ATP 4-16

Movement Control

April 2013

Headquarters Department of the Army

Army Techniques Publication
No. 4-16

Headquarters
Department of the Army
Washington, DC, 5 April 2013

Movement Control

Contents

***This publication supersedes FM 4-01-30, dated 01 September 2003**

Figures

Tables

Preface

This Army Techniques Publication (ATP) describes the roles, responsibilities, and command relationships for organizations planning, executing, and supporting Army movement control at the operational and tactical levels. This publication applies to the range of military operations and supports Army Doctrine Publication (ADP) 3-0 *Unified Land Operations* and ADP 4-0 *Sustainment*. This doctrinal manual is not intended to cover garrison operation.

The principle audience for ATP 4-16 is all members of the profession of arms. Commanders and staffs of Army headquarters serving as joint task force or multinational headquarters should also refer to applicable joint or multinational doctrine concerning the range of military operations and joint or multinational forces. Trainers and educators throughout the Army will also use this manual.

Commanders, staffs, and subordinates ensure their decisions and actions comply with applicable U.S., international, and, in some cases, host-nation laws and regulations. Commanders at all levels ensure their Soldiers operate in accordance with the law of war and the rules of engagement.

ATP 4-16 uses joint terms where applicable. Selected joint and Army terms and definitions appear in both the glossary and the text. Terms for which ATP 4-16 is the proponent publication (the authority) are marked with an asterisk (*) in the glossary. Definitions for which ATP 4-16 is the proponent publication are boldfaced in the text. For other definitions shown in the text, the term is italicized and the number of the proponent publication follows the definition.

This ATP applies to the Active Army, the Army National Guard, and the United States Army Reserve unless otherwise stated.

The proponent for this ATP is the United States Army Training and Doctrine Command. The preparing agency is the Unites States Army Combined Arms Support Command (USACASCOM). Send comments and recommendations on Department of the Army (DA) Form 2028 (Recommended Changes to Publications and Blank Forms) to Commander, U.S. Army CASCOM ,ATTN: ATCL-TDD (ATP 4-16), 2221 A Ave, Ft. Lee, VA 23801 or submit an electronic DA Form 2028 by e-mail to: usarmy.lee.tradoc.mbx.leee-cascom-doctrine@mail.mil.

Unless this ATP states otherwise, masculine nouns and pronouns do not refer exclusively to men.

Introduction

Army Techniques Publication (ATP) 4-16 replaces Field Manual (FM) 4-01.30, *Movement Control*. The purpose for the conversion and update of this manual is to comply with the Army's Doctrine 2015 initiative, align Army movement control roles and responsibilities with the current force structure, and incorporate lessons learned from recent operations. Significant highlights of this ATP are the introduction of a new Army definition for movement control and the establishment of movement control responsibilities above the movement control battalion. The ATP addresses Army movement control as a process that is not confined to a single unit but executed by a tiered network of organizations that provide a tool for commanders to influence movement over lines of communications (LOCs) in their area of responsibility. The focus of this publication is on the theater sustainment command (TSC) and its subordinate expeditionary sustainment commands (ESC), sustainment brigades, movement control battalions (MCB) and movement control teams (MCT). The ATP also defines a template for movement control operations in other organizations such as a division or brigade combat team (BCT).

Though this ATP addresses general movement control techniques, the specific execution of missions are dependent on the situation or environment. Furthermore, Army Doctrinal Reference Publication (ADRP) 3-0, *Unified Land Operations*, states that "any operational environment consists of many interrelated variables and subvariables, as well as the relationships among those variables and subvariables. How the many entities and conditions behave and interact with each other within an operational environment is difficult to discern and always results in differing circumstances. Different actor or audience types do not interpret a single message in the same way. Therefore, no two operational environments are the same." Consequently, ATP 4-16 provides a foundation for commanders to tailor the movement control process as necessary to meet the demands of any operational environment.

Introductory Table – 1. New Army terms

Terms	*Remarks*
distribution network design	replaces traffic circulation plan
route synchronization	replaces highway regulation

Introductory Table – 2. Modified Army terms

Terms	*Remarks*
movement control	establishes Army definition
standing transportation movement release	modified to support movement control definition
transportation movement release	modified to support movement control definition

Chapter 1

Fundamentals of Movement Control

Movement control is the dual process of committing allocated transportation assets and regulating movements according to command priorities to synchronize the distribution flow over lines of communications to sustain land forces.

Movement control, as a transportation subordinate function, provides commanders a mechanism to synchronize movements for deployment, redeployment, and distribution operations to support unified land operations and provides them situational understanding to effectively influence the movement in their area of responsibility. Movement control is inherently joint allowing other Services access to Army common user transportation and is a medium for the Army to utilize joint transportation to enhance military operations. Not vested in a singular unit, movement control responsibilities are embedded in a network that relies on coordination for the planning and execution while ensuring transportation assets are utilized effectively/efficiently and that LOCs are deconflicted to support decisive action.

The transportation system is metered by the demand signals of the supported forces so movement control balances requirements against capabilities, integrates military, host nation (HN) and commercial transportation by all modes, except pipeline for bulk fuel, to ensure seamless transitions from the strategic through the tactical level of an operation.

COMPONENTS OF MOVEMENT CONTROL

1-1. Movement control (MC) consists of three components: dual process, principles, and functions (see figure 1-1). These interrelated supporting elements provide the framework for synchronizing the flow. The flow is defined as the strategic/operational/tactical movement of forces, personnel, equipment, or sustainment cargo. Synchronizing includes the ability to increase or decrease the speed, impact the direction, or adjust the volume of the flow over air/land/water LOCs. If distribution is about getting the "right things" to the "right place" at the "right time" (ADP 4-0), then movement control as a subset of distribution synchronizes the flow to ensure the at the "right place" at the "right time" segment of distribution.

DUAL PROCESS

1-2. Committing allocated transportation assets is the umbrella process capturing the various sub processes that match a transportation movement requirement against transportation capabilities. It encompasses:

- The movement request process and the resulting transportation movement release (TMR)
- The committing of mode operators by movement control units
- The mode operators tasking their subordinate units to execute TMRs
- The validation of a movement program

1-3. This process uses such actions as selecting the mode of transport and determining departure times as mechanisms to synchronize the flow. Determining the appropriate mode of transport can increase the speed

(i.e. selecting air versus ground) or adjust the volume (i.e. using multiple modes so not to break the capacity of LOC).

1-4. Regulating movements entails the additional actions to synchronize the flow of movement over LOCs which includes but is not limited to the planning and execution of route synchronization and distribution network design (see chapter 6), managing convoys at distribution hubs/convoy support centers (CSCs)/border crossings/entry control points, and diverting movement of a convoy or single shipment when necessary.

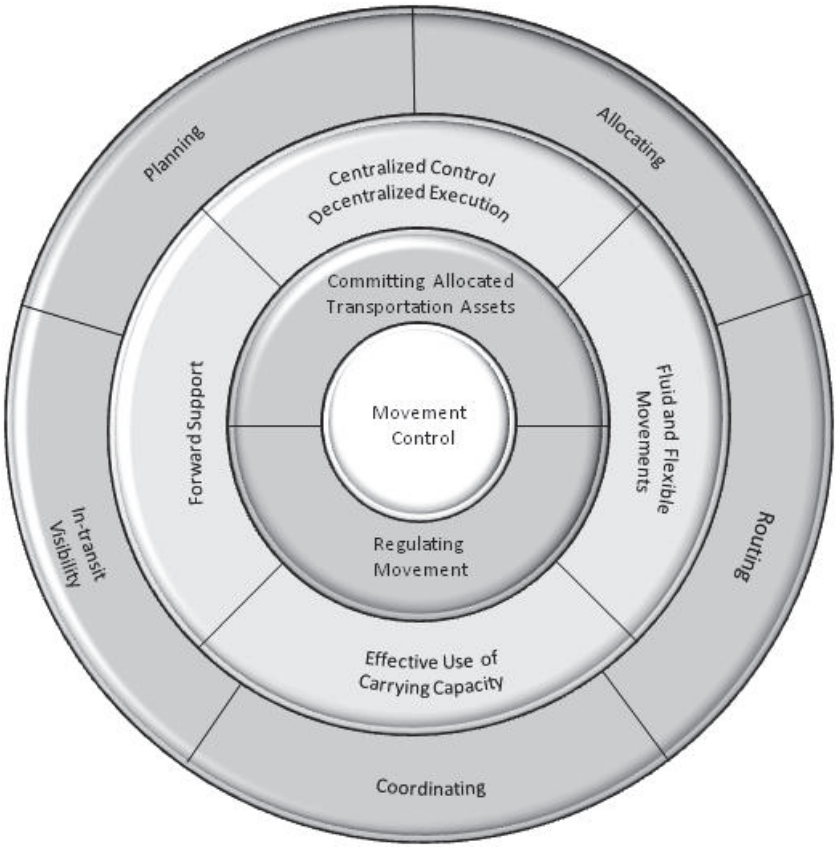


Figure 1-1. Components of movement control

PRINCIPLES OF MOVEMENT CONTROL

1-5. Centralized Control and Decentralized Execution. ***Centralized control*** **means that a focal point for movements planning and resource allocation exists at the appropriate level of command involved in an operation.** The focal point is an individual or unit that is aware of the current and future requirements of the supported force as well as the capabilities available to meet the requirements. Centralization of movement control normally occurs at levels charged with integrating logistics support. Decentralized execution of movement control operations is equally important. It is essential to establish mode determination during the movement request process at the lowest level possible and allow mode operators to remain free to assign the specific transportation assets that will meet the requirement. This practice enhances the flexibility to prioritize support to meet commander's intent.

1-6. Fluid and Flexible Movements. Transportation systems must provide the uninterrupted movement of personnel, supplies, equipment, and services. To do this, the system must be capable of rerouting and diverting traffic. Maintaining flexibility is one of the biggest challenges facing movement planners and operators in a changing operational environment with shifting conditions and priorities. The assurance of an uninterrupted flow of movement is essential to operational success. Movement control is responsible for

providing uninterrupted flow of movement over LOCs and relies heavily on information and communications systems embedded in the distribution system to enhance capabilities.

1-7. Effective use of carrying capacity. Transport capability that is not currently used cannot be stored to provide an increase in capability for subsequent days. Maximum use includes the prompt return of commercial transportation assets to ensure their rapid availability for subsequent operations, which also avoids penalty charges against the government. It is the responsibility of all movement personnel to ensure transportation assets are fully loaded and operating at the maximum capability that the operational environment permits. This includes the disciplined use of returning transportation assets to support retrograde or repositioning of equipment, personnel, and supplies. Also included is the fast off-loading of the assets to return them to the system to increase capability for later operations. Planners must temper this principle with appropriate attention to adequate equipment maintenance and crew rest. Understanding the capacity of LOCs to include limitations on traffic or weight/height/depth restrictions is essential to support freedom of movement.

1-8. Forward support. Forward support is rapid delivery of sustainment as far forward as possible with minimal handling and transshipping. It is dependent on fast, reliable transportation to move supplies and personnel as far forward as the operational environment requires and permits. The key to forward support is rapid reception and clearance at destination units. It is frequently necessary to temporarily augment destination units' reception and clearance capabilities to ensure operational success, but this principle must be balanced to also ensure all levels have the appropriate resources to remain effective.

FUNCTIONS OF MOVEMENT CONTROL

1-9. Planning. Planning involves the known and anticipating the unknown. Anticipation is the ability to foresee events and requirements and initiate necessary actions that most appropriately avoid or resolve an issue. It demands flexibility to accommodate change, the ability to see the operational environment, and a thorough understanding of the mission and concept of operations. For movement planners, anticipation includes developing alternative plans for routes and loss of assets due to enemy action. Movement planners must also know the distribution system, road networks, location of customer activities, and frequency and magnitude of their transportation requirements and their material/container-handling capabilities. The transportation planning function is vital to the success of military operations at all levels of command.

1-10. Allocating. Allocating assigns common user transportation capability against planned movement requirements. It is an extremely critical function in the decision making process since it forces planners to analyze and synchronize requirements, capabilities, and priorities. Planners must constantly review and adjust available capabilities to maximize the support provided. Transportation personnel allocate capabilities based on theater priorities when there are not enough assets to satisfy all transportation demands.

1-11. Routing. The routing function is the process of scheduling and directing movements on LOCs to prevent conflict and congestion. When routing traffic, movement planners consider the following:

- Assign highest priority traffic to routes that provide the minimum time-distance.
- Consider the sustained capabilities of roads and bridges when assigning movements.
- Separate motor movements from pedestrian movements.
- Separate civilian traffic (vehicular or pedestrian) from military movements.
- Consider consolidating shipments that can be applied to a selected route.

1-12. Coordinating. Coordinating entails the interface with organizations that participate directly or indirectly with the movement of personnel, supplies, and forces supporting deployment, redeployment, and distribution operations. Coordination extends to joint and multinational forces, HNs, contractors and non-governmental agencies. A common communications network is vital to this process.

1-13. In-transit visibility (ITV**).** In-transit visibility is the ability to track the identity, status, and location of DOD units, non-unit cargo (excluding bulk petroleum, oils, and lubricants) and passengers from origin to either consignee or destination across the range of military operations (JP 4-10.2). This includes force tracking and visibility of convoys, unit cargo/equipment, containers/pallets, and transportation assets. ITV

enables movement control the ability to anticipate and manage the flow over LOCs as well as provide commanders the ability to be proactive and make changes in a fluid operational environment.

MODULARITY

1-14. Movement control units are inherently modular and have transformed throughout the years (see figure 1-2) to best match their capabilities with changing operational environments. Movement control battalions (MCB) are not organic to any sustainment headquarters but will normally operate under the mission command of an expeditionary sustainment command (ESC). Movement control teams (MCT) are not organic to MCBs, but will fall under the mission command of an MCB. The proper employment of these units, as well as other units with movement control capability, is essential to execute, deployment (to include theater opening), redeployment, and distribution operations. There are no functional movement control units above the battalion level so theater Army movement control responsibilities are vested in various units and staff positions that rely on augmentation to enhance their capability when necessary. The transportation theater opening element (TTOE) is a transportation staff augmentation unit that provides a variety of transportation capabilities to include movement control (see chapter 3). This highly capable organization can be employed whole or segmented to augment the support operations (SPO) sections of a sustainment brigade to provide early entry movement control capability. This unit can also augment a theater sustainment command (TSC) or ESC to enhance their staff's movement control capability for enduring operations.

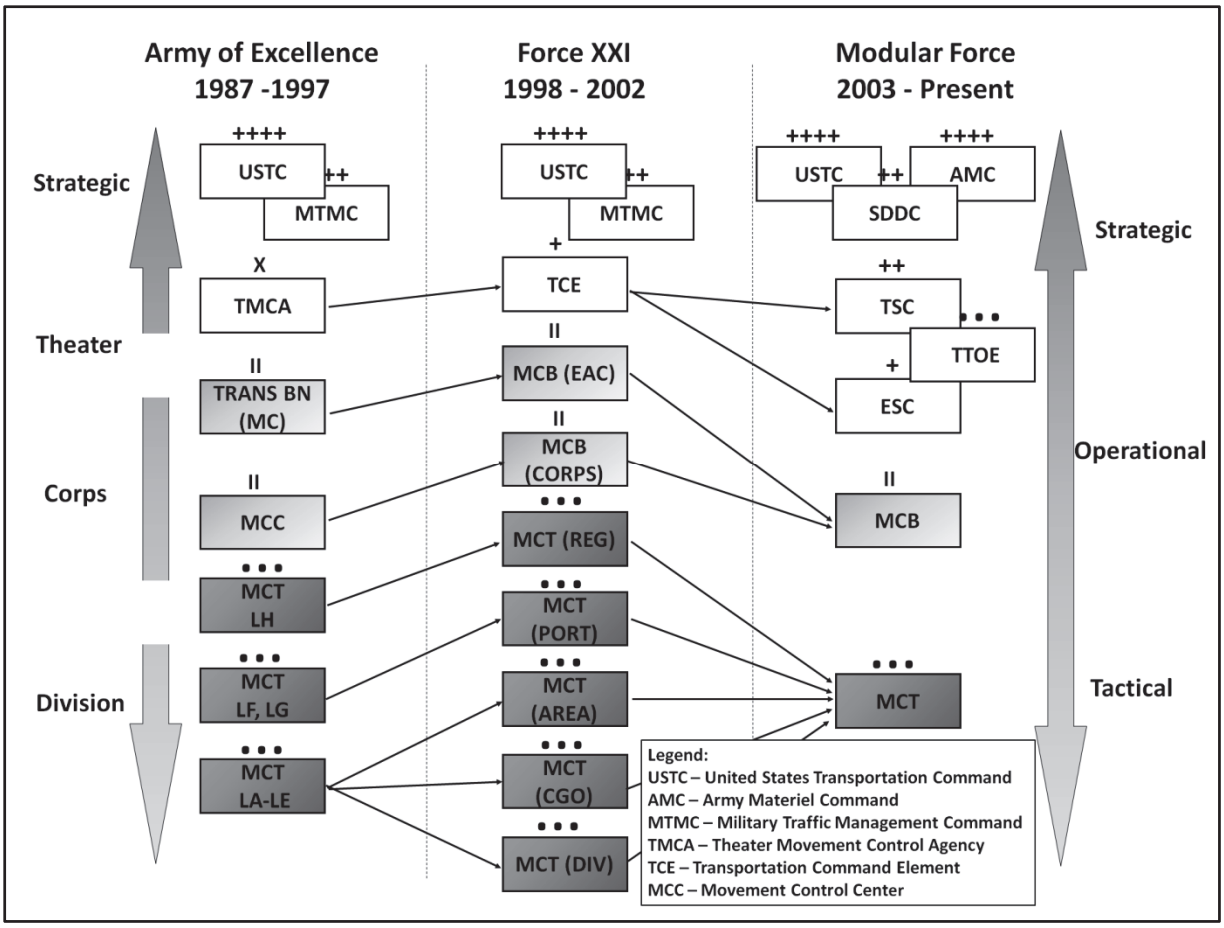


Figure 1-2. Movement control transformation

There is only one table of organization and equipment (TOE) design for an MCB and an MCT. MCTs can be further segmented to increase coverage at key intermodal nodes, distribution hubs, or checkpoints to regulate movement without loss of efficiency or effectiveness. As mentioned earlier, the proper employment of these

units is paramount to ensure a coordinated and synchronized intra-connected movement control structure to provide theater wide coverage capable of supporting the range of military operations.

This page intentionally left blank.

Chapter 2

Strategic and Joint Organizations

Strategic and theater joint organizations have specific roles and responsibilities that support the Army's movement control effort. These organizations are linked to the United States Transportation Command and provide the necessary strategic to operational level bridge to enable movement planning, movement execution, and in-transit visibility supporting deployment, redeployment, and distribution operations.

US TRANSPORTATION COMMAND (USTRANSCOM)

2-1. United States Transportation Command (USTRANSCOM), as the distribution process owner (DPO), oversees the overall effectiveness, efficiency, and alignment of Department of Defense (DOD)-wide distribution activities, including force projection, sustainment, and redeployment/retrograde operations. The DPO supports the strategic flow of deploying forces and sustainment to seaports of debarkation/aerial ports of debarkation (SPODs/APODs) in the joint area of operations (AO). These services are provided through use of common user airlift, sealift, surface transport, and terminal traffic management activities. USTRANSCOM, through its transportation component commands (see figure 2-1) (Air Mobility Command (AMC) (USAF), Military Sealift Command (MSC) (Navy), and Military Surface Deployment and Distribution Command (SDDC) (USA)) provides aerial port and seaport terminal management and services in support of the supported geographic combatant commander (GCC). USTRANSCOM coordinates the efforts of these commands with the supported and supporting commanders. USTRANSCOM and all of the transportation component commands ensure ITV is available for sustainment movements as well as time phased force deployment data (TPFDD) units and cargo. ITV is critical throughout the distribution pipeline as it allows contracted lift or theater organizations involved in movement control to adequately plan for regulating traffic flow and allocating assets.

DEPLOYMENT AND DISTRIBUTION OPERATIONS CENTER (DDOC)

2-2. In order to carry out the command mission, the commander of USTRANSCOM has established the deployment and distribution operation center (DDOC) as a functional internal organization to provide strategic movement control throughout the defense transportation system (DTS).

2-3. The DDOC directs the global air, land, and sea transportation capabilities of the DTS to meet national security objectives. The DDOC fuses capabilities of multi-modal deployment and distribution operations, intelligence, protection, capacity acquisition, resource management, and other staff functions to collaboratively provide distribution options to the GCC. The DDOC oversees and controls the majority of intertheater lift forces and logistic infrastructure and tracks the movement requirement from lift allocation and initial execution through closure at final destination through their support teams.

2-4. The DDOC uses a support team construct that provides upfront planning through collaboration with the supported commander and other key stakeholders. This allows the process to stay in step with commander's intent as the operation unfolds and increases visibility of all movement requirements. The geographical orientation of support teams enables a holistic view of strategic movement control and warfighter lift requirements, provides an opportunity to conduct a thorough transportation analysis, reduces correspondence management, leverages collaboration technologies, and enables aggregation of requirements within movement windows.

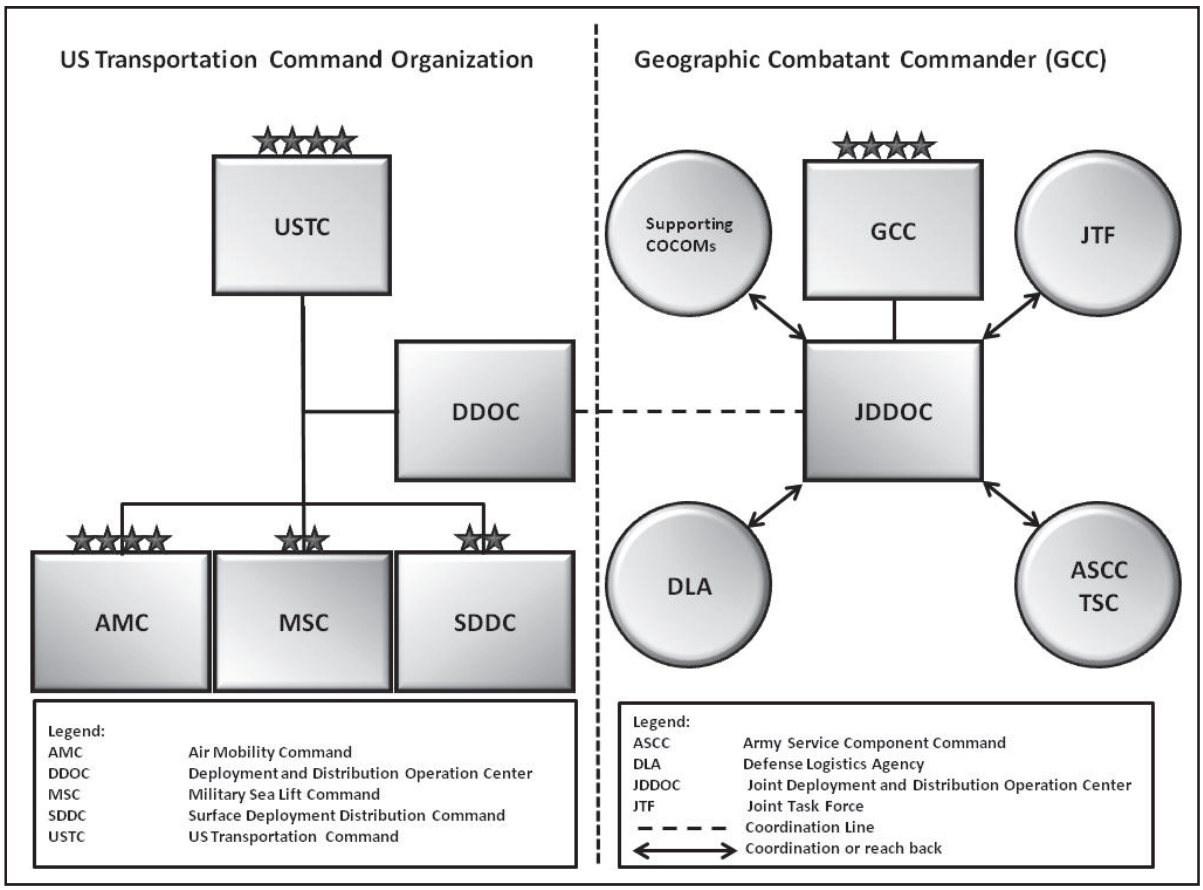


Figure 2-1. USTRANSCOM component commands and JDDOC

AIR MOBILITY COMMAND (AMC)

2-5. AMC is a major command of the US Air Force (USAF). As a transportation component of USTRANSCOM, AMC provides common-user air mobility (airlift and aerial refueling) and aeromedical evacuation services to deploy, employ, sustain, and redeploy US forces on a global basis. Additionally, AMC is the single port manager (SPM) of common-user aerial ports of embarkation (APOEs) and aerial ports of debarkation (APODs). AMC serves as the SPM for air mobility. AMC aircraft provide the capability to deploy the Army anywhere in the world. AMC provides military and chartered civilian airlift aircraft for transporting passengers and cargo, and also aerial refueling operations.

2-6. In its SPM role, AMC performs those functions necessary to support the strategic flow of the deploying forces' equipment and sustainment from the APOEs and hand-off to the combatant commander in the APODs. The SPM is responsible for providing strategic deployment status information to the combatant commander and to manage workloads of the aerial ports of debarkation based on the commander's priorities and guidance. The SPM is responsible through all phases of the theater APOD operations, from an unimproved airfield to a commercial contract supported port operation. In areas not served by a permanent USTRANSCOM presence, AMC through its contingency response wings (CRWs), will deploy contingency response groups (CRGs), contingency response elements (CREs), mobile aerial port flights, and/or mission support teams. An MCT or arrival/departure air control group (A/DACG) will usually be co-located with AMC units at air terminals to coordinate onward movement of arriving and departing personnel, equipment, and supplies.

MILITARY SEALIFT COMMAND (MSC)

2-7. The mission of the MSC is to provide ocean transportation of equipment, fuel, supplies, and ammunition to sustain U.S. forces worldwide, and therefore does not usually become involved in movement control.

MILITARY SURFACE DEPLOYMENT AND DISTRIBUTION COMMAND (SDDC)

2-8. SDDC is an operational level Army force designated by the Secretary of the Army as the Army Service component command (ASCC) of USTRANSCOM and a major subordinate command of United States Army Materiel Command (USAMC). The mission of SDDC is to provide expeditionary and sustained end-to-end deployment and distribution support to meet the Nations' objectives. As the SPM, SDDC acts as a liaison between government shippers and commercial carriers and is responsible for the establishment and maintenance of contracts, solicitations and agreements with the carrier industry to deploy and distribute DOD supplies, equipment, personal property and personnel worldwide.

2-9. SDDC manages the surface transport of defense materiel and the Continental United States (CONUS) air and surface transport of passengers. Transport is from the point of origin to the Seaport of Embarkation (SPOE) or APOE. SDDC does the following:

- Coordinates all activities with the supported combatant commander.
- Works with the combatant commander to create water terminal force packages for situations where reliable stevedore labor or support infrastructure is needed.
- Recommends SPOEs, both CONUS AND OCONUS, establishes cargo-booking procedures, and manages the movement of cargo onto and off ships.
- Operates USTRANSCOM CONUS and OCONUS SPOEs and SPODs.

2-10. USTRANSCOM, through the SDDC, is the DOD-designated SPM for all worldwide DOD seaports. SDDC performs all functions necessary to support the strategic flow of the deploying force's equipment and its follow-on sustainment supply to the SPOE and transitions them to the combatant commander at the SPOD. SDDC is responsible for all phases of the theater port operational continuum, which ranges from a bare beach deployment (logistics-over-the-shore operation) to a totally commercial contract-supported deployment. In all cases, SDDC is responsible for coordinating with the combatant commander to workload the SPOD port operator in a manner that responds to the combatant commander's priorities, and to provide movement status information to the SPOD and other interested parties.

2-11. The SDDC mission support role is port operations-centric and focused primarily on the strategic aspect of transportation, moving unit cargo from port-to-port, loading and unloading mostly organic, or ships crewed by Military Sealift Command. As the Army component of USTRANSCOM, SDDC also obtains and coordinates commercial movement by strategic carriers directly into a tactical area of operations to final destination. Commercial capabilities may offer significantly more advantages in terms of speed, cost and effectiveness than like military capabilities. When commercial capability is used, SDDC will forward that movement information in advance to the GCC (the JDDOC or directly to the TSC as appropriate) to assist the theater in gaining visibility of all movements in the area. The ability of commercial support to operate with little or no military footprint or node using 3rd party logistics (3PL) along the LOC is based on the operational environment. The use of this commercial capability may also support a myriad of deployment or distribution missions such as intransit visibility, container management, customs clearance and direct support for units going through the deployment process. Nontraditional missions that the SDDC capability may support include Foreign Military Sales shipments, humanitarian aid, and reconstruction cargo. As a theater matures, theater sustainment command (TSC) planners may also consider using SDDC's capability to handle border documentation, clearances, and HN transportation liaison missions.

JOINT DEPLOYMENT AND DISTRIBUTION OPERATIONS CENTER (JDDOC)

2-12. The JDDOC is an enduring capability of the GCC that is the cornerstone for linking the theater with the Defense Transportations System (DTS) to support the GCC's end-to-end movements. The JDDOC provides the GCC with a movement control capability designed to synchronize and optimize national and theater multi-modal resources in order to meet deployment and distribution timeline requirements. It also serves as a link between multiple organizations including multinational partners, nongovernmental organizations (NGO) liaison elements, commercial transportation providers, and other private entities. The JDDOC's assigned national partner representatives (see figure 2-2) provide expertise and capability to reach back to national intratheater legs of the DTS. The premise behind the JDDOC capability is that theater expertise is combined with national-level, strategic knowledge and reach back authority within the GCC's command structure. The JDDOC is an organization that accomplishes theater joint movement responsibilities for any potential logistic organizational structure as directed by the GCC. Normally, the JDDOC is embedded under the direction of the GCC's J-4; however, it may be established in organizations below the GCC level at the direction of the supported commander. Although the GCC can organize this structure as appropriate for the specific theater, the JDDOC must be placed at a level where it can effectively accomplish its assigned functions. The JDDOC must also be staffed and operated in the context of a joint command structure where command authorities can be used to accomplish the joint deployment and distribution mission for the Joint Force Commander (JFC).

2-13. The JDDOC synchronizes the strategic to operational movement of forces and sustainment into theater by providing advance notice to the GCC's air and surface theater movement mission command elements. The JDDOC collects data and provides the GCC with ITV on lift capacity throughout both the intertheater and intratheater systems. It also coordinates all GCC common-user transportation activities and integrates commercial lift capability as far forward as appropriate to move forces and materiel as quickly as possible based on GCC requirements.

2-14. In concert with GCC priorities and on behalf of the GCC, the JDDOC coordinates common-user and theater distribution operations above the tactical level. It develops deployment, redeployment and distribution plans; integrates multinational and/or interagency deployment and distribution; and coordinates and synchronizes supply, transportation, and related distribution activities. The JDDOC resolves potential deployment and distribution problems through coordination of available theater logistical support capabilities and collaborates reach back to organizations critical to the GCC's operational mission.

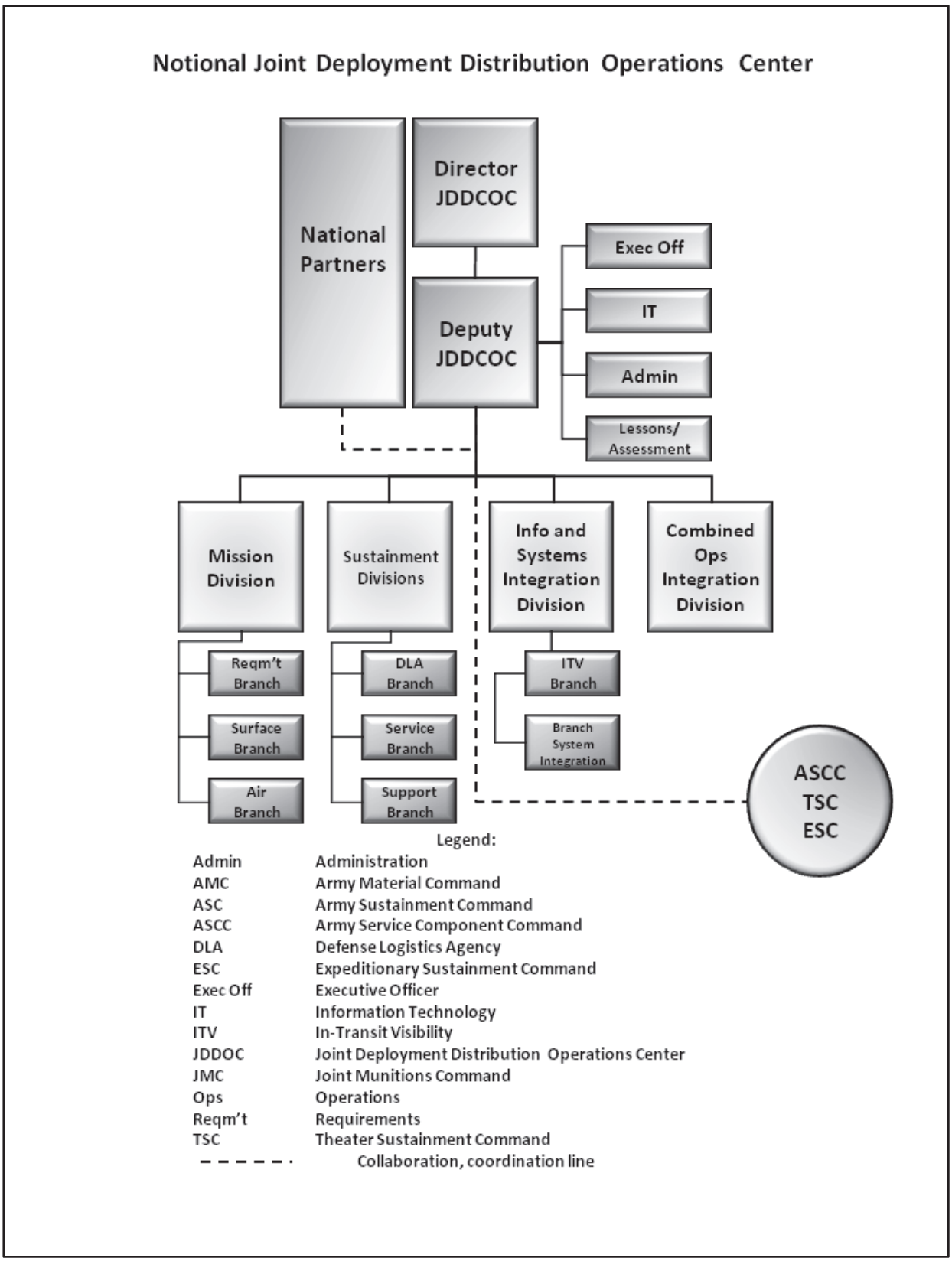


Figure 2-2. Notional JDDOC organizational structure

THEATER-JOINT TRANSPORTATION BOARD (T-JTB)

2-15. The T-JTB may be established by a GCC at the theater operational level in order to rapidly change transportation resource allocations to adjust to changing circumstances or immediately react to emergency or unanticipated situations. Procedures for establishing the T-JTB are developed during peacetime to facilitate rapid stand-up and execution under emergency or wartime conditions. The T-JTB's role is to resolve contentious transportation issues within the command, at the operational level (see ATP 4-01 *Army Theater Distribuition*).

JOINT MOVEMENT CENTER (JMC)

2-16. A Joint Movement Center (JMC) may be established at a subordinate Unified or Joint Task Force (JTF) level to coordinate the employment of all means of transportation (including that provided by allies or HNs) to support the concept of operations (CONOPS). This coordination is accomplished through established theater and JTF transportation policies within the assigned operational area, consistent with relative urgency of need, port and terminal capabilities, transportation asset availability, and priorities set by a Joint Force Commander (JFC). The JTF JMC will work closely with the JDDOC (see ATTP 4-0.1 *Army Theater Distribuition*).

Chapter 3

Movement Control in the Theater Distribution Network

This chapter describes Army movement control in the theater distribution network supporting unified land operations. The roles outlined support the single logistics mission command structure. They provide the template for the movement control network primarily within the theater sustainment command (TSC) and its subordinate units defining the coordination lines of effort to the strategic enablers. The roles and responsibilities of the MCB and its subordinate MCTs are covered in Chapter 4.

ARMY SERVICE COMPONENT COMMAND

3-1. Each GCC has Service component commanders from each Service-level organization (Army, Navy, Marines, and Air Force). In order to fulfill the requirement to provide a Service component commander, the combatant commander activates an Army Service component command (ASCC) headquarters.

3-2. The ASCC commander is specifically responsible for service-related United States Code (USC) Title 10 tasks to prepare, train, equip, administer, and provide supplies and services to Army forces assigned or attached to combatant commands. The ASCC may also have many lead service responsibilities, which entail common-user logistics (CUL) support to other services, multinational forces, other government agencies (OGAs), and/or nongovernmental organizations (NGOs). (see FM 4-94 for more details.)

3-3. At theater level, centralized movement control coordinates the flow of units, personnel, and material (including sustainment) into the theater and forward destinations. These actions are vital for processing deploying units and sustaining them in theater. The ASCC headquarters provides command and staff supervision of movement control units through the assigned TSC. The ASCC calls for deployment of a TSC, or elements of a TSC, to open lines of communications (LOC) in the theater. LOC components include facilities required to move, maintain, and sustain theater forces. LOC components consist of the following to create an intermodal distribution network:

- Aerial ports of embarkation and debarkation.
- Seaports of embarkation and debarkation.
- Water, rail, and route networks.
- HN resources.

3-4. Movement control organizations perform a vital role in establishing and supporting the theater distribution network. The theater distribution network provides the ASCC the ability to control the reception of forces, and the distribution and retrograde of materiel and to maintain total asset visibility (TAV) through communication and information systems. The ASCC normally establishes a TSC in the theater to manage the theater level logistics effort and provide mission command to the theater logistics units (see figure 3-1), but may establish an expeditionary sustainment command (ESC) or sustainment brigade in the theater as mission, enemy, terrain and weather, troops and support available, time available and civilian considerations (METT-TC) dictates.

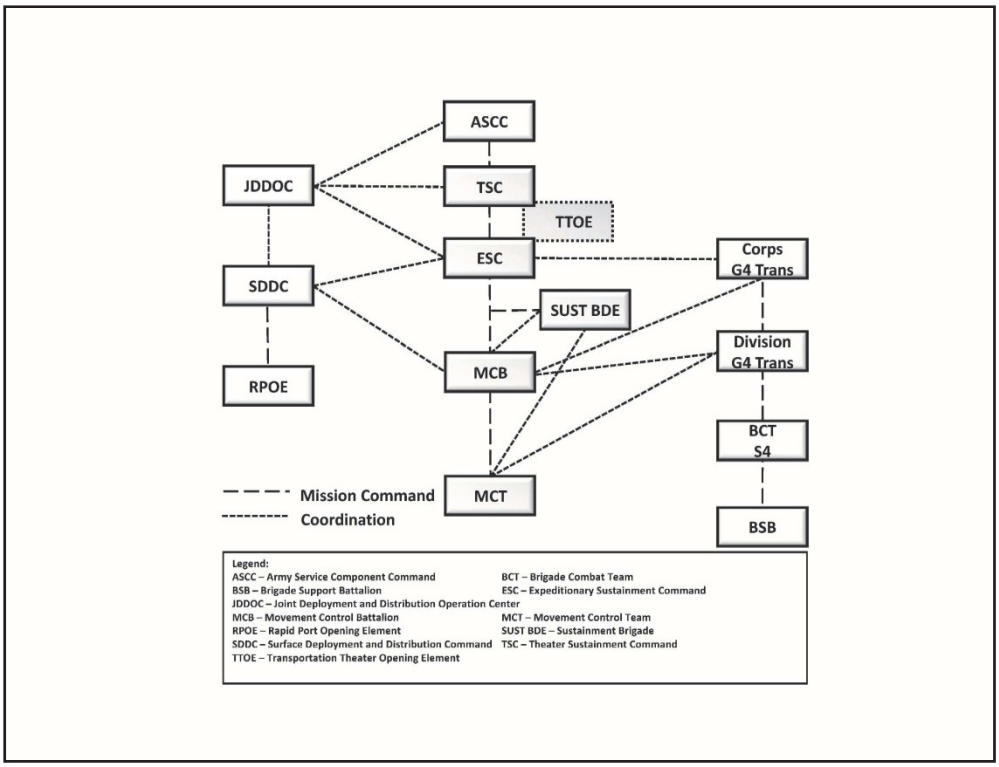


Figure 3-1. Movement control relationships in the theater distribution network

THEATER SUSTAINMENT COMMAND AND EXPEDITIONARY COMMAND

3-5. The theater sustainment command (TSC) (see figure 3-2) has mission command of operational-level movement control and multimodal operations in the theater. It is responsible for developing plans, policies, and programs that support the efficient use of Army transportation assets and the efficient flow of supplies, personnel, equipment, and units throughout the theater. The TSC headquarters collocates with the ASCC in order to most effectively perform its mission command functions and can employ an ESC as a forward deployed command post to provide a forward mission command presence or improve span of control. In this capacity, the ESC can assume the TSC's movement control responsibility for its assigned area of operation. MCBs, MCTs, sustainment brigades and their subordinate units serve as the building blocks of the force structure designed to execute the TSC's control measures within the theater based on:

- Geographic size of the theater.
- Number of forces.
- Transportation infrastructure.
- Number and type of movement requirements.

3-6. Additionally, as the senior logistics headquarters for the Army, the combatant commander may designate the TSC as a joint command for logistics. When exercising this option, the combatant commander must specify the control and tasking authorities for the TSC as well as the command relationships it will have with the Service components in accomplishing movement control operations. The TSC accomplishes this, in part, through effective coordination with the JDDOC to maintain situational understanding of the global distribution system and joint requirements for common user transportation assets.

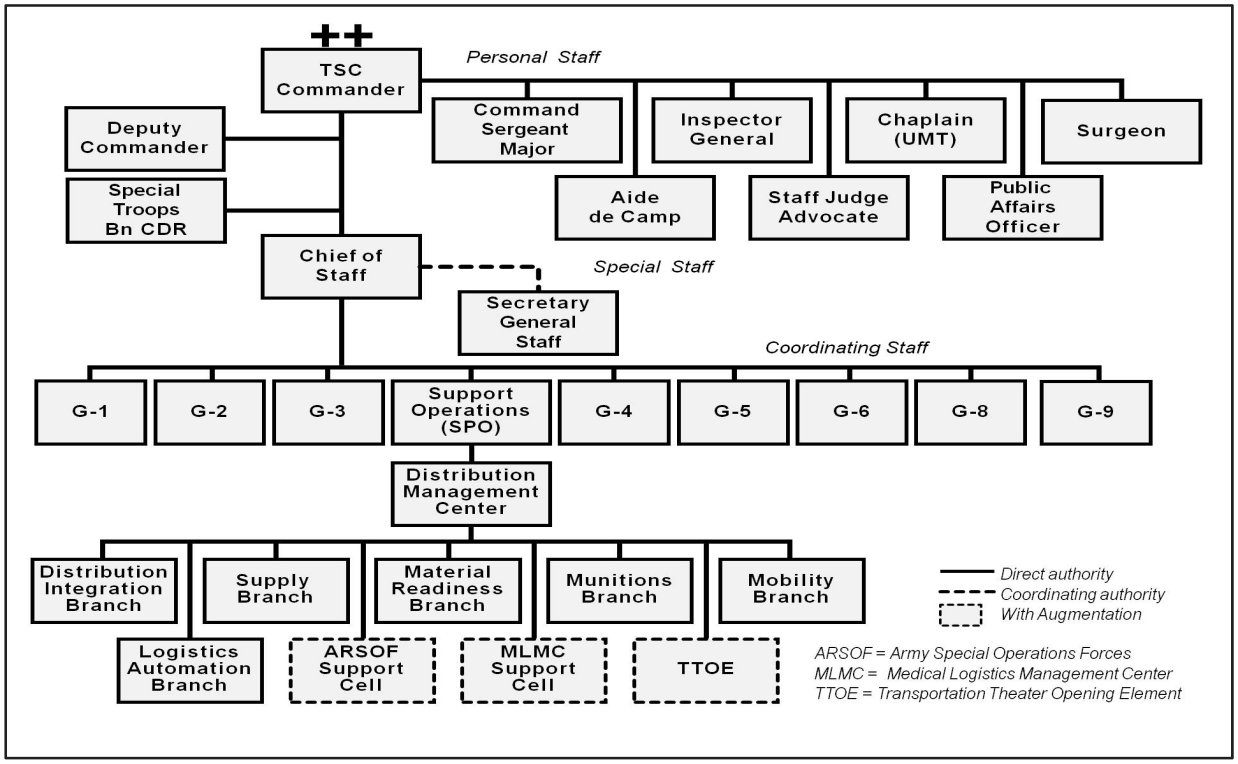


Figure 3-2. Theater Sustainment Command

3-7. While the TSC and ESC both provide mission command over logistics units, the ESC normally deploys when the TSC determines that a forward command presence is required, or when task organized directly under the mission command of a Corps / Army Force (ARFOR) commander. This capability provides the TSC commander with the regional focus necessary to provide effective operational-level

support to Army or JTF missions. The TSC is focused on strategic to theater physical and informational interfaces for all modes. The unit ensures the information flow from strategic deployment, distribution, and sustainment partners is accurate, timely, and adequate to support the actions of the theater sustainment forces to provide movement control for reception, staging, onward-movement and integration (RSOI) and sustainment operations. As an ITV gatekeeper, the TSC assures the strategic to operational linkage of critical information and notifies strategic partners if ITV data is not accurate or provided. The TSC ensures the physical flow of inbound forces and non-unit cargo is meeting the priorities and timeline established by the GCC and resolves issues with timing if unforeseen events interfere with the planned timing of strategic to theater deliveries. The TSC monitors the operation of the theater ports of debarkation and the theater distribution network to ensure there are no bottleneck to impede the flow of cargo and forces into and through the theater. The TSC supports the RSOI at the theater level based on GCC guidance. Consequently, they may be involved in resolving theater level issues with HNs and joint, interagency, multinational, commercial, and private organizations in the negotiations for joint use of assets available. The TSC plans for common user services and supplies that are provided by Army forces in the theater, and notifies the ASCC if the Army forces are inadequate for the expected workload.

3-8. While the focus of the TSC is on the strategic to theater linkages, a deployed ESC will focus more on receiving and employing information on the strategic to operational flow and on the actions of subordinate units from the theater to the tactical level. The TSC is employed at the theater level and one or more ESCs may be deployed forward in an AO which is subordinate to and smaller than the theater. The ESC will usually command more than one sustainment brigade and subordinate logistics units. The ESC ensures that information it is receiving on movements from strategic and theater levels is adequate to plan the activities of its subordinate units and ensures their units are receiving adequate movement information to meet their operational needs. The ESC ensures subordinate units have adequate assets to meet mission requirements and notifies the TSC of issues that cannot be resolved within its AO. When given the authority by the TSC, the ESC may resolve issues with HNs and joint, interagency, multinational, commercial, and private organizations if appropriate within its AO, especially in the instance where multiple ESC are operating long distances apart and especially if the ESCs are deployed in separate countries.

3-9. The TSC and ESC could provide mission command at different levels, areas of operations, or have different spans of control. There is also a significant difference in the units' planning horizons. The planning and operational horizons of the TSC and ESCs will be different due to their respective operational areas. The planning horizon for the TSC is much further out than the ESC with the ESC focusing on current and near term operations.

3-10. The TSC/ESC support operation is the staff section with overall responsibility for the planning and execution of movement control operations. This staff section also supervises supply, maintenance, hazardous waste management, field services, and transportation activities associated with support to the force. It also integrates transportation and movement of units, supplies, and materiel into, within, and out of theater. It provides this support through a distribution management center (DMC) comprising six subordinate branches: distribution integration, supply, material readiness, munitions, mobility, and log automation; a civil-military operations section; and a host nation support (HNS) section. Medical supply and Army special operations forces support cell augmentation is based on METT-TC. The DMC and mobility branches have tasks supporting movement control operations.

3-11. The DMC has the overall responsibility to develop the distribution plan, establishes direct liaison with the theater JDDOC and maintain liaison with higher, lower, joint and multinational headquarters. The DMC establishes the sustainment common operating picture and oversees operations of ITV systems. Additional responsibilities include:

- Manage all modes of transportation, to include air, land, and sea transportation assets and common user transportation support
- Coordinate and manages all aspects of intermodal container use
- Oversee operation of the ITV system
- Coordinate and monitor contracting and HNS requirements

3-12. The mobility branch within the DMC has primary responsibility for the oversight and management of movement control operations for the TSC/ESC. The Mobility Branch functions as the executive agent for

movement control and provides guidance, plans, policies, and staff supervision. The mobility branch develops and oversees the implementation of the movement program, coordinates for joint or HN transportation resources when requirements exceed the TSC/ESC, and chair theater level movement boards. Additional responsibilities include:

- Theater route synchronization to include common theater routes between MCBs.
- Movements portion to support operations plans (OPLANS)
- Oversee and coordinate with MCBs
- Coordinate with supply and distribution integration branches for distribution management of all commodities (less CL VIII and communications security equipment), passenger, and unit movements (reception, staging, onward movement and integration (RSOI), redeployment, and retrograde).
- Provide supplemental modal movement management for personnel and materiel, except bulk class III by pipeline, within, into, or out of theater.
- Manage United States and HN transportation assets identified as common user. Also, provides theater level liaison to HNs and for contracted assets.
- Serve as container, flat rack, and air pallet manager and coordinate all aspects of intermodal container use.
- Manage container operations from synchronizing support to retrograde operations with priority being return of ISO shipping containers, aerial delivery platforms, and flatracks to the distribution system.
- Enforce priorities for air, water and land transportation (both road and rail) established by the Theater Army and the supported combatant commander.
- Provide movement planning for strategic deployment, sustainment, and redeployment
- Optimize intratheater multimodal distribution.
- Manage transportation flow capability by maintaining visibility of resources that are being transshipped at or transiting the nodes.
- Prepare movement and port clearance plans and programs, including reception and onward movement.
- Maintain status of movement capabilities
- Recommend site selection for transportation activities centralized receiving and shipping points (CRSPs), air terminals, railheads, and inland waterway terminals.
- Balance existing transportation capabilities of the distribution system with the day-to-day and projected operational requirements.
- Provide contracting officer's representative (COR) for transportation functions as needed.

3-13. To more efficiently control movements within the theater, the TSC/ESC may decide to divide the theater or an operational area into transportation movement regions with an MCB per region. This method permits centralized control by the TSC/ESC and decentralized execution of movement control functions by subordinate MCBs. An additional consideration is the synchronization between potential movement regions of intermodal operations which is impacted by the way container management policies are enforced and container management is subsequently executed. It is vital to TSC distribution operations that visibility and control of containers be maintained. Adherence to TSC policies will ensure adequate numbers of containers are available to support intermodal operational requirements.

MOVEMENT REQUEST PROCESS

3-14. The TSC is the last Army organization in the movement request process and is a link into the joint process for common user transportation assets. As discussed earlier, the ESC is a forward command presence for the TSC and will have similar responsibilities of the TSC in the movement request process. The TSC/ESC may receive a movement request from one of its subordinate MCBs when they cannot fill the request with the assets under their committal authority.

3-15. The MCB/MCT will have committal authority over the common user transportation assets within a sustainment brigade and should have the ability to commit HN or commercial motor transport assets as

well. Additionally, the MCB should have the ability to commit allotted Army aviation, Army watercraft or HN rail, but the TSC/ESC may retain that authority when appropriate to meet operational needs.

> ***Note.*** An example of when the TSC/ESC should retain committal authority is when there is a limited transportation resource that provides support to multiple MCBs, i.e. Army aviation or Army watercraft. In this case the TSC/ESC retaining committal authority ensures these limited assets are committed based on the larger theater priority of support or availability to surge as needed. Alternatively, the TSC/ESC could allocate a specified number of platforms/sorties/assets for each MCB to commit on a daily basis, but the operational environment will dictate.

3-16. When the TSC/ESC receives a movement request its mobility section will verify that the common user assets available to the requesting MCB are committed based on the theater commander's priority of support. If an issue of prioritization arises, the mobility section will directly resolve the issue with the brigade having tasking authority over the transportation assets i.e. a sustainment brigade or combat aviation brigade (CAB). When the transportation assets are matched against valid commitments and if TSC/ESC has mission command over more than one MCB, it will coordinate with other assigned/attached MCBs to fill the request. If the alternate MCB can fill the requirement the TSC/ESC will forward the movement request to that MCB and the requirement will be filled using common user transportation assets the alternate MCB has committal authority over (see chapter 4 for MCB movement request process). If there are no TSC/ESC assets that can fill the requirement then the TSC/ESC will coordinate with the JDDOC for joint assistance. TSC/ESC can delegate its coordination authority with the JDDOC or strategic enablers to the MCB as appropriate.

MOVEMENT BOARDS

3-17. Movement boards are a mechanism to review and manage transportation policies, priorities, route status, convoy protection and synchronization, and transportation asset allocation to support distribution operations. Movement boards, which support the distribution boards, should be conducted at all levels from brigade to theater, wherever there is a requirement to validate transportation movement requirements against transportation capabilities. The movement board should cover the major internal and external movements by all modes of transportation supporting deployment, redeployment and distribution operations affecting organic transportation units or supporting assets. A validated movement program is an outcome of the board and ensures all movement requirements are matched with the appropriate capability and that the coordination and synchronization for mission execution is requested for movement occurring within 48-72 hours. Ideally, they should be conducted sequentially on a daily basis to support the next higher level of external support requirements and provide a forum to present issues and transportation shortfalls that can be resourced at the next headquarters level. Participation at the higher-level movement boards should include those headquarters and agencies that have equity in the distribution process. Each movement board will provide the capability to change transportation resource allocation and adjust to changing priorities or emergency situations. At the brigade, division, corps and theater level, movement boards at a minimum should cover:

- Intelligence threats, trend analysis and enemy situation.
- Deployment and redeployment movements along with operational movements.
- Validated transportation movement requirements 24, 48, 72 and 96 hours out.
- External transportation movements entering an organizations area of operation 24, 48, 72 and 96 hours out.
- Convoy security/escort requirements and protection support.
- Priority of movements and priority of support.
- Current and projected route and weather status.
- Retrograde and backhaul requirements.

3-18. The TSC/ESC will establish movement boards to manage transportation policies, priorities, lines of communications (LOCs) status, convoy protection and synchronization, and transportation asset allocation to support theater distribution operations. Movement boards establish movement requirements and at this level could be daily or weekly depending on the situation such as the number of movement regions, but

must be frequent enough to adjust to changes. The resulting TSC/ESC validated movement program will be published in an order and executed by subordinate units such as the sustainment brigade and MCB. The sustainment brigade and MCB can simultaneously start their planning and coordination for the pending missions. When transportation assets are tasked through a movement program, the MCB will ensure a transportation movement release (TMR) is produced to capture that transportation movement requirement. Theater level movements boards should include but are not limited to:

- TSC/ESC SPO, DMC, Mobility Sections
- TSC/ESC G2, G3, and G5
- TSC/ESC subordinate brigades
- MCBs
- Corps transportation officer (CTO)
- Division transportation officer (DTO)
- Maneuver enhancement brigade (MEB)
- JDDOC
- SDDC
- Contracting officer representative

TRANSPORTATION THEATER OPENING ELEMENT (TTOE)

3-19. The TTOE is assigned to a TSC and can be attached to an ESC or sustainment brigade with a theater opening mission. When attached to a sustainment brigade this organization augments the SPO and provides additional capability for the brigade to provide mission command and staff oversight of transportation terminal, intermodal, and movement control units. During early entry operation the TTOE can provide battalion level staff oversight of movement control operations until a MCB arrives in theater to include providing route synchronization, oversight of the MCTs and coordination with the rapid port opening element (RPOE) of the joint task force-port opening (JTF-PO) operating at an air or water terminal. The TTOE can also augment the SPO of the TSC/ESC to manage the theater-wide movements and transportation mission. The TTOE (see figure 3-3) or elements of the TTOE can merge with the mobility section of the SPO to provide depth and technical capability to support movement control operations. The movements branch of the TTOE was designed to replicate the capability of the MCB's Plans / Programs / Operations and Highway Traffic divisions and provides route synchronization support for common theater routes, increased technical capability to synchronize strategic to operational movements, and enhanced capability to manage multiple MCBs or movement control in multiple operational areas.

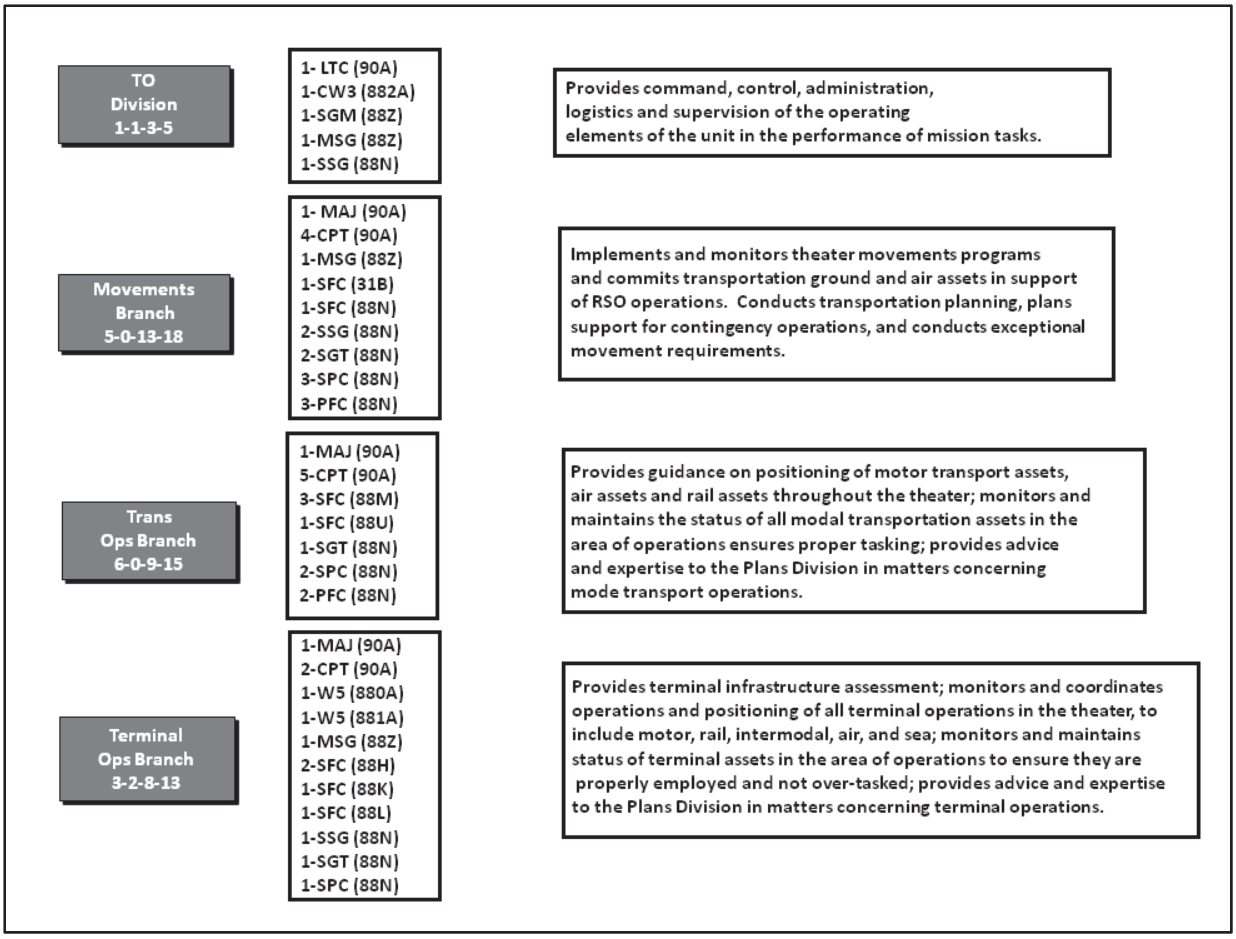


Figure 3-3. Theater transportation opening element

SUSTAINMENT BRIGADE

3-20. The sustainment brigade is a flexible, tailorable organization. All sustainment brigade headquarters are identical in organizational structure and capabilities. The core competency of the sustainment brigade is mission command of logistics operations, providing command and staff supervision of life support activities and distribution management to include movement control as an integral component of the theater distribution network. The sustainment brigade will not normally provide mission command for a MCB but the operational environment may dictate this command relationship if, for example, the sustainment brigade is the senior Army sustainment headquarters for that operational area as was the case in the early stages of Operation Enduring Freedom. Sustainment brigades will not normally provide mission command for MCTs, but as mentioned previously with the MCB, the operational environment will determine the command relationships. A sustainment brigade, with an attached TTOE, could provide mission command of MCTs during early entry operations until an MCB arrives or if the number of MCTs (fewer than 4) for the operation does not require an MCB.

3-21. The SPO section of the sustainment brigade oversees the execution of movements within the brigade and for its subordinate combat sustainment support battalions (CSSB) or motor transport battalions. Within the SPO, the mobility section has direct oversight of movement control operations which include:

- Monitor subordinate battalions common user transportation assets
- Report common user transportation status to supporting MCT
- Execute the brigades' requirements of the TSC/ESC movement program
- Match transportation capabilities against requirements
- Tasks subordinate common user transportation assets to meet mission requirements

- Coordinate for additional transportation support with supporting MCT when requirements exceed organic capability
- Coordinate convoy security for common user transportation assets as needed
- Request convoy clearance as needed
- Establish brigade movement boards as needed
- Ensure route intelligence is collected from subordinate units

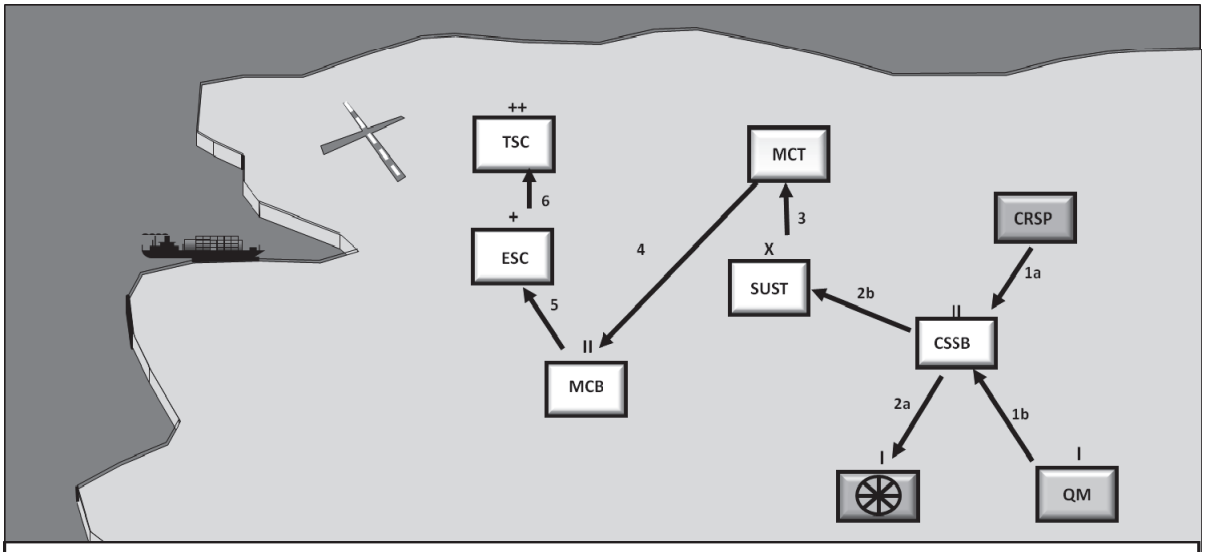
MOVEMENT REQUEST PROCESS

3-22. The brigade transportation section receives movement requirements from three sources: a higher headquarters' movement program, an internal brigade requirement, or a commitment from the supporting MCB/MCT. The SPO staff, as part of the TSC/ESC movement board, provides the forecast of available common user transportation assets for inclusion to the TSC/ESC movement program and to the supporting MCT. When the TSC/ESC movement program is published, the sustainment brigade mobility section will task its subordinate battalions and in turn, the battalions will task their subordinate units. The mobility section will coordinate with the supporting MCT to ensure that missions resulting from the distribution management board are matched with a transportation movement release (TMR).

3-23. Within the sustainment brigade, if a company needs additional transportation support it will send its movement requirement to its battalion SPO. If the battalion SPO can satisfy the requirement with internal assets from one of its subordinate companies, the SPO will task the company to provide support. If the battalion cannot satisfy the requirement with its internal assets, the battalion SPO will forward the movement requirement to the brigade SPO section. When the SPO section receives a movement request from a subordinate battalion, it will determine if the requirement can be filled using assets from another battalion within the brigade. If so, the SPO section will task the battalion to fill the requirement. The brigade SPO section will ensure these internal movements are coordinated with the supporting MCT to ensure a TMR is created for the mission. If brigade assets are not available, the SPO section will submit a movement request to the supporting MCT.

Note. The sustainment brigade having mission command of a centralized receiving and shipping point (CRSP) will establish a standing allotment of motor transport assets to arrive daily or as needed to support the mission thus preventing the need for the CRSP to request transportation on a daily basis. If the CRSP receives or anticipates an increase in volume that exceeds the capacity of the standing motor transport assets, then the CRSP sends a movement request to its battalion SPO. If the SPO cannot fill the request with other subordinate common user transportation assets, the movement request process outlined earlier is followed. The sustainment brigade will coordinate with the supporting MCT for a standing TMR (STMR) to capture standing allotments of transportation assets.

3-24. The sustainment brigade SPO section can receive a movement requirement from the MCT providing area support. The movement requirement from the MCT is referred to as a commitment. If the sustainment brigade has assets to meet the requirement it will confirm acceptance to the MCT, the SPO section will task subordinate units as outlined earlier in this section and the MCT will create the supporting TMR. When the sustainment brigade receives a commitment it cannot fill with its common user transportation assets, the SPO section will nonconfirm to the MCT which indicates the brigade cannot meet the requirement. It is important that movement requests from units external to the sustainment brigade operating in the brigade's area of support are submitted to the MCT providing area support. The operational environment will always dictate the appropriate procedures, but units external to the sustainment brigade submitting their movement request to the MCT allows the MCT to prioritize and deconflict requirements based on the theaters priority of support and select the mode of transportation that most effectively fulfills the requirement.



1a. Unit submits movement request to their higher headquarters.
1b. Unit submits movement request to their higher headquarters.
2a. The CSSB will task a subordinate unit to fill the request if assets are available.
2b. The CSSB will submit the movement request to their higher headquarters if it cannot meet the requirements with internal assets.
3. Sustainment Brigade will look internally at other CSSBs assets to fill requirement, if assets are not available the brigade will submit the movement request to the supporting MCT.
4. If MCT cannot fill the requirement it will forward the movement request to the MCB.
5. If the MCB cannot fill the requirement it will forward the movement request to the ESC.
6. The ESC will use available common user transportation assets, if it cannot fill the requirement the ESC will forward the request to its higher headquarters.

Note – If the TSC cannot fill a movement requirement with available common user assets, the TSC will submit a request to the GCC

Figure 3-4. Sustainment brigade in the movement request process

CORPS TRANSPORTATION OFFICER (CTO)

3-25. The CTO is the primary technical advisor to the corps commander on theater transportation policy, mode operations, movement planning, ITV, and transportation automation systems. This may include support of reception and onward movement of forces, replacement operations, and retrograde. The CTO also assesses the overall effectiveness of the TSC/ESC movement programs supporting Corps operations. Other CTO duties include the following:

- Coordinate transportation planning with the TSC/ESC, division, and separate brigade transportation officers to determine requirements.
- In accordance with the Corps G3 establishes procedures for movements that cross boundaries.
- Plan transportation support, develops policies, provides guidance, and recommends movement priorities and procedures for movement control and route synchronization.
- Plan, coordinate, and oversee large or special movements in conjunction with the TSC/ESC.
- Assist major subordinate commands and units transiting the Corps area.
- Prepare, in coordination with the TSC/ESC, the transportation portion of the Corps plans and orders.
- Recommend road repair priorities and improvements for the road network in the Corps area in coordination with the Corps G3 and engineers.
- Coordinate with the G3, TSC/ESC, and the military police on the Distribution Network Design and Route Synchronization plans.
- Coordinate with the G5, TSC/ESC and MEB for the movement of displaced civilians.

- Assesses and recommend requirements for HN Support.
- Coordinate policy and procedures with the joint movement center when the Corps is the Army component of a joint force or the JDDOC as appropriate.

3-26. The CTO also coordinates with the Corps G3 during unit movements, force tracking, and maneuver planning. The G3 plans and directs movement and maneuver of combat units through or within the Corps area. This may require rapidly projecting these forces over extended distances on MSRs. The G3, coordinating with the G4, establishes priorities for using MSRs for movements and maneuver. Maneuver will normally have priority over movements. However, maneuver must be well coordinated with movements to prevent route congestion, enforce movement priorities, and provide continuous logistical support. The G4 establishes sustainment support plans. The G4, using the recommendations of the CTO, establishes plans and implements sustainment priorities for movement. These priorities become the basis of the TSC/ESCs distribution plan.

RAPID PORT OPENING ELEMENT (RPOE)

3-27. The RPOE is the TOE unit assigned to USTRANSCOM, Operational Control (OPCON) to SDDC, and is the Army element of joint task force-port opening. The RPOE provides specific surface deployment and distribution support and operational capabilities at an APOD or SPOD and provides similar capability as an MCT performing an intermodal mission as well as the cargo transfer capabilities of an ICTC. When employed, the RPOE will perform the port mission of an MCT (see chapter 4) until replaced and it is vital that the RPOE link into and coordinate port clearance with the appropriate sustainment headquarters i.e. a CSSB or sustainment brigade. The RPOE coordinates with a sustainment headquarters to obtain additional motor transport assets or receive movement credits when needed for the movement of personnel, equipment or cargo from the port as well as provide visibility of movements which will assist the TSC and its subordinate units with their RSOI and distribution missions.

CONTRACTING

3-28. The use of contracting in distribution operations is a force multiplier that enhances the capability of commanders to provide more effective and efficient transportation support to their supported units. Contracts may be established to provide additional mode capability to include truck, bus, rail, fixed/rotary wing air, or watercraft transportation. To effectively manage these contracts, sustainment commanders must leverage the abilities of their staff and subordinate units by selecting the right person to perform as contracting officers' representative (COR) and establish the right level of command for the COR responsibilities. The key to effective contractor support is ensuring contractors follow the requirements in the contract and the COR is critical in managing those requirements. The COR, or assistant COR(s) can be placed at the TSC, ESC, sustainment brigade, MCB or a company/MCT based on:

- The ability to best monitor contract performance
- The magnitude of the contract
- The level/organization that has central oversight of the movement requirements the contract will support

This page intentionally left blank.

Chapter 4

Movement Control Battalion

Movement control battalions (MCBs) and their subordinate movement control teams (MCTs) are a critical component in the distribution network and in deployment/redeployment operations where they are key to linking movements from the strategic through to the tactical level in a theater of operation. Movement control units are versatile transportation organizations and can be used in a variety of movement missions spread throughout an operational area to support the distribution and sustainment effort in enabling decisive actions. This chapter describes the roles and responsibilities of the MCB and its subordinate MCTs.

MOVEMENT CONTROL BATTALION (MCB)

4-1. The MCB is a functional transportation battalion that executes movement control in its assigned area of operation. It provides mission command over four to ten MCT spread throughout its area of operation. The MCB oversees the committing of Army theater common user transportation and is responsible for regulating Army movement on theater controlled MSRs and ASRs. The MCB is directly subordinate to the TSC/ESC and is a vital component in assisting in the planning and execution of deployment, redeployment, and distribution operations. Given that movement control is not vested in a single organization, the MCB is the principal organization positioned to coordinate and synchronize the execution of movement control to ensure effective and efficient movements to support military operations. The MCB and its subordinate MCTs provide area support for all units in its operational area. Ideally, the MCB should co-locate with its higher headquarters to enhance the planning and coordination effort, but this may not be necessary with an adequate communications infrastructure.

4-2. The MCB can provide ITV of units during the RSOI phase of a deployment and of cargo in the distribution pipeline. To decentralize execution of movement control functions, the TSC/ESC may divide the operational area into transportation movement regions each with an MCB. Factors in determining movement region are: the number of MCTs required; the geographical size of the operational area due to the dispersion of MCTs and the effect on mission command; the variety of intermodal operations in an MCB operational area; or major distribution hubs and staging areas (SAs) which will all increases the MCBs coordination and synchronization efforts while simultaneously supporting deployment/redeployment and distribution operations. To provide effective support the MCB, in conjunction with its higher headquarters TSC/ESC, will select the sites where the MCTs will operate. Site selection will consider the location and types of customers requiring service, location of terminal and intermodal operations, and the location of mode operators. Other MCB tasks can include:

- Validate or selects mode for movement requirements.
- Coordinate with TSC/ESC, other MCBs, sustainment brigades, aviation brigades, maneuver enhancement brigades, CTO, DTO, and HN and commercial transportation organizations.
- Coordinate with SDDC and the JDDOC when the TSC/ESC delegates that authority for strategic movements entering their operational area.
- Provide additional synchronization of movements by maintaining mission command over Army Arrival/departure airfield control group (A/DACG) operations in their operational area.
- Assist in planning and executing plans for the reception, staging, onward movement, and retrograde of personnel, equipment, and sustainment supplies. This includes actions associated with marshalling and SAs.
- Monitor, manage, and execute the TSC/ESC movement and port clearance plans and programs.

- Monitor the use of containers located in its operational area. Coordinate with users to expedite return of these assets to the transportation system.
- Enforce movement priorities set by the TSC/ESC.
- Perform route synchronization (see chapter 6).
- Develop an intelligence collection plan for subordinate units.

COMMAND AND STAFF

4-3. The MCB command and staff sections (see figure 4-1) operate similar to other logistics battalion headquarters as outlined in FMI 4-93.2 *The Sustainment Brigade*, but there are some differences. The MCB staff provides additional assistance to the MCTs since MCTs are not structured like TOE companies and lack organic administrative, supply, and maintenance capabilities. The MCB may have to coordinate the additional support needed by MCTs with other units when the geographical dispersion of its MCTs prevents the battalion from providing effective support. The S2/3 operates similar to other battalion S2/3 sections but also incorporates the plans, programs, and operations (PP&O), and the highway traffic section (HTS) as subsections.

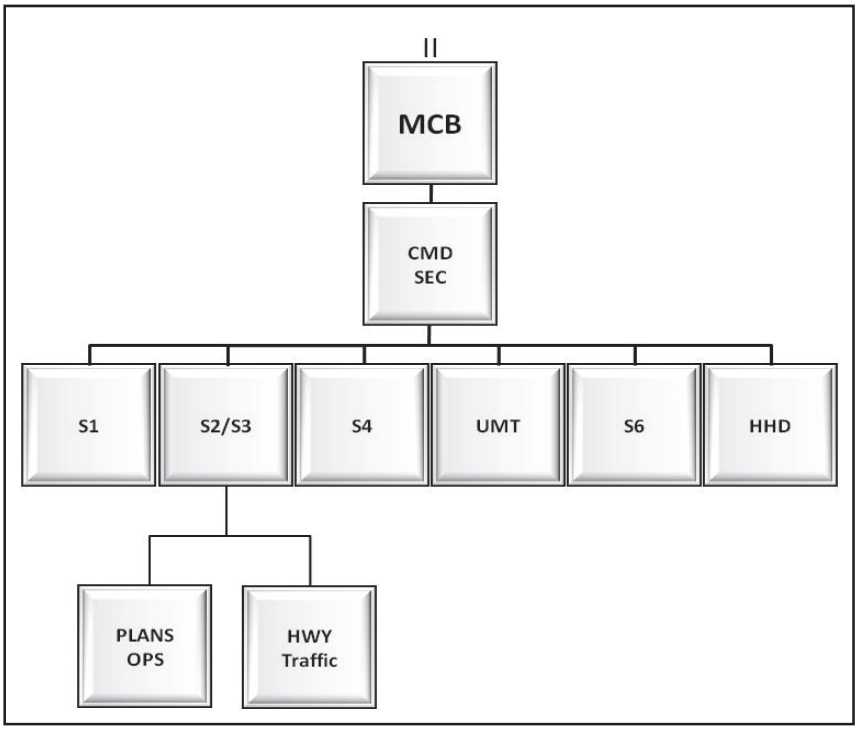


Figure 4-1. MCB organization

4-4. The PPO section is responsible for surface, logistics air, rail, Army watercraft movements, and assisting with container management. If attached, the Air Force, Army watercraft, or SDDC liaison will operate in this section. This section coordinates support and maintains the status of transportation activities throughout the MCB's operational area. This section also does the following:

- Assist in the development and implementation of the TSC/ESC theater movement program.
- Provides ITV for priority movements in its operational area.
- Coordinates and monitors the status of boundary crossing and strategic movements.
- Plans support for reception and onward movement.
- Performs transportation planning according to priorities implemented by the TSC/ESC.
- Validates programs and commits common user transportation assets to meet movement requirements according to priorities.

- Coordinates transportation support and maintains status of transportation activities throughout its operational area.
- Coordinates policy and procedures with the TSC/ESC.
- Maintains liaison with theater, joint, combined, and adjacent movement control organizations.
- Consistently assesses and determines support requirements for intermodal operations.
- Maintains availability status of common user transportation assets.

4-5. Highway traffic section performs route synchronization within the MCB's operational area. It coordinates with the TSC/ESC, other MCB highway traffic sections, DTOs, sustainment brigades, MEBs, operational environment owner, and appropriate HN authorities as needed for any movements that originate in its area. This section also does the following:

- Provides route synchronization planning assistance to the TSC/ESC and CTO to designate theater MSRs/ASRs and establish control measures to support the concept of operations.
- Develops route synchronization plans.
- Provides transportation route overlays and the distribution network design to support OPLANs.
- Coordinates with the TSC/ESC G2 and the MEB for route classification and selection.
- Coordinates with MCT for regulating movements.
- Collects, processes, and distributes information on route status.
- Issues movement credits for approved movements.
- Provides instruction for diversion or rerouting based upon the condition of MSRs, enemy activity, congestion, or direction from the operational environment owner.
- Coordinates large unit movement tables with other movements and maneuvers.
- Coordinates enforcement of route synchronization plans with the MEB and HN.
- Tracks movements of convoys; maintains status of movements to include current position or last reported checkpoint.

MOVEMENT CONTROL TEAM

4-6. The MCT is a modular 21 Soldier transportation organization (see figure 4-2) designed to execute five movement control missions: 1) intermodal 2) area 3) movement regulation 4) documentation and 5) division support (see chapter 5). The MCT has the capability to commit allocated transportation assets, regulate movement, and provide transportation services in a theater of operation. MCTs, normally supervised by Captains (O3), are subordinate elements of the MCB and are positioned throughout the theater to assist in the decentralized execution of movement control responsibilities. MCTs are the entry point for Joint and Army forces to request Army common user transportation assets when movement requirements exceed an organization's organic transportation capability. When given the authority by the MCB, MCTs can directly coordinate motor truck transportation with a sustainment brigade, HN, or commercial assets and can also coordinate for the use of allocated fixed/rotary wing assets in the Aviation Brigade. Though an MCT may not have committal authority over Air Force aviation assets, HN rail, or Army watercraft, it will coordinate the use of those assets when those modes of transportation are the most efficient and effective means to meet the movement requirement. MCTs can provide transportation services to other organizations that include ITV of personnel/supplies/equipment moving through the transportation system, assistance with transportation shipping documentation, and unit movement data processing as well as performing Unit Movement Coordinator duties as required in the operational area. Additionally MCTs can be used as a source to collect intelligence information as they our operating in their area of responsibility.

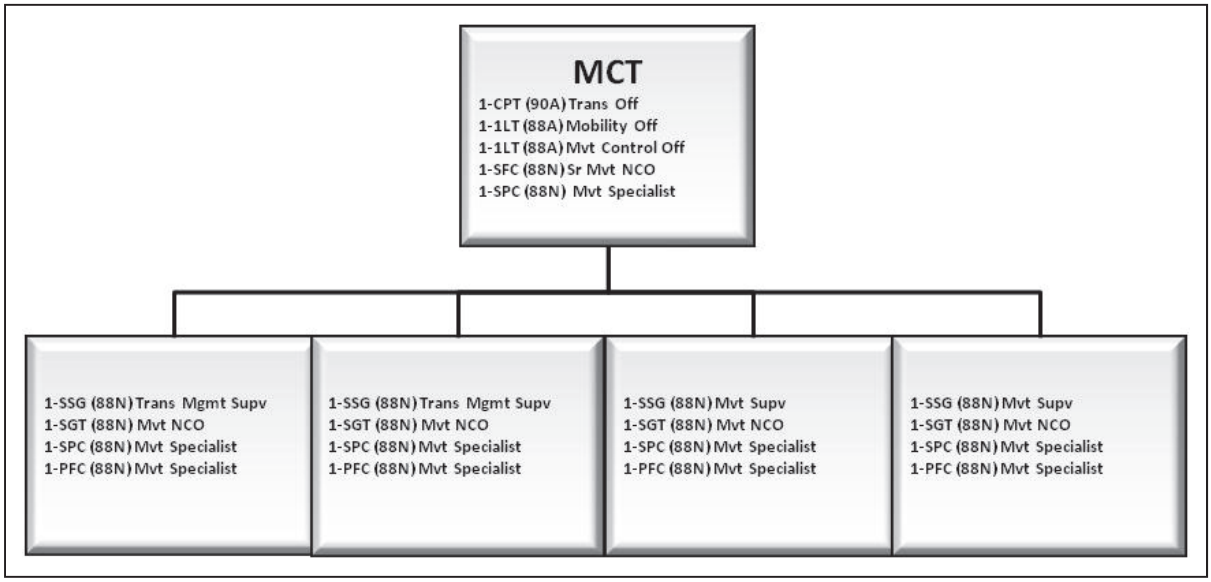


Figure 4-2. MCT organization

4-7. Being modular, the MCT is flexible and can be employed at a variety of locations in a variety of configurations to meet mission demands. MCTs can form the basis of an A/DACG, operate first destination reporting points (FDRP) at border crossings, assist in operating container yards, and can have slice element executing missions at different geographical locations. When an MCT is geographically separated from one of its elements but retains mission command, the separate element is referred to as a Branch MCT (BMCT). The designation of an MCT as an MCT (-) denotes that the unit is employed with significantly fewer personnel but retains its direct mission command trace to the MCB.

4-8. Since MCTs are spread throughout an area of operations on various MSRs and at distribution nodes they can be an excellent source of intelligence. Commanders must develop intelligence gathering and reporting procedures for their MCTs to ensure that the movement control soldier is attentive and knowledgeable about their environment to notice the subtle to the overt changes in their surroundings that could pose a threat to military operations.

INTERMODAL MISSION

4-9. MCTs or BMCTs are positioned at air, rail, or water terminals within the theater to coordinate expeditious clearance of personnel and cargo. The MCT conducting the intermodal mission coordinates transportation requirements for movement of units as they arrive in theater supporting RSOI and can assist units during redeployment in preparing their equipment for strategic transport. An MCT performing an Intermodal mission in conjunction with elements of an ICTC forms the basis for an A/DACG at an air terminal, and this combination provides similar capability as the JTF-PO RPOE. Additionally an MCT or BMCT combined with elements of an ICTC can provide the necessary support at a rail terminal. The MCT:

- Assists in preparing plans for expeditious handling and loading of freight.
- Provides technical transportation expertise at air, rail, or water terminals on a 24-hour basis.
- Corrects congestion areas or conditions that reduce movement capability.
- Ensures shipment of prioritized cargo, designated by movement programs or other directives.
- Receives and validates movement requests supporting port clearance and arranges transportation.
- Positive in bound clear cargo through the destination MCT.
- Coordinates, prepares, and distributes movement instructions to shippers, consignees, and transport services.

- Coordinates the arrival, spotting, loading, and unloading dates and times that are mutually acceptable to the shipper, consignee and transport service.
- Ensures packing, marking and documentation procedures, to include international requirements, are complied with.
- Provides technical expertise for efficient and expeditious handling, loading, and unloading of transport equipment.
- Marshalls convoys.
- Maintains ITV of personnel and cargo transiting the terminal.
- Ensures cargo is properly marked and containers have working Automated Identification Technology (AIT) tags.
- Enforces embargoes and priorities that have been established by proper authorities.
- Assists arriving personnel through customs at air, rail and sea ports of entry.
- Arranges for provisions of military passenger trains originating in or transiting the area.
- Prepares passenger manifests and load plans.
- Assists with container and pallet management.

AREA MISSION

4-10. An MCT or BMCT performing an Area mission coordinates transportation to support organizations when the organizations' organic transportation capabilities are not sufficient to meet their requirements. Coordinated transportation includes all Army common user transportation assets to include motor transport, rail, watercraft, and rotary/fixed wing. The MCT may have the authority to arrange HN and/or commercial transportation similar to the above mentioned to include buses and container/material handling equipment. This MCT commits sustainment brigade assets in accordance with MCB guidance and normally co-locates in the same vicinity of a sustainment brigade to facilitate coordination, but is not assigned or attached to the brigade. The MCT may commit aviation brigade assets if the MCB delegates that authority. In performing an Area mission, the MCT customer base can include but is not limited to the sustainment brigade, medical units, engineers, military police, separate brigades, non-divisional maneuver/maneuver support units, and the DTO. Additionally the MCT:

- Validates movement requirements.
- Arranges movement of personnel, equipment, and sustainment supplies.
- Coordinates transportation movements, diversions, and transfers of units, cargo, and personnel.
- Provides in-transit visibility of unit equipment and sustainment cargo movements.
- Processes convoy clearance and coordinates cross boundary movements as required.
- Provides additional movement control support at distribution hubs.
- Positive in bound clear cargo through the destination MCT.
- Monitors the use of containers located in its operational area and coordinates with users to expedite return of these assets to the transportation system.
- Reports availability status of common user transportation assets to the MCB.
- Needs augmentation to conduct other movement control missions in conjunction with an Area mission.

4-11. The MCT can also perform the duties of the unit movement coordinator (UMC) when deployed and provide transportation services for units in its operational area to support redeployment. Those services can include assisting in the preparation of shipping documents for unit cargo, deployment automation management, and processing unit movement data. As mentioned earlier, a 21 person MCT performing an area mission would need augmentation from another MCT or focus strictly on redeployment operations to provide UMC support.

MOVEMENT REGULATION MISSION

4-12. MCTs or BMCTs are placed at various locations to assist in managing the flow on MSRs or ASRs. The MCT can provide an FDRP at border crossings/boundaries to manage the flow of military or

commercial movement entering a unit's operational area, a country, stage convoys, and ensure movement schedules are adhered to at convoy support centers (CSC) or distribution hubs, or manage and provide visibility of incoming and outgoing convoy movements at base entry points. The MCT can also:

- Observe, assess, and report progress of tactical and non-tactical movements along main supply routes.
- Coordinate and adjust movement schedules as necessary to deconflict movement.
- Assist in implementing changes to vehicle/convoy routings.

CARGO DOCUMENTATION MISSION

4-13. A MCT can provide additional cargo documentation for the transshipment of cargo at water/air/rail nodes as well as at a CRSP. Documentation is inherent in other MCT missions such as the Intermodal and Area missions. An entire MCT is normally not needed specifically for this mission, but elements of a MCT can be sent to various distribution nodes to provide this capability or augment the existing documentation capability of other units as mission dictates. A BMCT of 6 Soldiers has the capability to perform documentation required to load, discharge, or transship approximately 500 short tons of general cargo or 480 containers daily in water/rail/air terminals or intermodal nodes.

MOVEMENT REQUEST PROCESS

4-14. An MCT is the immediate interface for Army units requesting transportation support when the unit's requirement exceeds their organic capability. The MCT is also the first point of contact for other DOD organizations needing Army common user transportation. The process at this level starts when an organization submits a movement request and ends when a Transportation Movement Release (TMR) (see appendix A) is established and a mode operator is committed.

4-15. An MCT performing an Area or Port mission can receive movement requests from customer units in their area of operations. Requests can come from units such as a sustainment brigade, engineer, military police, personnel, medical or another service to move a variety of supplies, equipment or personnel. A movement program (see chapter 7) acts as a movement request and the MCT will use the movement program's preplanned mode and mode operator for the mission. The MCT receiving the movement request is referred to as the origin MCT. When the origin MCT receives the request it must validate the movement request (see table 4-1) to ensure completeness and accuracy.

Table 4-1. Movement request mandatory data elements

Movement Request		
Type	***Requestor POC***	***Requestor Organization***
Priority		
	MODE	
Mode Method		
	ORIGIN	
DODAAC	Requested Spot Date	Mode
MCE	Requested Load Date	Installation
Street Address	Requested Pull Date	
	DESTINATION	
DODAAC	RDD	Street Address
City	Special Interest Code	Mode
MCE	Installation	PIC Required
Destination POC		
	CARGO	
Pieces	Weight	Dimensions

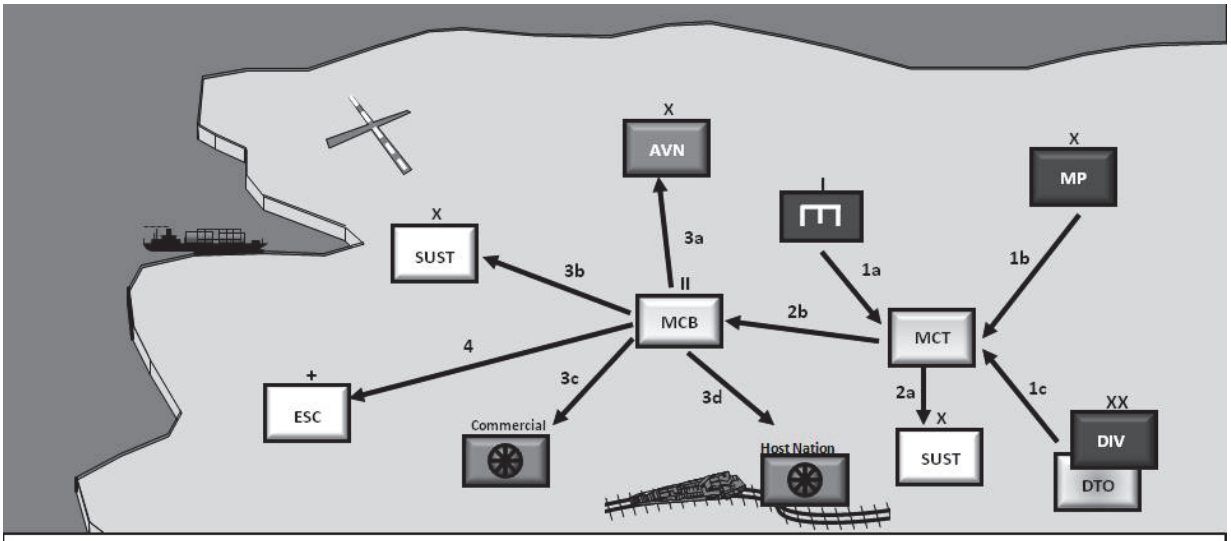
4-16. The MCB/MCT will determine the most appropriate mode of transportation, i.e. truck, rotary wing, or fixed wing. The MCB/MCT will consider a variety of factors to determine the most effective and efficient means to fill movement requirements. These factors include:

- Allocated transportation assets. The availability status of the mode operator's transportation assets must be a factor in determining which mode and which organization can execute the mission.
- Priorities. Provide service according to the command priorities for movement and support.
- Security. Consider security requirements for shipments involving hazardous or sensitive cargo. This may require cargo to be guarded or that the movement is conducted at night, by air, or by any other means to safeguard the cargo.
- Backhaul. Identifying the availability of cargo for transport on return missions is an important planning consideration to maximize vehicle usage.
- Political. Consider if there is any political sensitivity to materiel being shipped. This may require movement at night, by air, or other means.
- Tactical. Depending on the type of military operation or phase, the environment can be extremely fluid and non static. Coordinate with the requesting and destination units to determine potential changes in pickup or delivery locations.
- Routes. Rerouting may be required if there are changes to route classifications, the distribution pattern, or one of the other factors dictates a change.
- Rail movement. This mode is suitable for bulk and high tonnage cargo for delivery along the rail line and where transloading can be accomplished with material handling equipment (MHE) and container handling equipment (CHE).
- Air movement. Use of aircraft as a delivery mode is constrained to the air assets allocated for logistics support to the MCB. Transportation to move the cargo to and from the airfield or landing zone must be planned for.
- Water movement. This mode is suitable for bulk and high tonnage cargo for locations along the waterway. Use is limited by the availability of Army watercraft allocated to the MCB. Transportation to move the cargo to and from the water terminal or water ramps must be planned for.
- HN and commercial assets. Use is limited to those modes and assets provided by the host country or available through commercial contract. HN support is coordinated by the G5 or units having a HNS coordinating mission. The HN or a commercial contractor may not have the authority to move certain military cargo or may be limited to the geographical areas within a theater. Security of the commercial or HN transportation assets must be considered as well. Contractor identities will be vetted (using biometric capabilities) for locally employed personnel and other trusted positions.

4-17. Once all the considerations are taken into account, the origin MCT requests positive inbound clearance (PIC) for sensitive, classified, oversize, overweight, strategic "door to door," or other priority shipments through the destination MCT before issuing a TMR. PIC process assesses the unit's ability to receive the shipment considering the unit capabilities to have MHE, storage, and personnel available. The destination MCT can also confirm the availability of backhaul cargo ready for shipment at this time. Requests are forwarded to the destination MCT that, in turn, contacts the destination organization. The destination MCT confirms the organization's location and ability to off-load the cargo to the origin MCT. If the organization is unable to receive a shipment, the origin MCT reschedules the shipment by coordinating for alternate delivery dates. Though the origin MCT can schedule routine shipments without an inbound clearance, a receiving organization through the destination MCT must notify the origin MCT that it cannot receive the shipment and request the shipment be held.

4-18. To execute the movement request (see figure 4-3) the MCT will commit a mode operator in accordance with MCB guidance or forward the movement request to the MCB. The mode operator could be a sustainment brigade, aviation brigade, HN, or commercial organization. Commitments flow through predetermined channels developed between the TSC/ESC, MCB, and the brigade level mode operator. Normally for Army assets, the MCB or MCT will coordinate through the mode brigade headquarters, but, depending on the operational environment, the brigade may permit direct coordination with their

subordinate units. When the MCT commits a mode operator, it will create a TMR (see appendix C) which is a document that provides the details of that movement mission for the mode operator. The mode operator would then task one of their subordinate battalions for the mission. The mode operator submits a request for convoy or route clearance to its supporting MCT when needed. If the mode operator cannot support the TMR for any reason, it must notify the MCT immediately. The MCT either attempts to establish an alternate delivery date and time, select another operator, another mode, or forwards the movement requirement to the MCB.



1a. Unit submits movement request (MR) to their supporting MCT.
1b. Unit submits MR to their supporting MCT.
1c. Unit submits MR to their supporting MCT.
2a. MCT commits mode operator for available common user transportation (CUT) assets, based on established priority of support, to fill a MR..
2b. If military host nation (HN) or commercial CUT assets are not available, MCT will forward MR to its higher HQ.
3. MCB validates CUT is not available to MCT submitting the MR. Once validated, the MCB will determine the best common user mode/conveyance to fill the MR and commit the appropriate mode operator:
   a. The MCB may have the ability to directly arrange Army or Air Force fixed/rotary wing transportation.
   b. The MCB can commit other sustainment brigades for their common user transportation assets.
   c. The MCB may have the ability to directly arrange commercial surface or air transportation.
   d. The MCB may have the ability to directly arrange host nation surface or air transportation.
4. If military HN or commercial CUT assets are not available, the MCB will forward the MR to its higher HQ.

Figure 4-3. MCB in the movement request process

4-19. When the MCB receives a movement request from an MCT it will verify that the common user assets available to the requesting MCT are committed based on the theater commander's priority of support. If an issue of prioritization arises, the MCB will work to resolve the issue with the mode operator. When the mode operator's transportation assets are matched against valid commitments, the MCB can forward the request to another MCT to use assets the MCT has committal authority over or the MCB can execute the request if it has committal authority over transportation assets. The MCB can retain committal authority of allocated transportation assets if the operational environment dictates. Transportation assets such as Army aviation, rail, or Army watercraft are limited and selection of these modes can be retained at the MCB. Additionally, the committing of HN or certain commercial assets can be retained at the MCB if necessary. When the MCB commits a mode operator it will create a TMR for the movement and follow the process above as outlined in this section. If the MCB is unable to execute a movement request, it will forward the request to the TSC/ESC or coordinate directly with a joint organization for the use of other Service's assets such as Air Force aircraft, if the MCB is given that authority.

4-20. The destination MCT has the responsibility to close out all TMRs terminating in their operational area. There are a variety of automation systems that will provide asset and in-transit visibility but the MCT

should make direct contact with the receiving organization to ensure the shipment has arrived when communications allow. To close out the TMR, the destination MCT will contact the origin MCT to relay the mission is complete or close out the TMR in a movement control automation system when available. The MCB has the responsibility to ensure commercial movements arranged by SDDC are closed out and reported to the TSC/ESC.

This page intentionally left blank.

Chapter 5

Movement Control in the Division Distribution Network

The responsibility for movement control planning and execution for a division, separate brigade or in a BCT is vested in that headquarters' staff. The DTO, the brigade support battalion (BSB) SPO and brigade S-4 coordinate and manage movement control operations in their areas of operation. Though an MCB is not normally subordinate to division, an MCT can be requested through the request for forces (RFF) process to work directly for the DTO. The MCT is critical to provide needed movement control depth to assist the DTO with the responsibilities in planning and executing concurrent deployment/redeployment of subordinate brigades as well as simultaneously coordinating movement control operations supporting distribution. The major movement control responsibilities are to (1) Provide route synchronization of the supply routes within the division operational area (2) Ensure uninterrupted movement of divisional/ brigade sustainment convoys as well as theater sustainment convoys entering the division or brigade area (3) Manage the movement request process to ensure an efficient and effective use of internal assets while providing an expedient process for receiving external transportation support (4) Establish periodic movements boards to ensure inbound theater sustainment movements, internal sustainment movement and supporting coordination are synchronized and forecasted.

DIVISION TRANSPORTATION OFFICER

5-1. The DTO is a staff officer normally assigned in the sustainment cell of the division headquarters involved in the movement of units and maneuver elements in coordination with the division G3. Additionally, the DTO is a staff planner that advises the commander and coordinates transportation support with the division G3 and G4. The DTO coordinates with the G3 on operational movements, the G4 on sustainment and also provides guidance and coordinates transportation issues with other staff sections and commanders. The DTO advises the commander and staff on transportation matters that include:

- Division priorities for transportation and movement to support division plans and orders.
- The availability of subordinate brigade transportation assets.
- Movement regulating of main supply routes (MSRs) and alternate supply routes (ASR) the division will control.
- Assisting the G4 in preparing, updating and maintaining the transportation portion of the logistics estimate. The DTO provides subordinate brigades with policies and priorities. Participation in the military decision making process (MDMP) for future operations.

5-2. In addition to the above mentioned tasks, the DTO coordinates with other division staff offices to include the provost marshal, engineers, the United States Air force Air Mobility Liaison Officer (AMLO) , and subordinate staffs. The DTO movement control efforts also require close coordination with the MCB and the MCT providing area support. Additional coordination can occur with the following:

- Sustainment brigade
- Combat aviation brigade (CAB)
- Maneuver enhancement brigade (MEB)
- Corps transportation officer (CTO)

5-3. The DTO is the focal point for transportation technical guidance and assistance for the staff in areas of planning and in the execution of operations. With the mobility warrant officer (MWO) assigned to this office and an attached MCT, The DTO:

- Conducts route synchronization (in coordination with the G3 and supporting military police units) to include movement regulating teams, providing movement credits and march tables for sustainment convoys.
- Assists in the container management and tracking process.
- Provides technical assistance in planning for unit movement by all modes.
- Participates in the MDMP as a member of the division planning staff.
- Conducts concurrent planning with the staff to integrate movement, maneuver and transportation sustainment operations.
- Prepares a movement program.
- Develops the deployment, movement, and route synchronization portions of the division operation plans (OPLANs) and operation orders (OPORDs).
- Validates and coordinates the requirement for external transportation when requirements exceed a brigade's organic capability.
- Maintains the status of subordinate brigade's transportation assets.

BRIGADE COMBAT TEAM (BCT)

5-4. Within the brigade HQ, the S4 staff performs limited movement control functions due to its small transportation staff. The S4 transportation staff that includes a MWO and an 88N non commissioned officer (NCO) provides the following:

- Establishes supply routes in the brigade area in coordination with the DTO and brigades support battalion.
- Establishes a brigade route synchronization plan for movements within the brigade area of operations and for incoming sustainment convoys.
- Reports the status of containers, flatracks, pallets, and trailers in the BCT area of operations and their availability for retrograde to the division G4. Coordinate with the BSB SPO to identify when transportation requirements exceed the BCT capabilities.
- Coordination with sustainment brigade

BRIGADE SUPPORT BATTALION (BSB)

5-5. The BSB commander is the senior logistician in the BCT and provides critical transportation planning and execution capability. The BSB Support Operations (SPO) transportation section provides movement control support to the BCT to fulfill the BCT commander's distribution movement requirements. Additionally the SPO:

- Has tasking authority over the BSB's common user transportation assets.
- Coordinates with the BCT S4 when transportation requirements exceed the BCT capabilities.
- Maintains information on the status of its transportation assets allocated to support movement requirements and includes the transportation assets of the forward support companies (FSC).
- Monitors the status of containers, flatracks, pallets, and trailers in the BCT area of operations.
- Coordinates sustainment movement outside the BCT operational area with the DTO and informs the BCT S4.

MOVEMENT CONTROL TEAM (MCT)

5-6. An MCT (see figure 5-1 for a notional MCT headquarters and teams) that is attached or OPCON to a division headquarters is placed under the control of the DTO to augment that staff and assist in providing a range of transportation support planning, programming, and operations required to support the spectrum of military operations. The team operates on a 24-hour basis to assist the DTO in planning, scheduling, controlling, and coordinating mode operations. The team's automations system's also provides the division

linkage to the theater movement control network, maintains ITV of materiel and personnel transiting into, within, and out of the division area. This MCT is not subordinate to a MCB and is not performing the area mission of a MCT which may be co-located with or near the sustainment brigade providing support to the division. Other functions the MCT can assist the DTO with include:

- Execution of route synchronization.
- Coordination for use of MSRs within the division.
- Operating FDRP for sustainment convoys.
- Providing technical expertise to transportation users in the division area of operation.
- Providing movement control support for any divisional movements.
- Providing movement control capability to a BCT and/or MEB as needed.

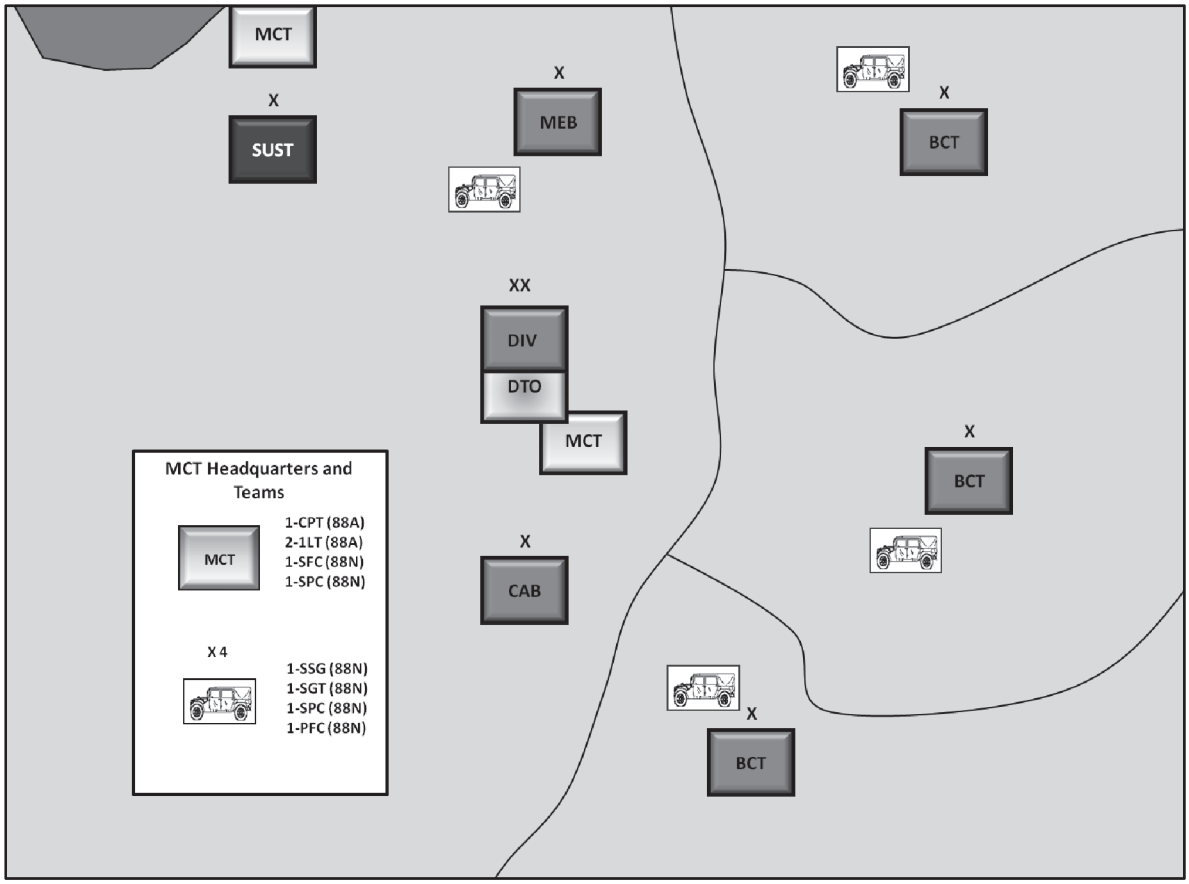


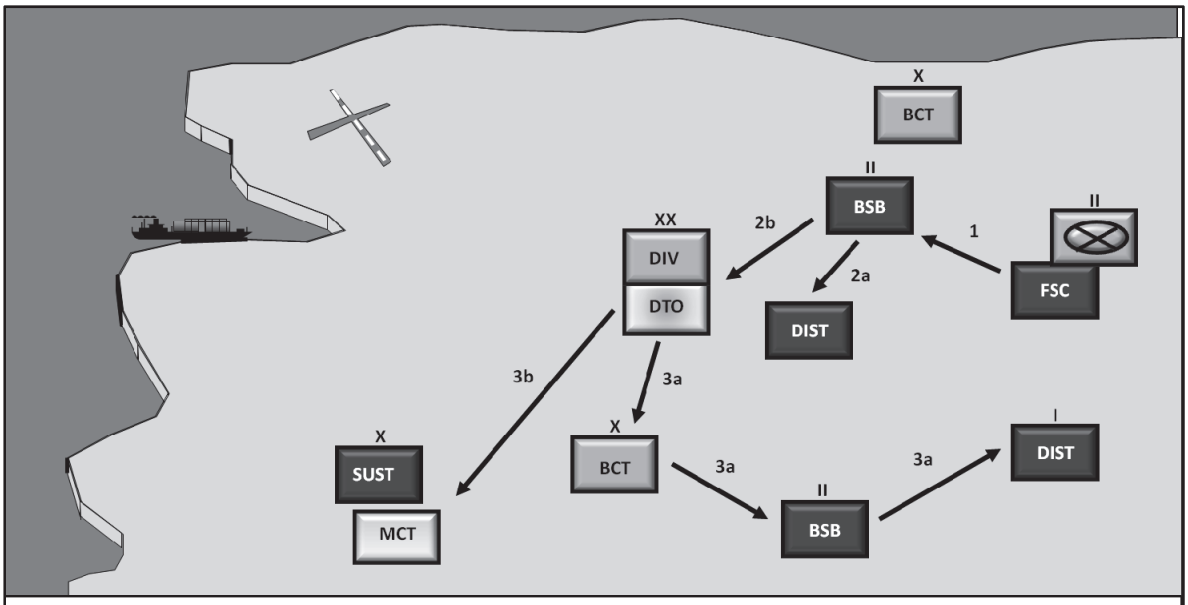
Figure 5-1. Notional MCT headquarters and team layout

DIVISION MOVEMENT REQUEST PROCESS

5-7. The movement request process in the division starts with the BCT. If a maneuver battalion exceeds their capabilities with internal assets, then the maneuver battalion's FSC will submit the requirement to the BSB SPO and inform the maneuver battalion S4 of the requirement (see figure 5-2). The BSB SPO will task its distribution company to fulfill the requirement. If the requirement exceeds the BSB's capabilities, the BSB SPO will forward the movement requirement to the DTO and inform the BCT S4 of the request. The DTO can remove themselves from the movement request process and permit subordinate BSBs to work directly with the MCT providing area support when the operational environment allows. The DTO must coordinate with the MCT providing area support and establish guidance to subordinate BSBs before direct BSB to MCT movement request coordination can occur. If a BCT is not operating under a division headquarters then the BSB will submit the movement request to the MCT providing area support

5-8. When the DTO receives a movement requirement from a subordinate brigade, the movement requirement may be filled more expeditiously using transportation assets from another BCT. The DTO must determine if using other BCT transportation assets is prudent and if so inform the division commander/G-3/4 on this course of action. It is important that movement request go through the DTO to ensure the most effective means of transportation support is pursued. Unlike a BCT, the DTO may have access to additional transportation assets such rotary or fixed wing Army aviation assets that can be used to assist a BCT when requirements exceed their capability. Additionally, the DTO is responsible for validating and prioritizing a requirement before submitting requirement request for external support.

5-9. When there is an MCT providing area support (not the MCT augmenting the DTO) the DTO will submit routine movement requests to that supporting MCT. This MCT may have access to available sustainment brigade, contracted, or HN transportation assets to commit to fill the request. If the MCT does not have the ability to meet division's movement requirements it will forward the request to the MCB. When there is no MCT providing area support the DTO will forward the movement request to the SPO of the supporting sustainment headquarters such as a CSSB or sustainment brigade.



1. FSC submits movement requirement to supporting BSB and inform BCT S4.
2a. If the BSB can fill the movement requirement with organic assets then the BSB will task its subordinate unit.
2b. If the BSB cannot fill the movement requirement the BSB will forward the requirement to their higher headquarters, normally the DTO.
3. The DTO will validate and determine the priority of the movement requirement and determine the most effective means of transportation support:
   a. Based on a recommendations from the DTO, the division commander/G3/G4 could use other brigade assets to fill the requirement.
   b. If transportation assets are not available, the DTO will forward the movement request to the supporting MCT.

Figure 5-2. Divisional movement request process

5-10. For non-routine movement requests such as large troop or equipment movements supporting maneuver operations, sustainment request that may require Air Force support, or Army fixed/rotary wing support that the division cannot meet internally, the DTO should coordinate with the MCB for support. The DTO can request support by a specific mode but the MCB is the mode selection authority.

DIVISION MOVEMENT BOARDS

5-11. See chapter 3, theater movement control, for general guidance on movement boards. At the division level, the DTO will normally chair movement boards but the division G4 or the deputy commanding general for support could chair if in a joint or multinational environment. A validated division movement

program should be outcome of the board that ensures all internal movement requirements are matched with the appropriate capability and that the coordination and synchronization for mission execution is confirmed for movement occurring within the next 24-48 hours. For movement occurring outside of 48 hours it is important to identify potential requirements along with the availability of committed assets. Representatives in the movement board should include but are not limited to:

- DTO
- Division G2, G3 current operations, and G5
- Subordinate BCT S4s and BSB SPO
- Representatives from separate brigades/battalions/companies
- Provost Marshall
- Division engineers
- Subordinate units attached or OPCOM from the MEB, CAB, and SB.
- MCT(s) providing area support
- Protection enablers (to include biometric capabilities)
- Electronic warfare officer

This page intentionally left blank.

Chapter 6

Route Synchronization

Route synchronization is the planning, routing, and scheduling of movement on ground supply routes and is a control measure that regulates the flow of movement supporting military operations. Route synchronization is executed by commanders with the responsibility to provide order, prevent congestion, and enforce movement priorities for the ground supply routes in their operational area.

The extent of the regulation needed depends upon the number of moves and the capacity of the road network. Route synchronization is crucial when operating over underdeveloped and saturated road networks. Well developed road networks provide higher throughput and may require less regulation. For highly developed road networks, the amount of regulation needed is less to allow the free-flow of traffic. Free-flow of traffic allows for the maximum movement of cargo and personnel.

PLANNING FOR ROUTE SYNCHRONIZATION

6-1. Planned movement requirements are identified in advance. They are found in distribution plans, movement programs, and operation plans and orders (see appendix B for road movement planning). They involve onward movement of forces from ports of debarkation (PODs), redeployment of forces to ports of embarkation (POEs), movement of supplies and equipment, and movement of units. Immediate requirements are unplanned and based on requirements generated during the conduct of operations. They include requirements such as unit displacement, unprogrammed resupply, and evacuation. Immediate requirements are normally of a higher priority than planned requirements and must be quickly acted upon.

6-2. The goal of route synchronization planning is to sustain movements according to the commander's priorities and make the most effective and efficient use of the road networks. It requires synchronization and coordination with planners of unit movement and maneuver. Planning is done in a logical sequence and results in the publication of the route synchronization plan and the distribution network design (see appendix G). The first step in the planning process is to assemble critical information. This information can be found in the following:

- Operation plans (OPLAN), operation orders (OPORD), and estimates. OPLANs, OPORDs, and estimates contain essential information. Movement planners must read and understand the concept of operations to effectively support the commander's intent while executing route synchronization. Information such as geographic boundaries, task organization, priorities, and locations of major supply activities are also contained in these plans.
- Engineer route reconnaissance or classification overlays. The engineer route reconnaissance or classification overlays provide detailed information on the characteristics of the road network such as road surface, width, restrictive features, effects of seasonal weather conditions and bridge classifications. This information is necessary to determine critical points and route capacity. The characteristics of the route are contained in the route classification formula. Current information is required and thorough route reconnaissance may not always be possible or feasible. Therefore, movement planners may also obtain information from aerial photographs, local authorities, intelligence reports, and military police (MP) hasty route reconnaissance to supplement information obtained from maps or intelligence studies.
- Traffic density information. Traffic density information is the anticipated volume of traffic on route segments during specific periods. It comes from planned requirements contained in the distribution plan, movement program, the OPLAN or OPORD, or fragmentary orders (FRAGOs). Planners must extract specified and implied requirements for unit movements,

sustainment movements, and retrograde movements. These documents may also require moving civilian refugees, unit displacement, or shared uses by multinational or HN forces. Each type of movement must be prioritized, planned, and coordinated.

- Intermodal and facilities data. Intermodal and facilities data obtained from the theater distribution plan, includes the location of supply points, intermodal points, staging and assembly areas, and refuel points. These are considered in terms of their total clearance and reception capabilities. Specific considerations include location, access from supply routes, and their capability to receive, load, unload, and stage.

6-3. When the data is assembled and studied, movement planners must identify the road networks that are capable of supporting the volume of traffic necessary to meet planned and anticipated movement requirements. These road networks will be recommended as main supply routes (MSRs) and alternate supply routes (ASRs). Planners must also plan extensions of the MSRs to anticipate forward movement of maneuver forces. ASRs are used when the MSRs are disabled or too congested, and should be planned for in the same manner as MSRs. The GCC's, Corps', or Division's J/G3 as appropriate approves the selection of MSRs and ASRs to ensure maneuver and other operational issues are considered before movement planners can conduct detailed route synchronization planning.

6-4. Movement planners will develop the route synchronization plan (see Appendix C) and distribution network design after coordination with the J/G3. The route synchronization plan is a written plan that describes the MSR network and establishes control measures to promote effective regulation. The distribution network design is a map overlay or equivalent graphic representation of the MSR network. Both are published as an annex to the OPLAN or OPORD. They are used by the provost marshal (PM) to develop the traffic control plan. The development process involves the following:

- Naming each MSR according to command directives. Avoid using colors to name MSRs since the MSR status and other logistics statuses are normally reported as green, amber, red, or black. Avoid using numbers to name MSRs because they may conflict with existing route numbers. Additionally, establish a theme to the naming convention such as sports teams, automobile modes, etc.
- Determining critical points. Critical points are areas along a route where movement may be slowed down halted. For more information on critical points see chapter 7.
- Establishing checkpoints (CPs) on each MSR to segment the MSRs. Segmenting the MSR facilitates route synchronization and traffic control planning and execution. CPs should be established at the following:
  - Major crossroads.
  - Locations where road conditions change.
  - Major supply or service areas.
  - Geographic boundaries.
  - Assembly areas.
  - Other critical points.

6-5. CPs are predetermined points on the MSR that are used as a means of regulating and controlling movement. When possible, CPs should be easily identifiable from the air and ground. Units use CPs when requesting movement clearance by using CPs to identify their start point (SP), release point (RP), and en route CPs. CPs enables quick dissemination of information during execution such as a point where traffic will be rerouted. CPs are also used when describing the MSR in the route synchronization plan. Some examples are as follows:

- MSR Spear is a paved, all weather road from CP 22 to CP 34.
- From CP 34 to the 1st BCT near boundary, the MSR is an improved fair weather road. The MSR can accommodate two-way traffic.
- The route is classified as an open route from CP 22 to CP 34.
- It is a supervised route from CP 34 to CP 8 at the division near boundary. Convoys of eight or more vehicles, tracked vehicles, or vehicles that cannot maintain a 30 km march rate require a movement credit on that segment.

- The most restrictive route feature is at CP 35, a bridge with a military load classification (MLC) of 30. Vehicles with an MLC greater than 30 must use the ford at NJ334098. Signs for the ford are posted.

6-6. Planners should identify sufficient CPs to adequately exercise control, but no more than they have the capability to manage when the plan is executed. This requires careful balancing so that excessive CPs do not impede execution.

- Establishing control measures for each route. Control measures should be based on the engineer route classifications, planned and anticipated traffic volume, mission, enemy, terrain and weather, troops, time available, civilian considerations, and critical points. Planners must also consider the capabilities of movement control and traffic control units to enforce the control measures. Control measures may change based on the conduct of operations. Movement planners must ensure that changes generated as the result of operational needs are incorporated into the OPORD or otherwise disseminated quickly. Below are the five control measures:
  - Open route. This is the least restrictive control measure. Any unit may use the route without a movement credit. Minimum control is exercised.
  - Supervised route. The movement control headquarters will specify the size of convoys, the type of traffic, or characteristics of vehicles that require a movement credit to use the route. Limited control is exercised.
  - Dispatch route. A movement credit is required to use this route regardless of the number or types of vehicles. A dispatch route will normally be designated when traffic volume is expected to exceed capacity or when the route is critical to operations and priority of use must be strictly enforced. Full control is exercised.
  - Reserved route. The route is reserved for the exclusive use of a particular unit(s) or type of traffic and no other units or traffic may use the route. Reserved routes may be identified for large unit movements. Examples are when a maneuver unit must pass another forward, when reserve formations are committed, or when units are withdrawn for reconstitution.
  - Prohibited route. The route is closed and no unit or traffic may use the route. A route may be prohibited due to washouts, destroyed bridges, maintenance, or construction work. It may be prohibited for only short periods, such as the time necessary to do repairs.

- Making the distribution network design. The overlay will show all MSRs, ASRs, and route synchronization CPs. It will also include route names, direction of travel, boundaries, and principal supply activities. It will reflect any restrictive route features, critical points, and convoy support centers. It may include traffic control points if provided by the PM before publication of the distribution network design.
- Determining reporting requirements. These requirements are for units using the MSR if reporting is necessary.
- Developing the route synchronization plan. The route synchronization plan is included in the operation plan or order. The written plan will describe the information contained on the overlay and specify the control measures that apply to each MSR or critical segments of MSRs. Control measures should be coordinated to phases of the operation if they can be determined in advance.
- Staffing and coordinating the plan. Recommend points where traffic control will be required. Recommend locations and priorities for engineer repair and upgrade efforts.

PRINCIPLES OF ROUTING

6-7. Routing is the process of coordinating, synchronizing and directing movements on MSRs or ASRs. When routing traffic, movement planners should consider the four principles that govern routing:

- Balance. Balance is the matching of vehicle characteristics with route characteristics to ensure that vehicle traffic does not exceed the most limiting feature of a route.
- Separation. Separation is allocating the road space to ensure that military movements do not conflict with each other, with pedestrian movements, or with civilian traffic.

- Distribution. Distribution is allocating as many routes as possible to reduce the potential for congestion, enhance the useful life of roads and bridges (sustained capability), and prevent deterioration of road surfaces (due to overuse). Distribution also promotes passive defense by distributing and separating traffic.
- Prioritize. Assign highest priority traffic to routes that provide the minimum time-distance.

METHODS OF SCHEDULING

6-8. Scheduling is the process of coordinating times for road and route movements. It involves receiving and managing movement requests and issuing clearances. Scheduling is essential to the application of the principles of routing.

6-9. The method of scheduling road movements is based on the control measures specified for the route. The four types of scheduling methods (from the least restrictive to the most restrictive) are described below.

- Infiltration schedule. This schedule is a rate of dispatch assigned to units for specific routes and time blocks to achieve an average traffic flow that is within the capacity of the route. By assigning rates of dispatch to different units that need to use the same route, average traffic flow can be held within desired limits. An infiltration schedule may be used for open or supervised routes.
- Route schedule. This schedule is a flexible scheduling method. It apportions blocks of time on MSRs to units, types of movements, phases of the operation, or for route maintenance. A route schedule may be used for supervised, dispatch, or reserved routes.
- Location schedule. This schedule is more restrictive than an infiltration or route schedule. It assigns arrival and clear times to different units needing to use the same entry point onto MSRs. The location will normally be a CP. For example, at a particular CP, unit A may be scheduled to arrive at 1000 and to clear at 1015, unit B to arrive at 1020 and to clear at 1030, and so on. A location schedule may be used for supervised or dispatch routes.
- Column schedule. This schedule is the most restrictive scheduling method. It specifies arrival and clear times at CPs along an entire route. It may be based on the requestor's movement request or movement table or on movement tables issued by the movement control organization. Based upon the extent of control required, a column schedule can provide the most effective route synchronization because it provides in-transit times to reach CPs and helps the pacesetter maintain the prescribed rate of march. It may be used for supervised, dispatch, or reserved routes. It should also be used when congestion is anticipated.

6-10. Apply the following guidelines in scheduling movements:

- Movements on routes requiring movement clearance must be scheduled.
- Movements that cross movement control boundaries must be scheduled, coordinated, and inbound cleared by the movement control organization responsible for the area where the movement originates to the movement control organization where the movement terminates.
- Large unit movements must be scheduled.
- Movements in one direction, on routes that require a movement clearance, are treated as a single movement, regardless of the distance or time involved. Each movement retains the same movement clearance to destination.
- Schedules and changes to schedules (due to changes in the tactical situation or in immediate movement requirements) are provided to the movement regulation teams MCT to execute route synchronization and to the PM to provide traffic control.

CLEARANCE REQUEST

6-11. Units needing to move on controlled routes that require a movement credit must request and receive clearance before beginning movement. The request is submitted through the MCT within the area movement originates and forwarded to the highway traffic section of the MCB to process. If a route is accessed by multiple MCBs then the MCB will forward the request to the TSC/ESC mobility section to

process. Within a division requests are submitted to the DTO for processing for access on division routes or the DTO will forward to the MCB for access on theater routes when required.

6-12. Requests are reviewed and considered based on command priorities for the type of movement and the unit requiring movement. Priorities for types of movements are normally specified in OPLANs or OPORDs. They include categories such as unit movement, movement of reserves, logistical movement, and movement of replacements. Unit or task force priorities are specified in OPLANs and OPORDs. Unit priorities are based on the commander's requirements to meet the tactical situation. These priorities frequently change. Movement planners must anticipate changes and frequently obtain planning guidance from the J/G3.

6-13. The MCB/DTO either schedules the movement as requested or notifies the unit if it cannot be granted. They will coordinate with the lower priority requestor to reschedule the movement at a different time or on a different route. If conflicts arise during planning that cannot be resolved by the MCB/DTO, they must seek resolution of the priority conflict through the staff that approved the priorities.

6-14. Movement credits are returned to the requesting unit through the same channels used for the request. Information on all movement credits issued is provided to the provost marshal (PM) for traffic control and movement regulating purposes. The movement credit gives the requesting unit the authority to move on a controlled route. The credit is a control number. Policies for developing the codes used for movement credits are governed by command directives. Movement credits normally include a command identifier, Julian date, and sequence number. For example, a unit of the 1st BCT will move on Julian date 043. The credit was the third issued for that date. The movement credit would be 01-043-003. Additional codes may be added after the sequence number to further identify the unit or type of movement. Command directives normally prescribe that moving units chalk the movement credit on the sides of their vehicles to identify that the movement is authorized.

COORDINATING MOVEMENTS

6-15. The MCB/DTO must deconflict and coordinate the planned movement of convoys on controlled MSRs in order to coordinate departure and arrival times, manage movement priorities, and synchronize protection enablers (route clearance, aerial surveillance, biometrics, and other protection measures). Use of the road movement table is a critical tool to minimize congestion on MSRs and maximize the protection available to all convoys (see table 6-1). Similar to the movement board, this coordination requires daily and weekly meetings such as a movements synchronization board/groups to validate convoy departure times and issue movement credits, and as required initiate the process to reroute or divert convoys. Coordination at all levels must occur before and during movement with the S3/G3 or headquarters responsible for the operational areas that the convoy is traversing.

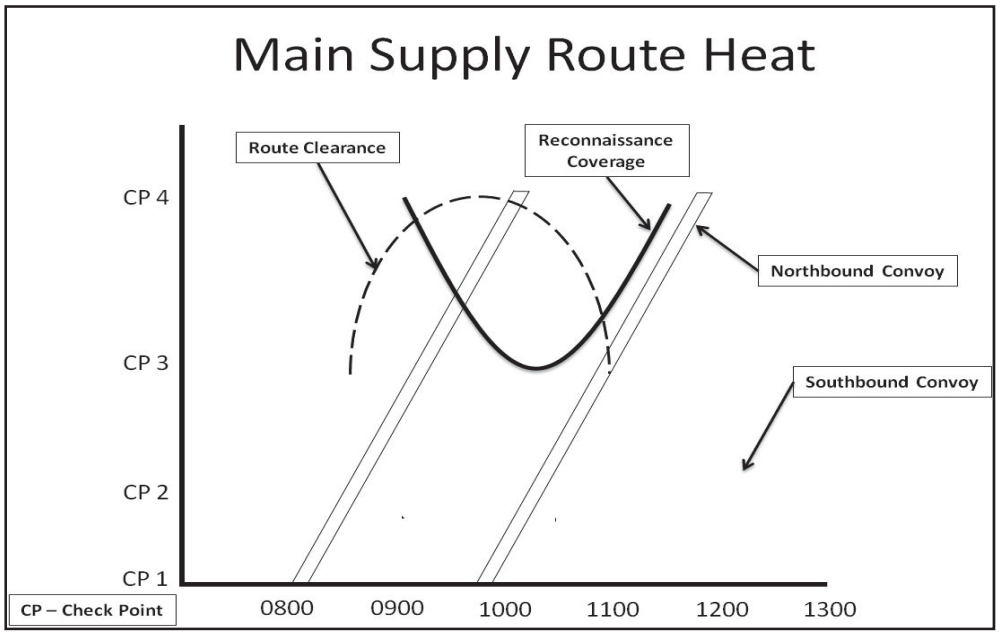


Figure 6-1. Notional road movement

6-16. While it is important for the MCB/DTO to monitor the in-transit status of all convoys, the operational environment owner also plays a critical role in monitoring and supporting convoys as they traverse controlled MSRs and ASRs. Changes to route status due to weather, enemy, and intelligence threats, must be communicated to the highway traffic section of the MCB for theater routes or the DTO for division routes, who is responsible for continuously updating and disseminating. Any changes to departure times will be communicated from the MCB's highway traffic section through the MCTs who are responsible for communicating route status information and issuing movement credits. Any changes to departure time for a convoy require additional synchronization and coordination with all other movements and protection enablers prior to issuing a new movement credit.

6-17. Without positive control measures, continuous communication and monitoring, the MSRs may become congested and movements will be delayed placing convoys at risk. The movement program and movement table (see appendix F) will provide commanders with the visibility and detailed information to visualize the location, composition and status of convoys at any time and know when they should arrive and clear CPs.

6-18. Brigade level commanders such as a BCT, fires, maneuver enhancement or sustainment brigade may have some responsibility for movement through their assigned area of operation (AO) even if the movement is conducted on MSRs or ASRs designated by higher headquarters. Depending on the theater policy established, units traveling through the AO of another brigade may have to coordinate clearance from that organization and obtain intelligence updates and/or coordinate security procedures in their AO. Coordination at a minimum takes place with the mode operator, the brigade that has the assigned AO, the MCB. The TSC/ESC or CTO can be involved if the operational environment dictates.

DIVERTING AND REROUTING

6-19. The MCB/DTO must monitor the status of convoys to determine if movements are being executed as validated in the movement table. They are also the focal point for initiating the diversion and rerouting of convoys, which must be able to communicate with MCTs, mode operators and protection enablers to influence changes and enforce control measures on MSRs. Normally the MCB/DTO should coordinate with the mode operator's staff as opposed to directly contacting a convoy. However there may be instances where contacting the convoy directly is the most expedient method to ensure the safety of the convoy. The

route synchronization plan and policies must provide detailed procedures for coordinating and disseminating route status changes and information that will impact convoy movements.

6-20. Changes to MSR status (see appendix F) and traffic disruptions may be caused by enemy actions, intelligence threat and weather that will require commanders to decide on the operational necessity of executing convoys. There must be a collaborative effort amongst the operational, intelligence, and logistics community to anticipate potential traffic disruptions and disseminate information and guidance on road movement restrictions and route avoidance. The MCB/DTO must continuously seek out and monitor information from other commands or staff sections to make assessments of route status. Upon receiving reports of problems on an MSR, the MCB and subordinate MCTs can simultaneously adjust the movement program and movement table to ensure maximum synchronization to support operational and movement priorities. They can issue instructions to hold operational and logistical movements that have not departed, issue new routing instructions, or divert convoys to a different destination.

LARGE UNIT MOVEMENTS

6-21. Large unit movements must be quickly executed. Coordination is critical during planning to open routes for movement and to reschedule previously planned movements. Maintaining logistical support and uninterrupted transportation to other supported units in conjunction with large unit moves requires continuous coordination. Large unit movements will normally be planned by the moving units under parameters defined by the J/G-3. This depends upon their location and whether the movement commits the forces or moves them from one assembly area to another. Planning for movement of large units consists of four concurrent steps:

- Determining the requirements for the move.
- Determining the timeframe for the move.
- Analyzing organic and nonorganic movement capabilities.
- Establishing movement priorities.

6-22. The fundamental precepts of METT-TC drive the planning for large unit movements as they form the base requirement for the time and space factors characterizing the movement. The following factors are considered:

- Task organization of units, current location, and density.
- Adequacy of routes to support vehicles and tonnages.
- Available assembly areas and transportation modes at origin.
- Control measures, coordination, and logistics support for the movement and at destination.
- Assembly areas at destination.
- Deception measures before and during the movement and at destination.
- Enemy situation, route and geographic conditions, and weather.

6-23. Preplanned movements must be reevaluated in terms of their priority in relation to the unit movement. Critical supplies may have to be pre-positioned or moved by alternate modes such as air, rail, or inland waterway if they are available. En route logistics support such as a refuel on the move, maintenance, and life support must be pre-positioned. Traffic control and MCTs must also be pre-positioned.

6-24. Route synchronization planning must be extensive and thoroughly coordinated. Critical road junctions must be identified and managed. Less critical movements must be rerouted, delayed, or shifted to alternate modes. Engineering may be required to upgrade routes or to construct bypasses or bridges. Scheduling guidance must be provided to the moving units. This guidance allows the units to conduct their internal planning for the movement. The main factor will be the availability of routes. Movement planners can use the following techniques:

- Creating reserved routes for particular units.
- Using location or columns scheduling to allocate time blocks for movement if units share routes.
- Developing movement tables if routes are limited and the requirement for control is greatest.

6-25. Detailed movement tables are necessary for smaller units to execute their portion of the plan. However, the moving unit can develop these plans based on the allocation of routes or time blocks.

Movement control organizations will not normally develop detailed movement tables for large unit movements.

Chapter 7

Developing an Integrated Movement Program

This chapter is for movement managers at all levels and explains how to develop an integrated movement program that matches transportation movement requirements against transportation capabilities supporting distribution, deployment, and redeployment operations. Developing an integrated movement program requires direct coordination between material managers, movement managers, and mode operators.

THEATER MOVEMENT PROGRAM

7-1. A theater movement program is a command directive prepared by planners in the TSC/ESC with assistance from the MCB and disseminated through the orders process. It incorporates all movements using Army and host nation common user transportation assets and movements originating from a movement request via an MCT (i.e. rail, commercial, aviation). A division, BCT, or separate brigade may also create an movement program to better synchronize their distribution operations

7-2. A movement program is used to preplan anticipated transportation requirements for movement and flow of units, personnel, materiel, and sustainment supplies. During the movement planning process, movement planners allocate available transportation resources based on the commander's priorities.

7-3. Implementing the commander's priorities is a responsibility of logisticians at each level of command. The movement program supports the commander's priorities by establishing what requirements can be resourced given available transportation assets, units, and infrastructure. Doing this effectively uses these available assets and identifies competing requirements and shortages.

7-4. An effective movement program is vital for successful support of combat operations. Therefore, supported units must provide accurate data when developing transportation requirements and inform movement planners of current and projected operating sites. Movement planners must be flexible because requirements often change based on changes in priority, unit locations, asset availability, and conditions of the LOCs. Therefore, supporting movement plans should have fully developed alternatives based on likely courses of action. The MCB must also be resourced with sufficient movement control teams (MCTs) and communications equipment to provide adequate movement control and operational flexibility.

7-5. The movement program serves as an authority to commit transportation assets. It authorizes the MCTs to issue transportation movement releases (TMRs), directs mode operators to furnish assets, arrange commercial movements, and alerts receiving units to accept programmed shipments so that they can unload transportation assets promptly. There are nine basic steps used to develop an movement program as follows:

- *Step One*. Assess the distribution pattern.
- *Step Two*. Determine requirements.
- *Step Three*. Determine transportation capabilities.
- *Step Four*. Balance the requirements against the capabilities.
- *Step Five*. Determine critical points.
- *Step Six*. Determine check points (see chapter 6).
- *Step Seven*. Determine shortfalls and recommended solutions for handling the shortfalls.
- *Step Eight*. Coordinate the movement program.
- *Step Nine*. Format and publish the program.

ASSESS THE DISTRIBUTION PATTERN

7-6. The distribution pattern is a complete logistics picture that shows the locations of ports, locations of supply, locations of consignees, maintenance activities, nodes, and transportation activities. It is the tool by which planners know where support should normally flow and where it may be diverted as operational needs dictate. The distribution pattern constantly evolves as the theater develops. The commander's concept of operations, number, types, and locations of in-place and incoming units guide development of the distribution pattern and their time phased arrival in theater. The distribution pattern delineates throughput and interzonal transportation requirements directly affecting the coordination and preparation of movement programs.

7-7. Movement planners use the distribution pattern to develop the transportation network. The network consists of the complete system of routes pertaining to all modes of transportation available in the theater. Movement planners study intelligence and engineer information on the operational area to determine the capabilities of transportation networks. They analyze the enemy situation to determine existing or potential threats to movement. Concurrently, they determine the suitability and feasibility of moving supplies, equipment and personnel over those transportation networks. Based on these studies, movement planners recommend locations for transportation units and modes to make full use of the transportation networks.

7-8. Movement planners in the TSC/ESC coordinate with their subordinate units regarding the positioning of transportation units and supply activities. These units are positioned so that their capabilities will enhance the distribution system.

7-9. Movement planners also coordinate with shippers and receivers to determine their capability to receive, handle, and load by various transportation modes. This capability is based on the availability of materials handling equipment (MHE), container handling equipment (CHE), ramps, labor, storage capacity, and other factors that affect transportation services. This information is necessary to efficiently schedule transportation and prevent congestion.

DETERMINE REQUIREMENTS

7-10. Having accurate requirements is the key to developing an effective movement program. Forecasts must be submitted far enough in advance for the transportation and supply systems to adjust their resources to carry out the program.

7-11. Movement planners use planning periods for forecasting requirements. The length of these periods is based upon the number and frequency that changes are experienced or anticipated. A 14-day planning period is desirable to allow a firm forecast of requirements for the current 7-day period and a tentative forecast for the succeeding 7-day period. This method provides a basis on which to operate during the current period and a tool for planning during the succeeding period. With a 14-day planning period, a new planning cycle is initiated every seven days. The availability of an integrated information system that integrates movement and supply information increases the accuracy of forecasts. It also allows for more accurate movement programming.

7-12. Materiel movement requirements are developed and grouped in terms of classes of supply, estimated weight and cube, required delivery date (RDD), priority, origin, and destination. Special handling requirements such as refrigerated cargo, hazardous cargo, and controlled or sensitive cargo should also be identified.

7-13. Personnel movement estimates are grouped by category such as troops, civilians, patients, and prisoners of war (POWs).

7-14. Major subordinate commands must provide their movement requirements that exceed organic transportation capability for inclusion in the movement program.

DETERMINE CAPABILITIES

7-15. Movement planners at each command level determine the capabilities of the transportation mode operators in their AO. They obtain from mode operators the characteristics and capabilities of the following:

- Number of units providing common user transportation and their equipment available to support common-user movement requirements.
- Total number of HN transportation assets allocated to support common-user movement requirements (including commercial, rail, and inland waterways).
- Number of third country and US-contracted assets.
- Reception, material handling, and in-transit storage capabilities.

7-16. Movement planners must update capabilities with changes as they occur and adjust movement programs accordingly. When developing transport capabilities, planners must use planning factors or experience based on the type of equipment, availability of MHE and CHE, weather, and terrain. Planners should obtain planning factors from mode operators or from planning publications.

BALANCE REQUIREMENTS AGAINST CAPABILITIES

7-17. Balancing requirements against capabilities determines whether the available mode assets will support movement requirements. As a result of this step, movement planners determine the workload for each mode and segment of the transportation network. They should not limit this process to simply programming the use of available transportation capability. Planners must also consider command relationships and geographic area of responsibility.

7-18. Movement planners must assign requirements against all capabilities in a logical manner. They must not only consider the capabilities but also the total transportation network, the tactical situation, the priority of movement, and the risk of failure. For example, if a critical shipment must move into an area that is accessible by multiple road routes, but only one rail route, it would be wise to program the movement by motor transport. The rail segment could make less critical movements. Planners must consider the following workload requirements:

- Direct shipments
- Multi stops
- Retrograde
- Intermodal shipments

7-19. If planners identify transportation shortfalls, they will plan movement according to command priorities and the transportation priority of the shipment. The remainder will be adjusted and these adjustments will be coordinated with the shipper, receiver, materiel managers, and logistics staffs.

7-20. Schematics may be used to assist movement planners when balancing requirements and capabilities. Their purpose is to graphically portray total shipping requirements and available transportation capabilities as they relate to the distribution plan. Planners use two types of schematics (requirements and mode).

REQUIREMENTS SCHEMATIC

7-21. Prepare a requirements schematic as shown in figure 7-1. Prepare the schematic as follows:

- Draw and circle origin and destination points obtained from movement requirement forecasts. Identify each origin and destination point.
- Connect each point with lines and arrows showing direction of movement.
- List the daily shipping requirements between each origin and destination point. The requirements list the classes of supply, the tonnage, and the movement program line number.
- Create a legend as shown in figure 7-1

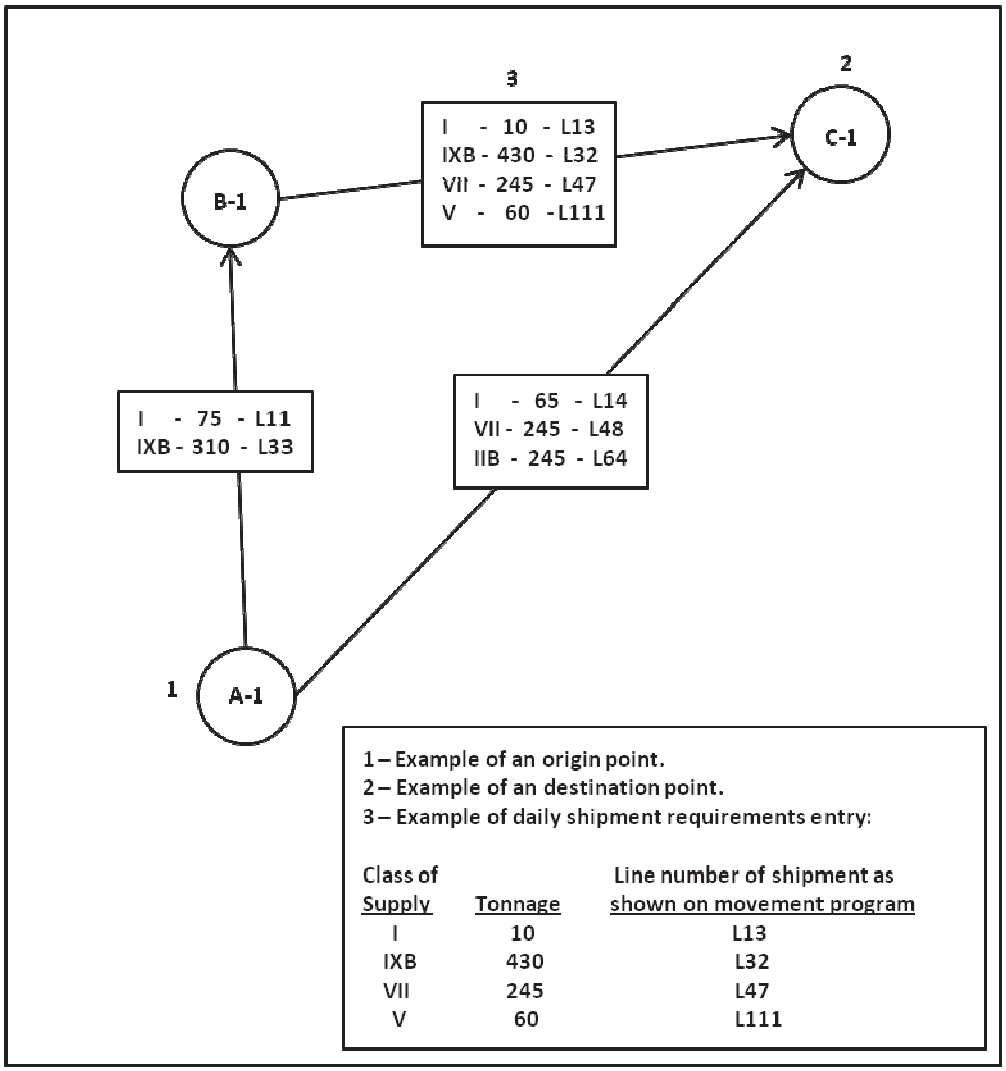


Figure 7-1. Requirements schematic

MODE SCHEMATIC

7-22. Prepare a mode schematic (see figure 7-2) for each available mode. Prepare the schematic as follows:

- Draw and label mode origin and destination nodes and connect with lines. Connect the lines whether or not the current program requires movement on a segment.
- Note the mode capacity on the outside of the lines. Mode capacity can be expressed for rail and air as the total daily tonnage capacity between major terminals. For motor transport compute capacity in a particular area or as segments of a line-haul operation.
- Identify the schematic.
- Assign program line numbers to each mode and list them between the modes as classes of supply, tonnage, and the movement program line numbers.
- Note the type of mode under the schematic.
- Create a legend as shown in figure 7-2.

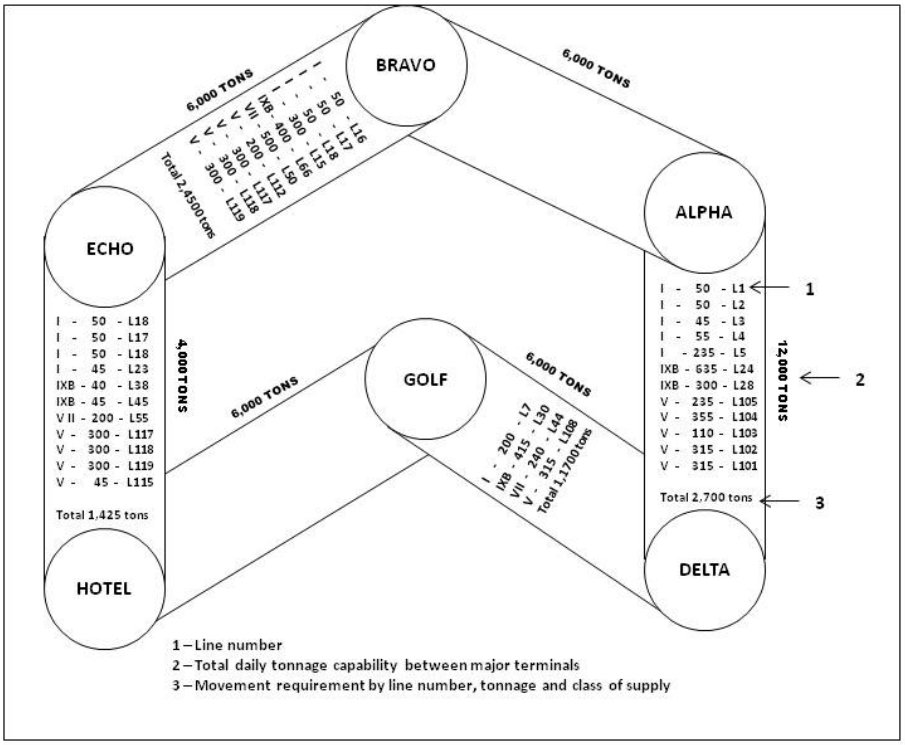


Figure 7-2. Mode schematic

PLANNING SEQUENCE FOR RECEPTION AND ONWARD MOVEMENT

7-23. The TSC/ESC develops a comprehensive plan for reception and onward movement that adheres to a step-by-step process similar to that used to develop a movement program. Planners must estimate the workload at specific transportation nodes to determine requirements for movement control, mode operating, and cargo transfer units. Planning should be done for operational periods for each mode. It must also identify requirements for MHE, CHE, and host nation support (HNS).

7-24. During this planning process movement planners at the port of debarkation do the following:

- Obtain advance arrival information for intertheater sea and air movement from port operators and operational planners.
- Assess the movement requirements data such as RDD, priority of movement, equipment characteristics, and special requirements.
- Group the requirements for each POD by destination geographic location in RDD sequence.
- Obtain movement priority for requirements that have the same destination and RDD.
- Determine available modes for onward movement based on upon planning requirements.
- Consider requirements, equipment characteristics, priorities, and modes servicing PODs, staging areas (SAs), and tactical assembly areas (TAAs).
- Select mode for each requirement.

- Program the mode for each requirement for reporting to POD based upon estimated time for POD clearance. This is dependent on the type of strategic asset lift; air or sea.
- Determine availability of equipment for follow-on missions at the POD. Estimate uploading and processing time for each mode at the POD. Apply time-distance factors to estimate transit time to other transportation nodes, or arrival at the TAA or other destination. Determine total transit time, maintenance, crew rest, and return time.
- Resolve conflicts by rerouting, changing modes, rescheduling, or obtain guidance from operational planners. Reconfirm that the selected route can accommodate any oversize or overweight cargo being moved.
- Identify requirements for MHE and CHE for each mode at the POD, cargo and trailer transfer points (TTP), and at destination.
- Coordinate to establish holding and storage areas outside the POD marshaling area if ports become congested.
- Identify en route support needs for fuel, mess, maintenance, and billeting. Identify need and potential location of convoy support centers. Coordinate with the TSC for this support.
- Determine critical points where route synchronization or traffic control should be established to maintain the flow of traffic. Provide for en route communication.

7-25. Plan retrograde missions for equipment returning from the SA and TAA in the same manner as above.

SELECTING A MODE

7-26. Movement planners use the following basic guidelines to allocate the mode of transport:

- Provide service according to command and transportation priority. Other factors such as shipment characteristics, security requirements, and political considerations are also evaluated.
- Whenever possible, reduce or eliminate cargo rehandling, avoid crosshauls, and plan for backhauls.
- Allocate all available transport equipment necessary to fulfill known requirements.
- Use the most efficient mode for the complete movement or as far forward as possible.

DETERMINE CRITICAL POINTS

7-27. Movement planners must identify critical points where restrictions could slow down or stop movement. Critical points include the following:

- Facilities
- Terminals
- Ports
- Railheads
- Bridges
- Tunnels
- Congested routes
- Cargo transfer points
- Check points
- Border crossings

7-28. Congested critical points limit the efficiency and effectiveness of the entire transportation network.

7-29. After identifying the critical points, planners determine alternative plans or control measures that could reduce or eliminate the risk of congestion. The MCB can place teams on the ground where the problems are expected so they can respond before delays congest the system. They should also coordinate with the engineer and military police support where necessary.

7-30. Included in the movement program is a MSR checkpoint list. It provides ready reference data about the MSR network such as checkpoints, link numbers, feeder routes into the MSR, and distances.

Movement control personnel and customers can use this information to identify what path to use from origin to destination and to identify segment numbers for use in requesting movement bids and receiving movement credits. Movement planners must identify checkpoints along the route to control movements. Checkpoints should be easily recognizable features that can be clearly identified on both the MSR checkpoint list and on the route.

DETERMINE SHORTFALLS AND RECOMMENDED SOLUTIONS

7-31. Once shortfalls between material to be moved and the transportation assets to move the material are identified, solutions must be developed. These include the following:

- Changing the date of the move to a later date.
- Assigning another motor transport unit to move the material.
- Assigning another mode (e.g., moving the material by rail rather than motor transport units).
- Using HN or commercial assets.
- Holding the material until transportation assets can be use to move it.

COORDINATE THE PROGRAM

7-32. The movement program must be coordinated with movement planners and distribution managers at each command level during its development and validated at the movement board to ensure integrated planning and coordinated execution. Once validated it becomes a directive to plan and allocate resources against.

FORMAT AND PUBLISH THE PROGRAM

7-33. During the planning process, planners assign each movement requirement a movement program line number. This line number is used to identify the requirement and provide additional information throughout the development of the movement program. The movement program planning process can also be used to identify and plan for the expected arrival of units into the theater. Information in the cargo format includes the following:

- Program line number
- TMR number
- Container type
- Class of supply
- Pieces
- Estimated weight (short tons and short tons cube)
- Cube
- Origin
- Transportation priority
- Origin location
- RDD
- Destination
- Mode
- Destination location
- Remarks
- Destination MCT

7-34. The remarks column should be used to identify characteristics for items requiring special handling. For example, the remarks column could include the dimensions of outsize/overweight cargo. Other examples include items requiring special handling such as controlled temperature, controlled environment, hazardous cargo, or cargo security.

7-35. Information in the personnel format includes the following:

- Program line number
- Passenger type
- Container type
- Estimated weight (short tons and short tons cube)
- Pieces
- Cube
- Origin
- Transportation priority
- Origin location
- RDD
- Destination
- Mode
- Destination location
- Destination MCT

7-36. The TSC/ESC compiles activity address files for units in the theater. These files list in-the-clear unit locations and points of contact. Therefore, these files must be designated as classified documents and must be safeguarded. The TSC/ESC provides a copy of each file to subordinate MCBs. These subordinate units also compile activity address files for units in their geographical area and update the TSC/ESC master file.

7-37. The movement program planning format may also be used to develop individual movement plans. Movement plans are initial developmental stages of a movement program that support specific OPLANs. As such, these movement programs are only plans until they are executed.

7-38. Included in the movement program is an MSR checkpoint list. It provides ready reference data about the MSR network such as checkpoints, link numbers, feeder routes into the MSR, and distances. Movement control personnel and customers can use this information to identify the path to be used from origin to destination and to identify segment numbers for use in requesting movement bids and receiving movement credits.

EXECUTING THE MOVEMENT PROGRAM

7-39. To activate a movement program line number, the shipper contacts its servicing MCT and requests its line number to be activated. The MCT verifies that the program data is still valid by coordinating with the shipper. The MCT will coordinate with the receiver if **positive inbound clearance** is required. If command priorities change during the current program cycle and these priority changes affect program executions, movement planners coordinate with affected shippers and receivers. Shippers or receivers should immediately contact their servicing MCT or DTO when there is a change in requirements, capabilities, or locations. A close working relationship between the TSC/ESC, the MCB, and sustainment brigades is required to effectively execute a movement program.

PREPARING THE PORT CLEARANCE PROGRAM

7-40. The port clearance program is part of the theater movement program. The TSC/ESC begins preparing the port clearance program as soon as it receives advance manifest. Once the manifest (lists what is actually on the ship or plane and where stowed) is available, the MCT at the port does the following:

- Programs actual transportation assets to provide onward transportation based on anticipated arrival date.
- Activates line numbers and/or programs.

7-41. The MCT coordinates through movement control channels the status of program execution.

7-42. The TSC/ESC provides input to the terminal port commander if diversion is required. The TSC/ESC makes recommendations based on the following:

- Cargo destinations.

- Available port capacities, capabilities, and workload.
- Capacities and projected workload for the various modes and segments of the transportation network.

This page intentionally left blank.

Appendix A

Transportation Movement Release

Transportation movement release (TMR) is a document that assigns a transportation capability to a transportation movement requirement and provides the movement details of the requirement.

A TMR is issued against Army common user transportation assets as the mechanism to assign transportation movement missions to the mode operator. A TMR is issued whenever Army common user transportation assets are used to support the range of military operations such as deployment, redeployment, and distribution. A TMR is normally issued by a MCB/MCT but can be issued by a mode operating brigade/battalion to its subordinate units if the operational environment dictates. A TMR and the corresponding TMR number assist in providing a theater with visibility and tracking of transportation movement missions as well as the availability of transportation assets. Figure A-1 shows an example of a TMR from TC-AIMS II.

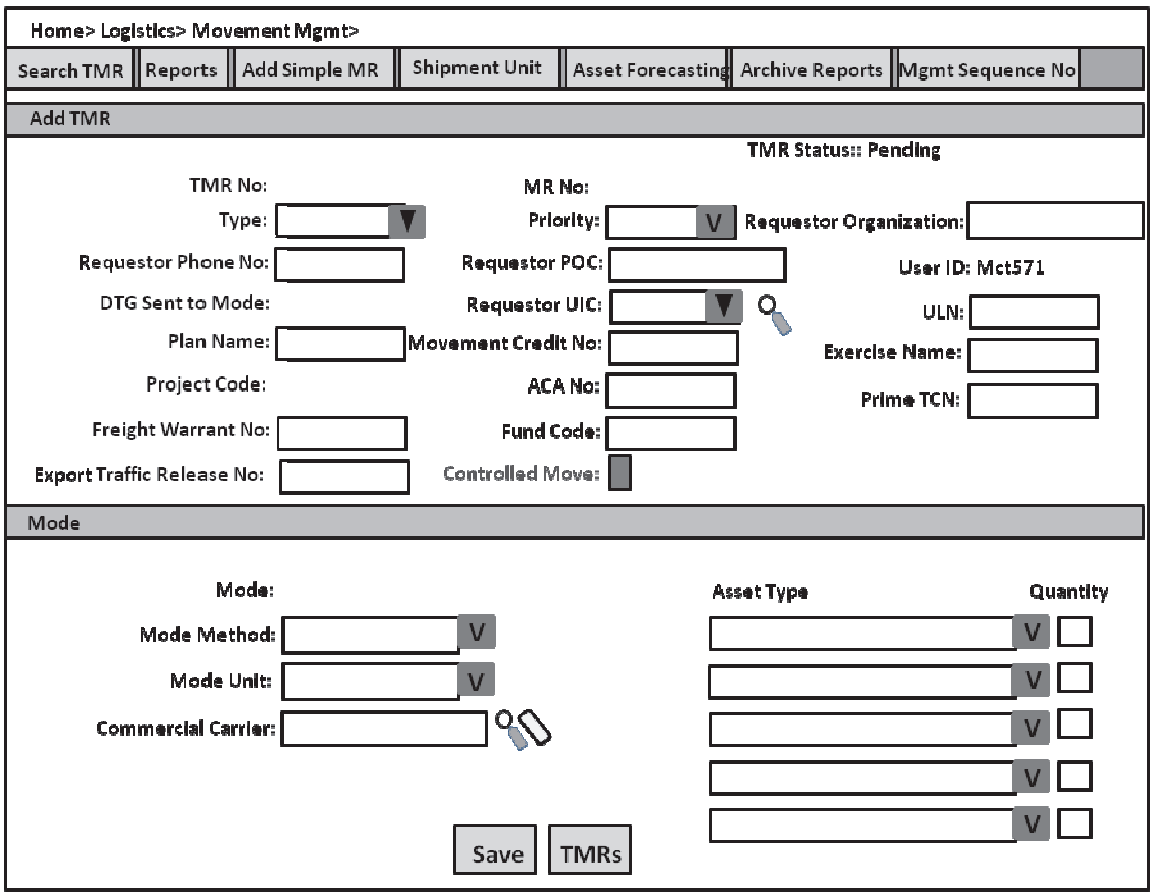


Figure A-1.Transportation Movement Release (TMR) TC AIMS II screen drawing

TMR GENERAL INFORMATION AND ASSOCIATED DOCUMENTATION DESCRIPTIONS:

A-1. The TMR No (Transportation Movement Release Number) entry should be a fourteen-position alphanumeric entry.

GENERAL INFORMATION

A-2. Each theater should have published guidance for TMR procedures that should also include codes for establishing the TMR number. Codes are locally generated unless DOD Regulation 4500.32R, Military Standard Transportation and Movement Procedures (MILSTAMP) is indicated as the source. The following is general information (as an example) used to establish a TMR number:

- The first two-positions of the TMR number is the Origin MCE Cd (movement control element code). It is the MCE Cd of the organization creating the TMR.
- The third position of the TMR number is the Month Cd. The month code will be the month code of the Requested Spot Date.
- Positions four through seven are the sequence numbers, these numbers are given to each TMR for its own unique identity.
- Positions eight and nine are the destinations MCE.
- Position ten, is the stop sequence. Stop sequences: S= single, A-Z with Z being the final.
- Positions eleven and twelve are Special Interest Code; RO= Reefer
- Position thirteen, the Mode Meth Cd. The mode method code is the code of the mode method assigned to the TMR.
- Position fourteen, is the Transportation Priority (TP-1,TP-2 and TP-3).

A-3. Once the TMR NO has been generated, Transportation Coordinators' Automated Information for Movement System II (TC-AIMS II will) will generate required fields to be filled in before a TMR can be submitted. The following are a brief description of fields:

- The Movement Request Control No entry is used to identify movement request that the TMR was created for.
- The Requestor Organization entry is used to identify the organization requesting the movement.
- The Requestor POC (Requestor Point of Contact) entry is used to enter the name of the POC for the unit requesting the transportation.
- The Requestor Phone No entry is used to enter the telephone number of the POC for the unit requesting the transportation.
- The Prime TCN (Prime Transportation Control Number) entry should be a seventeen-position entry. Positions 1 through 6 are the Consignor Department of Defense Activity Address Code (DODAAC). Positions 7 through 10 are the four-position Julian date of when the request was created. Positions 11 through 14 are the serial number and positions 15 through 17 are all Xs.
- The RDD (Required Delivery Date) entry is the date that the cargo or passengers must be delivered.
- The DTG TMR Sent to Mode (Date Time Group Transportation Movement Release sent to Mode) entry is the date that the TMR was provided to the Mode unit delivering the cargo or passengers.
- The ACA No (Airlift Clearance Authority Number) entry is used to enter the airlift clearance authority number for cargo being shipped by air.
- The Movement Credit: No entry is used to enter the Movement Credit. No for a convoy issued by the clearance authority. (A *Movement Credit* is the allocation granted to one or more vehicles in order to move over a controlled route in a fixed time according to movement instructions. FM 55-30)
- The Export Traffic Release No entry is issued by the Ocean Cargo Clearance Authority (OCCA) to authorize cargo to be exported.
- The Freight Warrant No entry is the freight warrant number of cargo assigned to the TMR.

- The Exercise Name entry is used to connect movements to a specific exercise.
- The Project Cd entry is used to depict that the TMR is in support of a specific exercise.
- The Transportation Priority Cd entry is used to depict the transportation priority of the cargo or passengers being moved.
- The Fund Cite entry specifies a fund citation that a movement can be charged to.

MODE INFORMATION ENTRY DESCRIPTIONS:

A-4. The following are mode information entry descriptions:

- The Mode Meth Cd (Mode Method Code) entry is the mode method used to ship the cargo.
- The Mode Unit Cd entry identifies the military mode unit that is assigned to the movement.
- The Commercial Carrier Cd entry is the code of the commercial carrier assigned to the movement.
- The Type Asset Cd entry is the code of the asset assigned to the movement.
- The No of Assets (Number of Assets) entry is the number of assets assigned to the movement.

ORIGIN PICK-UP LOCATIONS ENTRY DESCRIPTIONS

A-5. The following information are shown on Figure A-2:

- The Origin DODAAC (Origin Department of Defense Activity Address Code) entry is the DODAAC of the consignor where the cargo or passengers are to be picked up.
- The Origin MCE Cd (origin movement control element code) entry is the MCE supporting the consignor where the cargo or passengers are to be picked up.
- The Origin Unit Designation entry is a narrative designation that uniquely identifies a specific unit at whose location pick-up is to occur.
- The Origin Unit POC (Origin Unit Point of Contact) entry identifies the POC of the consignor.
- The Origin POC Phone No (Origin Point of Contact Phone Number) entry is the phone number of the origin POC.
- The Origin City entry is the city where the cargo or passengers are to be picked up.
- The Origin Installation entry is the installation where the cargo or passengers are to be picked up.
- The Origin Street Address/Bldg No (Origin Street Address/Building Number) entry is the street address/building number where the cargo or passengers are to be picked up.
- The Origin Grid Coord (Origin Grid Coordinates) entry is the grid coordinate where the cargo or passengers are to be picked up.

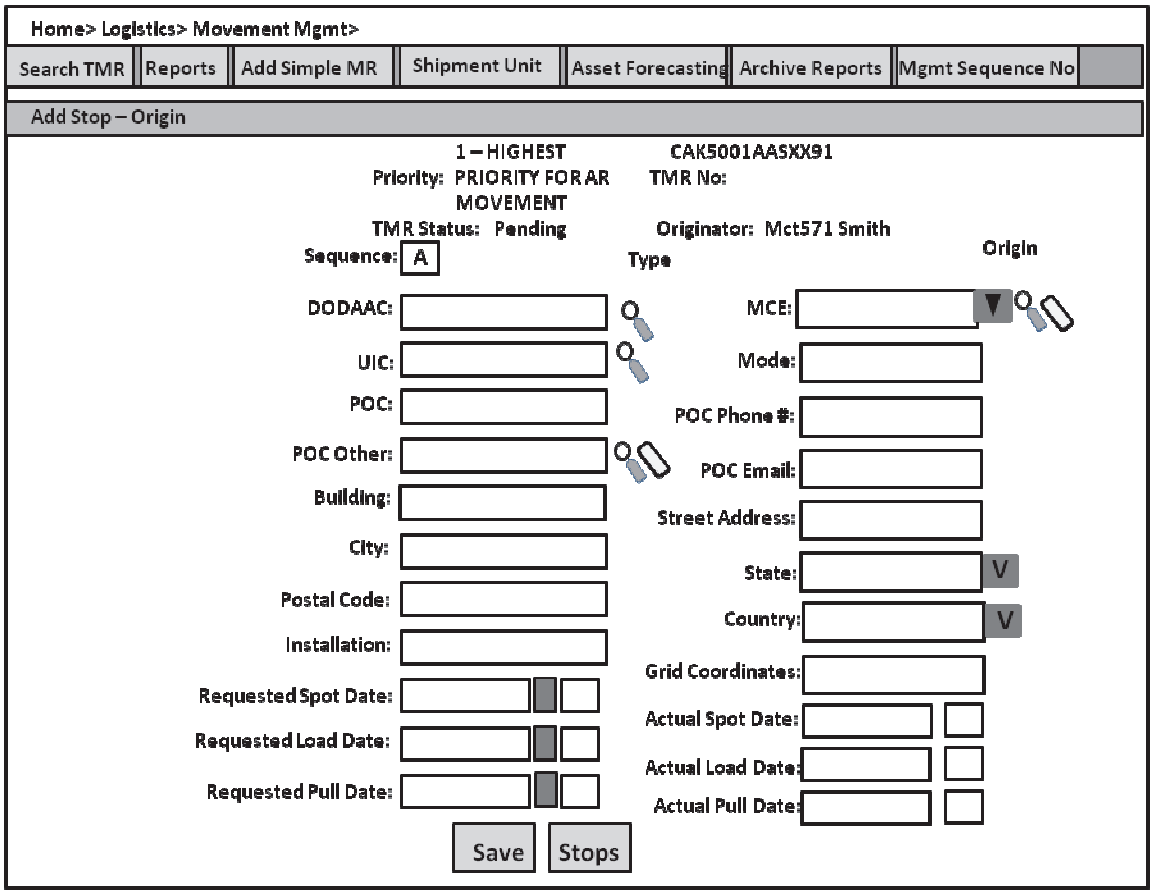


Figure A-2. Origin pick-up locations entry descriptions (TC AIMS II screen drawing)

REQUESTED SPOT, LOAD, AND PULL INFORMATION ENTRY DESCRIPTIONS

A-6. Information for requested spot, load and pull follows:

- The Requested Spot Date entry is the day that the customer wants the asset spotted at the consignor.
- The Requested Spot Time entry is the time that the customer wants the asset spotted at the consignor.
- The Requested Load Date entry is the date requested by the shipper that the asset be loaded.
- The Requested Load Time entry is the time that the customer wants to load the asset at the consignor.
- The Requested Pull Date entry is the date requested by the shipper that the asset be pulled from the consignor.
- The Requested Pull Time entry is the time that the customer wants the asset pulled from the consignor.

DELIVERY LOCATIONS ENTRY DESCRIPTIONS

A-7. The Dest Stop-Off (Destination Stop-Off) entry should be a one-position alphabetic entry. If the movement is a single stop movement (i.e., one consignee), the user will enter an "S". If the movement is a multi-stop movement (i.e., more than one consignee), an "A" will be entered for the first stop and a "Z" for the last stop. A four stop movement request would have A, B, C, and Z stops. For a multi-stop movement, all letters may be used except O, S, and I. The following entries (see figure A-3) support establishing destinations:

- The Dest DODAAC (Destination Department of Defense Activity Address Code) entry is the DODAAC of the organization where the cargo or passengers will be delivered.
- The Dest MCE Cd (destination movement control element code) entry is the MCE supporting the consignee where the cargo or passengers are to be delivered.
- The Dest Unit Designation (Destination Unit Designation) entry is a narrative designation that uniquely identifies a specific unit.
- The Dest Unit POC (Destination Unit Point of Contact) entry identifies the POC of the consignee.
- The Dest POC Phone No (Destination Point of Contact Phone Number) entry is the phone number of the destination POC.
- The Dest City (Destination City) entry is the city where the cargo or passengers are to be delivered.
- The Dest Installation (Destination Installation) entry is the installation where the cargo or passengers are to be delivered.
- The Dest Street Address/Bldg No (Destination Street Address/Building Number) entry is the street address/building number where the cargo or passengers are to be delivered.
- The Dest Grid Coord (Destination Grid Coordinates) entry is the grid coordinate where the cargo or passengers are to be delivered.
- The PIC Required (Positive Inbound Clearance Required) entry indicates if a positive inbound clearance is required.
- The PIC Date (Positive Inbound Clearance Date) entry is the date that the PIC was received from the destination MCT.
- The PIC POC (Positive Inbound Clearance Point of Contact) entry is the name of the point of contact with whom the PIC was confirmed.
- The PIC POC Phone No (Positive Inbound Clearance Point of Contact Phone Number) entry is the phone number of the point of contact with whom the PIC was confirmed.
- The RDD (Required Delivery Date) entry is the date that the cargo or passengers must be delivered.

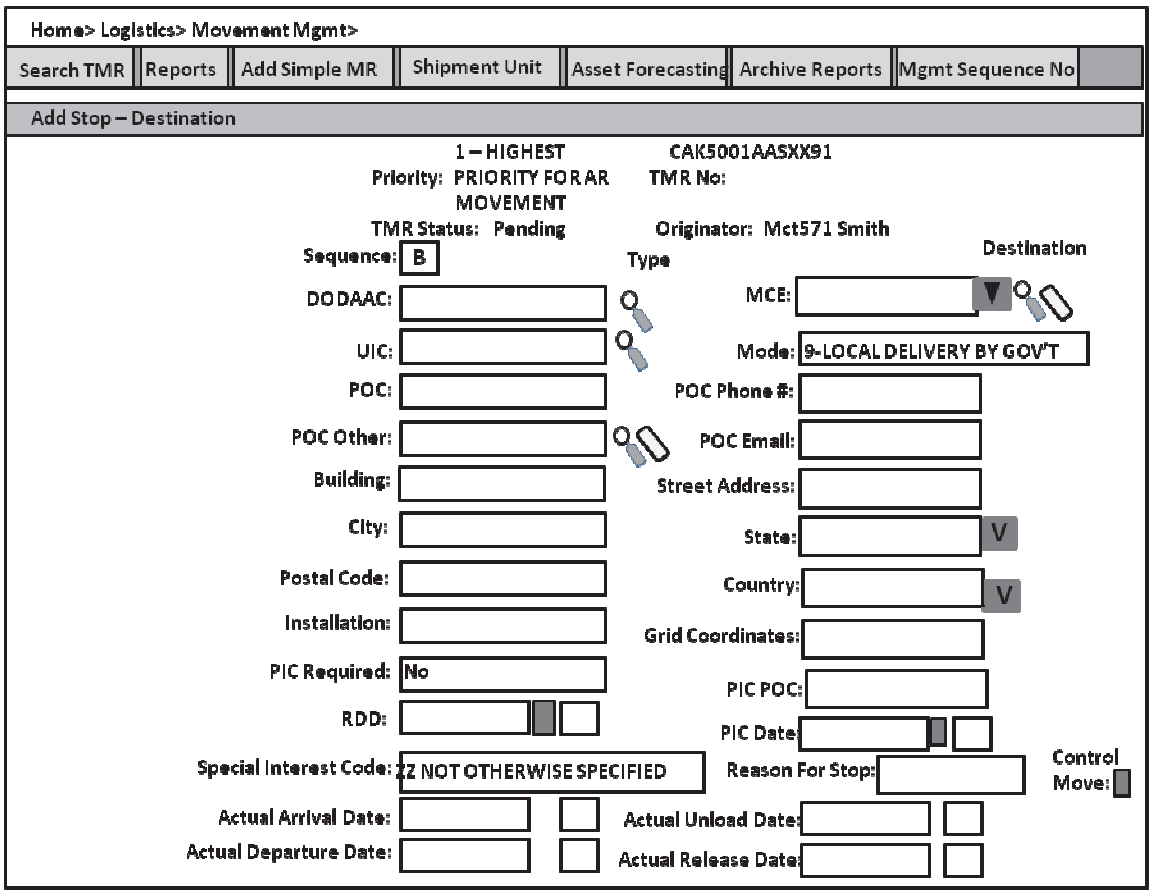


Figure A-3.Delivery locations entry descriptions (TC AIMS II screen display drawing)

CARGO ENTRY DESCRIPTIONS

A-8. See figure A-4 for an illustration of cargo delivery entry descriptions. The following are cargo entry descriptions:

- The Cmdty Desc (Origin Commodity Description) entry is the description of the cargo to be picked up.
- The Water Cmdty Cd (Origin Water Commodity Code) entry is the commodity code of the cargo to be picked up.
- The Type Cgo Cd (Origin Type Cargo Code) entry identifies certain types of cargo, primarily those that are hazardous.
- The Water Spec Hdl Cd (Origin Water Special Handling Code) entry indicates the type of special handling required by an item to ensure proper transportation without damage to the item, its surroundings, or its security.
- The Air Cmdty Cd (Origin Air Commodity Code) entry is the commodity code of the cargo to be picked up.
- The Air Spec Hdl Cd (Origin Air Special Handling Code) entry indicates the type of special handling required by an item to ensure proper transportation without damage to the item, its surroundings, or its security.
- The NSN (Origin National Stock Number) entry identifies the NSN of the cargo to be picked up.
- The HAZMAT PSN (Origin Hazardous Material Proper Shipping Name) entry identifies the PSN of the hazardous cargo to be picked up.
- The Compatibility Group Cd entry identifies the compatibility code of the hazardous cargo to be picked up.

- The Origin UN Class Cd/Division No (Origin United Nations Class Code/Division Number) entry identifies the United Nations class code/division number of the hazardous cargo to be picked up.
- The Supply Class Cd entry identifies the supply class of the cargo to be picked up.
- The TCN (Origin Transportation Control Number) entry identifies the TCNs of the cargo to be picked up.
- The Pcs (Origin Pieces) entry is the total number of pieces for the shipment unit that is being picked up.
- The Wt (Origin Weight) entry is the total weight of the shipment unit that is being picked up.
- The Cu (Origin Cube) entry is the total cubic feet of the shipment unit that is being picked up.
- The Lgth (Origin Length) entry is the total length of the largest piece of cargo being picked up when the cargo is outsized.
- The Wdth (Origin Width) entry is the total width of the largest piece of cargo being picked up when the cargo is outsized.
- The Ht (Origin Height) entry is the total height of the largest piece of cargo being picked up when the cargo is outsized.
- The Container No entry identifies the number of the container being picked up.
- The Pallet ID entry identifies the pallet being picked up.

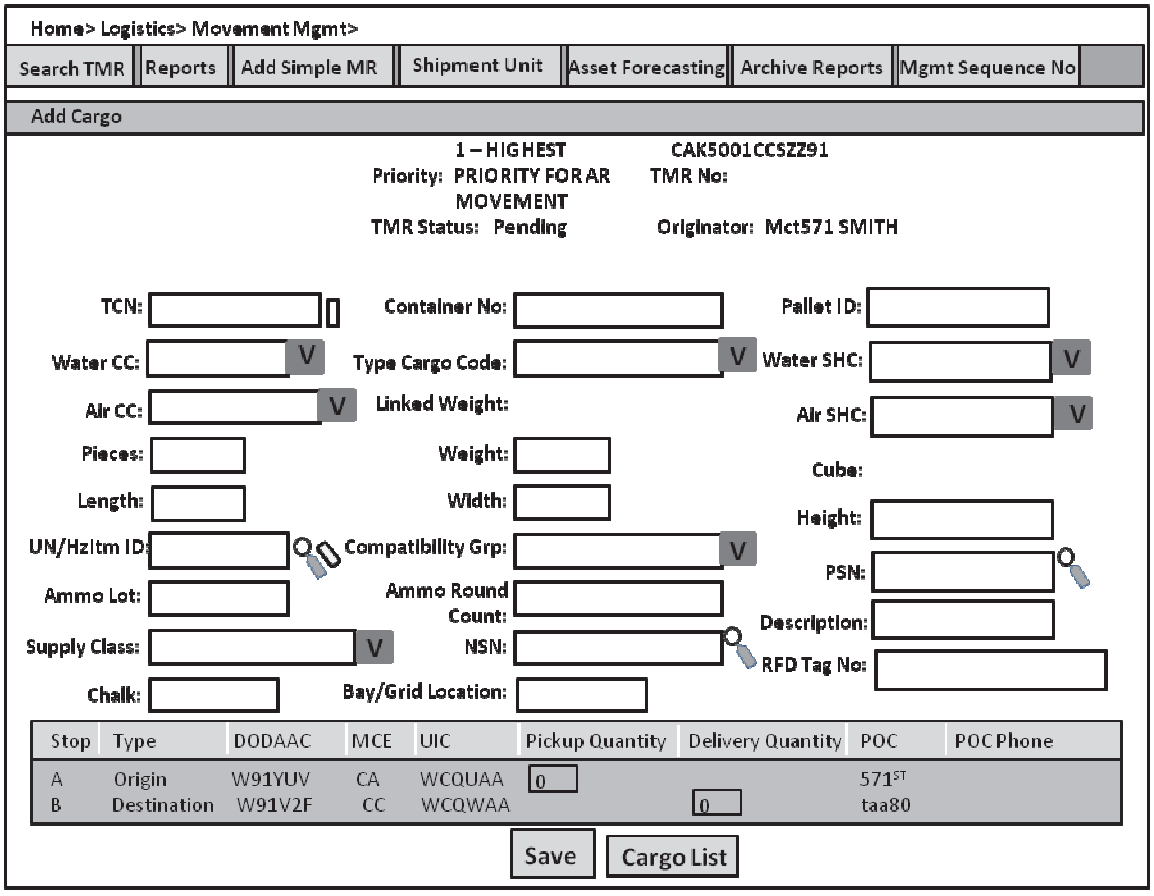


Figure A-4.Cargo entry descriptions (TC AIMS II screen display drawing)

PASSENGERS ENTRY DESCRIPTIONS

A-9. See figure C-5 for passenger entry descriptions: The following are passenger entry descriptions:

- The Pass Type Cd (Origin Passenger Type Code) entry is a code that identifies the type of passengers to be moved.
- The Pass Qty (Origin Passenger Quantity) entry is the number of passengers to be moved. This number is located in the Pickup Quantity field.
- The Pass Bag Pcs (Origin Passenger Baggage Pieces) entry contains the number of pieces of baggage that the customer is requesting to be moved with the passengers.
- The Pass Bag Wt (Origin Passenger Baggage Weight) entry contains the total weight of the baggage that the customer is requesting to be moved with the passengers.
- The Pass Total Stop Qty (Destination Passenger Total Stop Quantity) entry contains the total number of passengers of all types by stop-off.

Appendix B

Road Movement Planning

B-1. A movement graph is a method of graphically portraying movements along a single route. It shows the relationship between time and distance and highlights any conflicts between columns scheduled for movement on the route. Movement planners can use movement graphs during planning when conflicts are anticipated or when restrictions are applied to routes.

B-2. This appendix is divided into four sections. Section I shows planning factors for route movement. Section II outlines fundamentals of graphing, route restrictions, and movement tables. Section III describes the graphing, managing, and preparing of movement tables for a route movement. Section IV outlines how to manage movements over multiple routes using a critical time and point graph.

ROUTE MOVEMENT PLANNING FACTORS

MOVEMENT MEASUREMENT

B-3. Movements are measured by calculating how long it takes to move a given distance. The three methods of measurement are speed, pace, and rate of march. Movement planners normally use rate of march in performing movement calculations.

- Speed. Speed is the actual rate at which a vehicle is moving at a given time as shown on the speedometer. It is expressed as kilometers or miles per hour (kmph or mph).
- Pace. Pace is the regulated speed of a convoy or an element as set by a lead vehicle, the pacesetter. It is constantly adjusted to suit road, terrain, and weather conditions. Pace is also expressed as kmph or mph.
- Rate of march. Rate of march is the average number of kilometers or miles traveled in any specific time period. It includes short periodic halts and short delays, but it does not include long halts, such as those for consuming meals or for overnight stops. It is expressed in kilometers or miles in the hour (km/h or mih).

TIME AND DISTANCE FACTORS

B-4. Time and distance factors (see figure B-1) are used to perform a wide range of calculations for planning route movements. They can be used to conduct detailed planning to develop movement tables. They can also be used to conduct expedient planning and calculating to manage movement request.

Distance Factors

B-5. Distance factors are expressed in kilometers or meters. The terms used to describe distance factors are as follows:

- Length of any column or element of a column is the length of roadway that it occupies. It is measured from the front bumper of the lead vehicle to the rear bumper of the trail vehicle and includes all gaps inside the column.
- Road space is the length of a column, plus any additional space (safety factor) added to the length to prevent conflict with preceding or succeeding traffic.
- Gap is the space between vehicles, march units, serials, and columns. It is measured from the trail vehicle of one element to the lead vehicle of the following element. The gap between vehicles is normally expressed in meters. The gap between march elements is normally expressed in kilometers.
- Lead is the space between the heads of elements in a convoy or between heads of successive vehicles, march units, serials, or columns.
- Road distance is the distance from point to point on a route, normally expressed in kilometers.

- Road clearance distance is the distance that the head of a column must travel for the entire column to clear the RP or any point along the route. Route clearance distance equals the column's length or road space plus road distance.

Time Factors

B-6. Time is expressed in hours or minutes. The terms used to describe time factors are as follows:

- Pass time (or time length) is the time required for a column or its elements to pass a given point on a route.
- Time space is the time required for a column or its elements to pass any given point on a route plus any additional time (safety factor) added to the pass time.
- Time gap is the time measured between vehicles, march units, serials, or columns as they pass a given point. It is measured from the trail vehicle of one element to the lead vehicle of the following element.
- Time lead is the time measured between individual vehicles or elements of a column, measured from head to head, as they pass a given point.
- Time distance is the time required for the head of a column or any single vehicle of a column to move from one point to another at a given rate of march.
- Road clearance time is the total time a column or one of its elements requires to travel the road distance and clearance point along the route or the RP. Road clearance time equals the column's pass time or time space plus time distance.

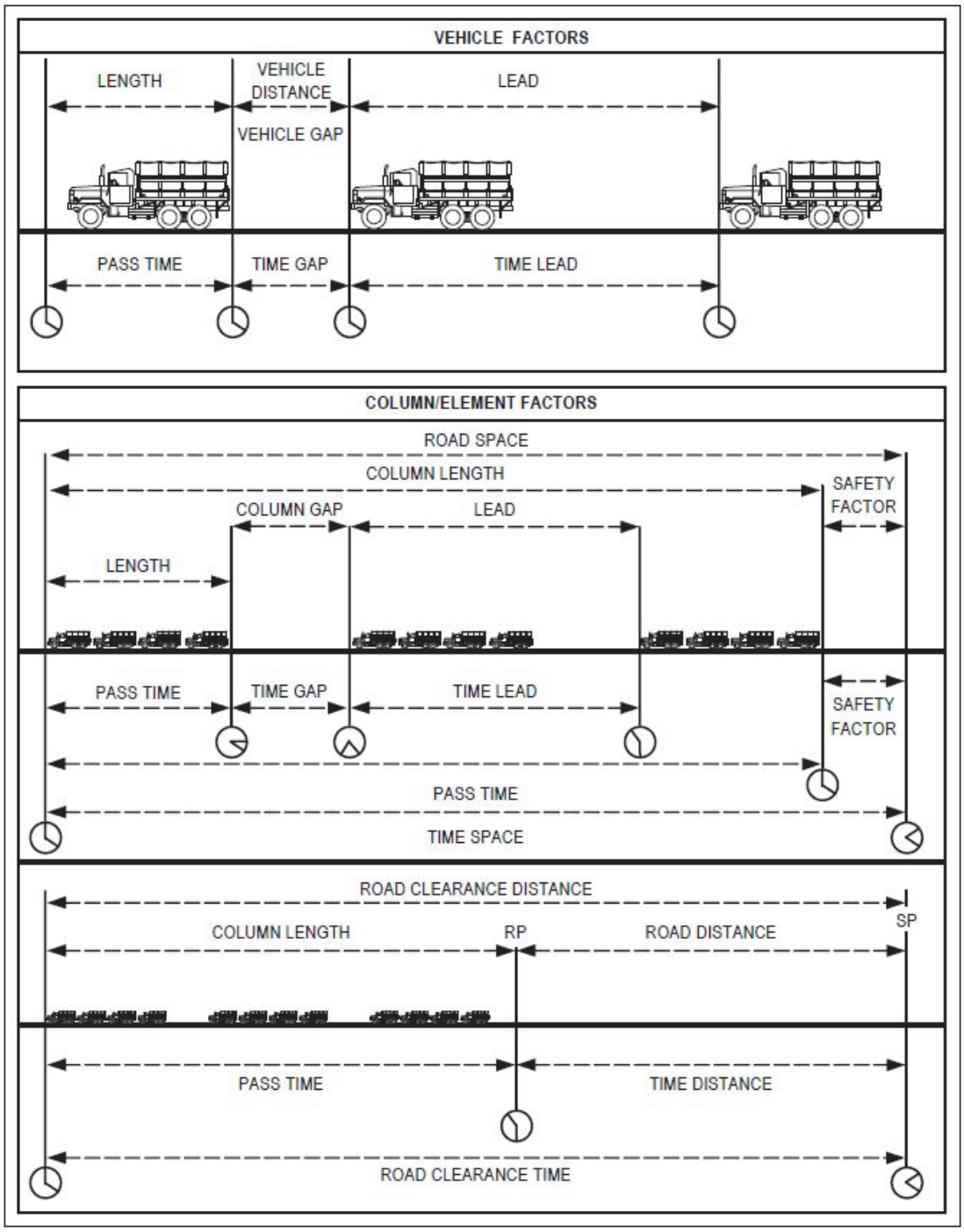


Figure B-1. Time and distance factors

TIME, DISTANCE AND RATE CALCULATIONS

B-7. Time, distance, and rate factors are used to make scheduling calculations for columns of any size. When two of the three factors are known, the third can be found by using one of following equations as shown in figure B-2.

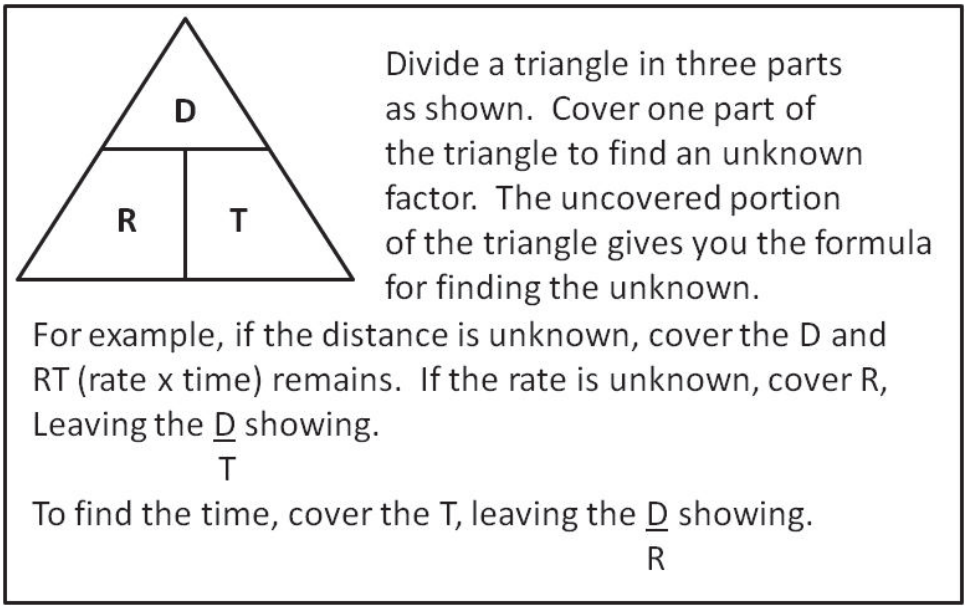


Figure B-2. Finding an unknown factor of time, distance or rate

- Determining Time. Time equals distance divided by rate. If the distance is 210 km and the rate of march is 42 km/h, the time is 5 hours: 210 ÷ 42 = 5.
- Determining Distance. Distance equals rate multiplied by time. If the rate of march is 40 km/h and time is 4 hours, the distance is 160 km: 40 x 4 = 160.
- Determining Rate. Rate equals distance divided by time. If a convoy travels for 5 hours to complete a 190 km trip, its rate of march is 38 km/h: 190 ÷ 5 = 38.

ARRIVE AND CLEAR TIME CALCULATIONS

B-8. To manage movements on main supply routes (MSR) by using location or column scheduling, movement control organizations can use an expedient method of planning and calculating. Both requestors and movement control organizations must understand and apply time and distance factors associated with the movement of convoys on MSRs. Moving units must make calculations as part of their movement planning and movement requests.

B-9. The minimum essential information needed is the arrive and clear times at SPs, intermediate CPs, and RPs. Therefore, theater standard operating procedures (SOPs) should specify a clearance request format that requires requesting units to calculate these arrive and clear times. The DTO or MCB may have to perform these calculations for large unit movements or special movements. They should check the accuracy of unit requests.

B-10. Use time, distance, and rate factors to calculate arrive and clear times. The arrive time is the time the first vehicle in the column will reach an SP, CP, or RP. The arrive time is derived from calculating the time distance. The clear time is the time the last vehicle in the column will clear that SP, CP, or RP. The clear time is derived from calculating the pass time.

B-11. Calculate arrive times as follows:

- To calculate the arrive time at the first CP (see also figure B-3), take the distance from the SP to the first CP, divide by the planned rate of march, and multiply by 60 minutes.

EXAMPLE	Distance from SP to first CP – 8 km March rate – 30 kmih
SOLUTION	8 ÷ 30 = .26 hours x 60 – 16 minutes If the SP time is 0800, then the arrival time at the first SP will be 0816

Figure B-3. Calculating arrive times (first CP)

- To calculate the arrive time at the second CP (see also figure B-4), take the distance from the first CP to the second CP, divide by the rate of march, and multiply by 60.

EXAMPLE	Distance between CPs – 9 km March rate – 30 kmih
SOLUTION	9 ÷ 30 = .30 hours x 60 – 18 minutes If the arrival time at the first CP is 0816, then the arrival time at the second CP will be 0834.

Figure B-4. Calculating arrive times (second CP)

Note. Continue this method to calculate the arrive time at succeeding CPs through the RP.

- To calculate the clear times at each CP, planners must determine the pass time. Calculating pass time requires calculations for density (figure B-5), time gaps (figure B-6), road space (figure B-7), and pass time (figure B-8).

DENSITY = $\dfrac{1{,}000 \text{ (meters)}}{\text{gap + average length of vehicle}}$

EXAMPLE If the gap is 50 meters and the average length of the vehicle in the column is 9 meters, then –

DENSITY = $\dfrac{1{,}000}{50 + 9} = \dfrac{1{,}000}{59} = 16.94$

= 17 vehicles per km

Figure B-5. Calculating pass times (density)

$$\text{Pass Time} = \frac{\text{road space} \times 60}{\text{rate}}$$

EXAMPLE

Continuation from previous examples.

$$\text{Pass time} = \frac{21 \times 60}{30} = \frac{1{,}260}{30} = 42 \text{ minutes}$$

Figure B-6. Calculating pass times (time gaps)

Note. Time gaps = ([number of march units - 1] x march unit time gap) + ([number of serials - 1] x [serial time gap - march unit time gap]).

$$\frac{\text{Number of vehicles}}{\text{density}} + \frac{\text{time gaps} \times \text{rate}}{60 \text{ minutes}}$$

EXAMPLE

Number of vehicles = 102
density = 17 per km
rate = 30 kmih
time gaps = 30 minutes

$$\text{road space} = \frac{102}{17} + \frac{30 \times 30}{60} = 6 + 15 = 21 \text{ km}$$

Figure B-7. Calculating pass times (road space)

$$\text{Pass Time} = \frac{\text{road space} \times 60}{\text{rate}}$$

EXAMPLE

Continuation from previous examples.

$$\text{Pass time} = \frac{21 \times 60}{30} = \frac{1{,}260}{30} = 42 \text{ minutes}$$

Figure B-8. Calculating pass times (pass time)

B-12. The pass time at the SP is 42 minutes after the first vehicle crosses the SP. If they arrive time at the SP is 0800, the clear time at the SP will be 0842. If the arrival time at the first CP is 0816, the clear time at the first CP will be 0858. Use this same method to calculate the arrive and clear times at succeeding CPs to the RP.

B-13. The pass time will stay the same throughout the route as long as the march rate and density do not change. If the march rate or density changes, then recalculate the pass time to determine the new clear time. Calculations are simplified by the following:

- Preparing and using conversion tables for changing US common distances to metric distances, number of vehicles to pass time, and distance to time.
- Standardizing variables to reduce calculation time. When possible, use standard march rates and density.
- Using automated programs to calculate arrive and clear times such as the military application program package.

GRAPHING

B-14. Movement graphs can be prepared on any type of graph paper. The vertical axis shows distance and the horizontal axis shows time. The lower left corner of the graph represents zero kilometers (or miles) and the earliest start time of the movement. The planner creating the graph must apply a scale to the vertical and horizontal axis as shown in figure B-9.

B-15. The scale of the vertical axis is a division of the total distance. The top number on the vertical axis is the greatest number of km (or miles) to be traveled by any element on the route. The distance scale shown in Figure B-9 is 3 km per block.

B-16. The scale of the horizontal axis is a division of the total time. The time at the end of the horizontal scale shows the latest planning time to complete all movements planned for the route. The time scale shown in figure B-9 is 12 minutes per block.

B-17. Critical points along the route, such as built up areas, road junctions, and checkpoints (CPs) are shown along the vertical axis on the same scale as that of the graph. The start point (SP) and release point (RP) can also be annotated alongside the CP if all movements begin and end at the same CP.

B-18. The graph at figure B-9 shows the time and distance scales, critical points, CPs, and a plotted line representing the movement of one vehicle (or the first vehicle of a column) from the SP (Newport) to Jackson Heights. Based on the scale of each block representing 3 km and 12 minutes, the head of the convoy will leave Newport at 0400, travel 90 km to Jackson Heights, and arrive at 0700. Using the formula to determine march rate ($R = D \div T$) the march rate is 30 kmph.

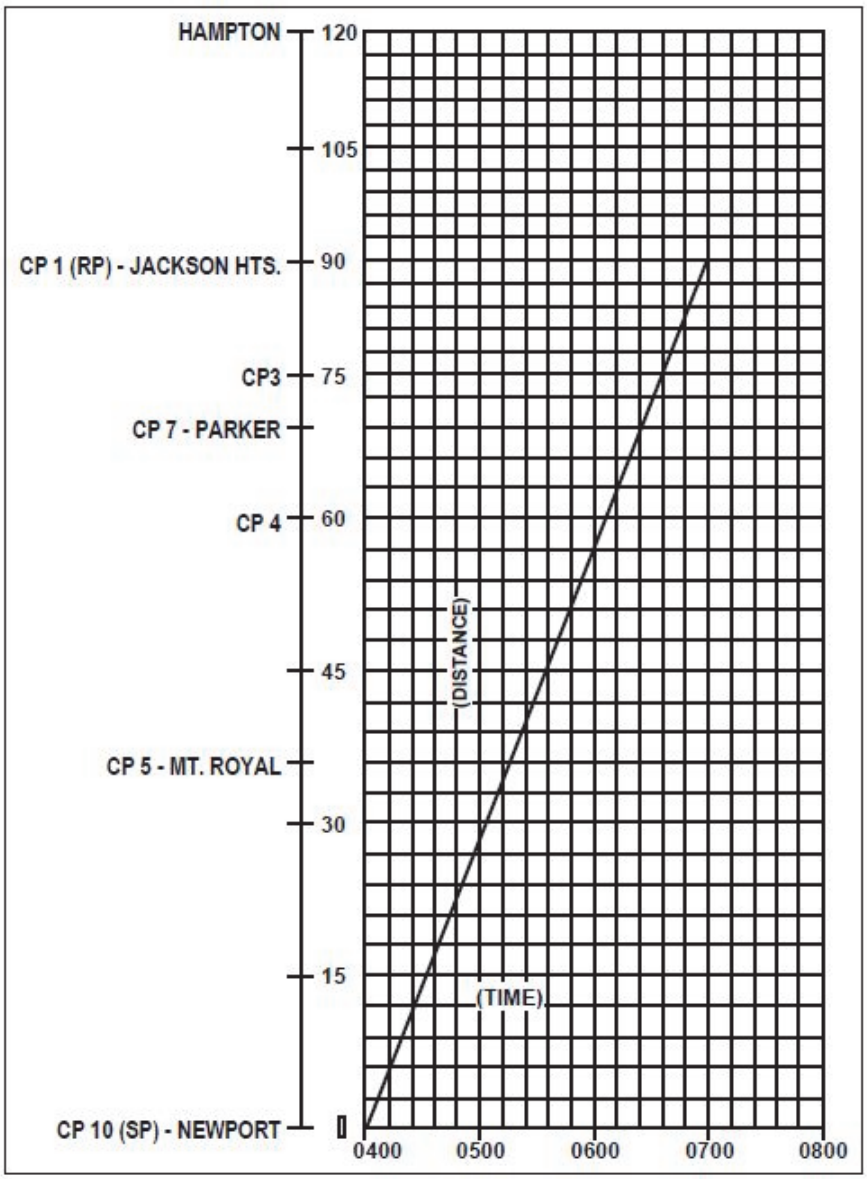


Figure B-9. Schedule of head of column

B-19. March columns, serials, and march units are represented on a graph by parallel diagonal lines like the ones shown in figure B-10. The vertical space between the diagonal lines is the length of roadway (length) occupied by the column. It is measured along the vertical scale. The horizontal space is the time it takes for the column to pass any given point (pass time or time length).

B-20. The head of the column is plotted at the intersection of the SP on the vertical scale and start time on the horizontal scale. The clear time of the head of the column is plotted at the intersection of the RP on the vertical scale and the clear time on the horizontal scale.

B-21. The trail of the column is plotted at the intersection of the same SP on the horizontal scale. The trail vehicle's start time is calculated by adding the pass time to the start time of the first vehicle. The clear time of the trail vehicle is plotted at the intersection of the RP on the vertical scale and its clear time on the horizontal scale. The trail vehicle's clear time is calculated by adding the pass time to the clear time of the first vehicle.

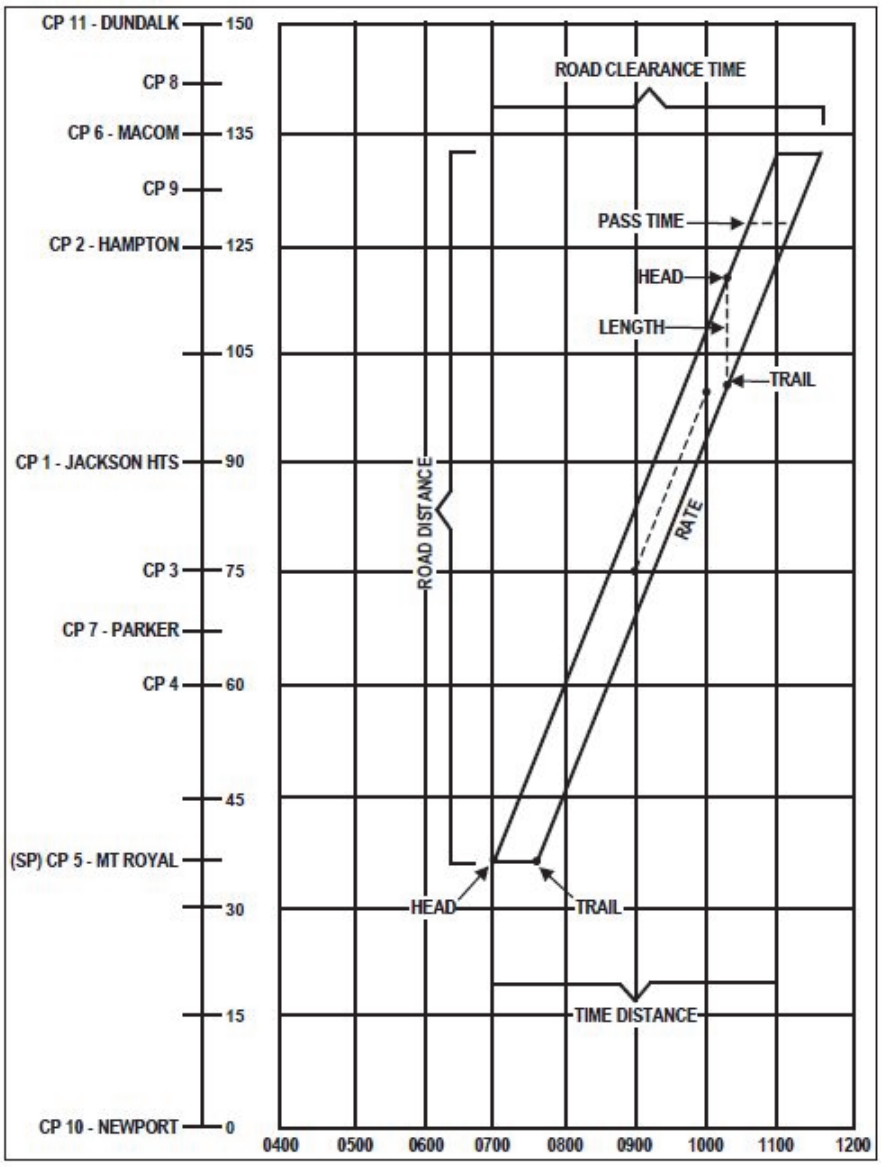


Figure B-10. March graph showing movement of a column

B-22. The graph now completely pictures the movement of one column. The vertical and horizontal scales reveal the following information:

- The two parallel diagonal lines show the head and the trail movements.
- The column's length is about 14 km.
- The pass time of the column is 36 minutes. That means that it will take 36 minutes for the column to clear any point along the route.
- The road distance from SP to RP is about 96 km. The time distance is 4 hours (0700 to 1100). That means it will take 4 hours for the head of the column to clear the RP.
- Road clearance time, calculated by adding the pass time to the time distance, is 4 hours and 36 minutes.
- Road clearance distance, calculated by adding the length to road distance, is 110 km.

B-23. March graphs are normally used to show multiple columns traveling over the same routes as shown in figure B-11. Each of these columns is explained below.

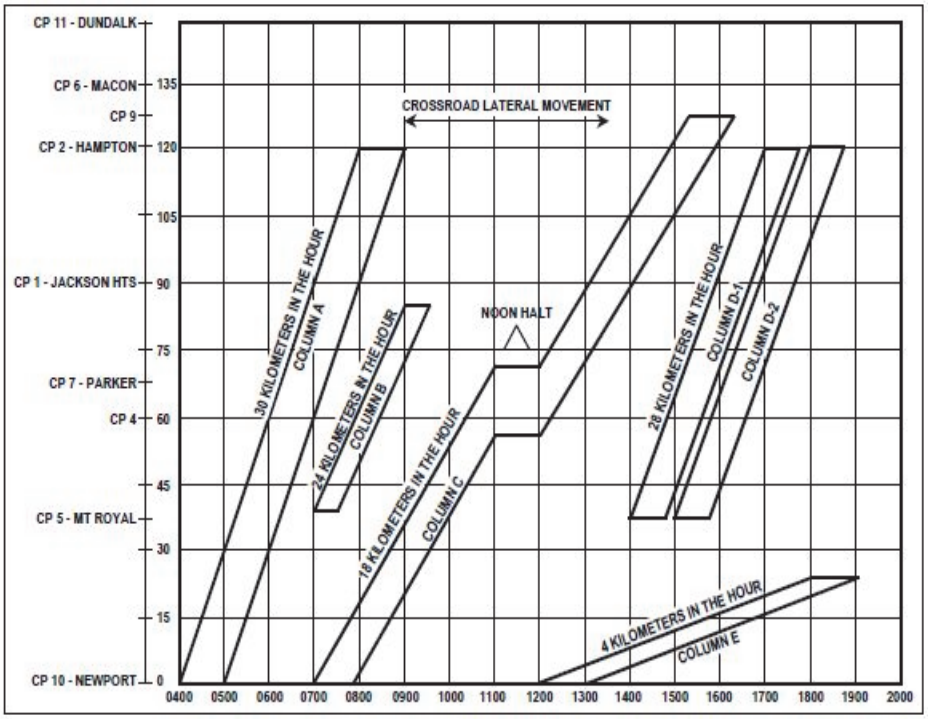


Figure B-11. Scheduling moves

- Column A is scheduled to leave its SP (Newport) at 0400 and clear the SP at 0500, a pass time of 1 hour. Distance to the RP (Hampton) is 120 km. The rate of march is 30 km/h. The time distance is 4 hours (120 km ÷ 30 km/h). The head will arrive at the RP at 0800 and the trail at 0900. Therefore, the road clearance time is 5 hours, which is the time distance plus the pass time.
- Column B makes a shorter move at a different time. It is scheduled to leave its SP (Mount Royal) at 0700 and clear the CP at 0730, a pass time of 30 minutes. Distance to the RP is 48 km. The rate of march is 24 km/h. The time distance is 2 hours (48 ÷ 24 km/h). The head will arrive at the RP at 0900 and the trail at 0930. Therefore, the road clearance time is 2 1/2 hours. The graph shows that this move does not conflict with the first move.

Note. A crossroad lateral movement is scheduled to cross at CP 1 from 0906 until 1312. The graph shows that the lateral movement will not interfere with any of the scheduled moves.

- Column C makes a longer and slower move than the other columns. The graph shows this because the diagonal lines representing time distance are not as steep as the lines of columns A, B, and D. The steepness of a diagonal line on the graph indicates the rate of march. Column C is scheduled to leave its SP (Newport) at 0700 and clear the SP at 0750, a pass time of 50 minutes. Distance to the RP is 132 ÷ km. The rate of march is 18 km/h. Column C is also scheduled for a 1 hour rest halt on the road. Rest halt time is added to the time distance when calculating. Therefore, the time distance is 132 km ÷ 18 km/h + 1 hour or 8 hours and 20 minutes. The road clearance time is 9 hours and 10 minutes.
- Columns D-1 and D-2 are two serials of one column. They are scheduled to travel at 28 km/h from the same SP to the same RP, one leaving 24 minutes after the other. The graph shows that the head of Column D-1 is scheduled to leave the SP at 1400 and arrive at the RP at 1700, a distance of 84 km in 3 hours. The rate of march is 28 km/h (84 ÷ 3 hours). Because both elements of the move are shown on the graph parallel to each other, the rate is the same for both.
- Column E is a foot march on the route. It is traveling slowly (24 km in 6 hours of walking time).

PLANNING FOR ROUTE RESTRICTIONS

B-24. Planners must consider route restrictions when graphing movements. These restrictions normally add greater control measures to a route. They may be imposed to allow for route maintenance, large unit movements, or maneuver. They should be specified in route synchronization plans, operations orders (OPORDs), or fragmentary orders (FRAGOs).

B-25. Restrictions are marked on graphs by blocking out the time and space on the graph when traffic may not use a route or cross an intersection. To plan around restrictions, planners can calculate either earliest or latest time a column can leave the SP to miss the restriction.

B-26. When passing after restriction ends, use the following formula. Compute the earliest time the head of the column can cross the SP to clear the ending time of a route restriction without halting at the restriction.

B-27. The earliest time the first vehicle can cross the SP = end of restriction time + safety factor - time distance from start point to restriction point.

Example: A restriction is in effect from 1140 to 1240. The distance from the SP to the restriction is 32 km. A safety factor of 15 minutes is in force before and after the restriction. This is a close column move executed at the rate of 16 km/h. Pass time is 12 minutes. Using the formula, calculate the earliest time the first vehicle can cross the SP: 1240 + 15 min – 32km/16 kmih = 1255 – 2hrs = 1055. The earliest time the column can leave the SP is 1055.

B-28. When passing before restriction begins, use the following formula. Compute the latest time the first vehicle of a column can cross the SP to have the last vehicle arrive at the 1140 to 1240 restriction before it begins.

B-29. The latest time the first vehicle of a column can cross the SP = beginning of restriction time - safety factor - time distance from SP to the restriction - time length. Using the data in the example in paragraph B-27 above, calculate the time:

1140 – 15 minutes – 32 km/16 kmih – 12 minutes = 1125 – 2 hrs – 12 minutes = 0913. The latest time the first vehicle can leave the SP is 0913.

PREPARING MOVEMENT TABLES FOR A HIGWAY MOVEMENT

REVIEWING THE SITUATION

B-30. This section provides a step-by-step example of how to compute a route movement, prepare a road movement graph, and prepare road movement tables for a convoy consisting of five serials.

Convoy Data

B-31. On 23 February, elements of the 439th Transportation Battalion will move from the unit's present position to an area near CP 106. The movement will consist of five serials, organized as shown in Table B-1. The first and second serials have six march units each; the third and fourth serials have seven march units each; and the fifth has five march units. The SP is CP 97, and the RP is CP 106. The route of march is from CP 97 to CP 106 by way of CPs 99, 103, 104, and 105. The lead vehicle of the first serial will cross the SP at 0800.

Table B-1.Organization of serial march units

SERIALS	*UNIT*	*NUMBER OF VEHICLES*	*NUMBER OF MARCH UNITS*
First	2439th and 2440th Transportation	126	6
Second	2441st and 2442d Transportation	135	6
Third	2443d and 2444th Transportation Companies and Headquarters and Headquarters Detachment, 439th Transportation Battalion	150	7

Table B-1.Organization of serial march units

SERIALS	*UNIT*	*NUMBER OF VEHICLES*	*NUMBER OF MARCH UNITS*
Fourth	2445th and 2446th Transportation Companies	144	7
Fifth	2447th and 2448th Transportation Companies (attached)	124	5

Movement Conditions

B-32. Extracts of the route synchronization plan specify the following conditions on the movement:

- The rate of march during daylight hours is 24 km/h and the density of vehicles during daylight hours is 12 per km.
- The rate of march during hours of darkness (1835 to 0630) is 16 km/h and the density of vehicles during hours of darkness is 48 per km.
- Gaps will be 10 minutes between serials and 2 minutes between march units.
- When an en route restriction is applied to the movement, a 15-minute safety factor will be allowed before and after the restriction.

Restrictions

B-33. The following restrictions are in effect on 23 February:

- CP 99 to CP 103 from 1100 to 1200.
- CP 105 from 1500 to 1530.
- CP 104 from 1510 to 1630.
- CP 105 from 1700 to 1830.

Additional Guidance

B-34. The fourth serial will halt in place at the 1500 to 1530 restriction at CP 105 and will continue as soon as possible after the restriction. The head of the fifth serial will depart the SP as soon as possible to clear the restriction at CP 104. The fifth serial will stop at the 1700 to 1830 restriction at CP 105 and disperse vehicles until the restriction is lifted.

B-35. All computations in minutes resulting in a fraction are raised to the next full minute; km are rounded up to the nearest tenth. For example:

- 15.6 minutes - 16 minutes.
- 15.3 minutes - 16 minutes.
- 13.67 km = 13.7 km.
- 13.43 km = 13.5 km.

Computing Time Distance of the Route

B-36. The planner must first determine how long it will take each serial to travel from the SP to the RP, the time distance of the route.

- Formula. Compute the time distance by dividing the distance from the SP to the RP by the rate of march (TD = D ÷ R).
- Data. The distances between CPs and total distance are shown in figure B-12.

	Kilometers
CP 97 to CP 99	24
CP 99 to CP 103	6
CP 103 to CP 104	9
CP 104 to CP 105	18
CP 105 to CP 106	18
Total	75

Figure B-12. Distances

- Computation. The distance from SP to RP is 75 km. The lead vehicle will cross the SP at 0800 and the rate of march during daytime is 24 km/h. Substituting in the formula TD = D ÷ R, TD = 75 ÷ 24, or 3.125 hours. Since .125 hours is 8 minutes (.125 X 60), the time distance is 3 hours and 8 minutes.

Computing Road Space of the First Serial

B-37. Road space is the length of a column. The formula for computing road space is shown in figure B-13. Table B-1 shows 126 vehicles in the first serial. The rate of march is 24 km/h; the density is 12 vehicles per kilometer. The time gap is 2 minutes between march units. Because six march units make up the serial, there are five gaps making a total time gap in the serial of 10 minutes. The formula for computing road space for the first serial is shown in figure B-14.

$$\text{Road space} = \frac{\text{number of vehicles}}{\text{vehicle density}} + \frac{\text{time gaps X rate}}{\text{60 minutes}}$$

Figure B-13. Computing road space

$$\text{Road space} = \frac{126}{12} + \frac{10 \text{ X } 24}{60} = 10.5 + 4 = 14.5\text{km}$$

Figure B-14. Computing road space (first serial)

Computing Pass Time of The First Serial

B-38. Pass time is the time required for a column to pass a point on the route. The formula for computing pass time is shown in figure B-15. Use the road space computed in table B-14 (14.5 km) to compute road space (figure B -16).

$$\text{Pass time} = \frac{\text{road space X 60 min}}{\text{Rate}}$$

Figure B-15. Computing pass time

$$\text{Pass time} = \frac{\text{14.5 km X 60 min}}{\text{24 kmih}} = \text{36.3 or 37 min}$$

Figure B-16. Computing road space

Computing Road space and Pass Time of the Second, Third, Fourth, and Fifth Serials

B-39. Using the same formulas and methods of computation as for the first serial, compute the road space and pass time for the second serial (figure B-17), third serial (figure B-18), fourth serial (figure B-19), and fifth serial figure B-20).

$$\text{Road space} = \frac{135}{12} + \frac{10 \text{ X } 24}{60} = 11.3 + 4 = 15.3 \text{ km}$$

$$\text{Pass time} = \frac{15.3 \text{ X } 60}{24} = 38.25 \text{ or } 39 \text{ min}$$

Figure B-17. Computing road space and pass time (second serial)

$$\text{Road space} = \frac{150}{12} + \frac{12 \text{ X } 24}{60} = 12.5 + 4.8 = 17.3 \text{ km}$$

$$\text{Pass time} = \frac{17.3 \text{ X } 60}{24} = 43.2 \text{ min or } 44 \text{ min}$$

Figure B-18. Computing road and space pass time (third serial)

$$\text{Road space} = \frac{144}{12} + \frac{12 \times 24}{60} = 12.5 + 4.8 = 16.8 \text{ km}$$

$$\text{Pass time} = \frac{16.8 \times 60}{24} = 42 \text{ min}$$

Figure B-19. Computing road space and pass time (fourth serial)

$$\text{Road space} = \frac{124}{12} + \frac{8 \times 24}{60} = 10.3 + 3.2 = 13.5 \text{ km}$$

$$\text{Pass time} = \frac{13.5 \times 60}{24} = 33.7 \text{ min or } 34 \text{ min}$$

Figure B-20. Computing road space and pass time (fifth serial)

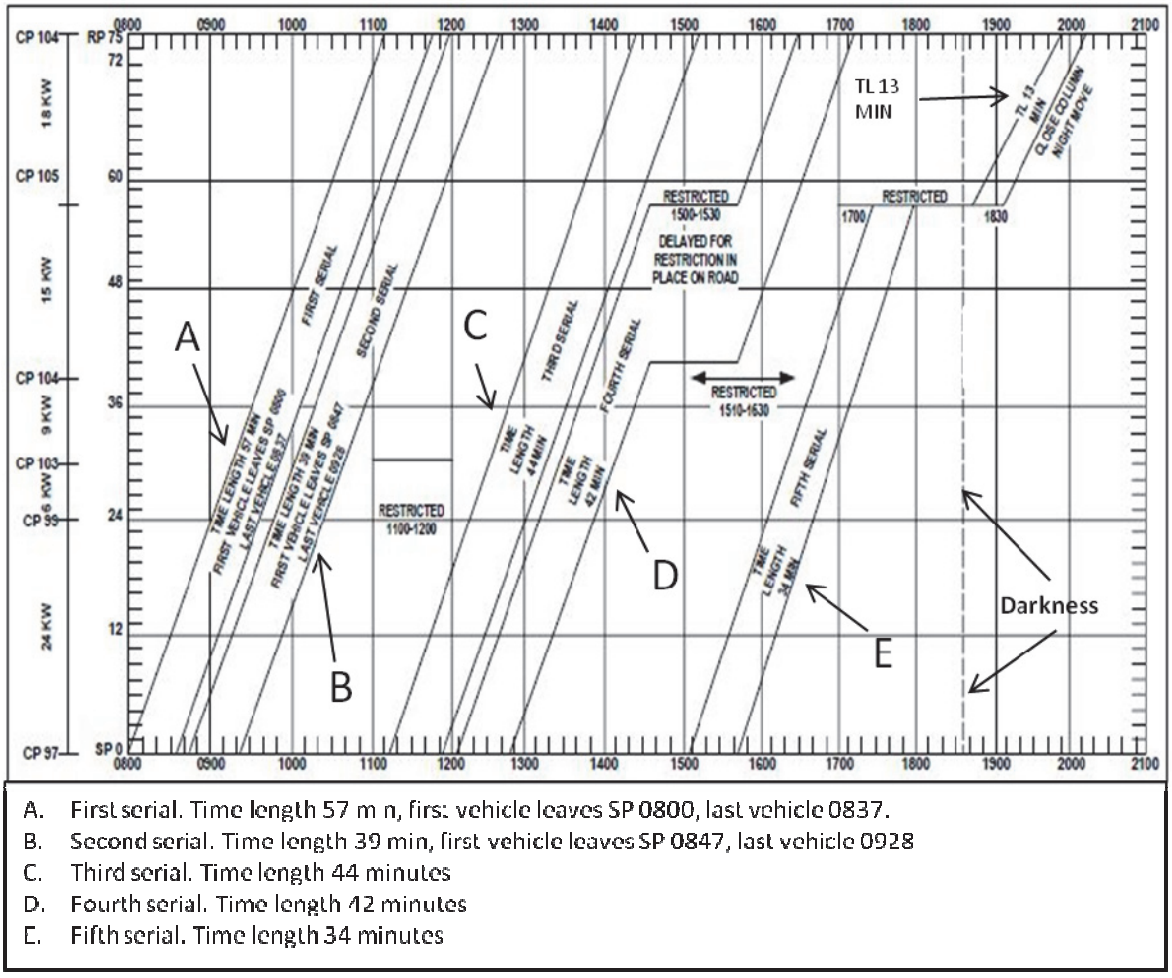
Publishing Road Movement Tables

B-40. The road movement graph is a planning work sheet for movement planners. It is not normally disseminated to subordinate units or published in plans and orders. Information obtained from the graph is published in road movement tables.

Preparing A Road Movement Graph

B-41. A road movement graph is a time and space diagram. After computing for a move, the planner can then see where he plotted the move. The following explains how to plot the move.

- Designating hours. From the lower left corner across the bottom of the graph designate the time needed for the movement. Since the first serial is to arrive at the SP at 0800, the timing of this graph should start at 0800 in the lower left corner. The computations performed in paragraphs B-36, B-37, and B-38 show that more than 12 hours are required to complete the movement of the five serials. This is derived from adding the time distance, sum of pass times, restricted times, and gaps. Therefore, the time of this graph must extend to at least 2100. In this example, each horizontal block represents 12 minutes and every six blocks represents 1 hour as shown in figure B-21.



A. First serial. Time length 57 m n, firs: vehicle leaves SP 0800, last vehicle 0837.
B. Second serial. Time length 39 min, first vehicle leaves SP 0847, last vehicle 0928
C. Third serial. Time length 44 minutes
D. Fourth serial. Time length 42 minutes
E. Fifth serial. Time length 34 minutes

Figure B-21. Road movement graph for five serials

- Designating kilometers. Indicate the distance to be moved in kilometers on the vertical axis. Begin at the SP in the lower left corner of the graph with 0 km. Since this move is 75 km, the top of the vertical axis should be marked as 75 km. In this example, each vertical block between 0 and 75 km represents 1.5 km as shown in figure B-21. It is important to show critical points, checkpoints, or other important points directly opposite the correct distance blocks of the graph. For example, CP 99 is 24 km from the SP and is noted on the scale opposite the 24 km line. CP 103 is noted on the scale opposite the 30 km line.
- Plotting the restrictions. Mark route restrictions within the graph as described below.
  - The first restriction is from CP 99 to CP 103 between 1100 and 1200. CP 99 is 24 km (16 blocks) from the SP and CP 103 is 6 km (4 blocks) from CP 99. To show the restriction, the time from 1100 to 1200 between CP 99 and CP 103 is blocked out.
  - The second restriction is at CP 105 between 1500 and 1530. CP 105 is at the 57 km point. In this example, the restriction is only at the CP. To show the restriction, a horizontal line from 1500 to 1530 at the CP is marked. It extends horizontally form 1500 over three blocks (30 minutes).
  - The third and fourth restrictions are also only at the CP. They are shown as above.

Graphing the First Serial

B-42. Once the hours, kilometers, and restrictions are marked on the graph, plot the serials. The first vehicle of the first serial is scheduled to leave the SP at 0800. Put a dot at the beginning of the 0800 line in the lower left corner of the graph. Figure B-21 shows the first vehicle is to arrive at the RP at 1108. This was calculated by adding the time distance (3 hours and 8 minutes) to the time the first vehicle crosses the SP. Locate the 1108 hour line at the top of the graph at the RP (75 km line) and put a dot there and then connect the dots.

B-43. The next step is to plot the trail (last vehicle) of the first serial. To find the time the last vehicle crosses the SP, add the pass time to the time the first vehicle crosses the SP. As determined in paragraph B-37, the pass time of the first serial is 37 minutes. Therefore, adding 37 minutes to 0800 gives 0837 as the time the last vehicle of the first serial leaves the SP. Make a dot at 0837 on the bottom of the graph. Then add the time distance of 3 hours and 8 minutes to 0837 start time to compute the time the last vehicle clears the RP. This is 0837 plus 3 hours and 8 minutes, or 1145. Make another dot at the top of the graph at 1145. Connect the dots. This second line parallels the first line drawn, which shows the movement of the first vehicle of the first serial. The horizontal space between the two lines represents the 37-minute pass time of the serial.

Graphing the Second Serial

B-44. Because the last vehicle of the first serial is scheduled to clear the SP at 0837 and a 10-minute time gap is required between serials, the second serial cannot begin movement until 0847. To show the first vehicle of the second serial on the graph, place a dot at 0847 on the bottom of the graph. The time distance for the second serial is the same as that of the first serial. Therefore, the trail vehicle of the second serial will clear the RP at 1155 (0847 plus 3 hours and 8 minutes). To show the last vehicle of the second serial on the graph, place a dot at 1155 at the top of the graph at the RP and connect the dots with a line.

B-45. Plot the trail vehicle of the second serial the same as the first serial. To find the time the last vehicle of the second serial crosses the SP, add the pass time of the second serial to the time the first vehicle of the second serial crosses the SP. From figure B-17, this was determined to be 39 minutes. Therefore, adding 39 minutes to the 0847 SP time gives 0926 as the time the trail vehicle of the second serial leaves the SP. Make a dot at 0926 on the bottom of the graph. Since the first vehicle clears the RP at 1155 and the pass time is 39 minutes, the trail vehicle will clear the RP at 1234 (1155 plus 39 minutes). Make another dot on the top of the graph at 1234. Connect the two dots. The second serial is now complete.

Graphing the Third Serial

B-46. Graphing the third serial is more complicated than the first two. The reason is that the third serial will not be able to clear the SP 10 minutes after the second serial clears the SP because this would cause it to run into the 1100 to 1200 restriction at CP 99. Therefore, compute for the earliest time the first vehicle can leave in order to pass the restriction after the restriction ends at 1200 (plus the 15-minutes safety factor). As shown in Figure B-21, the computation is 1200 (time the restriction ends) plus 15-minute safety factor minus 1 hour (time distance to the restriction [24 km at 24 km/h]) equals 1115. This time (1115) is the earliest time the first vehicle of the third serial can leave the SP. Place a dot at 1115 to show this SP time. Time distance is still 3 hours and 8 minutes. Therefore, the first vehicle of this serial will clear the RP at 1423. Put a dot at 1423 at the top of the graph and connect the two dots.

B-47. Since pass time for this serial is 44 minutes, the last vehicle will leave the SP at 1159. Time distance is still 3 hours and 8 minutes. Adding this to the starting time of the trail of the serial gives the clear time for the trail at the RP of 1507. Place dots at the times computed for the trail and connect them as with the two previous serials.

Graphing the Fourth Serial

B-48. Graphing the fourth serial is also more complicated than the others because it must halt at the 1500 to 1530 restriction at CP 105. The first step is to compute the time distance from the SP to the restriction. The distance is 57 km and the rate is 24 km/h. Using the formula to calculate time distance, TD = D ÷ R, 57 ÷

24 = 2 hours and 23 minutes. Because the last vehicle of the third serial cleared the SP at 1159 and a 10-minute gap is required between serials, the fourth serial cannot begin movement until 1209.

B-49. The first vehicle of this serial will arrive at the restriction (CP 105) 2 hours and 23 minutes after it clears the SP, or 1423. Adding the pass time of this serial (42 minutes) to this gives 1514 as the time when the trail vehicle of the serial would clear CP 105 if it moved on without stopping. Since the restriction at this point is from 1500 to 1530, the column must halt at CP 105 and cannot move on until 15 minutes (safety factor) after the restriction ends. Thus the serial begins moving again at 1545.

B-50. The remaining distance of 18 km will take 45 minutes (18 km ÷ 24 km/h), so the lead vehicle clears the RP at 1630. The trail vehicle leaves CP 105, 42 minutes after the lead vehicle at 1627 and clears the RP, 45 minutes later at 1712.

Graphing the Fifth Serial

B-51. For the fifth vehicle, as with the third serial, a 10-minute time gap will not work because the fourth serial will be halted on the road for the restriction at CP 104. If the fifth serial was to leave 10 minutes after the fourth serial cleared the SP, it would run into the fourth serial at its halt.

B-52. Therefore, compute the earliest time the lead vehicle can leave the SP in order to avoid running into the fourth serial at CP 104. As described in paragraph B-31, first find how long it takes the lead vehicle to travel the 39 km to CP 104: 39 km ÷ 24 km/h = 1 hour and 38 minutes. The restriction at CP 104 is in effect from 1510 to 1630. Adding the 15-minute safety factor, 1645 is the earliest time at which the lead vehicle of the serial can clear the restriction. Subtracting 1 hour, 38 minutes from 1645 gives 1507 as the earliest time the fifth serial can leave the SP. It will clear the CP 104 at 1645 without halting.

B-53. Another problem arises at this point. If the fifth serial leaves at 1507, it will arrive at CP 105 at 1730, 45 minutes after clearing CP 104. Since there is a 1700 to 1830 restriction at CP 105, the serial must halt and wait until 1845 to resume movement. Because this serial has been ordered to disperse off the road at CP 105, the halt is shown differently than with the fourth serial, which halted on the road and occupied road space.

B-54. The pass time of this serial must also be recomputed from this point since the movement instructions specified that a slower march rate and larger density apply to movements during darkness after 1835. Accordingly, the rate of march becomes 16 km/h, and vehicle density becomes 48 vehicles per kilometer. To find the new pass time, first calculate the new road space (see figure B- 22). To recalculate the new pass time see figure B-23.

$$\text{Road space} = \frac{\text{number of vehicles}}{\text{vehicle density}} + \text{time gaps} \times \frac{\text{rate}}{60 \text{ minutes}}$$

$$= 124 + 8 \times 16 = 2.6 + 2.2 = 4.8\text{km}$$

Figure B-22. Calculating new road space

$$\text{Pass time} = \frac{\text{Road space} \times 60 \text{ min}}{\text{rate}} = \frac{4.8 \times 60}{16} = 18 \text{ min}$$

Figure B-23. Recalculating new pass time

B-55. Traveling at 16 km/h, it takes the lead vehicle 1 hour and 8 minutes to travel the remaining 18 km to the RP. It arrives there at 1953 (1845 + 1 hour and 8 minutes). The trail vehicle leaves CP 105, 18 minutes later than the lead vehicle, or at 1903; and arrives at the RP at 2011.

Using a Road Movement Table

B-56. Data is taken from the graph and put into a road movement table, which can be issued as an annex to an OPORD for a road movement. Convoy commanders can use the information to track their progress during movement and ensure they arrive and clear each CP on schedule. Movement regulation teams (MRTs), traffic control points (TCPs), and others can use the information for control purposes.

B-57. Table B-2 and Table B-3 shows the front and back sides of a sample road movement table. The data in this table is derived from the information found on the graph in figure B-21.

Table B-2. Road movement table (front)

								Checkpoints				
Serial and Date	Units	# of Veh-icles	Load Class of Heavy Veh-icles	From	To	Route	Route to SP	Ref	Due hrs	Clear hrs	Route From RP	Remarks
(a)	**(b)**	**(c)**	**(d)**	**(e)**	**(f)**	**(g)**	**(h)**	**(i)**	**(j)**	**(k)**	**(l)**	**(m)**
1 23Feb	2439 Trans Co (Lt Trk) 2440 Trans Co (Lt Trk)	126	21	CP97	CP106	A	N28	CP97(SP) CP99 CP103 CP104 CP105 CP106(RP)	0800	0837	N16	
2 23Feb	2441 Trans Co 2442 Trans Co (Lt Trk)	135	21	CP97	CP106	A	N45	CP97 CP99 CP103 CP104 CP105 CP106	0847 0947 1002 1025 1110 1155	0926 1026 1041 1104 1149 1234	N14	
3 23Feb	2443 Trans Co (Lt Trk) Hq & Hq Det 439th T Bn (Trk)	144	21	CP97	CP106	A	N280	CP97 CP99 CP103 CP104 CP105 CP106	1115 1215 1230 1253 1338 S1423	1159 1259 1314 1337 1422 1507	N16	
4 23Feb	2445 Trans Co (Lt Trk) 2446 Trans Co (Lt Trk)	144	21	CP97	CP106	A	N4	CP97 CP99 CP103 CP104 CP105 CP106	1209 1309 1324 1347 1432 1630	1251 1351 1406 1429 1627 1721	N53	Halt at CP 105 1432 to 1545 until restric-tion ends
5 23Feb	2447 Trans Co (Lt Trk) 2448 Trans Co (Lt Trk) (attached)	124	21	CP97	CP106	A	N16	CP97 CP99 CP103 CP104 CP105 CP106	1507 1607 1622 1645 1730 1953	1541 1641 1656 1719 1919 2011		Stop at CP 105 disperse vehicles until restric-tion ends. Resume march at 1845

Table B-3. Road movement table (back)

MAPS			
1	AVERAGE SPEED Serials 1-4 - 24 km/h Serials 5-24 km/h after 1845 – 16km/h	5	CHECKPOINTS a. Start Points – CP97 B. Release Points CP106 C. Other Critical Points CP99, CP103, CP104, CP105
2	AVERAGE DENSITY Serials 1-5 – 12 vehicles per km Serials 5 – 47 vehicles per km after 1845	6	Main Routes to Start Points – N28, N45, N280, N4, N16
3	HALTS Fourth serial at CP 105 – 1432 to 1545 Fifth serial at CP 105 – 1730 to 1845	7	Main Routes from Release points – N16, N53
4	Routes – Route A		

ROAD MANAGEMENT PLANNING

MOVEMENT PLANNING

B-58. Movement planners must manage the planned movement of convoys on controlled MSRs in order to issue movement credits, reroute, or divert. A critical time and point graph is a tool that may be used by movement planners to aid in preventing conflicts at critical points when planning and scheduling movements. It is an alternative method of managing movements from the grid system. Both methods accomplish the same function of tracking the planned itineraries of convoys as they arrive and clear planned checkpoints along MSRs. This method is more detailed and may be useful for planning movements on road networks that have many MSRs crossing each other.

CRITICAL TIME AND POINT GRAPH

B-59. Data for developing a critical time and point graph is taken from route synchronization plans or distribution network design. These plans identify the critical points or checkpoints that will be used to plan movements. Movement planners also receive movement information for preplanned or immediate requirements. Preplanned information is derived from movement graphs or tables used to support the movement program. Immediate requirements are generated on short notice from clearance requests (movement credit).

B-60. The movement planner posts the movement data for each movement requirement to the critical time and point graph for the day or days involved. The planner will either confirm the availability of the road network for the requesting unit or makes changes to separate, balance, or distribute based upon command priorities.

B-61. An example of a critical time and point graph is shown in figure B-24. Critical time and point graphs are composed of subgraphs, one for each critical point. The name or number of the critical point is marked along the left margin. Each critical point has four paths, one for each direction (north, south, east, and west). These paths are marked along the left side to show the predominant direction of movement or change of direction. Time is annotated along the top on the vertical divisions of the graph in short time blocks, normally 15 minutes or less. A graph may reflect any time period. However, graphs do not normally exceed 24 hours.

B-62. The critical time and point graph reflects a route with three critical points (25, 26, and 27). In this example, the vertical lines represent five-minute time blocks. Two convoys are planned.

- Convoy 225 travelling eastward on MSR Sparrow will arrive at critical point 25 at 0020 and will clear that point at 0040. Therefore, the block representing convoy 225 extends from the arrive time to the clear time.
- Convoy 225 then continues to travel eastward and will arrive at critical point 26 at 0130. At critical point 26, convoy 225 turns northward on MSR Hawk as shown by the flag extending from the eastbound to northbound paths. Changes in direction of travel at critical points are always indicated by a flag extending into the appropriate path on the graph opposite N, S, E, W. Convoy 225 clears critical point 26 about 0145.
- Convoy 226 travelling northward on MSR Hawk arrives at critical point 27 at 0230 and will clear that point at 0300.

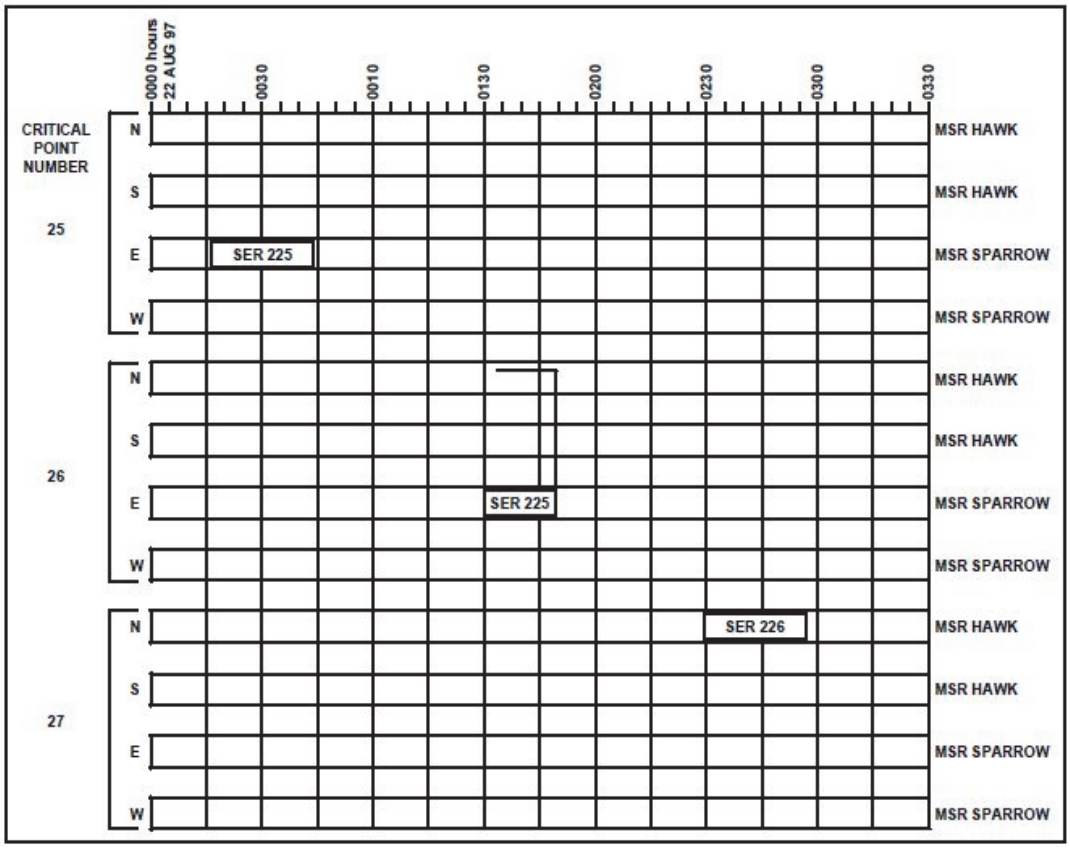


Figure B-24. Critical time and point graph

B-63. Critical time and point graphs should be prepared for each MSR in advance for a specified planning period to manage programmed moves over multiple routes. The data for arrive and clear times at critical points can be obtained from movement graphs or movement credits. The planning period will vary depending upon the level of command. Generally, the TSC/ESC and MCB work with longer planning periods than does the DTO because theater level movements can be programmed further in advance.

B-64. On the day of movement, movement planners receive the in-transit status of convoys as reported by MCTs or the moving unit. They check the progress of movement against the critical time and point graph for that day. When a convoy is reported off schedule, they check the graph for time and space separations from other convoys. If necessary, planners may reroute or stop a movement or reschedule convoys to prevent conflicts. They provide these changes to the affected commands and the military police (MPs).

This page intentionally left blank.

Appendix C

Example of a Route Synchronization Plan Format

1. PURPOSE.
The route synchronization plan is used to inform all units within the theater of operations of the policies and procedures governing convoy or oversize/overweight vehicle movements.

2. SCOPE

a. Route synchronization plan should be developed for all OPLANs or exercises and be included within the transportation annex of the applicable OPLAN or exercise directive.

b. It is the responsibility of all organizations with a wartime route synchronization mission to develop route synchronization plans. Responsible organizations include DTOs, MCBs, and TCEs.

c. Whenever two or more regulating agencies operate in the same theater of operation, coordination to standardize policies and procedures must be accomplished. Development of the distribution network design must also be coordinated to ensure mutual use MSRs are given one name throughout the theater to avoid confusion. Movement priority codes and other policies and procedures must be standardized.

3. RECOMMENDED FORMAT AND INFORMATION FOR THE ROUTE SYNCHRONIZATION PLAN

ANNEX ____ ROUTE SYNCHRONIZATION PLAN TO OPERATION____
Reference: Maps, distribution network design, and other relevant documents.
Time zone used throughout the order

Dates: Julian for COP system (movement request dates)

1. SITUATION

Include information affecting movement.

2. MISSION

Include provisions of effective route synchronization, reporting, support of operations, and coordination of movement and maneuver. Identify responsible organizations (who controls routes).

3. EXECUTION

a. Concept of movements. Briefly state the route synchronization concept and coordination of movements and maneuver and battlefield circulation control.

b. Tasks to subordinate units.

(1) Units perform route reconnaissance or get information from TCP pertaining to theater route network.

(2) Units responsible for abiding by all policies and procedures listed in the plan.

c. Coordination of use of MSRs.

(1) Request procedures.

(a) Use DD Form 1265 (Request for Convoy Clearance) and DD Form 1266 (Request for Special Hauling Permit). Put examples of these forms or the local equivalent in the appendix. Identify required data (mandatory). Hazardous cargo and oversize/overweight information must be put in remarks. Round trip, use DD Form 1265 with stopover time.

(b) Submit to. Identify locations units will submit convoy movement requests or versize/overweight. Telephone procedures/telephone numbers, FAX, walk in locations, MCT, system modem numbers, and so on. Hours of operation.

(c) Submit when. How many days before movement peace/war, emergency procedures, and authorization.

(d) Convoy movement priorities. Use numbers 1: highest priority and so on. Coordinate with all clearance activities to use same number system.

(e) Minimum number of vehicles that constitute a convoy.

(f) Infiltration rules (fewer vehicles than a convoy). Ensure infiltrating vehicles yield to convoys at intersection and do not hinder convoy movement.

(g) Special movement consideration information must be entered in remarks on the movement request.

(2) Route utilization information. Discuss MSR listed in TCP. Explain controlled versus MSR (open).

(a) MSR listed on TCP is open route, any unit can use. No clearance required. First come, first serve. Minimum speed on MSR and any restrictions. Direction of travel.

(b) Controlled route. Listed in TCP (same as dispatch route). Convoy request must be submitted and a clearance issued prior to movement. Minimum speed for controlled routes and any restrictions. Direction of travel.

(c) Supervised route. Identify route(s) rules and procedures.

(d) Prohibited route. Identify which route in TCP or not on TCP is prohibited.

(e) Reserved route (identify who can use and duration).

(f) Lightlines.

(g) Hardening of vehicles.

4. SERVICE SUPPORT

a. Provide logistical support request procedures. Rest, refueling, and so forth. The TCP (text version) identifies convoy halt locations, facilities, and services available to include units responsible for providing service.

b. Maintenance and recovery procedures. Vehicle breakdown procedures.

c. Medical evacuation procedures.

d. Halts.

5. PROCEDURES. (Note: Should be same information as in system parameter table.)

a. Planning factors (convoy).
- Distance between vehicles.
- Time gap between convoys.
- Oversize/overweight criteria. Procedures to submit request for clearance.
- Vehicles per march unit.
- March units per serial.
- Blackout procedures/light lines.
- Hardening of vehicles.
- Convoy/hazardous cargo marking/flags.
- Delay in meeting SP time procedures.

b. Planning factors (route information). Refer to TCP for location and type routes, halt locations and services, traffic control point locations, critical point locations, and restrictions.

6. ENFORCEMENT.

Include command actions that will be taken in the event units do not
follow policies and procedures. Stress the requirement that units must have approved march table/movement order prior to using controlled routes. Identify who will monitor and control movements.

7. COMMAND AND SIGNAL.

a. Command. Identify communications reporting locations and procedures with route synchronization and police officials.
b. Signal. Describe reporting requirements, method of communication, and radio frequencies.

8. APPENDIXES:

Distribution network design (text copy attached and system disk distributed to system users)
convoy request form and oversize/overweight (same form)

Appendix D

Automation Information Systems (AIS)

AUTOMATED AIR LOAD PLANNING SYSTEM (AALPS)

D-1. AALPS is a knowledge-based expert system that assists with loading military cargo aircraft for large scale air deployments. It is designed to serve four basic functions: generate and valid air load plans; generate and validate user defined air load plans; modify existing air load plans; and track movement statistics during actual deployments. AALPS is used by contingency planners and force designers to perform air load planning and execution. This entails the use of preplanned data (estimates) and the use of actual data for both "real-world" and "what-if" scenarios. AALPS is used for estimating airlift requirements (by specific aircraft type and delivery method) producing USAF certified "flyable" load plans, providing airlift/movement summary data and load reports ranging from a single mission to full-scale division deployments. AALPS can interface with TC-AIMS II, Global Air Transportation Execution System (GATES), Cargo Movement Operations System (CMOS) and Integrated Development Environment/Global Transportation Network (IDE GTN) Convergence (IGC).

BATTLE COMMAND AND SUSTAINMENT SUPPORT SYSTEM (BCS3)

D-2. BCS3 provides Mission Command (MC) enterprise services with node, commodity and convoy In-Transit Visibility (ITV) and Asset Visibility (AV) in spreadsheet format and on an automated Common Operating Picture (COP). Designed as the logistics Sustainment support system-of-record this MC System operates on classified and unclassified enterprise networks. BCS3 provides map-centric displays and data on workstations receiving logistics sustainment information feeds from other authorized system servers used to collect data from numerous other non-MC systems. Such data sources include but are not limited to the Logistics Information Warehouse (LIW) and the Joint Automatic Identification Technology (JAIT) national servers.

D-3. A subset of BCS3 is BCS3-Node Management (BCS3-NM) which allows users to track and manage Transportation Control Numbers (TCNs), containers, and pallets from the source of supply to the tactical supply activity. This capability provides commanders situational understanding of the sustainment pipeline and a complete assessment of the logistics situation. BCS3-NM seamlessly integrates logistical information elements from the U.S. Army, Air Force, Navy, Marine Corps, other DOD agencies, and multinational elements. It fuses numerous data points from various systems, i.e., Integrated Development Environment /Global Transportation Network (IDE/GTN) Convergence (IGC), Joint-Automatic Identification Technology (J-AIT), In-Transit Visibility (ITV) Server, and Business Systems Modernization-Energy (BSM-E), all of which manage various segments of the distribution pipeline.

CARGO MOVEMENT OPERATIONS SYSTEM (CMOS)

D-4. CMOS is a top down directed program that automates base-level transportation at various sites. Originally an Air Force program, the Army adopted it as another transportation system. CMOS is a combat support system that automates and streamlines installation level cargo movement processes for peacetime, deployment, and contingency cargo. Workstations in installation transportation officer functional areas support one-time data capture for the preparation of documentation for all modes of shipment. The specific functional areas supported are the receipt, preparation, and movement of cargo; the reporting of movement for in-transit visibility (ITV), and military airlift passenger travel. Currently the system runs on workstations, but will eventually move to an Enterprise environment in FY14. CMOS was designed to meet the emerging requirements of TC-AIMS II blocks four and five.

COMPUTERIZED MOVEMENT PLANNING AND STATUS SYSTEM (COMPASS)

D-5. COMPASS replaced Joint Force Requirement Generator II (JFRG II) and began its fielding in 2011 as the Army's Unit Movement Data used in Joint Operation Planning and Execution System (JOPES). This FORSCOM system provides deployment planning systems with accurate Army unit movement requirements. The system describes unit property and equipment in transportation terms and converts UMD into Computerized Movement Planning and Status System (COMPASS) automated unit equipment list (AUEL) and maintains unit movement data (UMD) for use in mobilization and deployment planning.

GLOBAL AIR TRANSPORTATION EXECUTION SYSTEM (GATES)/ GATES OCEAN

D-6. GATES is a system used at aerial ports that integrates mission command operations, passenger operations, and cargo movement processes. It assists management of cargo manifested for air shipment, cargo awaiting air shipment, and cargo departed from aerial ports via air or ground transportation. GATES (1) processes and tracks cargo and passenger information; (2) supports management of resources; (3) provides logistical support information; (4) supports scheduling and forecasting; (5) provides tracking and tracing of aerial port assets (including personnel, vehicles, equipment, and supplies); (6) supports processing service short-term cargo requirements and long term passenger and cargo requirements; (7) supports channel mission management; (8) manages tariff data regarding baggage, passenger, and pet fares; (9) manages passenger reservations; and (10) provides reports and transportation status for customers. Additionally, GATES OCEAN provides ship loading planning capabilities, concurrent planning for multi-ship operations and replaces the Worldwide Port System.

GLOBAL COMBAT SUPPORT SYSTEM-ARMY (GCSS-ARMY)

D-7. GCSS-Army will establish a web-based capability to provide the battle commander with a seamless flow of timely, accurate, accessible, and secure information. GCSS-Army will support commanders whether in garrison or during military operations by providing essential operational capabilities that includes materiel management, maintenance management for ground and an interface to air, property accountability operations to include unit basic load, warehousing, limited distribution, materiel requirement planning, human resources, integrated financial capabilities, and procurement functionality. It will integrate enterprise information and provide both tactical and installation capabilities. It is currently awaiting a full fielding decision expected in the summer of 2012 with extension of SSA modules in 2012-14 and all remaining capabilities in 2014-17.

D-8. GCSS-Army replaces:

- Property Book Unit Supply Enhanced (PBUSE) is an unclassified system which uses roles and permission to control and manage access to data. The system is employed in the Active Army, Army Reserve, and the National Guard and provides both sustaining base and tactical functionality. In the sustaining base, PBUSE operates over NIPRNet/Internet connections. In the tactical environment, PBUSE operates over the Very Small Aperture Terminal (VSAT) in combination with Combat Service Support Automated Information Systems Interface (CAISI). PBUSE provides real time property accountability, LOGTAADS updates, serial number tracking, unique item identifier traceability, asset adjustments, lateral transfers, authorization updates, and manages basic and operational loads, hand receipts and provides the capability to digitally sign and store documents for the user.
- Standard Army Maintenance System-Enhanced (SAMS-E) which transitioned from a DOS environment to Windows XP and merged ULLS-G, SAMS-1, SAMS-2 into an Oracle relational database for host-client capability. SAMS-E systems are located across the battlefield from brigade level echelons down to separate companies. Tactical locations include (but are not limited to) sustainment brigades, support battalions (BSB, CSSB, STB, ASB, etc.), Company level units include tactical units (POL, MP, ENG, MI, TRANS, etc.) and field support organizations (FSC, FMC, SMC, HHCs, etc.). Normally consolidated in maneuver units at the support organization within the forward support company (FSC) and field maintenance company

(FMC), SAMS-E provides maintenance and CL IX requisitions data management. SAMS-E modernizes unit level automated maintenance status reporting including weapon systems, sub-components, day-to-day maintenance supply related and readiness repair part issues as the transition to the two-level maintenance concept continues to evolve. It currently provides interfaces with other logistics systems, including SARSS, ULLS-AE, and LOGSA/LIW.

- Standard Army Retail Supply System (SARSS). SARSS is the primary automation system used in Army DS/GS supply units. It processes customer requests from ULLS-A (E), SAMS, and PBUSE. SARSS maintains stock record balances and reports them to the higher echelon SARSS. SARSS provides requisition status (estimated order-ship date, back ordered items, etc.) feedback to its supported customer units. SARSS functions are financial management, asset visibility, redistribution/referral, accountable records materiel release control system.

GLOBAL COMMAND AND CONTROL SYSTEM (GCCS)

D-9. GCCS provides DOD combat commanders with a single source of secure information. It assists joint force commanders with coordinating air, land, sea, and space operations of widely dispersed units in fast moving operations. It is flexible enough for combat operations or humanitarian assistance missions. GCCS allows greater software flexibility, reliability, and interoperability with other automated systems. Commanders can establish their own secure homepage and communicate worldwide using E-mail. Additionally, this automated information system provides situational understanding and deliberate and crisis planning with the use of integrated set of analytical tools and flexible data transfer capabilities. GCCS will be the single C41 system to support the war fighter from the foxhole to the command post.

GLOBAL POSITIONING SYSTEM (GPS)

D-10. GPS is a collection of satellites owned by the U.S. Government that provides highly accurate, worldwide positioning and navigation information, 24 hours a day. It is made up of twenty-four NAVSTAR GPS satellites which orbit 12,000 miles above the earth, constantly transmitting the precise time and their position in space. GPS receivers on (or near) the earth's surface, listen in on the information received from three to twelve satellites and, from that, determine the precise location of the receiver, as well as how fast and in what direction the receiver is moving.

INTEGRATED BOOKING SYSTEM (IBS)

D-11. IBS is the execution system for the defense transportation system (DTS) to move international cargo. IBS provides a worldwide, automated booking system to move military cargo OCONUS. IBS allows DOD shippers to automatically process movement requests directly using Surface Deployment and Distribution Command's (SDDC) booking offices. IBS automatically determines the best value ocean carrier supporting the move. IBS supports the deployment, employment, and sustainment. IBS interfaces with the ocean carrier industry, GATES, and IGC.

INTEGRATED COMPUTERIZED DEPLOYMENT SYSTEM (ICODES)

D-12. ICODES is an automated information system that develops both ship and rail stowage plans for deployments. It utilizes artificial intelligence (AI) principles and techniques to assist embarkation specialists in the rapid development of cargo stow-plans. It includes expert agents with knowledge in specific domains (e.g., hazardous material handling, trim and stability, ramps, cranes, and internal access paths) to evaluate and propose loading alternatives and recommendations. ICODES is designed to support division sized moves and cargo planning across the available fleet of ships. It supports multi-ship planning while maintaining unit integrity. ICODES is responsive to unplanned changes and contingencies. It interfaces with TC-AIMS II and GATES.

INTEGRATED DEVELOPMENT ENVIRONMENT/GLOBAL TRANSPORTATION NETWORK (IDE GTN) CONVERGENCE (IGC)

D-13. IGC is a convergence of USTRANSCOM's GTN and DLA's IDE that will provide the DOD with an integrated set of networked, end-to-end visibility, deployment, and distribution capabilities. The end goal of

IGC is to effectively support the Joint Force Commander's ability to make decisions based on actionable logistics information. IGC will create a single source for all users to access common, authoritative data, business standards, and information. The vision of IGC is to provide supply chain, distribution and logistics information fusion through common, integrated data and application services, enabling the development of cohesive command and control and business-decision solutions both by and for the combatant commands, services, joint staff, agencies, and other federal organizations. It provides:

- ITV information about units, forces, passengers, cargo, patients, schedules, and actual movements.
- Displays current operational asset information and provides transportation intelligence information on airfields, seaports, and transportation networks using graphics and imagery.
- Provide future operations information and models to support transportation planning and courses of action.
- Provides efficient routing for patient movement and provides ITV of individual patients.

  Interfaces with CAPS II, CFMS, CMOS, Defense Automated Addressing System (DAAS), Defense Transportation Tracking System (DTTS), GCCS, JOPES, Global Decision Support System, Mechanized Export Traffic System (METS), Passenger Reservation and Manifest System (PRAMS), TC-ACCIS, TC-AIMS II, and GATES.

IN-TRANSIT VISIBILITY (ITV) FOR SURFACE DEPLOYMENT & DISTRIBUTION CARGO (ISDDC)

- ISDDC is a repository of integrated and cleansed transportation data from numerous SDDC and DTS transportation systems. This is combined with an extremely robust Web-based reporting and analysis interface that includes a sophisticated, yet easy-to-use geographic information system (GIS) feature. The system provides reporting and analysis support to SDDC Brigades and BNs, HQ SDDC, USTC, DLA, and others using extremely accurate, methodically cleansed DTS data including: ocean cargo, surface freight, container management, performance metrics and much more. Data is available for ad hoc query, pre-formatted reporting and business intelligence analytical reporting. It is easily transformed into graphics and charting, as well as available for overlay on a map view.

JOINT OPERATIONS PLANNING AND EXECUTION SYSTEM (JOPES)

D-14. JOPES furnishes joint commanders and war planners, at all levels, standardized policy procedures and formats to execute a variety of required tasks. It assists planners in development of operation plans, concept plans, functional plans, campaign plans, and operation orders. JOPES is used for time-phased force and deployment data (TPFDD) management and development. It defines requirements and gains visibility of the movement of combat forces into the combat commanders' area of responsibility. JOPES combines individual service terminology into one standard system. It standardizes the joint planning system used to execute complex multi-service exercises, campaigns, and operations. The JOPES automated data processing resides in the computer network of the GCCS.

MOVEMENTS TRACKING SYSTEM (MTS)

D-15. MTS provides automated tracking of vehicles and Radio Frequency Identification (RFID) tagged cargo. It provides fleet monitoring using vehicle map displays, censors, communications log storage and retrieval capability, and remote monitoring worldwide. The MTS supports missions through the full spectrum of military operations from peacetime to war. It provides commanders with near real-time data on the location and status of transportation platforms, including specialist and other selected tactical wheeled vehicles, watercraft, flatracks, and containers, using cabin, console mounted hardware, and satellite technology. MTS automatically provides updated position tracking and two way, over the horizon, digital message capability between command and control elements and vehicle and watercraft operators.

MTS, as of 2012, is being replaced by Joint Capabilities Release – Logistics (JCR-Log) which merges the capabilities of Force XXI Battle Command Brigade and Below (FBCB2) Blue Force Tracker (BFT) with

MTS. BFT provides visibility of tactical level equipment and communication while MTS provides strategic data. The transition to JCR-Log facilitates increased collaboration on one system.

STANDARD ARMY AMMUNITION SYSTEM-MODERNIZATION (SAAS-MOD)

D-16. SAAS-MOD integrates all retail munitions supply functions and processes. It is used at three levels: corps and theater MMCs, ammunition supply points (ASPs), and the division ammunition office (DAO). The primary purpose of SAAS-MOD is to provide conventional ammunition assets to tactical commanders during wartime conditions. SAAS-MOD manages all conventional ammunition, guided missile large rockets (GMLRs) and their related components, and packaging material. The system uses desktop-type computers and associated AIT to accomplish these tasks. It provides in-transit visibility and stock record accounting for ammunition at the retail level. SAAS-MOD can interface with the following systems: SAAS, Logistics Modernization Program (LMP), Worldwide Ammunition Reporting System (WARS) and Property Book Unit Supply Enhanced (PBUSE).

TRANSPORTATION COORDINATORS AUTOMATED INFORMATION FOR MOVEMENTS SYSTEM II (TC-AIMS II)

D-17. . TC- AIMS II provides automated day-to-day operations for Unit Movement Officers (UMO) and organizations providing movement control at various levels in a theater of operations. TC-AIMS II improves and expedites unit movements and distribution while providing a source of timely and accurate deployment information for use at all Joint Deployment Community (JDC) command levels. Under TC-AIMS II, unit movement, installation transportation, and loading functionality are accessible from a single client platform at the unit/installation level. The processing, tracking, and reporting of data is available to decision makers at all command levels. Additionally, TC-AIMS II has the capability of running on an Enterprise. TC-AIMS II provides In-Transit and Total Asset Visibility to users and will be the basic building block of source data that IGC and BCS3 force tracking software will translate into ITV and force tracking information.

D-18. The latest edition to TC-AIMS II is Theater Operations (TOPS), this new addition is designed to facilitate movement control as it supports deployment, redeployment and distribution operations. Additionally TOPS adds the TIS Globe which is a route synchronization and convoy planning, de-confliction, and scheduling tool that integrates commercial off the shelf software components of Google Earth, custom maps, and custom software via Non-secure Internet Protocol Router Network (NIPRNet) Glove Services (NGS) to deliver advance imagery and route synchronization capabilities to TC-AIMS II users. The TIS Globe can be found in TC-AIMS II versions Barstow 6.0 and beyond.

UNIT LEVEL LOGISTICS SYSTEM AVIATION (ENHANCED) [ULLS-A(E)]

D-19. The ULLS-A (E) system provides an enhanced aviation maintenance management capability. It is a multi-user system incorporating a Local Area Network (LAN) to link the functions of tech supply, production control and quality control, phase team, and back shop sections within the aviation field maintenance organization. The program incorporates a back shops module that gives the maintenance units the capability to initiate and complete work orders. The Centralized Aviation Flight Record System (CAFRS), provides the Individual Flight Records Folder (IFRF) and will allow the user to send the DA Form 759 (Individual Flight Record and Flight Certificate – closeout) data to flight operations.

This page intentionally left blank.

Appendix E

Automatic Identification Technology

The purpose of this appendix is to describe the Automatic Identification Technology (AIT) equipment, hardware, and technology, as it pertains to transportation purposes.

AUTOMATIC IDENTIFICATION TECHNOLOGY (AIT) OPERATIONS

E-1. AIT use in operations consists of a suite of tools designed to provide commanders asset visibility, including in-transit visibility (ITV) of forces and material with minimum input. When integrated with Automatic Information Systems (AIS), AIT provides managers with timely ITV. This visibility allows commanders to control the movement of forces, equipment, redirect the movement as necessary to meet changing tactical situations and objectives.

E-2. AIT provides enabling technologies that must be fully integrated with AISs to be an effective ITV tool. The basic AIT components for ITV are source data that populate AIT data storage devices; AIT data capture devices (interrogators, scanners, and readers); and source and movement data transfer to AISs. These components work together as follows:

E-3. AIT data storage devices, store transportation, supply and personnel data. The data storage device is then attached to a piece of equipment, or in the case of smart cards, issued to a Soldier.

E-4. As the piece of equipment or Soldier moves through the transportation system, the data on the storage device is collected by AIT interrogators and readers that are strategically located throughout the system.

E-5. After collecting the data on the storage device, the interrogator, scanner, or reader passes the data to a host AIS. The host AIS passes the data to worldwide AIS that provide near real-time ITV data to the logistics and warfighting communities.

E-6. The Army uses four basic types of AIT data storage devices: bar codes, smart cards, Radio Frequency Identification (RFID) tags, and Contact Memory Buttons (CMB).

GENERAL PREPARATIONS FOR AIT USE

E-7. In most unit movement scenarios, the Army will use AIT at each node in the movement. The key to the successful use of AIT is unit AIT preparation before deployment. The unit has the ability at home station to capture source data, in its entirety, in AISs. Home station is also the logical location to prepare AIT data storage devices for all deploying forces and equipment. If the AIT mission is not performed correctly at the beginning of the unit movement, the age-old problem of limited or no ITV will continue.

UNIT RESPONSIBILITIES

E-8. AIT equipment is distributed with the Transportation Coordinators-Automation Information for Movements System II (TC-AIMS II). After receiving an alert for impending deployment, units have AIT-related responsibilities at home station. Among them are:

- Plan for the use of AIT based on the unit mission and requirements of the supported combatant commander.
- Ensure the unit deployment list (UDL) is complete, accurate, and current.
- Pass the UDL to higher headquarters and to the installation the unit is to use as a departure point.
- After receiving transportation data from the installation, properly label all UDL equipment with AIT storage devices.
- Use TC-AIMS II (or other system) to write RFID tags when RFID tags are being used.

- Use Hand Held Interrogators (HHI) to verify AIT storage device batteries are functional.
- Ensure every deploying soldier has an accurate and current smart card. This requirement is supported by the installation and accomplished during Soldier Readiness Program (SRP).
- Ensure the security of AIT data and equipment in accordance with applicable supply and information security procedures.

E-9. AIT is a powerful tool that can provide receiving commanders and theater logistics elements ITV and force tracking information. This information can enhance theater reception management; enable efficient reception, processing of units and equipment as they move into the theater.

AIT DATA STORAGE DEVICES

E-10. The essence of AIT is the storage of information of some kind in a device that accepts the storage in a coded format that can be retrieved by being read, either by scanning or interrogation. The device may be hand carried by personnel or attached to equipment and containers. There are four basic components of AIT:

- An automated identification data storage device, (e.g., bar code label, optical memory card [OMC], smart card and radio frequency identification [RFID] tag.
- AIT hardware used to write information onto the data storage devices and later read the data from the devices.
- Automatic Information Systems (AISs) that can receive and use AIT data.
- A reliable communications infrastructure that links the AIT hardware to the AISs and further links the AISs to global In-transit Visibility and Total Asset Visibility (TAV) systems.

BAR CODED DATA

E-11. Department of Defense (DOD) and the Army use two types of bar codes, linear and two dimensional. Each node of the DOD transportation and distribution systems, including commercial vendors, read and write linear and two-dimensional bar coded shipping labels that contain both transportation and supply information. Reader equipment scans the bar code, decodes it, and transfers the data to a supporting AIS.

LINEAR BAR CODE

E-12. The linear bar code provides item identification and document control information for individual items and shipments. Linear bar codes have limited storage capacity, normally consisting of about 20 characters. The commercial automated identification manufacturer's BC-1 (Code 39), the standard for linear bar codes, is used throughout DOD. Linear bar codes are used to represent essential data elements (e.g., a national stock number, document number, or transportation control number). Figure E–1 shows an example of linear bar code.

Figure E-1. Linear bar code (sample)

TWO DIMENSIONAL (2D) BAR CODE

E-13. A 2D bar code has a much greater data storage capacity than a linear bar code. It is currently capable of holding 1,850 characters. A 2D bar code can sustain considerable damage and still be read because of the redundancy of data within the bar code. The DOD standard 2D bar code is the commercial standard Portable Data File 417 (PDF 417). The 2D symbology provides comprehensive data on documents,

individual items or shipments, and consolidation data on multipacks and air pallets. Figure E-2 shows an example of a 2D bar code matrix.

Figure E-2. Two dimensional bar code (sample)

MILITARY SHIPPING LABELS (MSL)

E-14. Military Shipping Labels (MSLs) incorporate 2D bar code fields as well as linear bar codes. Figure E-3 shows an example of an MSL with linear bar codes used in blocks 1, 9 and 16 and 2D bar codes being used in block 18.

Figure E-3. MSL with linear and two dimensional bar codes (sample)

SMART CARDS (ALSO KNOWN AS COMMON ACCESS CARDS (CAC))

E-15. A smart card is a plastic card similar in shape to a credit card. Unlike a credit card, the smart card contains an integrated circuit chip with an embedded microprocessor and memory capacities. Smart cards may also contain one or more other methods (i.e., magnetic strip, bar code, digitized photo, printed information) for storing information related to the cardholder. In addition to memory capacity, smart cards can contain security measures such as personal identification numbers, passwords, encrypted data, photos, or thumb print technology. Figure E-4 depicts a sample Smart Card.

Figure E-4. Smart card (sample)

RADIO FREQUENCY IDENTIFICATION (RFID) TECHNOLOGY

E-16. RFID is used to provide automated data capture of movements at transportation and distribution nodes. RFID also provides commanders container or pallet content visibility and can be used to locate tagged items in congested ports, container yards, or staging areas.

E-17. RFID tags contain a microchip, a long-life battery, and an RFID transceiver. The microchip contains unique tag identification information and can be loaded with data to identify the items traveling with the tag. RFID write stations are used at the point of origin to write supply and transportation data to the tag and to report the same information to a central database. As the tag passes an interrogator during movement, the tag responds by sending data to the interrogator. The interrogator then passes this information and a date-time stamp to a supporting AIS or the In-transit Visibility (ITV) server. The interrogator can also be set to activate a tag beeper for all the tags within its range, or activate a specific tag number. Using this option, operators can find specific tags and associated equipment.

TYPES OF RADIO FREQUENCY TAGS

E-18. There are two basic types of RFID tags, active and passive that are used within the DoD. For the purposes of unit movement, primary emphasis is on the active RFID tag

- . (a) Active RFID Tags. The Radio Frequency In-transit Visibility (RF-ITV) system processes data from data-rich (i.e., carry shipment content data without the need for connectivity to a database) active RF tags in support of sustainment, unit movement, and ammunition specific data efforts. Data written to the tag by the unit, supplier, or depot supports both the shipper and the receiver. By providing local and immediate access to logistics data, the RFID tag allows the Soldier in the field to quickly and reliably identify and locate supplies and equipment without access to AISs. The RFID tags and other devices come in a variety of shapes and sizes and offer the capability to be license plates (ID only), asset trackers (ID and 6 description elements), or data rich (ID, description, and manifest information) packaged with 128Kb or basic memory. The data rich tags are also available as sensor tags (shock, temperature, humidity) or as security tags (sensors plus door detection, light). The sensor and security tags are capable of providing automated alert messaging to facilitate reaction to the sensor notification. The RF-ITV system operates on a frequency of 433.92 megahertz (MHz). Movement control personnel should note, however, that the radio frequency spectrum is a sovereign resource of the country in which operations are being conducted. Therefore, use of the RF spectrum should always be

coordinated through the operating echelon's G-6 signal officer to the supporting spectrum management office (Army) or Joint Electromagnetic Spectrum Management Office.

- (b) Passive RFID Tags. Passive RFID technology consists of small inexpensive tags that contain a microchip and an antenna. The tag design is a major factor in determining how well the tag can be read from a distance and how sensitive it is to orientation. Passive RFID tags do not have a battery. The tags receive power from a reader that has output in a single direction. The power from the reader energizes the tag, closes a circuit in the tag, and communicates the tag data back to the reader. Passive RFID tags are small, inexpensive, low-data capacity devices. Passive RFID tags are not currently integrated into Army movement control systems, but they may play a role in the future.

RFID HARDWARE

E-19. In addition to RFID tags, RFID hardware consists of tools used by operators to write information to RFID tags, and to interrogate and read the data stored on the tags.

RFID WRITE STATION

E-20. The RFID write station is a hardware interface unit called a tag docking station, which is connected to an AIS. It may be a tag docking station or write cable is used to write data to RFID tags, one tag at a time. Older series tags are inserted into the docking station and data is transferred. Newer series tags are connected via a write cable.

FIXED RFID INTERROGATOR

E-21. A fixed RFID interrogator transmits queries to and receives data from all active RFID tags in its range. The maximum unobstructed radius is approximately 300 feet. The interrogator uploads the data to a computer which passes the data to the RF-ITV server and can update the appropriate AIS. RF-ITV server passes data to the IGC to provide in-transit and total asset visibility. Fixed RFID interrogators are positioned permanently in warehouses, central receiving points, and at selected points within transportation and distribution networks. The interrogator operates by sending a 'wake-up' signal to RFID tags within range, which then transmits data back to the interrogator. Fixed RFID interrogators may also be used to write data to tags. Although interrogators take more time to write the data to an individual tag, the fixed interrogator can write to multiple tags, as opposed to a tag docking station or write cable that can only write data to one tag at a time. Interrogators are compatible with both older series tags that use the American National Standards Institute (ANSI) format and newer series tags that comply with International Organization for Standardization (ISO) format.

RADIO FREQUENCY (FR) RELAY

E-22. The RF relay functions as a wireless modem and is used as a substitute for cable connections between fixed interrogators and the host computer.

HAND HELD INTERROGATORS (HHI), SCANNERS, AND DATA COLLECTION DEVICES

E-23. RFID hand held interrogators (HHI) and scanners operate much like fixed interrogators but are not directly connected to the host computer. Data from HHIs are downloaded to the host computer using a cable or infrared port. HHIs can be used to locate a specific tag, view the tag details, or to locate a specific item contained within one of several tagged containers or pallets. HHIs can write or rewrite data to an RFID without using a tag docking station, (but see note below). HHIs can also be used to scan bar codes.

Note. Whenever a tag is written or re-written using an HHI, don't forget to upload the data to the RF-ITV server. If a tag has been written but not up-loaded to the RF-ITV Sever, when it begins its transit and is read by an interrogator, it will appear as a blank tag. If a tag has been re-written but not uploaded to the server, it will appear on the tracking portal as it was previous to the re-write. Generally tags should be uploaded to the RF-ITV Server as soon as practicable after they are written or re-written.

Appendix F

Example: Route Status Table

Table F-1. Route status table

CRITERIA		*GREEN*	*AMBER*	*RED*	*BLACK*
Enemy	Security	- Security is established along routes	- Additional security is needed along routes and bypasses	- Security is not established along routes	
	Threats	- Low occurrences of enemy activities - No schedule LN activities or religious observances	- Two enemy attacks between the same phase lines, within the last twelve hours with damage of equipment and / or injuries - Scheduled LN activity or religious event	- Enemy attacks ≥ 3 between the same phase lines within the last 12 hours with damage of equipment and / or injuries - Scheduled LN activity or religious event declared as a threat	- Enemy concentration at or above level 2 attack; enemy contact imminent along route
	Communications	- Commo established	- Commo established, but there are dead spots in certain areas	- No commo established	
	Bridges	- Bridges MLC > 100 - No damages - No overhead restrictions	- Bridges with MLC > 25 and < 99 - Damages with bypass available overhead ≥ 4.3 ≤ 5m	- Bridges with MLC > 4 and < 24 - Overhead < 4.3m - Damaged bridges awaiting Engineer damage assessment	- Non-passable; bridge completely Destroyed. Brides designated unsafe by Division Engineers for military traffic - No bypass available
Terrain	Roads	No Construction: - Double flow roads supports wheeled vehicles with width over 7.3m and tracked and combination with width over 8m - All weather roads (weather proof roads)	Construction: - Single lane roads (restricted to support vehicles, tracked and combination with width ≥ 3.5 ≤ 6.0m) - single flow roads (restricted to support vehicles, tracked and combination with width ≥ 6.0 ≤ 8.0m) - Limited all-weather routes affected by rain, frost, thaw, or heat - Road conditions delay convoy movements for < 2hrs	Construction: - Limited access roads (permits passage of isolated vehicles with width ≤ 3.5m and vehicles tracked combination with width ≤ 4.0m) - Fair-weather route seriously affected by adverse weather conditions that will remain closed for long periods.	Construction: - Non-trafficable routes or bridges due to severe damage due to enemy interdiction, blockages, or floods. Road will remain closed for an indefinite period.
		No Obstructions: - No overhead restrictions - Slopes < 7% - Curves with a radius > 45 meters; No blockages	Obstructions: - Curves with a radius of 25.1 to 45m - Slopes > 7% - Overhead restrictions ≥ 4.3 ≤ 5.0m over the route	Obstructions: - Curves with a radius > 25m - Road blockages	- Obstructions that block the entire traveled way of road. No bypass available

Table F-1. Route status table

CRITERIA		*GREEN*	*AMBER*	*RED*	*BLACK*
Weather	Impact on Personnel or Maneuver	- Favorable impact (Wind chill or heat index/temperature - 6C (21F) to 29C (85F) - No /Light precipitation, ground dry or frozen to 12", < 6" snow depth	Marginal Impact: - Wind chill or heat index/ temperature 30C to 35C or -7C to -26C, moderate precipitation, lightning within 5 mi, wind > 35 kts, hail > ½ inch diameter, puddles on improved surfaces, 1"-2" rain per 12 hours or 0.1 – 0.4" rain per hour, 1-2" snow per 12 hours, 6-12" snow depth, visibility 160 – 800m	Unfavorable impact: - Wind chill or heat index / temperature > 35C (95F) or < -26C (-15F). Heavy precipitation, with > 49 kts, hail > ¾" diameter, sand storms that reduce visibility to < 25 meters	- Unfavorable impact that causes a cease of military operations for more than two days. Visibility < 10 meters for sustainment convoys. No Medevac coverage is available due to extreme weather. Medevac will not fly during the following conditions – Day: < 500 ceiling &/ or 1 mile visibility, Night: < 700 ceiling &/ or 2 mile visibility, Thunder storm warning or GTS > 45 knots
Multi-national Operations		- No occurrences or scheduled friendly operations	- Scheduled or ongoing friendly operations without access restrictions	- Limited friendly operations with access restrictions	- Heavy enemy concentration; multinational forces engaged in ongoing offensive operations
Unit/ Friendly Action		- Absolute verification of no threat	- Threats are possible even if no immediate perceivable threat is present	- An MSR/ASR is assessed as red when USD-N and/or USF-I observes and reports an unconfirmed threat or interrogated, has limited use by multinational forces within last 7 days, or security assets are not available in the specific area. With exception of personnel supporting movement of route clearance and EOD. No USF-I Sustainment Personnel will travel on routes assessed as red, without coordination 96 hours out. The route will remain red until route clearance/sanitization clears or EOD confirms/ mitigates the threat. AABs/AATFs w/Brigade Commander's approval can shut down an MSR/ASR for an hour in case of emergency; USD-N G3 CHOPS is	- A route is assessed as black when no traffic can travel on it due to washout, damage or a unit route clearance, or EOD observes and reports a confirmed threat. With the exception of personnel supporting movement of route clearance and EOD, no USF-I Sustainment Personnel will travel on routes assessed as black. The route will remain black until route clearance or EOD mitigates/ reduces the threat and reports this status to USD-N G3 for further analysis

Table F-1. Route status table

CRITERIA		*GREEN*	*AMBER*	*RED*	*BLACK*
				approval authority if a part of a route will be red for more than 1 hr. USF-I must approve anything past 3 hrs.	

This page intentionally left blank.

Appendix G

Distribution Network Design

G-1. The distribution network design is a graphic representation of the road network (MSR/ASR) as well as control measures such as direction of traffic, check points, halt points, barriers and other identifiers that describe obstructions and warnings. Major distribution nodes such as air/rail/water terminals, Centralized Receiving and Shipping Points (CRSP), or theater distribution centers should be depicted as well.

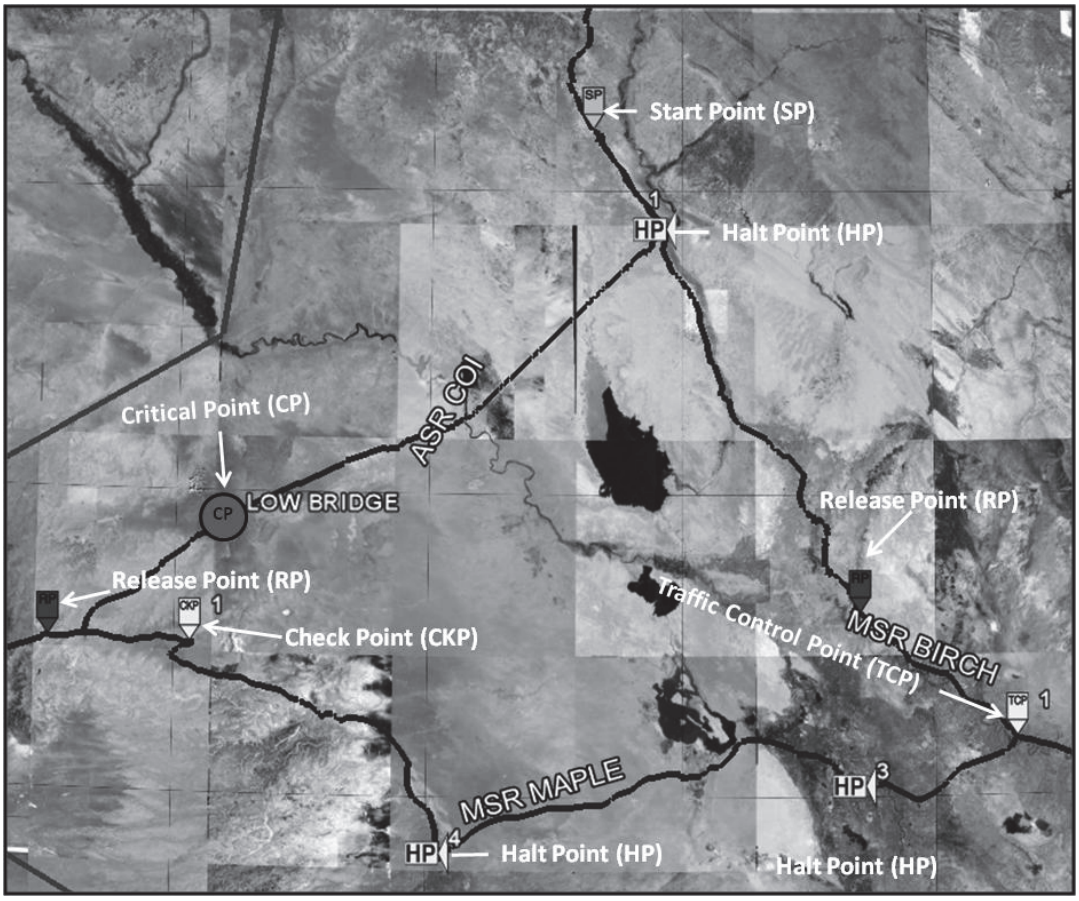


Figure G-1. Distribution network design (Generated in TC-AIMS II)

G-2. Figure G-1 depicts a screen shot of a Distribution Network Design generated from TC-AIMS II. The system allows configuration of MSRs and ASRs by road types, rate of speed and direction of travel in the attributes function which is not physically depicted on the illustration of the distribution network design. Critical points such as bridges and tunnels can be depicted on the illustration. However, the flow type of the road, weight, width, height limitations and track restrictions are depicted in the editor function on the system. Points of interests can be depicted by selecting a point on the map near an MSR or ASR to illustrate a barrier. These points are automatically snapped to the road by the system.

This page intentionally left blank.

Glossary

SECTION I – ACRONYMS AND ABBREVIATIONS

2D	two dimensional
A/DACG	arrival/departure airfield control group
AALPS	Automated Air Load Planning System
ACA	airlift clearance authority
ADP	Army Doctrine Publication
AIS	automated information systems
AIT	automactic identification technology
AMC	Air Mobility Command
AMC	Army Materiel Command
AMS	Automated Manifest System
AO	area of operation
AOR	area of responsibility
APOD	aerial port of debarkation
APOE	aerial port of embarkation
ASCC	Army Service component commander
ASP	ammo supply points
ASR	alternate supply routes
ATP	Army Technical Publication
AUEL	automated unit equipment list
BCT	brigade combat team
BMCT	branch movement control team
BSB	brigade support battalion
CAB	combat aviation brigade
CAPS II	Consolidated Aerial Port System II
CHE	container handling equipment
CMOS	Cargo Movement Operations System
COMPASS	Computerized Movement Planning and Status System
CONOPS	concept of operations
CONUS	Continental United States
COP	common operating picture
CP	check point
CP	command post
CRSP	centralized shipping and receiving point
CS	combat support
CSC	convoy support center
CSSB	combat sustainment support battalion
CTO	corps transportation officer
DAAS	Defense Automated Addressing System

DDOC	Deployment and Distribution Operations Center
DLA	Defense Logistics Agency
DMC	distribution management center
DOD	Department of Defense
DODAAC	Department of Defense Activity Address Code
DS	direct support
DTG	date time group
DTO	division transportation officer
DTS	defense transportation system
DTTS	Defense Transportation Tracking System
ESC	expeditionary sustainment command
EAD	echelon above division
FDRP	first destination reporting point
FSC	forward support company
FORSCOM	United States Army Forces Command
FRAGO	fragmentary orders
GATES	Global Air Transportation Execution System
GCC	Geographic Combatant Commander
GCCS	Global Command and Control System
GCSS	Global Combat Support System
GCSS-Army	Global Combat Support System-Army
GPS	global positioning system
GTN	Global Transportation Network
HAZMAT	hazardous material
HHI	hand held interrogators
HN	host nation
HNS	host nation support
HQ	headquarters
HTS	highway traffic section
IBS	Integrated Booking System
ICG	Integrated Development Environment/Global
ICODES	Integrated Computerized Deployment System
ICTC	inland cargo transfer company
ITO	installation transportation officer
ITV	in-transit visibility
JDDC	joint deployment and distribution operations center
JFC	joint force commander
JMC	joint movement center
JOPES	Joint Operation Planning and Execution System
JTB	joint transportation board
JTF	joint task orce

JTF-PO	joint task force - port opening
LAN	local area network
LOC	lines of communication
MC	movement control
MCB	movement control battalion
MCT	movement control team
MEB	maneuver enhancement brigade
METT-TC	mission, enemy, terrain and weather, troops and support available, time available, and civil considerations
MHE	material handling equipment
MMC	material management center
MP	military police
MRO	materiel release order
MRT	movement regulating team
MSC	Military Sealift Command
MSL	military shipping label
MSR	main supply route
MTS	Movement Tracking System
MWO	mobility warrant officer
NCO	non-commissioned officer
NGO	non-govenmental organization
NIPRNet	non secure classified internet protocol router network
NSN	national stock number
OCCA	ocean cargo clearance authority
OCONUS	outside the continental United States
OEL	organizational equipment list
OMC	optical memory card
OPLAN	operation plan
OPORD	operation order
PDF	portable data file
PIC	positive inbound clear
PM	provost marshal
POC	point of contact
POD	port of debarkation
POE	port of embarkation
POL	petroleum, oil, and lubricants
PPO	plans, programs, and operations
PRAMS	Passenger Reservation and Manifest System
PSN	proper shipping name
RDD	required delivery date
RF	radio frequency

RFID	radio frequency identification
RP	release point
RPOE	rapid port opening element
RSOI	reception, staging, onward-movement and integration
SA	staging area
SAAS-MOD	Standard Army Ammunition System – Modernized
SARSS	Standard Army Retail Supply System
SBU	sensitive but unclassified
SDDC	Surface Deployment and Distribution Command
SOP	standard operating procedures
SP	start point
SPM	single port manager
SPO	support operations
SPOD	seaport of debarkation
SPOE	seaport of embarkation
SRP	soldier readiness processing
SSA	supply support activity
STMR	standing transportation movement release
TAA	tactical assembly area
TAV	total asset visibility
TC-AIMS II	Transportation Coordinators' Automated Information for Movements System II
TCC	transportation component command
TCE	transportation command element
TCN	transportation control number
TDD	time definite delivery
T-JTB	theater joint tranportation board
TMR	transportation movement release
TOE	table of organization and equipment
TP	transportation priority
TPFDD	time phased force deployment data
TRANSCOM	transportation command
TSC	theater sustainment command
TTOE	transportation theater opening element
TTP	trailer transfer point
UDL	unit deployment list
UMC	unit movement coordinator
UMD	unit movement data
UMO	unit movement officer
USA	United States Army
USAF	US Air Force
USAMC	United States Army Materiel Command

USTRANSCOM	United States Transportation Command
WPS	Worldwide Port System

SECTION II – TERMS

alternate supply routes (ASR)

(Army) A route or routes designated within an area of operations to provide for the movement of traffic when main supply routes become disabled or congested. Also called ASR. See also main supply route. (ADP 4-0)

automatic identification technology (AIT)

A suite of tools for facilitating total asset visibility source data capture and transfer. Automated identification technology includes a variety of devices, such as bar codes, magnetic strips, optical memory cards, and radio frequency tags for marking or "tagging" individual items, multi-packs, equipment, air pallets, or containers, along with the hardware and software required to create the devices, read the information on them, and integrate that information with other logistic information. Also called AIT. (JP 3-35)

boundary

A line that delineates surface areas for the purpose of facilitating coordination and deconfliction of operations between adjacent units, formations, or areas. (JP 3-0)

*** centralized control**

(Army) Centralized Control means that a focal point for transportation planning and resource allocation exists at each level of command involved in an operation. The focal point is an individual or unit that is aware of the current and future requirements of the supported force as well as the capabilities available to meet the requirements. Centralization of movement control normally occurs at the levels charged with integrating logistics support.

***committal authority**

The ability to obligate Army common user transportation assets against a transportation movement requirement. It does not indicate a mission command relationship and therefore is different than tasking authority.

common-user-transportation

(DOD) Transportation and transportation services provided on a common basis for two or more Department of Defense agencies and, as authorized, non-Department of Defense agencies. Common-user assets are under the combatant command (command authority) of Commander, United States Transportation Command, excluding Service-organic or theater-assigned transportation assets. (JP 4-01.2)

contingency

A situation requiring military operations in response to natural disasters, terrorists, subversives, or as otherwise directed by appropriate authority to protect US interests. (JP 5-0)

ford

A shallow part of a body of water or wet gap that can be crossed without bridging, boats, ferries, or rafts. It is a location in a water barrier where the physical characteristics of current, bottom, and approaches permit the passage of personnel, vehicles, and other equipment where the wheels or tracks remain in contact with the bottom at all times. (ATTP 3-09.4)

lines of communication (LOC)

A route, either land, water, and/or air, that connects an operating military force with a base of operations and along which supplies and military forces move. (JP 2-01.3)

main supply route (MSR)

The route or routes designated within an operational area upon which the bulk of traffic flows in support of military operations. (JP 4-01.5)

marshalling area

A location in the vicinity of a reception terminal or prepositioned equipment storage site where arriving unit personnel, equipment, material, and accompanying supplies are reassembled, returned to the control of the unit commander, configured in an effective way, and prepared for onward movement. The joint complex commander and designating the location will coordinate the use of the facilities with other allied commands and the host nation, and will provide life support to the units while in the marshalling area. (JP 3-35)

military load classification (MLC)

(DOD, NATO) A standard system in which a route, bridge, or raft is assigned class number(s) representing the load it can carry. Vehicles are also assigned number(s) indicating the minimum class of route, bridge, or raft they are authorized to use. (JP 1-02)

Military Sealift Command (MSC)

A major command of the US Navy reporting to Commander Fleet Forces Command, and the US Transportation Command's component command responsible for designated common-user sealift transportation services to deploy, employ, sustain, and redeploy US forces on a global basis. Also called MSC. (JP 4-01.2)

movement control

(Army) The dual process of committing allocated transportation assets and regulating movement according to command priorities to synchronize the distribution flow over lines of communications to sustain land forces. (ADRP 4-0)

movement credit

The allocation granted to one or more vehicles in order to move over a controlled route in a fixed time according to movement instructions. (FM 55-30)

movement requirement

A stated movement mode and time-phased need for the transport of units, personnel, and/or materiel from a specified origin to a specified destination. (JP 4-09)

movement table

A table giving detailed instructions or data for a move. When necessary it will be qualified by the words road, rail, sea, air, etc., to signify the type of movement. Normally issued as an annex to a movement order or instruction. (JP 4-09)

node

A location in a mobility system where a movement requirement is originated, processed for onward movement, or terminated. (JP 3-17)

ocean cargo clearance authority (OCCA)

The Surface Deployment and Distribution Command activity that books Department of Defense sponsored cargo and passengers for surface movement, performs related contract administration, and accomplishes export and import surface traffic management functions for Department of Defense cargo moving within the Defense Transportation System. (JP 4-01.2)

operational control

Command authority that may be exercised by commanders at any echelon at or below the level of combatant command. Operational control is inherent in combatant command (command authority) and may be delegated within the command. When forces are transferred between combatant commands, the command relationship the gaining commander will exercise (and the losing commander will relinquish) over these forces must be specified by the Secretary of Defense. Operational control is the authority to perform those functions of command over subordinate forces involving organizing and employing commands and forces, assigning tasks, designating objectives, and giving authoritative direction necessary to accomplish the mission. Operational control includes authoritative direction over all aspects of military operations and joint training necessary to accomplish missions assigned to the command. Operational control should be exercised through the commanders of subordinate organizations. Normally this authority is exercised through subordinate joint force commanders and Service and/or functional component commanders. Operational control normally provides full

authority to organize commands and forces and to employ those forces as the commander in operational control considers necessary to accomplish assigned missions; it does not, in and of itself, include authoritative direction for logistics or matters of administration, discipline, internal organization, or unit training. (JP 1)

organic

Assigned to and forming an essential part of a military organization. Organic parts of a unit are those listed in its table of organization for the Army, Air Force, and Marine Corps, and are assigned to the administrative organizations of the operating forces for the Navy. (JP 1-02)

port of debarkation (POD)

The geographic point at which cargo or personnel are discharged. It may be a seaport or aerial port of debarkation. For unit requirements, it may or may not coincide with the destination. (JP 4-0)

port of mbarkation (POE)

The geographic point in a routing scheme from which cargo or personnel depart. May be a seaport or aerial port from which personnel and equipment flow to port of debarkation. For unit and nonunit requirements, it may or may not coincide with the origin. (JP 4-01.2)

***positive inbound clearance (PIC)**

The process of the origin MCT contacting the destination MCT before a TMR is created to ensure the destination unit has the ability to receive the shipment.

preposition

To place military units, equipment, or supplies at or near the point of planned use or at a designated location to reduce reaction time, and to ensure timely support of a specific force during initial phases of an operation. (JP 4-0)

reception

1. All ground arrangements connected with the delivery and disposition of air or sea drops. Includes selection and preparation of site, signals for warning and approach, facilitation of secure departure of agents, speedy collection of delivered articles, and their prompt removal to storage places having maximum security. When a group is involved, it may be called a reception committee. 2. Arrangements to welcome and provide secure quarters or transportation for defectors, escapees, evaders, or incoming agents. 3. The process of receiving, offloading, marshalling, and transporting of personnel, equipment, and materiel from the strategic and/or intratheater deployment phase to a sea, air, or surface transportation point of debarkation to the marshalling area. (JP 3-35)?The process of receiving, offloading, marshalling, and transporting of personnel, equipment, and materiel from the strategic and/or intratheater deployment phase to a sea, air, or surface transportation point of debarkation to the marshalling area. (JP 3-35)

required delivery date (RDD)

The date that a force must arrive at the destination and complete unloading. (JP 5-0)

staging

Assembling, holding, and organizing arriving personnel, equipment, and sustaining materiel in preparation for onward movement. The organizing and preparation for movement of personnel, equipment, and materiel at designated areas to incrementally build forces capable of meeting the operational commander's requirements. (JP 3-35)

staging area

1. Amphibious or airborne — A general locality between the mounting area and the objective of an amphibious or airborne expedition, through which the expedition or parts thereof pass after mounting, for refueling, regrouping of ships, and/or exercise, inspection, and redistribution of troops.

2. Other movements — A general locality established for the concentration of troop units and transient personnel between movements over the lines of communications. (JP 3-35)

***standing transportation movement release (STMR)**

A term used for a TMR that assigns a transportation capability to a transportation movement requirement that has the same origin, destination, load time, spot time, pull time and is required over multiple days.

Surface Deployment and Distribution Command (SDDC)

A major command of the US Army, and the US Transportation Command's component command responsible for designated continental United States land transportation as well as common-user water terminal and traffic management service to deploy, employ, sustain, and redeploy US forces on a global basis. (JP 4-09)

theater

The geographical area for which a commander of a geographic combatant command has been assigned responsibility. (JP 1)

theater of operations

An operational area defined by the geographic combatant commander for the conduct or support of specific military operations. Also called TO. See also theater of war. (JP 3-0)

time definite delivery (TDD)

The consistent delivery of requested logistics support at a time and destination specified by the receiving activity. (JP 4-09)

Time Phased Force Deployment Data (TPFDD)

The time-phased force data, non-unit cargo and personnel data, and movement data for the operation plan or operation order or ongoing rotation of forces. (JP 5-0)

Transportation Component Command (TCC)

The three component commands of United States Transportation Command Air Force Air Mobility Command, Navy Military Sealift Command, and Army Surface Deployment and Distribution Command. Each transportation component command remains a major command of its parent Service and continues to organize, train, and equip its forces as specified by law. Each transportation component command also continues to perform Service-unique missions. (JP 4-01.6)

transportation movement release (TMR)

A document that assigns a transportation capability to a transportation movement requirement and provides the movement details of the requirement.

References

REQUIRED PUBLICATIONS

These documents must be available to intended users of this publication.

ADRP 1-02, *Operational Terms and Military Symbols,* 31 August 2012

JP 1-02, *Department of Defense Dictionary of Military and Associated Terms*, 8 November 2011

RELATED PUBLICATIONS

These documents contain relevant supplemental information.

JOINT PUBLICATIONS

JP 3-0, *Joint Operations*, 22 March 2010

JP 3-35, *Deployment and Redeployment Operations*, 07 May 2007

JP 4-01, *Joint Doctrine for the Defense Transportation System*, 19 March 2003

JP 4-01.5, *Joint Terminal Operations*, 05 February 2010

JP 4-09, *Distribution Operations*, 05 February 2010

ARMY PUBLICATIONS

ADP 3-0, *Unified Land Operations*, 10 October 2011

ADP 4-0, *Sustainment*, 31 July 2012

ADRP 4-0, *Sustainment*, 31 July 2012

ATTP 4-0.1, *Army Theater Distribution*, 20 May 2011

DA PAM 700-85, *Automatic Identification Technology (AIT) Integration Guide*, 27 December 2000

FM 3-35, *Army Deployment and Redeployment*, 21 April 2010

FMI 4-93.2, *The Sustainment Brigade*, 04 February 2009

FM 4-94, *Theater Sustainment Command*, 12 February 2010

FM 55-1, *Transportation Operations*, 03 October 1995

FM 55-30, *Army Motor Transport Units and Operations*, 27 June 1997

FM 55-60, *Army Terminal Operations*, 15 April 1996

FM 55-80, *Army Container Operations*, 31 August 1997

OTHER PUBLICATIONS

MIL-STD-129, *Military Marking for Shipment and Storage*, September 2007

Technical Bulletin (TB) 55-46-1, *Standard Characteristics (Dimensions, Weight, and Cube) for Transportability of Military Vehicles and Other Outsize/Overweight Equipment (in TOE Line Item Number Sequence)*, February 2010

10 USC *Title 10*, *Armed Forces*

Title 49, *CFR Transportation*

USTRANSCOM *Joint Task Force – Port Opening (JTF-PO) Aerial Port of Debarkation (APO) Concept of Operations (CONOPS)*, 01 January 2009, Version 2.0

USTRANSCOM Joint Task Force – Port Opening (JTF-PO) Seaport of Debarkation (SPOD) Concept of Operations (CONOPS), *Interim Supplement*, 01 August 2008

DTR Reg 4500.9-R, Part II, *Cargo Movement*, June 2008

DTR Reg 4500.9-R, Part VI, *Management and Control of Intermodal Containers and System 463-L Equipment*, September 2007

DEPARTMENT OF DEFENSE FORMS

DD Form 1265, Request for Convoy Clearance.

DD Form 1266, Request for Special Hauling Permit.

DEPARTMENT OF THE ARMY FORMS

DA Form 2028, Recommended Changes to Publications and Blank Forms.

DA Form 759, Individual Flight Record and Flight Certificate-Army.

Index

This page intentionally left blank.

ATP 4-16 (FM 4-01.30)
5 April 2013

By Order of the Secretary of the Army:

RAYMOND T. ODIERNO
General, United States Army
Chief of Staff

Official:

JOYCE E. MORROW
Administrative Assistant to the
Secretary of the Army
1310604

DISTRIBUTION:

Active Army, Army National Guard, and United States Army Reserve: Not to be distributed; electronic media only.

PIN: 103277-000