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Functional Description for the Integrated Booking System (IBS)

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FOR THE UNITED STATES
DEPARTMENT OF ENERGY

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Energy Division

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ABSTRACT

The Military Traffic Management Command Directorate of International Traffic (MTIT) tasked the Oak Ridge National Laboratory to analyze the requirements for an Integrated Booking System (IBS), to design and build a prototype of the system, and to provide documentation that would be used in building the target system. This Functional Description (FD) follows the guidelines of DOD-STD-7935A, Military Standard: DOD Automated Information Systems (AIS) Documentation Standards. It describes the current methodologies for accomplishing the booking mission and defines the functional requirements for IBS. The report also discusses general architectural requirements and issues such as security, data exchanges, and system impacts.

The ultimate goal of IBS is to provide international cargo booking for both unit and nonunit movements during peacetime and wartime. This FD provides booking requirements for the continental United States only.

The results of the analysis of requirements are that IBS is a feasible system for accomplishing MTIT's cargo management goals. IBS will replace aging systems and integrate automated and manual procedures. It will provide a single automated system during wartime for viewing both unit and nonunit international cargo requests. Good human-computer interface design will be incorporated into the system during its development. Because of IBS querying capabilities, visibility of the booking process by MTIT will be enhanced.

1. GENERAL

1.1 PURPOSE OF FUNCTIONAL DESCRIPTION

This Functional Description (FD) for the Military Traffic Management Command's (MTMC's) Integrated Booking System (IBS) provides:

- the system requirements that must be satisfied (this list of requirements will serve as a basis for a mutual understanding between IBS users and the developer),
- a description of current methodologies for accomplishing the booking mission,
- information on performance requirements, system functions, inputs and outputs, data and database characteristics, and user impacts,
- a description of how to achieve the required capabilities through future design and development,
- a generic description of the proposed hardware, software, and communications environment,
- a discussion of issues relating to security, failure, costing, and system development planning, and
- a basis for the development of system tests.

This FD contains the functional requirements for the booking of unit and nonunit cargo in both peacetime and wartime. The procedures described in this FD ensure that the workforce can move efficiently from peacetime to wartime operations. The FD includes data transaction requirements, system and interface requirements, report generation, and communication requirements. IBS must interface with current and proposed systems within the MTMC Directorates of International Traffic (MTIT), Inland Traffic (MTIN), and

Strategic Plans and Mobility (MTPL), as well as with systems outside MTMC. This FD identifies these systems and describes the data flows.

It is extremely important to note that this FD covers the IBS functionality and technical requirements for the Continental United States (CONUS) and does not address additional requirements for implementing IBS Outside the United States (OCONUS). The OCONUS requirements and operating environments must be addressed at the earliest possible date to ensure that IBS will be efficiently and effectively designed to fulfill its worldwide mission. After analysis, the OCONUS requirements will be addressed in a supplement to this FD, to be produced at a later date.

1.2 THE IBS

The IBS will be a lead execution system of the Defense Transportation System (DTS) for international surface cargo in both peacetime and wartime. IBS will support traffic management within MTMC, the greatest percentage of which is booking nonunit peacetime cargo. IBS must also satisfy the MTMC mission to execute the strategy developed in deliberate planning for international surface cargo. In addition, IBS will be responsible for booking nonunit cargo during contingencies. IBS must respond to the requirements of both commodity managers and war planners to have continuous access to information about international surface cargo movement. Although this FD addresses IBS only at CONUS sites, IBS will eventually be fielded at both CONUS and OCONUS sites. It is currently planned that IBS will exchange data with other systems through a corporate-type database (yet to be developed) and via ASCII files, as appropriate. IBS will be also receive data manually.

IBS must exchange data with both classified and unclassified systems. Although IBS must receive data from classified systems in order to book wartime cargo movements, it is planned that the data actually used in the IBS booking functions will be unclassified. This declassification will occur before the data are entered into IBS. Therefore, IBS will be an unclassified system, using consistent and/or similar procedures in both peacetime and wartime. (For additional information on this declassification process, see Section 5.4.) Proficiency with peacetime operation of IBS will provide a smooth transition to wartime operation in case of a contingency.

1.3 THE IBS PROTOTYPE (IBS-P)

The prototype, developed by Oak Ridge National Laboratory (ORNL), conceptually defines an approach for the fully developed IBS. Because it reflects the functional requirements of the target IBS, the IBS-P helps determine an appropriate database design, a user interface, performance measurements, and technical solutions to interface problems for the target system. In addition, system sizing requirements and system architectures are more clearly defined for the target system because of the assessment conducted for the IBS-P. The IBS-P tests concepts associated with development of the full-scale IBS, verifies the feasibility of a proposed modeling solution, further defines functional concepts, and promotes an understanding of full-operational-capability design information. The functional modules of the prototype include booking unit cargo moves (exercises and contingencies), peacetime nonunit cargo moves, and wartime nonunit cargo moves.

It is anticipated that developers of the target system will benefit from the "lessons learned" during development of the prototype. Documentation produced for the IBS-P (see Sect. 1.4) will be useful to the developers of IBS.

There are anticipated differences between the IBS and the IBS-P. For example, the IBS-P operates on IBM-compatible microcomputers; however, the target IBS is not currently proposed as a microcomputer-based system. IBS-P is programmed using FoxPro as the development language; the prototype is a proof-of-concept system only, and the target language of the operational system has not been identified. Additionally, all interfaces for the IBS-P are simulated; thus, no actual data exchange occurs during operation of the IBS-P. Although much of the information contained in this functional description is based on the results of the prototyping effort, this FD describes the IBS, not the IBS-P. If, in this document, there is any potential for confusing the IBS and the IBS-P, the system under discussion will be clearly identified.

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1.5 TERMS AND ABBREVIATIONS

AC	Area Command
ACI	Automated Carrier Interface
ADD	Army Data Dictionary
ADP	Automated Data Processing

ALD	Available to Load Date (at POE)
APSA	Ammo Planning and Support Authority
AR	Army Regulation
ASCII	American Standard Code for Information Interchange
ASPUR	Automated System for Processing Unit Requirements
ATCMD	Advanced Transportation Control and Movement Documents
AUEL	Automated Unit Equipment List
AUTODIN	Automatic Digital Network
CDOP	Cargo Distribution Optimization Program
CFM	CONUS Freight Management System
CIN	Cargo Increment Number
CINC	Commander in Chief
CMB	Cargo Management Branch
CODES	Computerized Deployment System
CONUS	Continental United States
CPX	Command Post Exercise
DA	Department of the Army
DASPS-E	Department of the Army Standard Port System-Enhanced
DBMS	Database Management System
DEC	Digital Equipment Corporation
DDN	Defense Data Network
DLSS	Defense Logistics Standard Systems
DOD	Department of Defense
DODAAC	DOD Activity Address Code
DODIC	DOD Identification Code
DOE	Department of Energy
DOS	Disk Operating System
DOT	Department of Transportation
DTMR	Defense Traffic Management Regulation
DTS	Defense Transportation System
EA	Economic Analysis
EAD	Earliest Arrival Date (at POD)
EDD	Estimated Departure Date
EDI	Electronic Data Interchange
ELD	Earliest Load Date (at POE)
EOC	Emergency Operation Center
ETR	Export Traffic Release
ETRR	Export Traffic Release Request

FD	Functional Description
FMS	Financial Management System
FORSCOM	U.S. Army Forces Command
FTS	Federal Telecommunication Service
FTX	Field Training Exercise
GBL	Government Bill of Lading
GBLOC	Government Bill of Lading Office Code
GEOCODE	Geographical Code
GOPAX	Groups Operational Passengers
HQMTMC	MTMC Headquarters in Washington D.C.
IBS	Integrated Booking System
IBS-P	Integrated Booking System Prototype
ID	Identifier
ITO	Installation Transportation Office
JCS	Joint Chiefs of Staff
JDA	Joint Deployment Agency
JDC	Joint Deployment Community
JDS	Joint Deployment System
JOPES	Joint Operation Planning and Execution System
LAD	Latest Arrival Date (at POD)
LAN	Local Area Network
LDD	Latest Departure Date (from SPOE)
LIN	Line Item Number
LOGMARS	Logistics Application of Automated Marking and Reading Symbols
MAD	Master Address Directory
MARAD	Maritime Administration
MB	Megabyte
MENS	Mission Element Needs Statement
METS II	Mechanized Export Traffic System II
MHz	Megahertz
MILSTAMP	Military Standard Transportation and Movement Procedures
MSC	Military Sealift Command
MTEA-IM	MTMC Eastern Area Information Management

MTMC	Military Traffic Management Command
MTON	Measurement Ton
MTIM	Office of the Deputy Chief of Staff for Information Management (MTMC Directorate)
MTIN	Inland Traffic (MTMC Directorate)
MTIT	International Traffic (MTMC Directorate)
MTPL	Strategic Plans and Mobility (MTMC Directorate)
OCCA	Ocean Cargo Clearance Authority
OCBO	Ocean Cargo Booking Offices
OCONUS	Outside the Continental United States
OPLAN	Operation Plan
ORNL	Oak Ridge National Laboratory
OSB	Overseas Branch
OUT	Outsized (cargo)
OVER	Oversized (cargo)
PC	Personal Computer
PCF	Port Call File
POC	Point of Contact
POD	Port of Debarkation
POE	Port of Embarkation
POL	Petroleum, Oil, and Lubricants
POV	Privately Owned Vehicles
RDBMS	Relational Database Management System
RDD	Required Delivery Date
RLD	Ready to Load Date (at origin)
RORO	Roll-on/Roll-off
RUDI	Release Unit Data Input
SCAC	Standard Carrier Alpha Code
SEACOP	Strategic Sealift Contingency Planning System
SEASTRAT	Sealift Strategic Analysis System
SOCO	Shipping Order/Clearance Order
SPLC	Standard Point Location Code
SPOD	Seaport of Debarkation
SPOE	Seaport of Embarkation
SQL	Standard Query Language
SRF	Summary Reference File
SRO	Standing Route Order
STRADS	Strategic Deployment System

TACOS	The Automated Container Offering System
TC ACCIS	Transportation Coordinator's Automated Command and Control Information System
TC AIMS	Transportation Coordinator's Automated Information for Movements System
TCMD	Transportation Control and Movement Document
TCN	Transportation Control Number
TDR	Transportation Discrepancy Report
TERMS	Terminal Management System
TMO	Transportation Movement Officer
TOA	Transportation Operating Agency
TOC	Transportation Operating Command
TOLS	TERMS-on-Line System
TPFDD	Time-Phased Force and Deployment Data
TPFDL	Time-Phased Force Deployment List
TSM	Terminal Support Module
TUCHA	Type Unit Data File
UCR	Unit Cargo Release
UEL	Unit Equipment List
UIC	Unit Identification Code
ULC	Unit Level Code
ULN	Unit Line Number
UMD	Unit Movement Data
UNITREP	Unit Status and Identity Report
USTRANSCOM	United States Transportation Command
UTC	Unit Type Code
VAN	Value-Added Network
WIN	WWMCCS Intercomputer Network
WIS	WWMCCS Information System
WPS	Worldwide Port System
WWMCCS	Worldwide Military Command and Control System
4GL	Fourth-Generation Language

2. SYSTEM SUMMARY

This section describes the existing systems and methodologies for conducting booking operations. It states the major goals and objectives of IBS and presents an overview of the proposed system. Finally, assumptions concerning IBS development, implementation, and operation are listed.

2.1 BACKGROUND

MTMC has a worldwide mission to provide traffic management for international surface cargo movements. When fully implemented, IBS will manage and conduct these responsibilities. Ocean Cargo Clearance Authorities (OCCAs) and Ocean Cargo Booking Offices (OCBOs) are located throughout the world to provide effective and economical movement of cargo within the ocean segment of the DTS. The OCCA or OCBO controls the movement of Department of Defense (DOD) cargo by providing routing, port selection, and booking with the appropriate carrier. Also, the OCCA administers the Military Sealift Command (MSC) container agreements and contracts with commercial ocean carriers for the export and import of DTS cargo.

MTMC executes its traffic management mission by monitoring peacetime cargo movements; responding to inquiries for cargo status; reporting the status of wartime unit and nonunit cargo movements; monitoring the performance of ocean carriers, shippers, and traffic managers; and analyzing the transportation pipeline to ensure the efficient and economical expenditure of transportation funds. MTMC is also the single manager within the DOD for origin-to-final-destination management of intermodal containers.

Event data related to shipment status is currently maintained in a number of MTMC, theater, and carrier automated systems. To get information on all of the events occurring between the booking of the shipment and delivery to final destination, each of the separate systems must be accessed. The capability to draw this already-existing data into a single database for access by MTMC traffic managers and to satisfy status inquiries from shippers and the wartime fighting community is essential. This capability must provide a single interface for international surface cargo movements. Current plans indicate that a regional database (to which IBS will be a major contributor) will provide this capability.

2.2 OBJECTIVES

The primary objective of IBS is to provide a single, worldwide, automated booking system designed to support both the peacetime and wartime movement of unit and nonunit cargo in an efficient and timely manner. Existing automated functional requirements of the Automated System for Processing Unit Requirements (ASPUR) and Mechanized Export Traffic System II (METS II) will be incorporated into IBS.

Performance, operational, and functional requirements for IBS are listed in Section 3. In addition, specific objectives concerning inputs and outputs to IBS as well as information about the IBS database structure are included in Section 3.

A major objective of IBS is that normal cargo booking information using unclassified data will be accessible for booking and tracking functions. To efficiently conduct booking operations in a consistent manner in both peacetime and wartime conditions, IBS must be an unclassified system (see also Sections 5.4 and 6).

IBS will collect, use, process, and output data. IBS will interface (i.e., exchange data) with multiple systems and organizations (both automated and manual). These interfacing systems and organizations are described in greater detail in Section 5.4, "Interfaces." It is planned that these interfaces will be accomplished through a shared data environment (also known as the corporate or regional database), which will be accessible by other MTMC automated systems, or via ASCII files or manually. This shared data environment will serve to tie booking to documentation (i.e., manifesting), provide international visibility, and track information from origin to destination. A requirements analysis for the shared data environment is currently being performed. After this analysis is complete, specific interface requirements for IBS will be clarified.

2.3 EXISTING METHODS AND PROCEDURES

Specific existing procedures for peacetime and wartime booking operations are described in Sections 2.3.1-2.3.3. Currently the booking mission is supported by ASPUR for deploying units (used during exercises and contingencies) and METS II for booking peacetime nonunit cargo. The Automated Container Offering System (TACOS) is currently being used as an interface to METS II for determining the low-cost carrier under certain conditions. There is no automated system for booking wartime nonunit cargo, although it is assumed that METS II would be used.

Both METS II and ASPUR operate in the CONUS Area Commands (ACs). There is no standard automated system supporting the OCONUS booking mission. The only automated booking aid overseas is the Department of the Army Standard Port System - Enhanced (DASPS-E), which is a Standard Army Management Information System for port management and cargo documentation.

Cargo status data for peacetime operation exist in a number of separately maintained data systems. These include a variety of shipper and carrier systems, MTMC booking systems, and cargo documentation systems. No specific provisions exist for cargo tracking during wartime. [Although the Joint Operation Planning and Execution System (JOPES) has the functional ability to track the cargo, an efficient method for updating JOPES has not been developed because of the problems associated with interfacing unclassified systems with the classified JOPES.]

For exercises and wartime operations, MTMC Emergency Operation Centers (EOCs) become the central traffic management interface with ocean terminals and MSC. The MTMC EOC staff is formed from the Directorates of MTIT, MTPL, and MTIN. MTMC EOCs are located at MTMC Headquarters (HQMTMC) and at the ACs. (Potentially, all functional and support staff form the EOC staff as needed.) Communication between EOCs is accomplished via secure voice lines, through Worldwide Military Command and Control System (WWMCCS) terminals over the WWMCCS Intercomputer Network (WIN) or through secure Automatic Digital Network (AUTODIN) transfers. Currently no direct automated interface exists between MTMC booking offices and agencies planning projections of cargo volume or movement requirements.

Approximately 4000-6000 peacetime nonunit requests are booked each month at the Eastern AC. At the Western AC, approximately 2800 nonunit requests are booked each month. Of all nonunit cargo moves, about 90% are booked with commercial carriers using MSC rates; very few MSC ships are used for nonunit cargo. About 1% is booked to Foreign Flag vessels. Also, the Western AC provides Government-Bill-of-Lading (GBL) support for Hawaii and Guam (commercial ships, commercial tariff). In contrast, 90-100% of "normal" unit moves are handled by MSC-controlled ships. Nonunit cargo is assigned to ships; ships are assigned to unit cargo.

In both peacetime and wartime, meeting the services' needs is the driving consideration. For peacetime nonunit moves and for unit moves conducted during exercises, however, the cost of shipping is also considered. During wartime, for both unit and nonunit moves, the most important criteria in the booking operation is to ensure that the cargo meets the Required Delivery Date (RDD)[1] at the destination. (Thus, ship and port availability are important factors for the booking operation during wartime.) Maintaining unit integrity is also a high priority. Finally, during wartime, the booking operation attempts to load a ship as fully as possible in order to use a high percentage of the ship's capacity.

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[1]See also Sect. 2.3.1.2.

Section 2.3.1 provides an explanation of steps currently used for booking unit moves for both exercises and contingencies; Section 2.3.2 provides a description of current procedures for booking peacetime nonunit moves; and Section 2.3.3 describes current procedures for booking wartime nonunit moves.

2.3.1 Unit Cargo Moves

Unit cargo movements are defined as the movement of entire units as an integrated shipment to support an exercise or operation plan (OPLAN). Planning for crisis deployment is a critical part of national defense activities. Although IBS is primarily a peacetime system, an IBS goal is to employ functional procedures that are basically the same for wartime and peacetime. The method for ensuring that personnel are experienced in booking unit cargo moves is through participation in peacetime exercises.

Unit moves are described in Section 2.3.1.1 as exercises (which are conducted during peacetime in preparation for a contingency) and in Section 2.3.1.2 as contingencies. It should be noted that a unit move includes both personnel and associated cargo. IBS, however, books only the cargo portion of the unit moves. Other systems (for example, MTMC's Groups Operational Passengers (GOPAX) system for groups of 21 or more individuals) book personnel. Although it would seem that passenger and cargo systems should interface in such a way as to coordinate the arrival of passengers and their associated cargo at the destination, actually the services monitor the cargo movements in JOPES or through MTMC inquiries and then call the passengers to come forward.

Currently Army unit movements are based on movement directives from the U.S. Army Forces Command (FORSCOM) using an Automated Unit Equipment List (AUEL). Cargo for Air Force, Navy, and Marine units is booked in a similar manner except that a Unit Equipment List (UEL), which may or may not be automated, is used. The UEL is received via modem or via diskette or tape mailed from the units.

During Operation Desert Shield, units were port called to the Port of Embarkation (POE). The terminal commander assigned units to vessels keeping relative priorities intact [i.e., the earliest arrival date/latest arrival date (EAD/LAD) window at the port of debarkation (POD)]. IBS must be able to follow the specific guidelines listed above, but must also be flexible enough to follow the procedure used in Operation Desert Shield, if necessary.

2.3.1.1 Exercises

The following procedures currently are followed during Army exercises. The MTIT Terminals Division is the booking agency. Exercises include both Field Training Exercises (FTXs) and Command Post Exercises (CPXs). The CPX is more akin to reality although cargo moves are simulated. The FTX includes some artifice in that funding resources dominate most transportation planning.

- FORSCOM specifies the funding available for exercise transportation support and apportions it according to the preliminary requirement assessments.
- The decision on the number of necessary ships is based upon the requirements and the funding provided for the movement.
- The needs of the units, FORSCOM, MSC, and MTMC are reconciled during exercise conferences where the unit equipment list is modified, within the constraints of the transport available.
- The number of vessels, their size, and the schedule are also determined and provided to MSC and MTPL.
- Exercise conferences are normally conducted at least one year in advance of the actual exercise and are reconvened at three-month intervals to discuss changes and updates to the equipment, monies, and schedules.
- Although MTPL has the unit equipment information in advance of the actual exercise, the ship load planning uses only gross figures of total square feet or measurement tons against the predetermined ship type because significant changes may occur before the actual loading.

- During the planning process, FORSCOM continually updates the AUEL and periodically provides AUEL data via WIN to HQMTMC. These data are cleansed and declassified before being provided via tape format to the ACs.

- As the exercise date nears, this tape is fed into ASPUR by the MTMC AC Terminals Division to produce the ASPUR 130 or ASPUR 140 report for more specific planning information.

- At Eastern AC, the MTMC AC Terminals Division personnel receive a JOPES extract tape [the Time-Phased Force and Deployment Data (TPFDD)] from MTPL in the EOC.

- At Eastern AC, when the AUEL is resident in ASPUR, units can update the AUEL data using the Unit Movement Data (UMD) from Transportation Coordinator's Automated Command Control Information System (TC ACCIS) or the Interim TC ACCIS. Units receive Port Call Messages from the Terminals Division.

- At Western AC, the TPFDD is not used. The ASPUR 140 reports are sent by mail to all Seaports of Embarkation (SPOEs) involved in the exercise, and the contingency officer takes the requirements package to MSC for approval. The ports involved call the units to confirm published delivery dates.

- The Terminals Division contacts MTIN at the AC to coordinate the previously negotiated domestic movements by giving MTIN a printout of the unit equipment.

- MTIN provides rating and ranking information to the Installation Transportation Office (ITO). The ITO contacts the inland carrier and completes the schedule. MTIN provides line haul costs to assist in performing the port call analysis. The Terminals Division then releases the cargo for shipment.

- When the Port Call Message is issued, the detailed cargo information [the Advanced Transportation Control and Movement Document (ATCMD)] is created and sent through ASPUR to the Terminal Management System (TERMS) on-line System (TOLS) at the ocean terminal.

- MTMC port personnel update TOLS with the status of the cargo as it arrives in the port.

- MTMC port personnel send messages via AUTODIN or telephone concerning the port status and throughput capacity to the AC Terminals Division for inclusion (via manual update) in the JOPES feeder reports.

- At the water terminal, the Computerized Deployment System (CODES), a stow-planning system, assists load planning personnel. This software automates the load planning and subsequent document production (Ship Stow Plans) for the marine terminal. CODES is currently used at the AC level for space allocation on exercise ships. The Terminal Support Module (TSM), a microcomputer-based system, receives files from TERMS and integrates Logistics Application of Automated Marking and Reading Symbols (LOGMARS) technology. TSM can produce a modified manifest and is used to update TERMS.

Exercises will always be planned through use of a TPFDD and JOPES (or some similar but more efficient and accurate procedure). A peacetime unit move which is not a wartime exercise (for example, moving a unit from the Philippines to Japan) might not have a TPFDD in JOPES. These unit moves are similar to exercises in that cost is a factor; they are similar to contingencies (see Sect. 2.3.1.2) in that a TPFDD may not exist. When no TPFDD is available for exercises and contingencies, then the AUEL and UELs are used to determine unit moves. When neither JOPES nor AUEL/UEL data exist, then the Terminals Division personnel working with the unit use a best estimate of the cargo to be booked for movement.

2.3.1.2 Contingencies

If a crisis situation arises, the current procedure is for MTMC to access JOPES to obtain existing movement requirements, if any. If a TPFDD exists for the contingency, the procedures described in the "With JOPES" section (below) are followed. If a usable TPFDD does not exist in JOPES, the procedures described in the "Without JOPES" section are followed.

After the JOPES requirements are evaluated, the ACs request sealift support from MSC. Then MSC requests vessels from the Maritime Administration (MARAD) or uses the MSC-controlled fleet to satisfy movement requirements. If MARAD is involved, vessels from the available ship pool are requisitioned, and MSC is provided with information concerning the vessels. A ship schedule is then created by MSC and entered into JOPES.

With JOPES

Specific activities are conducted at the AC by MTIT personnel during a contingency for which a usable plan exists in JOPES. These activities and associated reports are listed below. It must be noted, however, that in any contingency, this list might be modified as needed (as in Operation Desert Shield).

- A JOPES E-3 Report is generated for the OPLAN being executed.
- Cargo is divided into groupings (or channels) based on like origin/destination and EAD/LAD requirements.
- SPOEs are reassigned/consolidated based upon a minimum measurement tonnage requirement. JOPES operators are notified that POE changes have been made so that the new SPOEs can be entered into JOPES.
- Offering numbers are assigned by MTMC for use by MTMC and MSC to control the large number of offerings. This is an eight-digit code for which digits 1 and 2 are the OPLAN number (numeric), digits 3 and 4 are an SPOE code (alphabetic), digits 5 and 6 are a POD code (numeric), and digits 7 and 8 are a serial number (representing the number of offerings per POD).
- For active-duty Army units [Unit Identification Codes (UICs) starting with "WA" to "WJ"], ASPUR 130 and ASPUR 140 reports are generated.
- For active-duty Army units, the feasibility of the planned arrival date at the SPOE is verified using the Minimum Inland Transit Time chart. For units unable to meet planned load date, a notification message is sent to HQMTMC, the U. S. Transportation Command (USTRANSCOM), and the Supported Commander in Chief (CINC).
- An ASPUR 130 or 140 report is provided to MTIN at the AC for inland transportation arrangements.

- The cargo offering is created using cargo figures from ASPUR reports for active-duty units and the JOPES E-3 report for all others, to determine cargo totals by type. The conversion factor worksheet is used to convert data to the required units.

- The offering is submitted to MSC for sealift.

- The ship schedule is received from MSC.

- The cargo is allocated to ships using the allocation worksheet. The completed worksheet is submitted to a JOPES operator for entry into JOPES.

- Unit arrival dates at the SPOEs are coordinated with port personnel through use of a Port Workload Report and the Port Capacity Program,

- The Port Call Message is released to all active-duty Army units.

As can be seen, a few differences exist between exercises and wartime unit movements. First, during wartime, current procedures indicate that all communications of vessel requirements and schedules would be done through JOPES instead of the planning conferences, as is done during exercises. (Procedures for how this communication would be accomplished have not been determined.) Second, in wartime, the unit movement system will be requirements driven. Thus, the SPOE will be chosen and all unit bookings will be handled on the basis of meeting the RDD. When ships are selected, it is assumed that if the ship arrives at the POD before or within the EAD/LAD window, the RDD at the destination will be met. Third, during peacetime, the unit movement system is funding driven; thus, the SPOE is chosen after a cost analysis is completed.

Currently there are no plans for a procedural transition to accommodate this fundamental difference between the peacetime method and the wartime method of unit moves, nor are there procedures to develop the organizational skill to translate AUEL information into ship requirements and pass these requirements on to the appropriate agency. IBS will need to consider these differences.

In addition, JOPES is a classified system. Although the JOPES E-3 Report is an output from JOPES, it has been declassified. A similar procedures will be required to obtain unclassified data for the booking process.

Without JOPES

If a contingency arises for which no plans have been prepared in advance and stored in JOPES, one or all of the following procedures will be followed.

- Movement requirements will be prepared by the Supported CINC and transmitted to MTMC.
- Either at HQMTMC or at the AC, MTMC and MSC will work together to determine the type and amount of sealift support required.
- The procedures outlined in the "With JOPES" section will be followed except that JOPES will not need to be updated.
- The Supported CINC and the Joint Chiefs of Staff (JCS) will rapidly configure a TPFDD and communicate it to the Supporting CINCs through JOPES.

It should be noted that if a contingency is so secret that JOPES is not used, then it is unlikely that MTMC's role will be significant.

2.3.2 Peacetime Nonunit Cargo Moves

The OCCAs at MTMC's ACs manage the movement of containerized and breakbulk cargo by providing low-cost carrier booking that meets the date designated by the requestor.[2] For peacetime cargo movements, the booking process begins when a requestor submits an Export Traffic Release Request (ETRR) to the MTMC AC.

About 80% of all movements during peacetime is via containers. Most of the ocean carriers bid origin-to-destination service when cargo is moved in containers. Ocean carriers provide the containers, hire the truckers to move the container from origin to POE, load the container onto the ship, transport the container overseas, discharge the container, and hire a trucker to move the container from the POD to the destination.

Because of appropriation restrictions, a shipper may request "K" service, which implies that origin-to-destination service is not requested. A request for K service is indicated in the Export Traffic Release (ETR) as part of the origin lading terms. In this situation, the vendor provides line-haul from the origin to the SPOE (or SPOD to destination) and the associated cost is sometimes used to assist in the selection of a carrier or the SPOE. K service is currently handled by the Cargo Distribution Optimization Program (CDOP).

The booking process for containerized cargo is carried out by one of the cargo booking branches as follows.

- The shipper or requestor sends an ETRR to the AC. MTMC prefers that users submit ETRRs via METS II or an AUTODIN message. Requests are submitted via telephone only in emergencies and submissions using mail are extremely rare. Once received at the AC, the ETRR is assigned to one of the booking branches.
- Each ETRR is checked for errors and inconsistencies. If the ETRR is submitted on-line, METS II automatically validates the ETRR. If METS II detects errors, it stops, and the individual who is submitting the on-line request must correct the errors, field by field for all essential fields. After

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[2]The OPLAN acronym "RDD" is currently also used for peacetime nonunit moves to designate "requested" (rather than "required") delivery date. Because this usage is incorrect and could potentially cause misunderstandings when unit and nonunit moves are handled by a single automated system, the acronym "RDD" should not be used in the peacetime nonunit cargo moves portion of IBS.

corrections have been made, the request is accepted by METS II, and processing continues. A file is generated that produces a Release Unit Data Input (RUDI) during batch processing. For requests coming in via AUTODIN, METS II does error checking, and the seriousness of the errors is evaluated. When possible, errors are corrected by an OCCA staff member. If necessary, the shipper or requestor is telephoned, and the problems are discussed. Generally the ETRR can be corrected. If the ETRR cannot be corrected, the shipper or requestor is asked to resubmit the ETRR. If an ETRR was not received through METS II or AUTODIN, OCCA staff members manually enter the data into METS II.

- METS II assigns the Port Call File (PCF) number, and each error-free ETRR is printed.

- In carrying out the booking process, the booking technician is responsible for (1) deriving the lowest cost carrier that can meet the delivery requirements for each request and (2) booking the cargo with the carrier. Meeting the shipper's movement specifications is the primary consideration, but low cost is a high-priority factor. There are five carrier booking categories.

    1. Commercial carriers using existing MSC agreements and contracts are generally used when cargo is transported over common ocean routes.

    2. Commercial carriers using commercial tariffs are used when moving cargo on routes that are not covered under MSC contracts.

    3. MSC ships are used only when commercial vessels are not available.

    4. Foreign flag carriers are used when there are no other U.S. flag vessels available.

    5. Specifically negotiated movements (usually for ammunition) are required if an ocean carrier will not move cargo using an MSC agreement or commercial tariff. For most movements, there is competition to provide the service. In those instances when no ocean carriers want to accept the movement, MSC negotiates a one-time-only rate to encourage carriers to accept the movement.

Currently, TACOS is being used to find the low-cost carrier under certain specific conditions. TACOS is still under development. The current design strategy for IBS is to include TACOS functionality (as described in Sects. 3-5).

After arriving at the lowest cost carrier that meets the shipper's delivery date, the cargo booking for containerized shipments is offered to the carrier using the Automated Carrier Interface (ACI), which is part of METS II. (Prior to MSC's directive that all carriers be connected to ACI, offers were also made via telephone, facsimile, or mail-drop.) The part of the automated interface that interfaces with the carriers' personal computers (PCs) is TELINK, a software package that was developed using electronic data interchange (EDI) standards. Carrier representatives that are on-site generally stop by the OCCA to see if there are movements being offered to their organizations.

If a carrier accepts an offer and agrees to the movement dates specified, the booking is completed. If the carrier rejects the offer, the cargo is offered to the next lowest cost carrier that can meet the delivery requirements. This process is continued until the cargo is booked.

If the booking technician notices that a movement cannot be accommodated on an MSC agreement because of a late delivery problem, the booking technician may contact the shipper to request a change in the requested delivery date. If the date is reasonable and cannot be changed, the booking must be awarded to the next lowest cost carrier who can meet the requested date. If the date can be changed, it is adjusted in the ETRR and the booking is completed. If the date is reasonable and there is not a ship which can closely match the date, the booking technician calls the requestor to find out if an earlier or later delivery date is preferred.

The booking technician offers a movement to all U.S. carriers that provide service to an area before offering it to foreign flag carriers. If all U.S. carriers reject the offering, the booking technician must contact MSC for approval of a foreign flag booking. If MSC approves a foreign flag booking, the booking technician offers the cargo to foreign flag carriers that can meet the requested delivery date.

There is a six-month cycle for rates between ports. (This six-month cycle is in the process of being changed to an annual cycle.) Competition forces use of MSC agreements rather than tariffs. If there is a low volume of cargo or no competition on a route, commercial tariffs may need to be used.

- The booking is completed after an ocean carrier has accepted an offer. The necessary data are added to the PCF. The booking technician then sends an ETR to the requestor via METS II, which produces an AUTODIN message. In exceptional cases, the shipper or requestor may be contacted via telephone or mail.

Although the above procedures apply specifically to container moves, they are generally applicable to breakbulk moves,[3] with the following exceptions:

- For breakbulk shipments, carriers do not provide origin to POE service and POD to destination service.
- Cargo, when less than 10,000 pounds, can be called forward to the port without being booked. This allows the cargo to proceed from origin to POE without booking being completed.
- Most of the breakbulk cargo moving is RORO.
- Only certain ports handle breakbulk. (Also, only certain ports handle RORO.)
- The ACI is not used.

The procedures for booking hazardous materials, protected cargo, petroleum products, ammunition, and other special types of cargo are generally like those for container moves of "ordinary" cargo. The commodity code identifies special cargo types. Other than this identification, no other special handling by the booker is required.

Proper loading and handling of hazardous materials (which could include bleach, fertilizer, etc.) is the responsibility of whoever loads it at the port. The same is true for protected cargo and petroleum products. Petroleum cargo products booked by MTMC are usually in containers. Tankers are not part of the MTMC booking responsibilities.

METS II handles "regular" ammunition requests and the ammo planning wire. The 5-character commodity code notifies METS II of an ammunition request. The same R11 series is used as for other nonunit requests. The ammo planning wire creates an R11 format request. The ammo planning wire is received via AUTODIN with special routing;

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[3]In this FD, the term "breakbulk" is used to mean all cargo that is not containerized. Some organizations do not include roll on/roll off (RORO) cargo under the category breakbulk.

it originates from the Ammo Planning and Support Authority (APSA). The ammo planning wire is used when a single ammunition booking is needed for shipment of multiple requests from multiple depots. A single ammo planning wire covers all physical origins because all the ammunition constitutes a single shipment. However, the ETR must go to each depot shipping ammunition for the request, as well as to the APSA (the original requestor). A problem with the ammo planning wire is that METS II (because of MILSTAMP regulations) will not accept duplicate Transportation Control Numbers (TCNs); one possible resolution to this problem is to change the last two characters from XX to AX, BX, CX, etc. on identical TCNs. The ammo planning wire can be very large (>100 data lines). Earle, NJ, and Sunnypoint, NC, are the two East Coast ammunition ports (Sunnypoint is most commonly used). Concord, California, is the West Coast ammunition port.

Foreign Military Sales and Grant Aid (cargo being given to another country) are indicated by the TCN containing B/D/P + 2-digit country code. No special programming requirements are needed for processing foreign sales. MSC agreement rates are not used. Two different levels of foreign sale requests exist: (1) the foreign country receiving the cargo arranges the ocean transportation, usually on a foreign flag vessel, and MTIT arranges the origin to POE transportation; (2) MTMC books the cargo with a commercial tariff over ocean, and the foreign country takes possession at the POD. Usually MTMC will handle some phase of Foreign Military Sales, but in the few cases it does not, the foreign country must still provide MTIT with information regarding the move for historical records. Only about 1% (or less) of all nonunit moves are Foreign Military Sales. Most foreign sale requests are ammunitions going through Sunnypoint.

The following information is currently used for the peacetime booking process: the ETRR, ocean carrier vessel schedules, rates, terminal status data (limited during peacetime), carrier usage data (information on carrier quotas), cargo status data, equipment list data, commercial carrier response to an offering, and the MSC response to a request or cargo offering.

Information that is currently generated by the booking process includes the following: cargo offering to carrier, cargo release, MTIN request data, foreign flag request data to MSC, change to booking request (in most cases a change to the request causes the process to start over), and the ATCMD. It should be noted that the ATCMD at this point is skeletal. The shippers and terminals complete the ATCMD.

The booking process is essentially the same at both ACs. At the Western AC, on selected major routes (Hawaii and Guam), the carriers have the same rate tariff. This rate is a conference rate, but carriers can modify the terms in order to be selected as the lower cost carrier. On other routes MSC rate guide rates are used. A weekly report of U.S. carrier usage is prepared manually by the Cargo Management Branch (CMB).

2.3.3 Wartime Nonunit Cargo Moves

The purpose of wartime nonunit cargo moves is to support deployed forces. Once IBS has been developed, the wartime booking of nonunit cargo by MTMC is expected to be accomplished using automated procedures very similar to those used in peacetime. There is currently no automated support for booking wartime nonunit cargo, although it is assumed that METS II would be used.

Three types of wartime nonunit cargo strategies exist. (1) Cargo (mostly vehicles) not specifically identified to a unit but listed in the TPFDD will move on MSC or MSC-controlled ships, possibly with unit cargo. (2) Some container resupply will move using similar procedures as those employed in peacetime (e.g., Desert Shield). (3) Some container resupply will be booked to MSC vessels on a maximum utilization basis similar to that of unit cargo. This third situation could occur in a global war.

Two mechanisms exist for determining wartime nonunit cargo requirements: (1) data contained in the appropriate TPFDD in JOPES and (2) requests that are submitted via Form DD1086 (ETRRs). A TPFDD for wartime unit movements contains specific UICs.

However, for any TPFDD, the resupply cargo data are purely notional. The Cargo Increment Number (CIN) is currently used by the defense logisticians to plan for nonunit cargo needs. There is currently no MTMC requirement to monitor or use the CIN for tracking cargo requirements. Nor is there a mechanism for tying the CIN to actual sources for the cargo. Thus, actual booking using JOPES TPFDD data for notional cargo is impossible without information specifying cargo origin and vessel schedules.

During peacetime, nonunit resupply requests are received from authorized requestors via ETRRs (see Section 2.3.2). For wartime nonunit cargo moves, this continues to be a viable procedure. The principal differences between wartime and peacetime procedures is the emphasis (in wartime) on meeting the RDD and full vessel utilization (instead of cost).

During a contingency, the EOC is involved in the total nonunit booking process. In wartime, the EOC expects to provide terminal status information to the MTIT CMB or Overseas Branch (OSB), and MSC expects to provide ship schedules. Cargo traffic forecasts are based on input from the Joint Deployment Community (JDC). Although procedures for the use of IBS are expected to remain very similar in peacetime and wartime, it has not been determined how the problem of interfacing the activities of the secure EOC with normal booking operations will be solved.

Prior to Operation Desert Shield, it was assumed that, during a contingency, carriers would allow the U.S. government to have 10% of the ship load -- there would be no rates; however, all moves for Desert Shield were conducted just like during peacetime (with new rates). As far as the booking technician is concerned, it does not matter who or what originates a request; the supply system would contact the depot system and the depot system would contact MTMC via a DD1086.

For wartime resupply, IBS will not be required to interface with JOPES to download data, although IBS may have to update JOPES. This data transfer to JOPES could be an impossible matching tasking, since the JOPES resupply cargo data are primarily notional.

2.4 PROPOSED METHODS AND PROCEDURES

Sections 3-6 describe in detail the proposed system design. Specifically, Section 3.3 describes the system's functional requirements. This section summarizes the improvements and impacts of the proposed IBS.

2.4.1 Summary of Improvements

The current methods for booking cargo have several shortfalls. For example, multiple systems are maintained for accomplishing similar functions. This duplicative effort increases maintenance and training costs and reduces flexibility. In addition, some of the current systems are nearing obsolescence. Users are becoming more aware of state-of-the-art computer capabilities and are demanding additional and more powerful automation, including on-line access and visibility of the total booking arena.

IBS will provide the following improvements to the existing methods for booking. IBS will provide a single system for booking unit moves for exercises and contingencies. IBS will be sized for both wartime and peacetime booking operations and will provide an efficient solution to the need, during wartime, for nonunit cargo movements. Because IBS will be the booking system used during both peacetime and wartime, proficiency for its use during a contingency will already be developed. The IBS peacetime algorithm (nonunit booking) for choosing a low-cost carrier is different from the wartime algorithm for choosing a carrier to meet the date the cargo is required to be at the destination; however, this difference will be transparent to the IBS operator.

In addition, IBS will eventually be provided to both CONUS and OCONUS sites; currently the OCONUS sites have no automated booking aides. Because IBS will be a worldwide system, monitoring of international surface cargo movements will be possible; in addition, a single system containing all cargo movement data improves capabilities of and timeliness for acquiring movement status data.

2.4.2 Summary of Impacts

This section describes the anticipated impacts of the proposed system on the existing user environments.

2.4.2.1 User Organizational Impacts

In CONUS, IBS will be installed with a complete database and application software at both ACs. Other sites (e.g., HQMTMC) will have remote login access. IBS will be developed using a relational database management system (RDBMS) and an open systems architecture. A system, database, and data administrator will be required at each AC site. A network administrator will be needed to ensure network integrity among the various IBS sites, eventually to include OCONUS. It is currently proposed that the system administrator at each site also serve as network administrator until IBS is implemented OCONUS. The potential users of IBS at the ACs are currently familiar with the METS II and ASPUR computer systems. However, retraining for IBS will be required. Additional personnel will not be hired for IBS; however, current programmers and analysts will need to be retrained on the new hardware, RDBMS, networking utilities, and application software.

It is proposed that IBS will read from and write to a corporate database. A decision will have to be made regarding the design schedule for the corporate database, since its development can impact the implementation schedule of IBS. The design and administration of that environment and its organizational impacts are not discussed in this FD.

2.4.2.2 User Operational Impacts

At the ACs, the OCCAs operate during peacetime to book nonunit cargo moves, and the Terminals Division operates during exercises and contingencies to book unit cargo moves. It is anticipated that IBS hardware will exist in both environments and that the current responsibilities of each office will continue. In addition, the OCCAs will be responsible for using IBS to book nonunit cargo during wartime as well as during peacetime operations.

Because of increased automation capabilities, the Terminals Division should not need to rekey declassified information from JOPES into an unclassified system (see Sect. 5.4). This impact should result in more efficient operations for booking unit moves.

2.4.2.3 User Development Impacts

Prior to and during implementation, METS II and ASPUR will continue to function at their current level of effort. They will be maintained in a status quo without enhancements during development of IBS. When IBS becomes operational, two options exist.
(1) Continue to operate METS II and ASPUR until all current bookings are complete (approximately 90 days) in parallel with operation of IBS which would be accepting all new requests. It would not be necessary for IBS to track bookings that were in place in METS II prior to IBS initiation. No historical booking data would be loaded into IBS.
(2) Load all active METS II data into IBS as soon as IBS comes online. This procedures would have the advantage of identifying any problems in volume processing early in IBS's existence, while METS II would still be available for processing the bookings if necessary.

Training will be required for IBS users and the system, database, and data administrators prior to implementation. At a large site, more than one individual may be required to fulfill any one of the above responsibilities; at smaller sites, one person may be sufficient to perform multiple tasks. (It is possible that a network administrator may need to be trained also).

The greatest impact during the development period will be on MTMC Information Management (MTIM) at the Eastern AC as this organization continues to maintain METS II and ASPUR as well as develop the programs for IBS. The staff responsible for developing and maintaining IBS may need training in the programming languages (see Section 5.2).

Another impact will be on OCONUS users when IBS is implemented there. Although the Eastern and Western ACs are accustomed to automated booking procedures, OCONUS personnel may need additional training in using IBS.

2.5 ASSUMPTIONS AND CONSTRAINTS

The following assumptions and constraints can affect the functionality, timeliness, and/or cost of the IBS.

1. A specific automation base for MTMC is stated in the AUTOSTRAD 2000 Plan. IBS will conform to the guidelines provided for hardware, software, and telecommunications. Funding to accomplish this objective will be budgeted and available in the appropriate timeframe.

2. TACOS will be fully functional and available for incorporation into IBS (including program code, hard-copy documentation, and hardware platform requirements) when needed.

3. IBS will use an RDBMS with a set of information management and analysis tools. Ada may be combined with a fourth-generation language (4GL) for programming of applications. Additional software packages that may be required include an object-oriented language, a graphics package, and a statistical analysis package.

5. It is assumed that, in CONUS, the IBS system, including a complete suite of hardware, software, and telecommunications, will reside at two sites: Eastern AC and Western AC.

6. The new system must interface with various existing or planned systems (see also Assumption 8 below), as well as with organizations that have no automated interfaces. Shippers, requestors, carriers, MTMC systems, theater-automated systems, the military services, and the MSC need to interact with IBS. Any conflicts concerning these interfaces must be resolved.

7. External, interfacing systems will not need redesign or data requirements changes; any changes to these systems which affect IBS will be communicated to the IBS designers and developers at the earliest possible time.

8. The regional database (i.e., shared data environment) which will be used by IBS and other systems (see also Assumption 6 above) will be available for use by IBS when needed. If it is not available, the IBS schedule will be adjusted.

9. The data dictionary for IBS will conform, insofar as is possible, to the Defense Logistics Standards Systems (DLSS) Dictionary and the Army Data Dictionary (ADD).

10. Any conflicts related to security issues, such as receiving data from and transmitting data to classified systems from the unclassified environment of IBS, will be resolved by MTMC.

11. No IBS hardware will require a TEMPEST configuration. IBS will be an unclassified system.

12. Any conflicts relating to database/data access and usage that could affect the integrity of the database/data and/or the sensitivity of information on unit moves will be resolved.

13. At Eastern AC, no more than 50 individuals will be logged into IBS at any one time conducting nonunit movement booking operations; no more than four individuals will be logged in at any one time conducting unit booking operations; and no more than 30 users will be logged in remotely transmitting files and/or querying the database. Therefore, a maximum of 84 users can be logged in concurrently. It should be noted that the proposed regional/corporate database may relieve some of the need for inquiries to the IBS database. Initially, however, the IBS database must be designed to handle the load given above.

15. At the Western AC, no more than 18 individuals will be logged into IBS at any one time conducting nonunit movement booking operations; no more than two individuals will be logged on at any one time conducting unit booking operations; and no more than ten users will be logged on remotely transmitting files and/or querying the database. Therefore, a maximum of 30 users can be logged on concurrently.

16. The unit line number (ULN) will <u>always</u> be available for use in booking unit movement requests for non-Army units.

17. The system must meet the needs of a wide range of MTIT users including management, bookers, personnel from Terminals Division, requesters, shippers, carriers, planners, data administration staff, and maintenance and modification staff. There will be three types of IBS user access: (1) users who are conducting the booking business, (2) users who are transmitting data to or from the system or are changing data values, and (3) users who are querying the database but not changing the data.

18. Shippers and requesters will communicate with IBS through dial-up telephone lines, the Defense Data Network (DDN), commercial value-added network (VAN) systems (e.g., Easylink), and AUTODIN. MTMC sites will communicate via local area networks (LANs) or DDN.

19. The IBS will require dedicated system, database, and data administration staff at each RDBMS site. A single IBS network administrator will be required to coordinate all network duties and issues.

20. Plans for implementing IBS OCONUS are not included in this document. These requirements must be analyzed.

3. DETAILED CHARACTERISTICS

This section lists specific performance, operational, and functional requirements for the IBS. Additional design details are found in Chapters 4-6. A Test Plan for the IBS-P was prepared by ORNL. This plan, which included a list of performance, operational, and functional requirements, could be expanded and used as the Test Plan for the IBS.

3.1 SPECIFIC PERFORMANCE REQUIREMENTS

This section presents specific performance requirements for the proposed system in nontechnical terminology. These requirements must be supported by the system design.

3.1.1 Correctness and Reliability

This section describes general accuracy requirements that will be imposed on the IBS.

Data stored in the RDBMS must be accurate to the following specifications.

1. All numeric calculations shall produce accurate results.
    - Accuracy specifications for the modeling portion of the IBS will be constrained by the accuracy specifications imposed on the data. That is, output from the model's mathematical calculations can be no more accurate than the resolution of any inputs.
    - Thus, to the fullest extent possible, data validation routines will be performed prior to entering data into the RDBMS. These routines shall include, for example, checks for out-of-range, data type, conformity with standards and conventions for formatting.

2. All algorithms shall produce accurate results.
    - Algorithms shall be tested against an expected suite of results.

- The system will be designed to provide sufficient information to determine the appropriate algorithm for use with peacetime/wartime or unit/nonunit conditions.

3. Using the same input parameters and same initial database contents, all functions shall be repeatable.

4. All results shall be expressed in units of measure that are meaningful to operational users.

   - For movement requirements being transported to an SPOE for transportation by MSC, scheduled arrival times will be given in C-date format as specified by JOPES.
   - Cargo movement requests for nonunit cargo will utilize dates in the YYMMDD format.
   - Resolution of weights for nonunit cargo will be to the nearest pound.
   - Resolution of volumes for unit cargo will be to the nearest square foot as well as to the nearest measurement ton (mton).
   - Resolution of volumes for nonunit cargo will be to the nearest cubic foot.
   - Resolution of measures of square footage shall be to the nearest square foot.
   - Resolution of petroleum, oil, and lubricants (POL) quantity will be to the nearest hundred barrels.
   - Resolution of the maximum height, length, and width measurements will be to the next higher inch.
   - Resolution of location will be in degrees, minutes, seconds, and hemisphere (DDMMSSH).
   - If needed, mode assignments will be made using actual dimension information for specific pieces of cargo.

5. A cargo movement request shall be traceable through the system from initial entry, through offering, to a status of booked and lifted.

6. Code shall be consistently written and formatted according to MTMC standards.

7. Code shall be tested for completeness.

8. A software quality assurance program shall be developed and adhered to.

9. The IBS software and data must be auditable. An audit program shall be instituted and followed.

10. A configuration management program shall be developed for IBS.

11. A set of data quality standards shall be developed; data quality policies and procedures shall be implemented and followed.

3.1.2 Efficiency and Timing

This section describes the timing requirements placed on the system. As a minimum, database performance must meet the following timing specifications. These timing specifications are based on the capabilities of the prototype system, which was developed in FoxPro, a microcomputer-based database and programming language. Therefore, these timing specifications should be reconsidered when the target system hardware and software have been determined.

- locate one record in a 100,000 record indexed table based on a single index in less than 2 sec;
- locate the last record in a 100,000 record table in less than 6 sec;
- replace 100 records in less than 4 sec;
- replace 1000 records in less than 15 sec;
- replace 10,000 records in less than 100 sec;
- execute single function "do while" loop 1000 times in less than 10 sec;
- index 100,000-record table on single 20-character key in less than 120 sec;
- index 100,000-record table on 20 character key and 8-character date field in less than 120 sec;
- sort 100,000 record table on a single 20-character field in less than 120 sec; and

- search for a substring within a single 20-character field within a 100,000-record table in less than 25 sec.

For peacetime nonunit moves, the IBS goal is to be able to book all standard (i.e., those not requiring special procedures) movement requests within 24 hours (one calendar day), assuming that the first carrier to whom the offering is made accepts the offer. (A carrier has 12 working hours to respond to an offer made through ACI.) For wartime nonunit moves, it is expected that the booking process will be quicker than peacetime nonunit moves because of the difference in priorities. For unit moves (exercises and contingencies), IBS should be able to book all movement requests in the timeframe as noted on the TPFDD (i.e., to allow a unit 2-3 weeks notice before the cargo must be at the port).

The IBS shall be available 95% of normal, regular business hours and after regular hours if needed. Downtime for maintenance and system upgrades will be scheduled in advance. This downtime will occur on a regular, scheduled basis; however, if a complete system software change is required, the downtime shall occur after regular business hours.

Responsiveness is defined as the elapsed time between a demand and the beginning of the response. If IBS does not provide a response to a database search request within 3 sec, a message will be provided to the user to the effect that processing is underway. The IBS-P User Interface Guidelines (see Sect. 1.4) describe this message in greater detail.

3.1.3 Portability

The capacity needed for IBS has been estimated. At Eastern AC, the maximum number of concurrent users is projected to be 84 (of which possibly 30 could be transmitting files and/or performing inquiries on the database; the others would be running applications, processing information, or performing maintenance duties). The total number of user identifiers (IDs) needed for IBS is about 400. This estimate of users is based on usage at

Eastern AC, because it has the highest volume of any site at which IBS would be located. The number of IBS users at Western AC (or OCONUS sites) will be smaller.

If a central CONUS database design is determined to be appropriate for IBS, which implies that all records for Eastern AC and Western AC users are contained in a single database, then the capacity limit estimated above must be increased.

The estimated size of the database (not programs) required to process unit moves should be no more than 128 Megabytes (MB). This capacity was computed as follows: consider the case in which the full AUEL (about 35,000 VAX blocks) is required to be loaded at the same time that the AUEL for reserves, the UMD, the Navy UEL, the Marines UEL, and the Air Force UEL must also be loaded. Assume that each file could be of equal size (i.e., 35,000 VAX blocks); this is a total of 35,000 x 6 = 210,000 VAX blocks. Converted to MB, 210,000 x 512 (the number of bytes per VAX block) = 108 MB. The TPFDD level 4 detail could occupy an additional 20 MB.

The estimated size of the database (not programs) required to process nonunit moves should be no more than 204 MB. This capacity was computed as follows: currently, METS II runs on a Honeywell Level 6 computer and occupies a total of about 796,240 sectors. Each sector equals 256 bytes. Thus the total disk usage is about 204 MB. The record length in METS II is 900 characters. It is possible that, with redesign, some of this space can be reduced.

Additional reference files (i.e., those not included in the METS II calculation) that may be needed by IBS (distances, capabilities, etc.) could require an additional 20 MB of disk space not computed in the above amounts.

The size of program and application files has been estimated at about 100 MB. This estimate was computed as follows: the IBS prototype was written in FoxPro, and the total space needed by the application programs is about 3 MB. The FoxPro program itself occupies about 1 MB. Modules not developed in FoxPro but which will be part of IBS could occupy another 10 MB. However, potential target programming languages for IBS include ORACLE, C++, X-windows, and Ada. The operating system will be UNIX (or a similar system). If it is assumed that the application programming code written in these languages would occupy no more than double the space required as currently written, that code would require 28 MB. Space required for loading these four languages (and possibly others, including statistical and/or graphics packages) is estimated at an additional 150 MB [ORACLE requires significant space allotment (53 MB for a workstation version and more for a server or mainframe) and 50 MB is assumed to be required for the other packages].

Thus, at least 530 MB of space is required initially for IBS databases, application programs, and commercial software packages. Since storage requirements for software packages are constantly changing, storage estimates should be updated periodically as new software releases become available. In addition, the estimate for the size requirements for the application programs is extremely conservative since it is based on requirements of a PC-based programming language rather than on that of a full-featured RDBMS with an active data dictionary and other capabilities. In addition, if Ada is used, significantly more space should be estimated.

The IBS programming language and RDBMS will be, as much as possible, machine independent. Portability over potential future hardware platforms must be considered when making the final hardware, software platform decision.

The IBS system will be developed in a modular fashion. For an overview of a suggested modular design, see Appendix D.

Sufficient comments will be provided within the program code to ensure that functionality and operability can be efficiently maintained. DOD-STD-7935A will be used as a guideline for life cycle documentation.

3.1.4 Flexibility

IBS will be a flexible system. It will provide both automated methods (e.g., the decision-support module which provides a booking assistant for identifying the low-cost carrier) as well as methods for revising the computer-generated solution.

Because of its modular design and because of recognizing in advance the potential for expansion, IBS will be expandable as future requirements are identified.

It is planned that the IBS RDBMS will interface with the shared data environment being planned by MTIT to be shared by IBS, the Worldwide Port System (WPS), and other systems, as appropriate. The IBS is not required to be interoperable with any other system, although files (generally ASCII format) will be downloaded from and uploaded to other automated systems (see Section 5.4). Requestors at remote sites will use data screens that have data fields consistent with the length and format of IBS fields. Carriers using the TELINK EDI interface with ACI will send and receive communications concerning offerings. Interaction with the ACI should be considered a module of IBS. Modules within IBS will be compatible, even though different languages and/or software development packages (e.g., a 4GL application developer, Ada, C++, and statistical and/or graphical software) may be used in their programming.

Networking is via DDN, LANs (using NOVELL Network Cards and TCP/IP protocol), VANs, and dial-in access on commercial lines. Networking compatibility is further defined in Section 5.3. Additional networking and/or communication capabilities may be required (e.g., third-party mailboxes).

3.2 OPERATIONAL AREA SYSTEM REQUIREMENTS

3.2.1 Usability

The IBS shall have an effective system design, including the database, application software, user interface, communications utility, and total hardware architecture. The design viewed by the user (screen faces, pull-down and pop-up menus, mouse and keyboard accesses, permissions, etc.) shall be consistently formatted; the system shall react consistently to user requests across all modules.

The user interface will be suitable for the users of the system. The IBS user community consists primarily of members of MTIT who are performing booking operations. These individuals will be highly skilled booking technicians but will not necessarily be skilled data processors. It is an aim of IBS that they will be able to use the system with minimal training. Periodically, the users should be polled to assess the effectiveness of the user interface and to receive suggestions for changes and additions to the system.

In-the-clear names should be used as prompts whenever possible. However, acronyms or abbreviations may be necessary due to limited screen space, particularly for the common acronyms. To help minimize erroneous or mistyped data, pop-up menus and windows should provide in-the-clear descriptions for codes used as field descriptions on data-entry screens.

The user interface should include graphical displays as appropriate (e.g., bar and pie charts are effective for showing port and/or ship usage statistics; a broken line chart could show port usage over time). Graphics output should be to the screen, printer, or file, as requested.

IBS will provide an on-line help facility that includes default, system-supplied information and error messages and a means for inclusion/substitution of developer-generated messages. This utility will be available for fields on data entry screens and for individual menu options on menu screens. Two types of help will be available: brief help and extended help. Brief help will contain one to three lines of explanation for a field, as appropriate: for example, a range of allowed values ("cube must not exceed 6 mton") or a format rule ("date format = YYMMDD"). Extended help will contain lookup tables for potential valid values. The user will be allowed to select a specific value or values for use in the application he/she is performing at the time help was requested.

Training and retraining shall be provided, as necessary.

3.2.2 Maintainability

IBS shall be of modular design, written in a simple style. The code shall be concise and consistent. All code must be thoroughly commented. Throughout design and development of IBS, the need for a flexible and easily maintained system will be stressed. Specific features that will be designed for maintainability include the following.

- Reference files: the frequency/method of update of each reference file will be included in the IBS Maintenance Manual (to be developed).
- Program files: configuration management and change control policies and procedures will be part of the configuration management program (to be developed).
- Database: a data dictionary will be developed for IBS and will be made available to the proposed corporate database environment; a policy statement for addressing data quality issues must be developed.
- System and life cycle documentation (see also Section 3.2.5): this documentation must be regularly updated.
- Hardware, telecommunication lines, and purchased software packages: maintenance agreements will be purchased.

3.2.3 Security

IBS is an unclassified system processing unclassified, but potentially sensitive, data. Precautions will be taken to ensure that the integrity of the system will be closely monitored and maintained. Additional information is provided in Section 6.

3.2.4 System Utilities

IBS will provide to a system manager sufficient information to monitor and manage system usage in the form of audit trails, journals, reports, and status messages. Information on attempts at illegal access will be provided through system reports. Information on the status of the database will be provided to a data manager and/or to a database manager. Capabilities for managing and maintaining IBS programs and the database will be provided through system utilities.

Journals will record the following information associated with the system database:

- date of update,
- time of update,
- which terminal made the changes,
- which user made the changes,
- command used to make the changes, and
- record number changed.

System utilities should provide the following:

- ability for a user to access and process another booker's ETRRs,
- a facility for supervisors to assign new or different routes to an IBS booking technician,

- the capability for IBS users to send messages to the database administrator regarding bad or erroneous data in reference files, and
- capability for the system administrator to grant or deny users access to the system.

3.2.5 Documentation

Documentation for IBS will be as required in DOD-STD-7935A. In addition, other documentation which will ensure quality operation of IBS will be produced and maintained. At a minimum, the following documents will be produced prior to implementation and will be maintained throughout the lifetime of the system: Test Plan, Functional Description, Economic Analysis, User's Manual, Maintenance/Operations Manual, System and Programming Specifications, Quality Assurance Plan, Database Specification Report, Configuration Management Plan, and Instructions for Remote Login to the IBS. An IBS Data Dictionary will be maintained on the system.

At least one copy of each of these documents will be available at each site, as appropriate. A User's Manual shall be available at each access site. The Instructions for Remote Login to the IBS will be available to all requestors and shippers who may have limited interface capabilities with IBS (e.g., terminal access for downloading and uploading files but no capability to accessing any applications or database files).

3.3 FUNCTIONAL AREA SYSTEM REQUIREMENTS

During final user reviews of the IBS-P (Western AC, January 23-25, 1991; Eastern AC, January 30 through February 1, 1991), many specific enhancements were noted by booking technicians, terminal operations personnel, and systems personnel. When feasible, these enhancements were added to the prototype software prior to its delivery to HQMTMC and the ACs. Because the prototype was not intended to be fully operational, however, many enhancements were not incorporated into the IBS-P software. Therefore, the trip notes from these user reviews MUST be consulted by system of IBS in order to incorporate some of these comments, which tend to be more specific than the general tone of this FD. The documented trip notes were made available to MTMC by ORNL.

IBS will provide functional capability to monitor, manage, analyze, and report on unit moves (exercises and contingencies), peacetime nonunit cargo moves, and wartime nonunit cargo moves. Flow charts of IBS activities are included in Appendix A.

In addition, to ensure proper and efficient booking operations, IBS must (1) interface with other systems via electronic data interchange, electronic media such as diskettes or tapes, and file transfer from a shared data environment; (2) provide on-line help to users; (3) produce both hard-copy and electronic reports and messages; and (4) maintain reference files.

3.3.1 Unit Cargo Moves

The IBS must allow MTMC, MSC, FORSCOM, and USTRANSCOM[4] to exchange data. Specifically, the following functions will be accomplished using IBS.

- Maintain all dates in C-date format.
- Receive DTS data in the format of the AUEL from FORSCOM, UMD from Transportation Coordinator's Automated Information for Movements System (TC AIMS) installations, and UEL from non-TC AIMS sites. Create an IBS unit movement requirements database.

[4]USTRANSCOM is responsible for making JOPES data available to the transportation community. JOPES will always be the primary source of Joint Deployment System (JDS) data; however, the system providing IBS with the data may be the Strategic Deployment System (STRADS). The specific process by which IBS will receive TPFDD data and by which JOPES will be updated must be determined.

- Receive appropriate data from JOPES, when available. This includes the following fields from a TPFDD Channelizer Report: UIC, ULN, POE, available to load date (ALD) at POE, POD, EAD (at POD), and LAD (at POD). Refer to Sect. 6.2.3.2 for the proposed method of declassification of the TPFDD information.

- Compare DTS data with JOPES data, and replace JOPES cargo information when the DTS data are available for a UIC/ULN combination. In cases for which a ULN does not exist in the UMD, the "basic" UIC (the first four positions) of the DTS record may be matched up with the UIC in the TPFDD. The associated ULN would then be carried over to the IBS database. Channels are created based on like SPOE-SPOD and ALD, EAD/LAD information.

- Create a scenario-specific database based on type data code and/or channelizer data.

- As changes from JOPES, UMDs, and UELs are received, update the scenario-specific database to reflect the modifications.

- <u>During peacetime</u> (i.e., for exercises), perform a port cost analysis to determine SPOE. [Transmit movement requirements by installation to Inland Traffic (MTIN), electronically if possible. Receive carrier information, line haul costs, and transit times from MTIN, electronically if possible. The purpose of this information transfer, which may be accomplished via the telephone if MTIN does not have an automated system for providing the information electronically, is to obtain data for use in performing the port cost analysis.] Create channels based on SPOE-SPOD and ALD, EAD/LAD information.

- Check port throughput thresholds against cargo arriving at the SPOE. (IBS needs to be able to assign unit cargo to a port according to either square feet or mtons.) If the threshold is exceeded, expand port's throughput, reassign cargo to a different port, or ignore the threshold value. When not enough cargo is assigned to a SPOE to justify opening the port, provide the capability to reassign cargo to a different SPOE.

- Use the unit's date available, inland transit time from origin to SPOE, estimated number of hours to load a ship, and the estimated ocean transit time from SPOE to SPOD to determine if the unit cargo can theoretically arrive at the SPOD within the EAD/LAD window. If not, prepare a message to notify the supported CINC and USTRANSCOM.

- Separate and identify types of cargo within channels to be offered to MSC. Create an offering to MSC.

- Transmit offerings to MSC, electronically if possible.

- Receive ship schedules from MSC, electronically if possible.

- Compare responses from MSC with MTIN movements to ports; for those units that are unable to arrive at the port in time, send notification message to the CINC.

- Allocate cargo from MSC offering to ships listed on the ship schedule. Cargo is assigned to a ship based on type, RDD, POE, POD, and space availability. Unit cargo with earliest RDD and highest priority moves on the earliest available "like" ship (e.g., trucks on RORO ships). Cargo is assigned trying to achieve a 75% efficiency of the ship's capacity.

- Generate port call schedule using units, port arrival dates, and vessel schedule information in the format of a Port Call Message. Also provide a Unit Cargo Release report (UCR). (The Port Call Message and the UCR perform the same function but are sent to different recipients.)

- Update channels by deleting existing channels, adding new channels, or modifying the UICs/ULNs within a channel. Provide capability to add, change, or delete UICs from an existing channel and to change the POE and POD for a single UIC/ULN within a channel, thereby assigning the UIC/ULN to a new channel.

- Modify header and detail records in both the IBS unit movement requirements database table and the scenario-specific database as needed.

- Respond to all ship modifications; update the IBS database tables as appropriate.

- Transmit the record to the proposed shared data environment (or WPS).

- Update JOPES as appropriate (e.g., ship manifests). (This update may occur via the STRADS interface.)

- Generate the following reports: Channel Summary Report, Port/Cargo Workload Report, Port Call Message, Export UCR, cargo summaries for offerings, cargo summaries for ships, Ship Characteristics Report, Manifested Cargo Report, channel listing, unit listing by port/ship/channel/offering, historical reports, Port Cost Analysis, Inland Traffic Report, ship schedule, and mileage report.

- Allow queries to the database. Both ad hoc (using data-entry screens) and pre-formed (for frequently needed information) queries should be possible.

3.3.2 Peacetime Nonunit Cargo Moves

Currently, a system (TACOS) is under development which uses artificial intelligence techniques to book nonunit peacetime cargo to the lowest cost carrier. This system will be incorporated as a decision-support module within IBS. The incorporation will be transparent to the IBS user. When IBS receives a request which fits the requirements of being processable by the decision-support module, this request will automatically be routed to this module for processing. The results (i.e., a low-cost carrier offering) will be offered through ACI. The decision-support capabilities will be referred to from now on as the decision-support module. For additional information on the development of this system, refer to the TACOS Functional Description or applicable documentation. The term "booker's assistant" refers to that function of the decision-support module which assists users in manually selecting a carrier and vessel. Cases will exist when it is not advantageous to use the automated portion of the decision-support system; in these idiosyncratic cases, the booker's assistant will be available. Some examples of instances when the booker's assistant should be used are as follows:

- only one carrier provides service along the necessary route,
- the needed route is not covered under the MSC rate agreement,
- the ETRR is a request for movement of ammunition,
- the ETRR is for a foreign flag move, and/or
- the ETRR is for a foreign military sale.

The activities listed in this section constitute most of the effort of IBS. Actions to be completed include the following functional requirements for all containerized movement requests:

- Receive a request from an authorized requestor.

- Validate the request. This process includes validating DOD Activity Address Codes (DODAACs), lading term codes, port codes, commodity codes, transportation mode codes, funding agency codes, dates, and van size. Any nonfatal errors will be corrected by the user (e.g., invalid/unrealistic requested delivery date). ETRRs containing fatal errors (e.g., scrambled data) will be rejected.

- Allow queries to the database. Both ad hoc (using data-entry screens) and pre-formed (for frequently needed information) queries should be possible.

- Receive ship schedules from carriers. System should assign voyage document number but allow user to modify.

- Permit the user to update the request (if necessary).

- For movement under the MSC Rates, the decision-support module will recommend the "best" carrier for both container and breakbulk movement requests.

- Use the "booker's assistant" for movement requests not covered under the decision-support module (e.g., ammo requests). The assistant will aid the user in selecting a carrier and ship.

- Allow the booking technician flexibility for overriding and or making changes to automated booking decisions, as appropriate.

- Communicate with MSC for approval of nonstandard moves (e.g., use of foreign flags).

- Offer the request to the carrier via the ACI for booking.

- Book the request.

- Assist the user in preparing the ETR and then transmit the ETR to the requestor.

- Produce the shipping order/clearance order (SOCO).

- Provide support reporting capabilities such as the ETRR, Lifted vs Booked Report, Container Lift Report, and Carrier Usage Report.

The same requirements listed above apply to processing of breakbulk shipments with the following exceptions.

- The ACI is not used. (However, it is proposed that ACI will be used to offer breakbulk bookings at some point in the future.)

- Carriers do not provide origin to POE service, nor POD to destination service; therefore, the IBS must arrange with MTIN or the individual ITOs for these transportation legs.

- IBS can call the cargo forward to the port without it being completely booked. This allows the cargo to begin moving toward the port. Once received at the port, the port submits a request for booking on the breakbulk cargo. (At the Western AC, breakbulk cargo is booked into the Military Ocean Terminal, Bay Area, or is free-flowed in for consolidation at the terminal.)

- IBS reference files must contain a list of the ports that are capable of handling breakbulk.

- Because most of the breakbulk traffic is RORO, IBS must contain a reference file of ship capabilities. (CODES contains a ship characteristics file from which an extract could be made for IBS usage. IBS does not need the extensive detail contained in CODES.)

The requirements listed for container shipments apply to shipments of hazardous materials, protected cargo, containerized petroleum products, ammunition, and other special types of cargo. The only difference, as far as IBS is concerned, is found in the commodity code. If the commodity code indicates that a shipment can only be shipped out of particular ports (e.g., ammunition), then IBS must route this type of cargo appropriately.

3.3.3 Wartime Nonunit Cargo Moves

The wartime resupply functionality is divided into two types of conflict: (1) limited (e.g., Operation Desert Shield) and (2) global. In both cases, wartime resupply requests will be received with precisely the same procedures as far as the IBS user is concerned. That is, requests will be submitted to IBS and the cargo movements will be processed using identical data-entry screens. The difference between the two systems is found in the algorithms.

During limited conflict, rates will exist for booking cargo to the crisis region. The decision-support module will book the cargo in the same manner as peacetime nonunit cargo (as described in Section 3.3.2).

In the event of global conflict, nonunit cargo and unit cargo are competing for the same shipping assets. Therefore, it is critical that both the OCCA and Terminals Division have access to the same ship schedules and availability on any given ship. To determine whether unit cargo or nonunit cargo has priority, the priority, RDD, and LAD of each competing cargo request are checked. The highest priority cargo is assigned to the ship. Lower-priority resupply cargo can be used to fill ships transporting unit cargo. Because flexibility during a contingency is critical, the system must also have the capability of using unit cargo to fill ships transporting nonunit cargo.

To process a nonunit request during global conflict, the IBS will provide capabilities similar to the peacetime "booker's assistant." The differences are that the "global assistant" will access all vessel schedules, calculate priority between unit cargo and nonunit cargo, and be able to book resupply cargo to a ship containing unit cargo. IBS must also be able to book resupply to both the port and to a ship. The following activities are expected to occur.

- Receive a request from an authorized requestor.[5]
- Validate the request. This process includes validating DODAACs, lading term codes, port codes, commodity codes, transportation mode codes, funding agency codes, dates, and van size. Any nonfatal errors will be corrected by the user (e.g., invalid/unrealistic delivery date). ETRRs containing fatal errors (e.g., scrambled data) will be rejected.
- Allow queries to the database. Both ad hoc (using data-entry screens) and pre-formed (for frequently needed information) queries should be possible.

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[5]If JOPES is enhanced so that resupply data is tied to specific sources and tonnages are more accurate, it is possible that IBS could receive wartime resupply data from JOPES (see Sect. 3.3.1 for information on the JOPES interface). This possibility should be reanalyzed in the future.

- Permit the user to update the request (if necessary).

- Use the "global assistant" to assist the user in selecting a POE and ship based on the requested date at the destination and transportation priority of the cargo. The assistant will analyze cargo type, ship types and schedules, space availability on the ships, and port capabilities.

- Allow the booking technician flexibility for overriding and or making changes to automated booking decisions, as appropriate.

- Communicate with MSC for approval of booking cargo.

- Book the request to the ship, after approval from MSC.

- Assist the IBS user in preparing the ETR and then transmit the ETR to the requestor.

- Produce the SOCO.

- Provide support reporting capabilities such as the ETRR, Lifted vs Booked Report, Container Lift Report, and Carrier Usage Report.

The same requirements listed above apply to processing of breakbulk shipments with the following exceptions.

- IBS must arrange with MTIN or the individual Transportation Office for transportation between origin-to-POE and POD-to-destination legs of the cargo move.

- IBS can call the cargo forward to the port without it being completely booked. This allows the cargo to begin moving toward the port. Once received at the port, the port submits a request for booking on the breakbulk cargo.

- IBS reference files must contain a list of the ports that are capable of handling breakbulk.

- Because most of the breakbulk traffic is RORO, IBS must contain a reference file of ship capabilities.

3.3.4 Interfaces

Functionally, it is imperative that IBS interface with systems to receive, process, and complete booking requests. Technical requirements for interfacing with other systems via both automated and manual means are described in greater detail in Section 5.4, "Interfaces." Inputs and outputs to IBS are described in Section 3.4.

3.3.5 Reports

IBS will provide the following resupply hard-copy reports: ETRR, Container Lift Report, SOCO Report, Lifted vs Booked Report, Carrier Usage Reports, vessel schedule, and historical reports.

The following unit moves hard-copy reports will be available in IBS: list of infeasible UICs/ULNs for deployment, UIC/ULN Detail Report, UIC Summary Report, Channel Summary Report, rollup by installation, Port Workload Report, Port Call Message, export UCR, cargo offerings to MSC, pre-manifest cargo listing, Port Cost Analysis, ship schedule, list of UICs/ULNs not allocated to a vessel, and historical reports.

Sample report formats are located in Appendix C. It must be noted that <u>many</u> additional reports are currently printed automatically by METS II. As IBS is developed, a more precise analysis of these reports should be conducted to ascertain their usefulness. It is believed that many (if not most) periodically printed hard-copy reports can be eliminated when the same information is available (through IBS) for easy access to the screen.

3.3.6 Reference Files

IBS shall maintain the following reference files: Geofile, MAD file, installation address file, ports data file, estimated ocean transit times, ship loading and unloading times, average ship characteristics data, distance between ports, land mileage between CONUS military activities and major U.S. ports, MSC rate files, vessel schedules, a vessels file, and a zip code file used for determining drayage zones.

IBS must be able to query and to maintain, including updating, the above reference files. For example, IBS will be able to update the ship call sign and vessel schedules and will be able to query carriers, vessels, and vessel schedules files.

3.4 INPUTS AND OUTPUTS

This section provides information on each input and output data file to be used for the IBS. Reference files will be accessed for identification of codes and geographical location information used by the IBS. Table 3.1 lists each IBS requirement and identifies whether the file is an input, output, or reference file.

3.4.1 UNIT CARGO MOVES

The file structures for all required reference files as currently defined are given in Appendix B.

3.4.1.1 Input Files

Movement requirement files contain data on the unit equipment to be moved, time frames within which the cargo must arrive at its final destination, the locations from which and to which the cargo is moving, and other information needed in selecting the best routing for the cargo. Movement data for exercises or contingencies are supplied to the MTMC ACs directly from FORSCOM (the AUEL), from JOPES (the TPFDD), and/or from the units requiring transportation (UMDs from TC AIMS and UELs from non-TC AIMS sites).

Table 3.1. INTERFACING INFORMATION FOR IBS DATABASE

File	Class	Notes
Movement Requirements		
ETRR File	input	a
FORSCOM AUEL	input	a,b
JOPES TPFDD Force Record File	input	a,b
TC AIMS UMD File	input	a,b
UEL	input	a,b
Vessel Data		
Vessel Schedules File	input	a
Carrier Data		
ACI Data	input/output	
Release Data and/or Reports		
Export Traffic Release	output	a
Port Call Message	output	a
Export UCR	output	a
Skeletal ATCMD (nonunit moves)	output	
ATCMD (unit moves)	output	
Cargo Movement Release (breakbulk call forward)	output	c
UIC Summary Report	output	
Channel Summary Report	output	
IBS Detail List for Individual UIC	output	c
IBS Rollup Detail List by Installation	output	c
Port Workload	output	
Ship Schedule	output	c
Automated SOCO	output	c
Reference Files		
JOPES Geofile	reference	a
Master Address Directory (MAD)	reference	a
Installation Address File	reference	a
MSC Rates Files	reference	a
Commodity File	reference	a
Vessels File	reference	a
Ship Loading/unloading Times	reference	a
POE-to-POD Mileage File	reference	a
POE/POD File	reference	a
Inland and Ocean Transit Times	reference	a
Ship Characteristics	reference	a
Port Capabilities	reference	
DODIC File	reference	a
Miscellaneous Codes File	reference	a

[a] A copy of the anticipated file structures for each of these files is given in Appendix B: Appendix B.1 contains unit moves formats; Appendix B.2, nonunit; Appendix B.3, reference files.

[b] These files are received and used to build the IBS unit movement requirements database table. After incorporation of their data into IBS, the contents of these imported data files are erased.

[c] See sample report formats in Appendix C. Additional reports will be required.

The AUEL is received at HQMTMC from FORSCOM on tape in ASCII format via the WIN. The AUEL is declassified at HQMTMC and transmitted to the ACs for use in processing unit moves. The AUEL contains an inventory list of equipment at the ITOs as of the last update performed by FORSCOM. The AUEL tape may contain all FORSCOM units or may be prepared for a specific exercise or contingency.

The JOPES TPFDD data file contains descriptions, routing, and aggregated cargo movement characteristics of forces defined for a specific OPLAN. The TPFDD Force Record File provides descriptions, routing, and aggregated cargo movement of forces defined for a specific OPLAN. It contains level 1 and 2 data for movement requirements.

TC AIMS data is provided to the MTMC ACs by deploying units at TC AIMS installations. This information gives the latest listing of the equipment which is actually being moved by the unit. The UMD Header Record File contains movement information for an entire shipment unit. The UMD Detail Record File contains movement information by TCN for each piece of equipment being transported.

Army non-TC AIMS sites and Navy, Marine, and Air Force units supply UELs. Automation of this information is needed and should be made available for IBS use.

3.4.1.2 Output Files and Reports

System outputs for unit moves include both release messages and reports as noted below.

Release Files

The Port Call Message provides the deploying units and other interested organizations with port information, port call dates, and deployment instructions.

The Export UCR provides the unit with the deployment mode, assigned SPOE, port information, and vessel data. The Export UCR Header Record contains general information to call units forward to a SPOE. The Export UCR TCN Record provides a listing of all TCNs released that were included in the referenced UMD set.

Reports

A list of unit reporting requirements is discussed below. Sample report formats are given in Appendix C.

The List of Infeasible UICs/ULNs for Deployment produces on-screen and hard-copy reports detailing the UICs/ULNs which theoretically cannot meet the LAD.

The UIC Summary Report generates a hard-copy report for a selected UIC. The detail records are "rolled-up"; that is, all items with identical line item numbers are summed into one record. Data items contained in the report include installation information, SPOE and SPOD information, vessel data, and equipment specifications, including unit totals and commercial requirements.

The Rollup by Installation Report generates a hard-copy report for a selected installation. The detail records are "rolled-up"; that is, all items with identical line item numbers are summed into one record. Additional data items contained in the report include installation information, unit totals, and commercial requirements.

The Channel Summary Report generates a hard-copy report for a selected group. The detail records for all UICs within the channel are rolled-up. Data items contained in the report include channel name, vessel information, equipment specifications, and unit totals.

The UIC/ULN Detail Report generates a hard-copy report for selected UICs. The detail records are one item per record. The report includes unit data, installation information, and equipment specifications.

The Port Workload Report generates an on-screen and hard-copy report detailing a port's workload for the active time period. The report includes unit data anticipated at the port on the specified date.

The Ship Schedule Report generates an on-screen and hard-copy report of the selected ship's schedules. Each voyage is printed on a different page. The report includes the ship name, call sign, and each port-of-call along with the arrival date, arrival time, sail date, and sail time.

The Port Call Message produces on-screen and hard-copy reports of the message to be disseminated. The message contains port call dates and port information for deploying units and instructions on deployment.

The Export UCR Report produces on-screen and hard-copy reports for the selected release number. The report includes general information to call units forward to a SPOE and the TCNs covered by the UCR.

The Premanifest Cargo Listing generates on-screen and hard-copy reports of the unit cargo assigned to an actual or notional ship. The report includes unit cargo specifications, port information, and vessel data.

The List of UICs Not Allocated to a Ship will provide on-screen and hard-copy reports of all unit cargo which has not been allocated to a vessel.

3.4.2 Peacetime Nonunit Cargo Moves

During normal peacetime operations, authorized requestors submit ETRRs to the booking branches at the ACs. These requests contain data on the cargo to be moved, timeframes within which the cargo must arrive at its final destination, the locations from which and to which the cargo is moving, and other information needed in selecting the best route of movement for the cargo. Peacetime ETRRs can be constructed on a PC and transmitted to IBS electronically, or they can be entered on-line by an authorized requestor.

3.4.2.1 Input Files

The Defense Traffic Management Regulation (DTMR), Army Regulation 55-355/NAVSUPINST 4600.70/AFR 75-2/MCO P4600.14B/DLAR 4500.3, provides a complete listing of the data field elements and valid input codes for an ETRR. For each data element, the DTMR provides the field name and size and an explanation of the field name or types of response required.

The ETRR Header Record File contains the R11 and R14 record formats for container and breakbulk nonunit movement requirements. In addition, it also contains the offering/booking data for the request. The ETRR Detail Record File contains the R21 and R24 record formats for breakbulk nonunit movement requirements. The ETRR Outsize Specification File contains the R23 record format for breakbulk nonunit movement requirements.

The Vessel Schedules contain the active ports-of-call for all ships operated by the participating carriers. The schedules are linked to a reference file containing vessel information such as call sign and operating carrier.

The ACI input and output files are offerings and counter offerings from the OCCA to the carrier and response from the carrier to the OCCA.

3.4.2.2 Output Files and Reports

Nonunit system outputs during peacetime include both release messages and reports as noted below.

Release Files

The ETR provides the requesting organization with all the booking information for the referenced request. Primary outputs are the selected carrier, POE to be used, date due at POE, vessel information, and booking remarks. Also included in the release are rating and routing data to the requester.

Reports

A discussion of nonunit reporting requirements is given below. Sample report formats are given in Appendix C.

The Cargo Movement Request Report provides on-screen and hard-copy reports for a selected port call file number. The report contains cargo specifications, carrier data, vessel information, rating and routing data, and booking remarks.

The Ship Schedule Report generates an on-screen and hard-copy report of the selected ship's schedules. Each voyage is printed on a different page. The report includes the ship name, carrier, call sign, and each port-of-call along with the arrival date, arrival time, sail date, and sail time.

The SOCO Report generates on-screen and hard-copy reports for the selected voyage document number. Data items contained in the report include ship information and detail information for each container and breakbulk item booked to the specified voyage.

3.4.3 Wartime Nonunit Cargo Moves

The required input and output files for the wartime nonunit cargo booking are identical to those required during peacetime nonunit booking except for the carrier reports (Sections 3.4.2.1 and 3.4.2.2).

3.4.4 Reference Files

Formats for all the reference files used by IBS are found in Appendix B.

The JOPES Geofile is the largest reference file to be maintained by IBS. It provides information for all registered geolocation codes for origins, POEs, intermediate locations, PODs, and destinations used by the Joint Deployment Community automated systems. The Geofile is used for booking unit moves.

The MAD file supplies current valid addresses and in-the-clear addresses for all shippers known to the DOD; it is used for both peacetime and wartime booking operations.

Various rate files are contained in IBS. The MSC Rate Files are updated semiannually. The MSC Breakbulk Rates File contains the current rate cycle figures negotiated by MSC for breakbulk moves. The MSC Container Rates File contains the current rate cycle figures negotiated by MSC for container moves. Other rate files include port-handling costs.

Reference files provide location information and cross-references for codes used in the IBS. The Commodity File is comprised of all valid commodity codes and in-the-clear definitions for each. The DOD Identification Code (DODIC) file supplies a valid six-position DODIC.

The MTMC ACs are supplied vessel and schedule information by the commercial carriers with MSC contracts. This information provides the sailing schedules and general data for the ships operated by each carrier. The port lookup table contains in-the-clear port names. Port characteristics information is contained in the port characteristics file which must be developed for use by IBS.

The POE/POD file provides all three position POEs and PODs, geographic code (GEOCODE), and in-the-clear location information.

Other reference files include the following:

- mileage from CONUS cargo sites to ports,
- estimated inland transit times,
- load time needed to load particular types of ships,
- ocean mileage from POEs to PODs,
- ocean transit times to travel a particular number of miles at a given nautical speed,
- POE to POD mileage,
- port throughput thresholds for SPOEs,
- stow factor files by ship and cargo type.

3.5 DATABASE CHARACTERISTICS

An RDBMS structure will be used for the IBS. The logical connectivity among data files for the IBS is shown in Table 3.2. For each data file, the data files to which it is linked and the key field for the linkage is displayed.

3.6 FAILURE CONTINGENCIES

This section provides a discussion of the alternative courses of action that will satisfy the information requirements if IBS fails.

3.6.1 Backup

Until a specific hardware acquisition has been determined, a precise backup plan for hardware is not feasible. The current plan, however, is that hardware backup at the ACs will be provided by having compatible hardware located at each of the CONUS ACs. Telecommunications capabilities will be identical at each of the sites. Hardware configurations, except for sizing, at the ACs will be identical. Thus, if hardware at a particular site becomes dysfunctional, the equipment at the alternate site may be used temporarily as a backup unit. It should be noted, however, that this extra load may be impossible to accommodate, especially if the Western AC (the smaller site) must do the booking for both ACs.

Hardware at remote login sites (e.g., HQMTMC, requestors, shippers) serves only to log into IBS and upload/download files or perform inquiries on system data. It is not necessary for IBS to back up this hardware.

Table 3.2. RELATIONSHIP AMONG DATA FILES FOR IBS

Database	Linked to	By
AUEL	JOPES Level 3 Data	ULN
	TC AIMS UMD Header Record	UIC ULN type UMD
ETRR Header Record	ETRR Detail Record	port call file number
	ETRR Outsize Specification	port call file number
	Vessel Schedules	voyage document number
	Vessels	voyage document number carrier id
	Master Address Directory	DODAAC zip code
	MSC Breakbulk Rates	carrier id route index
	MSC Container Rates	carrier id route index
	POE/POD File	port code
	ETR	port call file number

ETRR Detail Record	ETRR Header Record	port call file number
	ETRR Outsize Specification	port call file number sequence number
	Master Address Directory	DODAAC
	NMFC/UFC File	freight classification number
	Commodity File	commodity code
ETRR Outsize Specification	ETRR Detail Record	port call file number sequence number
TPFDD Force Cargo Detail Record	AUEL	ULN
TC AIMS UMD Header	TC AIMS UMD Detail	UIC ULN type UMD
	AUEL	UIC ULN type UMD
	Master Address Directory	DODAAC SPLC
TC AIMS UMD Detail	TC AIMS UMD Header	UIC ULN type UMD
	Commodity File	commodity code
	NMFC/UFC File	freight classification no.
	DOD Identification Code	DOD identification code
Vessel Schedules	ETRR Header Record	voyage document number
	Vessels	voyage document number
	POE/POD File	port code

Vessels	ETRR Header Record	voyage document number carrier id
	Vessel Schedules	voyage document number
	MSC Container Rates	carrier id
	MSC Breakbulk Rates	carrier id
Domestic UCR Header	Master Address Directory	DODAAC
	Domestic UCR ULN Data File	key ID (requestor DODAAC + requestor ID)
	Domestic UCR Alternative	key ID
Domestic UCR ULN Data File	Domestic UCR Header	key ID
	TC AIMS UMD Detail	ULN
Domestic UCR Alternative	Domestic UCR Header	key ID
ETR	ETRR	port call file number
Export UCR Header	TC AIMS UMD Header	UIC ULN
	Master Address Directory	DODAAC
	Geofile	geocode
	Export UCR TCN Record	release number
Export UCR TCN Record	Export UCR Header	release number
	TC AIMS UMD Detail	UIC and ULN and TCN

Application software will be backed up to ensure that onsite software is available if the programs become corrupted. Reference data files will be backed up when new versions are received so that a backup copy of the most recent reference file is always available. The working database of movement requests being processed must be backed up daily. An archived copy must be stored on removable media in case the AC work areas are damaged or destroyed. In addition, a transaction log will be maintained of all transactions against the database.

Algorithms for processing requests differ in some respects between the Eastern AC and the Western AC commands. (For example, block booking is practiced at Western AC.) In general, however, the booking business is very similar at both ACs. IBS code will incorporate the total booking process performed by both ACs, and the code will reside at both sites. Although some code residing at the Eastern AC (e.g., assistance for block booking) may be accessed infrequently or not at all, it will be available if necessary and will not interfere with normal operations.

Thus, if necessary, either command could use the software resident on the computer system at the other site; it should be noted, however, that the database of requests for each site will be resident only at that site unless it is decided that a single database would be the preferred architecture. Sizing and performance issues are still being considered concerning this issue.

3.6.2 Fallback

In case of total failure of the system during a contingency, the existing manual system will be the fallback. Printed copies of RDBMS output files, and reports must be maintained at HQMTMC and the ACs to serve as a starting point in case of system failure. Procedures must be developed to ensure that thorough configuration management controls are produced to protect MTMC data needs in case of system failure.

4. DESIGN CONSIDERATIONS

This section briefly describes how IBS will satisfy the requirements stated in Sections 2 and 3. It should be noted that a final system design has not yet been determined and that the proposed hardware and software described in this chapter are only potential candidates as the target architecture. Until an architectural analysis has been completed, the following suggested design considerations should be considered DRAFT proposals.

4.1 SYSTEM DESCRIPTION

The IBS will operate in an unclassified environment. The unit moves portion of IBS, though unclassified, contains sensitive information. Therefore, the system, including hardware, telecommunications and networking, and database partitioning, will be designed to protect data from unwarranted access. This requirement must be considered during the architectural analysis.

Complete system hardware and software will be located at the MTMC ACs. The hardware configuration at each site must contain sufficient computing power to provide the capabilities described in Section 3. For additional information about the IBS hardware configuration, see Section 5.1.

The IBS application programming language and associated RDBMS is, at this time, assumed to be ORACLE[6] or another 4GL and RDBMS of similar capability. The portion of IBS using artificial intelligence techniques is currently written in LISP; however, it will be converted to a programming language (possibly C++) with hooks to the 4GL language

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[6]Trademarked ORACLE Corporation, Belmont, California.

of IBS. Links to and from the decision-support module from the IBS programs must be transparent to the IBS user. For additional information about the IBS software configuration, see Section 5.2. Additional programming languages that may be linked to IBS include Ada, a statistical package, and/or a graphics package.

It is currently proposed that IBS will eventually read from and write to a MTIT corporate database. IBS will have interfaces with other automated systems (via removable electronic media exchange, ASCII files communicated electronically, or the corporate database). Requestors and shippers may log on via remote access and upload requests in the form of preformatted data-entry files. Carriers will have access to IBS via the ACI. MTMC directorates will have access via remote logins. Other agencies with whom IBS must communicate are MTIN and MSC; however, these modes of communication have not yet been determined and may be manual hard-copy reports. Access privileges for each of these interfaces with IBS must be clearly defined; some "users" will have limited access. Limitations for some users will be bounded by the portions of the database that they can access; some will be bounded by read-write-update privileges. For additional information on the IBS communication architecture and on system interfaces, see Section 5.4.

4.2 SYSTEM FUNCTIONS

IBS will be designed to accommodate the performance requirements listed in Section 3.1. These performance requirements address correctness and reliability, efficiency and timing, portability, and flexibility. IBS will be designed to accommodate the operational requirements listed in Section 3.2. These operational requirements address usability, maintainability, security, system utilities, and documentation. IBS will be designed to accommodate the functional requirements listed in Section 3.3. These requirements include the functionality to conduct unit moves, peacetime nonunit cargo moves, and wartime nonunit cargo moves and the capability to interface with certain other systems, to produce reports (ad hoc and formal), and to maintain reference files. The system environment presented in Section 5 must be sufficient to ensure that all performance, operational, and functional requirements can be met.

4.3 FLEXIBILITY

IBS will be designed to ensure flexibility. This design includes the following specific areas:

- flexibility of data input mechanisms,
- flexibility of using either computer power to perform tasks (e.g., choosing port or allowing the user to input chosen port),
- flexibility to change the value of a field when that value was automatically supplied; if the change could cause an error in the database or the booking procedures, the booking agent must receive a warning message,
- flexibility of performing queries (pre-formed or free-form),
- flexibility of making system changes (include configuration management checks and balances procedures), and
- flexibility for incorporating new requirements.

4.4 SYSTEM DATA

Input, output, and reference data files are listed in Section 3.4. Appendix A of the Database Specifications for the Integrated Booking System Prototype (IBS-P) (see Sect. 1.4) contains detailed descriptions of all IBS-P data files, including record structure, field descriptions, and physical mapping between database files. Appendix B of this FD contains some suggested data structures for tables within the IBS database. Due to anticipated programming language differences between the IBS-P and IBS, the structures in the above document may not be accurate enough for the target system.

4.4.1 RDBMS Capabilities

An RDBMS will be used to provide simplicity, flexibility, and ease of use to both developers of the system and end users. It is required that changes to the structure of the database minimize recompilation of existing application programs, and it is highly desirable that such changes minimize reloading of the database. The RDBMS must include the ability to define indexes to enhance system performance.

Because modularity and ease of expansion are readily obtained in state-of-the-art computer hardware and local area networking is widely practiced, it is important that the RDBMS be able to distribute both databases and components of the databases among the physical and logical components of a LAN **IF** (and only if) it is determined that distributed databases are desirable. Database distribution should be transparent to users, and system developers should be able to allocate functions in a LAN to optimize workload distribution and other external system properties without compromising database integrity. It would be premature to decide to implement a distributed database design at this time, however.

Several users will interact concurrently with the databases using a LAN, so it is essential that data integrity be maintained during concurrent use and that system overhead associated with multi-user access not seriously degrade performance. Requirements for RDBMS sizing, speed, security, report-writing capabilities, applications generator, and other features were determined during prototype development. Brief descriptions of some RDBMS features required of the system are described in the sections below.

4.4.2 Programming Tools

The RDBMS should have the following programming tools to enhance system development and system performance. The RDBMS must provide the following:

- The capability to group query language statements into logical transactions so that no operation is performed unless all of the commands in the group are performed.

- Structured query language (SQL) and possibly SQL extensions that allow easy access to the databases for data definition, control, entry, retrieval, and data manipulation.

- A procedural language interface that includes the ability to interface with one or more high-level procedural languages and allow host procedural language programs to enhance facilities of the RDBMS.

- A logical view facility that supports definitions of logical views of data in one or more databases so that individual users may have ready access to needed portions of the databases and ONLY to portions that are appropriate for their use.

- Optionally, a stored procedure facility that has the capability to group and name operations for subsequent reuse in queries, reports, and screens.

4.4.3 Data Integrity Controls

The RDBMS must have the following checks and controls to validate input and concurrency controls:

- On-line data validation that provides for automatic verification of data or for verification in applications programs as data is added or updated.

- Concurrency control that ensures data integrity during attempted simultaneous access.

4.4.4 Data Input

The RDBMS must have the following capabilities for real-time and batch data input:

- A capability for loading and updating RDBMS tables from externally supplied input.

- An applications generator that provides for customized data entry capabilities.

- A utility for assessing the correctness and completeness of data entering the system and to alert the data administrator if the data quality is not adequate for system requirements. The utility must provide a means by which the data administrator can manage data input.

4.4.5 Data Output

The RDBMS must have the following capabilities for real-time and batch data output:

- An applications generator that provides for customized data retrieval capabilities both to the screen and for generation of plain-paper reports.

- A report generator that includes facilities to generate reports that range from simple default tabular listings to paged, titled, formatted output.

- Application-defined, formatted ASCII or other files suitable for external transmission to and/or processing by other programs.

- Data output onto existing standard preprinted forms (e.g., the ocean GBL).

- An integrated software package that supports communication of information to and from systems outside the LAN, as appropriate.

- An archiving capability (preferably automatic) that allows for archiving of selected records or tables in the RDBMS.

4.4.6 Data Security

The RDBMS and/or associated tools must have the following data security system capabilities.

- A data security system that provides security from unauthorized access and the ability to limit access at various levels of the data structure.

- Physical security that provides protection from data corruption due to hardware or system software failure.

- Physical security that provides protection to application programs.

For additional information on security, see Section 6.

4.4.7 Data Dictionary

The RDBMS must have a data dictionary/directory that provides a central integrated facility that contains definitions of all tables, data elements, views, indexes, access privileges, and other organizational characteristics of databases.

5. ENVIRONMENT

5.1 EQUIPMENT ENVIRONMENT

In CONUS, IBS, with a full complement of hardware and software, will be located at the ACs. One potential hardware configuration at the Eastern AC is listed below. A hardware platform of equivalent or greater power, capacity, and response could be substituted. The Economic Analysis for IBS and the Architectural Analysis will consider alternative potential hardware configurations.

- Minicomputer -- (may need to link multiple minicomputers)
    - 24-MHz system board
    - 32-bit processor
    - Floating point coprocessor
    - 64-MB of RAM
    - Three 5.25-in. nonremovable 327-MB hard disk drives for a total of 981-MB of formatted storage
    - 125-MB SCSI cartridge tape drive
    - One 155-MB medium-capacity removable disk storage device
    - 720-KB floppy disk
    - SCSI host adapter card

- UNIX operating system

- Workstation
    - VGA high-resolution graphics color monitor (14 or 16 inch)
    - Serial mouse and driver
    - 101-key enhanced keyboard
    - 16-MB RAM
    - 25-MHz (or possibly 33-MHz) processing speed
    - 157-MB, 16-ms, SCSI hard disk drive

- Laser printer for complex or extra high-quality printing requirements
    - High-resolution, low-speed (300 x 300 dots per inch; 8 pp/min)
    - Supports complex graphics and multiple user-selectable fonts

- Laser printer for fast page printing
  - High-quality, high-speed (300 x 300 dots per inch; 24 pp/min)
  - Five type fonts and multiple pitches

- Boards and/or external units to complete the following networking requirements
  - DDN X.25 network
  - IEEE 802.3 LAN[7]
  - RS-232C dial-in ports
  - Ethernet board with interface to RG58

It is possible that a similar hardware configuration with fewer workstations will be placed at the Western AC. Alternatively, a larger capacity, more powerful database server/application processor could be installed at and maintained by Eastern AC and accessed by both ACs. A centrally managed database has some advantages. This option needs to be pursued further before a final decision is made.

5.2 SUPPORT SOFTWARE ENVIRONMENT

The following commercial software is proposed for development of IBS. A 4GL software environment of equivalent or greater capability and with equivalent or greater features could be substituted for the ORACLE RDBMS and applications software.

- UNIX operating system,

- ORACLE RDBMS,

- ORACLE management system tools
  - ORACLE SQL* Forms
  - ORACLE SQL* Plus
  - ORACLE SQL* Menu
  - ORACLE Easy* SQL
  - Network Station (SQL*Net)
  - Report Writer

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[7]The MTMC standard LAN card is the NE1000.

- C compiler or C++ compiler (to be used for programming the decision-support module; see Section 3.3.2). (Prior to a final decision on the software, designers will ensure that the programming software for the decision-support module has hooks to the 4GL being considered.)

- X-Windows plus a graphical user interface (possibly not required),

- a graphics package, and

- Ada compiler (It is possible that Ada may not be required.)

- Communications software
    - TCP/IP WIN/3B Interface Package
    - software to permit file sharing
    - software to permit a workstation or personal computer to handle communications

The application software, proposed to be developed primarily in ORACLE and in C (or C++) with some modules possibly being written in Ada, is described functionally in Sections 3.2, 4.2, and 5.2 of this report. It will be described in technical terms in the IBS Maintenance Manual.

5.3 COMMUNICATIONS REQUIREMENTS

The system must be capable of interacting with automated types of communications. For example, IBS will be capable of communicating directly with a corporate database which will also be accessed by the WPS and, possibly, other automated systems [e.g., the Transportation Discrepancy Report (TDR) system]. Other communications requirements include accepting user input via the keyboard and data entry screens and data input via direct communication with other automated systems (i.e., not through the shared data environment) through phone lines, including the DDN and FTS 2000. Although shipment requests have in the past also been received via AUTODIN, by telephone, and by mail, future plans are that all requests will be automated. This automation may occur through the use of VANs and third party mailboxes. The precise mechanism for this automation has not yet been determined.

The communications hardware includes a LAN board in each workstation. The NOVELL network system has been proposed because it is compatible with the AUTOSTRAD 2000 network plan. At HQMTMC, existing ethernet cables will be used. Use of TCP/IP protocol is mandatory. A Hayes-compatible 9600-Baud modem and associated phone line will also be required on at least one workstation in order to permit communication from some dial-up units.

5.4 INTERFACES

IBS will exchange data with automated systems, will access and update data in a proposed corporate database shared by other automated systems, and will receive and process information from several groups through manual, on-line, and partially automated procedures. Figure 5.1 shows current understanding of these interfaces for unit moves, and Fig. 5.2 shows connectivity for nonunit moves. In Figs. 5.1 and 5.2, systems that are either operational or currently under development are designated by circles; interfacing organizations are designated by rectangles. These organizations may or may not provide data electronically (e.g., the non-FORSCOM UEL data from some sites will be sent to MTMC on a diskette while other sites will provide paper copies of the UEL). It is also hoped that some interfaces, though not now automated, may be automated for IBS (e.g., the interface with MSC).

One system with which IBS will exchange data is the Transportation Coordinator's Automated Information for Movements System (TC AIMS). TC AIMS, an ITO system, transmits to IBS the UMD as an ASCII file. TC AIMS also passes ETRRs and route order amendments for a previous booking request to IBS. TC AIMS receives UCRs, ETRs, and route order amendment replies from IBS (also ASCII format).

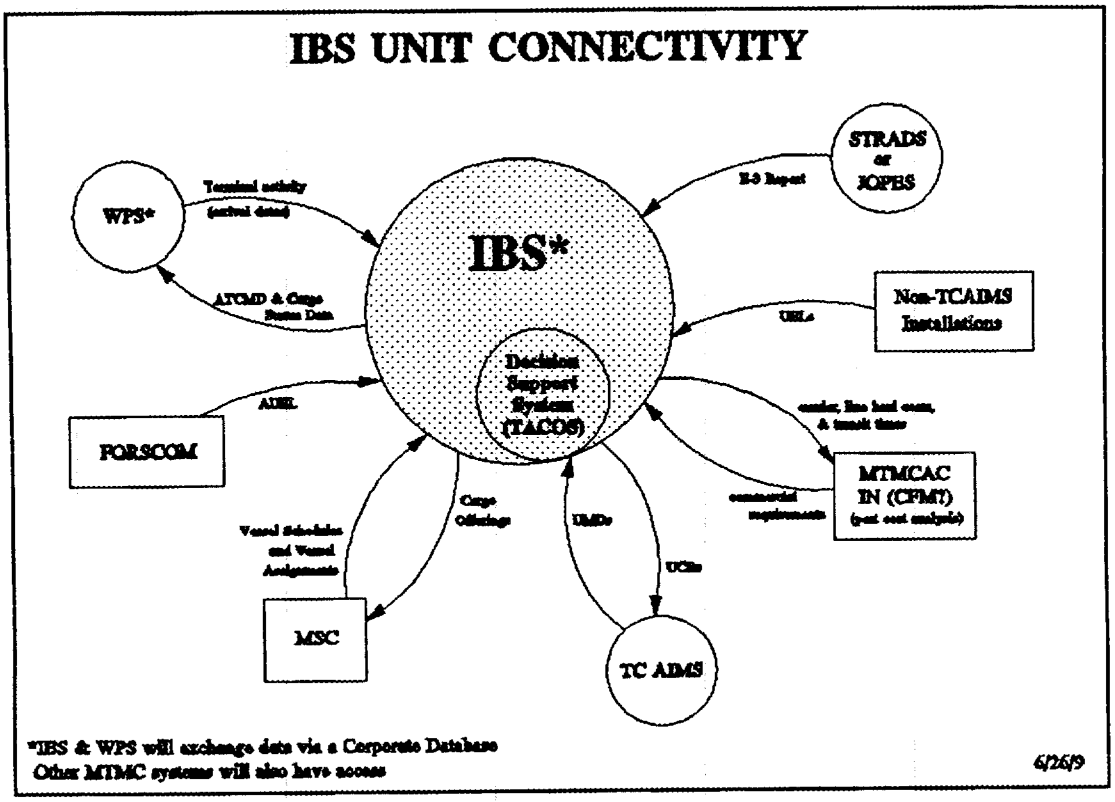

Fig. 5.1. Systems and organizations that interface with the IBS unit moves module.

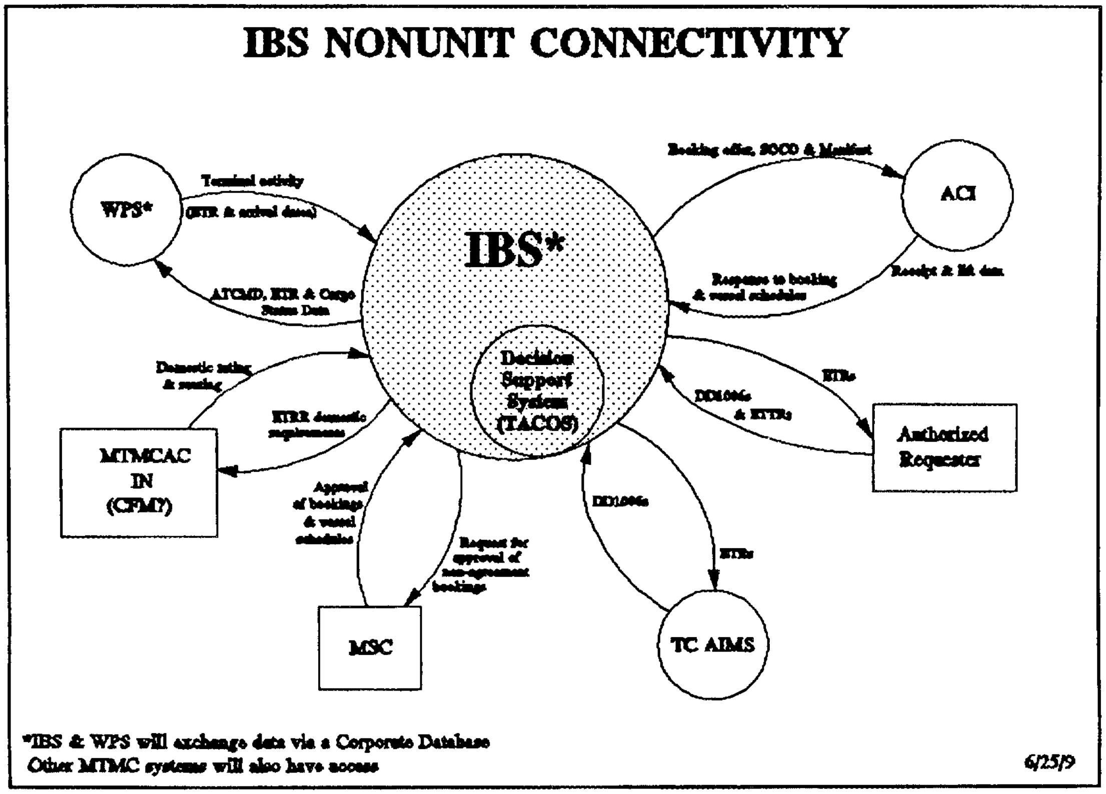

Fig. 5.2. Systems that interface with IBS nonunit moves module.

For wartime and peacetime unit moves, IBS will need an extract of the AUEL which is provided from FORSCOM to HQMTMC via the WIN. HQMTMC declassifies and reformats the AUEL prior to transmitting it to the ACs. This interface in the past has been a data tape. Because of security issues, IBS will never return data to FORSCOM or access the FORSCOM databases. For IBS, it is proposed that one of two procedures be implemented. First, the AUEL could be sent directly to the ACs via the secure WIN for declassification/formatting and downloading to a declassified electronic media format (which could be read into IBS). Alternatively, HQMTMC could continue to declassify and format the AUEL but transmit it to the ACs electronically via a download to IBS.IBS also receives information from a JOPES extract with information to be used in selecting specific units from the AUEL for further processing. This data could be obtained in two ways: first it could be produced from the Strategic Deployment System (STRADS), declassified, and loaded into IBS from some form of certified declassified electronic media. Second, it could be obtained from JOPES in the format of the E-3 report, declassified, certified, loaded onto some form of removable electronic media, and then loaded into the unclassified IBS. IBS data may need to be read back to JOPES, but the data elements included in this requirement have not been stated nor has the mechanism for this update been determined, although it is assumed that this update may be via the STRADS interface.

Non-Army sites will be transmitting a UEL, which serves the same purpose as the AUEL prepared by FORSCOM. This interface should be automated to IBS. The mechanism for this transmittal must be determined.

Commercial carriers will interface with IBS via the Automated Carrier Interface (ACI). Data passed to commercial carriers from IBS include the cargo offering and response to a counter-proposal change to a booking. Data passed from commercial carriers to IBS include commercial carrier schedules, carrier response to cargo offering (accept/reject), carrier counter proposal, and lifted container information.[8]

It is proposed that shippers and requestors will have an electronic access to IBS. They will be able to construct ETRRs on a PC and submit them through a commercial VAN.

A system that is currently under development but which will definitely interface with IBS is the Worldwide Port System (WPS). WPS is the replacement system for the Terminal Management System (TERMS) on Line System (TOLS), the Department of the Army Standard Port System - Enhanced (DASPS-E), and the Terminal Support Module (TSM). The primary function of the WPS is to provide stand-alone capability for a "desk top" terminal management system, which will operate in both peacetime and wartime. The WPS LAN at any site will be user operated and managed and will require a system administrator. Information shared with WPS includes the ATCMD and cargo status (IBS to WPS) and terminal activity and arrival data (WPS to IBS). WPS is an unclassified system.

It is currently proposed that the IBS-WPS interface be through a corporate MTIT shared data environment. Specific design and location of this database is not determined at this time; preliminary plans indicate that the corporate database may also be accessed by the Computerized Deployment System (CODES), MTMC's Financial Management System (FMS), and the TDR. Currently, payment for cargo movement is processed using data from TERMS and DASPS-E. After IBS is implemented, FMS will be alerted by WPS through the shared data environment to complete financial transactions. MSC pays on the basis of the reconciliation of the manifest, the SOCO, and the carrier invoice. Thus, all three documents must be transmitted to MSC. Other systems that may share in the ownership, updating, and maintenance of this corporate database are to be determined.

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[8]The following capabilities are proposed to be included in future ACI phased development: (1) container tracking (when received, when lifted, when ship sails, when discharged overseas), (2) generation of SOCO data to MSC and ocean carriers, and (3) production of manifest data to ocean carriers.

IBS may also interface with the CONUS Freight Management (CFM) system. The CFM handles booking for freight that requires some portion of the movement to be a domestic inland shipment. This interface with MTIN should be an automated feature, but it may be manual when IBS is first implemented.

The MSC interface with IBS should be automated; however, the procedure for implementing this interface has not yet been determined. Data received from MSC include commercial carrier schedules, MSC ship schedules, MSC responses to unit moves cargo offering (accept/reject), one-time-only rate, and foreign flag response. Data passed to MSC from IBS include cargo offering, manifest, request for one-time-only rate, request for a foreign flag booking, and SOCO.

5.5 SUMMARY OF IMPACTS

This section discusses the impacts of IBS on MTMC and interfacing automated data processing (ADP) organizations. Current ADP positional responsibilities will not be changed to accommodate the operation of IBS. Additional ADP responsibilities will be necessary for system, data, and database administration.

IBS will replace ASPUR and METS II. No functionality will be lost with the implementation of IBS. Automation will replace some activities that are now conducted manually (e.g., interfaces with MSC and MTIN). The greatest ADP impact will occur with the implementation of the corporate database which will be shared by IBS, WPS, and possibly others.

The resources necessary for development and testing are described in the IBS Economic Analysis. Because IBS is a new system, there will be no data conversion. The IBS prototype can be used as a guide for the target system IBS database and user-interface design. As much as possible, the screens, user help, menu scheme, and functional capabilities will be ported from the prototype to the target system. However, it should be noted that the prototype is being developed as a microcomputer-based system, using FoxPro software development language. In addition, the decision-support module is being developed in LISP. Therefore, most of the code will need to be rewritten for the new environment.

Personnel requirements for program maintenance, data administration, and database administration after implementation are discussed in the IBS Economic Analysis.

5.6 FAILURE CONTINGENCIES

Two types of failure modes exist: minor short-term outages and major system failures. If failure is caused by an electronic shortage or some other phenomenon in which the system can be rebooted fairly quickly, then the only problem is ensuring that any activity that was ongoing at the time of the failure has not compromised the integrity of the data. Specific restart/recovery procedures are to be determined after the hardware/software environment has been specified.

A major system outage is one in which a workstation or an entire site is affected for more than two hours during a regular work day; that is, the normal booking activities are disrupted. In this case, the primary failure contingency will be redundancy of hardware and software. If a minicomputer fails, operability will be transferred to a backup minicomputer. Because the ACs have redundant program code, there is always a copy of the current IBS program code should an entire site fail. If all IBS sites fail concurrently, bookings would be done in a completely manual mode.

5.7 ASSUMPTIONS AND CONSTRAINTS

The following assumptions and constraints concern only issues related to data automation for the development and operation of IBS.

- The data dictionary (as opposed to program code) will contain all rules necessary to ensure that the data being entered into the database are of high quality.
- Program code will contain triggers, as necessary, for ensuring data quality, if these rules cannot be included in the data dictionary.
- The database administrator will be responsible for enterprise planning and policy formulation (including security); development and enforcement of database standards and procedures; management of the data dictionary; database loading; database support; and database configuration management.
- The data administrator will be responsible for the contents of the database, specifically with data loading and with assessment and maintenance of acceptable data quality.
- A configuration management plan will be developed. It will establish policies and procedures for implementing changes to the IBS design.
- Ownership of and responsibility for the data in the shared data environment will be established as soon as possible.

6. SECURITY

6.1 BACKGROUND INFORMATION

Because IBS will be used for booking and tracking both unit and nonunit cargo during both peacetime and wartime, a large number of users will have access to the IBS database. Precautions must be implemented to ensure that no user can access information that is not pertinent to his/her information needs. The following sections describe those points at which illegal entry and/or potential degradation to the database could occur.

Although IBS will be an unclassified computer system, some data that will be processed are considered proprietary (e.g., carrier shipping rates and tariffs). Also, data used for booking unit moves are considered highly sensitive.

6.2 CONTROL POINTS, VULNERABILITIES, AND SAFEGUARDS

This section describes the points in the system where there is a potential vulnerability which requires specific safeguards. This section will be developed more completely at a later date.

6.2.1 Control Points

Data will be entered into IBS from automation of ETRR transmittal, from downloading reference data (from several sources), from manual data entry by booking personnel, and from electronic media which contain declassified unit move data (AUEL, UMD, UEL). All of these are input control points.

Process control points include data that pass to and from the carrier through the ACI and data that pass to and from the decision-support module. A very important part of the portion of IBS that controls unit moves processing is a need for flexibility. This point is potentially vulnerable and may require safeguards.

Output control points are transmittal of UCRs, ETRs, Port Calls, and other authorizations for cargo movement. An output that is of primary importance for national security is the data that will be read from IBS onto removable electronic media and used to update the classified database from which it was originally received. Finally, the records that are read into the shared data environment for tracking the cargo and providing international visibility are a control point.

6.2.2 Vulnerabilities

IBS will be designed to prevent conditions in the applications or system that cause error, loss, or compromise of information.

6.2.3 Safeguards

6.2.3.1 Administrative Safeguards

Entry of personnel to the central processing sites for IBS (i.e., the ACs) will be gate-checked. All MTMC military and civilian personnel associated with IBS operation and maintenance will have necessary clearances. Personnel will be trained in the use of IBS insofar as is necessary to perform the operations required.

Although IBS has a wide range of users, IBS will be designed to limit access to any user not previously assigned a user ID and password combination. Duplicate passwords must not be assigned, and passwords may not be shared. Passwords must be changed on a regular basis, probably once each quarter. Password protection of certain modules is a requirement.

Procedures for collection, preparation, and backup of data are noted in other sections of this FD. Policies for administration of the system, data, and database must be developed and closely monitored. In addition, it is expected that a network administrator will be required to maintain network operation when OCONUS sites become operational.

6.2.3.2 Physical Safeguards

IBS is an unclassified system; however, the data are considered sensitive. All major hardware pieces should be labeled with "UNCLASSIFIED/SENSITIVE" stickers. In addition, in accordance with WWMCCS guidelines, the "Welcome" screen for IBS will contain a disclaimer concerning its status as an unclassified system.

After IBS has completed booking activities for a cargo movement, it is proposed that the data will be transmitted to the shared database environment for further processing by WPS and possibly other systems. In addition, the records will be archived to a disk or tape storage device, labeled, and maintained. Policies for length of maintenance are in accordance with MTMC standard procedures.

Finally, physical entrance to the area in which data is downloaded from JOPES (or STRADS) to a standalone PC for declassification will be restricted. *Access to this area will* be limited to personnel with top-secret security clearances. In this area, a portion of the TPFDD data will be downloaded to the PC, and certain fields will be deleted or masked. It has been determined that the combination of POE, POD, dates at each port, and unit information (UIC and ULN) constitute classified data. The proposed procedure for declassifying the TPFDD data is to use the PC for changing the real-world PODs to dummy codes. The resulting information set will be certified declassified and loaded onto removable electronic media (disk or tape), transported (air-gapped) to the IBS area, and loaded into the IBS database. After IBS completes processing, the data will again be downloaded to electronic media, transported (air-gapped) back to the classified area, and used to update JOPES (perhaps via STRADS).

6.2.3.3 Technical Safeguards

User ID and password authorizations are one technical safeguard for entry into the system. In addition, user access will be limited to partitioned modules, as appropriate. Also, methods for detecting abnormal patterns of use and "hacking" tendencies will be pursued. Finally, protection against electronic surges and against viruses will be implemented.

Data quality will be maintained through data validation procedures implemented during data entry and through implementation of the data dictionary of the RDBMS. Procedures for determining classification/sensitivity status (e.g., POD and arrival dates in conjunction with OPLAN number) will be activated as processing triggers as a final automated protection mechanism.

6.3 SYSTEM MONITORING AND AUDITING

An audit trail (e.g., total transaction counts processed by location, time, and type) and or system journal (e.g., circumstances that trigger an event being written to the journal; type of information to be recorded; and follow-up procedures) will be maintained for IBS.

7. SYSTEM DEVELOPMENT PLAN

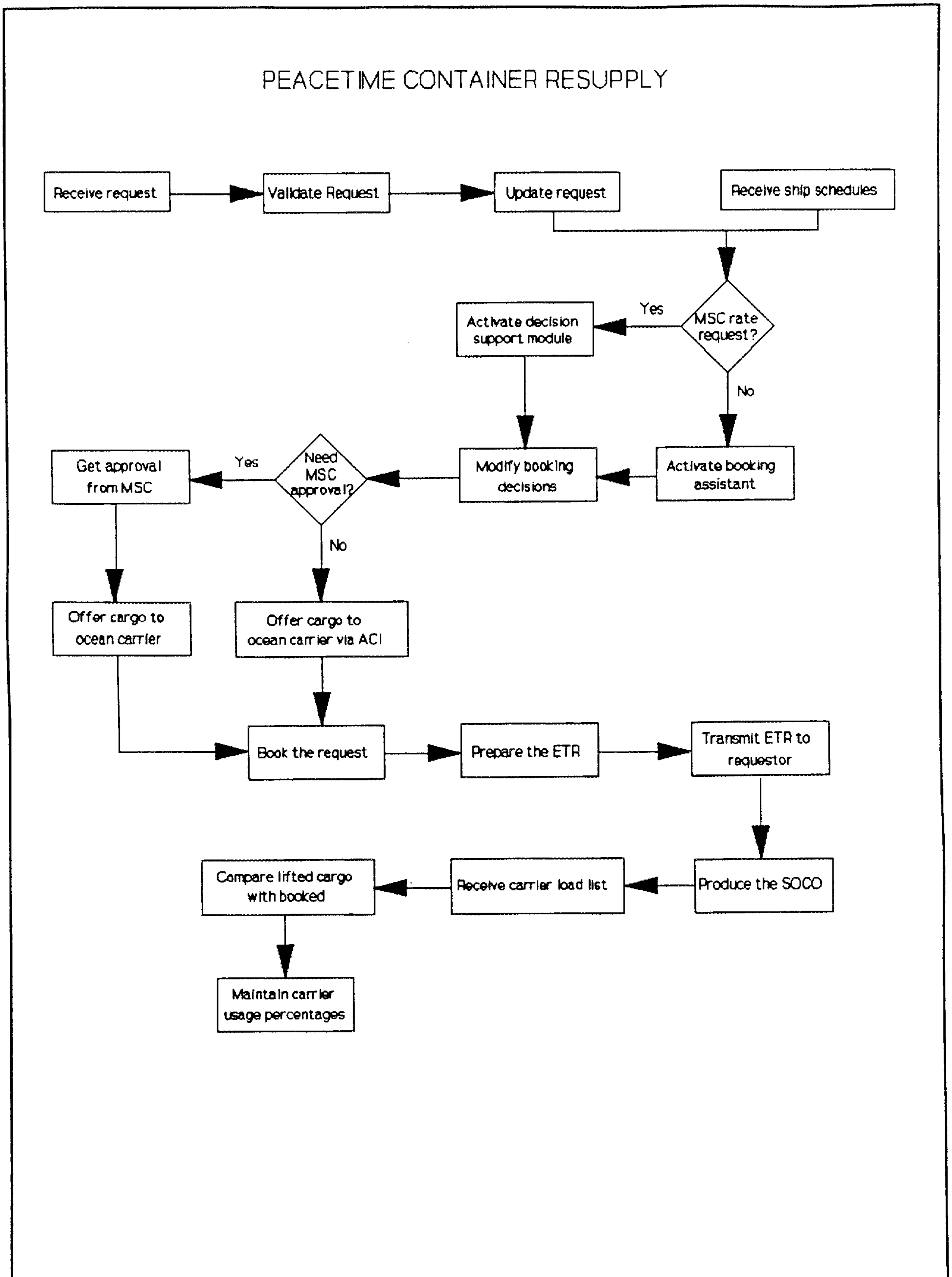
The IBS prototype software, completed in late March 1991, will be used as a starting point for the target IBS. It is currently proposed that development of the final design begin in June 1991, programming in October 1991, initial CONUS deployment in FY93, and final CONUS deployment in 1994.

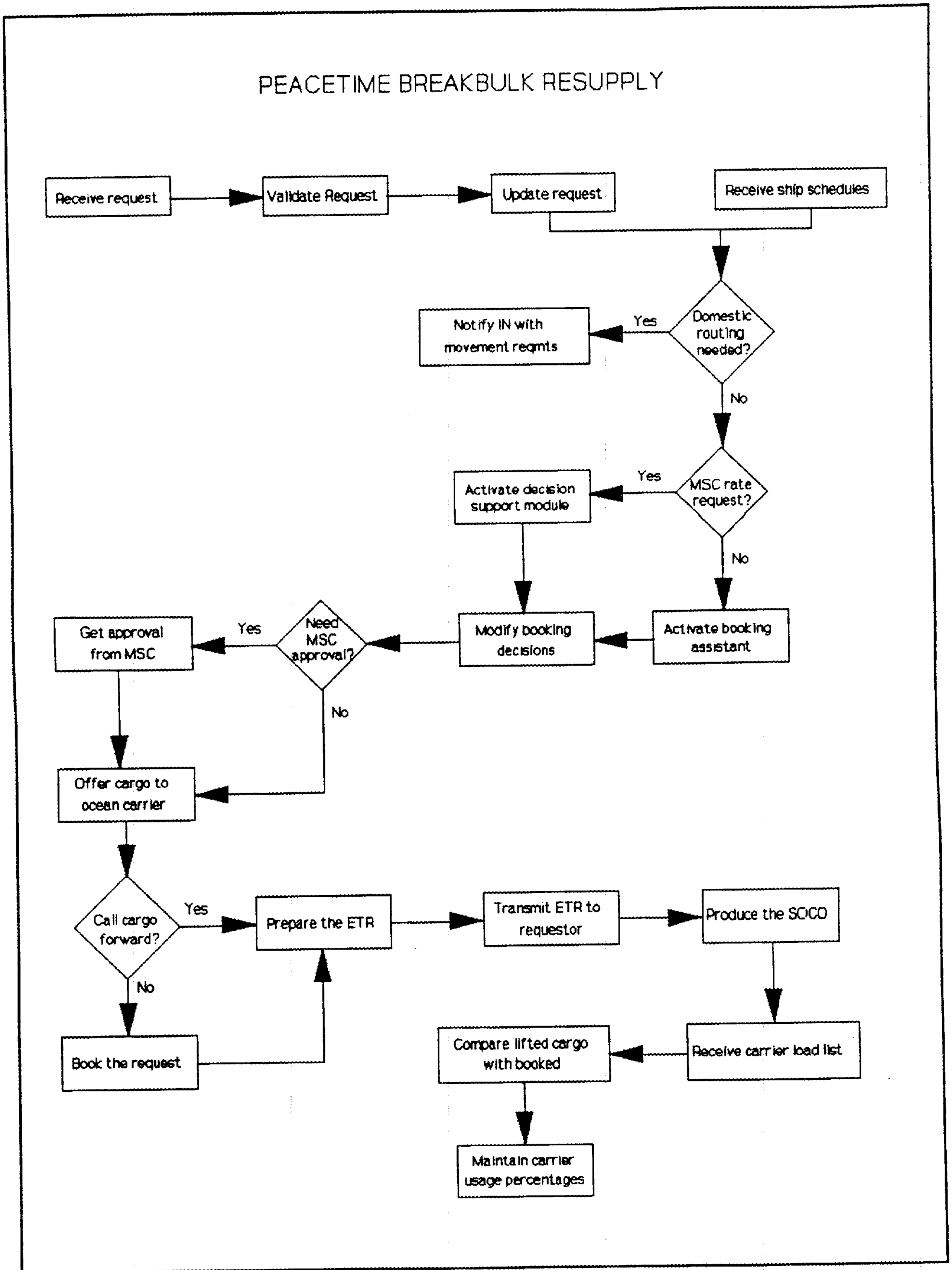
8. COST FACTORS

An economic analysis (EA) for the IBS will be documented in the Economic Analysis for the Integrated Booking System (IBS). All cost factors will be discussed in the EA. Alternatives for system development and system design will be presented. A draft EA was produced in early March 1991. The expected completion date for the next version of the EA is summer 1991. Therefore, no cost analysis is contained in this FD.

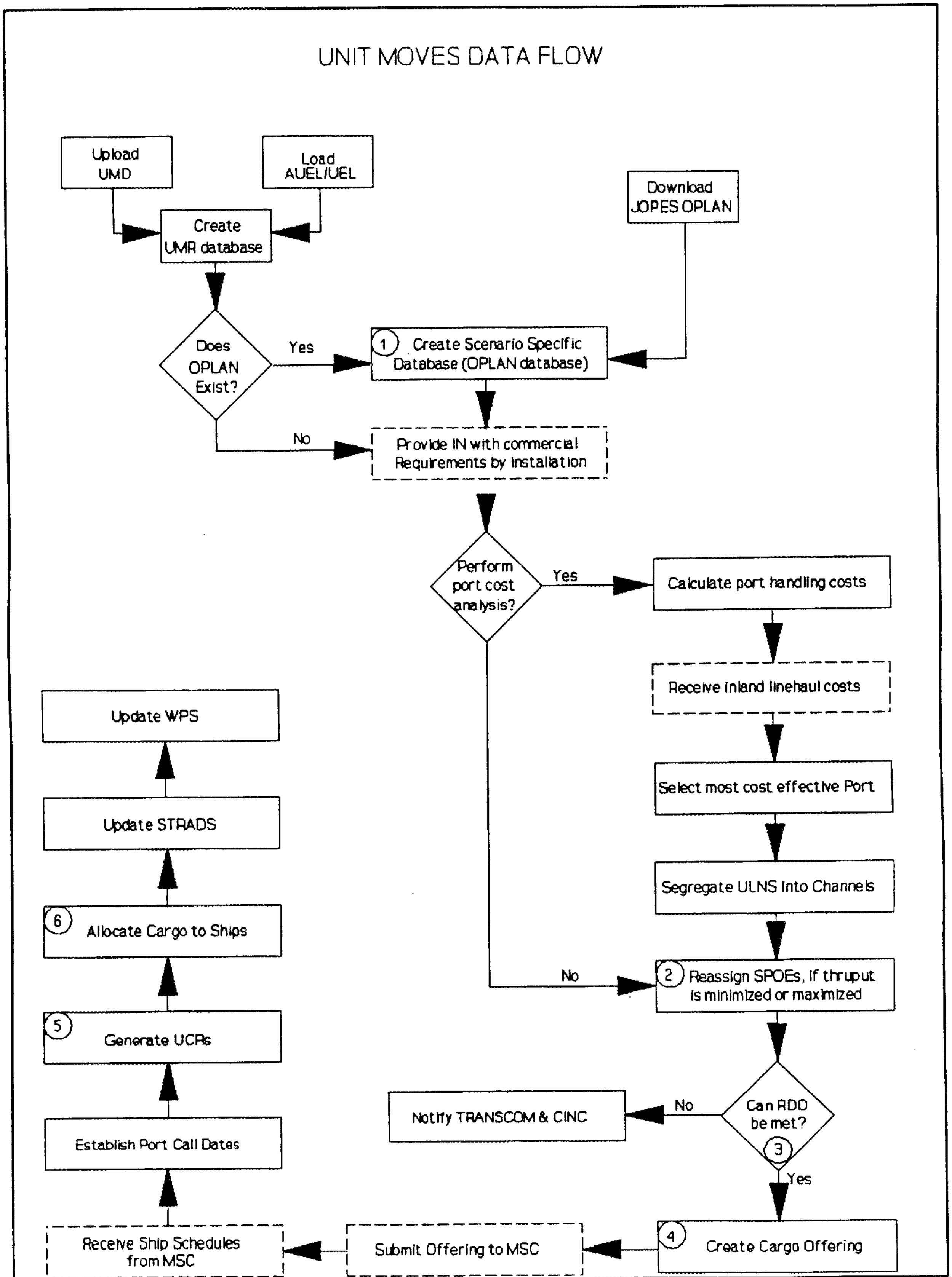
APPENDIX A

FLOW CHARTS OF DATA THAT WILL BE USED BY THE INTEGRATED BOOKING SYSTEM (IBS)

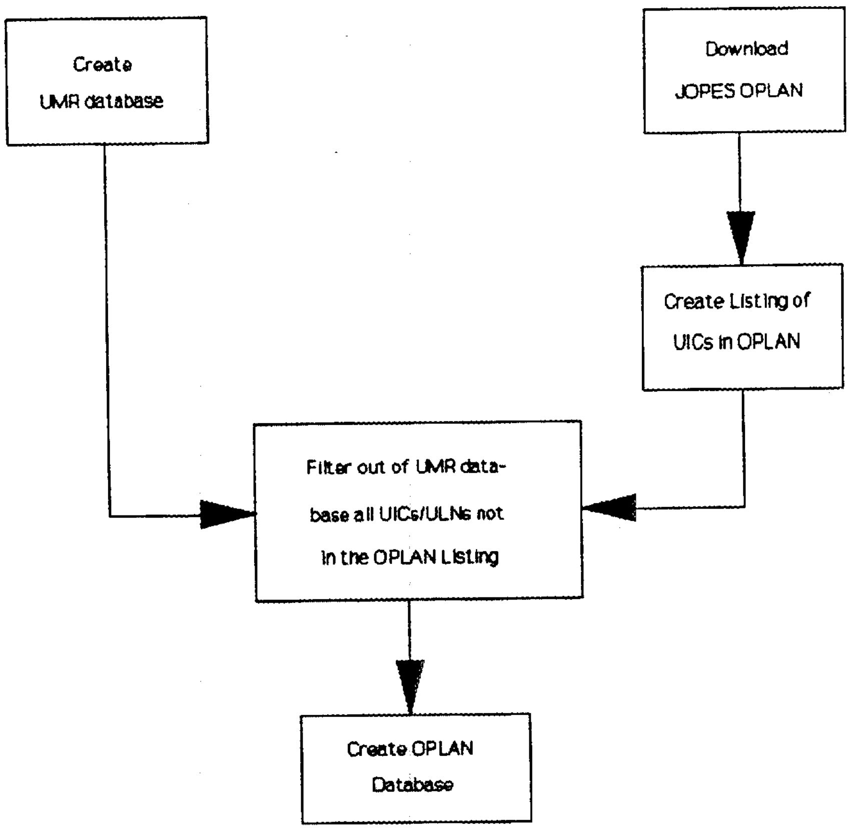

PEACETIME CONTAINER RESUPPLY
Receive request
Validate Request
Update request
Receive ship schedules
MSC rate request?
Yes
No
Activate decision support module
Activate booking assistant
Modify booking decisions
Need MSC approval?
Yes
No
Get approval from MSC
Offer cargo to ocean carrier
Offer cargo to ocean carrier via ACI
Book the request
Prepare the ETR
Transmit ETR to requestor
Produce the SOCO
Receive carrier load list
Compare lifted cargo with booked
Maintain carrier usage percentages



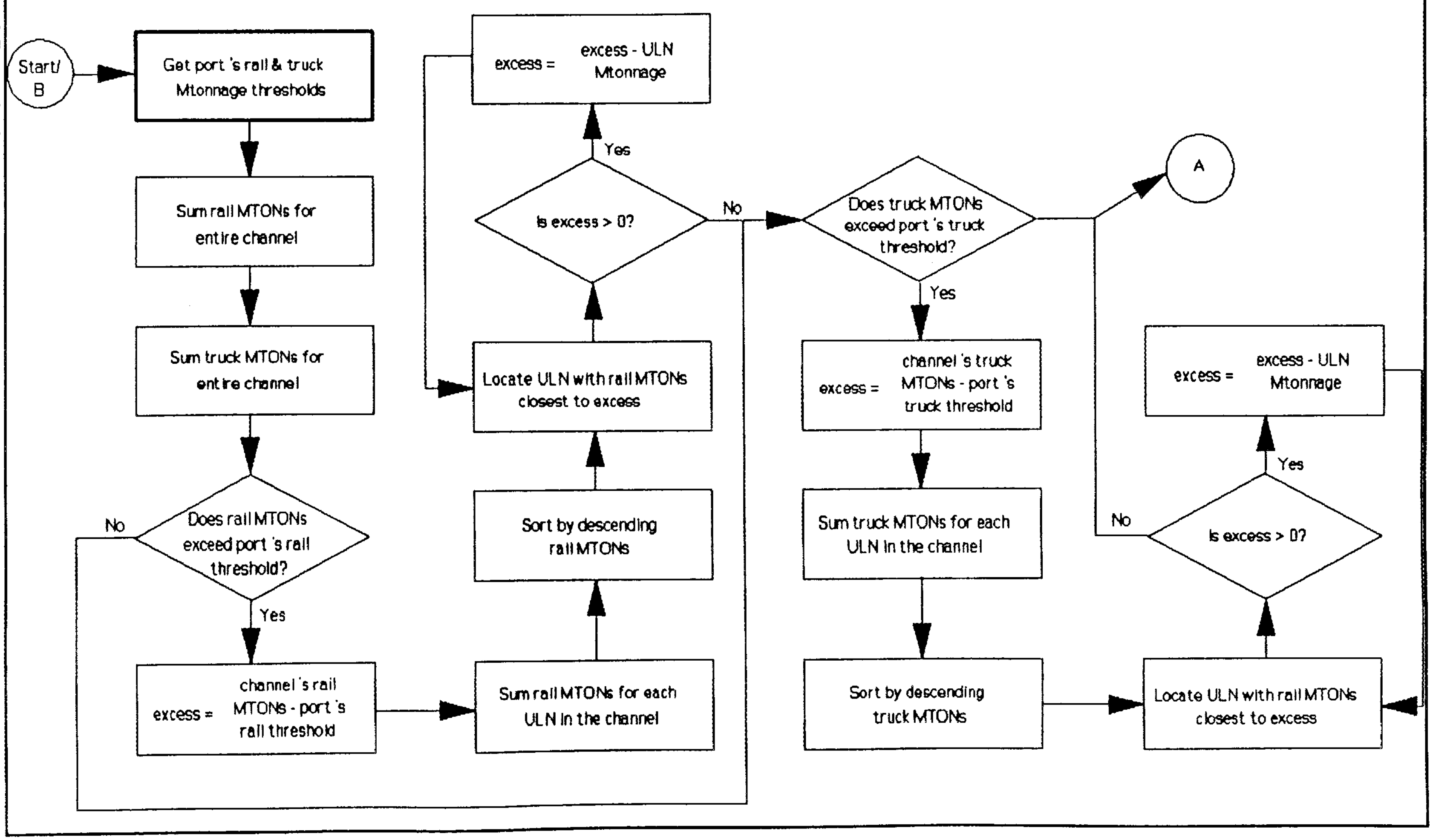
PEACETIME BREAKBULK RESUPPLY
Receive request
Validate Request
Update request
Receive ship schedules
Domestic routing needed?
Yes
Notify IN with movement reqmts
No
MSC rate request?
Yes
Activate decision support module
No
Activate booking assistant
Modify booking decisions
Need MSC approval?
Yes
Get approval from MSC
No
Offer cargo to ocean carrier
Call cargo forward?
Yes
Prepare the ETR
Transmit ETR to requestor
Produce the SOCO
No
Book the request
Receive carrier load list
Compare lifted cargo with booked
Maintain carrier usage percentages


UNIT MOVES DATA FLOW
Upload UMD
Load AUEL/UEL
Create UMR database
Download JOPES OPLAN
Does OPLAN Exist?
Yes
1 Create Scenario Specific Database (OPLAN database)
No
Provide IN with commercial Requirements by installation
Perform port cost analysis?
Yes
Calculate port handling costs
Receive inland linehaul costs
Select most cost effective Port
Segregate ULNS into Channels
No
2 Reassign SPOEs, if thruput is minimized or maximized
Can RDD be met? 3
No
Notify TRANSCOM & CINC
Yes
4 Create Cargo Offering
Submit Offering to MSC
Receive Ship Schedules from MSC
Establish Port Call Dates
5 Generate UCRs
6 Allocate Cargo to Ships
Update STRADS
Update WPS

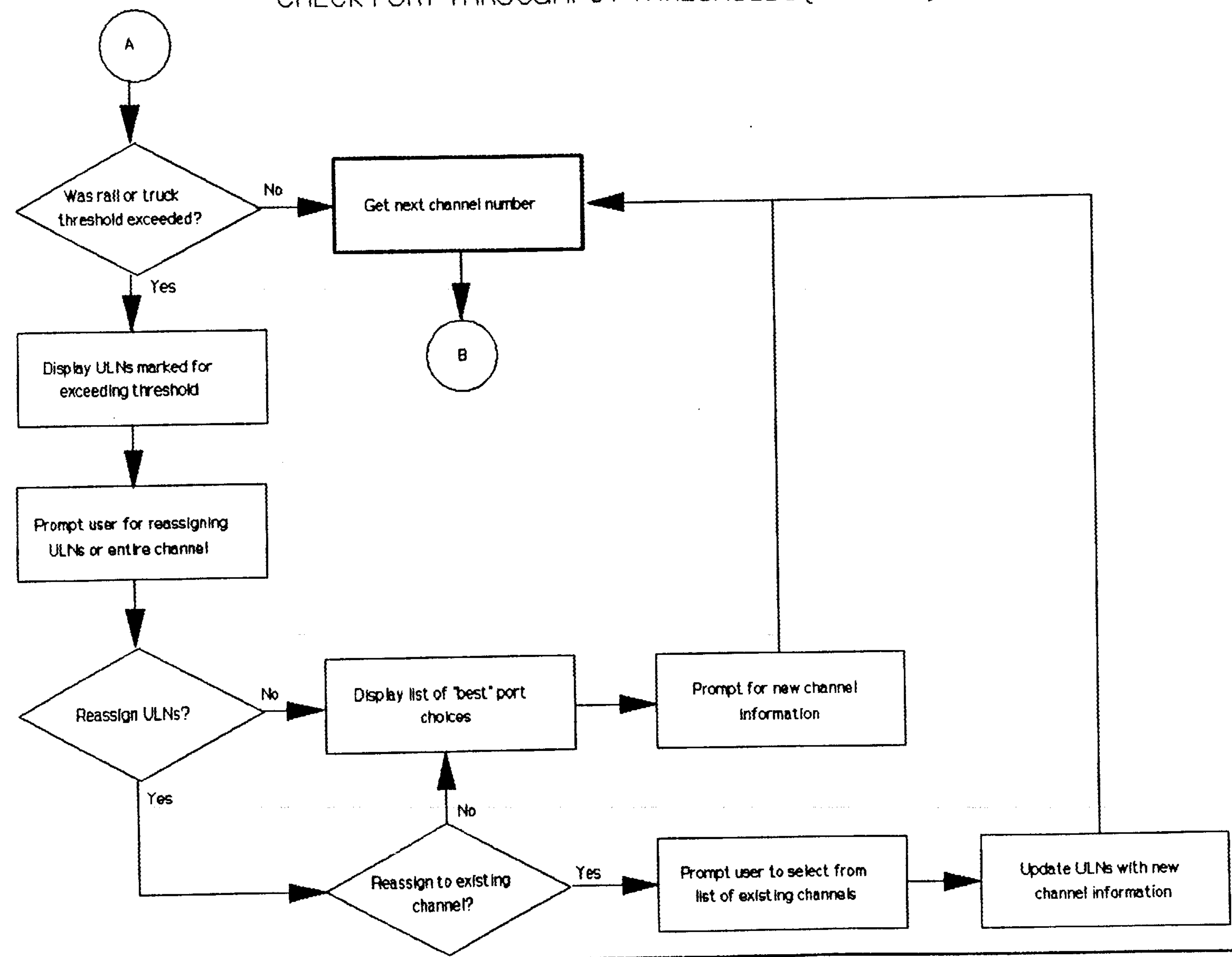
CREATE OPLAN DATABASE



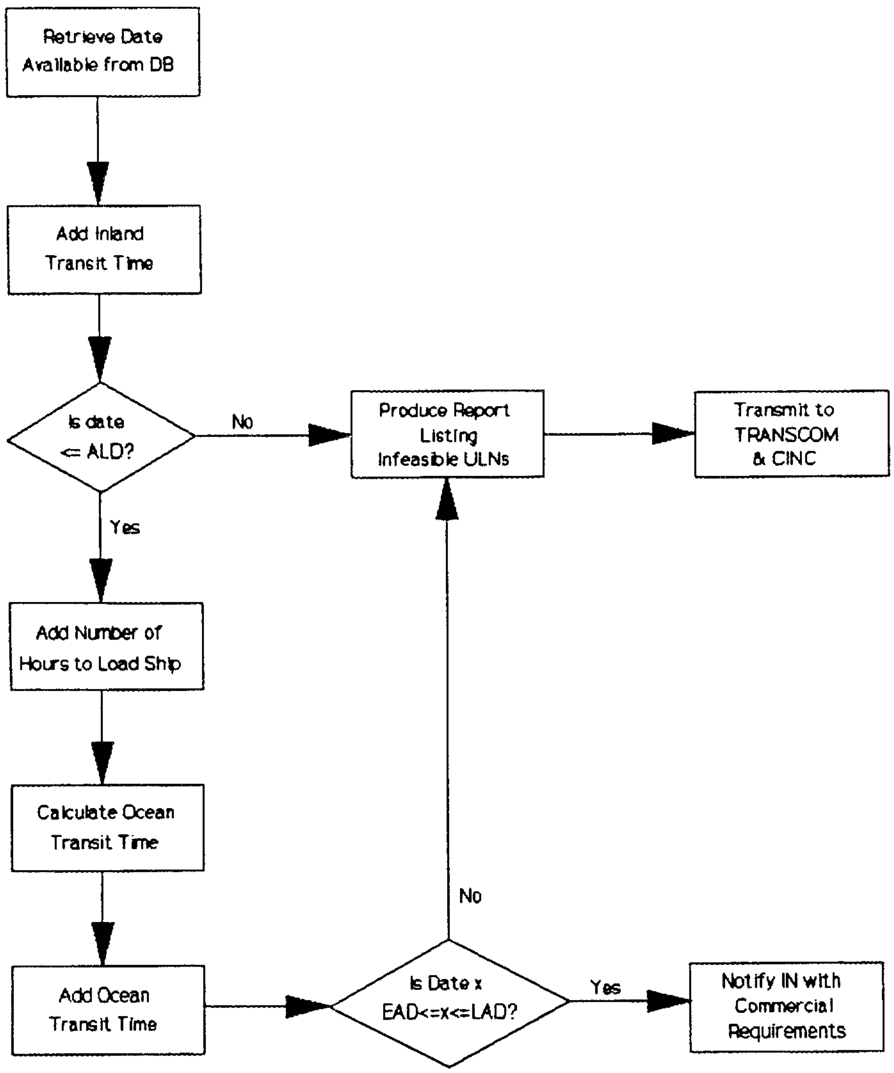
CHECK PORT THROUGHPUT THRESHOLDS



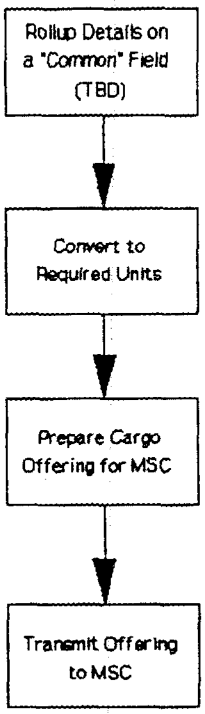
CHECK PORT THROUGHPUT THRESHOLDS (continued)



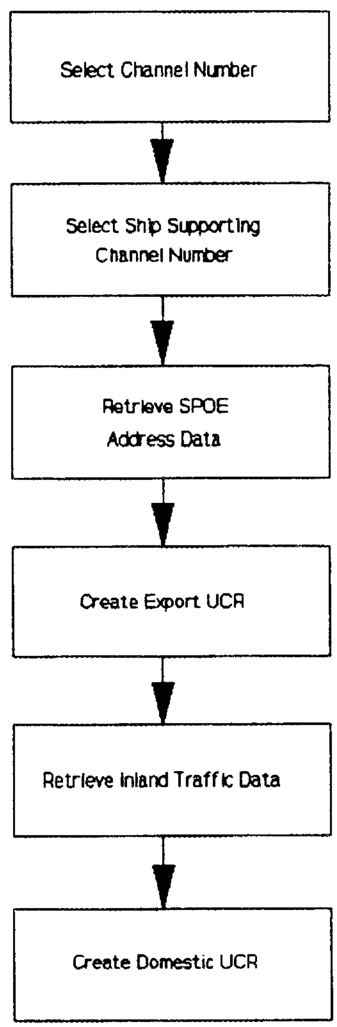
DETERMINE IF RDD CAN BE MET



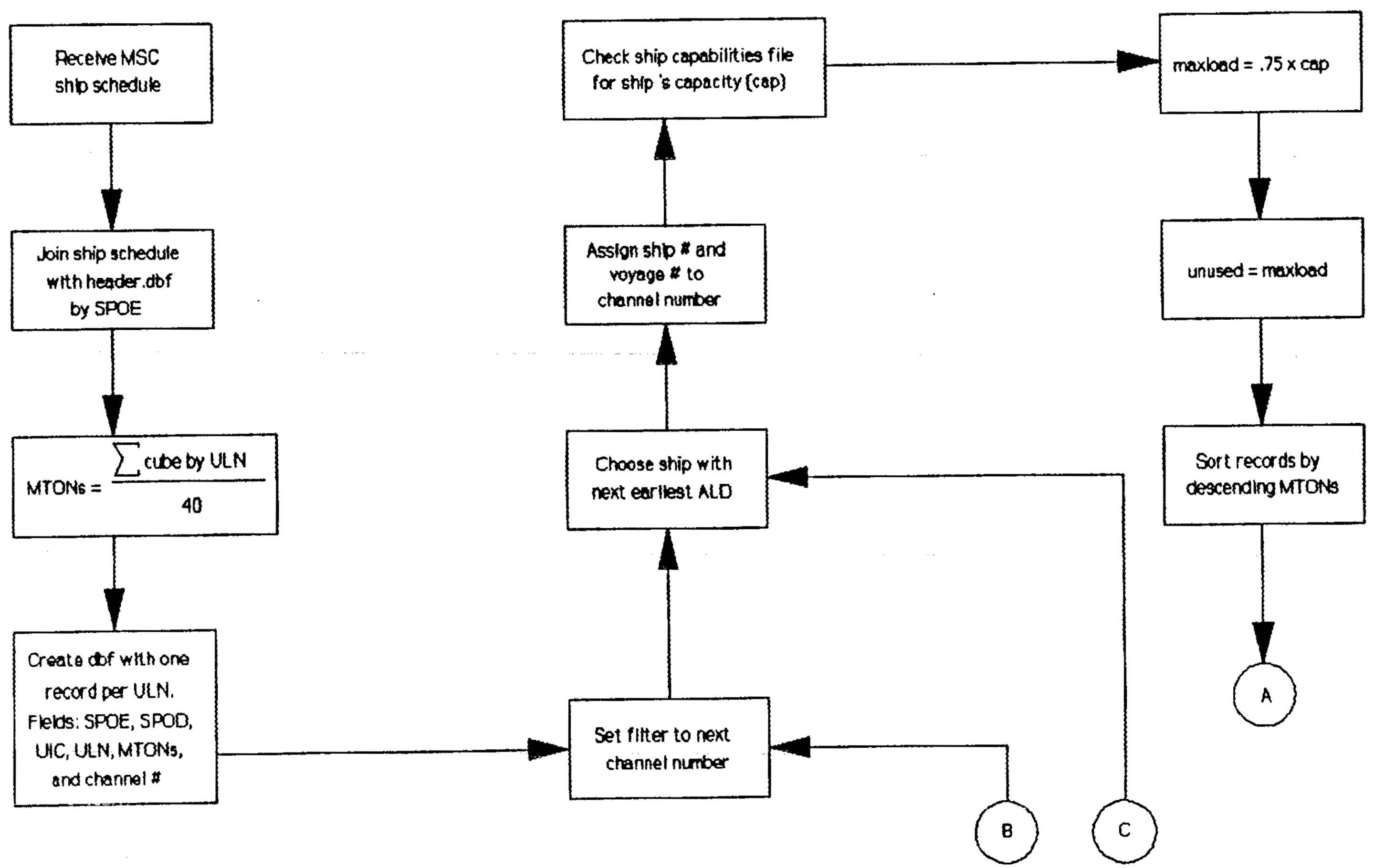
CREATE CARGO OFFERINGS



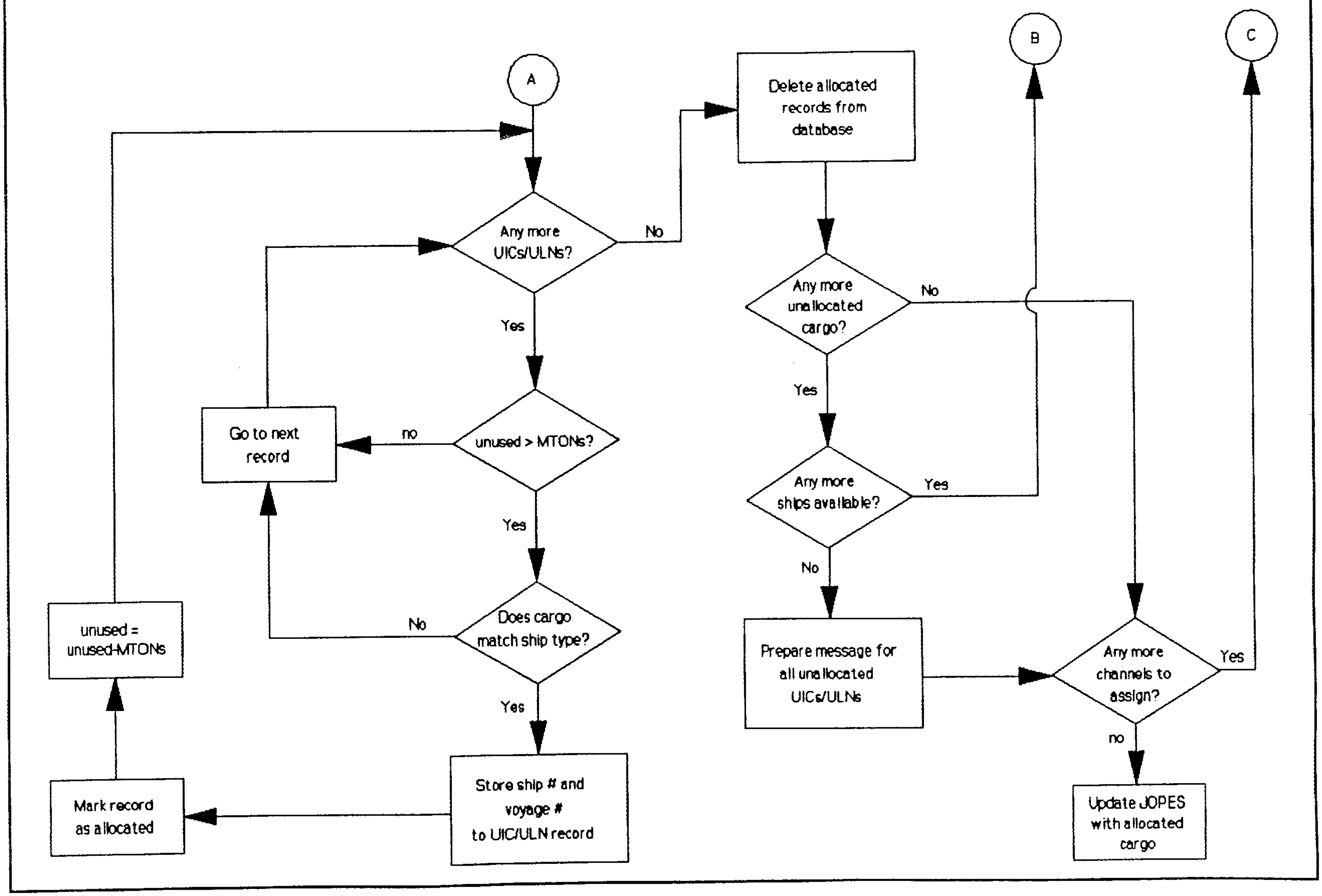
GENERATE UCRs



ALLOCATING CARGO TO SHIPS



ALLOCATING CARGO TO SHIPS (continued)



APPENDIX B. INPUT AND OUTPUT FILE FORMATS

The following file formats are used to book unit and nonunit moves. The reference files are used for both.

B.1 UNIT INPUT AND OUTPUT FILES

The AUEL may contain all FORSCOM units or may be prepared for exercises or contingencies.

FORSCOM AUEL HEADER RECORD FILE

Field Name	Format	Units	Description
UIC	C(6)		unit ID code
TYPEDATA	C(2)		type data code
FILLER	C(2)		unused positions
ULN	C(7)		unit line number
SECTNO	C(1)		section number
FILLER	C(4)		unused positions
UNIT	C(30)		unit name
STATION	C(9)		abbreviated station name
STATE	C(2)		state code
GEOCODE	C(4)		origin geocode
GBLOC	C(6)		origin GBL office code
LSTUPD	Date	yymmdd	date last updated

FORSCOM AUEL DETAIL RECORD FILE

Field Name	Format	Units	Description
UIC	C(6)		unit ID code
TYPEDATA	C(2)		type data code
FILLER	C(2)		unused positions
ULN	C(7)		unit line number

FORSCOM AUEL DETAIL RECORD FILE (continued)

Field Name	Format	Units	Description
SECTNO	C(1)		section number
SUNUMBER	C(4)		shipment unit number
LOADNUMBR	C(2)		load number
LIN	C(6)		line item number
LNDX	C(2)		line item index number
DESC	C(21)		item description
MODEL	C(6)		model number
COMMODITY	C(5)		water commodity code
TYPEPACK	C(2)		type pack code
LEN	N(4)	inches	length
WID	N(4)	inches	width
HGT	N(4)	inches	height
GROSSWGT	N(7)	pounds	gross weight
CUBE	N(7)	cubic feet	cubic feet of item
MODEPOE	C(1)		mode to POE
CCC	C(3)		cargo category code
HLDC	C(1)		heavy lift and dimension code

FORSCOM AUEL SUMMARY RECORD FILE

Field Name	Format	Units	Description
UIC	C(6)		unit ID code
TYPEDATA	C(2)		type data code
FILLER	C(2)		unused positions
ULN	C(7)		unit line number
SECTNO	C(1)		section number
FILLER	C(5)		unused positions
FLAT54	N(2)		54' chain tie down flatcar
FLAT60	N(2)		60' chain tie down flatcar
FLAT89	N(2)		89' chain tie down flatcar
TRLR_FLAT	N(2)		trailer on flatcar
CNT_FLAT	N(2)		container on flatcar
BILEVEL	N(2)		bilevel
TRILEVEL	N(2)		trilevel
GONDL53	N(2)		53' gondola
GONDL65	N(2)		65' gondola
DODX54	N(2)		54' DODX heavy duty flatcar
DODX68	N(2)		68' DODX heavy duty flatcar
GUARD	N(2)		guard car
DROPFR	N(2)		drop frame
LOWBOY	N(2)		commercial lowboy
FLATBED40	N(2)		40' flatbed
FLATBED45	N(2)		45' flatbed
FLATBED48	N(2)		48' flatbed
VAN20	N(2)		20' seavan
VAN40	N(2)		40' seavan

TPFDD FORCE CARGO DETAIL RECORD FILE

Field Name	Format	Units	Description
ULN	C(7)		ULN
DESC	C(25)		description
TYPE	C(1)		cargo type (bulk, oversized, outsized)
PCS	N(3)		number of pieces
LEN	N(4)	inches	length
WID	N(3)	inches	width
HGT	N(3)	inches	height
SQF	N(6)	square feet	area of space required
WGT	N(5)	STONs	weight in short tons
CUBE	N(5)	MTONs	measurement tons (1 MTON = 40 cubic feet)
REC_CH	Date	yymmdd	date record was last changed

TC AIMS data are provided to the MTMC ACs by deploying units. This information gives the latest listing of the equipment which is actually being moved by the unit. The UMD Header Record File contains movement information for an entire shipment unit.

UMD HEADER RECORD FILE

Field Name	Format	Units	Description
RECTYPE	C(1)		identification of header or detail record type
ACTION	C(1)		transaction code
UIC	C(6)		unit ID code
ULN	C(7)		unit line number
R_DODAAC	C(6)		requestor DODAAC
R_ID	C(8)		requestor ID
TYPEUMD	C(2)		type UMD
MODE	C(1)		deployment mode
D_AVAIL	Date	yymmdd	date available
UNITNAME	C(30)		unit name
STATION	C(9)		abbreviated station name
STATE	C(2)		state
RDD	Date	yymmdd	required delivery date
S_DODAAC	C(6)		shipper DODAAC
TAC	C(4)		transportation account number
PROJ_C	C(3)		project code
O_T_SPLC	C(9)		origin truck SPLC
D_T_SPLC	C(9)		destination truck SPLC
O_R_SPLC	C(9)		origin rail SPLC

UMD HEADER RECORD FILE (continued)

Field Name	Format	Units	Description
D_R_SPLC	C(9)		destination rail SPLC
GEOCODE	C(4)		geocode
GBLOC	C(4)		GBLOC
CONSIGNEE	C(20)		consignee
PSI	C(1)		private siding indicator
P_O_R_SCAC	C(4)		primary origin rail SCAC
S_O_R_SCAC	C(4)		secondary origin rail SCAC
P_D_R_SCAC	C(4)		primary destination rail SCAC
S_D_R_SCAC	C(4)		secondary destination rail SCAC
PRIORITY	C(1)		transportation priority
REQNAME	C(20)		requestor name
REQPHONE	C(10)		requestor telephone number
SUPRCARGO	N(2)		supercargoes
CABOOSE	N(2)		caboose / guardcar
FLAT54	N(2)		54' chain tie down flatcar
FLAT60	N(2)		60' chain tie down flatcar
FLAT89	N(2)		89' chain tie down flatcar
TRLR_FLAT	N(2)		trailer on flatcar
CNT_FLAT	N(2)		container on flatcar
DROPFR	N(2)		drop frame
BILEVEL	N(2)		bilevel
TRILEVEL	N(2)		trilevel
GONDL53	N(2)		53' gondola
GONDL65	N(2)		65' gondola
DODX54	N(2)		54' DODX heavy duty flatcar
DODX68	N(2)		68' DODX heavy duty flatcar
FLATBED40	N(2)		40' flatbed
FLATBED45	N(2)		45' flatbed
FLATBED48	N(2)		48' flatbed
LOWBOY	N(2)		commercial lowboy
VAN20	N(2)		20' seavan
VAN40	N(2)		40' seavan
BUS	N(2)		commercial bus
TRACTOR	N(2)		commercial tractor

The UMD Detail Record File contains movement information by TCN for each piece of equipment being transported.

UMD DETAIL RECORD FILE

Field Name	Format	Units	Description
RECTYPE	C(1)		identification of header or detail record type
ACTION	C(1)		transaction code
TCN	C(17)		TCN
LOAD	C(1)		load indicator
LIN	C(6)		line item number
LINNDX	C(2)		line item number index
DESC	C(21)		item description
MODEL	C(6)		model
COMMODITY	C(5)		commodity code
FRGTNO	C(6)		freight classification number
FRGTNDX	C(2)		freight classification index
TYPEPACK	C(2)		type pack
QTY	N(3)		quantity
WGT	N(7)	pounds	weight
CUBE	N(7)	cubic feet	volume
LEN	N(4)	inches	length
WID	N(4)	inches	width
HGT	N(4)	inches	height
MODE	C(1)		mode to POE
REMARKS	C(50)		remarks
HAZARD	C(1)		hazardous indicator ("1"=hazard, "0"=non-hazard)
ROUNDS	N(8)		round count
NSN_FSC	C(13)		NSN/FSC/NNSN
DODIC	C(4)		DOD ID code
UNNA_IND	C(2)		UN/NA indicator
UNNA_NO	C(4)		UN/NA number
GROUP	C(1)		compatibility group
UN_CLASS	C(2)		UN class number
CLASSIFY	C(25)		hazardous cargo classification
FLASHPT	C(4)		flash point
SHPGNAME	C(50)		shipping name

UEL data are deploying cargo lists received from non-TCAIMS installations.

UEL FILE

Field Name	Format	Units	Description
UIC	C(6)		unit identification code
ULN	C(10)		unit line number
UNIT	C(10)		unit name
STATION	C(20)		installation name

UEL FILE (continued)

Field Name	Format	Units	Description
VESSEL	C(10)		vessel name
DATE	Date	yymmdd	date updated
SUNUMBER	C(5)		shipmenu unit number
ITEM	C(6)		item number
DESC	C(26)		item description
W_T	C(1)		?
S_C	C(1)		?
MODEL	C(6)		model number
L_E	C(1)		?
COMMODITY	C(5)		water commodity code
T_P	C(2)		?
LEN	N(3)	inches	length
WID	N(3)	inches	width
HGT	N(3)	inches	height
WGT	N(6)	inches	weight
CUBE	N(5)	cubic feet	cube of item
M	C(1)		?
LTON	N(6)2		weight in long tons
STON	N(6)2		weight in short tons
MTON	N(8)2		cube in measurement tons
SQFT	N(8)2	square feet	square footage of item

Unit output files are port call messages and export UCRs. The port call message is distributed to all units called forward under the same message and to all interested organizations. The UCR provides the ITOs with the deployment mode, assigned SPOE, port information, and vessel data for their installation's units. The Export UCR Header Record contains general information to call units forward to a SPOE.

PORT CALL MESSAGE FILE

Field Name	Format	Units	Description
MSGFROM	C(70)		message originator
MSGTO	Text		all units receiving port call message
MSGINFO	Text		all organizations being informed of port call message
OPERATION	C(70)		operation supported
SHIPNUMBR	C(50)		ship number (if known)
EQPCONSGN1	C(50)		equipment consignee address
EQPCONSGN2	C(50)		equipment consignee address

PORT CALL MESSAGE FILE (continued)

Field Name	Format	Units	Description
EQPCONSGN3	C(50)		equipment consignee address
EQPCONSGN4	C(50)		equipment consignee address
CONVOY1	C(50)		convoys report to address
CONVOY2	C(50)		convoys report to address
CONVOY3	C(50)		convoys report to address
CONVOY4	C(50)		convoys report to address
GBL1	C(50)		GBL receiving address
GBL2	C(50)		GBL receiving address
GBL3	C(50)		GBL receiving address
GBL4	C(50)		GBL receiving address
INPOC	C(80)		inland traffic point-of-contact
PORTPOC	C(80)		port POC
ITPOC	C(80)		international traffic POC
PARA_1	Text		standard paragraph 1 text
PARA_2	Text		standard paragraph 2 text
PARA_3	Text		standard paragraph 3 text
PARA_4	Text		standard paragraph 4 text
PARA_5	Text		standard paragraph 5 text
PARA_6	Text		standard paragraph 6 text
PARA_7	Text		standard paragraph 7 text
PARA_8	Text		standard paragraph 8 text
PARA_9	Text		standard paragraph 9 text
PARA_10	Text		standard paragraph 10 text
PARA_11	Text		standard paragraph 11 text
PARA_12	Text		standard paragraph 12 text
NET	Date	yymmdd	"no earlier than" date
NLT	Date	yymmdd	"no later than" date

EXPORT UCR HEADER RECORD FILE

Field Name	Format	Units	Description
R_DODAAC	C(6)		requestor DODAAC
R_ID	C(8)		base requestor ID
RELEASE	C(14)		release number
UIC	C(6)		unit ID code
ULN	C(7)		unit line number
MODE	C(1)		deployment mode
GEOCODE	C(4)		geocode
POEPOC	C(20)		point-of-contact at POE
POEFONE	C(10)		POC's telephone number
VOY_NO	C(4)		voyage number
VESSELNAME	C(17)		vessel name
POEADDRESS	C(60)		port address
REMARKS	C(140)		release remarks

The Export UCR TCN Records provide a listing of all TCN's released that were included in the referenced UMD set.

EXPORT UCR TCN RECORD FILE

Field Name	Format	Units	Description
RELEASE	C(14)		release number
TCN	C(68)		TCN data

B.2 NONUNIT INPUT AND OUTPUT FILES

The ETRR Header Record File contains the R11 and R14 record formats for container and breakbulk nonunit movement requirements. In addition, it also contains the offering/booking data for the request.

ETRR HEADER RECORD FILE

Field Name	Format	Units	Description
PCFN	C(6)		port call file number
USR_ID	C(14)		user identification
R_DODAAC	C(6)		requestor DODAAC
R_ID	C(7)		requestor identification
TYPE_OFFR	C(1)		type offer code
S_DODAAC	C(6)		shipper DODAAC
D_AVAIL	Date	yymmdd	date available
LTC	C(1)		lading term code
NO_SU	N(2)		number of shipment units
PCS	N(5)		total number of pieces
CUBE	N(5)	cubic feet	total volume
WGT	N(7)	pounds	total weight
FLOW_FCT	C(2)		daily flow factor
LTON	N(4)		long tonnage
MTON	N(4)		measurement tonnage
REMARKS	C(300)		remarks
SRO_ID	C(4)		Standing Route Order identifier
SRO_DUE_D	Date	yymmdd	SRO date due at POD

ETRR HEADER RECORD FILE (continued)

Field Name	Format	Units	Description
SRO_POE	C(3)		SRO POE
SRO_MODE	C(1)		SRO transportation mode
VAN_REQD	N(2)		number of vans required
VAN_SZ	C(1)		size of van
COMMODITY	C(5)		commodity code
OCN_COMM	C(1)		ocean commodity code
C_DODAAC	C(6)		consignee DODAAC
FUND_AG	C(1)		funding agency code
PROJ_C	C(3)		project code
RDD	Date	yymmdd	required delivery date
PRIORITY	C(1)		transportation priority
REOFFR_POE	C(3)		request reoffered to POE
REOFFR_D	Date	yymmdd	date reoffer posted
CANCEL_C	C(1)		cancel code
CANC_D	Date	yymmdd	date cancel code posted
CANC_RSN	C(60)		reason request canceled
DELAY_C	C(1)		delay code
DELAY_D	Date	yymmdd	date delay code posted
PRP_REL_D	Date	yymmdd	projected date of release
REL_D	Date	yymmdd	date ETR released
REL_T	C(4)	24 hour clock	time ETR released
REL_POE	C(3)		POE ETR released to
D_DUE_POE	Date	yymmdd	date due at POE
POE	C(3)		port of embarkation
POD	C(3)		port of debarkation
VAN_RLSD	N(3)		number of vans released
VANTYPE	C(1)		type of vans released
OFFERED	Date	yymmdd	date offered to carrier
BOOKED	Date	yymmdd	date booked with carrier
BOOK_RSN	C(2)		booking reason
SOCO_VES	C(4)		Shipping Order/Clearance Order vessel number
SOCO_TERM	C(2)		SOCO terms of carriage
SOCO_R_NDX	C(2)		SOCO routing index
RECD_D	Date	yymmdd	date ETRR received
RECD_T	C(4)	24 hour clock	time ETRR received
CARR_ID	C(4)		carrier booked with
CARR_BK_NO	C(17)		carrier's booking number
SPOT_D	Date	yymmdd	spot date
BOOK_REM	C(150)		booking remarks
CONUS_COST	N(7)2		drayage costs from origin to POE
POE_COST	N(7)2		port handling costs
OCEAN_COST	N(8)2		overocean costs from POE to POD
OCONS_COST	N(7)2		drayage costs from POD to destination
TOTAL_COST	N(11)2		total cost of move
REQ_ROUTID	C(7)		requestor's routing indicator
REL_ROUTID	C(7)		release's routing indicator
ACISTAT	C(1)		ACI status
VDN	C(5)		voyage document number
LIFTED	Date	yymmdd	date cargo lifted at port

The ETRR Detail Record File contains the R21 and R24 record formats for container and breakbulk nonunit movement requirements.

ETRR DETAIL RECORD FILE

Field Name	Format	Units	Description
PCFN	C(6)		port call file number
SEQ_NO	N(2)		shipment unit sequence number
TCN	C(17)		transportation control number
C_DODAAC	C(6)		consignee DODAAC
FUND_AG	C(1)		funding agency
PROJ_C	C(3)		project code
PCS	N(5)		number of pieces
CUBE	N(5)	cubic feet	volume
WGT	N(7)	pounds	weight
FRGTNO	C(8)		freight classification number
TYPEPACK	C(2)		type pack code
COMMODITY	C(5)		commodity code
PRIORITY	N(1)		transportation priority
RDD	Date	yymmdd	required delivery date
POD	C(3)		POD
VAN_SZ	C(1)		van size requested
REMARKS	C(180)		remarks

The ETRR Outsize Specification File contains the R23 record format for breakbulk nonunit movement requirements.

ETRR OUTSIZE SPECIFICATION FILE

Field Name	Format	Units	Description
PCFN	C(6)		port call file number
SEQ_NO	N(2)		shipment unit sequence number
OUTORDR	N(1)		flag for outsize record 1 or 2
PCS	N(5)		number of pieces
WGT	N(7)	pounds	weight
CUBE	N(5)	cubic feet	volume
LEN	N(3)	inches	length
WID	N(3)	inches	width
HGT	N(3)	inches	height
REMARKS	C(40)		remarks

During peacetime and limited conflicts, ocean carriers provide vessel schedules for use in booking nonunit cargo. The file structure is listed below. In some instances, vessel schedules will also be available for unit cargo moves. When those schedules exist, they will have the same format.

VESSEL SCHEDULES FILE

Field Name	Format	Units	Description
VOY_DOC_NO	C(5)		voyage document number
PORTCODE	C(3)		water port code
ARRIVE_T	C(1)		time of arrival
ARRIVE_D	Date	yymmdd	date of arrival
SAIL_T	C(1)		sailing time
SAIL_D	Date	yymmdd	sailing date
CUTOFF_D	Date	yymmdd	cutoff date
TERMS1	C(2)		terms of carriage
TERMS2	C(2)		terms of carriage
TERMS3	C(2)		terms of carriage
TERMS4	C(2)		terms of carriage
TERMINAL	C(7)		terminal
COMVOYNO	C(2)		commercial voyage number

System outputs during peacetime are the ETRs. The primary outputs are the selected carrier, POE to be used, date due at SPOE, and vessel information. The ETR provides the requestor with all booking information for the referenced request.

ETR FILE

Field Name	Format	Units	Description
PCFN	C(6)		port call file number
RELEASED	N(7)		date & time group of release
EQUIPTYPE	C(1)		type of equipment required
CWT_RATE	C(4)		tariff rate per cwt
MINWGT	N(3)		minimum weight
CL_TL	N(2)		number of carloads or truckloads anticipated
TYPE_RATE	C(1)		type of rate used for routing
TARIFF	C(8)		tariff authority designation
ROUTING	C(28)		SCACs for upto 7 carriers
GBLNOTES	C(60)		notes required on the GBL
REMARK_RT	C(300)		instructions necessary for routing a shipment
REMARK_CNS	C(300)		instructions for proper land-water coordination
VAN_REQD	N(5)		number of vans required
VAN_SZ	C(1)		size of vans required
LST_VAN	C(3)		last van serial number assigned by booking
office			
MODE	C(1)		mode of transportation
EMRGNCY	C(2)		emergency condition code

B.3 REFERENCE FILES

Reference files will provide location information and look-up tables for codes used in the IBS. Vessel information is contained in the next file, which is supplied by the carriers. In the second file are ship types and characteristics for each type of ship.

VESSELS FILE

Field Name	Format	Units	Description
VOY_DOC_NO	C(5)		voyage document number
SHIPNAME	C(20)		ship name
CARR_ID	C(4)		carrier ID
FLAG	C(2)		flag ship is sailing under
CALLSIGN	C(8)		ship's call sign
CAPACITY	N(10)		ship's square foot capacity
SHIPTYPE	C(3)		ship classification

SHIP CHARACTERISTICS FILE

Field Name	Format	Units	Description
SHIPTYPE	C(3)		code for type of ship
DESC	C(25)		description of ship type
SS	Logical		self-sustaining flag
SPEED	N(5)1	knots	speed
MTON	N(7)		mtonnage
SQFT	N(7)	square feet	square feet
TEU	N(5)		number of TEUs
DRAFT	N(3)	feet	draft of ship
LEN	N(4)	inches	length of ship

The load time table lists the average times to load and unload a vessel based on the type of ship.

SHIP LOADING/UNLOADING TIME FILE

Field Name	Format	Units	Description
SHIPTYPE	C(3)		type of ship identifier
LOAD	N(2)	days	number of days to load ship type
UNLOAD	N(2)	days	number of days to unload ship type

The first table, the POE-to-POD Mileage File, lists the number of miles to a overseas port from CONUS port complexes. The Inland Transit Time File contains the average number of days to travel by rail and truck from an inland installation (location) to a specified port. The Ocean Transit Time Table provides the number of days and fractional day (hours) required to travel a specified number of miles at a given speed.

POE-to-POD MILEAGE FILE

Field Name	Format	Units	Description
PORTCODE	C(3)		OCONUS port code (POD)
SEATTLE	N(6)	miles	number of miles from the Seattle port complex
SANFRAN	N(6)	miles	number of miles from the San Francisco-Oakland port complex
SANDIEGO	N(6)	miles	number of miles from the San Diego port complex
GALVESTON	N(6)	miles	number of miles from the Galveston port complex
MOBILE	N(6)	miles	number of miles from the Mobile port complex
JACKSONVILLE	N(6)	miles	number of miles from the Jacksonville port complex
NORFOLK	N(6)	miles	number of miles from the Norfolk port complex
NEWYORK	N(6)	miles	number of miles from the New York port complex

INLAND TRANSIT TIME FILE

Field Name	Format	Units	Description
GEOCODE	C(4)		origin geocode
DODAAC	C(6)		origin DODAAC
ORIGIN	C(28)		in-the-clear origin
STATE	C(2)		origin state
PORTCODE	C(3)		port code
RAIL	N(2)		number of days by rail
TRUCK	N(2)		number of days by truck

OCEAN TRANSIT TIME FILE

Field Name	Format	Units	Description
MILES	N(5)	miles	number of ocean miles
SPEED	N(2)	knots	speed of ship
DAYS	N(2)	days	number of days of travel
HOURS	N(2)	hours	number of hours (fractional day)

The Commodity File is comprised of all valid commodity codes and in-the-clear definitions for each.

COMMODITY FILE

Field Name	Format	Units	Description
COMMODITY	C(3)		water commodity code
DESC	C(60)		description

The DOD Identification Code (DODIC) File supplies a valid four position DODIC and a NMFC/UFC code for conversion of the Ammo Planning Wire.

DODIC FILE

Field Name	Format	Units	Description
DODIC	C(4)		DoD ID code
FRGTNO	C(8)		NMFC/UFC freight classification code
DESC	C(60)		description

The JOPES GEOFILE provides location information for all registered geolocation codes for origins, POEs, intermediate locations, PODs, and destinations used by JDC automated systems.

GEOFILE

Field Name	Format	Units	Description
GEOCODE	C(4)		geolocation code
NAME	C(17)		geolocation in-the-clear name
ITC	C(3)		installation type code
CS_CO	C(2)		country/state code
CS_NA	C(5)		country/state short name
PRO_C	C(3)		province code
PRO_N	C(14)		province name
COORD	N(15)		geographical coordinates of the location identified in this record. Format is "dddmmssh" for longitude and "ddmmssh" for latitude in degrees, minutes, seconds, and hemisphere.
LPRC	C(2)		logistics planning and reporting code
P_GEOCD	C(4)		prime geolocation code
REC_O	C(6)		UIC of the organization responsible for reporting the data for this record
GSA_ST	C(2)		GSA state code
GSA_CI	C(4)		GSA city code
GSA_CO	C(3)		GSA county code
REC_CR	Date	yymmdd	date record was created
REC_CH	Date	yymmdd	date record was changed
GEOCD_C	Date	yymmdd	date geolocation code was cancelled
CS_LN	C(15)		country/state/area in-the-clear name
COMMAND	C(1)		unified or specified command are in which this geolocation code is located
REC_S	C(1)		record status code
SECURITY	C(1)		security classification code
ARMY	C(5)		Army location code
NAVY	C(2)		Navy location code

The Master Address Directory (MAD) file supplies current valid addresses and in-the-clear addresses for all shippers known to the DOD.

MAD FILE

Field Name	Format	Units	Description
DODAAC	C(6)		DoD Activity Address Code
POC	C(60)		point of contact
ADRESS	C(60)		mailing address
CITY	C(35)		city
CS_CD	C(2)		country/state code
CS_LN	C(35)		country/state in-the-clear name
ZIP	N(9)		zip code
SPLC	N(6)		standard point location code
BB_DODAAC	C(6)		DODAAC used for breakbulk shipments
POD	C(3)		preassigned POD
EFFEC_D	Date	yymmdd	effective date

The MSC Rate Files contains the current rate cycle figures negotiated by MSC for breakbulk and container moves. The MSC Drayage Rates File includes the negotiated drayage rates for both CONUS and OCONUS for container moves.

MSC BREAKBULK RATES FILE

Field Name	Format	Units	Description
ROUTE_NDX	C(2)		route index
PODZONE	C(2)		zoned routes
COMM_C	C(3)		commodity code
CARR_ID	C(4)		carrier ID
REMARKS	C(2)		reference remarks
RATE	N(7)2	dollars	rate per MTON
PERCENT	N(5)2		carrier's percentage over the route

MSC CONTAINER RATES FILE

Field Name	Format	Units	Description
ROUTE_NDX	C(2)		route index
PODZONE	C(2)		zoned routes
COMM_C	C(3)		commodity code
CARR_ID	C(4)		carrier ID
REMARKS	C(2)		reference remarks
VAN_SZ	C(1)		van size
RATE	N(7)2	dollars	rate per MTON
PERCENT	N(5)2		carrier's percentage over the route

MSC DRAYAGE RATES FILE

Field Name	Format	Units	Description
CITY	C(15)		inland origin/destination city
CS_CODE	C(2)		country/state code
CARR_ID	C(4)		carrier identifier
VAN_SZ	C(1)		van size
PORTCODE	C(3)		water port code
RATE	N(7)2	dollars	rate per MTON

The POE/POD File provides all three position POEs and PODs and in-the-clear location information.

POE/POD FILE

Field Name	Format	Units	Description
PORTCODE	C(3)		water port code
PORTNAME	C(40)		port name
PORTCITY	C(40)		port city
PORT_CS	C(2)		port country/state code
CS_LN	C(35)		country/state in-the-clear name
PODZONE	C(2)		route zone port is located in, if any

A Codes File provides the capability to maintain miscellaneous codes of varying lengths for cross-referencing and validating purposes.

MISCELLANEOUS CODES FILE

Field Name	Format	Units	Description
CODE	C(10)		valid codes
LEN	N(2)		length of code field
TYPE	C(6)		type of code
DESC	C(60)		in-the-clear description

The Installation Address File is used with port call messages for maintaing current and correct addresses of installations' points-of-contact.

INSTALLATION ADDRESS FILE

Field Name	Format	Units	Description
STATION	C(9)		abbreviated installation name
GEOCODE	C(4)		installation GEOCODE
POC	C(80)		installation point-of-contact
PHONE	C(25)		telephone number(s)
ADDRESS	C(80)		mailing address
CITY	C(25)		city
STATE	C(2)		state code
ZIP	N(9)		zip code

APPENDIX C. REPORT FORMATS

Report formats included in this section represent booking data for both unit and nonunit moves. A representative sample of reports is presented, including the export unit cargo release report, ship schedule report, IBS detail list, cargo movement request, the IBS rollup detail list by installation, and the shipping order/clearance order (SOCO) report.

EXPORT UNIT CARGO RELEASE

Requestor DODAAC :

Base Requestor ID :

Release Number :

UIC: ULN: Origin GEOCODE: Deployment Mode:

Port Information: POC : Phone:

Address:

Voyage Number:

Vessel Name :

Release Remarks:

TCNs:

SHIP SCHEDULE

Vessel: Carrier: Voy Doc No:

port	arrive date	time	sail date	time
	/ /		/ /	
	/ /		/ /	
	/ /		/ /	
	/ /		/ /	
	/ /		/ /	
	/ /		/ /	
	/ /		/ /	
	/ /		/ /	
	/ /		/ /	

IBS DETAIL LIST

Date Printed: yy/mm/dd | Station: | State:

UIC: | ULN: | Unit Name:

TCN	LIN	Description	Model	DIMENSIONS Len	Wid	Hgt	Weight	Cube	Type Pack	Commodity	Mode	STON	MTON

C A R G O   M O V E M E N T   R E Q U E S T

PCFN : etr->pcfn
TYPE OFFER: Container (if etr->type_offr = C or V)

REQUESTER: etr->r_dodaac-etr->r_id

DATE PRINTED: today's date
TIME PRINTED: current time

REQUESTER

etr->r_dodaac = madd->madcd
madd->name
madd->address1
madd->address2
madd->address3
madd->address4
madd->address5

SHIPPER

etr->s_dodaac
madd->name
madd->address1
madd->address2
madd->address3
madd->address4
madd->address5

POC:

RELEASE REMARKS: etr->remarks

CONTAINER DATA

DATE AVAIL : etr->d_avail
RDD : etr->rdd
LADING TERM: etr->ltc

PCS	WEIGHT	CUBE	L/T	M/T	VAN SZ	PRJ	PRI	FUND	COMMODITY/EXCEPTION
etr-> pcs	etr-> wgt	etr-> cube	etr-> lton	etr-> mton	etr-> van_sz	etr-> proj_c	etr-> priority	etr-> fund_ag	etr-> commodity

CONSIGNEE

etr->c_dodaac=madd->madcd
madd->name
madd->address1
madd->address2
madd->address3
madd->address4
madd->address5

POD

madd->pod
in-the-clear name from ports.dbf

CARRIER & BOOKING DATA

VESSEL NAME: vessel->shipname
CARRIER : vessel->carr_id
VOY DOC NO : vessel->voy_doc_no

POE : etr->poe
SPOT DATE: etr->spot_d
SAIL DATE: vessched->sail_d
POD : etr->pod

DATE OFFERD : etr->offered
DATE BOOKED : etr->booked
BOOKING NO : etr->carr_bk_no
BOOKING RSN : etr->book_rsn

COSTS: CONUS DRAYAGE : etr->conus_cost
POE HANDLING : etr->poe_cost
OCEAN : etr->ocean_cost
OCONUS DRAYAGE: etr->ocons_cost
TOTAL COST : etr->total_cost

NO VANS	SIZE	TYPK	TERMS	TC	RI
etr-> van_risd					

I B S   R O L L U P   D E T A I L   L I S T   B Y   I N S T A L L A T I O N

PAGE:

DATE PRINTED: yy/mm/dd

STATION: STATE:

LIN	QTY	DESCRIPTION	MODEL	*------------ INDIVIDUAL DIMENSIONS ------------*							MODE	*------------ TOTAL ALL ITEMS ------------*			
				LEN	WID	HGT	WEIGHT	CUBE	LTON	MTON		WEIGHT	LTONS	MTONS	SQ FT
lin	qty	desc	model	len	wid	hgt	wgt	cube	wgt/ 2240	cube/ 40	mode	qty * wgt	qty * lton	qty * mton	qty * (len * wid)

PARTICIPATING UNITS:

header->uic   header->uln   header->unitname

AUTOMATED SOCO REPORT
YY/MM/DD HH:MM:SS

SO/CO	TERM CARR	VOYAGE DOCUMENT NUMBER	SHIP NAME	CARRIER	CONTRACT NUMBER	ROUTE INDEX	SHIP CALL	P/D SOC

POE: POD: SAILING DATE: / /

PCFN	CONT SIZE	COMM CODE	DODAAC ID ACTIVITY	TCN V NR	CONT TERM	ULT DEST	STOP OFF	MISC CODE	BK REA	CONSIGNEE

SUBTOTAL =

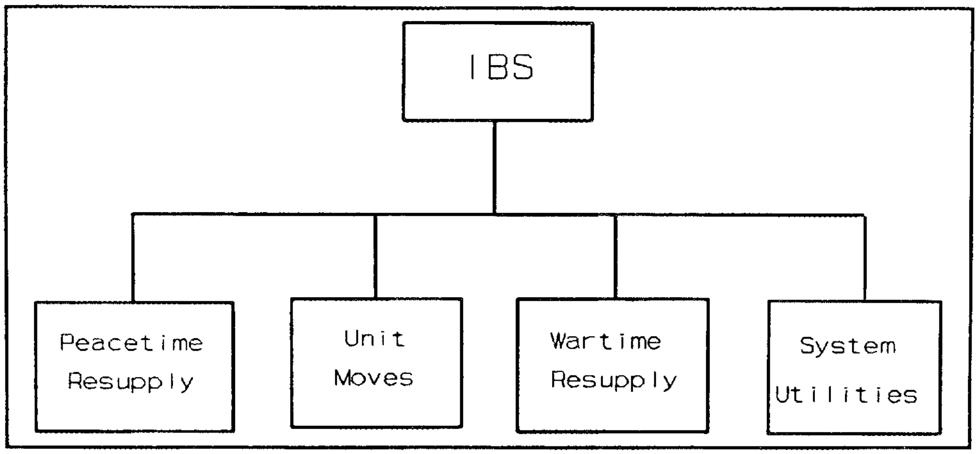
POE: POD: SAILING DATE: / /

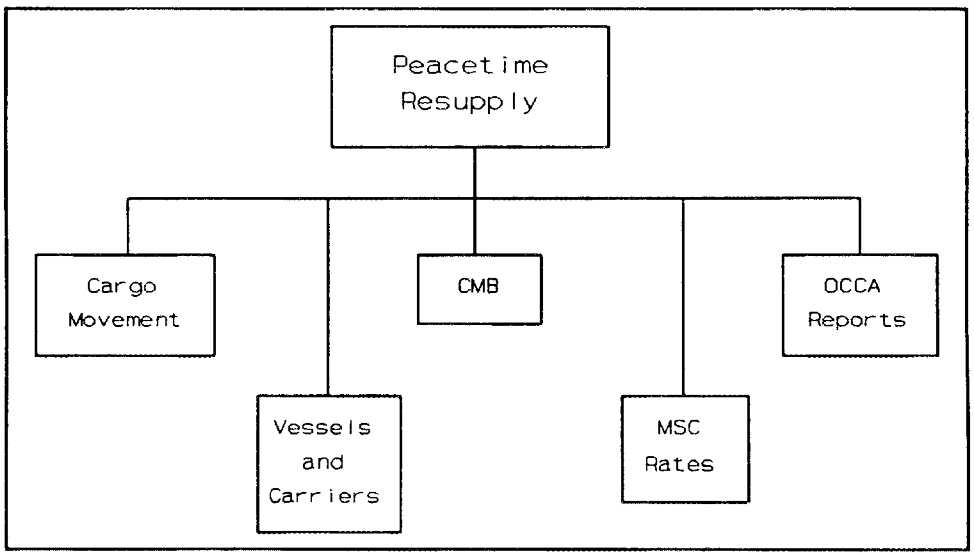
PCFN	CONT SIZE	COMM CODE	DODAAC ID ACTIVITY	TCN V NR	CONT TERM	ULT DEST	STOP OFF	MISC CODE	BK REA	CONSIGNEE

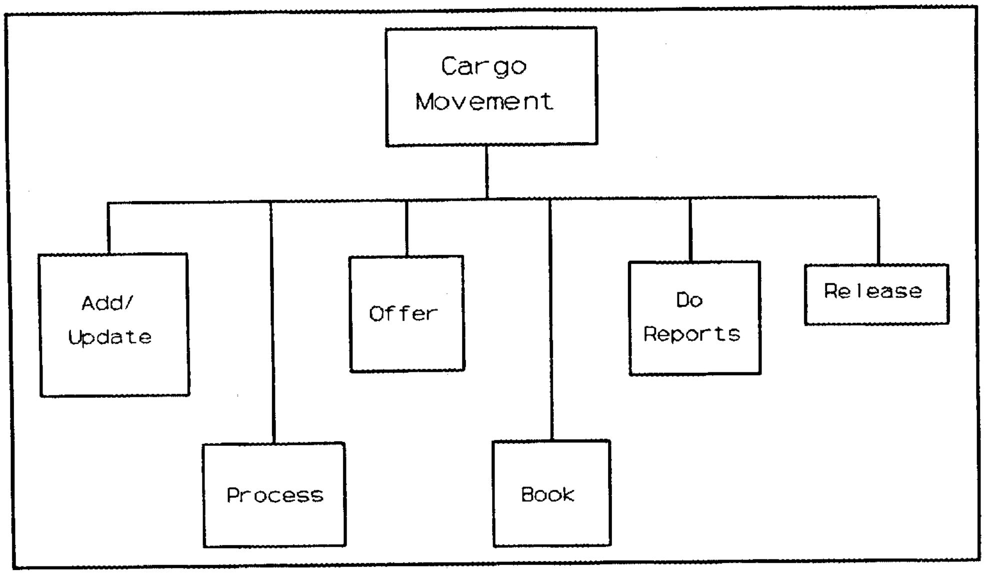
TOTAL =

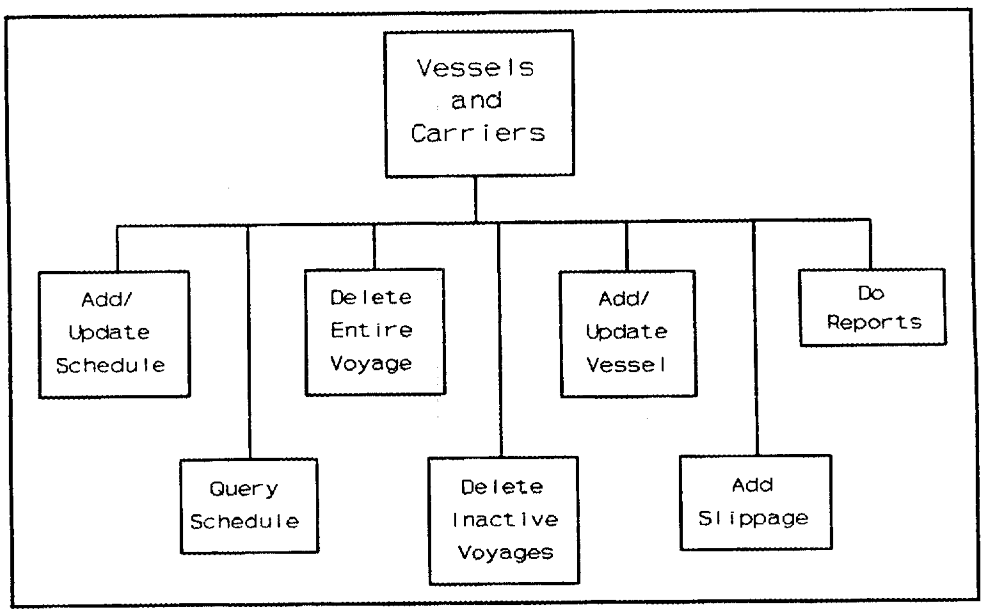
APPENDIX D. RECOMMENDED MENUS FOR IBS

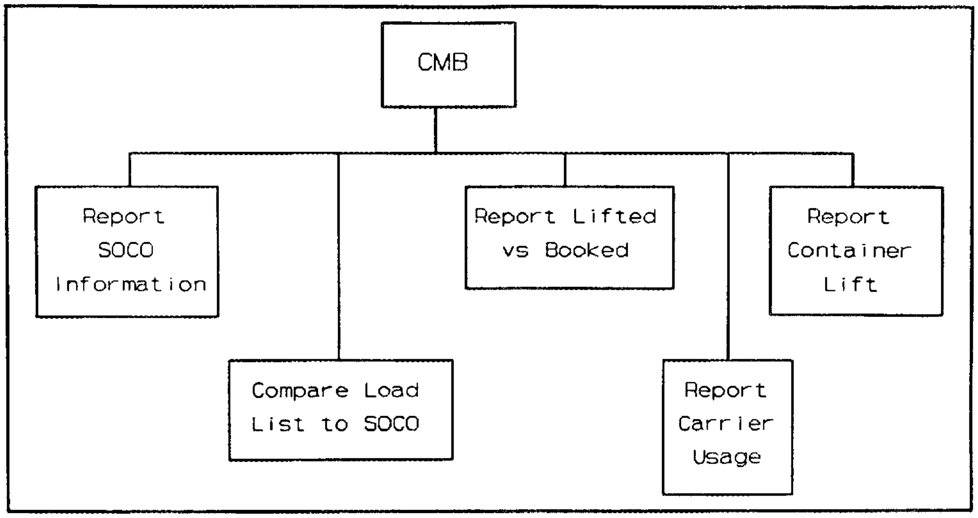
A potential menu structure is included in this section. Prior to development, this structure should be reviewed for efficiency (i.e., does this design provide the appropriate accessibility desired by the functional users), logic, consistency, and wording (i.e., are the terms and acronyms used appropriately). The system utilities module should be reviewed to ensure that all audit and maintenance features are included.

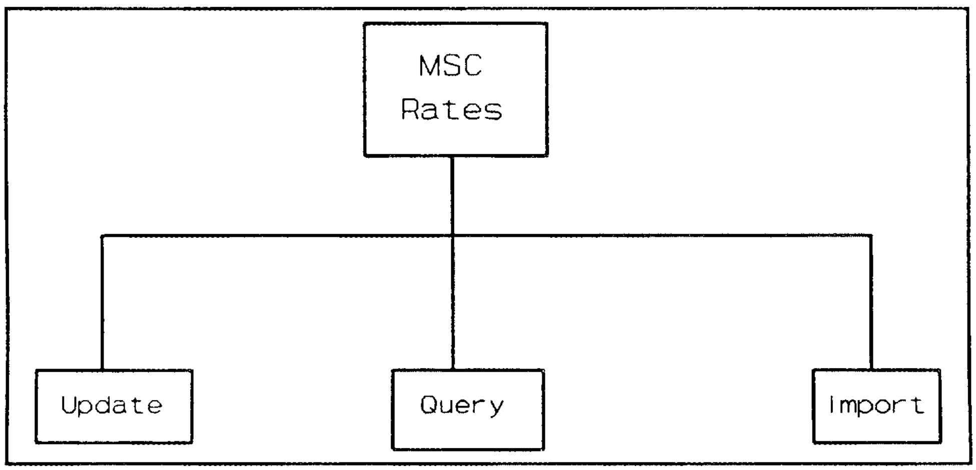

IBS
Peacetime Resupply
Unit Moves
Wartime Resupply
System Utilities

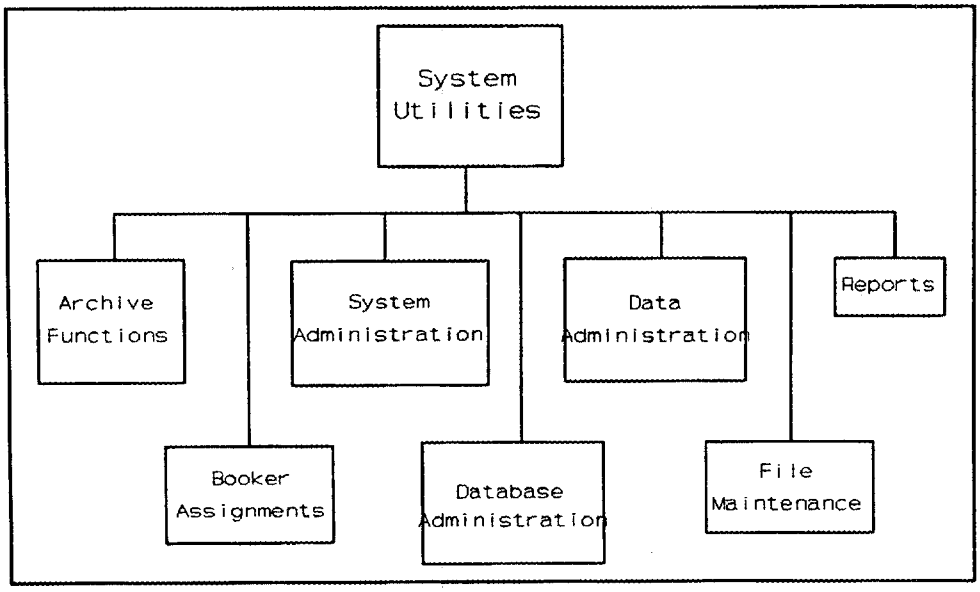

Peacetime Resupply
Cargo Movement
Vessels and Carriers
CMB
MSC Rates
OCCA Reports


Cargo Movement
Add/ Update
Process
Offer
Book
Do Reports
Release

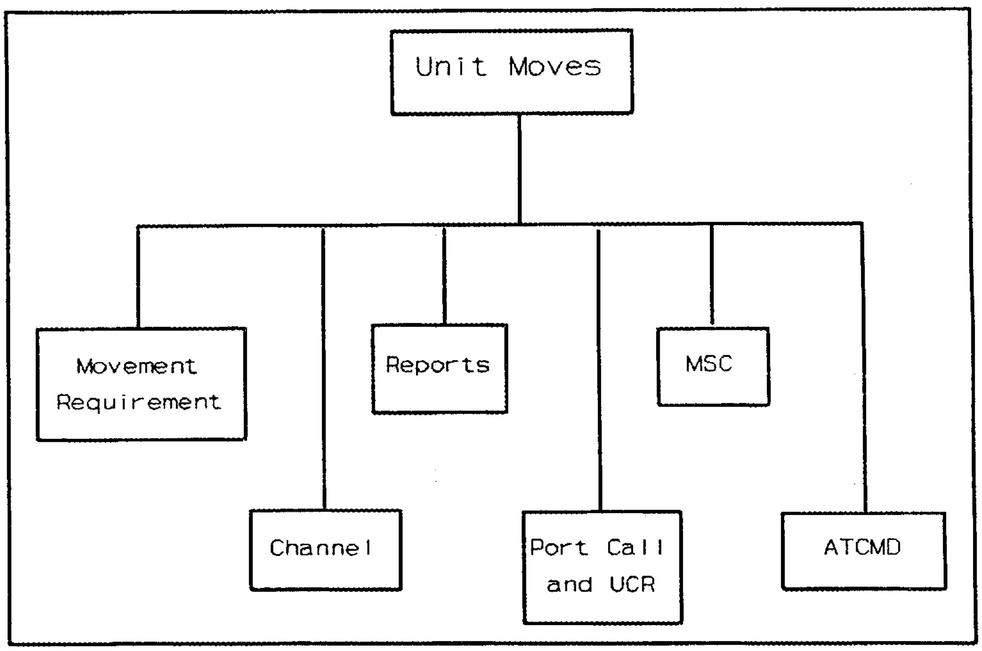

Vessels and Carriers
Add/ Update Schedule
Query Schedule
Delete Entire Voyage
Delete Inactive Voyages
Add/ Update Vessel
Add Slippage
Do Reports


CMB
Report SOCO Information
Compare Load List to SOCO
Report Lifted vs Booked
Report Carrier Usage
Report Container Lift

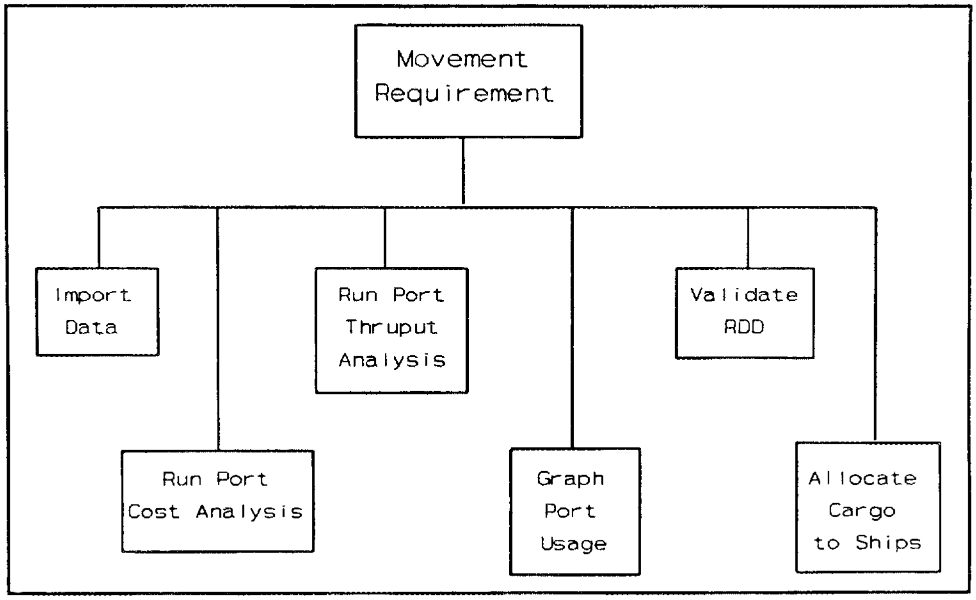

MSC Rates
Update
Query
Import



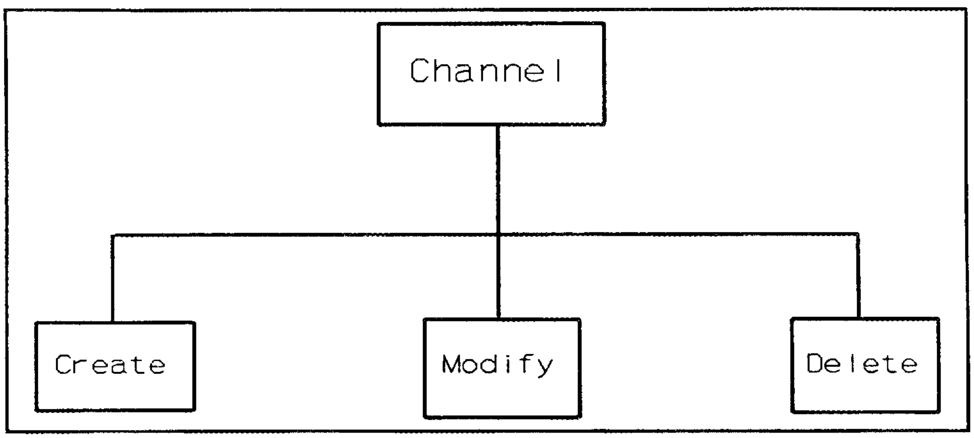
System Utilities
Archive Functions
Booker Assignments
System Administration
Database Administration
Data Administration
File Maintenance
Reports



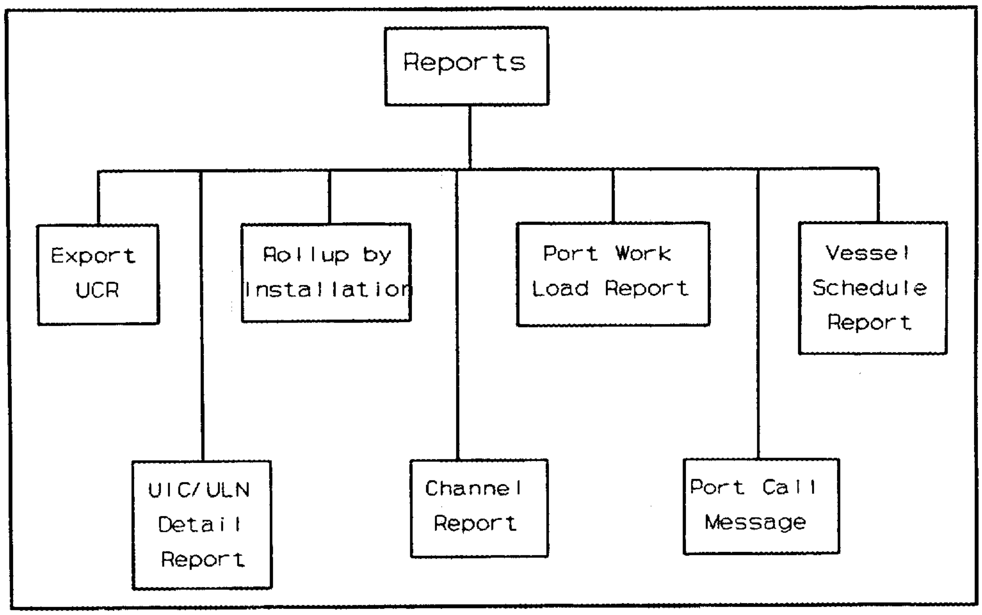
Unit Moves
Movement Requirement
Channel
Reports
Port Call and UCR
MSC
ATCMD

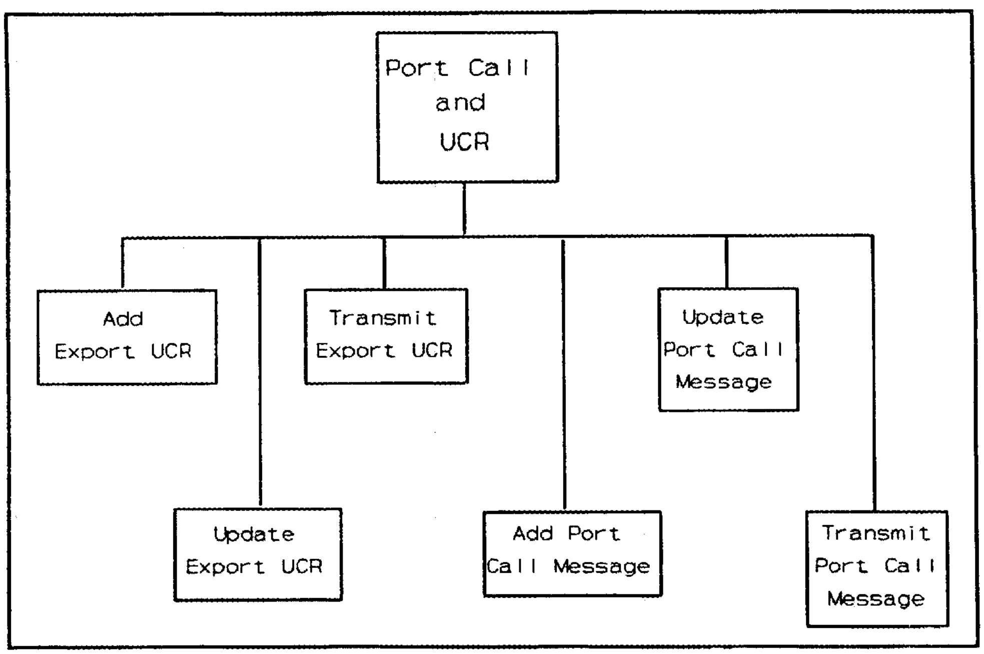


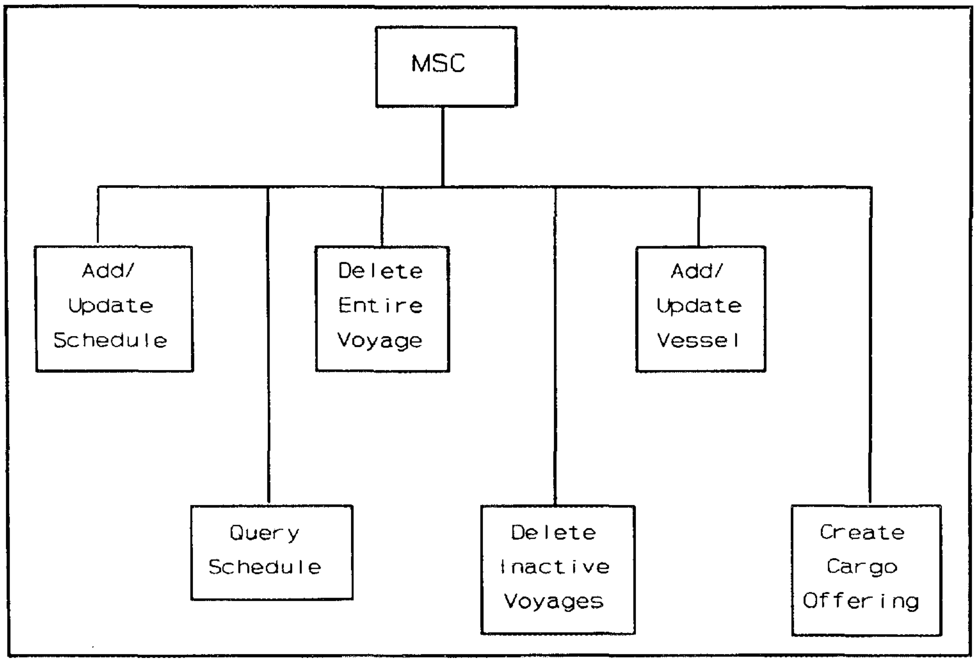
Movement Requirement
Import Data
Run Port Cost Analysis
Run Port Thruput Analysis
Graph Port Usage
Validate RDD
Allocate Cargo to Ships

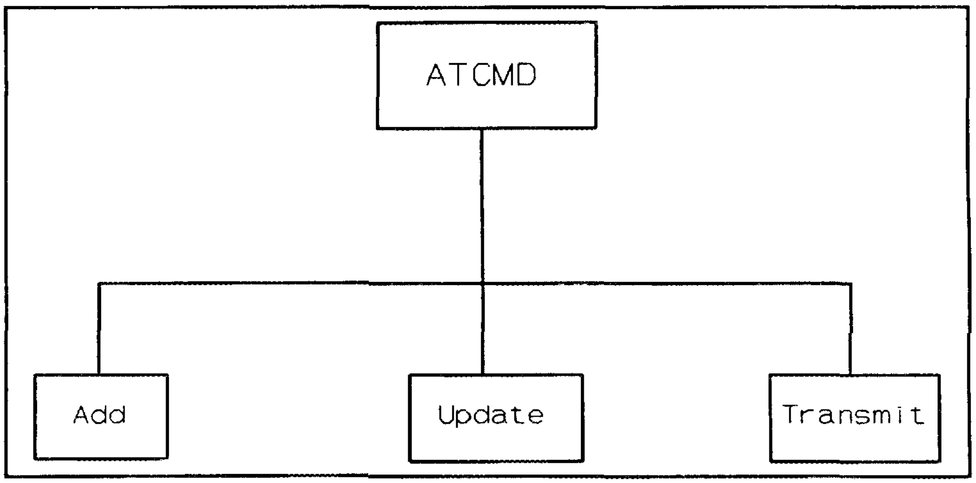


Channel
Create
Modify
Delete


Reports
Export UCR
UIC/ULN Detail Report
Rollup by Installation
Channel Report
Port Work Load Report
Port Call Message
Vessel Schedule Report


Port Call and UCR
Add Export UCR
Update Export UCR
Transmit Export UCR
Add Port Call Message
Update Port Call Message
Transmit Port Call Message


MSC
Add/ Update Schedule
Query Schedule
Delete Entire Voyage
Delete Inactive Voyages
Add/ Update Vessel
Create Cargo Offering


ATCMD
Add
Update
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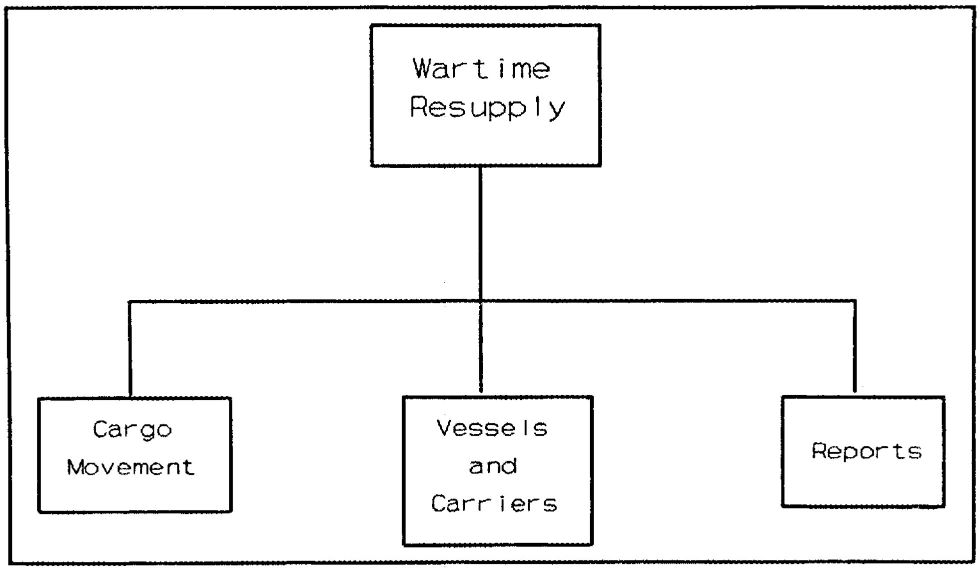
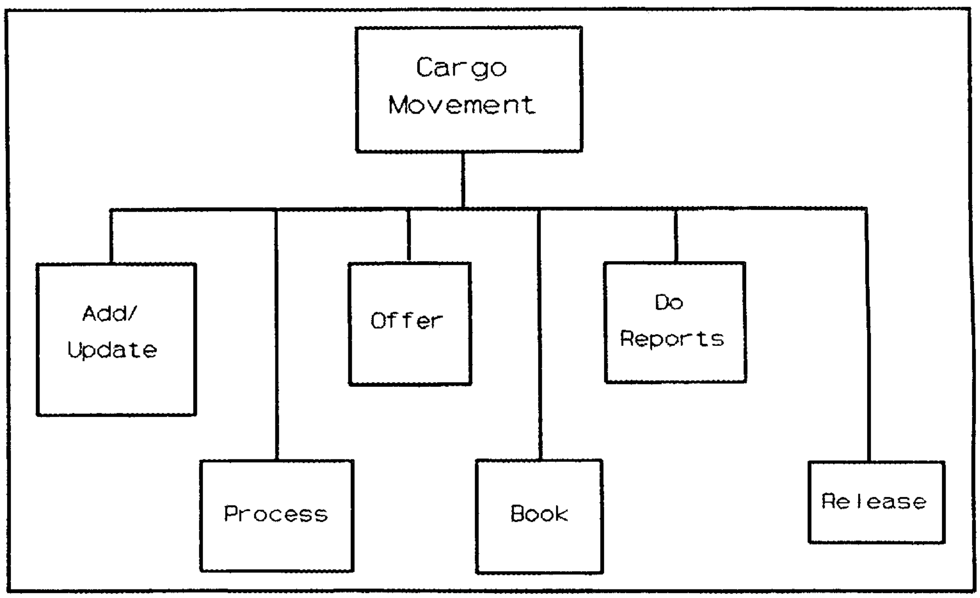
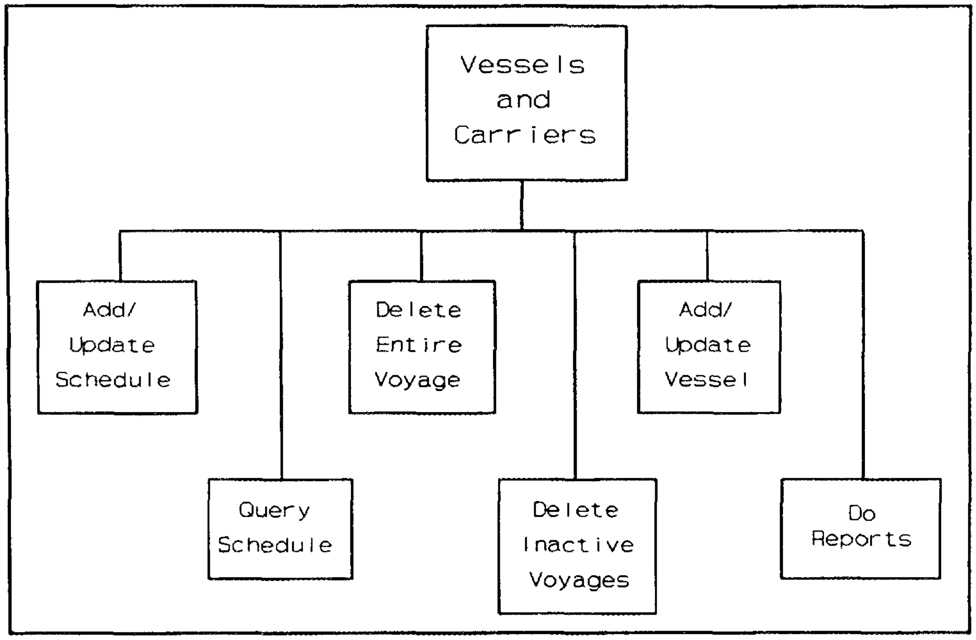

Wartime Resupply
Cargo Movement
Vessels and Carriers
Reports


Cargo Movement
Add/ Update
Process
Offer
Book
Do Reports
Release


Vessels and Carriers
Add/ Update Schedule
Query Schedule
Delete Entire Voyage
Delete Inactive Voyages
Add/ Update Vessel
Do Reports

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