

Pegasus Unbound?

The Challenge of Sustainment and Endurance in Airborne Joint Forcible Entry Operations

**A Monograph
by
MAJ Timothy M. Gilhool
United States Army**



**School of Advanced Military Studies
United States Army Command and General Staff College
Fort Leavenworth, Kansas**

AY 04-05

REPORT DOCUMENTATION PAGE			Form Approved OMB No. 074-0188	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503				
1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE 052605	3. REPORT TYPE AND DATES COVERED Monograph	
4. TITLE AND SUBTITLE Pegasus Unbound? The Challenge of Sustainment and Endurance in Airborne Joint Forcible Entry Operations			5. FUNDING NUMBERS	
6. AUTHOR(S) Major Timothy Gilhool				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) US Army Command and General Staff College School of Advanced Military Studies 250 Gibbon Ave. Fort Leavenworth, KS 66027			8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) U.S. Army Command and General Staff College Fort Leavenworth, KS 66027			10. SPONSORING / MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES				
12a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release; distribution is unlimited.			12b. DISTRIBUTION CODE A	
13. ABSTRACT (Maximum 200 Words) How should the Army should best structure the logistical elements of its new Airborne Brigade Combat Team (BCT) to support Joint Forcible Entry Operations (JFEO)? With the focus on becoming a more "Joint and Expeditionary" force with "Campaign Qualities," as well as the supply problems encountered by Army and Marine forces on the drive to Baghdad, logistics has once again come to the forefront. The strains involved in sustaining a parachute-delivered force in hostile territory can serve as an excellent model for just what the Army hopes to accomplish with "expeditionary" logistics. The primary conclusion of the work is that there has been a historical underestimation of requirements and overestimation of capabilities, especially in the area of aerial delivery, for sustainment of parachute operations. To overcome these factors, the paper recommends a number of solutions across the Doctrine, Organization, Training, Materiel, Leadership, and Personnel (DOTMLPF) spectrum. These include a greater emphasis in doctrine on pushing supplies and logistical assets forward; the production of a Joint manual on JFEO; the creation of a Assault Support Platoon within the various Forward Support Companies; the fielding of improved aerial delivery platforms; and the inclusion of Airborne JFEO facilities in the Joint Sea-Basing concept				
14. SUBJECT TERMS Joint Forcible Entry Operations, Logistics, Airborne			15. NUMBER OF PAGES 61	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT U	18. SECURITY CLASSIFICATION OF THIS PAGE U	19. SECURITY CLASSIFICATION OF ABSTRACT U	20. LIMITATION OF ABSTRACT none	

SCHOOL OF ADVANCED MILITARY STUDIES

MONOGRAPH APPROVAL

MAJ Timothy M. Gilhool

Title of Monograph: Pegasus Unbound? The Challenge of Sustainment and Endurance in Airborne Joint Forcible Entry Operations

Approved by:

Peter J. Tabacchi, COL, EN

Monograph Director

Kevin C.M. Benson, COL, AR

Director,
School of Advanced
Military Studies

Robert F. Baumann, Ph.D.

Director,
Graduate Degree
Programs

Abstract

PEGASUS UNBOUND? THE CHALLENGE OF SUSTAINMENT AND ENDURANCE IN AIRBORNE JOINT FORCIBLE ENTRY OPERATIONS

by MAJ Timothy M. Gilhool, US Army, 58 pages.

The purpose of this monograph is to examine how the Army should best structure the logistical elements of its new Airborne Brigade Combat Team (BCT) to support Joint Forcible Entry Operations (JFEO). With the Army's current focus on becoming a more "Joint and Expeditionary" force with "Campaign Qualities," as well as the supply problems encountered by Army and Marine forces on the drive to Baghdad, logistics has once again come to the forefront. The strains involved in sustaining a parachute-delivered force in hostile territory can serve as an excellent model for just what the Army hopes to accomplish with "expeditionary" logistics. The methodology used in this work is chronological, examining the past, present, and future of airborne sustainment. Data from each of the sections is evaluated against three criteria areas: Logistics Command and Control (C2), Supply Endurance, and Organizational Capability. With these three pillars, the paper delves in key historical events (World War II, Cold War, OIF), doctrine (current and proposed), structure, and ultimately results. The primary conclusion of the work is that there has been a historical underestimation of requirements and overestimation of capabilities, especially in the area of aerial delivery, for sustainment of parachute operations. To overcome these factors, the paper recommends a number of solutions across the Doctrine, Organization, Training, Materiel, Leadership, and Personnel (DOTMLPF) spectrum. These include a greater emphasis in doctrine on pushing supplies and logistical assets forward; the production of a Joint manual on JFEO; the creation of a Assault Support Platoon within the various Forward Support Companies; the fielding of improved aerial delivery platforms; and the inclusion of Airborne JFEO facilities in the Joint Sea-Basing concept.

TABLE OF CONTENTS

INTRODUCTION – WHY STUDY AIRBORNE LOGISTICS?.....	1
THE PAST – A BRIEF HISTORY OF AIRBORNE LOGISTICS	5
The World War II Experience	5
Airborne Logistics during the Cold War	10
Back to the Future – Urgent Fury and Airborne Logistics	12
Past Lessons – A Brief Summary	14
THE PRESENT - DOCTRINE IN THEORY & PRACTICE.....	16
Logistics Transformation – Distribution and Dulcinea	17
JFEO and Airborne Doctrine – Sustain the Assault & Lodgment	21
In Practice – Airborne Operations during OIF	24
Present Lessons – A Brief Summary	31
THE FUTURE – BCT REQUIREMENTS AND CAPABILITIES.....	33
Airborne BCT Structure and Requirements	33
An Airborne Segue - Building towards BCT log capabilities	35
What they have – Airborne BCT Logistics Capabilities	38
Shortfalls on Land or in Air?	41
Future Lessons – A Brief Summary	42
RECOMMENDATIONS AND IMPLICATIONS.....	43
Recommendations - DOTMLPF	44
Implications for Expeditionary Warfare	52
BIBLIOGRAPHY	54

TABLE OF FIGURES

Figure 1-Infantry BCT	34
Figure 2: Brigade Support Battalion	39

INTRODUCTION – WHY STUDY AIRBORNE LOGISTICS?

The need for sustainment is a constant. For a military entity, it is as integral to survival as breathing and as grounded in reality as gravity and physics. Commanders from Alexander to Abizaid have been faced with the challenge of properly aligning maneuver with sustainment. This task begets a host of questions: How does one build the force package to accomplish the mission? Where does the commander assume logistical risk? What is the proper balance between tooth and tail? When one adds the aerial dimension, the problem becomes only more complex. In airborne operations, the struggle between problem and potential is akin to the mythological winged horse Pegasus.¹ The mount of choice for ancient heroes such as Perseus and Bellerophon, this stallion also had tendency to be unpredictable and hard to tame, in ways very similar to today's military supply and distribution system. Like those ancient heroes, the goal is to find a way to both control and allow the modern Pegasus to fly unbound.

The subject of this work is Sustainment and Airborne Joint Forcible Entry Operations (JFEO). Though current Joint doctrine states that a JFEO can be accomplished via amphibious, air assault, or airborne forces, this monograph will focus exclusively on the airborne aspect. Unlike the first two types of forces, large-scale parachute formations are an exclusive capability that the Army brings to the Joint team.² From a logistical perspective, airborne operations also present a unique problem of how to equip and sustain a force that is light enough to jump in and yet robust enough to accomplish the mission. A recent Joint Staff study concluded that the "...laws of physics and tyranny of distance are the primary constraining factors for JFEO....".³

¹ For more on the various mythological adventures of Pegasus, see the outstanding encyclopedic Wikipedia homepage. Available [Online] <http://en.wikipedia.org/wiki/Pegasus>.

² Though today large-scale amphibious operations remains the province of the Marine Corps, the Army has a long history of conducting such missions, from Vera Cruz to Normandy. The Army also retains significant maritime assets (such as the JLOTS equipment in 7th Transportation Group) and could theoretically rebuild an amphibious capability. Both the Army and the Marine Corps employ vertical envelopment, demonstrated most recently by the Marine during OEF and by the 101st Airborne Division (Air Assault) during OIF. For now, though, only the Army can conduct airborne forcible entry operations.

³ The Joint Staff, J8, *Forcible Entry Operations Study Final Report*, (September 2003), G-4.

This has not changed since the advent of the airborne concept, nor will it be altered any time soon.

This brings us to the primary question to be researched, if not completely answered: *How should the Army best structure the logistics elements of its Airborne Brigade Combat Team / Units of Action (BCT / UA) to conduct Joint Forcible Entry Operations?* The answer to this question is not restricted to just the organization of a particular unit, but impacts upon all the elements of doctrine, organization, training, materiel, leadership, personnel, and facilities (DOTMLPF). Its relevancy is also much greater than might first appear. As understood, the intent of modularization is not necessarily to have a unique Airborne BCT, as exists in the current structure, but an Infantry BCT, capable of performing a multitude of traditional light infantry or air assault missions, including the requirement “to conduct forcible entry operations to seize a lodgment for the larger joint force.”⁴ Whether this is the best or final decision is still in doubt. For the purposes of this monograph, the reader should assume that there would be some sort of dedicated Airborne BCT. This assumption is supported by the recent Army announcement to stand-up and/or transforms a total of six BCTs designated as an Airborne Units of Action.⁵

In addition to the purely airborne element, an investigation of sustainment in this area can also serve as a prism for looking at the current state of Army modularity and logistics transformation. The Army as an institution is attempting to become a “Joint and Expeditionary Army with Campaign Capabilities.”⁶ That statement is rife with implications for the logistics community, especially from the “expeditionary” standpoint. Just what does it take to reach this benchmark? From the Joint aspect, this goal also raises several other important questions: how does the Army balance its own logistical capabilities with the other Joint services? Where does

⁴ Task Force Modularity, *Army Comprehensive Guide to Modularity – Version 1.0* (Fort Monroe, VA: US Army TRADOC, 8 October 2004), 9-10 – 9-12.

⁵ By Fiscal Year (FY) 2006, the Army will have dedicated Airborne BCT/UAs in Alaska (1), Italy (1) and Fort Bragg (4); see PowerPoint Briefing, “Modularity Status, As Of: 29 July 2004.”

⁶ Department of the Army, *Serving a Nation at War: A Campaign Quality Army with a Joint and Expeditionary Mindset (Draft Army White Paper)*, (Washington, DC: Office of CSA, 24 February 2004).

the Army draw the line on what capabilities a unit should possess and what they will rely on the other services to fulfill? Looking at all of these areas will allow a precise examination of the risks taken all too habitually by the Army and the other services in balancing logistics requirements and capabilities.

Thankfully, history and recent military operations provide a wealth of information on this topic. One of the most prominent is the opening of the “northern front” by the 173rd Airborne Brigade during Operation Iraqi Freedom. During the night of 26/27 March 2003, two parachute battalions along with various headquarters and sustainment units executed a parachute assault against an airfield near Bashur in Northern Iraq. Though US Special Operations Forces (SOF) and their Kurdish *Peshmerga* allies were already in control of much of the immediate area, the aerial delivery of over 990 paratroopers and 15 heavy-drop platforms represented the largest single airborne operation since the height of the Vietnam War.⁷ Over the next several weeks, the 173rd would struggle to both sustain itself and open this new front in the theater of operations. Even operating in a semi-permissive environment, their experience highlights the difficulties of expeditionary warfare. Perhaps more than any other operation during the war, the jump in northern Iraq epitomized the nonlinear, noncontiguous type of warfare envisioned in doctrine. The story of the 173rd is not unique to airborne operations or warfare in general. Their experience, though, is a metaphor for what it takes to be “expeditionary.” In the just the past 12 months, the Department of Defense has conducted multiple studies and exercises concerning JFEO. To date, the Army has devoted significant time and resources toward researching the optimum way to accomplish this critical task.⁸

⁷ Gregory Fontenot, E.J. Degen, David Tohn, *On Point: The United States Army in Operation Iraqi Freedom*, (Fort Leavenworth, KS: Combat Studies Institute Press, 2004), 79. Numbers for airdropped personnel and vehicles are from PowerPoint Briefing, Brigade S4, 173d Airborne Brigade, “SETAF/22d ASG, Deployment of the 173d BDE (ABN), Operation Iraqi Freedom,” 8 September 2004.

⁸ In December 2003, Joint Forces Command published a Joint Enabling Concept (v0.79) for JFEO. In October 2004, the Army and the Marines conducted the SEA VIKING exercise, built around a simultaneous airborne/air assault/amphibious invasion in the Pacific AOR.

It can be argued that logistics remains a very linear and chronological process. So too shall be the methodology of this work, with an examination of the past, present, and future of airborne sustainment. The first step is to look at the past. This will involve a brief review of the major logistics lessons from various historical airborne operations from 1939 to 1983. This starts with an in-depth look at World War II. Due the diversity, size, and number of parachute assaults, that conflict remains the greatest source of information on the concept of vertical envelopment. Any in-depth examination of this particular problem must begin there. This will be quickly followed by an overview of lessons from the Cold War and ends with 1983 US forcible entry into Grenada. The airborne experience there is especially relevant as it serves as an almost watershed event in expeditionary movement and sustainment.

Following that, the next step is to bring the concept up to date, covering the present. This involves a review of the current state of US doctrine on airborne and Joint Forcible Entry Operations, as well as significant coverage of recent operations in both Afghanistan and Iraq. Once the stage has been set in both historical and doctrinal concepts, the third step is to look into the future. This involves an analysis of the new BCT structure, requirements, and capabilities. Of course, the possible areas of comparison in this type of logistics analysis are manifold. For the sake of both precision and clarity, this work will focus on three broad areas: Logistics Command and Control, Supply Endurance, and Organic Capabilities. The analysis will be based on the Infantry BCT structure, currently being fielded by the 101st Airborne Division (Air Assault) and the proposed model for the Airborne BCT.⁹ The final step is to recommend changes to unit structure and capabilities to address deficiencies. This will follow the DOTMLPF format, with final thoughts address implications for both logistics transformation and Joint Operational Environment. As the reader will see, while an airborne capability is a uniquely Army asset, the lessons it can provide on expeditionary warfare are practically universal for the Joint force.

⁹ E-mail, LTC John "Skip" O'Neil, G2, 82nd ABN DIV, 22 September 2004.

CHAPTER 1

THE PAST – A BRIEF HISTORY OF AIRBORNE LOGISTICS

For generations, notable figures such as Leonardo Da Vinci and Benjamin Franklin have dreamt about the airborne concept.¹⁰ However, the myriad of technical advancements required to execute large-scale parachute operations were not mastered until well into the 1920s. While some historians and military professionals may question their ultimate utility, their impact on the discourse of warfare is unmistakable.¹¹ From the period of 1939 to 1983, paratroopers would make a definitive mark on the history of conflict. The logistics lessons of that period were forged from the fires of combat experience and continually grounded by the physics of weight and consumption. As the reader will see, many times over in that fifty-year time frame, hard lessons had to be rediscovered, often with harsh consequences on the battlefield. Using the evaluation criteria of Logistics C2, Supply Endurance, and Organizational Capability as a lens, one can trace the evolution of the airborne sustainment experience. Along that continuum, it would seem that the more things change, the more the stay the same.

The World War II Experience

Logistics C2 and Organizational Capability – Small Units with Big Tasks

In an era bereft of automation, command of logistics formations and coordination for supplies was a function of personal relationships. This is because both the support unit

¹⁰ Renaissance artist Da Vinci (1462-1519) is believed to have developed rudimentary parachute sketches around 1514-1516 A.D.; see John D. Anderson, Jr., *A History of Aerodynamics: And Its Impact on Flying* (London: Cambridge University Press, 1997), 27. American patriot Benjamin Franklin (1706 - 1790) was famously quoted as stating, “Where is the prince who can afford to so cover his country with troops for its defense as that ten thousand men descending from the clouds might not in many places do an infinite deal of mischief before a force could be brought together to repel them?” Available [Online] <http://www.military-quotes.com/database/f.htm>.

¹¹ The topic of the military effectiveness of vertical envelopment via parachute is worthy of a monograph in and of itself. The continued existence of airborne formations after almost a century in use speaks volumes to their persistence, if not viability. For more on this topic, see Marc DeVore, “The Airborne Illusion: Institutions and the Evolution of Postwar Airborne Forces,” (SSP Working Paper, June 2004), 30. Available [Online] http://web.mit.edu/ssp/Publications/working_papers/working_papers.html.

architecture and the staff structure were convoluted to say the least. For sustainment, the best place to start is with the Division Quartermaster. In a World War II-era US Division, this individual was dual-hatted as both a special-staff officer under the G-4 and a troop commander. This officer (usually a major) normally delegated the company command to a subordinate officer while spending the majority of his time planning and coordinating for supplies.¹² A single Quartermaster company, along with a similar-sized Maintenance and Medical unit, were the only direct-support logistics elements organic to both the American and British airborne divisions. These comparatively small formations could be split into as many as five different elements, strung between the airborne, airland, amphibious, airfield, and rear depot areas.¹³

This essence of this problem was crystallized in 1950 by Major General James Gavin, the 82d Airborne Division's wartime commander, while testifying before an Army ad hoc committee on Quartermaster support to airborne operations:

“...This has been a serious problem for a long time. In 1943 the late General Lee organized the Airborne Command. We got beyond the Parachute Battalion to form our first Parachute Regiments. We realized that, to put a regiment into combat with the equipment it was learning to take by parachute we would have to have logistical support beyond that which the company could provide for itself.... It has been necessary from the beginning to provide an organization to continue the interest of supply right to the fighting man. As we got into combat, frequently that was lacking, and to make the system work, we had to leave people of our own behind. You cannot divorce your supply from combat, and when you fight you have to have people who know you and are responsible to you to get the stuff to you....”¹⁴

For the US, the integration of logistics units into the airborne fight would a slow process.

Interestingly, though, the Germans in their development of airborne units had taken a different approach. They recognized this sort of logistics C2 problem since the inception of the concept, which is one of the reasons they choose to consolidate their *Fallschirmjaegers* underneath the

¹² William F. Ross and Charles F. Romanus, *The Quartermaster Corps: Operations in the War against Germany (The United States Army in World War II – Technical Services)*, (Washington DC: Office of the Chief of Military History, 1965), 471.

¹³ Ross and Romanus, 477. For more on the British units, see Frank Steer, *Arnhem: The Fight to Sustain, The Untold Story of the Airborne Logisticians* (London: Leo Cooper, Ltd., 2001).

¹⁴ Major General James A. Gavin, “Quartermaster Support of Airborne Operations – Excerpts of Testimony given before an Ad Hoc Committee,” *Quartermaster Review September-October 1950*, Available [Online] http://www.qmmuseum.lee.army.mil/korea/support_of_airborne.htm.

Luftwaffe vice the Army. It would be the German air force, not the army, that would transport and resupply the paratroopers.¹⁵

As with many aspects of the airborne concept, the Soviets seem to also have grasped many aspects of the correct approach from the beginning. Their *Vozdushno-Desantniy Voisk* (VDV) brigades were fully incorporated into the Soviet logistical, or “rear services,” structure. An excellent example is the 4th Airborne Corps’ participation in the Viaz’ma operation as part of the Soviet 33rd Army’s spring 1942 offensive. Because of both the weather and German attacks, the Soviet paratroopers were able to gather only 30-50% of the supplies, roughly 15-17 tons of the required 85-100 tons per day. In coordination with the Western Front, VDV Command, and even the People’s Commissariat of Defense, temporary warehouses were created at forward airfields for both evacuation of wounded soldiers and reception/distribution of required items.¹⁶

Supply Endurance – Soldier and Glider

Regardless of nationality, every airborne unit dealt with the problem of balancing what they brought with them (basic load) with what they either had dropped with them or later delivered. Thanks to the “arsenal of democracy,” the American (and to a certain extent, British) paratrooper leapt into battle very well equipped. Before jumping into Normandy, a member of the 101st Airborne Division described his generous load of personal equipment:

“...one set of O.D.s, worn under my jump suit..., helmet, boots, main chute, reserve chute, Mae West, rifle, .45 automatic pistol, trench knife, jump knife, hunting knife, machete, one (M1 Garand) cartridge belt, two bandoliers, two cans of machine gun ammo totaling 676 rounds of .30 ammo, 66 rounds of .45 ammo, one Hawkins mine capable of blowing the track off of a tank, four blocks of TNT, one entrenching tool with two blasting caps on the outside of the steel plate, three first aid kits, two morphine needles, a canteen of water, three days supply of K rations, two days supply of D rations (hard tropical chocolate bars), six fragmentation grenades, one Gammon grenade, one orange smoke and one red smoke grenade, one orange panel, one blanket, one raincoat, one change of socks and underwear, two cartons of cigarettes, and a few other odds and ends...”¹⁷

¹⁵ James Lucas, *Storming Eagles: German Airborne Forces in World War Two* (London: Arms and Armour Press, 1988), 15 - 17.

¹⁶ David M. Glantz, *History of Soviet Airborne Forces* (Portland: Frank Cass, 1994), 424.

¹⁷ Donald R. Burgett, *Curahee! A Screaming Eagle at Normandy* (New York: Dell Publishing, 1967), 77-78.

Soviet paratroopers were similarly well equipped. The VDV paratrooper jumped into battle well-equipped, with "...dry rations for three days, individual toiletry packs, unlimited ammunition for personal weapons, two hand grenades, and one antitank grenade, a knife, a machine pistol..." and other personal items. Such a bounty of equipment and supplies was not the case for the Germans. Their paratroopers were logistically constrained from the moment they exited the aircraft. The German *Fallschirmjaegers* carried neither rifle nor machine pistol, but instead were dependant on independently dropped containers carrying their personal weapons, ammunition, and other supplies¹⁸

Constrained by what a paratrooper could physically jump with (not to mention carry), most of the budding airborne formations came to the same solution – gliders. Soviet airborne forces were the first to experiment in this area, staging public maneuvers in 1935 and 1936. Their force packages were very ambitious, and many of their techniques quite unique.¹⁹ They even experimented with a LAPES (Low Altitude Parachute Extraction System) type of delivery of wheeled vehicles, though in the Russian's case, the soldiers were actually in the truck when it exited the aircraft.²⁰ The United States and Great Britain faced similar problems with developing their glider fleets. These fragile, powerless aircraft were a compromise based upon the technical limitations of the time. They were relatively cheap in cost (\$15,000 apiece), but had a horrible 80% single-mission rate; that is, only 2 in 10 could be reused after being in combat. Still, gliders could land in smaller, rougher fields than most planes, had no engine or fuel to ignite, and could be towed at twice the speed of some of the first (mid-1950s) helicopters. The US Waco glider could haul up to 3,750 pounds and the British Horsa a bit more. Though used for initial entry

¹⁸ James Lucas, *Storming Eagles: German Airborne Forces in World War Two* (London: Arms and Armour Press, 1988), 15 - 17.

¹⁹ Soviet brigades, consisting of one each parachute, glider, and air landing battle group. A brigade boasted 11 x light tanks, 67 x motorcycles, 54 x bicycles, 4 x 45-mm anti-tank guns, 4 x 76-mm guns, 9 x 82-mm mortars, and 3,500 men. See Steven J. Zaloga, *Inside the Blue Berets: A Combat History of Soviet & Russian Airborne Forces, 1930-1995* (New York: Presidio Press, 1995), 23.

²⁰ Maurice Tugwell, *Airborne to Battle: A History of Airborne Warfare 1918-1971* (London: William Kimber, 1971), 24-25.

assault in several spectacular cases (such as the British D-Day assault on Pegasus Bridge), it was primarily a follow-on, “second-wave” vehicle.²¹

Augmenting Endurance – The Birth of Aerial Delivery

The real key to extending endurance, though, was not glider-transported equipment and supplies, but aerial delivery. The delivery of equipment and supplies by parachute developed concurrently with the airborne concept, and its usefulness grew significantly throughout the war. The Soviets, again, were the first, developing a rudimentary heavy-drop system, allowing a motorcycle and small bundles of supplies to be landed with the troops.²² The Germans also pioneered many techniques through the use of the ubiquitous Junker Ju52 transport aircraft. With an operational range of around 850 miles, it could carry 18 paratroopers, 12 litters or a little over 4,000 pounds of supplies.²³ Unfortunately, the Nazi hierarchy significantly overestimated what they could accomplish via aerial delivery. When the German 6th Army was surrounded by Soviet Forces during the siege of Stalingrad (12 September 1942 – 31 January 1943), *Reichsmarschall* Herman Goering, the corpulent chief of the Luftwaffe, boasted that airpower could resupply the encircled armies, providing up to 300 tons per day of supplies. Unfortunately, the 6th Army was consuming closer to 700 tons per day, and the Luftwaffe only had enough aircraft to fly in 75 tons, and these were being rapidly culled by attacks from the Red Air Force.²⁴ Even with a draconian air effort, including the evacuation of over 30,000 wounded soldiers by air, the last pockets of German resistance were crushed by early February 1943.²⁵

²¹ John C. Warren, *USAF Historical Studies: NO. 97 – Airborne Operations In World War II, European Theater* (Maxwell AFB, AL: Air University USAF Historical Division, 1956), 197.

²² Tugwell, 24-25.

²³ Frans Bonne, “WW2 Warbirds: the Junkers Ju 52 Tante Ju,” Available [Online] <http://www.xs4all.nl/~fbonne/warbirds/ww2htmls/junkju52.html>. Supply weight limit has been described as “unspecified.” The “over 4,000 pounds” figure is based on the difference between empty and max takeoff weight minus fuel.

²⁴ Edwin P. Hoyt, *199 Days: The Battle for Stalingrad* (New York: Tom Doherty Associates, 1993), 219-221.

²⁵ Earl Ziemke, I.C.B. Foot (ed.), *The Oxford Companion to World War II* (Oxford: Oxford University Press, 2001), 824-825.

The airdrop experience was in general much more positive for the Allies. Allied successes in the Far East with far-flung British and Indian forces, as well as the airdrop of supplies to the encircled 101st Airborne Division during the Battle of the Bulge, gave the nascent US Army Air Force great confidence in its abilities.²⁶ The perspective was not always the same on the ground for the supported forces. During the war, supplies were rarely dropped with precision and were usually scattered over miles of ground. The task of collecting the various bundles was both difficult and hazardous. One airborne commander remarked that during Operation MARKET-GARDEN, it would have taken a third of his troops allotted to supply detail in order to collect the required amount of supplies. During the same operation, the British received more supplies from three bulk-loaded Hamilcar gliders than they did from an airdrop by 33 four-engine aircraft.²⁷ To summarize, though airborne units had accomplished great things on the battlefield, the issue of logistical support remained a major concern. In the years to come, while the level of airdrop precision would improve, some of the same problems would remain eerily similar.

Airborne Logistics during the Cold War

Parachute forces continued to play an important if not always decisive role in military conflict in the years after 1945. Though the US conducted three drops of the independent 187th Parachute Regiment during the Korean War to cut off withdrawing enemy forces, none of these played any major role in the overall battle.²⁸ Combined Anglo-French airborne and amphibious conducted an assault at Port Said in 1956 to secure the Suez and Belgian (supported by US aircraft) executed a brilliant raid and rescue operation in the Congo in 1964. Even the Israelis made good use of their paratroopers, seizing Mitla Pass by parachute assault in 1956 and

²⁶ Daniel L. Haulman, "Air Mobility Lessons of World War II," *Air Mobility Symposium: 1947 to the Twenty-First Century*, (Washington D.C.: US Government Printing Office, 1997), 22.

²⁷ Warren, 197.

²⁸ Tugwell, 299.

employing them in every subsequent conflict from the Golan to the Sinai.²⁹ Probably the most logistically significant, and daunting, operation was the 1953 French jump into a valley along the Laotian-Vietnamese border. It is forever known in history as the battle of Dien Bien Phu.

The insertion and subsequent siege of French positions by the Viet Minh is the poster-child for risk in airborne operations. In his excellent work on the battle, historian Howard Simpson leads off his introduction with a italicized statement, “An overdependence on air support and supply can lead to disaster during a guerilla-type campaign in difficult terrain or adverse weather conditions.”³⁰ This statement could, or perhaps should, be less restrictive and eliminate the comment on “guerilla-type campaigns” or even terrain and weather. The French goals of covering Laos, establishing a supply point for friendly guerrilla operations, and defeating the Viet Minh in a set-piece battle were laudable, if not entirely realistic.³¹ For the purposes of logistics lessons learned, though, it set the model for what aerial delivery could and could not accomplish. The fact that French forces held out for as long as they did, delivering food and supplies as well as evacuating wounded, and only falling after five months, is impressive. In the end, an overestimation of their supply endurance and rapidly diminishing on-the-ground capability, especially in the areas of maintenance and health service support, was an obstacle they could not overcome. Instead of being a boon, logistics became a burden. This is not to say logistics was the only reason Dien Bien Phu fell, but French logistical errors in planning or overall lack of concern for the logistical aspect of the operation ensured their defeat.³²

The impact of that battle echoed for the United States throughout the Vietnam War. Though the 173rd Airborne Brigade did conduct the only combat parachute jump in the Vietnam

²⁹ Tugwell, 305. For more on Israeli airborne operations, see Martin van Crevald, *The Sword and the Olive: A Critical History of the Israeli Defense Force* (New York: Public Affairs, 2002).

³⁰ Howard R. Simpson, *Dien Bien Phu: The Epic Battle that America Forgot* (London: Brassey's Inc., 1994), xx.

³¹ Major Harry D. Bloomer, “An Analysis of the French Defeat at Dien Bien Phu,” Available [Online] <http://www.globalsecurity.org/military/library/report/1991/BHD.htm>.

³² Jeff Miser, “Resupply at the Battle of Dien Bien Phu: What Lessons Were Learned and How Are They Applied to Today's Military Operations,” Monograph, US Army War College, 28 March 2001.

conflict on 22 February 1967 (Operation Junction City), its impact, like those of the Korean conflict, was negligible.³³ Even the 101st Airborne Division gave up its airborne capability, converted to a helicopter-borne airmobile formation in 1968.³⁴ What the French defeat really gave the United States Military an unmatched chance to learn from that operation and incorporate the lessons learned into future applications of airborne operations and training. The true standard of measurement in determining if the United States learned from the logistical shortfalls at Dien Bien Phu began with the support effort at Khe Sanh and in the airborne operations conducted by the United States since Khe Sanh.³⁵ However, as future airborne logisticians would learn, in an age of rapid and expeditionary warfare, aerial throughput is not the final arbiter of success.

Back to the Future – Urgent Fury and Airborne Logistics

For logistical purposes, airborne history resumes in 1983 with the US action in Grenada. The reason for this assertion is that, despite a long and proud lineage of airborne operations, both in America and across the world, the US airborne invasion of that tiny island was a logistical embarrassment. From the start, planning was very much an “on the fly” affair; less than four days passed from concept to execution. While the Marines would conduct amphibious landings in northern half of the island, the Army would conduct an airborne assault on the Point Salines airport on the islands’ southern tip. Two battalions of Rangers would lead the way, followed at H+4 by elements of the 82d Airborne Division.³⁶ According to one account, logistics coordination between the Rangers and the 82d Airborne Division (ABN DIV) was virtually nonexistent. At the very least, it was abbreviated and hindered by the lack of common procedures. Perhaps more importantly, XVIII Airborne Corps was completely bypassed in the

³³ Military.com Homepage – 173rd Airborne Brigade. Available [Online] <http://www.military.com/HomePage/UnitPageFullText/1,13476,100135,00.html>.

³⁴ Lieutenant General John J. Tolson, *Airmobility 1961-1971* (Washington DC: US Government Printing Office, 1989), 195.

³⁵ Miser, Ibid.

³⁶ H+4 means four hours after the initial (H-hour) assault by the Rangers. See Mark Adkin, *Urgent Fury: The Battle for Grenada* (Toronto: Lexington Books, 1989), 141-143.

Task Force organization; the chain of command went straight from the Joint Task Force to the 82nd. Neither the corps headquarters nor any of the critical Corps Support Command (COSCOM) logistics units were alerted, employed, or deployed to support the operation. The Rangers themselves would only deploy with very limited, organic supply and medical capability.³⁷

This decision had profound implication for the 82d Airborne Division Support Command (DISCOM). Divested of its habitual support from the COSCOM, especially in equipping and outloading, it faced the task of pushing out the first alert battalion in twelve hours, followed by a second only six hours later. The DISCOM did not possess either 10,000-pound or 6,000-pound forklifts to handle oversize pallets of food or ammunition. There were not sufficient trucks to carry duffle bags and basic load items from neighboring Fort Bragg to the Green Ramp loading site on Pope Air Force Base (AFB). Concurrently, the DISCOM also had the mission to rig numerous vehicles, supplies, and pieces of equipment for possible airdrop. An antiquated and imprecise air load planning system, which did not match the real capabilities of USAF aircraft, further complicated this process. In the end, Air Force loadmasters had to determine weight and space requirements using hand-held calculators.³⁸

The chaos at Fort Bragg and Pope AFB was mirrored on the far end at Point Salines in Grenada. To meet the twelve-hour timeline, soldiers had deployed with barely two days worth of rations and only one two-quart container of water. Level II and above medical support was “assumed” to be available from the naval task force offshore, so battalion medics deployed with only minimal Class VIII supplies. The only logistical element to initially deploy with the assault elements was a 35-soldier Forward Area Support Team (FAST), consisting of one Arrival Airfield Control Group (AACG), a small maintenance detachment, and a refueling crew. Doctrinally, major slices of the maintenance, medical, and supply & services companies would

³⁷ Adkin, 135.

³⁸ Jerome G. Edwards, Michael A. Anastasio, Gilbert S. Harper, Michael E. Simmons, *Grenada: Joint Logistics Insights for “No-Plan” Operations (National Security Program Discussion Paper 89-05)*, (Cambridge: Harvard University JFK School of Government, 1989), 24-27.

accompany the assault battalions, but because of “tactical considerations,” they were left behind. Even the DISCOM’s efforts in the rear were thwarted, as its hastily assembled pallets of ammunition and supplies were pushed aside when the Division Commander decided to send an additional six infantry battalions to the island.³⁹

The US invasion, in the end, proved to be a storm in teacup. The US quickly rolled over the hodgepodge of Cuban construction soldiers and local Grenadian militia, suffering 19 dead and another 115 wounded.⁴⁰ Casualties were evacuated by Marine and Navy helicopters to the *USS Guam* and aircraft carrier *USS Independence*, but only after the FAST figured out how to communicate with their naval counterparts.⁴¹ Problems with joint fuel compatibility, water purification, and food support for over 600 detainees and several hundred local refugees were identified and worked through.⁴² In the end, logistics issues were overcome, though the results did not look promising in the light of forty-plus years of American airborne history. For the entire US military, the Grenada operation was a wake-up call on readiness. It would generate a fair amount of introspection and doctrinal review, especially for both the 82nd Airborne and the logistics community. As the 1980s wore on and the decade closed out, the Army would find plenty of opportunities to put their expeditionary standards to the test.

Past Lessons – A Brief Summary

The lessons, logistical and otherwise, they could be extracted from the forty-four years of history covered in this chapter deserve much greater coverage than this monograph can allow. But, to summarize, there are three key issues to ponder while transitioning in the discussion from past to present:

³⁹ Edwards, 26-27.

⁴⁰ Adkin, 309. GlobalSecurity.org puts the figure at wounded figure at 119. Available [Online] <http://www.globalsecurity.org/military/ops/casualties.htm>. Only two soldiers from the 82d were killed, both in the only combat action the division saw in a 26 October attack on a Cuban-held sports complex, see Adkin, 259.

⁴¹ Edwards, 30.

⁴² Edwards, 32-33.

- *Initial stockpiles set the logistical base for the rest of fight.* Initial supply loads must account for unit requirements and friction, as well as balancing what is practical to be delivered with the soldier. Starting with the paratrooper's individual load and ending with either a glider and/or aerial delivery, what an airborne unit shows up to the fight with may be all it gets. To paraphrase a certain government official, "You go to war with the logistics you have."
- *Aerial Delivery can sustain but not necessarily win a battle.* It is an almost apocryphal saying that logistics cannot win a battle but it can lose one. Both Arnhem and Dien Bien Phu fall in this model, and Khe Sanh despite the final result is not too far removed from this conclusion.
- *End-to-end support relationships are essential in airborne operations.* MG Gavin's biggest conclusion about airborne logistics was "to have people who know you and are responsible to you to get the stuff to you"⁴³ A seamless logistics network both at the departure airfield on the objective. This was forgotten in the rush to Grenada. It should not be again.

This was a brief look at the past of airborne sustainment and forcible entry. The "present" reality is just around the corner.

⁴³ Gavin, Ibid.

CHAPTER 2

THE PRESENT - DOCTRINE IN THEORY & PRACTICE

The history of airborne operations did not end in 1983. The United States would again employ paratroopers to spearhead entry into a foreign land, most notably in Panama in 1989.⁴⁴ They would also launch, and recall, an airborne task force from Haiti in 1994.⁴⁵ In a historical context, those events are part of the “present,” and will be discussed in that venue. Therefore, having begun this study of sustainment and airborne entry operations with a solid historical foundation, it is possible to transition to the current reality.

For the US military, that reality is bounded by doctrine. If military theory is considered the “grammar of war,” then doctrine serves as the vernacular.⁴⁶ It is not a static concept, but one that allows thoughts to be translated into action. Foes of the United States have been alleged to claim that it is worthless to study American doctrine, since the Army does not follow it.⁴⁷ However, since the theoretical renaissance of the 1970s, the US military, and the Army in particular, has worked hard in crafting and critiquing its doctrine.⁴⁸ There is merit to an examination of how an army thinks it will fight (and sustain) a war, both in theory and practice. For our purposes, this means a concentration on the topic of contemporary logistics doctrine, both

⁴⁴ For more on airborne operations in Panama, see Thomas Donnelly, Margaret Roth, and Caleb Baker, *Operation Just Cause: The Storming of Panama* (New York: Lexington Books, 1991) and Ronald H. Cole, *Operation Just Cause: The Planning and Execution of Joint Operations in Panama*, February 1988-January 1990 (Washington DC: Joint History Office, 1995).

⁴⁵ For more on the plan and aborted drop, see Walter E. Kretchik, Robert F. Baumann, and John RT. Fishel, *Invasion, Intervention, “Intervasion” – A Concise History of the US Army In Operation Uphold Democracy* (Fort Leavenworth, KS: US Army CGSC Press, 1998).

⁴⁶ This gist of this metaphor is attributed to Dr. James Schneider, given during an ASMP Lecture in October 2004. He also made the analogy that “doctrine is to (military) theory as muscle is to bone.”

⁴⁷ This statement may be apocryphal, but is widely quoted. A simple Internet search using www.a9.com returned over 37,000 hits, including anonymous quotes such as, “One of the serious problems in planning the fight against American doctrine, is that the Americans do not read their manuals, nor do they feel any obligation to follow their doctrine (From a Soviet Junior Lt’s Notebook).” Available [Online] <http://www.military-quotes.com/funny-quotes.htm>.

⁴⁸ Shimon Naveh, *In Pursuit of Military Excellence: The Evolution of Operational Theory* (London: Frank Cass, 1997), 287. Also see John L. Romjue, *From Active Defense to AirLand Battle: The Development of Army Doctrine, 1973-82* (Ft Monroe, VA: Historical Office, TRADOC).

from the aspects of Joint Forcible Entry Operations (to include airborne specific elements), and for logistics transformation in general. The “in practice” components are the actual operations, specifically the recent experience of airborne operations during OIF. Together, they paint a picture of just where the military stands in its ability to conduct and sustain this type of warfare.

Logistics Transformation – Distribution and Dulcinea

Whenever in today’s environment one discusses the topic of sustainment, one cannot escape the brouhaha over logistics transformation. Too often, it would seem, instead of focusing on what the military can accomplish now with its current structure and capabilities, the proponents of transformation obsess with what new technologies might accomplish, much like the literary Don Quixote chasing after his Dulcinea.⁴⁹ This literary-born concern is more pressing in the concurrent environment as the military embarks on its current road of logistics transformation. The main element of this concept is captured by the JCS under the banner of “Focused Logistics.” It is captured in a recently published J4 Campaign Plan that “describes how we will achieve the full potential of focused logistics through revolutionary changes to information systems, reengineered processes, innovation in organizational structures, and advances in transportation technologies.”⁵⁰

As it is described, Focused Logistics is a multi-vectored attempt to revolutionize military logistics. Instead of relying on the warfighter to transform, the logistician transforms himself, working in areas such as logistics business processes, access to logistics information, and quicker response to demands. Improving customer wait time (CWT), Time-Definite Delivery (TDD), Total Asset Visibility (TAV), and developing a web-based, shared-data environment serve as the

⁴⁹ Dulcinea, of course, was the object of the erstwhile knight errant Don Quixote in Miguel Cervantes’ classic *Don Quixote*. She was a barmaid of questionable character whom Quixote mistook for a “fair maiden.” It is this author’s contention that perhaps many elements of logistics transformation may be of similar character, though one would hope that current efforts are not just “tilting at windmills.”

⁵⁰ J4, Joint Chiefs of Staff, *Focused Logistics Campaign Plan*, Available [Online] <http://www.dtic.mil/jcs/j4/projects/projects.htm>, 5.

pillars of the transformation process.⁵¹ These overall goals fall very much in line with those specifically expressed for JFEO. In order to meet the demands for forcible entry ops, logisticians are called upon to provide “focused sustainment.” In general, joint forcible entry formations are considered to be “smaller, lighter, and more mobile” than conventional units.⁵² This means, at least for the present, that they generally lack the motorized or mechanized assets of heavier Army and Marine Corps formations. Still, the goal of the JFC and his logistics staff is to “establish the smallest logistical footprint but deliver with speed and efficiency; eliminate strategic, operational, and tactical boundaries; and distribute to the point of the requirement.”⁵³ In addition to the above improvements in practices and performance metrics, the military also anticipates technological advances in areas such as alternative fuels, multi-power systems and materiel sciences, as well as the fielding of lighter and faster platforms.⁵⁴ Together, these methods hold the promise to significantly reduce at least some aspects of the military’s logistical burden and streamline support to its expeditionary forces.

The real problem in logistics, however, lies not in the promise of these new methods or technologies, but in their real-life performance. This topic is worthy of a monograph in and of itself, but for our purposes, the coverage must be brief. In the area of technology, even if a breakthrough in bandwidth or sharing a common operational picture, the military would require a massive infusion of funding, not to mention time, in order to field those new systems on a wide enough basis to make any significant logistical difference. Given the current optempo, this does not seem very likely, even in the ten to fifteen-year timeframe. This conclusion is not pure opinion, but based upon dollars. In its’ Fiscal Year (FY) 2005 Game Plan, the Army’s primary concern is maintaining its present level of resources in order to support ongoing operations and fulfill other strategic commitments while executing the current plan for Transformation. Even

⁵¹ *Focused Logistics Campaign Plan*, 13-14.

⁵² Headquarters, US Joint Forces Command, *Joint Forcible Entry Operations Joint Enabling Concept*, Version 0.79, (4 December 2003), *Joint Enabling Concept*, Version 0.79, 24.

⁵³ *Joint Forcible Entry Operations Joint Enabling Concept*, 30.

⁵⁴ *Joint Forcible Entry Operations Joint Enabling Concept*, 24.

with increased resources due to OIF and the Global War on Terrorism (GWOT), the Army sees the “increased level of resources” as “temporary – and we do not know how long it will last.”⁵⁵

The second half of the “promise” is the oft-cited “business practices.” These concepts are the outgrowth of many of the logistics reforms and experiments of the 1990s. In the wake of Desert Storm, the Army and the defense logistics community underwent a profound transformation, adopting many business practices to lower excess inventories and speed up delivery of parts and equipment. The phrase of the day was “velocity management,” and it represented a new paradigm in Army thinking, emphasizing speed over mass, quality over quantity, and paying close attention to just what items and services cost.⁵⁶ The results were not illusory. Customer Wait Time for spare parts in both CONUS and OCONUS fell by over 50%. Because of this, overall repair time for pieces of equipment dropped significantly and customer satisfaction and zero-balance rates increased dramatically.⁵⁷ Despite the increasing optempo of the 1990s, this “just-in-time” philosophy reaped great financial benefits for the US defense establishment. In an era of shrinking budgets, the “bill payer” for operations, training, and other priorities was logistics. Shrinking the “iron mountain” may have worked then, but it came to a crashing halt in the aftermath of the GWOT.

It has been perhaps overstated that 9/11 changed everything. To be sure, logistics did not escape the waves of change emanating from that event. In words of one recent article covering Operation Iraqi Freedom, the military logistics system was found wanting. Retired Vice Admiral Arthur Cebrowski, director of the Pentagon’s Office of Force Transformation, made this pronouncement, stating that while a “just-in-time” supply delivery system was efficient and

⁵⁵ Department of the Army, “Memorandum – Fiscal Year 2005 Game Plan, 1 November 2004.” Available [Online] <http://www.army.mil/features/2005ArmyGamePlan>.

⁵⁶ Rick Eden, “Faster, Better, Cheaper: U.S. Army Manages a Logistics Revolution,” *Rand Review* (April 2002), Available [Online] <http://www.rand.org/publications/randreview/issues/rr.04.02/faster.html>, 1.

⁵⁷ Eden, 5-6.

generally predictable, is was “wholly irrelevant to what actually goes on at the pointy end of the spear, where you do not have predictability.”⁵⁸ The Army, in its own analysis, was even harsher:

The CSS (Combat Service Support) difficulties cross all aspects of Army operations.... From the recent shift to “just-in-time” logistics to the training and equipping of CSS soldiers and units, the CSS community and the Army must rethink how they conduct operations. The current system emphasizes efficiency over effectiveness – from parts and supply distribution to the physical equipping of CSS units. In combat, however, effectiveness is the only real measure of success; many CSS units struggled to perform their mission due to “savings” realized in recent changes in organization, equipment, training resources, and doctrine.⁵⁹

This passage, placed in the introduction of the Army’s widely published OIF study *On Point*, was a damning indictment of business-oriented practices of the 1990s. Further challenges in areas from ammunition to body armor only reinforced this conclusion.

In response, LTG Claude Christianson, the current Army G4, has attempted to reorient Army logistics priorities to both take advantage of current technologies and acknowledge the need for realistic future improvements. Soon after assuming the post in late 2003, he issued the *Army Logistics White Paper*, which laid his priorities:

We will build confidence in the minds of the combatant commanders by delivering sustainment on time, every time. We can do that only if we provide Army Logisticians the capability to see the requirements every day and to control a distribution system that guarantees precise, time-definite support. Army Logisticians will be part of joint and combined logistics processes that deliver focused logistics.... If we do not connect Army logisticians, improve the capability of the distribution system, modernize force reception, provide integrated supply management and give the joint force combatant commanders JTAV (Joint Total Asset Visibility), we will study these same lessons after the next major conflict. The Army G-4 is committed to ensure that we will not have to relearn these same lessons.⁶⁰

Since then, the Army has made some impressive strides in these areas. In Spring 2004, it began fielding Very Small Aperture Terminal (VSAT) satellite communications systems to CSS units,

⁵⁸ Gerry J. Gilmore, “Military’s Logistics System Found Wanting in Iraq War,” *American Forces Information Service*, January 21, 2004. Available [Online] <http://www.globalsecurity.org/military/library/news.2004/01/mil-040121-afps03.htm>.

⁵⁹ Fontenot, xxvii.

⁶⁰ Department of the Army, *Army Logistics White Paper: Delivering Materiel Readiness to the Army* (Washington DC: US Government Printing Office, 2003), 8. Available [Online] <http://www.hqda.army.mil/logweb/sitemap/2003-Web/visnstmt/Whitepaper.pdf>.

down to the Brigade Support Battalion (BSB)-level.⁶¹ This is a quantum leap beyond the previous practices of exchanging computer disks or using the short-range SINCGARS-based to pass requisitions and other logistics data back and forth. These and similar, more realistic approaches have the potential to deliver on at least part of the “promise” of logistics transformation.

JFEO and Airborne Doctrine – Sustain the Assault & Lodgment

The post-OIF movement to reform logistics coincides with the military’s revisiting the topic of JFEO. It is only in the last year the military has started to really reexamine what is required to have a robust forcible entry capability.⁶² These various studies, conducted by the armed services, have a common point of departure. That point is the present source of US doctrine, Joint Publication (JP) 3-18, *Joint Forcible Entry Operations*. Published in July 2001, it states:

The primary task of the Armed Forces of the United States is to deter war and defend the United States and its territories against attack or aggression. To be credible both as a deterrent and as a viable warfighting option for policy enforcement, US armed forces must be capable of deploying and, if necessary, fighting to gain access to geographical areas controlled by hostile forces. Operational applications of forcible entry operations range in scope from an operation designed as the initial phase of a campaign or major operation, to a forcible entry that is a single major operation to achieve strategic and/or operational objectives.⁶³

This need to “gain access to geographical areas controlled by hostile forces” is the cornerstone of the concept. Whether it is Normandy or North Korea, the US military needs a capability to deploy, support, and sustain land forces in enemy territory. Logistics, within the context of forcible entry operations, is classified as those functions that “enable movement and maintenance

⁶¹ Stephan Larsen, “3ID Soldiers at the NTC agree: CSS VSAT is a combat multiplier,” *Army News Service*, 22 June 2004. Available [Online] http://www4.army.mil/ocpa/read.php?story_id_key=6080

⁶² The Army began the process in September 2001 by looking at the concept of “Air Assault 2010,” expanding the following year to include airborne operations. It was not until May 2003 that OSD commissioned the drafting of a White Paper on JFEO. See PowerPoint Brief, “Future Force Forcible Entry Operations, General Officer Steering Committee, Fort Monroe (VA), 7 January 2004.”

⁶³ Joint Chiefs of Staff, *JP 3-18, Joint Doctrine for Forcible Entry Operations* (Washington, D.C.: U.S. Government Printing Office, 10 September 2001), vii.

of forces from preparation and initial deployment to the envisioned end state of the operation or campaign.” The Joint Force Commander (JFC) is required to plan and establish the logistic systems for not only the assault, but also any follow-on operations as required. Any campaign design must include and integrate the six (Joint) logistics functional areas (transportation, health services, maintenance, supply, civil engineering, and other services).⁶⁴

From the operational perspective, this means that the JFC’s must play a key role in integrating and/or synchronizing logistics concept into the JFEO. Any concept for logistics support should include items such as:

Concept for movement of prioritized force packages into, within, and through the lodgment operational area (LOA), ...analysis of need for en route infrastructure and Intermediate Staging Bases (ISBs) to include locations...considerations for retrograde of prioritized personnel and cargo.... concept for theater distribution to minimize shortages or bottlenecks of critical resources.... identification of key logistic resources in the LOA and coordination for their acquisition, control, operation, and improvement to support the concept of operation....identification of logistic resources to be introduced into the LOA and their possible sourcing....Logistic conditions necessary to execute follow-on operations....Directive authority for logistics to assign Service and agency responsibilities by function, by phase, and/or by geographic area....identifying ISB requirements and associated transportation and infrastructure support.⁶⁵

As with any military venture, operational success “hinges on the quality of the planning effort that translates commander’s intent and concept into guidance for execution by subordinate commanders and logisticians.”⁶⁶

The logistics preparation of the battlefield for a JFEO takes the traditional considerations and adds the tyranny of distance, nebulous LOCs, and unpredictable foe firmly to the equation. These concerns are echoed in the current Army doctrine, Field Manual (FM) 90-26, *Airborne Operations*. Though over fourteen years have passed since its publication, much of its content and applicability remains unchanged. When discussing the limitations of airborne operations at the very start of the FM, it clearly addresses on the main logistical problem of an assault force – initial sustainment:

⁶⁴ Ibid., x.

⁶⁵ Ibid., IV-3.

⁶⁶ Ibid., IV-4.

[A]fter the initial airdrop, the sustained combat power of airborne forces depends on resupply by air. Any interruption in the flow of resupply aircraft can cause a potential weakening of the airborne force. Enemy air defense fires against resupply aircraft and long-range artillery and mortar fires on the DZ can hamper the delivery, collection, or distribution of critical supplies.⁶⁷

To overcome these challenges, commanders and staff officers, logistics and otherwise, build their plans on the base of both critical assumptions and Standard Operating Procedures (SOPs). In addition to FM 90-26, much of this comes from the 82d Airborne Division, stationed at Fort Bragg, North Carolina. Though by no means the only practitioners of mass tactical parachute assaults, their unbroken history of expertise in this form of warfare gives them, for better or for worse, the lead in setting the standard in how airborne operations are done.⁶⁸

This process begins with several key assumptions. These are generic to begin with, but serve as the basis for constructing both the assault package and what logistics elements will accompany it. For an airfield seizure operation, the 82d traditionally assumes that it will use a two-battalion, BCT (-) task force, that a single Drop Zone (DZ) will be utilized, air superiority exists, Close Air Support (CAS) available, any runway damage is minimal and is repairable in four hours or less, allowing airland operations will commence at P+4 hours.⁶⁹ To support this, the 82nd DISCOM forms three echelons to support an airborne operation - the assault echelon, the follow-on echelon, and the rear echelon. Each is tailored to the mission, but for a BCT-level assault are based upon the brigade's habitual Forward Support Battalion (FSB). The only one to physically accompany the airborne assault is the appropriately named Assault Echelon, or A-Echelon. This element is tailored for the mission and can include elements from the FSB's

⁶⁷ Department of the Army, *Field Manual 90-26, Airborne Operations* (Washington DC: US Government Printing Office, 1990), 1-10.

⁶⁸ The most prominent exception is, of course, the 75th Ranger Regiment, who has traditionally taken the lead, even over the 82nd, in performing airfield seizure and airborne assaults, with both Grenada and Panama being only two examples. They have, according to some media sources (see Seymour Hersh, *Chain of Command* (New York: HarperCollins, 2004)), performed more than a few of these types of missions during both OEF and OIF. Unfortunately, most of the details remain classified, and thus remain outside the scope of this work.

⁶⁹ P-hour is when the first paratrooper exits the door over the DZ. See 82nd Airborne Division, *Airfield Seizure Training Circular*, (Fort Bragg, NC: October 2004), 8.

ground maintenance company, a forward support medical company (FSMC), and headquarters and supply company (HSC). It can also include a detachment from the Division's quartermaster airdrop equipment and support company (organic to the Division Main Support Battalion) that can assist in the recovery and evacuation of airdrop equipment from the DZ. The FAST may receive augmentation from corps logistics or other support units (especially for functions such as A/DACG, light airfield repair, signal, and military police) based on mission needs.⁷⁰

Follow-on logistical support would be brought in as a second echelon, usually air landed, though theoretically every solidier, piece of equipment and/or supplies could also be airdropped. However, certain key elements of the DISCOM will stay at the departure airfield in the rear echelon. This echelon remains at the departure airhead or ISB and consists of elements not immediately required in the airhead to support the airborne force. These elements include the remaining portions of the DISCOM Materiel Management Center (MMC), Main Support Battalion (MSB), forward Corps Support Battalion (CSB), and the various personnel and finance units from both Division and Corps. Depending on the duration and nature of the operation, the rear echelon may be called forward and deployed into the AO after the lodgment is established.⁷¹

In Practice – Airborne Operations during OIF

The above paragraphs lay out what is established in doctrine for airborne operations, though much of it for the past sixty years has been practiced in peacetime. Several recent operations have given the military and the US Army a chance to readjust this bounding of reality. Parachute assaults, both planned and executed, that occurred during the first part of Operation Iraqi Freedom give us to opportunity to do just that. They help illustrate both the perils and

⁷⁰ *Field Manual 90-26, Airborne Operations*, 9-1. The FM refers to this as Forward Area Support Team (FAST), a doctrinal predecessor to the FSB. Current airborne and logistics doctrine uses the term A-(Assault) Echelon. The FM also still reflects units such as divisional Maintenance Battalions, which have been supplanted by the MSB. The MSB itself is dying breed and will be phased out in the UEx formations by the Sustainment UA.

⁷¹ *Ibid.*, 9-1.

promise of sustainment and airborne operations, not to mention expeditionary warfare in general. The first of these was the 173rd Airborne Brigade's jump into Northern Iraq. As it was mentioned during the introduction, this jump was executed in a semi-permissive environment with no enemy contesting the drop zone or the build-up of the lodgment. Still, the planning for and execution of sustainment for this operation has yielded a host of lessons concerning logistics and the expeditionary style of warfare. The second example exists in draft form only, but is equally useful in exploring the problems of airborne force sustainment. This was the 82d Airborne Division's 2nd Brigade Combat Team (BCT) and its planned drop on Saddam International Airport (now known as Baghdad International Airport, or BIAP) as part of V Corps' advance from Kuwait.

The Jump from the North – 173rd Airborne Brigade and Bashur Airfield

The airborne insertion of the 173rd and its litany of attached elements had not been part of the original concept developed for OIF.⁷² But with Turkey's refusal to grant the 4th Infantry Division passage through its territory into Northern Iraq, US Central Command (CENTCOM) and Combined Forces Land Component Command (CFLCC) determined they still needed some credible conventional forces to help fix the Iraqi forces in the north and assist the various US and Coalition Special Operation Forces (SOF) and Kurdish paramilitaries in destroying strategic targets and securing key terrain. This decision led to commitment of the 173rd to its first combat operation since the end of the Vietnam War.⁷³

To accomplish their task, though, they would need help, especially in the area of logistics. The 173rd had only recently achieved quasi-brigade status, adding a second airborne infantry battalion in mid-March 2003.⁷⁴ Unfortunately, they had only a company-sized element, the 501st Forward Support Company (FSC), to provide logistics support for the two infantry

⁷² Fontenot, 223.

⁷³ Ibid., 145. Also see Williamson Murray and Robert H. Scales, Jr., *The Iraq War* (London: Belknap Press, 2003), 193-194.

⁷⁴ Ibid., 222.

battalions and five other company-sized elements in the Brigade. To alleviate this, the core staff of the 201st Forward Support Battalion, (FSB) part of the 1st Infantry Division DISCOM in Germany, was tasked to assist. Under the leadership of LTC Daniel Mitchell, this group was “not an actual FSB, but rather a conglomeration of soldiers from across the 1st Infantry DISCOM put together to serve as a battalion headquarters.” In addition to the 201st staff, other units including the 250th Forward Surgical Team (FST), the 38th Personnel Services Detachment, and a Mortuary Affairs Collection Point (MACP) team from the 54th Quartermaster Company were added to the task organization.⁷⁵ Along with a Material Management Team (MMT) from the 200th Theater MMC, 21st Theater Support Command (TSC), these units formed the 201st Logistics Task Force (LTF). Upon assembling, they quickly went about the arduous task of planning and then executing expeditionary logistics.⁷⁶

The lessons from their experience have filled volumes. For the purposes of clarity and direction, they are divided into this paper’s three critical categories: Logistics Command and Control (C2), Supply Endurance, and Organic Capabilities. Key personal at the right place and bandwidth were the foundations of Logistics C2 for the 173rd. The standing-up of the ad hoc battalion headquarters proved absolutely critical. In the words of LTC (then MAJ) Phillip Mead, commander of the 501st FSC during OIF, there was

some question the need for a Battalion Logistics C2 element. As the FSC Cdr, I was consumed with planning and executing company level operations. The 201st FSB managed the logistic pipeline and interfaced with HQ USAREUR/21 TSC (Supporting Command.”⁷⁷

Communications with those CONUS and USAREUR-based logistics agencies came through a variety of means, including IMARSAT, Iridium phones, signal light comms package, and

⁷⁵ LTC Mitchell sent the original draft of this article along with extensive personal comments. See Jamie L. Krump, “Sustaining Northern Iraq: when the 173d Airborne Brigade dropped 1,000 paratroopers into northern Iraq, the provisional 201st Forward Support Battalion went into the theater with them” *Army Logistician* (Nov-Dec 2003). Available [Online] http://www.findarticles.com/p/articles/mi_m0PAI/is_6_35/ai_110459235.

⁷⁶ Krump, *ibid*.

⁷⁷ E-mail, LTC Phillip Mead, Commander, 501st FSC, 173rd Airborne Brigade, 12 October 2004.

eventually an Army Materiel Command (AMC) Flyaway package. Supply status was passed to higher headquarters “the old fashioned way,” via LOGSTATS and ULLS/SAMS. One of the biggest issues turned out to be not the pass-back of data or connectivity with higher sources of supply, but coordination and liaison at the Aerial Port Of Embarkation (APOE) for equipment and supplies bound for Iraq. Both LTC Mitchell and LTC Mead identified this area as a source of friction. Liaison Officers (LNOs) from the 200th MMC stationed at the APOD were on the phone “day and night” with the 173rd to ensure the right stuff (IAW changing priorities) was loaded on the aircraft going downrange.⁷⁸

Supply endurance was closely monitored and controlled from the start. Consumption estimates prepared by the 201st FSB staff turned out to be extremely accurate, though perhaps a bit close for comfort. LTC Mitchell summarized their challenges as such:

The (initial) airdrop went in on 26 march...for the next five days, 60 airland c17s came in with the 173d's equipment and lodgment build up supplies...only 12 birds could land a night because that is all you could get in during hours of darkness on a 1 MOG airfield. Then, we started 4 aircraft a day with sustainment. Some days, it would come in and some days not...for the first 5 days it was touch and go. The loads were preplanned to bring in the necessary supplies just in time. We carefully planned and then adjusted the sustainment birds to bring in the critical supplies. Eventually, we built up to 10 dos on the ground. Priorities changed daily, ammo one week, then Class IV the next, then prefab toilets. It varied. Fuel was important for a while because we felt we needed to get some JP8 (fuel) on the ground before we could bring in the Heavy Reaction Company of 5 tanks and brads with associated support equipment.... Where do you take risk? In the nonessential quality of life stuff, ... we took risk on MKTs and thus ate MREs for 90 days. The infantry didn't seem to mind.... We also had USAREUR ship us cup a soup and other supplements.

Organic capabilities were another area of concern. Two of special note are transportation and associated mobile handling equipment (MHE). In the words of CPT (then 1LT) Kyle Upshaw, “...had we not had the Air Force which was co-located w/ us at Kirkuk, and believe it or not 2 Iraqi Forklift that lasted the first 2 months, we'd have been in trouble....”. Transportation came via “5 x M931/M871 30'-ers which were used to haul everything from SMFT bags, to police uniforms, CLIV, ammo, MREs and bottled water to the ICDC, and other various commodities

⁷⁸ Krump, *ibid*, and e-mail, LTC Mead, *ibid*.

we'd launch down IED alley to Tikrit and pick up.”⁷⁹ This limited capability was greatly augmented by allied Kurdish and contracted host-nation assets. The 173rd Contracting Officer (KO) arranged for 50 trucks to supplement its own dearth of logistical assets. These trucks were “a conglomeration of different Iraqi trucks; most were 20 footers, but there was also 40 footers and low boys.” This contract bridged the gap logistically for the brigade for both its movement from the APOD and subsequent operations to secure the region around Kirkuk.⁸⁰

Overall, the logistical operation to support the 173rd and the buildup and expansion of its lodgment can be called nothing less than a marvelous success. With an ad-hoc organization and host of non-standard logistical issues, the 201st FSB and the 173rd overcome impressive hurdles to accomplish its mission and allow the US to establish a firm foothold in Northern Iraq. The situation was unique in many respects, though, because the 173rd given the time to build up and well as contract extensively to augment its capabilities. Though a model for many aspects of expeditionary operations, it should also serve as warning as to just what areas are severely lacking.

The Plan for the South – 2/82nd BCT and Saddam International Airport

Though never executed, the 82nd Airborne Division planned and prepared to launch an airborne assault as part of advance in Iraq. Planners at both CENTCOM and 3rd Army/CFLCC has asked for the Division “to be able to place a large force anywhere in Iraq rapidly, either to take advantage of opportunities such as a sudden collapse of the regime or to meet unforeseen challenges as the campaign unfolded.” Unfortunately, major elements of the both the Division and its headquarters staff were still in Afghanistan as part of OEF.⁸¹ Therefore, the task of both preparing for an airborne contingency drop and filling the role of the CENTCOM reserve fell to the division’s 2nd Brigade Combat Team (2BCT). They were joined by major slices of the division headquarters, elements of the DISCOM (HHC and 782nd MSB), the 1st Battalion, 82nd

⁷⁹ E-mail, CPT Kyle Upshaw, Supply Platoon Leader, 501st FSC, 13 October 2004.

⁸⁰ Krump, *ibid.*

⁸¹ Fontenot, 79.

Aviation (UH-60s), and other support elements.⁸² To prepare for their contingency mission, the Division and logistics unit established a massive heavy-drop rigging site adjacent to Kuwait international airport, dubbed Camp All-American. It was capable of preparing all the unit's equipment and supplies for aerial delivery.⁸³ In fact, even after they were committed to the fight, the 2BCT was initially sustained via Containerized Delivery System (CDS) bundles, Low Velocity Air Drop (LVAD) mass supply loads, and combat off load employing C130s.⁸⁴

Based on this be-prepared mission, the 2BCT developed a concept of support for how they would support an intra-theater forcible entry operation. The majority of their planning built upon the previously discussed assumptions and SOPs for one of the 82nd's Division Ready Brigades (DRB). However, in building the "logistics assault force," the 407th FSB took several other factors in account. The first was on the issue of Logistics Command and Control. In accordance with (IAW) the 82nd RSOP, the CSS Task Force would include a ten-person C2 element from the DISCOM and a forty-plus soldier element from the FSB headquarters.⁸⁵ Normally, the FSB Support Operations Officer (SPO) would jump in with the A-Echelon. He or she, along with the Brigade S4 and their one to two-person staffs, would be the sole entity to track, manage, and request logistics support until a consistent airland could be established. They would have access to the DRB's TACSAT, but at that time, did not possess any exclusive CSS VSAT capability.⁸⁶

The second and third areas considered are supply endurance and organic capability.

According to both doctrine and SOP, an airborne task force is supposed to hit the ground with 72

⁸² The 2nd BCT consisted of the three battalions of the 325th Airborne Infantry Regiment, 407th Forward Support Battalion, 2-319th Field Artillery Battalion (105T), as well as company-sized slices of Military Intelligence, Signal, and Air Defense elements. All were habitually associated with the 2BCT. After being committed from the reserve, numerous other units were attached. See Fontenot, 470-471.

⁸³ Fontenot, 79-80.

⁸⁴ E-mail, LTC John "Skip" O'Neil, G4, 82nd ABN DIV, Ibid.

⁸⁵ *Headquarters, 82nd Airborne Division, Readiness SOP (RSOP)*, (Fort Bragg, NC: 1 August 2000), 6-13.

⁸⁶ 82nd RSOP, 6-4. This links back to Chapter 3's discussion on bandwidth. Even if the FSB would have had its own TACSAT, there is no guarantee if would have been able to send out transmissions with so many other units competing for satellite-time. This is a key and complementary issue to the issue of communications and logistics transformation.

hours worth of sustainment, either jumped in or through follow-on airland (starting at P+4 hours).⁸⁷ The BCT, however, planned to jump in with only 1 DOS of water and 2 DOS of food, 1 DOS of fuel, limited Class VIII (especially blood due to the special handling requirements), limited Class IV Combat Configured Loads (CCLs), and a single brigade's worth of Ammunition Basic Load (ABL). All subsequent stocks would have been airdropped after the entire BCT got on the ground.⁸⁸

Organic logistics capabilities were similarly strained. The BCT would have little if no transportation or hauling capability and anemic maintenance (BDAR and cannibalization at first, controlled substitution once time permitted). Medical support was equally thin.⁸⁹ Units would have their combat lifesavers and organic Medical Platoons for Level I care and heavy slice of the Forward Support Medical Company (FSMC) with its attached Forward Surgical Team (FST) for limited Level II. More than anything, stabilization and rapid evacuation via backhaul airland C-130s and C17s would be the key to success.⁹⁰

In addition, LTC Douville, the wartime commander of the 407th FSB, had several other comments on logistics planning for the operation. His comments give a unique insight on the balance between operational risk and CSS capability. Some of his key concerns for mission success include:

1. Multi-capable Logisticians. To maximize the effectiveness of the log team while minimizing the size, we looked at our 1st 72-hr log missions/requirements and put multi-skilled troops to those missions/tasks. This meant that the A-Echelon was comprised of more seasoned troopers/NCOs such as, mechanics that could fix multiple systems -- weapons, communications, vehicles, etc.; troopers/leaders that could deal with executing missions with non-standard means (i.e., fix & use Iraqi equipment, test and use Iraqi fuel, fix & use Iraqi comms, keep troopers alive without having the right supplies/equipment). This also enhanced our ability to command and control decentralized logistics operations since most of the team were experienced leaders.

⁸⁷ *Field Manual 90-26, Airborne Operations*, 9-1. Also see 82nd RSOP, 3-D-1-1.

⁸⁸ E-mail, LTC Jeffrey Douville, former commander, 407th FSB, 27 October 2004.

⁸⁹ Douville, Ibid.

⁹⁰ LTC Douville did not specifically address this point. However, the above medical capabilities are in line with the 82d RSOP, 6-13.

2. Airborne Proficiency & Combat Skill Level. We knew that it would be a tough mission to pull off...fighting our way to the assembly area, coordinating & synchronizing logistics operations with multiple units engaged in close-in combat operations (including units outside the BCT) and enduring the rigors of continuous operations over a 72-96 hour period. We didn't want to risk the mission on someone that never made it to the assembly area (AA) because they weren't a seasoned jumper or didn't have the combat skills to make it alone across a dark DZ, potentially 5-10 kilometers away from the AA. EVERY person was critical to mission success because of the breadth of capabilities we needed and very little depth in any one capability.

3. Prioritization of Capabilities. The A-Echelon mission already stripped the depth out of our capabilities, but we also had to have a "bump plan" in case further streamlining of the logistics capability was necessary or if aircraft became unavailable.

4. Logistics Depth Must Come Soonest. The A-Echelon can sustain the fight over the near term (1st 72-96 hours) with airdropped/airlanded supplies and equipment, but after that, we needed bulk re-supply and systems that could handle a heavy workload through continuous operations (forklifts, HEMTT fuelers, wreckers, S&Ps). These are all systems that couldn't be airdropped or airlanded. We addressed this by sending all of our oversized cargo by ground with the initial elements of the 3ID. They would position themselves outside the objective area and be called fwd as soon as the AO permitted a safe ingress.⁹¹

More than anything, these comments do an outstanding job of highlighting the temperament of typical airborne logisticians. The emphasis on both soldiers possessing multiple skills, an adaptive mindset, and a rifleman's mentality are mandatory in supporting and surviving during a parachute assault operation. They also, however, highlight the extreme operational risks taken.

Present Lessons – A Brief Summary

So, what lessons should be taken from this “present” review of logistics and forcible entry doctrine? For the purposes of clarity and format, this work will limit the lessons to three:

- *Transportation and Logistics Mobility are key struggles during JFEO.* A common theme for both the 2/82d and the 173rd is the lack of sufficient truck and MHE assets in the aftermath of a parachute assault. In the case of the 173rd, its tactical mobility (and operational

⁹¹ E-mail, LTC Jeffrey Douville, former commander, 407th FSB, 27 October 2004.

effectiveness?) was constrained for almost a week until it built up sufficient supplies and movement assets to expand their lodgment.

- *Speed and Throughput will not be as fast as desired.* This fact seems to be acknowledged but ignored in airborne (and logistics) doctrine. FM 90-26 states, “Any interruption in the flow of resupply aircraft can cause a potential weakening of the airborne force.”⁹² What is doesn’t, and should say, is that the USAF has finite assets may not be able get forces, equipment, and supplies to the AO as fast as the airborne unit on the ground wants, or needs. This blunt assessment leads directed into the third and final lesson for this chapter.
- *Logistics Goals do not seem to mesh with Reality.* The promises of improved efficiency and quicker response times does not seem to be matching reality when measured against the wartime conditions of missions like OIF. It is this paper’s conclusion that there does not seem to be sufficient acknowledgement of friction in the process, and how this should affect both priorities and the commander’s determination of risk. The experience of Army logisticians “making it happen” despite long odds and limited resources actually works against them in the planning process.

These are the experiences of the present. What might the future hold? The next chapter will examine what logisticians and the airborne community envision for JFEO.

⁹² FM 90-26, Ibid.

CHAPTER 3

THE FUTURE – BCT REQUIREMENTS AND CAPABILITIES

Up to this point, this paper has explored where airborne sustainment has been and currently resides. The next and probably most important step is to map out where it is going. Logistics support for the UEx and various Brigade Combat Teams is still an evolving concept. Sustainment for an Airborne BCT is, at this point, even more nebulous. Though none of it has been enshrined in doctrine, there is enough data to do some preliminary analysis and make a few rough conclusions.

Airborne BCT Structure and Requirements

The 82nd Airborne Division and its DISCOM have recently completed several studies that lay out key concepts and critical assumptions on how such operations would be conducted. This monograph will utilize these to set for base for an analysis. The first of these is structure. Both the 82nd and the 101st Airborne plan to use the approved Infantry BCT organization (see Figure 3.1).⁹³ A significant change from the former infantry brigade format, it is composed of only two line infantry battalions instead of three, though each has three rifles companies plus a weapons company. In place of the traditional third infantry battalion, it instead has a reconnaissance squadron, composed of two motorized troops, one dismounted troop, and one surveillance troop (with organic UAVs). The Fires, or Strike, battalion has two firing batteries, vice three, of towed 105mm howitzers. The Brigade Special Troops Battalion (BSTB) contains the habitual signal, military intelligence, and engineer companies that a light or airborne brigade would normally have, as well as the brigade headquarters. Every one of these units (minus the BSTB) has a

⁹³ E-mail, LTC O'Neil, G4 82nd Airborne Division, Ibid. Also see TRADOC, "Approved IN UA v70 26 1300 May 04[1]" PowerPoint Brief.

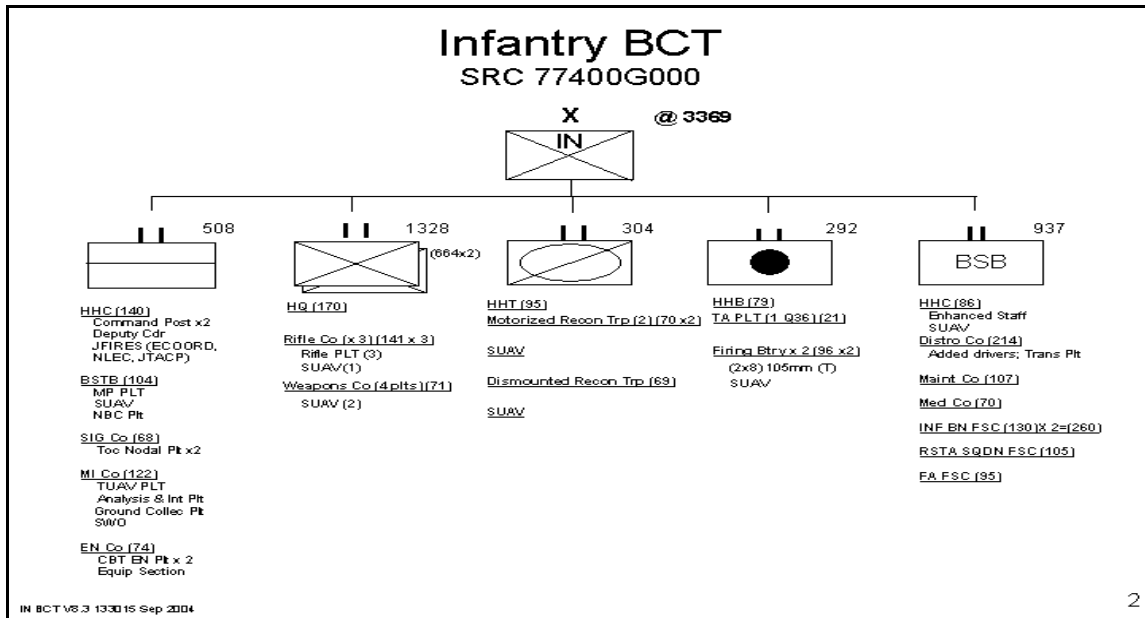


Figure 1-Infantry BCT

Forward Support Company (FSC) detached from the Brigade Support Battalion to provide sustainment and logistical support.⁹⁴

Based upon this task organization, some initial consumption figures can be generated. For the purposes of evaluating supply endurance, this monograph will restrict itself to the most critical: Class I and Water, Class III (B), and Class V. Though every class of supply can potentially be a war-stopper, beans-bullets-and-gas remains a primordial triumvirate for mission success. The Infantry UA has a personnel headcount of precisely 3,369 soldiers.⁹⁵ At three MREs per man per pay (PMPM), the BCT will require 843 cases, or 2 PLS Flat racks, for one Day of Supply (DOS). At eight gallons of water per man per day, they unit will require 21 bottles of water per soldier, or at total of 5,896 cases, or 13 PLS Flat racks, per day to sustain the unit.⁹⁶

⁹⁴ Headquarters, USA TRADOC, *Army Comprehensive Guide to Modularity, Version 1.0* (Fort Monroe, VA: Task Force Modularity, October 2004), 9-1.

⁹⁵ *Army Comprehensive Guide to Modularity, Version 1.0*, Ibid.

⁹⁶ Microsoft Excel, "UA Light 101 AA LEW 9_0 14 July 04." These figures come from a Logistics Estimate Worksheet (LEW), prepared by the 526th BSB, 101st Airborne Division (AA). An Excel spreadsheet, LEW is in wide use among Army logisticians and is one of the standard means of estimate consumption of materiel and supplies. 8 Gallons PMPD is considered a "sustaining" figure for water.

Transportation-wise, the BCT has 768-wheeled vehicles, to include over 100 types of HMMWVs, 38 x HEMTT LHSs, 57 x PLS trucks, 15 x M997 Field Litter Ambulances (FLAs), and numerous other contact trucks, fuel and water haulers, and other vehicles. Not surprisingly, a majority of these reside in the BSB and its subordinates companies. Using an estimate of not more than 10 kilometers driven per vehicle (an airfield seizure and its aftermath would require mostly in and around movement), the BCT / UA would consume 1,759 gallons of JP8. This does not include MOGAS for commercial generators or nonstandard vehicles, such as the Gator transport. Aside from individual weapons (M4 Carbines, M249 SAW, M240B Machine Guns), the Infantry BCT possesses 16 x M198 howitzers, 74 x Mk 19 40mm Automatic Grenade Launchers, 8 x 81mm Mortars, 12 x 60mm Mortars, and a basic load of 66 Javelin missiles. According to LEW, even with a deliberate attack, the BCT should require no more than a single Mission Configured Load (MCL) of artillery and mortar ammunition to replace its basic load⁹⁷

An Airborne Segue - Building towards BCT log capabilities

Before one can dive right into what requirements the BCT can fulfill, it is necessary to make a short segue. In the opinion of XVIII Airborne Corps, every one of these Infantry BCTs should be capable of performing air assault operations, though missions in Brigade strength or greater “may require special expertise at the UEx level.” This is even more the case for airborne operations. The conclusion of Task Force Modularity as briefed to the Army Chief of Staff (CSA) determined that brigade-level airborne operations (like air assault) require “special command and control expertise, capabilities, and facilities” in order to plan, execute, and sustain.⁹⁸ This conclusion has major implications on the sustainment portion of any parachute assault. In their opinion, it is only with the enhanced capabilities of the modularization of the

⁹⁷ Microsoft Excel, “UA Light 101 AA LEW 9_0 14 July 04,” Ibid.

⁹⁸ Directorate of Combat Developments (DCD), US Army Infantry Center (USAIC), “ABN ASSLT Enablers Conference SEP 04”, PowerPoint Brief.

Division into a UEx as an intrinsic part of transforming the “Forcible Entry UEx” behind them that a successful airborne operation could be mounted and supported. This falls clearly in line with the current direction of a “joint and expeditionary mindset” as well as proposed logistics concepts. However, like too much of logistics doctrine of both the present as well as recent past, it hangs success upon unproven future concepts and unresourced equipment and other enablers.

The potential flaws reside in two areas: structure and doctrine. The latter of these is holds perhaps both the most potential and greatest peril. According the 82nd DISCOM’s draft concept of support, sustainment for the new Airborne UEx and its BCTs is to be based on the Sense and Respond Logistics (S&RL), “where speed and quality of effects are the prime metrics of this evolutionary concept.”⁹⁹ S&RL is the sustainment companion to the Effects Based Operations (EBO). The Department of Defense defines the concept as “transformational network-centric concept that enables Joint effects-based operations and provides precise, agile support. Sense and Respond Logistics relies upon highly adaptive, self-synchronizing, and dynamic physical and functional processes.”¹⁰⁰

What this really means is that by constructing an integrated, seamless, end-to-end logistics network, to include all assets and stockpiles from the factory to foxhole, the military can best provide support to the point of need. Unfortunately, the concept relies on a wide variety of preconditions and enablers in order to function, including that

- Service and major ally logistics, operations, and intelligence systems and information will be interoperable, and interconnected....
- Most military end-items and systems (even warfighters) will be equipped to sense potential component failures or consumables status....
- Globally accessible databases correlating ePCs (enhanced Personal Computers) and RFIDs (Radio-Frequency Identification) to logistics items will exist....

⁹⁹ Headquarters, 82nd DISCOM, “Operational Concept for Forcible Entry UEx (DISCOM Revised),” 31 August 2004.

¹⁰⁰ Department of Defense Office of Force Transformation, *Operational Sense and Respond Logistics: Coevolution of An Adaptive Enterprise Capability (Concept Document – short version)*, 6 May 2004, 5. Available [Online] <http://www.oft.osd.mil/initiatives/srl/family.cfm>.

- Agreements exist with sustaining base elements (manufacturers, suppliers, contractors) to interface with S&RL and to provide direct connection from point-of-effect to factory.¹⁰¹

Many of these goals have been specifically enunciated in the Army G-4's recent paper.¹⁰² They are worthy goals, but not ones that will be met any time soon. One major hurdle is bandwidth. Without sufficient access to the electromagnetic spectrum, the end-to-end sense ability that the entire concept resides upon would fall apart. Upcoming systems such as the Joint Tactical Radio System (JTRS) and Warfighter Information Network-Tactical (WIN-T) are designed to help reach that level. However, even by 2010, the Army G-6's has acknowledged that the service, "will NEVER have enough BW [bandwidth]" and urges that it be treated as "an operational (limited) resource."¹⁰³

The second flaw, structure, also has great merit but may be based more on what is desired than what can be actually procured. Within the UEx area of operations (AO), the Strategic Response Sustainment Brigade (SRSB) provides distribution-based replenishment to units under the operational control of the UEx, back up direct support to the BSBs, and area support to any other unit.¹⁰⁴ This unit is the Forcible Entry UEx's equivalent of a Sustainment Unit of Area (SUA). It would be composed of A brigade troops battalion, one or two Combat Sustainment Support Battalions (CSSB), An Outload Support Battalion (OSB), A Mission Staging Support Battalion (MSSB), and other medical and strategic liaison elements.¹⁰⁵ Presently, many of these functions are performed by a combination of the Division's 782nd Main Support Battalion and several different units from the 1st COSCOM. The 46th Corps Support Group, consisting (at Fort Bragg) of the two Corps Support Battalions, the 189th and 264th, one of which was scheduled to

¹⁰¹ *Operational Sense and Respond Logistics*, Ibid, 11.

¹⁰² Department of the Army G-4, Ibid. Also see Chapter 3 for more discussion on this paper.

¹⁰³ Congressional Budget Office, *The Army's Bandwidth Bottleneck (August 2003)*, Chapter 2. Available [Online] <http://www.cbo.gov/showdoc.cfm?index=4500&sequence=0&from=0#anchor>.

¹⁰⁴ Distribution-based logistics is another key concept of logistics transformation.

¹⁰⁵ "Operational Concept for Forcible Entry UEx (DISCOM Revised)," Ibid.

be deactivated in FY 2005.¹⁰⁶ The 46th headquarters and the 264th are presently deployed in support of OIF 04-06 and will not redeploy until Summer 2006. The resources necessary to standup such an exclusive organization as the SRSB would be considerable. This is not to say it could not be done, but other projects, such as the reorganization of the 507th Corps Support Group as a Theater Opening Package, may very well take precedence.¹⁰⁷

What they have – Airborne BCT Logistics Capabilities

So where does this leave the Airborne BCT? More than ever, it will be have to sustain with what it brings to the fight. For all units operating within that brigade's AO, this means it will receive support from the Brigade Support Battalion (BSB) (see Figure 3.2). More robust than the "old" FSB, it includes a headquarters staff "fully enabled," with a Distribution Management Cell; several digital enablers (Blue Force Tracker, Logistics Common Operational Picture, Movement Tracking System); and a distribution-based CSS capability, to include a two-driver per platform allocation and additional Force Protection assets.¹⁰⁸ At the battalion level, each maneuver battalion will receive support from its habitually associated Forward Support Company (FSC). They provide all classes of supply (minus Class VIII) and field maintenance to its' supported battalion. The FSC's organic truck section has the capability of moving one company of infantry tactically in one lift.¹⁰⁹

Together, the BSB and its FSC organizes support echelons throughout the brigade battlespace. The FSC organizes combat trains that move within the infantry/reconnaissance/fires battalion combat formations during offensive operations, though some FSC elements may remain in the brigade trains area. According to the Logistics Transformation Operational and

¹⁰⁶ 46th CSG Homepage. Available [Online] <http://www.bragg.army.mil/46thcsg/Units.htm>. For information on deactivation of the 189th, see <https://perscomnd04.army.mil/CmdSlateInfo.nsf>.

¹⁰⁷ HASC Testimony, LTG Claude V. Christianson, Ibid.

¹⁰⁸ "Approved IN UA v70 26 1300 May 04[1]", Ibid.

¹⁰⁹ DCD, USA Combined Arms Support Command (CASCOM), *Logistics Transformation Operational and Organizational Concepts White Paper Sustainment Brigade (UEy/UEx)*, 12 August 2004.

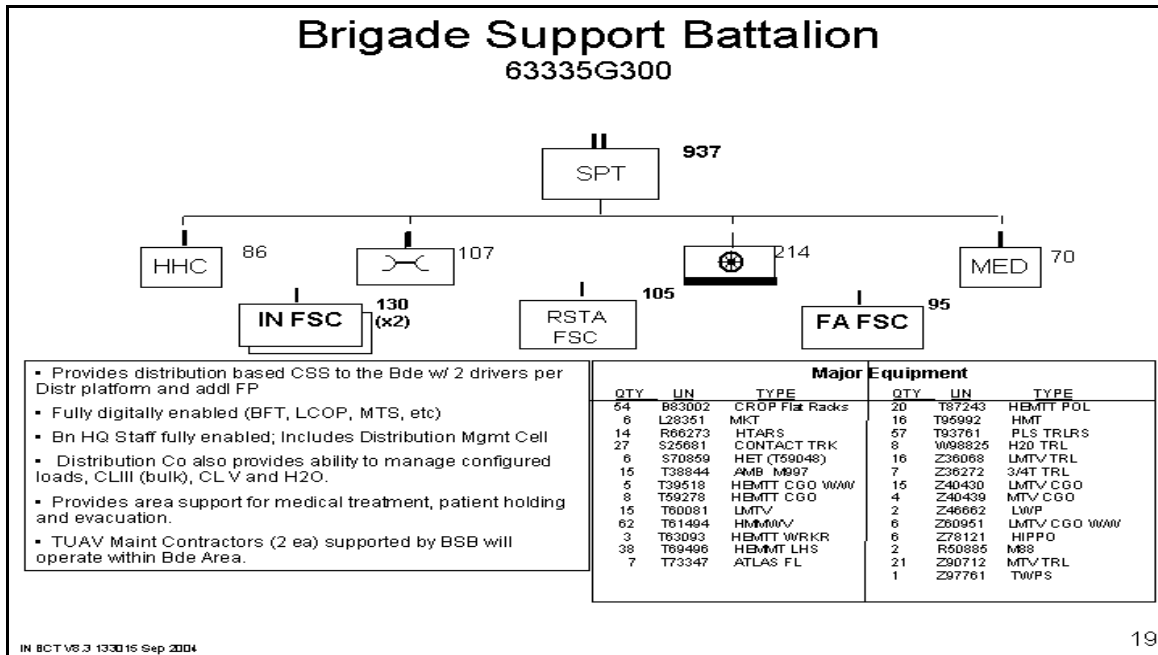


Figure 2: Brigade Support Battalion

Organizational (O & O) Concepts White Paper, the Brigade conducts two types of resupply operations, Sustainment Replenishment Operations (SRO) and Combat Replenishment Operations (CRO).¹¹⁰

SRO is designed to be “a quick, in-stride, operation” that is conducted within a maneuver BCT’s battle rhythm. This is similar to a “pit-stop” operation. Sustainment replenishment can be either a deliberate or hasty operation if an opportunity exists or circumstances allow.” Functions such as arming, fueling, fixing, medical support and personnel replacement activities occur as required to meet immediate needs. SRO is conducted mostly internal to the BCT using organic capability and classes of supply in the BSB, with limited support from the next echelon support unit, be it the SRSB or Sustainment Brigade/Unit of Action. Replenishment is conducted mostly internal to maneuver battalions between the support sections and the platform, using organic assets, including the various FSCs. Activities include rearming, refueling and cross-leveling

¹¹⁰ *Logistics Transformation Operational and Organizational Concepts White Paper, Ibid.*

supplies and on-board spares (Class IX items). Health Service Support (HSS) functions such as Class VIII re-supply and transfer evacuation of casualties is also conducted. It is primarily deliberately executed, but can also be hasty.¹¹¹

Only companies that are not currently engaged can receive support from the elements of the battalion trains. Companies that are engaged will be resupplied as they are cycled out of the fight by battalion commanders. When the consumables in the combat trains are exhausted, the Brigade Commander must disengage battalions and arrange an exchange of fuel and ammunition trucks from the field trains moving some distance behind the brigade. BSB carries the sustainment stocks that exceed the organic carrying capability of the BCT's maneuver and maneuver support three days of requirements for high intensity operations. FSCs can operate either a consolidated or split BN DP/LRP, based on METT-TC.¹¹²

Using the previously established criteria of Logistics C2, Supply Endurance, and Organizational Capability, at first glance, the BSB shows great potential. The various digital enablers, along with the recently fielded CSS VSAT, give it a robust, independent capability to send and receive logistics information.¹¹³ Supply Endurance remains in question. The 82nd DISCOM's concept of support discusses two categories of supply: accompanying and follow-on. Accompanying supplies are those supplies a unit will have immediately during and after the airborne assault. Both the A-echelon and immediate follow-on (airland) echelons will carry accompanying supplies. The amount of each class of supply will vary between 3, 5, and 15 days of supply. Each unit carries 15 days of CL III (P), the PLL items, and 3 days of supply of all other supplies into the airhead. These supplies are delivered to the airhead by the unit's organic vehicles or configured for airdrop. Follow-on supplies, the type and quantities are coordinated between the unit, the Support Operations Officer (SPO) of the BSB, and the SPO of the SRSB's

¹¹¹ *Logistics Transformation Operational and Organizational Concepts White Paper*, Ibid.

¹¹² Ibid.

¹¹³ Stephan Larsen, "3ID Soldiers at the NTC agree: CSS VSAT is a combat multiplier," Ibid.

designated CSSB (or whatever CSB/CSSB from the next echelon logistics organization).

Follow-on supplies may be automatic or on-call.¹¹⁴

The BSB SPO is responsible for the planning and management of all of the above supplies, as well as making recommendations on what type of equipment and organizational capabilities the BSB must bring to sustain the BCT. His or her biggest battle will be to ensure that these critical items are rigged, manifested, loaded, and delivered (not to mention recovered). It comes down to finite resources, specifically in aircraft. Even in the current 82nd RSOP, the CSS Task Force requires over thirty-seven C-17 aircraft loads to deliver its equipment and supplies, only six of which are part of the A-echelon. An additional 72-hours worth of supplies requires another fifty-three C-17s worth of aircraft, using of combination of CDS bundles and air landed platforms.¹¹⁵ If the entire DRB were to be deployed, it would require over two-hundred-and forty-four C-17 equivalent aircraft.¹¹⁶ As of September 2001, the US Air Force has only 67 in active service.¹¹⁷ This potential shortage had been recognized well before 9-11, and proposals had been made to increase the fleet to as large as 222 through FY 2011.¹¹⁸

Shortfalls on Land or in Air?

The Airborne BCT and its BSB are not designed purely for airborne or forcible entry operations. It cannot be and still perform the full spectrum of operations required of every Infantry BCT. Both the 82nd and the 173rd superb performance as light infantry in Iraq and Afghanistan over the past three years demonstrate this enormously. An analysis conducted this summer by the 526th BSB on its sustainment capability for the 502nd Infantry BCT found only a

¹¹⁴ “Approved IN UA v70 26 1300 May 04[1]”, Ibid.

¹¹⁵ 82nd Airborne Division RSOP, Ibid., 6-13 – 6-15.

¹¹⁶ 82nd Airborne Division RSOP, Ibid., 6-25. This includes the Corps ACP, Division DTAC, all three airborne infantry battalions, an armor/mech Immediate Reaction Company (IRC), CS and CSS assets, Aviation task force, and 72 hours worth of supplies.

¹¹⁷ Air Force Association, *AFA Almanac 2002*, “Equipment – Active Duty Inventory” Available [Online] <http://www.afa.org/magazine/May2002/equip.pdf>.

¹¹⁸ “C-17 Globemaster III Production,” Available [Online] <http://www.globalsecurity.org/military/systems/aircraft/c-17-prod.htm>.

few areas of major concern. The biggest issue remained management of limited transportation assets. Even though each FSC could move an entire rifle company in one lift, it still must “juggle” trucks, becoming, as one SPO put it, “more an art than a science.”¹¹⁹ Even so, logistical planning and execution have different and more immediate priorities for the airborne assault.

Future Lessons – A Brief Summary

Have the problems of the past and present been addressed in the new logistics and UEx/BCT doctrine? A short answer would be “No.” It is unrealistic to think every aspect of airborne (or ground) sustainment might be optimized. Still, the lessons that can be garnered from this third chapter contain elements of both trepidation and hope.

- *The Airborne BCT is more logistically capable, but not necessarily more deployable.* With all its assets on the ground, the Airborne BCT is an extremely robust formation, but three Ammunition Basic Loads (ABLs), 50,000 gallons of fuel, and a large amount of firepower. The problem is, though, it does not show up to fight with all its assets, and getting them on the ground is difficult problem. Airborne planners must figure out how to be the dedicated support units such as the FSC inserted into airborne planning and assault calculations.
- *Airdrop and Aerial Delivery Requirements are huge and probably will not be completely met.* The present and projected number of C-17 aircraft will limit the utility of any airborne operation. Obviously the use of C-130s for an intra-theater operation would significantly alter planning equations, but even then the previously mentioned need for airborne commanders and logistics planners to be draconian in their assessments is paramount.
- *SRO and CRO have no place in airborne operations, and perhaps logistics doctrine.* The preconditions mandated for resupply operations in both SRO and CRO seem to be are products of industrial age maneuver warfare than close combat in full-spectrum operations.

¹¹⁹ PowerPoint Brief, “502 BCT 101st AA Concept of Support v3.1,” Ibid.

Obviously, every unit wants to do resupply out of contact with the enemy. But how does it do it while in contact? This must be addressed in future doctrine.

What is the way ahead from here? The final chapter of this work gives recommendations on just how some if not most of these problems can be addressed, if not solved.

CHAPTER 4

RECOMMENDATIONS AND IMPLICATIONS

The previous three chapters have covered the past, present, and future of airborne forcible entry and sustainment. If one had to make a general conclusion, based upon the historical and operational materiel covered in this work, it is that airborne sustainment, because of its precarious nature, is absolutely built upon the twin factors of detailed planning and consistent follow-through. Physics and math drive logistics both on air and in the ground. Because of the limited nature and amount of equipment and supplies than can be delivered with the initial parachute assault, airborne forces must either be relieved quickly on the ground or consistently resupplied by air. Historical failures such as Arnhem and Dien Bien Phu demonstrate the potentially problematic nature of aerial resupply. As the previous chapter described, the 173rd Airborne Brigade was severally constrained in what it could accomplish until logistical links and contracts were established. A recent working paper from the Massachusetts Institute of Technology (MIT) Center for International Studies went so far as to call airborne forces an “illusion” and that most “of the resources are misspent because modern military technology makes it unlikely that airborne battalions will ever jump behind the lines of competent adversaries.”¹²⁰

Despite the hardness of these conclusions, three important facts remain. First, that US Airborne forces have been successfully used multiple times in the past fifteen years to spearhead

¹²⁰ Marc DeVore, “The Airborne Illusion: Institutions and the Evolution of Postwar Airborne Forces,” (SSP Working Paper, June 2004), 30. Available [Online] http://web.mit.edu/ssp/Publications/working_papers/working_papers.html.

American entry into a foreign land, from Grenada to Iraq. Second, both the doctrine and capability to mount such operations remain in the US arsenal. Third, the need for such a capability exists, as expressed in Joint doctrine and even now being reexamined. What needs to be determined is the question first posed in the monograph: *How can the Army best structure its logistics elements of the Airborne BCT to conduct JFEO?* Building upon the previous three chapters of history and doctrine, the following recommendations seeks to answer that question.

Recommendations - DOTMLPF

Doctrine – Plan for the Worst

Logistics support in JFEO must, to paraphrase Confederate cavalryman Nathan Bedford Forrest, arrive “furthest with the modest.” Army doctrine acknowledges the inherent limitations including dependence upon aerial resupply, vulnerability to enemy fires in collecting and distributing supplies at the airhead, and evacuation / treatment of casualties.¹²¹ These preconditions should scream danger for any logistical planner! With no guarantee that follow-on supplies and support will make it through, whether due to enemy actions or plain mechanical failure, doctrine must press commanders and planners to maximize of the amount supplies and logistical assets carried by assault forces during entry operations. Some new methods both materiel and structural will be discussed in later paragraphs of this chapter. Other techniques, such as LVAD, improved door bundles and other recently developed aerial delivery techniques are already in the inventory. Many were used for humanitarian assistance operations over the past decade in the Balkans as well as during OEF.¹²² Further observations from the recent (May

¹²¹ FM 90-26, Ibid., 1-10.

¹²² CPT Stephen R. Davis, CPT Mary E. Denniston, CPT Edward F. Ehlers, CPT John B. Hinson, CPT Maria Ogden, “Emerging Technology in Airdrop Operations” *Quartermaster Professional Bulletin*, Autumn 1997. Available [Online] http://www.qmfound.com/air_bosnia.htm. For more on aerial delivery systems and technology, see the defense contractor website, Available [Online] <http://www.army-technology.com/contractors/logistics/airlift/>

2004) *Sea Viking* JFEO Capabilities Seminar rose as the very first issues that planners must ensure sufficient logistics resources flow in to support combat forces on the ground.

This delicate balancing act is made even more difficult by limited entry points that restrict the flow of support into the JOA. Army ground forces are completely dependant upon sister services for assistance, via air and/or sea. It seems clear that a Joint Logistics Commander (JLC) should be established in all JFEO missions to enable pooling of resources and ensure that every unit gets what it needs, when it needs it.¹²³ Army doctrine, as well as that of the other services, is slowly but surely making the transition to the Joint arena. With recommendations such as these being made, and with airborne operations being so inescapably joint, an even better idea is the staffing and creation of a Joint Publication governing JFEO Airborne Operations. Such a manual already exists for amphibious doctrine. Does the topic of airborne operations deserve any less?

Organizational – Built the way they fight

The next area is one close to the heart of any logistician - organizational structure. The way a unit is organized is sometimes more than way the key to success. To further develop the Joint aspect of airborne operations, commanders and planners should include additional USAF elements in the assault task force organization. SOPs from the 82nd include the Special Tactics Squadron (STS) as part of the Joint Airborne Advanced Party (JAAP) to airfield control operations.¹²⁴ What would be even more useful from the distribution side would be the inclusion of a Tanker Airlift Control Element (TALCE). Their extensive MHE assets, included as part of the very first airland elements, could offsite significant shortages of equipment in the BSB.

Another one of the most critical element for managing and providing logistical support is Assault-echelon personnel. For a brigade-sized operation, this group is normally is led by the

¹²³ “Executive Summary, Sea Viking Capabilities Seminar (17-20 May 2004).” Available [Online] AKO Knowledge Center www.us.army.mil.

¹²⁴ Headquarters, 82nd Airborne Division, *82nd Airborne Division Airborne Standing Operating Procedures (ASOP), Edition VI* (Fort Bragg, NC: May 2001).

FSB/BSB Support Operations Officer (SPO) and slice elements from the supply, maintenance, and forward support medical (FSMC) companies. Though established by SOP, with the constant need for such an element, there is a case for a permanent A-echelon section/platoon as part of the Modified Table of Organization and Equipment (MTOE). This section would be in many ways analogous to the FAST and FASCO (Forward Area Support Coordinator) concept employed by the Light Infantry divisions during the mid-1980s and early 1990s.¹²⁵ At the FSC level, an Assault Support Platoon (ASPLT) could be established in each FSC, specifically staffed and equipped for forward, austere conditions. This would also facilitate the logistical support of Airborne Battalion Task Force vice a brigade-sized jump, which in the past would have mandated the ad-hoc splitting of assets. The ASPLT would also be well organized to conduct Forward Logistics Element (FLE) type tasks for conventional ground operations. Such a platoon could also serve equally well in an Air Assault FSC, with the ASPLT performing the same functions at a helicopter Forward Operating Base (FOB) instead of a drop zone or airhead.

At the BSB Level, it is more difficult to section off a portion of the staff to perform the command and control functions of the parachute assault. Instead of segregating the critical personnel, the MTOE should specifically code billets as either A- or B-echelon. This should include positions on the headquarters staff, as well as in the distribution, maintenance, and medical companies. Even if the staffing of the monograph, various concerns over the impact of this recommendation were raised. It is not meant to take flexibility away from a commander, but to establish a more fixed relationship for planning, training, and execution of airborne operations. The positions both at the BSB and subordinate FSCs could be augmented or adjusted depending upon mission requirements, but in order to retain the maximization of logistical support, they should not be removed from any jump task organization.

¹²⁵ Department of the Army, Field Manual 63-2, *Division Support Command, Armored, Infantry, and Mechanized Infantry Divisions*, (Washington DC: Government Publishing, May 1991), Appendix C.

A third and equally important organizational recommendation is the establishment of a habitually supporting UEx-level sustainment battalion. This could easily be one of the CSSBs proposed as part of the SRSB or Sustainment Unit of Action (SUA). Regardless of which organization it falls under, it is absolutely essential that the BSB establish a close and efficient support relationship with that CSSB. This organization must include, at the least, an Aerial Delivery and Material company to provide rigging and airdrop support the BCT(s). It is currently the 82nd's recommendation to move their existing Rigger unit (Echo Company, 782nd Main Support Battalion) to a UEx-level formation in order to perform those functions.¹²⁶ The most important responsibility of this unit and its higher HQ (CSSB) is to ensure that follow-on supplies are packed, prepared, marshaled, and delivered to the BSB elements on the airhead. Seamless functionality between the Airborne BSB and its supporting CSSB will produce world-class results.

Training – multifunctional and jump capable

The training for airborne units is normally rigorous. The level of physical fitness of every paratrooper must enable him or her to perform at a high level for potentially up to 72 hours with little or no sleep. They will drop into a hostile environment literally carrying everything they own a 60+ pound rucksack. Torso and upper body strength, endurance, and overall toughness are absolute necessities, but this is nothing new to the airborne community. What has changed? The change is in the COE and it is not constrained to the paratrooper's world. Emerging doctrine calls on the entire Army to train soldiers "how to think, not what to think" and that "will promote initiative above compliance and cultivate curiosity over complacency." In the aftermath of the ambush of the 507th Maintenance Company and the substandard performance of its CSS soldiers, there has been a huge cry to "produce multi-functional Soldiers who are warriors

¹²⁶ PowerPoint, "82nd AA Brief to HQDA G3 (v4)," 3 December 2004.

first and specialists second.”¹²⁷ This attitude is already infectious within the airborne community. Recall the comments of LTC Jeffrey Douville, the 407th FSB Commander in preparing to execute an airfield assault during OIF, “...We didn't want to risk the mission on someone that never made it to the assembly area because they weren't a seasoned jumper or didn't have the combat skills to make it alone across a dark DZ, potentially 5-10 Kilometers away from the AA. EVERY person was critical to mission success because of the breadth of capabilities we needed and very little depth in any one capability....”.¹²⁸

The second part of LTC Douville’s comment is particularly relevant in recommending changes to training. Soldiers in the A-echelon must be trained and certified in multiple logistics skills in order to maximize sustainment of a JFEO. This can begin with licensing soldiers on all of the relevant vehicles and pieces of equipment (Trucks, MHE, and generators) and should quickly follow with Battle Damage Assessment and Repair (BDAR) techniques on those same systems. It may not be possible to turn every soldier into a direct-support level mechanic, but they can become skilled amateurs. Perhaps just as important is increasing the number of Pathfinder/Air Assault/Sling load Inspector qualified personnel in the logistics A-echelon. One of their most critical duties is recovering supplies on the DZ. The skills needed to mark DZ, rig-derig-rerig platforms, and operate helicopter Landing Zones (LZs) form the distribution base for support of the forward Airborne BCT.

Material – Enabling Maximization of Support

The tools that could allow networked Logistics C2, robust Supply Endurance, and vigorous Organizational Capability exist today as commercial, off-the-shelf items or are being finalized through the DoD procurement pipeline. Thankfully, the tools for first of these seem to already be making their way to field. Satellite communications devices such as the CSS VSAT and satellite phones must be standard, MTOE items for the Support Operations sections in

¹²⁷ United States Army, “Serving a Nation a War.” Available [Online] <http://www.army.mil/howwewillfight/soldier/index3.html>.

¹²⁸ E-mail, LTC Douville, Ibid.

Airborne BCTs. These items will actually provide the means for forward deployed BSBs to “connect the logisticians.” Together with laptop versions of the Joint Logistics Deployment Version (JDLM) and the refined BCS3 can provide that SPO on the airhead the visibility of the supply chain he or she needs to adjust priorities and keep sustainment lines intact.¹²⁹

Supply Endurance, more than anything, is a question of physics. How can the individual paratrooper, and the rest of the BCT, hit the ground with the maximum (but not unbearable) load of supplies? Recommendations on improving airborne equipment are not unique to this monograph. MAJ Douglas DeLancey published a monograph in 2001 advocating the fielding of dune buggies to “significantly increase the combat power in the (82nd) Division Ready Brigade and reduce its deployment sorties using current, fielded technologies.”¹³⁰ Another is the 1st Tactical Studies Group (Airborne), “...a non-profit think-tank and action group dedicated to furthering U.S. military excellence... composed of several sub-study groups specializing in key military areas....”¹³¹ Based in the Fort Bragg area and advocating their various reforms on their website, the “1st TSG (A)” actually has some very useful and thought-provoking ideas, though the anti-authoritarian tone of some of their recent prose may turn more conventional pundits. Still, some of their ideas are quite practical.

One of the most interesting is in the area of supply palletization. Currently, the vast majority of supplies loaded on USAF aircraft go on to 463L pallets. These \$1,500 items are aluminum-plywood and designed to work with the cargo-rail system. The USAF is notorious for tracking these items down. However, they are not super-robust for airdrop, even buttresses by plywood and honeycomb shock absorbers. They are also not designed to be easily lifted by

¹²⁹ JDLM is the logistics tracking software utilized by CFLCC/3rd Army during OIF. It is a core component of the Battle Command Sustainment Support System (BCS3), the successor to CSSCS. See Headquarters, Department of the Army –G4, Connecting Logisticians White Paper. Available [Online] http://www.hqda.army.mil/logweb/cl_whitepaper.pdf.

¹³⁰ Douglas J. DeLancey, “The 82nd Airborne Division in Transformation: Is It Possible to Significantly Increase the Combat Power in the Division Ready Brigade and Reduce Deployment Sorties Using Current, Fielded Technologies?” SAMS Monograph, AY 00-01

¹³¹ Homepage, “1st Tactical Studies Group (Airborne),” Available [Online] <http://www.geocities.com/Pentagon/Quarters/2116>.

forklifts. In their place, the Enhanced Container Delivery System (ECDS) would provide a robust, MHE-friendly, reusable platform for supplies. Mated with a rubber SKEDCO covering on the bottom, it could be dragged across a muddy DZ and easily cleaned and put back on an USAF aircraft. It is also readily compatible with either a CROP platform or PLS flat rack. Best of all, they are air-droppable as part of as part of CDS bundles.¹³² This would allow a significant increase in the load and type of equipment and supplies delivered with the parachute assault. Of course, it would also require some sort of material handling equipment on the ground to recover these items. Luckily, technology has matured to a point to make just that possible.

In August 2004, Marines of the 1st Aerial Delivery Platoon, Combat Service Support Battalion 7, tested the Sherpa Guided Parachute Cargo System over the skies of Iraq. Descending to its target under a 1,100-pound capacity chute, its Global Positioning System (GPS) guided it to a predestined DZ. Capable of being dropped up to nine miles from the target and at altitudes of up to 25,000 feet, the Sherpa promises an unmatched capability to deliver supplies to the point of consumption. With two chutes, it can deliver up to 2,200 pounds of equipment, including something like a small, 4000-pound rough terrain forklift. It is slated for full production in 2008 or 2009.¹³³ Other systems in the works such as the 10,000-pound PEGASYS Joint Precision Airdrop System and other glider-based aerial delivery platforms offer even more capability for the Airborne BCT in the not too distant future.¹³⁴

Leadership and Personnel – Technically AND Tactically Proficient

The officers, warrant officers, NCOs, and soldiers who will bring success to an airborne sustainment mission exist in our Army today, and not just in the 82nd Airborne. If there is one

¹³² 1st Tactical Studies Group (Airborne), “Future Airborne Warfare: Mobile Columns Without Fixed Supply Bases.” Available [Online] <http://www.geocities.com/equipmentshop/abnlogistics.htm>. This system has also been included as part in the “The Future of Aerial Delivery” in Department of the Army, FM 4-20.41, *Aerial Delivery Distribution in the Theater of Operations* (Washington DC: Government Printing Office, August 2003).

¹³³ Editor, Military.com, “Up in the Sky: Sherpa Guided Parachute Cargo System.” Available [Online] http://www.military.com/soldiertech/0,14632,Soldiertech_SHERPA,,00.html.

¹³⁴ US Army Soldier Systems Center, “Joint Precision Airdrop System (JPADS) ACTD.” Available [Online] http://www.natick.army.mil/soldier/media/fact/airdrop/JPADS_ACTD.htm.

firm recommendation in the areas of leadership and personnel, it is not to segregate airborne sustainment from the rest of the logistics community. The unit that made the 173rd's jump into Northern Iraq a success was a heavy, "leg" formation – the 201st Forward Support Battalion of the 1st Infantry Division. The unit that made the 201st a success, and was heartily praised in both the 201st and 173rd's articles and after-action reports, was the 21st Theater Support Command. These non-airborne formations have been often disparaged by their paratrooper brethren for not being as tactically competent. As absolutely essential as warrior skills are, logisticians must never forget that what they bring to the battlefield is technical skills in the tasks that man, arm, fuel, fix, move, and sustain our Army. Combat skills for self-protection and area defense skills must be mastered, but neither should the superb proficiency of our logistical soldiers be neglected or otherwise tossed aside.

Facilities – Sanctuary and ISB Support

Once again, the twin pillars of airborne sustainment are detailed planned and consistent follow-through. Proper facilities to accomplish these tasks are absolutely critical, especially in storing and preparing key supplies for aerial delivery to the forward-deployed Airborne BCT. The Army and Air Force has invested considerable in improving Fort Bragg and neighboring Pope Air Force to support the JFEO mission of both the 82nd Airborne and the various SOF units on both bases. Both Bragg's restoration/mitigation efforts and Pope's Dangerous Cargo Apron project are under way and are either on or ahead of schedule. Pope is planning to spend \$50 million to extend its 7,500-foot runway an additional 3,000 feet, adding to its MOG and out load capabilities. The Army is spending about \$103 million to improve the Green Ramp area on Pope, where troops and cargo are loaded onto Pope's C-130 airplanes. The Air Force is already spending about \$33 million to improve the area where airplanes carrying explosives and hazardous cargo are fueled.¹³⁵

¹³⁵ "Pope AFB," Available [Online] <http://www.globalsecurity.org/military/facility/pope.htm>. Also see Slide 17, "Facilities," "82nd Airborne Division ARSTAFF Update Brief," Ibid.

The other part of “supporting facilities” are those located close to the JOA, specifically in an Intermediate Staging Base (ISB). The example of the building of Camp All-American in Kuwait by the 82nd is one example for an austere environment.¹³⁶ An area for future consideration, though, is inclusion of JFEO airborne sustainment facilities on the proposed Joint Sea-basing platforms. This project has already received major attention as part the Joint Forcible Entry Review.¹³⁷ Adding rigging sheds and storage areas should not impossible to include at this juncture, especially if the air assault forces share it.

Implications for Expeditionary Warfare

On the 20th of November 1953, French paratroopers jumped into a valley near the Vietnamese-Laotian border named Dien Bien Phu.¹³⁸ The agony of those airborne soldiers and failure of their logistics support has already been covered in previous chapters.¹³⁹ That operation has served as a warning on the limits of both airborne sustainment and expeditionary warfare. In the fifty years since that event, the United States has conducted more than few very successful airborne operations, several of which have been covered in this monograph. The question remains that was proposed at the being of this work – how do we help Pegasus to fly unbound?

The truth is that that Pegasus, like its Airborne BCT counterpart, cannot fly unbound. The reality of Airborne JFEO is constrained by math and physics, endurance and capability. But, despite its limitations, but it is not without prodigious skill and is capable of achieving thunderclap results when properly resourced. The key, as always, is the find the proper balance of tooth and tail given the resources available. An interesting avenue for further research in this area is the inclusion of motorized and mechanized assets for both airborne and air assault

¹³⁶ E-mail, LTC O’Neil, Ibid.

¹³⁷ Headquarters, United States Marine Corps, “Joint Forcible Entry Study,” Warfighter Concepts and Emerging Issues. Available [Online] <http://hqinet001.hqmc.usmc.mil/p&r/concepts/2003/PDF/Chapter2C&P03PDFs/Ch22EIJointForcibleEntryStudy.pdf>.

¹³⁸ Bernard Fall, *Street Without Joy*, (New York: Schocken Books, 1961), 315.

¹³⁹ Miser, Ibid.

operations. Retired BG David Grange first proposed this concept in the book *Air-Mech Strike*.¹⁴⁰ As this paper is being written, the Infantry Center has begun experiments on the Air Assault Expeditionary Force (AAEF) mechanization using elements of the 29th Infantry Regiment at Fort Benning.¹⁴¹

It is the considered opinion of this author and this paper that too much of the current (and recent past) proposals concerning logistics transformation are unrealistic. One only has to look as far as the experience with the Stryker Brigade to see a promise under done budgets and tactical reality. A recent Rand study along with several others debunked the goal of deploying the entire brigade by air in 96 hours.¹⁴² What current logistics transformation needs more than anything is a shot of reality and firm realization that chance and friction exist as strongly in the realm of sustainment as they do in the maneuvers of a mechanized formation racing towards Baghdad. Until then, the promise of technology will blind and stifle more than benefit future development, and the great winged horse that represents the potential of airborne sustainment will remain confined to his stable instead of soaring in the sky.

¹⁴⁰ David Grange et al., *Air-Mech-Strike: 3-Dimensional Phalanx; Full-Spectrum Maneuver Warfare to Dominate the 21st Century*, (Paducah, KY: Turner Publications, August 2000).

¹⁴¹ SPC Eliamar Castanon, "FCS takes aim on Army future – Infantry tests survivability of lighter force" TRADOC News Service, November 2004. Available [Online] <http://www.tradoc.army.mil/pao/TNSarchives/November04/111004.htm>.

¹⁴² Emanuel Huggins, "Florida Institute of Technology – Abstract: To identify whether the United States Transportation Command can meet the mobile demands of Army transformation and deploy a Stryker Brigade Combat Team from CONUS anywhere in the world and place them on the ground in 96 hours." Available [Online] <http://www.questionpro.com/academic/394.html>.

BIBLIOGRAPHY

Books

- Adkin, Mark. *Urgent Fury: The Battle for Grenada*. Toronto: Lexington Books, 1989.
- Anderson, John D., Jr., *A History of Aerodynamics: And Its Impact on Flying* (London: Cambridge University Press, 1997), 27.
- Burgett, Donald R. *Curahee! A Screaming Eagle at Normandy*. New York: Dell Publishing, 1967.
- Cole, Ronald H. *Operation Just Cause: The Planning and Execution of Joint Operations in Panama, February 1988-January 1990*. Washington DC: Joint History Office, 1995.
- Donnelly, Thomas, Margaret Roth and Caleb Baker. *Operation Just Cause: The Storming of Panama*. New York: Lexington Books, 1991.
- Fontenot, Gregory, E.J. Degen, and David Tohn. *On Point: The United States Army in Operation Iraqi Freedom*. Fort Leavenworth, KS: Combat Studies Institute Press, 2004
- Grange, David, et al. *Air-Mech-Strike: 3-Dimensional Phalanx - Full-Spectrum Maneuver Warfare to Dominate the 21st Century*. Paducah, KY: Turner Publications, August 2000.
- Fall, Bernard. *Street Without Joy*. New York: Schocken Books, 1961.
- Haulman, Daniel L. "Air Mobility Lessons of World War II." *Air Mobility Symposium: 1947 to the Twenty-First Century*. Washington D.C.: US Government Printing Office, 1997.
- Hersh, Seymour. *Chain of Command*. New York: HarperCollins, 2004.
- Hoyt, Edwin P. *199 Days: The Battle for Stalingrad*. New York: Tom Doherty Associates, 1993.
- Kretchik, Walter E., Robert F. Baumann, and John RT. Fishel. *Invasion, Intervention, "Intervasion" – A Concise History of the US Army In Operation Uphold Democracy*. Fort Leavenworth, KS: US Army CGSC Press, 1998.
- Lucas, James. *Storming Eagles: German Airborne Forces in World War Two*. London: Arms and Armour Press, 1988.
- Murray, Williamson and Robert H. Scales, Jr. *The Iraq War*. London: Belknap Press, 2003.
- Naveh, Shimon. *In Pursuit of Military Excellence: The Evolution of Operational Theory*. London: Frank Cass, 1997.
- Romjue, John L. *From Active Defense to AirLand Battle: The Development of Army Doctrine, 1973-82*. Ft Monroe, VA: Historical Office, TRADOC, 1985.
- Ross, William F. and Charles F. Romanus, *The Quartermaster Corps: Operations in the War against Germany (The United States Army in World War II – Technical Services)*, (Washington DC: Office of the Chief of Military History, 1965), 471.
- Simpson, Howard R. *Dien Bien Phu: The Epic Battle that America Forgot*. London: Brassey's Inc., 1994.

- Steer, Frank. *Arnhem: The Fight to Sustain, The Untold Story of the Airborne Logisticians*. London: Leo Cooper, Ltd., 2001.
- Tolson, Lieutenant General John J. *Airmobiltiy 1961-1971*. Washington DC: US Government Printing Office, 1989.
- Van Crevald, Martin. *The Sword and the Olive: A Critical History of the Israeli Defense Force*. New York: Public Affairs, 2002.
- Warren, John C. *USAF Historical Studies: NO. 97 – Airborne Operations In World War II, European Theater*. Maxwell AFB, AL: Air University USAF Historical Division, 1956.
- Zaloga, Steven J. *Inside the Blue Berets: A Combat History of Soviet & Russian Airborne Forces, 1930-1995*. New York: Presidio Press, 1995.
- Ziemke, Earl, Foot, I.C.B. (ed.). *The Oxford Companion to World War II*. London: Oxford University Press, 2001.

Papers and Monographs

- Bloomer, Harry D. “An Analysis of the French Defeat at Dien Bien Phu.” Available [Online] <http://www.globalsecurity.org/military/library/report/1991/BHD.htm>.
- DeLancey, Douglas J. “The 82nd Airborne Division in Transformation: Is It Possible to Significantly Increase the Combat Power in the Division Ready Brigade and Reduce Deployment Sorties Using Current, Fielded Technologies?” SAMS Monograph, AY 00-01.
- DeVore, Marc. “The Airborne Illusion: Institutions and the Evolution of Postwar Airborne Forces” (SSP Working Paper, June 2004). Available [Online] http://web.mit.edu/ssp/Publications/working_papers/working_papers.html.
- Edwards, Jerome G., Michael A. Anastasio, Gilbert S. Harper, and Michael E. Simmons. *Grenada: Joint Logistics Insights for “No-Plan” Operations (National Security Program Discussion Paper 89-05)*. Cambridge: Harvard University JFK School of Government, 1989.
- Huggins, Emanuel. “Florida Institute of Technology – Abstract: To identify whether the United States Transportation Command can meet the mobile demands of Army transformation and deploy a Stryker Brigade Combat Team from CONUS anywhere in the world and place them on the ground in 96 hours.” Available [Online] <http://www.questionpro.com/academic/394.html>.
- Miser, Jeff. “Resupply at the Battle of Dien Bien Phu: What Lessons Were Learned and How Are They Applied to Today's Military Operations.” Monograph, US Army War College, 28 March 2001.

PowerPoint Briefings and EXCEL Spreadsheets

- Brigade S4, 173d Airborne Brigade. “SETAF/22d ASG, Deployment of the 173d BDE (ABN), Operation Iraqi Freedom.” 8 September 2004.
- Directorate of Combat Developments, US Army Infantry Center. “ABN ASSLT Enablers Conference SEP 04.”
- Headquarters, 526th Brigade Support Battalion. “502 BCT 101st AA Concept of Support v3.1.”
- Headquarters, 526th Brigade Support Battalion. “UA Light 101 AA LEW 9_0 14 July 04.” Excel.
- Headquarters, 82nd Airborne Division. “Brief to HQDA G3 (v4).” 3 December 2004.

Headquarters, USA TRADOC. "Future Force Forcible Entry Operations, General Officer Steering Committee, Fort Monroe (VA)." 7 January 2004.

Headquarters, USA TRADOC. "Approved IN UA v70 26 1300 May 04[1]"

Government Publications, Papers, and Documents

Congressional Budget Office. *The Army's Bandwidth Bottleneck* (August 2003). Available [Online] <http://www.cbo.gov/showdoc.cfm?index=4500&sequence=0&from=0#anchor>.

Department of Defense - Office of Force Transformation. *Operational Sense and Respond Logistics: Coevolution of An Adaptive Enterprise Capability* (Concept Document – short version), 6 May 2004. Available [Online] <http://www.oft.osd.mil/initiatives/srl/family.cfm>.

Department of the Army. *Army Logistics White Paper: Delivering Materiel Readiness to the Army*. Washington DC: US Government Printing Office, 2003. Available [Online] <http://www.hqda.army.mil/logweb/sitemap/2003-Web/visnstmt/Whitepaper.pdf>.

Department of the Army. FM 4-20.41, *Aerial Delivery Distribution in the Theater of Operations*. Washington DC: Government Printing Office, August 2003.

Department of the Army. *Field Manual 63-2, Division Support Command, Armored, Infantry, and Mechanized Infantry Divisions*. Washington DC: Government Publishing, May 1991.

Department of the Army. *Field Manual 90-26, Airborne Operations*. Washington DC: US Government Printing Office, 1990.

Department of the Army. "Memorandum – Fiscal Year 2005 Game Plan, 1 November 2004." Available [Online] <http://www.army.mil/features/2005ArmyGamePlan>.

Department of the Army. *Serving a Nation at War: A Campaign Quality Army with a Joint and Expeditionary Mindset* (Draft Army White Paper). Washington, DC: Office of CSA, 24 February 2004.

Directorate of Combat Developments, USA Combined Arms Support Command. *Logistics Transformation Operational and Organizational Concepts White Paper Sustainment Brigade (UEy/UEx)*.

Headquarters, 82nd Airborne Division. *82nd Airborne Division Airborne Standing Operating Procedures (ASOP), Edition VI*. Fort Bragg, NC: May 2001.

Headquarters, 82nd Airborne Division. *Airfield Seizure Training Circular*. Fort Bragg, NC: October 2004.

Headquarters, 82nd Airborne Division. *Readiness SOP (RSOP)*. Fort Bragg, NC: 1 August 2000.

Headquarters, 82nd DISCOM. "Operational Concept for Forcible Entry UEx (DISCOM Revised)," 31 August 2004.

Headquarters, Department of the Army –G4. *Connecting Logisticians White Paper*. Available [Online] http://www.hqda.army.mil/logweb/cl_whitepaper.pdf.

Headquarters, US Joint Forces Command. *Joint Forcible Entry Operations Joint Enabling Concept, Version 0.79*. 4 December 2003.

Headquarters, United States Marine Corps. "Joint Forcible Entry Study." Warfighter Concepts and Emerging Issues. Available [Online] <http://hqinet001.hqmc.usmc.mil/p&r/concepts/2003/PDF/Chapter2C&P03PDFs/Ch22EIJointForcibleEntryStudy.pdf>.

Headquarters, USA TRADOC. "Executive Summary, Sea Viking Capabilities Seminar (17-20 May 2004)." Available [Online] AKO Knowledge Center www.us.army.mil.

Joint Chiefs of Staff. *JP 3-18, Joint Doctrine for Forcible Entry Operations*. Washington, D.C.: Joint Chiefs of Staff – J4. *Focused Logistics Campaign Plan*. Available [Online] <http://www.dtic.mil/jcs/j4/projects/projects.htm>.

The Joint Staff - J8. *Forcible Entry Operations Study Final Report*, September 2003

Task Force Modularity. *Army Comprehensive Guide to Modularity – Version 1.0*. Fort Monroe, VA: US Army TRADOC, 8 October 2004.

United States Army, "Serving a Nation a War." Available [Online] <http://www.army.mil/howwewillfight/soldier/index3.html>.

US Army Human Resources Command. "FY 04/05 - FA 90 Command Slate." Available [Online] <https://perscomnd04.army.mil/CmdSlateInfo.nsf>.

E-mail Interviews

Douville, Jeffrey, LTC, former commander, 407th FSB, 27 October 2004.

Mead, Phillip, LTC, Commander, 501st FSC, 173rd Airborne Brigade. 12 October 2004.

O'Neil, John "Skip," LTC, G4, 82nd Airborne Division. 22 September 2004.

Upshaw, Kyle, CPT, Supply Platoon Leader, 501st FSC, 173rd Airborne Brigade. 13 October 2004.

Article and Periodicals

1st Tactical Studies Group (Airborne). "Future Airborne Warfare: Mobile Columns Without Fixed Supply Bases." Available [Online] <http://www.geocities.com/equipmentshop/abnlogistics.htm>.

Air Force Association. *AFA Almanac 2002*. "Equipment – Active Duty Inventory." Available [Online] <http://www.afa.org/magazine/May2002/equip.pdf>.

Bonne, Frans. "WW2 Warbirds: the Junkers Ju 52 Tante Ju." Available [Online] <http://www.xs4all.nl/~fbonne/warbirds/ww2htmls/junkju52.html>.

Castanon, Eliamar, SPC. "FCS takes aim on Army future – Infantry tests survivability of lighter force" TRADOC News Service, November 2004. Available [Online] <http://www.tradoc.army.mil/pao/TNSarchives/November04/111004.htm>.

Eden, Rick. "Faster, Better, Cheaper: U.S. Army Manages a Logistics Revolution," *Rand Review* (April 2002). Available [Online] <http://www.rand.org/publications/randreview/issues/rr.04.02/faster.html>, 1.

Gavin, James A., Major General. "Quartermaster Support of Airborne Operations – Excerpts of Testimony given before an Ad Hoc Committee," *Quartermaster Review September-October 1950*. Available [Online] http://www.qmmuseum.lee.army.mil/korea/support_of_airborne.htm.

Gilmore, Gerry J. "Military's Logistics System Found Wanting in Iraq War." *American Forces Information Service*, January 21, 2004. Available [Online] <http://www.globalsecurity.org/military/library/news.2004/01/mil-040121-afps03.htm>.

Krump, Jamie L. "Sustaining Northern Iraq: when the 173d Airborne Brigade dropped 1,000 paratroopers into northern Iraq, the provisional 201st Forward Support Battalion went

- into the theater with them.” *Army Logistician*. (Nov-Dec 2003). Available [Online] http://www.findarticles.com/p/articles/mi_m0PAI/is_6_35/ai_110459235.
- Larsen, Stephan. “3ID Soldiers at the NTC agree: CSS VSAT is a combat multiplier.” *Army News Service* (22 June 2004). Available [Online] http://www4.army.mil/ocpa/read.php?story_id_key=6080
- Military.com. “Up in the Sky: Sherpa Guided Parachute Cargo System.” Available [Online] http://www.military.com/soldiartech/0,14632,Soldiartech_SHERPA,,00.html.
- US Army Soldier Systems Center. “Joint Precision Airdrop System (JPADS) ACTD.” Available [Online] http://www.natick.army.mil/soldier/media/fact/airdrop/JPADS_ACTD.htm.

Websites and Online Sources

- 1st Tactical Studies Group (Airborne). Available [Online] <http://www.geocities.com/Pentagon/Quarters/2116>.
- 173rd Airborne Brigade - Military.com Homepage. Available [Online] <http://www.military.com/HomePage/UnitPageFullText/1,13476,100135,00.html>.
- 46th Corps Support Group. Available [Online] <http://www.bragg.army.mil/46thcsg/Units.htm>.
- “C-17 Globemaster III Production.” Available [Online] <http://www.globalsecurity.org/military/systems/aircraft/c-17-prod.htm>.
- “ Funny Quotes #1.” <http://www.military-quotes.com/funny-quotes.htm>.
- “ Military Quotes/Quotations, F: Farragut to Fuller.” <http://www.military-quotes.com/database/f.htm>.
- “Pope AFB,” Available [Online] <http://www.globalsecurity.org/military/facility/pope.htm> “US Military Operations: Casualty Breakdown.” <http://www.globalsecurity.org/military/ops/casualties.htm>.