

AD-A262 664

BATTLEFIELD LOGISTICS SYSTEM FOR AVIATION 2000 (BLSA
2000) OPTIMIZING SUPPORT TO THE DIVISION AVIATION
BRIGADE(U) ARMY COMMAND AND GENERAL STAFF COLL FORT
LEAVENWORTH KS SCHO ... R L JOHNSON DEC 92

171

UNCLASSIFIED

NL

END
FILMED
DTIC

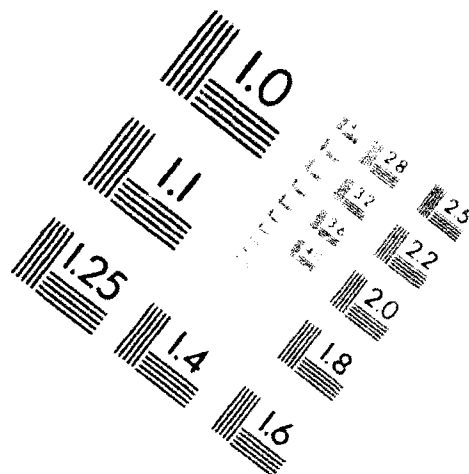
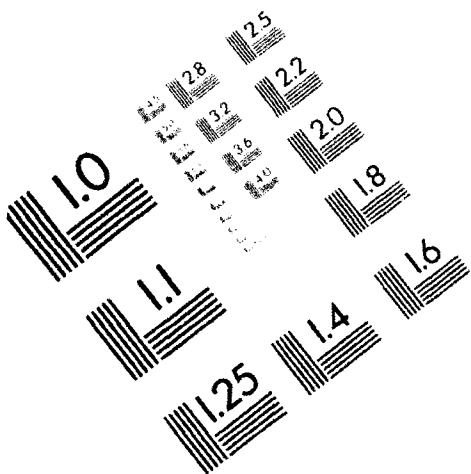


AIM

Association for Information and Image Management

1100 Wayne Avenue, Suite 1100
Silver Spring, Maryland 20910

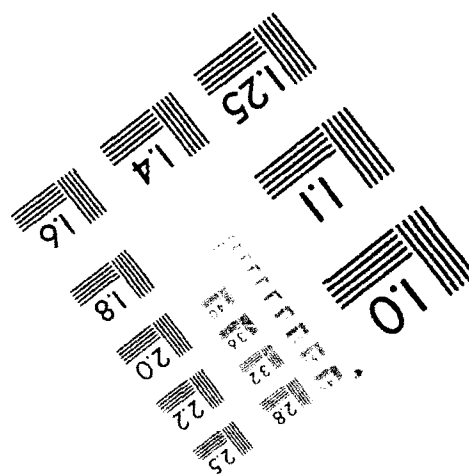
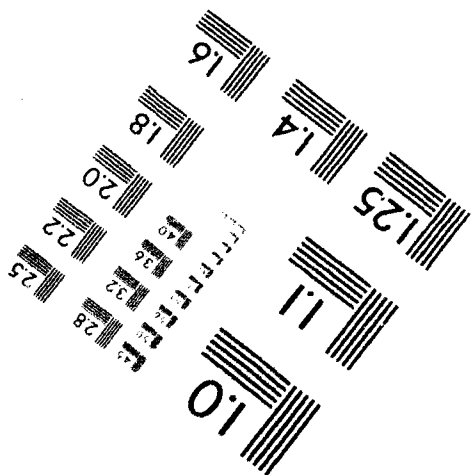
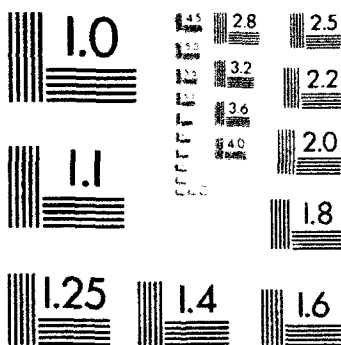
301/587-8202



Centimeter



Inches



MANUFACTURED TO AIM STANDARDS
BY APPLIED IMAGE, INC.

AD-A262 664



2

**Battlefield Logistics System for Aviation 2000
(BLSA 2000)**

Optimizing Support to the Division Aviation Brigade

**A Monograph
by**

**Major Robert L. Johnson, Jr.
Aviation**

**DTIC
ELECTE
APR 7 1998
S C D**



**School of Advanced Military Studies
United States Army Command and General Staff College
Fort Leavenworth, Kansas**

First Term AY 92-93

Approved for Public Release; Distribution is Unlimited

93-07148



93 4 06 025

REPORT DOCUMENTATION PAGE			Form Approved OMB No 0704-0188	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.				
1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE DEC 92	3. REPORT TYPE AND DATES COVERED MONOGRAPH		
4. TITLE AND SUBTITLE Battlefield Logistics System for Aviation 2000 <i>CAUSA 2000</i> -- Optimizing Support to the Division Aviation Brigade		5. FUNDING NUMBERS		
6. AUTHOR(S) MAJ ROBERT L. JOHNSON, JR., USA				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) SCHOOL OF ADVANCED MILITARY STUDIES ATTN: ATZL-SWV FORT LEAVENWORTH, KANSAS 66027-3437 COM (913) 684-3437 AUTOVON 552-3437		8. PERFORMING ORGANIZATION REPORT NUMBER		
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)		10. SPONSORING/MONITORING AGENCY REPORT NUMBER		
11. SUPPLEMENTARY NOTES				
12a. DISTRIBUTION / AVAILABILITY STATEMENT APPROVED FOR PUBLIC RELEASE; DISTRIBUTION UNLIMITED		12b. DISTRIBUTION CODE		
13. ABSTRACT (Maximum 200 words) SEE ATTACHED				
14. SUBJECT TERMS AVIATION SUPPORT BATTALION DIVISION AVIATION BRIGADE SUSTAINMENT IMPERATIVES		AIRLAND OPERATIONS AVIATION INTERMEDIATE MAINT BSA 2000 AVIATION LOGISTICS		15. NUMBER OF PAGES 58
17. SECURITY CLASSIFICATION OF REPORT UNCLASSIFIED		18. SECURITY CLASSIFICATION OF THIS PAGE UNCLASSIFIED		16. PRICE CODE
19. SECURITY CLASSIFICATION OF ABSTRACT UNCLASSIFIED		20. LIMITATION OF ABSTRACT UNLIMITED		

ABSTRACT

**BATTLEFIELD LOGISTICS SYSTEM FOR AVIATION 2000 (BLSA 2000)--
OPTIMIZING SUPPORT TO THE DIVISION AVIATION BRIGADE by Major
Robert L. Johnson, Jr., USA, 58 pages.**

This monograph investigates the organization and capabilities of the Army aviation support battalion and answers the question: Can the proposed aviation support battalion provide single source logistics to the divisional aviation brigade in accordance with the requirements of current and future doctrine? The modernization of Army Aviation with enhanced capability aircraft, coupled with emerging doctrine, mandate a revision of aviation logistics doctrine and support structure.

The monograph first considers the objective data from a 1992 field evaluation of two test aviation support battalions by the U.S. Army Combined Arms Support Command. Shortfalls between aviation brigade logistics requirements and aviation support battalion capabilities are highlighted. Secondly, the battalion is evaluated in a subjective manner with capability measured against the five logistics imperatives: anticipation, integration, continuity, responsiveness, and improvisation. Finally, battalion capabilities are evaluated against the logistics expectations of AirLand Operations--logistics that are proactive, tailorable, streamlined, and offer improved maintenance--and the subordinate concept of Battlefield Logistics System for Aviation 2000. This examination revealed that existing shortfalls in the battalion's current organization prevent it from fulfilling all requirements.

**Battlefield Logistics System for Aviation 2000
(BLSA 2000)**

Optimizing Support to the Division Aviation Brigade

**A Monograph
by**

Major Robert L. Johnson, Jr.

Aviation



**School of Advanced Military Studies
United States Army Command and General Staff College
Fort Leavenworth, Kansas**

First Term AY 92-93

Approved for Public Release; Distribution is Unlimited

SCHOOL OF ADVANCED MILITARY STUDIES

MONOGRAPH APPROVAL PAGE

Major Robert L. Johnson, Jr.

Title of Monograph: Battlefield Logistics System for Aviation (BLSA 2000)--
Optimizing Support to the Division Aviation Brigade

Approved by:

Randolph B. Wehner, Monograph Director
LTC Randolph B. Wehner, M.M.A.S., M.A.

James R. McDonough, Director, School of Advanced Military
Studies
COL James R. McDonough, M.S.

Philip J. Brookes, Director, Graduate Degree
Programs
Philip J. Brookes, Ph.D.

Accepted this 19th day of December 1992

Accession For	
NTIS	CRA&I ☒
DTIC	TAB ☐
Unannounced ☐	
Justification	
By	
Distribution /	
Availability Codes	
Dist	Avail and/or Special
A-1	

ABSTRACT

BATTLEFIELD LOGISTICS SYSTEM FOR AVIATION 2000 (BLSA 2000)--
OPTIMIZING SUPPORT TO THE DIVISION AVIATION BRIGADE by Major
Robert L. Johnson, Jr., USA, 58 pages.

This monograph investigates the organization and capabilities of the Army aviation support battalion and answers the question: Can the proposed aviation support battalion provide single source logistics to the divisional aviation brigade in accordance with the requirements of current and future doctrine? The modernization of Army Aviation with enhanced capability aircraft, coupled with emerging doctrine, mandate a revision of aviation logistics doctrine and support structure.

The monograph first considers the objective data from a 1992 field evaluation of two test aviation support battalions by the U.S. Army Combined Arms Support Command. Shortfalls between aviation brigade logistics requirements and aviation support battalion capabilities are highlighted. Secondly, the battalion is evaluated in a subjective manner with capability measured against the five logistics imperatives: anticipation, integration, continuity, responsiveness, and improvisation. Finally, battalion capabilities are evaluated against the logistics expectations of AirLand Operations--logistics that are proactive, tailorable, streamlined, and offer improved maintenance--and the subordinate concept of Battlefield Logistics System for Aviation 2000. This examination revealed that existing shortfalls in the battalion's current organization prevent it from fulfilling all requirements.

TABLE OF CONTENTS

	Page
I. Introduction.....	1
Methodology.....	5
II. The Aviation Support Battalion and Logistical Realities of Army Aviation.....	7
III. Aviation Support Battalion--Support for the Future.....	27
BLSA 2000 Framework.....	36
IV. Conclusions and Implications.....	42
V. Figures.....	46
VI. Endnotes.....	49
VI. Bibliography.....	55

I. INTRODUCTION

Since 14 April 1983, when then Secretary of the Army John O. Marsh, Jr. announced his approval of the establishment of Aviation as a separate branch, the aviation brigade has quickly become an integral part of the Army's warfighting divisions.¹ The brigade's ability to provide timely reconnaissance and intelligence throughout the division area, mass attack helicopter fires, enhance command, control, communications, and intelligence (C³I), and conduct antiarmor, antipersonnel and air movement operations "provide unique capabilities for the division commander."²

While the reorganization and centralization of all divisional aviation units under one headquarters have enhanced the command and control and, by extension, the effectiveness of aviation systems, there have been costs associated with these benefits. Limits on manpower authorization numbers, coupled with expanded personnel requirements for command and control, resulted in a sharp reduction in the capability and robustness at the aviation unit maintenance (AVUM) level. This led to a decrease in organic support capability and an increase in reliance on the division support command (DISCOM).

Though the aviation brigade allows the division commander to exploit "the aerial dimension of the battlefield,"³ the brigade makes a substantial logistical demand for this capability. Aviation operations by their very nature require a relatively large amount of logistics support (maintenance, aviation fuel, ammunition, repair parts, etc.)--a requirement that can place a significant strain on the division's support structure. Fortunately, this logistics effort is

made proportional by the lucrative pay-off that can be reaped from the aggressive and imaginative exploitation of the aerial dimension.

To appreciate the magnitude of logistics support required for the brigade, a description of the organization and number of vehicles and aircraft is needed. The aviation brigade of a typical forward-deployed heavy division is composed of one headquarters and headquarters company, one cavalry squadron, two attack helicopter battalions, one assault helicopter company, and one command aviation company (refer to figure 1, "Organization of the Heavy Division Aviation Brigade," page 46).⁴ Typically, the brigade has over 1800 officers and soldiers assigned. Additionally, it has one-hundred nineteen aircraft and forty-six combat vehicles.⁵

Even with the fielding of the current generation of enhanced performance helicopters and a new force structure, the basic principles of providing logistics support to the aviation brigade remained unchanged from the logistics systems of the Vietnam era. In an article written while attending the U.S. Army War College in 1987, Colonel Stuart W. Gerald (an aviation officer who later commanded Division Support Command, 101st Air Assault Division during Operation Desert Shield/Desert Storm) clearly made the point that while Army Aviation had effectively updated its "training, doctrine, combat developments and force packaging" since becoming a branch, the doctrine, techniques, and procedures for conducting sustainment operations had fallen far short of the requirement.⁶ Colonel Gerald went on to identify the major reasons for the sustainment shortfalls experienced in the aviation brigades as two-fold: first, a lack of a focused proponentcy that could develop a concept for "aviation

sustainment" and second, the tendency for everyone in the aviation community to "view ...aviation logistics as simply maintenance and repair parts."⁷ This article sounded the clarion call for Army Aviation to make the final push to gain the capability and attitude that will allow the branch to meet fully the requirements of AirLand Battle. Colonel Gerald even proposed a solution--the creation of an aviation support battalion.

In response to Colonel Gerald's and others' call for a more responsive and progressive aviation logistics organization, the Army, in October 1987, organized an aviation logistics study group to research initiatives and ideas that would enhance the logistics capability within Army Aviation. The key recommendation of the study group was in fact that the Army develop an aviation support battalion (ASB) that would "be the aviation brigade's single source of sustainment...."⁸

In October 1989 an Interim Operational Concept for the ASB was approved by the Commanding General of the Logistics Center (now Combined Arms Support Command or CASCOM), and the Training and Doctrine Command (TRADOC) Independent Evaluation Directorate developed issues and criteria for an Independent Evaluation Plan. These measures paved the way for a one year field test of the ASB concept in U.S. Army, Europe, which began late in 1990. This test is complete and data from the evaluation will be discussed in Chapter Two.

Regardless of the outcome of the field test, any move to organize an ASB would only address part of the problem. If attitudes about the way aviation sustainment functions are performed are not changed, a concept for logistics

that provides a single-source, focused effort is not developed, and proper equipment requirements identified and procured, aviation would remain mired somewhere in the evolution pattern of AirLand Battle.

In 1991 TRADOC Pamphlet 525-5, AirLand Operations: A Concept for the Evolution of AirLand Battle for the Strategic Army of the 1990's and Beyond, was published.⁹ This concept served as more than a launching point for the evolution from AirLand Battle to AirLand Operations. It called for the development of certain subordinate enabling concepts that would ensure that units have the capabilities demanded by AirLand Operations. One of these subordinate concepts is logistics. As a concept, AirLand Operations require logistics that are proactive, tailorable, streamlined, and offer improved maintenance.¹⁰

Aviation proponentencies were also obligated to develop concepts for doctrine, organization, and equipment that enable aviation commanders to meet the warfighting requirements of AirLand Operations. The U.S. Army Aviation Center, Ft. Rucker, Alabama is developing the doctrine for the Aviation branch under AirLand Operations. This concept is organized into two categories--aviation warfighting and aviation in operations other than war.¹¹ The subordinate concept under development at the U.S. Army Aviation Logistics School is called Battlefield Logistics System for Aviation 2000 (BLSA 2000).¹² With the effort well underway to field an organization that can support the aviation brigade in the manner that allows the commander to capitalize on the capabilities of aviation, the concern is whether the ASB is the

right organization, with the correct structure and mission capabilities to fulfill the requirements of AirLand Operations.

The research question for this study is: Can the proposed aviation support battalion (ASB) provide single source logistics to the divisional aviation brigade in accordance with the requirements of current and future doctrine? (Transportation, although a logistics function, is not included here in use of the term logistics. Doctrinally, transportation augmentation will continue to come from either division or corps assets.) The essence of the question is whether the ASB, either as a conceptual or operational organization, has the versatility and unique capabilities to meet the integration, multi-functionality, and support requirements of the doctrinal sustainment imperatives.

METHODOLOGY

The methodology used to answer the research question includes both objective and subjective data. Results of the field evaluation conducted by the U.S. Army Combined Arms Support Command on the test aviation support battalion will serve as the basic source of objective data in comparing logistical requirements to ASB capabilities. Emphasis will be on shortfalls identified by the evaluation team without regard to any other considerations (ability to improvise, assistance from other assets within the DISCOM, and budget or manpower restrictions).

Subjective criteria will be developed by discussing the requirements established for logistics in the Army's keystone doctrinal manual, FM 100-5, Operations (1986 version). Specific consideration is given to the five

sustainment imperatives of anticipation, integration, continuity, responsiveness, and improvisation.¹³ Additionally, ASB capabilities are compared to the logistics requirements established by TRADOC Pamphlet 525-5, AirLand Operations, and promulgated in the emerging aviation logistics doctrine (BLSA 2000)--that is, logistics that are proactive, tailorable, streamlined, and offer improved maintenance.

II. The Aviation Support Battalion and Logistical Realities of Army Aviation

The aviation brigade must have substantial base augmentation to properly sustain itself during operations. The critical augmentation requirements are for Class III (Petroleum), Class V (Ammunition), aviation intermediate maintenance (AVIM), and wheel and track vehicle maintenance to maintain effective and uninterrupted combat operations. These requirements are currently being met by the division support command's (DISCOM) main support battalion (MSB), the primary logistics operator in the division rear, and the aviation maintenance company, a separate company in DISCOM. On occasion, the DISCOM commander may also direct one of the forward support battalions (FSB) to support elements of the aviation brigade operating in a particular maneuver brigade sector. Elements of the cavalry squadron "usually" receive support from the closest FSB.¹⁴

Since the MSB typically supports up to twelve divisional elements that may be in the division support area (DSA), plus provides back-up to the three FSB's, it must shift support to the critical place and time and to the unit comprising the division's main effort.¹⁵ With this work load, it is not difficult to understand how the MSB can quickly become over-committed, especially when supporting high resource consuming forces like the division artillery and aviation brigade. This is but part of the reason senior aviation leaders have been calling for a single source logistics system for the aviation brigade. To more fully understand the impact that aviation support requirements have on the divisional support effort, one must attempt to

quantify those support requirements. Before discussing these requirements however, the aviation support battalion (ASB) organization and mission should be discussed.

The proposed ASB is organized into a headquarters and supply company (HSC), a ground maintenance company (GMC), and an aviation maintenance company (AMC) and totals 397 personnel (refer to Figures 2 through 5, pages 46-48 for organizational diagrams of the battalion and subordinate companies). Organization of the ASB will be drawn from existing assets of the aviation brigade--primarily from the brigade's Class III/V Section--and the MSB of the DISCOM. Assets to form the ground maintenance company will come primarily from the MSB, with some assets drawn from the aviation maintenance company.¹⁶ Like forward support battalions, the ASB will be assigned to the DISCOM but operate in direct support of the aviation brigade in garrison and in the field. The missions of the ASB units are as follows:

Headquarters and Supply Company (HSC):

- Provide C² for organic and attached units of the ASB.
- Plan, direct, and supervise aviation maintenance operations and direct support supply and ground maintenance.
- Requisition, receive, store, and issue Class I (Rations) and Class III (Petroleum) for the brigade.
- Requisition, receive, and issue Class II (General Supplies), Class IV (Construction Material), and Class VII (Major End Items).
- Operate a retail refuel point for designated aviation units (command aviation company and assault aviation company).
- Operate Class III (Bulk Petroleum) transload site for attack helicopter battalions and cavalry squadron.
- Augment Class V (Ammunition) sections in ammunition transfer points (ATP's).¹⁷

Ground Maintenance Company:

- Provide ground maintenance and Class IX (Air & Ground) repair parts.
- Provide maintenance support for brigade wheel and track vehicles and ground support equipment.¹⁸

Aviation Maintenance Company:

- Perform aviation intermediate maintenance (AVIM) for aircraft, aircraft systems, and aircraft sub-systems.
- Provide back-up aviation unit level maintenance (AVUM) support.
- Perform aircraft recovery and evacuation for divisional aircraft.
- Perform AVIM level maintenance on aviation night vision devices.¹⁹

The concept of an aviation support battalion, as mentioned in the introduction of this study, has been undergoing a field evaluation over the past two years. In June 1992 the objective results of that evaluation were published in a report by the U.S. Army Combined Arms Support Command (CASCOM), Fort Lee, Virginia. The two units that organized aviation support battalions within their division support commands and underwent evaluations were the 1st Armored Division and the 3rd Armored Division. Both of these divisions deployed to Southwest Asia and participated in Operation Desert Storm. The results of this field evaluation will be the basis for the objective portion of this study. Data from each of the two division organizations will be discussed here in the context of a single ASB, with no delineation between the different experiences of the two divisions. The discussion will address each of the functional areas of the ASB's mission in accordance with the doctrinal partitions.

Headquarters and Supply Company

The headquarters supply company (HSC) operates three separate sections that perform mission support--a Class I (Subsistence) section, a direct support supply section with the mission of supplying Class II (General Supplies), Class III (Petroleum), Class IV (Construction), and Class VII (Major End Items) materiel, and a Class V (Ammunition) section that supplies ammunition to the brigade (refer to figure 3, page 47, for organization diagram of the HSC). Each of the HSC mission area shortfalls are discussed briefly here.

Class I (Subsistence) Operation. The capability of the HSC to support the estimated 4.1 tons of daily Class I required by the aviation brigade is only marginal in its current configuration and equipment authorization.²⁰ Even using the supply point distribution method of support, the company is unable to operate the Class I distribution point during continuous operations because of manning authorization shortfalls. The Combined Arms Support Command (CASCOM) evaluation team recommended an increase in the authorization for two additional subsistence supply specialists (76X10). This increase in manning authorizations would give the HSC the necessary personnel depth for continuous operations.²¹

The other shortfall in the HSC Class I distribution section is a lack of authorized materiel handling equipment (MHE). MHE requirements at the Class I site are doctrinally met by using the one 4000 pound rough terrain forklift from the direct support (DS) supply section. Since the Class I point is never co-located with the Class II, III(P), IV, and VII point, this equipment

shortfall will prevent the HSC from providing the responsive Class I support required.²²

Direct Support Supply Section. The HSC's Class II, III, IV, and VII direct support section has a significant problem with both its level of personnel authorization and a lack of sufficient cargo transport. The section has no officer assigned (the HSC commander is the only officer currently authorized in the company). This requires the company commander to devote considerable attention to the direct support section's daily operations to ensure the proper reception, issue, storage, and accountability of materiel. The accounting problem is complicated by the lack of a materiel control and accounting specialist (76P10). The CASCOM evaluation team has recommended that the manning authorization be adjusted to correct these deficiencies.²³ The section has a similar shortfall in achieving the required mobility capability. These deficiencies require the addition of one low-boy trailer and one high-mobility, multipurpose, wheel vehicle (HMMWV) w/trailer for section command and control.²⁴

The typical aviation brigade of a heavy division can use from 46,000 to 53,000 gallons of aviation fuel per day.²⁵ The aviation support battalion has the doctrinal requirement to store 78,600 gallons of aviation fuel (using the fuel system supply point or FSSP), which would accommodate the standard of maintaining a one day of supply on hand; however, the ASB has the capacity to store only 60,000 gallons of fuel (40,000 gallons in the FSSP's fabric bags, and 20,000 gallons in the four 5,000 gallon tankers). The CASCOM evaluation team recommended a change to the equipment authorization document for two

additional 10,000 gallon storage bags for the FSSP to give the ASB its required storage capacity.²⁶

The ASB must distribute fuel to a forward area resupply point (FARP) for each of the two attack helicopter battalions and to one FARP for the cavalry squadron. Additionally, the ASB must operate a retail fuel resupply point for the command aviation company and the assault helicopter company. These requirements, plus the tendency for the attack and cavalry units to displace their FARP's frequently, stress the ASB's ability to react to unplanned requirements. The ASB is authorized only six heavy expanded mobility tactical trucks (HEMTT's) of 2,500 gallons capacity each and four semi-trailer tankers (5,000 gallon capacity, highway) to accomplish its fuel distribution (bulk and retail) mission. When considering total system capacity only, the ASB can meet the brigade's daily usage rate. However, this capability is achieved by use of a low number of high capacity systems. When the ASB attempts to service the geographically dispersed and frequently moving FARP's with this low number of vehicles, the expectation is that combat operations will be adversely affected. This problem is made worse by a lack of radios for the HEMTT's, resulting in loss of flexibility once they are dispatched for the day. These problems were highlighted during the CASCOT field evaluation.²⁷

The current inability to doctrinally store the required quantity of aviation fuel, coupled with the lack of flexibility in distributing Class III assets around the battlefield and the mission to operate a retail FARP, result in the ASB being only partially capable of supporting the brigade's Class III requirement.

Class V (Ammunition) Operations. In a high intensity battle the aviation brigade may use up to eighty-nine tons of Class V on D-Day, then sixty-seven tons each succeeding day.²⁸ Under the maneuver-oriented ammunition distribution system (MOADS), the aviation brigade receives Class V from the ammunition transfer point (ATP) located in the division support area (DSA). Basically, this support arrangement remains unchanged with the fielding of the ASB. However, the ASB can commit, by doctrine, personnel and equipment from its austere Class III/V distribution section to either the DSA ATP or one of the FSB ATP's if so requested by the division ammunition officer (DAO). In reality, the ASB Class III/V section would probably be committed to the effort to move munitions from the ATP to the two attack battalions and cavalry squadron FARP's.

The CASCOM field evaluation revealed that the HSC can basically meet the aviation brigade's daily Class V requirements; however, the ASB should have its own Class V (Air) ATP. This capability, coupled with the return of an organic capability to the aviation brigade to provide retail Class V support to the assault company and command aviation company, would provide a comprehensive capability and meet all demands.²⁹

Ground Maintenance Company

The ground maintenance company (GMC) proved itself capable of performing its maintenance mission during the CASCOM evaluation. The GMC possesses the required amount of automotive and firepower tools and equipment and proper number and type of vehicle repairmen to support the aviation

brigade's fleet of wheeled and track vehicles throughout the battle area. The problems experienced were with the ASB's Class IX authorized stockage list (ASL).

Historically, managing the division's aviation ASL has been the mission of the aviation maintenance company (AVIM) within the DISCOM. The ground ASL for the aviation brigade was located in the direct support (DS) company within the DISCOM's main support battalion. Since the ASB's ground maintenance company will have responsibility for the aviation brigade's DS maintenance support, the ground ASL for the brigade was placed in the GMC (under the new ASB concept). In the effort to streamline logistics, however, the GMC was also given the mission of managing the aviation ASL.

This move intended to streamline logistics by consolidating systems and reducing the number of personnel required to requisition, receive, store, issue and classify repair parts. However, the current version of the automated standard Army retail supply system (SARSS) does not allow the ground and air ASL's to be merged into one computer system.³⁰ This problem necessitates management of the two ASL's separately, which negates any gains in efficiency anticipated by co-location.

Aviation Maintenance Company

The aviation maintenance company (AMC) was judged by the CASCOT evaluation team to be capable of performing its mission despite several problem areas. Most of the problems noted were those that have always existed in aviation maintenance units--low density of critical personnel specialties

(66-series aircraft technical inspectors, electricians, sheetmetal repairmen, etc.), poor unit mobility, and a low density of critical test, measurement, diagnostic, and evaluation equipment.

Additional problems, beyond the automated ASL management shortfall discussed previously, resulted from the reassignment of the Class IX (Air) ASL from the aviation maintenance company to the ground maintenance company. The aviation maintenance company may not always be co-located with the GMC, which greatly reduces responsiveness of the Air ASL by forcing aircraft mechanics to travel to the ground maintenance company to requisition/receive repair parts. Transfer of the Air ASL to the GMC did slightly improve mobility of the AMC; however, this did not add anything to the mobility of the ASB since the same amount of Class IX (Air) must still be transported. Even though relieved of the responsibility for the aviation ASL, both of the AMC's undergoing the field evaluation had great difficulty maintaining the mobility pace set by their supported aviation brigades during Desert Storm offensive operations.³¹

The CASCOT field evaluation team compared aircraft readiness rates for the two aviation brigades involved in the field test in an attempt to objectively judge the effectiveness of the aviation maintenance company under the ASB concept. The team based their findings on aircraft operational readiness rates over a twenty-four month period. This allowed them to review data for a pre-ASB organization, a pre-Desert Storm ASB organization, and then performance of ASB organizations during and immediately following Desert Storm. This effort was inconclusive since readiness rates increased only slightly during the

ASB evaluation over the pre-ASB period, and it is impossible to adjust for the increased aircraft readiness rates realized in all aviation units in Southwest Asia due to the intense focus to prepare for Desert Storm. Subjectively, the ASB was judged by many to have made a significant difference in the performance of the aircraft maintenance system during Desert Shield/Desert Storm.³² Over the entire twenty-four month period, units supported by the ASBs attained Department of the Army readiness standards 34% of the time (considering all types of aircraft). This compared with the period prior to ASB organization, when units achieved standards 29% of the time. After ASB organization and prior to Desert Storm deployment, units achieved operational readiness standards 59% of the time. During Desert Storm the units achieved standards 43% of the time, but met the standards only 6% of the time after the operation. The post-Desert Storm figures are an anomaly, created by units placing all of their aircraft into maintenance at one time and the manner in which aircraft were redeployed from the theater.³³

In addition to readiness rates, the evaluation team reviewed the reasons aircraft did or did not make a particular standard due to time aircraft spent in unit level maintenance (AVUM), intermediate level maintenance (AVIM), and time aircraft were down due to repair parts non-availability (not mission capable-supply, or NMC-S). The evaluators were surprised to find that of 64 opportunities, 59 or 92% were due to AVUM level requirements with the remainder due to AVIM level maintenance requirements.³⁴ AVIM companies do perform back-up "unit level" maintenance, unlike ground maintenance direct support organizations which perform only "third-shop" maintenance, but this

analysis points to the fact that statistically the ASB did support their units with timely maintenance. However, this conclusion must carry the caveat that, though only 8% of the actual maintenance performed was due to intermediate level repairs, there was a significant amount of AVIM work done by the aviation maintenance company concurrent with AVUM maintenance tasks. Also, AVIM companies routinely perform a large amount of work that is actually listed AVUM level repair in the maintenance allocation chart (MAC).

In measuring the ability of the Air ASL to provide repair parts in a timely manner, the ASB met the Department of the Army "not mission capable due to supply" (NMC-S) standard only 66% of the time (42 of 64 opportunities).³⁵ The CASCOM evaluation team attributed this performance to problems with the wholesale level Class IX requisitioning and distribution system and not necessarily to ASB organization. Evaluated units had difficulties with their automation systems for maintenance and supply, and the ASB's did not receive all of their ASL into theater before Desert Storm ground operations began.³⁶

In addition to the specific findings discussed above, the evaluation team determined that other areas within the ASB required further study and action to correct deficiencies. These areas include command, control, and communications and health services.

Command, Control, and Communications. The ASB is currently organized with a vehicle authorization (with communications equipment) that is inconsistent with the mobility characteristics of the supported unit. The aviation brigade's momentum and operations tempo is such that the ASB staff can not adequately keep pace. Also, the CASCOM team determined that the ASB

must have a mobile command post (CP) instead of a command post that operates from a static location (from under canvas). The number of FM radios currently authorized is insufficient for the number of communication nets the ASB must establish or monitor.³⁷

Health Services. The aviation brigade has aid stations only in the two attack battalions and the cavalry squadron. There are no other medics or health specialists authorized in the aviation brigade, other than the flight surgeon and medics assigned to the headquarters and headquarters company of the aviation brigade. Due to the doctrinal nature of employing these units, these assets are not available for use throughout the remainder of the brigade, requiring support from the MSB or FSB on an area basis. The evaluation team recommended that the ASB be organized with a health services unit similar to forward support battalions.³⁸ This is a shortfall in the goal of fielding a single source logistical organization for the aviation brigade.

In summary, the CASCOM final report on the field evaluation of the ASB found that problems existed in the test organization with both equipment and personnel, but validated the organization as a viable concept.³⁹ The position of the CASCOM evaluation team is that the ASB gives the aviation brigade a level of dedicated, integrated support that it can not receive from the combination of a separate DISCOM aviation maintenance company (AMC) and support from the MSB coordinated by the brigade S-4. With improved command and control capabilities within the ASB headquarters will come a more sharply focused unity of effort among the supporting units. We have seen how the ASB concept compared in an objective sense to the current logistical requirements of the

aviation brigade and now must consider those subjective requirements that may be a reality on the battlefield of tomorrow.

LOGISTICS IMPERATIVES

FM 100-5 Operations is currently undergoing an update to reflect the realities of the post Cold War world. This effort will result in codification of the Army's warfighting doctrine whereby force projection is fundamental to Army operations, reverification of the basic tenets of initiative, agility, depth, and synchronization, and the addition of a fifth tenet "versatility."⁴⁰

The preliminary draft of the 1993 update of FM 100-5, Operations, retains the five logistics imperatives established in the 1986 version of FM 100-5: anticipation, integration, continuity, responsiveness, and improvisation.⁴¹ The discussion here of the relation of these imperatives to providing logistics for the divisional aviation brigade by the ASB will incorporate points from the draft FM 100-5 update. Regardless of any additional requirements that are established for the Army's logistics units, the sustainment imperatives will remain. Therefore, at the minimum, the ASB must be capable of performing its mission within the framework of the five sustainment imperatives.

Anticipation. Agility, one of the tenets of AirLand Operations, is "the first prerequisite for seizing and holding the initiative" (another of the five tenets). Anticipation is the key imperative that provides the sustainment means for the maneuver commander to maintain agility.⁴² Without anticipating logistical requirements, the supporting commander can not get the right amount of

materiel and support to the correct location at the right time. This could mean the loss of agility, which would result in the failure to seize or hold the initiative.

The ability of the aviation brigade to execute faster than enemy ground forces can react is a significant combat multiplier for the division. The sustainment problem for the ASB commander is anticipating logistics requirements early enough to meet them or to quickly make changes to support the high operations tempo which is a characteristic of the modern battlefield. Examples of this are the rapid relocation of aviation FARP's to support an anticipated attack helicopter mission, movement of maintenance support teams and aviation support teams (MSTs/ASTs) to the critical place or event, or planning a concept of support for an anticipated operation.

While the ASB organization has sufficient personnel for planning, it is deficient in much of the mobility and communications equipment throughout the battalion to enable effective, timely command and control. Without this capability, the ASB commander will have difficulty shifting logistics resources quickly even though he may have anticipated events and correctly developed a workable support plan. Likewise, a lack of depth in planning and staff personnel may make it difficult to execute branches and sequels, thus neutralizing the gains in C² capability envisioned by the drafters of the ASB concept that would allow the ASB commander to capitalize on his ability to anticipate requirements. The inadequate fuel storage and limited number of fuel distribution systems also hinder the ASB commander's ability to take advantage of anticipation.

Despite the desirability to create a streamlined logistics organization, the ASB must be adequately resourced with primary mission equipment. Otherwise, the expectations for the battalion may exceed the support realized with a corresponding degradation of aviation brigade capability to serve as a combat multiplier for the division.

Integration. Combat service support must be fully integrated into the commander's operational plan. Though there are many times when logistics will force the commander to shape his content of the operation to accommodate those logistical realities, the support commander must take every opportunity to develop his support plan in such a way that the maneuver commander can maintain the greatest amount of freedom and flexibility.⁴³

The ASB commander must plan and execute aircraft and vehicle maintenance programs, fuel the brigade's vehicles and aircraft, and perform supply functions in support of the brigade across the breadth and throughout the depth of the division area to ensure an integrated logistics plan. For instance, the cavalry squadron usually operates well forward of the division's front or along one of the flanks. The two attack helicopter battalions are often used to strike high value targets deep into the enemy's rear or engage enemy motorized forces in a friendly brigade's sector as part of the close battle. Simultaneously, the utility and observation aircraft of the brigade will be involved with command and control missions, critical resupply, and repositioning of critical personnel and equipment around the division area. This geographical separation makes it very difficult to achieve integration. The situation is made worse if the support organization must plan and execute a

fully integrated support plan by routinely relying on improvisation because of excessive resource constraints.

The field evaluation of the ASB concept found that shortfalls in mobility, communications, and robustness of operational capability prohibit the ASB commander from fully integrating his support plan with the aviation brigade commander's maneuver plan. One-of-a-kind or small numbers of critical test, measurement, diagnostic equipment (TMDE) and critical technical specialties limit the aviation maintenance company's ability to provide simultaneous support across the battlefield. If the aviation brigade operated in a centralized, geographically structured area, the problems in providing support would be considerably reduced. Since the aviation brigade must have the flexibility to operate throughout the entire DSA, the ASB's shortfalls must be corrected to give it the capability to integrate the support plan with the aviation maneuver plan.

Continuity. The force must have a continuous flow of support to maintain its combat power.⁴⁴ If any portion of the support flow is disrupted, the aviation brigade quickly loses its capability as a combat multiplier for the division commander.

Due to the particularly high dollar cost of repair parts, diagnostic and test equipment, and extensive training programs, the entire aviation support structure is characterized by equipment austerity and low density of critical personnel. This fact tends to take away many of the techniques and options often used by commanders to ensure continuity of non-aviation logistics support such as stockpiling and split operations. These factors place the ASB

commander at a distinct disadvantage when he develops a support plan for the aviation brigade that is versatile enough to allow for continuous logistical support.

Under current organization, the ASB can not provide continuous support with its Class I (Rations) section nor its direct support supply section due to personnel and equipment authorization shortages. With the requirement to operate the various supply points, coupled with the need to reposition frequently to maintain the pace of operations, the ASB's inability to maintain continuous support will remain unless changes are made to the organization structure.

Responsiveness. The aviation brigade gives the division commander the capability to exploit unexpected opportunities by concentrating and sustaining combat power at the critical time and place and by slowing or increasing the tempo of the battle.⁴⁵ The brigade can succeed only if it is provided responsive logistic support by the ASB. The ASB commander must be able to respond when the aviation brigade is given short-notice missions to strike the enemy if a sudden, often fleeting opportunity presents itself. The sustainment functions that are most critical to the combat aviation units during the execution of this type mission--fuel and ammunition--are those that the ASB is least capable to respond to quickly. The CASCOM report highlighted the ASB's lack of responsiveness caused by the low density of fuel distribution assets and the lack of radio communications with those fueling and arming vehicles. Since the combat units of the aviation brigade receive fuel and ammunition at their forward area resupply points (FARP), the ASB's slow response times to divert

fuel and ammunition can easily disrupt the brigade commander's concept of the operation. To ensure a responsive organization the ASB must have a robust mobility capability at least equal to the aviation brigade so as to move fully equipped maintenance support teams throughout the battlefield area and establish fuel, ammunition, and ration operations.

Improvisation. The ability of logistics units to improvise when unforecasted events occur is an important complement to all of the other logistics imperatives.⁴⁶ Improvisation has historically been a strength for U.S. forces and has enabled Army aviation units to accomplish many missions that at first seemed impossible. The ability of the ASB command and staff to improvise is key in its ability to provide responsive support on an unpredictable battlefield.

The addition of a battalion staff and senior aviation logistics commander to manage the aviation logistics effort at the division level enhances the capability to better improvise solutions to unexpected problems or mission requirements as they happen. An example of how improvisation can positively influence an operation occurred during Operation Desert Shield when Army helicopter rotor blades suffered unprecedented erosion of their leading edges by the particularly abrasive Arabian sand. Unit application of a hastily approved "paint-on" protective material to the leading edges of rotor blades provided sufficient protection until a more permanent fix (application of a blade "tape") could be fielded. Though the improvised solution to the problem originated from an echelon above the aviation maintenance company/aviation support battalion level, units nevertheless had to respond to this unforecast maintenance demand

without adversely disrupting the on-going maintenance program.⁴⁷ Thus, improvisation will continue as an important imperative for the aviation logistics community. However, as modern aircraft systems become more sophisticated with subsystems that are advanced, yet fragile and complex, the opportunities to solve problems by improvised means may lessen.

In summary, while the CASCOM evaluation team determined that the ASB concept is viable, it did document problems that impact on the ASB's ability to meet the requirements of the future battlefield. The problems primarily involve equipment and personnel shortages and have an adverse impact on the ASB's ability to adhere to the five sustainment imperatives. The following chart summarizes the ASB's shortcomings, measured in terms of the five sustainment imperatives discussed in preceding paragraphs, that the author feels must be corrected before the ASB can function effectively in the transition period to AirLand Operations and the years beyond. Most notable are the shortfalls that impact on the ASB commander's ability to anticipate the brigade commander's requirements and shift resources to accommodate them (most of those shortfalls highlighted in the chart are discussed under "responsiveness," but also impact indirectly on "anticipation"). These shortfalls are intensified when the logistical requirements of the modernized aviation brigade are beyond the capacity of the logistics organization to meet without undue reliance on improvisation.

SUSTAINMENT IMPERATIVES

ASB MISSION FUNCTION

	ANTICIPATION	INTEGRATION	CONTINUITY	RESPONSIVENESS	IMPROVISATION
C ²	👍 ^{1,2}	👍 ¹		👍 ²	
CL I Ops	👍 ^{3,4}		👍 ³	👍 ⁴	
CL II, IV, VII			👍 ⁵	👍 ⁶	
CL III Ops	👍 ^{7,8}		👍 ^{8,7}	👍 ⁹	
CL V Ops				👍 ¹⁰	
Grnd Maint					
Grnd ASL					
Avn Maint		👍 ¹¹		👍 ¹²	
Air ASL		👍 ¹³			
Health Services	👍 ¹⁴	👍	👍	👍	👍

NOTES:

- ¹Insufficient number of radio/communications equipment
- ²Lack of vehicles in S2/S3 and support ops section.
- ³Insufficient number of personnel in section.
- ⁴Lack of materiel handling equipment in section.
- ⁵Insufficient personnel and leader.
- ⁶Insufficient transport vehicles for materiel/equipment.
- ⁷Insufficient doctrinal fuel storage capability.
- ⁸Low density of refueling equipment and tankers.
- ⁹Lack of radio communications with tankers.
- ¹⁰Lack of radio communications with ammunition team.
- ¹¹Low density of critical personnel, equipment and vehicles.
- ¹²Air ASL not located at aircraft maintenance site.
- ¹³Inability to merge ground and air ASL's.
- ¹⁴Health Services currently not planned for in ASB concept.

Chart 1. ASB Mission Function
Shortfalls Compared to Sustainment Imperatives

III. AVIATION SUPPORT BATTALION--SUPPORT FOR THE FUTURE

TRADOC Pamphlet 525-5, AirLand Operations, formed the initial basis for a new FM 100-5 and established the enabling concepts from which subordinate logistics concepts are being developed. This document calls for logistics organizations and support systems that have the capability to offer a proactive combat service support command and control system, tailorable logistics organizations that have multi-functional capabilities, a streamlined system capable of handling pre-configured supplies and services, and an improved maintenance system capable of supporting the current and future fleet of vehicles, equipment, and aircraft.⁴⁸ The Army's senior leadership is also placing emphasis on force projection as a "key concept" and adapting the force to the Army's roles and mission in the reality of today's new world order.⁴⁹

Under the emerging Aviation branch concept, the aviation brigade will be utilized in both aviation warfighting and aviation operations short of war.⁵⁰ Therefore, the aviation support battalion must be capable of providing the logistics necessary to sustain the brigade through every stage of a particular operation. The ASB, as a logistics unit for the future, must be organized, manned, and equipped to meet all four of the requirements of the AirLand Operations concept--that is, logistics that are proactive, tailorable, streamlined, and offer improved maintenance.

Army aviation must also evolve to continue its role of supporting the division by "shaping the battlefield" and to maintain its ability to plan and

coordinate maneuver operations.⁵¹ As the demands on the aviation brigade change, so will the requirements for aviation logistics organizations. Since the aviation support battalion is a new organization, the opportunity exists for it to be structured from the ground up to provide the correct level of aviation logistics on the battlefield of the future--for the year 2000 and beyond.

The emerging concept for aviation logistics as a subordinate concept for AirLand Operations, called Battlefield Logistics System for Aviation 2000 (BLSA 2000), is intended to go far beyond the traditional aviation support organization that focused on aviation maintenance only in a narrow sense. BLSA 2000 is designed to function as a guide for the development and management of change for aircraft maintenance doctrine and procedures, training, leader development, organizations, and materiel requirements. It describes a comprehensive overview of a complete aviation support structure capable of integrated, multi-functional support across the entire spectrum of conflict--from operations short of war to high intensity combat. Although there are various components to the BLSA 2000 concept, the centerpiece is the ASB.⁵²

In order for the ASB to provide optimum support for the aviation brigade under BLSA 2000, it must be capable of performing beyond the level established by the five sustainment imperatives. Since TRADOC Pamphlet 525-5 served as the base from which the AirLand Operations subordinate concepts are being formulated, it is useful to examine the ASB's ability to meet the requirements that aviation logistics support be proactive, tailorable, streamlined, and offer improved maintenance.

Proactive Logistics. To properly anticipate (first of the sustainment imperatives) the logistical requirements of the aviation brigade, the ASB commander must understand what is happening on the battlefield in real time, fully understand the aviation brigade commander's intent for current and future operations, and form the most effective logistics task organization to support these operations. With the realities of modern aviation combat (characterized by high operations tempo and decentralized execution) throughout the division's area of operations, the ASB commander must have a functional and capable staff to gather information, conduct planning, and exercise control of subordinate units and operations. This forms the basis for an effective command and control system from which proactive logistics support can be provided.

Prior to the ASB concept, there was no single commander to plan logistics support for the brigade in an integrated manner. Planning functions were split between the commander of the aviation maintenance company (the separate AVIM company in DISCOM), the MSB commander, and the aviation brigade S-4 (with oversight by the aviation brigade executive officer). Since the ASB commander will have sole responsibility for all vehicle and aircraft maintenance (above operator/unit level) and all classes of supply (except Class VIII), centralized planning can be conducted by the ASB staff, and a focused approach to logistics can be pursued. The result of this enhanced planning capability should be logistics support to the aviation brigade that is more proactive and less reactive.

The 1992 CASCOT evaluation team determined that overall the ASB concept was valid--that is, the ASB headquarters successfully accomplished command and control of its subordinate units and had the capability to provide key maintenance and materiel support at the critical time and place in a proactive manner. However, shortcomings in equipment authorizations caused the two test ASB's to resort to improvisation to fully execute the command and control mission. Specifically, the current (Test) Table of Organization and Equipment document (TTOE 01937T200) authorizes only six VRC-12 series FM radios in the battalion command post (CP), but ASB personnel found this number insufficient to monitor all the required nets of subordinate units, higher headquarters, and the aviation brigade's nets.⁵³

The ASB's other primary shortcoming in equipment authorization affecting its ability to provide proactive logistics support is that neither the S2/S3 section or the support operations section is authorized vehicles (this includes a lack of a mobile, standardized tactical operations center, which in the DISCOM is usually a Truck Van: Expandable 5-Ton, 6X6 or equivalent). This shortfall effectively prevents the ASB commander's primary logistics operator and planner (the support operations officer) from having the mobility he needs to direct support operations. This is particularly difficult since the ASB performs its Class III, Class V, and Class I, II, IV, and VII mission in different locations on the battlefield. When the requirement to displace the battalion every three to seven days is factored into the equation, the capability to conduct C², gather information, and plan support operations by the ASB commander's staff is reduced substantially. This disrupts the

ASB's ability to maintain continuity of support and stay ahead of requirements by use of proactive logistics methods when it is displacing on the battlefield.⁵⁴

Personnel of the two previously discussed test battalions were able to improvise by gaining temporary authorization to draw additional vehicles after deploying to Southwest Asia. However, without the unique allowances created by the Army's preparation for Operation Desert Storm, it is doubtful that the typical ASB would be able to solve this problem on its own. Therefore, before the ASB can be judged capable of performing proactive command and control of the aviation brigade logistics effort, changes must be made to increase the headquarters equipment authorization document.⁵⁵

Tailorable Logistics. As the Army changes from a force with a significant number of units forward deployed to one that will rely more on force projection, the ability to tailor logistics task forces (LTF's) will become more important.⁵⁶ After receipt of a mission that requires deployment, the maneuver commander considers the factors of mission, enemy, terrain, troops, and time available (METT-T), strategic lift, prepositioned assets, and host nation support. He then matches units with requirements to tailor a force structure that can deploy, then quickly move from the port/airfield of debarkation into the area of operations.⁵⁷

Since the maneuver commander tailors his combat units, the CSS commander must also have the flexibility to tailor an LTF that can sustain the force from the initial lodgement in the theater through the detection/preparation stage, establishment of conditions for decisive

operations, decisive operations, and force reconstitution. Providing this phased support, which is often accompanied by a requirement to support in more than one location and in varying degrees, is perhaps the greatest challenge for the ASB to accomplish.

From data collected by the CASCOT evaluation team, there are grounds for the subjective determination that the ASB is sufficiently tailorable to support the aviation brigade in a variety of missions--from deployment of the first attack companies or battalion slices, through the end of decisive combat operations. However, the evaluation team warned that the ASB's low density of vehicles, communications and support equipment, lack of depth in aviation special tools and test equipment, and the low density of critical technical specialties in the battalion reduced its capability to tailor proper support packages.⁵⁸ The problems with the under-resourced S2/S3 section and the support operations section also can be expected to adversely impact the ability of the ASB to command and control additional support elements attached from the main support battalion.

Streamlined Logistics. For both contingency and reinforcing missions, the Army must have a distribution system that pushes properly configured materiel and supplies into theater and performs maintenance functions in a streamlined manner. This may entail jumping echelons as required--pushing assets and materiel directly down to the units, bypassing the logistics staffs of higher headquarters.⁵⁹

With the fielding of the ASB and the resultant enhanced command and staff capability over that of the DISCOM's aviation maintenance company,

aviation logistics will be able to use the streamlining concept to great advantage. This concept is particularly advantageous during contingency operations when, for instance, U.S. Army Aviation and Troop Command (ATCOM) may direct critical equipment and repair parts directly to the ASB in theater, bypassing the other logistics headquarters of the Army component command (or joint force command if the corps commander is serving as the joint force commander).

The ASB also offers streamlined logistics by fixing the responsibility for sustaining the aviation brigade in one person (the ASB commander) instead of sharing responsibility between the DISCOM's aviation maintenance company commander, the MSB commander, and the aviation brigade S-4. However, one area in which the ASB suffers a loss in streamlining capability is in its ASL operation. The collocation of the air and ground ASL in one company supports streamlining, but the requirement to manage those ASLs separately distracts from those efficiencies.

Improved Maintenance. This concept calls for a maintenance system that can function on any type of battlefield, perform rapid recovery of battle damaged equipment and aircraft, perform quick, on-site expedited repair of systems and subsystems, and provide for close accountability and delivery of critical Class IX repair parts to return systems to the unit with little delay.⁶⁰ This type of basic concept moves the Army's maintenance philosophy from one of "fix forward" to one that focuses on "replace forward." This may mean replacement of a subassembly or replacement of the entire end item. One reason for this is the increasing sophistication of the systems in use, with

a corresponding increase in sophisticated test, measurement, and diagnostic equipment. The subsystems can be removed forward, then repaired at some level in the rear (corps, theater, or sustainment base).

The enhanced capability aircraft that have become the backbone of Army aviation--UH60 series, OH58D, AH64A, and CH47D--are making new demands on the aviation maintenance system. The dollar costs of repair parts have increased dramatically due to the widespread use of composite and exotic materials in the basic aircraft system and the increase in a reliance on electronics. The high costs associated with troubleshooting, testing, and replacing the various night vision and targeting subsystems (for example, the Target Acquisition and Designation System/Primary Night Vision System, used on the AH-64A, has a unit cost of more than two million dollars) have forced the use of sophisticated electronic equipment test facilities at the corps aviation intermediate maintenance (AVIM) level. This allows the ASB's aviation maintenance company to rapidly change out the high dollar component as a unit well forward on the battlefield, while the Army retains the capability for rapid repair of the subassembly relatively close to the division area. The result is a faster return of the repaired subassembly to stockage while maintaining affordability without degrading aircraft readiness.

With the anticipated fielding of aircraft such as the AH-64D Longbow, OH-58D Kiowa Warrior, and RAH-66 Comanche, the Army must continue to develop improved maintenance systems and organizations that will efficiently maintain these sophisticated aircraft. BLSA 2000 focuses the ASB's efforts on battle damage assessment and rapid repair, removal and replacement of

components, and aircraft recovery. The ASB should also accommodate a possible "two-level" aviation maintenance system in the future to take advantage of RAH-66 Comanche manpower and personnel integration (MANPRINT) advantages (designed for maintenance with fewer tools and support equipment, built-in diagnostic and test equipment that interfaces with the portable intelligent maintenance aid (PIMA)).⁶¹

An integral part of developing an organization and system that offers improved maintenance is the requisition, shipment, receipt, storage and issue of Class IX repair parts. While command levels above the division level are working to improve shipment and in-transit visibility of repair parts, the ASB must have the capability to efficiently manage the ASL to fully comply with the concept of improved maintenance.⁶²

The emphasis, under the improved maintenance concept, on battle damage assessment and quick return of vehicles, aircraft, and equipment to the aviation brigade, requires the ASB to tailor its combat service support teams and maintenance support teams properly. To meet this requirement, the correct mix of personnel, communication equipment, diagnostic and test equipment, and repair parts must be assembled to allow a decision to be made quickly as to what to repair on site, what to evacuate to the rear, whether to use controlled substitution/cannibalization, and, if necessary, to abandon equipment on the battlefield.⁶³

In summary, the ASB has the potential to operate on the AirLand Operations battlefield in accordance with the requirements of the new logistics concepts. Unfortunately the same shortfalls in equipment, organization, and

personnel that disrupt the aviation support battalion commander's ability to adhere to the guidance established by the five sustainment imperatives also degrade his capability to plan, organize, and employ the battalion in a manner that takes advantage of the new logistics concepts established in TRADOC Pamphlet 525-5. (Refer to Chart 2, "Shortfalls in ASB Mission Functions Compared to AirLand Operations Requirements," page 40.) The following section discusses the remainder of the components that make up the BLSA 2000 concept and how well the ASB, an integral part of BLSA 2000, can operate as part of the system.

BLSA 2000 Framework

To implement the aviation support system of the future, BLSA 2000, the U.S. Army Aviation Logistics Center plans to structure the system to operate in two areas of the battlefield. These two areas will be designated the operational maintenance (OM) and sustainment maintenance (SM) areas.⁶⁴ Sustainment functions and procedures that are accomplished at the tactical level (division {DISCOM} and corps {COSCOM}) will be performed within the operational maintenance area. Sustainment functions and procedures that are accomplished at echelons above corps level (theater and wholesale, or sustaining base) will be performed within the sustainment maintenance area.

The ASB operates within the operational maintenance (OM) area. To function effectively in the OM area, the ASB must be able to conduct removal and replacement of components/subsystems and perform expedient field repairs. This must be accomplished throughout the division's area of

operations, which requires both mobile maintenance teams and maintenance performed at a central location. The intent of the OM area is to group maintenance functions into three categories: unprogrammed maintenance requirements resulting from battle damage, unprogrammed maintenance requirements caused by component failure (with emphasis on early diagnosis of impending failure), and programmed maintenance based on predicted component replacement.⁶⁵

To support unprogrammed maintenance due to battle damage, BLSA 2000 is designed to emphasize the rapid repair of systems using quick change assemblies (QCA's) and the extensive use of specialized battle damage assessment and repair (BDAR) kits and procedures. QCA's are major components (the mast mounted sight used on the OH-58D and aircraft engines are examples) with secondary subsystems pre-installed to reduce the time required to change out the component. BDAR kits are portable boxes configured with specific, tailored hand tools and repair material enclosed that a mechanic can use on the battlefield to effect a temporary repair on systems or subsystems (an example is an aircraft electrical BDAR kit that may have wire splicing tools, lengths of replacement wire, and electrical connectors that can be used to bypass a damaged electrical wiring system).

To alleviate many of the problems experienced by DISCOM's current aviation maintenance company and, if fielded, the aviation support battalion, maintenance personnel operating in the OM area will have a generic maintenance military occupation specialty (MOS). This is feasible since the concept hinges on the idea of focusing on either recovery or rapid repair using

QCA's or BDAR kits. Repair of the removed component would be done later-- either at the corps support command's AVIM company (OM area), in the theater aircraft maintenance point (TAMP), or by repair facilities within the United States (both of the latter are in the SM area).

To improve divisional and corps aviation logistics units' ability to perform the aircraft recovery mission by ground means, BLSA 2000 calls for the use of a special recovery, evacuation, classification, and cannibalization (REC²) vehicle. This vehicle will give the ASB the capability to lift, load, unload, or support cannibalization action by the maintenance support team. It will also solve some of the ASB's existing mobility shortfalls.⁶⁶

The other dimension called for by BLSA 2000 is the requirement for a highly efficient command, control, communication and automated information network that ties the operational maintenance area and the sustainment maintenance area together. This is key to solve both unprogrammed maintenance problems that occur and in tracking programmed maintenance, especially in an austere theater of operations, and in requisitioning, maintaining in-transit visibility, and issue of expensive Class IX (Air) components and subsystems. Additionally, this flow of maintenance and supply information will allow the logisticians in the SM area to closely monitor the performance of individual airframes (in the case of aircraft) and remain proactive to reduce the predicted maintenance failure.

Central to this capability will be the predictive aircraft maintenance system (PAMS), which will give the logistics operator in the OM area unprecedented visibility of aircraft data such as individual aircraft condition

and number of aircraft flight hours remaining until scheduled major component change.⁶⁷ This system will allow data to be retrieved from the specific aircraft, entered into the unit data base, then transmitted or delivered to the division materiel management center (DMMC) where it will be used as a decision making tool by the senior aircraft logistician in the division, then passed to the SM area.⁶⁸

In order to provide the aviation brigade with single, comprehensive aviation logistics support, the ASB must be structured, organized, and equipped to maintain the pace set by the brigade throughout all stages of AirLand Operations. The capabilities of the ASB forecasted by the BLSA 2000 concept--that calls for proactive, tailorable, and streamlined logistics, coupled with improved maintenance--give the aviation commander the capability of force projection and the means to maintain support even during the extended (in space and time) operations on the battlefields of the next century.

The following chart summarizes the shortfalls of the ASB in terms of these new logistics concepts:

NEW LOGISTICS CONCEPT

ASB MISSION FUNCTION

	Proactive Logistics	Tailorable Logistics	Streamlined Logistics	Improved Maintenance
C ²	✎ ¹	✎ ²		
CL I Ops	✎ ³			
CL II, IV, VII	✎ ⁴	✎ ⁵		
CL III Ops	✎ ⁶			
CL V Ops	✎ ⁷			
Grnd Maint				
Grnd ASL				
Avn Maint			✎ ⁸	✎ ⁹
Air ASL		✎ ¹⁰	✎ ¹¹	
Health Services	✎ ¹²	✎	✎	✎

NOTES:

- ¹ Communications equipment shortages inhibit commander's ability to read the battle in real time
- ² Under resourced support operations section limit deployment sequencing and mobility, lack of platoon leader in HSC degrades tailorability.
- ³ Insufficient personnel and materiel handling equipment limit capability of ASB to anticipate needs to fully support the commander's plan and intent in all cases.
- ⁴ Insufficient personnel and leader to meet all needs.
- ⁵ Insufficient transport vehicles for materiel/equipment limit capability to configure deployment team for optimum support.
- ⁶ Insufficient fuel storage capability, number of refuel vehicles, and lack of radios for flexibility in employing the vehicles limit ASB commander.
- ⁷ Lack of radios for ammunition team limit flexibility and may prevent ASB commander's ability to support the brigade in a proactive manner.

Chart 2

Shortfalls in ASB Mission Functions
Compared to AirLand Operations Requirements

Notes (Cont'd):

- ⁸Current reliance on mechanics and technical inspectors that are specialists as opposed to generic mechanics coupled with a limited number of aircraft test and diagnostic equipment hamper ability to tailor deployment teams.
- ⁹Current shortcomings in ASB concept to meet all requirements of BLSA 2000 are basically due to the fact that most of the equipment and vehicles envisioned in the concept are not yet fielded. Organization and doctrine should enable ASB to meet all BLSA 2000 requirements upon full fielding of the equipment and additional manpower authorization.
- ¹⁰Inability of the standard Army retail supply system (SARRS) to provide automated support in drawing aircraft specific repair parts from the ASL severely limit ability to tailor a support package in a deployment situation.
- ¹¹Current shortcomings by the HSC to provide concurrent management of both ground and air ASLs inhibit flexibility in providing push packages of repair parts.
- ¹²Shortfalls in all areas because ASB is currently not structured to provide Health Services to the aviation brigade.

IV. CONCLUSIONS AND IMPLICATIONS

Since the mid-1980's, Army aviation struggled with doctrine and systems to improve logistics for its aviation brigades. As discussed in the introduction of this paper, most of the Army's senior leadership recognized the problem as one whereby aviation logisticians and their commander's focused primarily on maintenance policies and procedures and, to some degree, the aviation repair parts system. The other maintenance and sustainment functions were handled separately, with shortfalls, duplicity, and improvisation the typical result. There has been, and remains today, much debate about where command and control of the aviation logistics effort should reside--in the division support command or in the aviation brigade.⁶⁹ It is easy to understand why total support of the aviation brigade never matured into an efficient, comprehensive system.

The aviation support battalion, along with the other improvements envisioned in the Battlefield Logistics System for Aviation 2000 concept, can significantly change the doctrine for supporting the Army's aviation brigades. The establishment of a single manager and one-stop coordinator could, and should, improve the entire aviation logistics system.⁷⁰ However, the ASB must be organized, structured, and resourced in a robust manner to ensure sufficient capability to meet all logistics requirements. Anything less, one can easily argue, merely aggravates the problem by raising expectations to unrealistic levels and disrupting the aviation brigade in its role as a key combat multiplier.

In its current configuration, the ASB has serious shortcomings in its ability to meet even the five sustainment imperatives (refer to Chart 1, ASB Mission Function Shortfalls Compared to Sustainment Imperatives, page 26). To fulfill the requirements of AirLand Operations and prepare for the fielding of the equipment and vehicles called for under the BLSA 2000 concept, the ASB must be able to accomplish these doctrinal fundamentals as a prerequisite. Once properly structured and resourced with personnel, equipment, and vehicles, it could not only perform its mission within the framework of the five sustainment imperatives, but also fulfill the requirements demanded by AirLand Operations (refer to Chart 2, Shortfalls in ASB Mission Functions Compared to AirLand Operations Requirements, page 40).

The strengths of the ASB concept include: the benefits of having an experienced senior logistics operator (the ASB commander) responsible for all aviation brigade sustainment functions; the expanded planning capability gained by the ASB staff; enhanced equipment and vehicle capability called for in BLSA 2000; and the versatility of using generic mechanics, module and component change out, and battle damage assessment and repair procedures to conduct rapid repair and return of vehicles and equipment to the brigade. The major weaknesses of the ASB as it is currently structured (under the test table of organization and equipment) are: the austerity in manning and equipping the command and control sections; inadequate manning and equipping of the direct support sections responsible for providing rations, fuel, and ammunition support; and limited ability to deploy/employ maintenance support teams to multiple locations.

Army aviation has a particularly unique opportunity to correct a long standing problem with its support system. If the decision is made to proceed with the Army-wide fielding of the aviation support battalion, it is imperative that the battalion be structured from the ground up to meet the requirements of emerging FM 100-5 doctrine and BLSA 2000. Any other technique, including the convenient pooling of existing assets and accepting their historical shortcomings, is illogical for effective aviation support and can only result in a flawed organization incapable of deploying with and maintaining the operations tempo of the divisional aviation brigade.

Under the ASB's current organization authorization, the answer to the question "can the proposed aviation support battalion provide single source logistics to the divisional aviation brigade in accordance with the requirements of current and future doctrine?" is no. However, if the highlighted shortfalls in equipment, vehicles, personnel, and health services capability and authorizations are corrected, the ASB can perform its mission as the single source logistics provider for the aviation brigade during warfighting and aviation operations short of war. In a recent article in a professional journal, Major General John D. Robinson, Commanding General, U.S. Army Aviation Center and Fort Rucker, Alabama, called the ASB "a critical part of Aviation's future...."⁷¹ The potential capability of such an organization coupled with the modernization and employment concepts of BLSA 2000 could go far in solving the problems experienced in Army aviation logistics today.

The opportunities for providing first class support to the aviation brigade by relying primarily on improvisation alone are growing fewer each year. The

techniques and systems used to support older generation UH-1H, OH-58A, AH-1S, and CH-47C helicopters simply will not work for a modernized fleet comprised of UH-60L Black Hawk, OH-58D Warrior, AH-64A/D Apache, RAH-64 Comanche, and CH-47D Chinook helicopters. The ASB, as the lead for the entire BLSA 2000 concept, must be properly structured and resourced to meet the requirements of Army aviation for the remainder of this decade and the demands of the year 2000 and beyond. Any level of commitment to aviation logistics short of this will continue the pattern of relying on a logistics system out of step with and unable to maintain the pace set by divisional aviation brigades modernized with realistic, effective doctrine and enhanced capability aircraft.

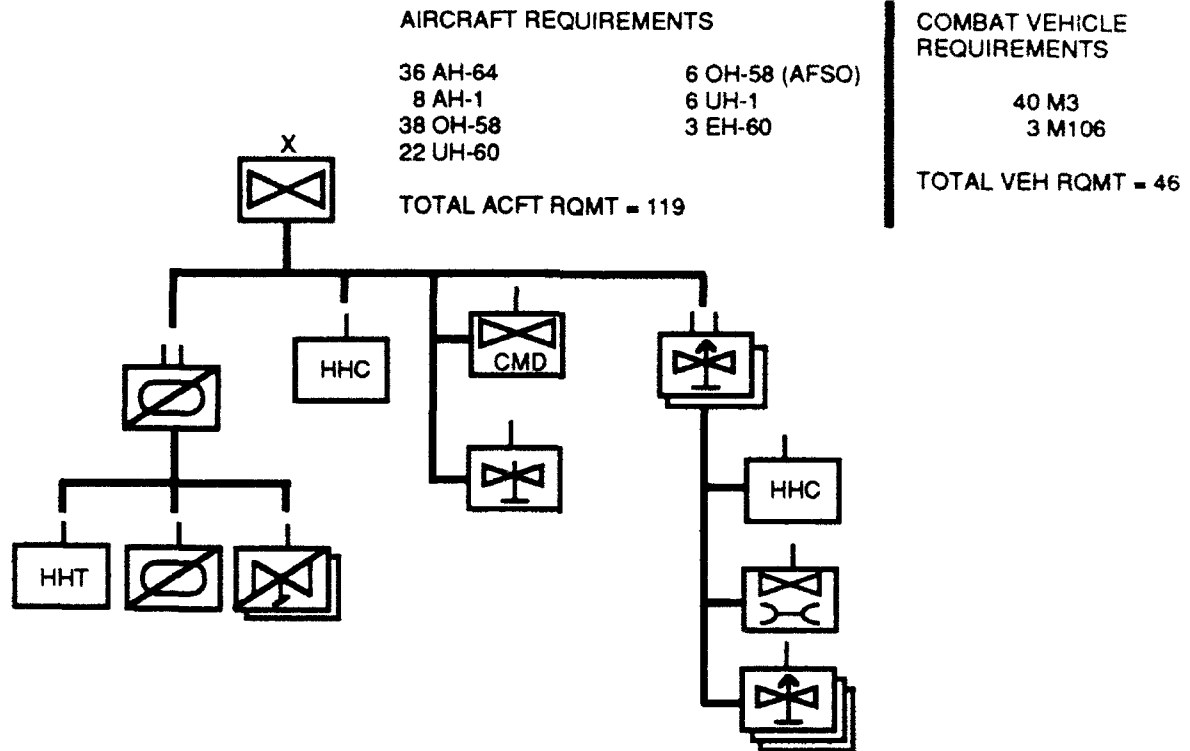


Figure 1, Organization of the Heavy Division Aviation Brigade

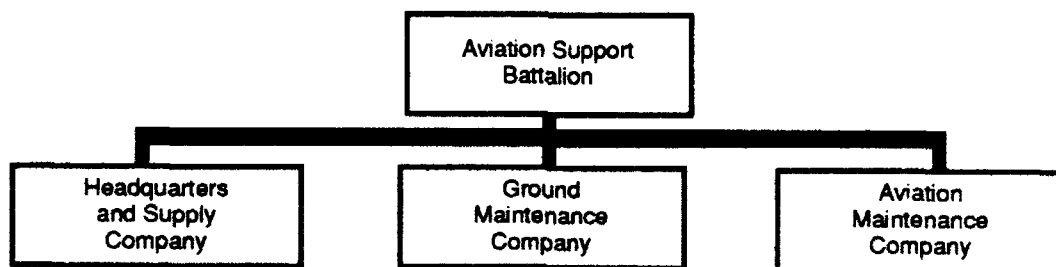


Figure 2, Organization of the Aviation Support Battalion

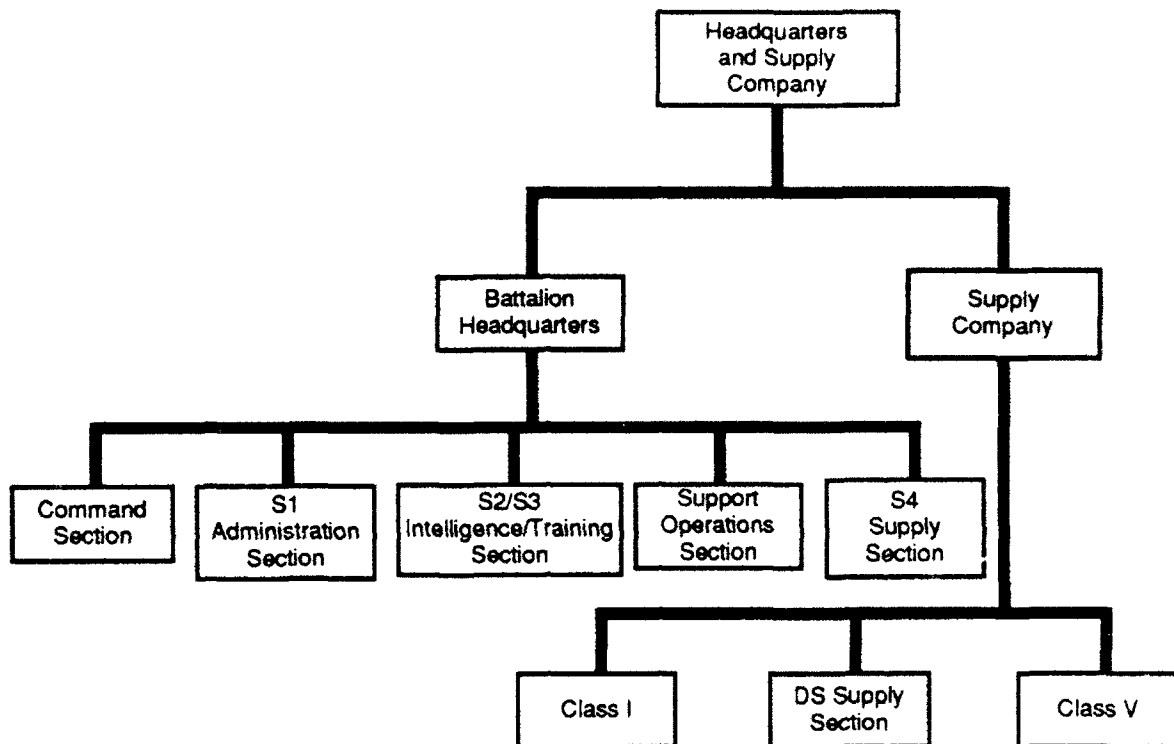


Figure 3, Headquarters and Supply Company

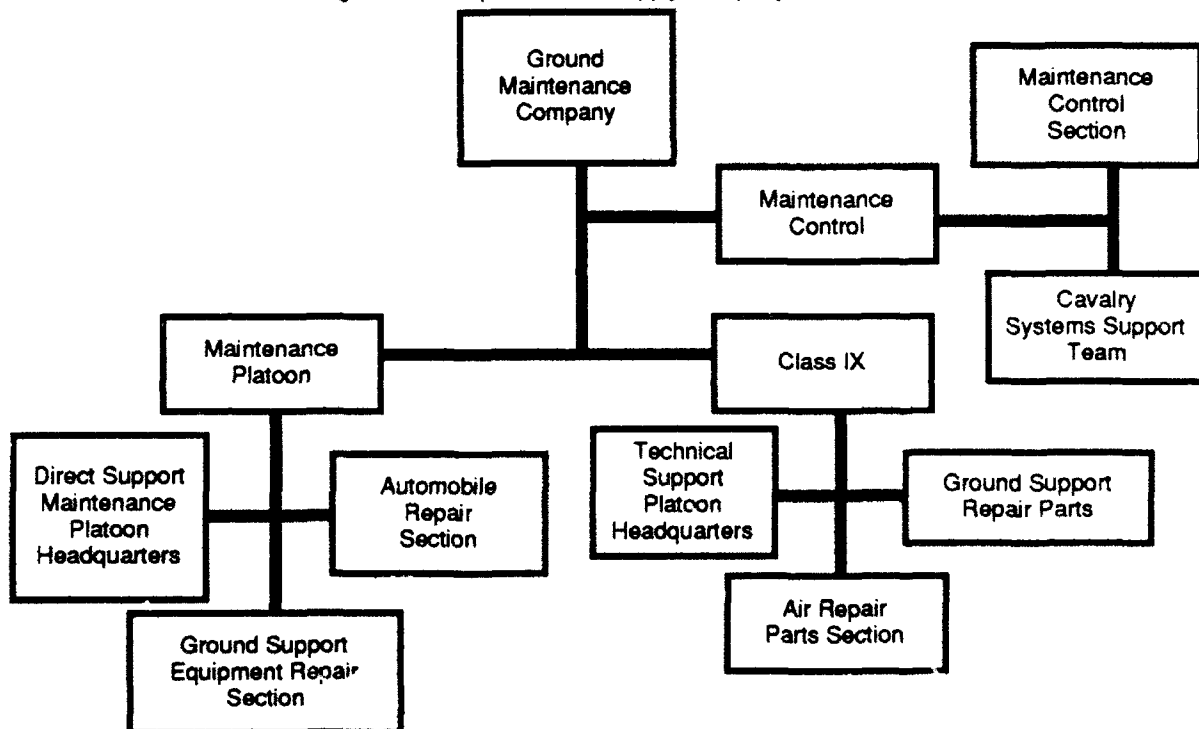


Figure 4, Ground Maintenance Company

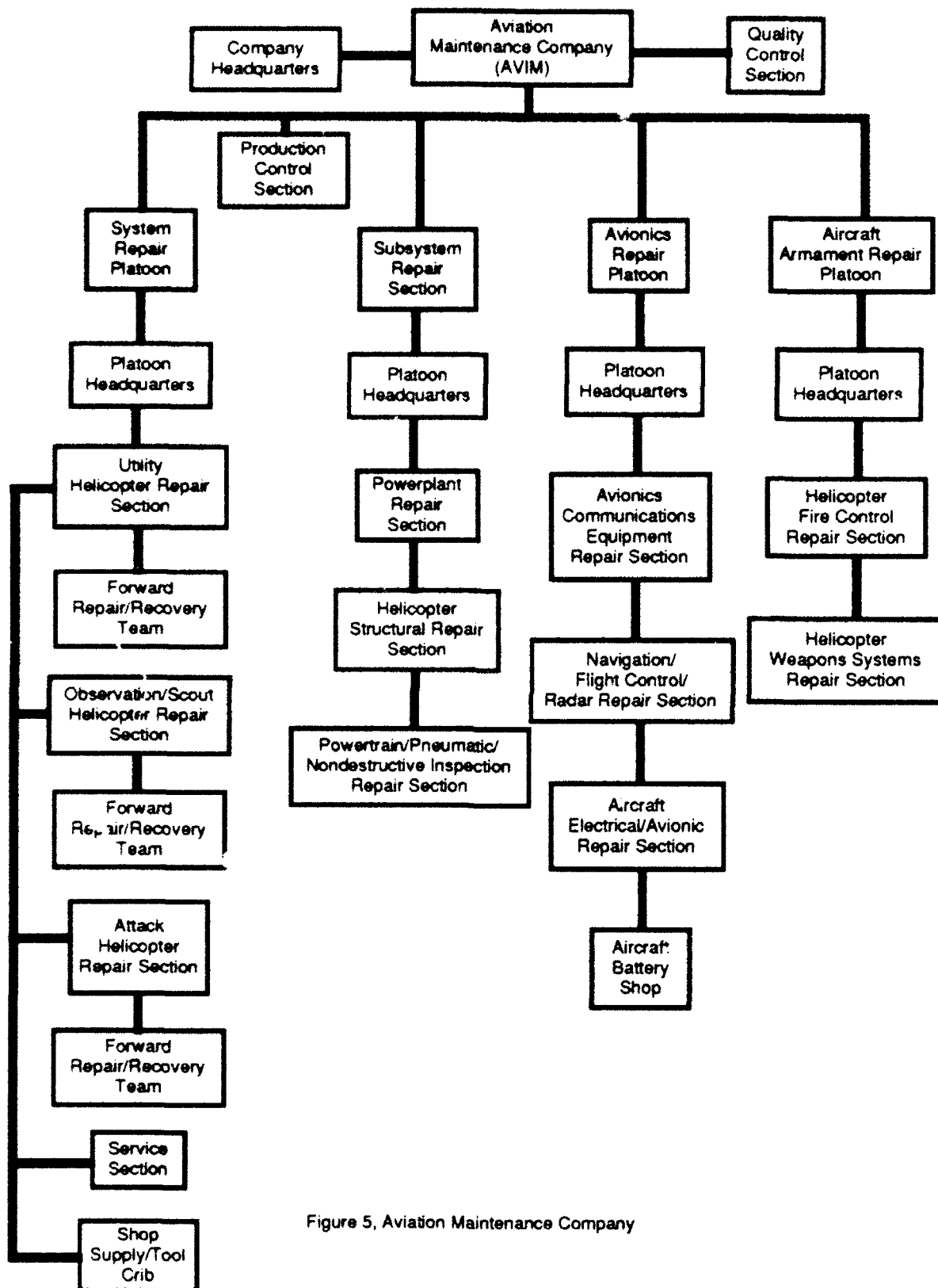


Figure 5, Aviation Maintenance Company

ENDNOTES

1. U.S. Army Aviation Digest 29 (April 1983): Back Cover.
2. U.S. Army, FM 1-111, Aviation Brigades (Washington, D.C: Department of the Army, 27 August 1990), 1-6.
3. Ibid., 1-12. FM 71-100, Division Operations (Washington, D.C: Department of the Army, June 1990), 2-3, 2-4.
4. FM 1-111, Aviation Brigades, 1-7. CONUS-based division aviation brigades are assigned only one attack helicopter battalion. Forward deployed divisions have two attack battalions.
5. Ibid., 1-8. These aircraft and combat vehicles include 36 AH-64, 8 AH-1F, 38 OH-58, 22 UH-60, 6 OH-58 (AFSO, or aerial fire support observer) 6 UH-1H, 3 EH-60, 40 M-3, and 6 M-106.
6. LTC Stuart W. Gerald, "Sustainment of the Combat Aviation Brigade," U.S. Army Aviation Digest 1-87-3 (November 1987): 38-39.
7. Ibid., 44.
8. James Curtin, "Division Aviation Support Battalion," U.S. Army Aviation Digest 1-03-90 (March-April 1990): 36. One noteworthy report on the shortfalls in Army aviation logistics structure and organization is the 1987-1988 "Aviation Brigade Combat Service Support Survey (ABCS³)" conducted by the U.S. Army Aviation Logistics School and authored by Robert E. Howard. Excerpts from this study appear in Robert E. Howard, "Aviation Logistics: ABCS³--A Field's Eye Look at Support," U.S. Army Aviation Digest 1-89-5 (May 1989): 22-27.
9. U.S. Army, TRADOC Pamphlet 525-5, AirLand Operations (Fort Monroe, Virginia: Headquarters, United States Army Training and Doctrine Command, 1 August 1991), I.
10. Ibid., 28, 31.
11. U.S. Army, TRADOC Pamphlet 525-XX (Draft), Aviation Branch Concept for AirLand Operations, (Fort Monroe, Virginia: Headquarters, Training and Doctrine Command, 9 December 1991), 6.

12. U.S. Army, TRADOC Pamphlet 525-XXX (Draft), Military Operations: Battlefield Logistics System for Aviation--2000 (BLSA 2000) (Fort Monroe, Virginia: Headquarters, Training and Doctrine Command, 9 April 1991), 1-2.
13. U.S. Army, FM 100-5, Operations (Washington, D.C: Department of the Army, 5 May 1986), 62-63.
14. U.S. Army, Field Manual 63-2, Division Support Command. Armored Infantry, and Mechanized Infantry Divisions (Washington, D.C: Department of the Army, 20 May 1991), 2-3.
15. U.S. Army, Field Manual 63-21, Main Support Battalion (Washington, D.C: Department of the Army, 7 August 1990), I-I, 1-2.
16. U.S. Army, "Final Evaluation Report (ER) for Aviation Support Battalion (ASB), Heavy Division" (Fort Lee, Virginia: U.S. Army Combined Arms Support Command, June 1992), 8-9.
17. Ibid., 3, 14.
18. Ibid., 3.
19. Ibid.
20. Ibid., 15, 16, 24.
21. Ibid., 15-16.
22. Ibid., 16.
23. Ibid., 17.
24. Ibid., 24.
25. The high figure taken from U.S. Army, Field Manual 101-10-1/2, Staff Officers' Field Manual Organizational, Technical, and Logistical Data Planning Factors (Volume 2) (Washington, D.C: Department of the Army, October 1987), Table 2-15, p2-55 and 2-123. The low figure taken from U.S. Army, ST 101-6, G1/G4 Battle Book (Fort Leavenworth, Kansas: U.S. Army Command and General Staff College, 1 June 1992), 2-3.
26. U.S. Army, "Final Evaluation Report (ER) for Aviation Support Battalion (ASB), Heavy Division," 20, 22-23.
27. Ibid., 22.

28. U.S. Army, FM 101-10-1/2, Staff Officers' Field Manual Organizational, Technical, and Logistical Data Planning Factors (Volume 2), Table 2-16, P. 2-130. U.S. Army, ST 101-6, G1/G4 Battle Book, 2-5.
29. U.S. Army, "Final Evaluation Report (ER) for Aviation Support Battalion (ASB), Heavy Division," 25.
30. Ibid., 27.
31. Ibid., 36-38.
32. Ibid., 29, 36. Major General John D. Robinson, "Maintenance Challenge," Army Aviation 41 (February 1992): 9.
33. U.S. Army, "Final Evaluation Report (ER) for Aviation Support Battalion (ASB), Heavy Division," 28-29. When readiness rates of all eleven aviation brigades and the six separate battalion size units that participated in Operation Desert Storm and subsequent operations in the Southwest Asia theater are combined, the Army aviation force achieved a Department of the Army readiness rate of 90.4%. This figure covers the period of January-March 1990, which were the key months of the operation.
34. Ibid., 29.
35. Ibid., 31. One of the two divisions with ASB's had a significantly better not mission capable--supply (NMC-S) record, having met the standard 68% of the time during the Pre-ASB and ASB pre-Desert Storm period. This unit also achieved the NMC-S standard 63% of the time during and after DESERT STORM.
36. Ibid., 31-32.
37. Ibid., 12-13.
38. Ibid., 13.
39. Ibid., 37.
40. U.S. Army, FM 100-5, (Preliminary Draft), Operations (Fort Monroe, Virginia: Headquarters, United States Army Training and Doctrine Command, 30 August 1992), 2-10, 3-1. Lieutenant Colonel Michael R. Rampy, "FM 100-5, Operations," U.S. Army Aviation Digest 1-07-92 (July-August 1992): 9.
41. U.S. Army, FM 100-5, Operations, 62-63.

42. U.S. Army, FM 100-5, Operations (Washington, D.C: Headquarters, Department of the Army, 5 May 1986), 16. U.S. Army, FM 100-5, (Preliminary Draft) Operations, 2-8.
43. U.S. Army, FM 100-5, Operations, 62.
44. Ibid., 62-63.
45. U.S. Army, FM I-III, Aviation Brigades, I-6.
46. FM 100-5, Operations, 63.
47. This example is to illustrate a point only. The initial blade erosion problem and the dynamics of improvising a solution occurred prior to deployment of the two test Aviation Support Battalions to Southwest Asia from Europe. Aviation units primarily involved with the U.S. Aviation Systems Command (AVSCOM) early effort to improvise a solution to this problem were those of the XVIIIth Airborne Corps. Eventually, this improvised fix to a major fleet-wide problem evolved into a program known as the Rotor Blade Erosion Control Program.
48. U.S. Army, TRADOC Pamphlet 525-5, AirLand Operations, 31.
49. FM 100-5 (Preliminary Draft), Operations , 3-1, 3-2.
50. U.S. Army, TRADOC Pamphlet 525-XXX (DRAFT), Aviation Branch Concept for AirLand Operations (Fort Monroe, Virginia: Headquarters, Training and Doctrine Command, 9 December 1991), 2-3.
51. U.S. Army, FM I-III, Aviation Brigades, I-6.
52. U.S. Army, TRADOC Pamphlet 525-XXX (Draft), Military Operations: Battlefield Logistics System for Aviation--2000 (BLSA--2000) (Fort Monroe, Virginia: Headquarters, U.S. Army Training and Doctrine Command, 9 April 1992), 2-3.
53. U.S. Army, "Final Evaluation Report (ER) for Aviation Support Battalion (ASB) Heavy Division," 12-13. U.S. Army, FM 63-23, (Preliminary Draft), Aviation Support Battalion (Washington, D.C: Headquarters, Department of the Army, May 1990), 1-2.
54. U.S. Army, "Final Evaluation Report (ER) for Aviation Support Battalion (ASB) Heavy Division," 12-14.
55. Ibid., 14.

56. U.S. Army, TRADOC Pamphlet 525-5, AirLand Operations, 2-3. U.S. Army, FM 100-5, (Preliminary Draft), Operations, 3-1.
57. U.S. Army, FM 100-5 (Preliminary Draft), Operations, 3-4.
58. U.S. Army, "Final Evaluation Report (ER) for Aviation Support Battalion (ASB) Heavy Division," 28.
59. U.S. Army, FM 100-5, Operations, Preface. LTG Leon E. Salomon, "Streamlining Logistics in Motion," Army: 1992-93 Green Book 42, (October 1992): 147-148, 150.
60. U.S. Army, TRADOC Pamphlet 525-5, AirLand Operations, 31.
61. The two-level maintenance concept consists of only two maintenance task levels--aviation user and depot. This contrasts with the three level maintenance system (unit, intermediate, and depot) currently in use by the U.S. Army for its rotary wing fleet.
62. Systems under development include a total asset visibility (TAV) initiative which will be able to track Army materiel assets owned, used, in transit or stored, and allows both vertical and horizontal visibility of Army stock inventories. Other improvements include the requisition validation (REQVAL) and asset control system (ACS) which will streamline the logistics process from the wholesale system down to the user unit. LTG Salomon, "Streamlined Logistics in Motion," Army, 154.
63. U.S. Army, FM 63-23, (Preliminary Draft), Aviation Support Battalion, 2-6.
64. U.S. Army, TRADOC Pamphlet 525-XXX (Draft), Battlefield Logistics System for Aviation--2000, 4.
65. Ibid., 5.
66. Ibid., 5-7.
67. Ibid., 6-7.
68. Ibid., 7.
69. Major Randolph B. Wehner, "Command and Control of the Divisional Aircraft Maintenance Company: Was It Broken? Should We have Fixed It?" (Monograph, School of Advanced Military Studies, U.S. Army Command and General Staff College, 5 December 1986), 33-34.

70. U.S. Army, TRADOC Pamphlet 525-XX (Draft), Aviation Branch Operations Concept for AirLand Operations, 26.

71. Major General John D. Robinson, "Maintenance Challenge," Army Aviation: 8-9.

BIBLIOGRAPHY

U.S. Army Publications

- U.S. Army, AR 700-138, Army Logistics Readiness and Sustainability. Washington, D.C: Headquarters, Department of the Army, 30 March 1990.
- U.S. Army, FM 1-100, Doctrinal Principles for Army Aviation in Combat Operations. Washington, D.C: Headquarters, Department of the Army, February 1989.
- U.S. Army, FM 1-111, Aviation Brigades. Washington, D.C: Department of the Army, 27 August 1990.
- U.S. Army, FM 1-500 (Coordinating Draft), Army Aviation Maintenance. Washington, D.C: Headquarters, Department of the Army, n.d.
- U.S. Army, FM 63-2, Division Support Command, Armored, Infantry, and Mechanized Infantry Divisions. Washington, D.C: Headquarters, Department of the Army, 20 May 1991.
- U.S. Army, FM 63-2-2, Combat Service Support Operations: Armored, Mechanized, and Motorized Divisions. Washington, D.C: Headquarters, Department of the Army, August 1985.
- U.S. Army, FM 63-3, Combat Service Support Operations--Corps. Washington, D.C: Headquarters, Department of the Army, 24 August 1983.
- U.S. Army, FM 63-21, Main Support Battalion. Washington, D.C: Headquarters, Department of the Army, 7 August 1990.
- U.S. Army, FM 63-23 (Preliminary Draft), Aviation Support Battalion. Washington, D.C: Headquarters, Department of the Army, May 1990.
- U.S. Army, FM 71-100, Division Operations. Washington, D.C: Headquarters, Department of the Army, 16 June 1990.
- U.S. Army, FM 100-5, Operations. Washington, D.C: Headquarters, Department of the Army, 5 May 1986.
- U.S. Army, FM 100-5, Operations (Preliminary Draft). Fort Monroe, Virginia: Headquarters, Training and Doctrine Command, 30 August 1992.

- U.S. Army, FM 100-10, Combat Service Support. Washington, D.C: Headquarters, Department of the Army, 18 February 1988.
- U.S. Army, FM 101-10-1/2, Staff Officers' Field Manual Organizational, Technical, and Logistical Data Planning Factors (Volume 2). Washington, D.C: Headquarters, Department of the Army, October 1987.
- U.S. Army, FM 700-80, Logistics. Washington, D.C: Headquarters, Department of the Army, 30 March 1990.
- U.S. Army, TRADOC Pamphlet 525-5, AirLand Operations. Fort Monroe, Virginia: Headquarters, Training and Doctrine Command, 1 August 1991.
- U.S. Army, TRADOC Pamphlet 525-XX (Draft), Aviation Branch Concept for AirLand Operations. Fort Monroe, Virginia: Headquarters, Training and Doctrine Command, 9 December 1991.
- U.S. Army, TRADOC Pamphlet 525-XXX (Draft), Military Operations: Battlefield Logistics System for Aviation--2000 (BLSA 2000). Fort Monroe, Virginia: Headquarters, Training and Doctrine Command, 9 April 1991.
- U.S. Army, ST 101-6, G1/G4 Battle Book, Fort Leavenworth, Kansas: U.S. Army Command and General Staff College, 1 June 1992.

Department of the Army Reports and Studies

- U.S. Army, "Final Evaluation Report (ER) for Aviation Support Battalion (ASB), Heavy Division." Fort Lee, Virginia: U.S. Army Combined Arms Support Command, June 1990.
- U.S. Army, "Aviation Support Battalion (Logistics in the Desert)." Unpublished briefing, 1st Armored Division, Division Support Command, n.d.
- U.S. Army, "Division Aviation Support Battalion." Unpublished briefing, Fort Eustis, Virginia: U.S. Army Aviation Logistics School, n.d.

U.S. Army Monographs

- Roh, Daniel J., "Supporting Forward in the Heavy Division." Fort Leavenworth, Kansas: Monograph, School of Advanced Military Studies, U.S. Army Command and General Staff College, 25 January 1988.
- Sinnreich, Richard Hart, et. al., "Employment of Combat Aviation." Fort Leavenworth, Kansas: Aviation White Paper, School of Advanced Military Studies, U.S. Army Command and General Staff College, 28 September 1988.

Wehner, Randolph B. Major, "Command and Control of the Divisional Aircraft Maintenance Company: Was It Broken? Should We Have Fixed It?" Monograph, School of Advanced Military Studies, U.S. Army Command and General Staff College, 5 December 1986.

Journals and Magazines

Converse, M. Wayne Major, "Division Aviation Support Battalion Update." Army Aviation (February 28, 1990): 44-45.

Curtin James, "Aviation Logistics: Division Aviation Support Battalion." U.S. Army Aviation Digest 1-90-2 (March/April 1990): 36-38.

Franks Frederick M. Jr. General, "Reshaping An Army, an Interview With General Frederick M. Franks Jr." U.S. Army Aviation Digest 1-92-3 (May/June 1992): 6-9.

Gerald, Stuart W. Lieutenant Colonel, "Sustainment of the Combat Aviation Brigade, Army Aviation's Achilles Heel?" U.S. Army Aviation Digest 1-87-3 (November 1987): 38-45.

Howard, Robert E., "Aviation Logistics: ABCS³--A Field's Eye Look at Support." U.S. Army Aviation Digest 1-89-5 (May 1989): 22-27.

Pagonis William G. Lieutenant General and Colonel Michael D. Krause, "Observations on Gulf War Logistics." Army Logistician 700-92-5 (September-October 1992): 5-11.

Pilgrim, Calvin F.H. Major and Captain Michael J. Fehn, "CSS for AirLand Operations." Army Logistician 700-92-2 (March-April 1992): 2-7.

Rampy, Michael R. Lieutenant Colonel, "FM 100-5, Operations: A Paradigm of Adaptation." U.S. Army Aviation Digest 1-92-7 (July/August 1992): 8-13.

Robinson, John D. Major General, "Maintenance Challenge." Army Aviation 41 (February 29, 1992): 8-9, 70.

Salomon, Leon E. Lieutenant General, "Streamlining Logistics in Motion." Army: 1992-93 Green Book 42 (October 1992): 147-154.

Snow, Stephen J., "Aviation Support for the AirLand Battle." Army Logistician 700-90-5 (September-October 1990): 28-29.

Stumpf, Harry D. Lieutenant Colonel, "Automating Supply Distribution." Army Logistician 700-92-6 (November-December 1992): 24-26.

Tuttle, William G.T. Jr. General, "Sustaining Army Combat Forces--Part I." Army Logistician 700-91-5 (September-October 1991): 6-11.

Tuttle, William G.T., Jr. General, "Sustaining Army Combat Forces--Part II." Army Logistician 700-91-6 (November-December 1991): 8-15.

Vuono, Carl E. General, "Sustaining Combat Power." Army Logistician, (July-August 1988): 2-6.

"We're a Branch." U.S. Army Aviation Digest 29 (April 1983): Back Cover.

Yeager, Timothy and Alan F. Estevez, "Total Asset Visibility." Army Logistician 700-91-3 (May-June 1991): 2-5.