M'burg Def Dpt	352	346	175	175	165	172	112	76	301
Scranton AAP	274	282	120	120	110	158	119	184	389
Tobyhanna Depot	268	271	100	100	90	138	103	195	371
USA Spt Actv	541	535	368	368	358	365	305	246	432

TABLE C-1 - cont

	Providence, RI	Davisville, RI	New York, NY	Bayonne, NJ	Newark, NJ	Philadelphia, PA	Baltimore, MD	Norfolk, VA	
RHODE ISLAND									
Quonset Pt NAS	20	15	172	180	180	180	262	357	517
SOUTH CAROLINA									
Charleston AFB	917	911	740	734	734	734	658	554	414
Charleston Depot	912	906	735	729	729	729	653	549	415
Charleston NB	917	911	740	734	734	734	658	554	414
Fort Jackson	867	869	690	684	684	684	605	504	389
Beaufort MCAS	961	955	784	778	778	778	702	598	462
Parris Island	974	968	797	791	791	791	715	611	486
Myrtle Beach AFB	834	828	657	651	651	651	572	471	317
Charleston NSC	917	911	740	734	734	734	653	554	415
Shaw AFB	863	857	686	680	680	680	601	500	375
SOUTH DAKOTA									
Camp Rapid	1862	1856	1694	1694	1694	1694	1656	1597	1783
Ellsworth AFB	1853	1847	1685	1685	1685	1685	1647	1588	1774
TENNESSEE									
Defense Depot	1258	1252	1081	1078	1078	1078	1002	898	869
Holston AAP	788	782	611	608	608	608	532	428	399
Milan AAP	1182	1176	1005	1002	1002	1002	926	822	793
Memphis NAS	1270	1264	1093	1091	1091	1091	1215	911	893
Volunteer AAP	995	989	818	815	815	815	739	635	596
TEXAS									
Bergstrom AFB	1916	1902	1739	1736	1736	1736	1657	1556	1502
Brooks AFB	1990	1981	1813	1810	1810	1810	1731	1630	1576
Camp Mabry	1908	1902	1731	1728	1721	1713	1652	1548	1491
Camp Stanley	1987	1981	1810	1807	1800	1792	1731	1627	1581
Caswell AFB	1757	1743	1580	1577	1570	1562	1498	1397	1371
Corpus Christi Depot	2019	2013	1842	1839	1832	1824	1763	1659	1588
Dyess AFB	1911	1899	1734	1731	1724	1716	1652	1551	1533
Ellington AFB	1806	1800	1629	1626	1619	1611	1547	1446	1386
Fort Bliss	2323	2317	2146	2146	2136	2143	2083	1997	1971
Fort Hood	1866	1860	1689	1686	1679	1671	1607	1506	1452
Fort S. Houston	1985	1981	1808	1805	1798	1790	1729	1625	1568

TABLE C-1 - cont

	Providence, RI	Davisville, RI	New York, NY	Bayonne, NJ	Newark, NJ	Philadelphia, PA	Baltimore, MD	Norfolk, VA	
<u>TEXAS - cont.</u>									
Fort Walters	1789	1783	1612	1609	1602	1594	1533	1428	1400
Goodfellow AFB	2001	1991	1824	1821	1814	1806	1742	1641	1623
Kelly AFB	1994	1981	1817	1814	1807	1799	1735	1634	1588
Lackland AFB	1998	1985	1821	1818	1811	1803	1739	1638	1592
Laughlin AFB	2136	2131	1959	1956	1949	1941	1877	1776	1730
Lone Star AAP	1552	1546	1375	1372	1365	1357	1296	1192	1174
Longhorn AAP	1623	1617	1446	1443	1436	1428	1367	1263	1203
Beeville NAS	1990	1984	1813	1810	1800	1795	1774	1630	1559
Corpus Christi NAS	2031	2025	1854	1851	1844	1836	1775	1671	1600
Dallas NAS	1732	1726	1555	1552	1545	1537	1476	1372	1343
Kingsville NAS	2038	3032	1861	1858	1851	1843	1782	1678	1607
Randolph AFB	1976	1970	1799	1796	1789	1781	1717	1616	1570
Red River AD	1553	1547	1376	1373	1366	1358	1294	1193	1167
Sheppard AFB	1788	1782	1611	1611	1601	1608	1548	1447	1429
W Beaumont AMC	2323	2317	2146	2146	2136	2143	2088	2585	1966
Reese AFB	2006	1989	1829	1829	1819	1824	1760	1659	1641
<u>UTAH</u>									
Fort Douglas	2358	2352	2190	2190	2180	2203	2148	2084	2237
Hill AFB	2348	2343	2180	2180	2180	2193	2133	2074	2227
Tooele Depot	2393	2387	2225	2225	2225	2238	2178	2119	2272
<u>VIRGINIA</u>									
Cameron Station	411	402	234	234	234	213	149	48	187
Arlington Hall	407	230	224	224	224	209	145	44	193
Cheatham Annex	557	551	380	380	380	359	298	194	44
Def Gen Sup Dpt	517	511	340	340	340	319	258	154	91
Fort Belvoir	416	410	239	239	239	218	157	53	182
Fort A.P. Hill	470	464	293	293	293	272	211	107	148
Fort Eustis	544	538	367	367	367	320	295	195	35
Fort Lee	532	526	355	355	355	334	273	169	78
Fort Myer	405	399	228	228	228	207	146	42	196
Fort Monroe	528	522	351	351	351	304	279	210	19
Fort Picket	565	559	388	388	388	367	306	202	111
Fort Story	516	508	339	339	339	292	264	232	18

TABLE C-1 - cont

	Providence, RI	Davisville, RI	New York, NY	Bayonne, NJ	Newark, NJ	Philadelphia, PA	Baltimore, MD	Norfolk, VA	
VIRGINIA - cont.									
Langley AFB	530	520	353	353	353	306	278	208	18
Quantico USMC	435	429	258	258	258	237	176	72	167
Norfolk NAS	523	517	346	346	346	299	274	225	11
Oceana NAS	524	518	347	347	347	300	274	238	19
Little Creek NAB	510	504	333	333	333	286	261	220	12
Norfolk NAC	523	517	346	346	346	299	274	222	11
Yorktown NWS	546	540	369	369	369	322	293	191	34
Radford AAP	677	671	600	600	600	482	421	317	278
Vint Hills FS	444	435	267	267	267	246	182	81	191
WASHINGTON									
Camp Murray	2990	2988	2826	2826	2826	2848	2793	2729	2915
Fort Lawton	2987	2978	2823	2823	2823	2845	2785	2726	2912
Fort Lewis	3002	2988	2839	2839	2839	2861	2801	2742	2928
Fairchild AFB	2710	2696	2546	2546	2546	2508	2508	2449	2635
Madigan AMC	3003	3001	2839	2839	2839	2861	2806	2742	2931
McChord AFB	2996	2994	2832	2832	2832	2854	2799	2735	2924
Bremerton NSC	2996	2994	2832	2832	2832	2854	2799	2734	2924
Seattle NSA	2992	2990	2828	2828	2828	2850	2795	2731	2920
Yakima Center	2888	2886	2724	2724	2724	2746	2691	2627	2816
WISCONSIN									
Badger AAP	1138	1132	970	970	970	992	937	873	1062
Fort McCoy	1187	1181	1019	1019	1019	1041	986	922	1111
Gen Mitchell Fld	1045	1039	877	877	877	899	844	780	969
WYOMING									
Camp Guernsey	1934	1925	1766	1766	1766	1779	1719	1660	1813
F.E. Warren AFB	1919	1910	1751	1751	1751	1764	1704	1645	1798

TABLE C-2
SURFACE MILEAGE BETWEEN CONUS
MILITARY ACTIVITIES AND MAJOR SOUTH ATLANTIC PORTS

	Wilmington, NC	Sunny Point, NC	Charleston, SC	Kings Bay, GA	Savannah, GA	Jacksonville, FL	Ft Lauderdale, FL	W Palm Beach, FL	Pensacola, FL
ALABAMA									
Alabama AAP	558	573	419	442	377	455	772	717	331
Anniston Depot	518	542	379	402	337	414	732	697	291
Fort McClellan	526	548	385	408	343	409	738	693	297
Fort Rucker	595	619	428	309	326	289	579	534	141
Maxwell AFB	589	613	451	354	352	346	662	617	172
Redstone Arsenal	612	636	473	496	431	497	826	781	357
ARIZONA									
Davis-Monthan AFB	2140	2164	2006	1937	1918	2215	2170	2170	1578
Fort Huachuca	2131	2155	1992	1914	1920	1921	2206	2161	1568
Luke AFB	2250	2274	2116	2039	2039	2028	2325	2280	1688
USMC Air Station	2380	2404	2291	2169	2169	2158	2455	2410	1818
Navajo Depot	2137	2161	2001	1984	1959	1985	2270	2225	1642
Williams AFB	2215	2239	2081	1988	2004	1993	2290	2245	1653
ARKANSAS									
Blytheville AFB	825	849	740	755	693	743	1059	1018	515
Camp Robinson	941	965	805	811	763	807	1123	1078	501
Fort Chaffee	1082	1106	946	959	904	948	1264	1219	667
Little Rock AFB	941	965	810	818	763	807	1123	1078	517
Pine Bluff Arsenal	960	984	826	786	779	775	1091	1046	467
CALIFORNIA									
Alameda Nav Fac	2883	2907	2747	2730	2705	2731	3016	2971	2388
Beale AFB	2929	2953	2803	2782	2756	2770	3067	3022	2430
Camp Obispo	2765	2799	2639	2583	2583	2572	2869	2824	2232
Camp Roberts	2770	2794	2639	2617	2592	2606	2903	2858	2266
Castle AFB	2775	2799	2644	2623	2597	2611	2908	2863	2271
Fort Baker	2892	2916	2762	2745	2714	2728	3025	2403	2388
Fort H. Liggett	2846	2856	2710	2693	2668	2694	2910	2934	2351
Fort Irwin	2519	2543	2380	2366	2341	2355	2652	2607	2015
Fort MacArthur	2895	2905	2764	2742	2717	2731	3028	2983	2391
Fort Ord	2850	2874	2719	2697	2672	2686	2983	2939	2346
George AFB	2519	2543	2388	2367	2341	2355	2652	2607	2015

TABLE C-2 - cont

	Wilmington, NC	Sunny Point, NC	Charleston, SC	Kings Bay, GA	Savannah, GA	Jacksonville, FL	Ft Lauderdale, FL	W Palm Beach, FL	Pensacola, FL
CALIFORNIA - cont									
Letterman AMC	2985	2919	2759	3040	2717	2731	3028	2983	2400
McClellan AFB	2890	2914	2959	3035	2712	2726	3023	2978	2386
USMC Air Station	2590	2614	2415	2379	2379	2380	2665	2620	2026
29 Palms USMC	2460	2484	2324	2308	2282	2296	2593	2548	1963
Camp Pendleton	2595	2605	2431	2384	2384	2385	2670	2625	2042
Barstow USMC	2477	2487	2341	2324	2299	2313	2610	2565	1973
San Diego USMC	2558	2568	2423	2351	2351	2352	2637	2592	2009
Alameda NAS	2883	2893	2747	2730	2705	2719	3016	2971	2399
Lemoore NAS	2709	2719	2573	2556	2531	2557	2842	2797	2214
Los Alamitos NAS	2597	2607	2458	2386	2386	2387	2672	2627	2044
Miramar NAS	2565	2575	2426	2354	2354	2355	2640	2595	2012
Moffett Fld NAS	2863	2873	2727	2710	2685	2711	2996	2351	2368
Long Beach NSC	2607	2617	2468	2396	2396	2397	2682	2637	2054
Oakland NSC	2881	2891	2745	2730	2703	2731	3014	2969	2386
San Diego NSC	2562	2572	2423	2351	2351	2352	2637	2592	2009
Concord NWS	2883	2893	2747	2730	2705	2731	3016	2971	2388
Seal Beach NWS	2597	2607	2458	2386	2386	2387	2672	2627	2044
Norton AFB	2545	2555	2406	2334	2780	2335	2620	2575	1992
Oakland Base	2883	2893	2747	2730	2705	2731	3016	2971	2388
Presidio of Mont	2846	2856	2710	2693	2668	2694	2919	2934	2351
Presidio of SF	2895	2905	2764	2742	2717	2731	3028	2983	2391
Riverbank AAP	2809	2819	2673	2656	2656	2657	2942	2897	2314
Sacramento Depot	2982	2902	2746	2729	2704	2730	3015	2970	2387
Sharpe Depot	2829	2839	2698	2676	2651	2665	2962	2917	2325
Sierra Depot	2346	2856	2743	2731	2696	2710	3007	2962	2370
Tracy Def Depot	2818	2828	2882	2665	2640	2666	2951	2906	2323
Travis AFB	2891	2901	2755	2738	2713	2739	3024	2979	2396
Rio Vista Area	2871	2881	2735	2718	2713	2719	3004	2959	2374
COLORADO									
Camp West	1768	1780	1701	1724	1659	1727	2031	1986	1457
Fitzsimons AMC	1763	1735	1696	1719	1654	1722	2026	1981	1446
Fort Carson	1763	1773	1684	1692	1637	1681	1997	1952	1384
Lowery AFB	1767	1778	1704	1727	1658	1714	2030	1985	1443

TABLE C-2 - cont

	Wilmington, NC	Sunny Point, NC	Charleston, SC	Kings Bay, GA	Savannah, GA	Jacksonville, FL	Ft Lauderdale, FL	W Palm Beach, FL	Pensacola, FL
COLORADO - cont									
Peterson AFB	1752	1762	1682	1698	1643	1690	2006	1961	1393
Pueblo Depot	1746	1756	1643	1656	1601	1657	1961	1916	1348
Rocky Mtn Arsenal	1769	1779	1707	1725	1660	1716	2032	1987	1445
WASH DC									
Bolling AFB	359	382	509	694	583	717	1047	1002	956
Fort McNair	362	385	512	697	586	720	1050	1005	952
Walter Reed AMC	368	391	523	703	592	726	1056	1011	967
FLORIDA									
Camp Blanding	444	437	282	77	175	38	338	323	407
Def Fuel SP, Jack	418	411	256	39	137	5	330	285	369
Def Fuel SP, PC	631	424	469	332	362	295	567	522	112
Eglin AFB	662	658	495	380	392	326	608	563	47
Homestead AFB	786	781	624	419	517	380	54	95	702
MacDill AFB	613	608	446	238	344	209	266	221	442
Cecil Fld NAS	421	416	259	54	152	12	342	297	362
Jacksonville NAS	418	413	256	51	149	2	331	286	378
Pensacola NAS	714	709	552	415	445	378	660	615	10
Key West NAS	907	902	745	540	638	502	175	216	823
Mayport Naval Station	427	422	265	60	158	33	340	295	399
Orlando NTC	548	543	386	181	279	143	216	171	458
Patrick AFB	574	569	412	207	305	169	185	140	515
Tyndall AFB		638	476	332	374	307	555	510	115
Whiting Fld NAS	694	689	532	225	425	358	640	595	20
GEORGIA									
Def Fuel SP, Atlanta	431	441	292	315	265	328	645	615	330
Dobbins AFB	445	455	311	325	264	330	659	614	343
Fort Benning	529	552	372	282	268	283	587	542	272
Fort Gillem	426	469	286	311	259	322	639	609	324
Fort Gordon	290	313	146	233	139	262	580	535	478
Fort McPherson	432	455	298	312	247	313	642	597	327
Fort Stewart	310	333	143	101	41	313	452	407	397
Hunter AAF	272	382	110	114	10	149	467	422	436
USMC Log Base	485	495	323	199	216	200	504	459	254

TABLE C-2 - cont

	Wilmington, NC	Sunny Point, NC	Charleston, SC	Kings Bay, GA	Savannah, GA	Jacksonville, GA	Ft Lauderdale, FL	W Palm Beach, FL	Pensacola, FL
<u>GEORGIA - cont</u>									
Moody AFB	429	439	262	251	160	132	429	384	284
Marietta NAS	445	455	283	325	265	343	659	614	343
Kings Bay NSB	383	393	221	-	114	51	369	324	415
Brunswick NAS	344	354	177	42	75	68	398	353	390
Robins AFB	442	452	280	159	181	241	557	512	364
<u>IDAHO</u>									
Gowen Field	2572	2582	2505	2528	2463	2537	2841	2796	2250
Mtn Home AFB	2536	2546	2474	2488	2427	2489	2805	2760	2205
<u>ILLINOIS</u>									
Army Area SUPCOM	941	951	909	993	928	1006	1323	1278	896
Fort Sheridan	968	978	941	1020	955	1021	1350	1305	914
Joliet AAP	946	956	914	998	933	999	1328	1283	901
Glenview NAS	960	970	928	1012	947	1025	1342	1297	915
Great Lakes NSD	976	986	944	1028	963	1041	1358	1313	931
Great Lakes NTC	976	986	944	1028	963	1041	1358	1313	931
Rock Island Ars	1073	1083	1040	1088	1024	1090	1419	1374	939
St. Louis ASC	916	926	849	872	807	885	1202	1157	711
Savanna Depot	1091	1101	1059	1113	1048	1126	1443	1398	961
Scott AFB	903	913	836	859	794	860	1189	1144	705
<u>INDIANA</u>									
Camp Attebury	739	749	647	868	725	811	1140	1095	704
Crane Ammo Actv	758	768	694	803	731	809	1126	1081	699
Fort B. Harrison	761	771	732	861	759	874	1191	1146	764
Grissom AFB	817	827	793	934	825	916	1245	1200	809
Indiana AAP	689	699	625	747	662	740	1077	1012	630
Crane NWC	758	768	694	803	731	809	1126	1081	699
Newport AAP	830	840	801	925	838	938	1255	1210	828
<u>IOWA</u>									
Camp Dodge	1233	1243	1200	1228	1163	1241	1558	1513	1050
Iowa AAP	1070	1080	1037	1068	1003	1069	1398	1353	918
<u>KANSAS</u>									
Fort Leavenworth	1203	1213	1136	1159	1094	1156	1472	1427	933

TABLE C-2 - cont

	Wilmington, NC	Sunny Point, NC	Charleston, SC	Kings Bay, GA	Savannah, GA	Jacksonville, FL	Ft Lauderdale, FL	W Palm Beach, FL	Pensacola, FL
KANSAS - cont									
Fort Riley	1298	1308	1236	1254	1189	1245	1561	1516	1013
Kansas AAP	1182	1192	1079	1092	1037	1093	1396	1352	844
McConnell AFB	1320	1330	1222	1232	1175	1219	1535	1490	944
Sunflower AAP	1184	1194	1117	1140	1075	1149	1453	1408	914
KENTUCKY									
Fort Campbell	658	668	591	614	549	627	944	899	517
Fort Knox	707	717	643	710	645	711	1040	995	613
Lexington Depot	605	615	541	688	578	705	1035	990	680
LOUISIANA									
Barksdale AFB	1023	1033	889	812	812	801	1098	1053	461
Camp Beauregard	994	1004	855	767	783	730	1012	967	384
England AFB	1000	1010	858	770	789	734	1016	971	379
Fort Polk	1048	1058	914	818	837	781	1063	1018	426
Louisiana AAP	1011	1021	872	800	800	789	1086	1041	461
MAINE									
Camp Keyes	958	981	1115	1295	1184	1330	1648	1603	1560
Loring AFB	1208	1231	1360	1537	1434	1568	1898	1853	1801
Brunswick NAS	925	948	1082	1262	1151	1297	1615	1570	1527
MARYLAND									
Aberdeen PG	427	450	582	762	651	785	1115	1070	1027
Andrews AFB	364	387	519	699	588	734	1052	1007	971
Edgewood Ars	421	444	576	756	645	791	1109	1064	1021
Fort Richie	428	451	583	763	652	786	1116	1071	990
Fort Detrick	404	427	559	739	628	774	1092	1047	980
Fort Holabird	402	425	557	737	626	772	1090	1045	1002
Fort Meade	388	411	538	723	612	746	1076	1031	988
Bethesda NMC	372	395	527	707	596	742	1060	1015	962
Pax River NAS	366	389	516	701	590	724	1054	1009	964
MASSACHUSETTS									
Fort Devens	786	809	938	1123	1012	1158	1476	1432	1379
Hanscom AFB	796	819	948	1144	1022	1156	1486	1441	1389
S Weymouth NAS	801	824	953	1138	1027	1161	1491	1446	1394

TABLE C-2 - cont

	Wilmington, NC	Sunny Point, NC	Charleston, SC	Kings Bay, GA	Savannah, GA	Jacksonville, FL	Ft Lauderdale, FL	W Palm Beach, FL	Pensacola, FL
<u>MASS - cont</u>									
Otis AFB	813	838	966	1151	1044	1195	1524	1479	1422
Westover AFB	730	753	882	1067	956	1090	1420	1375	1323
<u>MICHIGAN</u>									
Tank-Auto Cmd	843	853	864	1012	901	1047	1365	1320	996
Camp Grayling	1026	1036	1052	1195	1084	1218	1548	1503	1128
Detroit Arsenal	843	853	864	1012	901	1047	1365	1320	996
K.I. Sawyer AFB	1254	1264	1288	1369	1304	1370	1705	1654	1263
USA Stg Fac	874	884	895	1043	932	1066	1396	1351	1018
Michigan AMP	843	853	864	1012	901	1047	1365	1320	996
Army Eng Plant	1000	1010	989	1136	1026	1159	1476	1431	1049
Mt Clemens NAF	864	874	884	1032	921	1069	1388	1342	1018
Selfridge ANGB	870	880	896	1012	928	1062	1392	1347	1014
Wurtsmith AFB	1014	1024	1040	1186	1072	1206	1536	1491	1158
<u>MINNESOTA</u>									
Camp Ripley	1453	1063	1426	1505	1440	1506	1835	1790	1351
Fort Snelling	1345	1355	1313	1397	1332	1398	1727	1682	1243
Twin Cities AAP	1354	1364	1327	1406	1341	1407	1736	1691	1252
<u>MISSISSIPPI</u>									
Camp Shelby	805	815	671	531	578	511	793	748	156
Columbus AFB	687	707	548	513	516	512	828	783	292
Keesler AFB	810	820	661	515	541	474	756	711	119
Mississippi AAP	853	863	726	585	605	532	831	769	196
Meridian NAS	738	748	599	527	527	516	832	787	222
Nav Const Bn Ctr	824	834	662	525	555	488	770	725	142
<u>MISSOURI</u>									
Camp Clark	1257	1267	1047	1055	990	1089	1360	1315	812
Fort Leonard Wood	1052	1062	970	978	923	967	1283	1238	735
Gateway AAP	916	926	849	872	807	873	1202	1157	702
Lake City AAP	1168	1178	1101	1124	1059	1121	1437	1392	898
R-Gebaur AFB	1177	1187	1106	1104	1059	1103	1419	1374	871
USA Spt Ctr	916	926	849	872	807	873	1202	1157	702
Whiteman AFB	1127	1137	1065	1081	1018	1084	1400	1355	852

TABLE C-2 - cont

	Wilmington, NC	Sunny Point, NC	Charleston, SC	Kings Bay, GA	Savannah, GA	Jacksonville, FL	Ft Lauderdale, FL	W Palm Beach, FL	Pensacola, FL
MONTANA									
Malmstrom AFB	2317	2327	2290	2371	2300	2362	2678	2366	2130
NEBRASKA									
Cornhusker AAP	1488	1498	1426	1444	1379	1453	1757	1712	1209
Offutt AFB	1362	1372	1302	1320	1255	1317	1633	1588	1085
Sioux Army Depot	1738	1748	1685	1703	1638	1691	2007	1962	1468
NEVADA									
Hawthorne AAP	2689	2699	2558	2537	2511	2525	2822	2777	2185
Mc Lake Meade	2387	2397	2256	2225	2209	2223	2520	2475	1883
Nellis AFB	2387	2397	2256	2225	2209	2223	2520	2475	1883
NEW HAMPSHIRE									
Pease AFB	850	873	1002	1186	1076	1210	1540	1495	1443
NEW JERSEY									
Belle Meade GD	564	587	713	899	788	922	1252	1207	1155
Burlington AAP	519	542	674	854	743	877	1207	1102	1110
Fort Dix	525	542	680	865	754	888	1218	1172	1121
Fort Monmouth	529	562	706	900	789	923	1253	1208	1158
Camp Kilmer	560	583	710	895	784	918	1248	1203	1151
McGuire AFB	525	548	680	865	754	888	1218	1172	1121
Naval Wpns Station	536	559	708	897	756	920	1250	1205	1155
NEW MEXICO									
Cannon AFB	1638	1661	1504	1452	1457	1447	1744	1699	1107
Fort Wingate	1952	1975	1821	1799	1774	1788	2085	2040	1448
Holloman AFB	1813	1836	1679	1593	1602	1591	1888	1843	1251
Kirtland AFB	1812	1835	1681	1661	1634	1648	1945	1900	1308
White Sands MR	1853	1876	1714	1642	1642	1631	1928	1883	1291
NEW YORK									
Army Pictorial Ctr	583	606	735	920	809	943	1273	1228	1176
Fort Drum	723	746	880	1060	949	1083	1413	1368	1316
Fort Hamilton	579	599	731	914	801	945	1277	1222	1170
Schenectady Dpt	733	758	872	1174	960	1110	1433	1392	1318
Fort Wadsworth	579	599	731	914	801	945	1277	1222	1170
Griffiss AFB	748	771	898	1099	972	1106	1436	1391	1317

TABLE C-2 - cont

	Wilmington, NC	Sunny Point, NC	Charleston, SC	Kings Bay, GA	Savannah, GA	Jacksonville, FL	Ft Lauderdale, FL	W Palm Beach, FL	Pensacola, FL
NEW YORK - cont									
Hancock Field	725	748	875	1076	949	1083	1413	1368	1294
Plattsburgh AFB	881	904	1033	1174	1106	1241	1571	1525	1474
Seneca Depot	686	711	828	1029	907	1057	1383	1339	1265
Stewart AFB	652	675	804	989	878	1012	1342	1297	1245
Watervliet Ars	730	753	882	1083	956	1090	1420	1375	1323
NORTH CAROLINA									
Fort Bragg	132	155	212	389	278	412	742	697	711
New River MCAS	49	72	216	432	321	455	785	740	754
Cherry Pt MCAS	105	128	272	488	377	511	841	796	810
Camp Lejeune	56	75	223	439	328	462	792	747	761
Pope AFB	132	155	247	376	278	412	742	697	711
S. Johnson AFB	92	115	257	417	334	468	798	753	767
NORTH DAKOTA									
Camp Grafton	1758	1768	1736	1810	1745	1811	2140	2095	1656
Fraine Barracks	1778	1788	1746	1830	1765	1831	2160	2115	1654
Grand Forks AFB	166	1694	1657	1720	1671	1737	2066	2021	1582
Minot AFB	1852	1862	1839	1904	1839	1919	2248	2189	1731
OHIO									
Camp Perry	760	770	786	929	818	952	1282	1237	965
Def Const Spt Ctr	645	655	671	814	703	837	1167	1122	833
Def Elect Spt Ctr	672	682	683	825	715	842	1172	1127	773
Lima Tank Ctr	740	750	757	899	789	916	1246	1201	847
Ravenna AAP	674	684	695	843	732	866	1196	1151	984
Rickenbacker Bur	634	644	660	808	692	826	1156	1111	828
W-Patterson AFB	679	689	696	838	728	855	1185	1140	786
OKLAHOMA									
Altus AFB	1345	1355	1214	1203	1167	1192	1489	1444	852
Fort Sill	1187	1197	1056	1040	1009	1040	1345	1300	708
McAlester AAP	1258	1268	1127	1143	1080	1124	1440	1395	829
Tinker AFB	1316	1326	1185	1189	1138	1182	1498	1483	892
Vance AFB									
OREGON									
Kingsley Field	2936	2946	2874	2892	2827	2877	3193	3148	2567

TABLE C-2 - cont

	Wilmington, NC	Sunny Point, NC	Charleston, SC	Kings Bay, GA	Savannah, GA	Jacksonville, FL	Ft Lauderdale, FL	W Palm Beach, FL	Pensacola, FL
OREGON - cont									
Roberts Field	2887	2897	2820	2843	2778	2840	3156	3111	2556
Umatilla AD Actv	2801	2811	2734	2757	2692	2754	3070	3025	2470
PENNSYLVANIA									
Army Spt Det	587	610	652	795	684	818	1148	1103	1003
Carlisle Barracks	458	481	613	793	682	816	1146	1101	1027
Fed Cold Storage	599	622	664	807	696	830	1160	1115	1015
F. I. G.	501	524	656	836	725	859	1189	1144	1070
Frankford Arsenal	500	523	650	835	724	858	1188	1143	1091
Hayes AAP	599	622	664	807	696	830	1160	1115	1015
Letterkenny Depot	454	477	604	778	667	801	1131	1086	999
Willow Grove NAS	517	540	672	852	741	875	1205	1260	1108
Phila Naval Sup	500	523	658	835	724	858	1188	1143	1091
New Cumberland Depot	471	494	636	806	695	829	1159	1114	1040
M'burg Def Dpt	475	498	630	810	699	833	1163	1118	1033
Scranton AAP	583	606	738	918	807	941	1271	1226	1152
Tobyhanna Depot	594	617	744	929	818	952	1282	1237	1167
USA Spt Actv	599	622	659	807	696	830	1160	1115	1015
RHODE ISLAND									
Quonset Pt NAS	754	777	911	1091	980	1114	1444	1399	1347
SOUTH CAROLINA									
Charleston AFB	177	187	10	226	115	249	579	534	548
Charleston Depot	167	177	-	216	105	239	569	524	538
Charleston NB	172	182	-	221	110	244	574	529	543
Fort Jackson	207	217	119	257	151	285	615	570	550
Beaufort MCAS	229	239	67	161	47	184	514	469	483
Parris Island	242	252	80	155	41	178	508	463	477
Myrtle Beach AFB	77	87	90	306	195	329	659	614	628
Charleston NSC	172	182	-	221	110	244	574	529	543
Shaw AFB	177	187	114	269	158	292	622	577	580
SOUTH DAKOTA									
Camp Rapid	1847	1855	1804	1827	1762	1824	2140	2095	1592
Ellsworth AFB	1838	1848	1800	1820	1755	1815	2131	2086	1583

TABLE C-2 - cont

	Wilmington, NC	Sunny Point, NC	Charleston, SC	Kings Bay, GA	Savannah, GA	Jacksonville, FL	Ft Lauderdale, FL	W Palm Beach, FL	Pensacola, FL
TENNESSEE									
Defense Depot	805	815	674	682	627	671	987	942	439
Holston AAP	370	380	338	473	367	493	817	774	576
Milan AAP	744	754	656	655	609	675	998	953	457
Memphis NAS	818	828	694	702	647	691	1007	962	459
Volunteer AAP	513	523	409	432	367	433	762	717	405
TEXAS									
Bergstrom AFB	1362	1372	1228	1092	1130	1063	1345	1300	708
Brooks AFB	1426	1436	1259	1127	1157	1090	1372	1327	735
Camp Mabry	1354	1364	1215	1092	1122	1055	1337	1292	700
Camp Stanley	1426	1436	1264	1127	1157	1090	1372	1327	735
Carswell AFB	1250	1260	1116	1031	1039	1028	1325	1280	688
Corpus Christi Depot	1440	1450	1278	1141	1171	1104	1386	1341	749
Dyess AFB	1404	1414	1270	1187	1193	1182	1479	1434	842
Ellington AFB	1227	1237	1060	928	958	891	1173	1126	536
Fort Bliss	1851	1861	1717	1640	1640	1629	1923	1878	1286
Fort Hood	1312	1322	1178	1101	1101	1090	1387	1342	750
Fort S. Houston	1430	1440	1268	1131	1161	1094	1376	1331	739
Fort Walters	1282	1292	1143	1041	1071	1060	1357	1312	720
Goodfellow AFB	1475	1485	1341	1260	1264	1253	1548	1503	911
Kelly AFB	1433	1443	1266	1127	1164	1097	1379	1334	742
Lackland AFB	1437	1447	1270	1127	1168	1101	1383	1338	746
Laughlin AFB	1575	1585	1408	1277	1306	1239	1521	1476	884
Lone Star AAP	1063	1073	924	889	882	878	1183	1252	546
Longhorn AAP	1055	1065	916	844	844	833	1130	1085	493
Beeville NAS	1411	1421	1249	1112	1142	1075	1357	1312	720
Corpus Christi NAS	1452	1462	1290	1153	1183	1116	1398	1353	761
Dallas NAS	1225	1235	1086	1014	1014	1003	1300	1255	663
Kingsville NAS	1459	1469	1297	1160	1190	1123	1405	1360	768
Randolph AFB	1414	1424	1247	1127	1145	1078	1360	1315	723
Red River AD	1069	1078	934	874	887	883	1188	1143	551
Sheppard AFB	1331	1341	1197	1146	1150	1140	1437	1392	800
W Beaumont AMC	1851	1861	1717	1640	1640	1629	1923	1878	1286
Reese AFB	1543	1553	1409	1352	1362	1352	1649	1604	1012

TABLE C-2 - cont

	Wilmington, NC	Sunny Point, NC	Charleston, SC	Kings Bay, GA	Savannah, GA	Jacksonville, FL	Ft Lauderdale, FL	W Palm Beach, FL	Pensacola, FL
UTAH									
Fort Douglas	2275	2285	2208	2227	2166	2216	2532	2487	1906
Hill AFB	2271	2281	2209	2228	2162	2224	2540	2495	1931
Tooele Depot	2310	2320	2237	2245	2190	2234	2550	2505	1924
VIRGINIA									
Cameron Station	354	377	504	689	578	712	1042	997	951
Arlington Hall	360	383	510	645	584	718	1048	1003	946
Cheatham Annex	281	304	464	642	531	665	995	950	929
Def Gen Sup Dpt	247	270	402	582	471	605	935	890	858
Fort Belvoir	346	369	501	681	570	704	1034	989	944
Fort A.P. Hill	291	314	550	632	521	655	985	940	895
Fort Eustis	272	295	444	633	522	656	986	941	911
Fort Lee	234	267	389	569	458	592	922	877	844
Fort Myer	360	283	515	695	584	718	1048	1003	948
Fort Monroe	256	279	428	617	506	640	970	925	913
Fort Picket	233	256	384	566	455	589	919	874	880
Fort Story	258	281	433	619	508	642	972	927	915
Langley AFB	258	281	430	619	508	642	972	915	915
Quantico USMC	331	354	486	666	555	689	1019	974	929
Norfolk NAS	248	271	420	609	498	632	762	917	905
Oceana NAS	259	282	431	620	509	643	973	928	916
Little Creek NAB	249	272	421	610	499	633	963	918	906
Norfolk NAC	248	271	420	609	498	632	962	917	905
Yorktown NWS	259	282	446	635	524	658	988	943	911
Radford AAP	298	321	354	487	360	510	840	779	698
Vint Hills FS	358	381	508	683	572	706	1036	991	915
WASHINGTON									
Camp Murray	2979	2989	2947	2976	2911	2973	3289	3244	2741
Fort Lawton	2976	2986	2949	2973	2908	2970	3286	3241	2738
Fort Lewis	2992	3002	2965	2989	2924	2986	3302	3287	2754
Fairchild AFB	2699	2709	2672	2696	2631	2693	3009	2964	2461
Madigan AMC	3002	2960	2989	2924	2924	2986	3302	3257	2754
McChord AFB	2985	2995	2953	2982	2917	2979	3295	3250	2747

TABLE C-2 - cont

	Wilmington, NC	Sunny Point, NC	Charleston, SC	Kings Bay, GA	Savannah, GA	Jacksonville, FL	Ft Lauderdale, FL	W Palm Beach, FL	Pensacola, FL
<u>WASH - cont</u>									
Bremerton NSC	2985	2995	2949	2982	2917	2979	3295	3250	2747
Seattle NSA	2981	2991	2949	2978	2913	2975	3291	3246	2743
Yakima Center	2877	2887	2845	2874	2809	2871	3187	3142	2598
<u>WISCONSIN</u>									
Badger AAP	1133	1143	1091	1175	1110	1176	1505	1460	1044
Fort McCoy	1172	1182	1140	1224	1159	1225	1554	1489	1097
Gen Mitchell Fld	1030	1040	998	1082	1017	1083	1412	1367	976
<u>WYOMING</u>									
Camp Guernsey	1857	1867	1795	1815	1748	1810	2126	2081	1571
F.E. Warren AFB	1842	1856	1783	1789	1733	1795	2111	2066	1544

TABLE C-3
SURFACE MILEAGE BETWEEN CONUS
MILITARY ACTIVITIES AND MAJOR GULF PORTS

	Mobile, AL	Pascagoula, MS	Gulfport, MS	New Orleans, LA	Port Arthur, TX	Beaumont, TX	Galveston, TX	Houston, TX	Corpus Christi, TX
ALABAMA									
Alabama AAP	249	272	321	368	594	599	671	686	899
Anniston Depot	289	311	361	408	634	639	711	726	939
Fort McClellan	295	317	368	414	640	645	717	732	957
Fort Rucker	185	207	258	336	570	575	647	865	875
Maxwell AFB	179	201	252	330	564	569	641	859	869
Redstone Arsenal	350	372	395	441	667	672	744	936	972
ARIZONA									
Davis-Monthan AFB	1519	1503	1470	1420	1172	1151	1114	1064	1022
Fort Huachuca	1510	1494	1461	1411	1163	1142	1105	872	1013
Luke AFB	1629	1603	1580	1530	1282	1261	1224	991	1132
USMC Air Station	1759	1743	1710	1665	1412	1391	1354	1121	1262
Navajo Depot	1574	1575	1542	1497	1297	1276	1240	1190	1188
Williams AFB	1594	1578	1545	1495	1247	1226	1189	956	1097
ARKANSAS									
Blytheville AFB	456	477	444	470	569	574	646	632	845
Camp Robinson	442	447	414	442	415	414	490	591	653
Fort Chaffee	599	603	571	576	473	452	528	478	689
Little Rock AFB	458	463	430	453	431	430	456	607	669
Pine Bluff Arsenal	408	413	380	406	396	401	473	450	663
CALIFORNIA									
Alameda Nav Fac	2320	2331	2288	2243	1995	1974	1937	1887	1845
Beale AFB	2371	2372	2339	2289	2060	2039	2002	1952	1910
Camp Obispo	2173	2157	2124	2079	1826	1805	1768	1718	1676
Camp Roberts	2207	2196	2163	2113	1865	1844	1807	1757	1715
Castle AFB	2212	2213	2180	2130	1901	1880	1843	1793	1751
Fort Baker	2329	2330	2297	2258	2004	1983	1946	1896	1854
Fort H. Liggett	2265	2266	2219	2158	1914	1893	1855	1805	1765
Fort Irwin	1956	1957	1924	1874	1679	1658	1622	1572	1537
Fort MacArthur	1974	1958	1925	1880	1627	1642	1569	1519	1487

TABLE C-3 - cont

	Mobile, AL	Pascagoula, MS	Gulfport, MS	New Orleans, LA	Port Arthur, TX	Beaumont, TX	Galveston, TX	Houston, TX	Corpus Christi, TX
CALIFORNIA - cont									
Fort Ord	2287	2288	2255	2205	1962	1941	1904	1854	1812
George AFB	1956	1955	1922	1872	1624	1603	1566	1516	1474
Letterman AMC	2332	2333	2300	2255	2007	1986	1949	1899	1857
McClellan AFB	2327	2328	2295	2245	2016	1995	1958	1908	1866
USMC Air Station	1969	1953	1920	1875	1622	1601	1564	1514	1472
29 Palms USMC	1897	1898	1865	1820	1580	1559	1530	1472	1430
Camp Pendleton	1974	1953	1924	1875	1627	1606	1569	1519	1497
Barstow USMC	1914	1910	1888	1832	1637	1616	1580	1530	1495
San Diego USMC	1941	1920	1891	1842	1594	1573	1536	1486	1444
Alameda NAS	2320	2316	2287	2238	1995	1974	1937	1897	1857
Lemoore NAS	2146	2132	2113	2064	1828	1807	1770	1720	1678
Los Alamitos NAS	1976	1955	1926	1877	1629	1608	1571	1521	1479
Miramar NAS	1944	1923	1894	1856	1597	1576	1539	1489	1447
Moffett Fld NAS	2300	2296	2267	2218	1975	1954	1917	1867	1825
Long Beach NSC	1986	1965	1936	1887	1639	1618	1581	1531	1489
Oakland NSC	2318	2314	2285	2236	1993	1974	1935	1885	1843
San Diego NSC	1941	1920	1891	1842	1594	1573	1536	1486	1444
Concord NWS	2320	2316	2287	2238	1995	1974	1937	1897	1845
Seal Beach NWS	1976	1955	1926	1877	1629	1608	1571	1521	1479
Norton AFB	1924	1903	1874	1825	1577	1556	1519	1469	1427
Oakland Base	2320	2316	2287	2238	1995	1974	1937	1887	1845
Presidio of Mont	2283	2279	2250	2201	1956	1937	1900	1850	1808
Presidio of SF	2332	2329	2300	2250	2007	1986	1949	1899	1857
Riverbank AAP	2246	2342	2313	2164	1933	1902	1875	1825	1780
Sacramento Depot	2319	2315	2286	2237	2008	1987	1950	1900	1858
Sharpe Depot	2267	2263	2234	2184	1955	1933	1896	1844	1804
Sierra Depot	2311	2320	2291	2229	2034	2016	1970	1920	1893
Tracy Def Depot	2255	2251	2222	2173	1942	1963	1884	1834	1792
Travis AFB	2328	2324	2295	2246	2015	1994	1957	1907	1865
Rio Vista Area	2298	2304	2275	2226	1996	1974	1937	1887	1835
COLORADO									
Camp West	1388	1399	1355	1306	1111	1090	1091	1041	1090
Fitzsimons AMC	1380	1381	1347	1298	1103	1087	1083	1033	1082

TABLE C-3 - cont

	Mobile, AL	Pascagoula, MS	Gulfport, MS	New Orleans, LA	Port Arthur, TX	Beaumont, TX	Galveston, TX	Houston, TX	Corpus Christi, TX
COLORADO - cont									
Fort Carson	1325	1328	1293	1243	1048	1027	1028	978	1027
Lowery AFB	1384	1385	1352	1302	1107	1086	1087	1037	1088
Peterson AFB	1334	1335	1302	1252	1057	1036	1037	987	1036
Pueblo Depot	1289	1290	1356	1207	1012	991	992	942	991
Rocky Mtn Arsenal	1386	1387	1354	1304	1109	1088	1089	1039	1088
WASH DC									
Bolling AFB	963	1003	1036	1093	1320	1325	1397	1412	1625
Fort McNair	959	999	1032	1089	1316	1321	1393	1408	1621
Walter Reed AMC	965	1005	1038	1095	1322	1327	1399	1414	1627
FLORIDA									
Camp Blanding	397	429	480	548	782	787	859	874	1087
Def Fuel SP, Jack	414	446	497	565	799	804	876	891	1104
Def Fuel SP, PC	162	194	235	313	547	552	624	639	852
Eglin AFB	106	138	179	257	491	496	568	583	796
Homestead AFB	738	780	811	889	1123	1128	1200	1215	1428
MacDill AFB	487	519	560	638	872	897	949	964	1177
Cecil Fld NAS	407	439	480	558	792	797	869	884	1097
Jacksonville NAS	414	446	487	565	799	804	876	891	1104
Pensacola NAS	68	100	141	219	453	458	530	545	758
Key West NAS	859	891	932	1010	1244	1249	1321	1326	1549
Mayport Naval Station	435	467	508	586	820	825	897	912	1125
Orlando NTC	494	526	567	645	879	884	956	971	1184
Patrick AFB	551	583	624	702	936	941	1013	1028	1241
Tyndall AFB	162	194	247	325	559	564	636	651	864
Whiting Fld NAS	84	116	157	235	468	474	546	561	774
GEORGIA									
Def Fuel SP, Atlanta	337	369	410	488	719	724	796	811	1024
Dobbins AFB	350	382	423	498	725	730	802	817	1030
Fort Benning	272	304	345	423	657	662	734	749	962
Fort Gillem	329	361	402	480	714	719	791	806	1019
Fort Gordon	476	508	550	627	860	865	937	952	1165
Fort McPherson	334	366	407	485	719	724	796	811	1024
Fort Stewart	442	474	515	593	827	832	904	919	1132

TABLE C-3 - cont

	Mobile, AL	Pascagoula, MS	Gulfport, MS	New Orleans, LA	Port Arthur, TX	Beaumont, TX	Galveston, TX	Houston, TX	Corpus Christi, TX
<u>GEORGIA - cont</u>									
Hunter AAF	481	513	554	632	866	871	943	958	1171
USMC Log Base	290	322	364	441	675	680	752	767	980
Moody AFB	329	361	402	480	714	719	791	806	1019
Marietta NAS	347	379	420	495	722	727	799	814	1027
Kings Bay NSB	451	483	524	602	836	841	913	928	1141
Brunswick NAS	435	467	508	586	820	825	897	912	1125
Robins AFB	374	406	447	525	759	764	836	851	1064
<u>IDAHO</u>									
Gowen Field	2182	2214	2150	2100	1905	1884	1848	1798	1809
Mtn Home AFB	2146	2178	2114	2064	1869	1848	1812	1762	1773
<u>ILLINOIS</u>									
Army Area SUPCOM	867	896	890	934	1033	1038	1110	1085	1310
Fort Sheridan	884	913	918	961	1060	1065	1137	1112	1325
Joliet AAP	849	878	872	927	1015	1020	1092	1067	1262
Glenview NAS	886	915	910	964	1052	1057	1129	1104	1329
Great Lakes NSD	902	931	926	980	1068	1073	1145	1120	1345
Great Lakes NTC	902	931	926	980	1068	1073	1145	1120	1345
Rock Island Ars	871	900	882	909	1008	1013	1085	1060	1283
St. Louis ASC	643	672	653	691	779	784	856	831	1056
Savanna Depot	898	927	907	898	1028	1019	1094	1053	1267
Scott AFB	637	666	661	701	800	805	877	852	1077
<u>INDIANA</u>									
Camp Attebury	699	734	758	787	933	920	1010	1001	1214
Crane Ammo Actv	633	692	722	766	877	882	954	933	1157
Fort B. Harrison	748	821	792	849	956	961	1033	1024	1249
Grissom AFB	802	831	847	892	1009	1014	1086	1077	1290
Indiana AAP	634	663	652	708	798	801	958	866	1176
Crane NWC	663	692	722	766	877	882	954	933	1157
Newport AAP	735	764	771	816	917	949	994	972	1185
<u>IOWA</u>									
Camp Dodge	982	999	970	1007	937	916	982	932	1120
Iowa AAP	850	841	862	899	987	992	1064	1023	1220

TABLE C-3 - cont

	Mobile, AL	Pascagoula, MS	Gulfport, MS	New Orleans, LA	Port Arthur, TX	Beaumont, TX	Galveston, TX	Houston, TX	Corpus Christi, TX
KANSAS									
Fort Leavenworth	865	859	836	871	762	741	807	757	945
Fort Riley	954	955	926	941	787	766	771	721	887
Kansas AAP	776	777	748	771	667	576	642	592	768
McConnell AFB	885	886	857	825	671	650	655	605	771
Sunflower AAP	1038	1039	1010	978	824	803	808	758	924
KENTUCKY									
Fort Campbell	501	536	533	580	702	707	779	784	1009
Fort Knox	597	632	641	698	844	849	921	926	1151
Lexington Depot	597	632	641	698	844	849	921	926	1151
LOUISIANA									
Barksdale AFB	402	376	366	316	236	215	191	241	454
Camp Beauregard	316	255	245	206	152	157	229	244	469
England AFB	320	259	249	199	155	160	232	247	460
Fort Polk	367	406	296	246	120	125	197	212	425
Louisiana AAP	402	368	358	320	232	223	309	249	472
MAINE									
Camp Keyes	1558	1598	1632	1696	1912	1917	1989	2004	2228
Loring AFB	1808	1848	1881	1935	2162	2167	2239	2254	2467
Brunswick NAS	1525	1565	1599	1652	1879	1884	1956	1971	2184
MARYLAND									
Aberdeen PG	1025	1065	1099	1166	1382	1387	1459	1474	1687
Andrews AFB	969	1009	1042	1110	1326	1331	1403	1418	1631
Edgewood Ars	1019	1059	1092	1149	1376	1381	1453	1468	1681
Fort Richie	997	1037	1047	1092	1319	1324	1396	1411	1624
Fort Detrick	978	1018	1040	1096	1312	1317	1389	1404	1617
Fort Holabird	1000	1040	1073	1130	1357	1362	1434	1449	1662
Fort Meade	986	1026	1059	1116	1343	1348	1420	1435	1648
Bethesda NMC	960	1000	1033	1090	1317	1322	1394	1409	1622
Pax River NAS	971	1011	1044	1122	1353	1358	1430	1445	1658
MASSACHUSETTS									
Fort Devens	1386	1426	1460	1513	1740	1745	1817	1832	2045
Hanscom AFB	1396	1436	1469	1523	1750	1755	1827	1842	2055

TABLE C-3 - cont

	Mobile, AL	Pascagoula, MS	Gulfport, MS	New Orleans, LA	Port Arthur, TX	Beaumont, TX	Galveston, TX	Houston, TX	Corpus Christi, TX
MASS - cont									
S Weymouth NAS	1401	1441	1474	1528	1755	1760	1832	1847	2060
Otis AFB	1430	1470	1503	1557	1784	1789	1861	1876	2089
Westover AFB	1330	1370	1403	1457	1684	1689	1761	1776	1989
MICHIGAN									
Tank-Auto Cmd	980	1020	1025	1070	1227	1232	1304	1306	1519
Camp Grayling	1131	1171	1176	1221	1332	1337	1409	1384	1597
Detroit Arsenal	980	1020	1025	1070	1227	1232	1304	1306	1519
K.I. Sawyer AFB	1243	1283	1267	1310	1409	1420	1486	1461	1680
USA Stg Fac	1011	1041	1056	1101	1258	1263	1335	1332	1545
Michigan AMP	980	1020	1025	1070	1227	1232	1304	1306	1519
Army Eng Plant	1024	1052	1028	1082	1170	1175	1247	1222	1447
Mt Clemens NAF	995	1035	1040	1085	1237	1242	1319	1321	1534
Selfridge ANGB	1007	1048	1052	1097	1254	1259	1331	1333	1546
Wurtsmith AFB	1151	1192	1196	1241	1376	1381	1453	1443	1656
MINNESOTA									
Camp Ripley	1292	1322	1299	1325	1273	1252	1318	1268	1444
Fort Snelling	1184	1214	1191	1217	1179	1158	1224	1174	1350
Twin Cities AAP	1193	1223	1200	1226	1174	1153	1219	1169	1345
MISSISSIPPI									
Camp Shelby	97	92	69	120	354	359	431	446	659
Columbus AFB	233	280	257	302	521	526	598	613	826
Keesler AFB	60	35	12	91	325	319	402	417	630
Mississippi AAP	124	85	62	45	291	304	361	383	604
Meridian NAS	154	201	178	223	450	455	527	542	755
Nav Const Bn Ctr	74	24	-	80	313	320	390	405	618
MISSOURI									
Camp Clark	751	762	746	769	665	644	710	660	836
Fort Leonard Wood	676	691	664	690	719	712	788	738	939
Gateway AAP	643	681	654	680	779	784	856	831	1044
Lake City AAP	824	832	996	819	741	720	786	736	912
R-Gebaur AFB	812	814	784	807	741	720	786	736	912
USA Spt Ctr	543	681	654	680	779	784	856	831	1044
Whiteman AFB	793	796	766	798	767	760	836	786	986

TABLE C-3 - cont

	Mobile, AL	Pascagoula, MS	Gulfport, MS	New Orleans, LA	Port Arthur, TX	Beaumont, TX	Galveston, TX	Houston, TX	Corpus Christi, TX
MONTANA									
Malmstrom AFB	2071	2065	2043	2064	1892	1871	1872	1822	1871
NEBRASKA									
Cornhusker AAP	1150	1145	1122	1099	945	924	929	879	1045
Offutt AFB	1026	1021	998	1021	894	873	939	889	1055
Sioux Army Depot	1393	1388	1365	1358	1179	1123	1163	1113	1123
NEVADA									
Hawthorne AAP	2126	2114	2094	2044	1849	1828	1792	1742	1715
Mc Lake Meade	1824	1815	1792	1742	1547	1526	1490	1440	1413
Nellis AFB	1824	1815	1792	1742	1547	1526	1490	1440	1413
NEW HAMPSHIRE									
Pease AFB	1459	1490	1523	1577	1804	1809	1881	1896	2109
NEW JERSEY									
Belle Meade GD	1162	1202	1235	1292	1599	1518	1596	1611	1818
Burlington AAP	1117	1157	1191	1247	1474	1479	1551	1566	1779
Fort Dix	1128	1168	1201	1258	1485	1490	1562	1577	1790
Fort Monmouth	1165	1205	1238	1295	1522	1527	1599	6161	1827
Camp Kilmer	1158	1198	1231	1288	1515	1520	1592	1607	1820
McGuire AFB	1128	1168	1201	1258	1485	1490	1562	1577	1790
Naval Wpns Station	1162	1202	1235	1292	1519	1524	1596	1611	1824
NEW MEXICO									
Cannon AFB	1048	1045	1016	966	761	740	703	653	664
Fort Wingate	1389	1386	1357	1307	1112	1091	1055	1005	1016
Holloman AFB	1192	1189	1160	1110	890	869	832	782	765
Kirtland AFB	1249	1246	1217	1167	972	951	915	865	876
White Sands MR	1232	1229	1200	1150	912	891	854	804	753
NEW YORK									
Army Pictorial Ctr	1183	1223	1256	1310	1537	1542	1614	1629	1842
Fort Drum	1323	1363	1384	1429	1656	1661	1733	1748	1961
Fort Hamilton	1173	1207	1246	1307	1530	1525	1600	1612	1825
Schenectady Depot	1342	1382	1415	1460	1669	1674	1746	1748	1960
Fort Wadsworth	1180	1215	1253	1307	1539	1544	1616	1632	1844

TABLE C-3 - cont

	Mobile, AL	Pascagoula, MS	Gulfport, MS	New Orleans, LA	Port Arthur, TX	Beaumont, TX	Galveston, TX	Houston, TX	Corpus Christi, TX
NEW YORK - cont									
Griffiss AFB	1324	1364	1374	1419	1577	1582	1654	1659	1872
Hancock Field	1291	1331	1336	1381	1538	1543	1615	1620	1833
Plattsburgh AFB	1481	1521	1542	1587	1785	1790	1861	1867	2080
Seneca Depot	1257	1297	1316	1349	1515	1520	1592	1594	1806
Stewart AFB	1247	1287	1320	1354	1586	1591	1663	1679	1891
Watervliet Arsenal	1330	1370	1391	1436	1663	1668	1740	1755	1968
NORTH CAROLINA									
Fort Bragg	726	766	799	877	1108	1113	1185	1200	1413
New River MCAS	799	839	872	950	1184	1189	1261	1276	1489
Cherry Pt MCAS	855	895	928	1006	1240	1245	1317	1332	1545
Camp Lejeune	806	846	879	957	1196	1196	1268	1283	1496
Pope AFB	726	766	799	877	1108	1113	1185	1200	1413
S. Johnson AFB	787	827	860	938	1169	1174	1246	1261	1474
NORTH DAKOTA									
Camp Grafton	1597	1620	1575	1598	1496	1475	1536	1486	1560
Fraine Barracks	1595	1618	1567	1590	1473	1452	1457	1407	1524
Grand Forks AFB	1523	1546	1501	1531	1422	1401	1446	1412	1578
Minot AFB	1672	1695	1658	1667	1565	1558	1570	1520	1651
OHIO									
Camp Perry	953	998	1003	1048	1205	1210	1282	1284	1497
Def Const Spt Ctr	826	866	871	916	1072	1078	1150	1155	1368
Def Elect Spt Ctr	766	806	811	856	1013	1018	1090	1095	1308
Lima Tank Ctr	840	880	885	930	1087	1092	1164	1169	1382
Ravenna AAP	966	1006	1011	1056	1213	1222	1290	1295	1518
Rickenbacker Bur	821	861	866	911	1068	1073	1145	1150	1363
W-Patterson AFB	779	819	824	869	1026	1031	1103	1108	1321
OKLAHOMA									
Altus AFB	821	832	789	739	544	523	524	474	581
Fort Sill	793	795	761	711	516	495	496	446	544
McAlester AAP	649	655	624	567	413	392	458	408	584
Tinker AFB	770	772	738	688	520	499	502	452	618

TABLE C-3 - cont

	Mobile, AL	Pascagoula, MS	Gulfport, MS	New Orleans, LA	Port Arthur, TX	Beaumont, TX	Galveston, TX	Houston, TX	Corpus Christi, TX
OREGON									
Kingsley Field	2508	2531	2476	2426	2231	2210	2174	2124	2102
Roberts Field	2495	2418	2465	2415	2220	2197	2163	2113	2124
Umatilla AD Actv	2411	2434	2379	2329	2134	2111	2077	2027	2038
PENNSYLVANIA									
Army Spt Det	996	1036	1041	1086	1243	1260	1320	1325	1538
Carlisle Barracks	1031	1071	1081	1126	1353	1358	1430	1445	1658
Fed Cold Storage	1008	1048	1053	1098	1255	1260	1332	1337	1550
F. I. G.	1069	1109	1119	1164	1391	1396	1468	1483	1696
Frankford Arsenal	1098	1138	1171	1228	1455	1460	1532	1547	1760
Hayes AAP	1008	1048	1053	1098	1255	1260	1332	1337	1550
Letterkenny Depot	1006	1046	1056	1101	1328	1337	1405	1420	1633
Willow Grove NAS	1115	1145	1188	1245	1472	1477	1549	1564	1717
Phila Naval Sup	1098	1130	1171	1228	1455	1463	1532	1547	1760
New Cumb. Depot	1047	1067	1097	1142	1369	1374	1446	1461	1674
M'burg Def Dpt	1040	1070	1090	1135	1362	1367	1439	1454	1667
Scranton AAP	1158	1189	1209	1254	1481	1486	1558	1572	1786
Tobyhanna Depot	1174	1204	1224	1269	1496	1501	1573	1588	1801
USA Spt Actv	1008	1038	1053	1098	1255	1260	1332	1337	1550
RHODE ISLAND									
Quonset Pt NAS	1354	1384	1427	1481	1708	1713	1785	1800	2013
SOUTH CAROLINA									
Charleston AFB	593	623	666	744	978	983	1055	1070	1283
Charleston Depot	583	613	656	734	968	973	1045	1060	1273
Charleston NB	588	618	661	739	973	978	1050	1065	1278
Fort Jackson	557	587	630	708	941	946	1018	1033	1246
Beaufort MCAS	528	558	601	679	913	918	990	1005	1218
Parris Island	522	552	595	673	907	912	984	999	1212
Myrtle Beach AFB	673	703	746	824	1058	1063	1135	1150	1363
Charleston NSC	588	618	661	739	973	978	1050	1065	1278
Shaw AFB	587	617	660	738	971	976	1048	1063	1276
SOUTH DAKOTA									
Camp Rapid	1529	1563	1505	1526	1372	1351	1356	1306	1382
Ellsworth AFB	1524	1554	1496	1517	1363	1342	1347	1297	1389

TABLE C-3 - cont

	Mobile, AL	Pascagoula, MS	Gulfport, MS	New Orleans, LA	Port Arthur, TX	Beaumont, TX	Galveston, TX	Houston, TX	Corpus Christi, TX
TENNESSEE									
Defense Depot	380	410	369	395	494	499	571	576	789
Holston AAP	609	629	654	699	936	931	1003	1018	1231
Milan AAP	398	430	422	467	600	585	657	662	875
Memphis NAS	400	430	389	415	514	519	591	596	809
Volunteer AAP	402	412	447	492	719	724	796	811	1024
TEXAS									
Bergstrom AFB	649	634	578	528	280	259	222	172	214
Brooks AFB	676	641	605	555	307	286	249	199	142
Camp Mabry	641	606	570	520	272	251	214	164	216
Camp Stanley	676	631	605	555	307	286	249	199	145
Carswell AFB	629	633	597	547	353	331	332	282	414
Corpus Christi Dpt	690	655	619	569	321	300	263	213	-
Dyess AFB	783	789	751	701	492	471	434	384	400
Ellington AFB	477	649	406	356	108	87	35	17	230
Fort Bliss	1227	1192	1156	1106	858	837	800	750	708
Fort Hood	691	676	640	590	342	321	284	234	296
Fort S. Houston	680	645	609	559	311	290	253	203	149
Fort Walters	661	652	629	579	388	363	364	314	285
Goodfellow AFB	852	804	781	731	483	462	425	375	361
Kelly AFB	683	648	612	562	314	293	256	206	152
Lackland AFB	687	652	616	566	318	297	260	210	149
Laughlin AFB	825	790	754	704	456	435	398	348	290
Lone Star AAP	487	478	455	405	292	271	347	448	510
Longhorn AAP	434	425	402	351	266	245	303	253	438
Beeville NAS	661	626	590	540	292	271	234	184	63
Corpus Christi NAS	702	657	631	581	333	312	275	225	12
Dallas NAS	604	595	572	522	327	306	307	257	429
Kingsville NAS	709	674	638	588	340	319	282	232	40
Randolph AFB	664	629	593	543	295	274	237	187	162
Red River AD	492	483	460	410	312	291	367	317	530
Sheppard AFB	741	732	709	659	464	443	444	394	492
W Beaumont AMC	1227	1192	1156	1106	858	837	800	750	708
Reese AFB	953	944	921	871	666	645	608	558	569

TABLE C-3 - cont

	Mobile, AL	Pascagoula, MS	Gulfport, MS	New Orleans, LA	Port Arthur, TX	Beaumont, TX	Galveston, TX	Houston, TX	Corpus Christi, TX
<u>UTAH</u>									
Fort Douglas	1847	1838	1815	1765	1570	1549	1513	1463	1474
Hill AFB	1872	1863	1840	1790	1595	1574	1538	1488	1499
Tooele Depot	1865	1856	1833	1783	1588	1567	1531	1481	1492
<u>VIRGINIA</u>									
Cameron Station	958	998	1031	1088	1315	1320	1392	1407	1620
Arlington Hall	953	993	1026	1083	1310	1315	1387	1402	1615
Cheatham Annex	910	950	983	1061	1292	1297	1369	1384	1597
Def Gen Sup Dpt	864	904	937	1015	1246	1251	1323	1338	1551
Fort Belvoir	951	991	1024	1094	1321	1326	1398	1413	1626
Fort A.P. Hill	902	942	975	1053	1224	1289	1361	1376	1589
Fort Eustis	918	956	992	1069	1300	1305	1377	1392	1605
Fort Lee	851	891	924	1002	1233	1238	1310	1325	1538
Fort Myer	955	995	1028	1085	1312	1317	1389	1404	1617
Fort Monroe	920	960	993	1071	1302	1307	1379	1394	1607
Fort Picket	838	878	911	989	1220	1225	1297	1312	1525
Fort Story	922	962	995	1073	1304	1309	1381	1396	1609
Langley AFB	922	962	995	1073	1304	1309	1381	1396	1609
Quantico USMC	936	976	1009	1081	1308	1313	1385	1400	1613
Norfolk NAS	912	952	985	1063	1294	1299	1371	1386	1588
Oceana NAS	923	963	996	1074	1305	1310	1382	1397	1610
Little Creek NAB	913	953	986	1064	1295	1300	1372	1387	1600
Norfolk NAC	913	953	986	1064	1295	1300	1372	1387	1600
Yorktown NWS	918	958	991	1069	1300	1305	1377	1392	1605
Radford AAP	721	761	771	816	1043	1044	1120	1135	1348
Vint Hills FS	922	962	995	1052	1279	1284	1356	1371	1584
<u>WASHINGTON</u>									
Camp Murray	2682	2692	2654	2612	2417	2396	2360	2310	2321
Fort Lawton	2697	2689	2651	2609	2414	2393	2357	2307	2318
Fort Lewis	2695	2705	2667	2624	2430	2409	2373	2323	2334
Fairchild AFB	2402	2412	2374	2395	2221	2200	2201	2151	2197
Madigan AMC	2695	2705	2667	2625	2430	2409	2373	2323	2334
McChord AFB	2688	2698	2660	2618	2423	2402	2366	2316	2327
Bremerton NSC	2688	2698	2660	2623	2423	2402	2366	2316	2327

TABLE C-3 - cont

	Mobile, AL	Pascagoula, MS	Gulfport, MS	New Orleans, LA	Port Arthur, TX	Beaumont, TX	Galveston, TX	Houston, TX	Corpus Christi, TX
<u>WASH - cont</u>									
Seattle NSA	2684	2694	2656	2614	2419	2398	2362	2312	2323
Yakima Center	2529	2549	2507	2457	2262	2241	2205	2155	2166
<u>WISCONSIN</u>									
Badger AAP	989	999	1013	1056	1155	1160	1232	1207	1420
Fort McCoy	1049	1059	1073	1116	1215	1220	1292	1267	1480
Gen Mitchell Fld	956	966	980	1023	1122	1127	1199	1175	1387
<u>WYOMING</u>									
Camp Guernsey	1512	1522	1484	1452	1281	1260	1261	1211	1260
F.E. Warren AFB	1485	1495	1453	1403	1208	1187	1188	1138	1190

TABLE C-4
SURFACE MILEAGE BETWEEN CONUS
MILITARY ACTIVITIES AND MAJOR WEST COAST PORTS

	San Diego, CA	Long Beach, CA	Oakland, CA	Alameda, CA	San Francisco, CA	Concord, CA	Portland, OR	Tacoma, WA	Seattle, WA
ALABAMA									
Alabama AAP	2011	2056	2336	2336	2351	2336	2552	2560	2572
Anniston Depot	2050	2095	2375	2375	2390	2375	2581	2599	2601
Fort McClellan	2056	2101	2375	2375	2390	2375	2581	2599	2601
Fort Rucker	2083	2126	2462	2462	2471	2486	2698	2716	2706
Maxwell AFB	2003	2046	2380	2380	2389	2381	2610	2628	2618
Redstone Arsenal	2010	2016	2287	2287	2302	2287	2493	2511	2513
ARIZONA									
Davis-Monthan AFB	422	492	859	859	859	842	1388	1533	1563
Fort Huachuca	489	561	917	917	932	917	1455	1600	1642
Luke AFB	352	366	724	724	733	733	1254	1399	1429
USMC Air Station	184	286	642	642	657	642	1217	1362	1392
Navajo Depot	481	475	746	746	761	746	1220	1365	1360
Williams AFB	390	404	762	762	771	762	1300	1445	1475
ARKANSAS									
Blytheville AFB	1853	1845	2118	2118	2127	2118	2275	2293	2283
Camp Robinson	1665	1687	1958	1958	1973	1958	2188	2240	2242
Fort Chaffee	1536	1530	1801	1801	1816	1801	2031	2113	2115
Little Rock AFB	1681	1695	1966	1966	1977	1958	2198	2250	2240
Pine Bluff Arsenal	1684	1718	2000	2000	2000	2000	2221	2273	2263
CALIFORNIA									
Alameda Nav Fac	489	394	-	-	19	27	631	776	818
Beale AFB	554	458	138	138	141	129	551	696	726
Camp Obispo	319	221	228	228	232	249	855	1000	1042
Camp Roberts	358	260	189	189	193	210	816	961	961
Castle AFB	395	299	136	136	145	118	683	828	858
Fort Baker	498	403	13	13	6	39	634	785	815
Fort H. Liggett	393	295	165	165	169	186	798	943	973
Fort Irwin	213	166	434	434	443	401	984	1129	1159
Fort MacArthur	113	10	390	390	399	466	984	1129	1159
Fort Ord	456	360	108	108	112	129	735	880	910

TABLE C-4 - cont

	San Diego, CA	Long Beach, CA	Oakland, CA	Alameda, CA	San Francisco, CA	Concord, CA	Portland, OR	Tacoma, WA	Seattle, WA
CALIFORNIA - cont									
George AFB	149	102	402	402	411	402	952	1097	1127
Letterman AMC	501	406	16	16	9	36	637	782	824
McClellan AFB	510	414	100	100	103	77	582	727	757
USMC Air Station	84	37	409	409	418	409	998	1143	1185
29 Palms USMC	174	155	511	511	526	511	1086	1231	1261
Camp Pendleton	36	75	453	453	468	453	1042	1187	1217
Barstow USMC	181	136	404	404	421	406	956	1101	1143
San Diego USMC	-	111	489	489	498	489	1080	1223	1253
Alameda NAS	489	394	4	4	19	19	618	2823	2853
Lemoore NAS	322	226	189	189	204	189	780	925	955
Los Alamitos NAS	101	10	404	404	419	404	993	1138	1168
Miramar NAS	13	110	488	488	488	497	488	1222	1252
Moffett Fld NAS	469	374	46	46	35	68	669	81	844
Long Beach NSC	111	-	394	394	409	394	983	1128	1158
Oakland NSC	487	392	2	2	17	25	629	774	804
San Diego NSC	-	111	489	489	498	489	1078	1223	1253
Concord NWS	489	394	25	25	39	-	616	761	791
Seal Beach NWS	98	13	395	395	404	395	175	1129	1159
Norton AFB	102	73	425	425	440	425	992	1138	1168
Oakland Base	489	394	2	2	19	27	631	776	806
Presidio of Mont	452	356	116	116	120	137	743	888	918
Presidio of SF	501	405	16	16	3	33	637	782	812
Riverbank AAP	430	339	82	82	90	87	653	798	828
Sacramento Depot	502	407	90	90	101	77	576	721	751
Sharpe Depot	449	353	67	67	78	63	628	773	803
Sierra Depot	612	550	276	276	281	256	497	642	672
Tracy Def Depot	427	341	59	59	62	47	644	789	819
Travis AFB	509	414	47	47	52	34	585	730	760
Rio Vista Area	427	428	60	60	47	35	624	764	799
COLORADO									
Camp West	1086	1041	1245	1245	1254	1230	1239	1321	1323
Fitzsimons AMC	1094	1049	1253	1253	1262	1238	1246	1328	1318
Fort Carson	1082	1074	1305	1305	1308	1293	1316	1398	1388
Lowery AFB	1692	1045	1251	1251	1254	1230	1244	1326	1316

TABLE C-4 - cont

	San Diego, CA	Long Beach, CA	Oakland, CA	Alameda, CA	San Francisco, CA	Concord, CA	Portland, OR	Tacoma, WA	Seattle, WA
COLORADO - cont									
Peterson AFB	1091	1083	1313	1313	1318	1293	1311	1393	1383
Pueblo Depot	1046	1040	1304	1304	1315	1291	1336	1418	1408
Rocky Mtn Arsenal	1095	1048	1254	1254	1257	1230	1241	1323	1313
WASH DC									
Bolling AFB	2665	2669	2826	2826	2829	2801	2787	2730	2720
Fort McNair	2661	2665	2822	2822	2825	2807	2780	2726	2716
Walter Reed AMC	2661	2665	2822	2822	2825	2807	2780	2726	2716
FLORIDA									
Camp Blanding	2323	2368	2700	2714	2711	2702	2938	2956	2946
Def Fuel SP, Jack	2340	2385	2717	2731	2728	2719	2955	2973	2963
Def Fuel SP, PC	2103	2148	2480	2482	2447	2482	2774	2817	2807
Eglin AFB	2067	2090	2424	2419	2435	2419	2718	2780	2770
Homestead AFB	2679	2724	3050	3058	3067	3058	3313	3331	3321
MacDill AFB	2428	2471	2805	2799	2816	2799	3062	3080	3070
Cecil Fld NAS	2348	2391	2725	2727	2736	2727	2971	2989	2979
Jacksonville NAS	2352	2397	2729	2729	2746	2731	2967	2985	2975
Pensacola NAS	2009	2054	2386	2386	2403	2388	2680	2750	2740
Key West NAS	2800	2845	3177	3177	3194	3179	3434	3452	3442
Mayport Naval Station	2361	2406	2738	2738	2361	2740	2976	2994	2984
Orlando NTC	2435	2480	2812	2812	2823	2814	3069	3087	3077
Patrick AFB	2492	2537	2869	2869	2886	2871	3123	3141	3131
Tyndall AFB	2115	2158	2492	2492	2503	2494	2786	2829	2819
Whiting Fld NAS	2019	2073	2405	2405	2422	2407	2790	3008	2998
GEORGIA									
Def Fuel SP, Atl	2135	2180	2453	2453	2464	2455	2643	2661	2651
Dobbins AFB	2141	2184	2459	2459	2470	2460	2629	2647	2637
Fort Benning	2098	2143	2475	2475	2486	2477	2687	2705	2695
Fort Gillem	2140	2183	2462	2462	2473	2470	2652	2670	2660
Fort Gordon	2276	2319	2598	2598	2615	2600	2788	2806	2796
Fort McPherson	2135	2178	2457	2457	2468	2455	2647	2665	2655
Fort Stewart	2329	2372	2700	2700	2711	2745	2890	2908	2898
Hunter AAF	2351	2396	2703	2703	2720	2705	2893	2911	2901
USMC Log Base	2158	2203	2535	2535	2552	2537	2773	2791	2781

TABLE C-4 - cont

	San Diego, CA	Long Beach, CA	Oakland, CA	Alameda, CA	San Francisco, CA	Concord, CA	Portland, OR	Tacoma, WA	Seattle, WA
GEORGIA - cont									
Moody AFB	2240	2283	2717	2717	2628	2545	2855	2873	2863
Marietta NAS	2138	2182	2456	2456	2473	2660	2630	2648	2638
Kings Bay NSB	2351	2396	2729	2729	2745	2730	2958	2976	2966
Brunswick NAS	2322	2365	2699	2699	2710	2705	2919	2937	2927
Robins AFB	2200	2243	2552	2552	2563	2742	2742	2760	2750
IDAHO									
Gowen Field	931	870	644	644	655	631	430	512	502
Mtn Home AFB	951	904	700	700	705	671	486	568	558
ILLINOIS									
Army Area SUPCOM	2093	2048	2157	2157	2166	2142	2097	2040	2030
Fort Sheridan	2108	2061	2170	2170	2175	2157	2075	2018	2008
Joliet AAP	2066	2021	2130	2130	2139	2115	2101	2044	2034
Glenview NAS	2099	2054	2163	2163	2171	2148	2082	2025	2015
Great Lakes NSD	2116	2071	2180	2180	2189	2165	2074	2017	2007
Great Lakes NTC	2116	2071	2180	2180	2189	2165	2074	2017	2007
Rock Island Ars	1927	1882	1989	1989	2000	1976	1971	1934	1924
St. Louis ASC	1858	1852	2100	2100	2109	2085	2086	2104	2094
Savanna Depot	1958	1913	2009	2009	2017	1993	1960	1903	1893
Scott AFB	1897	1873	2121	2121	2130	2106	2107	2125	2115
INDIANA									
Camp Attebury	2120	2112	2320	2320	2325	2301	2302	2261	2251
Crane Ammo Actv	2103	2097	2342	2342	2354	2332	2331	2349	2339
Fort B. Harrison	2115	2109	2292	2292	2301	2277	2272	2221	2211
Grissom AFB	2151	2143	2273	2273	2276	2252	2234	2177	2167
Indiana AAP	2124	2118	2366	2366	2375	2351	2352	2346	2336
Crane NWC	2103	2097	2342	2342	2354	2332	2331	2349	2339
Newport AAP	2053	2047	2257	2257	2266	2242	2237	2227	2217
IOWA									
Camp Dodge	1757	1712	1821	1821	1824	1806	1801	1776	1766
Iowa AAP	1898	1861	1970	1970	1979	1955	1950	1946	1936
KANSAS									
Fort Leavenworth	1609	1603	1828	1828	1609	1814	1809	1841	1831
Fort Riley	1482	1474	1718	1718	1723	1718	1713	1794	1785

TABLE C-4 - cont

	San Diego, CA	Long Beach, CA	Oakland, CA	Alameda, CA	San Francisco, CA	Concord, CA	Portland, OR	Tacoma, WA	Seattle, WA
KANSAS - cont									
Kansas AAP	1544	1538	1809	1809	1824	1809	1872	1954	1944
McConnell AFB	1423	1415	1688	1688	1697	1756	1751	1833	1823
Sunflower AAP	1597	1591	1835	1835	1844	1820	1825	1843	1833
KENTUCKY									
Fort Campbell	2009	2015	2286	2286	2301	2286	2347	2365	2355
Fort Knox	2140	2134	2383	2383	2392	2368	2369	2367	2357
Lexington Depot	2187	2181	2429	2429	2438	2414	2415	2409	2399
LOUISIANA									
Barksdale AFB	1543	1586	1920	1920	1931	1918	2214	2296	2286
Camp Beauregard	1664	1709	2043	2043	2058	2043	2335	2417	2407
England AFB	1660	1703	2037	2037	2048	2043	2331	2413	2403
Fort Polk	1653	1690	2030	2030	2041	2034	2324	2466	2396
Louisiana AAP	1551	1596	1928	1928	1939	1930	2222	2304	2294
MAINE									
Camp Keyes	3183	3154	3263	3263	3272	3248	3033	2976	2966
Loring AFB	3315	3388	3377	3377	3382	3358	3124	3047	3057
Brunswick NAS	3150	3121	3230	3230	3239	3215	3020	2963	2953
MARYLAND									
Aberdeen PG	2727	2722	2853	2853	2862	2838	2814	2757	2747
Andrews AFB	2671	2677	2832	2832	2841	2817	2793	2736	2726
Edgewood Ars	2721	2716	2845	2845	2856	2832	2808	2751	2741
Fort Richie	2646	2638	2769	2769	2774	2749	2732	2675	2665
Fort Detrick	2657	2651	2780	2780	2791	2767	2743	2686	2676
Fort Holabird	2702	2700	2829	2829	2840	2818	2792	2735	2725
Fort Meade	2688	2694	2836	2836	2841	2823	2799	2742	2732
Bethesda NMC	2662	2668	2812	2812	2821	2797	2773	2716	2706
Pax River NAS	2706	2712	2882	2882	2893	2869	2845	2788	2778
MASSACHUSETTS									
Fort Devens	3025	2998	3105	3105	3116	3092	3022	2965	2955
Hanscom AFB	3025	3018	3127	3127	3132	3114	3036	2979	2969
S Weymouth NAS	3040	3031	3138	3138	3149	3125	3058	3001	2991
Otis AFB	2966	2937	3044	3044	3055	3031	2961	2904	2894
Westover AFB	2966	2937	3044	3044	3055	3031	2961	2904	2894

TABLE C-4 - cont

	San Diego, CA	Long Beach, CA	Oakland, CA	Alameda, CA	San Francisco, CA	Concord, CA	Portland, OR	Tacoma, WA	Seattle, WA
<u>MICHIGAN</u>									
Tank-Auto Cmd	2350	2305	2412	2412	2423	2399	2354	2309	2299
Camp Grayling	2407	2362	2469	2469	2480	2413	2423	2366	2356
Detroit Arsenal	2350	2305	2412	2412	2423	2399	2354	2309	2299
K.I. Sawyer AFB	2332	2287	2286	2286	2297	2336	1932	1875	1865
USA Stg Fac	2357	2312	2419	2419	2430	2406	2364	2307	2297
Michigan AMP	2350	2305	2412	2412	2423	2399	2354	2309	2299
Army Eng Plant	2247	2202	2309	2309	2314	2296	2260	2193	2203
Mt Clemens NAF	2365	2220	2427	2427	2438	2414	2369	232 +	2314
Selfridge ANGB	2377	2305	2441	2441	2444	2399	2385	2328	2318
Wurtsmith AFB	2468	2421	2532	2532	2535	2520	2251	2194	2184
<u>MINNESOTA</u>									
Camp Ripley	1977	1932	1991	1991	1978	1976	1635	1538	1528
Fort Snelling	1963	1918	1975	1975	1980	1962	1691	1634	1624
Twin Cities AAP	1958	1911	1970	1970	1975	1957	1682	1625	1615
<u>MISSISSIPPI</u>									
Camp Shelby	1844	1887	2221	2221	2232	2225	2515	2585	2575
Columbus AFB	1906	1946	2231	2231	2242	2223	2445	2463	2453
Keesler AFB	1903	1946	2297	2297	2308	2358	2591	2665	2655
Mississippi AAP	1869	1914	2315	2315	2286	2258	2570	2631	2621
Meridian NAS	1866	1911	2245	2245	2254	2245	2520	2538	2528
Nav Const Bn Ctr	1891	1936	2285	2285	2302	2287	2579	2653	2643
<u>MISSOURI</u>									
Camp Clark	1588	1740	1851	1851	1878	1863	1916	1906	1896
Fort Leonard Wood	1725	1717	1988	1988	1999	2010	2056	2074	2064
Gateway AAP	1858	1852	2098	2098	2109	2085	2086	2104	2094
Lake City AAP	1610	1604	1846	1846	1851	1863	1834	1852	1842
R-Gebaur AFB	1607	1599	1850	1850	1855	1863	1845	1872	1862
USA Spt Center	1858	1852	2098	2098	2109	2085	2086	2104	2094
Whiteman AFB	1681	1673	1921	1921	1926	1920	1909	1927	1917
<u>MONTANA</u>									
Malmstrom AFB	1330	1283	1164	1164	1169	1175	719	662	652

TABLE C-4 - cont

	San Diego, CA	Long Beach, CA	Oakland, CA	Alameda, CA	San Francisco, CA	Concord, CA	Portland, OR	Tacoma, WA	Seattle, WA
NEBRASKA									
Cornhusker AAP	1484	1439	1546	1546	1557	1563	1528	1576	1566
Offutt AFB	1611	1570	1679	1679	1690	1666	1661	1674	1664
Sioux Army Depot	1273	1180	1288	1288	1290	1304	1267	1349	1339
NEVADA									
Hawthorne AAP	473	411	346	346	351	366	668	813	803
Mc Lake Meade	339	292	559	559	570	552	988	1133	1123
Nellis AFB	339	292	559	559	570	552	988	1133	1123
NEW HAMPSHIRE									
Pease AFB	3080	3054	3158	3158	3163	3148	3021	2964	2954
NEW JERSEY									
Belle Meade GD	2811	2805	2934	2934	2945	2912	2897	2840	2830
Burlington AAP	2781	2775	2904	2904	2909	2891	2867	2810	2800
Fort Dix	2787	2779	2910	2910	2915	2897	2873	2816	2806
Fort Monmouth	2822	2816	2945	2945	2956	2932	2908	2851	2841
Camp Kilmer	2802	2796	2925	2925	2936	2912	2883	2826	2816
McGuire AFB	2787	2781	2910	2910	2915	2847	2873	2816	2806
Naval Wpns Station	2819	2813	2942	2942	2947	2929	2905	2848	2838
NEW MEXICO									
Cannon AFB	991	1010	1281	1281	1292	1289	1575	1657	1647
Fort Wingate	666	658	929	929	940	933	1245	1327	1317
Holloman AFB	749	792	1150	1150	1159	1158	1603	1685	1675
Kirtland AFB	808	798	1071	1071	1088	1072	1387	1469	1459
White Sands MR	717	762	1116	1116	1133	1092	1626	1708	1698
NEW YORK									
Army Pictorial Ctr	2822	2816	2929	2929	2940	2916	2883	2826	2816
Fort Drum	2882	2853	2960	2960	2965	2947	2877	2820	2810
Fort Hamilton	2826	2822	2950	2950	2959	2928	2911	2847	2837
Schenectady Depot	2866	2862	2944	2944	2953	2932	2856	2792	2781
Fort Wadsworth	2823	2817	2947	2947	2950	2924	2908	2843	2833
Griffiss AFB	2780	2740	2858	2858	2863	2843	2794	2737	2727
Hancock Field	2741	2710	2819	2819	2824	2805	2755	2698	2688
Plattsburgh AFB	2945	2898	3011	3011	3012	2988	2789	2732	2722
Seneca Depot	2712	2706	2790	2790	2793	2769	2723	2659	2649

TABLE C-4 - cont

	San Diego, CA	Long Beach, CA	Oakland, CA	Alameda, CA	San Francisco, CA	Concord, CA	Portland, OR	Tacoma, WA	Seattle, WA
NEW YORK - cont									
Stewart AFB	2897	2845	2935	2935	2938	2916	2895	2831	2820
Watervliet Ars	2882	2851	2960	2960	2965	2941	2877	2820	2810
NORTH CAROLINA									
Fort Bragg	2520	2526	2795	2795	2812	2797	2893	2852	2842
New River MCAS	2611	2643	2643	2643	2931	2916	3012	2971	2961
Cherry Pt MCAS	2647	2653	2922	2922	2939	2924	3020	2979	2969
Camp Lejeune	2618	2648	2917	2917	2928	2919	3015	2974	2964
Pope AFB	2520	2524	2795	2795	2806	2812	2893	2852	2842
S Johnson AFB	2573	2577	2848	2848	2859	2865	2946	2905	2895
NORTH DAKOTA									
Camp Grafton	1839	1794	1793	1793	1804	1780	1379	1322	1312
Fraine Barracks	1658	1613	1612	1612	1627	1599	1258	1201	1191
Grand Forks AFB	1925	1878	1839	1839	1844	1840	1452	1395	1385
Minot AFB	1732	1699	1645	1645	1656	1632	1257	1200	1190
OHIO									
Camp Perry	2352	2307	2414	2414	2425	2401	2368	2311	2301
Def Const Spt Ctr	2286	2280	2448	2448	2459	2435	2411	2354	2344
Def Elect Spt Ctr	2217	2211	2395	2395	2406	2382	2377	2322	2312
Lima Tank Ctr	2252	2233	2340	2340	2351	2327	2303	2246	2236
Ravenna AAP	2405	2386	2492	2492	2498	2480	2456	2399	2389
Rickenbacker Bur	2289	2281	2455	2455	2460	2435	2418	2361	2351
W-Patterson AFB	2224	2216	2402	2402	2407	2389	2381	2324	2314
OKLAHOMA									
Altus AFB	1244	1269	1538	1538	1555	1540	1828	1910	1900
Fort Sill	1314	1329	1598	1598	1609	1600	1888	1970	1960
McAlester AAP	1474	1483	1754	1754	1765	1745	2013	2095	2085
Tinker AFB	1360	1352	1623	1623	1634	1617	1883	1965	1955
Vance AFB	1382	1374	1645	1645	1656	1651	1797	1879	1869
OREGON									
Kingsley Field	809	713	360	360	365	350	289	434	464
Roberts Field	962	866	513	513	518	503	144	281	301
Umatilla AD Actv	1181	1119	845	845	850	832	188	280	259

TABLE C-4 - cont

	San Diego, CA	Long Beach, CA	Oakland, CA	Alameda, CA	San Francisco, CA	Concord, CA	Portland, OR	Tacoma, WA	Seattle, WA
PENNSYLVANIA									
Army Spt Det	2460	2454	2565	2565	2576	2552	2528	2471	2461
Carlisle Barracks	2642	2636	2765	2765	2776	2752	2728	2671	2661
Fed Cold Storage	2472	2466	2577	2577	2588	2564	2540	2483	2472
F. I. G.	2676	2670	2799	2799	2804	2786	2762	2705	2695
Frankford Arsenal	2759	2753	2882	2882	2893	2869	2845	2788	2778
Hayes AAP	2472	2466	2577	2577	2588	2564	2540	2483	2473
Letterkenny Depot	2627	2619	2750	2750	2755	2705	2713	2656	2646
Willow Grove NAS	2757	2751	2880	2880	2885	2867	2843	2786	2776
Phila Naval Sup	2759	2753	2887	2887	2887	2869	2845	2788	2778
New Cumb. Depot	2654	2648	2777	2777	2782	2764	2740	2683	2673
M'burg Def Dpt	2647	2641	2770	2770	2775	2757	2733	2676	2666
Scranton AAP	2744	2727	2834	2834	2839	2821	2788	2731	2721
Tobyhanna Depot	2763	2740	2849	2849	2854	2829	2803	2746	2736
USA Spt Actv	2472	2466	2517	2517	2588	2564	2540	2483	2473
RHODE ISLAND									
Quonset Pt NAS	2993	2984	3091	3091	3096	3078	3045	2988	2978
SOUTH CAROLINA									
Charleston AFB	2420	2465	2742	2742	2759	2744	2932	2944	2934
Charleston Depot	2428	2473	2750	2750	2767	2752	2940	2952	2942
Charleston NB	2423	2468	2745	2745	2762	2747	2935	2947	2937
Fort Jackson	2357	2400	2679	2679	2690	2676	2842	2851	2841
Beaufort MCAS	2398	2443	2727	2727	2744	2729	2917	2935	2925
Parris Island	2392	2437	2740	2740	2751	2742	2930	2948	2938
Myrtle Beach AFB	2495	2538	2817	2817	2828	2823	2977	2969	2959
Charleston NSC	2423	2468	2745	2745	2762	2747	2935	2947	2937
Shaw AFB	2381	2430	2709	2709	2720	2747	2872	2881	2871
SOUTH DAKOTA									
Camp Rapid	1390	1345	1402	1402	1407	1389	1210	1153	1143
Ellsworth AFB	1410	1354	1413	1413	1418	1389	1217	1160	1150
TENNESSEE									
Defense Depot	1801	1807	2076	2076	2087	2078	2284	2302	2292
Holston AAP	2271	2277	2546	2546	2548	2548	2667	2676	2666
Milan AAP	1876	1882	2151	2151	2153	2153	2359	2377	2367

TABLE C-4 - cont

	San Diego, CA	Long Beach, CA	Oakland, CA	Alameda, CA	San Francisco, CA	Concord, CA	Portland, OR	Tacoma, WA	Seattle, WA
TENNESSEE - cont									
Memphis NAS	1821	1827	2086	2086	2098	2098	2304	2322	2312
Volunteer AAP	2113	2119	2388	2388	2390	2390	2526	2544	2534
TEXAS									
Bergstrom AFB	1330	1373	1729	1729	1723	1723	2082	2164	2154
Brooks AFB	1306	1349	1705	1705	1700	1700	2101	2183	2173
Camp Mabry	1322	1367	1721	1721	1738	1723	2074	2156	2146
Camp Stanley	1299	1344	1698	1698	1715	1700	2094	2176	2166
Carswell AFB	1315	1358	1698	1698	1709	1700	1992	2074	2064
Corpus Christi Depot	1444	1489	1843	1843	1860	1845	2239	2321	2311
Dyess AFB	1160	1203	1552	1552	1563	1558	1846	1928	1918
Ellington AFB	1503	1546	1902	1902	1913	1887	2245	2327	2317
Fort Bliss	740	783	1139	1139	1150	1134	1655	1737	1727
Fort Hood	1321	1364	1720	1720	1731	1722	2034	2116	2106
Fort S. Houston	1303	1348	1702	1702	1719	1704	2098	2180	2170
Fort Walters	1280	1325	1658	1658	1675	1660	1952	2032	2022
Goodfellow AFB	1140	1183	1539	1539	1550	1537	1878	1960	1950
Kelly AFB	1306	1349	1705	1705	1716	1700	2101	2183	2173
Lackland AFB	1307	1350	1706	1706	1717	1700	2102	2184	2174
Laughlin AFB	1166	1209	1565	1565	1576	1567	1969	2051	2041
Lone Star AAP	1520	1562	1557	1557	1906	1891	2149	2231	2221
Longhorn AAP	1512	1557	1889	1889	1900	1891	2180	2265	2255
Beeville NAS	1401	1466	1800	1800	1811	1802	2196	2278	2268
Corpus Christi NAS	1456	1501	1855	1855	1872	1857	2251	2333	2323
Dallas NAS	1341	1386	1718	1718	1735	1720	2012	2094	2084
Kingsville NAS	1459	1504	1858	1858	1869	1860	2254	2336	2326
Randolph AFB	1318	1353	1709	1709	1720	1700	2105	2187	2177
Red River AD	1517	1557	1842	1842	1853	1862	2136	2218	2208
Sheppard AFB	1262	1302	1581	1581	1592	1584	1875	1957	1947
W Beaumont AMC	733	778	1122	1122	1143	1134	1648	1730	1720
Reese AFB	1062	1102	1385	1385	1396	1389	1679	1761	1751
UTAH									
Fort Douglas	752	705	741	741	752	728	765	847	837
Hill AFB	777	730	766	766	771	763	740	822	812
Tooele Depot	760	713	730	730	735	720	802	884	874

TABLE C-4 - cont

	San Diego, CA	Long Beach, CA	Oakland, CA	Alameda, CA	San Francisco, CA	Concord, CA	Portland, OR	Tacoma, WA	Seattle, WA
VIRGINIA									
Cameron Station	2660	2664	2827	2827	2832	2809	2790	2733	2723
Arlington Hall	2625	2659	2821	2821	2826	2809	2784	2727	2717
Cheatham Annex	2654	2660	2929	2929	2946	2925	2920	2877	2867
Def Gen Sup Dpt	2614	2620	2889	2889	2906	2885	2880	2837	2827
Fort Belvoir	2666	2672	2836	2836	2841	2823	2799	2742	2732
Fort A.P. Hill	2646	2652	2921	2921	2938	2917	2912	2869	2859
Fort Eustis	2662	2668	2937	2937	2954	2933	2928	2885	2875
Fort Lee	2617	2633	2894	2894	2909	2894	2895	2852	2842
Fort Myer	2657	2661	2822	2822	2833	2809	2785	2728	2718
Fort Monroe	2680	2684	2955	2955	2972	2951	2946	2903	2893
Fort Picket	2567	2573	2842	2842	2853	2844	2867	2826	2816
Fort Story	2691	2645	2966	2966	2977	2968	2968	2925	2915
Langley AFB	2679	2683	2954	2954	2965	2951	2945	2902	2892
Quantico USMC	2653	2657	2849	2849	2860	2836	2812	2755	2745
Norfolk NAS	2681	2685	2956	2956	2973	2958	2958	2915	1905
Oceana NAS	2692	2698	2967	2967	2984	2969	2974	2931	2921
Little Creek NAB	2682	2685	2957	2957	2968	2959	2956	2913	2903
Norfolk NAC	2681	2687	2956	2956	2973	2958	2915	2905	2905
Yorktown NWS	2662	2668	2937	2937	2954	2933	2928	2885	2875
Radford AAP	2388	2394	2663	2663	2680	2665	2705	2664	2654
Vint Hills FS	2624	2628	2834	2834	2839	2824	2797	2740	2730
WASHINGTON									
Camp Murray	1224	1128	774	774	785	761	145	13	32
Fort Lawton	1260	1164	811	811	816	791	182	39	7
Fort Lewis	1208	1112	759	759	764	761	130	15	45
Fairchild AFB	1290	1228	878	878	883	863	354	294	284
Madigan AMC	1208	1113	759	759	770	746	130	15	45
McChord AFB	1217	1122	768	768	779	755	139	8	38
Bremerton NSC	1256	1161	807	807	818	794	178	33	16
Seattle NSA	1265	1170	816	816	823	803	187	44	5
Yakima Center	1158	1063	709	709	720	696	185	155	145

TABLE C-4 - cont

	San Diego, CA	Long Beach, CA	Oakland, CA	Alameda, CA	San Francisco, CA	Concord, CA	Portland, OR	Tacoma, WA	Seattle, WA
<u>WISCONSIN</u>									
Badger AAP	2051	2006	2063	2063	2074	2050	1854	1799	1789
Fort McCoy	2118	2073	2180	2180	2191	2167	2024	1967	1957
<u>WYOMING</u>									
Camp Guernsey	1240	1195	1252	1252	1263	1239	1192	1121	1211
F.E. Warren AFB	1171	1124	1183	1183	1188	1172	1165	1247	1237

APPENDIX D

DISTANCE BETWEEN PORTS

TABLE D-1
DISTANCE BETWEEN PORTS (NAUTICAL MILES)

Port of Debarkation	Port of Embarkation (CONUS)			
	Seattle WA	San Francisco CA	San Diego CA	Galveston ¹ TX
Alaska, Kodiack	1,257	1,693	2,121	6,459
Albania, Durrës	9,721	8,946	8,544	6,071
Algeria, Oran	9,624	7,849	7,447	4,974
Argentina, Buenos Aires	9,449	8,674	8,272	6,419
Australia, Sydney	6,810	6,448	6,530	9,226
Azores, Ponta Delgada	7,443	6,668	6,266	3,750
Bangladesh, Chittagong	8,651	8,942	9,254	11,404
Belgium, Antwerp	8,847	8,082	7,680	4,989
Bermuda, Hamilton	5,723	4,948	4,546	1,864
Brazil, Rio de Janeiro	8,431	7,656	7,254	5,360
British Honduras, Belize	4,880	4,105	3,703	935
Burma, Rangoon	8,252	8,534	8,921	11,388
Chile, Valparaíso	5,916	5,140	4,738	4,168
China, Shanghai	5,220	5,502	5,793	10,351
Colombia, Buenaventura	4,158	3,383	2,981	1,904
Costa Rica, Limón	4,254	3,479	3,077	1,394
Crete, Souda Bay	9,567	8,792	8,390	6,201
Cuba, Guantanamo	4,753	3,978	3,578	1,278
Cyprus, Famagusta	10,363	9,588	9,186	6,713
Denmark, Copenhagen	9,409	8,634	8,232	5,541
Diego Garcia	9,370	9,652	10,039	10,181
Djibouti, Djibouti	11,608	10,913	10,511	8,024
Dom. Rep., Santo Domingo	4,866	4,091	3,689	1,625
Egypt, Port Said	10,315	9,540	9,138	6,665
El Salvador, Acajutla	3,221	2,446	2,044	2,385
England, Liverpool	8,705	7,930	7,528	4,837
France, Le Havre	8,672	7,897	7,495	4,803
France, Marseilles	9,083	8,308	7,906	5,433
Finland, Helsinki	10,110	9,325	8,923	6,232
French Guiana, Cayenne	6,329	5,554	5,152	2,875
Germany, Bremerhaven	9,065	8,290	7,888	5,187
Greece, Piraeus	9,840	9,105	8,703	6,230
Guam, Apra	4,948	5,053	5,379	9,450
Guatemala, Puerto Barrios	4,887	4,112	3,710	1,041
Guiana, Georgetown	5,579	4,804	4,402	2,542
Hawaii, Honolulu	2,409	2,091	2,278	7,237
Hong Kong	5,768	6,044	6,432	10,819
Honduras, Puerto Cortez	4,796	4,021	3,619	1,001
Iceland, Reykjavik	8,162	7,387	6,985	4,228
India, Bombay	9,584	9,866	10,254	9,714
Iran, Bandar Abbas	13,156	12,381	11,979	9,492
Iran, Bander-E-Khūmeini	13,363	12,861	12,459	9,972
Iran, Bushehr	10,880	11,162	11,549	9,671

TABLE D-1 - cont

Port of Debarkation	Port of Embarkation (CONUS)			
	Seattle WA	San Francisco CA	San Diego CA	Galveston ¹ TX
Iran, Chah Bahar	12,940	12,165	11,763	9,276
Israel, Haifa	10,403	9,628	9,226	6,753
Italy, Livorno	9,295	8,520	8,118	5,609
Jamaica, Kingston	4,614	3,839	3,437	1,246
Japan, Yokohama	4,254	4,536	4,923	9,234
Kenya, Mombasa	11,130	11,412	11,799	9,671
Korea, Pusan	4,919	5,201	5,512	10,422
Kuwait	10,976	11,258	11,645	9,903
Lebanon, Beirut	10,406	9,631	9,229	6,756
Malaysia, Penang	7,429	8,102	8,103	11,398
Malta, Marsaxlokk	9,389	8,614	8,212	5,739
Marshall Islands, Jaluit	4,296	4,150	4,394	8,218
Mexico, Veracruz	5,484	4,709	4,307	623
Morocco, Casablanca	8,372	7,597	7,195	4,722
Netherlands, Rotterdam	8,862	8,096	7,685	5,192
New Zealand, Auckland	6,170	5,680	5,655	8,068
Nicaragua, Corinto	3,388	2,613	2,211	2,235
Norway, Oslo	9,355	8,580	8,178	5,487
Pakistan, Karachi	10,025	10,307	10,694	9,530
Panama, Colon	4,064	3,289	2,887	1,508
Peru, Callao	4,764	3,989	3,585	2,902
Philippines, Manila	6,828	6,299	6,604	10,922
Portugal, Lisbon	8,216	7,441	7,039	4,539
Puerto Rico, San Juan	5,056	4,281	3,879	1,715
Russia, Leningrad	9,108	8,333	7,931	5,248
Ryukyu Island, Nakagusuku	5,093	5,375	5,762	10,073
Saudi Arabia, Ad Damman	10,825	11,106	11,493	9,807
Saudi Arabia, Jidda	11,036	10,261	9,859	7,372
Singapore	7,062	7,735	7,736	11,683
Somalia, Mogadishu	12,807	12,032	11,630	9,143
South Africa, Capetown	10,552	9,777	9,375	7,482
South Yemen, Aden	10,774	11,056	11,443	8,065
Spain, Rota	8,352	7,577	7,175	4,702
Sweden, Stockholm	9,968	9,193	8,791	6,110
Taiwan, Tan-shui	5,400	5,682	6,069	10,380
Thailand, Ban Satlahip	7,557	7,839	8,226	12,097
Trinidad, Port of Spain	5,223	4,448	4,046	2,213
Tunisia, Bizerte	9,141	8,366	7,640	5,491
Turkey, Iskenderun	10,426	9,653	9,249	6,776
UAE, Abu Dhabi	13,258	12,483	12,081	9,594
Uruguay, Montevideo	8,264	7,488	7,101	6,342
Venezuela, LaGuaira	4,905	4,130	3,728	1,938
Vietnam, Ho Chi Minh City	6,673	6,878	7,267	11,653
Virgin Islands, St. Thomas	5,092	4,317	3,915	1,785
Yugoslavia, Rijeka	10,020	9,245	8,843	6,410

TABLE D-1 - cont

Port of Debarkation	Port of Embarkation (CONUS)			
	Mobile AL	Jacksonville ² FL	Norfolk VA	New York NY
Alaska, Kodiack	6,321	6,467	6,730	6,925
Albania, Durrës	5,844	5,089	4,688	4,540
Algeria, Oran	4,747	3,922	3,591	3,443
Argentina, Buenos Aires	6,281	5,808	5,824	5,871
Australia, Sydney	9,088	9,234	9,497	9,692
Azores, Ponta Delgada	3,523	2,776	2,401	2,247
Bangladesh, Chittagong	11,177	10,422	10,021	9,873
Belgium, Antwerp	4,762	3,974	3,617	3,468
Bermuda, Hamilton	1,637	965	683	696
Brazil, Rio de Janeiro	5,133	4,707	4,723	4,762
British Honduras, Belize	846	1,047	1,503	1,703
Burma, Rangoon	11,161	10,406	10,005	9,857
Chile, Valparaíso	4,053	4,176	4,439	4,634
China, Shanghai	10,213	10,208	10,471	10,666
Colombia, Buenaventura	1,789	1,912	2,175	2,370
Costa Rica, Limón	1,292	1,589	1,852	2,047
Crete, Souda Bay	5,974	5,219	4,818	4,670
Cuba, Guantanamo	1,109	851	1,117	1,312
Cyprus, Famagusta	6,486	5,731	5,330	5,182
Denmark, Copenhagen	5,314	4,409	3,999	3,840
Diego Garcia	9,954	9,057	8,656	8,508
Djibouti	7,797	7,057	6,652	6,493
Dom. Rep., Santo Domingo	1,487	1,166	1,329	1,489
Egypt, Port Said	6,438	5,683	5,282	5,134
El Salvador, Acajutla	2,270	2,493	2,656	2,851
England, Liverpool	4,610	3,709	3,362	3,242
France, Le Havre	4,576	3,788	3,431	3,282
France, Marseilles	5,206	4,451	4,050	3,902
Finland, Helsinki	6,005	5,100	4,690	4,531
French Guiana, Cayenne	2,648	2,294	2,394	2,447
Germany, Bremerhaven	4,960	4,182	3,825	3,676
Greece, Piraeus	6,003	5,240	4,847	4,699
Guam, Apra	9,312	9,548	9,811	10,006
Guatemala, Puerto Barrios	950	1,144	1,603	1,804
Guiana, Georgetown	2,404	1,980	2,090	2,217
Hawaii, Honolulu	6,099	6,245	6,508	6,703
Hong Kong	10,681	10,755	11,018	11,213
Honduras, Puerto Cortes	915	1,109	1,568	1,764
Iceland, Reykjavik	4,001	2,565	2,677	2,495
India, Bombay	9,487	8,751	8,350	8,202
Iran, Bandar Abbas	9,265	8,525	8,120	7,965
Iran, Bander-E-Khomeini	9,745	9,005	8,600	8,445
Iran, Bushehr	9,444	8,689	8,288	8,140
Iran, Chah Bahar	9,049	8,309	7,904	7,749
Israel, Haifa	6,526	5,771	5,370	5,222

TABLE D-1 - cont

Port of Debarkation	Port of Embarkation (CONUS)			
	Mobile AL	Jacksonville ² FL	Norfolk VA	New York NY
Italy, Livorno	5,382	4,627	4,226	4,078
Jamaica, Kingston	1,108	1,016	1,279	1,474
Japan, Yokohama	9,096	9,242	9,505	9,700
Kenya, Mombasa	9,444	8,689	8,288	8,140
Korea, Pusan	10,284	10,430	10,693	10,888
Kuwait	9,676	8,921	8,520	8,372
Lebanon, Beirut	6,529	5,774	5,373	5,225
Malaysia, Penang	11,171	10,416	10,015	9,867
Malta, Marsaxlokk	5,512	4,757	4,356	4,208
Marshall Islands, Jaluit	8,080	8,226	8,489	8,684
Mexico, Veracruz	825	1,315	1,789	1,989
Morocco, Casablanca	4,495	3,740	3,339	3,191
Netherlands, Rotterdam	4,965	3,979	3,622	3,473
New Zealand, Auckland	7,930	8,076	8,339	8,534
Nicaragua, Corinto	2,320	2,243	2,506	2,701
Norway, Oslo	5,257	4,333	3,923	3,764
Pakistan, Karachi	9,303	8,548	8,147	7,999
Panama, Colon	1,393	1,516	1,779	1,974
Peru, Callao	2,787	2,910	3,173	3,368
Philippines, Manila	10,784	10,930	11,193	11,388
Portugal, Lisbon	4,302	3,541	3,147	2,988
Puerto Rico, San Juan	1,488	1,121	1,252	1,399
Russia, Leningrad	5,021	5,230	4,811	4,661
Ryukyu Island, Nakagusuku	9,935	10,081	10,344	10,539
Saudi Arabia, Ad Damman	9,580	8,825	8,424	8,276
Saudi Arabia, Jidda	7,145	6,405	6,000	5,845
Singapore	11,456	10,701	10,300	10,152
Somalia, Mogadishu	8,916	8,176	7,771	7,616
South Africa, Capetown	7,255	6,862	6,802	6,801
South Yemen, Aden	7,838	7,083	6,682	6,534
Spain, Rota	4,475	3,740	3,339	3,191
Sweden, Stockholm	5,883	4,826	4,416	4,257
Taiwan, Tan-shui	10,242	10,388	10,651	10,846
Thailand, Ban Satlahip	11,870	11,115	10,714	10,566
Trinidad, Port of Spain	2,004	1,685	1,799	1,939
Tunisia, Bizerte	5,264	4,509	4,108	3,960
Turkey, Iskenderun	6,549	5,794	5,393	5,182
UAE, Abu Dhabi	9,367	8,627	8,222	8,067
Uruguay, Montevideo	6,115	5,727	5,710	5,753
Venezuela, LaGuaira	1,800	1,527	1,687	1,848
Vietnam, Ho Chi Minh City	11,515	11,350	10,949	10,801
Virgin Islands, St. Thomas	1,558	1,181	1,296	1,434
Yugoslavia, Rijeka	6,183	5,388	4,987	4,839

¹For distance to Houston, TX, add 50 miles; for Beaumont, TX, add 70 miles.
²For distance to Savannah, GA, add 46 miles.

Source: Defense Mapping Agency Pub 151, Distances Between Ports, 1991.

TABLE D-2
ESTIMATED TRANSIT TIMES

Distance (nautical miles)	Speed in Knots													
	08		09		10		11		12		13		14	
	Days- Hours	Days- Hours	Days- Hours	Days- Hours	Days- Hours	Days- Hours	Days- Hours	Days- Hours	Days- Hours	Days- Hours	Days- Hours	Days- Hours	Days- Hours	Days- Hours
50	0-06	0-06	0-06	0-05	0-05	0-05	0-05	0-04	0-04	0-04	0-04	0-04	0-04	0-03
100	0-13	0-11	0-11	0-09	0-10	0-09	0-09	0-08	0-08	0-08	0-08	0-07	0-07	0-06
200	1-01	0-22	0-22	0-18	0-20	0-18	0-18	0-17	0-17	0-17	0-15	0-14	0-13	0-12
300	1-14	1-09	1-09	1-03	1-06	1-03	1-03	1-01	1-01	1-01	0-23	0-21	0-20	0-18
400	2-02	1-20	1-20	1-12	1-16	1-12	1-12	1-09	1-09	1-09	1-07	1-05	1-03	1-01
500	2-15	2-08	2-08	2-07	2-02	2-07	2-07	2-02	2-02	2-02	1-14	1-12	1-09	1-07
600	3-03	2-19	2-19	2-16	2-12	2-16	2-16	2-10	2-10	2-10	1-22	1-19	1-16	1-14
700	3-16	3-06	3-06	3-01	3-08	3-01	3-01	2-19	2-19	2-19	2-06	2-02	2-05	2-02
800	4-04	3-17	3-17	3-10	4-04	3-10	3-10	3-03	3-03	3-03	2-14	2-09	2-12	2-08
900	4-17	4-04	4-04	3-19	4-04	3-19	3-19	3-11	3-11	3-11	2-21	2-16	2-19	2-15
1,000	5-05	4-15	4-15	7-14	8-08	7-14	7-14	6-23	6-23	6-23	3-05	2-23	2-19	2-11
2,000	10-10	9-06	9-06	11-09	12-12	11-09	11-09	10-10	10-10	10-10	6-10	5-23	5-13	4-22
3,000	15-15	13-21	13-21	15-04	16-16	15-04	15-04	13-21	13-21	13-21	9-15	8-22	8-08	7-08
4,000	20-20	18-12	18-12	18-23	20-20	18-23	18-23	17-09	17-09	17-09	12-20	11-22	11-03	10-10
5,000	26-01	23-04	23-04	22-17	25-00	22-17	22-17	20-20	20-20	20-20	16-01	14-21	13-21	13-01
6,000	31-06	27-19	27-19	26-12	29-04	26-12	26-12	24-07	24-07	24-07	19-06	17-21	16-16	15-15
7,000	36-11	32-10	32-10	30-07	33-08	30-07	30-07	27-18	27-18	27-18	22-11	20-19	19-11	18-06
8,000	41-16	37-01	37-01	34-02	37-12	34-02	34-02	31-05	31-05	31-05	25-16	23-19	22-06	20-21
9,000	46-21	41-16	41-16	37-21	41-16	37-21	37-21	34-16	34-16	34-16	28-21	26-18	25-01	23-12
10,000	52-02	46-07	46-07	37-21	41-16	37-21	37-21	34-16	34-16	34-16	32-02	29-17	27-20	26-03
														24-13

TABLE D-2 - cont

Distance (nautical miles)	Speed in Knots											
	18		19		20		21		22		23	
	Days- Hours	Days- Hours	Days- Hours	Days- Hours	Days- Hours	Days- Hours	Days- Hours	Days- Hours	Days- Hours	Days- Hours	Days- Hours	Days- Hours
50	0-03	0-03	0-03	0-03	0-03	0-03	0-02	0-02	0-02	0-02	0-02	0-02
100	0-06	0-05	0-05	0-05	0-05	0-05	0-05	0-05	0-05	0-04	0-04	0-03
200	0-11	0-11	0-11	0-10	0-10	0-10	0-10	0-09	0-09	0-08	0-08	0-07
300	0-17	0-16	0-16	0-15	0-15	0-14	0-14	0-14	0-13	0-12	0-12	0-10
400	0-22	0-21	0-21	0-20	0-20	0-19	0-19	0-18	0-17	0-16	0-16	0-13
500	1-04	1-02	1-02	1-01	1-01	1-00	1-00	0-23	0-22	0-21	0-20	0-17
600	1-09	1-08	1-08	1-06	1-06	1-05	1-05	1-03	1-02	1-01	1-00	0-20
700	1-15	1-13	1-13	1-11	1-11	1-09	1-09	1-08	1-06	1-05	1-04	0-23
800	1-20	1-16	1-16	1-15	1-15	1-14	1-14	1-12	1-11	1-09	1-08	1-03
900	2-02	1-23	1-23	1-21	1-21	1-19	1-19	1-17	1-15	1-14	1-12	1-06
1,000	2-08	2-05	2-05	2-04	2-04	2-00	2-00	1-21	1-19	1-18	1-16	1-09
2,000	4-15	4-09	4-09	4-08	4-08	3-23	3-23	3-19	3-15	3-11	3-08	2-19
3,000	6-23	6-14	6-14	6-06	6-06	5-23	5-23	5-16	5-10	5-05	5-00	4-04
4,000	9-06	8-19	8-19	8-08	8-08	7-22	7-22	7-14	7-06	6-23	6-16	5-13
5,000	11-14	10-23	10-23	10-10	10-10	9-22	9-22	9-11	9-01	8-16	8-08	6-23
6,000	13-21	13-04	13-04	12-12	12-12	11-22	11-22	11-09	10-21	10-10	10-00	8-08
7,000	16-05	15-09	15-09	14-14	14-14	13-22	13-22	13-06	12-16	12-04	11-16	9-17
8,000	18-13	17-14	17-14	16-16	16-16	15-22	15-22	15-03	14-11	13-22	13-08	11-02
9,000	20-21	19-19	19-19	18-18	18-18	17-22	17-22	17-00	16-06	15-16	15-00	12-11
10,000	23-05	22-00	22-00	20-20	20-20	19-22	19-22	18-21	18-01	17-10	16-16	13-20

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