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AIR UNIVERSITY

DIVISION AVIATION SUPPORT BATTALION

MODULARITY FOR SPLIT BASE OPERATIONS IN SUPPORT OF OOTW

by

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Preface

Since the end of the Cold War, I have been personally involved with a number of split based military deployments in support of Operations Other Than War (OOTW) (i.e., Somalia, Hungary, and Bosnia). I am an aviation maintenance logistician with ten years of experience planning, executing, and managing aviation maintenance operations. Each of the units that I have been assigned to performed their OOTW mission from multiple locations or "split based". The continued prospect to support many more split based operations inspired me to write this research paper. Additionally, I wanted to provide a research paper to the military library system to help foster further development of Army Aviation Modularity for maintenance structure. My research led me to many military library web sites such as Ft. Lee, Ft. Rucker, Ft. Leavenworth, Ft. Eustis, and Maxwell AFB for information regarding current and historical aviation maintenance concepts of modularity and split base operations. I found some great ideas unrelated to my subject but not one research paper on aviation logistics, modularity, and split operation. In addition to the lack of research material available, I discerned a lack of focus and direction on where the Army wants to go with aviation maintenance modularity (with the exception of TRADOC PAM 525-5 (Force XXI) and TRADOC PAM 525-68 (Modularity)). You can't build a long-range solution without a doctrine base. When I finally discovered doctrinal guidance, it was conflicting. In the After Action Reviews (AAR) from Haiti, the Department of the Army, Deputy Chief of Staff for Operations

(DA DCSOPS) stated that, "I need a fix right now for split based operations for the 10th Mountain and 25th Infantry Divisions" –but without additional bills.[1]. In response, the Training and Doctrine Command (TRADOC) position is that we, "need Modular Aviation Intermediate Level Maintenance (AVIMs) units documented with separately identifiable Unit Identification Codes (UIC) and Standard Requirement Codes (SRC)"[2]. They place the bill for this capability at 305 personnel spaces and $48 million for entire total force.

However, I did find two civilians, one Harold Thomas and the other Dick Guilmart, both with experience dealing in modular structures concepts for aviation logistics. Both were involved with earlier attempts in the early to mid 1990s to get modularity design into aviation maintenance structure.

I would like to give special thanks to Tom Thomas (working for DCD Force Structure, Ft Rucker, Alabama) and Dick Guilmart (working at RDD, Ft Lee, Virginia) for their expertise and guidance. I also and eternally beholding to LTC McGaughey, previous commander of the Army's premier aviation support battalion, the 127th ASB and future commander of the Aviation and Missile Command for his patience, mentoring and historical reference material.

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Abstract

The focus of this paper is to support the need for modularity in Army Aviation maintenance with an emphasis on how to restructure the Division Aviation Support Battalion (DASB) to provide increased flexibility and capability to support split base operations and Operations Other Than War (OOTW). I further narrow my focus to developing modular designs for the DASB Aviation Intermediate Level Maintenance (AVIM) company that can provide 24 hour split based operations capable of supporting OOTW. This thesis will cover the full range starting with traditional maintenance, recent historical perspectives, to modularity in it's general form, defining modular limitations, onward look at modular concept development, and finally a comparison between current maintenance structure and modular concepts.

The strategic environment has changed from a monolithic enemy (Cold War) to a more vast unpredictable threat. Because of this change to the strategic environment we have experienced an increased Operation Tempo (OPTEMPO) of mission support in the form of unconventional means. Most deployments involve smaller force structure. The deployment packages are Brigade size combined arms Task Forces that plug into a major Commander of Combatant Command (CINC) organization structure. The Aviation Brigade (AB) will not always deploy as an entire brigade in support of OOTW. It will probably form an Aviation Task Force (ATF) to meet the mission requirements. The ATF could be made up of various unit mixes. For example, the ATF could comprise

itself of two battalions of different aircraft types (one Attack Battalion and one General Support Aviation Battalion (GSAB)), two battalions of like aircraft, or company and smaller combinations of available aircraft types performing split based operations. By doctrine, aviation logistics provides forward aircraft maintenance support. The DASB must send Aviation Intermediate Level Maintenance (AVIM) Maintenance Contact Teams (MCT) forward to support the Aviation Task Force. (ATF) The DASB is a robust logistic unit, however, it has some shortfalls when supporting split base operations OOTW scenarios.[3] The current DASB design is monolithic, which is structured to support the division's AB within the Brigade Support Area (BSA). The DASB lacks the required transportation, supply/distribution, tool sets, special tools, low density Military Occupation Skills (MOS), and organic support aircraft (task the AB to get UH-60 support from the GSAB) to sustain split base operations. I will present an alternate modular design that will enhance the efficiency of the DASB. Modularity is a cornerstone of the Army's force structure for the 21st century. Instituting modularity within the DASB is the most effective, cost efficient means to provide CSS support to the AB today and in tomorrows strategic environment.[4]

Notes

[1] Telephone Conversation and interview with Harold Thomas, GS-12, DCD Force Structure, Ft. Rucker, Alabama, 15 October 1998.

[2] Ibid.

[3] James P. McGaughey, LTC, USA, 127th ASB OJE Deployment AAR, 127th ASB Staff, Fliegerhorst, Hanau, Germany, January 1997.

[4] Dale A MacPherson, LTC, USA, Chief, Organization Force Development Division, Stike Force SIMEX I After Action Report, Ft. Rucker, Alabama, November 18, 1998.

Chapter 1

INTRODUCTION

The only thing harder than getting a new idea into the military mind is getting an old one out.

Liddel Hart

Today's Army is being tasked to prepare for and accomplish missions that focus increasingly on peacekeeping and humanitarian missions in addition to sustaining combat capabilities. As a result, commanders must routinely build task forces from a variety of units to meet mission specific requirements not available in currently configured organizations. Building or providing forces to a task force can render the parent organization incapable of performing its mission due to the lack of modularity of key personnel, equipment, and transportation. The purpose of this paper is to determine the best method to enhance the Division Aviation Support Battalion (DASB) Combat Service Support (CSS) capabilities that will adequately support the Aviation Brigade (AB) during split base operations.

The United States National Military Strategy reflects the changes that have occurred in the world and political environment. However, change to the Army structure has been slow to accommodate the new threat due to limited resources, a lack of focused guidance towards the Army's structure for 2010, and the future Army After Next by it's leadership.

Modularity provides commanders at all levels the ability to provide the right balance of Combat, Combat Support (CS), and Combat Service Support (CSS) units to execute the mission.

Modularity has the additional advantage of allowing the commander to rapidly deploy a force with the right function and capability around the globe, yet the remaining portion of the organization maintains its capability so that it can deploy later or provide mission support somewhere else.[1]

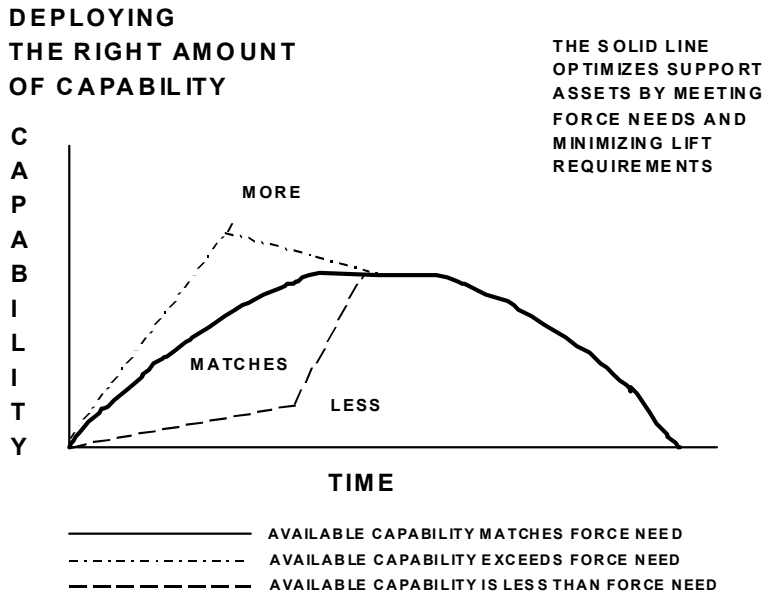

Figure 1: DEPLOYING THE RIGHT AMOUNT.[2]

The AB is a unique organization and is challenging to support due to its quick mobility on the battlefield. There are several more characteristics and facts that I need to mention about the AB's uniqueness. First, it is the only brigade in the heavy division that performs aviation combat, CS, and CSS missions.[3] Second, the Army has completed the

implementation of the Aviation Restructuring Initiative (ARI) that restructured aviation operational units, mothballing old airframes, and increasing the number of maintenance personnel.[4] Third, ARI did not take into account adequate restructuring of maintenance support for Aviation Unit Level Maintenance (AVUM) and AVIM units for split base operations.[5] Fourth, the monolithic designed AVIM has a difficult time supporting the AB in split base operations (two or more locations) in support of OOTW.[6] Fifth, Army aviation vision to support Force XXI is focused on the Combat and Combat Support (CS) roles ignoring the requirement to modernize the Combat Service Support (CSS) structure.[7]

In addition to these problems, there are reasons for studying CSS for the AB. First, the strategic environment and aviation doctrine have evolved, since the introduction of the DASB, from a cold war era to an era with an undefined threats and high OPTEMPO operations.[8] Second, ARI and the advancements of modular designs may provide opportunities for improved support to the full spectrum of war (general to OOTW). Considering the problems with current structure (need for modern structure), change requirements to CSS doctrine, and the increased requirement to provide support during split base operations and OOTW, it is time to reconsider other alternatives of CSS for the AB.[9] Lastly, Force XXI vision initiated the requirement to implement structure capabilities to execute 24 hour split based operations.[10]

A good example that exemplifies the majority of the U.S. military deployments and missions supported today is Bosnia. In December 95, the 127th ASB (DASB), 1st Armored Division (AD) deployed as part of the Implementation Force (IFOR) in support of Operation Joint Endeavor (OJE) to the Intermediate Staging Base (ISB) in Hungary.

Within a month, the 127th ASB established operations in six different forward locations in Hungary, Bosnia, and Central Region (CR) Germany, providing forward support to the 130 Task Force Eagle aircraft and the 4th AB. Half of the 127th ASB AVIM was pushed forward to Commanche Base to support the 4th AB in Tuzla, Bosnia.[11]

Notes

[1] Department of the Army, Concept for Modularity, TRADOC Pamphlet 525-68, Fort Monroe, VA, 10 January 1995, Forward.

[2] Ibid. Forward.

[3] Department of the Army, Army Aviation Operations, FM 1-100, Washington, DC, 21 February 1997, 1-10.

[4] Telephone Conversation and interview with Harold Thomas, GS-12, DCD Force Structure, Ft. Rucker, Alabama, 15 October 1998.

[5] Ibid.

[6] James P. McGaughey, LTC, USA, 127th ASB OJE Deployment AAR, 127th ASB Staff, Fliegerhorst, Hanau, Germany, January 1997.

[7] Department of the Army, Force XXI, TRADOC Pamphlet 525-5, Fort Monroe, VA, January 1996.

[8] Joint Forces Quarterly, Winter 1996-97, Number 14, 1-6.

[9] Department of the Army, Concept for Modularity, TRADOC Pamphlet 525-68, Fort Monroe, VA, 10 January 1995, 2-1.

[10] Department of the Army, Force XXI, TRADOC Pamphlet 525-5, Fort Monroe, VA, January 1996.

[11] James P. McGaughey, LTC, USA, 127th ASB OJE Deployment AAR, 127th ASB Staff, Fliegerhorst, Hanau, Germany, January 1997.

Chapter 2

TRADITIONAL AVIATION MAINTENANCE SUPPORT

Army Aviation performs CSS functions in support of units throughout the entire area of operations. Aviation units enhance the commander's battlespace through rapid delivery of supplies, personnel, and aeromedical evacuation.

FM 1-100

The AB of a heavy division (to include other division structures such as Light and Airmobile) is a flexible organization that can accomplish its mission as a pure-aviation organization or as a task-organized force. The speed and mobility of the AB make it best suited for rapid-reaction, deep, close, and rear operations over the entire width and depth of the division area.[1] With its versatile capabilities, the rotary wing assets provide a full spectrum of responses anywhere in the world from general war to OOTW.[2] Like its manuever counterparts, the aviation brigade units require supplemental CSS on the battlefield because of the fluid operations and the great demands for resources that are characterized by Army operations. The logistics system be flexible enough to insure that the AB headquarters can also assume the responsibilities of a Task Force, with the ground and air forces. Specifically, the AB must be able to man and arm tactical units, fix and fuel equipment, move the force, and sustain its soldiers and their systems.

The current structure of the DASB (See Figure 2) allows it to function as any other Forward Support Battalion (FSB), dedicated to supporting the peculiarities of their Brigade. Doctrinally, the DASB locates with the AB trains in the Brigade Support Area (BSA). As a result, the footprint of the brigade increases dramatically. It is important that the DASB commander, CSS planners and operators at division and DISCOM, and those within the AB units anticipate, integrate, improvise, and apply continuity and responsiveness as they plan and execute the sustainment operations. The focus of the CSS structure in the DASB is on providing support for AB units as far forward as practical.

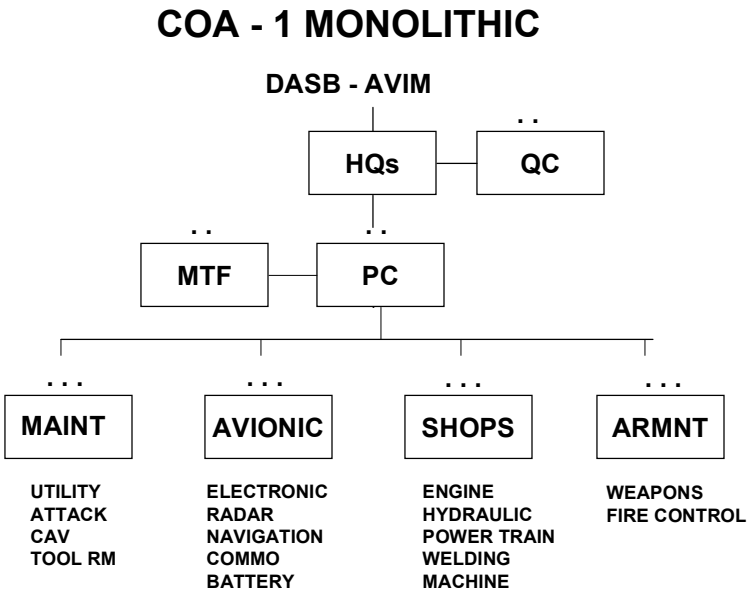

Figure 2: MONOLITHIC DASB.[3]

The DASB is somewhat a robust structure that provides the AB with a variety of aviation support capabilities. Specifically, it provides: direct AVIM support; back-up AVUM support; extensive component and sub-component repair; state of the art non-

destructive testing; operate and manage repairable exchange; management for contractor maintenance augmentation personnel; back-up aircraft recovery; and management of the Division's Operational Ready Float (ORF) aircraft. Doctrinally, the DASB AVIM accomplishes its mission by "supporting forward". Under this concept, Maintenance Contact Teams (MCT) are developed based on the type and density of aircraft supported. The MCT's normally consist of a few mechanics (for all deployed aircraft), a couple of Technical Inspectors (TI), and some good sub-system mechanics capable of rapidly removing, repairing, and reinstalling components. If a component requires bench work it is evacuated back to the parent AVIM where the necessary personnel, parts, publications, and special tools are available. The part can be repaired or the additional capabilities can be sent forward with the new or repaired part. It is important to emphasize that there is not a set method in task organizing and operating the MCT. For example, the AVIM MCT would supporting a task force might be required to deploy with some special avionics repair capabilities. In that case, the MCT would, mix and match test sets in avionics vans/shop sets to minimize the AVIM footprint and load out requirements. Retaining the flexibility to crosslevel personnel and equipment based on the mission is freequently stymied by the lack of organic transportation in the AVIM. By its organization document, the AVIM is only 50% mobile. With most of that mobility pushed forward with the first maintenance contact team, the second MCT is virtually grounded, dependent on external assets.

In addition to transportation, other operational deficiencies exist in the structure of the AVIM. These deficiencies center on the limited authorization of required tools and test equipment. Under current documentation, the capability of the AVIM is severely

reduced when it task organizes its systems repair and subsystem repair platoons into two or more maintenance contact teams. This specifically impacts the battery shop, standardized test sets and test equipment within shop sets and avionics vans, as well as hydraulic test stands and other ground support equipment. Additional impacts due to low density authorizations are found throughout the avionics and armament repair platoons. Another deterrent to supporting multiple operations is the availability of TMDE calibration and repair tools. Let's say that the AVIM has two sets of special tools, it is very likely that 50% of the time one of the two special tools is in calibration. These are a few examples of why we need to adjust our existing maintenance structure to accommodate the flexibility offered by incorporating modularity. Specifically, modularity would validate the requirement to increase the number of low density MOSs, tools, equipment, transportation, and test sets to enhance the operational capabilities of the DASB structure.[4] Modularity enables the logistics commander the flexibility to package the correct balance of CSS unit elements to support the customers ability to properly execute the mission. Today's Army is challenged with CONUS-based and forward-based units in force projection operations. Supporting the wide spectrum of war and OOTW requires that we cope with limited strategic lift, an increased participation in joint, combined, multinational, and interagency operations. Responding to these challenges will require more efficient force tailoring capability. Modularity can provide that capability.[5] The DASB structure needs to become more modularized in order to effectively and efficiently support the AB during high OPTEMPO split base operations.

Notes

[1] Department of the Army, Aviation Support Battalion, FM 63-23, CASCOM, Ft. Lee, Virginia, March 1998, 1-1.

[2] Ibid, 1-1 and 1-2.

[3] Department of the Army, Aviation Support Battalion, FM 63-23, CASCOM, Ft. Lee, Virginia, March 1998, 2-1.

[4] James P. McGaughey, LTC, USA, 127th ASB OJE Deployment AAR, 127th ASB Staff, Fliegerhorst, Hanau, Germany, January 1997.

[5] Department of the Army, Concept for Modularity, TRADOC Pamphlet 525-68, Fort Monroe, VA, 10 January 1995, 2-1.

Chapter 3

HISTORICAL PERSPECTIVE

Operation Joint Endeavor (OJE) provided many opportunities to assess the capabilities found in a DASB. The 127th ASB (DASB), 1st Armored Division (AD) deployed from Germany in December 1995 to provide CSS, including Direct Support (DS) supply of Class (CL) II, III, IV, VII, IX (Air and Ground), as well as DS Maintenance and Aviation Intermediate Maintenance (AVIM) for the 27 M1 Tanks, 50 M3 Bradly Fighting Vehicles, 41 other tracked vehicles, 815 wheeled vehicles, and 130 helicopters assigned or attached to the 4th AB and other Task Force Eagle (TFE) units located throughout Bosnia, Croatia, and Hungary.

The decision to deploy the DASB early in the deployment flow allowed TFE aircraft to arrive and begin operations as soon as they arrived. That decision required the Division Support Command (DISCOM) commander to rely on the 127th ASB to establish the initial logistics support for the 1AD and TFE within the Area of Operations (AOR). As the AB completed their initial deployment through Hungary and into Bosnia, the DASB was required to move forward, supporting split based operations. The DASB sent forward 120 soldiers into Bosnia to provide the AVIM and DS maintenance mission support, as well as the receipt and distribution management of all classes of supply

(except CL I, V, VIII) for all of TFE units in the vicinity of the Tuzla Valley for roughly two months.

The DASB forward deployed elements located in the Tuzla Valley never exceeded more than 25% of the battalions assigned strength. During the deployment, the remainder of the +350 soldiers assigned to the DASB maintained a maintenance "hub" and a Life Support Area (LSA) at Workhorse International Army Airfield (WIAAF) Kaposjilak near Kaposvar, Hungary. The maintenance "hub" became the aviation maintenance center for Theater (TFE and USAREUR forward (ISB)). This is where the 127th ASB (Workhorse) continued to juggle and improve their support for split based operations as well as improve, manage, and secure a major base camp, maintenance facility, and airfield.

The current structure of the DASB allows it to function as any other Forward Support Battalion (FSB), dedicated to supporting it's AB. This allows the DISCOM commander the flexibility to task organize as the mission dictates. Having a good understanding of how to support aviation operations, to include tying into directly with the AB Command and Control (C2) structure, allowed the 127th ASB staff to deliberately coordinate plans rather than reacting to situations.

The measurement of success for any support battalion is measured by the maintenance rates of their supported customers. Consider that the TFE helicopters that deployed to OJE flew three times the normal OPTEMPO while maintaining Fully Mission Capable (FMC) rates at levels well above the Department of the Army (DA) averages for ten consecutive months. The TFE aviation units flew over 31,000 helicopter hours due to the DASB completing 52 phase maintenance inspections on AH-64, UH-60,

EH-60, OH-58, and AH1 aircraft. The DASB and contract maintenance personnel assigned to the 127th ASB completed over 90% of the phase maintenance for TFE aviation units. Additionally, the DASB mechanics and technicians completed over 5100 AVIM work orders during the same period. This was accomplished while both the DASB and the AB underwent Modification Table for Organization and Equipment (MTOE) changes, which required, the turn-in of 8 AH-1s, 8 OH-58Ds, and 4 OH-58Cs.

The DASB maintained and controlled all of the Operational Ready Float (ORF) aircraft deployed in support of TFE and 1st AD, including: two AH-64s; one UH-60; one EH-60; two OH-58Cs; two AH-1s. During the deployment 34 ORF transactions were completed. This provided great flexibility to the AB in the form of readiness and "bank time". When the AB redeployed to Germany, they did so with higher readiness rates and more aircraft flying hour "bank time" than when it deployed.

It should be noted that the incredible results occurred because both the aviation maintenance and supply support structure integrated well. This was a team effort across the board with both the operators and the logistics community. The success stemmed from involving the AVUMs, contractor maintenance personnel, Logistic Assistant Representatives (LAR), to include soldiers on temporary duty from other Divisions and the Army National Guard/ Reserves. Additionally, logistic assistance was provided by 200th TAMMC and ATCOM helped resolve logistic problems before they impacted readiness.

Ground maintenance factored into the high level of aviation readiness. Ground support equipment to include vehicles and power generators proved to be vital in the effort to maintain aircraft availability. The DASB was very successful maintaining the

AB's 835 vehicles and pieces of power generation equipment, which maintained a constant readiness rate of 95% during the entire deployment and redeployment.

The Supply Support Activity (SSA) processed over 22,000 CL IX requisitions while converting over to the SARSS-O system. The DASB supplied and handled in excess of 4.2 million gallons of JP8 without an environmental incident. The 127th operated a 24-hour, four-point hot and cold aircraft refuel operation and retail vehicle fuel points in both WIAAF in Hungary and Eagle Base Bosnia. They also managed a 80K bulk fuel storage and distribution point at Commanche Base Bosnia, to include a fuel lab deployed in support of OJE.

Yes the DASB validated itself during OJE. However, this was due to the DASB's leadership to possess the ability to improvise logistic support to adapt and overcome some of the DASB structural shortfalls. The shortcomings of the DASB structure became more apparent when it supported TFE from multiple locations. It was no surprise that the identified shortfalls were limited transportation assets, low density MOSs, and shortage of tool sets/special tools. While the support provided by the 127th ASB was significant, it highlighted the AVUMs inability to sustain a high OPTEMPO for an extended period without a significant amount of unit level maintenance being performed by the AVIM.[1] This is an area of concern that warrants further study due to the recent aviation doctrine shift that eliminates back up AVUM maintenance support unless the AVUM is in a surge OPTEMPO. Surge situation warrant AVIMs to assist AB units perform AVUM maintenance.[2]

Notes

[1] James P. McGaughey, LTC, USA, 127th ASB OJE Deployment AAR, 127th ASB Staff, Fliegerhorst, Hanau, Germany, January 1997.

[2] Telephone Conversation and interview with Harold Thomas, GS-12, DCD Force Structure, Ft. Rucker, Alabama, 15 October 1998.

Chapter 4

GENERAL MODULARITY

"MODULAR-Constructed with standardized units or dimensions for flexibility and variety use".

WEBSTER

In past times, our military forces were expected to take part of large land forces operating mostly in Europe against cold war scenarios. Large forces forward deployed in Theaters that are well established and massively reinforced. Task organizing was and still is the primary means to insure the right capability to accomplish the mission. Task organization as defined in FM 101-5, is temporary grouping of forces designed to accomplish a specific mission. Yesterday and today, task organizing presents us with re-occurring problems. First, task organizing does not allow the Army to optimize strategic lift capability, which is more critical today with the reduction of Air Force Mobility aircraft. Second, task organizing often requires the deployment of slices from organizations. This leaves the residual portion of the unit limited in capability to perform its Mission Essential Tasks due to loss of key personnel and equipment.

Today's Army and the Army After Next 2025 must be able to respond to an increasing spectrum of war to include OOTW. The United States and our allies are supporting more OOTW with the military instrument of power. Current trends within the strategic environment, movement for information superiority, advancement and increased

reliance on technology, and senior military leadership guidance moving us further into the 21st century require changes to structural design or enhancements.[1]

Modularity can provide capabilities needed to meet the challenges of today and the future. With modularity, units can participate in CONUS-based and forward-based force projection operations more efficiently. Modularity can allow a parent unit to detach capabilities in support of a force projection force with the parent unit maintaining the capability to perform its mission. Modularity will provide a force that is interchangeable, expandable, and tailorable to maximize appropriate force requirements and optimize strategic lift (See Figure 3).[2]

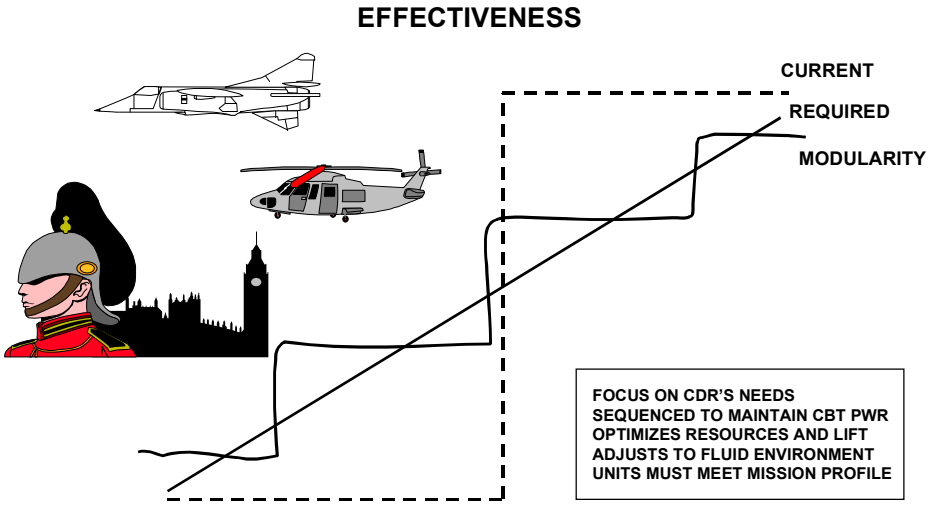

Figure 3: EFFECTIVENESS ILLUSTRATION.[3]

Multifunctional logistics is defined in the conceptual terms of tactical, operational, and strategic levels. The primary focus of the DASB is tactical level

logistics support. Currently, Army aviation maintenance system is a 3 level system (AVUM, AVIM, and DEPOT.). Aviation maintenance occurs at basically three levels throughout the Services. Those levels are, squadron or unit maintenance, intermediate maintenance, and depot maintenance. All Services routinely deploy with unit and intermediate maintenance capabilities for their peculiar aircraft. The repair capability at the unit level is normally limited to minor troubleshooting, removal and replacement of parts and components, and daily servicing.

Intermediate maintenance provides backup support for the unit level maintenance as well as an expanded capability to perform diagnostic troubleshooting, tear-down analysis and repair, and limited rebuilding of components, to include engines. During crisis situations the augmentation of personnel, tools and test equipment from the theater level also provides the intermediate maintenance unit with some limited depot level repair and rebuild responsibility. Doctrinally, repairs of aircraft and components completed by the intermediate maintenance unit are usually returned to the owner.

Depot maintenance is normally accomplished only at centralized, fixed facilities (usually within CONUS) which possess an even greater tear-down, analysis and rebuild capability. The components and aircraft that are repaired by the depot facilities feed the Service or DOD supply system and are not returned to the previous owner. Thus the inclusion of some depot capability within any aviation maintenance program is critical to assuring the operational readiness of the high technology aircraft present within the force.[4]

However, future aircraft systems like the RAH-66 Comanche will be supported significantly different under a 2 level maintenance and supply system. The transition

from 3 level to 2 level maintenance system (Depot, user concept AVUM/AVIM) should be relatively invisible in force structure. The transition will take place in the organizational structure design over time.[5]

Merging the right capabilities from each level of maintenance and supply support into a viable support structure that can support the specific requirements of a contingency will be our challenge. To accomplish this, logistics capability must be modularly configured to permit responsive tailoring of the logistics support organization to match the requirement of the AB or the aviation task force and to implement aviation maintenance fix forward doctrine. Prior to modularity concepts, task organizing and force tailoring were methods used deploying slices from the organization. Most of the time this left the remaining portion of the unit incapable of performing its full spectrum of missions due to the loss of key transportation, personnel, and equipment.[6] Modular designs will insure logistics units have the depth of support (robustness) and flexibility to support an aviation task force across the full spectrum of war (general to OOTW).

The Army utilizes Table of Organization and Equipment (TOE) and Modified Table of Organization and Equipment (MTOE) databases to document the minimum mission essential wartime personnel and equipment requirements. Requirements for OOTW do not fit this definition. For OOTW requirements to be accommodated in TOE/MTOE documentation, the accommodation must be incidental to the organizational design for general and limited war. For ARI aviation brigade designs, aviation maintenance systems repair requirements for OOTW can be documented in TOE/MTOEs because they represent minor deviation from wartime requirements.[7] This is not to say that modularity would benefit only OOTW operations but redundancy provided by

modularity would also be beneficial to the full spectrum of war. TRADOC has the mission to document the supported commanders warfighting requirements. When developing documentation the following force structure and organizational design guidance applies:

1. General War: Logistics force structure and organizational designs (TOEs) will reflect requirements to support the AB general war configuration in that portion of the AB design that is resourced total army Analysis (TAA) process.[8]
2. Limited War: Modular designs or definition will allow rapid adjustment of the general war logistic unit configurations to match the requirements of the provisional AB Task Force (TF). A provisional AB is the general war brigade reconfigured for the conduct of limited war.[9]
3. OOTW: Aviation maintenance systems repair requirements for OOTW will be documented in TOEs and MTOEs for ARI design aviation units. Currently, the DASB's aviation maintenance subsystem repair requirements must be satisfied through task organizing (hemming the suit instead of building a suit for the requirement), using maintenance capability of units designed for general war. To help in logistics task organization for OOTW (and other unresourced aviation support requirements), contingency or supplemental TOEs can be developed.[10]

Modularity has been used to incrementally increase an existing capability within an organization or to provide an organization a capability it does not normally have. For aviation maintenance applications, modularity is intended to facilitate, at the tactical

level, the task organization of logistics to support a designated aviation task force and to implement fix-forward doctrine. To accomplish this, it is necessary to link approximate logistics capability within the support organization to specific elements to be supported within the aviation task force (single service, multinational, or JTF).[11]

Current doctrine describes a requirement for dedicated multifunctional CSS for divisional AB requirements. The force design that will provide this support is the DASB Forward. This title is designated to differentiate this organization from similar organizations designed for other concepts and studies, specifically; the DASB that evolved from the 1988 Aviation Logistics Study and its ARI variant, ASB.[12]

Previous studies on aviation requirements for the combat structure of the Army investigated dedicated multi-functional CSS for Corps and Echelons-Above-Corps (EAC) AB. However, the General Officer Steering Committee (GOSC) concluded that full multifunctional CSS modular support for the Corps and EAC AB was too costly. The GOSC stated that area support doctrine adequately supports AB requirements.[13] This works well during general or limited war scenarios. However, we must again look at scenarios that the divisions AB supports OOTW as part of a division and a TF when the Corps is not included, nor will it directly support the division.

The division AB will be deployed as an aviation TF operating split based in support of OOTW. The DASB must be augmented in order to support the AB because current structural design does not afford redundancy of pertinate tool sets, shops and low density MOSs. Task organizing within or outside the division must augment the DASB.

Doctrinally, aviation fights as a brigade, however selected battalions might be deployed and organized into provisional brigades (aviation task force) for OOTW. This

doctrine perpetuates the perception that the aviation battalion is an element that cannot be broken down below battalion level structure to support limited war or OOTW. The facts from recent, real world operations provide plenty of evidence exists that will argue that provisional brigades and or aviation task force organizations are in fact broken down to company level and sometimes platoon, to support OOTW. In other words, current doctrine is outdated and is logically and factually inconsistent with the way aviation has been and is being fought, particularly in OOTW scenarios. Aviation logistics doctrine must also evolve to support aviation as it fights not as it is organized for C2 for the conduct of general war.[14]

An example from a historical perspective, the Army supported Operation Able Sentry in Macedonia with four UH-60 aircraft, crews, and maintenance support. At the same time the parent unit and support unit where deployed elsewhere throughout Hungary, Croatia, Bosnia, and Central Germany. Fortunately, in all deployed locations, units supported only OOTW missions. However, mission support was limited due to a shortage of single density personnel and equipment (to include special tools). Personnel and equipment had to be task organized from divisional units located in and out of the 1st Armored Division.

Analysis of ARI aviation force designs concluded wartime modules should identify manpower and equipment requirements to the company level for support of general and limited war instead of battalion level. For OOTW, modular designs should focus modularity efforts on the Smallest Deployable Units (SDU). For example the AB SDUs are currently defined as follows: Attack Company (8 AH64), Air Cavalry Troop (8 OH58D), and General Support Company (8 UH60).[15] SDU definition should include

aviation elements below the company level so that modularity maintenance support can be accurately defined.

Notes

[1] Joint Forces Quarterly, Spring 1998, Number 18, 6.

[2] Department of the Army, Concept for Modularity, TRADOC Pamphlet 525-68, Fort Monroe, VA, 10 January 1995, 2-1.

[3] Ibid, 2-1.

[4] Department of the Army, Army Aviation Maintenance, FM 1-100, Washington, July 1989, pp.3-1, 3-2.

[5] Harold Thomas, GS-12, DCD Aviation Force Structure, Information Paper, Aviation Modularity, Ft Rucker, Alabama, 14 July 1998.

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[7] Harold Thomas, GS-12, DCD Aviation Force Structure, Information Paper, Aviation Modularity, Ft Rucker, Alabama, 14 July 1998.

[8] Ibid.

[9] Ibid.

[10] Ibid.

[11] Department of the Army, Concept for Modularity, TRADOC Pamphlet 525-68, Fort Monroe, VA, 10 January 1995, 2-3.

[12] Harold Thomas, GS-12, DCD Aviation Force Structure, Information Paper, Aviation Modularity, Ft Rucker, Alabama, 14 July 1998.

[13] Ibid.

[14] MAJ Calatayud, ATZQ-CDO, Information Paper, TRADOC CSS/Modularity Review, January 23, 1995.

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Chapter 5

MODULAR LIMITATIONS

The logical alignment of essential CSS functions should be the first step in the force and organizational design process for modularity. Force and organizational designs will evolve as the respective modular concepts are tested and structure design decisions are made. Currently, AVIM units are monolithic and will remain so under the Battlefield Logistic Support for Aviation (BLSA) concept. For AVIM units, this definition exceeds the narrow definition used for modeling force structure in the Total Army Analysis (TAA) process. However, the AVIM force structure and organizational designs are tailored to the specific requirements of the supported force. More importantly, the AVIM workload is derived from the aviation programmed force. This is significantly different from the current process of developing workload projections from a designed force.[1]

Many decisions impact the resourcing of aviation force structure and each directly influences AVIM force structure and organizational design. Perhaps most importantly, the resourcing decisions have a impact on the numbers and types of aircraft and the composition distribution of the aircraft. The capability of active component logistics units must match the requirements of the aviation units they support. For the most part the divisional units are standardized in their structure and isn't as critical. What is important and the main reasons for modular design development are that the AVIM force

and organizational design seldom translates without significant change to programmed force structure or TOE/MTOE documentation (such as systems and subsystem platoons within the AVIM).[2] These conceptual designs will represent one of several battlefield configurations that can be created by rearranging units and capabilities within units to satisfy operational requirements. The TOE should clearly identify the sub element designed for modularity. This will assist planners to rapidly identify minimal Army force packaging requirements for deployment and effective mission accomplishment.[3] Unit Identification Code (UIC) can be used to further identify units on the MTOE.[4]

Notes

[1] Harold Thomas, GS-12, DCD Aviation Force Structure, Information Paper, Aviation Modularity, Ft Rucker, Alabama, 14 July 1998.

[2] Ibid.

[3] Department of the Army, Concept for Modularity, TRADOC Pamphlet 525-68, Fort Monroe, VA, 10 January 1995, 3-3.

[4] Ibid.

Chapter 6

MODULAR CONCEPT

Modularity is a force design methodology which establishes a means of providing force elements that are interchangeable, expandable, and tailorable to meet the changing needs of the Army.

Provide a means of rapidly identifying, mobilizing, and deploying doctrinally sound, sustainable, and fully mission-capable elements / organizations capable of operating in a joint and combined environment.

TRADOC PAM 525-68

The BLSA concept prescribes dedicated multifunctional logistics support for the divisional AB and centralized management of all logistics operations. A variation of the traditional DASB will satisfy possible modular concepts. Aligning major functional responsibilities of a maintenance organization in support of major design elements can perform modularity.[1]

Under the BLSA, the AVUM and AVIM functions have been consolidated. The AVUM systems repair capability is organized as the forward support platoon with sections correlating to the supported aviation structure. The AVIM systems repair capability is documented as the system repair platoon. Both AVUM and AVIM subsystems repair capability are documented in the subsystems repair platoon. Limitations of the TOE format may require documentation of AVUM and AVIM subsystems repair capability with discrete aviation structure.[2]

The purpose for the consolidation of AVUM and AVIM capability in a single organization is to provide a single manager for all aviation maintenance and to enhance operational effectiveness by allowing movement of maintenance capability both vertically and laterally on the battlefield (future digitized battlefield). In operation, the AVUM (forward support section) systems repair personnel and equipment will normally be co-located and under the operational control of the supported aviation unit. Functions associated with these units are typical of the traditional ASB/FSB organization.[3] The BLSA describes a threat of vastly varying dimensions and characteristics. The Army must be prepared to fight the high intensity general war configuration that the DASB must be specifically designed to support.[4] The DASB TOE and MTOE documentation must be either modularly designed or contain sufficient modular definition that it can be readily reconfigured to support a provisional aviation task forces designated for the conduct of limited war or OOTW. Modular design or definition is necessary to insure the DASB design contains appropriate redundancies in personnel and equipment to support task organizations, support aviation maintenance fix-forward doctrine, and facilitate the reconstitution and /or reorganization of logistics capabilities to match the requirements of surviving aviation capabilities. Modular design or modular definition within TOE/MTOE documentation is critical to the support of aviation task organization, and operational effectiveness.[5]

In order to implement fix-forward doctrine, commanders and staffs of logistics units within the DASB will have to be familiar with the organization and capability of their respective units so they can maximize the operational flexibility inherent to their organizational designs. TOEs and MTOEs will continue to reflect the organization

(personnel and equipment) necessary to support general war. At the same time, logistics commanders will no longer have to fight their units as depicted in TOE/MTOEs, but will have the flexibility of rearranging organizational modules to best satisfy operational requirements. Using aircraft maintenance as an illustration, aircraft maintenance unit TOE/MTOEs will continue to document a variation of the design with systems repair and subsystems repair integrated into a single unit.[6] Added definition in TOE/MTOE documentation will link both systems and subsystems maintenance capability of this unit to the individual aviation units being supported. The logistics commander can fight the maintenance unit exactly as it is documented in the MTOE or can adjust the organization to other configurations.[7]

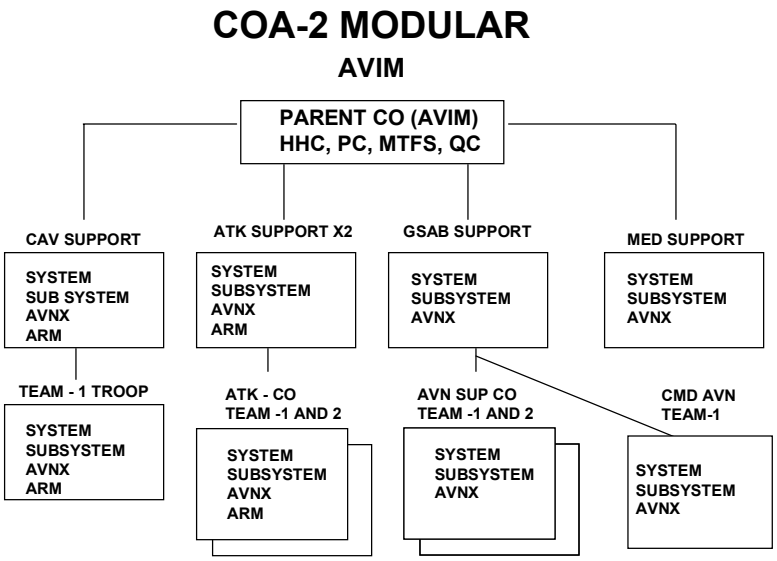

Figure 4: MODULAR THREE LEVEL MAINTENANCE[8]

Modular definition within the aircraft maintenance MTOE will permit the logistics commander to adjust maintenance capability to accommodate the change from the

general war configuration depicted in his MTOE to a configuration necessary to support the provisional aviation task force designated for limited war or OOTW. For deployment, the DASB commander will provide the right amount of aviation maintenance support at the right time for the deploying ATF.[9]

Light aircraft maintenance (on aircraft systems repair) and heavy maintenance (off aircraft maintenance repair) need not remain integrated in a single organization. Modular design or definition allows multiple options. For example, it might be desirable to not deploy a subsystem repair capability, but to rely on the supply system and dedicated priority distribution to meet the requirement. Another option will be to deploy the total unit capability, but extract the subsystems repair capability from the unit as a section, and attached it to another unit of the DASB, or Forward Support Battalion (FSB)/Main Support Battalion (MSB), or consolidate all subsystem repair capability in a separate company. This later option effectively segregates the light systems repair from the heavy systems repair, which substantially increases the mobility of the unweighted aircraft systems repair maintenance unit (See Figure 4).[10]

AVUM forward support teams for a specific aviation unit can be augmented with either of its AVIM systems or subsystems repair capability. The latter option represents fix forward doctrine in its purest sense and provides the aviation unit a repair capability comparable to the Integrated Direct Support Maintenance (IDSM) concept employed successfully during Vietnam.[11]

Notes

[1] Harold Thomas, GS-12, DCD Aviation Force Structure, Information Paper, Aviation Modularity, Ft Rucker, Alabama, 14 July 1998.

Notes

[2] Ibid.
[3] Ibid.
[4] Ibid.
[5] Ibid.
[6] Telephone Conversation and interview with Tom Thomas, GS-13, DCD Force Structure, Ft. Rucker, Alabama, October 15, 1998.
[7] Harold Thomas, GS-12, DCD Aviation Force Structure, Information Paper, Aviation Modularity, Ft Rucker, Alabama, 14 July 1998.
[8] Samuel J. Ford III, MAJ, USA, Decision Paper, Modular Design Comparison for Better Maintenance Support of the GSAB, Ft. Lee, Virginia, April 1995.
[9] Telephone Conversation and interview with Harold Thomas, GS-12, DCD Force Structure, Ft. Rucker, Alabama, October 15, 1998.
[10] Harold Thomas, GS-12, DCD Aviation Force Structure, Information Paper, Aviation Modularity, Ft Rucker, Alabama, 14 July 1998.
[11] Ibid.

Chapter 7

MODULARITY CONCEPT COMPARISON

The purpose of this chapter is to compare modular and modular forward concepts against the current DASB monolithic structure to determine the best DASB system to support the AB during split base operations and OOTW. By comparing modular concepts against the current monolithic DASB, this process will determine which maintenance system design can better support the AB during split base operations and OOTW. The three Courses of Action (COA) to compare are COA 1 (current DASB Monolithic Design Three Level Maintenance (See Figure 2)), COA 2 (Modular Design Three Level Maintenance (See Figure 4)), and COA 3 (DASB FWD Modular Forward Design Two Level Maintenance (See Figure 5)).

The COA 1 provides both AVIM level and back-up AVUM level DS maintenance to the AB. Under COA 1 the AVIM Company supports a fixed structure of specific aircraft types and quantity. The DASB is part of the three level maintenance system that includes AVUM, AVIM, and Depot.[1] COA 2 proposes a modular concept that also provides AVIM level and AVUM level DS maintenance to the AB. The modular concept supports the AB by built in sections for specific aircraft types. For example, if one of the battalions send forward two GSAB companies to be part of an ATF, the DASB AVIM can send modular sections of AVIM for each company.[2] Finally, COA 3 thoroughly

integrates the DASB FWD Modular Forward Design into two level maintenance system supporting specific airframe types. The other half of the AVIM is in the division rear or CORPS support area performing AVIM and Depot level maintenance.[3]

Each COA provides the same mission support capabilities: direct AVIM support to the AB; back-up AVUM support; extensive component and sub-component repair; state of the art non-destructive testing; operate and manage repairable exchange; management of contractor maintenance augmentation personnel; back-up aircraft recovery; and management of the Division's ORF aircraft.

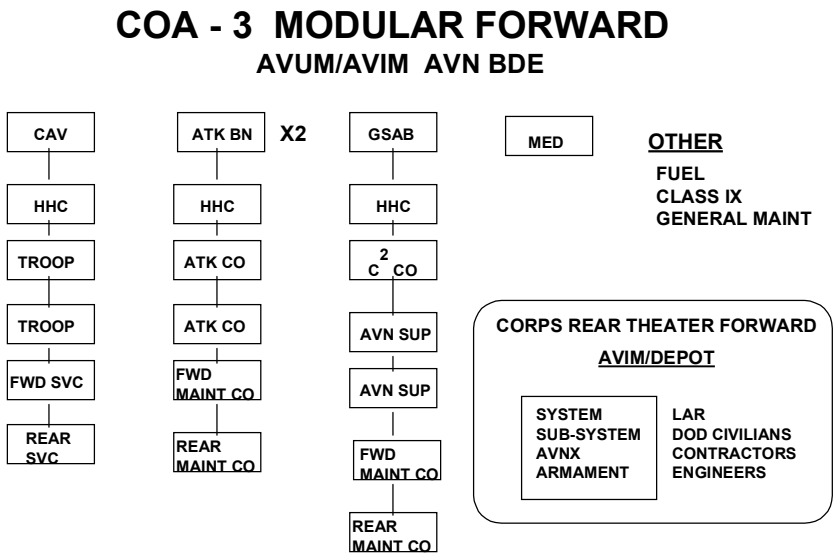

Figure 5: DASBFWD TWO LEVEL MAINTENANCE.[4]

The criteria used to measure the structure designs for COA comparison are the logistics functions continuity, integration, and responsiveness. In addition, cost and Command and Control (C2) will be measured in the COA comparison along with the chosen logistic functions. In order for a COA to be considered, each COA must meet the

criteria of suitability, feasibility, acceptability, distinguishability, and completeness.[5] Each COA must meet TRADOC 525-5 Army Force XXI guidance. It is important to remember that the vision of Force XXI requires Aviation units to be capable to sustaining split based (two separate locations with company size units) 24-hour operations. In order for the current DASB design to meet Force XXI guidance, the DASB would need to eliminate critical low density MOSs and equipment. Since modularity is not a goal of Force XXI. Current documentation of Force XXI TOE's are the same as ARI with one exception, one attack battalion instead of two in the AB. This puts us back at levels below MARC and moves us backwards to the same structures we utilized during the Army Of Excellence (a move in the wrong direction). If we could eliminate critical single density equipment and MOS's, COA 1 could be the least expensive way to achieve split operation capability.

Force Design Update (FDU) 95-2 proposal for the Heavy Division DASB recommended $2.3 million for equipment and seven personnel slots to meet Force XXI guidance.[6] However, FDU 95-2 was disapproved by the Department of the Army Headquarters in March 1996 because it was considered too costly.[7] Because the current DASB (COA 1) does not meet Force XXI guidance, it is no longer a feasible or an adequate COA. Both COA 2 and COA 3 designs qualify for COA comparison by meeting Force XXI guidance. For purposes of design comparison, the criteria will not be weighted for concept comparison.

Assumptions and facts are included to set the parameters that surround the issues that are related to the DASB environment. Some of the assumptions were identified from policy decisions that are inherent to Army aviation. The assumptions are:

a. The division conversion to the DISCOM support structure is complete within the heavy division, which includes the support structures of the MSB, FSB, and ASB (DASB).

b. The DASB ARI conversion is complete within the heavy divisions.

c. The heavy division AB ARI fielding is complete.

d. The AB deploys as a brigade size during general war, brigade to less than a brigade for limited war (possible three or less battalion size task force), and brigade to less than a company aviation task force supporting OOTW.

e. The SDU is defined down to the company level.

f. Both COA 2 and COA 3 can sustain split based 24-hour operations in separate locations with company size units.

g. COA 2 and COA 3 by design can support the AB SDUs.

h. The current DASB design does not adequately support split base operations and OOTW.[8]

Facts are based on doctrine and the way we currently support the AB customer. The facts to be considered are:

a. The heavy division only one DASB supports the AB.

b. The AB battalions all have their own AVUM support.

c. The DASB is the only support battalion within the heavy division that provides both ground and air maintenance support.

d. The AB generates 100% of the DASB class II, IV, and IX requirements.

e. The aircraft types currently found in the heavy division AB are AH-64, UH-60A/L, EH-60, and KWOH-58D.

f. The DASB C2 relationship falls under the DISCOM, not the AB.

g. The heavy division by definition is armor, mechanized infantry, and cavalry.[9]

To compare COAs I will assess continuity, integration, responsiveness, cost, and Command and Control (C2). Continuity is the ability to provide uninterrupted logistic support. Continuity is the lifeline of combat operations. Continuity is measured by the number of levels a unit's requisition must pass through in the division under the SARRS Objective supply system (unit tech supply, SSA, DMMC, and NICP) in order to receive a needed part. Requisitions that pass through the supply system more direct with the NICP should get a quicker response time receiving parts. The least number of levels a unit's requisition must pass through is rated best. A requisition that passes through more levels is rated worse.[10] Comparing requisitions sent through COA 2 and COA 3, COA 2's requisition passed through 4 levels of supply to get to the NICP (unit tech supply, SSA, DMMC, and NICP) and COA 3 passed through 3 levels of supply (SSA, DMMC, and NICP). The best COA when measuring continuity is COA 3 (See Appendix A COA Decision Matrix).[11]

Integration is important to a unit that it has the ability to integrate logistic and operation concepts during planning and execution. Knowledge of existing logistics capabilities and limitations are important for successful support of the concept of operations. There are many instances that a unit must integrate with another unit to meet a mission requirement. Integration is measured by the number of units that you must integrate with when task organizing or tailoring to meet mission requirements. The least number of units you must integrate with is rated best and more is worse. COA 2 once coordinated with, has built in sections that allow it to support forward integrating AVIM

maintenance support sections with deploying ATF AVUM maintenance. COA 3 has both AVUM/AVIM maintenance sections integrated together ready to provide maintenance support to deploying ATF. Comparing the number of units that both COA must integrate with when providing AVIM maintenance support, COA 3 was already integrated into a tailored maintenance sections and COA 2 integrating between two units. The best COA when measured against integration criteria is COA 3 (See Appendix A for COA Decision Matrix).[12]

Responsiveness is the ability to react quickly to a crisis through effective organization, strong leadership, effective training, and thorough planning. This is true when faced with preparing for a deployment tailoring the right amount of support at the right time to meet customer requirements. Responsiveness is measured by the ability of the DASB to prepare itself in number of hours it takes to provide capable support to the AB. The shortest length of time to respond with maintenance support is best and longer is worse. Comparing each COA against responsiveness, both COA 2 and COA 3 were determined to take 12-24 hours to respond and provide maintenance capability resulting in a tie (See Appendix A COA Decision Matrix).[13]

The cost to operate DASB structure and designs are to be determined. Comparing equipment and personnel cost of each COA a cost analysis was performed. The structure and design that is the least expensive to operate is an advantage. A costly structure and design are considered a disadvantage. Comparing each COA with cost of personnel and equipment, COA 2 structure cost $28, 237,000 and COA 3 cost $18,655,000.[14] COA 2 was an increase of 10% over the original DASB monolithic design ($26,145,000) due to an increase to equipment and personnel that reduce low density MOS, equipment, and

added modular structuring. COA 3 decrease by 31 % of the original DASB monolithic design due to the splitting-up of the DASB AVIM with half integrated with the AB and half with the CORPS in the form of AVIM and depot. COA 3 is determined the best COA with the least amount of cost (See Appendix A COA Decision Matrix).[15]

The DASB has a unique C2 relationship within the heavy division. While the DASB supports the divisional AB, it remains under the command of the DISCOM commander. To perform its C2 functions, the DASB must develop and maintain a variety of relationships with both the DISCOM and the AB. The DASB C2 relationships are with its higher organization, the DISCOM. Lateral relationships include the MSB, FSB, and CORPS logistic task forces. The DASB relationship with supported organizations is the AB. Within the DASB, the internal relationship is with the subordinate organizations DASB companies.[16] It is important to streamline C2 structure to ensure that the best support is provided to the AB while maintaining flexible control and lines of communication with supporting organizations. The measurement for C2 is the organization structure that can effectively implement "fix-forward" doctrine and achieve the enhancements to operational effectiveness to task organize maintenance support incrementally in the conduct of general and limited war, to include OOTW and split base operations. Using C2 as criteria for COA comparison is a topic of controversy. COA 2 would meet current doctrine because AVIM C2 falls under the DISCOM. COA 3 AVUM/AVIM C2 is aligned with the AB. The question on whether the AVIM belongs to the DISCOM or AB is an old argument. The current DASB falls under the DISCOM. However, future AVIM modular designs may require it to remain under the DISCOM or move under the AB C2. This will have to be determined in future studies.

In conclusion, the DASB FWD modular design (COA 3) is the best method for providing CSS to the AB during split based operations. It is a modular concept that provides the most continuity, cost effectiveness, integration, responsiveness, and best C2 support. Just as important COA 3 meets the Force XXI requirements for sustained 24 hour split based operations in separate locations. COA 3 can be resourced at an affordable cost by combining AVUM/AVIM forward with brigade aviation units. This COA combines theories of DASB doctrine with the reality of providing enhance forward support to the AB, to include SDUs, during split based operations in support of OOTW (covers full spectrum of war). Bottomline, COA 3 provides CSS support to the AB that is comparable in quality to what other separate maneuver elements receive.

Notes

[1] Samuel J. Ford III, MAJ, USA, Decision Paper, Modular Design Comparison for Better Maintenance Support of the GSAB, Army Logistics Management College, Ft. Lee, Virginia, April 1995.

[2] Ibid.

[3] Ibid.

[4] Ibid.

[5] Department of the Army, FM 101-5, Staff Organization and Operations, Washington, DC, May 31, 1997.

[6] Department of the Army, Force XXI, TRADOC Pamphlet 525-5, Fort Monroe, VA, January 1996.

[7] Telephone Conversation and interview with Harold Thomas, GS-12, DCD Force Structure, Ft. Rucker, Alabama, 15 October 1998.

[8] Samuel J. Ford III, MAJ, USA, Decision Paper, Modular Design Comparison for Better Maintenance Support of the GSAB, Ft. Lee, Virginia, April 1995.

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[10] Department of the Army, Aviation Support Battalion, FM 63-23, CASCOM, Ft. Lee, Virginia, March 1998. 1-2.

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[12] Ibid.

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[14] Telephone Conversation with Dick Guilmart, GS-13, CASCOM, Research Doctrine Developer, TOE Developer, Ft Lee, VA, 26 February 1999.

[15] Samuel J. Ford III, MAJ, USA, Decision Paper, Modular Design Comparison for Better Maintenance Support of the GSAB, Army Logistics Management College, Ft. Lee, Virginia, April 1995.

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Appendix A

DECISION MATRIX COA COMPARISON

COURSE OF ACTION COMPARISON. Below is a matrix showing the ratings of each COA after their comparison. A high rating is better than a low rating.

CRITERIA	**COA 2**	**COA 3**
CONTINUITY	1	2
INTEGRATION	1	2
RESPONSIVENESS	1.5	1.5
COST	1	2
TOTAL	**4.5**	**7.5**

COA 3 rated higher with a raw score of 7.5. It is the best modular design to support the AB during 24 hour split base operations in support of OOTW.

RESPONSIVENESS.- Responsiveness was measured by the ability of the DASB to prepare itself to support the AB in the shortest amount of time. The least amount of time to prepare is the best scenario and more time is worse.

COST.- Cost was measured by comparing each organization's design of equipment and personnel. The lower the cost the better the COA. A costly structure and design are considered a disadvantage.

* COA2 increase of 10% due to increase of equipment and personnel as a result of section expansion. This modularity increase is for additional maintenance coverage section for GSAC and Command and Control Section.

* COA3 decreased by 31% due to the splitting-up of the AVIM/DASB and a decrease of 15% due to the reduction duplicated equipment and personnel

CONTINUITY.- Continuity was measured by the number of levels a unit's requisition must pass through in the division under SARS Objective (unit tech supply, SSA, DMMC, NICP). The least amount of levels a unit's requisition must pass through is rated best. A requisition that passes through more levels is rated worse.

INTEGRATION. Integration was measured by the number of units you must integrate with when task organizing for a mission. The least amount of units you must integrate with is rated best and more is worse.

Glossary

AAR	After Action Review
AB	Aviation Brigade
AD	Armored Division
AOR	Area of Operations
ARI	Aviation Restructuring Initiative
AVIM	Aviation Intermediate Maintenance
AVUM	Aviation Unit Maintenance
ATF	Aviation Task Force
BLA	Brigade Logistics Area
BLSA	Battlefield Logistic Support for Aviation
BSA	Brigade Support Area
C2	Command and Control
CINC	Commander of Combatant Command
CL	Class of Supply
CR	Central Region (Germany)
CS	Combat Service
CSS	Combat Service Support
DA	Department of the Army
DASB	Division Aviation Support Battalion
DCD	Doctrine Concept Development
DCSOPS	Department Chief of Staff for Operations
DISCOM	Division Support Command
DS	Direct Support
FMC	Fully Mission Capable
FSB	Forward Support Battalion
GSAB	General Support Aviation battalion
IFOR	Implementation Forces
ISB	Intermediate Staging Base
JO	Joint Operation
LAR	Logistic Assistant Representative

MCT	Maintenance Contact Team=MST
METL	Mission Essential Task List
MOS	Military Occupation Specialty
MSB	Main Support Battalion
MST	Maintenance Support Team =MCT
MTOE	Modified Table of Organization and Equipment
OJE	Operation Joint Endeavor
OOTW	Operations Other Than War
OPTEMPO	Operation Tempo
ORF	Operational Ready Float
RDD	Research Doctrine Development
RW	Rotary Wing
SDU	Smallest Deployable Unit
SFOR	Sustainment Forces
SIMEX	Simulated Exercise
SRC	Standard Requirement Code
TAA	Total Army Analysis
TF	Task Force
TFE	Task Force Eagle (1st Armored Division)
TI	Technical Inspectors
TOE	Table of Organization and Equipment
TRADOC	Training and Doctrine Command
UIC	Unit Identification Code
USAAVNC	United State Army Aviation Command

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