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**Army Aviation Logistics
in the Gulf War:
A Corps-Level Perspective
(Or, the Good, the Bad and the Ugly?)**

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Army Aviation, with its high technology weapons systems, mobility, and night fighting capability, proved to be a capable and lethal force during Operations Desert Shield/Storm (ODS). However, there were significant shortfalls and problems constraining the corps aviation intermediate maintenance (AVIM) battalion supporting the XVIII Airborne Corps' aviation units. The most serious problems were inadequate mobility and communications assets throughout the Corps AVIM battalion, inadequate manning/equipment levels in some corps AVIM companies, and C² issues. These and other corps-level AVIM shortfalls are addressed and examined through the operations of the Corps' AVIM battalion, 8th Battalion, 158th Aviation Regiment (AVIM), during ODS. Recommendations addressing some the problems noted are offered. Current Aviation branch initiatives and concepts related to the issues are also noted, but are not discussed or analyzed in the paper.

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INTRODUCTION

Background

The exceptional contributions of Army Aviation to the Gulf War's success are well documented and underscore its capability, lethality, and critical role in future contingencies. The monumental logistics effort in support of Army aviation in the Gulf was equally a success story. However, support operations at the corps Aviation Intermediate Maintenance (AVIM) level surfaced new, and/or highlighted existing shortfalls during the relatively short duration of Operation Desert Shield/Storm (ODS). These problem areas (the "Bad") began to impact even before deployments were fully underway for Desert Shield and continued through Desert Storm. To note a few:

- Some nondivisional AVIM companies were deployed with obsolete and/or severe shortages of critical equipment, deficient ASLs (authorized stockage lists) and personnel technical skills;^{1,2}
- Personnel manning levels at low ALOs (authorized level of organization) required last minute fills or went unfilled;³
- The command and control headquarters for the XVIII Airborne Corps' AVIM battalion deployed from Germany after several of its subordinate units from CONUS;⁴
- The poor mobility of the Corps' AVIM units hindered responsive support to aviation units with more capable mobility assets;⁵
- The communications capability within the Corps' AVIM organizations was totally inadequate for the ODS mission.⁶

Does this imply there were no success stories in aviation logistics at the corps level? Absolutely not! The high combat readiness rates (average 90% in Desert Storm) for the Corps' aircraft can certainly be attributed in part to the successful corps-level AVIM support provided by dedicated, professional, and skilled soldier/technicians.⁷ Many things (the "Good") went very well, according to doctrine, and as planned--AVIM shop shelters and mobilizers, clamshell maintenance shelters,

soldier skills, M931 5-ton tractors--to name a few. Some shortfalls (the "Ugly") were overcome by modifying equipment or doctrine, through intense coordination, or simply by "good old American ingenuity" and the initiative to get the job done.

But high mission readiness for aircraft during ODS is not the whole story. This was admittedly a short war and aviation sustainment capability for future contingencies should not be judged solely on the success in the Desert. Forces in ODS had two to six months time to build up force levels and sustainment stocks, they "owned the skies", never encountered rear area threats or NBC activity, and experienced minimal combat damage/loss. What would have happened if Army aviation had suffered heavy battle damage? What if the war had gone on for 15-30 more days, with battle losses? What if coalition forces had to force their way in and support under combat conditions from day one? These and similar questions should be kept in mind as the various issues are examined in the paper.

Purpose

The purpose of this paper is to review corps-level Army aviation logistics during Operations Desert Shield/Storm (ODS), examining issues such as doctrine, mobility, equipment, manning, training, and command, control, and communications (C³) as they impacted on mission performance. The intent is to:

- Ensure some lessons learned are documented from this first doctrinal employment of a corps AVIM battalion in a large regional combat operation.
- Develop conclusions and make appropriate recommendations regarding shortfalls in capability or concept, and the implications for support of future contingency operations.
- Surface operational, doctrinal, technological, and related issues for consideration in new aviation branch initiatives on support concepts and force structures.
- Finally, attempt to fill a void in published information regarding corps-level AVIM operations during the Gulf War.

The paper does not revisit all the challenges that confronted Army aviation as it deployed to Desert Shield and fought in Desert Storm. Those problems and other

combat service support issues that surfaced theater-wide during ODS, and impacted virtually all units, are noted only as necessary to clarify a corps AVIM related issue. They have for the most part been covered in detail in numerous ODS after action reviews (AARs) and in professional journals. This paper attempts to stay focused on those issues, good or bad, that surfaced primarily at the corps AVIM level.

Methodology

The operations of the 8th Battalion, 158th Aviation Regiment (AVIM) are used as the primary vehicle to surface and examine many of the issues, good and bad, as they occurred. The 8-158th deployed its headquarters and one subordinate AVIM company from V Corps in Germany to Saudi Arabia in September of 1990, conducted support operations for XVIII Abn Corps aviation units during ODS, and redeployed to Germany 31 March 1991. While this necessarily tends to make part of the paper read like an after action report (AAR), or case study, it also adds clarity and credibility to the issues discussed--they really happened, as opposed to academic exercise scenarios and notional "what ifs".

Related and/or peculiar issues and comparisons with similar operations of the VII Corps AVIM battalion (7-159th) that deployed from Germany in December are discussed when known and applicable. However, the paper focuses on 8-158th's logistical support of XVIII Abn Corps aviation operations.

Finally, in addition to the "normal" sources of information such as personal interviews, doctrinal/historical literature, and unit ODS AARs, the paper also uses unpublished personal notes, unit files/reports, and related experiences of personnel from the 8-158th.

BACKGROUND

General

The use of the term "aviation" throughout this paper refers to Army Aviation, unless otherwise noted. Aviation logistics is the business of supporting Army aviation assets in a mission capable status through responsive and effective supply, maintenance, testing, troubleshooting, battle damage assessment and repair (BDAR), evacuation, recovery, etc., at all levels--unit, intermediate, and depot. The variables at each level are many, but the end result is oriented on the same objective--mission ready aircraft. Staffing, resourcing, equipping, training, and employing aviation logistics personnel and units are also key parts of this equation.⁸

Although in need of updating, Field Manual (FM) 1-500, Army Aviation Maintenance, describes aviation logistics doctrine, briefly integrating Airland Battle concepts and sustainment imperatives for aviation combat service support (CSS) planners in low-, mid-, and high-intensity conflicts.

Doctrine--How We Do It Now.

Army aviation maintenance is currently based on a concept of three levels of support--aviation unit maintenance (AVUM), aviation intermediate maintenance (AVIM), and depot.⁹ While AVUM is oriented on operational support at the organizational level (battalion/squadron), AVIM (division, corps, and echelons above corps (EAC)) provides direct and back-up support maintenance for the AVUM (operating) organizations, acting as a bridge between them and the depots located away from the battlefield.¹⁰ However, since this paper focuses on AVIM at the corps level, AVUM and division/EAC-level AVIM, as well as depot operations, are addressed only as necessary to clarify or highlight related issues at the corps level.

The Army adopted the current three level concept during the post-Vietnam years of declining budgets and low manning levels. Reenforced, defensive European scenarios and limited (until ODS) deployments allowed the doctrine to work, even though noted to be lacking in the areas of mobility, manning levels, communications,

and flexibility. The Army essentially adapted to its shortcomings and worked around them, or supplemented efforts with contractor or base personnel augmentation.¹¹

Several differences exist between divisional and non-divisional AVIM units, with mission, organization, and capabilities the principal ones. Divisional AVIMs focus on providing direct AVIM support for their respective divisional AVUM units. Under an area support concept, corps AVIM units provide direct AVIM support (includes class IX air) to all non-divisional (corps) aviation units in the area without organic AVIM assets, such as the corps aviation brigade, regimental cavalry air squadron, and air ambulance units. They also provide backup/passback AVIM support to those divisional AVIMs within their area. Corps AVIM units are usually larger than divisional AVIMs, with more equipment and personnel, are less mobile, and possess more extensive test and repair capability.

Regardless of the level, AVUM or AVIM, the more extensive repairs are done at the more rearward locations. Maintenance that is forward and nearer the battle is oriented primarily on remove and replace, BDAR, armament systems, and other minimum field expedient actions that return the aircraft to a flyable condition for further missions or recovery to the rear. In peacetime, corps AVIM units normally develop habitual support relationships with their supported aviation units, divisional and nondivisional, due to functional maintenance capabilities, geographic locations, joint training opportunities, and/or contingency force plans. Ideally these habitual relationships and peacetime missions will prevail during wartime, although this was not always the case in ODS.

Deployment.

The preparation and deployment of the battalion from Germany was unplanned, confusing, indecisive, and tumultuous--in a word, terrible!¹² This is not meant to assess blame on any person or organization, but rather to explain why things happened and highlight issues to preclude repeating them in the future. Additionally, they reflect the different problems facing the first units deploying from Germany vs those deploying from CONUS installations.

Why was the deployment such a horrendous undertaking? Numerous things

contributed, but the key ones were:

- The deployment of the initial units from Germany was totally classified from early August until mid-September, greatly inhibiting planning and coordination.
- Units in Germany were already forward deployed and had no movement plans or training for deploying out of Germany.
- Decisions on which units to deploy, command relationships, organizational structures, and movement modes changed continuously.
- Unit family support plans and community plans were oriented on evacuating family members for European war, not supporting them when units deployed.
- Last-minute cross-leveling from non-deploying units to fill personnel and equipment shortages in deploying units created changes, delays, and confusion in movement operations planning.
- Very little information was available on the mission, organizations, C², locations, requirements, support available, etc., for deploying units planning prior to arrival in theater.

Even given these hurdles, and the short (7 days) notice the headquarters was finally (after 2 false starts) given to deploy, these challenges paled in comparison to those facing the battalion upon arrival in SWA.

DISCUSSION

General

This section describes the battalion's operations during ODS, particularly the concepts, planning, and actual corps AVIM support operations during the various phases. The intent is to familiarize the reader with the battalion's overall effort and provide a framework to clarify the impact of the issues. Many of the issues and problems are noted as they occurred, although some are discussed separately at the end of the section.

Desert Shield Operations

AVIM Support Mission. The mission of Headquarters, 8-158th, during ODS was to provide doctrinal command and control (C²) for the XVIII Airborne Corps' five non-divisional AVIM companies (4 from CONUS, 1 from Germany). The battalion was attached under the 1st Corps Support Command (COSCOM) to the 507th Transportation Group (later Corps Support Group (CSG)), both part of XVIII Abn Corps from Ft. Bragg.¹³ (See Fig. 3, p. 25).

Initially, the battalion headquarters was doctrinally located in the Corps rear area near the Dhahran airport and port of Dammam. (Fig 1.) Although possibly not an optimal location, it was essentially the only option, given the extremely limited real estate options for the headquarters, and an increasing urgency for the battalion to quickly become operational. The battalion and group staff continued working the myriad of deployment issues, but shifted more each day to operational AVIM support. Key tasks were:

- Obtaining interim transportation assets for the headquarters until organic equipment arrived.
- Acquiring headquarters space, billeting, and mess, for the battalion headquarters 60 personnel.
- Attaching the Corps AVIM companies to 8-158th, as they all "belonged" to someone else at this point, even though 8-158th had been given the C² mission for

these units. This issue was to become a real problem, requiring considerable time and effort to resolve.

- Emplacing AVIM units for best customer support, developing and coordinating a corps AVIM support concept, to include customer support alignments, standardized reports, procedures, and interface with theater policies.

Late arrival of the battalion headquarters meant some of the decisions the battalion would normally have made regarding location of subordinate units were already a "done deal". The headquarters and/or advance elements of most of the nondivisional AVIM companies were already in country, but under the C² of a headquarters other than 8-158th. Initial unit locations were:

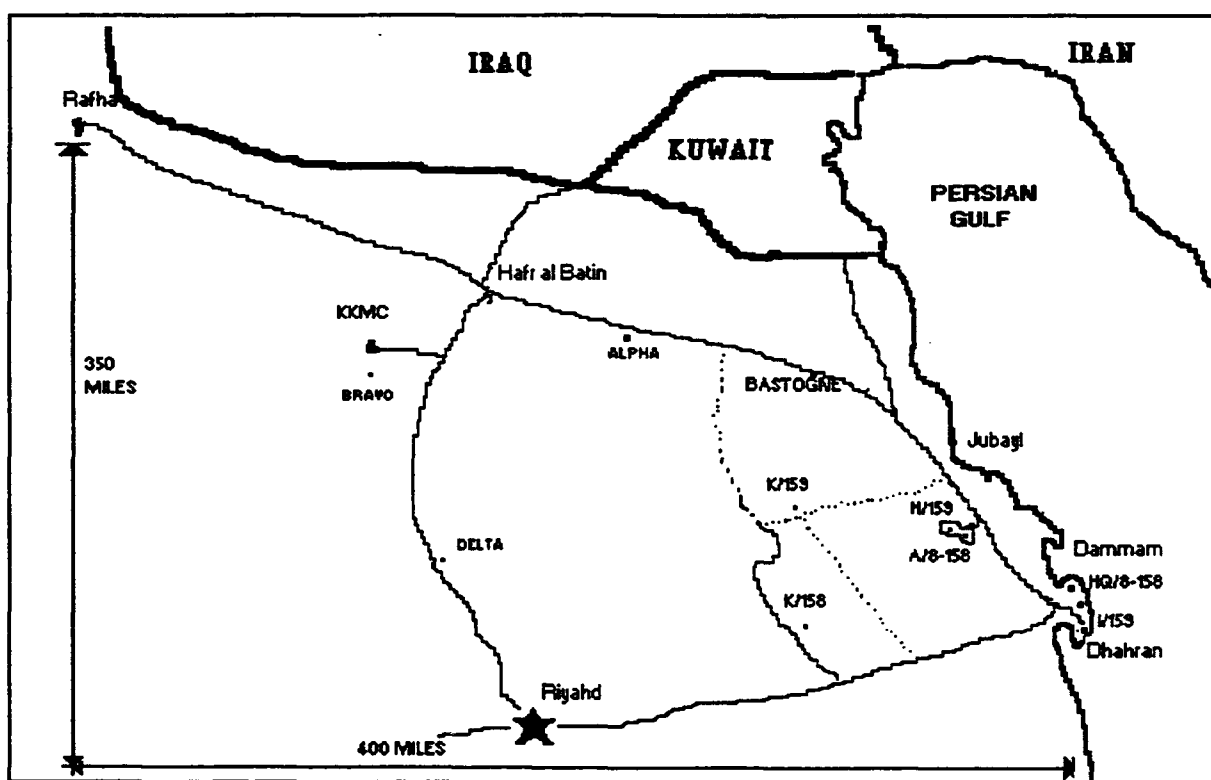


Figure 1. 8-158th unit locations--Desert Shield

- Two AVIM units (H/159 and A/8-158) were at King Faud airport, approximately 30 miles north of Dhahran, supporting the 12th CAB and the 101st Airborne Division (Air Assault).

- One AVIM unit (I/159) was located on the Dhahran airbase, supporting 18th

Aviation Brigade (18th AB) and the 82d Combat Aviation Bde (CAB).

- The final two AVIM units (K/158 and K/159) were, or would be, located in the desert over 140 miles west of Dhahran, supporting the 24th Infantry Division, 1st Cavalry Division, and 3d Armored Cavalry Regiment (ACR).

- Additionally, the 256th Signal Support Company from Ft. Rucker was attached to the 8-158th and initially located at Dhahran airbase, with a mission to provide maintenance and supply support for all tactical air traffic control (ATC) assets in theater.

Aircraft continuously arrived in theater for XVIII Abn Corps during Desert Shield. By the time Desert Storm began, the total divisional and nondivisional aircraft requiring support in the Corps approached 1,000. Virtually all models (rotary and fixed wing) were represented--OH-58, UH-1, UH-60, AH-1, AH-64, CH-47D, OV-1, and RU-21.

The initial stages of Desert Shield focused on force buildup to deter possible further aggression by Iraq and defend Saudi Arabia if Saddam decided to attack.¹⁴ To support that mission, the entire aviation logistics community, from the Aviation Systems Command (AVSCOM) (now AATCOM) in CONUS to the crewchief in the sand, focused on improving the Corps' aviation logistics program and structure. Increased coordination, better equipment, expanded capabilities, eliminating bottlenecks in Class IX (repair parts), and overcoming the tremendous environmental challenges to helicopter operations and maintenance characterized these efforts.

The success of many of these initiatives--Clamshell maintenance shelters, rotor blade taping, turbine engine inlet filters, Desert Express, AOG (aircraft on ground) parts requests, etc., has been noted in numerous ODS AARs and professional journal articles, and is not elaborated on here.

However, there are several other less visible things that were key to helping the early corps-level AVIM structure and operation develop successfully. They are:

- The Corps' aviation officer (commander of the XVIII Avn Bde) ensured integration of the aviation operational concept and the maintenance support effort through continuous personal interaction in both areas.

- The daily, then 3x weekly corps-level aviation maintenance meetings,

attended by a full spectrum of aviation logistics personnel, civilian and military, were critical for coordination and problem solving, especially in the early, confusing weeks.

- The Corps was fortunate to have key personnel (commanders and staff) at the AVIM unit/battalion, CSG, COSCOM, and Corps level with functional aviation logistics expertise, who not only integrated and guided the development of support structures, they also aggressively championed resolution of issues.

- The early, effective, and continually increasing support provided by the Theater Aviation Maintenance Program (TAMP).

Desert Storm Operations

General. The initial transition from Desert Shield to more direct preparations for future offensive operations was in many ways transparent. Much of the work already done in building the Corps' AVIM support structure also helped prepare for offensive operations. However, the routine that had developed by the middle of November was soon upset as many new challenges began to surface in the theater.

The arrival of a second corps in Saudi Arabia created competition for already scarce resources just when the most intense efforts were occurring to get maximum numbers of Corps aircraft into a mission capable status. This was further complicated by the learning curve process of the recently arrived theater material management center (TAMMC) and taking over that role from the 1st COSCOM corps material management center (CMMC).¹⁵ Additionally, units attempting to develop support plans for Desert Storm were frustrated by the lack of information due to the highly classified and compartmented nature of CENTCOM's planning cells.

Finally, one of the biggest issues facing the battalion was how would it relocate units and supplies such large distances (300-450 miles) in preparation for offensive operations, while simultaneously providing corps-level AVIM support to combat units?

Concept. The establishment of forward logistics bases and the complex, logistics-intensive relocation of the two corps during the air campaign were key to the success of Operation Desert Storm.¹⁶ Although seemingly a single operation, plans actually called for three phases:¹⁷

Phase I: Prepositioning. This phase was to officially begin on D-Day, the start

of the air campaign. Although the date for D-day was not known for certain, at least in the 8-158th, it was "best guessed" to be on, or near, the UN deadline of 15 January. During this initial phase the corps and theater CSS units would establish forward logbases and move resources forward to build up stockage levels (Fig. 2).

Phase II: Repositioning. During this phase, the CSS units would complete their movement and continue building stocks in the logbases as the combat units of the two corps moved from their Desert Shield locations to tactical assembly areas (TAAs). These were generally near their respective corps logbases (Charlie, Echo), from which they would commence the offensive.

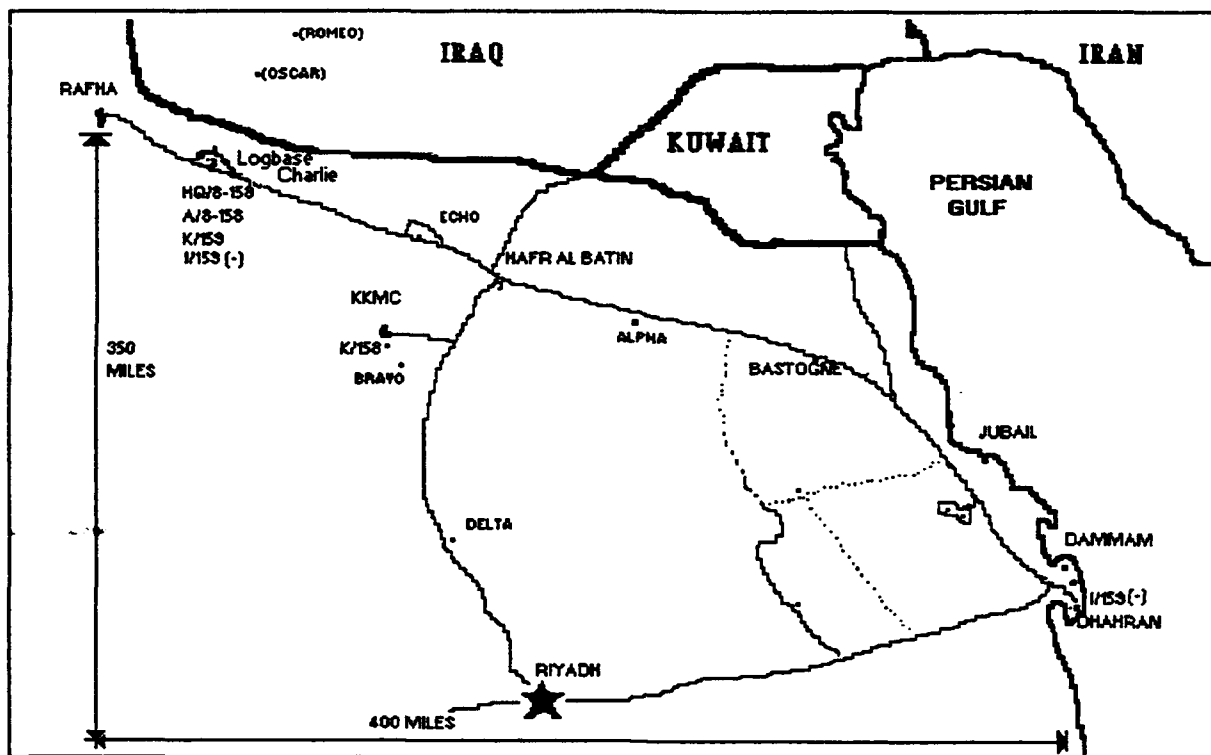


Figure 2. 8-158th unit locations--Desert Storm

Phase III: Offensive Operations. This was the actual ground campaign into Kuwait and Iraq. The actual start date (G-Day) was not known at the time, and was predicated on the success of the air campaign and combat readiness levels of the ground units. Included were plans for provisional logistic support bases in Iraq (Oscar/Romeo) to sustain the offensive with throughput of supplies from the forward logbases in Saudi Arabia. Due to the rapid pace, deep insertion, and short duration

of the ground war, these provisional logbases were never fully established.¹⁸

AVIM Support Operations. Planning and executing corps AVIM support for XVIII Abn Corps during Desert Storm, the battalion had to confront many challenges in addition to the lack of detailed planning information noted above. Among these were:

- How does the battalion simultaneously support the Corps' aviation units during all three phases, while relocating its own headquarters and units, and without H/159th, who had been reattached to the 101st Airborne Division in December?

- How could the AVIMs compete for limited corps/theater transportation assets to help them relocate their tremendous amount of supplies and equipment in a timely manner?

- How would they effectively coordinate support during a massive offensive operation with such meager communications assets?

- How and to where are non-flyable aircraft evacuated from current aviation and AVIM unit locations as the units relocate forward?

- How much corps AVIM support would be required at Logbase Charlie (LBC), XVIII Airborne Corps' logbase, when, for how long, and what would be needed further forward?

- Who was going to provide the EAC AVIM support for aviation units deploying into theater--CH-47s, weapons system replacement operations (WSRO) AH-64 battalion, medevac aircraft, etc., currently being done by 8-158th AVIM units at Dhahran and King Khalid Military City (KKMC)?

- How would the flow of aircraft Class IX (repair parts), already faltering, move from the APODs at Dhahran/KKMC to LBC?

The support concept that evolved addressed most of these challenges, capitalizing on the battalion's strengths and capabilities to minimize the impact of known and anticipated shortfalls. For Desert Storm the 8-158th's AVIM support concept was to:

- Provide AVIM area support from LBC, KKMC, and limited AVIM with a detachment left at Dhahran for EAC aviation units there.

- Support forward into Iraq using a robust forward maintenance support element with BDAR kits, stocks of line replaceable units (LRUs), repairable exchange (RX), quick change assemblies (QCAs), and operational readiness float (ORF).

- Concentrate more extensive repair at LBC, and provide maintenance support teams to customers as needed.

- Orient on fixing forward to keep aircraft in the battle by extensive use of LRUs/RX, BDAR, QCAs, controlled substitution, ORF, and aggressive evacuation and recovery to LBC.

A decision was made to initially consolidate a robust corps AVIM capability at LBC as soon as possible during phase I, eventually consisting of:¹⁹

- The AVIM battalion headquarters
- Two AVIM companies
- The Corps' aviation intensely managed item (AIMI) stocks
- The Army Oil Analysis Program (AOAP) lab for aviation units
- The aviation section of the CMMC (Corps Material Management Center)
- A life support area for LARs (logistics assistance reps)
- The location for the Corps' weekly aviation maintenance meetings
- An uploaded and staged AVIM forward support element prepared to move forward to one of the provisional logbases during the offensive when necessary.

This centralization of substantial corps AVIM assets into one primary support area was only possible due to coalition air superiority. The AVIM support base was extremely large, with a perimeter of approximately two miles, and required a large guard force 24 hours a day. The security force was consolidated from units in the perimeter, coordinated and managed by the battalion S3. The support area became known as "Challenge City", after the battalion's motto, and was the focal point for the Corps AVIM effort, providing virtually "one-stop support".

To provide continual customer support during relocation (phase II), the battalion:

- Coordinated in detail with customers to determine their requirements and movement plans

- Developed an intricate support/movement plan for its AVIMs to phase their movement operations, transfer workloads, and assigned LNOs and maintenance support teams to assist customers

- Coordinated additional support from AVSCOM's Theater Aviation Maintenance Program (TAMP) for evacuation of aircraft, workload handoff, and assignment of contract maintenance augmentation teams to the AVIMs.²⁰

- Temporarily consolidated much of the individual AVIMs' line haul truck assets under battalion control to focus capability when and where needed in a timely manner. It still took 10-14 days to fully relocate an AVIM, and all its stocks, the 450 miles to LBC while continuing to provide support at both old and new locations.

- Prepositioned an element of the battalion headquarters and one AVIM company 300 miles forward to Logbase Bravo (LBB) near KKMC in early January to minimize the transit time to LBC (another 150 miles) on D-day.²¹

One corps AVIM (K/158) was initially moved forward to LBB to support aviation units in the KKMC area, including EAC units. They were subsequently attached to 7-159th, VII Corps' AVIM battalion, in February, leaving 8-158th with three AVIM companies.

Finally, to minimize the problem the AVIM units were having with visibility and distribution of aviation repair parts, battalion personnel were placed at the APODs and cargo transfer points in Dhahran and KKMC to identify and aggressively expedite shipments to LBC by whatever means available--C-130, C-23, CH-47, and organic or host nation support (HNS) vehicles.

Summarizing, the 8-158th's concept to support Desert Storm was to provide continuous support to aviation units as they prepared for offensive operations, during their repositioning, and during the offensive. This entailed a phased movement of the corps AVIM units, redistribution of their workloads during the move, early repositioning to LBC to establish an extensive AVIM area support base, maintenance support teams/LNOs with customers, and a mobile, forward maintenance support element during the offensive.

Given the short duration and success of the offensive, the planned logistic

support bases in Iraq were not fully established. Thus the requirement to deploy a robust corps AVIM capability forward never materialized. While some corps AVIM personnel did augment and deploy with the Corps' aviation units, the bulk of corps AVIM efforts forward of LBC during this time were oriented primarily on aircraft recovery operations.

To put a perspective on the extent of the battalion's support operation during ODS, consider that by April 91 the battalion had:

- Processed over 14,000 aircraft and component work orders
- Processed over 33,000 requests for repair parts
- Performed 57 aircraft recovery operations, 11 in hostile territory, including rigging two captured enemy aircraft, an Mi-8 Hip and Mi-24 Hind
- Drove over one million miles in organic vehicles
- Flew over 1,900 hours in organic aircraft

Other Issues

This section addresses additional issues and discusses in more detail some of those previously noted.

Area Support Concept. The area support concept of the corps AVIMs during ODS was often tenuous at best. Although the static nature of Desert Shield permitted the system to eventually mature and work to a degree, the tremendous distances and lack of communications with customers seriously degraded responsiveness above the level of the supporting AVIM company. These same problems were amplified during Desert Storm by the fast, fluid offense, and the severely limited mobility of the corps AVIMs.

The use of liaison (LNO) personnel, frequent coordination meetings at the battalion and corps level, routine reports, and assistance visits helped to alleviate some of the problems. However, maintenance support teams (MST) and LNOs dispatched to "live" with the supported unit are often of limited value. There are insufficient numbers of special tools, test sets, and vehicles at the AVIMs to disperse them out with MSTs and still maintain a similar capability within the unit.²² Additionally, LNOs are faced with the same distance and lack of communications

problems that inhibit timely unit coordination and response .

C² of the Corps AVIM Battalion. Although the corps AVIM battalion is doctrinally assigned to the corps normally as a separate battalion under the COSCOM, the 8-158th was attached to the rear Corps Support Group (CSG) during ODS. This proved to work well, particularly after the CSG acquired personnel with aviation logistics expertise on its functional staff. The benefits gained through additional support from the CSG staff on administration, communications, transportation, planning, and supply, far outweighed the negative impacts of an additional command layer.

When the battalion is directly under the COSCOM, the COSCOM deputy commander is normally the immediate "boss" of the battalion. While this may be workable in peacetime, it has drawbacks in combat. The COSCOM staff is oriented on supporting the next command below them--corps support groups, not a battalion, whose staff finds itself outranked and forced to coordinate requirements with assistant staff officers on a general staff. Additionally, the COSCOM deputy commander already has a "full plate" dealing with corps-wide support and COSCOM functional staff issues, leaving little time to deal with command issues for one or more separate battalion-level organizations.

C² of the Corps' AVIM Companies. According to FM 1-500, non-divisional (corps) AVIM companies within the corps are assigned/attached to a corps AVIM battalion, which was the purpose for which the 8-158th's Headquarters deployed from Germany.²³ Although the 8-158th arrived in theater on 21 September, it was mid-October before all corps AVIM companies were finally attached to the battalion. There was tremendous reluctance by the habitual customer and parent organizations of the deploying AVIM companies to detach them to 8-158th.²⁴ It took a major effort by the battalion, CSG, and COSCOM staff to accomplish this seemingly routine task, and it delayed the battalion's transition to full-up operations.

There should be no question that assignment of all non-divisional AVIM companies under one headquarters in the corps is the optimal solution under current doctrine. This allows integration of the effort and responsive crossleveling of

resources (people, tools, parts, equipment, vehicles) and workload between the units to meet critical mission support priorities, surges, shortfalls, etc. Without the C² capability of a single headquarters, visibility across the Corps' AVIM structure is diluted and responsive maximization of critical assets and tailoring AVIM units to mission requirements is not possible.

After this issue seemed resolved, in December the 101st Abn Division commander convinced the Corps commander to reattach H/159th AVIM back to their divisional AVIM battalion, as it was in peacetime. The loss of H/159th's assets to the corps AVIM battalion fragmented the corps AVIM effort and flexibility to crosslevel assets to meet the Corps' requirements. This initially occurred during the transition to Desert Storm when units were relocating and lack of C² over H/159th precluded temporarily using their assets to assist 12th Bde when A/8-158th moved.²⁵ As a corps AVIM, H/159th gave the 101st access to corps-level assets without the Corps AVIM battalion having visibility over H/159 assets. They could benefit from the corps AVIM system, but did not have to contribute resources to the Corps' AVIM support requirements.

Span of Control--Battalion Headquarters. FM 1-500 indicates a corps AVIM battalion is normally assigned a maximum of four non-divisional AVIM companies.²⁶ The 8-158th headquarters was initially stretched beyond this limit providing command and control for up to five AVIM units and a signal support detachment. As will be seen, an adequate communications capability within the battalion would have precluded many of these span of control problems.

With a total assigned battalion strength in excess of 1500 soldiers, spread over hundreds of miles, and lacking adequate communications, even the simplest internal administrative action became a major effort for the staff. Actions requiring only simple telephonic coordination back at home station took hours and often days to complete in person. Two person rules for vehicle operations, 24 hour operations, and perimeter guard requirements further exacerbated the problem.

These same challenges affected the battalion's Aircraft Maintenance Operations (AMO) staff as well, as they struggled to coordinate much of the Corps' fast-moving

and far-flung AVIM efforts. In addition to their efforts as the battalion AVIM staff, they also performed an implied integrating function for the corps, coordinating many efforts of the TAMP, divisional AVIMs, and the (CMMC). This effort was often cumbersome and unresponsive due to a lack of sufficient communications assets.

This remained a problem even after the move to the large AVIM support base at LBC, although not as severe. Subordinate and customer units were much closer (geographically at least!), the battalion had decreased to 3 AVIM companies, and was finally "blessed" with a tactical telephone. Additionally, databases, routines, reports, support relationships, and workarounds had improved considerably since September.

Communications. The communication assets and capabilities of the AVIM battalion are pitiful! This shortfall greatly detracted from mission response and internal support operations during the entire deployment. FM 1-500 notes that not only is radio a primary means of communication for all aviation assets, but it is becoming even more critical with the increasing flexibility and mobility found in aviation.²⁷ This was so true in ODS aviation operations! Insufficient numbers and the lack of capable communications system routinely inhibited the corps AVIM support mission and was a factor in many of the other issues.

This is also a serious issue throughout the entire CSS community, as noted by LTC Taylor in his ODS related report, and in 1st COSCOM's ODS AAR.^{28,29} Only the overwhelming success and short duration of the offense kept this issue from surfacing as a major AVIM support constraint during the battle.

During Desert Shield the battalion was unable to obtain access to a communications node for tactical phone service to the headquarters due to limited area assets and its location. Upon relocation to LBC for Desert Storm, the decision was made to locate the battalion headquarters very near the CSG headquarters to take advantage of the communications node to be installed there. This was a primary consideration in locating the Corps AVIM base, and enabled the battalion to have two tactical telephone lines that greatly improved mission support capabilities.

Mobility. As with communication assets, the battalion's mobility assets were usually too few, too old, or the wrong type. The AVIMs located in the desert during

Desert Shield had to transport Class IX from the APOD at Dhahran more than 140 miles to their field locations, much of it over unimproved desert "roads" and in 100+ degree weather. During Desert Storm, the battalion was forced to primarily use its internal assets to move Class IX from the APODs at Dhahran (450 miles each way) and KKMC (150 miles). This was after the wear and tear of Desert Shield and the tremendous miles accrued moving the AVIMs and stocks to LBC. A lot of equipment was broken just relocating the units to LBC, and many were still deadlined when Desert Storm began.

The prime movers that K/158 and K/159 primarily had were obsolete M52 and M818 five ton tractors. These old, decrepit vehicles may have sufficed for transport in and around the units' homebase installations, but they were woefully inadequate for the harsh environment, heavy loads, continual use, and tremendous distances in ODS.

The M931 and M931A2 five ton tractors in I/159 and A/8-158 performed much better. But they were in such demand due to lack of other assets that they suffered from overuse and lack of time to routinely perform proper maintenance. Many of them were tasked to pull ammo and POL (petroleum, oil, lubricants) trailers into Iraq in support of the 24th Div's attack, further depriving the AVIM battalion of critical transportation assets for an extended period.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Although the corps-level AVIM support provided XVIII Abn Corps was successful when viewed in the overall context of ODS, there were many problems and often less than required support was provided. Fortunately, both the long "grace period" to build up forces during Desert Shield and the shortness of the ground war helped minimize the impact of many of the shortcomings in doctrine, equipment, personnel, mobility, etc. However, this grace period and quick success may not occur in the next conflict.

The late deployment of the corps AVIM battalion's headquarters and delay in attaching AVIM units to it hindered the rapid development of an effective corps AVIM support operation in the early part of Desert Shield. This was exacerbated by the lack of habitual relationships, joint training experiences, and contingency planning between the Germany-based AVIM battalion, XVIII Abn Corps units, and other CONUS AVIMs, and together delayed the transition to responsive support operations in a combat environment.

The inadequate communication capabilities within the non-divisional AVIM battalion virtually precluded responsive coordination of corps-level AVIM efforts to meet changing support requirements. Without improved communications and some increase in headquarters staffing, the corps AVIM battalion cannot effectively C² multiple AVIM companies in combat operations when they are widely dispersed over several hundred miles. The AVIM battalion headquarters also needs additional personnel to effectively operate around the clock at more than one location, in an austere, combat environment.

The non-divisional AVIM company's size, complexity, inadequate mobility and communications assets, and extensive transportation requirements, diminished the level of AVIM support provided to corps aviation units in the mobile, fast paced,

offensive combat operations. The organizational structure, critical equipment densities, and depth of some skills in the corps AVIM does not readily support deployment of multiple MSTs for customer-oriented, on-site tasks. Added to these problems are the nonstandard peacetime missions, equipping, and training of the nondivisional AVIMs, leaving them unable to perform the full range of mission tasks required in ODS.

You cannot move the corps AVIMs often and expect them to provide effective AVIM support. They are either moving or supporting, but not both. Transferring workload between corps AVIMs during a multi-unit move is good in theory, but different skills, parts, tools, procedures, and locations actually make it very difficult, if not impossible. It takes forever to break down a corps AVIM, upload, transport, download, and setup again. The personnel doing the driving, loading and unloading, are also the mechanics and supply personnel. There aren't any "plain" truck drivers in the battalion, although there needs to be. The requirement to support multiple types of aircraft has led to a growth of peculiar test equipment, LRUs, ground support equipment (GSE), MHE, ASLs, and AIMI stocks in the corps AVIM. Add to this the necessary life support items and you have a monster organization with tremendous transport requirements. An example of this is the 18 C-5s and 10 C-141s it took to move one corps AVIM's (K/159th) equipment entirely by air to SWA.³⁰

Although eventually there were considerable aviation logistics resources in theater, the initial lack of a coordinating authority above the corps level hampered effective interface, prioritizing, and resource distribution of critical aviation logistics assets between the two corps and the TAMP.³¹

The static defensive positions and improving CSS operations during Desert Shield enabled the battalion to eventually overcome many of the problems and shortcomings inherent in the area support concept. However, a longer, more intense Desert Storm would likely have found the AVIM battalion without sufficient capability to continuously and responsively support aviation units as they moved forward. Why? One need only look at the thinly stretched lines of communication (LOC), meager mobility and communication assets, limited BDAR kits, AIMI assets, LRUs, etc., for

the answer.

Recommendations.

The changing world environment (read threat), defense downsizing (fewer units), and declining budgets (fewer acquisitions), have forced a rethinking in future battle doctrine, contingency operations, force structures, deployment capabilities, movement requirements, etc. The Army's corps-level aviation logistics doctrine--thinking, process, organizations, equipment, training--essentially, the entire spectrum, also needs updating. However, given that the current structure will not disappear overnight, regardless of ongoing initiatives, it seems there may be several things we can do to improve it before the next conflict, or until something better replaces it.

We need to relook the peacetime employment, resourcing, and training of the nondivisional AVIM companies to ensure they address the full spectrum of their mission capabilities that could be needed during combat operations. Deploying AVIMs with limited equipment and personnel skills because they "never did that mission at Ft.----" is an unacceptable risk and waste of peacetime resources. Contingency requirements for these units must be identified to establish opportunities for coordination, training, and exercising with supported units, sister units, and the C² headquarters of force deployment packages. The battlefield is not the place to meet for the first time! (This also applies to the remaining active nondivisional AVIM battalion headquarters identified as part of contingency force packages, as well as those in the reserve components.)

It is past time to get rid of the old M35 2 1/2 ton cargo truck, M831 five ton cargo truck, M49C fuel tanker, M816/819 wrecker, and M1008/1009 CUCV in CSS units. Supported combat units have the HUMMV and HEMMT family of vehicles that proved themselves excellent in ODS--when will they be in the corps AVIMs? Support units need mobility assets that will enable them to maintain pace with their supported units, or they cannot effectively support them.³²

The area support concept for the corps AVIM (battalion/unit) is viable only with enhanced communications capabilities, additional one-of-kind tool and test sets for use by mobile MSTs, full authorized manning levels, and more modern vehicles and

aircraft. The UH-1 performed well for the AVIM battalion, but the degraded mission support due to its payload and range would not have occurred in the UH-60. We need to resource these units with the proper equipment and enough people to provide the support needed by corps aviation units.

Nondivisional AVIM companies deployed to a theater of operations should be assigned to the corps AVIM battalion per current doctrine. The fewer AVIM companies assigned to the battalion decreases the flexibility and capability for the battalion to respond effectively to support requirements across the corps area of operations.

The AVIM battalion headquarters needs some additional folks, not many, but with specialized skills. The battalion should have an authorized chaplain (the battalion had a "loaner" chaplain" during ODS), and a battalion motor officer (warrant officer), and food service supervisor (E7) for the battalion S4 staff. Managing food service, motor maintenance, and spiritual programs for up to five, widely dispersed units during ODS was often less than satisfactory with the small staff currently authorized.

The goal of 50% mobility (FM 1-500) for the corps AVIM with organic equipment in one lift is a joke. We cannot afford the number of vehicles or trailers it would take to move the unit in only two lifts. We need to relook at the unit authorization documents and aggressively delete all the obsolete, and excessive quantities of items. Newer, smaller, more efficient GSE, materials handling equipment (MHE), test sets, and shop and tool sets, would also cut down the amount to be moved.

As I noted earlier in my conclusions, there are numerous aviation logistic support initiatives and concepts being studied and/or tested for implementation. Floating AVIMs, prepositioned equipment afloat, modular units, aviation support groups, apprentice mechanic program, and multifunctional aviation support battalions (ASBs) are some of these. These concepts address, in one form or another, many of the issues noted in this paper. However, most of them also require considerable resources to implement, and in this era of downsizing and budget trimming, how much hope is there for near-term success? My intent here is not to suggest we

should not be working on these future concepts--quite the contrary. But, in the interim we need to be working with what we have now to develop the best possible support package for evolving operational concepts.

Finally, I would suggest that one of the most important areas we must pursue is the identification and training of nondivisional AVIM units for contingency operations. Regardless of the success of the above mentioned programs, AVIM units must know, coordinate, and train with the other forces in their specific contingency mission(s) during peacetime. We cannot expect to have a "grace period" to smooth out the operational and support issues that inevitably erupt when units are thrust together for the first time, especially in a combat environment. The learning curve in ODS for corps-level aviation logistics was too long--we must ensure it is shortened before the next conflict.

AVIATION LOGISTICS SUPPORT

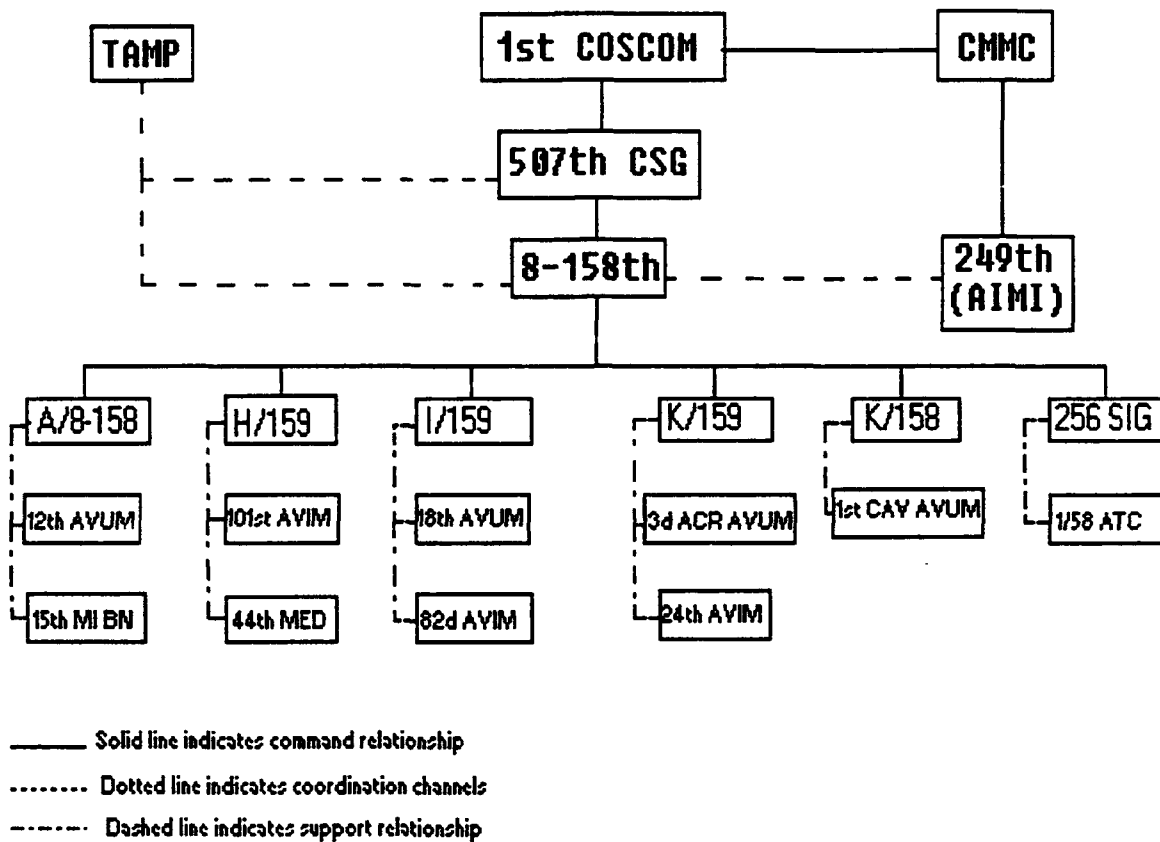


FIGURE 3. Organizational and support relationships diagram (Desert Shield)

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