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**AIR ASSAULT LOGISTICS
DURING DESERT STORM:
A PERSONAL EXPERIENCE MONOGRAPH**

BY

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United States Army**

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**AIR ASSAULT LOGISTICS DURING DESERT STORM:
A PERSONAL EXPERIENCE MONOGRAPH**

AN INDIVIDUAL STUDY PROJECT

by

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ABSTRACT

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Alerted for deployment on 9 August 1990, the 101st Airborne Division (Air Assault) was one of the first Army divisions to deploy to Saudi Arabia to participate in Desert Shield. The division experienced the full range of logistics support...from bare base to mature theater. This paper, as a Personal Experience Monograph, addresses logistics support of the 101st during Operation Desert Shield/Storm from the perspective of the Commander of the Supply and Transport Battalion of the 101st Airborne Division (Air Assault). The paper uses the chronology of the deployment as the vehicle to identify and address logistics issues as they occurred. It identifies lessons learned and provides recommendations for correction.

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INTRODUCTION

At approximately 0700 hours, 60 UH-60 Blackhawks and 30 Ch47D Chinooks carrying 1st Brigade's first air assault element climbed from the brigade's pickup zone in TAA Campbell. In just over an hour, the aircraft had safely deposited some 500 soldiers 93 miles deep into Iraq. The 1st Battalion, 82d Brigade of Iraq's 49th Infantry division had entrenched themselves just north of MSR Virginia. The 1/327th Infantry discovered the Iraqi battalion while clearing FOB Cobra in zone. A sharp firefight ensued. The Iraqi battalion commander surrendered once the 1/327th attacked his position. Upon his capture, the Iraqi commander was persuaded to use a bullhorn to convince his 300 plus soldiers to lay down their arms.

Situation Report from the 101st Airborne Division (Air Assault)¹

Concurrently, the command and control cell of the Division Support Command's (DISCOM) forward operating base (FOB) element, loaded in two UH-60s, lifted off from Tactical Assembly Area (TAA) Campbell enroute to FOB Cobra. Its initial mission was to select the locations for the combat service support elements of the DISCOM. Of primary importance was the massive helicopter refuel and rearm point, the centerpiece of FOB Cobra, which would be critical to the division's subsequent air assault into the Euphrates River valley. The success of the 101ST Airborne Division (Air Assault) was to be determined, in large part, by the competence of its logisticians.

By the end of the first day, forty helicopter refuel points, spread across five locations within FOB Cobra, were established. Two of these locations were also attack helicopter rearm points. Rations, water, motor gasoline, and ammunition were also brought in by helicopter and supply point operations were immediately established. Similarly, both ground and aviation maintenance

capabilities were established as was a medical operation with air MEDEVAC capability. At the end of the day, all DISCOM elements were in place and functioning. During the remaining days of the war, these initial elements would be augmented and a robust logistics capability would be established.

The successful establishment of FOB Cobra was a vivid portrayal of innovation, versatility, adaptability, and technical competence on the part of the division's logisticians. Logisticians, who throughout the deployment, were given missions and left to their own resources to devise the methods to accomplish them. More importantly, it was the culmination of an effort that began on 9 August 1990 when the 101st Airborne Division (Air Assault) was formally alerted to deploy to Saudi Arabia to participate in Desert Shield.

This paper, as a Personal Experience Monograph, will address logistics operations during Desert Shield/Storm and the periods prior to deployment and redeployment. It will trace, in essentially chronological order, the actions required to enable the division to reach the point of being able to conduct the air assault operation into Iraq and the subsequent follow-on operations. Accordingly, the perspective will be that of the commander of the Supply and Transportation (S&T) Battalion of the 101st Airborne Division (Air Assault). This paper will identify lessons learned, from this perspective, and provide recommendations as appropriate. Additionally, it will identify and discuss operating methods and organizations unique to the

DEPLOYMENT PREPARATION

The 101st Airborne Division (Air Assault), as a member of the XVIII Airborne Corps, routinely trained to be able to deploy its lead elements within 18 hours of notification. Consequently, the division did not experience many of the problems discussed in The Center for Army Lessons Learned document, Getting to the Desert.² The document, published towards the end of the deployment in December 1990, was an excellent one for deploying troop units (albeit perhaps a bit late) but failed to discuss any of the major problems encountered by logistics units in their role of providing support.

Logistics units must prepare to deploy, and actually deploy elements of their units, while continuing to provide support. Obviously, a significant factor in accomplishing this is the ability to plan workloads and allocate resources accordingly. As Getting to the Desert pointed out, many units flooded the supply system with requisitions.³ This, combined with the upgrading of requisition priorities and the automatic release of equipment, by the wholesale system, to fill major end item shortages created an almost unmanageable workload. During this period, the division's class II, IV, VII warehouse received on a daily basis the same number of shipments that could be reasonably expected on a weekly basis.

This situation was essentially caused by a lack of timely and accurate information. Information regarding the shipment status of a requisition may be obtained through any of several

methods. The customer can allow the automated system to automatically provide updated status. The customer can specifically request status for selected requisitions through the Direct Support Unit (DSU) Supply Support Activity (SSA) or submit a request for a specific requisition directly to the Logistics Intelligence File (LIF) either telephonically or by computer.

During the pre-deployment period, there was a daily limitation on the number of requests for status which could be submitted. Army Regulation 725-50, Requisitioning, Receipt, and Issue System, Chapter 6, discusses the purpose and capabilities of the LIF but does not discuss a limitation on the number of requests. According to the regulation, the LIF has the capability to provide a management report to the level of detail required by commanders of requisitioning activities. The reports are based on one more of the data elements used in the requisition process. These include, at a minimum, either the Department of Defense Activity Address Code (DODAAC) or project code. Based on these data elements, detailed information regarding requisitions can be provided, grouped by supply source, and identify the requisitions' position in the logistic pipeline.⁴

Neither the 101st nor the installation took advantage of the LIF's total capability. The reason is not clear nor is it important. The lesson learned is that the capability was available to provide the DSU and its customers with the information required to program its workload and, equally as

important, to calculate or modify transportation requirements.

Another issue concerning class II, III(p), and IV was the preparation for deployment of the Authorized Stockage List (ASL) items. The class II, III(p), and IV ASL is not nearly as formalized nor as structured as that for repair parts (Class IX). Essentially, the 101st's warehouse stocked those items that were demand supported based on customer requisitions. The items were not necessarily those that would be required in combat. Rather, they were those required to support garrison operations and training. The class IX ASL, however, supports the automotive maintenance Prescribed Load List (PLL) of the units within the organization and therefore is directly tied to readiness. The same can not be said for the class II, III(p), and IV ASL.

In an effort to overcome this, the 101st developed contingency packages configured to support a brigade task force in combat for thirty days. These loads were rigged on 463L air/land pallets and routinely inspected to ensure all items were serviceable. During the deployment planning process, however, the first brigade to deploy decided to reconfigure the packages based on the projected airflow and the potential threat in the theater.

This decision caused a significant increase in workload at a time when additional work was not needed. This situation may have been avoided if each the Forward Supply Companies (FSC) within the S&T battalion had maintained established contingency ASLs to support their respective brigades. To take this one step

further, the FSCs should have been directed to operate doctrinally by routinely supporting the brigades in garrison and during field training.⁵ By doing so, at least some type of demand history would have been established. The primary benefit derived, however, would have been the working relationship that would make the transition to combat much smoother.

As the date for moving to the port approached, the division continued to be flooded with supplies and major items of equipment. Units soon received much more equipment and supplies than they could transport with organic assets. To alleviate the situation, the division requested and was provided containers to move organic supplies and equipment, the class II,III(p), and IV ASL, and the division's basic load of ammunition.

Since all the containers would not arrive at once, the division leadership established priorities to determine which units would receive what quantity and when. The Assistant Division Commander-Support (ADC-S) chaired a daily logistics coordination meeting where decisions such as these were made. Basically, like units received like quantities of containers based on their position in the flow. The ASLs and the ammunition basic load received containers on a daily basis to optimize workload. This procedure worked well and allowed for adjustments in priorities based on changes in the airflow, ship schedules, and the continued influx of supplies.

The S&T Battalion, alone, used 54 of the 40 foot containers to move the class II,III(P),and IV and unit organic supplies and

equipment. Most of the containers were used to ship the class II, III(p), and IV items. The Army has not recognized there is requirement for an ASL of class II, III(p) and IV supplies. FM 100-10, Combat Service Support states that DSU's will carry limited stocks since they are not immediately critical.⁶ Accordingly, there was not a significant amount of organic transportation to move the supplies. The additional containers used by the division further complicated the load planning process for the ship movement as the quantity continued to increase. The final numbers reflected that the 101st used 10 ships with a total capacity in excess of one million square feet to move its equipment and supplies to Saudi Arabia. The initial estimate was that 8 ships would be required to move the division's equipment.

There are several lessons learned here. One, addressed earlier, was the availability of information concerning the shipment status of inbound supplies and equipment. The second is that units simply do not have enough organic transportation to move organic supplies. Because of this and the requirement to configure vehicles to the lowest height for ship movement, large numbers of containers were required. This may be a blinding flash of the obvious but vehicle authorizations clearly deserve a re-look by the Army's leadership. Currently, the Army position as per Field Manual 100-10, Combat Service Support is:

All units are allocated, in addition to their mission equipment, only those cargo carriers required to carry basic loads and mission essential equipment. This conserves transportation resources and improves

fighting force mobility. Most combat and combat support units are fully mobile and can move with organic equipment. CSS units, not normally having to move as frequently, are only partially mobile, depending on transportation units to move them when they relocate.⁷

Realistically, the 101st could have deployed with fewer containers. The division decided to take as many supplies as possible to sustain itself since, at that point, neither the length of the deployment nor the availability of backup support were known. Additionally, there were no real constraints on the amount of equipment the division could deploy.

MOVEMENT TO THE PORT

Jacksonville, Florida was used as the sea port of embarkation for the 101st. To get there, the division had to convoy approximately 750 miles and pass through several major metropolitan areas. Oversized equipment, materials handling equipment, and the older 2&1/2 ton trucks were transported to the port by commercial carriers.

Rail transporation was used only minimally. The rail siding at Fort Campbell is limited. Deploying the entire division by rail would have increased the time required to deploy. The Post Transportation Officer coordinated for the loading of commercial carriers around the clock. Additionally, there was no shortage of commercial carriers. Many drivers camped out at Fort Campbell to await their loads and once loaded immediately headed south to Jacksonville.

The 101st Corps Support Group and U.S. Army Reserve units provided convoy support along the route. The convoy operation

was extremely successful and a model for any future operations. At each rest stop, the support units established a refuel point, a maintenance operation, and a limited recovery capability.

AT THE PORT

Initially, the division was left to its own resources at the port of Jacksonville. Fortunately, two reserve component port support units were just starting their two week annual training and assumed the responsibility for loading the ships. Even with the reserve units, the 101st still had to provide a significant work detail to perform port security. Additionally, because of the number of helicopters in the Air Assault Division, a large aviation maintenance contingent was required to prepare them for shipment.

The issue of Port Support Activities (PSA) was addressed in the Training and Doctrine Command (TRADOC) Desert Storm Conference Report. The report stated PSAs are a lesson learned requiring an Army fix. It went on to state that PSA doctrine must address world wide contingency operations. While current doctrine addresses limited port operations, it provides little guidance concerning structure and procedures. The report emphasized that doctrine must be developed to address these issues. Additionally, doctrine must address more than just the deployment and redeployment phases.⁸

IN COUNTRY

On 5 October 1990, the 101st closed in Saudi Arabia. The final numbers for the deployment were: 13,500 soldiers; 4,455

vehicles and items of equipment; and 320 helicopters via 50 C5As; 60 C141s; 30 CRAF aircraft; and 10 ships. Initially, the priority for deployment within the 101st went to the combat units. This paralleled the Commander's-in-Chief, Central Command (CINCCENT) decision that the primary need was combat forces.⁹ Figure 1. below portrays the relationship of combat to combat service support units until the division closed in-theater.¹⁰

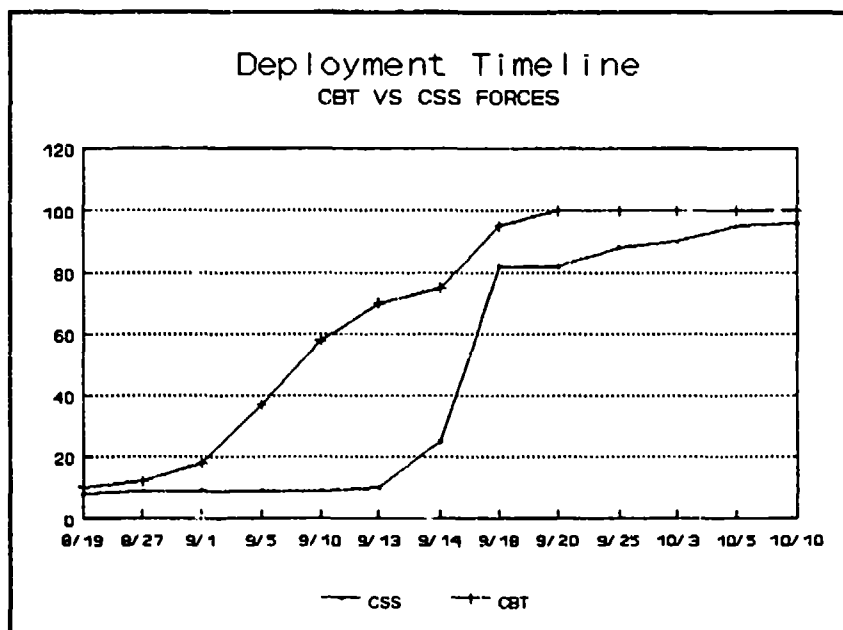


Fig.1. Relationship of CSS to combat forces during the deployment expressed as a percentage.

The obvious is, there was a period (1 Sep -14 Sep) when there was a significant imbalance in the ratio of combat to combat service support units. Again, this was a decision by the division's leadership to deploy primarily combat forces early in the flow. This is not to imply that there were no logisticians early in the flow. Although, the brigades deployed elements of their Forward Area Support Teams (FAST) there was minimal

division level support early on in the deployment.

The impact of the decision was that logistics support was initially an ad hoc arrangement. The few CSS soldiers who were in country supervised teams of detail soldiers to distribute supplies. Supplies essentially consisted of those the brigade deployed with and those obtained from the pre-positioned ships. Bottled water and fuel was supplied through host nation support. Rations were provided from the pre-positioned ships after those that the units deployed with were consumed. The logistics effort for the first few weeks in Saudi Arabia was directed towards obtaining food, fuel, water, and lodging. As CSS units arrived, normal support relationships were established and the logistics systems began to mature.

MATURATION OF THE LOGISTICS SYSTEM

As the 101st soldiers continued to arrive, a site for a base camp was identified. King Fahd International Airport (KFIA) was selected and would become Camp Eagle I. (The first Camp Eagle was in Viet Nam.) King Fahd was an ideal location for the 101st. It was near the major port of Ad Dammam, the airfield at Dhaharan, and the highway that ran north to south along the coast and which would become one of the main supply routes (MSR).

Although still under construction, the airport location offered many advantages over an undeveloped desert location. Water, although non potable, was available and there was access to international telephone lines. The airport runways could be used by both military and commercial aircraft once the air

traffic control element was operational. Additionally, there were many large abandoned construction compounds with buildings which could be used to house supply points.

One of the first priorities was to find a way to house all the troops to protect them from the harsh desert environment. The decision was made to contract for "Haj" tents. These were very light cotton tents normally used by the pilgrims at Mecca. Several thousand tents were obtained so the entire division could bivouac in one location. The base camp was laid out in brigade areas and over time each developed its own identity. Showers and latrines were brought in and telephone lines were laid. Camp Eagle II was now the desert home of the 101st.

It is important to point out that the entire division was never located at Camp Eagle all at once until after the war was over. The division's initial mission was as the covering force for the XVIII Airborne Corps. Consequently, the division's area of operations (AO) was much farther north. Camp Eagle II was the location to which units would return after approximately six weeks up north in the covering force area. More importantly, during Desert Shield it was the hub of the logistics system from which support for five other locations would originate.

According to FM 100-10, the Army's initial go-to-war supply system is a push system. Supplies are sent to the theater to replenish expended supplies. Once the theater matures, the overall system becomes a pull system. At the brigade and battalion level, however, supplies continue to be pushed to the

user. ¹¹ The Corps Support Command (COSCOM) units would deliver to the Division Support Area (DSA) or throughput to the Brigade Support Areas (BSA). As discussed earlier, the initial logistics system was essentially a function of the units in-country as opposed to a doctrinal configuration. Consequently, representatives from the Division Materiel Management Center (DMMC), had to go search for supplies and then arrange for transportation to move them to the division. The COSCOM did not have the capability, initially, to support three divisions (101st, 24th, and 82d) simultaneously across the distances encountered in Saudi Arabia. The DMMC also maintained a liaison officer at the ARCENT Support Command headquarters to coordinate supply requests. It was not until the automation capability for both the COSCOM and the DMMC arrived that requisitions were submitted through normal channels.

The establishment of the automation systems was not the final solution to every supply problem. There were problems caused by variations in software systems and architecture among units. Desert Shield occurred during a period of transition for the automation architecture used at various levels within the Army. The Army was phasing-in systems to replace the older systems of manually completing requisitions and batch processing. The new system (hardware and software) processes requisitions and status from the company through division/corps/theater/and National Inventory Control Point (NICP) by means of electronic data transfer. In Saudi Arabia, the capabilities of automated

systems ranged from batch processing (SAILS/DS4) to interactive processing (SARRS-0). The 1st COSCOM of the XVIII Airborne Corps used SARRS (O) while the 101st used SARRS (I). Because of this, the 101st could not pass requisitions through the 1st COSCOM. Requisitions had to be submitted through the III Corps MMC which used the same system.

Further complicating the situation, was the lack of tactical communications, below division level, for electronic data transfer. Consequently, support units, below division level, hand carried floppy disks or magnetic tapes to the supporting corps MMC. In many cases, this delayed, by several days, the processing of supply transactions. Added to this, was the number of supply requisitions processed during Desert Shield. The result was long computer processing times. Accordingly, the time required to pass a requisition from the company level to the wholesale system averaged between 5 to 15 days during Desert Shield/Storm. These delays may have caused some units to lose confidence in the supply system. This was reflected in the increase of high priority requisitions. During Desert Shield/Storm, 64.9 percent of all requisitions were high priority. Additionally, many units submitted multiple requisitions for the same item and requested status more frequently than normal (adding to the number of supply transactions). All these factors further exacerbated the system and increased the computer run time by saturating the system.¹²

A valid observation, here, is the obvious one. The Army

automated supply system works best in the garrison environment with its fixed facilities and dedicated communications. In the garrison environment, supply transactions are passed through the installation to the next higher level. The key word is installation. Installations do not deploy. The XVIII Airborne Corps is the parent headquarters for the 101st. During peacetime however, there is not an operational relationship with the Corps MMC. Does this imply that there are two distinct supply systems in the Army? The point is that Army must focus on war fighting organizations instead of installations when developing supply systems. In the garrison training environment where systems are tested every resource is dedicated to ensuring the system works. Desert Shield/Storm was the first valid test of our current systems and they did not perform to expectations.

Similarly, there were the related problems of asset visibility and distribution. (Distribution is defined as getting the right supplies to the right location commensurate with the priority of the requisition.) Supplies would arrive in theater and were essentially unaccounted for until, or if, they arrived at the requisitioner's location and were then picked-up on the system. There was no mechanism to track supplies once they arrived in the theater. Again, there are two systems---garrison peacetime and combat. During peacetime, the LIF can provide the status of an individual requisition as it passes through any point in the logistics pipeline. Asset visibility and distribution are inseparable. To move supplies to the right

location, there must be an organized procedure for determining what the supplies are, the priority, and the transportation method. A transportation expediter should not have to make such decisions. Movement forward must not be based simply on tonnage and cube. It must be based on priority. Asset visibility, therefore, is the key.

Once the decision was made to deploy a second corps, the corresponding decision should have been to deploy a Theater Army Area Command (TAACOM) into the theater prior to the arrival of the second corps. The TAACOM is the theater level logistics organization with a theater level MMC. In his book, Moving Mountains, LTG Pagonis discussed the rationale of the decision not to deploy the 377th TAACOM. Essentially, the thought process was that the introduction of another logistical unit in the theater would be counterproductive.¹³ Had the 377th TAACOM been introduced into the theater, then there would have been no requirement for the 22nd SUPCOM. The difference between the 377th and the 22nd SUPCOM was that the 22nd was an ad hoc organization without all of the functional capabilities of a formal organization. The 377th may have been able to pull together the pieces to improve asset visibility.

MOVING SUPPLIES FORWARD

Normally, supplies were transported via commercial contract vehicle (with a division escort) to Camp Eagle II where they were broken down and then pushed to the forward areas in the north. The exception to this was fuel which was transported directly to

the forward areas. Contract tank vehicles, with escorts provided by the S&T battalion, would deliver fuel to units in the forward areas.

Another critical source of supplies in the early days of the deployment was airlift. Prior to deploying, the DMMC changed the "ship to" address to Saudi Arabia for inbound supplies and at the same time ordered replenishment supplies which would be delivered in-country. Initially, virtually all supplies came by air. Normally, one would expect only high priority requests to be shipped by air. By this time, however, because of priority abuse, almost every requisition was a high priority. As a result, it was not uncommon to receive 463L pallets containing only paper products for mess halls, hometown newspapers, or just about any other type of non-essential supply. The lesson learned is that there must be a mechanism to sort the critical supplies from the non-critical prior to shipment. The Air Force can not be expected to do this since they simply fly what the Army offers for shipment. There must be a method developed to sort out items which should never be shipped by priority transportation if there are other supplies awaiting shipment. In this case, paper products, a visual inspection could have determined that other supplies should have had priority. Obviously, this is a simple example and the solution is complex but the point is valid. Space on a aircraft is too valuable to be use to ship items that do not directly and immediately enhance the war fighting capability of the force.

FORWARD OPERATING AND LOGISTICS ASSAULT BASES

The covering force mission presented unique challenges for the DISCOM because of the extended distances and the lack of improved lines of communication (LOC). In the covering force area, the only improved road, other than the north/south coastal highway, was Tapline Road which ran east to west a few miles south of the Iraq border. The road distance from Camp Eagle II to the division's closest location in the covering force area was 110 miles. From that point, the next location was another 45 miles away of which 16 miles were across the desert.

It was obvious that the traditional methods and organization for support were not the ideal solution for supporting the covering force. Accordingly, the DISCOM implemented a concept which optimized the capability of the Air Assault Division while providing light, tailored sustainment commensurate with the tactical requirement. (The DISCOM tested a similar concept during training exercises in the spring and summer of 1990.) The concept employed a series of Forward Operating Bases (FOB), Logistics Assault Bases (LAB, and a smaller Division Support Area (DSA). The basic principles were: the maximum utilization of all available transportation modes; Corps and division - task force air and ground assets to project sustainment as far forward as possible in configurations readily usable by individual soldiers and small units (e.g., rations by case; water by case, 5 gallon can, 55 gallon collapsible drum; ammunition by case or round). A key aspect of the concept was maximum utilization of sling load

for the distribution of supplies.¹⁴

A LAB supported a brigade. An FOB could support two LABs. The DISCOM could operate two FOBs simultaneously. During the covering force mission, the DSA remained at Camp Eagle II. The mission of the DSA was to push supplies forward to the FOBs. At the FOBs, the supplies were broken down to the optimum configuration prior to shipment to the LABs. In most cases, during Desert Shield, bulk petroleum was throughput to the LABs by corps assets.

There was no doctrinal foundation on which to base the FOB/LAB concept. The initiative was solely the 101st's. FM 63-2-1, Division Support Command, Light Infantry, Airborne, and Air Assault Divisions, dated 16 November 1992 does not address the organization for support in the Air Assault Division. There is an appendix reserved in the Table of Contents for the Air Assault Division but the entry reflects that it is "To Be Developed".¹⁵ Earlier manuals discussed the traditional functional battalion organization but did not really address the uniqueness of the Air Assault Division.

TRAINING

The FOB and LAB elements of the S&T Battalion used every mission tasking as a training opportunity to develop and refine innovative methods of sling loading supplies. One such innovation was the rigging procedure for sling loading the 10,000 gallon collapsible tank used with the Fuel System Supply Point (FSSP). At this point in the deployment (Nov 90), the division

switched its focus from defensive operations to the planning process for offensive operations. The initial guidance was that the aviation brigade would have to fly out, across the desert, beyond the fuel capacity of the helicopters. To do this, a refuel point would have to be established at the optimum point along the route. The planning distance required a refuel point approximately 85-100 miles from the TAA. Because of the mission time line and the distance, the system to build the refuel point had to be transportable by CH47D Chinook.

The solution was jointly developed by the aviation brigade and the S&T Battalion. The requirement was to establish a high flow rate, 40 point, system with a minimum storage capacity of 100,000 gallons and it had to be operational within six hours after landing at the objective (H+6). The solution was to sling load the 10,000 gallon tank filled with 2,500 gallons of fuel. The 350 gallon per minute (GPM) pump and a combination of the HEMMT Tanker Aviation Refueling System (HTARS) and FSSP hoses and fittings would be used to distribute the fuel. Replenishment fuel would be brought in by 500 gallon collapsible drums rigged five to a load. A special manifold was developed to provide the capability to decant five drums at a time using the 350 GPM pump. The fuel from the drums would be used to fill the 10,000 gallon tanks connected to another 350 GPM pump which would be used to refuel the helicopters through a maximum of four refuel points. An additional requirement was that a UH60 Blackhawk had to be refueled in approximately 7 1/2 - 8 minutes.

To test the system under realistic conditions, a rehearsal was conducted on 19 December 1990. Both the system and the soldiers performed flawlessly. Consequently, the use of the system to support an air assault operation, was, from that point on, formally included in the division's planning for offensive operations. One additional major rehearsal would be used prior to the actual operation. The centerpiece of FOB Cobra was viable.

DESERT STORM

On 17 January 1991, the air campaign began. Desert Shield became Desert Storm. The CENTCOM plan required the 101st, which had been performing the covering force mission in the eastern sector, to move out to the western flank of the coalition forces. Prior to the start of the air war, the majority of the division's forces had returned to Camp Eagle II to facilitate the move out to the west.

One of the two FOB elements in the covering force area did not move back to Camp Eagle II. FOB Bastogne remained open to provide refuel support to helicopters moving west. Once the move was completed, the FOB elements joined the division in the west and a corps level unit assumed responsibility for the mission.

Prior to the start of the air war, the other FOB was directed to relocate its supplies, primarily ammunition, further to the west to a location near King Kalihd Military City. The intent was to avoid moving the supplies back to Camp Eagle and then have to ship them north again. The division was not

authorized to move to its TAA prior to the start of the air war. The concern was that a premature buildup of forces in the west would be detected by Iraq. The optimum solution, therefore, was to move the supplies as close as possible to the TAA without compromising security.

The convoy route to the TAA was approximately 750 miles. The division relied heavily on transportation provided by echelon above division (EAD) units to move supplies and equipment. In addition to the EAD transportation, the S&T battalion, was provided commercial flatbeds to move forklifts. These vehicles arrived the day before the convoy date but were in no condition to travel 750 miles. All of the vehicles required extensive maintenance before they could be moved and 50 percent experienced maintenance failures during the convoy. The issue here is not the maintenance status of the contractor supplied vehicles rather it is the inadequacy of the overall transportation system in the theater and the greater problem of the Army's failure to resource transportation.

According to The DOD Report to Congress, the Army deployed 72 percent of its transportation resources to support only 25 percent of its combat forces.¹⁶ Nonetheless, there were serious shortages of Heavy Equipment Transporters (HET). Various nations provided HETs but the combined total still fell short of the requirement. In an article in Army Logistician, LTG Pagonis, the Commander of the 22nd Support Command during the war, recommended that the Army incorporate additional HETs into the

Army at a ratio of one HET for every three armored vehicles.¹⁷ That is, however, as far as the recommendation went. He did not address the costs nor the impact that such an increase in over-sized vehicles would have on strategic mobility or force structure. Clearly, these factors must have been addressed before and perhaps were the rationale for not increasing the number of HET's. Desert Storm, however, may have provided the impetus to cause a change to the current structure.

Likewise, the General Accounting Office reported that the Army could not meet its commitment as the executive agent for inland ground transportation because it lacked the transportation assets to meet its own requirements and those of the other services. Consequently, the Marine Corps and the Air Force had to establish their own surface transportation operations.¹⁸ This is an easy criticism that does not appear to realistically consider the distances over which transportation units had to operate. Additionally, an equally important but perhaps subtle factor, was that the theater did not stabilize until just before the ground war. Prior to the ground war, the effort was to buildup supplies and reposition forces. Similarly, one must recognize that transportation units were playing catch-up in that they, like other CSS units, arrived relatively late in the deployment. The point is that there were several factors contributing to apparent lack of army surface transportation. The transportation units were never able to settle into a routine. As discussed earlier, the recommendation that the Army

evaluate the transportation force structure remains valid.

AT THE TAA

The 101st completed the repositioning, including all supplies, on 3 February 1991. To complete the repositioning move to the TAA, the division used: 550 C130 sorties; 350 helicopters; and 6,289 vehicles. The route for the main body was from Camp Eagle II to Riyadh to Hafar Al Batin to the TAA located near the town of Rafha on Tapline Road.¹⁹ Along the route, the 22nd SUPCOM established convoy support centers. These locations provided hot meals, a location for soldiers to take a break, and performed limited maintenance and recovery.

After closing at the TAA, the division immediately began to prepare for the attack into Iraq. Its mission was to penetrate rapidly by air assault to the Euphrates River, cut the LOC between Baghdad and Iraqi forces in the Kuwaiti Theater of Operations (KTO), destroy all enemy forces along those routes, and turn east to block north of Al Basrah.²⁰ The first phase of the operation would be the establishment of FOB Cobra on G-Day.

ATTACK INTO IRAQ

The division's plan required an infantry brigade task force to conduct an air assault to secure the objective. DISCOM would then rapidly establish CSS operations. Elements of the DISCOM, however, would participate in the initial air assault. They were scheduled to arrive at the objective less than two minutes after the first infantry forces set down. The officer-in-charge (OIC) of the DISCOM element had less than two hours to select the five

locations for the refuel points and then call forward the 100 CH47D sorties which would deliver the equipment, supplies, and personnel necessary to establish the CSS operations. The plan worked to perfection. There was a slight delay in selecting the site for the AH64 rearm and refuel sites as they were in the proximity of the Iraqi battalion. The DISCOM OIC decided to wait until the area was secure before landing and conducting a ground reconnaissance. At the H+1:45 mark, however, the codeword to launch the Chinooks was passed via radio to the log pad at the TAA.

The first day (G-DAY) end state for FOB Cobra was five refuel systems with a total of 40 refuel points. Rations, motor gasoline, water, and ammunition was also brought as were elements of the other DISCOM units. Although 100 CH47D sorties were planned, only 75 were flown as result of a two hour weather delay prior to the start of the operation. In total, the 101st used 370 aircraft, flying 1046 sorties, to secure and establish FOB Cobra...a 200 square kilometer location in the desert and the hub of all planned future operations.²¹ (FOB Cobra also served as the springboard that allowed XVIII Airborne Corps to move eight attack helicopter battalions and cavalry squadrons 200 KM to the east to interdict Iraqi forces fleeing on the AL Hammar causeway toward Al-Basrah on G+3.) On this day, the 101st Airborne Division (Air Assault) had completed the most massive air assault operation in military history.²²

As the air assault operation began, a 700 vehicle convoy

left the TAA enroute to FOB Cobra via an MSR, New Market, carved out of the desert by the engineer battalion of the 101st. The convoy carried additional supplies to replenish FOB Cobra.²³ In addition to other supplies, the convoy was transporting 100,000 gallons of vital aviation fuel.

At this point, it is appropriate to discuss the impact of the division's decision to use a single fuel for both vehicles and aircraft. A variation of the commercial Jet A1 was used. To a great extent, the concept of fuel support for the division was based on the fuel within the 500 gallon collapsible drums as interchangeable for use in refueling either vehicles or aircraft. As it was, 510 drums were used in the operation and, obviously, they were constantly being emptied and refilled. The introduction of another fuel, such as diesel, would have required the segregation of drums for different fuels and increased the number of drums required. This would have created additional handling problems and increased the potential for error but more importantly it would have reduced flexibility tremendously. There were no significant maintenance problems resulting from the use of Jet A1 in vehicles. The single fuel on the battlefield is a viable concept and should be adopted Army wide.

Another aspect of the resupply operation deserving additional discussion is water distribution. Much has been written about water support during the war. The government of Saudi Arabia provided bottled water for the U.S. forces. During Desert Shield, the bottled water was convenient and easily

distributed to the troops for drinking purposes. During Desert Storm, however, bottled water was used very little by the 101st. Bottled water was very difficult, and labor intensive, to rig for sling load. Consequently, collapsible drums were used to sling load water forward to the brigades. The brigades were provided a water team as part of the LAB package. The water team filled the brigade's water cans or smaller drums.

Water was never a problem during the deployment. Wherever possible, the Reverse Osmosis Water Purification Units (ROWPU) were used to purify water from wells. The division obtained two Tactical Water Distribution Systems (TWDS) from the pre-positioned systems. This system, very similar to the FSSP for fuel, significantly increased the water storage capacity of the division and provided the additional collapsible drums required for distribution.

On G+1 and G+2, the 101st attacked into the Euphrates River valley. Landing Zone (LZ) Sand, 62 miles north of FOB Cobra, was the first objective in AO Eagle. Sixty CH47D sorties were used to complete the air assault of a mounted tow and infantry task force. To move an infantry brigade task force into the vicinity of Highway 8, 125 sorties of UH60 Blackhawks were used. Another 100 CH47D sorties were used to resupply FOB Cobra. To support these air assaults, the refuel points at FOB Cobra issued 390,000 gallons of JET A1 to refuel helicopters in a 12 hour period.

On G+3 at 1000, an infantry brigade task force attacked 200 km east of FOB Cobra to seize a location for FOB Viper. Fifty

five CH47D sorties and 120 UH60 sorties were used in the air assault. At 1200, four AH64 attack helicopter battalions from the 101st and XVIII Airborne Corps closed on FOB Viper. Two attack battalions from the 101st were the first to the Al-Basrah causeway (Engagement Area Thomas). Visibility was reduced to less than 1,000 meters because of the smoke from the burning oil wells. It was so dark that the aviators had to rely almost completely on thermal sights. The two battalions destroyed every moving vehicle on the causeway. The destroyed and scattered vehicles blocked any further movement up the causeway. A second pair of battalions flew further north across the Al Hammar lake and began engaging targets that had already crossed the causeway. The last escape route was now cut. The Iraqi forces were sandwiched between the advancing 24th Infantry Division (Mechanized), the VII Corps, and the Euphrates River.²⁴ A cease fire would be declared that night and the 100 war would be part of history.

Throughout the war, the DISCOM used the FOB/LAB concept to provide support. Each of the brigade task forces were provided a LAB. FOB Cobra supported three LABs. Although, Viper was designed to be a FOB to support the attack of the 1st Brigade of the 101st into the vicinity north of Al Basrah , it never developed into a robust FOB since the war ended at the 100 hour mark. Most support was provided via sling load. Because of the distances, the terrain, and lack of improved MSRs, cross country travel was limited and resupply by ground assets was never a

significant factor.

The best perspective of the distances involved in the division's area of operations can be gained from using references to cities on the east coast of the United States. If TAA Campbell were located in Washington D.C.; then Harrisburg, Pennsylvania would be FOB Cobra. AO Eagle would correspond to Williamsport, Pennsylvania and FOB Viper would be at Philadelphia. Engagement Area Thomas would be located in New York City²⁵ Viewed from this perspective, it readily becomes obvious that supporting the division solely by ground transportation would not have worked.

POST CEASE FIRE

After the cease fire was declared, the division remained in place until the middle of March. The move back to Camp Eagle II was accomplished over a period of approximately two weeks. The most significant problem encountered during this period was the turn-in of the division's basic load of ammunition. The ammunition had to be transported to the Theater Storage Area located approximately 150 miles to the east. There was no transportation available from EAD units. Consequently, The division's organic vehicles transported approximately 2,000 short tons of ammunition to the turn-in point. At first glance, this may seem to have been a simple transportation requirement but it became increasingly complex when the factors of compatibility and net explosive weight were considered. These factors increased the vehicle and the handling requirements tremendously.

At the theater level, the problems were obviously compounded. The Army shipped nearly 300,000 tons of ammunition to South West Asia. An ammunition retrograde team was formed as a subordinate element of the U.S. Army Materiel Command - Southwest Asia and the 22nd Support Command. The team had executive responsibility for coordinating and providing technical advice for ammunition retrograde operations between the 22nd Support Command and its subordinate commands. The team encountered several problems. Some of these were: much of the ammunition was missing its inner and outer packing; or had damaged or missing containers. The ordnance units quickly became accustomed to handling ammunition returned in all sorts of field expedient containers. Much of their time was spent searching for materials that could be used to repack the ammunition. Additionally, some of the ammunition was unserviceable or unsafe and had to be destroyed by Explosive Ordnance Demolition (EOD) teams. Similarly, the National Inventory Control Point (NICP) authorized destruction of all loose small-arms ammunition and small lots of ammunition determined to be uneconomical for retrograde. Eventually, the task became so large that a service contract was let to a commercial firm.²⁶

While the retrograde team was clearly successful, the issue is that it was another example of an ad hoc organization resulting from the position in the deployment flow of CSS units. The 11th Ordnance Group (Ammo) (DS/GS) had theater responsibility for ammunition operations in SWA. It, however, did not arrive

until February, 1991. The recommendation is that elements of the ammunition group and the theater MMC should deploy with the earliest troops to provide ammunition accountability and visibility. Total accountability of ammunition in the theater was not obtained until the retrograde was complete.²⁷

REDEPLOYMENT

The time spent at Camp Eagle was used to prepare the vehicles and equipment for redeployment. The effort was to ensure that every item was as clean as possible prior to return to the U.S. During the deployment, the division acquired a significant amount of equipment, to fill existing shortages, and modernization items (HMMV vice CUCV). Consequently, 1000 containers and an additional 200,000 square feet of ship space were required to complete the redeployment of the 101st. All of the 101st, with the exception of a small stay behind element, returned to Fort Campbell, KY by 15 April. The remaining soldiers would depart in May after all accounts were closed and the base camp returned to its original configuration. For the 101st Airborne Division (Air Assault), the war was over.

LESSONS LEARNED/RECOMMENDATIONS

The 101st Airborne Division (Air Assault) was one of the first units to deploy to Saudi Arabia. The division experienced the entire spectrum of logistics infrastructure/support during the deployment...from bare base to a reasonably mature theater. When looking at the 101st experiences during the war, however, one must recognize that the division is a unique unit, the only

one of its kind in the Army. Accordingly, the division's perspective may differ slightly from that of a heavy division. Over the years it developed unique procedures for logistics as well as combat operations. The thrust of these procedures was to facilitate operations over extended distances. Many of the procedures were employed during the war and validated. Similarly, there were innovations which enhanced the capability of the 101st but may not be applicable to the rest of the Army. At the same time, there were lessons learned from the 101st experience which may require an Army fix.

Flow of CSS units. CSS units must be located early in the deployment flow commensurate with the threat. As an absolute minimum, the command and control elements of key logistics organization must deploy early. The failure to do so would result in ad hoc logistics organizations and extend the time required for the logistics system to mature. It is during the planning phase when the TPDF is developed that the planner has the greatest impact in determining the success of the logistics system.

Transportation structure. Desert Shield/Storm vividly pointed out the Army's transportation force structure must be reviewed. The shortage of HETs was simply one of the most visible symptoms.

Tactical communications for logistics automation. Below the division level, the tactical communications system for automated systems was inadequate. There was no connectivity between the

DMMC and the corps MMC.

Single fuel on the battlefield. The single fuel concept worked and provided tremendous flexibility. The concept should be adopted throughout the army.

FOB/LAB concept. The FOB/LAB concept worked for the 101st. The 101st is a unique organization with unique capabilities and requirements. The Army template for CSS structure should not be imposed on the 101st simply for the sake of commonality.

Additional water equipment. The TWDS provided the means for the storage and distribution of water. The ROWPU has a limited storage capacity and no distribution capability. The TWDS should be added to each of the FSCs.

Host Nation Support. Host nation support (HNS) was a critical and integral factor in the logistics system throughout the deployment. The lesson learned is that it should be "unlearned". Obviously, depending on the theater, HNS will be available at varying levels. The planner must thoroughly evaluate the capability of the theater, and when possible document support agreements, before assuming away any logistics problems by relying on host nation support.

Requisition priority abuse. Reports reflected that 64.9 percent of all requisitions were high priority. The Army must seek a way to solve this problem. This not a simple matter of statistics for the purpose of statistics. Rather, it is the impact of the second and third order effects of priority abuse on the distribution system. As discussed, as an example, paper

products with the same priority as an injector pump receive the same transportation priority.

Modification to the LIF. The LIF should be user friendly. It contains a vast amount of vital information which is often difficult for the customer to obtain.

Port Support Activities. PSA doctrine requires a thorough review. Doctrine must address structure and procedures. More training opportunities must be provided. These are reserve component units whose annual training could be scheduled around major exercises involving the use of ships.

CONCLUSION

The Desert Shield/Storm logistics effort was unprecedented in recent military history. Throughout the deployment, logistics was an integral part of the plan, if not the vital part, until hostilities ceased on 28 February 1991. Clearly, the competence of logisticians was an enabling factor in the successful combat operations against the forces of Iraq. Desert Shield/Storm validated our training, doctrine, and organization for support. Nevertheless, the lessons learned from Desert Shield/Storm may be used to refine force structure, improve training, and revise doctrine to produce a ready and capable Army; prepared to enter the uncertain world of the 21st century.

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