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STUDY
PROJECT

**LOGISTICAL SUPPORT OF A
MULTIPLE LAUNCH ROCKET SYSTEM (MLRS)
BATTALION DURING
OPERATIONS DESERT SHIELD/STORM**

BY

**LIEUTENANT COLONEL ALAN W. THRASHER
United States Army**

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The logistical support of a resource intensive unit, like an MLRS battalion, proved to be challenging throughout both the build-up and execution phases of the Gulf War. From the initial deployment of the XVIII Airborne Corps into a very immature theater to the rapid build-up of combat power of the VII Corps, the logistical support structure required to sustain such an operation was tremendous. The battalion, like many other units, experienced changing command relationships both on the tactical as well as the support side. These changes required the battalion to be extremely proactive and flexible in its approach to logistics. In order to keep the equipment combat ready in such an extremely harsh desert environment while simultaneously dealing with these changing support structures, the battalion used both the established support structure and innovative methods to keep our equipment operational and prepared for combat. Many lessons were learned throughout the seven months the battalion prepared for and then conducted combat operations. This paper attempts to capture the approaches we took towards logistics in order to ensure the soldiers and their equipment were prepared to perform their combat mission.

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LOGISTICAL SUPPORT OF A MULTIPLE LAUNCH ROCKET SYSTEM
(MLRS) BATTALION DURING OPERATIONS DESERT SHIELD/STORM

A PERSONAL EXPERIENCE MONOGRAPH

by

Lieutenant Colonel Alan W. Thrasher
United States Army

Dr. Douglas V. Johnson, II
Project Adviser

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TABLE OF CONTENTS

	<u>Pages</u>
ABSTRACT	ii
INTRODUCTION	1
BACKGROUND	1
Command and Control	
PREDEPLOYMENT	6
POM	
Supply and Maintenance	
DEPLOYMENT	14
Airlift	
Sealift	
PRECOMBAT	23
Maintenance Support	
Training	
Single Source Fuel	
27Ms	
Army Tactical Missile System (ATACMS)	
Contact Teams	
Class V	
Combat Maintenance Training	
Requisitioning	
Maintenance Tents	
Combat Life-Support Planning	
Blast Shield Replacement	
Improvisations	
NBC	
CONCLUSIONS	53

INTRODUCTION

A personal experience monograph, this paper recounts my experiences as the commander of the 3rd Battalion, 27th Field Artillery Regiment, during Operations Desert Shield and Desert Storm. I will focus on logistical support operations of the battalion. I will not describe the tactical operations conducted during combat. Recounting the battalion's ground combat missions and exploits would go far beyond the scope of this paper, so I will focus on logistical support operations-- primarily on precombat operations during the six months the battalion spent in the desert training and logistically preparing the soldiers and their equipment for combat. However, the significant events of each the following phases are also addressed in this paper: predeployment, deployment, precombat--with some carry-over into combat operations. Because of the harsh desert environment and the uncertainty of the enemy, it was important for the soldiers to accomplish as much training and for the battalion to build up as much logistics as possible prior to the start of ground hostilities.

BACKGROUND

First, let's consider the battalion and some unique challenges it faced. The battalion was a Multiple Launch Rocket System (MLRS) artillery unit, part of the XVIII Airborne Corps, located at Fort Bragg, North Carolina. At the time of alert, 6 August 1990, in response to the Iraqi

invasion into Kuwait, the unit was a separate battalion under the command of the XVIII Airborne Corps Artillery. The battalion had roughly 450 soldiers, noncommissioned officers (NCOs), and officers. The TO&E vehicle strength was approximately 200 track and wheel vehicles. The battalion was organized into three firing batteries, supported by a headquarter/service battery. Each firing battery had nine rocket launchers (27 total in the battalion), each broken into three platoons, with three launchers per platoon. The firing platoons made up the basic fire-and-movement element in the battalion. We therefore organized the maintenance and support around this structure, so that during combat we could sustain the platoons and keep them in the fight. The unit was short some critical vehicles at the time of deployment, to include four track recovery vehicles (M88s), three Heavy Expanded Mobility Tactical Trucks fuel tankers (HEMTTs), and over 50 Heavy Expanded Ammunition Trailers (HEMATs). These were the most important missing pieces of equipment, and these shortages did have an impact on our mission during combat. We were able to make up some of these shortages, with comparable substitute vehicles, before crossing the line of departure. The battalion also was short personnel. The most critical need was for platoon leaders. But very competent senior NCOs filled these positions, and they did a superb job.

Even though the battalion had some equipment and

personnel shortages, these were never war-stoppers. The unit was able to overcome these short-comings by adapting and making the best of what we had. A special feature of the battalion was its ability to take care of itself. In peacetime, the battalion learned to function independently from its higher headquarters. The resulting sense of autonomy contributed to its approach to combat. The unit enjoyed a tremendous amount of freedom allowed by our higher headquarters. The mutual trust and respect allowed us the opportunity to do our mission and take care of our needs in the way we felt things should be done. Because of the soldiers, and particularly the leadership, took the attitude that if we wanted or needed something done, we did it ourselves. We did not request or expect someone else to do it for us. As one of only two track vehicle units at Ft Bragg, and the only heavy self-propelled artillery unit, we faced challenges that other units on post did not confront. We had to take a different approach to maintenance and supply functions than those used by the light or airborne units on post. We were accustomed to dealing with tough maintenance and supply issues. Our budget was two to three times higher than that of other post units. A lot of our direct support maintenance functions, especially track vehicle maintenance, were performed in the battalion area by our own mechanics. We assumed the same self-sufficient philosophy toward logistics in the desert. Some have argued

that the logistical support system was all screwed up in Saudi Arabia. However, we found that the ability to make things happen, regardless of the amount or quality of support, was dependent on how much the unit was willing to take control of-- how willing it was to be responsible for its own destiny. As one of the first deploying units into SWA, we tended not to sit around and wait for someone to tell us what to do. We were very proactive in establishing our role in the immediate defense of Saudi Arabia.

COMMAND AND CONTROL

The battalion changed command relationships several times during deployment. The battalion deployed to SWA, quite some time before the Corps Artillery Headquarters deployed. Therefore the unit was temporarily attached to the 18th Field Artillery Brigade (FA Bde) for command and control during movement, because it was the only peacetime active duty artillery brigade assigned to the Corps. When Corps Artillery headquarters arrived in country, we went back under their control. In early October, the battalion repositioned north in order to better support the tactical situation. Then it was attached to the 212th FA Bde. The 212th was a heavy artillery brigade from Fort Sill, Oklahoma; in peacetime it is a III Corps unit. During the Defensive Phase, the 212th was given a General Support Reinforcing (GSR) mission to support the 101st Air Assault Division and the 3rd Armored Cavalry Regiment in the Covering Force Area,

and the 24th Infantry Division (Mech) in the Main Battle Area. The battalion's mission was to provide the deep fires as part of the 212th FA Bde's overall mission of GSR to these Corps units. In late November, when the Corps' mission was transitioning to the offense, the 212th's relationship began to solidify toward a more permanent mission of providing GSR fires to the 24th Division. This shared mission with the 24th Division allowed the brigade to establish solid links with the Division's support structure; at the same time it was as well tied into the 171st Corps Support Group (CSG). This corps/division lash-up was a de facto dedicated support that made a lot of sense because of the tactical mission given to the Division. The relationship established between the 171st CSG and the 24th Division Support Command provided the Division commander tremendous flexibility and allowed him to task organize his support assets to best fit his combat plans. The most beneficial asset available then to support our battalion's needs were the additional transportation vehicles to help move our MLRS ammunition.

The battalion stayed with the 212th FA Bde and the 24th Division throughout combat operations. After the withdrawal from Iraq and into the post combat/redeployment assembly areas along the Tapline Road, the battalion was detached from the 212th FA Bde and reassigned to Corps Artillery.

As with these command relationship changes, the battalion's logistical support units changed just as often.

In fact, we had five support changes from the time we deployed until we redeployed to Fort Bragg.

The battalion was one of the first units to redeploy back to the states; the bulk of its soldiers returned on or about 25 March 1991. The stay-behind party did not complete their vehicle clean-up and movement-to-port missions until around 15 April 1991. The battalion's vehicles and equipment did not return to Fort Bragg until mid-May to early June, and our sealand containers/milvans did not close until early July.

PREDEPLOYMENT

The battalion was alerted for deployment just after midnight on 6 August 1990. The movement order required us to prepare one firing battery for air deployment to support the 82d Airborne Division. We had to be ready to load out from Pope Air Force Base's Green Ramp in less than 18 hours. Alpha Battery was selected for movement because it had just completed a live-fire exercise and its equipment had demonstrated that it was ready for immediate action in Saudi Arabia. We had very few problems preparing the unit for movement. But as the air flow began to materialize, it became obvious that we would be able to air deploy only one platoon. Realistic deployment of a MLRS unit requires a C-5A aircraft to transport the vehicles and equipment, based on combat configurations and load-out weights. Also, the situation in SWA was too unstable to allow the unit to deploy

without their ammunition. A single platoon with ammunition, a complement of battalion support, and a contact maintenance team from the direct support company required five C-5As. Not enough airframes were available during the initial deployment to accommodate our total requirement of 13-15 aircraft for a complete battery. This reduction gave the battalion a little more flexibility. As we pushed this single element to Green Ramp, the rest of the battalion was loading out for sea lift. The battalion had less than five days to prepare its equipment to rail-load and convoy to the port at Wilmington, North Carolina.

The total lack of war reserve ammunition caused the battalion a one day delay. The tactical decision not to move the platoon without its ammunition delayed the actual deployment for almost 72 hours. The battalion had tried since activation to obtain war reserve ammunition at Fort Bragg, but was denied this based upon safety restrictions. The Corps Artillery G-4 requested the ammunition from Anniston Army Depot almost immediately. But because of a combination of problems, the ammunition was not shipped to Fort Bragg as required. One cause of delay was that Anniston would not release the ammunition without approval from the Army Missile Command (MICOM). FORSCOM had not notified MICOM, and in return they had not notified Anniston that we were alerted to deploy and that we needed ammunition for air movement. The established contingency plan called for all

ammunition to move to seaport for shipment; it had not considered air-lifting ammunition. Other reasons for the delay, we were told, dealt with the Depot handing out pink slips to its employees the day the alert was called, as part of the Army and DoD drawdown. Also, they needed time to issue a trucking contract just to move ammunition on such short notice. Regardless of the reasons, this was a major concern for us. The Depot said they could deliver. But when the crunch came, they could not. The problem was addressed after the war and resolved. Fort Bragg now stores the WR stocks for the MLRS on the installation to handle air deployments for a future crisis.

POM

Once the initial alert taskings were solved and the deployment sequences were in progress, the battalion began its detailed support planning and preparations for SWA. The battalion staff looked at all areas involving the deployment process and focused first on personnel and equipment. The immediate concern was, of course, to take care of the personal issues relating to the soldier and families, to ensure all the Preparations for Overseas Movement (POM) items were straight. Such typical things as wills, powers of attorneys, shot records, and insurance and pay records had to be updated and accurate. Other maintenance or personal concerns like inventory and security of personal items and storage of privately own vehicles-- all had to be

accomplished in a very short period of time. The battalion organized meetings for the families and ensured the soldier/family support system was active and ready to support the needs of both the married soldier and the single soldier.

SUPPLY AND MAINTENANCE

As these personnel issues were being attended to, the rest of the staff devoted most of its time to planning and organizing for the logistical support needs of the battalion. The first decisions dealt with the support needs of the platoon deploying with the 82d Division. Next were the critical logistical issues that affected the battalion's equipment--those that required immediate attention. The deadline report was scrutinized in detail. Anything and everything that could be fixed was taken care of immediately. This process was difficult, to say the least, because all units on post were in the same deployment process. Our highest maintenance priority went to the launchers. All deadlined items were reviewed. If a repair part was needed, we either had the item managers from the depots expedite the items or went to the Corps Operational Ready Floats (ORF) for parts to bring our launchers up. The Corps maintained two ORFs at Fort Bragg, but at the time of the alert only one was operational. We coordinated with the COSCOM to ship one of the floats with the battalion and maintained control of the launcher until the direct support battalion was established in theater. The remaining float was to remain on post. Once

made operational, it would be shipped to SWA. This launcher never made it to the Gulf. When the unit returned after the war, it was in the same condition as it was when the battalion deployed.

MICOM was extremely helpful to the battalion as we prepared to deploy; they agreed to ship us any repair parts or spares we felt we might need. The most critical items the MLRS uses are the line replaceable units (LRU). The MLRS is totally dependent upon those to remain operational. The system has several electronic and manual LRUs that keep this high-tech system functioning. MICOM looked at our authorized stockages for certain high use items and gave us additional units to help take care of any immediate problems we might face, particularly because we were going into a theater without any established logistical repair capability. Our most immediate concern was the platoon going into theater before the rest of the battalion or the COSCOM units. We had to ensure that the platoon could maintain its readiness. To help us out in this situation, MICOM packaged and shipped a pallet of LRUs, totaling over 1.5 million dollars, to SWA.

The battalion executive officer led our planning sessions. His staff identified many items the battalion needed to sustain itself upon arrival into theater. The battalion property book officer (PBO) was our critical link in ordering the equipment we needed and ensuring delivery to SWA. In fact, his mission was to manage these items to

ensure they remained valid requests. This was important, because as the support units began to disengage from normal operations and start deploying, it became very difficult to get information and to track statuses of our requests. Once these items arrived on post, the PBO would personally deliver them to either the Corps' logistics aircraft that departed daily from Pope Air Force Base, or take them to the port for sealift. We kept him at Fort Bragg for about two months after the battalion deployed so we could maintain visibility on these items and ensure that we actually received what we ordered. I'm convinced that if he had not stayed behind to manage this process closely, the battalion would have lost visibility on these items just because of the sheer volume of items being requisitioned by units throughout FORSCOM and the lack of control of these items in theater.

The PBO began immediately requisitioning items that were needed for the desert environment. Items like desert camouflage systems, sand bags, insect repellent, sun screen, additional chemical over-garments, and chemical agent antidotes were only a few of the items that he ordered. We believed one of the most critical items was the desert camouflage paint for the battalion's vehicles. All Fort Bragg units were painted with forest green camouflage patterns; we wanted this changed to desert camouflage. We were able to acquire some paint before we deployed the main body, but most of this paint had to be shipped after we

departed. We air deployed all of the paint we had received by using some allocated C-141 cargo space given to Corps Artillery.

However, the battalion's most critical class IX item was track shoes for the battalion's fleet of tracks. This problem was previously identified on our July unit readiness report. All launchers had exceeded the recommended wear-out specifications for both mileage and metal wear. The battalion had not replaced the tracks for fiscal reasons. The cost was around \$445,000, and the unit had not been allocated this money in its budget. Since this issue had been previously identified, it was an easy process for the battalion to order the track using Desert Shield fund codes. We dropped the requisitions the day we were alerted and received some track that night. We were able to retrack all of the airlifted launchers and a portion of one battery before we loaded our equipment on the ship. The rest of the track had to be shipped to SWA. Once it arrived on post, our PBO and the COSCOM Supply and Services Battalion took care of packaging and shipping these items to the battalion. The battalion received its final shipment of track while in the desert in late November. Before moving into the combat staging areas, we were able to change every vehicle's track in the battalion, to include the drive sprockets and all roadwheels that needed replacement. This ensured the vehicles could travel the long distances required from the

combat staging areas in Saudi Arabia to the Euphrates River in Iraq and return. Even though the 24th Division traveled over the roughest terrain in theater, only one vehicle had a track-related problem. One launcher broke a roadwheel support arm while turning in extremely rocky terrain in Iraq.

This track problem offers an excellent example of the unique situation of being a heavy artillery battalion stationed on an airborne installation. The money required to adequately support this type unit, which is very maintenance intensive with heavy resource requirements, exceeds that of an entire towed artillery brigade and this disparity usually makes it difficult to receive proper funding. This problem was temporarily fixed after redeployment by building into the budget request a bonafide track replacement account. Additionally, the battalion is in good shape for any near-term contingency because we used a one-time opportunity to order another replacement track using Desert Storm reconstitution funds.

The staff also came up with recommendations to use what remaining monies we had left in the battalion's year end budget. We decided to spend about \$2,000 for an arc-welder to assist the maintenance personnel in taking care of minor vehicle repairs and other shop functions. This one purchase alone proved extremely useful to the battalion in the desert; the arc-welder was used extensively for numerous functions throughout our deployment.

One of the first issues the Battalion S-1 worked was the lash-up of the battalion's surgeon. The unit was authorized a medical doctor to deploy with the battalion under the program called PROFIS. The doctor the battalion had on the contingency plan did not deploy with the unit. At the time of the alert the corps surgeon decided our doctor was needed more with the Corps' advance party than with the battalion. When we received our new replacement doctor, he reordered vast amounts of medical supplies. Fortunately for the unit, our new doctor felt we did not have the right kinds of medical equipment and supplies on order. He had spent a tour in the Sinai; he knew the desert environment required many different types of supplies. The battalion ordered everything he requested. We were able to fill one or two cargo pallets on C-141 aircraft that had been dedicated to the corps artillery. Once we arrived in country, the battalion ended up running the aid station for all Corps artillery units because we either had the only medical supplies needed to support the early deploying units, or we had significant quantities available to support the operation. Either way, the battalion not only provided for its own sick-call, but also provided other units medical supplies until theater medical supply units were established in country.

DEPLOYMENT

The battalion prepared Alpha Battery for deployment with

the 82d Airborne Division. Once the decision was made on the basic numbers of aircraft available, we tailored a package that would provide the Division a firing platoon of MLRS rocket launchers and the necessary structure to support the platoon. The basic element included the three launchers, three ammunition vehicles, command and control elements and maintenance support. In order to give the platoon the robustness it needed, we decided to send a support slice from the battalion and also a slice from the direct support maintenance unit. We sent the battalion's only track recovery vehicle with the unit. The platoon needed these elements to remain operational until the battalion arrived.

However, the most significant logistical problem we faced in sending an element of the battalion with the 82d Division was the lack of any divisional support structure to maintain heavy self-propelled artillery, particularly the MLRS system. The division support command had very few repair parts needed to support our unit, nor did it have the mechanics qualified for the repairs we needed. In order to support even the platoon element, we elected to send our battalion maintenance technician and battalion motor sergeant to ensure the platoon was provided enough expertise to keep all systems operational. In addition, we had to front-load enough Prescribed Load List (PLL) items, in particular Line Replaceable Units (LRUs), to keep the systems operational until the battalion and its corps support command (COSCOM)

support could be deployed. As noted, MICOM assisted the unit by shipping nearly 1.5 million dollars worth of LRUs to beef up the unit's PLL. These LRUs were air shipped directly to the Dhahran Air Port. We had a problem locating the pallet; it was temporarily lost somewhere between the Airport of Embarkation (APOE) and the Airport of Debarkation (APOD). We had telecommunications with the unit in country and had a pretty good idea when the pallet was to arrive. However, because we did not have total asset visibility, the pallet was not found until about the first week in September. The unit checked with the air field every day for over two weeks before finding the cargo. The only way to locate the pallet was for the battery commander or the battalion maintenance tech to walk the stock yards daily until they spotted our pallet. If the pallet had been shipped later in the build-up, we may never have found the pallet. In fact, we did lose a pallet shipped only two months later from Germany. The temporary loss of these LRUs from MICOM was quite significant: locating them cost us time and money; also, they were critical to our combat readiness-war-stoppers! Without a doubt, we were working with a "stove-pipe" operation; our request had not been processed through the normal supply and distribution system; however, the logistical system was basically nonexistent during the early days of the operation. Thus it took a lot of individual effort from the in-country units to make these types of functions work. Our experience

with the normal supply system's ability to keep visibility on items did not improve. In fact, it only worsened throughout the operation.

AIRLIFT

The battalion had problems at the air field trying to get the platoon loaded for deployment. Priorities kept changing both at the division level and at CENTCOM. At one point during the air flow, the Air Force had five C-5As land for a pick-up. However, they were not scheduled at that particular time, so this caused much confusion. The C-5As sat on the tarmac waiting for someone to load, but because the airfield control team could not make a decision on which units to load, the air crews almost ran out of crew flight time. The battalion could have loaded. It did attempt to load, but was turned around on the loading ramp by the division. They could not decide which units they wanted to load next. Or perhaps they were receiving altered priorities from CENTCOM. Before the battalion turned around, the assistant Division Commander was called (around 0200 hrs) to make the decision on which units would be loaded on the aircraft. Even though the MLRS was scheduled into the flow, had been weighed, chalked, and lined up awaiting aircraft, we were not allowed to load. The deploying divisional units required only C-141s, whereas the weight requirements caused by the ammunition up-loaded on the battalion's track vehicles called for C-5As. Even with the 82d controlling the flow,

the 82d Division Artillery Commander assumed responsibility for pushing our MLRS unit out before he had deployed his own units. This decision demonstrated that he understood the significant firepower the rocket launchers provided to the division and therefore, he worked the MLRS into the air flow early. I'm sure that by now the Transportation Command (TRANSCOM) has reviewed the air flow problems and is taking corrective actions. To facilitate prioritizing the unit flow on future deployments, a Corps should run the air-transportation operation.

SEALIFT

While the battalion was pushing out the air flow, it was also preparing the rest of the unit for road march and rail movement to the port of Wilmington.

When the Corps was alerted to deploy, the Corps Artillery Commander selected our battalion executive officer to be the officer in charge (OIC) of the ship carrying all of the Corps artillery's equipment. He was OIC of the Fast Sealift Ship (FSS), USNS Polluk. He was responsible for all of our equipment making it to the SWA theater in an operational condition. This was a smart decision for the Corps Artillery, because he was definitely the best man for the job. However, this made things more difficult for us as we went through all the logistical preparations in deploying the battalion and also in making the necessary support plans for our arrival in country because he was deployed on the

transport mission. To add to the challenge, the battalion had just conducted a change of command on 10 July 1990. It had virtually a new leadership team: including the commander, executive officer, command sergeant major, and the operations officer. However, we continued to drive on and were able to carry out the preparations with the battalion's very capable junior officers and senior NCOs.

Because the battalion did not have facilities for the soldiers in theater, I decided to take the advance party with me on a C-141 to help prepare for the battalion's reception. To help with the reception and set-up, I took the Bn S-4 and the Bn S-4 sergeant to serve as both Local Purchasing and Contract Officers. My numerous REFORGER Exercises taught me that this would be one of the most important initial functions we would have to accomplish once we landed in country. This proved to be the most critical task we faced initially, especially in light of the fact that the SWA Theater was very immature. It was very unprepared to accept early deploying units. In fact, it took almost two months before the theater reception process improved to any great extent. Once our small advance party arrived, we had approximately 72 hours to find a place to house or marshal the battalion before the troops began to arrive. TRANSCOM had contracted Jordanian airlines to fly the battalion. This was not a smart decision and with the help of the Department of State, the aircraft was cancelled. As a result

of this problem, this bought us more time to locate and make living arrangements. The soldiers finally arrived aboard a U.S. carrier two days later.

When the advance party arrived in country, we used the vehicles from the platoon that deployed with the 82d for our transportation. This gave us a tremendous advantage because there were very few local rental vehicles. They were very difficult to acquire. Without transportation, we would have been dependent on Corps for assistance in making contracts and carry out other logistical support arrangements that had to be completed quickly. We found our decision to bring the battalion logisticians in country early placed us well ahead of other units which were arriving without their supply personnel. These other units really struggled to accomplish these tasks with only their operations type people and without the logistics guys who knew how to work the system. Additionally, I found logisticians also knew how to approach the local economy and make deals and contracts happen quickly. During the initial days in country, we drove around the local area trying to find a place for the soldiers to sleep. But we also looked for large covered areas that we could use to pull maintenance on our vehicles. We had made arrangements with a local land owner, with the approval to negotiate from the Corps G-3/G-5, for a large maintenance facility. However, when we went to make what I thought were final agreements, the 24th Division was there with the same

idea. I met COL King, the DISCOM commander, there as he was looking to house his soldiers in the same facility. Billeting space for our soldiers was no longer a problem, because we had found a facility that was referred to as the SANG Compound. Because we did not need the area in question to house our soldiers, I did not debate the issue with Col King any further. I agreed that his life support requirements took priority over our maintenance facility. We ended up doing like most other units in SWA; we did not have facilities to use for maintenance, but had to work on the equipment in the open.

The SANG Compound was a new Saudi National Guard installation that a Prince from the Eastern Province Area Command (EPAC) had built for his guard units. The facility was in its final stages of completion and had not yet been occupied by his soldiers. The facility was complete with all the buildings necessary for both operations and life support. It was centrally located between the Dhahran Air Port and the Port of Damman, which made it ideal for reception operations and several months later for redeployment operations. The Prince allowed Corps Artillery units to use his compound for the duration at no cost to the U.S. Government. This was his way of thanking the coalition forces for defending his country and allowing him to make a contribution to Host Nation Support. I'm not really sure who was responsible for the initial negotiations for our use of the compound, but the

Deputy Corps Artillery Commander concluded the agreement with the Prince. The compound was located next to the EPAC Headquarters. The morning we took possession of the facility, a small party of the Corps Artillery officers went to have tea with the Prince and discuss his offer. Luckily, Corps Artillery maintained a very close relationship with the Prince throughout our stay, and the Corps Artillery units were allowed to use the facility for the duration. This area was later used as a rest and relaxation (R&R) site for all XVIII Airborne Corps Artillery units prior to the start of the air campaign. This site also provided an excellent rear area operations and logistical center for each field artillery brigade assigned to the XVIII Corps Arty headquarters (18th FA, 75th FA, 212th FA, and also for attached elements of the Corps Signal Bde). For our road convoy crews, who drove six hours from the desert Assembly Areas to pickup all classes of supplies, this was an excellent facility for rallying and sleeping overnight before making the return trip to the desert. These supply and mail runs were made daily for almost three months until a logistical support base was established in sector and until our mail was rerouted to a field site at the 24th Division's Army Post Office (APO). Those units which did not have a facility in the rear area to use for logistical operations were probably at a disadvantage. There was a plan for the commander of the Army Central Command (ARCENT) to take

control of all areas and/or facilities in the Dhahran area. But this plan was either never fully implemented or the SANG compound was somehow exempted.

PRECOMBAT

The precombat phase, or what we also referred to as the sustainment and training phase, was our most important period. During this time we were able to learn how to operate in a desert environment. We adjusted our maintenance procedures to sustain our equipment and made all the final preparations for our combat mission. During this five-month period of living and training in the desert, our soldiers did everything possible to ensure that they were ready to execute both the defensive and offensive plans.

The platoon accompanying the 82d arrived in country in early August. The remainder of the battalion arrived around 30 August. It took two to three days to off-load the equipment at the Port of Damman and move all the equipment to the SANG Compound. The platoon remained with the 82d for about three weeks until the tactical situation appeared to settle. During this time, the Division provided some logistical support for the platoon, such as fuel and rations.

MAINTENANCE SUPPORT

The battalion received limited logistical support from our habitual direct support (DS) support unit, 503d Maint Company of the 530th Maint Battalion. This unit provided not only the intermediate level maintenance, but also the ASL

needed to sustain both the track and the wheel fleets. Also organic to this Battalion is the general support (GS) section that repairs or rebuilds LRUs for the launchers. This maintenance team is headquartered at Ft Bragg; the working relationship is pretty good between the mechanics as well as between the officers and noncommissioned officers. The missile maintenance is performed by 27M (MOS) mechanics, whose support is critical to the battalion's ability to operate. The 27Ms' only mission is to support the MLRS system; they are a highly specialized asset. Without the support of these personnel, the battalion could not maintain its readiness on the launchers. The level and detail at which the launchers have to be maintained is very high, so the unit must have these mechanics available to trouble-shoot and make the necessary repairs. Fortunately for the battalion, the relationship established with our 27Ms did not change throughout both Desert Shield and Desert Storm.

Even though the support relationship did not change, we did experience a general lack of support when the battalion first deployed in country. There was not, however, a problem with the contact team that deployed with A Battery and the 82d Division. This element stayed with the platoon at least initially until the support battalion arrived in country. However, the rest of the battalion did not have the same good fortune. We could not get support when the support battalion arrived because they used the 27Ms as security

guards and set-up crews while they established their own battalion's shop areas in Dhahran. We could usually get help only on a case-by-case basis, even while we were also based in Dhahran; however, the travel time was minimal so this arrangement was marginally satisfactory. The real problem arose when our battalion moved to a desert location approximately six hours away. Our assembly area (AA) was located approximately 5 km due south of the Corps' most Forward Operating Base (FOB) Bastone. FOB Bastone was located along the Tapline Road, near the town of An Nu Ayriyah. The battalion remained in this location through out the defensive phase in order to support the 101st Air Assault Division in the Covering Force Battle and also the 24th Division in the Main Battle Area. Before our battalion deployed to the defensive area, we made arrangements with the support battalion commander: He would provide the 27Ms for the maintenance support on our launchers. Additionally, he agreed to provide us with a maintenance slice to support engineer, communications and electronics, and automotive maintenance. However, when the battalion moved to the desert, we did not receive any of this promised support. The support the battalion did receive was done back in Dhahran. The long distances we had to travel (4-6 hours) made any kind of meaningful maintenance almost impossible. The situation did not improve until mid-October. Then, after many discussions, the 27Ms joined the battalion at our assembly

area. Fortunately the problem was not with the worker-bees at the company, but with the leadership at the battalion. The soldiers wanted very much to deploy to the field and be a productive part of the team, but they were not allowed to leave Dhahran. For whatever reason, the leadership decided that pulling security for the battalion more important than providing support to its customers who were in combat assembly areas hundreds miles away. The 530th set itself up as the DSU for port operations. This appeared to them to keep them in their facilities however, this overloaded them to the point that they could not support anyone. The lesson the support battalion never learned was that when the Corps deployed to the desert, it should have moved along to provide support. Only when the Corps was making final attack plans in late December that the support battalion finally decided it wanted to be a part of the Corps' operation. The support battalion tried to regain its control over the 27Ms as their parent headquarters. But we refused to restructure this close to execution and retained the existing maintenance support structure.

That responsibility, for the missile maintenance support, had shifted to another support unit from Ft Sill, Oklahoma. We "took the 27Ms under our control" and worked out an acceptable command relationship. Their maintenance officer served as the detachment's OIC who worked under the direction of our battalion's chain of command for all life

support and administration support. All technical maintenance and service support functions were managed through the logistical support system's chain of command. This relationship operated without a problem and except for the logistical headquarters providing repair parts and some technical assistance, the 27Ms were treated just like all other elements organic to our battalion.

This whole issue of not having our support maintenance located within the battalion is really crazy. The doctrine should be changed: Assign these mechanics to the MLRS battalion and not to the DS battalion. The only liaison required would be a small team at the maintenance battalion's logistics shop. This element could coordinate any higher echelon maintenance functions, to include monitoring and issuing of ASL items. The GS level mechanics should also be part of the maintenance battalion's operation; they should man the test and repair facilities for the LRUs. However, the actual platoon level repairmen (27Ms) should be a part of the MLRS unit. After deployment, we learned the hard way why the system does not work. The fix is obvious--and easy. The system worked fine during initial deployment, because we took control of the 27Ms and manifested the soldiers and all their equipment with our battalion. It was only after we arrived in country that the support battalion decided they wanted their soldiers back to do unit functions instead of customer support maintenance.

A key issue we were able to resolve was the authorized stockage level (ASL) for all the MLRS specific parts. The Ft Sill maintenance headquarters agreed to sign for the entire ASL from the 530th Battalion; it would then be the single point of issue for parts. The Ft Sill unit had to balance maintenance and ASL support for two MLRS battalions. As the support plans were finalized, it became obvious to us that the only way our battalion would ever receive support during the ground attack was for the ASL to be issued to our battalion, rather than maintained at the DS/GS units. Because this was not doctrine and because the higher headquarters did not want to relinquish control of these parts, making this change was no simple matter. However, after many meetings and verbal agreements, we finally convinced the DS commander that this was the best and only sure way of support. As we found throughout combat operations, only those repair parts that we had with us at the battalion were available for ASL/PLL replenishment. It did not matter what sexy support plans our unit or any other unit had designed to use for distributing ASL, no other arrangement worked with any degree of success. Because of the fast-moving pace of the battle, the long separation from our support units and the adverse weather we experienced during combat, we would never have received any replenishments. We had to carry what we needed-- or do without.

TRAINING

The battalion conducted its first field training exercise (FTX) after being in country for about 10 days. We wanted to move to the field as soon as possible so that we could acclimate the soldiers to the hot temperatures and learn how to fight in the harsh desert environment. Most of the battalion had never trained at the National Training Center (NTC) or in any desert environment. So the sooner we learned to operate under these conditions, the better. We learned how difficult it was to move heavy equipment over rough desert terrain, to drive over dry and moist lake beds, and to operate our equipment in 135 degree (plus) temperatures. Our first FTX proved that if a unit is going to fight in the desert, it must learn how to take care of its equipment and counter the destructive forces of the environment with intense maintenance procedures. The MLRS launcher is a very maintenance intensive vehicle to begin with. When you add the extremely dusty and sandy conditions and the extreme heat on the equipment into the maintenance formula, the out come can be disastrous. This first FTX was very difficult to support logistically. Since we were an early deploying unit, the 24th Division was also just arriving in country. The low-boy transporters needed to move their units from port were the same vehicles we needed to move our equipment to the desert.

SINGLE SOURCE FUEL

We also had our first experience with JET A-1 fuel issued for use as the "single-source" fuel. The battalion filled it's 2500 gallon tankers with what the theater logistics were issuing. It was decided that all units would use a single source fuel, JET A-1, instead of diesel. This decision was probably supposed to make distribution much easier. But this decision was a very costly one for our unit. And, from what I saw, it was very costly to several other units, particularly in Corps Artillery. While on our first FTX, the battalion started having problems keeping our vehicles running. The ones most affected were the wheel vehicles-- in particular the High Mobility Multi-Purpose Wheel Vehicle (HMMWVs). The vehicles' fuel injectors became clogged. It became extremely hard to keep them running. Once the vehicles shut down, the clogged injectors played havoc on the starters. These initial problems proved to be the first of many long term complications we would witness for months to come. Not only did the battalion run out of injectors, we also destroyed several vehicle starters. Neither the injectors nor the starters were available through the supply system. The battalion maintenance tech located repair parts on the economy and personally rebuilt these items. The lighter weight fuel caused trash and sediments normally found in diesel fuel tanks to float to the top and into the fuel lines themselves. The fuel also had a lower

flash point, so vehicle fires were much harder to extinguish. During our second battalion FTX, we had a MLRS launcher catch fire. The on-board hallogon system did not smother the fire. As a result, we lost a launcher. After our accident and our internal assessment to the possible cause, we stopped using JET A-1 fuel. Shortly after our FTX, a 155mm SP Howitzer Battalion in the 212th FA Bde lost a howitzer due also to an on-board fire. This unit was not as lucky because the howitzer, along with three copper-head rounds on board, was a total loss. Nearly two months after the battalion started using this fuel, we started having additional trouble with the MLRS launcher's fuel injectors. The injectors started sticking in our A Battery, the unit we deployed with the 82d Division in early August. The injectors had to be rebuilt or replaced--or we had to install a new engine. To solve the problem, we coordinated with a depot repair activity called SASCO, located in Dhahran. We talked with the head engineer, who agreed to retool his equipment in order to rebuild our injectors. He allowed us to bring in one or two injectors at a time for rebuilding. Our battalion maintenance folks were able to exchange a couple of injectors from unserviceable packs and start the exchange process. We theorized that the JET A-1 fuel did not have the detergent additives or lubricants needed to keep the push rod or some sliding metal rod properly lubricated. This lack caused the rods to rust or corrode. After the Corps Arty lost its howitzer, the

Corps Arty commander called and asked my opinion on the possible links between our launcher fire, the howitzer fire, and other maintenance problems. I restated my concern that they were all related; I felt strongly that they were attributable directly or indirectly to the JET A-1 fuel. The commander made the decision that all Corps Arty units would use only diesel fuel. The theater POL agreed to supply at least our units with the grade fuel we desired. ARCENT requested a POL inspection team from CONUS to come into theater and investigate/evaluate the potential POL problem. I read the report. The team stated that there was no evidence to substantiate a problem with using the single source fuel. Even though we had extensive problems and these problems were known at least at the Corps, the inspectors never used that information or ever questioned those of us who had first-hand knowledge. This issue was investigated in late November or early December. During a subsequent visit to Dhahran to see some old friends arriving from VII Corps, I provided the VII Corps G-4 a copy of the report. My advice to them was to stay away from the JET A-1 fuel and use only diesel. To the best of my knowledge VII Corps used diesel for their ground vehicles.

This fuel issue caused the battalion a tremendous amount of maintenance problems that severely strained an already weak supply system. However, even though these problems were unnecessary, we were fortunate that they occurred during our

precombat period and not while we were crossing the line of departure.

The battalion learned many important lessons on our first exercise, but some of the most important ones dealt with modifying our existing maintenance operations to adapt to the desert conditions. The battalion returned from our training exercise and was then ordered to move to a site in the Covering Force sector. The battalion was initially positioned in the 24th Division's main battle area sector, but we then moved forward to a more appropriate area in the 101st Division's sector. Within four weeks from the time the battalion had off-loaded its equipment, it had occupied three different locations. The final position we settled into was known as Assembly Area Courage. This area again was 5 km south of FOB Bastone. The battalion was finally in a tactical position from which we could quickly support combat operations, if the Iraqi forces decided to attack south into Saudi Arabia.

27Ms

By mid-October, the 27Ms joined the battalion in AA Courage. We initially allowed the detachment to set up their life support and maintenance operation as a separate unit within the assembly area. Once they were organized and able to function in the desert environment, we organized them into assigned platoon maintenance teams. The detachment was led a second lieutenant; his assistant was a staff sergeant. They

were fully integrated into the battalion's operation and became a critical element of our maintenance program. Each battery commander received a two-man maintenance team for each firing platoon. Three teams were assigned to each firing battery, with a noncommissioned officer in charge in each battery. In addition to their maintenance functions, each soldier was required to assist with security functions and other field duties as required by the chain of command. In other words, these soldiers were an integral part of the team; they were both very good mechanics and soldiers. The battalion also integrated two female soldiers into the battery teams; they were able to function with little or no additional considerations. Except for using male soldiers as latrine and shower guards for them, these female soldiers did not require any special treatment and performed well throughout our operations. We were very fortunate to have such strong teams. They were invaluable to the success of the battalion throughout the sustainment and training periods, as well as during combat. Launcher maintenance readiness remained high, even though we had to overcome numerous problems with PLL shortages and other repair parts and replenishments. During our final preparation for combat, our maintenance teams were able to bring all 27 launchers to a very high state of mission readiness. All launchers remained operational throughout combat. Even though we had launchers that were occasionally not totally combat ready,

the 27Ms, other mechanics, and crew members made combat fixes and kept all launchers moving and shooting. For example, one launcher lost a road wheel arm assembly and another launcher lost the ability to fire from both firing bays. These soldiers did whatever it took to keep our rockets firing. Without exception, they did a superb job. The battalion finished the fight with all 27 launchers operational; we moved from the Euphrates River valley back to Saudi Arabia without a problem.

ARMY TACTICAL MISSILE SYSTEM (ATACMS)

When the DS maintenance reorganization took place, the 27Ms from the 503d Maintenance Company were attached to the support unit out of Ft Sill. This unit became the parent headquarters for our MLRS support. The commander of the unit was responsible for supporting both MLRS battalions assigned to the XVIII Airborne Corps: 3rd Bn, 27th FA; and 6th Bn, 27th FA. Our higher level maintenance was handled at this headquarters along with the requisitioning and distribution of ASL items. The only difference we had in the support between the two battalions was that MICOM had converted two batteries from the 6th Bn to ATACMS capable. This changed the type of LRUs those two batteries would use in their launchers. Also the support unit from Ft Sill did not have HMMWVs in their TO&E; they still had the CUCV. They took possession of all the equipment and divided assets to give both units equal off-road capability. Even though we

were not happy with this decision, we did not object because we were all in the war together and both units needed off-road capability.

In November, the Corps Artillery commander asked if we wanted to convert one of our firing batteries to an ATACMS capable unit. Even though this sounded very appealing, I requested that we not make this switch this late in the game. There were several reasons to stay MLRS pure. The most important, I felt, was the fact that MICOM had a very limited number of improved LRUs that were required to support the upgraded launcher. Our battalion had ample supplies of the older type LRUs and other PLL items to keep our fleet operational. The other reason was based on the number of missiles physically in the Army inventory. In November 90 we had only about 60 missiles in stockpile, even with a surge from the manufacturer. No more than 90 missiles were estimated to be available by late December 90.

This was not a sound logistical situation, because the weapon system is dependent on LRUs and requires adequate ASL stocks to stay operational. One problem with a high-tech weapon system, like the MLRS, is that when an electronic LRU goes down, there is no manual back-up. The system is totally self-contained, so its firing data is determined by its on-board computer. Thus all launcher electronic systems must be operational before the system will fire. The decision was made to allow our battalion to remain MLRS pure. This

allowed us to integrate into the 24th Division's support system and exchange any ASL/PLL items with the division's MLRS battery or with the division's support command. This was very beneficial to our battalion, because the 24th Division did a very good job keeping their requisitions filled. They were particularly helpful when we needed Bradley specific parts for the launchers. Throughout the build-up and sustainment phase, we received several major assemblies: engines, transmissions, and final drives from the 24th Division. Our relationships were very strong. The support we received greatly enhanced our ability to provide MG McCaffrey and his maneuver commanders devastating artillery fires throughout combat operations. The battalion was also closely tied to A/13, the division's MLRS battery. We offered mutual support in helping them maintain their launchers, particularly during the final phases of combat. The divisional battery was attached to the battalion as a fourth battery while we were in the Euphrates River Valley, and the battalion helped get three of their launchers operational. Their launchers had major assembly problems, and our battalion maintenance folks focused their total resources to bringing every divisional launcher back to mission capable status. The one logistical problem all divisional MLRS batteries have is the lack of senior maintenance personnel. These senior logisticians at the battalion level have both the expertise to isolate mechanical

faults and the ability to work the system. The bottom line is that they know how to make things happen; they ultimately find a way to fix problems.

CONTACT TEAMS

The battalion organized our battery-level mechanics into platoon contact teams consisting of our organic mechanics and the DS level mechanics. The battery mechanics were normally 63Ts (track mechanic), 63Ss (heavy wheel), and 31Vs (communications), who were teamed with the 27Ms (missile maintenance). We configured each team with at least two vehicles and tried to use HMMWVs where possible for off-road capability. This was because they had to move to the launchers' locations in order to provide the support. We started a massive vehicle build-up program; we built wooden shelters on each vehicle, which allowed us to store the tools they needed for repairs, and the PLL and ASL repair parts. Thus they were immediately available at the platoon. This lash-up of the 27Ms with our own mechanics also provided communications that the DS folks did not have. This lack of communications had become a particularly sore subject because when our battalion was fielded at Ft Bragg, the 27Ms were fielded with radio-equipped vehicles in order for them to support MLRS. Unfortunately, after the lash-up they lost some of their authorized vehicles and most of their radios to their higher headquarters. However, during combat we transferred replacement items from platoon to platoon and

from battery to battery within the battalion. This proved to be a very tactically sound decision, because we were able to repair our vehicles, particularly the launchers, with little to no loss of combat power throughout the entire operation.

Our combat trains were located at the battalion headquarters, and they were readily available to support the batteries. The field trains, however, were positioned with the 24th Division's trains. We never saw them until after the cease fire was called. We had anticipated this would happen, so we placed only our Bn S-4, battery mess, and supply vehicles with this element. We were very pleased with our arrangement. This breakdown of our assets allowed the battalion the maximum degree of flexibility. We supported our forces as far forward as possible and reduced any downtime we experienced to the shortest time possible. However, the most important lesson learned was the decision to split out the ASL from the DS support detachment and to carry these items along with our own PLL with the platoon contact teams.

CLASS V

MLRS ammunition was being delivered to the Port of Damman from prepositioned shipping stationed at Diego Garcia. The ammunition was being off-loaded onto the docks at the same time our battalion equipment was arriving. Two hundred pods were taking up space on the docks, which were also used by soldiers for sleeping. Corps had not established an ammunition supply point (ASP) yet, nor were transportation

assets available to move it from the docks. It appeared to me that since we were the only MLRS battalion in Saudi Arabia, we should volunteer to take control of all the MLRS pods. We coordinated this request with the support unit running the docks and with Corps G-4. It was agreed that if we had the capability to transport and secure the ammunition, we could have it. We convoyed our ammunition HEMTTs to the dock and moved this ammunition to a vehicle park outside the SANG compound and provided security for it while we stayed at the compound. We coordinated with the 82d DivArty commander to transfer this ammo to the Div ASP established at Camp All-American. Within a week we convoyed these pods north and stored them until the battalion moved to its desert assembly area Courage. Once in position at AA Courage, this ammo became part of our basic load. Throughout the defensive phase this ammo remained up-loaded for rapid deployment to fight the Covering Force Battle if required. Fortunately, we never had to fight this battle. Prior to the scheduled move west to our new combat staging area, we coordinated with the 24th Div to move this ammunition using their long haul tractor-trailers rigs. These transportation assets never became available because of the massive repositioning of the Division's log bases; the same was true with corps assets. Therefore, three days before the battalion moved west, we convoyed this ammo again using our own organic vehicles to a hastily established ASP in the Division's new combat staging area.

COMBAT MAINTENANCE TRAINING

While the battalion lived at AA Courage, we focused on training for our combat mission and maintaining our equipment. As part of the 212th FA Brigade, our mission was to reinforce the 101st Air Assault Division and then the 24th Division in the Main Battle Area with long range artillery fires. In order to meet the challenges of a fast-paced battle, we had to ensure our equipment was fully mission capable. The soldiers had learned how to deal with the harsh desert conditions, so our task now was to keep the equipment totally capable. We designed a maintenance plan that we felt met the standard, one that would ensure our equipment would be combat effective. The plan called for intensive maintenance for several hours a day. In fact the crews routinely pulled maintenance on their equipment during our assembly area or garrison time and more or less continuously during field training. We constantly exercised the vehicles and followed up with disciplined maintenance periods, which were priority missions for the commanders. Training was conducted not only in the local desert around the battalion area but also at a corps designated training area called Faisal Training Area. We conducted several exercises with the 101st and the 24th Division in the XVIII Corps sector to ensure we were ready to destroy the Iraqi forces if they decided to come south. In addition, we conducted battalion and brigade exercises at the Faisal area; this required us to

move cross country at least 60 to 80 km just to reach the training area. These extensive marches, plus the three-day simulated attacks, allowed us to rehearse our war plans and exercise our equipment. This type training required us to have a very proactive maintenance program. The more training we did, the more we stressed the system to provide the repair parts to keep us fully combat operational. At times, especially during early October, the supply system was unable to support our requirements. It took creative leaders to find ways to force the system to provide the parts we needed in order for us to sustain our training. Additionally, we learned that our main enemy was sand. When soldiers were not training or maintaining, they were blowing the sand out of all parts of their vehicles. It was a never ending battle; however, was significant in keeping the equipment operational.

REQUISITIONING

It was apparent that the state-side requisitions were not working, nor were there enough support units in country to give us what we needed. We placed a call to Germany to see if they could give us support. After a few calls to personnel at VII Corps headquarters and the 7th Corps Support Group, we provided a list of critical parts we needed to get our launchers and wheel vehicles operational. We coordinated with the 12th Avn Bde headquarters, stationed at FOB Bastone, to send two NCO's on their log bird going to Rhein

Main to pick up these parts. We had to get permission from Corps for permissive TDY orders, but this was not a problem. The NCOs were very successful with both V and VII Corps; they picked up almost everything we needed. However, while they were in Germany, the President announced the European call-up and our NCOs lost their priority to bring the pallet of parts back to Saudi. It took our NCOs about two days just to get a return flight, but the Air Force refused to allow us any priority to ship our cargo. When they left Rhein Main Airport, every departing aircraft was bringing in priority cargo. Unfortunately, we never received our parts.

MAINTENANCE TENTS

The battalion was successful in obtaining some critical logistical support items we needed from ARCENT. The battalion continued to pull maintenance and work through various problems while in the desert. As part of the preparation program, our goal was to pull a modified service on every vehicle in the battalion. Also, we attempted to do the same for all attached support vehicles. By this time, we had 245 vehicles but only 550 soldiers. We found this very difficult to do at times because of the weather, especially during sand and dust storms. We had requested a maintenance tent for each battery to pull these services and to perform maintenance operations that required a semi-protected environment. Several maintenance functions, like repacking wheel bearings or making internal engine repairs, required a

protected area as free from blowing dust and sand as possible. During November, the battalion soldiers were allowed to take a short, but well deserved, R&R back at the SANG compound. While we were in Dhahran the Bn XO and I took a trip to ARCENT to check on the status of tentage. According to their J-4 personnel, the records indicated all types of tents were on the docks. The only problem was that they really did not know exactly what kind or how many of each type of tent they had. The records did indicate there were ample maintenance tents, but they were listed as incomplete. We decided it best to check at the dock to verify firsthand the status of these tents. The property and containers stacked on the docks was much worse than it had been just several weeks earlier. However, with only a little direction from the officer in charge at the docks, we were able to locate the maintenance tents by opening several Sea-Land containers. The problem was locating only the desired tent components, because each van contained bulk numbers of the same item. The records indicated that the tents were incomplete and awaiting components, therefore ARCENT would not issue the tents. The only component we could not find was the metal stakes, which were not a critical item. We immediately went back to ARCENT to ask for the tents based on what was available. Approval required going personally to see MG Pagonus. His chief of staff agreed in principle to let us have the tents, but we had to have the General's

approval. It is unfortunate that we had to waste his time, but it was necessary in order for us to perform the kind of maintenance we needed to pull. By 0200 hrs the following morning we escorted a convoy of flat-bed trucks to AA Courage with four maintenance tents, as well as four GP-Mediums and one GP-Large tent for the batteries to use as mess/video tents.

These tents were tremendous morale boosters for the soldiers. After three months in the desert, they now had a protected area to eat their meals without the dust. More importantly, each battery's mechanics and crews had a superb maintenance facility.

In addition to conducting our daily intense maintenance, the battalion embarked on several projects to improve or enhance our combat sustainability and survivability. Many of these projects were ongoing or in the process of starting during the month of December, which became our busiest period. We were there pulling together our final combat preparations. The battalion tightly coordinated the planning and execution by monitoring and tweaking the system daily to ensure we met all our objectives. The officers and NCOs worked together to successfully complete every task on schedule.

COMBAT LIFE-SUPPORT PLANNING

By mid-November, the tactical decision was finally made for a ground offensive against the Iraqi forces. Our

battalion, as part of the 212th Brigade, would swing wide left with the 24th Division. The plan called for us to move as rapidly as possible to cut the Iraqi's lines of communications along the Euphrates River Valley; then we would destroy the Republican Guards Divisions as they tried to run for Baghdad. It was estimated that the operation would take from 10 to 14 days; resupply operations could be delayed, depending on the battlefield situation.

During our planning in early November, we were looking for ways to increase our capability to haul the supplies necessary to sustain operations if in fact we had limited capability to resupply. One such project was to develop a means to carry 14 days of supply (DOS) of food and water for each soldier. The wheel vehicles were not a problem; they offered sufficient space to store these quantities of supplies. The challenge was for the launcher crews. The track is designed to carry only one or two 5-gallon water cans and one case of MREs. Other than space inside the launcher loader module (LLM) for three duffle bags, the track does not provide for additional storage. After much study and discussion with soldiers and leaders in the battalion, we designed a bustle rack structure, which would be mounted to the front of the cab and anchored to the vehicle's tow pintles. A prototype was designed with the capability to carry 17 to 20 full sand bags and enough space to hold 14 DOS of 5-gal water cans and cases of MREs for the three crewmen.

Initially the section chiefs were skeptical about such jerry-rigging. But once we began to produce the racks, it was an entirely different story. This project reached full production in mid-December and went around the clock for two weeks. We spent hundreds of dollars on metal supplies and cutting tools. We used the arc-welder we had purchased prior to departing Ft Bragg, and we also borrowed a welder from a MICOM/LTV team working in the battalion area. The labor was provided by volunteers in the unit and supervised by the battalion maintenance sergeant. These racks allowed our soldiers to carry the supplies they needed. Once in Iraq, they even provided us the capability to feed many hungry Iraqi civilians. We also gave food and water to other U.S. units, who, because of the logistical resupply problems, had run out. Once the unit returned to Ft Bragg, this design for the bustle rack was provided to MICOM and the combat development folks for use in future design improvements.

CAMOUFLAGE PAINTING

Our vehicle painting operation was also well underway. We sought to make the battalion more survivable on the battlefield by repainting our forest green vehicles with desert sand camouflage paint. We wanted to do this as soon as we were alerted in early August. One of the first requisitions our PBO dropped was for the desert sand camouflage paint. We received part of this requisition immediately and flew a pallet of paint over on a C-141. Once

we arrived in country, we made the mistake of asking for permission to paint. For the first three months we were denied permission to paint from Corps because, supposedly, the Saudis would not allow the hazardous chemicals to be sprayed. We were finally granted permission from our headquarters in November. We set the process in motion and locally purchased all the paint equipment and, most importantly, the protective masks and clothing for the soldiers. This program was closely monitored by the battalion maintenance personnel and the battalion XO. Even though this was one of the most important things we could do to protect our troops and equipment on the battlefield, the safety of the soldiers on the paint details was more important. Because this was done in the middle of the desert, spraying the paint was a major logistical operation involving every soldier in the battalion. Vehicles had to be taped and the glass had to be covered. Because of the time involved to paint our many large vehicles, this required a 24 hour operation. For example, we had nearly 70 HEMTT-type vehicles and 43 trucks to paint, in addition to all the smaller-sized trucks and trailers-- a total of over 245 vehicles. We painted inside one of our newly acquired maintenance tents that had been positioned on the perimeter of the assembly area. Once we started the painting, we painted for nearly three weeks with only a break on Christmas day and a half-day on New Years. We ran out of paint twice

but, were able to get an additional 750 gallons from warehouses in Dhahran. These were the same folks that were supplying the VII Corps operation at the port of AL-Jubayl. Once the vehicles were camouflage-painted, the soldiers seemed to take extra pride in their vehicles. They felt they were better prepared for combat. Most vehicles developed names, some had mottos, and some discreetly displayed messages for Saddam Hussein. The lesson we learned was sometimes it's better to ask for forgivenesses than for permission.

BLAST SHIELD REPLACEMENT

Another large battalion project during December was the replacement of the launchers' blast shields panels. Located on the LLM, these panels protected the metal from melting during rocket firings. The current shields were made of neophrene, designed only to withstand approximately 108 rocket firings before they had to be replaced or repaired. MICOM had developed replacement shields made of Titanium and stainless steel. These new shields were built to withstand over 1000 firings. The problem was availability of panels. The theater received 36 panels, which unfortunately, was the entire Army inventory. A team from MICOM and a team from the Mainz Army Depot (Germany) were in country to replace as many shields as possible prior to combat. The 24th Division was able to replace their launchers' panels, and now the teams were in our battalion replacing the

remaining panels. We knew that unless the teams worked quickly to finish, there would be a fight with VII Corps to get as many of these panels as they could. There was an on-going battle for all types of resources between the two corps, and we knew this would be no exception. The battalion was even assisting the teams by stripping off the old panels, which allowed the teams to concentrate on the installation. Even though we worked as fast as possible, we were able to finish only 12 launchers before we were directed by ARCENT, via XVIII Corps, to stop operations at once and send the teams and all remaining kits to VII Corps. We contested the logic of wasting time moving the teams, but to no avail. We saluted the flag and the teams moved out. No one in theater ever received any more than the 36 kits.

IMPROVISATIONS

We were also trying to construct wooden carrying platforms for many of our vehicles. We decided that the only way to carry all the supplies we would need in combat, based on a limited resupply capability, was to build up selected vehicles assigned to haul critical items. The most critical vehicles were the maintenance and PLL trucks. The maintenance team vehicles had to store the launchers' PLL and ASL items in order to conduct maintenance as planned, down in the platoons. The supply and communications vehicles also had to be built up to carry their loads without losing any of their items over the rough terrain. This again required the local

purchase of construction materials and carpenter teams to build standardized shelters. We were able to complete all the construction before the paint operation was finished, so each vehicle and shelter was painted. We would not have been able to carry all the items we needed, particularly the repair parts, if we had not built up these vehicles.

We also developed a way to mount 55-gallon drums on all ammunition HEMTTs to increase our fuel haul capability. We were short three 25000 gallon fuel tankers and had been unable to fill this shortage through POMCUS or other fielding efforts. It was apparent we would not receive them before combat, so we decided to use the drums left over from the camouflage painting. The drums were brand new and did not require any cleaning or modifications. The paint had been shipped inside the drums in boxes packed in a dry-sweep compound. We initially tried to find a way to mount the drums underneath the bed and on the opposite side of the vehicle's fuel tank. But we could not find metal bands strong enough or brackets reliable enough to hold these heavy drums up. We also experimented with mounting them on the fender next to the engine, but they could not hold the weight. The drums worked best mounted in the rear of the bed, because this location still allowed room for reloading ammunition pods. Prior to departing from the combat staging area, each vehicle filled its drums. This emergency fuel was used only when the battalion came dangerously close to

running out of fuel. The battalion had to use this fuel after about 72 hours of combat. By then the battalion, along with the rest of the 212th Brigade, was unable to get a fuel resupply. The battalion stopped and used this fuel to replenish our launchers prior to reaching the Euphrates River. This allowed the battalion to continue the attack without missing a fire mission. The battalion drove past an 8-inch artillery battery that was unable to continue because of a fuel shortage. The battalion's tankers were searching for the 24th Division's support area; it was able to refuel and link up with the battalion a few hours later.

NBC

Another critical operation that started in late November and did not finish until late December was the NBC maintenance support we received from SASCO. The civilian technicians gave us outstanding support with both our NBC decontamination equipment and our NBC personal masks. We had a M-12 decon set at battalion and also portable sanators in each battery. This equipment was very difficult to work on and even more difficult to get repair parts. The SASCO techs agreed to come out to AA Courage, a four-hour drive by civilian vehicle, to help us get them operational. The NBC officer was also able to get every protective mask in the battalion inspected at their shop in Dhahran. The depot team had air-pressurized testing stands that could detect the smallest defects in the masks and determine if they were

operational or not. They tested and inspected each one of the soldiers' masks over a period of three weeks and gave us a one-for-one exchange for every mask that was nonoperational. This type support was available for the asking. The key to getting this kind of support in the theater was having someone taking the initiative to seek out the resources and make things happen. The battalion leaders proved over and over that they wanted to make things happen. And they did.

CONCLUSIONS

By the first week of January, just prior to the air war, the battalion completed all its precombat sustainment and maintenance operations. The last 30 to 45 days were extremely busy and quite productive. The unit had been able to accomplish many things that we felt would be critical to the success of the battalion in combat. Before the battalion moved to its marshalling area for the 300 mile move to the west, every vehicle in the battalion finished its scheduled service. We felt the soldiers were thoroughly prepared and very confident in their equipment. They had made as much logistical preparation as possible to better keep them in the fight. We all understood that keeping pace with the armored force of the 24th Division would be challenging. We knew a whole lot of soldiers were depending on the long-range rocket support that only this battalion could provide. The results, as expounded by the Division Commander, clearly demonstrated

that the soldiers fully met his expectations and then some.

The battalion attacked over 360 km in four days of combat and in some instances in front of the 24th Division's maneuver units. It was the only Corps Artillery unit to keep up the entire battle and fired 629 rockets to destroy numerous targets deep into enemy territory. Because of the extensive logistical preparations, no logistics factor ever precluded the unit from completing any mission. The battalion crossed the LD with 245 vehicles, got to the Euphrates River with 243--one combat lose, one nonoperational. On the long return road march to Saudi Arabia from Iraq, the battalion completed the move with 243 vehicles and without one breakdown. During the post combat logistical phase, the battalion garnered enough supplies for 100 per cent reconstitution of its contingency capability. In February 1993, the Chief of Staff of the Army approved the battalion for The Valorous Unit Award for its contributions in the Persian Gulf War.

"Be prepared" is more than a Scout's motto. It's the best way to wage war-- to make it short and sweet.