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**NAVAL WAR COLLEGE
Newport, R.I.**

**U.S. Air Force: Inadequately Prepared for Forward Operations
In a Combat Environment**

By

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A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

Signature: _____

16 May 2006

Abstract

The United States Air Force, for many years, has successfully deployed Airmen all over the world to execute operations. To do so, during all major conflicts, the Air Force has set up temporary Forward Operating Locations (FOL) to support their mission. Due to the shift in the nature of the war from initial conventional to insurgency, not since the Vietnam War has forward-deployed Air Force basing been enveloped within a violent insurgency environment. This paper addresses the major planning and capability shortfalls experienced during the development of the Air Force FOL network within Iraq beginning in June 2003. It will also review logistics challenges created by failures to upgrade outdated support systems and the deficiencies in training and equipping our Airmen for working and living in a combat environment. Finally, solutions are identified to resolve issues experienced during Operation IRAQI FREEDOM and to help transform today's Air Force into a more rapidly deployable and capable force to counter tomorrow's adversary.

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Introduction/Background

The United States Air Force, for many years, has successfully deployed Airmen all over the world to execute operations. To do so, during all major conflicts, the Air Force has set up temporary Forward Operating Locations (FOL) to support their mission. During Operation IRAQI FREEDOM (OIF), a network of “bare” bases was planned to support ground forces and projects associated with the redevelopment of Iraq, following the fall of Saddam’s Regime. Due to the shift in the nature of the war from initial conventional to insurgency, not since the Vietnam War has forward-deployed Air Force basing been enveloped within a violent insurgency environment.

Civilian and military planners for OIF believed Iraqis would welcome the Allies, and they did initially in the predominantly Shiite and Kurdish regions in the south and northeast, respectively. Even in Baghdad, which is within a region known as the “Sunni Triangle,” Iraqis welcomed the fall of Saddam. In fact, senior Air Force personnel based at Baghdad International Airport (BIAP or Camp Sather) were free to travel into Baghdad to eat at local restaurants with minimal security precautions.¹ Unfortunately, the security environment rapidly evolved as more military personnel began to occupy regions around Baghdad International Airport. The U.S. military build-up at BIAP quickly drew the attention of the growing insurgency. Rocket, mortar, small arms, and shoulder fired anti-aircraft missiles soon became a daily threat to the U.S. and coalition forces around BIAP.²

The security threat to Air Force personnel, as a result of the growing insurgency in Iraq, created an unfamiliar environment for the Air Force, not experienced since Vietnam. Many of the Air Force FOLs in Iraq became exposed to regular attacks, logistics lines were threatened by the enemy, and any travel outside the base fell victim to enemy disruption. In

the summer of 2003, the Air Force found itself unprepared for the threats its Airmen faced on the ground in Iraq. Airmen were not properly equipped or trained to meet the demands of deploying, living and fighting within a violent insurgency environment. Air Force bases in Iraq were not built to provide adequate force protection from the hostile environment. The Air Force planning and acquisition system had not prepared or invested in the necessary logistics programs required to develop and sustain an airbase network within an austere under-developed region like Iraq.

This paper addresses the major planning and capability shortfalls experienced during the development of the Air Force FOL network within Iraq beginning in June 2003. It will also review logistics challenges created by failures to upgrade outdated support systems and the deficiencies in training and equipping our Airmen for working and living in a combat environment. Finally, solutions are identified to resolve issues experienced during Operation IRAQI FREEDOM and to help transform today's Air Force into a more rapidly deployable and capable force to counter tomorrow's adversary.

Bare Base Planning

The Air and Space Expeditionary Force (AEF) concept was developed in the 1990s to deploy and employ a forward presence from the continental United States and allow the Air Force to quickly move a tailored sustainable force to meet any national security issue abroad.³ The AEF system became necessary because of the reduced forward presence created following the closure of many overseas bases during the past twenty years. The Agile Combat Support (ACS) system was developed to help facilitate the AEF in meeting a rapid deployment capability. The practices and processes of ACS improved the

responsiveness, deployability, and sustainability of forces.⁴ The stated capability goal for deploying to Forward Operating Locations (FOL) under the ACS system is 72 hours for the deployment phase, with initial operations beginning within 48 hours after arrival, a five day goal.⁵ This notional goal has never been achieved since the birth of the concept. The austere basing structure of Operation ENDURING FREEDOM (OEF) and OIF made it even more difficult to achieve. The average for OEF was a total of 44 days and for OIF it was 32 days. Improvement between OEF and OIF was primarily due to the use of OEF bases, with some infrastructure already in place, later used for OIF operations.⁶ The delays in base openings related to the fact that creating an OIF “bare” base was more complex than had been estimated. Extensive engineering and development efforts were required. Much of the facilities in place at the basing locations were unusable. “In almost all cases, the assumptions that utilities would be operational on seized airfields were wrong.”⁷ Engineering and communications combat support personnel were necessary in large numbers. Much of the host nation support that was promised or expected from the planners never materialized.⁸ The “bare” basing requirements for OIF were well in excess of any operations since the Vietnam War and surpassed the demands required for OEF.⁹

Within the combat environment, reutilizing former Iraqi military bases meant removing unexploded ordnance (UXO) and mine hazards. The Air Force lacked a capability to quickly clear airfield mines and had to rely on limited Explosive Ordnance Disposal (EOD) resources to clear the threats; many airfields remained unusable until the subsurface mines were cleared and areas were swept of UXOs.¹⁰ Even after primary working and living areas were cleared, there were many areas that remained off-limits due to unknown hazards and the limited resources to properly clear them.

When Tallil AB was opened in southern Iraq, there was a dispute between the Army and Air Force over who would handle perimeter defense.¹¹ An Air Force perimeter defense package was not in place in reasonable quantities, so the Army was forced to maintain a defensive position until Air Force assets arrived.¹² Air Force force protection assets should have been scheduled with the first base opening deployment package in numbers to self sufficiently support base security. This would have avoided the reliance on the Army.

Hardening structures and shelter/bunker materials were not properly planned for in the “bare” base buildup plan. Several of the airbases in dangerous regions of Iraq had only limited numbers of HESCOs available to harden some of the tent areas.¹³ Concrete barriers, used to create bunkers/shelters, were not available during the stand-up of the “bare” bases due to limited concrete production capacity in Iraq. At BIAP, because of the lack of materials locally, protective shelters were not available for most of the deployed population and all of the transiting passengers through the Camp Sather Passenger Service Terminal. During the early stages of Camp Sather’s establishment (June to December 2003), 25,000 passengers or more transited the terminal per month, all vulnerable to attacks without shelter protection. Air Force initiated a contract with local Iraqis to fill sandbags used to harden the billeting tents within Camp Sather and protect the deployed base population. It was January 2004 (over eight months from when Camp Sather was established) before protective bunkers/shelters were constructed for transiting aircrews/passengers and in the common areas of the base.

Equipment Shortfalls

The individual mobility equipment requirements a person deploys to the field with is determined by the Operational Planners, usually at the major command (MAJCOM) level. Air Force planners determine requirements based on the deployment location and the best available equipment in the Air Force inventory. At the start of OIF, the Air Force had obsolete and outdated equipment available for Airmen deploying into combat environments. Weapons and body armor, specifically, were inferior to that provided their Army and Marine Corps counterparts. When conditions in and around the bases became hostile and enemy attacks more prevalent, Air Force Airmen were placed at risk. Most Airmen that deployed to Iraq in 2003 were outfitted with old Vietnam-era flak jackets, rather than the latest Type III ceramic-plate Interceptor body armor. Many of the direct combat Army units had received the Type III armor, but the majority of the Air Force, with the exception of Security Forces, had not yet been issued the gear.¹⁴ Airmen also received M-16A2s, with some arriving into theater with Vietnam era M16A1s.¹⁵ Individual mobility equipment, like weapons and body armor, were basically old and outdated.

Up-Armored Humvees and 10,000-pound capacity Adverse Terrain Loaders (10K A/T) were two special-purpose vehicles in short supply during OIF. Shortages were predominantly due to insufficient allocations for deployment and competing demand due to ongoing operations for OEF. Camp Sather, at BIAP, received only two armored Humvees to support a “bare” base of over 1100 Air Force personnel. Up-Armored Humvees were also notorious for maintenance problems, so usually only one was operational at any given time. Other leased vehicles were available as a substitute, but they were unarmored Toyota Land Cruisers or GMC pickup trucks, which lacked protection from small arms, RPG, or Improvised Explosive Devices (IEDs). The 10K A/T was the most utilitarian of all base

equipment throughout the Area of Responsibility (AOR), because of their payload, unimproved surface capability, and usefulness throughout airbase operations. There was no capable substitute for the 10K A/T, and on many occasions day-to-day missions and base sustainment operations were directly impacted by the shortage in the AOR.

The Air Force failure to upgrade the quality of individual mobility items over the years can probably be attributed to their assumption the Air Force would not be directly involved in a war where the quality of these items would be a determining factor in how effective we fought. Armored vehicles would not be a significant requirement for operations, with the exception of EOD and Security Forces. Air Force planners never expected operations so heavily based within enemy territory and for Airmen to be regularly engaging enemy forces.

Logistics Problems

The Air Force experienced a serious deficiency in a capable mobile fuel distribution system. None of the four Air Force “bare” bases opened in Iraq during OIF had usable fuel storage or underground pumping systems, common at most airports in developed countries. Lack of storage and pumping capability demanded the deployment of outdated fuels mobility support equipment (FMSE) to supply fuel.¹⁶ The FMSE first entered service in the 1960s originally to support tactical field forces when the need arose to deploy a fuel support system; they later became the Air Force answer to a mobile deployable system for forward deployed fuel operations.¹⁷ They are not only very old systems but have been plagued by a number of operational problems. In general, the FMSE performed poorly in OIF.¹⁸ The fuel trucks and mechanical pumps were regularly victims of maintenance problems. Their age

and the hot dusty weather of southwest Asia combined to make the systems in need of practically continuous maintenance. The Air Force has very few liquid fuels mechanics with the training and experience to troubleshoot the equipment. During the start of OIF, many FOLs did not have a single experienced mechanic assigned. Bases that had the expertise were lucky to have one mechanic, which required them to work long hours to maintain the high tempo operations during OIF. Bases without experienced mechanics were forced to improvise using talented vehicle mechanics with the proper maintenance technical orders. The other major problem with deployable fuel systems was leaking bladders. Again, the extreme heat in southwest Asia contributed to the problem. All the bladders leaked, some worse than others. They can be, and are, patched repeatedly, as leaks become too numerous or severe, the bladders eventually need to be replaced prematurely and discarded. Replacing bladders is a very time consuming and labor intensive project under the best conditions and sufficient manning. The Army and Marine Corp used the same deployable fuels equipment and experienced the same poor performance during OIF.

Local logistics support in Iraq was very limited and difficult to utilize. However, Air Forces, U.S. Central Command (CENTAF) planners often assumed host-nation support would be available, and in many cases the support that was promised never delivered, or was very slow to evolve.¹⁹ Due to the poor Iraqi infrastructure and limited supply of airlift, supply convoys became a primary means of transport for perishables, water, fuel, food, and other essentials. Supplies were trucked into Iraq from neighboring Kuwait, Saudi Arabia, Jordan, or Turkey. The dangers associated with insurgents, thieves, and lawlessness on the highways of Iraq demanded heavy convoy security details. The Air Force had not

anticipated and was unprepared to support the intensive supply convoy operations necessary to sustain airbase operations.

Air Force Training Deficiencies

Air Force training deficiencies start with the basic combat essential of weapons proficiency. A majority of career fields in the Air Force required only minimal exposure to handling weapons on the firing range every few years. For Airmen deployed to a combat environment, their lack of weapon's familiarization reduced effectiveness and safety. Based on their lack of experience, senior leadership on many Air Force bases in Iraq did not allow Airmen to carry weapons until they were required to travel off-base. These tough decisions by Air Force leaders were due to their lack of confidence in the ability of their Airmen to carry and use their weapons safely. Although somewhat justified under the circumstances, separating Airmen from their weapon upon arrival to a hostile AOR is less than acceptable. Airmen must be trained to combat proficiency with either the M16 or M9, with an increased number trained on heavier weapons as needed.

Another important skill for all Airmen deploying to the AOR is first-aid training. In the Air Force, the training is called Self-Aid and Buddy Care. Not enough emphasis is placed on this core competency. Like weapons training, it is administered every few years and not to an adequate level of understanding. Airmen should be able to respond to the needs of a wounded comrade. They should be able to skillfully provide basic medical assistance in the field and improve the survivability of their fellow soldiers.

For Air Force personnel, the lack of advance planning and training for convoy operations, was the worst example of how the Air Force was unprepared. During the initial

convoys, vehicle mechanics acted as security, while vehicle drivers drove the supply trucks. It was a very dangerous situation that could have led to more casualties than resulted. Successful convoy operations required well-trained drivers, security details, and detailed security procedures for the drivers and riders. During the first year of OIF, untrained Airmen ran supply convoys, sometimes with the assistance of Army Military Police assistance. Convoy operations should have been predicted and Airmen should have been prepared. By 2004, the Air Force was soon not only running convoys to support Air Force “bare” bases, but also supplying manpower to the Army to support their manning shortages in the combat support fields.²⁰ Convoys traveled hundreds of miles through rugged desert environments where temperatures exceeded 125 degrees through lawless regions of Iraq filled with enemy fighters and extremely poor Iraqis willing to scavenge any amount of food or water for their families. Convoy support missions last from eight hours to two weeks.²¹ Practically every convoy experienced an improvised explosive device (IED), rocket propelled grenades, small arms fire, or mortar attack.²² Air Force personnel needed the ability to protect themselves and their convoy and were woefully unprepared to do both.

Recommendations

The Air Force must plan and train for the type of combat environment Airmen will face whether conventional or unconventional. OEF, and to a greater extent OIF, have created a view into the future of how the Air Force must be able to deploy and fight. Since the start of OEF in 2001, the Air Force has reacted to the changing combat environment through various programs. The first such program is EAGLE FLAG, which began its first exercise in October 2003. EAGLE FLAG is an Air Force-level Expeditionary Combat Support Exercise

designed to train Airmen in the latest procedures and equipment available to establish an air base and achieve initial operation capability for any type of forward operation.²³ The concept is a step in the right direction; however, it must be administered to all senior and mid-level leaders prior to deployment with recurring training every couple of years. All Air Force personnel should ultimately receive the training prior to deploying, if timing permits.

Special base opening teams should be created that provide the right skilled personnel and equipment to open a “bare” base in enemy territory with limited infrastructure. A category three FOL site is the worst case location and would be considered a “bare” base possessing only a useable runway, water source and fuel, or the potential to set up a deployable fuel system.²⁴ The team should be broken down into elements that are timed to arrive based on the function they perform. Security Forces and EOD would arrive first to secure the area and remove UXOs. The engineers and combat communications would arrive next. Staging the arrival of functions would reduce the time functions, like the engineers; spend waiting around for UXOs or mines to be cleared so that structures can be built, for example.

A new core competency should be developed that incorporates perimeter defense and clearing the base area of mines and UXOs. As part of the “bare” base establishment team, there should be a Unit Type Code (UTC), probably comprised of Security Forces personnel responsible for establishing a perimeter defense and making sure all areas of the proposed base are either cleared or identified as not cleared before the base opening team arrives. The engineering and communications packages should be scalable based on the needs of the site. There is no need to waste airlift or resources deploying equipment and personnel specialized in runway repair when the runway does not require repair. A concept that closely assimilates

this idea is the newly formed Airborne RED HORSE Teams. Built as a vision of General John P. Jumper, Air Force Chief of Staff, the Airborne RED HORSE (Rapid Engineer Deployable Heavy Operational Repair Squadron) Team is a smaller scale version of the traditional RED HORSE Squadrons first activated in 1966 as the Air Force version of a combat construction team. In addition to the twenty-one Airmen drawn from RED HORSE Squadrons, there are six EOD members, six fire fighters, and two that specialize in nuclear, biological and chemical (NBC) defense. The airborne element of the team identifies their ability to parachute from an aircraft or rappel from a helicopter.²⁵ This type of capability would greatly improve the Air Force effectiveness in preparing “bare” bases in austere and hostile environments.

The overall standard base operating footprint needs to become smaller at “bare” base airfields. This would help reduce the time it takes to set up a fully operational airbase in a “bare” base environment. The five-day goal is probably unreasonable, but the timelines experienced during OEF and OIF were much too long. The HARVEST FALCON “bare” basing kits, which are self-contained deployment structures, are not designed for rapid deployment function and require too much airlift to get them to the FOL. It takes 72 C-17 loads or 250 trucks to deliver a standard HARVEST FALCON expeditionary shelter package, which takes four days to assemble. A set this size is capable of housing 1100 people and includes electrical generator support.²⁶ A new version of HARVEST FALCON needs to be developed that is more modular. Smaller elements could be forward deployed to set up the basic base elements that would allow operational sorties to begin, and then expanded as time progresses to expand base capabilities.

Improvements need to be developed into the HESCO barrier systems to make them lighter in weight. The HESCO concept is very simple and quick to install and can provide great security to a large area in a very short period of time. The current designs are too heavy making them impractical for airlift and requiring too many trucks to deliver them to the FOL. They are a very important component of base security, yet the transport requirements dictate a wait of weeks or months for them to arrive on station. More HESCOs into the field sooner would have satisfied the bunker/shelter deficiencies from OIF and would have made the HARVEST FALCON resources hardened from attacks in a much shorter timeline. Pre-positioning the existing metal design HESCOs, as part of War Reserve Material (WRM), closer to regional areas of conflict would be a quick solution to today's problem of securing FOL "bare" bases fast.

Providing the proper equipment to Airmen prior to deployments is a problem that merely needs funding and advance planning prior to the start of hostilities. Funding was provided in FY04 and FY05 for \$140 million to equip four AEFs with the latest quality body armor. Up-armored Humvees were also purchased with funding during FY04 and FY05 at a cost of \$29.6 million providing 173 new vehicles.²⁷ The weapons used in the field by Air Force personnel also need to be upgraded. A good starting point would be modernizing the weapons carried by the Security Forces, then pass on their used equipment to the rest of the Air Force personnel. The Security Forces are the first line of defense for deployed airbases and they should have the most capable weapons available. Individual weapons for the rest of the deployed population are a secondary defense, but should also be improved over current older model M16s. Smaller M4s should also be available to individuals manning convoy operations. They would provide greater ease of operation from a convoy vehicle.

A new replacement to the 10K A/T should also be sourced. A more versatile model would allow for a forklift attachment as well as a bucket loading capability. The forklift capability fills a very common need throughout all airfields in the AOR. There are often competing groups that fight for the use of 10Ks. The bucket attachment would make it also useful for filling HESCOs and preparing surfaces at “bare” bases during airbase construction. The adverse terrain four wheel drive high clearance feature is also a must when operating on a “bare” base. Using Iraq as an example, there are very few areas with prepared surfaces outside of towns and at the “bare” base locations. In the time that it takes for a new 10K A/T to be developed, more of the existing model should be provided to the field.

The solution to the poor deployable fuels system appears to have been resolved with the introduction of the Fuels Operational Readiness Capability Equipment (FORCE). The new system is modular in design reducing the logistics footprint and manpower while increasing throughput and effectiveness at bases. The Air Force has programmed \$87.1 million to purchase the systems through FY11.²⁸ The existing forty-plus-year old equipment should be replaced as soon as the new systems are available. First article testing was scheduled for the spring of 2005 with production models available in FY06.²⁹

Convoy operations appear to be here to stay, and will very possibly be a requirement in future conflicts in remote under-developed countries. Formal joint training started late in CY04 with the Army at the Army’s Transportation Center at Fort Eustis and Fort Jackson. The equipment, procedures and tactics have all improved and continue to change as we adapt to changing enemy tactics. The equipment currently in use is the best available in the form of armored vehicles, firepower and personal body armor protection. As seen by the

following table, convoy operations are still as dangerous as they have ever been and Airmen are playing a significant role.

CONVOY SUMMARY	2006 TOTALS	1-25 APRIL 2006
MILES DRIVEN	3,260,514	326,848
MISSIONS COMPLETED	858	132
AIRMEN DRIVING	360	360
IED ATTACKS	20	5
SMALL ARMS	18	2
RPG/OTHER	20	3
AIRMEN PROVIDING SECURITY	865	850

30

Some of the individual training deficiencies have begun to be addressed. Air Force Basic Military Training (BMT) has been modified to provide more focus on combat skills. Combat training, base defense, and combat first-aid classes have been added since November 2005. The Air Force intends to start issuing new recruits an M-16 as soon as they arrive rather than in the final week of training, as had been done in the past. In October 2007, the Air Force plans to add two weeks to BMT. They also plan to transform the BMT “Warrior Week” into a mini-deployment exercise called Basic Expeditionary Airman Skills Training (BEAST).³¹ Similar training needs to reach all ranks of the Air Force, not just basic trainees. Recurring training requirements need to be reassessed to address weapons handling and combat first aid, as well as other training to better prepare Airmen for living and working in a combat environment.

Air Force planning needs to become better at estimating problems and deficiencies before we get too far ahead. The difficulties of sustaining operations for several years within a combat environment were not considered. Plans should have included the transition from temporary HARVEST FALCON facilities to more permanent structures before the HARVEST FALCON facilities began to wear out, as they started to do after a year of continuous use.

Conclusion

Operation IRAQI FREEDOM required the largest network of “bare” bases since the Vietnam War. Many of the bases stood-up in combat environments within close proximity to the enemy. Living and working in a hostile region was unfamiliar to the way the Air Force had trained and planned. Many deficiencies were highlighted in the way the Air Force planned and executed base opening operations in austere combat locations. There were important capabilities the Air Force was unprepared to provide, like hardened facilities, independent perimeter defense forces, mine and UXO clearing. Many Airmen were placed into combat situations without adequate training or equipment. Logistics problems arose from known weakness the Air Force failed to address during peacetime, like deployable fuel services. Combat support operations in an insurgent environment had not been practiced since the Vietnam War. Airmen proved to be innovative and resourceful and worked through the problems on the fly. However, lives were put at risk and casualties were taken because of insufficient planning, preparation, and training.

The Air Force’s poor estimate of the battle field made the force vulnerable when exposed to the hostile environment. Years of investments into future weapons systems and

technology came at the expense of deployable base systems, combat gear, and proper training. A fact that was quickly realized by Airmen that deployed to Iraq during the start of OIF.

Many lessons have been learned from the Air Force planning and preparation failures prior to Operation IRAQI FREEDOM. The experience gained from the extensive buildup and sustainment operations have made the Air Force more capable to fight future adversaries. Changes have been made to eradicate many of the problems identified during the start of OIF, much more remains to be accomplished. Unfortunately, it takes severe deficiencies in capabilities and inadequacies in preparation, like those experienced in the performance of the FMSE or lack of supply convoy training, during times of war before the appropriate resources are redirected to upgrade combat support systems or even the most basic requirements, like Type III body armor or Up-Armored vehicles.

End Notes

¹ The Author was assigned to the 447th Air Expeditionary Group (AEG), as Commander 447th Expeditionary Logistics Readiness Squadron (ELRS) stationed at Camp Sather (Baghdad International Airport) during the first AEF cycle in OIF (2003-2004). Many of the situational observations are his firsthand account of the problems.

² Of the four Air Force-operated bases established in Iraq in 2003 (BIAP, Kirkuk, Tallil, and Balad), Camp Sather, at Baghdad International Airport, received the most attacks through the end of 2003. As the development and buildup of Balad continued, to the north of Baghdad within the “Sunni Triangle”, the number of attacks began to resemble BIAP.

³ Kristin F. Lynch, John G. Drew, Robert S. Tripp, and C. Robert Roll, Jr. *Lessons from Operation Iraqi Freedom*, (Santa Monica, CA: RAND Corporation, 2005), 1.

⁴ James Rainey and Beth F. Scott. 2004 Logistics Dimensions: Readings in the Issues and Concerns Facing the Air Force Logistics in the 21st Century, Volume, (Maxwell AFB, AL: Air Force Logistics Management Agency, August 2004), 13.

⁵ Lynch, 44.

⁶ Ibid, 46-47.

⁷ Rainey and Scott (2004), 165.

⁸ Lynch, 51-55.

⁹ Ibid, 14-15, 54.

¹⁰ Rainey and Scott (2004), 166.

¹¹ Tallil Air Base was one of four Air Force FOLs stood-up in Iraq during 2003. The other three bases are Camp Sather (Baghdad International Airport), Kirkuk AB, and Balad AB.

¹² Rainey and Scott (2004), 167.

¹³ HESCO Concertainer® is a prefabricated, multi-cellular system, made of galvanized steel Weldmesh and lined with non-woven polypropylene geotextile. For more information refer to:

http://www.hescobastion.com/US_site/topframe.html

¹⁴ Peter Brownfeld., "U.S. Troops In Iraq Have Limited Body Armor." *Fox News*, 24 October 2003.

http://www.foxnews.com/printer_friendly_story/0,3566,101061,00.html [2 May 2006]

¹⁵ The point that the M16A1 model, originally built in the 1960s, was still being issued for use in combat is noted here just to highlight the lack of importance placed on the combat capabilities of deploying Airmen. The existence of the M16A1 in Air Force inventory also reinforces the outdated weapons available to front line soldiers in combat environments.

¹⁶ The fuels mobile support system (FMSE) is comprised of cloth fuel bladders of various sizes, pumping hydrants, and a fleet of R-11 (5000 gallon) fuel trucks to transport fuel from the bladders to the aircraft on the flightline

¹⁷ Rainey, James and Beth F. Scott. *Thinking About Logistics: Readings in the Issues and Concerns Facing the Air Force Logistics in the 21st Century*. Maxwell AFB, AL: Air Force Logistics Management Agency, January 2005, 9-14.

¹⁸ U.S. Congress. House. Presentation to the Committee on Armed Services, Subcommittee on Readiness. *Reconstitution of Equipment*. 6 April 2005, 4.

¹⁹ Kristin F. Lynch, John G. Drew, Robert S. Tripp, and C. Robert Roll, Jr. *Lessons from Operation Iraqi Freedom*. Santa Monica, CA: RAND Corporation, 2005, 49.

²⁰ Sarah Wood, "DefenseLINK News: Rumsfeld Lauds Air Force Progress in Adapting to Fight Terrorists." *American Forces Information Services*, 3 August 2005.

http://www.defenselink.mil/news/Aug2005/20050803_2316.html [23 March 2006]

²¹ Ryan Hansen, "Tikrit-based Airmen Protect Re-Supply Convoys." *Iraq Newslink*, 332nd Air Expeditionary Wing, 7 January 2005. <http://www.afnews.af.mil/iraq/balad/010705-tikrit-balad.htm> [23 March 2006]

²² Scott G. West, "Logistical Support of Operation Iraqi Freedom (OIF)." *Logistics Spectrum*, April – June 2004, Vol. 38, Iss. 2, 9.

²³ United States Air Force, Headquarters Air Mobility Command, "Eagle Flag" April 2005.

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²⁴ Rainey and Scott (2004), 22.

²⁵ Scott R. Gourley, "Airborne RED HORSE" April 2006. http://www.special-operations-technology.com/print_article.cfm?DocID=397 [11 May 2006]

²⁶ Rainey and Scott (2004), 160.

²⁷ U.S. Congress. House. Presentation to the Committee on Armed Services, Subcommittee on Readiness. *Reconstitution of Equipment*. 6 April 2005, 4.

²⁸ Ibid.

²⁹ United States Army Petroleum Center, "Fueling Freedom's Finest: The Fuel Point Newsletter" Issue 8, April 2005. http://usapc.army.mil/fuel_point/FuelPoint8pdf3.pdf [30 April 2006], 5.

³⁰ U.S. Air Force AIM Points, "Convoy Summary Data." 25 April 2006.

³¹ Julian E. Barnes, "The Flyboys Get Tough." *U.S. News and World Report*, 17 April 2006.

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