Mitigating the Need for a Logistic Pause

A Monograph
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This monograph addresses the causes of logistic pauses in Operation Desert Storm and Operation Iraqi Freedom. These two operations provide an interesting framework for comparison since they were fought on similar terrain, with similar equipment, and against the forces of Saddam Hussein. Of particular note, and the focus of this paper, is the fact that ech offensive experienced, or nearly experienced a logistic pause. This paper defines a logistic pause as an unplanned delay in military operations due to the inability to coordinate or complete effective logistic support in a predictable mannner. However, the intent of this paper is not to persuade the reader that a logistic pause is indicative of failure. A planned pause may avoid culmination, but an unplanned pause risks hindering the execution of the maneuver plan. This paper addresses logistic support measures, deployment planning, doctrinal impacts, and distribution problems for each operation and provides recommendations for addressing, or mitigating the need for an unplanned logistic pause throught the lenses of doctrine, organization, and leadership.

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Abstract

MITIGATING THE NEED FOR A LOGISTIC PAUSE by Major Jason A Carrico, US Army, 61 pages.

The United States has now invaded Iraq on two separate occasions. These invasions offer some interesting similarities such as occurring on nearly the same terrain with similar equipment and against Iraqi forces under the leadership of Saddam Hussein. The first invasion occurred in 1991 during Operation Desert Storm (ODS) with the objective of liberating Kuwait from Iraqi forces. The second occurred in 2003 during Operation Iraqi Freedom (OIF) with the objective of forcing Saddam Hussein from power. These dissimilar objectives, in conjunction with a lapse of twelve years, resulted in some basic differences. Some of these notable differences are the distance traveled in the offense, the tempo of the operations, enemy actions and responses, preparation time available for the campaign planners, and the forces employed in the offensive. Another significant point, and the focus of this paper, is the conduct and effectiveness of the logistics system used in support of these offensives. Of particular concern is the fact that each offensive encountered, or nearly encountered, a logistic pause.

For the purpose of this research, the definition of a logistic pause is the unplanned delay in military operations due to the inability to coordinate or complete effective logistic support in a predictable manner. The fact that ODS nearly encountered a logistic pause and OIF did encounter a pause indicates that logistic efforts may have been lacking in both operations. However, the intent of this paper is not to persuade the reader that a logistic pause is indicative of a failure to plan or properly execute a ground offensive. Current joint doctrine recognizes that pauses may be required to prevent a major operation from reaching the end of its sustainability and in some circumstances are necessary due to logistical constraints or shortfalls. Simply stated, a planned pause may provide the safety valve to avoid culmination, but an unplanned pause risks losing the initiative or hindering the execution of the maneuver plan.

Admittedly, a paper of this length cannot address every factor that contributes to the need for a logistic pause nor offer comprehensive means of mitigation. However, using the ground offensives of ODS and OIF as reference points, this paper explores aspects of these campaigns that proved critical to the development, or near development of a logistic pause in these operations. This paper addresses logistic support measures, deployment planning, doctrinal impacts, and distribution problems for each operation and provides recommendations for addressing, or mitigating the need for an unplanned logistic pause through the lenses of doctrine, organization, and leadership.

TABLE OF CONTENTS

INTRODUCTION

The United States has now conducted ground offensives in Iraq on two separate occasions. These offensives offer interesting similarities for comparison such as occurring on nearly the same terrain with similar equipment and fought against Iraqi forces under the leadership of Saddam Hussein. The first invasion occurred in 1991 during Operation Desert Storm (ODS) with the objective of removing Iraqi forces from Kuwait. The second occurred in 2003 during Operation Iraqi Freedom (OIF) with the objective of removing Saddam Hussein from power. These dissimilar objectives, in conjunction with a separation of twelve years between operations, resulted in some basic differences such as the distance traveled in the offense, the tempo of the operations, enemy actions and responses, preparation time available for the campaign planners, and the available forces employed in the offensive.

Another significant point, and the focus of this paper, is the conduct and the effectiveness of the logistic systems used in support of these offensives. The fact that ODS nearly encountered a logistic pause and OIF did encounter a pause indicates that logistical efforts may have been lacking in both operations. For the purpose of this paper, the definition of a logistic pause is an unplanned delay in military operations due to the inability to coordinate or complete effective logistic support in a predictable manner.[1] This research will explore the factors that caused or, in the case of ODS, nearly caused a logistic pause and offer recommendations for mitigating the need for an unplanned logistic pause in future ground campaigns.

This subject is relevant and worthy of research because the US Army will unquestionably continue to conduct ground offensives. These offensives may face relatively conventional threats or dispersed irregular forces. Regardless of the threat faced, the mitigation of the cause(s) and impacts of an unplanned logistic pause is critical to the conduct of future ground offensives. The third draft of Joint Publication (JP) 5-0 dated August 2005 states that pauses can be useful tools

[1] *Joint Publication 5-0 – Joint Operations Planning – Revision. Third Draft* (3) (10 August 2005), 53.

for obtaining the proper synchronization of sustainment and operations. However, if a pause occurs due to the improper employment of logistic assets or as the result of poor planning, then friendly forces have not postured themselves for success. Yet, the intent of this paper is not to persuade the reader that a logistic pause is indicative of a failure to plan or properly execute a ground offensive. According to JP 5-0, pauses may be required to prevent a major operation from reaching the end of its sustainability and are necessary in certain circumstances due to logistic constraints or shortfalls. Simply stated, a planned pause may provide the safety valve to avoid culmination, but an unplanned pause risks losing the initiative or hindering the execution of the maneuver plan.[2]

Given the conditions of the current operating environment, one must ask what measures the US Army can implement to mitigate the need for an unplanned logistic pause during a ground offensive. Through the comparison of the logistic efforts of ODS and OIF, this research seeks to answer the following questions: (1) what factors caused, or nearly caused, a logistic pause in each operation, and (2) did the organization, doctrine, or leadership of logistic forces negatively impact the conduct of logistic operations in these campaigns. This paper provides a general overview of each campaign and examines the factors that nearly led to a pause in ODS and led to an actual pause in OIF. This paper concludes by proposing measures that the US Army can implement to mitigate the need for an unplanned logistic pause during ground offensives in the contemporary operating environment. In the interest of historical precedence one must begin with a review of ODS.

OPERATION DESERT STORM

The logistic efforts expended in support of ODS were massive and complex. General Norman Schwarzkopf, the Central Command commander, stated, “Operation Desert Shield was the fastest build up and movement of combat forces across greater distances in less time than at

[2] *Joint Publication 5-0*, 53-54.

any other time in history."[3] General Schwarzkopf also stated that ODS was a "gigantic accomplishment," and he could not give enough credit to the logisticians who supported the operation.[4] Before turning to the specific logistic experiences of the operation, one must place the operation in its historic and strategic setting. A general overview of the campaign is critical to understanding the situational context in which the operation occurred.

OVERVIEW OF OPERATION DESERT STORM

On August 2, 1990, Saddam Hussein's Iraqi forces invaded Kuwait. On August 6, 1990, King Fahd of Saudi Arabia requested US military assistance, and on September 18, General Norman Schwarzkopf tasked US Army planners to begin work on the concept of a ground invasion in support of the liberation of Kuwait. The ground campaign received approval on February 8, 1991, and on February 16, forces moved into attack positions near the Iraqi and Saudi Arabian international border.[5] The US ground attack began on February 24 with a massive and complex ground assault emphasizing speed and mass. On February 26, 1991, the Iraqi forces began fleeing Kuwait City and the coalition forces destroyed fleeing elements of the Iraqi Republican Guard.

A cease-fire took effect at 8:00 AM, February 28, 1991. It took the United States three short days to defeat the fifth largest army in the world and liberate Kuwait. The ground offensive lasted only 100 hours and it accomplished all the objectives of the Commander in Chief of US Central Command (CINCCENT). These objectives were to control critical Lines of Communications (LOCs) in the Kuwaiti Theater of Operation (KTO), to eject Iraqi forces from Kuwait, to secure Kuwait International Airport and the crossroads west of Kuwait City, to destroy

[3] Congressional Report, *Final Report to Congress; Conduct of the Persian Gulf War* (April 1992). 434

[4] Ibid., 434.

[5] Ibid., 434.

Republican Guard Forces, and to liberate Kuwait City.[6] The ground maneuver force that swiftly defeated Iraqi forces required and possessed a massive amount of logistic support. Logisticians in ODS supported over 300,000 combat troops, 114,000 trucks and wheeled vehicles, 12,400 armored vehicles, and maintained a theater stockage level of 60 days of supply for food, fuel, construction and barrier materiel, ammunition, expendable medical supplies, and repair parts and components.[7]

Although the offensive was short, *Final Report to Congress: Conduct of the Persian Gulf War,* stated that, if the offensive continued, US forces risked out distancing their supply lines and potentially experiencing a logistic pause.[8] The logistic issues addressed in the congressional report raise concern since the United States devoted a significant amount of time and effort in preparation for 100 hours of combat. Admittedly, the campaign rapidly accomplished its objectives, but to reach the end of the logistic tether so quickly indicates that the potential for an unplanned logistic pause was high. The primary question derived from the congressional report is why and how could a 100-hour offensive leave US ground forces in such a delicate logistic position on day four of the ground campaign? The answer to this question lies in the factors leading to the potential logistic pause.

FACTORS LEADING TO A POTENTIAL LOGISTIC PAUSE

One must consider the employed logistic measures, the deployment planning, doctrinal implications on the force, and the distribution system applied to this campaign. These aspects of the campaign will illuminate the reasons why ODS nearly experienced a logistic pause. However, before exploring these factors one must first determine if a pause was planned or even expected.

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[6] Ibid, 340.

[7] Department of Logistics and Resource Operations, U.S. Army Command and General Staff College, *Logistics: Desert Storm and Into the 21st Century*, (Fort Leavenworth, Kansas, 1995), 65.

[8] Congressional Report, *Final Report to Congress; Conduct of the Persian Gulf War,* 344.

WAS A PAUSE PLANNED?

A review of literature and official records located at the Combined Arms Research Library (CARL), Fort Leavenworth, Kansas coupled with interviews of planning participants for ODS provide no indication that the "near pause" on day four of the ground offensive was planned. An interview with Professor Jim Martin, a corps logistic planner during ODS, revealed that he agreed with the final report to congress that a pause was nearing. Professor Martin noted instances of shortages and confusion in the logistic system resulting from the sheer mass of units involved in the operation and recognized that an unplanned pause was nearing early in the campaign.[9] This author accepts that the forces employed were nearing the end of their logistic tether and were soon to experience an unplanned logistic pause. The logic of accepting this position rests on the fact that no documentation exists to indicate a pause was planned or expected so early in the campaign. This fact, combined with corroborating statements from a senior planner such as Professor Martin, indicate that an unplanned logistic pause was near at hand. Given that an unplanned logistic pause was nearing, one must look to the logistic support measures taken in preparation for and during the conduct of the ground offensive.

LOGISTIC SUPPORT MEASURES

The first Corps vessel carrying equipment into theater arrived on December 6, 1990. The time between initial receipt of equipment to the date coalition forces crossed the border into Iraq was roughly four months. In the Final Report to Congress, the Department of Defense (DOD) states, "If the coalition had lacked the extended period of time to deploy, the tactical situation might have been precarious." The report also identifies logistics as a major shortfall in ODS, particularly strategic mobility.10 Given the massive logistic preparation for ODS, in time and materiel, the fact that logistics was a noted shortfall in the operation is concerning. A potential reason for this shortfall is the level of logistic risk accepted by the senior leadership early in the

[9] Dr. James Martin, Ph.D., Personal interview, 21 September 2005.
[10] Congressional Report, *Final Report to Congress,* 456.

campaign. In order to explore this further, one must look at command and control of logistic forces, the use of pre-positioned stocks, and the impacts of host nation support (HNS). These efforts should have reduced logistic risk in the operation. However, these efforts met with less than complete success.

The early days of ODS saw a brief period when logistic command and control was inadequate. The complexity of the Time Phased Force Deployment Data (TPFDD) process caused delays at logistic headquarters while additional combat forces pushed into theater. This situation resulted in the Army Component Central Command (ARCENT) electing to establish an ad hoc logistic headquarters to oversee the initial deployment of forces. This command quickly discovered that it alone could not effectively handle the massive deployment of troops and equipment. In response, Forces Command (FORSCOM) sent a general officer with a small, handpicked staff to form the nucleus of the logistic support command in theater. This small staff coordinated logistics for the entire deployed Army in theater. The three major tasks associated with this headquarters were the reception of arriving forces, the onward movement of those forces, and the sustainment of all soldiers, equipment, and supplies arriving in theater.[11] If one considers the massive influx of troops, equipment, and supplies that arrived, or were arriving, in Saudi Arabia, these are daunting tasks indeed. These tasks were made even more daunting by the delayed flow of some logistic assets into theater.

Placing Combat Service Support (CSS) units late in the deployment delayed combat units' initial support accordingly. This decision may have been tactically prudent, but it also created the initial burden on the logistic system. These delays led to support backlogs that quickly grew and required intense management to remedy.[12] This initial backlog and state of confusion, although manageable, set the conditions for strained logistics in support of the upcoming ground offensive into Iraq. Units deploying from Europe generally arrived with their organic logistic

[11] Ibid., 461.
[12] Ibid., 461.

assets, but the delay of some newly fielded items, such as HEMTT Fuel Trucks, contributed to the disrupted force flow. [13] However, it is important to note that critical logistic assets and units did eventually arrive in theater and were postured to support the ground offensive.

Given that logistics is the science of planning and carrying out the movement and maintenance of forces, a combat force is only as capable as the logistic support it receives. In the case of ODS, logistics arrived and provided support, but a portion of it arrived late in the deployment process.[14] This late arrival caused an "accordion effect" for logisticians early in the campaign. This situation is most evident in the backlog of materiel that quickly accumulated at Ports of Debarkation (PODs) and contributed to the mountains of supplies frequently associated with ODS. Without adequate logistic units to receive forces and supplies at the PODs, a large amount of materiel accumulated and was not positioned to support the offensive. For a logistician, this situation is similar to competing in a 100-yard dash and starting ten seconds behind the other runners. In the case of ODS, some logistic units arrived early and intact, but many others arrived quite late or were piecemealed into the force flow. This disrupted force flow created problems early in the campaign with controlling the influx of materiel and personnel into theater.

In response to the massive influx of materiel and personnel, the logisticians of ODS maximized the use of all available assets, including the use of rail, coastal and inland waterways, host nation assets, and the assistance of coalition partners. These efforts were particularly critical in the forward movement of munitions and critical spare parts. For example, the single rail line that ran between Riyadh and Ad-Damman served extensively to move munitions containers inland to forward ammunition storage sites. In addition, coalition partners contributed almost 2,000 cargo trucks, water trucks, refrigerator vans, and fuel vehicles. These commercial vehicles

[13] Martin, Personal interview.

[14] Headquarters Department of the Army, *FM 4-0 (FM 100-10) Combat Service Support* (Washington: August 2003), 1-1.

combined with the efforts of the rail line added crucial mobility and increased flexibility.[15] These efforts resulted in logistic units being able to focus their attention far forward in support of the critical "last tactical mile."

Support of the "last tactical mile" proved particularly important in ODS because ground forces quickly advanced significant distances from their fixed bases of support, thus creating extended LOCs very early in the campaign.[16] The positioning of CSS assets well forward was of critical importance in order to sustain the forward deployment of combat assets and the attack's momentum. In response, CSS assets conglomerated into forward logistic bases that were to be able to both sustain forces throughout initial deployment and to serve as intermediate bases as ground forces advanced into Iraq. Over time, these bases became enormous and static but accomplished the critical task of echeloning support forward. For example, fourteen days after the air campaign began more than 29 million meals, 36 million gallons of fuel, and almost 115,000 short tons of ammunitions supplied these forward bases. The establishment of these forward logistic bases would accompany the ground advance. The plan called for these forward bases to assume the primary sustainment role once the situation stabilized and the rear bases dissipated.[17] The relative ease of establishing these forward bases was made possible by maximizing the use of pre-positioned stocks and the integration of HNS.

In anticipation of a ground campaign in the region, DOD attempted to alleviate logistic strain and enhance response time by investing heavily in pre-positioned stocks. These stocks proved crucial in sustaining ground forces. For example, the Marine Pre-Positioned Stocks (MPS) that brought Marine Corps equipment ashore provided the initial sustainment effort for all ground forces. These stocks initially sustained the 7th Marine Expeditionary Brigade and the 82nd Airborne Division. In addition to the extensive use of prepositioned stocks, units shipped

[15] Congressional Report, *Final Report to Congress*, 497.
[16] Ibid., 458.
[17] Ibid., 501.

everything possible to mitigate the potential of leaving anything behind. Of course, this situation proved to be neither effective nor efficient. "At the end of Desert Shield/Storm, there were 27,000 containers in Saudi Arabia with contents unknown for most of them. This led to discovery learning by opening each container to find out the contents."[18] This situation was clearly a waste of resources and created the initial logistic risk by overburdening the logistic units and limited support systems in theater. The simple fact that, besides prepositioned stocks, 27,000 containers remained unopened throughout the campaign is indicative of a distribution system that either was struggling to keep pace or simply had more materiel than was needed for the operation.

HNS during ODS also greatly reduced the logistic burden of the ground forces. HNS functions included accommodations for personnel, specialized materiel-handling equipment, facilities, storage, subsistence, transportation, utilities, water, and materiel. Of great benefit to US forces was the availability of the region's major seaports and modern airports. The two initial Aerial Ports of Debarkation (APOD) were Dhahran and Riyadh, and these airports proved vital to the build up of US forces in preparation for the ground offensive. The two primary Sea Ports of Debarkation (SPOD) were Ad-Damman and Al-Jubayl. Fortunately, these ports had ample heavy lift equipment, warehouses, hardstand storage, staging areas and relatively good road networks. Arguably, without this critical HNS, the ground forces might have been forced to execute the mission without adequate resources, or been forced to delay the offensive until sufficient logistic preparations were made.[19] The lack of this critical HNS might have even delayed execution of the ground offensive for an extended period. Now that we have explored the logistic support measures of ODS we will turn to the deployment planning in support of the operation.

[18] Joseph L. Walden, *The Forklifts Have Nothing To Do!: Lessons in Supply Chain Leadership* (Lincoln, Nebraska: Universe, Incorporated, 2003), 17.

[19] Congressional Report, *Final Report to Congress,* 458-470.

DEPLOYMENT PLANNING

So how did the ground campaign nearly experience a logistic pause given such a large amount of pre-positioned stocks and host nation support available? The answer lies in the planning for the deployment of forces into theater. The planning for ODS was effective but complex, as are all real-world contingencies. The strategic deployment of such a massive ground force proved to be a daunting planning endeavor. One must delve in to the challenging arena of deployment planning to appreciate the logistical impacts of these deployment decisions. As noted earlier, these deployment decisions set the conditions that strained the logistic effort early in the campaign.

The framework of DOD deployment planning consists of three key elements; the Joint Strategic Planning System (JSPS), the Joint Operations Planning and Execution System (JOPES), and the accompanying Time Phased Force Deployment Data (TPFDD). JOPES provides automated systems for the development of Concept Plans (CONPLANs) and Operations Plans (OPLANs). ODS experienced substantial friction from this system of support during the course of the operation. For example, during ODS, JOPES had not been frequently exercised during training and a shortage of JOPES capable operators became apparent. Deployment data not reviewed early in the planning process complicated the determination of transportation feasibility. This situation resulted in early movements to Saudi Arabia conducted with a draft TPFDD developed during execution.[20] This point is key to understanding the logistic efforts of ODS. The TPFDD determines the sequencing of units arriving into theater. The impacts of deploying forces while drafting a TPFDD is that maneuver elements and their associated logistic assets may not arrive in a logical sequence or timeline.

[20] Ibid., 436.

The cumbersome nature of the TPFDD forced the routine repositioning of logistic personnel and transportation assets within the force flow into theater.[21] As combat forces deployed well in advance of many CSS units, an already stressed logistic situation became increasingly more complex and intra-theater transportation assets were quickly overwhelmed. The combination of an austere highway system, massive supply and support requirements for inland haul, the sheer size of the geographic Area of Responsibility (AOR), and most importantly, the impact of the delayed flow of logistic units into theater severely stressed the support structure.[22]

The impacts of a TPFDD formulated while under execution resulted from the decision to front-load the deployment with combat formations. In the *Final Report to Congress,* DOD states, "Absolutely crucial to the successful sustainment of deployed forces is the correct determination and timely introduction of the logistic force structure into theater."[23] As initial combat units deployed, few logistic personnel, equipment, or structure existed to receive them, build the necessary stocks for the offensive, and logistically prepare units for combat. To complicate matters further, General Schwarzkopf remained concerned about an Iraqi ground attack into Saudi Arabia. He required immediate combat power to deter Iraqi aggression as opposed to building a logistic structure to prepare for the upcoming ground campaign.

At first glance, the delay of logistic assets appears to be merely the prioritization of efforts given the tactical situation. However, the ad hoc nature of the deployment planning may have actually forced General Schwarzkopf to choose between these apparently competing efforts. Arguably, more thorough and detailed deployment planning that enforced the proper use of the TPFDD may have prevented this predicament. According to Captain Mark Peterson and Captain Jules Doux, both transportation officers during ODS, "A complicating factor associated with

[21] Ibid., 437.
[22] Ibid., 492.
[23] Ibid., 460.

transporting heavy forces in the early stages of Desert Shield and Desert Storm was the early deployment of combat forces with little transportation support."[24] This issue only served to exacerbate an already precarious logistic position stemming from a cumbersome deployment process.

Complications resulting from a disjointed deployment plan were magnified by the lack of a theater-wide contingency plan (CONPLAN) before August 1990. The lack of a CONPLAN may partially explain the cumbersome force flow into theater. Doctrinally, logistic support plans stem from Operations Plans (OPLANS) and the commander's concept of the operations. Initially, no logistical support plan existed for the scope of the logistics required in ODS, thus, a fully developed TPFDD was lacking before the commencement of the operation. Although delayed, the creation of the needed support structure did integrate with service doctrine. However, the disrupted force flow contributed to the friction experienced early in the ground campaign.

The use of outdated planning factors may have further exacerbated the issue. An example is provided by Professor James Martin who served as a logistic planner for VII Corps during ODS. Professor Martin notes that the use of inaccurate planning factors, for such items as ammunition, greatly complicated the planning process. According to the planning factors utilized in ODS, based on outdated consumption factors, a theater stockage level of 45 days was required for ammunition alone. This requirement proved to be excessive and unnecessary on the battlefields of 1991. The situation was further complicated when General Schwarzkopf demanded that the stockage level for ammunition be increased to 60 days of supply. Hindsight shows that this task proved unnecessary given the advantages of modern technology, distribution, and strategic transport but the decision is understandable given the tactical conditions faced early in the campaign.[25] However, the requirement to increase ammunition to 60 days of supply was

[24] Department of Logistics and Resource Operations, U.S. Army Command and General Staff College. *Logistics: Desert Storm and Into the 21st Century*, 73.

[25] Martin, Personal interview.

challenging to support given the delayed deployment of some logistic elements into theater. Naturally, the deployment planning of ODS, particularly the force flow and selected stockage levels, influenced the doctrinal employment of logistic assets. To amplify these implications we must review the logistics doctrine of ODS and its applicability to that campaign.

DOCTRINAL ISSUES

The US Army doctrine of 1990, based on the Cold War concepts of Air Land Battle, recommended supporting from relatively fixed locations with robust higher echelons of support. According to the *Final Report to Congress* the logistic system for ODS was designed for static Cold War conditions using established infrastructure such as that provided by NATO (North Atlantic Treaty Organization) and the nations of western Europe.[26] The Kuwaiti Theater of Operation was remarkably different from what the US Army had trained for throughout the entire Cold War era. At the time of ODS, Army regiments and divisions had CSS units organic to their formations. They provided immediate support to the combat elements of those organizations but had limited capabilities in extended operations. These organic CSS units depended heavily on organizations at higher echelons to provide more comprehensive sustainment. At the Corps and Theater Army level, logistic units were task organized to support the force. Typically, support units—companies, battalions, and groups—were formed and distributed across the battlefield and were to be further organized into Support Commands.[27]

The Theater Support Command (SUPCOM) in ODS adhered to doctrine by echeloning support forward. The SUPCOM pre-positioned supplies forward to support the ground offensive while simultaneously moving two separate corps into their attack positions. By February 24, 1991, approximately 29 Days of Supply (DOS) of food, 5.2 DOS of fuel, and 45 DOS of ammunition were stocked at these positions. Upon implementation of the cease-fire on February

[26] Congressional Report, *Final Report to Congress*, 500.
[27] Ibid., 460.

28, 1991, there were 25 DOS of food, 5.6 DOS of fuel, and roughly 66 DOS of ammunition stocked at these forward locations. One must question whether these Cold War doctrinal concepts were applicable to the distribution-based sustainment required in this ground offensive. The requirement for forward positioning of large stocks may indicate that the doctrine of the time was not applicable to the fast moving ground campaign. A closer look at the actual distribution of supplies indicates shortfalls that may have doctrinal roots.[28]

DISTRIBUTION PROBLEMS

A primary cause of the distribution problem encountered in ODS may be that the ground offensive simply demanded deviations from doctrinal practices. These deviations varied from the establishment of Logistic Task Forces (LTFs) to support specific maneuver elements to the establishment of Convoy Support Centers (CSCs) to enhance the forward movement of convoys and support elements. These doctrinal deviations or modifications are explored further in the following paragraphs.

The VII Corps, in particular, deviated from the doctrinal support template to support an armored advance of roughly 200 kilometers. The VII Corps elected to utilize LTFs to move Combat Configured Loads (CCLs) of fuel and ammunition and other supplies needed by day two of the attack. These LTFs formed from the CSGs (Corps Support Groups) and remained attached to maneuver brigades in the advance. The intent was for these LTFs to support their assigned maneuver forces, thus conserving the combat unit's organic supply and providing a distribution link to relatively fixed bases of supply. The intent was to enter the second day of battle with full fuel tanks and 100 percent of the formations' organic support. The size of the LTFs supporting the advancing maneuver units was enormous. For example, the LTF supporting the 2nd Armored Cavalry Regiment alone carried 90 trucks of fuel and general supplies. In addition, the formation

[28] Department of Logistics and Resource Operations, U.S. Army Command and General Staff College, *Logistics: Desert Storm and Into the 21st Century*, 94.

of these LTFs potentially took distribution assets away from their doctrinally assigned responsibilities at the theater level.[29]

The conglomeration of critical assets into mission specific LTFs may have reduced the overall effectiveness of limited distribution assets at the theater level. For example, in order to alleviate wear and tear on combat vehicles the US Army attempted to maximize the use of Heavy Equipment Trailers (HETs) prior to the commencement of and during the conduct of the ground offensive. Roughly 1,310 HETs were needed to support US forces during ODS, however, only 497 of these were US DOD-owned assets. The remainder of these critical vehicles came from a wide range of suppliers including former Warsaw Pact members and leased US commercial vehicles.

During ODS more than 3,500 truck convoys occurred with these vehicles traveling more than 2,700 miles on the MSR. These combined convoys logged more than 35 million miles, which included more than 1,700 moves by HET and an estimated 5,800 moves by other equipment transporters such as lowboy trailers and 10,100 trips by flatbed trucks. This strenuous use of HETs and other heavy transport equipment grew in complexity since the vast majority of these convoys occurred on unimproved dirt roads.[30] Admittedly, the extensive use of HETs is not a distribution problem in itself, but the fact that the US Army was so critically short of HETs may be indicative of a lack of analysis of distribution shortfalls prior to the campaign.

The formation of LTFs only further reduced the availability of these theater assets by dedicating them to specific units for the duration of the operation. As a result, logisticians maximized the use of these specialized transports to the point of their degradation. One newspaper account quoted Army officials as saying, “The harsh environment and accelerated training pace is wearing out most parts far more quickly than normal. For example, most filters fail eight times faster; tires, five times. In general, the Army, based on past testing in desert

[29] Ibid., 27.
[30] Congressional Report, *Final Report to Congress*, 496.

conditions, has been buying parts 3 ½ times its normal rate for systems deployed in the region and it's proven to be pretty accurate."[31] Tasking these critical assets to specific units for the duration of the offensive may have reduced their potential to support in a cohesive manner across the breadth of the battlefield. A better alternative may have been to conglomerate these assets into functional battalions to preposition combat forces for the offensive.

The shortage of critical transportation assets undoubtedly contributed to the distribution problem. For example, heavy cargo trucks with off-road capability were in very short supply. Once the ground offensive began, the large number of HETs and petroleum transports simply could not keep the pace, particularly in situations requiring off-road travel. The efforts of the logistic planners combined with the remarkable efforts of the mechanics and drivers allowed logistic forces to meet the requirements, but the lack of appropriate equipment caused the logistic effort to struggle to keep pace. Fortunately, the US Army had fielded the Heavy Expanded Mobility Truck Transport (HEMTT) prior to ODS. The HEMTT provided the much-needed off-road capability for logistic elements trying to keep pace with the rapidly advancing maneuver forces. There were simply not enough HEMTTs to support the entire combat formation and the majority of these assets were assigned to unit specific LTFs. As stated in the final congressional report, "…the experience clearly demonstrated the need for more support vehicles with off road capabilities."[32] The shortage of transportation assets combined with the force deployment issues addressed earlier created logistic strains that manifested themselves as conditions for a potential unexpected pause on day four of the ground campaign.

In addition to the development of LTFs, other ad hoc logistic arrangements emerged. A good example of logistic improvisation is the establishment of CSCs. These centers functioned similar to commercial truck stops that operated 24 hours a day and provided fuel, latrines, food,

[31] Department of Logistics and Resource Operations, U.S. Army Command and General Staff College, *Logistics: Desert Storm and Into the 21st Century*, 114.

[32] Congressional Report, *Final Report to Congress*, 496.

sleeping tents, recovery vehicles, and limited maintenance and repair facilities. The CSCs were very important when considering that the transportation network in theater consisted of a mix of six, four, and two-lane asphalt roads, secondary roads, and cross-country lanes. The CSCs added to the comfort, safety, and morale of the forces traveling in theater and were instrumental in supporting the heavy convoy requirement of supporting over 300,000 troops and divisions of heavy equipment.[33] The CSCs formed to support the roughly 3,000 convoys per day traversing between Saudi Arabia and the leading combat trains and established themselves at 150-mile intervals with the primary purpose of providing fuel to the advancing columns. Estimates reveal that each of the nine CSCs alone dispensed an estimated 100,000 gallons of fuel per day.[34] CSCs were not a doctrinal concept but emerged as a critical node in the forward movement of supplies and materiel. Arguably, the establishment of these CSCs may indicate that the delayed force flow of logistic units required doctrinal deviations to overcome expected, and unexpected, logistic shortfalls.

These shortfalls are most evident in the function of forward distribution. One example is the case of a food shortage experienced during the course of the offensive. Another example is the fuel support to maneuver forces. According to the *Final Report to Congress*, advancing units' inventory records show food stocks down to less than one DOS.[35] Generally, units conducting combat operations rarely fall below three DOS in preparation for potential exigencies that can quickly develop. Considering that 60 DOS of food was stocked in theater, including 29 DOS of Meals Ready to Eat (MREs) available at the time of the offensive, a supply chain problem existed that could have had significant effects during the course of the offensive.[36] Admittedly, no units reported running completely out of food during the offensive and the congressional report does

[33] Ibid., 471.
[34] Department of Logistics and Resource Operations, U.S. Army Command and General Staff College, *Logistics: Desert Storm and Into the 21st Century*, 66.
[35] Congressional Report, *Final Report to Congress*, 502.
[36] Ibid., 502.

not clearly indicate how many units were at less than one DOS. However, this issue does indicate that distribution from forward support bases was a problem throughout the campaign.

Another example of an overtaxed distribution system is the fuel support to maneuver forces. On the modern battlefield, fuel is a critical commodity of supply and this fact was true of the mechanized and armored ground forces deployed in support of ODS. Inland fuel delivery behind the corps area, performed by host nation assets, freed tactical logistic units to deliver fuel forward in preparation for and during the ground offensive. These measures did not negate the problem of distributing fuel to forward elements. The decision to transition to the offense served to increase fuel requirements and necessitated the establishment of forward logistic support bases to reduce the distance between combat forces and their corresponding support bases. The continued increase in force structure, the dramatic increase in stockage levels, and the requirements for additional forward bases burdened the logistic system. These decisions placed an already over-taxed logistic structure in a very delicate position as the ground offensive progressed.[37]

One measure taken to rectify the increasingly difficult supply of forward forces was to increase the use of intra-theater airlift. Central Command (CENTCOM) implemented two types of support missions known commonly as STAR (Scheduled Theater Airlift Route) and Camel flights. STAR flights were a joint intra-theater attempt at moving people and mail throughout the Arabian Peninsula. In contrast, the Camel missions provided daily cargo transport service. At the height of ODS twenty-five C-130 aircraft were dedicated to STAR and Camel missions alone.[38] These missions greatly assisted the flow of supplies and personnel to forward staging bases. Yet, these missions were only as effective as logistic communications systems allowed them to be. For example, an improperly ordered critical item of supply might face rejection from the system, be delivered to the wrong customer, or result in duplicate shipments to the same customer. The lack

[37] Ibid., 475.
[38] Ibid., 493-494.

of connectivity of logistic automation caused immense strain on logistic personnel and contributed to the ineffectiveness of the distribution systems. The use of STAR and Camel flights did not rectify the problems of forward distribution stemming, in part, from poor connectivity of logistic automation systems. However, the use of intra-theater lift did mitigate some adverse affects of the stressed forward distribution system.

The connectivity of the logistic automation systems plagued the entire campaign. During ODS, LTFs were supposed to be linked to rear echelon support via logistic automation software. The effectiveness of logistic automation during ODS was substantially degraded by the lack of tactical communications support below the Corps level. In addition, the commercial communications infrastructure was virtually nonexistent in Saudi Arabia and Iraq. This situation caused many units to become dependent on commercial communications systems to augment tactical systems. Supply requests were often carried more than 100 kilometers daily by tactical vehicle or helicopter, and during the peak of activity, requisitions numbered over 10,700 per day. The lack of communications support for logistic automation equipment had several adverse effects such as the loss of labor due to courier transactions, longer order-ship times, and a larger number of parts in the supply line. This situation resulted in a loss of confidence in the system and the abuse of priority requisitions, manifesting itself in the form of multiple requests for the same item. These issues only increased backlog and saturation of the system.[39]

Closely linked to the problem of logistic automation is asset visibility. Asset visibility emerged as a critical shortfall of the logistic system in ODS. It also became a seemingly insurmountable obstacle to effective logistical and distribution efforts. Asset visibility requires knowing the status of requested materiel at every stage of the process from requisition to delivery.[40] This contributes to increased logistic flexibility and efficiency. During ODS, asset visibility was generally adequate until the items of supply physically arrived in theater. According

[39] Ibid., 463.
[40] Ibid., 498.

to the *Final Report to Congress*, "This lack of visibility resulted in considerable confusion and reordering, sometimes multiple reordering, of the same items by field units concerned about existing or projected shortages of crucial items."[41] The report also states that the distribution system supported units across vast distances with marginal communications, that a lack of supply discipline occurred at all levels of the supply chain, and that the manifest data received at arrival terminals was not quickly shared with materiel management centers because of the massive backlog that rapidly accumulated. These effects contributed to the confusion created by the ground offensive.

These complications become clearer when one considers that the Reserve Component port units and their Material Handling Equipment (MHE) were not early in the deploying elements. The report goes on to state, "This led to large materiel accumulations at the ports, adding to the visibility problem and delaying delivery to already anxious users."[42] The technological problems that were seemingly insurmountable in theater combined with the lack of logistic connectivity directly contributed to a loss of confidence in the supply system. In turn, the loss of confidence complicated logistic efforts and contributed to potentially overwhelming the logistic system relatively early in the campaign.

SUMMARY OF ODS

The logistic efforts of ODS appear massive given the short duration of the ground campaign, but according to the 1992 *Final Report to Congress*, logistic units could not keep pace with the advancing maneuver units. Logistic structure and doctrine were cited as being found wanting in the high tempo offensive operation. Specifically mentioned shortfalls were Heavy Equipment Trailers (HETs), off-road truck mobility, and a lack of connectivity for logistic automation systems. The report specifically stated, "Had the operation lasted longer, maneuver

[41] Ibid., 498-499.
[42] Ibid., 499.

forces would have outrun their fuel and other support."[43] Admittedly, this statement is a broad deduction, but one must consider that DOD had legitimate cause to assert this claim. Indicators of the shortfalls encountered were evident in the SUPCOM estimated requirement for 1,300 heavy expanded mobility transporters, 450 lowboy trailers, and 2,200 flatbed trailers for a total of almost 4,000 heavy vehicles just to move the heavy equipment and armored vehicles alone. This requirement forced FORSCOM to strip non-deploying units and the United States Army Europe (USAEUR) of more than 3,444 truck drivers.[44] The intense 100-hour campaign had virtually drained the entire US Army of many critical logistic assets and still neared overextension during the course of the short ground campaign. However, one must consider that hindsight provides clarity that was lacking to the planners of ODS. Undoubtedly, coalition forces expected much stiffer resistance from Iraqi forces and chose to use all available assets to ensure success.

Although ODS did not experience a logistic pause during the course of the short offensive, indicators exist that an unexpected pause was near at hand for part or perhaps all of the advancing formation. Based on the evidence, the ground forces were arguably near the end of

their logistic tether and an unplanned pause was nearing. The development of the TPFDD while executing the mission, the delayed deployment of critical logistic units, the lack of critical equipment such as HETs, the lack of supply discipline with the corresponding loss of confidence, the lack of communications connectivity combined with the lack of asset visibility, and the reliance on out-dated doctrine combined to nearly force an unexpected pause by the fourth day of the offensive. In summary, lengthy planning and positioning time, extensive host nation and coalition support, combined with the building of truly massive amounts of supplies and logistic forces allowed the ground forces to overcome these shortfalls. Fortunately, Iraqi resistance quickly collapsed and the operational objectives were secured.

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[43] Ibid., 344.

[44] Department of Logistics and Resource Operations, U.S. Army Command and General Staff College, *Logistics: Desert Storm and Into the 21st Century*, 101.

The *Final Report to Congress* stated "…the adequacy of material distribution performance was attributable largely to extended deployment time and large amounts of HNS that may not necessarily be available in other contingency operations."[45] Through the massive build up of stocks, extensive preparation time, robust host nation and coalition support, combined with the near Herculean efforts of logisticians, Operation Desert Storm was successful. This recipe for success cannot be expected in every contingency, and failing to investigate the critical logistic shortfalls of ODS may increase the logistic risk of future ground offensives. Now, an examination of OIF is in order to determine if the lessons learned in ODS received application a decade later.

OPERATION IRAQI FREEDOM

Some might argue that OIF was merely a continuation of ODS and that coalition forces had over a decade to prepare for the operation. However, the reader must be mindful that OIF differed considerably from ODS in many ways. Of particular note is that coalition forces were much smaller, deployed more rapidly, advanced farther, and faced stiffer opposition. As a result, the logistic efforts supporting OIF can be characterized as highly complex, relying on speed and synchronization. However, before turning to the specific logistic experiences of the operation one must place the operation in its historical and strategic setting.

OVERVIEW OF OPERATION IRAQI FREEDOM

To some observers the events of September 11, 2001, served as the excuse to "finish what was started" during the first invasion of Iraq. The growing concern over Saddam Hussein's regional ambitions, his noted support of terrorism, and his suspected possession of Weapons of Mass Destruction (WMD) served as reasonable cause to take military action against him. The factors determining the political decision to invade Iraq are well beyond the scope of this paper. However, it is interesting to note that over a decade had lapsed since ODS and US forces were

[45] Congressional Report, *Final Report to Congress*, 498.

once again preparing to conduct a ground offensive into Iraq. Coalition forces would face the Iraqi Army on parts of the same battlefield that it had twelve years before.

In late 2002, US forces continued to build supply stocks in theater and prepare for ground combat. Coalition forces had over a decade to pre-position stocks, to move critical items of supply, review lessons learned from ODS, and to establish new basing and support facilities in Kuwait. Saddam Hussein seemed poised for the massive air campaign, as was seen in ODS, to begin. On the night of March 19, 2003, without the expected massive air bombardment, the ground offensive began in earnest. US forces received intelligence that Saddam Hussein and his sons had been located and the potential for a decapitating strike on the Iraqi regime was great. The US reacted within hours and launched a combined strike of cruise missiles and stealth aircraft in combination with a ground offensive. The goal was to create "shock and awe" within the Iraqi government and force Hussein's capitulation. [46]

The ground invasion started before all the forces originally planned for were available. The 4th Infantry Division remained afloat in the Mediterranean because of the Turkish refusal for port access. In addition, the 101st Airborne Division (Air Assault) was still in the process of deploying its large number of aircraft and equipment. The primary ground elements conducting the ground offensive were the 3rd Infantry Division and the 1st Marine Expeditionary Force, in conjunction with Special Operations Forces supported by precision air strikes.[47] The strategic objective of US forces was to end the tyrannical, dangerous regime of Saddam Hussein.[48] The invasion forces' operational objective was Baghdad, and success depended on speed and synchronization as opposed to the emphasis on mass as experienced in ODS.[49] These were robust

[46] Anthony H. Cordesman, *The Iraq War: Strategy, Tactics, and Military Lesson* (Washington, D.C.: CSIS Press, 2003), 59.

[47] Ibid., 59-60.

[48] Williamson Murray and Robert H. Scales, Jr., *The Iraq War: A Military History* (Camridge: Belknap Press of Harvard University Press, 2003), 89.

[49] Ibid., 65-66.

objectives, but, by all appearances prior to March 23, the rapid US advance indicated that success was nearing.

On March 23, 2003, US forces began taking significant casualties and the advance on Baghdad slowed immensely. According to Anthony H. Cordesman, "…some outside observers concluded that the pace of the U.S. land advance threatened to bog down for days or weeks because Iraq was making creative use of asymmetric warfare in attacking the U.S. lines of advance." Concerns arose over the limited amount of available forces, the lack of preliminary air strikes, and the stiff, albeit irregular, Iraqi counterattacks and defenses encountered by US forces. These arguments gained validity as elements of the US V Corps paused for several days to regroup, and intense urban fighting near Al Kut halted the Marines.[50] According to Lieutenant General William Wallace, the commander of the V Corps, "The adjustment that we made was to actually fight and have a presence in some of these urban areas that we had not really planned to do. We planned to bypass them. But we found it necessary to establish a presence to stop these paramilitaries from influencing our operations."[51] Fortunately, the halt proved to be relatively short and the advance on Baghdad resumed.

The regime in Baghdad essentially ceased to function on April 9, 2003.[52] By April 13, "…the last remnants of organized resistance by main Iraqi units were fading and Saddam Hussein's regime had lost control over every major town in Iraq."[53] On April 14, Pentagon representative Victoria Clarke stated, "The regime is at its end and its leaders are either dead, surrendered, or on the run."[54] Once again, as in ODS, US forces had invaded Iraq and defeated Iraqi military forces in short order. However, the unplanned "near pause" of ODS became a reality in OIF.

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[50] Cordesman, 63-64.
[51] Ibid., 63-64.
[52] Ibid., 112.
[53] Ibid., 125.
[54] Ibid., 127.

The second invasion of Iraq advanced farther and against more determined resistance than the first invasion. During OIF, the advance to Baghdad coupled with the threatened forced removal of Saddam Hussein increased Iraqi resistance and determination to halt the advance. According to Anthony Cordesman, "There was an operational pause. JFLCC (Joint Force Land Component Command) imposed a four day operational pause prior to the final assault on Baghdad."[55] Although an operational pause occurred in OIF, the momentum of the attack was not lost. Arguably, the pause likely prevented an untimely culmination of the ground advance. Now, one must explore the factors that led to this unplanned logistic pause.

FACTORS LEADING TO A LOGISTIC PAUSE

Attacks by irregular Iraqi forces, a sudden sandstorm, and the sheer tempo of operations created a challenging tactical situation. The combination of effects "led to continuing coordination problems between forward combat elements and combat support, service support, and logistic forces."[56] These problems further affected the operational level and below by poor rear area communications and digital systems incapable of properly tracking or forecasting the battlefield effects on logistic requirements. These issues, coupled with the ad hoc nature of the flow of logistic units into theater, fostered an extremely complex logistic environment that contributed, as in ODS, to a loss of faith in the supply system.[57] The logistic measures taken in preparation for the offensive failed to negate the impacts of these issues.

Author Walter Boyne wrote in *Operation Iraqi Freedom: What Went Right, What Went Wrong, And Why* that "[d]espite all the statements to the contrary, the V Corps and the MEF outran their supply lines, and this not only hampered their forward movement but also exposed

[55] Ibid., 391.
[56] Ibid., 395.
[57] Ibid., 395.

them to the possibility of dangerous counterattack."[58] In *Logistics Transformation—Restarting a Stalled Process*, Lieutenant Colonel Victor Maccagnan, Jr. writes that while combat formations have been outdistancing their supplies lines for centuries, the fact that this situation continues to trouble the US Army after so many years of transformation efforts directed at preventing just such an occurrence is particularly troubling. Lieutenant Colonel Maccagnan, Jr. states that there are a "myriad of stories of units pleading for more ammunition—always ammunition first—and for other supplies…" during the course of OIF.[59] Clearly, distribution of critical supplies did not keep pace with the offensive and certainly contributed to the occurrence of the pause. However, before turning to the logistic measures taken in support of the offensive one must determine if a pause was planned, or even expected.

WAS A PAUSE PLANNED?

A sampling of officers involved in the ground offensive indicates that a pause was expected but not planned in detail. Colonel Kevin Benson, a senior CFLCC (Coalition Forces Land Component Command) planner, stated that a pause was expected but not planned for so early in the campaign. In a personal interview, Colonel Benson indicated that a pause was discussed at length by CFLCC planners and was expected at or near Karbala just prior to the final offensive on Baghdad.[60] However, the rapid advance of coalition ground forces quickly extended the LOCs and rendered the MSR (Main Supply Route) susceptible to attacks from irregular Iraqi forces. The sandstorm provided additional cover for these attacks, complicated resupply by ground, and virtually halted resupply by air. As a result, ground forces conducted a pause earlier than expected to secure the MSRs and conduct resupply in preparation for the final push to Baghdad.

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[58] Walter J. Boyne, *Operation Iraqi Freedom: What Went Right, What Went Wrong, And Why* (New York: Forge Books, 2003), 124.

[59] LTC Victor Maccagnan, Jr., *Logistics Transformation—Restarting a Stalled Process* (Strategic Studies Institute, January 2005), 10-11.

[60] COL Kevin Benson, Personal Interview, 9 February 2006.

In support of the assertion that the pause was expected but unplanned so early in the campaign, Major Kris Arnold, military aide to Major General Marks, the senior intelligence officer in CFLCC states,

> I can't remember whether or not [the pause] was planned. However, I think it was discussed that we may have to take an operational pause, especially when you consider the distances the forces were traveling. Again, like any planning process, you talk about a lot of things but not everything is going to make it into the order. I don't remember CFLCC staff being too surprised about having to take the pause, which leads me to think it had been discussed.[61]

In addition, Major Robert Umstead, a Task Force 20 Air Liaison Officer, said, "If the pause was planned it was not known by the air component." Major Umstead states that evidence of this fact is that the Fire Support Coordination Line (FSCL) remained north of Baghdad well into the halt in vicinity of An Najaf. Only upon the recommendation of the air component was the FSCL moved south to the leading edge of the paused ground units. This measure surfaced in order to protect paused friendly units as well as increase the availability of targets to the air component.[62] Surely, if the pause had been planned the adjustment of the FSCL would have been coordinated prior the pause occurring. Understandably, at some point, a pause was expected but nothing indicates that it was planned for so early in the campaign. Now one must explore the details of the pause itself.

DETAILS OF THE PAUSE

The pause during OIF began on March 21, 2003. At this time, the 3rd Infantry Division began surrounding An Najaf. Critical items of supply, particularly fuel and ammunition, began running low and the 230 fuel tankers in the division established refuel points and began refueling vehicles on the move and under fire.[63] At this point, Saddam's Fedayeen, paramilitary forces composed of loyal troops trained in guerilla warfare techniques, began concentrating attacks on

[61] MAJ Kris Arnold, Personal interview, 28 September 2005.
[62] MAJ Robert Umstead, Personal interview, 28 September 2005.
[63] Murray and Scales, 103.

the division. This storm provided the enemy with cover for infiltration of US lines, hampered resupply by ground, and virtually stopped resupply by air. The situation for the 3rd Infantry Division quickly grew dire as the irregular forces continued their attacks. "On one occasion troopers of the 7th [7th Cavalry Regiment] ran out of ammunition and, unable to receive resupply in the intense fire fight, relied on captured AK-47s and ammunition to continue."[64] Enemy forces, under the cover of a sandstorm, nearly severed the Lines of Communication (LOCs) and forced an unplanned logistic pause. The logistic situation had become perilous and the tactical situation had arguably become tenuous.

According to the *Objective Assessment of Logistics in Iraq*, "The long ground line of communication posed its own challenges. In general, the logisticians are not comprehensively trained, equipped, or tasked to defend themselves, and large areas left unsecured in the race to Baghdad. The asymmetrical warfare employed by the Iraqis did not allow logistic trains to move supplies effectively."[65] The inability of logistic units to contend with the climatic effects of the sandstorm and enemy attacks on the LOCs certainly contributed to the requirement for the pause. Given this perilous situation, one must explore the roots of the pause to determine what measures might have alleviated this challenging situation.

According to General (Retired) Gary Luck, the emphasis in OIF was "overmatching force" whereas the emphasis in ODS had been on "overwhelming force." Attacking across a wide spectrum of capabilities Iraqi forces would suffer systemic collapse.[66] This concept relied heavily on information systems that could provide greater fidelity than ever before. This situation should have "…allowed the Coalition to apply fewer numbers in precise ways aimed at psychological

[64] Ibid., 104.

[65] Defense Logistics Board, *Objective Assessment of Logistics in Iraq: DUSD (L&MR) and Joint Staff (JSJ4) Sponsored Assessment to Review the Effectiveness and Efficiency of Selected Aspects of Logistics Operations During Operation Iraqi Freedom (OIF)* (March, 2004), 28.

[66] Murray and Scales, 92.

dislocation of the enemy."[67] The logistic support of this "new way of war" was simply not able to keep pace. This problem became evident as combat formations maneuvered deep into Iraq—350 miles at some points—and connectivity to supply bases and logistic structure was lost. For example, "Most units literally spent 21 days in continuous combat operations without receiving a single repair part. A number of factors such as the inability to transmit data while on the move and lack of transportation assets fed the downward spiral from which it was nearly impossible to recover."[68] This inability to communicate on the move undoubtedly contributed to the complexity of a precarious logistic situation and to the logistic pause encountered early in the operation.

A relatively high level of logistic risk remained acceptable to ground forces. Lieutenant General William Wallace, V Corps Commander, noted that the drive on Baghdad had not been without logistic risk. He stated that he was concerned whether US forces would continue to be able to resupply if the enemy changed its tactics. Lieutenant General Wallace considered pulling lead elements back for resupply and consolidation but the commander of 2nd Brigade, 3rd Infantry Division, Colonel Dave Perkins, convinced Lieutenant General Wallace that it was actually safer to remain forward. In addition, Major General Blount, the commander of 3rd Infantry Division told Lieutenant General Wallace, "I think we can stay…We've got all the intersections secured. We can run fuel tankers in. We can run ammunition resupply in. We've got good lines of communication. I recommend we stay."[69] All ground forces, including the Marines, experienced a pause at roughly the same time. According to Lieutenant General Conway, 1st MEF Commander, "…[T]here was a halt, an operational halt, that allowed us to build supplies…and we held forces in place for two or three days…to get some supplies built up to the point we were comfortable that we weren't experiencing extreme risk."[70] These are strikingly honest

[67] Ibid., 93.
[68] Command and General Staff College, *End of Course Symposium* (Fort Leavenworth: US Army Command and General Staff College, 2005), RC-2.
[69] Cordesman, 117.
[70] Ibid., 396.

assessments made by commanders under fire in the field whose determination unquestionably led to regaining the momentum of the attack.

However, the fact that all ground forces encountered a pause nearly simultaneously is indicative that the pause was not expected. One would assume that logistic efforts would be synchronized within the operational plan so that only some maneuver elements would pause for resupply at a given time. To attempt to resupply all ground forces at once is challenging and, for the limited logistic assets supporting OIF, might risk losing the initiative or momentum of the attack. Fortunately, Lieutenant General McKiernan, CFLCC (Coalition Forces Land Component Command) Commander, quickly recognized the gravity of the situation. He authorized the release of a brigade from the 82nd Airborne Division to secure the lines of communication in support of the 3rd Infantry Division. The 101st Airborne Division (Air Assault) contributed to this effort as well. This situation allowed the 3rd Infantry Division to focus on advancing toward the objective of Baghdad. Generals Franks and McKiernan recognized the additional need to establish a fully functional forward supply base near An Najaf. Lieutenant General Wallace estimated that the corps needed to establish at least three DOS, and potentially five or six DOS, at this forward location in order to sustain the attack. These senior leaders agreed that, prior to launching the final attack, they needed to clear up the lines of communications and establish a forward supply base.[71] The establishment of this base was necessary in order to preserve combat power and regain the momentum of the offensive.

The most striking aspect of the invasion was not that the V Corps and 1st Marine Expeditionary Force had to pause for resupply or had to deal with the continuous threat to the extended lines of communication. According to Anthony Cordesman in *The Iraq War: Strategy, Tactics, and Military Lessons*, "…[I]t was rather that the average rate of advance became so high

[71] Murray and Scales, 128.

and continued in the face of major problems with weather and sandstorms."[72] On March 25-28, 2003, high winds, rain, and hellish sandstorms struck throughout much of Iraq.[73] This untimely weather event clearly muddled an already precarious situation. Precision guided munitions suffered degradation, communications were affected, and rotary wing resupply aircraft were grounded. Logistic efforts were primarily restricted to limited ground MSRs and emergency resupply by air became nearly impossible. Iraqi irregular forces used this opportunity to reposition and ambush logistic activities. The weather finally cleared and on March 29, the LOCs were secured, supplies moved forward and coalition forces resumed their advance. Now, one must explore how the logistic support measures affected the conduct of the offensive and contributed to the unexpected pause on day four.

LOGISTIC SUPPORT MEASURES

The logistic preparation for OIF differed considerably from ODS. Even though the United States had maintained a presence in theater for over a decade, it had not made extensive preparations specifically for a ground offensive. The decision to invade Iraq a second time developed rapidly and a rushed deployment sequence emerged accordingly. As in ODS, but perhaps with greater impact, CSS forces were placed in low priority for movement into theater. The level of logistic risk accepted by the senior leadership early in the campaign was significant. In order to explore this further, one must visit the logistic command and control efforts in theater, the use of pre-positioned stocks, and the impacts of host nation support (HNS). These efforts should have reduced the risks of the operation, but unfortunately, these efforts met with less than complete success. To explore this issue further, one must turn to the logistic planning for the operation.

[72] Cordesman, 74.
[73] Ibid., 76.

According to Admiral Lippert, commander of the Defense Logistics Agency (DLA), logistic planning for combat in Iraq began in July 2002. The planning effort clearly defined distribution as a weakness in the early phases of the campaign. In order to assist in the distribution of such vast quantities of supplies a Theater Distribution Center (TDC) was formed in Kuwait. This development was a non-doctrinal arrangement that faced a seemingly insurmountable task. Colonel Joseph L. Walden, commander of the TDC, stated, "Never in the history of the United States Army has a Theater Distribution Center been established in an active wartime theater of operations….Previous operations used Theater Logistic Support Bases, but never formally established one central distribution center to support all the military forces in a theater."[74] Colonel Walden identified problems early in the establishment of the TDC: "Daily we were reminded that the Theater Distribution Center was the 'Commanders Priority'. Yet, daily for the first two weeks we had to operate with detailed personnel."[75] This reinforces the assertion that logistic command and control was not adequate early in the campaign.

The inadequacy of logistic command and control is evident in the development of the TDC. The creation of an ad hoc logistic headquarters to oversee the initial distribution of supplies and materiel to forces arriving in theater indicate that logistic efforts were not thoroughly planned prior to initiating the offense. It is sufficient to say that this command was never able to fulfill its duties during the combat phase of the operation and the ad hoc nature of its creation is indicative of a noted distribution shortfall. The concept of a single theater distribution manager is certainly valid and the introduction of the TDC demonstrates that the US Army is wrestling with this problem. However, there are several reasons for the less than perfect performance of the initial TDC in OIF that deserve further clarification.

As an improvised capability, the TDC was not part of the original theater architecture. As two divisions, one Army and one Marine, deployed to theater the need for a distribution center

[74] Walden, 19.
[75] Ibid., 21.

became increasingly apparent. As had happened in the initial stages of ODS, combat forces arrived well ahead of the support elements and the small logistic footprint in theater was not adequate to properly receive and prepare two divisions for combat. The TDC provided a critical capability but located itself in an undeveloped location and lacked key communications capability, critical materiel handing capability, and enough trained personnel to function properly.

The TDC was supposed to fill in the "distribution gap" that resulted from the unusual force flow into theater and move logistic support quickly away from supply point distribution.[76] Admittedly, the personnel involved in the establishment of the TDC performed remarkably well in an ambiguous and fast-paced environment. However, their efforts were not sufficient to overcome the inertia of the backlog already forming in the theater. Lieutenant Colonel Maccagnan, Jr., in reference to a US Government Accountability Office (GAO) report at the conclusion of the ground offensive, confirms "…a backlog of hundreds of pallets and containers of materiel at various distribution points…a wide array of materiel, spread over many acres, that included a mix of broken and useable parts that had not been sorted into appropriate supply class." He goes on to note unidentified items in containers that were not opened and inventoried and items that appeared to be deteriorating due to harsh desert conditions.[77] The TDC attempted to organize itself to handle the massive quantities of supplies required for the ground offensive but could not overcome the inertia created by the "rolling start" of the operation.

The United States did not have the coalition support that it had experienced in ODS. The reason(s) for this lack of international support is beyond the scope of this paper, but the implications are tremendous for the logistic units supporting the offensive. It is sufficient to say that OIF was primarily an American operation with limited regional support. Saudi Arabia even denied the use of its ports in preparation for the offensive. Logistic units sought to focus their attention far forward in support of the critical "last tactical mile" but lacked the massive

[76] Defense Logistics Board. *Objective Assessment of Logistics in Iraq*, 25.
[77] Maccagnan, Jr., 12.

assistance of coalition partners that had proved so valuable in ODS. This lack of support caused the logisticians to dedicate crucial assets across the entire theater at the potential cost of reducing the availability of forward support.

In preparation for the ground campaign, DOD relied heavily on the use of pre-positioned stocks. These stocks proved crucial in the initial sustainment of ground forces. Admittedly, the delay of the 3rd ACR and 4th ID greatly reduced the initial need for prepositioned stocks. However, as opposed to ODS, units did not flood the theater with enormous amounts of supplies and extraneous materiel. Given the very limited logistic assets in theater prior to commencement of the offensive, these stocks proved to be extremely beneficial even though their importance was somewhat diminished by the small size of the employed ground force. Now, to determine the root of the logistic complexities of OIF one must turn to the actual deployment planning for the operation.

DEPLOYMENT PLANNING

In preparation for the ground campaign DOD decided in November 2002 not to utilize a TPFDD but elected to use the Request for Forces (RFF) process instead. The RFF process breaks the force flow into manageable modules, and, in theory, these modules can move quickly and expeditiously to the theater of operations. The intent was to deploy the minimum forces necessary to accomplish a quick, decisive victory. The large logistic base that had been deployed in support of ODS would not be required if the minimal amount of combat forces arrived rapidly and the mission was quickly accomplished. The RFF process separated into over 50 different deployment orders with combat forces receiving highest priority. Each of these deployment orders required its own time consuming transportation feasibility analysis, which resulted in a disrupted force flow into theater. Logistic commanders had to justify the flow of their units and equipment into the

theater often with little success.[78] The result, reminiscent of the early stage of ODS, was that combat units arrived in theater with virtually no one to receive them, and task organized logistic elements from forces arriving in theater performed the initial logistic support.

Once again, as in ODS, some critical CSS units, such as those possessing port handling and materiel handling equipment, arrived later in the deployment flow. Naturally, this situation affected support to ground forces accordingly. This decision may have seemed tactically prudent given the emphasis on speed, but it contributed to the initial burden on the logistic system. These initial delays led to support backlogs that quickly grew and required intense management to remedy.[79] This initial backlog and state of confusion, although manageable, set the conditions for strained logistic support of the upcoming ground offensive. However, it is important to note that the logisticians of OIF lacked the massive amount of logistic assets and units that were available in ODS. In comparison to ODS, the logisticians of OIF found themselves having to do "more with less" in regards to forward distribution.

The complicated force flow caused some consternation for units deploying in support of the operation. For example, units from the 377th Theater Support Command and the 3rd Corps Support Command either experienced deletion from the deployment list or suffered severe delays. This decision resulted in logistic personnel not being able to effectively support the daily increase in arriving personnel and make appropriate preparations for combat. The potential for an impending shortfall became apparent as units prepared for the offensive. US forces attempted to mitigate the effects of the poorly executed deployment process by assigning movement priorities to specific items of supply. Initial priority was given to food, water, ammunition, and fuel. Spare parts, which are critical to a mechanized force, moved on a limited basis due to low prioritization

[78] *Government Accountability Office Report. GAO-05-275: Actions Needed to Improve the Availability of Critical Items During Current and Future Operations* (4 August 2005), 11.

[79] LTC E. J. Degen, COL (Ret) Gregory Fontenot, and LTC David Tohn, *On Point: The United States Army in Operation Iraqi Freedom* (Fort Leavenworth, Kansas: Combat Studies Institute Press, 2004), 73-79.

for forward movement. The result of this prioritization is exemplified by the fact that two weeks became the average time for critical spare parts to move from staging areas in theater to combat units. Given that the entire ground offensive only lasted three weeks, it is conceivable that some units received little, if any, spare parts during the course of the campaign. This problem may be evidence of a hampered forward distribution system stemming from the effects of a "rolling start."

The effects of the "rolling start" disrupted distribution efforts throughout the combat phase of the operation. For example, a GAO report confirmed that after 45 days of combat, transporting water still consumed over 60 percent of the available transportation assets and some units stated that they received no spare parts during the course of the offensive.[80] The requirement to devote such a large amount of transportation assets to transport water at the expense of distributing spare parts is indicative of a shortage of transportation assets in theater. Arguably, this shortage of assets may have been rectified if the transportation requirements had been more thoroughly analyzed and critical logistic assets included in the initial deployment planning. Logistic assets found themselves conducting a "rolling start" with little time to prepare themselves or their customer units for combat and the impacts were felt throughout the entire theater. Now that a review of the factors leading to the pause, the logistic support measures employed prior to and during the offensive, and the deployment planning involved in the operation have been discussed, one must examine the doctrinal framework of OIF.

DOCTRINAL ISSUES

The doctrine employed in OIF was Distribution Based Combat Service Support. This doctrine emerged from the lessons learned of ODS. According to *Field Manual (FM) 4-0 Combat Service Support*, dated August 2003, "Distribution-based CSS replaced bulk and redundancy with velocity and control…only an agile distribution-based CSS system will allow Army forces to be

[80] *Government Accountability Office Report. GAO-05-275*, 11.

strategically responsive and operationally effective across the full range of military operations." FM 4-0 emphasizes the use of maximized throughput and states, "Throughput is the flow of sustainability assets in support of military operations, at all levels of war, from point of origin to point of use. It involves the movement of personnel and materiel over lines of communications using established pipelines and distribution systems." [81]The experiences OIF indicate that the forward distribution of critical supplies is a shortfall of current CSS operations, just as it was in ODS.[82]

In order to maximize throughput during the course of OIF, commanders at all echelons relied strongly on "reach back." In theory, "reach back" allows the theater commander to support maneuver forces without having to deploy significant assets to forward locations. Reach back is difficult due to the distance from the national support base to the combat zone. For example, a decision made that requires an item of supply from CONUS (Continental United States) takes 60 days for the item to arrive by sealift at the requesting unit in Southwest Asia (SWA). Accepting the small volume of supplies that occurs by air, this 60-day shipping time means that if a combat unit did not begin the fight with an item in hand, the request for the item generally remains unfilled during the course of the offensive.[83] According to the Defense Logistics Board, in a review of OIF logistic operations, "The limited view of actual consumption by the forward support elements or combatant units left no choice but to rely on push packages and authorized unit loads."[84] Push packages can be effective but can also be wasteful of resources and are somewhat inefficient by design. Push-packages are doctrinally acceptable and do provide a vital link in the logistic chain; however, these packages must be planned, resourced, and constructed in a timely manner in order to support a rapid ground advance. Normally these packages are for

[81] Headquarters Department of the Army, *FM 4-0 (FM 100-10) Combat Service Support* (Washington: August 2003), 1-10.

[82] Ibid., 1-10.

[83] Department of Logistics and Resource Operations, U.S. Army Command and General Staff College, *Logistics: Desert Storm and Into the 21st Century*, 15.

[84]Defense Logistics Board, *Objective Assessment of Logistics in Iraq*, 17.

emergency resupply on a case-by-case basis and not the preferred primary method of distributing supplies. The extensive use of push packages as an emergency measure may be indicative of a lack of prior logistic planning.

According to an After Action Report of the 24th Corps Support Group, the logisticians did not work through problems ahead of time to anticipate needs once they got on the ground. In addition, the late arrival and integration of logistic headquarters units, such as the 3rd Corps Support Command (COSCOM), further complicated command relationships prior to the combat phase of operations. Because of the late arrival and integration of logistic units, logistic activities were not fully planned, coordinated, or integrated when units crossed the line of departure into Iraq.[85] The report goes on to state that there were only three MSRs available in support of the offensive. Of these three only one MSR received designation for Army forces. Naturally, commanders knew these MSRs would become lengthy and congested by traffic. Because of this expectation, tactical units took everything they possibly could with them in the advance, which increased the length of the supply columns even more. This situation is reminiscent of the LTFs and massive convoys utilized in ODS. To make matters worse, "[t]he long supply lines could not be controlled by MPs [Military Police] because they were not included in the forward echelons, and due to choked routes could not get to the forward echelons to clear the choke points."[86] Simply put, the doctrinal concept of distribution-based logistics remained untenable throughout the ground campaign. As in ODS, the evidence of this failure is revealed in the distribution problems experienced during the offensive.

DISTRIBUTION PROBLEMS

Of course, as history clearly records, the ground campaign was successful and logistic issues did not prevent a military success. However, the ad hoc formation of the Theater

[85] Ibid., 13.
[86] Cordesman, 391.

Distribution Center (TDC) and heavy reliance on emergency resupply were temporary solutions to the problems created by poor deployment planning that manifested themselves as distribution shortfalls. These shortfalls and the logistic issues surrounding them receive further exploration in the following paragraphs.

Significant logistic concerns were evident early in the offensive. Shortly after the invasion launched, national television in the United States reported severe food and water shortages in combat units. These reports ran globally within ten days of the initiation of the ground offensive. General Tommy Franks quickly refuted these reports by stating, "We have sufficient, and have had sufficient, stocks all across the battlefield of food, water, fuel, and ammunition. But that doesn't necessarily mean that … Sergeant Franks or Private Franks out there in the west-most squad, because he was involved in some serious combat, may not have gotten his fair share on a given day."[87] This statement, made from a well-seasoned and informed officer, emphasizes the reality of the battlefield. However, it also indicates that distribution, especially to "Private Franks in the west-most squad," remained a logistic shortfall during the course of the campaign and may have contributed to the need for a logistic driven pause.

Colonel Joseph L. Walden wrote in the book *The Forklifts Have Nothing to Do!: Lessons in Supply Chain Leadership* that "[o]ne soldier told me that they went six days without a ration delivery and if it were not for the goodies from home and the snacks that the soldiers brought with them, they would have gone hungry."[88] Colonel Walden also states that these types of shortages were primarily the result of the long distances required to support from Kuwait, the location of combat units in Iraq, the interdiction of the road network by para-military forces, and the lack of dedicated lift assets to move the rations and general supplies forward. During the advance, the lines of communication became over-extended and there simply was not enough truck and rotary wing assets to support such a rapid offensive. Lieutenant Colonel Maccagnan,

[87] Maccagnan, Jr., 10.
[88] Walden, 16.

Jr., author of *Logistics Transformation—Restarting a Stalled Process*, acknowledged these shortfalls**.** He states, "…[T]he Army simply did not have enough trucks to support and sustain the long distance supply chain."[89] This situation was only part of the cause of the distribution problem. According to Lieutenant Colonel Maccagnan, Jr., "The basic components comprising a theater distribution system were not there. Trucks being just one obvious part." [90]

Food, particularly combat rations or MREs, became a critical issue during the offensive. Food remained critical throughout major combat operations and only ended when permanent or semi-permanent dining facilities were established. Certain Army units, particularly in 3rd Infantry Division, reported running out of MREs. Even though no proof exists to date of any ground forces completely running out of food during the offensive, some units may have been at risk due to a hindered distribution system.[91] According to several after-action reports, the lack of appropriate ground transportation, particularly cargo trucks, contributed greatly to the distribution problem. For example, the 377th Theater Support Command (TSC), responsible for logistic support in Kuwait reported that it required 930 cargo trucks but had only 515 available when the offensive began. The 377th TSC attempted to rectify the problem via contractors, but this action did not alleviate the problem. The 377th TSC continued to function with roughly half of the required transportation assets for the duration of the ground campaign. This critical shortfall became evident in the movement of MREs from the port to the TDC. During the offensive contractors reported only having 50 out of the 80 required trucks for moving MREs, and the TDC was critically short of transportation assets as well. As a result, DLA officials reported that at one point in the offensive 1.4 million MREs were at the port awaiting transportation. This evidence suggests that the distribution system was not prepared to support the advance.[92]

[89] Maccagnan, Jr.,10-11.
[90] Ibid., 11.
[91] *Government Accountability Office Report. GAO-05-275*, 5.
[92] Ibid., 11.

The limited availability of trucks and distribution assets adversely affected the distribution system as well. As noted earlier, contracting for commercial trucks mitigated the problem to some extent but did not resolve it. As a result, the 3rd Infantry Division chose to use available line haul capacity to satisfy fundamental requirements for food, fuel, water, and ammunition leaving behind large quantities of repair parts.[93] According to a House Armed Serviced Committee hearing on OIF lessons learned, "Multiple After-Action Reviews [AARs] from the ground forces conducted after the end of the combat phase of operations consistently cite the lack of Class IX parts during combat operations as a logistical planning shortfall."[94] The lack of critical assets, combined with a delayed deployment of logistic assets severely strained the distribution efforts.

The criticality of some distribution shortfalls is evident in the review of ammunition management. According to the 3rd Infantry Division After Action Report, Chapter 1, ammunition quickly became a critical commodity in the advance into Iraq. The report notes that consumption rates for ammunition proved much higher than anticipated. Common ammunition, such as 25mm and 155mm High Explosive, experienced nearly continuous consumption for the first three days of the advance. The report goes on to state, "Although they had intended to travel ammo resupply with the division, the COSCOM was unable to muster and organize the assets and have them integrated with the division prior to LD (crossing the Line of Departure)."[95] Simply stated, the assets required to move ammunition were not available in the required quantities when the offensive began.

Fuel proved to be another critical item of supply, but fuel distribution did not hinder the ground offensive. The 3rd Infantry Division received a sizable bulk fuel package from corps and

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[93] United States Congress House of Representatives, *House Armed Services Committee: Subcommittee on Readiness Holds a Hearing on Iraqi Freedom Lessons*, (30 March 2004), 28.

[94] Ibid., 11-12.

[95] Third Infantry Division (Mechanized), *Third Infantry Division (Mechanized) After Action Report – Operation Iraqi Freedom* (7 July 2005), 1.

echelons above corps. The division crossed the line of departure with the additional fuel assets of two Petroleum, Oil, and Lubricants (POL) companies and a Direct Support (DS) fuel company, which provide 170 bulk fuel transport trucks. According to the division after action report, "Without these assets, the Division would have been forced to stop, tethered at no more than the time/distance a truck driving team could make in a single day. Instead the division was able to cover nearly four times that distance in less than two days, and still had fuel in the weapons systems to continue operations."[96] In the case of fuel, adequate refueling assets were in theater and the effective employment of these critical assets greatly contributed to the ability of logisticians to provide support.

In addition to ammunition and fuel, other critical items of supply experienced distribution problems. Tires and batteries top the list of items that reached critical shortage during the course of the offensive. According to a GAO report, "…[U]nits in 3rd Infantry Division reported that tire shortages affected their mission by forcing them to abandon equipment."[97] In addition, the same GAO report identifies non-rechargeable lithium batteries as a severe shortfall. These batteries power more than sixty pieces of critical communications and electronic systems such as radios and missile guidance systems. In May of 2003, confidence in the supply system had faltered which caused duplicate requisitions and orders to rise rapidly to over 900,000 demands per month for these batteries. This situation is notable when compared to the peacetime requirement of 20,000 demands per month. According to Marine Corps officials, "…[I]f the war had continued at the same pace into May 2003 or beyond, Marine units would have experienced degraded communications capability and increased risk as a result of battery shortages."[98] The possibility that a US ground offensive could be seriously degraded, or halted, due to the lack of tires and batteries is alarming. These shortages are indicative of a distribution system that was ineffective

[96] Command and General Staff College, *End of Course Symposium,* RC-3.
[97] *Government Accountability Office Report. GAO-05-275*, 5.
[98] Ibid., 6.

and, in turn, probably contributed to the requirement for an unplanned pause. The lack of batteries led to the diminished ability to communicate which in turn may have contributed to the loss of situational awareness by some advancing elements.

Communications problems plagued US forces in OIF just as they had in ODS. Logistic information systems proved to be seriously lacking in support of the advance and contributed to the lack of an effective distribution system. According to a GAO report on OIF, "Logistics information systems in use during OIF could not effectively transmit data, making it difficult to process and track requisitions for critical supplies."[99] This problem was attributed to the lack of bandwidth in theater to support the myriad of systems users, systems incompatibility, the lack of the necessary equipment within the units for systems linkages, and distances being too great during the offensive for effective data transmission by radio. The report goes on to state that 3rd Infantry Division only received approximately 2,500 of the 10,000 items ordered including track shoes, lithium batteries, and tires requisitioned during the division's deployment to OIF.[100] According to Lieutenant General Christianson, CFLCC C-4, "…I can assure you that even though we ran this operation with a much smaller pile of supplies than we did in Desert Storm, we did not run out of anything at the theater level."[101] However, logistic information systems could not interface at the theater level resulting in theater stocks not consistently being available to forward combat formations. According to Brigadier General Usher, USMC 1st Force Service Support Group (FSSG) Commander, "We could have mitigated some of those shortfalls by having better in-transit visibility and a better picture or common logistic picture of the battlefield."[102]

The lack of a functioning logistic information system was evident in the lack of asset visibility in the distribution system. This lack of visibility had negative impacts on a clearly

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[99] Ibid., 12.
[100] Ibid., 12.
[101] House of Representatives, *House Armed Services Committee: Subcommittee on Readiness Holds a Hearing on Iraqi Freedom Lessons,* 8.
[102] Ibid., 9.

stressed distribution and materiel management system. The effects were particularly critical at the TDC where the lack of in-transit visibility forced TDC personnel to sort incoming shipments manually. Poor asset visibility and tracking in OIF is attributed to two primary problems. The first problem was the failure to place radio frequency identification tags on all shipments sent into theater. The second problem was the lack of scanners at fixed facilities. The first problem resulted from a conscious decision to rapidly move supplies into theater. This decision, at Army Materiel Command (AMC) and Defense Logistics Agency (DLA), was one made of expediency. The use of hand held scanners might have corrected the second problem, but these scanners often failed in the harsh environment of Kuwait and Iraq.

Distribution and communication problems had serious consequences for the maneuver and logistic units conducting the offensive. CENTCOM reported approximately 1,500 Small Arms Protective Inserts (SAPI) plates were lost and 17 containers of MREs were left at a supply base in Iraq in excess of a week.[103] These items might have saved lives during the offensive and reflect the precarious logistic situation in which US forces found themselves. The critical lack of connectivity led to a decreased level of situational awareness for logisticians throughout the battlefield. Even with a decade to improve, the logisticians of OIF encountered connectivity problems eerily reminiscent of ODS. This problem causes alarm since without adequate mobile connectivity distribution-based logistics simply cannot work.

The lack of adequate communications equipment mated with the piecemeal introduction of logistic assets eroded many logisticians' sense of situational awareness. According to Anthony H. Cordesman, effective situational awareness for logisticians simply did not exist. Cordesman faults the synchronization and movement of support forces with the operations of combat forces. He states that CSS forces were not properly equipped to operate as independent and mobile units required in support of the combat formations. Cordesman argues that logistic units did not receive

[103] Ibid., 13.

anything approaching the past level of effort for protection.[104] This issue received widespread attention when a disoriented element of the 507th Maintenance Company entered Al Nasiryah alone and was ambushed with US soldiers being captured by Iraqi forces. The loss of this convoy suggests that logisticians forward on the battlefield possessed generally poor situational awareness and lacked the ability to communicate while on the move.

A shortage of support personnel in theater prior to and during the initial phases of the campaign contributed to the distribution shortfall as well. Many of the limited number of support personnel on the ground early in the campaign were not skilled in their assigned duties. According to a GAO report on the build-up for OIF, this critical shortage of trained personnel was most apparent in the TDC and resulted in added "delays in the processing (receipt, sorting, and forwarding) of supplies, and backlogs."[105] The report goes on to indicate that the TDC had roughly 200 personnel assigned in March 2003 and did not reach its anticipated staffing level of 965 personnel until May 2003. The TDC, the hinge of distribution efforts in theater, was at less than thirty percent strength during the early days of the campaign. In addition, when the TDC opened, a backlog of 5,000 pallets already existed. The fact that more shortages did not develop during the course of the campaign is remarkable, given that the center opened with a huge backlog, did not control even half of the necessary cargo vehicles for effective distribution, and remained critically short of trained personnel during the major combat phase of the operation.

According to congressional testimony, "One of the major causes of distribution problems during OIF was that most Army and Marine Corps logistic personnel and equipment did not deploy to the theater until after the combat troops arrived. Most Army logistic personnel did not arrive until after major combat operations were well under way."[106] The testimony went on to say that, of those Army personnel arriving, "[l]ogistic personnel were not adequately trained in

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[104] Cordesman, 206.
[105] *Government Accountability Office Report. GAO-05-275*, 11.
[106] House of Representatives, *House Armed Services Committee: Subcommittee on Readiness Holds a Hearing on Iraqi Freedom Lessons,* 3.

various logistic functions such as operating material handling equipment, and managing theater distribution centers."[107] The lack of training, when combined with late, piecemeal arrivals, undoubtedly contributed to the confusion and backlog of supplies, services, and logistic functions in theater, which prevented the optimization of logistic efforts in theater.

Finally, to exacerbate complicated resupply issues the roads simply would not sustain the traffic. On March 21, the 3rd Infantry Division moved over 5,000 vehicles and roughly 20,000 soldiers forward along Highway 28. The road quickly began to collapse resulting in treacherous movement of supply vehicles and deadly exposure to fatigue and to enemy interdiction.

According to the book, *The Iraq War: A Military History*, "After enduring the abuse of a few seventy-ton Abrams tanks, road surfaces began to deteriorate rapidly. Even paved surfaces soon became sand traps. Adding to the difficulties, the movement of thousands of vehicles churned up the sand into a permanent reddish fog that smothered every piece of equipment and choked every throat."[108] After three tortuous days of movement in combat, soldiers and leaders found themselves at the limit of endurance and operational effectiveness. However, as noted earlier, the pause was not expected this early in the campaign and may have simply been the untimely culmination of the initial stage of the offensive.

SUMMARY OF OIF

According to the 3rd Infantry Division final AAR, "The degree of comprehensive, thorough, and rigorous logistic planning, judged by comparing OIF to prior operations, emerged as a major issue throughout the discussions." The abandonment of the TPFDD process in mid-cycle caused other planning tools to render obsolete information or provide inaccurate data (e.g., tank treads projections were significantly off).[109] Lieutenant General Dail, Deputy Commander of US Transportation Command, notes in congressional testimony that "…we were not able to

[107] Ibid., 3.
[108] Murray and Scales, 101.
[109] Third Infantry Division (Mechanized), 11-12.

effectively hand off and synchronize the strategic to operational logistic efforts once it got into theater, once it got into Kuwait."[110] Lieutenant General Dail goes on to state that a general understanding of the overall scope of impending operations did not reach many of those who might have applied the appropriate planning processes and tools to support the operation. He notes that the result was that many agencies and commands did not follow their established processes and failed to apply planning tools appropriately. He concludes that the speed at which the operation occurred resulted in core planning processes and tools that could not support an Operational Tempo (OPTEMPO) as that encountered in OIF.[111]

According to the 3rd Infantry Division AAR, "…[W]ith numerous logistical challenges throughout the operation, specifically during the operational pause … many units operated dangerously low on ammunition, fuel, water, and other sustainment items."[112]The report goes on to state, "Difficulty in movement on routes and inaccessibility to routes caused unit movements to last as much as 100% longer than planned." The assumptions regarding the ease of movement and LOC security proved to be very optimistic. The report concludes by stating, "Despite detailed planning, the failure of these assumptions caused movement forward not to occur as planned."[113] Based on the evidence, logistic concerns and critical shortfalls of supplies certainly constitute a large part of the decision to halt the advance on Baghdad.

The logistic effort in OIF was considerably stretched considering it supported a rapid armored advance of nearly 75 miles a day.[114] Logisticians maintained continuous operations with minimal preparation time due to delayed deployment, provided immense amounts of fuel and munitions with very limited assets, distributed over 40,000 gallons of water a day with little host

[110] United States Congress House of Representatives, *House Armed Services Committee: Subcommittee on Readiness Holds a Hearing on Iraqi Freedom Lessons,* 10.
[111] Ibid., 41.
[112] Third Infantry Division (Mechanized), 1.
[113] Ibid., 13.
[114] Cordesman, 130.

nation support, and supplied over 300,000 cases of MREs across the breadth of the battlefield.[115] These accomplishments were remarkable given the nature of enemy resistance, the erratic weather conditions, and the complexity of the employed maneuver forces. Undoubtedly, the success of logistics in OIF was due in large part to the art of improvisation and the remarkable adaptability of the soldiers on the ground.

According to Lieutenant General Claude Christianson, "The achievements of our logisticians are especially significant in light of the fact that they were asked to support a 21st century battlefield with a mid-20th century logistic structure."[116] Lieutenant General Christianson stated in congressional testimony, "In general, our logistic systems, procedures and organizations were not ideally suited to support the rapid combat operations that defined the vast Iraqi battlefield." He also indicated that the modern battlefield is characterized by widely dispersed operations, is noncontiguous in nature, and connected by insecure lines of communications. The pace of operations in the modern battlefield is rapid, with forces reorganizing as rapidly as the enemy situation changes.[117]

Even with training deficiencies, technical challenges, a complex and adapting enemy, operating in an austere environment, and supporting a rapid advance of a mechanized force, Army logisticians adapted with flexibility in support of the offensive. The Coalition was fortunate in its logistic success. The familiar problems of deploying logistic forces late in the force flow, inadequate connectivity of logistic automated systems while on the move, and the inability to effectively distribute supplies forward directly contributed to an unplanned logistic pause early in the ground offensive. Now one must ask what can be done to prevent the recurrence of these logistic problems in future campaigns.

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[115] Ibid., 203.

[116] United States Congress House of Representatives, *House Armed Services Committee: Subcommittee on Readiness Holds a Hearing on Iraqi Freedom Lessons*, 5.

[117] Ibid., 5.

RECOMMENDATIONS

The Defense Logistics Board, *Objective Assessment of Logistics in Iraq* states, "During OIF, we have been engaged for months, not hours, but have moved only two-thirds of the volume we moved for Desert Storm."[118] History records the ground offensive of OIF as a combat success; however, OIF revealed unresolved logistic problems as well. Stove piped processes, inadequate in-theater planning, insufficient resources, and a lack of flexibility in the logistic chain required numerous ad hoc solutions for basic requirements. "Logistics in OIF was characterized in one Army AAR as 'brute force logistics.' From the perspective of the war fighter, logistics failed to provide the required level of support."[119] Similar comments were made following ODS as well. The concept of distribution-based logistics emerged from ODS, was tested in OIF and failed to perform as expected.

Naturally, everyone does not see the logistic efforts in OIF or ODS as a failure at all. In comparison to ODS, OIF did exhibit increased efficiency and effectiveness but this performance did not negate the occurrence of an unplanned logistic pause. OIF logisticians attempted to maximize throughput and endeavored to synchronize the delivery of personnel and equipment to reduce the waste associated with the infamous "Iron Mountains" of ODS.[120] The comparison to ODS is critical to understanding the logistic success and failures encountered in OIF. In OIF, the advance extended for hundreds of miles through urban areas with significant terrain constraints, which is significantly different from the miles of open desert encountered in ODS.[121] Given the similar outcomes within the framework of the physical similarities of these offensives, the US Army must now decide how to mitigate the need for a logistic pause in future ground campaigns. When viewed through the lenses of organization, doctrine, and leadership some key observations become apparent.

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[118] Defense Logistics Board, 7.
[119] Ibid., 11.
[120] Ibid., 14.
[121] Ibid., 15.

ORGANIZATION

The organization lens provides a common view of ineffective distribution systems in both operations. Planners in ODS configured massive supporting convoys and LTFs to support the advance, but planners in OIF simply did not have the resources to do so. Both campaigns relied heavily on the use of connectivity to distribute supplies at the necessary times, but logistic connectivity on these mobile battlefields proved ineffective. The inability to consistently communicate logistic requirements and statuses led to a loss of faith in the system and finally to a breakdown of established processes.[122] An after action review conducted following OIF states, "Army support elements for the 3rd ID used systems that could not be connected while in motion. Because of the speed of advance required these units to generally be on the move, they were unable to connect to process any supply data."[123] The report goes on to state that the theater infrastructure was unplanned and not developed prior to the initiation of the combat phase of operations.[124] These comments are as applicable to ODS as they are to OIF.

The US Army must continue to pursue communications systems that are capable of sustaining forces on the move. It is imperative that logistic units receive adequate bandwidth and hardware to communicate requirements. This "communications network" provides the framework for distribution and is particularly critical during a rapid ground offensive. As the US Army continues to evolve from the "mountains" of ODS it must have the communications infrastructure, hardware, and trained personnel to identify requirements and coordinate the distribution of supplies and effective services. A single, common operating picture, such as that found in the recently fielded BCS3 (Battle Command Sustainment Support System) is required to fully integrate logistics in the emerging command and control network and provide logisticians with the situational awareness required to support a modern ground offensive.

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[122] Ibid., 50.
[123] Ibid., 65.
[124] Ibid., 80.

The lens of organization also illuminates critical shortfalls in the transportation assets needed to support a ground offensive on the scale of ODS or OIF. Admittedly, in OIF the US Army made a corporate decision to not deploy the significant amount of transportation assets deployed in support of ODS. However, a 3rd ID After Action Review of OIF stated, "The lack of transportation assets frustrated the logistic arena. The poor response to logistical support, especially repair parts, was largely due to the lack of ground and air support."[125] The report also states that the lack of general transportation assets (light/medium and medium truck companies) and the failure of host nation assets to perform as planned had a negative impact on the consistency of support to the division. The report summarizes by stating, "The assets were not sufficient to support corps and divisional requirements."[126] Naturally, this shortfall in transportation assets created shortages when carrying capacity could not meet operational requirements.

A possible corrective measure for this issue is the acquisition of additional transportation assets such as trucks or palletized loading systems. Unfortunately, merely increasing the availability of transportation assets on the battlefield will serve to no avail if these assets do not deploy early enough to perform critical missions. As ODS and OIF demonstrate, the deployment sequence of these limited assets may directly affect the operational reach of maneuver elements. In ODS and OIF these assets and their corresponding units moved late in the force flow and received piecemeal introduction in the deployment sequencing. To continue this trend will only serve to hinder logistic support by reinforcing the failures associated with a "rolling start" and increase the risk of a logistic pause in future offensives. Simply stated, logistic transportation assets and their associated command and control structure are critical to operational success and must be effectively deployed and managed accordingly.

[125] Third Infantry Division (Mechanized), 2.
[126] Ibid., 7.

DOCTRINE

The lens of doctrine offers key insights as well. Today, primarily because of the experiences of OIF, doctrinal manuals that address distribution-based logistics and operational pauses are being drafted at an ever-increasing rate. The US Army cannot continue to rely on hastily task organized units, such as the SUPCOM in ODS or the TDC in OIF, to control the distribution process in a ground campaign, someone must be in charge. As one observer noted, "The general consensus since OEF [Operation Enduring Freedom] and OIF has been that no one agency or organization exercises overall control of the distribution process; the follow-on implication is that this lack of ownership lies at the root of distribution problems experienced during these operations."[127] Fortunately, DOD has identified US TRANSCOM (United States Transportation Command) as the process owner for distribution from "factory to foxhole."[128] It remains undetermined whether this command can effectively control the distribution process from the strategic to the tactical level. However, the designation of a sole process owner for distribution is certainly a positive step toward solving the distribution problem.

In both ODS and OIF, distribution proved to be extremely complex. In ODS the problem was mitigated by flooding the theater with all available assets, and in OIF the emphasis fell on the minimum amount of logistics required to support a rapid and decisive victory. As evidence demonstrates ODS nearly experienced a logistic pause by day four of the campaign even with the "mountains" of supplies moved to the theater. In contrast, OIF relied primarily on throughput of supplies and did encounter a logistic pause early in the campaign. The US Army must determine why distribution continues to plague Army ground campaigns given the different levels of logistic risk accepted in each of these campaigns. An OIF after action review states that a key reason for failure of distribution-based logistic in operations as massive as OIF is the incredible

[127] Maccagnan, Jr., 20.

[128] United States Army Combined Arms Support Command. *Modular Force Logistics Concept: Version 1.2* (Fort Lee, Virginia: August 31, 2005), 14.

complexity of the system. Distribution-based logistics requires a system that enables a unit to order supplies, enables managers to achieve a required level of Total Asset Visibility (TAV) to order and redirect supplies, enables units to receive and configure supplies, and allows for the proper type and quantity of transportation assets to support the customer units. The report goes on to state that "[f]ailure in any one of the component areas of distribution-based logistics will cause problems. Failure in multiple areas, or in the case of OIF in nearly all areas, can be disastrous. This complexity is manageable, but only if the system is established early. What was revealed in both OEF [Operation Enduring Freedom] and OIF was that we failed to establish the system."[129]

The critical first step in mitigating distribution problems is to ensure the early deployment of logistic forces and the integration of critical transportation assets into the campaign plan. TRADOC (United States Army Training and Doctrine Command) notes, "…Future Force sustainment units must rely on the same level of situational understanding as the operational formation they support, allowing logisticians to anticipate operational commanders' priorities rather than merely reacting to them."[130] The US Army is pursuing modular formations that should transform the force into a more rapidly deployable and sustainable force. As of this writing modularity doctrine remains under development and the implementation of the modular force concept remains incomplete. However, the formation of modular CSS units, such as the newly formed Sustainment Brigades that are responsible for maintaining the distribution system in coordination with the Theater Support Command, is certainly a positive step in addressing the doctrinal problems associated with forward distribution.[131]

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[129] Maccagnan, Jr., 18-19.

[130] *The Army in Joint Operations: The Army's Future Force Capstone Concept 2015-2024 Version 2.0* (Fort Monroe, VA: Department of the Army, April 2005), 33.

[131] United States Army Combined Arms Support Command. *Modular Force Logistics Concept: Version 1.2*, 11.

LEADERSHIP

The leadership lens provides the final recommendation of this paper. In response to the logistic shortfalls identified in recent campaigns, the Army G-4 is leading the logistic transformation effort by emphasizing four logistic focus areas. These focus areas are: (1) Connect the Logistician, which focuses on improving the connectivity of logistic communications systems, (2) Modernize Theater Distribution, which emphasizes positive control of end-to-end deployment and sustainment systems, (3) Improve Force Reception Capability, which emphasizes focused planning and the use of self-contained cohesive logistic packages, and (4) Integrate the Supply Chain, which concentrates on asset visibility throughout the entire supply chain.[132] Admittedly, at this time, these initiatives remain relatively immature, but are being addressed as rapidly as current funding will allow. These focus areas are certainly a significant step toward mitigating the logistic problems identified in OIF.

However, these focus areas do not specifically address the force flow of logistic units into a theater of operation. According to LTC Maccagnan, Jr., "Part of the challenge of supporting combat operations while the force is still deep into the deployment process, or conducting 'a rolling start' as it was termed for OIF, lies in basic logistic planning and the development and execution of the initial support concept."[133] Simply put, if Army leadership continues, as in ODS and OIF, to place CSS late in the deployment cycle ground commanders will be forced to accept a higher level of logistic risk early in an operation. The failure to properly plan, deploy, and build a theater logistic support structure prior to operations commencing may result in an unplanned logistic pause early in a ground campaign. A functioning logistic support structure established early in a campaign, combined with a networked and resourced distribution system manned by qualified personnel will greatly reduce the potential for an unplanned logistic pause. To disregard

[132] Headquarters Department of the Army, Office of the Deputy Chief of Staff, G-4. *Logistics Transformation: Adapting to Next-Generation Warfare and Technology Change*. (Washington: 2 October 2003), 3.

[133] Maccagnan, Jr., 23.

these concerns is inherently dangerous and increases the potential for an unplanned logistic pauses in future ground offensives.

CONCLUSION

According to Lieutenant Colonel Victor Maccagnan, Jr., since the official beginning of the Army's transformation journey in 1991 little has changed in the way that the U.S. Army executes logistic operations. Lieutenant Colonel Maccagnan, Jr., states, "…[T]roubling is the realization that the depth of involvement in current operations and preparations for follow-on and future operations in the Global War on Terror may very likely perpetuate the status quo."[134] He goes on to state, and this author concurs, that performance in the field will determine the true effectiveness of logistic transformation and that no other backdrop is as relevant or important.[135]

OIF serves as an excellent "yardstick" against which logistic transformation can be measured since it represents a level of warfare that will mark U.S. military operations in both the present and future strategic environment.[136] Army logisticians now have the opportunity to harness the current mood and affect the necessary changes. Fortunately, the Army does not appear to be confusing victory with success in terms of how effectively we have transformed our logistic forces, systems, and processes.[137] Simply stated, the time is ripe to affect positive change for logistic support to major ground offensives and to mitigate the need for an unplanned logistic pause. The opportunities exist now and the audience is appreciative of the logistic shortfalls identified in ODS and OIF.

The US Army is addressing the logistic shortfalls experienced in OIF. The implementation of modular combat forces, the directed logistic emphasis of the Army G-4 focus areas, and the development of emerging doctrine should combine to affect positive change in

[134] Ibid., 2.
[135] Ibid., 8.
[136] Ibid., 8.
[137] Ibid., 33.

regards to logistic transformation. TRADOC Pamphlet 525-3-0, dated April 7, 2005, states, "Future Force operations must artfully blend strategic and operational sustainment flows into the theater to provide continuous sustainment throughout the JOA [Joint Operational Area], without requiring an extensive logistical buildup or risking a shortage driven operational pause."[138] The US Army recognizes the importance of logistics in the contemporary operating environment and TRADOC is attempting to guide the US Army in rectifying the shortfalls identified in recent operations. According to TRADOC, "Sustainment capability will determine what is feasible, when the force can fight, and how long it can sustain operations."[139]

Distribution and logistic support to ground offensives is a complicated issue deserving of consideration at our highest levels of command. The answer is far more than just "more and better trucks." The Army must continue to revise our doctrine to match the current and future strategic environments, revise our habitual methods of deploying logistic forces, ensure our logisticians are "connected" with the rest of the force, and ensure we have trained operators and adequate owners for our distribution and logistic processes. In summary, the lessons are now clear and if the US Army fails to capitalize on recent experience it risks failure in future ground campaigns. As General Frederick M. Franks, Jr. says, "Forget logistics and you lose."[140]

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[138] *The Army in Joint Operations: The Army's Future Force Capstone Concept 2015-2024 Version 2.0*, 31.

[139] Ibid., 31.

[140] Department of Logistics and Resource Operations, U.S. Army Command and General Staff College, *Logistics: Desert Storm and Into the 21st Century*, 47.

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