USMC

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Distribution and Transportation Operations

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FOREWORD

Marine Corps Tactical Publication (MCTP) 3-40F, *Distribution and Transportation Operations*, addresses the fundamental principles required for the planning and execution of Marine air-ground task force distribution and transportation operations.

This publication provides a broad doctrinal overview for commanders and their staffs on transportation support tasks and functions related to Marine air-ground task force operations. Additionally, it provides the reader with a conceptual understanding of distribution and transportation capabilities, planning considerations, command relationships, support requirements, and considerations for the successful execution of missions across the range of military operations.

This publication supersedes MCTP 3-40F, *Transportation Operations*, dated 5 September 2001.

Reviewed and approved this date.

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CHAPTER 1
FUNDAMENTALS

The Marine Corps organizes tactical-level logistics into six functions of combat service support (CSS). One of those functions is transportation; however, the description of the transportation function in tactical-level logistics lacks the detail necessary to provide a complete picture of how to staff, equip, deploy, and sustain a force. At the joint level, distribution is one of the seven core functions of logistics and includes transportation as part of its description. Distribution and transportation are therefore interrelated, and together these two concepts help complete the picture on how to staff, equip, deploy, and sustain the operational forces.

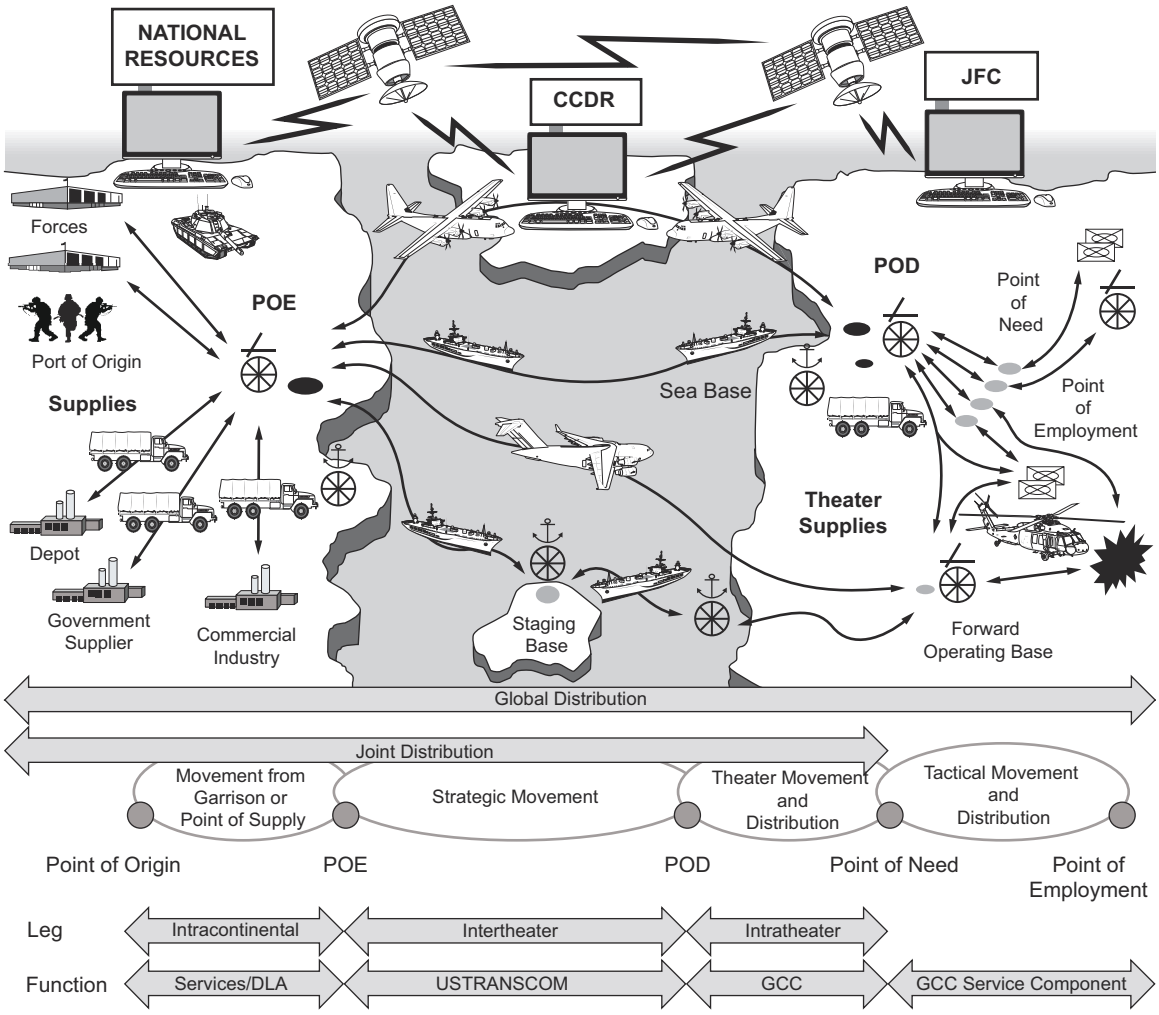
Transportation is executed over lines of communications (LOCs) that are used to provide movement of resources from one node to another utilizing roads, railroads, waterways, pipelines, oceans, and airways. Transportation enables a Marine air-ground task force (MAGTF) to establish, execute, and sustain operations involving both mature and immature theaters at the strategic, operational, and tactical levels. Any major disruption of transportation support can adversely affect a MAGTF commander's ability to distribute resources; therefore, the commander's capacity to establish, execute, and sustain assigned missions is tied directly to the distribution capacity of transportation assets.

DISTRIBUTION

Distribution is the operational process of synchronizing all elements of the logistic system to deliver the right things to the right place at the right time to support the geographic combatant commander. (*DOD Dictionary of Military and Associated Terms*, hereafter referred to as *DOD Dictionary*) It includes the ability to plan and execute movement of forces for deployment and redeployment, as well as sustainment and retrograde operations. See Joint Publication (JP) 4-09, *Distribution Operations*, for detailed information on distribution.

The distribution network contains nodes that are connected by LOCs designed to move cargo and passengers from the point of origin to the point of employment. The distribution manager is the executive agent for managing distribution within the combatant commander's area of responsibility.

See figure 1-1 for an illustration of the global distribution network.



LEGEND

CCDR combatant commander DLA Defense Logistics Agency GCC geographic combatant commander

Figure 1-1. Global Distribution Network.

TRANSPORTATION

Transportation is the movement of cargo and passengers from one node in the distribution network to the next node or point of employment on the battlefield. At the MAGTF-level, landing support activities establish or occupy nodes that receive, and stage for employment, personnel and cargo from theater distribution via transportation agencies.

TRANSPORTATION NODES

A node is a location in the defense transportation system where a movement requirement is originated, processed for onward movement, or terminated. Terminals are the major nodes where cargo and passengers embark, disembark, or change mode of transportation. The functions organic to the MAGTF that support the throughput of cargo and passengers are covered in the following subparagraphs.

Embarkation

Embarkation is the process of putting personnel and/or vehicles and their associated stores and equipment into ships and/or aircraft. (*DOD Dictionary*) Since the MAGTF must maximize its combat power in the shortest possible time, the embarkation process must support the rapid and orderly build up and assembly of personnel and materiel. This requires the placement in their assigned shipping to be in a sequence designed to meet the combat power requirements of the MAGTF's operations. Additionally, proper embarkation enhances the force projection effectiveness of the MAGTF.

Materials Handling

Materials handling is the movement of materiel from the supplier to the shipper or user; from warehouses and storage areas to receiving, shipping areas, and ultimately the end user. Materials handling equipment (MHE) is a collection of mechanical devices for handling supplies and cargo with greater ease and economy. The MAGTF transportation planners coordinate across joint capability providers, coalition forces, and host nations to establish capabilities to receive, handle, store, load, and distribute essential cargo. These capabilities are based on the availability of host-nation agreements, MHE, cargo handling equipment, cranes, ramps, labor, storage capacity, and other factors that affect transportation services. This information and the availability of a materials handling capability is necessary to efficiently schedule transportation and prevent congestion. An effective throughput concept is vital for successful support of combat operations. Therefore, supported units must provide accurate data when developing transportation requirements and inform transportation planners of current and projected operating sites and available materials handling capability. Effective use of available MHE is essential to movement control and maintaining the throughput of supplies and equipment.

Landing Support

Landing support is the assistance provided to affect the efficient and responsive throughput of personnel, supplies, and equipment during the ship-to-shore movement phase of amphibious operations or across beaches in support of operations ashore. It includes control of the flow of personnel and material across the beach and into landing zones (LZs). Landing support does not end when the MAGTF completes the assault. It continues through landing of the assault follow-on echelons and sustainment operations. Landing support also includes the evacuation of casualties and enemy prisoners of war (EPWs).

MODES OF TRANSPORT

Modes of transport are categorized by sea transport (coastal and ocean), air transportation, and inland surface transportation (road, rail, and inland waterway). The following subparagraphs further defines these modes.

Sea Transport

The main characteristic and advantage of sea transport is its large carrying capacity and endurance. Sea transport is ideally suited for transporting large amounts of equipment and materiel. The principal limitations of sea transport are its vulnerability, particularly in ports or at anchorage, and its slow speed. However, because of its ability to move a large volume of cargo, it remains the most economical and is often the fastest way to deploy large amounts of equipment. Therefore, it is the principal mode of transportation for overseas movement of materiel. Sea transport is normally not the best method for deploying personnel, with the exception of an amphibious landing force.

Air Transportation

Although air transportation is a relatively expensive mode of transportation, its inherent speed, range, and flexibility make it ideally suited for military operations over complex and restrictive terrain. Aerial delivery is conducted through the means of air transportation. Aerial delivery provides speed and range through fixed-wing, rotary-wing, and tiltrotor transport aircraft. It enables the rapid deployment of forces, supplies, and equipment over long distances. The longer the distance and the shorter the time available, the more attractive the use of air transportation becomes in order to seize the initiative via speed and surprise and by providing follow-on sustainment of critical materiel. The two types of aerial delivery operations are airdrop and air-land (both internal and sling load).

Inland Surface Transportation

Movement of cargo, for both material and forces, usually begins and ends with land transportation but also includes inland waterways. Inland surface transportation is flexible, utilizing road and rail transportation systems to move cargo across trafficable terrain and inland waterways when the terrain is not trafficable or when time in transit is not of overriding importance.

Road. The road system is the most versatile mode of transportation that links the aerial ports, seaports, supply centers, rail, and inland waterway terminals. The tactical motor transportation fleet is specifically designed to provide ground mobility to combat and CSS units. It is an all-weather mode of transportation that the MAGTF commander can use over any trafficable terrain, to include off-road. Motor transportation units can move nearly any type of cargo over local and limited line hauls. The commander may use organic, attached, contracted, or supporting motor transportation assets to support operations. Special loads, such as main battle tanks, require specialized rolling stock.

Rail. Railways are unrivalled in their capacity to move heavy and bulky loads over long distances at relatively high speeds. Rail capacity is dependent upon factors such as loading gauges, passing facilities, and the availability of motive power and rolling stock.

Planning in the continental United States (CONUS) should take place 90 days before movement if possible, but can be executed in as little as 14 days, in some cases. The strategic rail corridor network, also known as STRACNET, is a CONUS designated rail network that allows for movement to most training areas and major seaports. Remote and rugged areas are often not served by rail because the laying of new track is both expensive and time consuming.

Inland Waterway. Inland waterway transport can be operated on rivers, canals, inland seas, lakes, and intercoastal routes for ship-to-shore discharge. It is particularly suited for the carriage of heavy and bulky equipment, stores, and fuel and bulk nonperishable food when time in transit is not of overriding importance. Many countries have natural inland waterway transport routes based on rivers and lakes that provide the only viable means for bulk transport. Many industrialized countries also have good inland waterway transport infrastructures that should not be overlooked in movement planning.

THROUGHPUT

Throughput is the average quantity of cargo and passengers that passes through a node on a daily basis in support of military operations, at all levels, from the point of origin to the point of use, to establish, execute, and sustain the force. The throughput measurement provides distribution managers with performance indicators that can be correlated to measure the effectiveness of process improvements.

Throughput, in transportation, is the average quantity of cargo and passengers that can pass through a port on a daily basis from arrival at the port to loading onto a ship or plane, or from the discharge of a ship or plane to the exit (clearance) from the port complex. (*DOD Dictionary*) Throughput is usually expressed in measurements of tons, short tons, or passengers.

Throughput capacity is the estimated capacity of a port or an anchorage to clear cargo and/or passengers in 24 hours; cargo is usually expressed in tons, but may be expressed in any agreed upon unit of measurement.

JOINT OPERATION PLANNING AND EXECUTION SYSTEM

The Joint Operation Planning and Execution System (JOPES) combines individual Service terminology and operating procedures into one standard, multifaceted system. It provides standardization to the joint planning system used for the execution of complex multi-Service exercises, campaigns, and operations. The JOPES uses a set of command and control (C2) techniques and processes, supported by a computerized information system, to ensure the right amount of timely support gets to the warfighter to ensure a decisive victory. The JOPES does this by providing movement requirements to lift providers for use in their plan development. The system includes automated data processing support for planners and commanders by providing both hardware (computers) and software (programs) to facilitate joint operation planning and execution. It is the tool used by all echelons of planners and operators to speak a commonly understood language.

CHAPTER 2
DISTRIBUTION NETWORK

Distribution and transportation operations are executed with significant differences in magnitude and scope at each level of sustainment. Therefore, logistic planners must have a comprehensive understanding of the distribution network in order to align appropriate transportation requirements to the different transportation and distribution organizations.

UNITED STATES TRANSPORTATION COMMAND

The United States Transportation Command (USTRANSCOM) is a Department of Defense (DOD) unified functional command with the mission to provide strategic air, land, and sea transportation and to provide common-user port management across the range of military operations. Thus, USTRANSCOM provides full-spectrum, global mobility solutions and enables capabilities for supported customer requirements in peace and war.

MILITARY SEALIFT COMMAND

The Military Sealift Command is a major command of the US Navy, reporting to the Commander, United States Fleet Forces Command. As the US Navy component command of USTRANSCOM, it is responsible for designated common-user sealift transportation services to deploy, employ, sustain, and redeploy US forces on a global basis. The Military Sealift Command reports through three distinct and separate chains of command: USTRANSCOM for appropriation matters, United States Fleet Forces Command for Navy unique-matters, and the Assistant Secretary of the Navy for Research, Development, and Acquisition for procurement policy and oversight matters. See JP 4-01.2, *Sealift Support to Joint Operations*, for more detailed information on Military Sealift Command's sealift transportation services.

Strategic sealift is the principal delivery means for the equipment and logistic support of land forces. Strategic sealift employed in support of joint logistics over-the-shore operations includes the Military Sealift Command's common-user ships and prepositioning ships. These ships are capable of conducting port operations and joint logistics over-the-shore operations from anchorage. They deliver cargo in accordance with requirements based on cargo delivery dates, the tactical situation, and ship capability and availability. See JP 4-01.6, *Joint Logistics Over-the-Shore*, for more information on strategic sealift.

AIR MOBILITY COMMAND

The Air Mobility Command (AMC) provides strategic lift between CONUS and outside the continental United States for sustained worldwide air mobility operations. These operations consist of aerial delivery, air refueling, air mobility support, and aero-medical evacuation. The AMC also transports humanitarian supplies to hurricane, flood, and earthquake victims both at home and around the world.

SURFACE DEPLOYMENT AND DISTRIBUTION COMMAND

The Surface Deployment and Distribution Command (SDDC) is a major command of the US Army, and the USTRANSCOM's component command responsible for designated CONUS 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.

JOINT TASK FORCE–PORT OPENING

Joint Task Force–Port Opening provides a joint expeditionary capability to rapidly establish and initially operate an aerial port of debarkation (APOD) or seaport of debarkation, conduct cargo handling and movement operations to a forward distribution node, and facilitate port throughput in support of combatant commander executed contingencies. Joint Task Force–Port Opening is designed to be in place in advance of a deployment of forces, sustainment, or humanitarian assistance/disaster relief supplies in order to facilitate joint reception, staging, onward movement, integration, and theater distribution.

DEFENSE TRANSPORTATION SYSTEM

"The Defense Transportation System (DTS) is that portion of the worldwide transportation infrastructure that supports Department of Defense (DOD) transportation needs in peace and war. It consists of two major elements: military (organic) and commercial (nonorganic) resources. These resources include aircraft, ships, barges, rail and road assets, pipelines, services, and systems organic to, contracted for, or controlled by the DOD. The DTS infrastructure, including seaports, aerial ports, railways, highways, pipeline pumping and terminal stations, automated information systems, as well as supporting services, such as in-transit visibility (ITV), customs, and traffic management, are vital elements of the DOD capability to project power worldwide." (JP 4-01, *The Defense Transportation System*)

THEATER DISTRIBUTION NETWORK

The geographic combatant commander theater deployment and distribution operations center maintains an effective theater distribution network. The theater distribution network is the connector between the strategic and the tactical distribution networks (i.e., between the point of origin and the point of employment).

MARINE CORPS LOGISTICS COMMAND

The Marine Corps Logistics Command mission is to provide the Marine Corps with worldwide, integrated logistics through supply chain support and distribution management, to provide a strategic prepositioning capability in support of Marine Corps operating forces to maximize their readiness and sustainability, and to support Marine Corps enterprise/program-level total life cycle management. Marine Corps Logistics Command capabilities supports MAGTF transportation requirements by providing maintained global information systems (i.e., logistics automated information systems [LOGAISs]), operational throughput via forward-deployed distribution teams, and equipment support through prepositioned resources.

UNITED STATES NAVY AMPHIBIOUS SHIPPING

United States Navy amphibious shipping is part of the operational level of the defense transportation network, and it is composed of organic US Navy ships. They are specifically designed to transport, land, and support landing forces in amphibious landing operations, capable of being loaded or unloaded by naval personnel without external assistance in the amphibious objective area. See JP 3-02, *Amphibious Operations*, for additional information.

MARITIME PREPOSITIONING FORCE

A maritime prepositioning force (MPF) operation includes the aerial delivery and sealift of the MAGTF, Navy support element (NSE), and maritime expeditionary security force units (with selected equipment) into an arrival and assembly area (AAA) to join with equipment and supplies that are carried aboard maritime prepositioning ships (MPSs). Maritime prepositioning provides a combatant commander with employment flexibility and an increased capability to respond rapidly to a crisis or contingency with a credible force. An MPF operation may consist of one ship interacting with a forward-deployed Marine expeditionary unit (MEU) or a maritime prepositioning ships squadron (MPSRON) and a Marine expeditionary brigade (MEB) fly-in echelon (FIE). An MPF operation may also consist of a Marine expeditionary force (MEF) interacting with all three MPSRONs. See Marine Corps Tactical Publication (MCTP) 13-10D, *Maritime Prepositioning Force Operations*, for more detailed information on MPF operations.

OPERATIONAL AIR MOBILITY

Operational air mobility support missions are movements of high-priority passengers and cargo with time-, place-, or mission-sensitive requirements. Operational air mobility support aircraft are DOD-owned and/or controlled fixed- or rotary-wing aircraft acquired and/or retained exclusively for operational air mobility support missions. Operational air mobility aircraft are controlled by the combatant commander. See JP 3-35, *Deployment and Redeployment Operations*, and JP 3-17, *Air Mobility Operations*, for more information.

INTERTHEATER AIRLIFT

Intertheater airlift assets are the common-user aircraft linking theaters to the United States and/or other theaters. The majority of these air mobility assets are assigned to the Commander, USTRANSCOM. Because of the ranges usually involved, intertheater air mobility is normally conducted by the heavy long-range intercontinental aerial delivery assets but, may be augmented with short-range aircraft when required. See JP 3-17 for more information.

UNITED STATES ARMY MOTOR TRANSPORT

United States Army motor transportation organizations and assets are capable of supporting and interfacing with joint, multinational, multi-agency, nongovernmental organizations, host nation, and commercial operations in the conduct of their transportation mission. United States Army motor transportation operations are fully capable of integrating dissimilar resources, as required, to meet the operational requirements of the joint force commander (JFC).

RAIL OPERATIONS

In theater, rail operations may consist of a broad initial or pre-invasion plan based on limited time and intelligence data available. As more detailed data becomes available, the initial plan is modified based on the estimates and potential movement capability of the railway system. The utilization of rail operations is requested through the MAGTF deployment and distribution operations center (MDDOC).

MAGTF Deployment and Distribution Operations Center

Located within the MAGTF command element, the MDDOC will conduct integrated planning; provide inventory resources; and provide guidance, direction, coordination, and transportation monitoring as they relate to management of the MAGTF's distribution process.

MAGTF Movement Control Center

The MAGTF movement control center (MMCC), a standing element of the MDDOC, allocates, schedules, and coordinates ground transportation requirements based on the MAGTF commander's priorities. The size and scope of the MMCC scales appropriately to meet mission requirements of the MAGTF (MEF, MEB, MEU, and special purpose MAGTF) that it supports. The MMCC supports the planning and execution of MAGTF movements and reports directly to the MDDOC. The MMCC coordinates all MAGTF ground movement scheduling, equipment augmentation, transportation requirements, MHE, and other movement support as necessary. In addition, it coordinates activities with installation operations, support groups, and unit movement control centers (UMCCs) and coordinates MAGTF priorities with the terminal operations organizations via the MDDOC. See appendix A for step-by-step instructions to properly build a movement control center symbol.

MAGTF Materiel Distribution Center

The MAGTF materiel distribution center (MMDC) is the MAGTF's distribution element. Its mission is to provide general shipping and receiving services and consolidated distribution services, maintain asset visibility to enhance throughput velocity, and sustain operational tempo. The MMDC is located in the Marine logistics group (MLG) for garrison operations. The MMDC integrates/collocates with the base freight operation centers to train and maintain distribution competence. However, the MMDC resides with the logistics combat element (LCE) during deployed operations. In a deployed environment, LCE will establish and operate the distribution network and coordinate as necessary with the MDDOC.

Unit Movement Control Center

Unit movement control centers are standing organizations that support the marshalling and movement of assigned subordinate units. They are established at major subordinate commands (MSCs) or major subordinate elements (also referred to as MSEs) and, as required, for units subordinate to the MSCs/ major subordinate elements. Additionally, the UMCC will coordinate with the MDDOC as necessary.

Distribution Liaison Cells

Distribution liaison cells are distribution elements that are manned by the LCE. Distribution liaison cells are task-organized and structured to perform various tasks at ports of embarkation (POEs)/ports of debarkation (PODs) or forward operating areas, including, but not limited to, providing support for deploying MAGTFs. Distribution liaison cells will coordinate with the MDDOC as necessary.

INTRATHEATER AIRLIFT

Intratheater airlift is airlift conducted within a theater. Assets assigned to a geographic combatant commander or attached to a subordinate JFC normally conduct intratheater airlift operations. Intratheater airlift provides air movement and delivery of personnel, equipment, and supplies directly into an objective area through air landing, airdrop, extraction, or other delivery techniques, as well as the air logistic support of all theater forces, including those engaged in combat operations, to meet specific theater objectives and requirements. During large-scale operations, USTRANSCOM assets may be tasked to augment intratheater airlift operations, and may be temporarily attached to a JFC. See JP 3-17 for more information.

Intratheater airlift is provided by the following types of aircraft:

- Fixed-wing medium lift.
- Tiltrotor medium lift.
- Rotary-wing medium/heavy lift.

The aviation combat element (ACE) of the MAGTF will plan and execute an operations cycle to provide assault support of people and supplies. These missions are a specific form of air transportation that occur along the tactical distribution portion of the global distribution network.

Aerial delivery is the air transport of units, personnel, supplies, and equipment. It employs two methods of delivery: airdrops and air landings. Air landings involve personnel or material, which are moved by air and disembarked, or unloaded, after the aircraft has landed or while an aircraft is hovering. Airdrop is the unloading of personnel or material from aircraft in flight.

EXPEDITIONARY FAST TRANSPORT

Expeditionary fast transport (EPF) is used for fast intratheater transportation of troops and equipment. An EPF is capable of transporting 600 short tons 1,200 nautical miles at an average speed of 35 knots. It is capable of operating in shallow-draft ports and waterways, interfacing with roll-on/roll-off discharge facilities, and onloading/offloading of a combat-loaded Abrams main battle tank. The EPF includes a flight deck for helicopter and/or tiltrotor operations and an offload ramp that allows vehicles to quickly drive off the ship. The ramp is suitable for the types of austere piers and quay walls common in developing countries. The EPF's shallow draft (under 15 feet) further enhances littoral operations and port access. This makes the EPF an extremely flexible asset for support of a wide range of operations, including maneuver and sustainment, relief operations in small or damaged ports, flexible logistic support, or as the key enabler for rapid transport. Operated by the Military Sealift Command, the EPF will support joint or coalition force operations of the US Army and US Navy. The main roles of the EPFs are transportation of troops and equipment for a range of global missions. Additionally, this vessel will support military logistic and humanitarian assistance/disaster relief operations.

LANDING FORCE SUPPORT PARTY

The ship-to-shore movement is a complex evolution that generates intensive activity under combat conditions. The landing force support party (LFSP) is a temporary landing force organization composed of US Navy and landing force elements tasked to provide initial combat support and CSS to the landing force during ship-to-shore movement. Its mission is to support the landing and movement of troops, equipment, and supplies across the beaches and into the tactical distribution network. The LFSP facilitates the smooth execution of the landing plan. It is specifically task-organized to facilitate a rapid build up of combat power ashore by ensuring an organized and uniform flow of personnel, equipment, and supplies over the beach in support of the landing force scheme of maneuver.

HELICOPTER/TILTROTOR SUPPORT TEAM

The helicopter/tiltrotor support team (HST) is a task organization whose composition is formed and equipped for employment in pickup zones and LZs. These teams facilitate the pick-up, movement, and landing of air assault troops, equipment and supplies, and the evacuation of selected casualties and EPWs. The team can be as small as a fire team or large enough to include a headquarters element, a helicopter control element, and an LZ platoon. The LZ platoon provides supply and engineer support functions. The helicopter control element consists of an LZ control team provided by the ACE commander when necessary and may include personnel to provide refueling and emergency maintenance. The LZ control team may be task-organized from the Marine air traffic control detachment when the size or scope of the operation warrants and the MAGTF commander determines it is necessary. See MCTP 3-01B, *Helicopterborne Operations*, for more information.

ARRIVAL AND DEPARTURE AIRFIELD CONTROL GROUP

The arrival/departure airfield control group (A/DACG) is responsible for receiving deploying equipment from units at the aerial port of embarkation (APOE) and for coordinating with the US Air Force airlift control element. Departure airfield control groups (DACGs) ensure that cargo and personnel are properly prepared for air shipment and positioned at the ready line. Arrival airfield control groups (AACGs) operate in the APOD. They ensure that cargo and personnel are properly unloaded from aircraft and pass through the APOD. See MCTP 3-40B, *Tactical-Level Logistics*, for more information on A/DACGs.

PORT, BEACH, AND RAILHEAD OPERATIONS GROUPS

The port operations group (POG) is responsible for preparing the port prior to arrival of the MPS, commercial black bottom ships, Military Sealift Command ships, and United States Naval Ships. They are also responsible for the throughput of equipment and supplies as they are offloaded from the ships.

The beach operations group (BOG) organizes and develops the beach area as necessary to support the offload and throughput of equipment and supplies. See MCTP 3-40B for more information.

The railhead operations group will provide expertise in loading and securing equipment on different types of railcars. They also provide traffic control and coordination at the railhead.

CHAPTER 3
COMMAND AND CONTROL

"Command and control is the means by which a commander recognizes what needs to be done and sees to it that appropriate actions are taken." (Marine Corps Doctrinal Publication [MCDP] 6, *Command and Control*) The command and control of a distribution system follows warfighting principles where command functions (e.g., top-down guidance, mission type orders, directives) respond to a feedback loop (e.g., reporting requirements, ITV, automated requisition systems) to allow commanders of transportation capabilities to observe, orient, decide, and act to meet the needs generated by units supported by the system. Agencies that manage parts of the distribution infrastructure provide information up and down the chain of command. Inherent communications systems and infrastructure layout facilitates decentralize execution of transportation which maximizes time, efficiency, and throughput.

Planning and developing the framework of a tactical distribution system is subject to the tenets of the Marine Corps Planning Process. The single-battle concept states that "operations or events in one part of the battlespace often have profound and consequential effects on other areas and events." (Marine Corps Warfighting Publication 5-10, *Marine Corps Planning Process*) To synchronize warfighting functions and assess their effects on one another, the MAGTF utilizes combat operations centers (COCs) as an information flow inducer and C2 decision-making platform. Maneuver is a warfighting function that is controlled from this platform. Maneuver is the employment of forces in the operational area through movement in combination with fires to achieve a position of advantage in respect to the enemy. (*DOD Dictionary*)

The data that is collected and reported over and through C2 nodes must be able to indicate trends that reflect capacity and readiness. Decisions that impact the distribution system should aim to increase the seamless employment of personnel and cargo balanced with cost efficiency.

MOVEMENT CONTROL

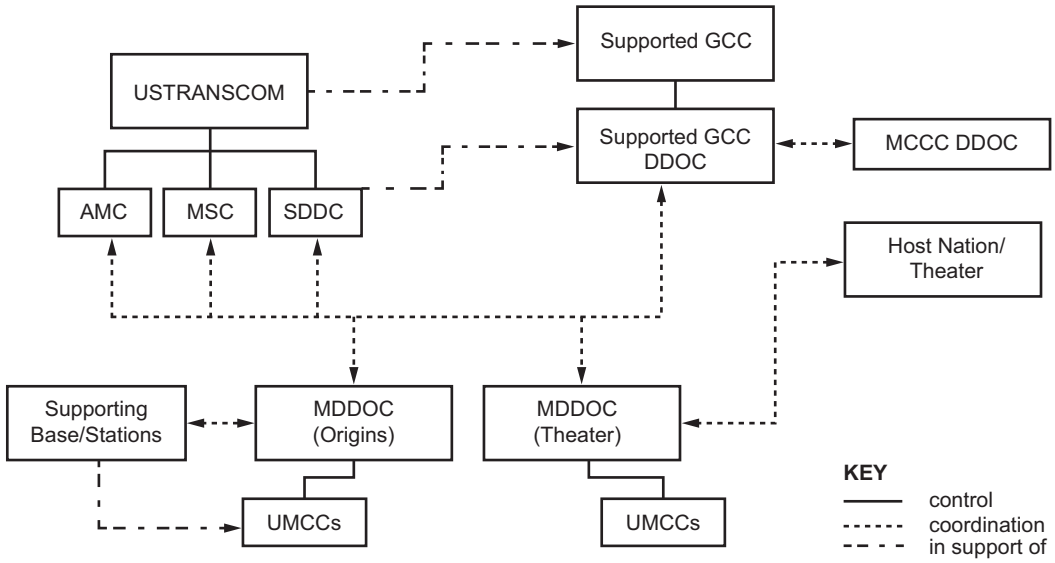
The organizations and their movement control responsibilities described in this paragraph are applicable to marshalling, movement, and deployment. Amphibious and MPF operations apply transportation C2 structure tailored specifically to their specialized mission at the strategic, operational, and tactical level, which is detailed later in this chapter.

A movement control center (MCC) is an agency that plans, routes, and schedules personnel, supplies, and equipment movements over LOCs (e.g., point of origin to POE, POD to final destination, or movements within the area of operations).

Movement control centers are used to execute separate, but integrated, controls on tactical distribution missions. By title, the primary function of the MCC is to control and manage marshalling and movement. The integration with the COC is through information flow, in the form of reports, thereby providing near-real-time status of missions. Since the MCCs function as future operations decision-making platforms for movement control and mission tracking within the LCE, COCs must ensure that there is an information flow to MCCs so they can influence future operations decision-making cycles. Also, MCCs need to have communication with COCs to de-conflict and coordinate operations. A best practice is for units to collocate their COC and MCC functions to facilitate this concept.

One subfunction of a COC is to serve as a current operations decision-making platform for maneuver control. Transportation operations will impact the battlespace operations as transportation along LOCs within the battlespace will require maneuver support and can impact other operations requiring maneuver.

Distribution management and movement control agencies must operate the same way during training exercises as they do during operations. In some cases, the agencies are permanent. For example, every MAGTF should have a full-time transportation section. For smaller units, this may be no more than one or two Marines inside a COC. In other cases, movement control agencies are temporary. Battalions, squadrons, regiments, and groups establish temporary MCCs when their organizations are moving. A local standing operating procedure (SOP) establishes the composition and procedures for MCCs. Figure 3-1 depicts the relationships between various commands, their movement control agencies, and supporting organizations during deployment of a MAGTF.



LEGEND

CCDR	combatant commander	MCCC	Marine Corps combatant commander
DDOC	deployment and distribution center	MSC	Military Sealift Command
GCC	geographic combatant commander		

Figure 3-1. Movement Control Relationships During Deployment.

Movement Control Agencies

Movement control agencies during deployments are detailed in the following subparagraphs.

Marine Forces Movement Control Center. The Marine Forces MCC is primarily an information processing agency that keeps the Marine Corps forces commander abreast of the status of subordinate unit deployments. This MCC can coordinate with USTRANSCOM on transportation requirements, priorities, and allocations as required.

MAGTF Deployment and Distribution Operation Center. The MDDOC is the MAGTF commander's agency to control and coordinate all deployment support activities. It exists as an activity at the MEF- and MEB-level staffs. The MEUs coordinate this level of support from the higher headquarters (HHQ) MEB or MEF. The MDDOC is also the agency that coordinates with USTRANSCOM component commands (e.g., AMC, SDDC, and Military Sealift Command). When the MAGTF operates as part of a joint force under a JFC, the MDDOC coordinates with USTRANSCOM via the JFC's joint deployment and distribution operations center (JDDOC), which coordinates the requirements for all Service components.

The MDDOC, located within the MAGTF command element, conducts integrated planning, provides guidance and direction, and coordinates and monitors transportation resources in its role as the manager of the MAGTF's distribution process. The MDDOC operates under the cognizance of the G-3 and is manned by the G-4. The arrangement requires integration of the MDDOC's activities with the counterpart staff section; normally, the components of the MDDOC are not split between two sections. The MDDOC tasks include the following:

- Manage movement priorities and movement control procedures per the MAGTF commander's intent.
- De-conflict competing distribution priorities.
- Maintain visibility of MAGTF distribution resources.
- Provide container control management for the MAGTF.
- Coordinate and maintain asset visibility requirements and implementation throughout the distribution pipeline.
- Coordinate and supervise distribution process training.
- Coordinate strategic and operational level deployment distribution support with higher and adjacent agencies in support of the MAGTF.
- Participate in the development of the air tasking order (ATO) in order to coordinate the use of aviation distribution assets.
- Monitor and oversee the cargo routing matrix and manage the cargo routing information file and the defense automated addressing system.
- Serve as the MAGTF-level air clearance authority validator.
- Serve as the MAGTF reception, staging, onward movement, and integration coordinator.

MAGTF Movement Control Center. The MMCC is a standing organization and a subordinate element of the MDDOC that allocates, schedules, and coordinates internal transportation requirements based on the MAGTF commander's priorities. At the MEF level, the MMCC

supports the planning and execution of MAGTF movements. The MMCC coordinates all MAGTF ground movement scheduling, equipment augmentation, transportation requirements, MHE, and other movement support. In a theater of operations, the MMCC will de-conflict and coordinate ground movements on theater-controlled routes, and register requirements to the joint movement center for support. In addition, the MMCC coordinates activities with installation operations, supporting commands, and MSC UMCCs. The MMCC tasks include the following:

- Serve as the MAGTF transportation capacity manager.
- Coordinate air movement distribution requirements with the MDDOC, as required.
- Coordinate cross-boundary and movement clearance requests within the MAGTF, joint, and/or coalition battlespace.
- Coordinate with the MAGTF inventory capacity manager to locate inventory points based on the MAGTF's transportation capability in order to facilitate distribution efforts throughout the logistic chain.
- Provide transportation route overlays and traffic circulation plans to support MEF operation plans.
- Coordinate with the MAGTF intelligence and operations sections for route reconnaissance, classification, and selection.
- Collect, process, and distribute information on main supply route status as needed.
- Coordinate convoy clearances issued by battlespace owners.
- Develop, publish, and manage the execution of the surface tasking order/ground transportation order to direct and coordinate organic, commercial, and host-nation movements.
- Draft directives, policies, and fragmentary orders related to transportation management and movement control.
- Maintain visibility of all movements within the MAGTF area of operations, ensuring ground movements are part of the common operational picture.
- Establish and conduct movement control boards.

Major Subordinate Command Unit Movement Control Centers. The division, wing, and MLG commanders deploy forces to support operational MAGTFs. Both deploying and employing MSC commanders manage transportation and communications assets needed to execute deployments. Major subordinate commands, as required, establish UMCCs down to the battalion, squadron, or independent company, to serve as the unit transportation capacity manager. The MSC UMCC's tasks are as follows:

- Prepare units for embarkation.
- Comply with highway regulations and movement control standards as designated by higher authority.
- Direct unit marshalling and coordinate the use of organic movement assets.
- De-conflict competing movement requirements within the command and coordinate additional support requirements with either the next higher movement control agency or supporting LCE.
- Coordinate the movement of forces to an aerial or seaport of embarkation via the HHQ movement control agency to the MMCC.

- Designate a representative to attend the MAGTF movement control board to discuss pending requests and gain awareness of MAGTF-level movement issues.
- Establish a permanent position within the COC to provide visibility of ground movements to the operations section.
- Coordinate cross-boundary and movement clearance requests for units transiting the unit's battlespace.

Base Operations Support Group. Bases from which Marine Corps forces deploy establish base operations support groups to coordinate their efforts with those of the deploying units. Base operations support groups coordinate and manage transportation, communications, and other functional support requirements beyond organic capabilities to supported units during deployment, similar to Marine Corps component commands.

Station Operations Support Group. Air stations from which Marine Corps forces deploy establish station operations support groups to coordinate their efforts with those of the deploying units. Like Marine Corps component commands, air stations have transportation, communications, and other assets useful to all commands during deployment.

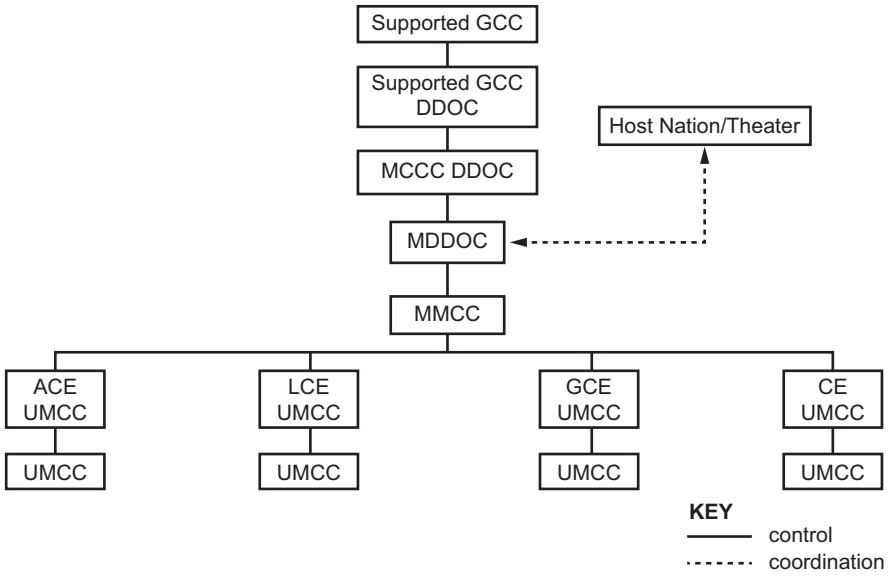
Flight Ferry Control Center. In addition to its MCC, the Marine aircraft wing (MAW) establishes a flight ferry control center to control deploying aircraft. The flight ferry control center operates under the cognizance of the MAW G-3.

Movement Control in the Area of Operations

As with operations of MCCs during deployment, local SOPs establish the composition and procedures for MCCs. Figure 3-2 depicts relationships between various commands, their movement control agencies, and supporting organizations after arrival in the area of operations. The MAGTF commander often delegates responsibility for routine day-to-day movement control to the LCE. Modifications to meet specific operational requirements are in the transportation appendix to Annex D (Logistics/Combat Service Support) of the operation order.

HOST-NATION SUPPORT

The MAGTF should use host-nation support to maximize their transportation capability, consistent with tactical considerations. This may require operational contracting support and/or standardized/specialized agreements with the host nation. The support associated with these agreements may utilize parts of the distribution infrastructure and provide information up and down the chain of command, thereby effecting command and control.



LEGEND

CCDR	combatant commander	GCC	geographic combatant commander
CE	command element	MCCC	Marine Corps combatant command
DDOC	deployment and distribution operations center		

Figure 3-2. Movement Control Relationships in the Area of Operations/Theater.

STANDARDIZATION AGREEMENTS

When operating with NATO [North Atlantic Treaty Organization] or quadripartite ABCANZ [American, British, Canadian, Australian, and New Zealand Armies Standardization Program], there are certain standardization agreements among the participating nations by which the MAGTF is obligated to abide. These standardized agreements are referred to as STANAGs in the NATO arena, and quadripartite standardization agreements (also referred to as QSTAGs) in the ABCANZ Standardization Program arena. The support associated with these agreements may utilize parts of the distribution infrastructure and provide information up and down the chain of command, thereby effecting command and control.

MOTOR TRANSPORTATION COMMAND AND CONTROL

The MAGTF commander and subordinate commanders must exercise varying degrees of control over their motor transportation assets before and during operations to ensure mission accomplishment.

Motor transportation commanders plan and execute motor transportation operations by assigning appropriate missions based on the concept of CSS, establishing appropriate command relationships, and supervising the flow of support.

AVIATION COMBAT ELEMENT ALLOCATION OF RESOURCES IN MOVEMENT CONTROL

There are two major aspects of aviation planning: support of the operation plan/fragmentary order development and production of a daily ATO. Both allocate aviation assets, munitions, and support to elements of the MAGTF. The ATO production is a continuous cycle based on assets and time. It is important for logistic planners within the ground combat element (GCE) and LCE to ensure that they coordinate with the ACE well in advance of the resupply mission. Such coordination ensures that they meet the time requirements of the ATO cycle by submitting assault support requests in advance of the ATO planning cycle deadline, which is usually 72 to 96 hours in advance of the date of mission execution.

While the MAGTF command element is planning overall MAGTF operations, the ACE commander and staff are concurrently planning air operations in support of the MAGTF and coordinating with other elements of the MAGTF to determine their aviation support requirements. This concurrent, parallel approach to planning is possible through the use of mission type orders, a clear understanding of the MAGTF commander's intent, and close and continuous liaison amongst the ACE, GCE, and LCE. Concurrent, parallel planning provides aviation and ground planners with the time necessary to execute the air tasking cycle. This form of planning also ensures that ACE operations are focused on attainment of MAGTF objectives in concert with the MAGTF commander's concept of operations.

Allocation is the translation of the level of effort into total number of sorties (by aircraft type) available for each task. Allocation includes the submission of preplanned air support requests by the ACE, GCE, and LCE commanders. Preplanned requests include air support requests and joint tactical airlift requests. Once the air support requests have been submitted, sorties are allotted according to the needs of the MAGTF mission:

> For example, 30 sorties are available for a day during the operation. The GCE commander needs to conduct an air assault, and the LCE commander needs to set up a refueling point to support the GCE scheme of maneuver. Each subordinate element is given a percentage of the 30 sorties to fulfill its requirements.

The LCE planners should keep in mind the ATO cycle process, deadlines, and competing MAGTF requirements when deciding whether or not to use Marine Corps aviation for logistic support.

COMMAND RELATIONSHIPS

When the JFC conducts joint operations through Service component commanders, the Marine Corps component commander and the other Service component commanders have command, operational control (OPCON), and administrative control (also referred to as ADCON) of their assigned Service forces. The JFC may also establish a support relationship (supporting/supported) between Service components to facilitate operations. Support that can be general, mutual, direct, or close is a command authority. A senior commander establishes a support relationship between subordinate commanders and determines when one should aid, protect, complement, or sustain the other. See MCDP 1-0, *Marine Corps Operations*, for more information on command relationships.

SUPPORT MISSIONS

Another tool that a commander has available to control transportation assets is the assignment of support missions. The following subparagraphs provide detailed information on the CSS missions and their associated responsibilities. These options give the commander flexibility across a spectrum, ranging from fully centralized to decentralized control. The mission structure facilitates changes by standardizing the responsibilities associated with each mission. When used in conjunction with structural options and command relationships, assigned support missions allow the commander to tailor transportation support to the specific tactical situation.

Transportation Missions

The concept of assigning missions to transportation units is intended to standardize CSS relationships, responsibilities, and C2 procedures. Clean, simple, and responsive lines of command and control are prerequisites to flexibility. The assignment of missions to transportation units improves support to the MAGTF from the inception of the operation to its termination. Assigning support missions to a transportation unit facilitates command and staff relationships, clarifies support relationships, and establishes liaison and communication responsibilities.

Mission Assignment

Combat service support missions assigned by the LCE commander to transportation units dictate specific responsibilities for the supporting transportation unit and the supported unit. For the supporting unit, mission assignments establish not only the relationship to the supported force, but also the relationship to other support units. As shown in table 3-1, each of the CSS missions has five inherent responsibilities:

- Priority of response to request.
- Area of responsibility.
- Liaison requirements.
- Establishment of communication.
- Locating/relocating.

SUPPORTING TRANSPORTATION UNIT RESPONSIBILITIES

The following subparagraphs detail the four support relationships (direct support [DS], general support [GS], reinforcing, and general support-reinforcing) for supporting units.

Table 3-1. Combat Service Support Missions.

Responsibility	Direct Support	General Support
Priority of response to request:	Supported unit HHQ LCE or MAGTF Own units	HHQ LCE or MAGTF Supported unit Own units
Area of responsibility	Area HHQ	Area of supported unit
Liaison requirements	Supported unit	Supported unit
Establishment of communications	Supported unit HHQ LCE or MAGTF	Supported unit HHQ LCE or MAGTF
Locating/relocating	HHQ LCE or MAGTF in coordination with supported unit	LCE HHQ

Direct Support

Direct support is a support relationship requiring a unit to support another specific unit and authorizing it to answer directly to the supported unit's request for assistance.

> ***Note:*** Joint doctrine considers DS as a mission rather than a support relationship.

A unit assigned a DS relationship retains its command relationship with its parent unit, but is positioned by and has priorities of support established by the supported unit. A direct support mission requires a supporting unit to furnish close and continuous support to a single supported unit. Units given a tactical mission of DS are not attached or under the command of the supported unit. An LCE unit that is in DS of another unit is immediately responsive to the needs of the supported unit.

General Support

General support is that support relationship given to the supported unit as a whole and not to any particular subdivision thereof. Units assigned a GS relationship are positioned and have priorities established by their parent unit. The parent commander retains complete authority over and responsibility for the operation of the supporting unit. An LCE unit that is in GS supports the MAGTF under the direction of the LCE commander.

Reinforcing

Reinforcing is a support relationship requiring a unit or force to support another supporting unit. Only like units (e.g., artillery to artillery) can be given a reinforcing mission. A unit assigned a reinforcing support relationship retains its command relationship with its parent unit, but is positioned by the reinforced unit. A unit that is reinforcing has priorities of support established by the reinforced unit, then the parent unit.

General Support-Reinforcing

General support-reinforcing is a support relationship assigned to a unit to support the force as a whole and to reinforce another similar-type unit. A unit assigned a general support-reinforcing support relationship is positioned and has priorities established by its parent unit and secondly by the reinforced unit.

SUPPORTED UNIT RESPONSIBILITIES

Determination and identification of transportation requirements that exceed the organic capabilities of the supported unit are the responsibility of the supported unit in coordination with the supporting LCE. Identification of requirements is the first step in the process of obtaining transportation support. In the requirements determination process, the supported unit commander must evaluate the assigned mission, the situation, task organization, organic equipment capabilities and density, and the concept of operations. The supported unit commander must fully use organic motor transportation assets before requesting transportation support. The LCE commander must be engaged in the process to assist the supported unit, which enhances the LCE commander's ability to anticipate demand.

A transportation support requirement generates a request to move specific quantities of cargo or personnel. The request is not a request for specific types or quantities of vehicles unless the tactical situation drives such a request. The supporting unit commander will determine types and quantities of vehicles to support the requirement. Additionally, effective communications must be maintained between the supported unit and the supporting unit to establish requirements, priorities, and allocation of resources.

The supported unit commander should establish priorities well in advance so that the supporting unit can develop a complementary concept of support. Priorities, however, cannot be dealt with in a vacuum—the supported unit commander should take into account the other factors that dictate how the supporting unit should do its job.

During planning, the supported unit commander must establish priorities and allocations of resources. When prioritizing, the commander establishes the precedence of who receives what resource. When allocating, the commander establishes how much of a resource is received.

TRANSPORTATION COMMAND AND CONTROL IN AMPHIBIOUS/LANDING SUPPORT OPERATIONS

During beach and sea terminal operations, the MAGTF commander establishes temporary C2 organizations to support the landing plan and follow-on movement ashore. The success of the LFSP and arrival and assembly operations is determined by the ability to command and control support elements on the beach, at the port, and in the LZ. To establish an effective C2 system, the LFSP must integrate into the amphibious force's C2 systems. See the landing support operations paragraph in chapter 5 for further information on the LFSP and subordinate organizations.

TRANSPORTATION COMMAND AND CONTROL IN MPF ARRIVAL AND ASSEMBLY OPERATIONS

Maritime prepositioning provides a combatant commander with deployment flexibility and increased capability to respond rapidly to crisis or contingency with a credible force. The purpose of an MPF operation is to rapidly establish a MAGTF ashore to conduct subsequent operations across the operational continuum. At a minimum, an MPF operation may consist of one ship to a maximum of a multiple MPSRON offload, dependent on the size of the MAGTF.

Arrival and Assembly

Arrival and assembly may well be the most crucial phase of an MPF operation and includes the following:

- Initial preparation of the AAA.
- Coordinated arrival and offload of equipment and supplies from the MPS (in port, in-stream, or both).
- Reception of the FIE.
- Movement and distribution of maritime prepositioning equipment and supplies (MPE/S).
- Security.
- Preparation for the MAGTF operational mission.

Commencement and Disestablishment

The arrival and assembly phase commences with the arrival of the first MPS or the first aircraft of the main body at the designated AAA. Disestablishment begins when adequate equipment and supplies are offloaded and issued to awaiting units, C2 communications are established, and the MAGTF commander reports that all essential elements of the MAGTF have attained combat readiness. Simultaneous or subsequent tactical operations by the MAGTF and movements to those operations are not considered part of the MPF operation.

Arrival and Assembly Organizations

The following subparagraphs identify the organizations that conduct arrival and assembly operations. These organizations have the purpose of transforming cargo and personnel into a viable combat force.

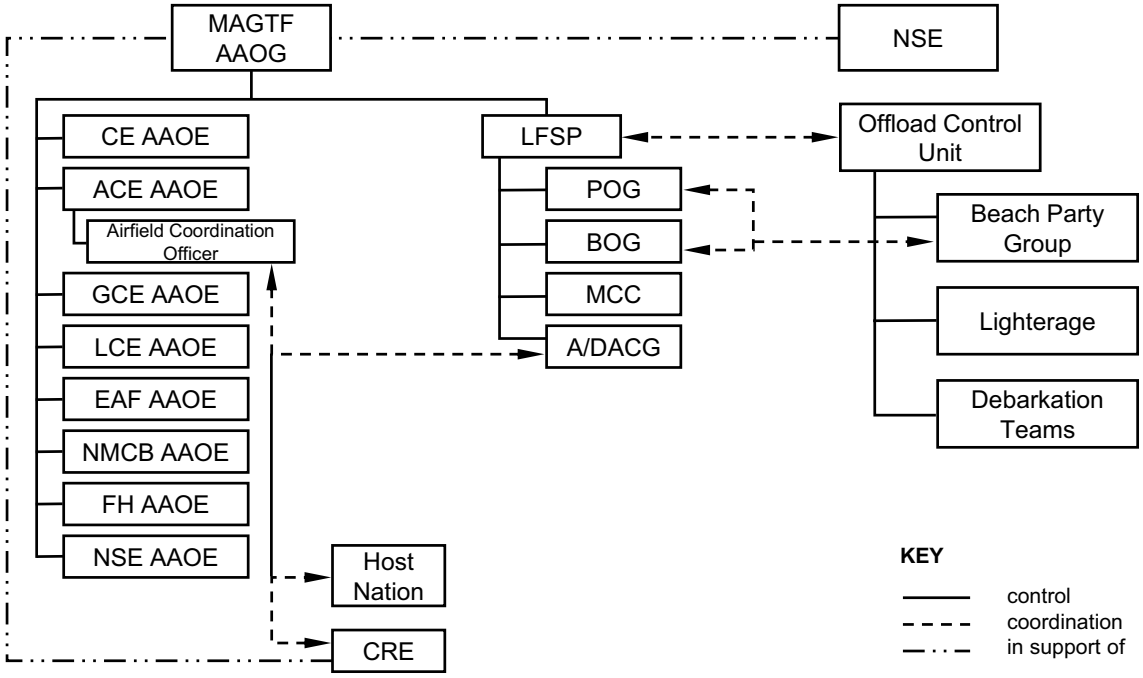
Arrival and Assembly Operations Group. The arrival and assembly operations group (AAOG) is task-organized from the MAGTF. Its function is to coordinate and control arrival and assembly operations. It consists of personnel from all MAGTF elements, plus a liaison from the commander, NSE, as shown in figure 3-3. The AAOG must—

- Monitor the airflow of the FIE into the AAA.
- Coordinate the association of MPE/S with designated organizations.
- Provide initial C2 functions for the MAGTF in the AAA.
- Direct and coordinate the arrival and assembly operations element (AAOE) operations.

- Provide direction, coordination, and interface with the LFSP and airfield coordination officer (ACO) until such time as the respective MAGTF elements assume responsibility for those functions.
- Publish the daily situation report.

Arrival and Assembly Operations Element. Each element within the MAGTF and NSE establishes an AAOE to perform the following tasks:

- Provide initial C2 activities within the assembly area until arrival of the element commander.
- Receive MPE/S and verify items with the MAGTF.
- Distribute MPE/S to unit equipment reception points per the MAGTF commander's distribution plan.
- Provide liaison with the AAOG.
- Coordinate security in the assembly areas.
- Provide throughput reports to the AAOG as directed by the arrival and assembly plan.



LEGEND

CE	command element	FH	field hospital
EAF	expeditionary airfield	NMCB	naval mobile construction battalion

Figure 3-3. Command and Control Organizations for Arrival and Assembly.

Landing Force Support Party. The LFSP is a task-organized unit composed primarily of elements from the LCE, NSE, and augmented by other MAGTF elements. The LFSP controls throughput of personnel and MPE/S at the port, beach, and airfield. The LFSP falls under the control of the officer in charge, AAOG, and has four principal throughput groups:

- POG.
- BOG.

- A/DACG.
- MCC.

Port Operations Group. The POG is a task-organized group from the MAGTF's beach and terminal operations unit and the US Navy cargo handling group. The POG may be retained after arrival and assembly to facilitate the offload of resupply shipping as well as retrograde of damaged equipment. The POG is responsible for preparing the port prior to arrival of the MPS and the throughput of supplies and equipment as they are offloaded from the ship. The POG operates under the overall direction of the LFSP and in coordination with the ship's debarkation officer. The POG is responsible for the following tasks:

- Establish overflow areas for supplies and equipment.
- Clear piers and overflow areas of material.
- Establish communications with the LFSP and ship's debarkation officer/MAGTF offload liaison officer.
- Establish liaison with host-nation port authorities for employment of cargo and MHE, operations and longshoreman support, and dunnage.
- Operate cargo/MHE including shore-based cranes, forklifts, tractors, dollies, lighting, etc.
- Assist US Navy cargo handling force detachments in ship offload as directed and transport cargo to overflow areas as necessary.
- Establish bulk fuel/water reception and transfer facilities as directed.
- Be prepared to continue port operations for follow-on shipping.

Beach Operations Group. The BOG is task-organized from the MAGTF landing support unit and the NSE. The BOG operates under the overall direction of the LFSP and in coordination with the assault craft unit. The BOG may be retained after the arrival and assembly phase for offload of follow-on shipping. The functions of the BOG and associated NSE beach party teams include the following:

- Provide the beach area command and control necessary to control and coordinate the throughput of MPE/S.
- Organize and develop the beach area as necessary to support the throughput of MPE/S, to include designation and establishment of overflow areas.
- Coordinate the bulk fluid transfer as required.
- Offload lighterage at the beach.
- Provide direction for MAGTF drivers to move vehicles from the lighterage.
- Provide surge vehicle operators.
- Prepare for follow-on operations.

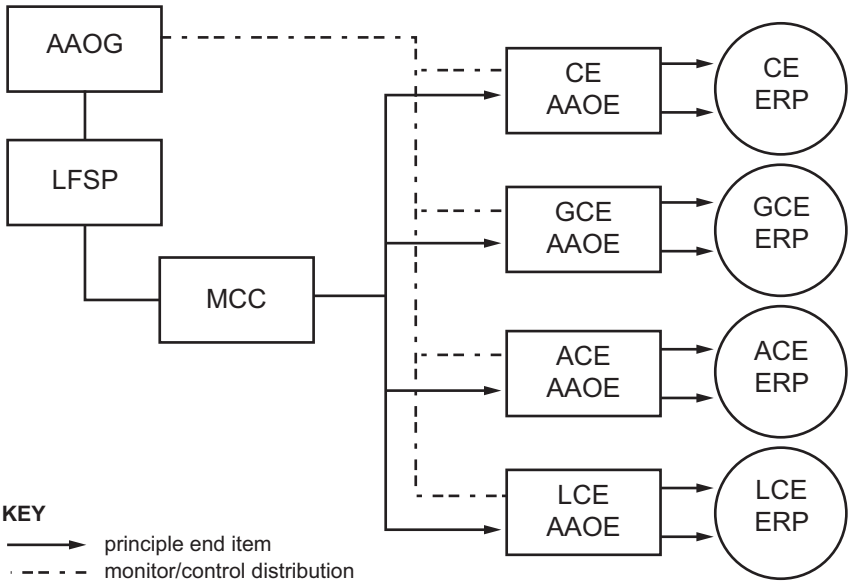
The ACO is designated by the MAGTF commander under the cognizance of the ACE and acts as the single point of contact for host-nation support and other support peculiar to aviation operations at the airfields. Non-air mobility command support requirements identified by the contingency response element (CRE) advanced echelon will be coordinated through the ACO. The ACO should be a member of the survey, liaison, and reconnaissance party to facilitate airfield operational planning.

Arrival/Departure Airfield Control Group. The A/DACG is responsible for the control of the offload, coordination of airlifted units, and the equipment that is providing limited CSS to those units. The A/DACG is task-organized around a nucleus provided by the landing support company of the LCE and is structured and manned to provide continuous operations support for multiple aircraft. Normally, the A/DACG will deploy as an element of the advance party and initiate operations at the arrival airfield. The A/DACG is the point of contact between CRE, contingency response force (CRF), and contingency response group (CRG) at the arrival airfield and the LFSP.

Movement Control Center. The MCC is the agency that plans, routes, schedules, and controls personnel and equipment movements over LOCs. In MPF operations, the MCC forms the MPE/S principle end items being offloaded from the ship or aircraft into separate convoys for movement to the subordinate AAOEs (see figure 3-4).

AUTOMATED INFORMATION SYSTEMS SUPPORT

The following subparagraphs detail automated information management systems designed to support transportation operations. These systems are utilized by movement planners to facilitate logistic support.



LEGEND

CE command element ERP equipment reception points

Figure 3-4. Movement Control Center Relationships.

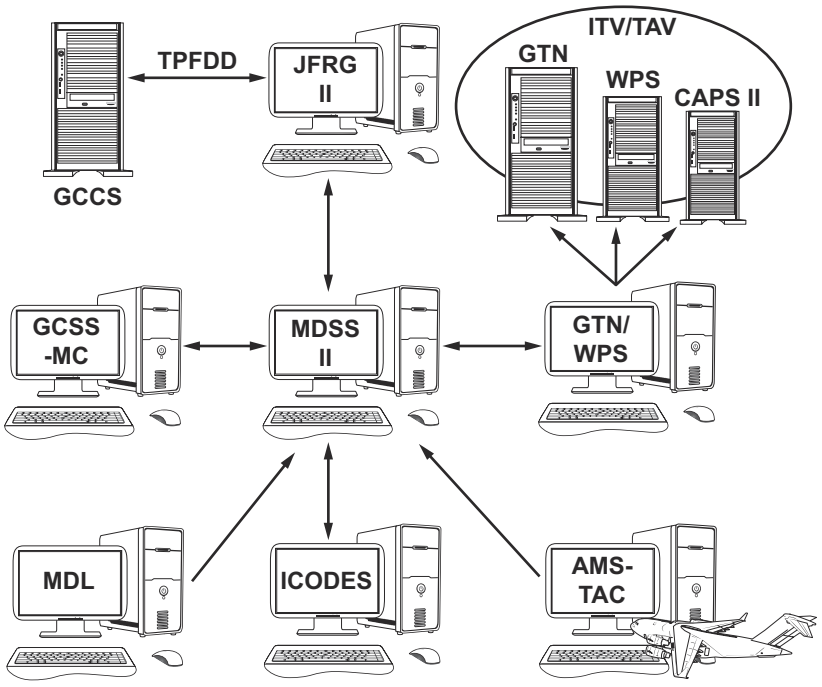
Joint Force Requirements Generator II/Logistics Automated Information Systems

The joint force requirements generator II (JFRG II) is a software application designed to provide the Services with a state-of-the-art, integrated, and deployable automated information system that supports strategic force movements within the mandated 72-hour timeframe. The JFRG II provides rapid force list creation and interfaces with JOPES, Marine Air-Ground Task Force Deployment Support System II (MDSS II), and the War Reserve System (WRS).

The JFRG II/LOGAISs is a family of coordinated, mutually supporting automated systems designed to support deliberate and crisis action/time-sensitive planning, deployment, employment, and redeployment of a MAGTF in independent, joint and/or multinational operations. The JFRG II/LOGAIS is composed of interrelated systems that perform common and discrete functions. It also includes the MAGTF data library (MDL), which serves as source data for the systems.

Each system shares a common database, yet performs separate and complementary functions. For example, individual systems are used to gather data for day-to-day operations and feed into a system like the Global Transportation Network to provide visibility for other organizations. Each of the systems uses the same data and, if so desired, the same plan. This allows a plan (see figures 3-5 and 3-6) to go through the various stages of creation, sourcing, assignment to transportation assets, and time-phased force and deployment data (TPFDD) construction without the necessity of exporting data from one system to another. Used primarily in the planning and marshalling phases of operations, JFRG II provides the information and functionality necessary to—

- Forecast lift and sustainability requirements.
- Provide deployment requirements to MDSS II for detailed sourcing and refinement at the battalion, squadron, or separate company level.
- Rapidly develop and refine TPFDD information to meet crisis planning based on combatant commander priorities and Service-mandated deadlines.
- Compare and select alternative force structures.
- Allow the rapid sharing of detailed deployment information between planners, operators, and logisticians.



LEGEND

AMS-TAC	Automated Manifest System, Tactical	CODES	Integrated Computerized Deployment System
CAPS II	Consolidated Aerial Port System II	TAV	total asset visibility
GCSS-MC	Global Combat Support System-Marine Corps	WPS	Worldwide Port System
GTN	Global Transportation Network		

Figure 3-5. JFRG II/LOGAIS Relationships.

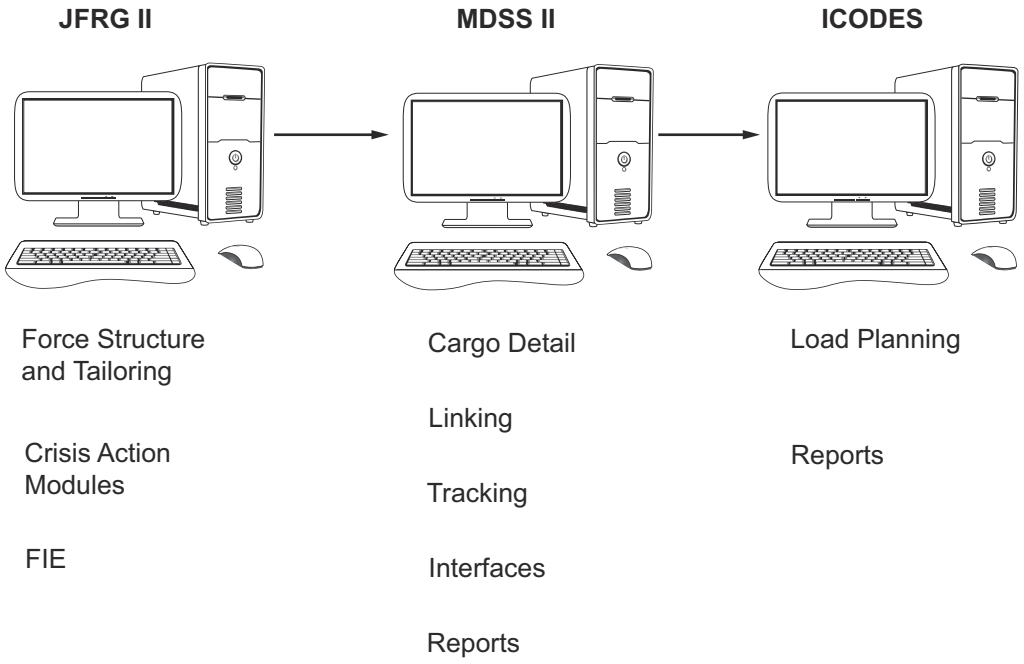
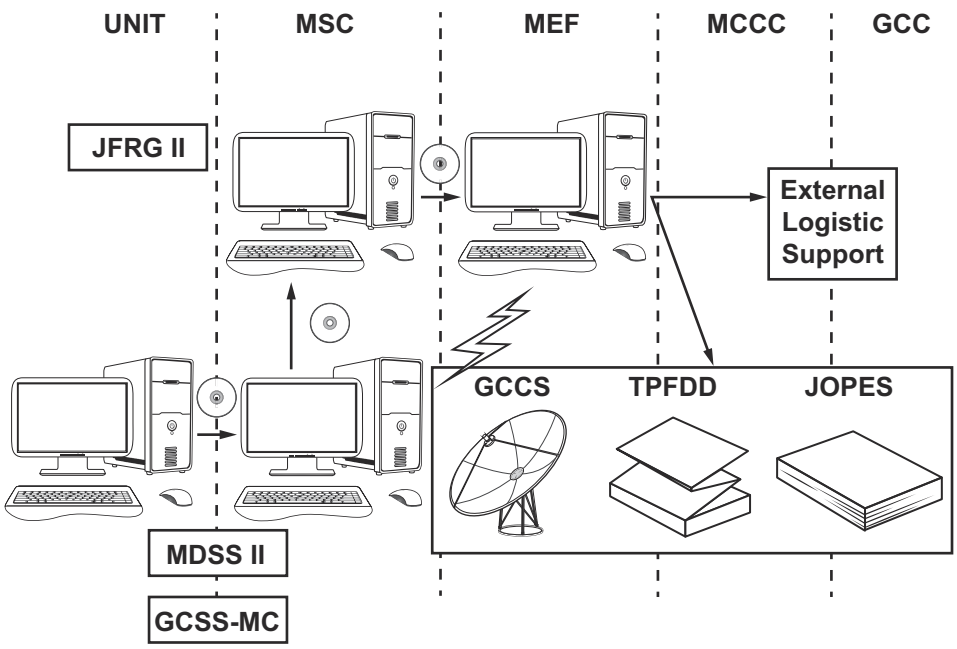


Figure 3-6. Maritime Prepositioning Force Functions.

MAGTF Deployment Support System II. The MDSS II is a standalone system used by Marine Corps operating forces to support force deployment planning and execution (FDP&E). It is the database and interface hub for unit deployment. Through the use of extensive reference files, the system provides actual data to JFRG II to create an executable TPFDD. It reads/writes standard military shipping labels and active radio frequency identification (RFID) tags. It collects and formats data for transmission to the ITV server and exchanges information with Marine Corps and joint logistic movement and distribution systems (see figures 3-7, 3-8, and 3-9). The MDSS II provides commanders with the ability to respond to JFRG II tasking for detailed plan data. Used during all phases of an MPF operation, MDSS II provides the information and functionality necessary to—

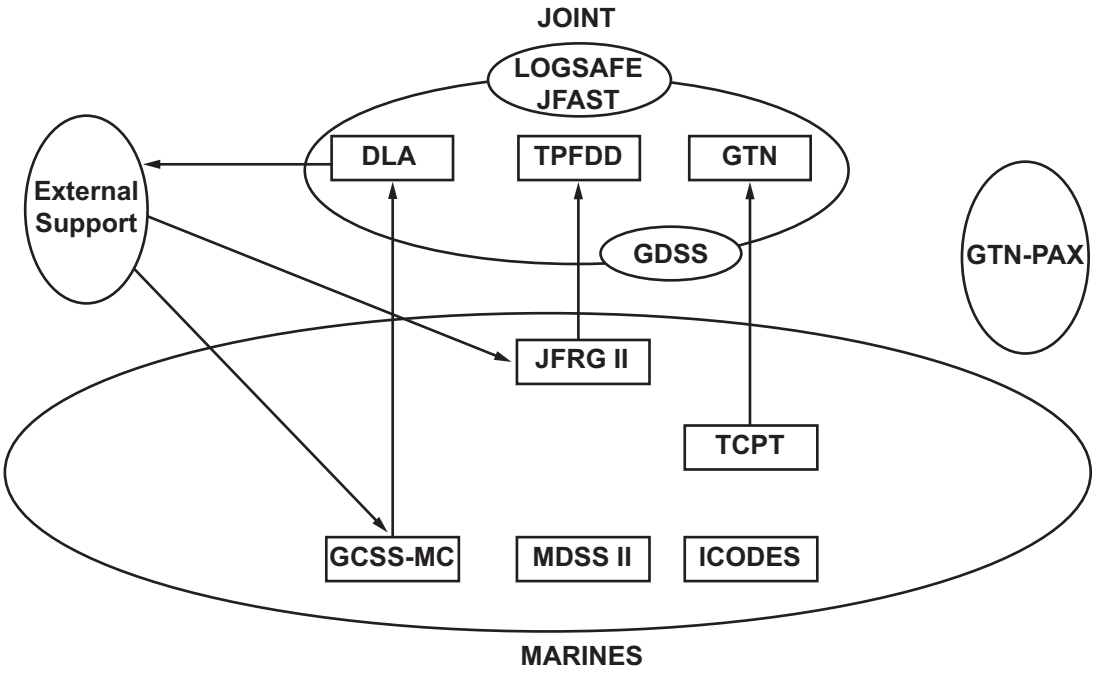
- Source and tailor plan-specific force structures composed of personnel, equipment, and supplies for multiple operation plans.
- Monitor embarkation readiness status.
- Provide movement and embarkation planning data.
- Assign prepositioned assets and equipment to specific units.
- Develop and tailor equipment databases for future operations.
- Create supply transactions that update Global Combat Support System-Marine Corps (also referred to as GCCS-MC) in order to create accountability records.
- Provide unit-level embarkation data to Integrated Computerized Deployment System (ICODES) in order to prepare load plans.
- Provide standard and ad hoc reports in response to information requests.



LEGEND

GCC	geographic combatant commander
GCSS-MC	Global Combat Support System-Marine Corps
MCCC	Marine Corps component command

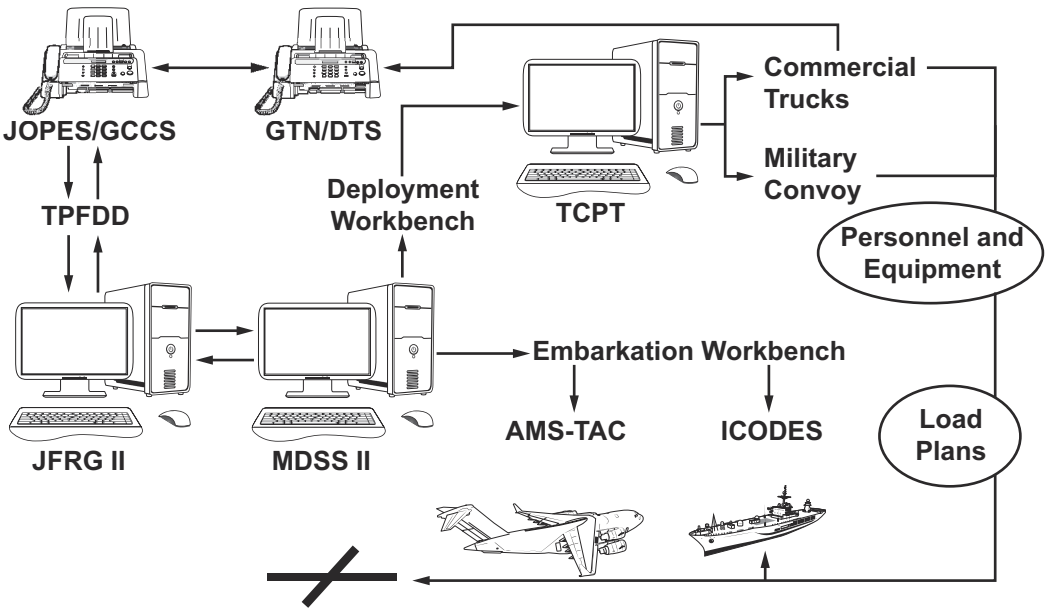
Figure 3-7. JFRG II and MDSS II Planning.



LEGEND

DLA	Defense Logistics Agency	GTN-PAX	Global Transportation Network Passengers
GCSS-MC	Global Combat Support System-Marine Corps	LOGSAFE	Logistics Sustainment and Feasibility Estimator
GDSS	Global Decision Support System	JFAST	Joint Flow and Analysis System for Transportation
GTN	Global Transportation Network	TCPT	Transportation Capacity Planning Tool

Figure 3-8. Deployment Systems Overview.



LEGEND

AMS-TAC	Automated Manifest System, Tactical	TCPT Transportation Capacity Planning Tool
GTN	Global Transportation Network	

Figure 3-9. Deployment Support.

Integrated Computerized Deployment System. The ICODES is a joint decision-support system developed to assist users with the staging and load planning requirements for multiple military and commercial modes of transportation. The ICODES incorporates intelligent tools for staging, conveyance load planning, and multimodal planning designed and implemented in compliance with the principles of a Service-oriented architecture and operates within a collaborative environment. The ICODES enables users to plan and track cargo stowage for air, ocean, rail, and truck transport in a single system that affords the capability for one time entry of the data. It enables the joint community to easily create, exchange, and interpret cargo movement plans through a single software application. Other features assist users by providing high-quality alternative solutions to complex load planning problems. The ICODES integrates multiple knowledge-based expert systems, data storage, and a graphical user interface within a distributed and collaborative operational environment providing global services to the operating forces.

The ICODES is used by the unit-level embarkation officer to accomplish detailed load planning of amphibious and Military Sealift Command shipping. An AMC load planner certification is required for representatives to approve load plans for airlift. The ICODES provides information and functionality necessary to—

- Template deck diagrams for both amphibious and Military Sealift Command shipping.
- Produce dangerous cargo manifests.
- Conduct trim, stress, and stability calculations.
- Produce “as loaded” deck diagrams upon completion of loading.

Transportation Capacity Planning Tool. Movement control agencies use the transportation capacity planning tool to manage transportation assets in the deployment, employment, and redeployment of operational forces. The transportation capacity planning tool provides the capabilities and functionality necessary to—

- Provide the commander a decision support tool for transportation and engineering equipment, planning, management, and mission execution.
- Allow transportation planners throughout the MAGTF to view transportation capacity through movement requests, personnel resources, and equipment resources.
- Provide a standardized method for supporting units to electronically manage organic transportation/engineer resources.
- Provide a standardized method for supported units to electronically submit and track transportation request beyond organic capability.
- Manage licensing of personnel.
- Manage electronic dispatching.
- Associate equipment to convoy tracker.
- Manage transportation movement requests.
- Manage a ground transportation request (also referred to as GTR)/ground transportation order.

Supporting Systems

The following are non-JFRG II/LOGAIS systems that provide support to transportation operations.

Automated Manifest System, Tactical. The Automated Manifest System, Tactical is a standalone system used by the Marine Corps distribution management community. It automates standard DOD transportation and supply functions such as break bulk, receiving, issue, freight consolidation, redeployment, and retrograde operations. It is capable of reading and writing standard military shipping labels and active RFID tags.

Cargo Movement Operations System. The Cargo Movement Operations Systems is a Web-based and standalone combat support system that automates and streamlines installation-level cargo movement processes for both peacetime and deployment/contingency operations.

Global Air Transportation Execution System/Worldwide Port System Convergence. The Global Air Transportation Execution System (also referred to as GATES) automates support for receipt, movement, and billing of cargo and passengers at sea and aerial ports. It provides the AMC, DOD, and commercial partners with an automated management system to process and track cargo and passenger information, support management of resources, provide logistic support information, generate standard and ad hoc reports, and provide message routing and delivery service for virtually all aircraft movement data.

> ***Note:*** The Worldwide Port System has recently been integrated to the Global Air Transportation Execution System Web site. The Worldwide Port System and Global Air Transportation Execution System documented capabilities and requirements are fundamentally similar and the benefits of combining the two systems are immeasurable.

Integrated Distribution Environment/Global Transportation Network Convergence. The Integrated Global Transportation Network Convergence is an automated C2 information system that provides transportation users and providers with an integrated view of distribution information. It gives USTRANSCOM the ability to perform C2 operations, planning and analysis, and business operations to meet customer requirements. The Integrated Global Transportation Network Convergence collects and integrates transportation information from selected DOD systems for use by transportation data customers, the joint staff, combatant commanders, and the Services in order to provide ITV for the DTS.

Radio Frequency Identification Infrastructure/Server. Radio frequency identification is a family of technologies that enables hands-off processing of materiel transactions for cargo deploying through the DTS. Radio frequency identification provides operators a means to remotely identify, categorize, and locate materiel automatically within relatively short distances. The RFID infrastructure consists of remote fixed and nonfixed (i.e., mobile portable deployment kit) interrogators, which are located a few inches to 300 feet from the transponder device, that electronically retrieve data via electromagnetic energy (normally in the radio frequency or microwave frequency range) and send the data to the RFID server.

MAGTF Data Library. The MDL serves both data distribution and data quality control functions. Issued on a quarterly basis, this CD-ROM transmitted data set updates the permanent technical data files within JFRG II/LOGAIS. The users of JFRG II/LOGAIS are provided an opportunity to submit requests to change or correct this data through the use of a data trouble report, which is passed via their reporting chain to the contractor tasked with maintaining the MDL.

War Reserve System. The WRS is a mainframe system used to compute sustainment and war reserve requirements for deliberate planning and crisis execution purposes in support of the various regional contingencies requiring Marine Corps operating forces involvement. During deliberate planning, sourced requirements from the system flow into other JFRG II information systems and ultimately result in updating TPFDDs for various contingencies. In the event of contingency operations, materiel release transactions generated within the WRS can pass into both retail and wholesale inventory systems as the means of withdrawing and pushing equipment/materiel to Marine Corps operating forces in the area of operations. The objective of the Marine Corps War Reserve Program is to ensure that acceptable levels of materiel are available to support Marine Corps operating forces during crisis or contingency operations. The WRS interfaces with other Service's inventory systems, including the Defense Logistics Agency.

Joint Deployment Systems

The joint deployment systems help the individual Services interface and create economy of efforts within the DOD. The following are joint deployment systems applicable to transportation:

- *Global Command and Control System*. The Global Command and Control System (also referred to as GCCS) is the joint standard for C2 systems and is the communications and computer architecture for all joint systems to operate on. It supports the JOPES.
- *Time-Phased Force and Deployment Data*. The TPFDD registers all strategic (intertheater) sea and air movement requirements for deployment. The TPFDD is a part of Global Command and Control System and is an automated support tool for JOPES procedures.

- *Logistics Sustainment Analysis and Feasibility Estimator*. The Logistics Sustainment Analysis and Feasibility Estimator aids the planner by assessing the sustainment feasibility of a proposed operations plan.
- *Global Decision Support System*. The Global Decision Support System is an AMC system that schedules, tracks, and controls all air movements.

CHAPTER 4
MODES of OPERATION

The execution of MAGTF distribution operations is directly affected by mode of transport—inland surface transportation, sea transportation, air transportation, and pipelines—and mode selection. Mode selection is a decision-making process that identifies the means by which a lift requirement will be met with transportation support. Mode of transport selection impacts operations and provides options (based on cost versus benefit analysis) to the commander.

Mode selection authority rests with USTRANSCOM's SDDC for intertheater lift requirements utilizing the JOPES process. A JDDOC maintains mode selection authority for intratheater lift. A Marine Corps component command interfaces with a JDDOC via a Marine Corps operating forces distribution officer for lift requirements that exceed assigned force capabilities for intratheater lift. Within a MAGTF, mode selection for combat support to maneuver elements is decentralized to subordinate commanders in tactical control of maneuver elements. For GS missions, mode selection is assigned to the MMCC under the MDDOC, and for missions exceeding the supporting unit's capabilities, mode selection is assigned to distribution management office under the MDDOC.

Combat service support mode of transport selection authority remains as a LCE G-3/S-3 function for DS missions.

It is important for distribution managers to understand that MAGTF operations are typically intermodal. For example, an amphibious operation is designed to transition from sea to air or inland surface rapidly to generate combat power ashore. The greatest impact this has on cargo is the requirement for standardization to allow for transshipping. Mode capabilities need to be expressed in measures that reflect the standards for intermodal shipment. For strategic lift assets, this may be short tons and cubic feet. For tactical distribution, it may be palletized or 20-foot equivalents to reflect the International Organization for Standardization containers. Mode selection will therefore be impacted by embarkation readiness of the supported units and is a key consideration with the time available from selection to execution. Nodal ITV should be required for inland ports using the inland codes, in conjunction with shipping and tracking processes, as nodes.

INLAND SURFACE TRANSPORTATION

Most inland surface transportation missions will initiate and terminate at inland bases or installations. The distribution system nodes that will be connected to inland surface transportation will include road terminals and railheads. Roads, highways, and railways characterize the medium for this type of ground LOC. Inland surface movements are limited to the operational range, rate of march, and lift capacity of the means of transport. For instance, motor transportation vehicles

may have a range of 300 miles, a rate of march of 25 kilometers per hour, and convoy serials may be limited to 25 International Organization for Standardization containers of capacity per lift. Other factors that can influence these variables include anything from weather to local traffic. While this may limit transportation capacity, inland surface transportation provides rapid mission tempo and flexibility for placement along the LOC.

The Joint Flow and Analysis System for Transportation is a tool used to help control and analyze the impacts of changes to inland surface transportation. It is used for estimating the time and resources required to transport military forces under various scenarios and situations, and it can analyze transportation requirements from point of origin to the point of debarkation.

Section I discusses motor transportation operations that support inland surface transportation and distribution.

SEA TRANSPORTATION

Given that much of the world is accessible by sea or inland waterway, sea transportation is ideal for prepositioning forces and sustainment due to its relatively low operating costs and endurance of typical vessels used as a means to transport items over bodies of water. Commercial freight and MPS are typically used to support military lift requirements via sea LOCs. While these options are limited to accessing seaports for terminal operations, amphibious shipping can increase projection by using supplementary landing craft to ferry cargo and passengers to and from a beachhead. See JP 3-02 for detailed discussion on sea transportation's support of MAGTF distribution operations.

AIR TRANSPORTATION

Military operations sometimes require the distribution network to deliver forces and sustainment over long distances during a short period. Air transportation uses fixed-wing, tiltrotor, and rotary-wing aircraft to transport cargo and passengers. Air transportation is also capable of employing unmanned craft for transport of cargo. Air operations are costly to operate and maintain and they create a setting where demands often exceed capabilities. Selection for this mode within the MAGTF's organic capabilities needs to be prioritized based on an urgency of need. The air tasking process is used to manage air transport capabilities available to the MAGTF.

Aerial delivery is a valuable distribution mode and understanding the basic fundamentals of aerial delivery is imperative. Aerial delivery will play a role in every stage of current and future conflicts, from predeployment and sustainment through the redeployment of forces on every part of the battlefield. Exactly how the receiving unit gets the supplies depends, in large part, on the needs of the unit. These needs will drive the selection of aircraft, methods, and rigging equipment used. The decision process requires weighing the numerous aerial delivery advantages and disadvantages to determine whether airdrop or air-land best suits the situation.

Section II discusses the aerial delivery operations that support air transportation and distribution.

PIPELINE TRANSPORTATION

Pipelines are often the most economical and effective method of petroleum distribution The inland petroleum distribution system is a multi-product system consisting of both commercially available and military standard petroleum equipment that can be assembled by military personnel and, when assembled into an integrated petroleum distribution system, provides the military with the capability required to support an operational force with bulk fuels. (*DOD Dictionary*) The inland petroleum distribution system is comprised of three primary subsystems: tactical petroleum terminal, pipeline segments, and pump stations. The MAGTF must maintain pipeline capabilities that align with the theater sustainment structure for bulk fuel transportation operations. While pipelines are ideal for transporting large quantities of liquid over a short time, they are manpower intensive for security and maintenance. The endurance requirements of an operation are a key consideration for this mode selection. See JP 4-03, *Joint Bulk Petroleum and Water Doctrine*, for more detailed information on the use of pipelines for transportation and distribution of petroleum.

Section I. Motor Transportation Operations

Motor transportation is the most versatile mode of transportation. It links aerial ports, seaports, supply centers, rail, and inland waterway terminals. During combat operations, motor transportation links CSS to supported combat units. It is an all-weather mode of transportation that the MAGTF commander can use over any trafficable terrain, to include cross-country. Motor transportation units can move nearly any type of cargo. They can provide local, line, or zonal hauls. The commander may use organic, attached, supported, contracted, or host-nation support motor transportation assets to support operations.

The Marine Corps motor transportation systems provides an effective means of meeting the requirements of the landing force for ground transportation. Motor transportation operations may fall under the category of either combat support or CSS. The tactical motor transportation fleet is specifically designed to provide ground mobility to combat, combat support, and CSS units. The commander may attach motor transportation units to supported units or control allocated motor transportation resources by assigning an appropriate mission in GS or DS. Successful motor transportation operations require careful management.

Economical transportation operations are dictated by matching the type and quantity of vehicle configurations to the task and reducing the turnaround time. Factors that affect turnaround time include, but are not limited to, distance, rate of march, and the time it takes to load and unload. The turnaround time can be delayed if supporting and supported units responsible for loading and unloading vehicles are slow or fail to release the vehicles after unloading.

PRINCIPLES OF MOTOR TRANSPORTATION

The principles of motor transportation are essential to enabling and sustaining combat power and extending operational reach of the MAGTF. The principles of motor transportation are resource management, command relationship, ITV, and interoperability.

Resource Management

Effective management of resources is critical from planning through execution of motor transportation operations. Maximizing lift capacity, reducing turnaround time, and minimizing repair cycle times are responsibilities of leaders at all levels.

Movement planners should select the optimal vehicle configuration for a given lift requirement based upon the availability of equipment and personnel. Planners need to ensure that assets are fully loaded; consider the factor of weighing out the vehicle's capability versus cubing out (i.e., comparing weight capacity to the cubic area available for cargo in the type of transportation selected). Empty or partially-empty vehicles that have not reached their weight or cube capacity represent an inefficient use of valuable ground support assets, potentially putting personnel and equipment unnecessarily at risk. Utilizing the backhaul method and minimizing empty loads increases efficiencies of ground transportation resources.

Reducing turnaround time is accomplished by increasing the rate of march, determining effective route selection, increasing the hours of operations, or reducing offload time, all of which require strict judgment to mitigate the risks associated with motor transportation operations. Some vehicles reduce handling requirements once on the battlefield, thereby extending throughput capability. It is the supported unit's responsibility to identify the requirements necessary for the loading and unloading of cargo during the request process. Close coordination between supporting and supported units will mitigate potential problems and expedite the availability of ground transportation resources for follow-on missions.

Performance of field-level maintenance is critical to successful motor transportation operations. Unit commanders are responsible for ensuring all assigned equipment is maintained in accordance with applicable orders, directives, technical manuals, and publications. A vehicle operator is the key element in equipment readiness, thus responsible for the performance of preventive maintenance checks and services, as well as operational checks per equipment teams. Motor transportation maintenance technicians are responsible to perform preventive maintenance checks and services and corrective maintenance for which they are trained and authorized to complete. These field-level maintenance functions are critical to maintaining asset serviceability and availability.

Command Relationship

Effectively exercising motor transportation capabilities requires establishment of proper command relationships. A motor transportation unit may remain under the control of its parent organization, allowing the motor transportation commander to retain full authority over organic units. Motor transportation units (both permanent and task-organized) can also be assigned to DS of an organization other than their parent unit. They may be attached to units from the LCE, GCE, ACE,

or other Services. These options should always be considered during planning, keeping in mind that when motor transportation units are assigned DS or attached to other organizations, centralized control is lost. Although the commander cannot assign or change the mission of units that have been assigned DS or attached to other organizations, the commander retains responsibility for supporting the attached units.

In-Transit Visibility

Motor transportation assets should possess the long-range, near-real-time communications capability necessary to operate within the MAGTF theater of operations. In-transit visibility is a critical capability required to track units, equipment, personnel, supplies, and transportation assets as they move throughout the battlefield. Motor transportation assets should be fully interoperable and interconnected with all elements of the MAGTF, as well as the joint force, when applicable. Motor transportation assets should be capable of gathering information from all appropriate sources (including automated information systems) in order to maintain near-real-time ITV across the theater of operations. This includes the capability to maintain near-real-time monitoring and communication with motor transportation assets and ITV of cargo and the ability to redirect movements based on shifting operational requirements, threats, or priorities.

Interoperability

Motor transportation units should be capable of supporting and interfacing with units across the MAGTF, joint, multinational, and multiagency movement operations. Motor transportation units should be fully interoperable with joint, multinational, nongovernmental organizations, and the host nation to the maximum extent possible. For example, while operating in a joint environment, motor transportation units should have the ability to operate with different Services, including the interoperability of vehicle couplings with trailers to ensure proper towing capabilities in the execution of assigned missions.

MOTOR TRANSPORTATION FUNCTIONS

Motor transportation operations support a variety of missions depending on unit locations and situations. Whether in CONUS or outside the continental United States, motor transportation units are employed in various roles that are based on command relationship, specific area of operations, available resources, and other factors within a specific area or along specific routes. The use of motor transportation assets facilitates the distribution of supplies and movement of forces and equipment throughout the battlespace.

Movement of Forces

Motor transportation units are an important link in enabling operational reach for the maneuver element. Motor transportation units contribute in the projection of combat power by increasing the maneuver commander's ability to quickly and efficiently shift forces across the area of operations and deliver forces in a high state of readiness. In a tactical mobility role, motor transportation units move forces and equipment in the theater of operations as far forward as the mission, enemy, terrain and weather, troops and support available–time available factors permit.

Distribution System

The distribution system consists of the physical network and the resource network that facilitates distribution. Distribution is the flow of personnel, equipment, and material within a theater of operation that enables the MAGTF to accomplish its tactical missions. The resource network of the distribution system consists of the personnel (e.g., military and civilian—host nation, government, military, and contractor), organizations, material, and equipment operating within the physical network of the distribution system. Motor transportation operations are a critical component to the resource network of the distribution system.

Movement Control

Efficient and effective motor transportation operations in support of movement of troops, equipment, and supplies are essential to rapid deployment and the support of forces. Motor transportation operations are an essential enabler for connecting all air, land, and sea LOCs with ground requirements. Movement control is the most critical part of a transportation system as inadequate control of logistic movement results in waste, reduced efficiency, and loss of combat power, all of which can create increased risk to the force. Movement control is the planning, routing, scheduling, and control of personnel and cargo movements over LOCs. It also consists of validating and prioritizing movement requirements, allocating resources, coordinating and de-conflicting movements, and force tracking of personnel and cargo during movement. Movement control is a vital principle to balance requirements against capabilities and assign resources based on the commander's priorities in motor transportation operations.

Recovery and Battle Damage Assessment and Repair

Recovery and battle damage assessment and repair (BDAR) are vital functions of motor transportation operations. Both are the owning units' responsibilities; both have a fundamental purpose of returning combat assets to the battlefield as soon as possible. The purpose of recovery is to rapidly remove disabled or mired equipment from the battlefield; the purpose of BDAR is to rapidly repair the equipment to continue the mission or allow self-recovery.

Recovery is the retrieval or freeing of abandoned, inoperative, or immobile equipment from its current position and returning it to operation or to a maintenance site for repair. These actions typically involve towing, lifting, or winching. Towing is usually limited to moving equipment to the nearest unit maintenance collection point.

Battle damage assessment and repair is the procedure used to rapidly return disabled equipment to the operational commander by field expedient repair of components. Battle damage assessment and repair restores the minimum essential combat capabilities necessary to support a specific combat mission or to enable the equipment to self-recover. It can be accomplished by utilizing selective interchange; cannibalizing parts from like or lower priority equipment; fabricating repair parts; jury-rigging; and using substitute fluids, materials or components. Depending on the repairs required and the amount of time available, repairs may or may not return the vehicle to a fully mission-capable status. The previously mentioned methods should only be utilized to increase equipment operational capabilities when repair parts are not available through the supply system or when combat conditions warrant increased equipment availability for mission accomplishment. Request for any of the aforementioned methods should be closely scrutinized and authority to execute will be granted when it is necessary for mission accomplishment. When authorized, operators/crew, maintenance teams, maintenance support teams, contact teams, or recovery teams may perform BDAR.

MOTOR TRANSPORTATION PLANNING

In general, motor transportation operations and movement planners are identifying, evaluating, and comparing those factors that tend to facilitate or impede convoy movement and control. This information can be analyzed using mission, enemy, terrain and weather, troops and support available–time available factors. Additionally, map reconnaissance is conducted, followed by a physical (ground or air) reconnaissance, if possible. When developing map reconnaissance, other available information such as engineer intelligence, law enforcement information, and aerial photos should be used. Since route conditions are susceptible to change in a relatively short time, due to enemy action or weather, a physical reconnaissance is highly beneficial if time and the security situation permit. Physical reconnaissance should be conducted in concert with an engineer reconnaissance team. This is particularly critical when gap crossings and route construction may be required. Aerial reconnaissance may be conducted visually or by using aerial photography or airborne sensor systems. The environmental conditions along the convoy route and the distance between communicating stations may affect communication reliability. It may be necessary to establish airborne radio relay or retransmission sites to ensure that adequate communications are maintained at all times.

Marine Corps forces may be employed in areas of extremes (e.g., weather and terrain) that affect motor transportation operations. These areas encompass more than half the Earth's land surface and are made up of arctic-like areas, mountains, deserts, jungles, and flooded areas. Marine Corps motor transportation units are organized and equipped to perform missions under all environmental conditions. In support of mobile maneuver forces, usually only minor changes to equipment are required to support extreme conditions of weather and terrain. Additionally, normal motor transportation procedures may require modification to be effective.

Jungle Operations

Jungle terrain includes areas of tropical rain forest and secondary growth that vary in locale from mountains to low-lying swampy plains. It lacks fully developed LOCs. Jungle terrain and climate limit foot and vehicular movement, observation, fields of fire, communications, and control. There are few roads and trails in jungle areas and their use is limited to light trucks or tracked vehicles. Roads usually have to be constructed, but the dense vegetation, unstable soils, poor drainage, and general lack of building materials make road building difficult. Jungle roads and trails are overgrown rapidly unless they are in constant use. Extensive reconnaissance and/or clearing may be necessary to locate and put roads to use.

Light vehicles provide greater utility when operating on jungle trails and roads. Additionally, the load-bearing capacity of the soil in most jungle areas, especially during the rainy season, is quite low. Extensive engineer effort may be anticipated to maintain any roads that carry heavy vehicles. Distances may be short, but operating speeds will be slow; therefore, movement planning must compensate for this limiting factor. During and after rains, roads will quickly become impassable if subject to heavy traffic flow. Movements in hostile areas require effective security measures to guard against ambush. Seasonal weather conditions will affect all aspects of motor transportation operations, so units must become familiar with the area weather and prepare for the worst.

Standard driving techniques are employed in jungle operations. However, operators must be oriented to the jungle environment; they must be on guard to avoid areas their vehicles are incapable of passing, and be aware of the possibility of flooding in low areas and along watercourses during heavy rains. On unimproved roads, except in high mine threat areas, vehicles should not follow in the preceding vehicle's tire tracks. Doing so leads to the development of ruts, drainage problems, and reduced trafficability. The reduced visibility that is characteristic of jungle roads requires operators to be alert and prepare for defensive action against enemy threats and road hazards. Operators should watch for overheating of vehicles as a result of prolonged low speed operation or radiator blockage from mud or vegetation.

Desert Operations

Deserts are semiarid and arid regions containing a wide variety of soils in varying relief. Desert characteristics include extreme temperatures, dust storms, lack of water and vegetation, bright sunshine and moonlight, mirages, and lack of roads. The dynamic nature of desert operations, and the large areas in which they may be conducted, necessitate some modification of landing force organization and equipment to provide for increased mobility. Desert operations can be most efficiently conducted when the landing force is 100 percent mobile. Planners should be concerned with integrating available motor transport, amphibious assault vehicles, light armor vehicles, tanks, self-propelled weapons, and aircraft into a combination that will best support the landing force.

Operations in the desert involve long distances and are conducted over terrain that channels motor transportation movements. There are few developed roads and the similarity of terrain features makes cross-country navigation difficult. Therefore, motor transportation personnel must have maps and be proficient in land navigation techniques. Marines should receive training with available navigation assets and use them to the fullest extent during desert operations.

Vehicles should be well dispersed during both movements and halts; thereby facilitating a defense against air and artillery attacks. Camouflage materials should be carried on vehicles since there will be little natural concealment.

The desert climate will reduce the ability of personnel to perform physically. In some cases, especially over the long term, it will be counterproductive to attempt heavy labor except during the most favorable times of the day or night. Maintenance of vehicles exposed to the sun in hot desert areas must be limited to essential tasks. Shelter may be required to provide shade and maintenance activities may have to be scheduled during hours of darkness.

As a best practice, vehicles with poor cross-country mobility should not be employed in the desert. Consideration should be made to traveling at night whenever possible to avoid visual detection from low flying aircraft and ground forces. All Marines should use every available tool and receive training in night driving techniques (i.e., blackout lights, night vision goggles, and navigation tools).

Driving in intense heat over long distances and for extended periods of time will be monotonous and tiring. High-speed operations on desert roads will require operators to remain alert in spite of the monotony. Each vehicle in a convoy will raise a cloud of dust, which will obscure the vision of the following operator; therefore, vehicle spacing should be increased to the maximum extent possible consistent with convoy security. The following techniques should be used:

- Wear goggles while driving open hatched vehicles regardless of visibility. Clear-lens goggles should be worn at night unless night vision goggles are used. Bandannas or surgical masks should be worn to avoid breathing heavy dust.
- Maintain a dust distance of twice the normal interval, or as specified in the unit SOP, to allow time for the dust to dissipate. When driving on extremely dusty roads or trails, if traffic conditions permit, a staggered column formation can be used with vehicles alternately driving on the left and right side of the road.
- Turn on lights to increase visibility. Overtaking and passing slower vehicles should be accomplished with great care when dust obscures the roadway and possible oncoming vehicles.
- Remain alert and adjust speed to keep engine revolutions per minute within the safe operating range. Fuel consumption will increase dramatically. Although the desert may appear to be flat, gradually rising terrain will often make it impossible to operate at the highest gear range and at the proper engine revolutions per minute. A strong headwind will compound this problem, as will a covering of loose sand on the roadway.
- Drive on sand at night or early morning when the sand is damp and traction is better. Operators should be aware that traction may be reduced on vehicles equipped with newer military tires designed with closer treads. Damp sand packs between the tread in the grooves of these tires, resulting in virtually no surface traction. While driving in loose sand, the vehicle tends to get mired down. If the vehicle becomes mired in the sand, use low transfer and low gears to keep the vehicle engine and transmission from overheating.
- Reduce vehicle tire pressure to the recommended tire pressure listed in the vehicle's technical manuals. Vehicle speed should be reduced when tire pressure is reduced. Lower tire pressure at higher speeds increases tire sidewall heat and will increase the possibility of tire failure. The lower tire pressure does not affect vehicles equipped with radial tires or central tire inflation system if the maximum speed listed in the operator's manual is not exceeded.
- Ensure vehicle loads are evenly distributed. All-wheel drive should be used where possible to prevent the vehicle from becoming mired down.

Mountain Operations

In mountain areas, conditions of ground and climate require modification in landing force and motor transportation organization, training, equipment, and tactics. Mountains cause compartmentalization of military operations and may present great difficulties to movement and maneuver. The weather is characterized by rapid changes in temperature accompanied by high wind, fog, mist, rain, or snow. Road networks are limited and the construction of new roads and trails is difficult and time-consuming. Even when road networks are available, the enemy may hinder movement by destroying bridges, channel sections of the road along steep slopes, or block throughput with slides of snow, rocks, or timber. Vehicles are used as far forward as possible, and then supplies are moved forward on animals or porters in steeper, more inaccessible country. Within density-altitude limitations, helicopters and tiltrotor aircraft may be used for moving equipment and supplies. Airdrop of supplies and equipment may be necessary when flying conditions permit.

Specific knowledge of road characteristics is especially important when planning mountain operations. Grades, bridge capacities, tunnels, and the radius of turns may limit the types of vehicles that can be employed, as well as the loads they can carry. Unless a well-developed road network is available, heavy vehicles and certain truck-trailer combinations may be useless in the mountains.

Seasonal weather patterns of the area of operations should be reviewed. At high altitudes, freezing rain and snow can be expected over a major portion of the year. Motor transportation leaders should evaluate potential weather conditions and prepare for the worst.

Recovery of disabled vehicles will be difficult and may completely halt the flow of traffic. Before operation checks, maintenance, and inspection of vehicles prior to dispatch must be closely monitored.

Marine Corps vehicles are well-suited to operating in mountainous regions due to their high power-to-weight ratios, low-gear ratios, and relatively short wheelbase. Operators should have no difficulty in operating vehicles on the steep grades, sharp curves, and narrow roadways if vehicles are checked for mechanical fitness prior to being dispatched, loaded within prescribed limits, and driven skillfully with full concern for road and weather conditions.

When approaching a steep upgrade, especially when loaded, the operator should make a judgment as to whether the high-gear or low-gear range will be required. Normally, the lowest range will be used and the transfer case should be shifted to low range before the vehicle speed drops below that prescribed by the respective technical manual. This will increase chances of topping the hill at the best possible speed and with the engine operating at maximum torque speed. This early shift of the transfer case into a lower gear range will often avoid having to shift into first gear at low speeds when driving manual-shift vehicles. On vehicles with an automatic transmission, it will prevent overheating of the transmission fluid.

When approaching a downgrade, the operator should make a judgment as to what gear should be used to obtain the best retarding effect from the engine. Brakes should be tested, brake air pressure monitored, and the vehicle speed reduced to a rate consistent with road and weather conditions. In the event that brakes fail and the engine retarding capability is exceeded, emergency stop procedures should be executed immediately, including, if necessary, ditching the vehicle on the uphill side of the road. Attempting to ride it out in a runaway vehicle adds to the chances of serious injury and endangers other vehicles and personnel.

Cold Weather Operations

Operations in arctic and subarctic regions of the world require a landing force and its transportation elements to use special equipment and special techniques to operate successfully. Deep snow and extreme cold are found in the North Temperate Zone and at high altitudes in all zones. The areas in which these conditions exist range from forested to relatively barren regions and vary extensively in population. Offensive and defensive operations in these areas are conducted as in other climates; however, operations in this environment typically require greater CSS planning and supplies and more time to accomplish. The considerations of special techniques, equipment, and the additional time inherently needed must be included in the planning and conduct of such operations.

In-depth planning for motor transportation operations is necessary and must provide for reduced capability of vehicles and motor transportation units. Special training for operators in cold weather driving and vehicle maintenance is essential when providing motor transportation services to units engaged in cold weather warfare. Routes with easily identifiable checkpoints should be used. Checkpoints require pronounced vertical characteristics, since drifting snow covers contours and terrain features rapidly. An assistant operator should be assigned to each vehicle. Driving in heavy snow and extreme cold is fatiguing and demands increased driver concentration that makes periodic relief necessary. All vehicles must have proper tires, chains, tow devices, and snow shovels. Items likely to be needed first should be loaded last.

Operating in reduced temperatures require increased maintenance personnel, facilities, and special equipment. Low-temperature lubricants and fuels must be provided. Shelter from the wind and intense cold is required for performance of any but the simplest maintenance tasks.

Motor vehicle operators and crew must be equipped with and required to carry cold weather clothing and equipment in their vehicles for survival in case of accident or breakdown. They must be trained to survive in the cold.

Typically, units engaged in cold weather warfare require additional vehicles due to reduced efficiency. Vehicles are less efficient for the following reasons:

- Organic vehicles of the units have reduced capability, thereby placing increased demands on support units.
- Vehicles require extra time and special attention for starting at low temperatures. The number of troops that can be transported in vehicles will be reduced due to bulk of clothing and additional gear carried. The quantity of individual and organizational equipment required to survive in cold climates makes it necessary for the unit to use a greater number of vehicles to transport the unit load.
- Operating speeds are reduced to accommodate hazardous driving conditions.
- Fuel consumption is increased by 25 to 50 percent due to operation in lower gears, increased idle time to warm running gear, and frequent starting and stopping due to hazardous road conditions.
- Frequency of accidents and in route delays are increased by hazardous road conditions.
- Bad weather conditions and fatigue of cargo handlers will increase loading and unloading times.

These same reasons also affect the ability of motor transportation units to provide increased support (see chapter 5 for more detailed information on planning considerations). In addition, it must be expected that the availability of vehicles for service will deteriorate as a function of the duration and the intensity of cold weather.

The level of maintenance of the road network, in heavy snow areas, will have a strong influence on the support capabilities of the motor transportation units, especially in performing resupply missions. Snow clearing must be planned for and equipment must be available to support motor transportation units.

Tactical employment of infantry units will require them to operate off the established road network. Infantry units require support of marginal terrain vehicles to retain their mobility despite the heavy additional loads imposed by clothing, shelter, fuel-to-heat shelters, and increased quantity of rations. In turn, the additional vehicles needed to operate in this environment will increase supply and maintenance needs of the units using them.

Cold weather driving techniques are different for maintained and unmaintained road networks and are further described below:

- *Maintained road network*. Convoy operations may be carried out normally, except for reduced speeds and increased gaps between vehicles. Convoy speed is adjusted dependent upon the road surface conditions along various sections of the route or changes in weather conditions. Vehicle operators are trained to keep the other vehicles in the group in sight and assist if a vehicle becomes disabled.
- *Unmaintained road network*. On roads not fully maintained by snow removal operations, vehicles in the 1 1/4-ton class can operate at reduced speeds in snow depths up to 6 inches. Vehicles in the 5-ton and above payload class can operate at reduced speeds in snow up to 12 inches and under emergency conditions with full payload in snow depths of 20 inches with fully trained and experienced operators. Use of non-powered trailers or other towed loads should be avoided in heavy snow conditions.
- *Ice*. Frozen lakes and rivers are excellent supply routes. Ice routes must be selected and tested for ice thickness and structural integrity (see table 4-1). Even amphibious vehicles may not be able to extricate themselves from an ice hole.
- *Over-snow vehicles*. Operations of over-snow logistic support vehicles require special procedures to ensure maximum use of every vehicle. The following principles apply:
  - Use prepared and marked trails whenever possible.
  - Dispatch vehicles in small groups, never singly.
  - Exercise positive control measures to monitor the location of every vehicle operating off trails.
  - Train operators to be proficient in land navigation when operating cross-country.
  - Top off fuel tanks when dispatching a vehicle to ensure sufficient range for the return trip.
  - Minimize operations on cleared roads.
  - Plan loads carefully in order to not overload the vehicle in deep snow.
  - Observe care when transporting troops. Closed over-snow vehicles are prone to entrapment of carbon monoxide.

MOBILE OPERATIONS

Maneuver is the movement of forces to secure or retain positional advantage over an enemy. The GCE commander may require motor transportation assets in addition to amphibious vehicles, armored vehicles, and helicopters and tiltrotor aircraft to achieve the ground battlefield mobility required by the tactical situation.

Employment

The continuous requirement for a timely concentration of units and material will often demand short notice movement of forces and major shifts in movement direction. Motor transportation units can be attached to both maneuver units and infantry battalions to facilitate that requirement.

Motor transportation units should be attached to maneuver units during mobile operations to provide unity of command that will increase responsiveness and flexibility.

Mechanized operations will be fast moving and will often move well forward of friendly units or in unanticipated directions to take advantage of a tactical situation. Motor transportation units may be attached to infantry battalions to meet the lift requirements as well as their logistic trains.

Table 4-1. Ice Load-Bearing Capacities.

Load Type	Gross Weight (tons)	Minimum Ice Thickness		Minimum Distance Between Loads	
		Centimeters	Inches	Meters	Yards
Marine on skis or snowshoes	0.1	3	1.2	5	5.5
Marine on foot	0.1	5	2	5	5.5
Infantry (column of 2)	n/a	7.6	3	7.3	8
Infantry (column of 4)	n/a	10	4	10	11
Wheeled vehicle loads up to:	3.5	23	9	15	16.5
	6	30	12	20	22
	10	40	16	25.6	28
	15	61	24	30	33
Tracked vehicle loads up to:	3.5	20	8	15	16.5
	10	30	12	20	22
	12.5	40	16	25.6	28
	25	61	24	40	44
	45	81	32	50	55
	60	81	32	60	66

Operations

During mobile operations, trucks will be used to move infantry companies and their equipment rapidly to dismount points to continue the attack on foot. As objectives are seized, trucks will be called forward under the leadership of motor transportation leaders and infantry units will remount the trucks and continue the attack in an effort to maintain the momentum. Traditional convoy techniques may not be employed under these conditions. Motor transportation unit leaders will be required to advise and assist infantry unit leaders in developing plans, including movement formations, movement techniques, primary and alternate routes to objectives, and dismount points. Motor transportation leaders will also be required to advise infantry leaders on the maintenance of vehicles.

Mechanized operations are conducted by infantry units mounted in amphibious assault vehicle, supported by armor, along with a full combined team of combat support and CSS elements. Mechanized operations will be characterized by rapid and long-distance movements and typically require large amounts of supplies for sustainment. In order to sustain mechanized operations and maintain the momentum of the attack, logistic trains will be formed for the maneuver units. Unlike tank and artillery units, infantry units do not have organic medium trucks (with the exception of the division truck company) that will be required in the logistic trains. This requirement is usually filled with DS CSS elements.

Motor transportation unit leaders should retain tactical command of their trucks while under the commander of the logistic train. In this role, the motor transportation leader advises and assists the logistic train commander in the planning of convoy procedures and movement routes for the logistic train and routes for resupply of forward combat units.

Hauling

Hauling is the movement of equipment, personnel, and supplies by transportation assets. Motor transportation units utilize specific hauling methods to best accomplish mission requirements; these operations are characterized as intra-zonal and inter-zonal. Intra-zonal is an operation confined within a specific transportation organization's area of operation. Inter-zonal is as an operation that crosses a boundary of a specific transportation organization's area of operation, causing the organization to be under the area control of more than one headquarters or command.

There are three different types of hauls (local, line, and zonal), which are categorized by time and distance:

- *Local*. Local (short) hauls are operations in which vehicles can make two or more round trips per day based on distance and transit time. Local hauls have short running times and are typically within one unit's boundary. The measure of effectiveness for evaluating local haul operations is the amount of tonnage moved during the operational period.
- *Line*. Line (long) hauls are operations in which vehicles cannot make more than one round trip or portion of a trip per day due to distance traveled, terrain restrictions, tonnage, or transit time. Line hauls have long running times compared to loading and unloading, and usually involve one trip. Line hauls commonly cross boundaries into other unit battlespaces and may require additional coordination and support when traveling across different battle space.
- *Zonal*. Zonal (extended) hauls are operations in which vehicles cannot make a complete portion of a trip per day and must be broken up into legs due to distance traveled, terrain restrictions, tonnage, or transit time. Zonal hauls commonly cross boundaries into other areas of operations, which could require joint coordination and support to be completed.

Three general methods are used in moving cargo and personnel:

- *Direct haul*. A direct haul is a single transportation mission completed by the same vehicles. It does not involve a transfer of supplies or exchange of equipment. The commander uses direct haul to speed forward movements before establishing transfer or exchange points. Direct hauls can be used in local or line haul operations. They may also be used when there is a need for rapid movement of tonnage over long distances.

- *Shuttle*. A shuttle is a single transportation mission completed by the same vehicles between two points, making repeated trips between two points. This method is commonly used in local hauls.
- *Relay*. A relay is the continuous movement of supplies or troops completed in one trip utilizing multiple vehicles without transferring the load. The motor transportation unit does a relay by changing drivers, tractors, or both for each segment. It involves the continuous movement of supplies or troops over successive segments of a route. This method is most common for line hauls. The relay system, using tractor-trailer or semitrailer combinations, is the most efficient method of line haul operations. Containerized or cargo on flat racks increases the effectiveness of this system and better uses the tonnage capabilities of vehicle platforms. This technique is best used when there is a well-developed road network that is not subject to interdiction. Relay is also the best method to use when the unit cannot complete a one-way haul in one day. This system provides rapid throughput of cargo and guarantees adequate supervision and support along each segment of the route.

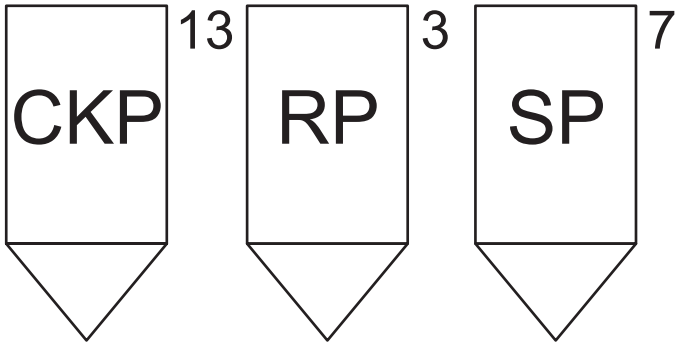
Operational Techniques

The commander may increase the tonnage moved with a fixed number of vehicle configurations by adopting some or all of the following techniques:

- Loading each vehicle to its maximum allowable capacity.
- Increasing the authorized speed of the vehicles, though existing traffic, terrain, and weather conditions will dictate safe operating speeds.
- Synchronize delivery and pick-up schedules to various units.
- Reducing turnaround time.

Convoy Operations

Convoys are task-organized to meet the requirements of the assigned mission. A convoy may include a transportation element, an escort or security element, a C2 element, and trail or recovery elements. Because units plan and execute their own convoy operations, the convoy commander is the direct representative of the commander initiating the operation and is responsible for the conduct, safety, security, and accomplishment of the convoy's mission. However, HHQ often establishes control measures and regulations governing convoy operations on main supply routes. Commanders publish control measures and regulations in local SOPs and in their operation orders. These control measures include start points, checkpoints, halts, and release points. See figure 4-1 for control measure examples.



Note: For more information on symbols and their draw rules, see the most current version of MIL-STD-2525.

Figure 4-1. Checkpoint, Release Point, and Start Point Examples.

MOTOR TRANSPORTATION ORGANIZATIONS

Tactical motor transportation assets are a part of virtually every organization within the Marine Corps operating forces.

Logistic Combat Element

The LCE of the MAGTF provides medium and heavy lift/equipment recovery and bulk fuel and water distribution. The LCE may be task-organized and is employed in GS and DS to transport cargo, equipment, and personnel over extended distances for sustained periods of time. Organic equipment includes medium tactical vehicle replacement family of vehicles, logistics vehicle systems replacement (LVSR) family of vehicles, 40- and 50-ton semitrailers, flatrack refueling capability, six containers together (SIXCON) fuel and water modules, and semi-refueler trailers. For notional GS and DS motor transportation company organizational structures see figures 4-2 and 4-3.

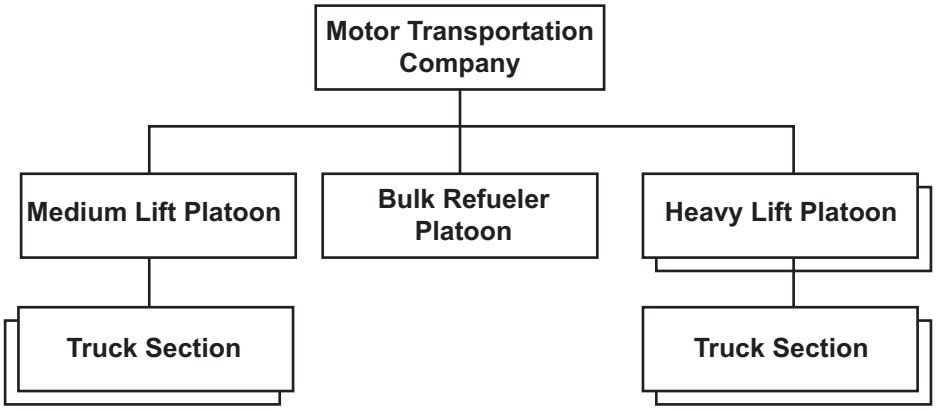


Figure 4-2. General Support Logistics Combat Element Motor Transportation Company.

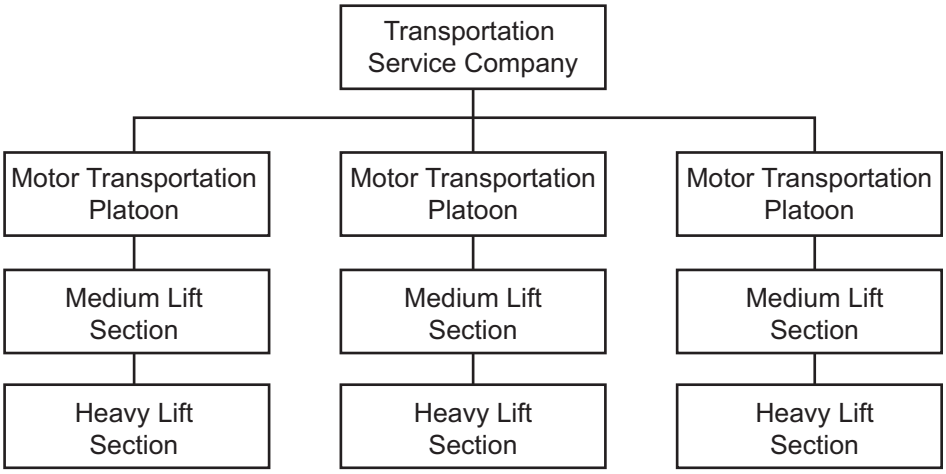


Figure 4-3. Direct Support Logistics Combat Element Transportation Service Company.

Transportation Support Battalion. The mission of the transportation support battalion (TSB) is to provide tactical throughput support and associated command and control to facilitate the distribution of personnel, equipment, and supplies by air, ground, and sea for the MEF. The TSB is organized to plan, coordinate, and supervise the throughput and distribution functions; facilitate task organization for operations conducted by the battalion; and facilitate task organization for landing support and throughput operations conducted in support of the MEF. It is equipped to provide tactical, medium through heavy cargo transportation capabilities. Additionally, the battalion provides the initial source for centralized CSS for sustained MEF operations.

The tasks of the TSB include the following:

- Provide command and control of landing support, distribution, throughput functions, materiel handling, air delivery support, convoy operations, and transportation during operations conducted by the MEF or smaller MAGTFs.
- Provide selected heavy equipment lift augmentation in support of the MEF.
- Transport personnel, equipment, and supplies within organic lift capabilities.
- Provide throughput and distribution of bulk, liquid, containerized, and dry cargo.
- Perform port and terminal operations at ports, beaches, railheads, airheads, and cargo terminals.
- Provide air delivery support for MEF operations.
- Perform expedient horizontal construction tasks required for landing support operations to include austere site preparation and construction/removal of obstacles and barriers.
- Provide, from organic assets, a nucleus for the task organization of a LFSP/AAOG to provide C2 structure for the landing support and distribution for initial CSS for MEF operations.
- Manage freight, break bulk cargo, container cargo, and passenger throughput.

General Support Mission. The TSB provides GS for medium and heavy lift ground transportation and vehicle recovery, enabling throughput and sustainment of MAGTF operations. Select items are listed in table 4-2.

General support LCE motor transportation tasks include the following:

- Transport personnel, equipment, and supplies within organic lift capabilities in support of MAGTF operations.
- Provide throughput and distribution of containerized and dry cargo in support of MAGTF operations.
- Provide distribution of bulk water (Class I) and bulk fuel (Classes III and III [A]) in support of MAGTF operations.
- Provide unit and supply point distribution of bulk water and fuel.
- Augment the motor transportation and supply distribution capabilities of the DS elements within the MAGTF, as required.

Table 4-2. Logistics Combat Element General Support, Selected Items of Equipment.

Table of Authorized Materiel Control Number	Description	Model(s)
D0003	Truck, cargo, 7-ton, armored	AMK23/25
D0005	Truck, cargo, 7-ton, armored, extra wide body	AMK27/28
D0013	Truck, tractor, 7-ton, armored	AMK31
D0015	Truck, wrecker, 7-ton, armored	AMK36
D1214	Truck, wrecker, 10x10, LVSR	MKR15/AMKR15
D0215	Semitrailer, aircraft refueler, 5,000 gallon	MK970/AMK970
D0886	Truck, cargo, 10x10, LVSR	MKR18/AMKR18
D0035	Trailer, palletized load system	M1076
D0887	Truck, tractor, 10x10, LVSR	MKR16/AMKR15
D0235	Semitrailer, lowbed, 40-ton, medium heavy equipment transport	M870A2S
D0002	Semitrailer, lowbed, 50-ton, medium heavy equipment transport	M870A2E1
D0211	Flatrack refueler, 2,500 gallon	MK2500
B2085	SIXCON, fuel storage tank module	n/a
B2086	SIXCON, water storage tank module	n/a

Direct Support Mission.The TSB provides DS for medium and heavy lift ground transportation and vehicle recovery enabling throughput and sustainment of MAGTF operations. Select items are listed in table 4-3.

Direct support LCE motor transportation tasks include the following:

- Provide limited line haul and distribution of bulk water (Class I) and bulk fuel (Classes III and II [A]) for the LCE.
- Provide medium and heavy lift motor transportation for the movement of bulk dry cargo, Classes V and V (A), and heavy equipment.
- Augment the personnel lift capability, as required, of elements of the MAGTF.

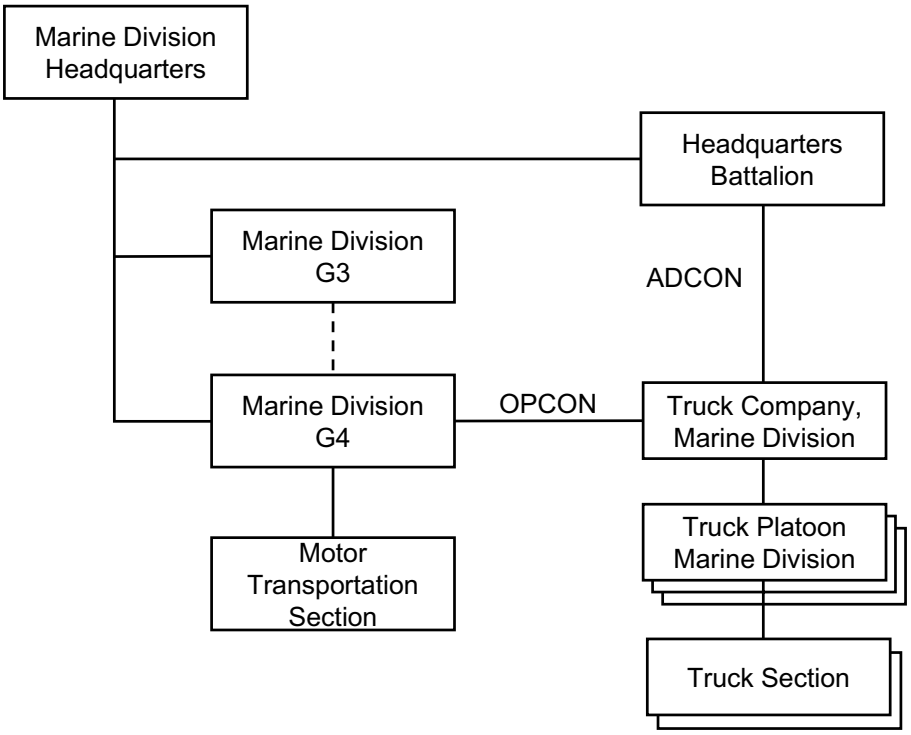
Table 4-3. Logistics Combat Element Direct Support, Selected Items of Equipment.

Table of Authorized Materiel Control Number	Description	Model(s)
D0003	Truck, cargo, 7-ton, armored	AMK23/25
D0015	Truck, wrecker, 7-ton, armored	AMK36
D1214	Truck, wrecker, 10x10, LVSR	MKR15/AMKR15
D0886	Truck, cargo, 10x10, LVSR	MKR18/AMKR18
D0211	Flatrack refueler, 2,500 gallon	MK2500
B2085	SIXCON, fuel storage tank module	n/a
B2086	SIXCON, water storage tank module	n/a

Ground Combat Element

Subordinate elements of the GCE have motor transportation equipment authorized for organizational use. Because of the limited quantities and specialized roles of that equipment, it will normally not be available for routine logistic support. For a notional organizational structure of an LCE unit in DS of the GCE, see figure 4-4.

Truck Company, Headquarters Battalion, Marine Division. The truck company provides limited tactical mobility to the Marine division. The company commander directs and controls all matters pertaining to company administration and support. The company headquarters supports the company commander in exercising command and control of the operating elements in the three truck platoons, Marine division. The truck company is under the administrative control of the headquarters battalion commander and OPCON of the division G-4. Operational tasking of the truck company is coordinated by the division motor transportation officer in conjunction with priorities established by the division G-3 operations officer.



LEGEND

ADCON administrative control

Figure 4-4. Notional Marine Division Motor Transportation.

A truck company is a combat support asset of the Marine division. It is capable of transporting the assault elements of two infantry battalions simultaneously. Truck platoons will normally be attached to or placed in direct support of infantry regiments and are capable of sustained operations on a 24-hour basis. Normally, the tactical situation will require that motor transportation assets of the truck company be used (typically broken up into three platoons with two sections per platoon) to augment the limited organic capability of subordinate division units. The truck company is capable of providing field-level maintenance for all organic equipment except communications equipment. Field-level maintenance for organic communications

equipment is provided by the communications company, headquarters battalion within the division. Intermediate field-level maintenance for all other equipment is provided by the LCE. Selected items of equipment organic to the truck company are listed in table 4-4.

Table 4-4. Truck Company, Division Selected Items of Equipment.

Table of Authorized Materiel Control Number	Description	Model(s)
D0003	Truck, cargo, 7-ton, armored	AMK23/25
D0015	Truck, wrecker, 7-ton, armored	AMK36
B2085	SIXCON, fuel storage tank module	n/a

Motor Transportation Section, G-4, Division Headquarters. The motor transportation section, division headquarters, consists of the division motor transportation officer and a small administrative staff. The motor transportation officer performs the general duties of a special staff officer under the cognizance of the assistant chief of staff, G-4. The staff responsibilities of the division motor transportation officer include the following:

- Supervising the planning, technical training, and motor transportation-related duties and programs within the division.
- Coordinating planning for motor transportation intelligence and the dissemination thereof.
- Conducting comprehensive analyses of all motor transportation tasks required to implement the commander's plan.
- Maintaining liaison with higher, lower, and adjacent commands pertaining to motor transportation matters.
- Analyzing and evaluating motor transportation capabilities throughout the command.
- Coordinating all motor transportation support requirements and direct commitments, as appropriate, to organizations best capable of providing the support required.
- Monitoring and providing technical supervision to all motor transportation requirements, commitments, and movements of the truck company.
- Supervising and coordinating the maintenance of required motor transportation records and reports.
- Developing, coordinating, implementing, and monitoring command technical inspections for motor transportation.
- Monitoring motor transportation combat readiness in all subordinate organizations of the command.
- Advising the commander of all technical matters concerning motor transportation.

Aviation Combat Element

Some subordinate elements of the ACE have limited, special purpose motor transportation equipment authorized for organizational use. Other than limited general purpose motor transportation equipment, units of the ACE receive organic motor transportation support from the Marine wing support squadrons (MWSSs).

Marine Wing Support Squadron. Organic motor transportation support for the MAW is provided by the MWSSs of the Marine aircraft group. Each MAW has two MWSSs designed to support a fixed-wing aircraft group and two MWSSs to support a rotary-wing aircraft group (these are designated MWSS/FW and MWSS/RW, respectively). The exception to this is in 1st MAW, which has one fixed-wing and one rotary-wing MWSS. The motor transportation operations division, which falls under the aviation motor transportation company of the MWSS, is organized into two branches: the light/medium branch and the heavy branch (see figure 4-5). Table 4-5 presents a list of selected items of equipment.

Marine Aircraft Wing Motor Transportation Section. The motor transportation section of the MAW consists of the MAW motor transportation officer and a small administrative staff. The motor transportation officer performs the general duties of a special staff officer and has responsibilities that parallel those of the division motor transportation officer.

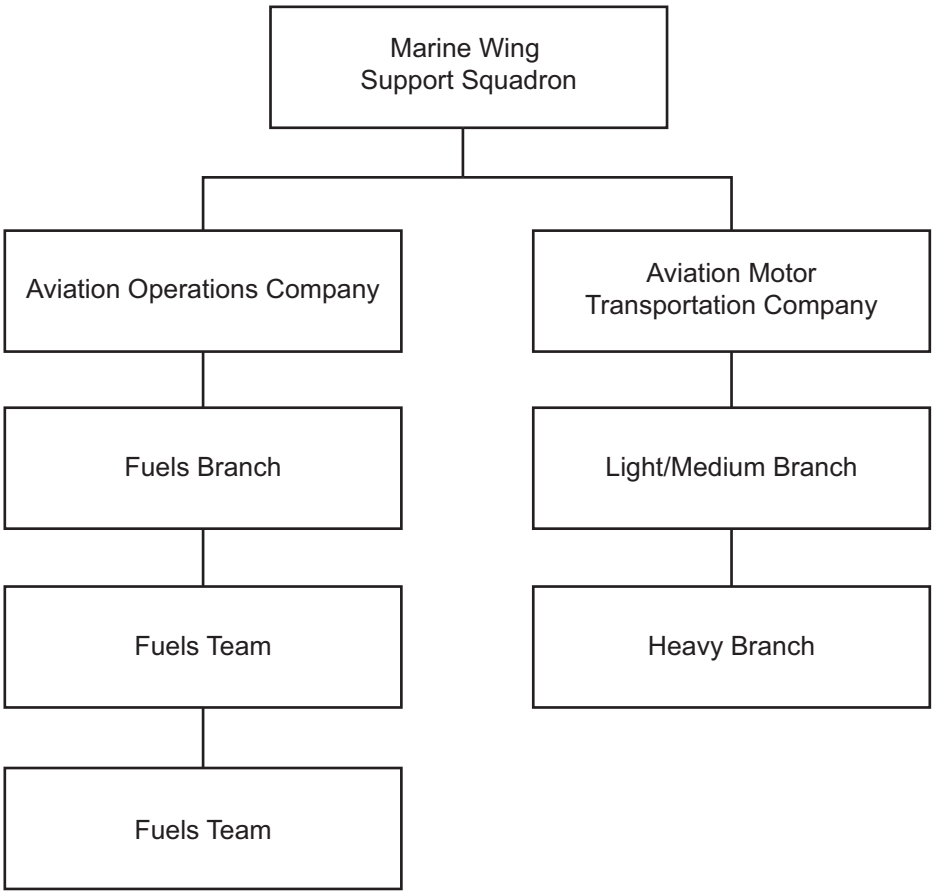


Figure 4-5. Marine Wing Support Squadron Motor Transportation.

Table 4-5. Air Combat Element Selected Items of Equipment.

Table of Authorized Materiel Control Number	Description	Model(s)
D0003	Truck, cargo, 7-ton, armored	AMK23/25
D0005	Truck, cargo, 7-ton, armored, extra wide body	AMK27/28
D0013	Truck, tractor, 7-ton, armored	AMK31
D0015	Truck, wrecker, 7-ton, armored	AMK36
D1214	Truck, wrecker, 10x10, LVSR	MKR15/AMKR15
D0215	Semitrailer, aircraft refueler, 5,000 gallon	MK970/AMK970
D0886	Truck, cargo, 10x10, LVSR	MKR18/AMKR18
D0035	Trailer, palletized load system	M1076
D0887	Truck, tractor, 10x10, LVSR	MKR16/AMKR16
D0235	Semitrailer, lowbed, 40-ton, medium heavy equipment transport	M870A2S
D0002	Semitrailer, lowbed, 50-ton, medium heavy equipment transport	M870A2E1
D0211	Flatrack refueler, 2,500 gallon	MK2500
B2085	SIXCON, fuel storage tank module	n/a
B2086	SIXCON, water storage tank module	n/a

Section II. Aerial Delivery Operations

Aerial delivery is a viable mode of distribution to support the range of military operations against a flexible, fluid, and ever-changing threat environment. It is one of the vital links to the tactical distribution environment. Aerial delivery consists of airdrop and air-land (both internal and sling load). The logistic planner measures many variables when selecting modes of aerial delivery or when deciding whether or not to use aerial delivery. The LCE commander determines if aerial delivery is the appropriate mode of transportation and, if it is, which method will be used. Each method of aerial delivery has its distinct advantages and disadvantages.

AIR-LAND DELIVERY

Air-land delivery occurs when a transport or tanker aircraft lands and unloads its cargo or, in the case of vertical takeoff and landing aircraft, after it has entered a hover. Air-land is the preferred method of delivery because it is usually the most efficient, safest, and least expensive way to deliver personnel and cargo. Air-land operations also allow for backhaul capability, including aeromedical evacuation. Air-land can be conducted in austere airfields with minimal ground support and security on a limited contingency basis. Extended basing operations require secure, suitable, and conveniently-located airfields with appropriate air mobility support assets to facilitate offload. Sound operational procedures, well-planned base defense, and rapid offloading and onloading techniques associated with various airlift aircraft can minimize some of the

constraints of air-land delivery. Commanders should view air-land delivery as the method of choice for most air movements.

Advantages of air-land (internal) mode of transportation include the following:

- Allows equipment that is not air-droppable, such as tanks, some artillery, and helicopters, to be brought rapidly in-theater.
- Allows a greater degree of tactical integrity and the capability to rapidly employ units after landing.
- Exposes deploying personnel and equipment to less risk of injury or damage.
- Eliminates the need for specially trained personnel to prepare supplies for delivery.
- Permits the maximum utilization of aircraft loads by eliminating the volume and weight of preparing loads for airdrop deliveries.
- Allows aircraft to be used for backhaul or evacuation of personnel.
- Low cost per ton of cargo moved ratio.

Disadvantages of air-land (internal) mode of transportation include the following:

- Requires moderately level, unobstructed LZs.
- Requires more time for delivery of a given size force than when delivery is by parachute, especially for a small, restricted LZ.
- Requires more support personnel and MHE.
- Exposes aircraft to prolonged air and ground attack because of the extended time on the ground at forward airfields.
- Requires more engineer assets to maintain the airfield.

Advantages of sling loads include the following:

- Provides for rapid movement of heavy, outsized cargo directly to the user, bypassing surface obstacles.
- Allows the use of multiple flight routes and landing sites, enhancing survivability of the aircraft and the flexibility afforded to the ground commander.
- Allows a reduced planning cycle, thus providing a far more flexible and responsive asset.

Disadvantages of sling loads include the following:

- Helicopter weight capacities are generally less than that of fixed-wing aircraft.
- Airspeed and maneuvering capabilities may be restricted if the sling load causes the helicopter to be unstable during flight.
- Adverse weather conditions are more likely to affect sling loads. For example, helicopter lift capacity is affected by atmospheric pressure, altitude, temperature, humidity, and winds.
- Limited number of helicopters currently available in the force may limit sling load operations.

- LZ surface conditions (debris, dust, and snow) and the size of the LZ will impact the ability to conduct successful operations.
- Requires specialized training.
- Increases aircraft detection.

For more detailed information on sling load operations, see Marine Corps Reference Publications (MCRPs) 3-40F.4, *Multiservice Helicopter Sling Load: Basic Operations and Equipment*; 3-40F.5, *Multiservice Helicopter Sling Load: Single Point Load Rigging Procedures*; and 3-40F.6, *Multiservice Helicopter Sling Load: Dual-Point Load Rigging Procedures*.

AIRDROP DELIVERY

Airdrop delivery is the in-flight delivery of specially-rigged equipment and supplies to land-based combat forces. It is performed by fixed-wing, tiltrotor, or rotary-wing aircraft from varying altitudes. Airdrop operations are conducted in the following tactical distribution methods:

- *Direct drop zone (DZ)*. Supplies and equipment are delivered directly to the using unit at its present location. No further vehicle support is required in order to receive the equipment and supplies.
- *Indirect DZ*. Equipment and supplies are delivered to a location separate from the unit and moved by vehicle to the using unit. This method of delivery is often used when an area can be secured for airdrop; this allows for shorter convoy operations.

Advantages of the airdrop mode of transportation include the following:

- Permits sustainment deliveries to units operating away from airfields and LZs.
- Permits the delivery of combat forces and materiel, concentrated and in mass, with minimum space and time requirements (often with the element of surprise).
- Can accurately distribute personnel and materiel in conditions of poor visibility that would otherwise preclude airlift and surface operations.
- Enable aircraft to remain above some low altitude threats if using medium/high altitude airdrop methods.
- Allows critical cargo to be delivered by an uncontaminated aircraft into a contaminated LZ/DZ or airfield.

Disadvantages of the airdrop mode of transportation include the following:

- Increases risk of injury to personnel and damage to cargo.
- Requires special training for the riggers, transported personnel, and aircrews.
- Limits allowable cabin load utilization substantially because of the special rigging required for airdropped materiel.
- Increases risk of surface wind limitations.

- Represents an operational-level risk when employed by a large formation. If an enemy successfully targets and attacks the airdrop, it could result in the loss of the airlift force and the unit and/or materiel being carried. Accordingly, the decision to use the airdrop method is predicated on determining if a user's requirements justify the risk to, and expenditure of, scarce and costly airdrop resources.

CONCEPT OF ORGANIZATION AND STRUCTURE

The MAGTF requires airdrop capabilities to be organized in a manner that provides responsive support when surface, tiltrotor, or helicopter transport cannot fulfill resupply requirements due to range, closed LOCs, lack of adequate airfields, prohibitive ground tactical situation, high tonnage, or the need to reduce response time. See MCTP 3-20E, *Assault Support*, for more information on airdrop capabilities. Airdrop operations provide flexibility and complement tactical distribution capabilities available to the MAGTF. As the Marine Corps increases its distributed and dispersed operations, the advantages of an airdrop becomes a logical choice in order to sustain forces that would not be accessible by other modes of transportation. However, an effective airdrop requires training, equipment, and planning to ensure readiness. The air movement can also be provided by coalition or multinational airlift platforms.

Within the three MLGs, each active duty landing support company has a resident airdrop capability. They are assigned as a GS asset to be task-organized by requirement. The air delivery platoon consists of a headquarters section, heavy pack section, light pack section, heavy drop section, and maintenance section. The 1st and 2d MLG's air delivery platoons have three, 10-person airdrop teams and an headquarters element of 7 personnel, totaling 37 Marines per platoon. The 3d MLG air delivery platoon consists of three, 9-person airdrop teams and a headquarters element of 7 personnel, totaling 34 Marines.

The most common support relationship assigned to an air delivery platoon is GS to the MAGTF. Their capability can be tasked-organized into teams and detachments required to meet operational needs. Unique requirements exist for conducting airdrop missions and personnel parachute operations that require task organization to facilitate the mission.

Each supported unit requiring airdrop must be able to articulate the desired end state in the initial request to ensure the airdrop team or detachment is correctly manned, equipped, and certified to execute the assigned airdrop mission profile. Specific certifications are required based on the type of airdrop mission profile and aircraft being used. Every airdrop situation requires a minimum of two joint airdrop inspectors. Those units requiring airdrop by rotary-wing or tiltrotor aircraft from the ACE, or any time the joint precision airdrop system (JPADS) is being used, a jumpmaster is also required. Units utilizing a Marine Corps personnel parachuting capability requires a minimum of two jumpmasters to properly execute the mission. Additionally, peacetime deployments and exercises add to the requirement needed to conduct parachute operations. Personnel parachute operations, at a minimum, require two jumpmasters and a qualified drop zone safety officer (DZSO) to provide the required safety oversight during parachute operations.

Cargo airdrop requirements differ slightly if personnel are not involved. If just cargo is being distributed, the requirement is two joint airdrop inspectors, and in the case of rotary-wing or tiltrotor aircraft, a jumpmaster and rigger, to deploy the load from the aircraft.

CONCEPT OF EMPLOYMENT

Airdrop is a unique mode of transportation in tactical distribution since mode selection must be recommended by the supported unit. This is due to the responsibilities levied on the supporting unit as well as the magnitude of coordination that impacts operations. Along with mode selection, the supported unit must provide a preferred method of employment. The type of airdrop methods depends on the threat, the required payload, the accuracy required, and whether mass is required on the DZ. The following subparagraphs explain the various methods of airdrop employment.

A-7A/Door Bundle Container Loads

The A-7A/door bundle container loads can be rigged for low-velocity or high-velocity airdrop. Drops of the A-7A/door bundle container loads occur from as low as 300 feet mean sea level or as high as 2,500 feet mean sea level. The container can exit the aircraft either through the paratroop doors or off the ramp. The equipment should be padded with felt, cellulose wadding, or paper honeycomb. This container is usually used to supply small items, ready-to-use or disassembled equipment, or other nonfragile supplies, the load being within the weight range of 75 to 500 pounds.

These loads are deployable from fixed-wing, rotary-wing, and tiltrotor aircraft. The A-7A/door bundle load is required to be inspected by a certified jumpmaster. Deployment of the load is executed by a certified jumpmaster. See figure 4-6.

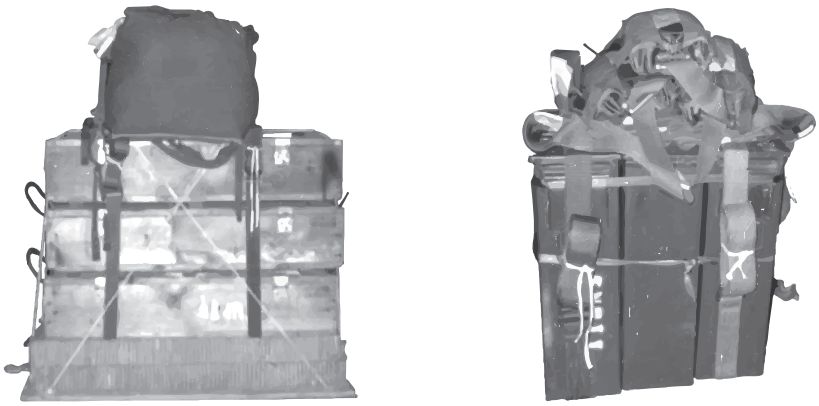


Figure 4-6. A-7A/Door Container Bundle Loads.

Container Delivery Systems

A container delivery system (CDS) airdrop is a gravity-assisted airdrop utilizing A-22 containers rigged to different parachutes. The loads are cushioned with energy absorbing material and contain supplies that can withstand high velocity impact. The CDS is the most common method of airdrop resupply. The CDS can be rigged for low-velocity or high-velocity airdrop. Container delivery system drops occur from as low as 500 feet mean sea level or as high as 25,000 feet mean

sea level. A typical CDS consists of an A-22 container and cargo weight-based parachute utilizing an adjustable nylon cloth and webbing container used to deliver food, medicine, ammunition, supply-type loads and disassembled or ready-to-use equipment. The entire bundle is attached to a plywood skid board measuring 48 by 48 inches and has a weight range of 501 to 2,200 pounds. Paper honeycomb is used as an energy-dissipating material. See figure 4-7.

The CDS must be inspected by a certified joint airdrop inspector before and after loading of the aircraft. Deployment of the system is conducted by a loadmaster on fixed-wing aircraft and by a certified jumpmaster on rotary-wing and tiltrotor aircraft.

Figure 4-7. Container Delivery System.

Type V Airdrop Platform (Heavy Drop Platform)

Heavy equipment loads consist of vehicles, equipment, or supplies rigged for airdrop on Type V platforms, which are extracted singularly or sequentially by extraction parachutes. The Type V airdrop platform is a modular component assembly constructed of aluminum extrusions and is used for airdropping typical mass supply loads. The platforms are available in 4-foot increment lengths, ranging from 8 to 32 feet, and are capable of airdropping loads ranging from 2,500 to 42,000 pounds. See figure 4-8.

Type V airdrop platforms can be deployed from C-17 and C-130 aircraft utilizing the 463L standard, dual-rail restraint systems. Deployment of the platform is conducted by a loadmaster only. Type V airdrop platforms must be inspected by a certified joint airdrop inspector before and after loading of the aircraft.

Figure 4-8. Type V Airdrop/Heavy Drop Platform.

Low-Cost Aerial Delivery System

The low-cost aerial delivery system (also referred to as LCADS) is a modified, lightweight A-22 container with no scuff pad, cover, or friction adapters on the lateral bands. It is rigged like the A-22 container, but is used for high-volume delivery of items where airdrop equipment is not recoverable. The low-cost aerial delivery system is a one-time use system with no retrogrades required. The weight capacity of the load is 501 to 2,200 pounds, without the weight of the parachute. See figure 4-9.

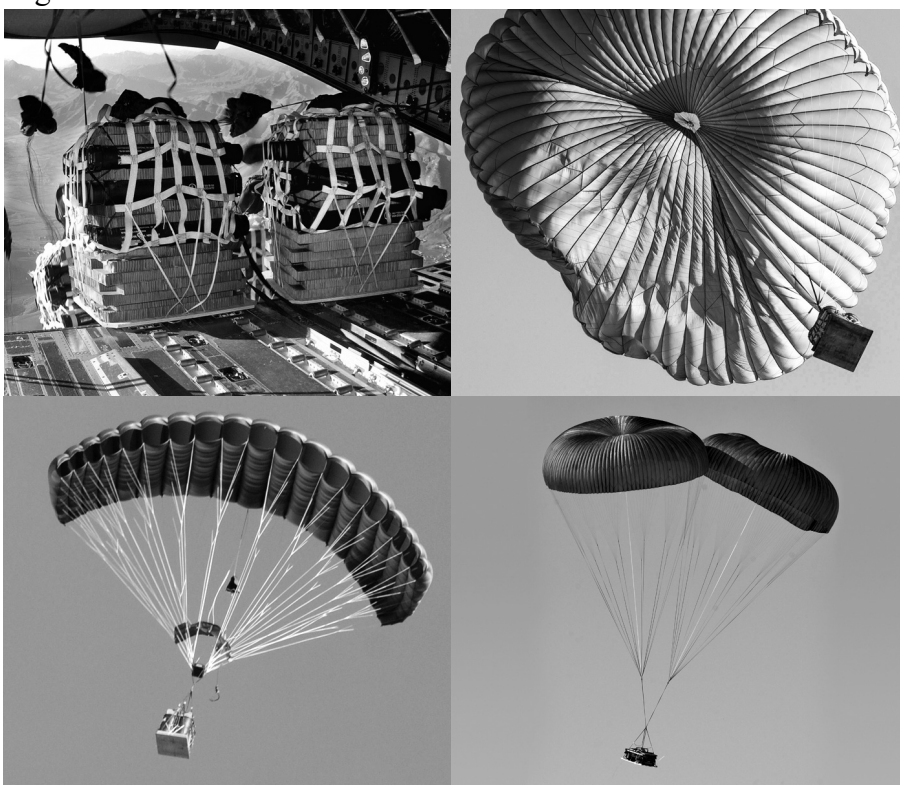


Figure 4-9. Types of Low-Cost Aerial Delivery System.

Joint Precision Airdrop Systems

The JPADS is a family of autonomous, GPS [Global Positioning System]-guided, and self-maneuvering airdrop systems. The overall basic system consists of a common mission planner, an airborne guidance unit, and multiple steerable parachute/parafoil systems. Flight profiles can vary significantly with the type of system utilized. Airspace deconfliction is a critical JPADS employment operations planning factor. The family of systems includes ultralight weight, 2K, and 10K systems that are capable of delivering cargo loads of 250 to 10,000 pounds of supplies and equipment, safely and effectively, from 24,500 feet mean sea level to within 150 meters of an intended point of impact. The JPADS utilizes satellites to obtain and maintain positional awareness in order to accurately deliver supplies and equipment. The JPADS allows clandestine resupply and aircraft protection from MANPADS [man-portable air defense systems]. The JPADS is capable of providing at least 8 kilometers horizontal offset from the intended point of impact.

The JPADS is deployable from fixed-wing, tiltrotor, and rotary-wing aircraft. The JPADS loads must be inspected by a certified joint airdrop inspector before and after loading of the aircraft. Deployment of the system is conducted by a loadmaster on fixed-wing aircraft and by a certified jumpmaster on rotary-wing and tiltrotor aircraft.

Tri-Wall Aerial Distribution System Airdrop

This system is used to airdrop containers of humanitarian daily rations during humanitarian assistance airdrop operations. It uses standard CDS procedures with boxes rigged to destruct at the end of a static line as they exit the aircraft, causing their contents to be dispersed into the air. Like leaflet drops, target size/coverage area is a factor when determining drop altitude.

TASKS AND RESPONSIBILITIES

The air delivery platoon and the airlift unit should coordinate with each other throughout the airdrop planning and mission execution on matters such as—

- Terrain conditions on the DZ that could cause an unacceptable number of injuries, excessive equipment damage or loss, or other deployment delays.
- Routes to the DZ, terrain obstructions, ease of zone identification, and adversary and/or enemy defenses.
- Earliest possible collaboration on intelligence matters, to include requirements for intelligence data and imagery products.
- Identification of mission-critical cargo and a *GO/NO GO* decision point.

The airlift unit should also coordinate with the supported unit before determining the tactics to employ. Many factors influence this decision, including the size of DZs, surrounding terrain features, tactical scheme of maneuver, enemy air defenses, and en route and objective area weather.

Supported Unit

The supported unit receives airdropped supplies and equipment. The supported unit's responsibilities include the following:

- Identify the type and quantities of supplies required.
- Request resupply through appropriate channels.
- Select, mark, and operate DZs.
- Recover airdropped supplies and equipment from DZs.
- Recover, stage, safeguard, and evacuate airdrop equipment (including parachutes) to the rigging site.

Air Delivery Platoon

The air delivery platoon's responsibilities include the following:

- Receive, temporarily store, and prepare supplies and equipment for airdrop.
- Perform organizational and intermediate maintenance on airdropped equipment (including parachutes and platforms).
- Ensure equipment is inspected and certified as required.
- Provide supervision, technical assistance, and advice on the operation of DZs and the recovery and evacuation of airdropped equipment from DZs.
- Furnish personnel to assist in the pre-load and post-load inspections of airdropped loads.
- Provide technical advice and assistance to other units involved in parachute operations if necessary.
- Assist in loading supplies and equipment into aircraft.
- Provide auxiliary personnel to aid flight crews in performance of the airdrop mission if necessary.

Logistics Combat Element

The LCE's responsibilities include the following:

- Validate the mode and method of resupply.
- Task the air delivery platoon with aerial delivery missions.
- Provide supplies and equipment for aerial delivery missions.
- Transport supplies and/or equipment from storage areas (dumps) to the rigging sites.
- Provide the support required by the air delivery platoon (i.e., MHE, motor transport, and communications).
- Request airlift support required to accomplish the aerial delivery mission.
- Provide support to the air delivery platoon for replacement of equipment and consumables used in rigging.
- Act as coordinator to ensure airdrop loads are marshalled and loaded aboard supporting aircraft (air delivery platoon may assist).
- Verify receipt of supplies by supported unit.

Airlift Unit

The airlift unit is the aviation unit that provides the aircraft to accomplish the aerial delivery mission. Responsibilities of the airlifting unit differ slightly depending on whether Marine Corps or US Air Force assets are used. If Marine Corps assets are used, the responsibility rests with the air delivery platoon to provide additional equipment and personnel. If US Air Force assets are used, the responsibility to provide additional equipment and personnel rests with the US Air Force. Airlift units, regardless of Service component, have the following responsibilities:

- Provide appropriate aircraft to accomplish the assigned mission and advise the supported unit on the method of delivery.
- Provide airdrop inspectors to conduct before and after load joint airdrop inspections with the air delivery platoon.
- Supervise the loading of the aircraft.
- Deliver the loads to the appropriate DZs.

PLANNING

Generally, planning for airdrop operations is conducted by HHQ. Detailed coordination among the airdrop liaison/representative, the G-3/S-3, and the fire control sections is required to ensure that air delivery airdrops do not conflict with supporting fires or other air operations.

The air delivery platoon locates, rigs, marshalls, and assists in delivery of supplies and equipment in conjunction with the ACE, other air components, and the supporting aircraft. The amount of airdrop support required is determined and the concept of operations is developed. Deployment planning encompasses both deliberate and crisis response planning. The LCE commander validates the mode of transportation required to support the requesting units. The strategic mobility or AMC liaison officer located in the G-4 identifies and tasks airlift assets based upon mission requirement. This may require liaison with external agencies such as the CRE or contingency response team.

The concept of employment is developed and airdrop assets are positioned to best support the assigned mission. The staging area, when supplies and equipment are to be airdropped, is collocated with the air delivery platoon along with supporting equipment and personnel. Airdrop support request procedures are developed and specific C2 procedures are established. Supported units are trained to operate DZs and to recover/evacuate airdrop equipment. Once planning and training are accomplished, the airdrop operation moves to the execution phase.

The following considerations significantly impact the planning process of an airdrop operation:

- The air delivery platoon cannot support itself; therefore, augmentation involves administrative support, liaison personnel, transportation (e.g., MHE, communications, motor transport) etc.
- The supply support required to sustain an airdrop is extensive. For example, large amounts of expendable supplies (e.g., plywood) are required. The supported unit must provide this material.

- Airdrop operations require large numbers of skilled and highly-trained personnel.
- The air delivery platoon's C2 procedures must be clearly defined. This is critical if the platoon is not deployed or collocated with its parent unit.
- The air delivery platoon is generally positioned at an airfield that can conduct fixed-wing operations.

The following additional requirements must also be addressed during planning:

- Special requirements must be determined (e.g., the need to airdrop engineer equipment or other large platform loads).
- Adequate storage/operating facilities at or near the departure airfield. These facilities should protect airdrop equipment from adverse weather.
- Electrical power for lighting, sewing machines, tools, and fans used to repair and pack large cargo parachutes and airdrop equipment.
- Special sites may have to be established for rigging and storage of ammunition and petroleum, oils, and lubricants airdrop loads.
- MHE may be required to move/load airdrop containers and platforms, also to move supplies during the rigging process.
- Prime movers and trailers may be required to move rigged loads from the rigging site to the aircraft.
- Close liaison must be established between the platoon and the airlifted unit to coordinate marshalling, loading, and inspection of airdrop loads.
- Communications support is required to coordinate rigging and loading activities.

Drop Zone Types and Considerations

Drop zones are specified areas used for the airdrop of personnel, equipment, or supplies. There are several different types of DZs, tailored to specific operations and locations. The DZ size and selection are the shared responsibility of the supporting and supported force commanders and depend on the load being dropped, method of delivery, dispersal pattern, and the level of risk the commander is willing to accept. The supported force is responsible for DZ establishment, operation, safety, and elimination or acceptance of ground hazards associated with the DZ. The airlift mission commander is responsible for the safety-of-flight review.

Types. A physical survey is accomplished by a qualified surveyor, followed by a safety-of-flight review in order to create a DZ. After these are accomplished, the survey is reviewed and approved.

Rectangular Drop Zone. Drop zones are normally rectangular due to the longer length requirements of certain aircraft. These DZs can have one axis of flight from one direction, or they can allow flight axis from the opposite direction.

Circular Drop Zone. A circular DZ, shown in figure 4-10, has multiple run-in headings and is inherently random. Mission requirements and usable terrain govern its size. The radius of a circular DZ corresponds to the minimum required distance from the point of impact to one of the trailing edge corners of a rectangular DZ for the same type and number of loads being dropped. In

other words, the entire DZ box fits inside the circle. Water DZs are normally circular in shape. The point of impact of a circular DZ is typically at the DZ's center.

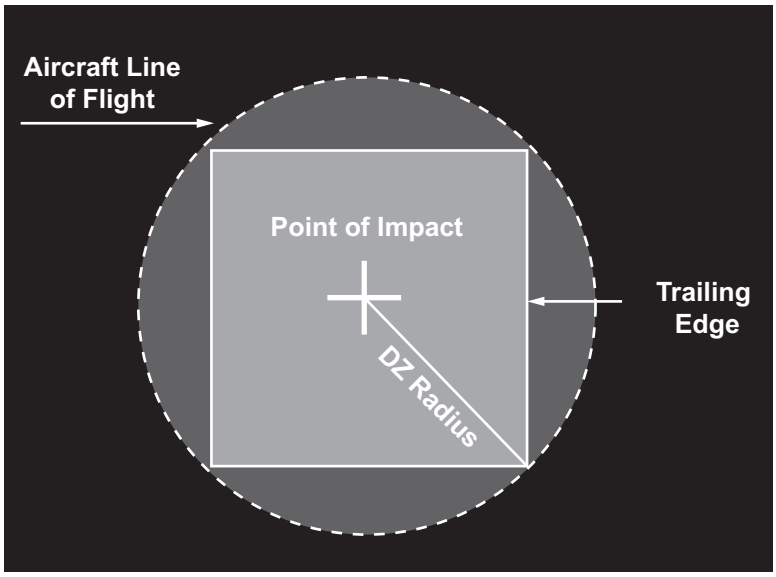


Figure 4-10. Circular Drop Zone.

Random Approach Drop Zone. Random approach DZs are circular, square, or rectangular, and large enough to permit multiple run-in headings. Any axis of approach may be used as long as the resulting DZ meets minimum criteria for the load being airdropped. The point of impact is normally placed at the DZ center point.

Joint Precision Airdrop System Drop Zone. The JPADS (guided systems) DZs are typically circular. The point of impact is located at the center point. Some JPADS multiplatform loads/capabilities may drive elliptical DZs, approximated by rectangular surveyed boundaries. For JPADS/improvised CDS airdrops, collateral damage estimation is required. This is necessary to mitigate the risk to people, buildings, and equipment near or on the DZ if a chute or guidance unit fails. It is critical that the collateral damage estimate be coordinated between the supporting and supported force commander.

Tactical Drop Zone. During exercises and operations, tactical DZs (DZs that have not been formally surveyed) are sometimes selected to support highly mobile ground forces. These DZs are evaluated and approved for use using tactical survey procedures. When using a tactical DZ, the airlift unit assumes responsibility for aircraft safety-of-flight while the receiving unit assumes responsibility for load condition. The DZ size should be determined by method of delivery, load dispersal statistics, collateral damage assessment, discussion with the receiving unit, and professional judgment. Other considerations are recoverability of airdrop equipment and survivability or recoverability of the load. For example, small trees covering the entire DZ might limit the recovery of airdrop parachutes, but still allow complete recovery of the loads. Tactical DZs may be created within the boundaries of an existing surveyed DZ if needed to accomplish a particular mission. In this case, the tactical DZ need not use the existing dimensions or axis of approach as long as minimum DZ requirements are still met.

Drop Airspeeds. Specific airdrop airspeeds for each type aircraft are published in appropriate Service manuals or technical orders. Except in emergencies, aircraft should not deviate from these established airspeeds. Deceleration to prescribed drop airspeed and attainment of level flight altitude are required to provide a stable platform for the actual airdrop of personnel, supplies, or equipment.

Drop Zone Wind. Drop zone wind information is critical to airdrop accuracy and aircrews must consider wind data from all available sources when determining the computed air release point. In addition to in-flight wind data, aircrews are normally provided with DZ wind information from ground sources (such as a US Air Force special tactics team or a DZ support team), which includes surface winds and the computed mean effective winds. Additionally, ground sources can relay indications of possible wind shears or local phenomena that could affect wind direction or speed and, ultimately, impact upon airdrop or mission success. Airdrop operations may not be feasible during conditions of strong or gusty surface winds. The JFC, based on recommendations by the supported commander and the US Air Force component commander, may accept the high risk, cancel, or postpone the operation because of excessive wind velocity on the DZ.

Drop Altitudes. The airborne force commander and airlift mission commander establish minimum altitudes for airdropping personnel and materiel in accordance with established criteria. Minimum altitudes for airdrop operations are based on the operational requirements of the personnel and cargo airdrop systems used. In a high-risk, high-threat environment, survivability of airlift aircraft may require dropping parachutists and equipment at the lowest possible altitude. However, if the threat situation permits, aircraft performing normal low-altitude, low-velocity airdrop operations should drop above the minimum altitude to increase load survivability. Higher altitudes increase load time under canopy and allow more time for stabilization of parachute malfunctions.

Drop Zone Size and Selection. The JFC determines the general area for the airborne operation. Factors influencing DZ selection are—

- Physical characteristics of available DZs and surrounding areas.
- Threat assessment.
- Method of airdrop.
- Number of airdrop loads or personnel.
- Length of the desirable dispersion pattern.

Subordinate ground commanders determine specific grid coordinates and grid reference being used and pass these to the appropriate C2 node. During exercises and operations, DZ size and selection criteria are the joint responsibility of the supporting and supported commanders. The supported ground commander makes the final decision to accept use of the DZ. For other than US Air Force unilateral airdrops, the ground commander may waive normal minimum training DZ sizes on a by exception basis. Separate or multiple points of impact should be used for equipment and personnel for the most efficient use of the DZ. If the DZ is too small for the delivery of a full aircraft load of parachutists, the number of parachutists may be reduced, multiple DZs may be used for one aircraft load, or aircraft may employ multiple run-in procedures, commonly referred to as “racetracks.” Use of the latter tactic, however, increases risk of enemy action.

Drop Zone Run-in Heading. The ground force commander must evaluate the risk to personnel and property when selecting the run-in heading.

Drop Zone Markings. Drop zone markings should be consistent with the threat situation. Clear markings facilitate successful visual acquisition and authentication of the DZ, increasing the probability of success. The DZs are normally marked with a raised angle marker, marker panels, omnidirectional visible lighting systems, or electronic navigational aids. Virtually any type of overt or covert lighting or visual marking system is acceptable if all participating units are briefed and concur in its use. Other day markings or visual acquisition devices include, but are not limited to, colored smoke, mirrors, or any reflective or contrasting marker panel, such as a space blanket. In some cases geographical points may be used. Night markings or acquisition aids may include a light gun, flares, fire or fire pots, railroad fuzes, flashlights, and chemical lights. Special tactics teams or DZ controllers may also use specialized clandestine infrared lighting systems. Electronic markings may be used for either day or night operations. A verbal-initiated release system may be used with no markings. Airlift crews may be called upon to conduct airdrop operations on an unmarked, blind DZ.

Drop Zone Command and Control. The DZSO represents the appropriate commander as provided in the mission directive. The DZSO observes and evaluates all factors that may adversely affect the safety of the operation and ensures transmission of weather information when required. The DZSO is normally a certified jumpmaster.

Drop Zone Sequencing and Separation of Personnel and Equipment. Separation times between personnel and equipment and the sequence of the drop are important considerations in an airdrop mission. Terrain and threat assessment dictate whether personnel or equipment are airdropped first. Combination drops occur when parachutists exit from the cargo ramp immediately after release of equipment. Equipment and personnel can also be dropped from separate aircraft on the same DZ simultaneously if equipment loads are sufficiently separated to provide adequate clearance for personnel. However, such a course of action requires the concurrence of the supporting and supported commanders.

Execution

The air delivery platoon advises the LCE commander concerning method and type of aerial delivery method to be used. Typically, the air delivery platoon arrives in the area of operations to establish a rigging site with limited equipment and personnel. To provide effective support, the platoon and its HHQ must know in advance what aerial support will be required; i.e., the amount of supplies to be airdropped, aircraft availability, the threat, the duration of the operation, and special requirements.

CHAPTER 5
OPERATIONS

This chapter discusses the concepts related to transportation when applied to different operations. The concepts are nested within the distribution network discussed in chapter 1. The distribution network's LOCs contain nodes, which are defined as a location in a mobility system where a movement requirement is originated, processed for onward movement, or terminated. (*DOD Dictionary*) The influence that can be generated relates to the nature of controls that are organic to these nodes that allow distribution managers to control throughput, maintain ITV, and adjust priorities of support based on the needs of the supported commanders. The MAGTF commander has requirements to operate nodes and terminals within the respective area of operations. It is also important for the MAGTF commander to understand the nodes related to the MAGTF's specific distribution network, but outside of its area of operations. Understanding the capabilities of the overall system providing theater sustainment allows the MAGTF commander to plan and execute operations efficiently. This allows for the proper alignment of sustainment activities for particular modes of transport serviced at these nodes. A terminal is defined as a facility designed to transfer cargo from one means of conveyance to another. (*DOD Dictionary*) Transportation terminals are categorized according to the related modes of transport that affect throughput: sea, air, and inland surface. Pipeline and pack animal modes of transport rely on terminal operations within these terminal categories.

SEA TERMINAL OPERATIONS

Sea terminals can range in maturity from a permissive beachhead to large port facilities with deep water complexes containing several wharves, anchorage areas, shore-based cranes, cargo sorting and storage areas, dry docking facilities, and rail sidings. Landing support operations detail the organization and capabilities for transportation over a beach (see MCTP 3-40B). For sea terminals that mature beyond the beach, the MAGTF commander will establish a POG, which is similar in concept to the LFSP. The POG commander is responsible for the safe, expeditious loading and unloading of equipment, supplies, cargo, and personnel. Selection for conducting seaport operations are appropriate in an environment that allows emphasis to be placed on safety of the operation rather than the defense of the port and/or safety of the personnel and ships.

Like the LFSP, the POG is a temporary organization that supports seaports of embarkation and seaports of disembarkation. The scale of the group and required capabilities are based on the throughput requirements of the port operations. The group will be predominantly sourced from the LCE. The organization and employment concepts are similar to the LFSP. A fundamental difference between beach and port operations involves the volume of cargo and methods of materials handling. In the initial seizure or planning phase, the Military Sealift Command and

the MDDOC are the primary coordinating agencies that require special consideration in the identification of requirements and integration of civilian or host-nation capabilities when conducting operations within a seaport. Greater emphasis needs to be placed on the plans for the marshalling and staging of personnel and equipment due to the magnitude of requirements and scarcity of available facilities and billeting. Marshalling and staging will require more coordination with outside agencies than beach operations in an expeditionary environment.

Inland waterway terminals range in maturity from harbors with minimal throughput infrastructure to large, industrialized ports with shore-based cranes, cargo sorting and storage areas, rail and road connections, and clearance facilities. In the distribution network analysis of the intelligence preparation of the battlespace local and host-nation port facilities on inland waterways can serve as terminal points for inland water transport passengers and freight. The MAGTF commander may establish a POG to operate these kinds of terminal facilities within the MAGTF area of operations.

The POG will coordinate with commercial and military sealift agencies through the MDDOC to synchronize efforts for materials handling, marshalling, and control of throughput at inland waterway terminals. The selection to employ an inland waterway terminal may stem from links to other nodes in the distribution network having disrupted LOCs due to disaster or enemy action.

AIR TERMINAL OPERATIONS

Air terminal operations can range in maturity from a helicopter support zone facilitating rotary-wing passenger and cargo throughput within an area of operations to a multinational air transit terminal, serving as a major node in a spoke-and-hub system, which facilitates theater sustainment. The MAGTF commander will establish A/DACGs that will support air terminal operations within the area of operations. While it is possible to geographically separate arrival and departure throughput functions for air movement, the best practice is to collocate these capabilities to facilitate command and control. The establishment of an A/DACG is required in advance of any air movement commencing or terminating within the area of operations. This organization is separate from the AAOG, which is specifically organized to support the FIEs of MPE/S from the MPS to unit assembly areas.

Similar to the other landing support organizations within the MAGTF, the A/DACG is a temporary task-organized unit that will support APOE and APOD. Depending on the required capabilities and placement in the distribution network, it is typical for the airfield to support a joint or combined multinational mission to maximize airlift capabilities. The organization of the A/DACG will require consideration of local and joint inspection requirements as well as the information requirements that will facilitate the control of throughput at that facility. The MAGTF will assign an air liaison element who will coordinate with external air transportation agencies to the MAGTF, such as the US Air Force CRE, for air movement timelines and throughput requirements. Also, it is possible for joint missions to require multi-Service operations of a single airfield for rotary-wing, tiltrotor, and fixed-wing transportation throughput. Joint force commanders will typically assign US Army movement control teams to these missions. The MAGTF commander may establish roles and assign support relationships, with consideration to memorandums of understanding or agreements, with nonorganic transportation assets operating in the MAGTF area of operations to ensure interoperability and a

unity of effort. Figures 5-1 and 5-2 display notional airfields with assigned areas of responsibility between a mobility agency (US Air Force CRE), a movement control agency (A/DACG), and unit areas.

See appendices B, C, D, and E for worksheets to support the A/DACG in the performance of its mission.

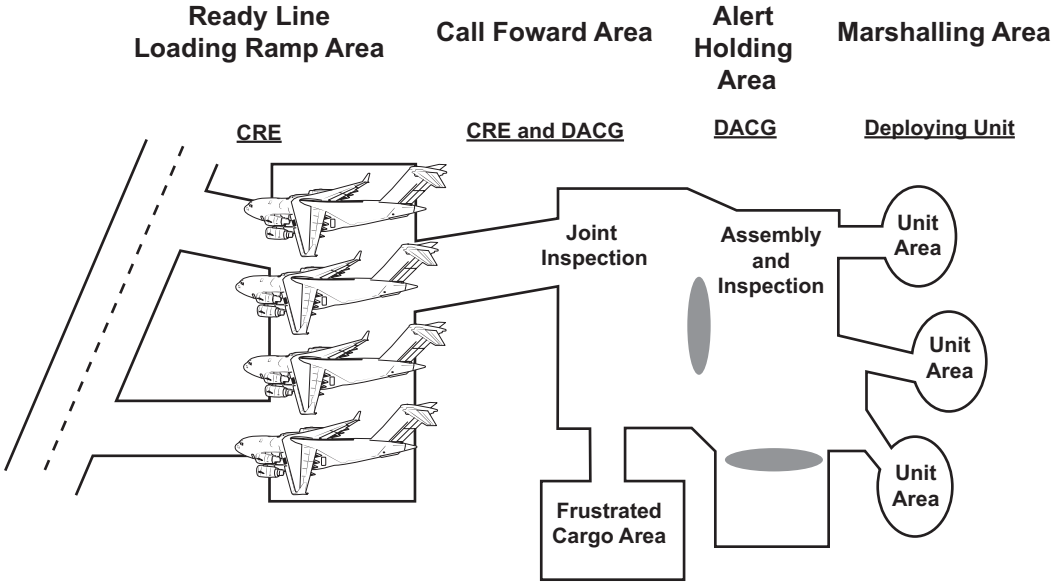
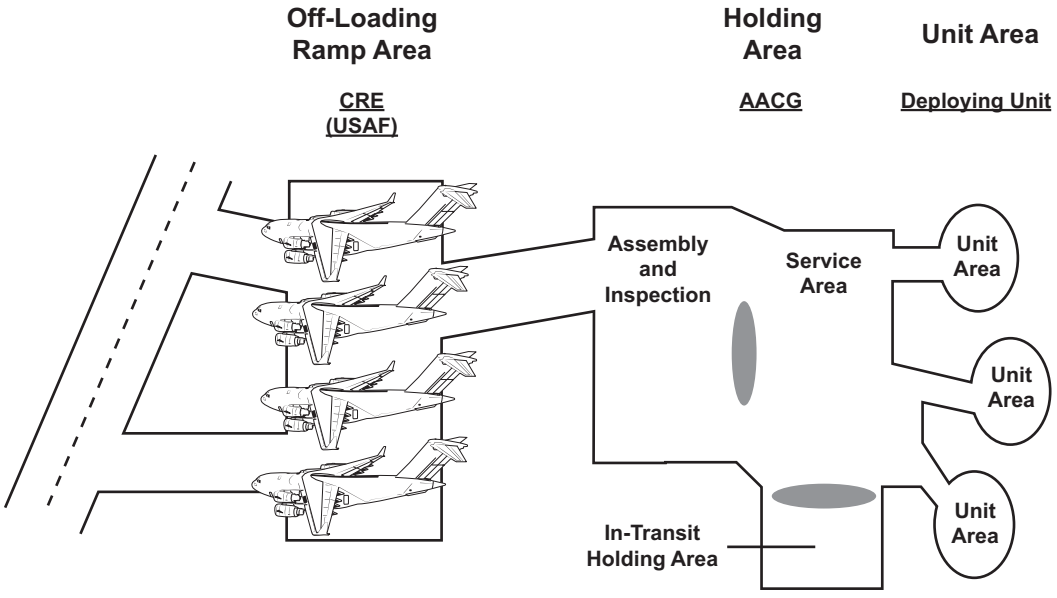


Figure 5-1. Notional Departure Airfield Areas of Responsibility.



LEGEND

USAF United States Air Force

Figure 5-2. Notional Arrival Airfield Areas of Responsibility.

INLAND SURFACE TERMINAL OPERATIONS

Inland surface terminals include both road and rail terminals.

Road Terminals

Road terminals can range in maturity from preplanned rapid replenishment points on the battlefield to a regional operating base serving as a hub for ground LOCs. A road terminal will typically consist of a collection of activities instead of a single functional organization that facilitates the throughput of personnel and cargo requiring a change to or from a motorized mode of transportation. Examples of activities common to a road terminal include movement control, reception and dispatch of material, temporary storage and staging, and sustainment of personnel.

Road terminal requirements are derived from an analysis of the distribution network requirements of ground LOCs. The placement of road terminals must factor in the concept of convoy operations within the area of operations balanced with the sustainment requirement of the operating forces. The estimates for the operational tempo and lift requirements of ground transportation units will generate throughput requirements for the nodes along the ground LOCs. Planning factors incorporating the capabilities and limitations of ground transportation units are detailed in the motor transportation planning section of this publication.

Railhead Operations

Rail terminals are areas along rail that possess adequate marshalling areas and commercial enablers to accomplish the throughput for embarkation or disembarkation of passengers and freight on rail transport cars. Rail ports of embarkation and rail ports of debarkation are collectively referred to as railheads. Rail operations are executed by existing commercial rail infrastructure under the supervision of supported units. The MAGTF commander may establish rail operations teams to plan, coordinate, and supervise the loading and unloading of rail cars in support of deploying/redeploying units.

The rail operations team is a temporary task organization similar in function to the terminal and landing support organizations employed by the MAGTF. To ensure the effective and efficient use of rail operations, the team will require requisite knowledge of the blocking and bracing requirements particular to military freight selected for transportation. The procedures to marshall, load, and unload passengers/freight needs to be aligned with the commercial standards while providing the MDDOC with reporting that will allow for sufficient visibility and control of rail operations in support of the MAGTF. For distribution network nodes outside of the MAGTF area of operations, sustainment planners will require coordination through the MDDOC with the JDDOC for visibility of throughput.

EMBARKATION

This paragraph provides an overview of embarkation and considerations for operations that are common for the MAGTF. Embarkation is the process of putting personnel and/or vehicles and

their associated stores and equipment into ships and/or aircraft. (*DOD Dictionary*) The types of operations conducted by the MAGTF require the regular usage of ships and aircraft with a focus on amphibious operations. A measure of successful amphibious operations is how rapidly and efficiently a MAGTF can project combat power ashore to accomplish the commander's purpose. In order for personnel and cargo to transition seamlessly on and off the ship, it requires embarkation readiness. Materiel readiness and accurate data leads to embarkation readiness, which supports the planning and execution of combat cargo operations aboard amphibious shipping. The purpose of effective embarkation is to maximize flexibility and capabilities available to the commander for employment. The principles of embarkation readiness apply to all modes of lift and is the responsibility of the embarking unit commander. Embarkation readiness requires training, the assignment of personnel, continuing actions, and maintenance down to the company level.

Embarkation planning and execution is complex due to inter-Service and intermodal considerations. Trained and qualified personnel must be available to perform a host of embarkation duties. Commanders must carefully consider who they assign to execute unit embarkation duties as these activities become the primary duty of assigned personnel during the FDP&E process. Familiarity of the following embarkation operations elements and the unit embarkation program provides a baseline of information to address embarkation issues:

- Assign and train personnel in embarkation duties.
- Complete understanding of embarkation techniques and procedures.
- Thorough knowledge of the FDP&E.
- Proper handling, stowage, and transportation of hazardous materials/dangerous cargo.
- Movement control procedures, during deployment, to move cargo from the unit origin (base or camp) to seaports of embarkation and APOEs.
- General characteristics and capabilities of military and commercial transport aircraft and amphibious and commercial shipping.
- Primary APOEs/APODs and seaports of embarkation/debarkation.
- Prepare supplies and equipment for movement by all transportation modes.
- Maintain the garrison unit deployment list (UDL) in accordance with local SOPs.

Amphibious Embarkation Planning

"Amphibious embarkation planning must begin early and proceed concurrently with all other planning; this cannot be overemphasized." (JP 3-02.1, *Amphibious Embarkation and Debarkation*) It requires detailed knowledge of mission requirements and the characteristics, capabilities, and limitations of ships and their relationship to the personnel, supplies, and equipment to be embarked. The timely and effective embarkation of units aboard ships can only be achieved through detailed planning and careful execution of plans. Amphibious embarkation planning requires constant coordination between all Marine Corps and US Navy command levels, and a mutual understanding of the requirements of each. Before an amphibious exercise or operation, unit embarkation personnel should completely review—

- JP 3-02.1.
- MCTP 13-10B, *Combat Cargo Operations*.

- MCTP 13-10C, *Unit Embarkation Handbook*.
- MCTP 3-10E, *Ship-to-Shore Movement*.
- Appropriate orders and directives released by component commanders.

Maritime Prepositioning Forces

Maritime prepositioning forces remain one of the Marine Corps' premier deployment options available to support our expeditionary maneuver warfare concepts. Coupled with strategic airlift, use of the MPF greatly reduces the deployment timeline by having equipment staged aboard MPSs.

There are 14 ships that are specially configured and assigned to MPSRONs to transport nearly everything a Marine needs for initial military operations—from tanks and ammunition to food, fuel, spare parts, and engine oil.

The mobile landing platform provides at-sea marshalling and debarkation from MPF shipping. Materiel discharged from MPF supply ships may be loaded onto a mobile landing platform and ferried to a point where landing craft (e.g., LCAC [landing craft air cushion] and EPF) can marry with the mobile landing platform and transfer cargo ashore. The capability generates additional throughput capacity from the sea base to the shore base. Embarkation data needs to be drawn from the MPF in order for items to be called forward for transportation to the point of need.

Airlift Embarkation

Embarkation personnel involved in airlift planning and operations at all levels must be familiar with the following:

- Capabilities of the departure and arrival airfields to support the number and type of aircraft to be used.
- Airfield operating hours and their effects on the movement.
- Availability of support equipment at the departure and arrival airfields and staging and marshalling areas.
- Points of contact at each location supporting the airlift.
- Availability of permanent or expeditionary messing and billeting facilities.
- Any unique requirements inherent to the unit.

Inland Surface Transportation Embarkation Planning

A clear understanding of the required arrival dates of personnel, vehicles, supplies, and equipment at the intended destinations is the ultimate goal of FDP&E. It involves determining the requirements that will be levied on the distribution system; these quantifiable measures must be accurate to ensure efficiency in transportation and resource management.

Transportation planners express initial force movement requirements in terms of tonnage, number of personnel, and distance. As detailed planning continues, tonnage is quantified by classes of supply or principle end items. Distances between specific origins and destinations become movement legs. Transportation planners estimate requirements based on the supplies needed to support the MAGTF and the average distances to move during each phase of an operation. For

dedicated airlift, 100 passengers or 15 short tons is the minimum planning requirement for a unit line number movement. This estimate provides a starting point to develop and refine the TPFDD.

Force Movement Requirements

Force movement requirements are the personnel, vehicles, supplies, and equipment to be moved, derived from the UDL and personnel data uploaded into JOPES (TPFDD) through MDSS II. Data is sequenced by required delivery date and priority within the required delivery date. These requirements must be accurately sourced by deploying units and identified at a minimum of TPFDD Level IV detail before the MAGTF commander passes the consolidated requirement to the combatant commander for validation. The combatant commander submits them to USTRANSCOM for sourcing of the appropriate transportation assets.

Lift Mode and Source. The selected lift mode and source identifies what transportation means move a specific unit line number between each movement leg (e.g., between point of origin [camp, base, or station] and POE, POD, or destination [assembly area]). Refer to the HHQ TPFDD letter of instruction for specific mode and source definitions.

Port of Embarkation. The POE is the geographic point in a routing scheme where cargo or personnel depart (e.g., A Camp Pendleton unit embarks out of Naval Station, San Diego aboard amphibious shipping. The POE is Naval Station, San Diego, and the origin is Camp Pendleton). This may be a seaport or aerial port where personnel and equipment flow to a POE. For unit and nonunit requirements, it may or may not coincide with the origin.

Port of Debarkation. The POD is the geographic point where cargo or personnel are discharged. This may be a seaport or aerial port; for unit requirements, it may or may not coincide with the destination.

Timing. Transportation planners must consider the following timing issues:

- Required delivery date at the destination.
- Ready-to-load date (the day relative to C-day when unit and non-unit equipment and forces are prepared to depart their origin on organic transportation or are prepared to begin loading on USTRANSCOM-provided transportation).
- Available-to-load date (the day relative to C-day when the unit or non-unit equipment and forces can begin loading on an aircraft or ship at the POE).
- Time/distance factors between the point of origin, POEs, PODs, and final destination.

Throughput

Throughput is usually expressed in measurement tons, short tons, or passenger count. Reception and storage limitation may affect throughput. Port throughput data should consider not only port offload capability, but also the theater's ability to move and sustain forces away from the port. Matching the strategic TPFDD flow to the theater's reception, staging, and onward movement capability should prevent port saturation and backlogs that slow the build up of mission capability.

Force Protection

Force protection encompasses the security of POEs and PODs, advance or intermediate staging bases, and supply depots. Force protection is a continuous process.

Special Requirements

Transportation planners must consider the following special requirements:

- Permits needed for oversized loads.
- Routing considerations due to bridge capacities.
- Impact of terrain, climate, and the environment.

Determining Resources

Transportation planners must consider the following when determining resources:

- Characteristics and capabilities of commercial and military modes of transportation.
- Capabilities of host-nation transportation and deployment support.

Coordination

Constant coordination by transportation planners with operations planners is necessary to accommodate changes in the MAGTF commander's concept of operations. This may affect lift requirements, movement priorities, and allocations of transportation assets.

Selecting the Unit Marshalling Area. A unit marshalling area is a centralized location large enough to stage personnel, vehicles, supplies, and equipment to be organized and prepared for movement. If space is limited, a movement schedule must be established for phasing the movement of personnel and assets through the marshalling area. Doing so will ensure the embarking unit can meet inspection and deployment timelines. Consider the following when selecting the marshalling area:

- *Accessibility*. The marshalling area should have entry and exit points to accommodate moving vehicles and MHE through the area.
- *Lighting*. Lighting should be available to accommodate work at night. If lighting is not available but required, then requests for floodlight sets should be submitted.
- *Facilities*. Marines must have appropriate sanitary facilities to support 24/7 operations. Proper coordination must be made with the base operations support group/station operations support group via HHQ for sanitation support.
- *Water points*. Water is required to hydrate Marines supporting marshalling operations and may also be required to conduct agricultural washdown operations.
- *Medical support*. Medical support should be coordinated with embarking unit aid stations. Corpsmen should be at the marshalling area when conducting operations.
- *Marshalling area workspace*. Embarkation or logistic personnel should coordinate a marshalling area workspace. The workspace may be a tent or an existing building. It should provide embarkation, movement control, and administrative personnel sufficient office space and support capability to conduct MDSS II deployment database management, passenger manifesting, convoy assignments, and communications; set up RFID equipment; and perform any additional administrative requirements.

- *Communications support*. Communications support should be coordinated with the embarking unit's communications section. Operations may require e-mail connectivity, telephone lines (landlines and cellular phone support), very high frequency radios, and hand-held radio support.
- *Security force*. A security force will be required to protect equipment from pilferage, specifically if any sensitive equipment is staged overnight or if called for by the current force protection threat condition. Security will be a key consideration of the MAGTF commander and the staff force protection officer.

Organizing the Unit Marshalling Area. The marshalling area should be organized to prepare unit equipment for movement and correct any discrepancies identified in equipment/vehicle inspections. Often, the marshalling area will be shared with administrative personnel to process and manifest personnel for transportation. Some areas needed within the marshalling area are as follows:

- *463L pallet buildup area*. The 463L pallet buildup area should be large enough to accommodate all the unit's cargo and baggage required to deploy by air. The area needs to be able to stage each 463L pallet on three pieces of dunnage. Additional room should be allocated to allow the use of MHE to access the pallets.
- *Mobile loading area*. This area should be large enough to accommodate the staging of unit vehicles, equipment, and supplies required to be mobile-loaded and provide room for MHE operations.
- *Vehicle staging area*. Vehicles should be parked so any vehicle can be moved without moving anything else while maintaining unhindered access to the exit point.
- *Personnel processing station*. This area is usually located within the marshalling workspace and may require additional desks and chairs for administrative personnel. It should be separated from any cargo and vehicle movement as much as possible and provide sufficient space for passenger manifesting.
- *Vehicle loading area*. This area should be large enough to accommodate buses and tractor trailers and located near the exit point. It must be located near a loading ramp to load rolling stock onto flatbed trucks.

Required Equipment. All items required to prepare supplies and equipment should be on hand in the unit marshalling area. Supporting equipment may include—

- MHE.
- Portable wheel scales.
- 463L pallets and side/top nets.
- Bags, shoring, and dunnage.
- Tie down material/devices.
- Waterproofing material.
- RFID equipment.
- Hazardous material spill response kit.
- Labeling materials, signage, and placards.
- Engineer stakes and tape.
- Security material for specialized storage.

MATERIALS HANDLING OPERATIONS

Materials handling takes place in receiving, storing, and shipping operations:

- *Receiving*. Unloading transportation platforms, horizontal movement to storage, and elevating to upper floors in multistory buildings, etc.
- *Storing*. Stacking, rotation of stock, and managing on-hand quantities at the storage points.
- *Shipping*. Removing stock from stacks; lowering from upper floors in multistory buildings; horizontal movement to processing, packaging, and crating areas and to platforms; and loading transportation platforms.

Basic Principles of Materials Handling

The following are the five principles of materials handling:

- Straight-line flow.
- Continuous flow.
- Concentration of operation.
- Efficient handling.
- Principle of work.

Straight-line Flow. Movement of material between any two points should travel by way of the shortest distance. This is based on the principle that a straight line is the shortest distance between two points. It should be considered that in some processes, where a straight-line is not feasible, this principle is applied by finding the path with the shortest distance.

Continuous Flow. Materials should move continuously along any production line. Continuous flow should be applied to all shipping and receiving operations. Material should always move as smoothly as possible; choppy or broken flow causes confusion and delay. In shipping or receiving materials, every effort must be made to move the materials directly to the requisite mode of transportation.

Whenever it can be used, one of the best methods to assure continuous flow is a conveyor system. A conveyor system will act as a pace setter and interruptions are easily observed. Continuous flow can also be achieved in the following operations: hand labor, use of platform trucks, tractor-trailer trains, forklift trucks, and pallets. Take care that flow is not interrupted by inefficient checking or inspection methods, unnecessary marking, miscellaneous bottlenecks, or lack of necessary labor and equipment, particularly in shipping and receiving operations. To avoid interruptions and inefficiencies, plan where the material will go, and then create a process that takes the material there without extraneous tasks or controls. Process improvement requires the consideration of necessity and time-value gained with improvements.

Concentration of Operation. The principle of concentration of operation implies that in the movement and handling of material, each operation should be managed in distance and area covered. Concentrating functions of a process should be balanced against congestion and buildup.

A process that is sensitive to process infractions can be an indicator of congestion if one delay causes major interruptions in surrounding processes.

The degree of impact in applying this principle in operations such as packing, inspection, assembly, and certain checking operations varies by situation. In setting up such operations, it is necessary to study just what and how much work must be done; then, apply the first two principles, straight-line and continuous flow, which should eliminate much of the confusion that can occur. Limit the operation to an area in which people can work without interference, without taking unnecessary steps, or making unnecessary motions in doing their part of the job.

Often by combining different operations into one, workspace required, laborers required, and amount of supervision needed can be saved. For example, in preparing shipments, personnel are faced with many different operations: removing from the stack, strapping, removing or blocking old markings, stenciling new markings, weighing, checking, loading, and transporting. Instead of moving each container to multiple different locations in the warehouse to get the whole job done, it is more economical to move the operations to one spot and, in the smallest workable area, perform the job with the least amount of handling of the containers.

Furthering this principle, care must be taken not to over staff an operation, which creates congestion merely because there are too many people involved. Through careful study, determine how many people can efficiently perform a certain operation at one time and in one location. For example, it would be inefficient to permit three or four people to strap an average-sized container; at most, two people can do the job efficiently if one person does not have to wait on the other.

Properly supervising the various operations, considering the amount of space used and the number of people working in the area, will pay dividends. Be sure that there is concentration of operation, but not congestion.

Efficient Handling. The principle of efficient handing is often overlooked, but is perhaps the most important. There should be the least possible handling in the movement of materials. This principle should be applied to both manual and mechanical operations. Despite the use of mechanical equipment, the majority of materials handling is still done by hand. Constantly lifting and lowering material wastes time and energy, ties up the use of equipment, and causes damage.

When this principle is applied to manual handling, there can be an immediate improvement to efficiency. The following are examples of where it would be appropriate to reduce excessive manual handling in an operation:

- When lifting/carrying heavy material.
- When there is improper lifting technique.
- When lifting material to excessive heights.
- When carrying material long distances.

Regardless of the type of mechanical equipment available, there will be some manual handling somewhere in the process. Manual handling should be reduced to a minimum and done properly.

Manual handling of material can be illustrated if the job of unloading a freight car is broken down into work hours. Work hours are the measure of effectiveness for the amount of effort required to complete a task. For example, two laborers and one fork truck and operator will be used to unload a freight car:

- 2 laborers × 2 hours = 4 personnel hours.
- 1 truck operator × 2 hours = 2 personnel hours.
- 1 truck × 2 hours = 2 truck hours.
- Total = 8 work hours.

In the 8 work hours consumed, only 2 hours were used by mechanical equipment and 6 hours consumed by personnel hours. In other words, about 75 percent of the work in this example was done by manual labor.

The job might have taken many more hours to complete without the use of mechanical equipment and may have involved many more laborers. Do not make the mistake of thinking that mechanical equipment replaces manual handling; rather, it supplements it and makes it easier. By eliminating all excess manual handling, particularly lifting, it is possible to increase the efficiency not only of the laborer, but of the job itself. Whether picking up pieces from the floor or loading a truck from ground-level, the element of fatigue rapidly cuts efficiency and production.

Principle of Work. The principle of work stresses the fact that the greatest amount of distance must be covered in the least amount of time. The successful application of this principle is largely dependent upon the first four principles—straight-line flow, continuous flow, concentration of operation, and efficient handling—in the previous sections. To reduce cost and increase speed, constantly check two things: the time it takes to do the job and the personnel hours used in doing it.

Balance in an Operation

To do any materials handling job efficiently Marines must apply the principle of work, thereby, a balance in operation must be achieved. Balance is the work that has been planned so that all manpower and equipment used on the job are working continuously without loss of motion or time. To get balance in an operation, the time it takes to perform each part of the job must be determined and the difference equalized by the number of people and pieces of equipment used.

To help attain balance, avoid the following situations:

- Equipment waiting for laborers.
- Laborers waiting for equipment.
- Equipment arriving empty when pallets or other necessities should be carried.
- Waiting for quality control.

Movement Factors

Materials handling involves two general types of movement: horizontal and vertical. In both of these movements there are certain existing conditions that affect material handling operations.

Horizontal Movement. There are certain conditions that limit or affect the operation in horizontal movement. They consist of the following:

- *Distance of haul*. The distance of haul will have a bearing on the type of equipment to be used, based on efficiency gained by mechanical advantage balanced with availability of resources.
- *Platform space*. The amount of platform space available for loading and unloading cars and trucks is a determining factor in the method used. For example, platforms may be too narrow for tractor-trailers or conveyors, or they may be too narrow to permit the use of tractor-trailer trains in conjunction with a gravity conveyor for unloading, sorting, and checking sized items.
- *Roadways and floors*. The condition of the roadways or floors will determine the method used to carry commodities any distance by means of mechanical equipment. In cases where the roadways and floors are rough and uneven, it may be necessary to stack the material differently. In some cases, tying or strapping is necessary to keep the material from shifting.
- *Width of aisles*. The width of aisles is important since it influences the type of equipment that can be used in the handling of material. The aisles and doors must be wide enough to permit mechanical equipment to be used; otherwise, material will have to be handled by hand. For example, it would not be efficient to try to use a 6,000-pound fork truck in 9-foot aisles. Trailers and tractors cannot be used in 30-inch or even 36-inch aisles, which are sometimes found in loose issue rooms.

Vertical Movement. There are certain conditions that limit or affect operations in vertical movement. They consist of the following:

- *Ceiling heights*. Ceiling heights determine the overhead storage available and are also a factor in the size and type of equipment that can be used in an installation. Facilities and MHE should be aligned to maximize storage capacity and visibility of stocks.
- *Overhead obstacles*. Overhead obstacles such as trusses, sprinklers, lighting fixtures, and skylights are all factors that affect vertical movement.
- *Type of material*. Type of material (the shape, size, weight, and crushability) directly controls methods of handling, as well as the height to which material can be stacked.
- *Safety precautions*. Certain safety precautions and regulations of a stack must be considered: stability, height, and weight. Care must be taken to prevent damage and injury in handling materials in vertical movement. Size and capacity of elevators in multistory buildings are limiting factors in the equipment used for handling, as well as how and in what order such equipment can be used. Regulations can be a form of controls to direct conduct of duties with regards to safety considerations. Training laborers in the proper way of lifting to avoid strain is another safety control that can be implemented.

LANDING SUPPORT OPERATIONS

This paragraph discusses the concepts related to transportation involving landing support operations. The concepts of landing support operations are nested within amphibious operations and ship-to-shore movement, and are conducted in support of a company landing team, amphibious

ready group operations, MPF arrival and assembly operations, and special purpose MAGTF operations. Landing support operations involve organizations and processes across the landing force and amphibious task force; it is not exclusive to the landing support specialist community. As the Marine Corps shifts to distributed and disaggregated operations, the tasks and responsibilities that generate combat power projection ashore will remain the same. The planning and execution of these operations require input from all participating elements. This paragraph serves to highlight the areas that require a shared understanding of responsibilities, which will result in a unity of effort and efficient employment of landing support concepts. The following task organizations are typically involved in, but not limited to, the coordination of landing support operations.

Landing Force Support Party

The LCE will provide the personnel to form the LFSP. The LFSP headquarters element will be reinforced with special attachments from the MAGTF to enable landing support operations. The LFSP is organized into the following sections:

- *Headquarters*. The LFSP headquarters controls and supervises landing support operations within the landing area as set forth in the landing force operation plan. The LFSP headquarters ensures effective landing support through close coordination, timely reinforcement, and consolidation of shore party group and beach party group activities.
- *Command and administrative section*. The LCE will provide the personnel required to form the command and administrative section.
- *Medical section*. Medical battalion, MLG, provides the nucleus of the medical section. The medical section plans the LFSP's medical evacuation functions, supervises patient operations within the shore party and the HST's evacuation sections, and prepares medical reports.
- *Law enforcement section*. Typically, the law enforcement section consists of personnel taken from the MEF command element. This section supervises the shore party and HST's law enforcement sections. In addition, this section establishes and organizes the landing force's EPW stockade and evacuates EPWs from the objective area.
- *Communications section*. The nucleus of the communications section is provided by the LCE and may be augmented from other sources. This section establishes and maintains LFSP command net, control net, CSS net, and medical regulating net (see MCTP 13-10E for additional information).
- *Motorized and heavy equipment section*. The LCE will assign equipment and capabilities required by the LFSP to support the movement of equipment and personnel moving across the beach. The relationship of this support will be decided by the MAGTF commander based on the duration and magnitude of the landing, as well as requirements of follow-on operations ashore.
- *Liaison section*. The liaison section consists of personnel from elements outside the LCE that are attached to or under the OPCON of the LFSP.

Shore Party Group. The shore party group is capable of providing landing support to a regimental landing team across a colored beach by assisting movement of troops and supplies, evacuees, casualties, EPWs, and controlling landing craft and amphibious vehicles. Marine Corps components of the shore party group perform tasks inland from the water's edge, and US Navy

components perform tasks seaward from the water's edge. All tasks are performed under the direction of the shore party group commander, who is designated by the LFSP commander. Shore party groups are not regularly employed at the MEU level and below.

The shore party group, task-organized and equipped by the LFSP commander, is an intermediate C2 agency between the LFSP and landing support capabilities effecting throughput over a colored beach. The capabilities managed by the shore party group mirror those employed by the LFSP on a smaller scale.

The shore party group has a headquarters, two or more shore party teams, and special attachments as required (see figure 5-3). The nucleus of the shore party group is drawn from the landing support company. It coordinates with the LFSP aboard ship, the tactical-logistical (TACLOG) group and the landing force.

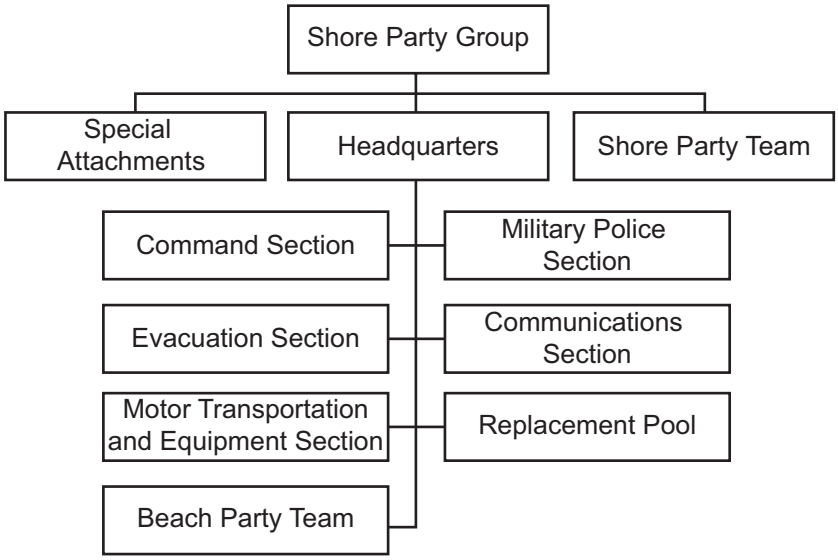


Figure 5-3. Headquarters, Shore Party Group.

Beach Party Group. A beach party group is the US Navy counterpart to the shore party group and is organized during colored beach landing support operations. The beach party group is within the LFSP and is under the OPCON of the LFSP commander. The beach party group will be organized into a headquarters, beach party teams, craft LZ control teams, and beach support units (see MCTP 13-10E, *Ship-to-Shore Movement*, for additional information).

Special Attachments. The requirement for special attachments is generated by analysis of the landing plan and the LFSP commander's estimate of support required during landing support operations. Sourcing of attachments is not limited to the LCE.

Helicopter/Tiltrotor Support Team. The HST is a task-organized unit composed of personnel and equipment from the air assault unit and the LFSP. It is augmented from other units as required. The actual organization and commander of the HST is decided by the air assault unit commander. This decision is based on the mission and whether a CSS buildup is planned for the area.

If the concept of operations will require sustainment from the LCE, the LZ where an HST is established may be built up to a landing zone support area (LZSA). The HST will conduct a transfer of coordinating authority of the LZ to the LZSA detachment. As the LCE transitions capabilities forward from a CSS area in the rear to the forward LZSA, it may mature into a forward combat logistic support area. Throughout all of these possible transitions, LZ operations and the HST remain subordinate to the LFSP commander until the LCE is transitioned ashore. For detailed planning considerations of support areas, refer to MCTP 3-30C, *Rear Area Operations*, and MCRP 3-30C.1, *MAGTF Rear Area Security*.

The HST typically consists of an advance party, headquarters, helicopter control section, and LZ platoon (see figure 5-4). The HST personnel must be fully trained and capable of carrying out their assigned duties (including the special considerations required of air assault operations).

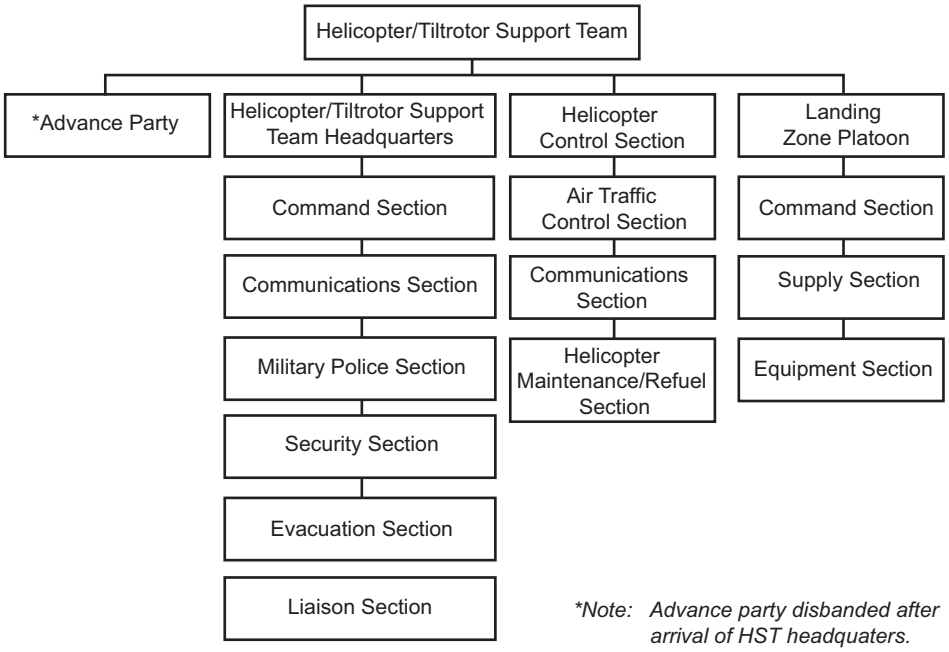


Figure 5-4. Helicopter/Tiltrotor Support Team.

Planning

Landing force support party planning begins upon receipt of the order initiating the amphibious operation. The LFSP commander plans concurrently with other landing force and amphibious task force organizations at the parallel chains of command within the amphibious forces. The commander, amphibious task force has overall responsibility for preparation of plans and control of the ship-to-shore movement. The commander, landing force (CLF) is responsible for determining the landing force's requirements for ship-to-shore movement. Detailed planning of the ship-to-shore movement begins after the landing force scheme of maneuver is determined and allocation of resources is finalized. Final ship-to-shore planning is expressed in the landing plan. The landing plan establishes the landing priority among various elements of the landing force, provides overall coordination of ship-to-shore movement, and allocates resources. It is issued in the operation order in Tab C (Landing Plan) to Appendix 14 (Amphibious Operation) to Annex C (Operations). Amphibious planning is discussed in detail in JP 3-02 and in MCTP 13-10E.

Planning Considerations. Principal considerations that affect the landing support mission and ultimately the structure of the LFSP include the following:

- Early, detailed analysis of the objective area.
- Analysis of tactical plans and their landing support requirements.
- Timely and complete training of the task-organized LFSP.
- Detailed planning for organization of the beach support area (BSA) and LZSA.
- Combat loading of each assault ship.
- Employment of the sea echelon concept.
- Establishment of adequate communications between tactical units, control elements, and landing support units (includes shore party and helicopter/tiltrotor support).
- Defense requirements of BSAs and landing areas.
- Composition of the assault echelon and assault follow-on echelon.
- Evaluation of enemy activity and installations in the objective area.
- Establishment of the landing force scheme of maneuver and landing plan.
- Evaluation of beach hydrographic conditions and terrain features inland from the beaches. This also includes LZs.
- Quantity and types of supplies to be landed from assault shipping.
- Availability of personnel, supplies, and equipment for shore party operations.
- Availability of assault shipping.
- Development of plans for handling EPWs.
- Development of casualty evacuation and disaster recovery plans.
- Identification of coordination requirements with other agencies.
- Concept of CSS.
- HST (advanced party employment).

Planning Documents. Planning documents are the cornerstone to efficient and effective operations. The following planning documents directly affect the landing zone support mission.

Activation Order. The LFSP activation order is issued by the CLF. The LFSP activates on order of the CLF and is normally terminated once the LCE commander assumes responsibility for CSS ashore.

Landing Force Support Party Operation Order. The LFSP commander issues amplifying instructions to subordinates in the form of an operation order. These instructions only pertain to subordinate units and are therefore not suitable for inclusion in the landing plan.

Landing Plan. The landing plan sets forth the concept of operations and the detailed and special tasks required to accomplish specific landing support missions. It contains control instructions and floating dump instructions, identifies prepositioned emergency supplies, establishes priorities for LFSP equipment, and identifies missions assigned to each major subordinate section. It also identifies the relationship of landing support operations to the overall CSS and landing force schemes of maneuver.

Intelligence Considerations. Accurate and timely intelligence is the keystone to planning and decision-making. Once intelligence requirements are determined, all available information is studied and evaluated to prepare for the landing support mission. Intelligence information must address the following:

- Topography.
- Local resources.
- Manmade obstructions.
- Climate.
- Routes of communications.
- Enemy methods.
- Enemy installations.
- Equipment and activities.
- Beaches.
- Hydrographic conditions (critical).
- Terrain immediately inland from the beaches and around LZs.
- General character of surf and inshore currents and their effect on landing craft.
- Beach gradient and its effect on the beaching of landing craft and use of vehicles.
- Depth of water inshore, as related to determination of anchorage and maneuverability of supporting vessels.
- Composition of the beach and its influence on beaching and retracting landing craft and soil trafficability for personnel and vehicles.
- Tidal range of the designated beaches in relation to existing and reinforcing obstacles and beach widths.
- Location of obstacles as related to their influence on beaching landing craft or landing helicopters/tiltrotors and debarking personnel and material.
- Range and time of tides.

Environmental Concerns. The intelligence, surveillance, and reconnaissance production cycles will provide forecasted information on the physical environment where landing support operations will be conducted. The impacts from weather, terrain, and sea state must be analyzed against the capabilities and limitations of landing craft and personnel executing the landing plan. Inclement weather can produce heightened sea states, which can disrupt ship-to-shore movement. Also, motorized assets and automated systems can be adversely affected by extreme climates. Building redundancy into C2 functions can mitigate possible disruptions in service caused by environmental concerns.

Reports and Records. Reports and records are crucial to establish and maintain command and control during the initial phase of an amphibious assault. Reports provide the status of the movement, personnel, and supplies ashore. It is essential that the LFSP provide the CLF with the status of units ashore. This information becomes a basis for the commander's tactical decisions. The reports' paragraph or report tab to the LFSP Appendix to Annex D (Logistics/Combat Service Support) of the operation order identifies the required content and time of submission of LFSP reports. The required reports vary with each operation.

Subordinate units of the shore party and HST maintain and must continually update unit and equipment movement records. These records are submitted to HHQ where they are consolidated with other applicable material to develop the required reports. The following are some of the records that must be maintained:

- *Beach landing support area overlay*. This overlay shows the location and disposition of all units, CSS dumps, unloading points, command posts, landing support units, bivouac areas, temporary bivouacs in the BSA, LZSA, road net, traffic control plans, and landing support installations.
- *Beach landing defense overlay*. This overlay shows the defensive organization of the support area. All organizations assigned a ground defensive mission in the support area are shown, even if they are not organic to the shore party team or HST. This overlay is submitted to the next higher landing support echelon and the supported unit commander as soon as possible. Changes are reported as they occur.
- *Tactical situation overlay*. Since the shore party/HST requires security and protection during a landing, it is essential that the shore party/HST be aware of the tactical situation. The tactical situation overlay identifies the tactical disposition of all friendly forces and aids in the delivery of CSS. The tactical situation overlay is also used to brief arriving unit commanders on the latest tactical situation.
- *Enemy situation overlay*. This overlay shows the location of enemy forces in the objective area. It is used to identify the current enemy situation for the shore party/HST commanders and to orient unit commanders passing through the area.
- *Disposition to seaward chart*. This chart shows the location and disposition of friendly naval units. It includes picket boats and offshore transfer barges.
- *Ships position chart*. This chart indicates the relative position of each ship that is or will be unloaded by a shore party echelon.
- *Ships unloading status chart*. This chart provides the LFSP commander with the unloading status of each transport/cargo ship. It also provides unit commanders and their staffs with the status of their troops and gear. The ships unloading status chart includes the following:
  - Percentage of personnel unloaded.
  - Percentage of vehicles unloaded.
  - Percentage of cargo, by class, unloaded.
  - Estimated percentage of entire ship unloaded.
  - Estimated time of completion to unload entire ship.
  - Ship's scheduled time of return to the sea echelon.
- *Dump status chart*. This chart reflects quantity of supplies received, issued, and on hand at a specified time.
- *Casualty and EPW evacuation chart*. This chart shows the number of casualties and EPWs received, evacuated, and retained.
- *Vehicle and equipment status chart*. This chart provides the disposition of vehicles and equipment operating under control of the LFSP.

- *Landing force support party personnel distribution chart*. This chart shows personnel attached to the LFSP by unit and their deployment to subordinate landing support units.
- *Serials landed status report*. This report records the status of equipment and personnel who have reached their intended designated beach.

Communications. To maintain command and control, the LFSP must communicate with each of its units, the TACLOG group, and ships participating in the landing. A reliable, flexible, and effective communications net is essential to command and control because it allows the commander to monitor the status of the LFSP.

> ***Note:*** Tactical-logistical groups monitor ship-to-shore movement and provide the commander, amphibious task force and CLF with critical information concerning the movement and forces ashore.

As soon as advance units of the shore party or HST land, they establish primary and alternative communications nets. Alternative communications nets generally parallel beachmaster (the naval officer in command of the beachmaster unit of the naval beach group) communications nets and are used if the primary communications net fails. After advance units have landed and established communications, they relay requests for troop serials and supplies from the commanders ashore to the TACLOG groups located on the control ships. All requests for troop serials and supplies are made via the LFSP, except when LFSP communications are not established. If the urgency of the situation or the failure of a communications net requires the landing force to transmit its requirements directly to the TACLOG group through a tactical or command net, the landing force must notify the LFSP immediately upon reestablishment of communications.

The shore party/HSTs are the primary users of communications equipment and supplementary communications because they must communicate with the ship, landing craft, and aircraft. The LFSP uses supplementary communications (e.g., public address systems, electronic megaphones, various signal lights) to direct the landing and movement of crafts in and around the beaches and the LZ.

The use of beach and landing site markers is another method to maintain command and control. Standard markers are used by the shore party teams and the HSTs to maintain order and to facilitate smooth operations ashore. Markers locate and identify beaches, landing sites, unloading points, dumps by class of supply, beaching points for landing ships, range markers, landing points for vehicles, and casualty evacuation points. Standard markers are available to support both day and night operations. Appendix F contains illustrations of standard beach and landing site markers.

Concept of Employment

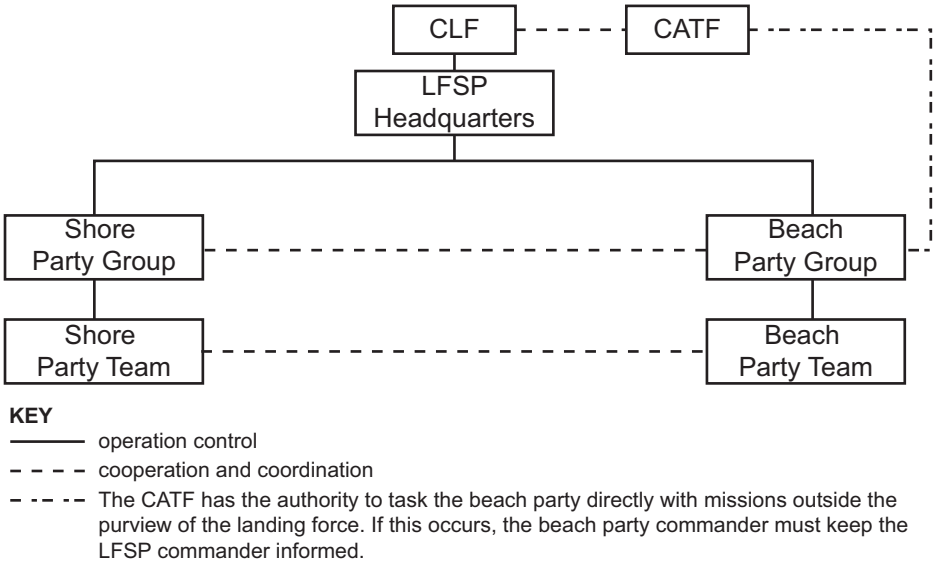
Ship-to-shore movement is that portion of an amphibious operation that moves the landing force off assault shipping and into a designated area. Its objective is to ensure the landing of troops, equipment, and supplies at the prescribed time and place. The type of control exercised in the ship-to-shore movement is based on the type of movement required and the concept of operations ashore. Typically, centralized control is exercised up to the limits of communications. The control system must provide for rapid fulfillment of landing force requirements ashore.

Establishment of the Beach Support Area. The LFSP commander and staff control landing support operations within the landing area. In smaller scale operations when an LFSP may not be established, the beach party performs this function. The LFSP matures from a small cell in the early stages of ship-to-shore movement, when beach and LZ operations are decentralized, to a robust organization as LFSP operations expand and become more centralized (see figure 5-5).

In the initial stages of ship-to-shore movement of a large-scale operation, the LFSP headquarters is afloat. Landing force support party operations are decentralized to the shore party and the beach party teams on numbered landing beaches. A shore party team and beach party team are among the first waves of troops ashore to each landing beach. The shore party team commander has OPCON of the beach party team until the beach party group commander comes ashore. As the ship-to-shore movement progresses, the shore party group commander will be phased ashore. Once established ashore, the shore party group commander will take OPCON of the shore party team, beach party group, and beach party team. The shore party group coordinates with the beach party group for employment of units in the BSA. The LFSP headquarters will then be established ashore, and the LFSP commander assumes OPCON of the shore party group, beach party group, special attachments, and all other LFSP units ashore.

"The size and capability of the shore parties and [beach parties] expand with the magnitude of the LFSP activity and responsibility. However, the increase in size is small relative to the growth of the shore party and [beach party] HQs, because the shore party and [beach party] HQs perform the majority of LFSP C2 tasks." (MCTP 13-10E)

See JP 3-02.1 and JP 3-02 for more detailed information.

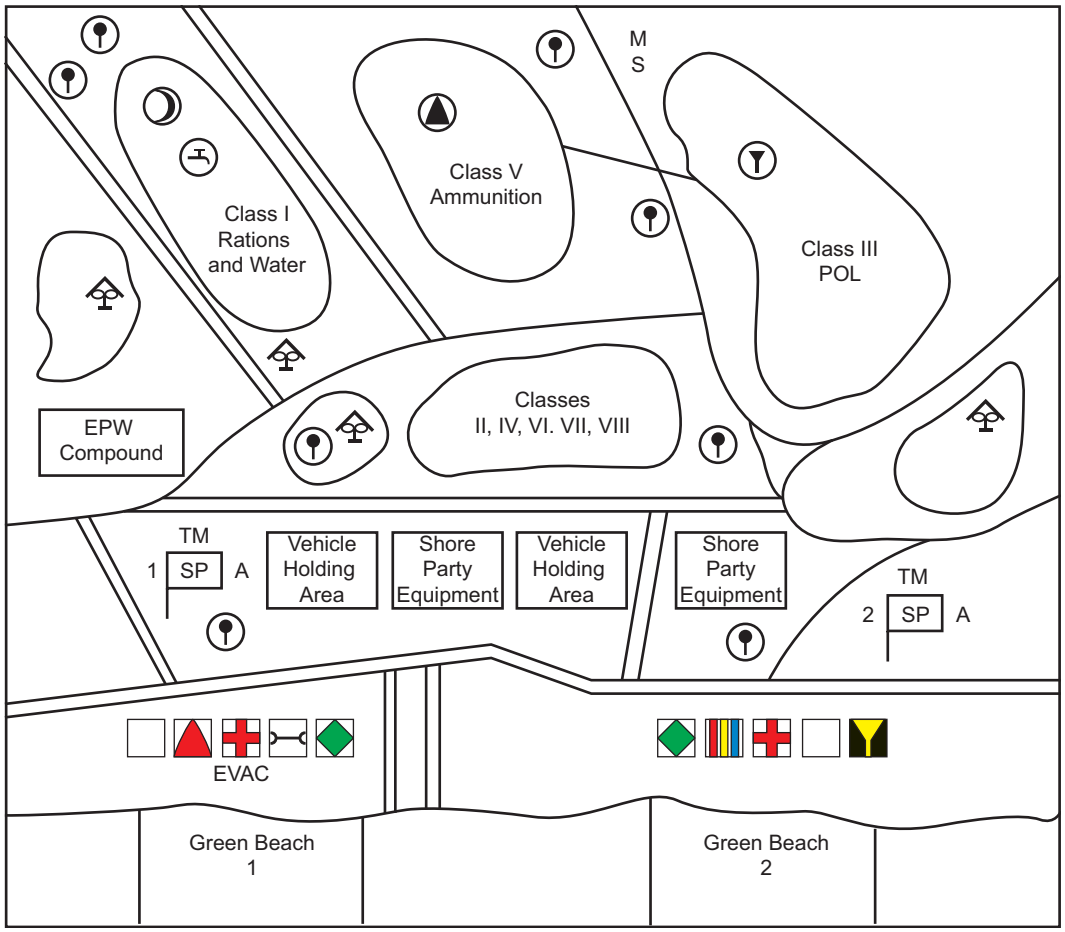


LEGEND

CATF commander, amphibious task force

Figure 5-5. Landing Force Support Party Command and Control Relationships Ashore.

Operations Ashore. Landing support operations begin with the landing of the advance parties and continue until the landing support operation is terminated or the LCE commander relieves the LFSP of its responsibilities. The primary CSS beach is designated during the planning stage and will be known as the BSA. The BSA remains operational and is the primary means of support to the landing force during subsequent operations ashore (see figure 5-6).



LEGEND

EVAC	evacuation	SP	shore party
POL	petroleum, oils, and lubricants	TM	team

Figure 5-6. General Layout of Beach Support Area.

Landing Force Support Party Headquarters. The LFSP headquarters controls and supervises landing support operations within the landing area as set forth in the landing force operation plan. The LFSP headquarters ensures effective landing support through close coordination, timely reinforcement, and consolidation of shore party group and beach party group activities. It accomplishes the following tasks:

- Establish and operate information centers and maintain current situation maps.
- Control of traffic in the BSA.

- Maintain communications with surfaceborne and air assault element commanders, and their TACLOG group detachments.
- Establish lateral communications between beaches and LZs.
- Maintain a status record of quantities by category of units, equipment, and supplies landed.
- Establish, as part of the overall landing force warning system, a system to warn of attacks within the BSA.

Shore Party Group. The shore party group accomplishes the following tasks:

- Allocating shore party personnel and equipment as required.
- Establishing shore party group communications and consolidating shore party team communications.
- Providing liaison personnel to supported unit's headquarters.
- Coordinating defensive measures.
- Coordinating with the beach party group commander.
- Submitting reports and records.

Beach Party Group. The beach party group accomplishes the following tasks:

- Installing navigational aids and removing obstacles.
- Marking beach landing sites.
- Advising shore party commanders of suitable sites for beaching amphibious craft.
- Directing landing craft and amphibious vehicles to and from beach landing sites.
- Observing and reporting surf conditions to the primary control officer.
- Conducting salvage operations and making emergency repairs to amphibious craft.

Helicopter/Tiltrotor Support Team. The HST performs tasks within the LZ similar to those performed by the shore party group in the BSA. An HST performs the following tasks:

- Prepares, maintains, and marks landing sites.
- Removes or marks obstacles.
- Erects wind direction indicators (e.g., wind socks), panels, and range lights (used during night operations).
- Establishes and maintains required communications (including communicating with supporting helicopters/tiltrotor aircraft and other US Navy control organizations).
- Reconnoiters and selects areas for supply dumps and other CSS installations, HST command posts, casualty evacuation stations, and defensive positions that provide LZ security.
- Directs and controls air assault operations and support units within the LZ.
- Unloads aircraft (including external lifts).
- Loads cargo nets, pallets, and slings on board aircraft.
- Loads EPWs and casualties on board aircraft.
- Establishes dumps.

- Issues supplies.
- Maintains supply records (i.e., supplies received, issued, and available).
- Maintains the aircraft unit's basic load at the prescribed level.
- Passes requests for replenishment (i.e., basic load, supplies not contained in the LZ dumps, and on-call serials) to the air assault unit TACLOG group that is collocated with the amphibious air traffic control center.
- Provides personnel and vehicle ground control.
- Maintains a situation map and information center.
- Provides emergency helicopter repair and refueling as required.
- Performs firefighting duties in the LZ.

For detailed information on helicopter sling load operations refer to MCRPs 3-40F.4, 3-40F.5, and 3-40F.6.

APPENDIX A
MOVEMENT CONTROL
CENTER SYMBOL BUILDING PROCESS

Table A-1 provides step-by-step instructions on how to construct an MCC symbol to readily identify the unit location on various systems, C2 displays, etc. For more information on constructing military symbols, see the most current version of Military Standard (MIL-STD)-2525.

Table A-1. Movement Control Center Symbol Building Process.

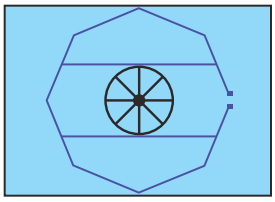
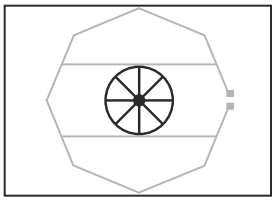
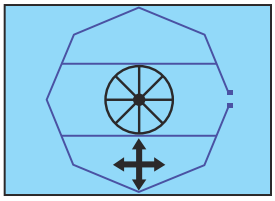
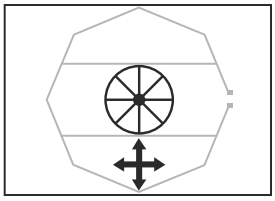
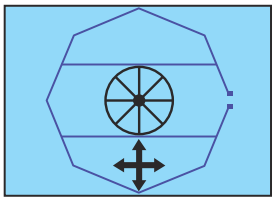
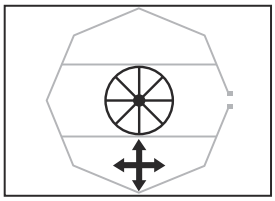
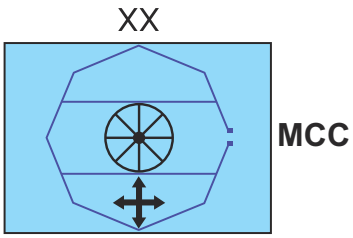
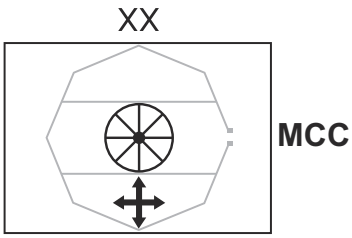
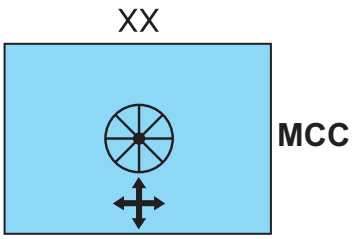
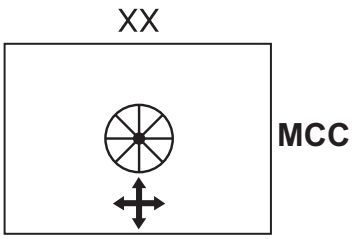
STEP	DESCRIPTION	EXAMPLE COLOR	EXAMPLE BLACK/WHITE
1.	**Select the appropriate frame.** In this example, select the friendly land unit frame, which is a rectangle. **Note:** *Some systems have color displays that would depict the friendly land unit as a cyan (i.e., blue) rectangle.*		
2.	**Select the main icon.** The "transportation" main icon is used to depict the MCC. **Note:** *The octagon shape is provided for orientation only and is not part of the symbol.*		
3.	**Select the sector 2 modifier.** The "control" sector 2 modifier is used with the transportation main icon to depict the MCC.		
4.	**Select the echelon level.** Immediately above and center on the selected frame, insert the echelon level. For example: place XXX to indicate a MEF-sized MAGTF or II to indicate a battalion- or squadron-level unit.	XX 	XX 

Table A-1. Movement Control Center Symbol Building Process. (Continued)

STEP	DESCRIPTION	EXAMPLE COLOR	EXAMPLE BLACK/WHITE
5.	**Select the "H" amplifier.** The H amplifier is additional textual information that is required for this symbol. Insert either MCC, MMCC, or UMCC.		
Final	When transmitting or displaying an MCC, MMCC, and UMCC symbol, the "H" amplifier is required.		

APPENDIX B
DEPARTURE AIRFIELD CONTROL GROUP WORKSHEET

This worksheet is designed to assist the DACG in the performance of its mission. The tasks listed are not all inclusive, but are intended as a guide. The following tasks should not be overlooked during planning.

Completed	Task
	Brief personnel engaged in DACG operations.
	Establish required communications.
	Secure parking and flow plan from CRE.
	Brief unit commanders on vehicle flow plan.
	Ensure that sufficient load team personnel with pusher vehicles are available.
	Coordinate with the CRE to ensure that personnel and cargo are guided to the proper aircraft.
	Inform liaison officers of changes to the movement plan.
	Maintain status of arrival, departure, and loading.
	Obtain airfield diagrams for guides.
	Ensure that communications are operational between all elements of the DACG.
	Ensure that support equipment; wreckers; petroleum, oils, and lubricants; food service; lighting; first aid; weighing devices; and maintenance contact team are available.
	Coordinate with the MAGTF operations officer.
	Coordinate with the deploying unit's movement officer.
	Coordinate with the call forward officer.
	Issue special instructions to alerted aircraft loads.
	Receive instructions from the MAGTF/deploying unit operations officer.
	Inspect all loads upon receipt from the alert holding area.
	Assist in preparing, inspecting, and making corrections as necessary to passenger and cargo manifests.
	Provide guides to escort planeloads through the loading ramp area to designated plane sites or release points.
	Inform MAGTF/deploying unit operations officer of problems affecting movement schedules.
	Coordinate with the CRE to ensure aircraft are parked and assigned numbers in accordance with the movement plan.
	Coordinate MHE with the CRE.
	Unload personnel/equipment from aborted aircraft and guide to replacement aircraft or holding area.
	Ensure all personnel involved in the movement operation are briefed on safety.
	Ensure all incidents/accidents are investigated and reported.

Completed	Task
	Ensure personal and related services are provided by the base/installation for deploying units.
	Ensure logistic requirements are met.
	Provide deploying units with points of contact for logistic support.
	Secure and supervise facilities for the DACG and deploying units.
	Compile pertinent deployment and movement data.
	Coordinate reports required by HHQ/MCCs with the CRE.

APPENDIX C
ARRIVAL AIRFIELD
CONTROL GROUP WORKSHEET

This worksheet is designed to assist the AACG in the performance of its mission. The tasks listed are not all inclusive, but are intended as a guide. The following tasks should not be overlooked during planning.

Completed	Task
	Brief all personnel engaged in AACG operations.
	Establish required communications.
	Secure parking flow plan from CRE.
	Ensure that sufficient offload team personnel with pusher vehicles are available.
	Coordinate with the CRE to ensure that personnel and cargo are cleared from arriving aircraft and guided to release point or hold area.
	Maintain status of the arrival and departure of the deploying unit's personnel and equipment at the arrival airfield.
	Ensure that dunnage/shoring materials are retained by the deploying unit.
	Coordinate with the MAGTF operations officer.
	Coordinate with the deploying unit's movement officer.
	Inform MAGTF/deploying unit operations officer of problems affecting movement schedules.
	Coordinate MHE with the DACG and the CRE.
	Ensure all personnel involved in the movement operation are briefed on safety.
	Ensure all incidents/accidents are investigated and reported.
	Ensure that personnel and related services are provided by the base/installation for deploying units.
	Ensure logistic requirements are met.
	Provide deploying units with points of contact for logistic support.
	Compile pertinent deployment and movement data.
	Coordinate reports required by HHQ/MCCs with the CRE.

APPENDIX D
DEPLOYING UNIT AND A/DACG PLANNING AND PREPARATION PHASE REQUIREMENTS WORKSHEET

This worksheet is designed to assist the A/DACG in the performance of its mission. The tasks listed are not all inclusive, but are intended as a guide. The following tasks should not be overlooked during planning.

Completed	Task
Deploying Unit Tasks	
	Identify the number of personnel to be moved.
	Identify the type and quantity of cargo and equipment to be moved.
	Establish priorities for arrival.
	Establish required liaison.
	Identify the cargo or equipment that requires special handling based on shipping configuration or fragile/ hazardous characteristics.
	Request technical assistance.
	Prepare equipment and train personnel.
	Request staff assistance in administrative support, unit movement training, air movement planning, logistics, maintenance support, and standard safety practices in and around aircraft.
	Assign unit movement or embarkation officer.
	Develop traffic plan for movement to the departure airfield.
	Establish trained load teams to assist the A/DACG.
	Identify foreign border clearance requirement if applicable.
	Enter force deployment requirements into the JOPES to accurately reflect lift requirements and deployment priorities.
	Review inspection procedures and documentation requirements for hazardous cargo.
	Coordinate procedures for transporting individual weapons, ammunition, and equipment.
	Determine shoring requirements, ensure equipment availability prior to loading, and establish destination disposition procedures.
	Construct 463L pallets in accordance with JP 3-17, *Air Mobility Operations*.
	Prepare vehicles and equipment.
Departure Airfield Control Group Tasks	
	Determine the number of personnel to be moved.
	Determine the type and quantity of cargo and equipment to be moved.
	Determine the timeframe for loading.

Completed	Task
	Confirm the location of airfield and marshalling areas with the installation or base commander and the deploying unit.
	Determine available departure airfield logistic/administrative facilities.
	Develop DACG organization structure and staffing.
	Determine user support requirements (e.g., MHE, security, lighting, fuels).
	Establish liaison with the deploying unit and other support activities.
	Coordinate with the CRE to establish DACG training requirements.
	Coordinate foreign border clearance requirements and procedures if necessary.
	Obtain UDL of unit cargo and equipment to be loaded. Identify any problems that will affect loading or require special attention to the CRE.
	Validate shoring requirements.
	Ensure 463L pallet dunnage availability.
	Determine requirements for vehicle cargo restraint devices based on deployed unit input.
Arrival Airfield Control Group Tasks	
	Coordinate with CRE prior to arrival of aircraft to determine support requirements
	Ascertain the unloading timeframe.
	Determine location of arrival airfields and holding areas.
	Determine AACG logistic/administrative facilities available at the arrival airfield.
	Develop AACG organizational structure and staff.
	Establish liaison with deploying unit, CRE, and other supporting activities.
	Coordinate with the CRE to establish AACG training requirements.
	Confirm coordination contacts.
	Obtain UDL of unit cargo and equipment to be loaded. Identify any problems that will affect loading or require special attention to the CRE.
	Finalize AACG organization to include aircraft load teams and training requirements.

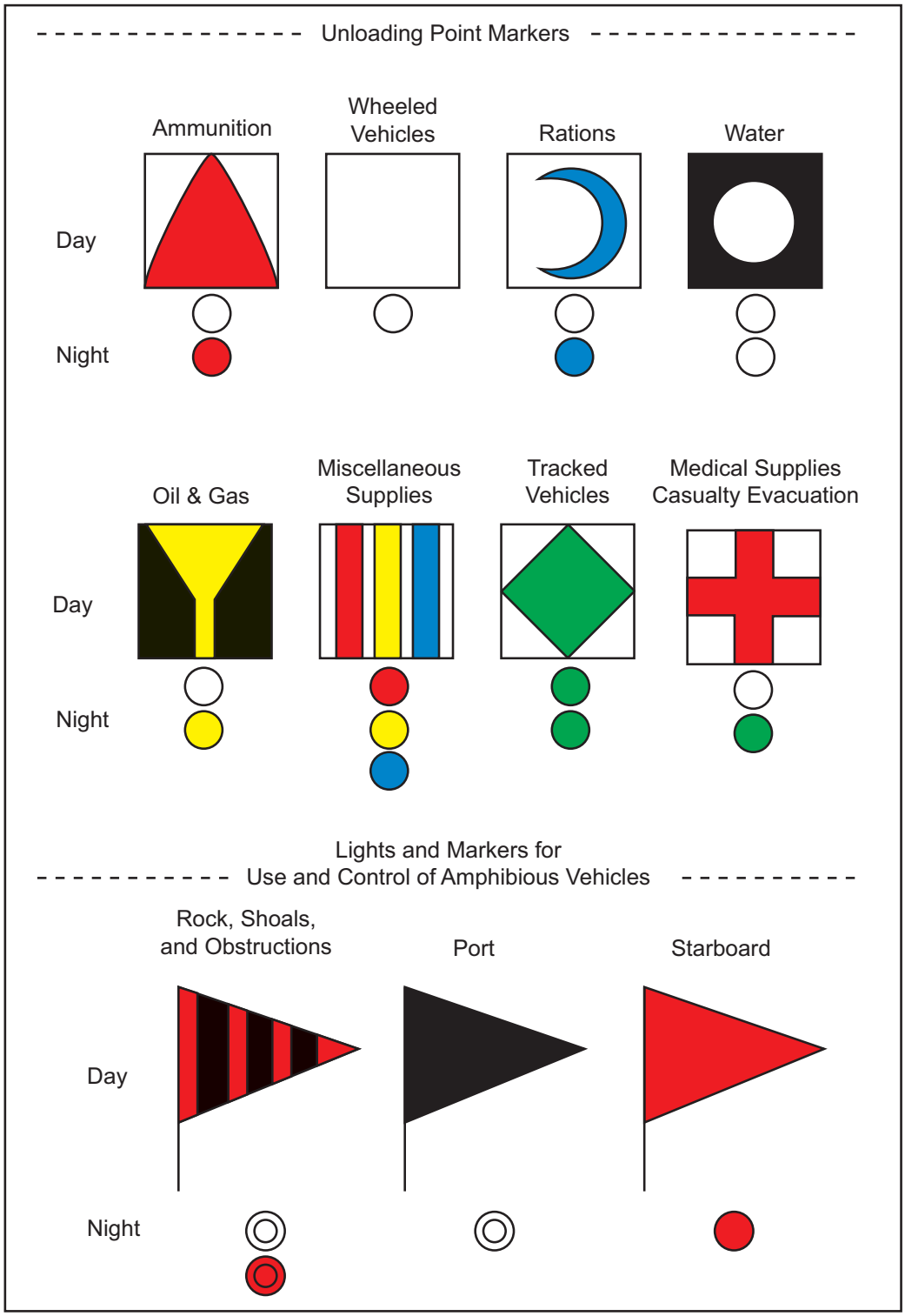
APPENDIX E
DEPLOYING UNIT AND A/DACG EXECUTION PHASE REQUIREMENTS WORKSHEET

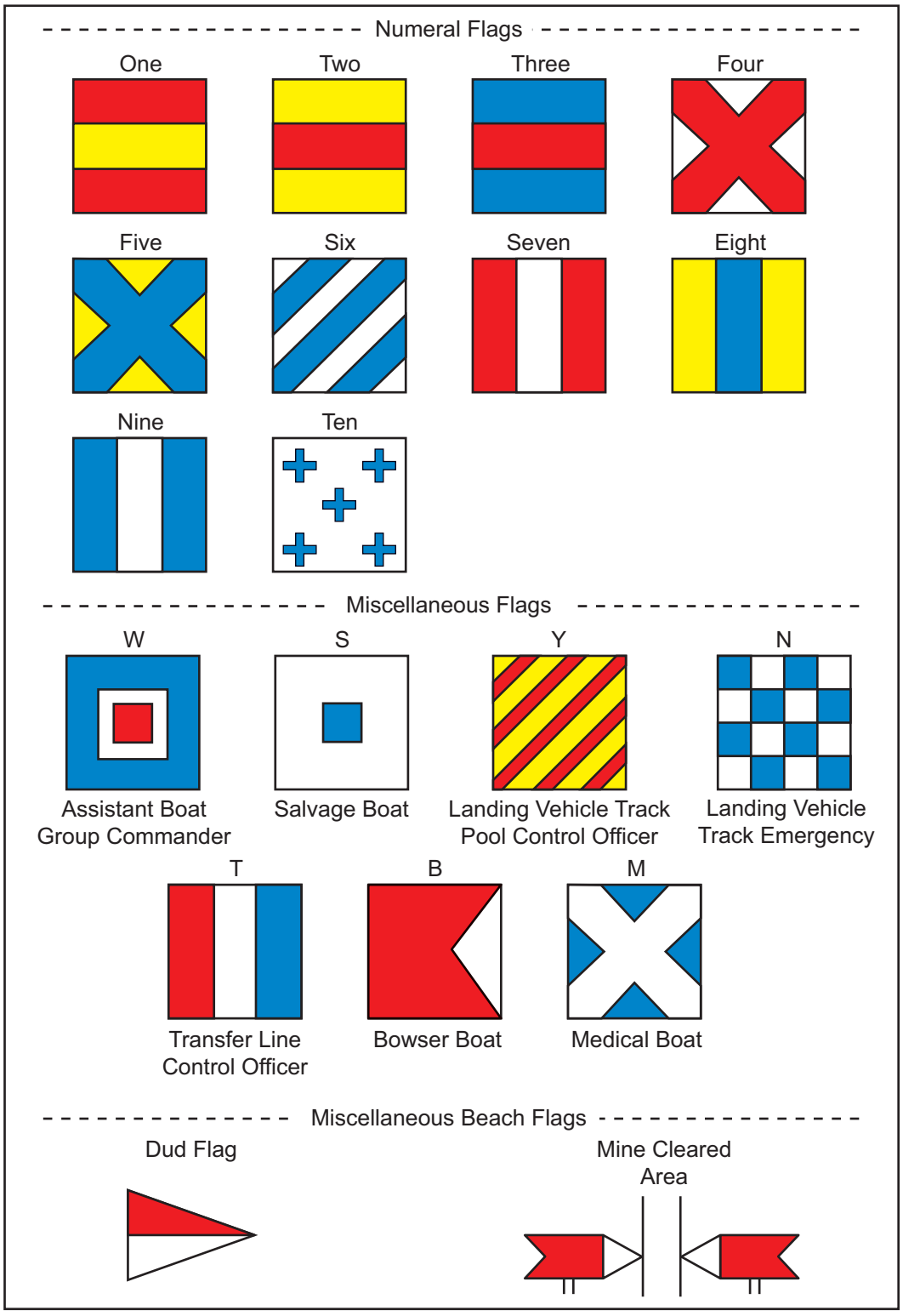
This worksheet is designed to assist the A/DACG in the performance of its mission. The tasks listed are not all inclusive, but are intended as a guide. The following tasks should not be overlooked during execution.

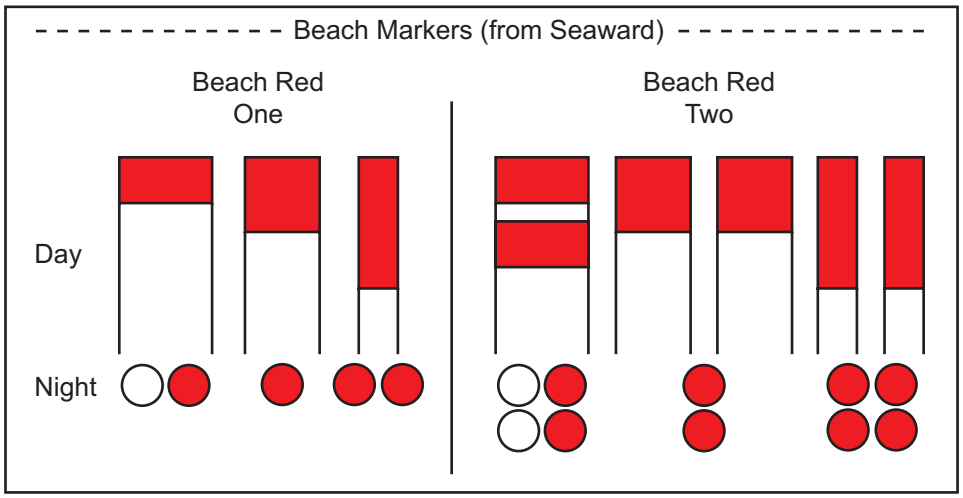
Completed	Task
Deploying Unit Tasks at the Departure Airfield	
	Establish liaison with the DACG and other activities.
	Conduct final preparation of vehicles, cargo, and equipment in accordance with JP 3-17, *Air Mobility Operations*.
	Ensure required shoring is on-hand.
	Prepare cargo and passenger manifests in accordance with JP 3-17.
	Assemble personnel, cargo, and equipment in aircraft loads per established load plans.
	Appoint plane team commanders and brief on responsibilities.
	Pass control of unit aircraft loads to DACG at the alert holding area at the time specified by the DACG.
	Correct discrepancies identified by the DACG and CRE during joint inspection.
	Provide specialized help in loading the aircraft if required.
	Retain one copy of final passenger/cargo manifest.
Deploying Unit Tasks at the Arrival Airfield	
	Provide assistance to the loadmaster.
	Receive instructions from the unload team chief.
	Retain or dispose of all shoring and dunnage as determined in planning.
Departure Airfield Control Group Tasks	
	Maintain liaison with the deploying unit.
	Arrange technical assistance required by the deploying unit with the CRE.
	Maintain liaison with the aerial port section.
	Call aircraft loads forward from the marshalling area and assume control in the alert holding area.
	Inspect aircraft loads and ensure they are complete and correctly prepared and that the required shoring and dunnage was provided by the deploying unit.
	Establish a discrepancy correction area.
	Inspect documentation for accuracy and completeness.
	Ensure passenger accountability and control.

Completed	Task
	Provide emergency maintenance and related services, as necessary, to accomplish the loading mission.
	Direct aircraft loads to the call forward area when required.
	Assist in the joint inspection of aircraft loads.
	Ensure the deploying unit corrects discrepancies found during the joint inspection.
	Move equipment forward to the ready line when required.
	Reassemble aircraft loads, with the assistance of the CRE, and prepare required manifest changes if there are aircraft aborts, changes to the load, or load discrepancies.
	Maintain statistical data on the movement of personnel and equipment, as well as passenger/cargo manifests and inspection records.
	Ensure the deploying unit adheres to the established timetable.
	Provide loading team personnel and support equipment.
	Provide fueling/defueling capability.
	Provide emergency maintenance for vehicles to be transported.
	Provide and control passenger holding area if required.
	Transfer control of the aircraft load to the CRE at the ready line and monitor the loading.
	Obtain aircraft load completion time from the CRE, CRF, and CRG.
Load Team Chief Tasks at the Ready Line	
	Receive the load at the ready line.
	Direct and supervise load teams and vehicle operators.
	Ensure equipment and supplies are properly restrained in the aircraft.
	Coordinate with the CRE ready line coordinator for any special assistance for support needed.
	Ensure loadmaster has appropriate number of copies of passenger/cargo manifest.
	Conduct preflight briefing to all embarking personnel.
	Pass load completion time to the CRE air operations center section.
Arrival Airfield Control Group Tasks	
	Establish coordination with the receiving command or installation if the AACG is part of the arriving unit's load element.
	Ensure accountable aircraft restraint devices are returned to the aircraft.
	Establish liaison and maintain coordination with the deploying unit and the CRE, CRF, and CRG.
	Ensure unload teams are available and briefed on their duties.
	Coordinate with the CRE, CRF, CRG, and deploying unit on the recovery and storage of shoring and dunnage.
	Accept each planeload from the CRE, CRF, and CRG at the established release point.
	Establish facilities as determined during planning.
	Maintain records on personnel and cargo received and cleared.
	Release aircraft load to the deploying unit at the designated location.

APPENDIX F
BEACH AND LANDING SITE MARKERS




Numeral Flags
One
Two
Three
Four
Five
Six
Seven
Eight
Nine
Ten
Miscellaneous Flags
W
Assistant Boat Group Commander
S
Salvage Boat
Y
Landing Vehicle Track Pool Control Officer
N
Landing Vehicle Track Emergency
T
Transfer Line Control Officer
B
Bowser Boat
M
Medical Boat
Miscellaneous Beach Flags
Dud Flag
Mine Cleared Area


Beach Markers (from Seaward)
Beach Red One
Beach Red Two
Day
Night

GLOSSARY

Section I. Abbreviations and Acronyms

AAA ..... arrival and assembly area
AACG ..... arrival airfield control group
AAOE ..... arrival and assembly operations element
AAOG ..... arrival and assembly operations group
ACE ..... aviation combat element
ACO ..... airfield coordination officer
A/DACG ..... arrival/departure airfield control group
AMC ..... Air Mobility Command
APOD ..... aerial port of debarkation
APOE ..... aerial port of embarkation
ATO ..... air tasking order

BDAR ..... battle damage assessment and repair
BOG ..... beach operations group
BSA ..... beach support area

C2 ..... command and control
CDS ..... container delivery system
CLF ..... commander, landing force
COC ..... combat operations center
CONUS ..... continental United States
CRE ..... contingency response element
CRF ..... contingency response force
CRG ..... contingency response group
CSS ..... combat service support

DACG ..... departure airfield control group
DOD ..... Department of Defense
DS ..... direct support
DTS ..... Defense Transportation System
DZ ..... drop zone
DZSO ..... drop zone safety officer

EPF ..... expeditionary fast transport
EPW ..... enemy prisoner of war

FDP&E ..... force deployment planning and execution
FIE ..... fly-in echelon

G-3 ..... assistant chief of staff, operations/operations staff section
G-4 ..... assistant chief of staff, logistics/logistics staff section
GATES ..... Global Air Transportation Execution System
GCE ..... ground combat element
GS ..... general support

HHQ ..... higher headquarters
HST ..... helicopter/tiltrotor support team

ICODES ..... Integrated Computerized Deployment System
ITV ..... in-transit visibility

JDDOC ..... joint deployment and distribution operations center
JFC ..... joint force commander
JFRG II ..... joint force requirements generator II
JOPES ..... Joint Operation Planning and Execution System
JP ..... joint publication
JPADS ..... joint precision airdrop system

LCE ..... logistics combat element
LFSP ..... landing force support party
LOC ..... line of communications
LOGAIS ..... logistics automated information system
LVSR ..... Logistics Vehicle System Replacement
LZ ..... landing zone
LZSA ..... landing zone support area

MAGTF ..... Marine air-ground task force
MAW ..... Marine aircraft wing
MCC ..... movement control center
MCDP ..... Marine Corps doctrinal publication
MCRP ..... Marine Corps reference publication
MCTP ..... Marine Corps tactical publication
MDDOC ..... MAGTF deployment and distribution operations center
MDL ..... MAGTF data library
MDSS II ..... Marine Air-Ground Task Force Deployment Support System II
MEB ..... Marine expeditionary brigade
MEF ..... Marine expeditionary force
MEU ..... Marine expeditionary unit
MHE ..... materials handling equipment
MLG ..... Marine logistics group
MMCC ..... MAGTF movement control center
MMDC ..... MAGTF materiel distribution center
MPE/S ..... maritime prepositioning equipment and supplies
MPF ..... maritime prepositioning force
MPS ..... maritime prepositioning ship
MPSRON ..... maritime prepositioning ships squadron

MSC ..... major subordinate command
MWSS ..... Marine wing support squadron

NSE ..... Navy support element

OPCON ..... operational control

POD ..... port of debarkation
POE ..... port of embarkation
POG ..... port operations group

RFID ..... radio frequency identification

S-3 ..... operations officer/operations office
SDDC ..... Surface Deployment and Distribution Command
SIXCON ..... six containers together
SOP ..... standing operating procedure

TACLOG ..... tactical-logistical
TPFDD ..... time-phased force and deployment data
TSB ..... transportation support battalion

UDL ..... unit deployment list
UMCC ..... unit movement control center
US ..... United States
USTRANSCOM ..... United States Transportation Command

WRS ..... War Reserve System

Section II. Terms and Definitions

advance party—A task organization formed by the Marine air-ground task force commander that consists of personnel designated to form the nucleus of the arrival and assembly organizations. The primary tasks of the advance party are to arrange for the reception of the main body and provide force protection. (USMC Dictionary, part 1 of a 2-part definition)

air mobility—The rapid movement of personnel, materiel and forces to and from or within a theater by air. (DOD Dictionary)

amphibious assault—A type of amphibious operation that involves establishing a force on a hostile or potentially hostile shore. (DOD Dictionary)

amphibious force—An amphibious task force and a landing force together with other forces that are trained, organized, and equipped for amphibious operations. Also called **AF**. See also **amphibious task force**; **landing force**. (DOD Dictionary)

amphibious task force—A Navy task organization formed to conduct amphibious operations. Also called **ATF**. See also **amphibious force**; **landing force**. (DOD Dictionary)

arrival and assembly area—An area identified by the designated commander in coordination with the unified commander and host nation for arrival, offload, and assembly of forces and equipment and supplies and preparations for subsequent operations. The arrival and assembly area is administrative in nature and does not denote command of a geographic area. Such an area may be inside an amphibious objective area. Within the arrival and assembly area, coordination authority for the following is implied for the designated commander: prioritization and use of airfield, port, and beach facilities and road networks; air traffic control; and logistic support activities. Also called **AAA**. (USMC Dictionary)

arrival and assembly operations element—A command and control agency in each Marine air-ground task force element and the Navy support element that coordinates the logistic functions of the offload of maritime prepositioning equipment and supplies and the arrival and assembly of forces in the unit assembly area. Also called **AAOE**. (USMC Dictionary)

arrival and assembly operations group—A staff agency composed of the Marine air-ground task force personnel and a liaison from the Navy support element, to control the arrival and assembly operations. Also called **AAOG**. (USMC Dictionary)

basic load—The quantity of supplies required to be on hand within, and which can be moved by, a unit or formation, expressed according to the wartime organization of the unit or formation and maintained at the prescribed levels. (DOD Dictionary)

beachhead—A designated area on a hostile or potentially hostile shore that, when seized and held, ensures the continuous landing of troops and materiel, and provides maneuver space requisite for subsequent projected operations ashore. (DOD Dictionary)

beachmaster unit—A commissioned naval unit of the naval beach group designed to provide to the shore party a Navy component known as a beach party, which is capable of supporting the amphibious landing of one division (reinforced). Also called **BMU**. See also **naval beach group**; **shore party**. (DOD Dictionary)

beach party— The Navy component of the landing force support party under the tactical control of the landing force support party commander. See also **beachmaster unit**; **shore party**. (DOD Dictionary)

beach party team—The Navy support element component of the shore party team commanded by a Navy officer. The beach party team provides Navy functions such as lighterage salvage and repair. In addition, as a component of the debark control unit for a maritime prepositioning force operation, it is responsible to control lighterage in the surf zone and transfer bulk liquids from the maritime prepositioning ship(s). Also called **BPT**. (USMC Dictionary)

beach support area—In amphibious operations, the area to the rear of a landing force or elements thereof, that contains the facilities for the unloading of troops and materiel and the support of forces ashore. Also called **BSA**. (DOD Dictionary)

C-day—The unnamed day on which a deployment operation commences or is to commence. (DOD Dictionary)

commander, amphibious task force—The Navy officer designated in the initiating directive as the commander of the amphibious task force. Also called **CATF**. See also **amphibious task force**; **commander**, **landing force**. (DOD Dictionary)

commander, **landing force**—The officer designated in the initiating directive as the commander of the landing force for an amphibious operation. Also called **CLF**. See also **commander**, **amphibious task force**; **landing force**. (DOD Dictionary)

coordinating authority—A commander or individual who has the authority to require consultation between the specific functions or activities involving forces of two or more Services, joint force components, or forces of the same Service or agencies, but does not have the authority to compel agreement. (DOD Dictionary)

debarkation—The unloading of troops, equipment, or supplies from a ship or aircraft. (DOD Dictionary)

distribution—The operational process of synchronizing all elements of the logistic system to deliver the “right things” to the “right place” at the “right time” to support the geographic combatant commander. (DOD Dictionary, part 5 of a 6-part definition)

embarkation—The process of putting personnel and/or vehicles and their associated stores and equipment into ships and/or aircraft. (DOD Dictionary)

flight ferry—The movement by self-deployment of the aircraft of the aviation combat element to the arrival and assembly area. Also called **FF**. (USMC Dictionary)

fly-in echelon—(See DOD Dictionary for core definition. Marine Corps amplification follows.) Airlifted forces and equipment of the Marine air-ground task force and Navy support element plus aircraft and personnel arriving in the flight ferry of the aviation combat element. Also called **FIE**. (USMC Dictionary)

helicopter support team—A task organization formed and equipped for employment in a landing zone to facilitate the landing and movement of helicopterborne troops, equipment, and supplies, and to evacuate selected casualties and enemy prisoners of war. The team is sourced from the Marine logistics group, specifically from the landing support company of the support battalion. Also called **HST**. (USMC Dictionary)

inland petroleum distribution system—A multi-product system consisting of both commercially available and military standard petroleum equipment that can be assembled by military personnel and, when assembled into an integrated petroleum distribution system, provides the military with the capability required to support an operational force with bulk fuels. Also called **IPDS**. (DOD Dictionary)

intertheater airlift—The common-user airlift linking theaters to the continental United States and to other theaters as well as the airlift within the continental United States. See also **intratheater airlift**. (DOD Dictionary)

in-transit visibility—The ability to track the identity, status, and location of Department of Defense units, and non-unit cargo (excluding bulk petroleum, oils, and lubricants) and passengers; patients; and personal property from origin to consignee or destination across the range of military operations. Also called **ITV**. (DOD Dictionary)

intratheater airlift—Airlift conducted within a theater with assets assigned to a geographic combatant commander or attached to a subordinate joint force commander. See also **intertheater airlift**. (DOD Dictionary)

landing beach—That portion of a shoreline required for the landing of an amphibious force. (DOD Dictionary)

landing craft—A craft employed in amphibious operations, specifically designed for carrying troops and their equipment and for beaching, unloading, retracting, and resupply operations. (DOD Dictionary)

landing force—A Marine Corps or Army task organization, which is part of the amphibious force, formed to conduct amphibious operations. Also called **LF**. See also **amphibious force**; **amphibious task force**. (DOD Dictionary)

landing force support party—(See DOD Dictionary for core definition. Marine Corps amplification follows.) The forward echelon of the logistics combat element formed to facilitate the transportation and throughput operations. In maritime prepositioning force operations, the landing force support party is responsible to the Marine air-ground task force commander for the reception of maritime prepositioned equipment and supplies and personnel at the beach, port, and arrival airfield, and movement control to the unit assembly areas. Also called **LFSP**. (USMC Dictionary)

landing zone— (See DOD Dictionary for core definition. Marine Corps amplification follows.) A specified ground area for landing assault support aircraft to embark or disembark troops and/or cargo and it may contain one or more landing sites. Also called LZ. (*Note: Replaces helicopter landing zone [HLZ]*.) (USMC Dictionary)

landing zone support area—A forward support installation that provides minimum essential support to the air assault forces of the Marine air-ground task force. It can expand into a combat service support area but it is most often a short-term installation with limited capabilities, normally containing dumps for rations, fuel, ammunition, and water only; maintenance is limited to contact teams and/or support teams. Also called **LZSA**. (USMC Dictionary)

logistics combat element—The core element of a Marine air-ground task force (MAGTF) that is task-organized to provide the combat service support necessary to accomplish the MAGTF's mission. The logistics combat element varies in size from a small detachment to one or more Marine logistics groups. It provides supply, maintenance, transportation, general engineering, health services, and a variety of other services to the MAGTF. In a joint or multinational environment, it may also contain other Service or multinational forces assigned or attached to the MAGTF. The logistics combat element itself is not a formal command. Also called **LCE**. See also **Marine air-ground task force**. (USMC Dictionary)

Marine air-ground task force—The Marine Corps' principal organization for all missions across the range of military operations, composed of forces task-organized under a single commander capable of responding rapidly to a contingency anywhere in the world. The types of forces in the Marine air-ground task force (MAGTF) are functionally grouped into four core elements: a command element, an aviation combat element, a ground combat element, and a logistics combat element. The four core elements are categories of forces, not formal commands. The basic structure of the MAGTF never varies, though the number, size, and type of Marine Corps units comprising each of its four elements will always be mission dependent. The flexibility of the organizational structure allows for one or more subordinate MAGTFs to be assigned. In a joint or multinational environment other Service or multinational forces may be assigned or attached. Also called **MAGTF**. See also **logistics combat element**. (USMC Dictionary)

MAGTF movement control center—A standing organization and a subordinate element of the MAGTF deployment and distribution operations center that allocates, schedules, and coordinates ground transportation requirements based on the MAGTF commander's priorities. At the Marine expeditionary force level, the MAGTF movement control center replaces the logistics and movement control center, and may require augmentation to execute movement command and control based on operational tempo. Also called **MMCC**. (USMC Dictionary)

Marine logistics group—The logistics combat element of the Marine expeditionary force (MEF). It is a permanently organized command tasked with providing combat service support beyond the organic capabilities of supported units of the MEF. The Marine logistics group is normally structured with direct and general support units, which are organized to support a MEF possessing one Marine division and one Marine aircraft wing. It may also provide smaller task-organized logistics combat elements to support Marine air-ground task forces smaller than a MEF. Also called **MLG**. (USMC Dictionary)

maritime prepositioning equipment and supplies—Unit equipment and sustaining supplies associated with a Marine air-ground task force and a Navy support element that are deployed on maritime prepositioning ships. Also called **MPE/S**. (USMC Dictionary)

maritime prepositioning force—A task organization of units under one commander formed for the purpose of introducing a Marine air-ground task force and its associated equipment and supplies into a secure area. The maritime prepositioning force is composed of a command element, a maritime prepositioning ships squadron, a Marine air-ground task force, and a Navy support element. Also called **MPF**. (USMC Dictionary)

maritime prepositioning ship—(See DOD Dictionary, maritime pre-positioning ships, for core definition. Marine Corps amplification follows.) A maritime prepositioning ship is normally designated as a T-AKR. Also called **MPS**. (USMC Dictionary)

maritime prepositioning ships squadron—A group of civilian-owned and civilian-crewed ships chartered by Military Sealift Command loaded with prepositioned equipment and 30 days of supplies to support up to a maritime prepositioning force Marine air-ground task force. Also called **MPSRON**. See also **maritime prepositioning force**. (USMC Dictionary)

marshalling area—(See DOD Dictionary for core definition. Marine Corps amplification follows.) 1. The general area in which unit preparation areas and departure airfields may be located and from which air movement is initiated. 2. In amphibious operations, the designated area in which, as part of the mounting process, units are reorganized for embarkation; vehicles and equipment are prepared to move directly to embarkation areas; and housekeeping facilities are provided for troops by other units. (USMC Dictionary)

naval beach group—A permanently organized naval command within an amphibious force composed of a commander and staff, a beachmaster unit, an amphibious construction battalion, and assault craft units, designed to provide and administrative group from which required naval tactical components may be made available to the attack force commander and to the amphibious landing force commander. Also called **NBG**. See also **shore party**. (DOD Dictionary)

Navy support element—The maritime pre-positioning force element that is tasked to conduct the off-load and ship-to-shore movement of maritime pre-positioned equipment and/or supplies. Also called **NSE**. (DOD Dictionary)

serial—(Part 1 of a 2 part definition.) An element or group of elements within a series that is given a numerical or alphabetical designation for convenience in planning, scheduling, and control. (DOD Dictionary)

ship-to-shore movement—That portion of the action phase of an amphibious operation that includes the deployment of the landing force from ships to designated landing areas. (DOD Dictionary)

shore party—A task organization of the landing force, formed for the purpose of facilitating the landing and movement off the beaches of troops, equipment, and supplies; for the evacuation

from the beaches of casualties and enemy prisoners of war; and for facilitating the beaching, retraction, and salvaging of landing ships and craft. Also called **beach group**. See also **beachmaster unit**; **naval beach group**. (DOD Dictionary)

survey, liaison, and reconnaissance party—A self-sustaining task organization formed from the Marine air-ground task force and Navy support element. It conducts reconnaissance, establishes liaison with the in-theater authorities, and initiates preparations for the arrival of the main body of the fly-in echelon and the maritime prepositioning ships squadron. The survey, liaison, and reconnaissance party normally deploys to the arrival and assembly area under the Marine air-ground task force cognizance. Also called **SLRP**. (USMC Dictionary)

tactical-logistical group—Representatives designated by troop commanders to assist Navy control officers aboard control ships in the ship-to-shore movement of troops, equipment, and supplies. Also called **TACLOG group**. (DOD Dictionary)

Section III. Nomenclature

AMK23/25 ..... armored 7-ton cargo truck
AMK27/28 ..... armored 7-ton cargo truck, extra wide body
AMK31 ..... armored 7-ton tractor truck
AMK36 ..... armored 7-ton wrecker truck
AMK970 ..... 5,000-gallon aircraft refueler semitrailer
AMKR15 ..... 10x10 configured wrecker truck, Logistics Vehicle System Replacement
AMKR16 ..... 10x10 configured tractor truck, Logistics Vehicle System Replacement
AMKR18 ..... 10x10 configured cargo truck, Logistics Vehicle System Replacement
C-130 ..... cargo aircraft (Hercules)
C-17 ..... transport aircraft (Globemaster III)
M1076 ..... Palletized Load System trailer
M870A2E1 ..... 50-ton low bed semitrailer, medium heavy equipment transport
M870A2S ..... 40-ton low bed semitrailer, medium heavy equipment transport
MK1077 ..... flatrack Palletized Load System
MK2500 ..... 2,500-gallon flatrack refueler
MK970 ..... 5,000-gallon aircraft refueler semitrailer
MKR15 ..... 10x10 configured wrecker truck, Logistics Vehicle System Replacement
MKR16 ..... 10x10 configured tractor truck, Logistics Vehicle System Replacement
MKR18 ..... 10x10 configured cargo truck, Logistics Vehicle System Replacement

REFERENCES AND RELATED PUBLICATIONS

Joint Issuances

Joint Publications (JPs)

3-0	Joint Operations
3-02	Amphibious Operations
3-02.1	Amphibious Embarkation and Debarkation
3-17	Air Mobility Operations
3-35	Deployment and Redeployment Operations
4-0	Joint Logistics
4-01	The Defense Transportation System
4-01.2	Sealift Support to Joint Operations
4-01.5	Joint Terminal Operations
4-01.6	Joint Logistics Over-the-Shore
4-03	Joint Bulk Petroleum and Water Doctrine
4-09	Distribution Operations

Miscellaneous

DOD Dictionary of Military and Associated Terms

Marine Corps Publications

Marine Corps Doctrinal Publication (MCDPs)

1-0	Marine Corps Operations
6	Command and Control

Marine Corps Warfighting Publications (MCWPs)

5-10	Marine Corps Planning Process

Marine Corps Tactical Publications (MCTPs)

3-01B	Helicopterborne Operations
3-20E	Assault Support
3-30C	Rear Area Operations
3-40B	Tactical-Level Logistics
13-10B	Combat Cargo Operations
13-10C	Unit Embarkation Handbook
13-10D	Maritime Prepositioning Force Operations
13-10E	Ship-to-Shore Movement

Marine Corps Reference Publications (MCRPs)

1-10.2	Marine Corps Supplement to the DOD Dictionary of Military and Associated Terms
3-30C.1	MAGTF Rear Area Security
3-40F.4	Multiservice Helicopter Sling Load: Basic Operations and Equipment
3-40F.5	Multiservice Helicopter Sling Load: Single Point Load Rigging Procedures
3-40F.6	Multiservice Helicopter Sling Load: Dual-Point Load Rigging Procedures

Marine Corps Orders (MCOs)

4470.1_	USMC Marine Air Ground Task Force (MAGTF) Deployment and Distribution Policy (MDDP)

Navy Publications

Navy Tactical Reference Publication (NTRP)

1-02	Navy Supplement to the DOD Dictionary of Military and Associated Terms