

# OPERATIONAL LOGISTICS

A MONOGRAPH  
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## ABSTRACT

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In the twentieth century, Army operational logisticians sustained land combat operations in five recognized wars: World War I, World War II, Korea, Vietnam, and Operation Desert Storm. Only three of the five wars involved major combat maneuvers, namely World War II, Korea, and Operation Desert Storm. In each war, the logistics system had to be tailored in size, structure, and procedures to support the mission, composition, and concept of operations of the military forces. In World War II, the operational logistics system sustained the island hopping campaigns in the South Pacific and the Normandy invasion in Europe. In Korea, the operational logistics system sustained the Naktong (Pusan) Perimeter, the Inchon landing, and the ground offensive into North Korea. In Operation Desert Storm, the operational logistics system sustained the major ground offensive into Iraq.

With the exception of Operation Desert Storm, the operational logistics system exhibited limitations. Lack of thorough planning in support of branches and sequels resulted in logistics culmination and operational logistics pauses in Operation Chromite (Korea) and Operation Overlord (World War II). US forces surrendered the initiative to the enemy and missed opportunities to quickly end the wars. According to James Huston, author of *Logistics in Armed Conflict*, logistics culmination and operational logistics pauses are a common event in the US war experience. "One of the weaknesses of logistics has been a failure of transportation for the support of the exploitation and pursuit phases of an action."

The purpose of the monograph is to determine whether continued ground operations would have shown Operation Desert Storm to be an example of a responsive Army theater logistic system for sustained land combat. The answer will depend on researching several factors: defining operational logistics, developing an operational logistics planning process, conducting a case study on Operation Desert Storm, and defining the logistics characteristic of responsiveness. For the purpose of making the determination, the discussion will be based on the assumption that the ground war continued beyond the four day and the General Yeosock was permitted to issue the pursuit order to General's Luck and Frank.

A working definition of operational logistics is necessary because multiple definitions exist in Army doctrine. The definition will assist in developing an operational logistics planning process. The theater logistic system will be developed by redefining the factors of mission, enemy, terrain and weather, troops available, time, and civilian considerations (METT-TC) as logistical planning tools. A case study is conducted of the theater logistic system that sustained the four-day war in Operation Desert Storm.

The research indicated that Operation Desert Storm does not serve as an example of a responsive theater logistics system for sustained land combat. Neither the XVIII Airborne Corps nor the VII Corps could have massed ground combat forces south of Basrah to destroy the Republican Guard because the distance was beyond the logistics reach of the 22<sup>nd</sup> SUPCOM. The major lessons identified by Operation Desert Storm are that future opponents will not allow the US six-months to prepare for combat, and that Army logisticians are still not capable of sustaining the pursuit phase of campaigns and major operations. One reason is that pursuit operations are not trained at the brigade, division, and corps level combat training centers (CTC). The other problem is that the logistics focus of the Command and General Staff College (CGSC) is on teaching logisticians how to receive, stage, onward move, and integrate combat power for a five-day operation. To fully prepare the Army, and particularly logisticians, for the next major war, all four types of offensive operations must be fully trained: movement-to-contact, attack, exploitation, and the pursuit.

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## CHAPTER ONE

### I. INTRODUCTION

The United States Army as an institution has seven strategic mission essential tasks: close with and destroy the enemy, shape the security environment, respond promptly to crisis, conduct forcible entry operations, conduct sustained land operations, provide support to civil authorities, and mobilize the Army<sup>1</sup>. The mission essential tasks establish the key capabilities required to effectively employ land power in the strategic environment in support of national policy.

The concept of the strategic environment is confusing and requires clarification. For the Army, that environment is initially defined by the national security strategy, which is broken down into the three categories of: war, conflict, and peace. Subordinate to the national security strategy, the national joint military strategy consists of two types of operations, war and military operations other than war (MOOTW). Both types of operations have the objective of achieving the political end state established by the national command authority.

The Army's seven strategic mission essential tasks relate directly to the four categories of Army operations: offensive, defensive, stability, and support. Joint Force Commanders and Army component commanders determine the emphasis Army forces place on each type of operation. Offensive and defensive operations dominate in war. Stability and support operations dominate in MOOTW. In war, the capability to conduct sustained land combat operations requires the full integration of logistics at the strategic, operational, and tactical levels of war.

In the twentieth century, Army operational logisticians sustained land combat operations in five recognized wars: World War I, World War II, Korea, Vietnam, and Operation Desert Storm. Only three of the five wars involved major combat maneuvers, namely World War II, Korea, and Operation Desert Storm. In each war, the logistics system had to be tailored in size, structure, and procedures to support the mission, composition, and concept of operations of the

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<sup>1</sup>Department of the Army, *Student Text 3-0: Operations*, Fort Leavenworth, Kansas: U.S. Army Command

military forces. In World War II, the operational logistics system sustained the island hopping campaigns in the South Pacific and the Normandy invasion in Europe. In Korea, the operational logistics system sustained the Naktong (Pusan) Perimeter, the Inchon landing, and the ground offensive into North Korea. In Operation Desert Storm, operational logistics system sustained the major ground offensive into Iraq. In each war, the operational logistics system had its limitations.

During the execution of Operation Overlord in World War II and Operation Chromite in Korea, the tempo of offensive operations exceeded the operational reach of the sustainment base at decisive points in the campaign. The effect on both operations was missed opportunities to quickly end the war. In Operation Overlord, the Army organization responsible for operational logistics was the Service of Supply (SOS). The SOS demonstrated great flexibility in conducting logistics-over-the-shore operations to sustain the invasion and ground attack into Normandy, but was unable to sustain tactical success when the operation transitioned to the pursuit.<sup>2</sup>

For approximately two months after the invasion, the Germans successfully repelled Allied attacks until V Corps made a tactical breakthrough. Seeing an opportunity to destroy the German Army in France, the Joint Task Force Commander ordered a general pursuit. The rate of Allied advance quickly exceeded the operational reach of the SOS. Running out of fuel, Allied forces were compelled to conduct an operational pause while the lines of communication (LOC) were reestablished. The delay allowed the German Army to escape destruction, reconstitute their combat power, and launch a major counter-offensive into the Ardennes<sup>3</sup>. For a brief moment, the Allied advance had culminated because the offensive was no longer sustainable in spite of the fact that plenty of supplies were stockpiled in Normandy.

The problem in Operation Overlord was that the operational logistics system was inflexible and not capable of supporting unexpected tactical success. The Supreme Allied

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and General Staff College, October 2000: 1-4 to 1-7.

<sup>2</sup> Department of the Army Center of Military History, Logistics in World War II: Final Report of the Army Service Forces, Washington, DC: U.S. Government Printing Office, 1993: 41.

<sup>3</sup> Charles R. Shrader, United States Army Logistics, 1775-1992 An Anthology, Washington, DC: U.S.

Headquarters G4 effectively outlined the issue several days before the plan was executed. “The operation could be supported if everything went according to plan, for there is no margin of safety.”<sup>4</sup> The focus of the logistics planners had been on establishing a logistics system for sustaining the initial invasion. Their concerns were warranted given the fact that an invasion the size of Overlord had never been done before. Evidence supports the conclusion that the logisticians did not seriously consider the possibility of unanticipated success. Intelligence reports indicated that France possessed an excellent rail network, the densest concentration being in the north and west with Paris as the central hub. Accordingly, the logistics planners estimated that only one rail line was required to sustain Allied forces. Contingency plans were designed to repair the single rail line along the main axis of advance but no plans were developed to repair additional rail lines if more were needed. The planning oversight was made painfully clear when the single rail line proved insufficient and the engineering resources were not available in country to open additional rail lines to sustain the offensive.<sup>5</sup> In desperation, the planners hastily consolidated all transportation assets in the theater to move bulk fuel and ammunition to the combat zone, creating the “Red Ball Express.” Their solution met with mixed results for two reasons. The movement of supplies did not incorporate military police support, which resulted in convoys regularly getting lost. The supply columns were also not integrated into the ground tactical plan, which caused numerous conflicts in the use of roads. The operational pause that ensued caused the war to last another year, consuming more men, supplies, and equipment.

A similar situation occurred in Korea. The Army’s 2<sup>nd</sup> Logistics Command was responsible for operational logistics during Operations Chromite. The Command successfully supported the X Corps amphibious assault at Inchon and the deliberate attack into Seoul. At the same time, the 2<sup>nd</sup> Logistics Command supported 8<sup>th</sup> Army’s counter-attack north from the Pusan

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Government Printing Office, 1997: 489.

<sup>4</sup> James A. Huston, *The Sinews of War: Army Logistics 1775-1953*, U.S. Government Printing Office, 1967: 523.

<sup>5</sup> Roland G. Ruppenthal, *US Army in World War II: Logistics Support of the Armies Volume I: May 1941-*

Perimeter along the west coast of the peninsula. The major offensive caught the North Korean Army by surprise and, fearing total destruction, the North Korean Army conducted a full-scale retreat. In the process, the retreating North Korean Army destroyed the main north-south rail line and every bridge between Pusan and Seoul. Sensing the opportunity to destroy the North Korean Army, General Walker, Commander, 8<sup>th</sup> Army, developed contingency plans to attach X Corps under his command and transition to a general pursuit. Before Walker could execute his plan, General MacArthur, the Joint Task Force Commander, became concerned for the sustainment of the Republic of Korea (ROK) forces attacking along the east coast of the peninsula. MacArthur ordered X Corps out of Seoul to conduct a supporting amphibious assault into the port of Wonsan with the objective to open a direct LOC for the ROK forces. The decision had a significant impact on the campaign.

The only means available to reposition X Corps was by ship from Inchon, which meant sailing around the peninsula. In addition, logisticians realized that the throughput capacity at the port of Inchon was unable to handle the throughput tonnage required to sustain 8<sup>th</sup> Army's advance. Until the port at Wonsan was opened, the primary sustainment base for the entire campaign would have to be Pusan. The subsequent weakening of 8<sup>th</sup> Army's combat power, the long LOC from Pusan, and the repositioning of X Corps forced 8<sup>th</sup> Army to conduct an operational pause to establish a second LOC.

The pause, caused by an inadequate logistics preparation of the theater, permitted the North Korean Army to escape destruction, to reconstitute their combat power, and to execute an effective retrograde operation across North Korea to the border of China. Logistics planners should have anticipated the limited throughput capacity at Inchon and the potential sustainment problems in the east, and should have developed feasible alternatives. The effect on the overall campaign was that China entered the conflict and the war dragged on for three more years.

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September 1944, Washington, DC: U.S. Government Printing Office, 1954: 544, 545, 551.

In both examples, lack of thorough planning supported by branches and sequels resulted in US forces surrendering the initiative to the enemy and missing opportunities to quickly end the war. According to James Huston, author of *Logistics in Armed Conflict*, logistics culmination and operational logistics pauses are a common event in the US war experience. “One of the weaknesses of logistics has been a failure of transportation for the support of the exploitation and pursuit phases of an action.”<sup>6</sup>

In South West Asia, The Army command responsible for operational level logistics during Operation Desert Storm was the 22<sup>nd</sup> Support Command (SUPCOM). Logistics culmination and an operational pause did not occur in South West Asia for three reasons. First, the enemy surrendered in mass. Second, the National Command Authority (NCA) believed US forces had achieved the national objectives within 100 hours of the commencement of hostilities. Third, General Yeosock, Commander, Army Central Command, was not permitted to issue a general pursuit order to General Luck, Commander, XVIII Airborne Corps, and to General Franks, Commander VII Corps. As a result, Army operations did not exceed the operational reach of the support units. Had a general pursuit order been issued, it is not clear whether the operational logistics system developed by the 22<sup>nd</sup> SUPCOM could have sustained 3<sup>rd</sup> Army’s ground campaign without an operational pause. General Pagonis, Commander, 22<sup>nd</sup> SUPCOM, indicates as much in his statement, “The elegant two-wheel resupply structure got tested in the build-up phase, but was not called upon for heavy resupply.”<sup>7</sup>

In the next war, the United States may not be able to rely on an operational pause to reposition logistics assets. Among the seven logistics principles, responsiveness is the most essential;<sup>8</sup> all other considerations are irrelevant if the logistics system cannot support the

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<sup>6</sup> James A. Huston, *The Sinews of War: Army Logistics 1775-1953*, U.S. Government Printing Office, 1967: 672.

<sup>7</sup> William C. Pagonis and Jeffery L. Cruikshank, *Moving Mountains: Lessons in Leadership and Logistics from the Gulf War*, Massachusetts: Harvard Business School Press, 1995.

<sup>8</sup> The seven logistics principles are: responsiveness, simplicity, flexibility, attainability, sustainability, survivability, economy, and integration.

supported commander's concept of operations. Responsiveness is achieved through the development of a logistical system that supports the mission, the force composition, and the concept of operations by anticipating unforeseen operational requirements.<sup>9</sup> The monograph will determine whether continued ground operations would have shown Operation Desert Storm to be an example of a responsive Army theater logistic system for sustained land combat. The answer will depend on researching several factors: defining operational logistics, developing an operational logistics planning process, conducting a case study on Operation Desert Storm, and defining the logistics characteristic of responsiveness.

In chapter one, operational logistics will be defined using joint and service doctrine, relevant books, and periodicals. A working definition of operational logistics is necessary because multiple definitions exist in Army doctrine. The definition will assist in developing an operational logistics planning process.

In chapter two, a theater logistic system will be developed by redefining the factors of mission, enemy, terrain and weather, troops available, time, and civilian considerations (METT-TC) as logistical planning tools. Joint publications, Army field manuals, and Command and General Staff College student texts will be used as reference material. Redefining the factors of METT-TC is necessary because joint and Army doctrine has not created a planning system to assist the logistician in developing the theater logistic system.

In chapter three, a case study will be conducted of the theater logistic system that sustained the four-day war in Operation Desert Storm. The concept of operations will briefly be explained, and the operational logistics planning process developed in chapter two will be applied to Operation Desert Storm. Operations orders, relevant books, and periodicals on the subject will be used as reference material.

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<sup>9</sup> Chairman of the Joint Chiefs of Staff, Joint Publication 4-0: Doctrine for Logistics Support of Joint Operations, Washington, DC: U.S. Government Printing Office, January 1995: II-1.

In chapter four, an assessment will be made whether Operation Desert Storm is an example of a responsive theater logistic system for sustained land combat. The assessment will be based on projected logistical issues had the ground war continued beyond the fourth day and had General Yeosock been permitted to issue the pursuit order to Generals Luck and Franks. The logistics characteristic of responsiveness will be used as a measure of effectiveness to assess the flexibility of the theater logistics system to sustain the pursuit phase of the operation. Finally, recommendations will be made for sustaining or improving the logistics lessons of Operation Desert Storm.

### **Operational Level of War**

US Army Command and General Staff College (CGSC) *Student Text (ST) 3-0: Operations* defines the operational level of war as: “the use of military forces to achieve strategic goals through the design, organization, integration, and conduct of theater strategies, campaigns, major operations, and battles.”<sup>10</sup> The definition contained in *ST 3-0* is consistent with the doctrinal definition contained in *Field Manual (FM) 100-5*.

The operational level is the vital link between national and theater strategic aims and the tactical employment of forces on the battlefield. The focus at this level is on conducting joint operations – the employment of military forces to attain theater strategic objectives in a theater of war and operational objectives in the theater of operations through design, organization, and execution of the subordinate campaigns and major operations.<sup>11</sup>

Both definitions are useful because they provide a comprehensive understanding of the operational level of war in three key areas. The definitions clearly state the purpose of the operational level of war. The definitions provide a conceptual framework to visualize war at the operational level. Finally, the definitions clearly indicate that the planning and execution of battles, major operations, and campaigns are the means to achieve the military end state. Based

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<sup>10</sup> Department of the Army, *ST 3-0: Operations*. Fort Leavenworth, Kansas: U.S. Army Command and General Staff College, October 2000: 2-2, 2-3.

<sup>11</sup> Department of the Army, *Field Manual 100-5: Operation*, Washington, DC: U.S. Government Printing Office, June 1993: 6-2.

upon such a clearly articulated definition of the operational level of war, it seems appropriate that a similar definition would exist for operational logistics.

## **Operational Logistics**

The definition for operational logistics contained in *ST 3-0*, *FM 100-5*, and supporting Army doctrinal manuals is shallow by comparison.

Operational CSS (combat service support) links the national sustainment base capabilities to tactical support requirements during campaigns and major operations (*ST 3-0: Operations*).<sup>12</sup>

Operational logistics encompasses those support activities required to sustain campaigns and major operations (*FM 100-5: Operations*).<sup>13</sup>

CSS at the operational level links the strategic and tactical levels (*FM 100-10: Combat Service Support*).<sup>14</sup>

Operational logistics consists of logistical and other support activities required to support the force during campaigns and major operations within a theater of operations (*FM 100-7: Decisive Force: The Army in Theater Operations*).<sup>15</sup>

Operational - level CSS supports the CINCs plan in either a mature or an immature theater. The theater of war base and the theater of operations forward operating bases provide strategic and operational CSS to the tactical CSS bases (*FM 100-16: Army Operational Support*).<sup>16</sup>

The multiple definitions indicate that the Army as an institution has not come to terms with the concept of operational logistics. The impact in the field is confusion in planning and executing the sustainment of Army forces at the operational level of war.

Major Kent Marquardt, logistics planner for III Corps, argues that current operational logistics doctrine does not support Army missions because the doctrine is not fully developed. He recommends that the Training and Doctrine Command revise Army operational logistics

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<sup>12</sup> Department of the Army, *ST 3-0: Operations*. Fort Leavenworth, Kansas: U.S. Army Command and General Staff College, October 2000: 12-13.

<sup>13</sup> Department of the Army, *FM 100-5: Operations*, Washington, DC: U.S. Government Printing Office, June 1993: 12-3.

<sup>14</sup> Department of the Army, *FM 100-10: Combat Service Support*, Washington, DC: U.S. Government Printing Office, October 1995: 1-11.

<sup>15</sup> Department of the Army, *FM 100-7: Decisive Force: The Army in Theater Operations*, Washington, DC: U.S. Government Printing Office, May 1995: 5-19.

<sup>16</sup> Department of the Army, *FM 100-16: Army Operational Support*, Washington, DC: U.S. Government Printing Office, May 1995: 3-7.

doctrine. “The new doctrine must include principles and functions that enable an operational commander and staff to construct and evaluate courses of action during the military decision-making process.”<sup>17</sup> The inability to define operational logistics is not just an Army problem, but also a joint service problem. James Brabham, Commander, 1<sup>st</sup> Force Service Support Group (USMC) during Operation Desert Storm, states, “The operational level of logistics and how Marines operate at this level, however, is less well defined and because of its nature rarely fully exercised.”<sup>18</sup>

*Joint Publication (JP) 4-0: Logistics* is the Chairman of the Joint Chiefs of Staff (CJCS) keystone document for logistics support to joint operations. Yet, *JP 4-0* does not define operational logistics, but only logistics in general as “the science of planning and carrying out the movement and maintenance of forces.”<sup>19</sup> Before operational logistics doctrine can be rewritten, a common definition has to be accepted within the joint community. The definition must link operational logistics to the sustainment of land operations at the operational and tactical levels of war. Two potential sources for a definition exist in Navy and Marine Corps doctrine.

The Navy’s definition of operational logistics doctrine is contained in *Naval Doctrinal Publication 4: Naval Logistics*.

Operational logistics involves coordinating and providing theater logistics resources to operating forces. It includes support activities to sustain campaigns and major operations within a theater and is the level at which joint logistics responsibilities and arrangements are coordinated. It is the bridge that translates strategic logistics capability into tactical logistics support.<sup>20</sup>

The Navy definition is less ambiguous but does not meet the Army requirement of linking operational logistics to the sustainment of land operations at the operational and tactical levels of

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<sup>17</sup> Kent S. Marquardt, “Devising Operational Logistics Doctrine,” *Army Logistician*, Volume 32, issue 1 (January-February 2000): 33.

<sup>18</sup> James A. Brabham, “Operational Logistics: Defining the Art of the Possible,” *Marine Corps Gazette*, volume 78, issue 4 (April 1994): 26.

<sup>19</sup> Chairman of the Joint Chiefs of Staff, *Joint Publication 4-0: Doctrine for Logistics Support of Joint Operations*, Washington, DC: U.S. Government Printing Office, January 1995: I-1.

<sup>20</sup> Department of the Navy, *Naval Doctrinal Publication 4, Logistics*, Washington, DC: U.S. Government Printing Office, September 1999:5.

war. The value of including the Navy definition is that it is the first doctrinal definition to include joint logistics responsibilities. A better definition of operational logistics is found in *Marine Corps Doctrine Publication 4: Logistics*.

Operational logistics addresses sustainment within a military theater of operations. It connects the logistics effort of the strategic level with those of the tactical level. Taking resources provided from the strategic level, it makes them available in sufficient quantities to the tactical commander to support the concept of operations. Operational logistics involves those support activities required to sustain campaigns and major operations. It normally encompasses three tasks: providing resources to the tactical commanders, procuring resources not provided by strategic logistics, and managing the resources necessary to sustain the campaign in accordance with the intent of the operational-level commander.<sup>21</sup>

The Marine Corps doctrinal definition provides a link to the sustainment of land operations at the operational and tactical levels of war for several reasons. First, the requirement for operational logistics to make resources available to the tactical commander acknowledges the fact that sustainment of battles and engagements are the foundations of successful major operations and campaigns. Second, the requirement to support the tactical commander's concept of operations also indicates that operational logistics has to be integrated into the tactical plan. Third, at the operational level of war the supporting relationship of logistics is established by the requirement to support the operational-level commander's intent. Fourth, the definition provides the critical actions that operational logistics must accomplish: provide resources, procure resources, and manage resources. Finally, the definition embodies the components of logistics responsiveness to support the mission, composition, and concept of operations of the military forces.

Having accepted the Marine Corps definition for operational logistics, the discussion will progress to defining the logistics planning process. Once the operational logistics METT-TC has been defined, it can be used as the framework for evaluating the logistics plan for Operation Desert Storm.

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<sup>21</sup>Department of the Navy, Marine Corps Doctrinal Publication 4, Logistics, Washington, DC: U.S. Government Printing Office, February 1997: 50.

## CHAPTER TWO

### II. OPERATIONAL LOGISTICS METT-TC

The Army doctrinal planning procedure is called the military decision making process (MDMP). The MDMP is an analytical decision-making tool used by Army commanders and staffs for the application of land combat power in peace, conflict, and war.<sup>22</sup> The process contains three primary parts: mission analysis, course of action (COA) development, and COA selection. Of the three, mission analysis is the most important because it allows the commander and planning staff to visualize the operation from beginning to end. *FM 101-5: Staff Organization and Operations* states “The major components of the commander’s visualization are based on METT-TC factors.”<sup>23</sup> The METT-TC refers to the planning factors of: Mission, Enemy, Terrain and weather, Troops available, Time available, and Civilian Considerations.

There are two problems with METT-TC. First, Army doctrine was not evolved to include civilian considerations, though it is used constantly in planning; the manuals are outdated. Second, there is not a direct association between the factors of METT-TC and the mission analysis process. Upon review of both documents, it is clear that the factors of METT-TC and the steps of the mission analysis process are mutually supporting. Third, the 100-series field manuals have not defined the factors of METT-TC into a clearly articulated format that can be used during mission analysis.

*FM 101-5* provides generic guidelines for the staff officer to consider. “Prior to the mission analysis briefing, staff officers must know the status of subordinate units, limitations and capabilities of weapon systems, area of operations, area of interest, enemy situation and

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<sup>22</sup> Department of the Army, *FM 101-5: Staff Organization and Operations*, Washington, DC: U.S. Government Printing Office, May 1997: 5-1.

<sup>23</sup> *Ibid*: I-1.

capabilities, and time available.”<sup>24</sup> The guidelines are too simplistic to effectively steer the staff planners in assisting the operational commander in his battlefield visualization.

*FM 100-10: CSS* provides limited assistance in the form of a vague outline of a logistics METT-T planning process. The mission is simply defined as the “support mission derived from the operation.” The enemy is ambiguously defined as the “threat to CSS operations.” Terrain and weather are expressed in terms of “affects on requirements and support methods.” The troops are defined as the “total supporting forces—joint, multinational, civilian.” Time available is expressed in terms of “influences support requirements and distribution method.”<sup>25</sup> *FM 100-10*’s revision of METT-TC is obsolete and flawed because it does not provide enough detail to be used by the logistics planner at the operational level of war.

*FM 100-7: Decisive Force: The Army in Theater Operations* and *FM 100-16: Army Operational Support* do not even address the components of METT-TC. Instead, both manuals simply refer to the factors of METT-TC as being critical to the planning process, particularly in developing a theater logistic system for sustained land combat. Marquardt’s point is valid that current operational logistics doctrine does not support the commander and his or her staff.

To rectify the situation, the Army has included conceptual planning tools in *ST 3-0* to assist the commander and planners in using the MDMP process at the operational level of war. The three elements of the planning tools are visualization, description, and direction. Visualization pertains to mission analysis and includes the factors of METT-TC, the elements of operational design, and the products of staff estimates. *ST 3-0* develops the concept of operational design into a useable process that links ends, ways, and means. The concept of visualization is a powerful tool in enabling the commander and planning staff to develop a

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<sup>24</sup> Department of the Army, *FM 101-5: Staff Organization and Operations*, Washington, DC: U.S. Government Printing Office, May 1997: A-1.

<sup>25</sup> Department of the Army, *FM 100-10: Combat Service Support*, Washington, DC: U.S. Government Printing Office, October 1995: 2-3.

“mental model” for the conduct of the operation from deployment, to end state, to redeployment.<sup>26</sup>

The second element of the planning tools, description, pertains to COA development and selection. Based on the commander’s intent and initial planning guidance, the staff develops COAs that are suitable, feasible, and acceptable. Staff planners use the concepts of the operational framework and the elements of operational design as tools to develop COAs. The operational framework presented in *ST 3-0* is a significant departure from the terminology and conceptual understanding presented in *FM 100-5*. *FM 100-5* describes the framework in terms of a linear battlefield consisting of deep, close, and rear operations, a battlefield framework appropriate to the Cold War era of contiguous and linear operations.<sup>27</sup> *ST 3-0* defines the battlefield framework in terms of the operational environment through the employment of decisive, shaping, and sustaining operations. *ST 3-0*’s operational framework addresses the noncontiguous and nonlinear operations characteristics of the modern spectrum of warfare.

The third element, direction, pertains to plans and orders which clearly and concisely communicates a concept of operations and synchronizes the warfighting power of the battlefield operating systems (BOS). The direction technique presented in *ST 3-0* is a significant innovation, providing a systems approach to warfare by grouping related battlefield operating systems together according to their use on the battlefield.<sup>28</sup>

General Erwin Rommel once remarked: “The battle is fought and decided by the quartermasters before the shooting begins.”<sup>29</sup> What Rommel meant was that the logistic preparation of the theater (LPT) accomplished during mission analysis and throughout the

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<sup>26</sup> Department of the Army, *ST 3-0: Operations*, Fort Leavenworth, Kansas: U.S. Army Command and General Staff College, October 2000: 5-6.

<sup>27</sup> Department of the Army, *FM 100-5: Operation*, Washington, DC: U.S. Government Printing Office, June 1993: 6-14, 6-15.

<sup>28</sup> Department of the Army, *ST 3-0: Operations*, Fort Leavenworth, Kansas: U.S. Army Command and General Staff College, October 2000: 5-15.

<sup>29</sup> Martin Creveld, *Supplying War: Logistics from Wallenstein to Patton*, London: Cambridge University Press, 1985: 200.

planning process determines military success or failure. The doctrinal tool that guides the logistic planners development of a theater logistics system are the factors of METT-TC. The operational planning tools discussed in *ST 3-0* are not specifically tailored to the operational logistician as aids in developing a theater logistics system during the planning process. However, by revising the components of METT-TC, an operational logistics system can be developed. The doctrinal reference for the joint operational logistics system can be found in *Joint Publication (JP) 4-0*.

The theater logistics system consists of lines of communication; theater transportation network; CSS units, host nation, allied, and coalition forces; and contingency contracting. The LOCs consist of all the routes (land, water, and air) that connect an operating military force to the theater base of operations and along which supplies and military forces move. The transportation network is defined as the ports, bases, airports, rail heads, pipeline terminals, and trailer transfer points that serve as the reception and transshipment points for the LOCs. The CSS units are specified units responsible for operating the seaports, bases, and airports. Host nation, allied, and coalition support is the desired civil and military assistance from allies that included RSOI and the sustainment of deploying US forces. Contingency contracting is support of a contingency in an overseas location in the areas of facilities, supplies, services, maintenance, transportation, and quality of life support.<sup>30</sup>

*JP 4-0*'s discussion of the theater transportation network is similar to *FM 100-10-1: Theater Distribution* discussion of the theater distribution hub. The theater distribution hub is the point where the seaports, airfields, and ground/rail LOCs converge. The term distribution hub is more definitive and will be used in place of the term theater transportation network.

## **Mission**

*“Commanders determine the mission through analysis of the tasks assigned. The results of that analysis yield the essential tasks that, together with the purpose of the operation, clearly indicate the action required.”*<sup>31</sup>

From the logistics perspective, the purpose of the mission component of operational METT-TC is to determine the mission tasks, the Army theater logistic provider, and the method of entry into the theater.

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<sup>30</sup> Chairman of the Joint Chiefs of Staff, *Joint Publication 4-0: Doctrine for Logistics Support of Joint Operations*, Washington, DC: U.S. Government Printing Office, January 1995: IV-2.

<sup>31</sup> Department of the Army, *ST 3-0: Operations*, Fort Leavenworth, Kansas: U.S. Army Command and General Staff College, October 2000: 5-4.

Determining mission tasks at the operational level is challenging. *FM 101-5-1: Operational Terms and Graphics* provides a list of doctrinal mission tasks from which to choose. However, there are two problems with the task list presented in *FM 101-5-1*. First, the mission tasks only address the results or effects the commander wants to achieve in regards to the enemy, terrain, and friendly forces at the tactical level of war.<sup>32</sup>

Ambush	Attack by fire	Block	Breach	Bypass
Canalize	Clear	Contain	Counterattack	Cover
Defeat	Delay	Destroy	Disrupt	Fix
Follow & Assume	Follow & Support	Guard	Interdict	Isolate
Neutralize	Occupy	Penetrate	Protect	
Relief in Place	Retirement	Reduce	Retain	Screen
Secure	Security	Seize	Support by fire	
Suppress	Withdraw			

The same intellectual effort has not been developed to address the results or effects the commander wants to achieve at the operational level of war. Second, the mission tasks are focused only on the combat arms. The contributions of combat support and combat service support units are not addressed in terms of the results or effects the commander wants to achieve throughout the levels of war. Exclusively focusing on the combat arms inhibits a systems approach to land warfare. Nevertheless, a set of logistics mission tasks could be developed that addresses the results or effects the commander wants to achieve in regards to the terrain and friendly forces at the operational level of war, and is also based on the understanding of the national military strategy, on operational experience, and on Army doctrine.

The US national military strategy is based on the concepts of forward presence and power projection, which facilitate the accomplishment of national military objectives.<sup>33</sup> Power projection is the ability to achieve national security objectives through the employment of the elements of national power: diplomatic, informational, military, and economic. The military

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<sup>32</sup> Department of the Army, *FM 101-5-1: Operational Terms and Graphics*, Washington, DC: U.S. Government Printing Office, September 1997: 1-1 to 1-163.

<sup>33</sup> Chairman of the Joint Chiefs of Staff, *National Military Strategy*, Washington, DC: U.S. Government Printing Office, August 1999: 4.

element of power projection is force projection. Force projection encompasses a range of processes: mobilization, deployment, employment, sustainment, and redeployment.<sup>34</sup> These processes occur in a continuous, overlapping, and repeated sequence throughout military operations. In a broad sense, the force projection processes constitute military strategic-level logistics tasks. However, the supporting military operational level logistics tasks are not specified.

Defining the supporting military operational level logistics tasks requires a review of several Army doctrinal sources: *FM 100-7*, *FM 100-10*, and *FM 100-16*. The field manuals state that the primary focus of the operational logistician is on reception, positioning of facilities, material management, movement control, terrain management, distribution management, reconstitution and regeneration, and redeployment. The problem is that the emphasis of each manual is directed towards identifying operational logistics functions versus operational logistics tasks.

Identifying logistics functions does not meet the criteria of addressing the results or effects the commander wants to achieve in regards to the terrain and friendly forces. The doctrine writers seemed to acknowledge the problem, because the discussion of the LPT in *FM 100-7* and *FM 100-10* is more in terms of effects the operational commander wants to achieve in regards to the terrain. “These (LPT) include identifying and preparing forward operating bases; selecting and improving LOCs; projecting and preparing forward logistics bases; and forecasting and building operational stock assets forward and afloat.”<sup>35</sup>

The Army field manual that meets the criteria of addressing the results or effects the commander wants to achieve in regards to the terrain and friendly forces is *FM 100-17-3: Reception, Staging, Onward Movement, and Integration*. *FM 100-17-3* states, “All large-scale

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<sup>34</sup> Department of the Army, *FM 100-17: Mobilization, Deployment, Redeployment, Demobilization*, Washington, DC: U.S. Government Printing Office, October 1992: 1-4 to 1-5.

<sup>35</sup> Department of the Army, *FM 100-10: Combat Service Support*, Washington, DC: U.S. Government Printing Office, October 1995: 2-4.

deployments consist of three distinct and interrelated deployment segments: fort-to-port, port-to-port, and port-to-foxhole.”<sup>36</sup> The fort-to-port piece takes place in the continental United States. The port-to-port part reflects the interface between the strategic and operational levels of war, and the port-to-foxhole segment occurs in the theater of operation. The process of moving combat power from the port to the foxhole is called “reception, staging, onward movement, and integration,” or RSOI. *FM 100-17-3*, states that the functions of RSOI apply to all three levels of military operations: strategic, operational, and tactical.

“Reception is often the interface between the strategic and the operational levels. Staging and onward movement are normally within the operational level. Integration represents the interface between the operational and tactical levels of war.”<sup>37</sup> Sustainment and redeployment of forces occurs at all three levels of military operations.

The requirement to receive, stage, onward move, integrate, sustain, and redeploy Army forces implies logical lines of operations, because these activities connect Army forces from the base(s) of operations to the objective(s). Doctrine states that lines of operation translate into the essential tasks that Army forces must complete to achieve the desired end state. Therefore, the standardization of reception, staging, onward movement, integration, sustain, and redeployment into operational mission tasks is required. The physical manifestation of the operational mission tasks is the requirement to establish reception bases, staging bases, onward movement bases, integration bases, and sustainment bases which, in conjunction with supporting LOCs, form part of the theater logistics system. The concept of bases and LOCs is supported by James Brabham, he states that operational logistics consists of a triad: critical ports, air facilities, and lines of communication.<sup>38</sup> The concept is consistent with the strategic logistics functions performed by

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<sup>36</sup> Department of the Army, *FM 100-17-3: Reception, Staging, Onward Movement, and Integration*. Washington, DC: U.S. Government Printing Office, March 1999: 1-7.

<sup>37</sup> Department of the Army, *FM 100-17-3: Reception, Staging, Onward Movement, and Integration*. Washington, DC: U.S. Government Printing Office, March 1999: 1-10.

<sup>38</sup> James A. Brabham, “Operational Logistics: Defining the Art of the Possible,” *Marine Corps Gazette*, volume 78, issue 4 (April 1994): 27.

the US Transportation Command: Maritime Sea Command (Sea), Air Mobility Command (Air), Military Traffic Management Center (ground/rail LOCs). Understanding the link between operational mission tasks, theater bases, and theater LOCs can provide the framework for operational logistics commanders and their staffs to better visualize the campaign or major operation.

In full spectrum operations, US Army forces are either subordinate to or designated as the Joint Force Command (JFC) often within a multinational and interagency environment. Determining the appropriate Army theater logistics provider is essential for mission success because the provider may be delegated authority to coordinate and execute Army operational-level Title 10 and lead-service common user logistics support responsibilities.<sup>39</sup> A central issue is determining the size of the Theater Support Command (TSC) structure needed to conduct operational CSS in the theater of operations. At the macro-level this can be determined by deciding whether the mission is a small-scale or large-scale contingency. In small-scale contingencies, a TSC early entry module (EEM) can augment a Corps Support Command (CSC) or a Division Support Command (DSC). The purpose of the TSC is three-fold. First, the TSC provides a single point of contact between the strategic and tactical CSS providers. Second, the TSC can provide a theater force-opening package to conduct the RSOI and initial sustainment of combat power in theater. Third, in the event that the crisis evolves into a large-scale contingency, the TSC can form the nucleus for an operational CSS structure. In large-scale contingencies, a TSC can perform the duties as the operational-level logistics provider, thereby relieving the tactical CSS unit of this responsibility.

In force projection operations, determining the method of entry and the level of assistance from the host nation has significant impact on the Army theater logistic provider, on the concept of support, and on the logistics battlefield organization. Opposed entry operations require the up

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<sup>39</sup> Items suitable for common supply transport are food, water, fuel, and ammunition.

front deployment of significant land combat forces to secure the lodgment and expand the area of operations available for RSOI. Opposed entry operations may also require the seizing of the ports of debarkation. In this environment, the initial entry CSC may function as the operational logistics provider, which means that the Corps will have to conduct RSOI operations. Critical to operational success is the deployment of a TSC EEM for the rapid transfer of responsibility for the RSOI of combat forces to the theater.

Opposed entry operations are also characterized by the air and sea terminals of debarkation becoming centralized bases for RSOI activities. The distinction between ports and terminal is made because much more than a seaport and airport is required to conduct theater RSOI operations.<sup>40</sup> In this situation the communications zone (COMMZ) may not exist in the theater of operations until the depth of the combat zone expands, the enemy forces are destroyed, the effects of the enemy's long-range indirect fire weapon systems are minimized, and a credible land-based theater air defense system is established.<sup>41</sup> Once these conditions are met, the location of the staging bases, onward movement bases, and integration bases can be expanded.

In unopposed entry, combat forces may still be required to secure the lodgment and expand the area of operations depending upon whether the entry is assisted or unassisted. In assisted entry operations, the host nation provides port assistance and security. Unassisted entry operation the host nation does not. However, the operational logistics provider has more time to deploy and develop the reception bases, staging bases, onward movement bases, and integration bases. If the mission is a unilateral US operation requiring a single US corps then the CSC can perform the dual role as the Army operational and tactical logistic provider with augmentation from a TSC EEM. If the mission requires multiple US corps, joint land forces, or coalition land force, then a TSC is the appropriate choice as the operational logistics provider.

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<sup>40</sup> Department of the Army, *FM 100-17-3: Reception, Staging, Onward Movement, and Integration*, Washington, DC: US Government Printing Office, March 1999: 3-1 to 3-12.

<sup>41</sup> Communications Zone (COMMZ) is a physical location(s) in the theater of war or theater of operations that contains airports, seaports, beach landing sites, and supporting lines of operation, for the reception,

## Enemy

*“The analysis of the enemy includes current information about his strength, location, activity, and capabilities.”<sup>42</sup>*

*FM 34-130 Intelligence Preparation of the Battlefield (IPB)* presents intelligence considerations for each BOS. The manual is intended to serve as a guide for the use of IPB by all units of all types, at all echelons, across the entire spectrum of conflict, and during the conduct of any mission. The IPB format is standardized into four components: define the battlefield environment, describe the battlefield’s effects, evaluate the threat, and determine threat COAs.<sup>43</sup> *FM 34-130* addresses friendly and enemy tactical logistics IPB concerns, but does not address operational logistics IPB concerns.

James Brabham defines operational logistics IPB as a triad consisting of critical seaports, airfields, and ground/rail LOCs.<sup>44</sup> With this methodology, the logistics planner can analyze the enemy from three perspectives. First, he can determine the enemy’s ability to influence critical seaports, airfields, and ground/rail LOCs throughout the area of responsibility. The purpose of the analysis is to determine the level of combat power required to protect the theater seaports, airfields, and ground/rail LOCs from potential enemy action and to develop contingency plans to respond to destruction or damage to the theater infrastructure.

Second, the planner can conduct a reverse BOS analysis to determine the location of the enemy’s theater logistics base(s) based on the point where the seaports, airfields, and ground/rail LOCs converge in the enemy’s area of operations. The intent is to identify potential points of vulnerability in the enemy’s operational logistics system that can be exploited. Historically, the enemy’s distribution hubs and LOCs have been the intermediate objectives of tactical ground

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staging, onward movement, and integration of military forces.

<sup>42</sup> Department of the Army, *ST 3-0: Operations*, Fort Leavenworth, Kansas: U.S. Army Command and General Staff College, October 2000: 5-4.

<sup>43</sup> Department of the Army, *FM 34-130 Intelligence Preparation of the Battlefield*, Washington, DC: U.S. Government Printing Office, July 1994: 4-19 to 4-22.

<sup>44</sup> James A. Brabham, “Operational Logistics: Defining the Art of the Possible,” *Marine Corps Gazette*, volume 78, issue 4 (April 1994): 27

combat forces.

Third, the planner can template the operational reach of opposing forces based on enemy refueling requirements and capabilities. Templating operational reach requires a reverse BOS analysis of the enemy's logistics system, which begins by estimating the enemy's fuel requirements based on the type and quantity of armored, mechanized, and wheeled combat systems he has. Once the fuel capacity of each combat system is obtained (by referencing unclassified publications such as the *Janes Fighting Series* publications), the enemy's tactical fuel storage and distribution capability can be determined.<sup>45</sup> The value of the assessment is the ability to determine the enemy's requirements for operational pauses during offensive operations. The concept presented here compliments the doctrinal one presented in *FM 34-130* for CSS units.

## **Terrain & Weather**

*"Analysis of the terrain and weather helps commanders determine observation and fields of fire, cover and concealment, obstacles, key terrain, and avenues of approach."*<sup>46</sup>

Analysis of the terrain and weather is a continuation of the operational logistics IPB and must include examination of the terrain and weather effects on seaports, airfields, and ground/rail LOCs throughout the theater of operations. The value of including the entire theater is that it facilitates seeing potential logistics bases and supporting LOCs throughout the area of operations. The analysis should produce three estimates.

The first estimate is the number, location, and distances of seaports, airfields, and ground/rail LOCs available in the theater. The assessment will determine the logistic areas of operations. The second estimate is the density and quality of the ground/rail LOCs. The assessment will determine the throughput of the "distribution pipeline" in theater. The third estimate is the throughput capacity of each seaport and airfield. The assessment will determine the sustainment flow into theater.

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<sup>45</sup> The assessment requires detailed knowledge of the opposing forces logistics structure.

<sup>46</sup> Department of the Army, *ST 3-0: Operations*, Fort Leavenworth, Kansas: U.S. Army Command and General Staff College, October 2000: 5-5.

## Troops & Support Available

*“Commanders assess the quality, training level, and psychological state of friendly forces. The analysis includes the availability of critical systems and joint support.”<sup>47</sup>*

At the operational level, troops and support available is more appropriately defined as troops and support required. Making this distinction is necessary because there are four methods of employing US military forces to a theater of operations: assigned, apportioned, allocated, and augmented. Assigned forces are those forces that have been placed under the combatant command of a unified commander by the Secretary of Defense for normal peacetime operations. Apportioned forces and resources are made available for deliberate planning. They include assigned forces, forces expected through mobilization, and forces programmed for a specific geographic region. Allocated forces and resources are those provided by the NCA for either execution planning or actual implementation. Augmentation forces are those forces to be transferred from a supporting commander to the combatant commander or to the operational control of a supported commander during the execution of an operation order upon approval by the NCA.<sup>48</sup>

Analysis conducted to determine the troops and support required for mission accomplishment is actually logistics force tailoring to project combat power and sustain military operations. The analysis is a composite of the previous work to determine the method of entry, the enemy’s ability to influence the friendly operational logistics triad, and the estimate of the throughput capacity of the seaports and airfields. Also included is the estimate of sustainment requirements which assists in building a supporting CSS force structure, in making recommendations on the theater stockage objectives, in identifying the location of the operational and tactical sustainment bases, and in making estimates of the logistics reach of the proposed operational sustainment bases.

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<sup>47</sup> Department of the Army, *ST 3-0: Operations*, Fort Leavenworth, Kansas: U.S. Army Command and General Staff College, October 2000: 5-5.

<sup>48</sup> *Ibid*: 2-9.

Determining the method of entry helps to define the type of theater force-opening package (TFOP) required to receive US forces at the ports of debarkation. The TFOP is an operational-level CSS asset that operates the ports of debarkation and provides initial life support to US forces. Determining the enemy's ability to influence the friendly operational logistics triad guides the type and quantity of required port security assets. Determining the throughput capacity of the seaports and airfields determines whether US forces have the capability to accomplish the mission in terms of available time, space, and resources. Logistics reach is defined as the distance over which CSS resources can be employed decisively.<sup>49</sup> The consolidated assessment helps define the logistical selection criteria for COA development.<sup>50</sup>

Estimating CSS requirements is accomplished through assessment of the mission essential classes of supply needed to sustain land combat forces. James Brabham defined the mission essential classes of supply in terms of the "Three Commodities": Class I which includes food and water, Class III bulk which is fuel, and Class V which is ammunition.<sup>51</sup> It is important to point out that during major offensive operations CSS units must stock and carry items necessary to maintain the tempo of the operation. To do this requires hard choices between what is needed versus what is "nice to have." Examples of nice to have items are large stocks of Class IX repair parts. During offensive operations, opportunities for major vehicle repairs are limited. Operators and mechanics perform battle damage assessment and repair, vehicles often operate at less than fully mission capable status, and non-mission capable vehicles become sources of supply. The requirement's estimate is quantified in terms of short tons (STON) and gallons. For example, Class I and Class V are defined as the number of STONS required per day. Water and Class III bulk are defined as the number of gallons required per-day.

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<sup>49</sup> Department of the Army, *ST 3-0: Operations*, Fort Leavenworth, Kansas: U.S. Army Command and General Staff College, October 2000: 5-10.

<sup>50</sup> COA selection criteria: suitable, feasible, acceptable, distinguishable, and complete.

<sup>51</sup> James A. Brabham, "Operational Logistics: Defining the Art of the Possible," *Marine Corps Gazette*, volume 78, issue 4 (April 1994): 29.

The CSS requirements estimate forms the basis for building a supporting CSS force structure. Echelon above Corps (EAC) CSS units are defined as below the line forces. With the exception of the TSC, below the line forces are normally not assigned or allocated by the NCA during the deliberate or crisis action planning process. The supported commander must request them based on the mission analysis. The basic building block for these below the line forces is company-size units. To determine capabilities over time, Array CSS units on the map.

Building a supporting CSS force structure from these below the line units is unique to each CSS functional area. There are eleven functional areas but only four are discussed here: supply, ordnance, field services, and transportation. For supply and ammunition ordnance companies, the allocation of units is based on the ability to receive, store, and issue the mission essential classes of supply. For ordnance and field service companies, the basis of allocation is the total number of units supported. For transportation companies, the allocation is based on the total requirement to haul the mission essential classes of supply. The most thorough reference source for building a multifunctional CSS force structure is found in US Army CGSC *ST 101-6: G1/G4 Battle Book*.

The recommended theater stockage objective is actually a decision regarding the days of supply (DOS) of certain commodities needed to be maintained in theater. The decision is based on strategic throughput, operational throughput, the duration of the campaign or major operation, and any estimates of the impact of destruction or damage to the theater infrastructure. The most essential decision factor is the level of risk the commander is willing to accept in terms of maintaining a small theater stockage.

The location of the theater logistics base(s) is tied to points where seaports, airfields, and ground/rail LOCs converge. The location of operational sustainment bases is influenced by time/distance, the axis of advance of US combat forces, and location of the tactical sustainment bases. Effective analysis will result in the minimal intra-theater stockpiling of the mission essential classes of supply.

In many cases, US Army logistics resources will be constrained which will result in sustainment shortfalls. Finding solutions to logistics constraints is the art of logistics planning. It begins by knowing the reach of the logistics bases, and by using the concept of the logistics reserve, mentioned but not fully developed in *JP 4-0*.<sup>52</sup> Logistics reserve refers to the process of procuring resources not provided by the strategic logistics sustainment base. What this really means is “out sourcing” logistics support by securing host nation support, contracting support, coalition support, and/or regional support to extend the operational reach of CSS units. The focus of out sourcing should be to support resourcing the mission essential classes of supply.

The logistics reach of the tactical and operational sustainment bases is determined by visualizing the placement of logistics bases throughout the communications zone and the combat zone, terms defined later. At this point, it is important to delineate the difference between permanent and temporary sustainment bases. Theater-level bases are generally permanent and consist of reception bases, staging bases, onward movement bases, and integration bases. Integration bases are locations where combat power is assembled within the theater before being employed. Temporary bases included tactical and operational sustainment bases, locations from where the employment of combat power is sustained throughout the campaign or major operation. Tactical and operational sustainment bases move in response to combat situations.

From a macro sense, envisioning the emplacement of tactical and operational sustainment bases really means understanding the dimensions of the tactical and operational areas used by divisions, corps, and armies. From a logistics perspective, it is the conceptual emplacement of the Division Support Commands (DSC), the Corps Support Command (CSC), and the Theater Support Groups (TSG).<sup>53</sup> Just as maneuver planners array forces two levels below their own (i.e. division planners track battalion maneuver elements), so should the logistician (i.e. the TSG

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<sup>52</sup> Chairman of the Joint Chiefs of Staff, *Joint Publication 4-0: Doctrine for Logistics Support of Joint Operations*, Washington, DC: U.S. Government Printing Office, January 1995: II-8, II-9.

<sup>53</sup> The term Theater Support Groups (TSG) is a non-doctrinal term, but refers to the Echelon Above Corps (EAC) Support Group which is a subordinate unit of the Theater Support Command.

planner tracks DSCs in the theater). In brief, the mission of the CSC and its subordinate CSGs is to provide logistics and medical support to the corps, and the mission of the DSC is to provide logistics and health service support to the division.

*ST 101-6: G1/G4 Battle Book* is the only manual that provides a detailed illustration of a linear theater of operations which includes the combat zone, the communications zone (COMMZ), and the zone of interior (see Appendix 1). The combat zone consists of the division and corps areas. The division area of operations is defined as 60 to 75 kilometers (km) in depth from the forward edge of the battle area. The corps area of operations is defined as 140 to 180 km in depth.<sup>54</sup> Therefore, the depth of the combat zone is defined as 200 to 255 km. The COMMZ consists of the entire theater area, the dimensions of which are situational dependent.

It is important to understand from a logistics perspective how the dimensions of the combat zone were derived. The division area of operations incorporates several tactical sustainment bases: the (maneuver) battalion support area (10 km depth), the brigade support area (15 to 20 km depth), and the division support area (35 to 45 km depth). In a linear battlefield, these tactical areas are contiguous.

The local haul distances of the organic CSS units in the DSC define the depth of the division. Motor transportation classifies resupply operations as local haul and line-haul operations. Local haul is defined by the ability to complete four round trips in a ten-hour operating shift. The planning distance for local haul operations is 35 to 45 km. Line-haul is defined by the ability to complete two round trips in a twenty-hour operating day. The planning distance for line-haul operations is 140 to 144 km.<sup>55</sup>

The corps area of operations also consists of several tactical sustainment bases. Assigned to the CSC are Forward CSGs and a Rear CSG. The Forward CSGs (70 to 90 km in depth)

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<sup>54</sup> Department of the Army, *Student Text 101-6: G1/G4 Battle Book*, Fort Leavenworth, Kansas: U.S. Army Command and General Staff College, July 2000: Appendix G.

<sup>55</sup> Department of the Army, *FM 55-10: Movement Control in a Theater of Operations*, Washington, DC: U.S. Government Printing Office, December 1992: 6-3.

operates behind the division rear boundary. The Rear CSG (70 to 90 km in depth) is centrally located behind the Forward CSGs. In a linear battlefield, the areas are contiguous and create a corps depth of 140 to 180 km. Essentially, the line-haul distances of the organic CSS units in the CSC define the depth of the corps. In total, the tactical depth of the combat zone is 200 to 255 km.

Although, the tactical width of the combat zone is not defined in *ST 101-6*, an approximation can be made by cross-referencing several Army field manuals. *FM 34-130* states that the typical defensive frontage of a US Battalion Task Force (BN TF) is 4 km standard and 8 km extended.<sup>56</sup> With the defensive frontages in mind, it can be assumed in most cases that a Brigade Combat Team (BCT) commander will attack with two BN TF's abreast and one BN TF following in trail. It can further be assumed that the BCT commander will extend the BN TF's formation in the attack and that the expansion will be twice the distance of a BN TF in the defense. Therefore, the tactical width of a BCT is approximated as 15 to 20 km.

Using the same philosophy for a division attacking with two BCTs abreast and one in trail, the tactical width of the division is approximately 30 to 35 km. Extending the concept to a corps consisting of four divisions attacking with three divisions abreast and one division in trail, the tactical width of the corps can be approximated as 90 to 120 km. This estimate represents approximately one half of the depth and is logical from the viewpoint that at the point of attack the corps commander wants his center of mass dispersed in depth to increase tactical flexibility.

In essence, logistics reach within the combat zone has a somewhat fixed planning dimension (250+/- km by 120 +/- km), while the logistics reach requirement within the COMMZ is an unknown variable. The unknown quantity can be defined by using the planning factors of R (rate), T (time), and D (distance) to line-haul the mission essential classes of supply.<sup>57</sup> Rate is the

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<sup>56</sup> Department of the Army, *FM 34-130: Intelligence Preparation of the Battlefield*, Washington, DC: U.S. Government Printing Office, July 1994: B-34.

<sup>57</sup> Department of the Army, *FM 55-10: Movement Control in a Theater of Operations*, Washington, DC: U.S. Government Printing Office, December 1992: 7-8 to 7-9.

average speed the convoys must maintain while traveling from the point of origin to the point of destination. The planning rate for poor roads is 16 km per hour (kph). The planning rate for good roads is 32 kph.

The time factor includes duration of travel as well as delays for loading/unloading from the point of origin to the point of destination. Transportation assets are classified into three types: straight, container, and semi-trailers. Straight trucks and semi-trailers require 2.5 hours' loading/unloading time per round trip. Container transporters require 1.5 hours' loading/unloading time per round trip. Truck tractors in semi-trailer relay operations (tanker transport point operations) require 1 hour per relay.

Distance is defined as the road distance between logistics bases. At the theater/operational level, the TSGs are usually positioned within line-haul distance of the rear CSGs. As stated previously, the planning distance for line haul operations are 140 to 144 km.

To prevent logistical culmination, the distance between the TSG and the rear CSG must not exceed the defined line-haul distance. In a linear battlefield, the dimensions the TSG must cover can be estimated as the total depth and width of Army forces along the axis of advance from the ports of debarkation to the final objectives minus the depth and width of the Corps sectors. Given the operating dimensions, summarized in Appendix 1, it is apparent that the operational logistics provider determines the logistics responsiveness of the theater.

### **Time Available**

*“Commanders assess the time available for planning, preparing, and executing the mission.”<sup>58</sup>*

Time available is an analysis of the time, space, and resources required to mobilize, deploy, employ, sustain, and redeploy US forces. *ST 3-0* asserts, “These processes occur in a

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<sup>58</sup> Department of the Army, *ST 3-0: Operations*, Fort Leavenworth, Kansas: U.S. Army Command and General Staff College, October 2000: 5-5.

continuous, overlapping, and repeated sequence throughout an operation.”<sup>59</sup> The challenge of logistics planners is to synchronize the deployment of US forces to ensure the combatant commander has the right resources in the right place at the right time, with the intent to conduct decisive operations so rapidly that the enemy is defeated before he can effectively confront US forces.

The methodology for effective time, space, and resource analysis is to estimate the time required to RSOI forces, to build the theater stockage objectives, and to sustain combat operations. The primary tool to assist the planner in the RSOI of forces is the Time-Phased Force and Deployment List (TPFDL) which is contained in the Joint Operations Planning and Execution System (JOPES) data base portion of the operation plan/order. The TPFDL identifies types and/or actual units and materiel required to support the operation plan/order.

Although the TPFDL is not completed until the deployment plan or course of action is developed, it will determine what is logistically feasible. Therefore, to assist COA development the logistics planner must breakdown the proposed force into manageable deployment packages. The type and quantity of air and sealift allocated by the TRANSCOM and the throughput capacity of the ports of debarkation will determine the actual size of the deployment packages. For planning purposes, the logistician must develop deployment packages sized to the brigade combat team. Each deployment package must then be designated a task and purpose. For example, Package Alpha-TFOP and Port Security, Package Bravo-Sustainment Operations, Package Charlie-Shaping Operations, and Package Delta-Decisive Operations. Listing the essential task(s) will allow the planner to identify capabilities established in the theater of operations over time. The planner then conducts a Joint Feasibility Assessment System for Transportation (JFAST) computer simulation run of the proposed deployment packages to obtain

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<sup>59</sup> Department of the Army. *ST 3-0: Operations*. Fort Leavenworth, Kansas: U.S. Army Command and General Staff College, October 2000: 3-13.

an estimate of what is feasible. JFAST is a deployment-planning tool that can determine the deployment feasibility of COAs before submission to TRANSCOM.

### **Civil Considerations**

*“Commanders consider the natural environment, to include cultural sites, in all operations directly or indirectly affecting civilian populations. Commanders include civilian political, economic, and information matters as well as more immediate civilian activities and attitudes.”<sup>60</sup>*

The operational logistics planner must analyze civil considerations from four perspectives. First, the planner must determine the attitude of the local population toward US intervention: positive, negative, or neutral. Second, the extent of foreign humanitarian support needs must be defined and compared to the amount of humanitarian resources already in country. Third, the planner must assess what resources the host country, region, and contractors can provide in the form of labor, equipment, material, and facilities, with particular focus on the mission essential classes of supply. Finally, the planner must estimate external logistics support the host nation or military coalition forces may require to continue combat operations.

US military forces may be called upon to come to the aid of a host country that has been invaded by an enemy force where the host nation’s military has been committed to battle and suffered some losses. In this situation, an assessment must be made as to the level of US responsibility for the reconstitution or regeneration of the host nation’s military forces.

The factors of METT-TC provide a useful framework to develop the theater logistics system discussed in *JP 4-0*. It is important to point out that *JP 4-0*’s discussion of the theater logistics system is similar to *FM 100-10-1*’s discussion of the theater distribution system with one critical difference: *FM 100-10-1* de-emphasizes the importance of theater stockpiles. “The velocity of a distribution system reduces the reliance on large stockpiles of resources within an

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<sup>60</sup> Department of the Army, *ST 3-0: Operations*, Fort Leavenworth, Kansas: U.S. Army Command and General Staff College, October 2000: 5-5.

AO.”<sup>61</sup> The problem with this line of reasoning is that it does not address the pursuit phase of offensive campaigns or major operations. “One of the weaknesses of logistics has been a failure of transportation for the support of the exploitation and pursuit phases of an action.”<sup>62</sup>

Successful pursuits require the immediate resupply of fuel and ammunition to tactical combat units. Fuel and ammunition do not lend themselves to just-in-time delivery from the strategic sustainment base to the theater sustainment and then finally to the tactical units without associated cost, a logistics pause. Although pursuits cannot be forecasted, they have to be planned and resourced which means the intra-theater stockpiling of fuel, ammunition, and the associated transportation assets to move it responsively. The benefit is maintaining the initiative and tempo of offensive campaigns and major operations must be weighed against the cost of building and maintaining stockpiles.

Central to developing the theater logistics system is maintaining focus on the distribution hubs and LOCs throughout the METT-TC process. Maintaining this focus allows the operational logistics planners to identify critical actions that CSS must accomplish to support the operational commander’s intent, and the tactical commanders concept of operations.

Having defined the operational METT-TC process (summarized in Appendix 2), the ground war theater logistic system for Operation Desert Storm can now be evaluated.

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<sup>61</sup> Department of the Army, *FM 100-10-1: Theater Distribution*, Washington, DC: U.S. Government Printing Office, October 1999: 3-11.

<sup>62</sup> James A. Huston, *The Sinews of War: Army Logistics 1775-1953*, U.S. Government Printing Office, 1967: 672.

## CHAPTER THREE

### III. OPERATION DESERT STORM CASE STUDY

#### **Concept of Support**

In Operation Desert Storm, the command responsible for US Army theater logistics was the 22<sup>nd</sup> Support Command (SUPCOM). Logistics culmination and pause did not occur in the operation because the ground war ended in four days (100 hours). Had the ground offensive continued beyond the fourth day, it is not clear whether the operational logistics system could have sustained 3<sup>rd</sup> Army's ground campaign without an operational pause. The purpose of the case study is to evaluate the responsiveness of the theater logistic system that sustained the four-day ground campaign. As stated in chapter one, responsiveness is defined as developing a logistical system that supports the mission, composition, and concept of operations of the military forces by anticipating unforeseen operational requirements. Understanding the Operation Desert Storm theater logistics system requires a review of the concept of support for the ground war, which is summarized in Appendix 3.

The 22<sup>nd</sup> SUPCOM developed a five-phase concept of support: reception of combat forces and the defense of Saudi Arabia, preparation of the ground offensive, the ground offensive into Iraq and Kuwait, security of Kuwait and consolidation of US forces, and the redeployment of US combat forces. Not mentioned in the unclassified documents of Operation Desert Storm is the responsibility of the 22<sup>nd</sup> SUPCOM for the RSOI, sustainment, and redeployment of coalition forces.

To support the reception of combat forces and the defense of Saudi Arabia, the 22<sup>nd</sup> SUPCOM established the theater reception base near the cities of Dhahran and Damman, and the first operational sustainment base, Logbase Bastogne, near the city of An Nu Ayriyah. Logbase Bastogne was also the location of the SUPCOM forward command post. The main command

post was located near the ARCENT and CENTCOM headquarters in Riyadh. To support preparations for the ground offensive, the 22<sup>nd</sup> SUPCOM established convoy support centers along the main supply routes (MSR) to provide basic life support and sustainment.<sup>63</sup> In addition, a second series of sustainment bases were emplaced including the theater ammunition storage site located between Riyadh and King Kalid Military City (KKMC), called Logbase Delta, and a general sustainment base at KKMC, designated Logbase Bravo.

To support the ground offensive into Iraq and Kuwait, the 22<sup>nd</sup> SUPCOM established a third set of operational sustainment bases and developed contingency plans to establish a fourth set. Before commencement of the ground war, operational sustainment bases were established in XVIII Corps (Logbase Charlie) and VII Corps (Logbase Echo) tactical assembly areas (TAA). Once the war began, the corps TAA's became the primary theater sustainment bases for the ground war. Logistical resupply was line-hauled from the TAAs to the rear CSGs. The rear CSGs line-hauled to the forward CSGs. The forward CSGs line-hauled directly to the DSAs or FSBs. The line-haul operation would continue until the rear boundary of the combat zone (the rear CSG) exceeded the line-haul distance (the logistical reach) of the theater transportation assets. General Pagonis, Commander, 22<sup>nd</sup> SUPCOM, defined this distance as "90 miles" or 144 km. At this point, contingency plans were developed to establish forward operational sustainment bases, Logbases Oscar and November, and the process would resume.<sup>64</sup>

The operational logistics METT-TC process developed in chapter two will now be used to evaluate the theater logistical system.

## **Case Study**

### **Mission**

In determining the operational mission tasks, General Pagonis and his planners worked

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<sup>63</sup> Convoy Support Centers contained: food, water, latrines, shelter, fuel, maintenance, vehicle recovery, medical, communications, and entertainment support.

<sup>64</sup> Because the ground war ended so quickly, the contingency plan was not executed.

under one guiding principle from General Yeosock, Commander, ARCENT: sustain the ground offensive without any operational pauses.<sup>65</sup> Yeosock's reason for the instruction was, "The campaign plan strived to force the enemy beyond his culminating point first."<sup>66</sup> To do this, Yeosock envisioned ARCENT forces first enveloping and then destroying the Republican Guard near Basrah before it escaped across the Euphrates River. To sustain the operational plan, General Pagonis focused his planners by making three critical assumptions: the coalition forces would win the ground war, the front line trace would shift rapidly, and the SUPCOM would have to develop a flexible logistics system.

Assuming a successful ground war allowed the planners to focus their time and limited resources on sustaining operational success versus developing contingency plans for potential stalemate or failure. Assuming a rapidly shifting front line trace provided the planners with a mental model of the tempo of the battles and engagements. The benefit of this mental model was that it created the concept of developing mobile stocks of mission essential classes of supply. Assuming a flexible theater logistics system would be required meant that the logistics plan had to be simple: port-to-logbase, logbase-to-forward.<sup>67</sup>

## Enemy

The logistics planners determined that, before the ground war, the enemy's ability to influence Saudi Arabia's seaports, airfields, and ground/rail LOCs was limited to Scud missile attacks. Once the ground war started, the planners estimated that Iraq could influence key logistical locations through terrorist attacks in the coalition rear areas and through increased Scud attacks. To defend logistics resources, the planners tasked a Patriot air defense battalion to defend the seaports and airfields, acquired a Military Police brigade to secure the ground/rail LOCs, and inserted special operations teams deep behind Iraqi lines to detect and destroy Scud

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<sup>65</sup> Richard M. Swain, "*Lucky War*": *Third Army in Desert Storm*, Fort Leavenworth, Kansas: U.S. Army Command and General Staff College, 1994: 122.

<sup>66</sup> Robert H. Scales, *Certain Victory: The US Army in the Gulf War*, Fort Leavenworth, KS: US Army Command and General Staff College, 1994: 314.

<sup>67</sup> William G. Pagonis and Jeffery L Cruikshank, *Moving Mountains: Lessons in Leadership and Logistics*

launch sites.

The planners also conducted a reverse BOS analysis of the Iraqi operational logistics triad to determine the location of their theater logistics base(s). CENTCOM's area of operations included Saudi Arabia, Kuwait, and Iraq south of the Euphrates River. Within the area of operations, Iraq had one major international airport and one primary commercial port at Basrah and three fighter bases at As Salman, Tallil, and Jalibah. By June 1990, Iraq had completed the six-lane international ground LOC (highway 8) that linked Safwan on the Kuwait border with the Syrian and Turkish borders. A rail LOC ran parallel to highway 8 from Safwan to Turkey. In addition, there was an east/west road in the southern part of the country starting at the Kuwaiti border connecting the Iraqi towns of Al Busayyah and As Salman, see Appendix 4.<sup>68</sup>

Based on this information, the planners determined that the Iraqi theater logistics base would be located along highway 8 and the rail LOC, and close to an airfield. Their analysis identified the town of Juwarin as being the likely location of the Iraqi theater logistics base.<sup>69</sup> The town of Juwarin is located on the north side of highway 8 and the rail LOC, between the Jalibah airfield and Basrah City. The analysis resulted in the Iraqi theater logistic base, the Basrah International airport, and the three fighter bases (As Salman, Tallil, and Jalibah) becoming intermediate objectives for XVIII Airborne Corps and VII Corps.

In templating the Iraqi Army's operational reach, planners determined that the enemy had two options: to conduct a deep attack against the coastal cities of Al Jubaly or Dhahran or in the interior of the country towards Riyadh, or to conduct a limited attack on a local objective such as the town of Hafar al-Batin or KKMC. An Iraqi deep attack into Saudi Arabia would have required an advance in excess of 300 kms, twice the distance covered in conquering Kuwait. A limited attack into Saudi Arabia to the town of Hafar al-Batin or KKMC would have required an

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*from the Gulf War*, Massachusetts: Harvard Business School Press, 1995: 149.

<sup>68</sup> Jane's, *Jane's Sentinel Security Assessment: The Gulf States*, Virginia: Jane's Information Group Inc, 2000: 3.6.1 to 3.6.8.

<sup>69</sup> Swain, Richard M, "*Lucky War*": *Third Army in Desert Storm*, Fort Leavenworth, Kansas: U.S. Army Command and General Staff College, 1994: 232.

advance of less than 100 km. Although the second option was much more likely, neither option was feasible. The Iraqi military's deepest operation to date had been the Kuwaiti invasion, and national intelligence sources indicated that the Iraqi logistical system was feeling the strain of arming, fueling, and maintaining a mobile force consisting of T55, T62, and T72 main battle tanks. Therefore, as early as August 1990 the Iraqi Army chose a third option, to establish an operational defense in depth to repel a potential coalition ground attack.<sup>70</sup>

## Terrain & Weather

The theater of operations was 815 by 640 kms, approximately one fourth the size of the continental United States encompassing Saudi Arabia, Kuwait, and Iraq south of the Euphrates River. By the third phase of the operation, there were two challenges facing logistics planners: the extreme distances between the seaports and airfield in Saudi Arabia, and the operational depth of the Iraqi defense in Iraq and Kuwait. The central issue, which is summarized in Appendix 4, was the throughput of critical classes of supply from the port to the combat units.

Saudi Arabia had excellent north/south and east/west ground LOCs on the exterior of the country but no major LOCs in the interior. The ground distances from the seaport and airports on the southeast coastline to the corps TAA was in excess of 500 km along the northern route and 900 km along the southern route. The northern route was called Tap Line Road and was the most direct route to the front. The logistics planners prioritized this route for the movement of combat forces. Tap Line Road could handle 5,780 vehicles per day. The southern route was called MSR Dodge and was prioritized for the movement of logistics. MSR Dodge could handle 19,720 vehicles per day.

Occupied by Iraq, Kuwait City consisted of one major airport of debarkation (APOD), Kuwait International, and one major seaport of debarkation (SPOD), the port of Shuwaikh. The APOD was capable of receiving US Air Force C5 transports and the SPOD was capable of

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<sup>70</sup> Robert H. Scales, *Certain Victory: The US Army in the Gulf War*, Fort Leavenworth, KS: US Army Command and General Staff College, 1994: 66.

receiving deepwater resupply ships. In addition, the SPOD included nine front loaders, mobile and fixed cranes, forklifts, and trailers. The APOD and SPOD were supported by extensive ground LOCs heading north, south, and west. From Kuwait City, there was a major ground LOC that ran north into Iraq and south into Saudi Arabia along the Gulf Coast.<sup>71</sup>

In addition to the challenges of sustaining US forces in Saudi Arabia, the planners were faced with the fact that the distance from the corps TAAs to the Euphrates River was in excess of 355 km, and from the TAAs to the Iraq/Kuwait coastline was 365 kms. During decisive operations, the extreme distances would require the SUPCOM to establish a forward logistics base 100 to 160 km inside enemy territory.

### Troops & Support Available

To minimize the impact of extended LOCs during phase three, the ground offensive, the planners made several innovations. First, the planners limited the logistical requirements for Army forces to food, water, fuel, and ammunition. Of the commodities, the requirement for fuel and ammunition were deemed critical. At the tactical level, repair parts resupply was achieved through cannibalization of non-mission capable weapon systems. Medical resupply was conducted through the casualty evacuation process. Weapon system replacement operations and theater reconstitution was postponed until phase four, the security of Kuwait and consolidation of forces. The primary reason for the narrow supply focus was to gain and maintain the initiative.

The planners determined that the daily requirements for fuel and ammunition for VII Corps was 2.4 million gallons (480 truckloads) and 9,000 STON (450 truckloads). For XVIII Airborne Corps, the daily requirement was set at 2.1 million gallons (400 truckloads) and 5,000 STONs (400 truckloads). Therefore, the total daily requirement for fuel and ammunition was 4.5 million gallons (880 truckloads) and 14, 000 STONs (850 truck loads) respectively. The significance of including the corresponding truckloads is that it set the groundwork for creating mobile distribution system.

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<sup>71</sup> Jane's, *Jane's Sentinel Security Assessment: The Gulf States*, Virginia: Jane's Information Inc, 2000:4.6.1 to 4.6.8.

The planners then determined the theater stockage objectives for the mission essential classes of supply. Of the mission essential commodities, the requirement for ammunition was the only commodity requiring strategic throughput to the theater. The Saudi Arabian government was providing bulk fuel and bottled water resupply. Army Reverse Osmosis Water Purification Unit (ROWPU) barges in the Gulf were purifying bulk water. By December 1990, there were more than enough meals-ready-to-eat (MRE) in theater.

By January 1, 1991, ammunition resupply was arriving by sea LOC every fifteen days and delivering approximately 42,000 STONs, which was three days of supply. Based on these factors, the planners determined the required theater stockage objective in terms of days of supply (DOS): thirty DOS of food, four DOS of water, thirty DOS of fuel, and forty-five DOS of ammunition. The theater stockage was positioned forward in the Saudi area of operations: Logbase Delta contained fifteen DOS of ammunition; Logbase Bravo contained fifteen DOS of food, fuel, and ammunition, and 1 DOS of water; and Logbases Alpha, Charlie, and Echo each contained five DOS of food, fuel, and ammunition, and one DOS of water.

With the throughput requirements and the infrastructure defined, the planners then created a mobile logistics force from resources available in country. The 22<sup>nd</sup> SUPCOM consisted of four ASGs, two transportation groups, one quartermaster group, and one ordnance group. The 22<sup>nd</sup> SUPCOM positioned one ASG at KKMC in direct support of the CSCs. Two ASGs were located near Dhahran to operate the theater logistics base, and one ASG was left in reserve at Riyadh operating convoy support centers along MSR Dodge. During Phase Four the reserve ASG would provide foreign humanitarian support to Kuwait City. The 7<sup>th</sup> Transportation Group was used to line-haul supplies from the XVIII Airborne Corps' TAA in Saudi Arabia to the 1<sup>st</sup> CSC's tactical sustainment base in Iraq, while the 32<sup>nd</sup> Transportation Group was used to line-haul supplies from the VII Armored Corps' TAA in Saudi Arabia to the 13<sup>th</sup> CSC's tactical sustainment base in Iraq. The quartermaster group was assigned to operate Class III points at the

theater logistics bases and the operational sustainment bases. The ordnance group was used to operate the theater ammunition storage area.

Based on the requirements, the planners created a theater transportation structure that consisted of 413 5,000-gallon fuel tankers and 350 ammunition trailers. XVIII Airborne Corps required 200 5,000-gallon fuel tankers and 125 ammunition trailers. VII Armored Corps required 213 5,000-gallon fuel tankers and 225 ammunition trailers. To fill the requirements the transportation groups had to conduct extended line-haul operations consisting of two trips every twenty-four hours.

To estimate the logistical reach of the operational sustainment bases in the Corps TAAs, the logistics planners concluded the hourly rate or convoy speed of the tractor-trailers would be 16 km or 10 miles. Their reasoning was that in excess of 350 tractor-trailers destined for each corps would have to travel across poor or non-existent roads. They assumed that the corps LOCs would be congested. To meet the daily requirement, each line-haul operation had to be completed within 24 hours. Allowing for enroute delays, this meant that the driving time from point to point had to be no more than ten hours. The complete operation had to last no longer than twenty hours. Combining the rate (16 km) and the time (10 hours) defined the logistical reach of 160 km.

The planners also realized the final objective of US forces was to envelop and destroy the Iraqi Army near Basrah before it escaped across the Euphrates River. With this in mind, the planners analyzed the terrain and developed contingency plans to meet mission requirements within the constraints of their logistical reach. The first plan was to establish forward operational sustainment bases Oscar and November inside Iraq near the towns of As Salman and Al Busayyah. The straight-line distance was about 140 to 150 km, slightly less than the estimated logistical reach. Vital supporting reasons for selecting the towns were that they contained roads, fixed structures, and were located near wells that could be used to produce fresh water.

## Time Available

The J3 planners estimated the ground offensive would last for two weeks, and the security of Kuwait and consolidation of US forces would take an additional four weeks. During Phase Four, the security phase, the planners anticipated conducting theater level reconstitution of combat power. The planners estimated that each corps would lose the equivalent of one combat battalion. The theater reconstitution site was to be established at KKMC. Phase Four simultaneous operations would include the Arab force restoring civil order in Kuwait while US forces established a defense along the Kuwaiti/Iraqi border to repel an anticipated Iraqi counterattack.

## Civil Considerations

At the start of the ground war, the planners expected that host nation labor and transportation assets would not be a reliable source of support in sustaining the ground attack and that US Army transportation units would have to conduct the lion's share of the line-haul operations. The US Army and the government of Saudi Arabia planned to restore basic services to Kuwait City during phase four of the operation. The work was planned to occur in two parts. In the first part, an ASG would establish an operational logistics base (Logbase Golf) near the Kuwait/Saudi Arabia neutral zone to provide basic humanitarian relief supplies and services to minimize the suffering of the local population. In part two, Saudi contractors would rebuild Kuwait City. As an additional planning factor, the US Army did not incur any responsibilities to support the reconstitution of coalition land forces because logistics was a national responsibility.

By commencement of the ground war (G-Day), the XVIII Airborne Corps' 24<sup>th</sup> Infantry Division and 2<sup>nd</sup> Armored Cavalry Regiment (ACR) reached the city of As Salman (see Appendix 5). By the second day (G+1) the VII Armored Corps' 3<sup>rd</sup> ACR reached the city of Al Busayyah (see Appendix 6). At G+2 both corps had advanced to their full tactical depths (see Appendix 7). XVIII Corps had advanced approximately 300 km averaging 15 kph, and VII Corps had advanced approximately 240 km averaging 12 kph. Both corps limited their advances to daylight hours.

“Shammals” (severe sandstorms) had reduced visibility by fifty to seventy-five percent during the day and to near zero at night. Tank and Bradley gunners reported difficulty in identifying thermal targets. To minimize the potential of fratricide, Army force advances were restricted to daylight hours, which was approximately eight hours a day. By this time, the forward operational sustainment bases at As Salman and Al Busayyah were operational trailer transfer points (TTP). By the fourth day (G+3), both corps’ centers of mass were oriented to the east and in direct combat with Iraqi armored forces. XVIII Corps advanced 175 km due east of As Salman and VII Corps advanced 125 km due east of Al Busayyah. The Iraqi Army was retreating along the north/south coastal highway. The majority of Iraqi forces were in the Basrah pocket. On the morning of February 28, 1991 (G+4), the NCA ordered a halt to hostilities.

The logistical planning and execution of the ground campaign proved sufficient because the ground war ended prematurely, before the stated military objective had been accomplished. General Schwarzkopf stated that the primary objective of US ground forces was “to destroy the Republican Guard.”<sup>72</sup> This did not occur.

By March 1, Republican Guard armored and mechanized units had reached as far north as Al-Quarnay, almost 100 kilometers north of Basrah. These units were not fleeing in disorder; their march order was disciplined. As they halted, the tanks dug dispersed revetments with 360-degree security. They were leaving one fight to join another against the Shia and Kurds. To have reached so far north on the 1<sup>st</sup>, the Guard armor had to have moved into Basrah on the 27<sup>th</sup>, if not the 26<sup>th</sup>.<sup>73</sup>

Left unanswered was whether the SUPCOM could have sustained the pursuit phase of the operation.

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<sup>72</sup> Swain, Richard M, “*Lucky War*”: *Third Army in Desert Storm*, Fort Leavenworth, Kansas: U.S. Army Command and General Staff College, 1994: 90.

<sup>73</sup> Robert H. Scales, *Certain Victory: The US Army in the Gulf War*, Fort Leavenworth, KS: US Army Command and General Staff College, 1994: 316.

## CHAPTER FOUR

### IV. FINDINGS

To determine whether Operation Desert Storm serves as an example of a responsive theater logistical system for sustained land combat, further discussion will be based on the assumption that the ground war continued beyond the fourth day and that General Yeosock was permitted to issue the pursuit order to Generals Luck and Franks. Yeosock's pursuit order would have been for US forces to destroy the Republican Guard before it escaped across the Euphrates River near the Basrah pocket, meaning that a distribution system originally designed for the attack would have to support the pursuit.<sup>74</sup>

Proceeding forward then on the fourth day (G+3), both corps' centers of mass are oriented to the east and in direct combat with Iraqi armored forces. XVIII Corps advances 175 km beyond As Salman with VII Corps 125 km beyond Al Busayyah. At the end of day, Yeosock prepares to order a general pursuit to General's Luck and Franks. In anticipation, the 22<sup>nd</sup> SUPCOM planners develop two contingency plans.

The first plan is to extend the logistical reach of the SUPCOM line-haul operations from Saudi Arabia by establishing forward operational sustainment bases (Logbases Oscar and November) approximately 150 km inside Iraq. The intent is to improve the efficiency of the line-haul operation by reducing the distance to the supported units. Establishing a forward operational sustainment base is, however, not without cost. Such a move causes a reduction in logistics momentum because it requires the 22<sup>nd</sup> SUPCOM to reapportion limited line-haul assets between the bases in Saudi Arabia and Iraq. Army forces will now have to exist on fifty percent less of their requirement for fuel and ammunition because the same number of line-haul assets will have to be divided between two points: Saudi Arabia and Iraq.

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<sup>74</sup> Robert H. Scales, *Certain Victory: The US Army in the Gulf War*, Fort Leavenworth, KS: US Army Command and General Staff College, 1994: 315.

The second plan is to establish a joint logistics over the shore (JLOTS) operation, but success relies on a port in Kuwait being made available. The intent is to bypass the issue of extended ground LOCs by creating an entirely new theater logistics base. The second plan is not feasible for three reasons: all the Kuwaiti ports are mined, Iraqi forces are still in Kuwait City, and there is not enough time or joint resources to conduct forcible entry operations to establish a JLOTS operation.

Neither contingency plan is optimal. The dilemma is whether to decrease the distance to the tactical elements by either creating another sustainment base or by increasing the rate (speed) of the current line-haul operation. A better plan would have been to use the TTPs established during the attack phase to sustain the pursuit. In the XVIII Corps sector the distance from As Salman to the Iraqi coastline is in excess of 325 km. From the discussion of tactical reach, it was determined that the Corps reach is 200 to 255 km. In pursuit operations, it can be assumed that the Corps would be at its maximum distance of 255 km, which means the 22<sup>nd</sup> SUPCOM would have to cover the 70 km distance from As Salman to the Corps rear, in addition to the 150 km from Saudi Arabia. The total distance would be in excess of 250 km. Therefore, in order to stay within the twenty-four hour limit for line-haul operations, the rate (speed) of convoy operations would have to be increased from 16 to 20 kph. Conducting simultaneous engineer operations to improve the MSR at the beginning of the ground attack could solve or minimize the problem. The situation in the VII Corps sector is not much better. The distance from Al Busayyah to the Kuwait coastline is 240 km. The distance is within the tactical reach of the Corps, 200 to 255 km. If the Corps was required to position ground combat power into the Basrah pocket, it would have to cover an additional 75 kms (315 km). To support the operation, the 22<sup>nd</sup> SUPCOM would have to cover the 75 km distance from As Salman to the Corps rear, in addition to the 150 km from Saudi Arabia. Therefore, the line-haul operations in both Corps sectors would have to surge. There is no indication that the engineers were tasked to conduct this mission or any indication that the logistics planners considered it as a feasible solution.

Operation Desert Storm does not serve as an example of a responsive theater logistics system for sustained land combat. Neither the XVIII Airborne Corps nor the VII Corps could have massed ground combat forces south of Basrah to destroy the Republican Guard because the distance was beyond the logistical reach of the 22<sup>nd</sup> SUPCOM (summarized in Appendix 9). James Huston's prophetic statement is still true today: "One of the weaknesses of logistics has been a failure of transportation for the support of the exploitation and pursuit phases of an action."<sup>75</sup>

## **Assessment**

As previously mentioned, responsiveness is defined as developing a theater logistical system that supports the mission, composition, and concept of operations of the military forces by anticipating unforeseen operational requirements, a concept that is consistent with Army doctrine. For example, Army doctrine states that there are four types of offensive actions: movement-to-contact, attack, exploitation, and pursuit. The doctrinal requirement to anticipate unforeseen offensive operational demands is in reference to sustaining the four types of offensive action. To do this, logistical planners must be able to react to three possible outcomes in any type of military action: success, stalemate, or failure. An essential tool in the planning of any operation is the development of transition requirements for each phase of the operation. The transition requirements become criteria for the execution of branches and sequels.

In offensive operations, logistical transition criteria can be quantified in terms of an assessment of supply and demand in three areas: mission essential supplies, combat power, and operational advances. "Assessment is the continuous monitoring of the current situation and progress of an operation, and the evaluation of it against criteria of success to make decisions and adjustments."<sup>76</sup>

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<sup>75</sup> James A. Huston, *The Sinews of War: Army Logistics 1775-1953*, U.S. Government Printing Office, 1967: 672.

<sup>76</sup> Department of the Army, *ST 3-0: Operations*, Fort Leavenworth, Kansas: Command and General Staff College, October 2000: 6-21.

For a logistics planner to develop a responsive support plan he must first compare the rate of consumption for mission essential classes of supplies to the theater stockage levels. He must then determine if the theater stockage for mission essential classes of supplies is less than, equal to, or in excess of the consumption rate for combat forces. Based on the results, he must make an assessment whether or not the operation is supportable for the theater stockage levels.

The planners' second action is to compare the rate of combat losses to the ability of the theater logistics system to generate combat power. He must determine whether replacements, personnel returning to duty, maintenance returns and class VII resupply operations are less than, equal to, or exceed the actual loss rate of combat forces. He then must make an assessment as to whether the operation is supportable for combat power generation.

The third key to a responsive logistics plan is the comparison of the rate of tactical advance to the echelonment of support. The planner must determine if the line-haul operations are less than, equal to, or exceed the rate of advancing Army forces and make an assessment whether the operation is supportable by the selected echelonment of support.

Army doctrine defines the logistics characteristic of responsiveness, but the institutional training base does not reinforce its application.

## **Recommendation**

There are three lessons from Operation Desert Storm and a recommendation for the Army.

The first lesson is the value of understanding the capabilities and limitations of the enemy's logistical system. As early as August 1991, the Iraqi Army had logistically culminated. Therefore, the deployment of US Army forces to Saudi Arabia could have been a balanced mix of combat, combat support, and combat service support (CSS) units. Presented in the study is a process for analyzing the enemy's logistics system. The process can be used to determine the feasibility of enemy courses of action.

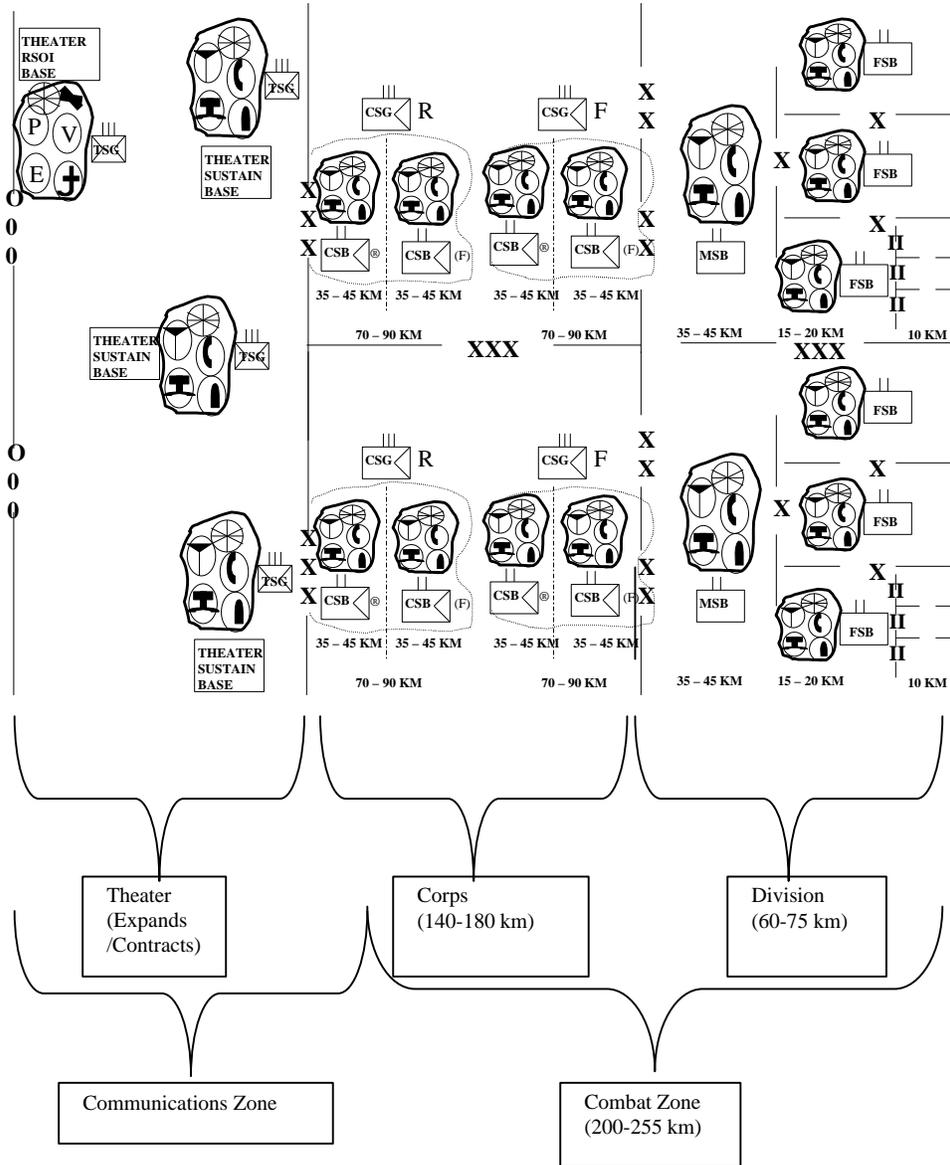
The second lesson is that Army commanders should anticipate receiving less than 100 percent of their mission essential classes of supply during pursuit operations. The Army's logistics system is designed, organized, and resourced to sustain two forms of offensive operations, the movement to contact and the attack. Army CSS units have a fixed hauling radius. The planning factor for local haul operations is 35 to 45 kms. The planning factor for line haul operations is 140 to 150 kms. Friction occurs when pursuit operations exceed the logistical reach of Army CSS units.

The third lesson is that the planning and execution of pursuit operations are not trained at the brigade, division, and corps level combat training centers (CTC). CTC exercises are only five-days in length. The "mental model" being reinforced throughout the Army is that future wars will be short-term operations.

Compounding the problem is that the logistics focus of the Command and General Staff College (CGSC) is on teaching logisticians how to receive, stage, onward move, integrate, and sustain combat power for a five-day operation. Army doctrine stresses the rapid deployment of decisive military force to defeat the enemy on the field of battle, but does not address how to respond to the enemy exercising his option to retire from the battle and fight another day, or to prolong hostilities indefinitely in protracted unconventional warfare.

To fully prepare the Army, and particularly logisticians, for the next major theater of war, all four types of offensive operations must be fully trained: movement-to-contact, attack, exploitation, and the pursuit. The significance of exploitation and pursuit operations is the ability to prevent the enemy from retiring from the field of battle and fighting another day.

# Appendix 1: Theater of Operations



Note: The Communications Zone continues across the sea-line and airline of communication to the continental United States. The Zone of Interior is the continental United States.

## Appendix 2: Operational Logistics METT-TC

### MISSION –

- Determine operational mission tasks
- Determine Army theater logistics provider
- Determine the method of entry & level of assistance from the host nation

### ENEMY – Analyze the enemy in terms of the operational logistics triad (seaports, airfields, and ground/rail LOCs) from two viewpoints:

- Determine enemy's ability to influence the friendly operational logistics triad
- Determine the location of the enemy's theater logistics base(s) based on the point where his operational logistics triad converges
- Template the opposing forces operational reach

### TERRAIN & WEATHER - Analyze terrain and weather in terms of its effects on the operational logistics triad (seaports, airfields, and ground/rail LOCs):

- Determine the number, location, and distances of the seaports, airfields, and ground/rail LOCs
- Estimate the throughput capacity of the seaports and airfields
- Estimate the density of each ground/rail LOC

### TROOPS & SUPPORT AVAILABLE - Analyze troops and support required to sustain land forces and the associated operational CSS structure.

- Estimate logistics requirements and supporting theater stockage levels
- Build supporting CSS force structure
- Determine the location of operational and tactical sustainment bases
- Estimate the logistic reach of the operational logistics bases

\* Array CSS units on the map to determine capabilities over time

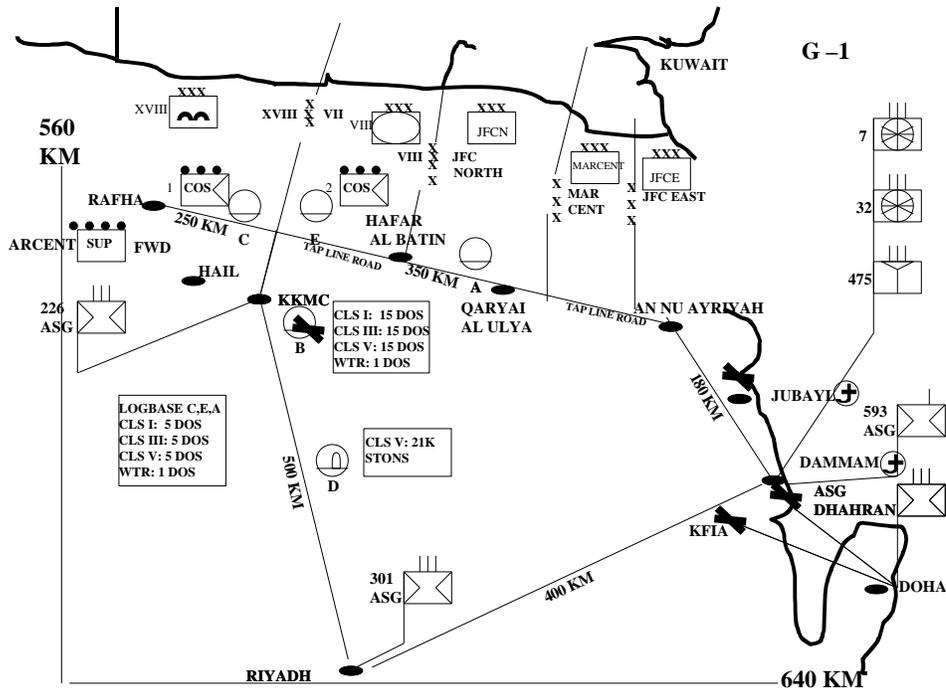
### TIME AVAILABLE – Analyze time in terms of the startup costs to:

- RSOI combat forces
- Sustain combat forces
- Redeploy combat forces

### CIVIL CONSIDERATIONS - Analyze civil considerations from three perspectives.

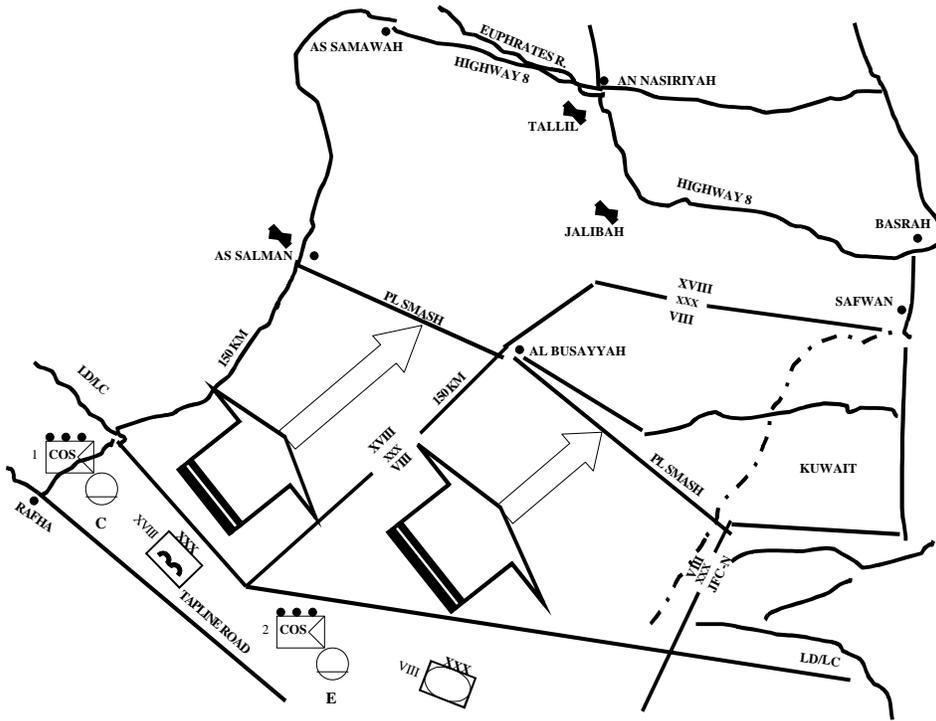
- Determine the extent of foreign humanitarian support
- Assess what resources the host country, region, and contractors can provide
- Estimate the external logistics support the host military land forces may require

# Appendix 3: Theater Logistics System

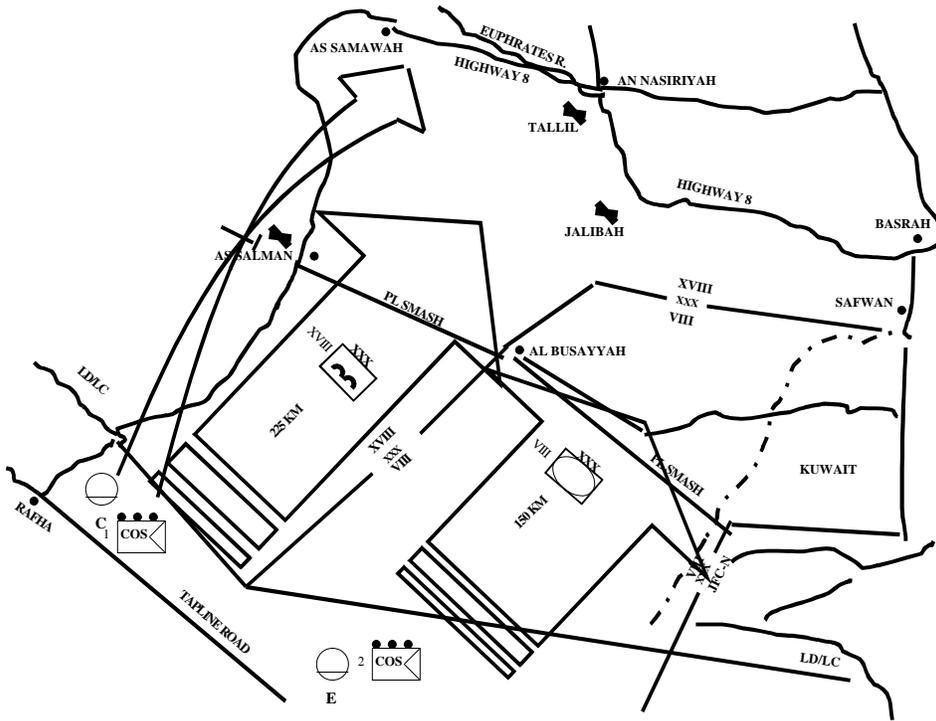




## Appendix 5: G-Day (First Day)

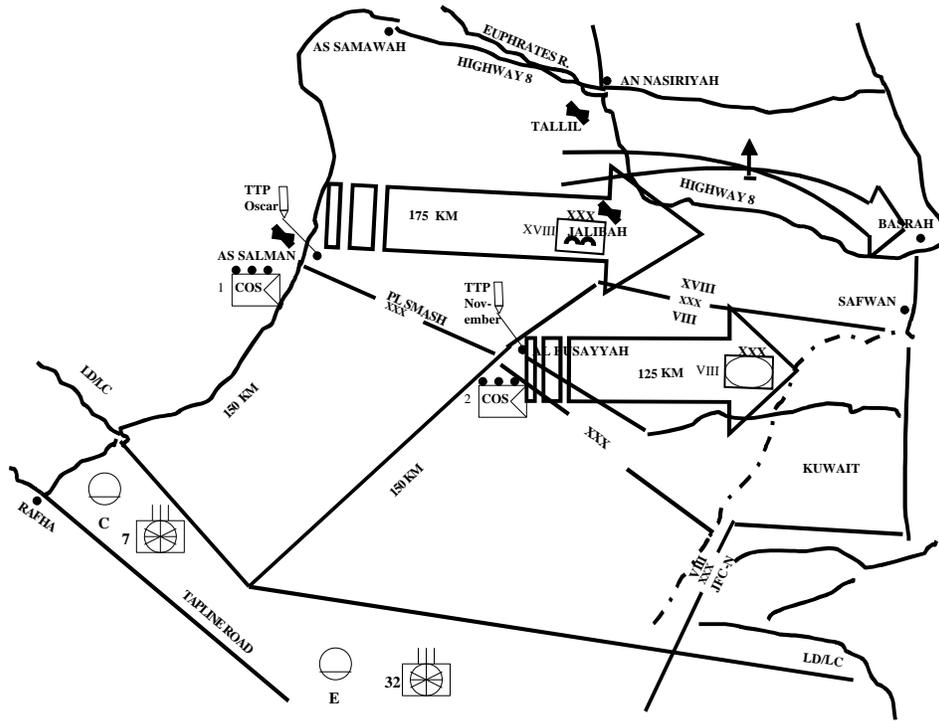


## Appendix 6: G+1 (Second Day)

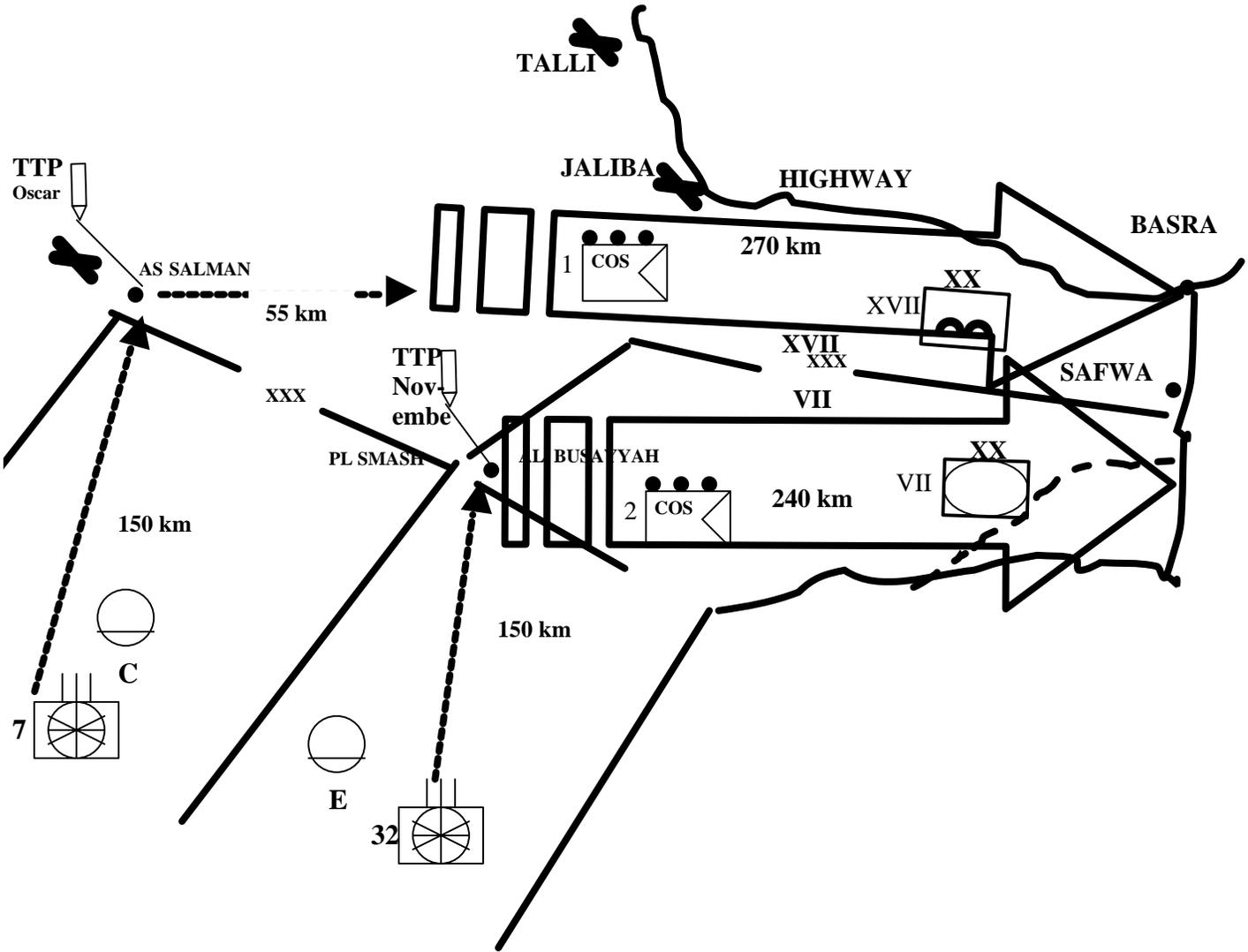




# Appendix 8: G+3 (Fourth Day)



# Appendix 9: G+4 (Fifth Day)



## **GLOSSARY**

ALOC	Air Line of Communication
AMC	Army Material Command
APOD	Air Port of Debarkation
ARCENT	Army Central Command
ASCC	Army Service Component Command
BCT	Brigade Combat Team
BCTP	Battle Command Training Post
BN TF	Battalion Task Force
BOS	Battlefield Operating Systems
CDR	Commander
CENTCOM	Central Command
CINC	Commander and Chief
CGSC	Command and General Staff College
Class I, III, V	Food & water, fuel, and ammunition
COA	Course of Action
COMMZ	Communications Zone
CSC	Corps Support Command
CSG	Corps Support Group
CS	Combat Support
CSS	Combat Service Support
CTC	Combat Training Center
DA	Department of the Army
DLA	Defense Logistics Agency
DLRO	Department of Logistics and Resource Operations

DSC	Division Support Command
EAC	Echelon Above Corps
ETO	European Theater of Operations
FM	Field Manual
FSB	Forward Support Battalion
G Day	Commencement of the Ground War
IPB	Intelligence Preparation of the Battlefield
JFAST	Joint Feasibility Assessment System for Transportation
JFC	Joint Forces Command
JOPES	Joint Operations Planning and Execution System
KM	Kilometer
KPH	Kilometer Per Hour
LOC	Line of Communication
LOGBASE	Logistics Base
LPB	Logistics Preparation of the Battlefield
LPT	Logistics Preparation of the Theater
MDMP	Military Decision Making Process
MOOTW	Military Operations Other Than War
MSB	Main Support Battalion
MSR	Main Supply Route
MRE	Meal Ready to Eat
NCA	National Command Authority
OPLAN	Operations Plan
OPORD	Operations Order
OR Rate	Operational Readiness Rate
PAM	Pamphlet

POD	Port of Debarkation
RLOC	Rail Line of Communication
ROK	Republic of Korea
ROWPU	Reverse Osmosis Water Purification Unit
RSOI	Reception, Staging, Onward Movement, and Integration
SLOC	Sea Line of Communication
SOS	Service of Supply
SPOD	Sea Port of Debarkation
ST	Student Text
STON	Short Ton
SWA	South West Asia
TAA	Tactical Assembly Area
TOA	Transfer of Authority
TFOP	Theater Force Opening Package
TPFDL	Time-Phased Force and Deployment Data List
TRADOC	Training and Doctrine Command
TRANSCOM	Theater Transportation Command
TSG	Theater Support Group
TSC	Theater Support Command
TTP	Trailer Transfer Point

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