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GULF WAR LOGISTICS: THEORY INTO PRACTICE

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Abstract

This Air Command and Staff College Gulf War Logistics research project comprises two parts. First is a computerized toolbook that visually depicts operational-level logistics operations in the Gulf War. Second is a paper that analyzes how logisticians, led by Lieutenant General William G. "Gus" Pagonis, put logistics theory into practice during the war.

The paper asserts that timely departures from traditional Army logistics doctrine were absolutely essential to success in the Gulf War; it is divided into two main sections. The first is an overview of how Army logistics doctrine evolved in the decades prior to the Gulf War, especially as it related to the Vietnam War and the development of AirLand Battle. The second section of the paper focuses on how Gulf War logisticians applied, and modified, logistics doctrine to fit their unique circumstances.

The paper discusses the ramifications of three key aspects of Pagonis's operation: first, his appointment as the single point of contact for logistics; second, his intentionally *ad hoc* approach to logistics; and, third, his development and use of a new-style logbase that stocked limited classes of supply and was located *forward* of US forces.

The paper concludes that Army logistics doctrine, developed over the previous decades, gave Gulf War logisticians the basis of a sound logistics plan on the eve of the war, but that, in its original form, this doctrine offered little help in dealing with the inevitable "friction" of war. The realities of the situation, in which tens of thousands of combat troops preceded logisticians into the theater, demanded innovation and flexibility. That is exactly what LTG Pagonis and his logisticians provided.

GULF WAR LOGISTICS: THEORY INTO PRACTICE

CHAPTER 1

Background and Methodology

"We need to understand that the Gulf War did not take 100 hours to win. It took 20 years."[1]

General J.H. Binford Peay
(Vice Chief of Staff, US Army)

General Peay's comment is an acknowledgment that few military operations are carried out on the spur of the moment. In fact, most are based on carefully constructed plans reflecting years of research and analysis. Military planning is an on-going process during which plans, based on then-current doctrine and theory, are tested in exercises or actual military operations. Even the most carefully crafted plans invariably undergo some modifications on the battlefield as the fog and friction of war act upon them. In some cases, the doctrine on which the plans are based must change as well. History is replete with examples of leaders who clung doggedly to doctrine in the midst of battles that called for innovation and adaptation. The remains of World War I trenches, where millions died carrying out obsolete doctrine, are mute testament to the folly of clinging to doctrine when innovation is required.

Statement of Purpose and Thesis

This research project encompasses two main purposes. The first, embodied in the accompanying toolbook, is to provide a visual overview of how logisticians carried out their responsibilities in the Gulf War. The second, covered in this paper, is to analyze how logisticians, led by Lieutenant General[2] William G. "Gus" Pagonis, put logistics theory

into practice during the war. This paper argues that timely departures from traditional Army logistics doctrine were absolutely essential to success in the Gulf War.

Statement of the Problem

In 1994, LTG Pagonis contacted Air Command and Staff College and commissioned a computer toolbook overview and an analysis of Gulf War logistics. More specifically, he requested an analysis of the effectiveness of the doctrinal changes he had introduced during the war. He was especially interested in the ramifications of three particular aspects of his operation: first, his appointment as the single point of contact for logistics in theater; second, his intentionally *ad hoc* approach to logistics, and third, his vision for a new type of theater ground supply point (logbase).

Literature Review

This research project benefited from the contributions of LTG Pagonis, who granted several interviews to team members and made his abundant source material available for scrutiny. Pagonis's files contain hundreds of photographs, scores of hours of video, and several linear feet of formal and informal reports and notes compiled during Desert Shield and Desert Storm. Pagonis wrote *Moving Mountains: Lessons in Leadership and Logistics from the Gulf War*[3] and commissioned two of his Gulf War Logistics Cell members, John J. McGrath and Michael D. Krause to compile some of the materials into *Theater Logistics and the Gulf War*[4]. However, this Air Command and Staff College project represents the first time Pagonis made these materials available to an outside agency.

In addition to LTG Pagonis's files, primary source material on Gulf War logistics is fairly abundant. Historians continue to benefit from LTG Pagonis's foresight in requiring all of his immediate subordinates and his Combat Service Support unit commanders to compose a written document recording their role in Gulf War logistics

prior to departing the theater. These documents, written mainly from the perspective of those serving at the Brigade and Battalion level, focus on the tactical or operational ramifications of logistical problems such as poor intransit visibility and lack of ground transportation equipment.

Two additional rich sources of primary materials are the Combined Arms Command at Fort Lee and the Army's Center for Lessons Learned at Fort Leavenworth. The latter repository in particular contains a goldmine of untapped sources on Gulf War logistics. Reams of material were sent to this location after the war but historians are only just now beginning to exploit the wealth of information stored there.

Secondary source material on Gulf War logistics is prevalent. The *Special Bibliography Series: Persian Gulf War, 1990-1991,*[5] contains nine pages listing just a portion of these sources. Many secondary sources are documentary in nature, emphasizing statistics like tonnage of supplies moved and number of troops sustained in the field. Other sources analyze strategic, operational, and tactical problems faced by logisticians. These include shortages of airlift and sealift assets, the shortage of shipping containers, poor intransit visibility, inferior communications equipment for logisticians, and inadequate ground transportation and material handling assets.

None of the available sources studies the Gulf War as a laboratory where logistics doctrine was tested and refined. This paper fills a gap in the current historiography of the Gulf War by focusing on LTG Pagonis's unprecedented authority and on his unique contributions to the evolution of logistics doctrine during Desert Shield and Desert Storm. Historians of the air war in the Gulf have written scores of articles and books attributing success to the creation of a Joint Forces Air Component Commander (JFACC). Conversely, historians of Gulf War logistics have said virtually nothing about the significance of General Schwarzkopf's decision to appoint LTG Pagonis as the single theater logistics commander. This paper will rectify that shortcoming.

Methodology

The ACSC Gulf War Logistics research team was divided into two groups. Each group had one primary job in addition to research which was required and shared by all. One group created the computer toolbook that visually depicts Gulf War logistics at the operational level. The second group wrote the paper. The second group was further subdivided into three sections. The first focused on the background of logistics doctrine from Vietnam to the Gulf War and looked at the application of that doctrine in Desert Shield. The second focused on logistics during Desert Storm, and the third looked at logistics during Desert Farewell--the redeployment of forces from Southwest Asia.

Frequent combined meetings both formal and informal allowed a crossflow of research information and a consensus of main points for the project. It was discovered early that each of the two formats required would benefit from individual focuses that could be combined for a better final product all around. This resulted in this paper being electronically included in the Gulf War Toolbook and interfaced (hot-worded) to the dictionary and lexicon. Two meetings with LTG Pagonis served to ensure we were on track. We discussed our main points and the general provided additional background on each.

The bulk of research for this project was done at the Air University Library and the Air Force Historical Research Center. Two team members and one faculty advisor conducted research off-site. One went to Fort Lee, Virginia, archives for Army logistics doctrine. Another traveled to Fort Leavenworth, Kansas to consult sources at the Army's Center for Lessons Learned. The faculty advisor traveled to Chicago to collect material from LTG Pagonis's files and interviewed him on three separate occasions.

CHAPTER 2

Army Logistics Doctrine: From Vietnam To AirLand Battle

The Theory Behind the Doctrine

Much of the logistics doctrine used during the Vietnam War relied on examples and planning factors from World War II . Army Field Manual 100-10: *Combat Service Support,* dated March 1973, codified this doctrine as it had evolved in the 1960s. Under FM 100-10, planners divided the combat theater of operations into two major geographical areas -- the combat zone and the communications zone (COMMZ). Both the combat zone and the COMMZ had their own logistics support elements. The combat zone ended at the rear boundary of the fielded army and the Corps Support Command (COSCOM) was the highest-level logistical organization in that sector. The remainder of the theater was the COMMZ. The Theater Army Support Command (TASCOM) was responsible for the COMMZ. It controlled all logistics elements within the COMMZ and provided backup support to units in the combat zone. The TASCOM also controlled various theater-level commands including a Personnel Command, a Material Command,[6] a Transportation Command and a Medical Command. Logistical elements within a theater were grouped under headquarters called Area Support Groups (ASG) that controlled all logistical units within a specific area. In large theaters, intermediate headquarters, called Theater Army Area Commands (TAACOM), controlled multiple ASGs.[7]

Logistics Theory Into Practice--The Vietnam War

During the Vietnam war, the unconventional nature of the battlefield and combat operations precluded establishment of a combat zone and a communications zone. Consequently, logistical units established themselves at large bases near ports and other important communications centers in an almost *ad hoc* manner, a pattern that would be

repeated, in some measure during the Gulf War.[8] For most of the war in Vietnam, there was no overall theater logistics command to serve as the focal point for logistics issues. Logistical elements of the US Navy and Marines ran the northern third of the country through the Fleet Logistics Command, while the Army's 1st Logistical Command controlled the southern two-thirds of the country.

In the initial major build-up phase of the Vietnam War (1964-1965), the deployment of logistics assets and personnel assumed a secondary concern to the deployment of combat troops. By the end of 1965, the logistics situation in-theater was so disorganized and ineffective, that military officials curtailed deployment of combat units so they could rush support units into the theater. Eventually, logistics personnel comprised 45 percent of total US personnel in South Vietnam and the 1st Logistical Command expanded into the largest Army organization of its time, evolving into a theater-wide organization running four subordinate support commands and two major base depots.[9]

Post-Vietnam--Rethinking the Doctrine

The US Army doctrine used in Vietnam actually reflected a Central European flavor. It had been designed primarily to halt, or at least slow, an onslaught of the Soviet Red Army through the Fulda gap. The United States crafted a huge military infrastructure in Europe, drafted scores of host nation support agreements, supported a significant number of combat personnel in-place, and developed and exercised detailed plans for rapidly deploying additional forces to Europe in the event of a Soviet invasion.

After Vietnam, logisticians rethought and recrafted logistics doctrine, redesigning several organizational structures in the process. They based their changes primarily on what they had experienced in Vietnam--a war without clearly defined boundaries. They tested some of their ideas in a number of studies focusing on the European theater. One

such study was the Echelons Above Division (EAD) Study that was incorporated into the new FM 100-10: *Combat Service Support*, dated April 1976.

The revised logistics manual retained the old COMMZ and combat zone delineation but altered command and control responsibilities. Under the new concept, TASCOM headquarters was merged with that of the theater army. The COSCOM retained its responsibility as the highest level logistical organization in the combat zone while the TAACOM replaced the TASCOM as the highest in the COMMZ.[10] The corps became the largest organization with specific combat service support functions.

The new doctrine envisioned that the theater army would be tailored for the specific theater but would have no overall logistics headquarters. The functions formerly handled by the TASCOM would belong directly to the theater army commander, exercised through his Deputy Chief of Staff for Logistics. Further, doctrine allowed for the theater army commander to assign logistics responsibility to one or more TAACOMs depending on the size of the theater, thus providing support to units in the COMMZ on a geographical basis.

Under the new FM 100-10, the functional commands were now directly subordinate to the theater army headquarters.[11] If a single corps were deployed into a theater, its organic COSCOM would support it. If the theater was too large for adequate control, the theater army commander could establish a COMMZ with a TAACOM to oversee logistics.

Roots of Gulf War Logistics Doctrine: AirLand Battle Doctrine

Another influence on the evolution of Army logistics doctrine in the decade preceding Desert Shield/Storm was the development of the Army's new combat doctrine: AirLand Battle. Developed in the early 1980s as the only practical solution to fighting the Soviets in Europe, AirLand Battle doctrine emphasized "fight[ing], often outnumbered, in an extremely hostile environment and win[ning]."[12] It required commanders to shape the

battlefield as far forward of friendly lines as possible, while simultaneously preparing to defend their own rear areas and to engage the enemy in close. AirLand Battle doctrine emphasized concepts like anticipation, integration, continuity, responsiveness, and improvisation.[13] For AirLand Battle doctrine to work in combat, logisticians had to find a way to integrate its unique attributes into their own doctrine. Throughout the 1980s, they responded by restructuring Combat Service Support (CSS) units to optimize speed and flexibility on the battlefield.

Though repeatedly tested in peacetime exercises, including the annual Return of Forces to Germany (REFORGER), the new logistics doctrine of the 1980s did not have its wartime trial until 1990, when President Bush committed US forces to a coalition operation aimed at ousting the Iraqi army from Kuwait. As in every preceding major contingency, putting logistics theory into practice proved a difficult challenge and necessitated many creative adjustments to ensure success. LTG Pagonis, relying heavily on his experiences during past REFORGER exercises, applied those lessons learned in Europe to logistics in the Gulf War. Concepts like the forward-deployed logistics base and creation of a single point of contact for theater logistics, cultivated in Europe, took hold and flourished in the desert.

CHAPTER 3

Logistics In The Gulf War

The Theater and the Plan

The Southwest Asia theater of operations falls under Central Command (CENTCOM), one of five geographically-organized combatant commands. Activated on 1 January 1983, CENTCOM assumed responsibility for protecting the interests of US and friendly states in the region. CENTCOM was created in response to growing tensions in Southwest Asia as the balance of power in the region began to shift after the Iranian revolution and the Soviet invasion of Afghanistan. During the 1980s, a new threat to stability in the region emerged as Iraq's Saddam Hussein built up his military forces, threatened aggression against neighboring Kuwait and Saudi Arabia, and engaged Iran in all-out combat.

CENTCOM planners tackled the challenge of designing a military campaign capable of repulsing any Iraqi military threat to Middle East oil supplies. The resultant OPLAN 1002-90, tasked the Third Army's XVIII Airborne Corps (consisting of the 82d Airborne Division, the 101st Airborne Division [Air Assault], and the 24th Infantry Division [Mechanized]) to provide the initial response for any major contingency in the region. The Third Army's principle theater logistics organization was the Army Reserve's 377th TAACOM, based in New Orleans. There was no active duty counterpart to the 377th for Third Army, but planners envisioned deploying the 13th Corps Support Command (COSCOM) from Fort Hood, Texas to assume the role of the TAACOM if the reserves were not activated for a contingency. Deploying the COSCOM (approximately 13,000 people) posed a problem for CENTCOM planners who anticipated that, in virtually any contingency, logistics assets and personnel would be given a lower priority than combat forces on initial transportation flow plans--just as had been the case in

Vietnam. (This concern turned out to be well justified. When Desert Shield commenced, the US hastened to rush combat personnel into the theater to slow an anticipated Iraqi invasion of Saudi Arabia. On flow plan after flow plan, logistics personnel and assets were bumped in favor of combat troops and equipment. Deploying forces were forced to rely, initially, on what they could carry into the theater and on what supplies were available on several prepositioned ships based out of Diego Garcia in the Indian Ocean.)

After General Schwarzkopf assumed command of CENTCOM on 23 November 1988, he directed a complete review and test of current missions and plans. He also reoriented the command's focus from a scenario in which it protected Iranian oil fields from the Soviets to one in which it defended the Arabian Peninsula against Iraqi aggression.[14] In the summer of 1990, logisticians had the opportunity to test the newly revised OPLAN 1002-90 in the annual CENTCOM exercise known as Internal Look. The exercise ended in July 1990 but, unfortunately, before planners could fully assess the plan and adjust it accordingly, Iraqi forces invaded Kuwait and CENTCOM found itself prosecuting a real-world military operation.

The Challenge

The challenges facing logisticians during Operations Desert Shield and Desert Storm seemed almost insurmountable and, in some measure, prompted the *ad hoc* approach LTG Pagonis adopted in tackling them. Logisticians had to find a way to deploy over 350,000 combat troops into the theater along with all their equipment and supplies. They had to sustain those forces in the theater for as long as the war lasted. That meant delivering food and water to personnel dispersed over hundreds of miles of desert, plus getting fuel, lubricants, ammunition, and spare parts where they were needed, when they were needed, to arm and maintain over 2,000 M1A1 tanks, thousands of armored personnel carriers, motorized artillery, trucks, helicopters, and aircraft. One source estimated a demand for 15 million gallons of fuel a day once the ground war began, all of

which would have to be trucked to the battlefield.[15] The final challenge facing logisticians was how to redeploy those forces and supplies once the war ended.

A Single Logistics Leader: The First Doctrinal Deviation

Doctrine called for a Theater Army Area Command (TAACOM) to deploy and to operate as a logistical echelon above corps whenever two or more corps deployed. CENTCOM plans earmarked the 377th TAACOM as the unit that would oversee multi-corps operations in the theater. Their job would be to manage the daunting logistical challenge just outlined. However, even after the National Command Authority ordered the VII Corps to join the XVIII Corps in Saudi Arabia in November 1990, the full 377th never deployed to Southwest Asia. There were several reasons for that. First, the necessity to get as many combat troops as possible into the theater as quickly as possible meant that the 377th would not be able to deploy right away. By the time the VII Corps was tapped to deploy to the desert, LTG Pagonis had already established an *ad hoc* logistics operation that was handling what would have been 377th TAACOM responsibilities. A second factor was LTG Pagonis's insistence that the only way to achieve success in the operation was to have a single point of contact to run logistics. Schwarzkopf concurred. He was not interested in dismantling one headquarters function and substituting another in the middle of an already hectic operation.[16] By mid-November, Schwarzkopf had put the brakes on the activation and deployment of the 377th TAACOM and had told Pagonis that he would run the logistics operation for the duration.

Prior to the Gulf War, LTG Pagonis was serving as the Forces Command Director of Logistics. He had participated in several REFORGER exercises and was considered a subject matter expert. Schwarzkopf was well aware of Pagonis's reputation and did not hesitate to entrust him with the requisite authority over the logistics operation. He appointed Pagonis the Army Central Command (ARCENT) Deputy Commanding General

for Logistics. Upon appointment, Pagonis established the 22nd Support Command (Provisional) and proceeded to put his unique spin on logistics doctrine.

Ramifications of Schwarzkopf's Decision

Schwarzkopf's decision to halt activation of the 377th TAACOM remains controversial to this day. Reservists were understandably upset that they were not allowed to demonstrate their capabilities at the task for which they had trained. Pagonis maintains that, given the realities of the situation in Saudi Arabia, (i.e., combat troops supplanting logisticians on deployment plans), he needed workers, not staff officers, in theater. He wanted to keep management overhead to an absolute minimum in order to expedite decision making and to encourage innovation.[17] Ironically, the same "flat" bureaucracy Pagonis advocated in the desert is now the style of choice for many of the nation's top corporations and government agencies as they downsize.

In some respects, LTG Pagonis was the equivalent of the JFACC--a fact that has gone virtually unnoticed by Gulf War historians. He had broad-ranging authority over Air Force, Navy, and Army logistics assets. From the moment resupply ships arrived at a port or airlifters landed in Saudi Arabia, Pagonis determined the process and priority of offload operations. He "owned" the material handling equipment (MHE) at the airfields and on the docks, and he exercised operational control (OPCON) of the personnel operating it. Pagonis also controlled delivery of supplies within theater.[18] He noted in *Moving Mountains* that he was responsible for "fuel, water, food, vehicles, ammunition, all classes of supply (except equipment repair parts) for the Marines, Air Force, and the Army, as well as items common to all the services (T-shirts, socks, and such)."[19] He decided how supplies were delivered, who they went to, (if a critical commodity) and where they would be stockpiled in support of the ground operation. In short, he wielded more authority over logistics operations than any other commander in the history of the US Army.

Schwarzkopf's abandonment of the TAACOM concept in favor of a single point of contact for logistics, was probably the most radical departure from logistics doctrine in the war. It fostered the development of an *ad hoc* style of management in the theater and undoubtedly contributed to many of the other innovative departures from doctrine that characterized LTG Pagonis's operation. By reducing management overhead, and empowering his commanders, Pagonis enabled logisticians to overcome what, in other circumstances, might have been insurmountable difficulties. These will be discussed in more detail below.

The First Hurdle: Reception of Forces

When President Bush ordered the US military to deploy to Saudi Arabia, the Army alerted the 7th Transportation Group, Fort Eustis, Virginia, and ordered a host nation coordination cell under Pagonis to travel to Saudi Arabia immediately. The 7th Transportation Group's first responsibility was to prepare the Saudi port facilities to receive the XVIII Airborne Corps and its equipment. Fortunately for US forces, in an interesting twist of history, Saudi Arabia's ports and airfields were among the best in the world thanks, in large measure, to huge revenues generated during the 1973 oil embargo which saw worldwide oil prices quadruple. The Saudis poured the windfall "petro-dollars" into their nation's military and civilian infrastructure. In addition to building ports, airfields, and superhighways, the Saudis constructed King Khalid Military City (KKMC) in the desert near the Iraqi border. This base, capable of supporting a force of more than 75,000 troops played an extremely important role as a staging base for the coalition forces' offensive thrust into Iraq during the ground war. [20]

On 7 August 1990, LTG Pagonis and five members of his hand-picked logistics team boarded an aircraft for Saudi Arabia. While enroute they worked furiously to sketch out a plan of action. As soon as they arrived, they established a Logistics Operations Center (LOC) at the Ministry of Defense and Aviation (MODA) Building in Riyadh. On 9

August, four days before the 7th Transportation Group arrived in theater, the first elements of the 82nd Airborne Division and XVIII Airborne Corps began streaming into Dhahran. From that moment on, logisticians were scrambling to stay one step ahead of the torrent of people and supplies that began pouring into the country.

The initial mission of Pagonis's log cell (prior to his formal appointment as the single logistics point of contact) was to arrange host nation support and to oversee reception of the XVIII Corps until the 1st COSCOM and its subordinate Division Support Commands (DISCOMs) arrived. (1st COSCOM was the organic Corps Support Command for the XVIII Corps. Anytime the XVIII Corps deployed, 1st COSCOM deployed with it.) The fog and friction of combat operations quickly complicated matters when the 24th Infantry Division's DISCOM was delayed due to mechanical problems with the ship carrying its equipment. Pagonis and his *ad hoc* organization had to fill the gap until the DISCOM's equipment arrived 45 days later. In addition, by doctrine, logistical support for sister services becomes the Army's responsibility by a set period. Consequently, on 3 October, Pagonis and his SUPCOM became responsible for providing fuel distribution to the Air Force and on 23 October, rations support.

The rush to get combat troops into the theater, and the usual fog and friction of operations, necessitated immediate diversion from published doctrine that offered virtually no guidance for the situation. LTG Pagonis sketched out a logistics concept of operation for the Gulf War within hours of finding out he would deploy to Saudi Arabia. Relying heavily on his experiences with REFORGER, he focused his plan on three general categories: reception, onward movement (to assembly areas and defensive positions), and theater sustainment.[21] He chose twenty-two officers and enlisted men to form his logistics cell, including individuals with expertise in aerial and sea ports of debarkation (APOD and SPOD), maintenance, food service, contracting, facilities, engineering, resource management, and transportation.

One of the hallmarks of LTG Pagonis's logistics operation was his delegation of tremendous authority and responsibility to his logistics team members. All responded with unique contributions based upon their particular areas of expertise. Perhaps the most well known innovator on the logistics team was Chief Warrant Officer Wesley Wolf. Wolf was responsible for contracting for the tons of fresh produce and other foodstuffs that the troops enjoyed. Before the war ended, Wolf and his "Wolf Mobiles" were serving "Wolfburgers" and other fresh food to over 300,000 troops daily.[22]

Even LTG Pagonis's astute leadership could not overcome the very real problems that occurred when thousands of combat troops poured into the theater while their logisticians and support personnel remained behind to make room for them on aircraft and ships. When logisticians did make it into theater they had to make due with inadequate support equipment because, initially, M1A1 Abrams tanks and Bradley Armored Personnel Vehicles replaced fuel trucks and MHE on deployment flow plans. Colonel Greg Gustafson, one of the CSS unit commanders in theater, later wrote that the decision to frontload combat troops and hold back support troops had serious repercussions for logisticians. "During the deployment phase the CSS to combat forces was .7 to 1," wrote Gustafson. "At no time prior to the conclusion of Desert Storm did the ratio exceed 1.4 to 1. Doctrinally the accepted ratio is almost twice that amount."[23]

In the first few days of Desert Shield, three officers of the US Military Training Mission were the only US personnel on hand to receive the first elements of the 82nd Airborne Division. Within three days, they received more than 4,000 troops and moved them to a vacated Saudi Air Defense Artillery site using borrowed buses from the Saudi Air Force. These 4,000 soldiers lived in Saudi tents designed to hold only 250 troops. Meanwhile, the continuous influx of troops quickly overwhelmed all local resources. Soldiers were quartered on tennis courts or anywhere there was adequate space. In the first 15 days, more than 40,000 troops processed through the APODs, and every day, hundreds more arrived. In fact, the troop flow continued unabated until the 82nd

Airborne Division, 101st Airborne Division (Air Assault), the First Marine Expeditionary Force, 1st Cavalry Division (Armored), 24th Infantry Division (Mechanized) and the 3rd Armored Cavalry Regiment were all in theater.[24] These initial forces comprised more than 100,000 troops and posed constant challenges for logisticians.

By 4 November 1990, the XVIII Airborne Corps had completed its deployment to Saudi Arabia. In 93 days Pagonis and his team had overseen the reception and beddown of more than 112,000 troops and the offloading of more than 106 ships carrying 4,123 tracked vehicles, 31,547 wheeled vehicles, and 703 aircraft. The XVIII Corps deployment had barely ended when President Bush ordered the VII Corps to deploy from Germany to Saudi Arabia. Fortunately, by that time, the 22d SUPCOM (provisional) had grown to 11,849 logisticians including 2,973 reservists from fifty-nine units and was better prepared to handle the influx of troops.[25]

The Second Hurdle: Sustainment

Interestingly, LTG Pagonis's immediate concern during the reception phase of operations was not how to sustain forces with food and shelter, but rather how to provide them with adequate sanitation. He knew that poor sanitation in past wars had cost American forces thousands of incapacitated combat soldiers due to dysentery and related illnesses. With Iraqi forces poised to attack Saudi Arabia at a moments notice, the US could ill-afford to lose any soldiers to disease. Pagonis and his logistics team responded quickly with characteristic creativity. Within days of arriving in-theater, Captain Tony Gardener designed a wooden latrine, shower, and wash basin (similar to those used in Vietnam) and negotiated a deal with a Saudi company to produce 100 of the units daily at a cost of $360 each. Within a month, 3,000 of the latrines had been built and distributed among the deployed units. By October, Saudi contractors were producing 600 latrines, 300 showers, and 200 sinks daily. Pagonis later cited the fact that no US troops

succumbed to disease due to poor sanitation as one of his proudest accomplishments of the war.[26]

There is no question that host nation support was absolutely essential to successful US operations in the Gulf War--especially when it came to sustaining forces in theater. Pagonis and his staff worked closely with Prince Mohammed bin Fahd, governor of the Saudi Eastern Province, to negotiate scores of host nation agreements. The first major progress concerning host nation support occurred on 11 August when the Saudis turned over the port facilities at Ad Dammam to US forces.[27] Pagonis immediately moved his Logistics Operations Center to nearby Dhahran.

Contracting support was equally important to logistics operations. On 23 August 1990, Pagonis received authority to lease up to $2 million worth of real estate. In addition, contracting officers leased hundreds of trucks, buses, tents, MHE, and tons of food, water, and other supplies.

A New-Style Logbase: The Second Doctrinal Deviation

A major factor in LTG Pagonis's success in sustaining more than 350,000 combat troops in theater was his willingness to deviate from Army doctrine regarding logistics supply points. Pagonis was determined to design a logistics system that was flexible and responsive enough to act as a true force multiplier for the combat forces. He developed his own unique version of the "logbase."

For centuries, armies had built supply bases in their rear areas to stockpile supplies and equipment needed to prosecute battles along relatively stationary fronts. When the fronts moved, the supply bases had to be moved with them--an often laborious and lengthy process. Armies were invariably tied to these immobile supply points. LTG Pagonis's idea was to add a new twist to the supply base concept. He constructed logbases at key points *in front* of advancing coalition combat forces so that supplies would be readily available as forces advanced on the enemy.

Pagonis made two key distinctions between supply bases and logbases, (though for simplicity's sake, all the supply points constructed during the Gulf War were called "logbases"). For Pagonis, a true logbase was a temporary point where only certain expendable classes of supply (food, water, fuel, and ammunition) were stored with minimal accountability. This was in stark contrast to the traditional supply bases described in army doctrine that contained all classes of supply, each item of which had to be carefully accounted for at all times--even during combat. Pagonis knew that AirLand Battle required tremendous flexibility and responsiveness of both combat forces and logistics capabilities. He was convinced that his logbases were the key to providing these attributes. Mobile supply points meant that logisticians could travel with combat forces; expendable assets meant that securing the bases was not an issue. Pagonis assigned a specific CSS unit to run each logbase and charged them with destroying the base if the enemy threatened to overrun it.

Planning for the Ground War

As LTG Pagonis oversaw implementation of the sustainment phase of his operation, General Schwarzkopf finalized his operational plan for the ejection of Iraqi forces from Kuwait and the destruction of the Iraqi Republican Guard. His plan hinged on two key logistical concepts: first, finding a way to support two corps from forward bases located more than 350 miles from the main APOD and SPOD and, second, to reposition the two corps to take advantage of each one's unique capabilities. The latter undertaking meant moving over 350,000 personnel and thousands of vehicles hundreds of miles over open desert without being spotted by the Iraqis.

LTG Pagonis and his planning cell quickly developed a five-phase logistics plan to support Schwarzkopf's concept of operations. Phase Alpha would preposition supplies and shift SUPCOM units to provide logistical support once the combat forces moved forward. During this phase, logisticians would receive and move VII Corps to its Tactical

Assembly Area (TAA). Phase Bravo would be the simultaneous movement of the VII Corps and XVIII Corps to their Forward Assembly Areas (FAA) using SUPCOM and COSCOM transportation assets. Logisticians would construct logbases to provide needed support. Phase Charlie would be the support and sustainment of the ground offensive into Iraq and Kuwait. During this phase, which would commence on order at the start of the ground campaign, logisticians would build additional mobile logbases deep inside Iraqi territory and stock them with critical supplies like food, water, ammunition, and fuel. Phase Delta outlined logistics support for the defense and restoration of Kuwait. It would commence concurrently with Phase Charlie once coalition forces liberated Kuwait City. Phase Echo would be the redeployment and closure of the theater and would commence as soon as the ground campaign ended.[28]

Implementing the Logistics Plan

Phase Alpha. Pagonis's five-phase plan worked extremely well. Beginning on 18 November 1990, as part of Phase Alpha, logisticians constructed four theater logbases (actually supply bases), Bastogne, Pulaski, Alpha, and Bravo. SUPCOM planners put a great deal of thought into where to locate the logbases in order to provide optimum support and flexibility once the ground war began.

Bastogne, the first logbase, was 150 miles northwest of Dhahran outside Nu'ayriyah. It supported XVIII Corps in its TAA and was located on Tapline Road, a key main supply route (MSR) in theater that paralleled the Kuwaiti border and ran almost the entire length of Saudi Arabia. Despite SUPCOM staffers' careful planning, many of Schwarzkopf's corps and division staff members criticized the location of Bastogne, insisting that it should not be placed *forward* of friendly forces. These officers feared the consequences of losing Bastogne if the Iraqis invaded. LTG Pagonis held his ground, though, and argued successfully that logbases benefited the corps very little when they were located in the rear. He insisted that Bastogne was perfectly positioned between

XVIII Corps and Kuwait, thus allowing maximum flexibility no matter which direction the corps went.[29] Logisticians positioned supply point Pulaski 75 miles west of Dhahran along MSR Mercedes. It supported the 1st Cavalry Division.[30]

On 23 November, the 731st Maintenance Battalion helped establish Logbase Alpha to support VII Corps in its TAA. The battalion exercised administrative control over all support units in the vicinity, including the elements of the VII Corps support command and the 2nd COSCOM. Emphasis at Logbase Alpha was on accumulating enough supplies of rations, water, bulk petroleum products, and ammunition to support 113,000 soldiers. The base eventually grew to 30 miles by 30 miles wide.[31]

Logbase Bravo, the major theater prepositioned supply hub, was located just south of KKMC. It was established by the 226th Area Support Group (ASG), an Alabama National Guard unit, and designed to support 250,000 soldiers. It contained, among other items, theater stocks of clothing and organizational equipment, barrier and other engineer-type material, rentals, busses and trucks. It too was 30 by 30 miles wide.[32]

Once the four main theater supply bases were built and stocked, final details for Phase Bravo were completed. Logisticians had to find a way to reposition two entire corps over several hundred miles of desert in only 21 days. (To make matters worse, the two corps would have to cross paths at a single intersection.) In addition, logisticians had to find a way to resupply the corps once they moved hundreds of miles away from their main supply bases. On 17 January, the day the air campaign against Iraq commenced, logisticians began Phase Bravo.

Phase Bravo. One of the first tasks of Phase Bravo was construction of Logbases Charlie and Echo. These were the true "logbases" that Pagonis had envisioned. Selectively stocked and mobile, they were markedly smaller than supply bases Bastogne, Pulaski, Alpha and Bravo. Logisticians had to wait until the air war had blinded the Iraqis to begin constructing the bases since earlier American activity around KKMC had resulted in the Iraqis shifting several divisions to a point in southern Iraq roughly opposite the base.

Logbase Charlie was situated northwest of KKMC to support the XVIII Airborne Corps in its FAA. Logisticians organized and stocked it to support 111,000 soldiers. It was 3 by 5 miles wide. Logbase Echo, also 3 by 5 miles wide, was located due north of KKMC, just north of MSR Dodge. Logisticians prepositioned limited stocks of fuel there prior to the start of the air campaign and finished stocking the base with rations, ammunition, and additional fuel after the air war began. They also established a Tactical Petroleum Terminal (TPT) to enable rapid fuel delivery to the battlefield.[33]

Once again, Schwarzkopf's division and corps commanders found it difficult to come to grips with a battle plan that seemed to pose insurmountable logistics obstacles. Colonel Butch Neal, Schwarzkopf's Deputy Operations Officer, worried aloud about stretching the logistics tail too thinly: "Jesus," he railed, "I'd rather have them [XVIII Corps] in closer where they can influence the action. We've got them eighty million miles out there in the west where it's a logistical nightmare."[34] Pagonis and his staff were undaunted nonetheless and set to work proving the efficacy of Pagonis's new mobile logbases.

Constructing the forward logbases was no easy matter. For years, the army had suffered a shortage of wheeled vehicles--especially the Heavy Equipment Transporters (HETs), used to transport tanks and other armored vehicles over great distances. The Army could supply only 500 of 1,200 HETs required for the Gulf War. The rest came from purchases, lease agreements, loans, and donations from governments or firms in the United States, Saudi Arabia, Germany, Egypt, Italy, and Czechoslovakia.[35] Building and resupplying logbases was a vehicle-intensive operation. LTC Patrick Garren, Commander of the 13th Supply and Service Battalion, noted that his unit required "390 stake and platform (S&P) trailers, 79 HETs, 68 five-ton cargo trucks, and 14 two-and-one-half ton cargo trucks" to complete its 10-day movement from Logbase Alpha to Logbase Echo, 340 miles to the west. "This was for the transport of stockage only;" Garren added, "it did not include transportation of unit equipment."[36]

Tactical Airlift

To overcome vehicle shortages in theater, logisticians turned to airlift. The Air Force deployed approximately 149 Air Force C-130s (about one third of its C-130 fleet) to Saudi Arabia during Desert Shield/Storm. Flying the "BlueBall Express," C-130 crews expedited the movement of supplies from ports to theater bases. In *Gulf War Air Power Survey Summary Report*, Thomas Keaney and Eliot Cohen estimate that while strategic airlifters (C-141s, C-5s, and Civilian Reserve Air Fleet aircraft) flew 500,000 people and 540,000 tons of cargo into the theater, C-130s moved "over half that amount again" within the theater.[37] Intratheater airlift planners laid out a series of "Camel" and "STAR" airlift routes that crisscrossed Saudi Arabia and enabled daily channel missions that supported Army, Air Force, Navy, and Marine units with timely delivery of critical "show stopper" parts.[38] In addition, the Navy operated a separate intratheater airlift system to support its fleet operations. They relied primarily on five C-130s, two C-2s, two US-3s, five C-12s, and numerous CH-53 and H-46 helicopters.[39] Twenty active and reserve Marine Corps C-130s provided vital airlift between Bahrain International Airport in Al-Jubayl and forward logistics bases in northeastern Saudi Arabia, while Marine CH-53s and H-46s ferried supplies, equipment and personnel between theater logbases and forward deployed troops.

Ground Transportation

Despite the yeoman service provided by C-130 crews, the bulk of Gulf War supplies moved, by necessity, on the ground. From a logistics standpoint, Logbases Charlie and Echo posed a tremendous resupply challenge. SUPCOM planners had to find a way to ensure a steady stream of supplies into these locations. That meant designing a road network capable of handling thousands of vehicles each day, and it meant finding thousands of drivers to operate those vehicles. By the time Phase Bravo ended,

logisticians had devised a greatly expanded network of theater MSRs traversing great distances and carrying huge volumes of traffic.

KKMC was 202 miles beyond Logbase Bastogne. It was 302 miles north of Riyadh. To resupply KKMC logbases, logisticians established two new MSRs to push supplies and troops forward. The first, MSR Dodge, was the northern route. Beginning at the port of Ad Dammam, it followed the north-south coast highway, and then Tapline Road to the northwest--a distance of 334 miles to KKMC. The southern route, MSR Toyota was 528 miles long. It left Ad Dammam along the westward Dammam-Riyadh expressway to Riyadh, then turned north along the Riyadh-Hafr al Batn road (MSR Sultan) to KKMC. Despite the longer distance, MSR Toyota was the route of choice for logisticians due to its better road conditions and smaller volume of traffic. (MSR Dodge was a key route for combat troops and thus was often crowded with tanks and other vehicles).[40]

Logisticians recruited approximately 2,000 drivers from countries like Saudi Arabia, India, Pakistan and the Philippines. This "coalition driver pool" spawned its own unique problems due to rivalry between the different nations' drivers. For example, Filipino drivers, anxious to demonstrate their superior driving skills, would attempt to pass Saudi drivers. The typical Saudi driver tended to exhibit extremely aggressive driving patterns and did not want to be passed by Filipino drivers--or anyone else for that matter. The result was, all too often, disastrous, as drivers negotiated treacherous stretches of highway, (which carried far more vehicles than they were designed to accommodate), at speeds far too fast for prevailing conditions.[41]

The heavy volume of traffic, poor road conditions, local driving habits, and exhausting work schedules, all contributed to a larger number of US casualties from traffic accidents than from the war. To optimize driver's safety, and to provide checkpoints along the MSRs, Pagonis's team established seven convoy support centers. These were

essentially truck stops along the MSRs where drivers could access fuel, food, latrines and showers and where they could get some often badly needed rest.[42]

As logisticians built Logbases Charlie and Echo, the VII Corps and XVIII Corps began their difficult repositioning movement on 21 January. Incredibly, the "mother of all traffic jams" never materialized at the "mother of all intersections," where, at one point, an average of 18 vehicles per minute from VII Corps and XVIII Corps crossed a single intersection.[43] Meanwhile, theater airlifters helped expedite the movement by ferrying XVIII Corps personnel and equipment from King Fahd and nearby bases to Rafha, over 400 miles away. For the first thirteen days of the operation, C-130s averaged a takeoff and landing at Rafha approximately every seven minutes, 24 hours a day. When the operation concluded, C-130 crews had moved 14,000 personnel and over 9,000 tons of equipment.[44] On 20 February, Phase Bravo came to a close with VII Corps and XVIII Corps poised to begin offensive operations deep into Iraq.

Preparing to Enter the Fray

As G-Day neared, logistics units within VII Corps and XVIII Corps completed tailoring their CSS units to support ground operations. VII Corps's 2d COSCOM created "multifunctional logistics task forces (LTFs)" each of which was designed to support the unique requirements of its assigned division or regiment during the entire process of maneuver, movement to contact, and combat with enemy forces. XVIII Corps took a similar tact. Once in theater, CSS and LTF units built up corps logistics packages (LogPacks) at Logbases Charlie and Echo. Each LogPack contained fuel, ammunition, subsistence, and other supply classes tailored to the unit it supported and would move via trailer from logbases to trailer transfer points (TTP) throughout Iraq and Kuwait, and then onward to Logistics Release Points near the supported units, once the ground war began.[45]

At Logbase Echo, LTC Daniel Fairchild divided his support battalion into two parts in anticipation of the ground war. He organized a small, mobile contingent of vehicles and personnel to move forward with the Division on G-Day. He designated another element, known fondly as "Fat Lady" and comprising approximately 500 soldiers and 250 vehicles, to remain at the logbase until 24 hours after the entire division had passed there. Fat Lady contained less mobile equipment and vehicles that might have slowed the rate of advance into Iraq.[46]

Phases Charlie and Delta. On 24 February 1991, the ground war, and Phase Charlie, commenced. (Phase Delta began soon afterward with the liberation of Kuwait City). Phases Charlie and Delta required logisticians to support combat units in battle. This was where years of planning to support the AirLand Battle concept of operations came to fruition. Logisticians initially anticipated building four additional mobile logbases within Iraq to support the ground war. On G-Day, LTG Gary Luck, XVIII Corps Commander, ordered a brigade from the 101st Airborne to construct a forward logistics base at Objective Cobra, 90 miles into Iraq and 20 miles east of As Salman. At 3:00 a.m. on 24 February, Apache and Blackhawk helicopters crossed the Saudi-Iraqi border and pushed forward toward Objective Cobra to prepare the battlefield. Four hours later, supported by Air Force F-16 and A-10 aircraft, 66 Blackhawks, 10 Hueys, and 30 Chinooks delivered the first waves of 101st Airborne troops to secure the area around Cobra. Within hours, Iraqi resistance collapsed and scores of helicopters began swarming into the position. Over the next few days, Logbase Romeo rose out of the desert sands as logisticians delivered more than a million gallons of fuel and tons of food, water, ammunition and spare parts to the new-style logbase.[47] Similar operations resulted in creation of logbase Oscar.

As XVIII Corps logisticians put the finishing touches on their two forward logbases, logisticians from VII Corps made plans for building Logbases November and

Hotel approximately 90 miles north of their FAA. They loaded up fuel and ammunition on trailers in anticipation of a grueling resupply effort to the forward located logbases. The rapidity of subsequent ground operations resulted in November and Hotel only serving as TTPs instead of full-up logbases.

By the evening of the first day of ground operations, LTC Fairchild and his logisticians were 71 miles inside Iraq. They refueled division vehicles and moved empty tankers to the pre-positioned TTPs where they exchanged them for full tankers. Logisticians even used some of their HETs to move enemy prisoners of war to rear areas.[48]

On 26 February, the division turned east and began to march toward the northwest Kuwaiti border. At 1430, the units halted for refueling and the brigade commander ordered Fairchild to establish a brigade support area (BSA). Under the BSA concept, medical and fuel assets would continue to advance with the combat units, while remaining logistics elements established the site. This meant that logistics personnel were split into three groups: those moving forward, those at the BSA, and those trailing behind in the "Fat Lady." This set-up gave them the flexibility to support combat forces wherever and whenever they engaged the enemy.

As it turned out, the BSA and other planned logbases were never built due to the speed with which coalition forces overwhelmed the Iraqi army. By late afternoon, on the 26th, Fairchild had reconsolidated all of his logistics elements and his supported brigade moved forward and began a protracted battle with the Iraqis. It was during this engagement that the usual problems facing logisticians surfaced. Lack of fuel was the most severe. Fuel trucks, ill-equipped for the realities of desert travel, bogged down in the sand or lost track of rapidly moving units. Far to the south, "ninety-five petrol tankers, 160 ammunition trailers, and nearly a hundred water trucks" were stuck in a huge traffic jam caused when units of the 24th Infantry Division and the 82d Airborne Division unexpectedly got tangled up on MSR Virginia.[49]

Logisticians hastened to overcome these problems by reapportioning fuel between brigades, and even divisions, to ensure no one was immobilized.[50] Whether or not these makeshift efforts would have worked had the ground war been more protracted is a matter for speculation. LTG Pagonis later commented that he had kept fuel vehicles in reserve for just such a contingency. Only he and General Schwarzkopf knew this "ace card" existed. As soon as he learned of the fuel crisis, Pagonis dispatched the fuel reserves. He later contended that, at the height of the crisis, the fuel reserves were within 45 minutes of units with the most critical requirements.[51]

Another resupply coup LTG Pagonis pulled off was getting water to combat troops during the battles. Anticipating that dehydration would become a major limiting factor for American forces engaged in drawn-out tank battles in the stifling desert heat, Pagonis arranged for a water resupply unit of 400 trucks to deliver water right to the troops during the battles.[52] LTG Pagonis's uniquely innovative approach to logistics was eclipsed only by his genuine concern for people.

Phase Echo. On 28 February 1991, President Bush announced a cease fire and America's most effective combat action came to a close. For logisticians, however, the cease fire was just the beginning of another demanding stage of their operation. Phase Echo, also known as Desert Farewell, called for the redeployment of hundreds of thousands of personnel, tens of thousands of vehicles, and tons of equipment and supplies, back to their home bases. From the start of Desert Farewell, logisticians were under the gun to prosecute it at a breakneck pace. Virtually from the moment the ground war ended, civilian and military officials were pressuring General Schwarzkopf to begin sending troops home immediately. Logisticians responded by arranging the first symbolic redeployment of troops on 7 March. Within days, the redeployment of the XVIII Corps began in earnest.

Redeployment was no simple matter. Each corps had to move from battlefield positions to TAAs where their tens of thousands of vehicles and other equipment had to

be thoroughly washed, sanitized and, in some cases, shrinkwrapped in order to meet US Department of Agriculture standards for goods arriving in the US from the Middle East.[53] Tens of thousands of vehicles also required repainting since they had been painted in desert camouflage when they arrived in theater. Once this job was completed, corps personnel had to proceed to their aerial or sea ports of embarkation (APOE or SPOE) for final transportation out of the theater. To expedite the vehicle preparation process, Pagonis and his team set up four "washrack" units at the TAAs. These units cleaned over 117,000 wheeled and 12,000 tracked vehicles, 2,000 helicopters, and 41,000 containers of supplies in the first 120 days of Desert Farewell.[54]

By 1 April 1991, LTG Pagonis and his logisticians had overseen the redeployment of over 165,000 troops. On 11 April, the Iraqis signed the formal cease fire and the VII Corps retraced its steps to its TAA and then to the APOE and SPOE. By 1 June, the number of troops redeployed topped 350,000 as the bulk of VII Corps departed. By 12 June, the last of its equipment followed. Logisticians continued to scour the countryside rounding up lost or abandoned equipment and supplies. By January 1992, Phase Echo was just about over and LTG Pagonis was finally able to declare his portion of Gulf War operations officially closed.

CHAPTER 4

Findings and Conclusion

The magnitude of the feat pulled off by logisticians during the Gulf War is hard to fathom. In his book, *Moving Mountains: Lessons in Leadership and Logistics from the Gulf War,* LTG Pagonis notes that his logisticians transported the equivalent of "the entire population of Alaska, along with their personal belongings, to the other side of the world, on short notice."[55] They brought them home again too. Logisticians, including 5,000 civilians from contractors and the Department of Defense, deployed and redeployed 2,000 helicopters, tens of thousands of tracked and wheeled vehicles, 41,000 cargo containers and 350,000 tons of unexpended ammunition in 500 ships and 10,000 aircraft sorties. They served over 95 million meals and delivered 2.5 billion gallons of fuel. They handled an avalanche of mail for the half million soldiers, airmen, marines, and sailors in the theater, delivering 38,000 tons of letters and packages--enough to cover 21 football fields eight feet high.[56]

General Peay's comment that the Gulf War took 20 years, not 100 hours, to win was entirely accurate. Army logistics doctrine developed over the previous decades, (particularly that designed to support AirLand Battle), gave Gulf War logisticians the basis of a sound logistics plan on the eve of the war. It is important to note, however, that this doctrine in its original form probably could not have matched the success of LTG Pagonis and his logistics operation in the Gulf. The doctrine offered sound guidance in a scenario where logisticians and their equipment could get on the scene early in an operation, but offered little help for a situation in which tens of thousands of combat troops preceded logisticians into the theater.

The realities of the situation demanded flexibility and innovation. By appointing LTG Pagonis as a single manager of logistics, General Schwarzkopf enabled creation of an

ad hoc logistics infrastructure, devoid of layers of bureaucracy. This infrastructure was perfectly suited to the requirements of desert warfare.

For his part, LTG Pagonis practiced a style of leadership that was also perfectly suited to the realities of the Gulf War. He was comfortable delegating tremendous responsibility and authority to his subordinates. He was not afraid to deviate from doctrine when the situation warranted. His new-style logbases, placed forward of friendly forces, are a classic example of his innovative leadership.

Despite the unquestioned success of logisticians in the Gulf War, historians should be careful not to rush to judgment on incorporating all aspects of the Gulf War logistics operation into current doctrine. It is critical to remember that actual combat operations in the war were of incredibly short duration. There is simply no way to know whether Pagonis's logbase system could have sustained combat forces in battle for a protracted period. The fuel shortages experienced in the field early in combat operations may have been an aberration--or they may have portended a weakness in the system itself. So, while it does seem well advised to incorporate the new logbase concept into doctrine, it must be more thoroughly exercised and refined.

At more of an issue in an analysis of Gulf War logistics is the question of whether or not doctrine should incorporate LTG Pagonis's *ad hoc* style of leadership. Was his success in the Gulf War a personal success or a doctrinal success? Could someone else have stepped into his shoes and achieved the same (or better) results? This issue requires more scrutiny.

One issue that does seem clear, based on analysis of Gulf War logistics, is that the single most important factor in the success of logistics operations was the appointment of a single logistics manager. In any complex, time-critical situation, there is no question that having one "boss" dramatically streamlines the decision-making process. Civilian corporations have been rediscovering this fact for the past two decades and have responded by dramatically scaling back their management bureaucracies. Government

agencies, including the military departments, have been following suit. LTG Pagonis's logistics operation reflected this new trend in corporate management. Not surprisingly, given the complexity of the situation, his operation worked extremely well. Military planners would do well to incorporate current management theory into their logistics doctrine.

In conclusion, logisticians entered the Gulf War with sound logistics doctrine, developed and tested over two decades. The doctrine emphasized responsiveness and flexibility, yet retained the trappings of old-style management bureaucracies. General Schwarzkopf and LTG Pagonis both demonstrated a willingness to deviate from this doctrine to enhance logistics operations. The result was the unprecedented appointment of a single manager for logistics in a combat theater, a unique *ad hoc* logistics management infrastructure, and the creation of a new-style logbase that enabled logisticians to act as a true force multiplier for combat troops.

The Gulf War logistics effort was not flawless, but then, to quote Carl von Clausewitz, "friction" is the only concept that "distinguishes real war from war on paper."[57] LTG Pagonis ensured that his logisticians were empowered to meet the challenges of putting logistics "theory" into practice while overcoming the friction of war. That made all the difference.

Endnotes

[1]Challenges and Opportunities; America's Army: Trained and Ready Into the 21st Century. The US Army Posture Statement: FY 95 (Washington: Ofc of CSA, 1994): 81.

[2]Lieutenant General Pagonis was a Major General at the time of his appointment to head the logistics effort in the Gulf War. He was promoted during the war and will be referred to as LTG throughout this paper. Also note that rank abbreviations used are those common to the U. S. Army.

[3]William G. Pagonis, *Moving Mountains: Lessons in Leadership and Logistics from the Gulf War* (Boston: Harvard Business School Press, 1992).

[4]John J. McGrath and Michael D. Krause, *Theater Logistics and the Gulf War*, (Alexandria, VA: U. S. Army Materiel Command, 1994).

[5]A. Sue Goodman, comp., *Special Bibliography Series: Persian Gulf War, 1990-1991, Desert Shield/Desert Storm,* (Maxwell AFB: AU Library, 1991).

[6]The Theater Army Material Management Center (TAMMC) eventually replaced the MATCOM.

[7]Department of the Army, *Combat Service Support,* FM 100-10: (Washington: HQ USA, 1973), 3-11.

[8]George S. Eckhar, *Command Control 1950-1969, Vietnam Studies Series* (Washington: HQ USA, 1974), 45.

[9]Shelby L. Stanton, *The Rise and Fall of an American Army: US Ground Forces in Vietnam, 1965-1973,* (Navato, CA: Presidio, 1985), 23.

[10]Department of the Army, *Combat Service Support,* FM 100-10, (Washington: Dept of the Army, 1976), 1-6.

[11]Ibid.

[12]Department of the Army, *Combat Service Support*, FM 100-10 (Washington DC: US Army, 1988) 1-2.

[13]Ibid.

[14]H. Norman Schwarzkopf, with Peter Petre, *It Doesn't Take A Hero,* (New York: Bantam Books, 1993), 331-337.

[15]Rick Atkinson, Crusade: The Untold Story of the Persian Gulf War, (Boston: Houghton Mifflin Co., 1993), 247.

[16]Pagonis, 131.

[17]Interview with LTG Gus Pagonis, 9 Feb 95, Maxwell AFB, AL.

[18]Interview with LTG Gus Pagonis, 9 Feb 95, Maxwell AFB, AL.

[19]Pagonis, 97-98.

[20]Bo Eldridge, "Desert Storm: Mother of All Battles *Command* (Nov-Dec 1991).

[21]Pagonis, 68-69.

[22]Pagonis, 112-114.

[23]Greg R. Gustafson, "Logistics Management Systems in Desert Shield/Desert Storm--How Well Did They Do?" Unpublished Manuscript, (US Army War College, Carlisle Barracks, PA, 1992), 15.

[24]McGrath and Krause, 21.

[25]22nd Support Command, Chronology, [Pagonis files].

[26]Interview with Pagonis, 9 Feb 95, Maxwell AFB, Alabama.

[27]ARCENT LOGSITREP#6, 12 August 1990, [Pagonis files].

[28]McGrath and Krause, 42.

[29]Interview with LTG Pagonis, 9 Feb 95, Maxwell AFB, AL.

[30]McGrath and Krause, 21.

[31]McGrath and Krause, 75-77.

[32]Ibid.

[33]Ibid.

[34]Quoted in: Rick Atkinson, *Crusade: The Untold Story of the Persian Gulf War*, (Boston: Houghton Mifflin Co., 1993), 247.

[35]Interim Report, Gulf War, undated, p. 7-12, [Pagonis files].

[36]Patrick E. Garren, "Supplying a Deployed Corps--a Supporting Battalion Commander's Perspective," Unpublished Manuscript, (US Army War College, Carlisle Barracks, PA, 15 April 1993), 13.

[37]Thomas A. Keaney and Eliot A. Cohen, *Gulf War Air Power Survey Summary Report*, (Washington: GPO, 1993), 207-208. See also, Table 23 in *Gulf War Air Power Survey Statistical Compendium*. In Vol 3 of *Gulf War Air Power Survey* Keaney and Cohen state that C-130s moved 134,000 passengers and 142,000 short tons of equipment during Desert Shield and another 184,000 passengers and 159,000 short tons of cargo during Desert Storm. (p. 153).

[38]Keaney and Cohen, *Gulf War Air Power Survey,* 5 vols. (Washington: GPO,1993), vol 3: *Logistics and Support,* 152-153.

[39]H. Norman Schwarzkopf, "Logistics Buildup and Sustainment: Report to United States Congress," Reprinted in: *Operational Structures Coursebook*, (Maxwell AFB: Air Command and Staff College, 1995), 58.

[40]"Theater Logistics in the Gulf War: August 1990-December 1991," 22d SUPCOM Briefing, 8 December 1991.

[41]Ibid.

[42]Interview with LTG Pagonis, 22 Sep 94, Maxwell AFB, AL.

[43]Interview with LTG Pagonis, 9 Feb 95, Maxwell AFB, AL.

[44]Keaney and Cohen, *Gulf War Air Power Survey,* 5 vols. (Washington: GPO,1993), vol 3: *Logistics and Support,* 8.

[45]William H. Taylor, "Logistics Command and Control (C2) and its Application During Desert Shield/Storm," Unpublished Manuscript (Carlisle Barracks, PA: US Army War College, 1992), 14.

[46]Daniel L. Fairchild, "Operational Aspects of a Forward Support Battalion Participating in Operations Desert Shield and Desert Storm," Unpublished manuscript, (Carlisle Barracks, PA: US Army War College, April 1992), 8.

[47]Atkinson, 384-385.

[48]Fairchild, 9-10.

[49]Atkinson, 435.

[50]Fairchild, 17.

[51]Interview with LTG Gus Pagonis, 9 Feb 95, Maxwell AFB, Alabama.

[52]Ibid.

[53]Pagonis, 157.

[54]Pagonis, 157-158.

[55]Pagonis, 1.

[56]William G. Pagonis and Michael D. Krause, *Operational Logistics and the Gulf War,* The Land Warfare Papers, 13.

[57]Carl von Clausewitz, *On War,* ed. and trans. Michael Howard and Peter Paret (Princeton NJ: Princeton University Press, 1984), 119.

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Vita

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