United States Marine Corps
Command and Staff College
Marine Corps University
2076 South Street
Marine Corps Combat Development Command
Quantico, Virginia 22134-5068

MASTER OF MILITARY STUDIES

TITLE: Future Design of the Marine Aviation Logistics Squadron

SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF MILITARY STUDIES

AUTHOR: Major Robert L. Wiser
United States Marine Corps

AY 08-09

Mentor and Oral Defense Committee Member: Pauletta OTIS
Approved: Pauletta Otis
Date: 19 March 09

Oral Defense Committee Member: _____
Approved: _____
Date: 24 April 09

Report Documentation Page

Form Approved
OMB No. 0704-0188

Public reporting burden for the 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. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
2009		**00-00-2009 to 00-00-2009**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
Future Design of the Marine Aviation Logistics Squadron	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **United States Marine Corps,Command and Staff College, Marine Corps Combat Dev,Marine Corps University, 2076 South Street,Quantico,VA,22134-5068**	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT **unclassified**	b. ABSTRACT **unclassified**	c. THIS PAGE **unclassified**	**Same as Report (SAR)**	**33**	

DISCLAIMER

THE OPINIONS AND CONCLUSIONS EXPRESSED HEREIN ARE THOSE OF THE INDIVIDUAL STUDENT AUTHOR AND DO NOT NECESSARILY REPRESENT THE VIEWS OF EITHER THE MARINE CORPS COMMAND AND STAFF COLLEGE OR ANY OTHER GOVERNMENTAL AGENCY. REFERENCES TO THIS STUDY SHOULD INCLUDE THE FOREGOING STATEMENT.

QUOTATION FROM, ABSTRACTION FROM, OR REPRODUCTION OF ALL OR ANY PART OF THIS DOCUMENT IS PERMITTED PROVIDED PROPER ACKNOWLEDGEMENT IS MADE.

Illustrations

Page

Executive Summary

Title: Future Design of the Marine Aviation Logistics Squadron

Author: Major Robert L. Wiser, United States Marine Corps

Thesis: The current structure of the eleven active duty Marine Aviation Logistics Squadrons (MALS) was established in 1988. Since then several significant changes have occurred that, combined with emerging capabilities, will impact the design and functioning of the MALS in the future. This paper will explore how contemporary advances in technology, inventory management, and future aircraft design should be taken into account in redesigning the structure and functioning of the MALS. This paper is intended to contribute to the general discussion within the community; not to offer *the* correct solution, but to capture some of the elements that will influence the Future MALS [MALS (F)] design and to discuss how they should shape MALS (F). It will explore/discuss developments since the current MALS structure was established that have made it possible or necessary to modify that structure. Further, it will explore some specific concepts that will be introduced in the near future and consider how they should be implemented into the aviation logistics concept.

Discussion: There are two reasons why the MALS design must change: First, is a mandate to change from the leadership of the aviation logistics community. Second, there are opportunities to improve our current business practices which will allow us to improve aircraft readiness and to reduce the forward deployed footprint of the MALS. Some of the available technologies include End to End AIRspeed, Current Readiness, and, most significantly, Marine Aviation Logistics Program II (MALSP II). These new concepts are being developed, however, it is not yet clear how they impact the design and structure of MALS (F). The author proposes that implementation of these concepts should reduce the size of the MALS. Some functions should be moved from the MALS to other squadrons within each MAG, while other functions should be consolidated at the Marine Aircraft Wing level. Although change is necessary, some things, such as the command structure and command relationships that exist between the MALS and the Marine Aircraft Groups (MAGs) they support and the ability to smoothly transition from a garrison to deployed environment, should not change.

Conclusion: With new technology and logistics methods serving as the enablers of change, and emerging concepts and support requirements serving as the drivers of change, the time for change to the MALS concept has clearly arrived. There is no doubt that imminent changes will have an impact on the future structure of the MALS. The result is likely to be fewer MALS that are organized regionally. The MALS of the future is also likely to be smaller than the current MALS, unless they are consolidated into fewer, but larger units. More functions will be performed in the rear, requiring fewer Marines deployed forward. In order to successfully manage the impending changes the aviation logistics community must thoroughly and deliberately institutionalize proven new concepts, while, at the same time, holding onto certain things that have proven successful.

Table of Contents

Preface

For those of us in the Aviation Logistics community these are exciting times. We have seen many new concepts gain momentum over the last several years. In the coming years we will see these concepts implemented, likely resulting in significant changes to the Marine Aviation Logistics Squadrons in which we serve. As I mention in the Introduction to this paper, it is my intention to outline some emerging concepts and to humbly offer some ideas for the future direction of the MALS. I hope the reader will find them thought provoking and worthy of additional discussion.

A special note of thanks is due to Colonel Don Davis, USMC (Ret.) who provided me an excellent education about the history of Marine Aviation Logistics and the reasons behind our current structure and support concepts. He provided an understanding and appreciation for how far we have come as a community, and, as importantly, a grasp on critical lessons learned that we can take into the future.

I would also like to thank Dr. Paula Otis, my staff mentor for this project, for her advice and guidance. Without her help this project would not have been possible. I am also deeply grateful to Mrs. Polly Blake for the expert guidance she selflessly gave and for her endless patience.

Introduction

The current structure of the eleven active duty Marine Aviation Logistics Squadrons (MALS) was established in 1988 and has served the Marine aviation community well since that time. However, several significant changes have occurred over the past fifteen years that, combined with emerging capabilities, will impact the design and functioning of the MALS in the future. The time has come to consider how these changes can be applied to modernize the MALS concept.

This paper will explore how contemporary advances in technology, inventory management, and future aircraft design should considered in redesigning the structure and functioning of the MALS. This paper is intended to contribute to the general discussion within the community; not to offer *the* correct solution, but to capture some of the elements that will influence the Future MALS [MALS (F)] design and to discuss how they should shape MALS (F). It will explore/discuss developments since the current MALS structure was established that have made it possible or necessary to modify that structure. Further, it will explore some specific concepts that will be introduced soon and consider how they should be implemented into the current aviation logistics construct.

Marine Aviation Logistics Squadron Design and History

A Marine Aircraft Group (MAG) consists of several squadrons that are composed of airplanes, pilots, and mechanics. For the purpose of this paper these squadrons will be referred to as "flying squadrons." A MALS is a squadron within a MAG that does not have pilots or aircraft assigned, but provides aviation support consisting of maintenance, aircraft parts supply, avionics parts and technicians, ordnance, and ground support equipment to the flying squadrons

within the MAG. Each MAG contains one MALS. In the Marine Corps aviation community there are three levels of maintenance. These levels of maintenance are: the organizational level ("O Level"), which is basic maintenance performed within the flying squadrons by mechanics and technicians assigned to the squadron as organic personnel; Intermediate Level ("I Level"), which is performed by MALS personnel, usually within MALS squadron spaces; and Depot Level ("D Level") maintenance, which is extensive maintenance such as overhaul, performed by civilians at one of several Naval Aviation Depots located around the country. Depot level maintenance has traditionally been performed in CONUS, although civilian contractors currently perform some depot level maintenance in Iraq.

In 1988, the aviation logistics community transitioned to the current MALS structure in part to address the problems caused by diluted chains of command and lines of responsibility for aviation support within each MAG. Prior to 1988, Maintenance and Supply Officers were assigned to the MAG staff as special staff officers to the MAG commander, but were also administratively assigned to the Headquarters and Maintenance Squadron (H&MS), which was the organization that preceded the MALS.[1] This convoluted chain of command caused significant inefficiencies and denied the MAG commander a single point of contact for all matters relating to aviation support within the MAG. Matters were further complicated by the fact that each MAG was structured slightly differently based on the type of aircraft supported, and on the preferences of the key personnel within each MAG. When implemented, the MALS concept addressed these problems by providing the MAG commander with a subordinate commander who served as a single point of contact for all matters related to aviation logistics within the MAG.[2] This command structure, in which all the subject matter experts are on the

MALS staff and answer to the MALS commander instead of the MAG commander, has proven very effective and should be maintained in whatever future design is developed for MALS.

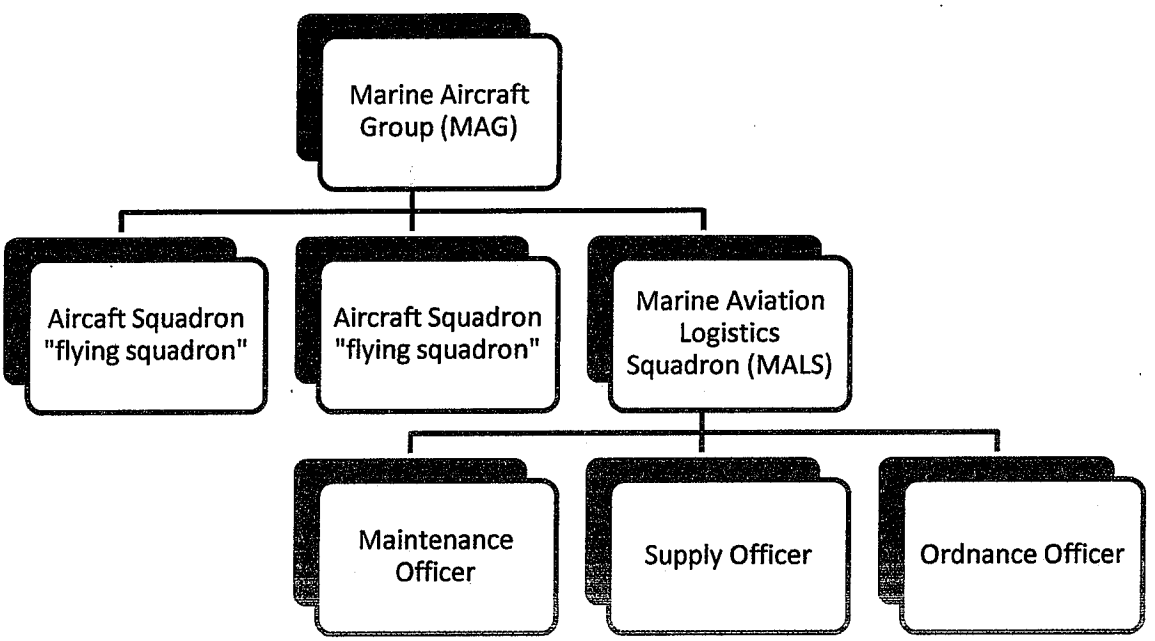

Figure 1: Diagram of Current MAG/MALS Structure

In addition to solving the problem of convoluted lines of responsibility, the MALS concept was brilliantly designed to support aircraft training and readiness in garrison and to be quickly task organized for deployments. The ability to quickly task organize is a critical requirement because, when in garrison, each MALS is outfitted and equipped to support only the types of aircraft assigned to the MAG to which the MALS belongs. However, when an Aviation Combat Element (ACE) is formed to support a Marine Air-Ground Task Force (MAGTF) it may be made up of any number of aircraft of various types. These task organized ACEs are known as "composite" squadrons or MAGs. In order to support these various aircraft, a MALS must also

be task organized and outfitted with the correct parts, equipment, and technicians to support the unique mix of aircraft assembled to form an ACE. The answer to this challenging task is called the Marine Aviation Logistics Support Program (MALSP). This concept calls for a designated MALS to form the "core" MALS to support the composite ACE, and for each of the MAGs contributing aircraft to the composite ACE to provide a "slice" of parts, Marines, and equipment to support their aircraft contribution to the composite ACE. This idea provided a tailorable and scaleable support concept capable of supporting any size ACE consisting of any aircraft mix.[3] The MALSP concept was an enormous improvement over the ad-hoc arrangements that were used prior to 1988.

The aviation logistics community faces numerous challenges that did not exist in 1988. Some of these challenges include the increased use of civilian contractors over the past two decades, which has adversely affected the technical expertise of some Marines within the MALS; recent deployment schedules have further affected the professional development of junior leaders within the MALS, many of whom will rise to leadership positions within the aviation logistics community in the coming years; and, a decrease in the number of noncommissioned officers applying for the warrant officer programs, which will impact both the number and quality of technical experts available in the future. Also of significance, future aircraft are being designed to require fewer maintenance and supply functions performed at the MALS, eventually affecting the MALS manpower and organizational structure.[4]

There are many initiatives currently under way that are aimed at developing and testing new ideas. Many of the concepts being studied hold great potential to improve current aviation logistics business practices, but it is not yet clear how new concepts could shape the structure

and function of the MALS. In order to effectively manage the impending transition, the Aviation Logistics Transformation Task Force was established and chartered in 2005 to " ... transform Aviation Logistics to achieve an end state. That end state is to offer, as a force multiplier to the Aviation Combat Element (ACE), a performance-driven expeditionary logistics force that is agile, flexible, responsive, lighter, and has a sustainable footprint." [5] Clearly, Headquarters Marine Corps, Aviation Logistics Support Branch (ASL) has demonstrated that Marine aviation logistics is on the path toward the future, and the future will not look like the present.

Why the Design Must Change

The current MALS structure is not broken. However, it was designed in a different era to face different challenges. Although it was on the cutting edge when developed, by today's standards it results in a heavy footprint and a reactive support system.[6] There are two reasons that the structure of the MALS should be reconsidered and that change is necessary. The first is that Marine Corps future concepts present a mandate to change. The second is the development of new technology that will enable aviation logisticians to find better, more efficient ways to do business.

Requirements

The Aviation Logistics Transformation Task Force charter calls for the aviation logistics community to "operate within the guidelines of emerging concepts".[7] These emerging concepts are sea basing and operational maneuver from the sea (OMFTS). A reduced forward footprint and improvements in expeditionary flexibility, agility, and effectiveness will be required whether

operating from a sea base, from over the horizon, or simply from a forward operating base ashore.

The *Aviation Campaign Plan* and *Marine Corps Vision 2025* both extensively address the requirement for a reduced footprint and increased agility and flexibility. Specifically, *Marine Corps Vision 2025* calls for Marine forces to have the ability to sustain themselves ashore through the use of either a sea base or an initial lodgment ashore which leverages the advantages of sea basing and expeditionary airfield basing. A balance must be struck between being heavy enough to sustain expeditionary warfare and light enough to facilitate rapid deployment. [8]

Additional issues that will drive change is the steady move toward a two-level maintenance system, from the current three levels, and the increase in Performance Based Logistics (PBL) contracts.[9] Currently, there is a blurring of the traditional lines that separate the three levels of maintenance. For example, depot level mechanics are increasingly being placed in the MALS to perform maintenance traditionally done at the depots.[10] Depot level mechanics are even deployed to Iraq to perform maintenance in proximity to MALS Marines. Meanwhile, FY-03 Defense Policy Guidance required each Military Department to establish a PBL implementation schedule for all new weapon systems. As a consequence of this and subsequent guidance from the Assistant Secretary of the Navy for Research, Development and Acquisition, there has been a significant trend toward PBL support strategies in Naval and Marine aviation in recent years. This is not restricted solely to new aircraft; it can apply to new equipment such as radars, engines, or other equipment that are added to aircraft. Although each Performance Based Logistics contract is unique, the basic tenants are similar. "A PBL contract is an agreement, usually long term, in which the commercial provider is incentivized and empowered to meet

overarching customer oriented performance requirements (reliability, availability, etc.) in order to improve product support effectiveness while reducing Total Ownership Cost (TOC)." [11] Often, PBL contracts turn repair work that was previously done by MALS Marines over to contractors. [12] The increasing prevalence of this practice is likely to spawn a steady erosion of workload for the MALS.

Opportunities to capitalize on new concepts

In addition to the requirement to change mentioned above, the impetus for change is the existence of new technologies that were not yet conceived when the MALSP concept was developed. Current technology holds the potential to deploy fewer Marines into harm's way, or to deploy more ground combat Marines in lieu of some aviation logisticians.[13]

It is hard to believe, but MALSP was designed before the Internet. The twenty years that have passed since the development of MALSP have witnessed significant advancements in software, network communications, and Automated Information Technology (AIT). The rate at which new technologies and logistics concepts were developed during that time is especially significant. Several of these technologies hold significant promise for implementation into a new concept for Marine Aviation Logistics.

One technology in particular, Radio Frequency Identification Devices (RFID), holds the potential to improve asset visibility and accountability in transit and to reduce the man-hours required to perform inventory management functions. Implementation of RFID could reduce the amount of manual inventory management work that must be done in forward deployed areas. RFID is widely used in the commercial sector to enable in-transit visibility of supplies and

equipment and it will soon be common place in military applications as well. Hand-held scanners and other wireless devices will probably soon be used to perform aircraft troubleshooting, reference maintenance or supply publications, record supply transactions, and collect maintenance data as a matter of routine.[14]

The Expeditionary Pack Up Kit (EPUK) and electronic Buffer Sizing Tool (eBST) are being developed and tested for use in a new Marine Corps aviation logistics chain. These tools, or others like them, will aid in accurately determining what aircraft parts to include in deployment pack-ups, for predicting the quantity of various items that are likely to be ordered during a given time period, and for mitigating against spikes in demand and disruptions in resupply. These tools will allow aviation logisticians to create parts pack-ups and warehouse stores with much greater accuracy.[15] Furthermore, Theses tools will also provide the ability to scan parts as they are received, sent, and stowed, and to transmit these transactions to a data base in a rear area or even to CONUS. Implemented properly, and in conjunction with appropriate software and network connectivity, these technologies could reduce the size of parts inventories sent forward by ensuring that only the right parts are sent. Eventually, a secondary effect may be a reduction in the number of aviation logistics Marines required forward.

Autonomic logistics represents a significant advancement in the discipline of logistics because it means that the logistics concept of support was envisioned early in the aircraft development process and was incorporated into the aircraft design, as opposed to a support concept developed after the aircraft is purchased by the Department of Defense, which has been normally been the case. The F-35 Joint Strike Fighter, which is expected to be fielded in the next ten years, will be the first Marine Corps aircraft to incorporate autonomic logistics in the design.

The aircraft will be capable of self diagnosing problems, relaying maintenance requirements to ground crews while still airborne and identifying upcoming parts requirements. This technology, if it proves effective, combined with an overall aircraft design intended to minimize complex repairs required in the field, will require fewer maintenance and supply Marines to support it than older aircraft have traditionally.[16] Although the Joint Strike Fighter is the first Marine Corps aircraft to possess this capability, it is reasonable to assume that other future aircraft will possess similar technology, thus requiring reduced support personnel and equipment in the field.

The Primary Catalysts of Change

Aside from the above mentioned concepts that will eventually impact the Marine Corps concept of aviation logistics support, three major concepts currently in development soon will have a significant impact on the current MALS. They are End to End Airspeed, Current Readiness, and MALSP II.[17]

End to End AIRspeed

AIRSpeed is the term applied to a strategy for continuous process improvement that combines the commercial industry principles of Theory of Constraints, Lean, and Six Sigma in order to optimize efficiency. The effort to streamline and improve processes within the MALS through the application of AIRSpeed has been on-going for several years and measurable improvements have been made. The next step, known as End to End (E2E) AIRspeed, applies these principles across the elements of the naval aviation logistics system. E2E is targeted at activities such as wholesale supply distribution centers, depot maintenance facilities, engineering support, and even the flying squadrons.[18] The goal of E2E AIRspeed is to better align all

elements of the naval aviation logistics system to the same goal of producing aircraft readiness, as opposed to each entity focusing solely on its role in isolation from all the other elements in the logistics chain.

Current Readiness

The complexity of the problems facing naval aviation become apparent when one examines the enormous military industrial complex that supports Marine Corps and Naval Aviation. The collection of commands, military organizations, government agencies, and commercial activities required to support Naval aviation is known collectively as the Naval Aviation Enterprise (NAE). These disparate entities operate in a complex system that is stove piped, sometimes redundant, and occasionally pits elements of NAE at cross purposes with each other. The system has grown more complex over time and, in some cases, ad hoc solutions and work arounds have become institutionalized processes. There is no single voice of authority or unifying goal to link all the elements of the NAE together.

Current Readiness is an NAE-wide strategic approach that is intended to address these problems and to address the negative impact they have on aircraft readiness. The purpose of Current Readiness is to identify, isolate, and resolve the root causes of friction within the NAE using AIRspeed principles. System alignment and synchronization at the tactical, operational, and strategic levels is the goal.[19]

Although system alignment has improved significantly since MALSP was developed, under the Current Readiness concept this alignment will continue to improve. The MALS is the Intermediate Level organization at the tactical level and serves as the interface between the

flying squadrons and the complex segment of the military industrial complex that supports naval aviation. It makes sense that the structure of the intermediate level organization (the MALS) should evolve as the entire enterprise aligns to become more focused on support to the flying squadrons.

Marine Aviation Logistics Support Program II

Although E2E and Current Readiness will undoubtedly influence the shape of the future MALS, it is difficult to determine how significant or immediate the impact will be. However, the primary driver of change in the near term will be MALSP II and it is not as difficult to anticipate how it will impact the future.

The goal of MALSP II is to address the shortcomings of the MALSP program, in particular by improving the effectiveness of supply pack-ups and the timeliness of stock replenishments at deployed locations.[20] The concept entails building support packages that are aircraft/unit/mission-scaleable, much like the packages that are built under the current MALSP construct, but more precisely tailored than is possible today, and more mobile. The support packages are custom built for each deployment based on the amount of time required for stock replenishment at any specific location (known as TRR - Time to Reliably Replenish) and the likely demand pattern for parts generated by the specific aircraft mix of the ACE. The improved support packages will be replenished from a system of "buffers" – precisely sized inventory levels - that cushion against demand spikes and variability in delivery time. Buffers are sized based on TRR and demand patterns. These buffers form a logistics chain placed at strategic nodes in the theater; each buffer contains a small amount of inventory which is used to replenish

the nodes closer to the end user as demand at the point of use depletes the stock level. These nodes will be placed in the most advantageous location for a given deployment scenario and where they can best optimize the effectiveness of the entire logistics chain. This is known as a logistics "pull" system in which a stock depletion created by issuing a part triggers the shipment of a stock replacement.[21] To make the system work properly timely reach back and transportation between the nodes is crucial. Experience in Operation Iraqi Freedom has validated that the secret to improving the effectiveness of deployed supply pack ups is to create a system of nodes and to disburse supply stocks in key locations.[22]

MALSP II embodies the evolution of Marine aviation logistics transformation and it will significantly change the way aviation logistics is conducted in the near future. The Marine Corps has shown its commitment to the MALSP II program and its implementation is one of the reasons for the creation of the Transition Task Force (TTF) mentioned earlier. There is a strategy for making MALSP II a program of record in the near future and Initial Operating Concept (IOC) is expected in 2012.[23]

How the Design Should Change

Although the need and opportunity for change are apparent, it is not yet clear how the MALS should be redesigned to incorporate significant leaps forward in aviation logistics. Reducing forward deployed footprint and improving parts pack ups are two things the aviation logistics community should strive for when implementing the new concepts. As mentioned above, MALSP II will improve parts pack ups. While the model that the Navy is pursuing aboard their newest ships could serve as an example of how to reduce the forward deployed footprint and serve as a roadmap for the Marine Corps aviation logistics community.

The Gerald R. Ford (CVN-78), which is scheduled to join the U.S. Navy's fleet in 2015, is slated to replace the current Enterprise and will be the lead ship of the new class of United States Navy super carriers.[24] Considerable effort is being put into reducing the number of crew required to operate CVN-78 and other new ships. It is anticipated that each crew will be between 2500 and 2700 personnel, a reduction of 500 to 900 personnel from the current Nimitz class of carriers.[25] The number of aviation support personnel required is expected to be substantially reduced. The ship's Intermediate Maintenance Activity (IMA) essentially performs the same functions in support of Navy aircraft aboard the ship as a MALS does for Marine aircraft deployed ashore. Therefore, the avenues being explored by the Navy in their effort to reduce the crew requirements aboard the CVN-78 can give insight into how the Marine Corps aviation logistics community might achieve the same goal of reducing forward deployed personnel and footprint.

The Navy is developing a concept called "Distance Support" that seeks to "leverage process changes and technology enhancements to either transform or eliminate previously performed workload afloat".[26] The goal is to incorporate technology to reduce the requirement to deploy Sailors to order, track, receive and issue material, and to perform financial record keeping functions.[27] It seems plausible that similar business processes can be moved out of the MALS and performed or managed from afar, perhaps even from CONUS. This could allow for the consolidation of some functions into regional or centralized support activities similar to the Navy Distance Support concept.

Several of the concepts under development that have been outlined in this paper hold the potential for the reduction of forward deployed personnel. However, opportunities may also

exist to reduce the size of the MALS through consolidation of some functions and by moving some functions to the squadron level. Centralizing some functions could also lead to greater effectiveness and increased efficiencies. For example, a more efficient way to conduct financial record keeping – perhaps by removing it from the MALS - should be studied. This appears to be low hanging fruit for reducing forward deployed personnel and footprint. A possible solution is to assign aviation supply Marines directly to the flying squadrons. Consolidation of financial data from individual squadrons could be achieved at some central point – be it at the Wing level, or at some other centralized site - and reported to higher headquarters as required. The end result would be the removal of the current Supply Accounting Department (SAD) from the MALS and the reassignment of those Marines to the flying squadrons and the wing or some other centralized point. Financial transactions resulting from inventory functions at the MALS could also be centralized and performed in rear areas. Developments in web-based inventory databases, bare coding, RFID, and Total Asset Visibility hold the promise to make this possible.

The existence of significant redundancy in the number of places that "expediting" is taking place from the Marine aircraft wing to the flying squadrons presents another opportunity for streamlining through consolidation. Expediting involves following up on the status of parts that have been ordered, adjusting status as required, and communicating with various personnel in the NAE who control the movement of parts to the end user. Currently, the primary responsibility for expediting parts belongs to the MALS.

The MALS Supply Response Division (SRD) has the responsibility of expediting material that is required by the squadron to repair aircraft. However, savvy maintenance personnel in the squadron often put considerable effort toward expediting their own

requirements, often duplicating the efforts of the SRD Marines at the MALS. Furthermore, personnel in the NAE may be wasting time helping multiple people expedite the same part. Often the Wing level will seek to assist the MALS with expediting their most pressing requirements because the Wing carries more weight in the NAE and has more resources to draw from. Therefore, the Wing may be able to get parts that MALS personnel cannot. In addition to expediting parts, MALS Marines frequently brief the Wing on the status of critical requirements and keep the flying squadron personnel updated through phone calls and frequent face to face meetings. This creates wasted and redundant effort.

A solution to this problem is to assign supply Marines directly into the flying squadrons to expedite for that squadron. This would remove the MALS from the expediting function, but the squadron expeditors could still leverage the Wing for assistance if needed. This is the same approach as the aforementioned financial accounting restructure and would result in fewer supply Marines at the MALS and more at the flying squadron and the Wing level. This solution would provide flying squadrons an organic expediting function and direct ownership over the expediting function. Additional benefits are removal of the "middle man" (the MALS), reduction of the MALS footprint, and elimination of redundant expediting functions. Marines expediting parts will have a heightened sense of ownership and will be better positioned to provide their chain of command timely updates regarding the status of parts. This would facilitate better decision making at the squadron regarding the availability and scheduling of aircraft. The MALS would continue to expedite parts for stock. [28]

Currently, one MALS supports each Marine Air Group. This design has many benefits – perhaps the most important being the habitual support relationship that exists between each

MALS and the squadrons within the MAG. This relationship is crucial and should be maintained if possible. However, it makes sense that the possibility of one MALS supporting more than one MAG be considered. In order for such a concept to work the MALS would have to be capable of supporting the MAGs while deployed to different locations, and possibly even different theaters. A redesigned MALS supporting multiple MAGs would have to be designed around a remain behind core comprised of detachable elements that could be deployed to various locations along with the supported flying squadrons.

When combining MALSP II with a redesigned MALS concept, it makes sense that permanent nodes be established in each Combatant Commander's Area of Responsibility (AOR). These nodes would create aviation logistics agility by serving as Global Propositioned Packages (GPPs) that could rapidly be stood up to support Marine aircraft any place on the globe. The MALSP II concept would dictate that a remain behind element serve as the Parent MALS supporting the various nodes in the lay down. The existing nodes in each geographic area should also be capable of supporting I-level maintenance. Additional nodes could be established at Forward Operating Bases and Forward Arming and Refueling Points as the situation required.[29]

The key to making this new concept work would be a MALS structure that existed around multiple detachable elements built to be deployed in support of various ACEs. These detachable elements would have to be scaleable based on the size of the ACE element to be supported, like the capability that exists today with the MALSP concept. The detached elements would be supported by a core capable of supporting multiple detachments simultaneously from CONUS. These MALS would not necessarily need to be associated with a specific MAG, but could be consolidated in a regional fashion and built around a single non-deploying core for each

aircraft wing. Multiple MAGs or detachments could be supported from the core – both deployed and in CONUS. During deployments the previously mentioned expediting and financial functions could take place directly between the remain behind core and the deployed ACE.

Finally, although not directly related to new aviation logistics methodologies, the MALS internal command structure should be changed in conjunction with any future redesign of the MALS. Each MALS is approximately equivalent in manpower strength to an infantry battalion. However, unlike an infantry battalion, which has several commanders at the company level subordinate to the battalion commander, the MALS commander has no subordinate commanders. This forces the headquarters element to handle many administrative issues that could be handled by subordinate commanders, causing the commander and his staff to spend more time with administrative matters and less on aviation logistics concerns. Therefore, the structure should be modified to create command billets at the company grade officer level. Doing so would distribute command and control to subordinate commanders as is standard in other Marine Corps units of this size. The additional benefit of command experience opportunities for younger officers within the MALS would also be provided. Current "departments" should be designated as company level commands to include ordinance, maintenance, avionics, and supply companies. This would be similar to the current organization of the Marine Wing Support Squadrons.

Civilianization

Some of the proposals offered in this paper will require manpower adjustments. For example, transferring the accounting and expediting functions from the MALS to the Wing and flying squadrons could be accomplished by assigning one aviation supply clerk (MOS 6672) to each flying squadron in addition to the two that were recently added. If this were the only structural

change made to the current MALS structure it would require an increase in the end strength of the 6672 MOS. However, in recent years there has been a significant increase in the number of civilian contractors involved in Marine aviation logistics. Manpower and civilianization considerations will be contingent on the structure of MALS (F), but it is likely that the trend toward increased civilianization will continue as new processes and innovation make it possible to send fewer aviation logisticians forward. A consolidated MALS supporting multiple MAGs and built around a remain behind core would enable increased use of civilians in remain behind functions such as accounting and expediting. Likewise, permanent nodes in each geographic area of operations would also present opportunities for the use of civilians in lieu of Marines. Although civilianization of aviation functions is a decision that will ultimately be made based upon evaluation of the costs, effectiveness, and desirability of increased civilianization, it is likely that opportunities will exist to increase civilianization of aviation logistics functions.

What Should Not Change

As the aviation logistics community moves into the future and embraces new opportunities for improvement, it is important that the context in which the current process and design was developed is kept in mind. The current structure was designed to solve problems of command and control within the MAG as well as to facilitate a smooth transition from garrison to deployments with pack-ups that were standardized and tailored for the correct number and type of aircraft supported. In the effort to reduce the footprint while increasing our ability to generate aircraft readiness lessons previously learned must not be forgotten. Therefore, some things must not change.

The purpose of transitioning to this structure was to correct the problems of reporting chain and organizational structure, and to give the MAG commander a single point of contact for all aviation logistics concerns within the MAG. These improvements must not be lost. Additionally, the leadership positions within the MALS must continue to be staffed with aviation logisticians. In the days before MALSP was developed, the senior aviation logistics personnel in the Marine Corps, as well as the commanding officers of the Headquarters and Maintenance Squadrons (predecessor to the MALS) were aviators. Had this not changed it is unlikely that the MALSP concept would have ever been developed because the true aviation logistics experts were not in the correct billets to drive necessary change. Wisely, the senior aviators and logisticians recognized this problem in the late 1980's and corrected it. Marine Corps aviation benefited enormously from that far sighted decision, and the community must not go backwards.

Additionally, a high rate of readiness in garrison must be supported to facilitate the training required for the Marine Corps to maintain its readiness posture. The ability to transition smoothly from a garrison environment to a deployed environment must also not be diminished. The Marine aviation logistics community must continue to provide Marine forces and the Combatant Commanders they serve with logistics support that is agile, flexible, proactive, and able to surge when required.[30]

Another key to success that must remain unchanged is the nature of the support relationship between each MALS and the MAG it supports. Because the MALS is organic to the MAG, there is a habitual command relationship between the MAG and the MALS which helps ensure optimum support. Equally important is the nature of the command relationship between the MALS commanding officer and the MAG commanding officer. This is one of the keys to

success of the current structure. Under the current structure the MALS commanding officer works directly for the MAG commanding officer. This relationship allows the MAG to direct the MALS' focus of effort to specific squadrons within the MAG where it is most needed in his judgment. The MALS commanding officer has one boss who is an aviator and who knows exactly where and when to focus the logistics efforts of the MALS. If the MALS were put under a Marine Logistics Group, for example, this command relationship would most likely be altered. This would dilute the command relationship critical to the success of aviation logistics at the tactical level. Although, as previously discussed, one MALS may someday support more than one MAG, it must be designed it in a way that protects the subordinate commander to senior commander relationship that currently exists between the MALS and MAG Commanders.

Conclusion

This paper has outlined some of the many concepts and ideas being explored for application to the Marine Corps aviation logistics support concept. As they are implemented, the result is likely to be fewer MALS that are organized regionally. The MALS of the future is also likely to be smaller than the current MALS, unless some are consolidated into fewer, but larger units.

More functions will be performed in the rear, requiring fewer Marines deployed forward. Nodes will be distributed in strategic locations throughout the theater of operations and elements of the MALS will likely be located at each of these nodes. As the MALSP II concept is developed and implemented consideration must be given to where nodes could potentially be positioned in each theater. Close attention should also be paid to the progress the Navy makes in

the development of CVN 78 and the Distance Support concept and the same principles and lessons learned should be applied to MALS (F).

Some Marines in the aviation logistics community may feel that the transformation of MALS and the development of MALSP II and MALS (F) is taking a long time to mature. However, the deliberate pace being taken is a good thing because the coming changes must be approached with a degree of caution. The Doctrine, Organization, Training, Material, Leadership, Personnel, and Facilities (DOTMLPF) issues associated with MALSP II and MALS (F) must be deliberately developed in incremental steps. At the same time, things that have proven successful must be retained. Only by proceeding in a deliberate, well thought out manner can the aviation logistics community ensure that MALS (F) is a worthy successor to the concepts that have served Marine aviation so well for the past decades.

ACRONYMS

ACE	Aviation Combat Element
AIT	Automated Information Technology
AOR	Area Of Responsibility
ASL	Aviation Logistics Support Branch
AVLOG	Aviation Logistics
CONUS	Continental United States
CR	Current Readiness
CSP	Contingency Support Package
DOTMLPF	Doctrine, Organization, Training, Material, Leadership, Personnel, and Facilities
eBST	Electronic Buffer Sizing Tool
EPUK	Expeditionary Pack Up Kit
ESB	Enroute Support Bases
E2E	End to End
FARP	Forward Arming and Refueling Point
FOB	Forward Operating Base
GPP	Global Prepositioned Packages
HQMC	Headquarters Marine Corps
H&MS	Headquarters and Maintenance Squadron. (The predecessor to MALS)
IMA	Intermediate level Maintenance Activity
IOC	Initial Operating Capability
MAG	Marine Aircraft Group
MAGTF	Marine Air Ground Task Force
MALS	Marine Aviation Logistics Squadron
MALS (F)	Marine Aviation Logistics Squadron, Future
MALSP	Marine Aviation Logistics Support Package
MALSP II	Marine Aviation Logistics Support Package II
NAE	Naval Aviation Enterprise
OMFTS	Operational Maneuver From The Sea
PBL	Performance Based Logistics
RFID	Radio Frequency Identification
SAD	Supply Accounting Department
SRD	Supply Response Division
TRR	Time to Reliably Replenish
TTF	Transition Task Force

Notes

[1] Don Davis, Col, USMC (Ret), conversation with author, 23 January, 2009. Col Davis discussed with the author many of the problems which necessitated the development of the current MALSP concept and MALS design, as well as the problems it solved.

[2] Charles T. Hayes, "Marine Aviation Logistics Squadron," (Master's Thesis, Marine Corps University, 1992), 1-2.

[3] Hayes, 6-7.

[4] F-35 Joint Strike Fighter Program Office. http://www.jsf.mil/program/prog_org_autolog.htm. (accessed Dec 22, 2008).

[5] Headquarters, United Stated Marine Corps, Aviation Logistics Support Branch. *Charter for the Marine Aviation Logistics Support Program II (MALSP II) Project Office & Transition Task Force (TTF),* http://Marine.mil/ASL/TTFcharter (accessed Feb 10, 2009).

[6] Douglas S. Steward, "Pushing a Pull System," *Defense AT&L* (Jul-Aug 2008): 40.

[7] Headquarters, United Stated Marine Corps, Aviation Logistics Support Branch. *Charter for the Marine Aviation Logistics Support Program II (MALSP II) Project Office & Transition Task Force (TTF),* http://Marine.mil/ASL/TTFcharter (accessed Feb 10, 2009).

[8] United States Marine Corps. "*Marine Corps Vision and Strategy 2025 Executive Summary,*" ww.quantico.usmc.mil/download.aspx?Path=./Uploads/Files/SVG_MCVS%20EXSUMM%2019%20AUG.pdf (accessed 20 January, 2009).

[9] Aviation Logistics Support Branch, "Aviation Logistics," *Marine Corps Gazette* 90, no.5 (May 2006): 41. http://proquest.com/. 3.

[10] Aviation Logistics Support Branch, "Aviation Logistics," *Marine Corps Gazette* 90, no.5 (May 2006): 41. http://proquest.com/. 2.

[11] U.S. Department of the Navy. Assistant Secretary Of The Navy, Research, Development and Acquisition. *Performance Based Logistics (PBL) Guidance Document.* Washington, DC: Department of the Navy, 2002

[12] Aviation Logistics Support Branch, "Aviation Logistics," *Marine Corps Gazette* 90, no.5 (May 2006): 41. http://proquest.com/. 2.

[13] Steward, 40.

[14] Avraham Y. Goldratt Institute, "*AGI Applies* AIR*Speed Methodology to CVN 21 Design,*" The TOC Times (April 2005): http://www.goldratt.com/toctquarterly/april2005.htm (accessed Jan 3, 2009).

[15] Steward, 42.

[16] F-35 Joint Strike Fighter Program Office. http://www.jsf.mil/program/prog_org_autolog.htm. (accessed Dec 22, 2008).

[17] Headquarters, United Stated Marine Corps, Aviation Logistics Support Branch. *Aviation Logistics Strategy brief*, November, 2008.

[18] United States Marine Corps, FY2009 Marine Aviation Plan, 11-4.

[19] Headquarters, United Stated Marine Corps, Aviation Logistics Support Branch. *Marine Aviation Current Readiness Improvement Program Operational Procedures and Commanders Guidance Handbook*, November, 2008. 2-5.

[20] Pierre C. Garant, "The Transformation of Marine Aviation Logistics," *Marine Corps Gazette* 88, no.5 (May 2004): 34.

[21] Steward, 41.

[22] Marine Aviation Logistics Support Program II (MALSP II) Pilot Integrated Master Plan (IMP) Version 5: 2-3.

[23] Headquarters, United Stated Marine Corps, Aviation Logistics Support Branch. *MALSP II IOC brief*, obtained via e-mail in January, 2009.

[24] NavalTechnology.com. *CVN 78 Gerald R Ford Class – U.S. Navy CVN 21 Future Carrier Program, USA.* http://www.naval-technology.com/projects/cvn-21/. (accessed Jan 1, 2009).

[25] NavalTechnology.com.

[26] United States Navy, Naval Supply Systems Command, *CVN 78 Automated Inventory Management System.* 7 December, 2006: 1-2.

[27] United States Navy, Naval Supply Systems Command, *CVN 78 Automated Inventory Management System Brief*, May, 2007.

[28] B.G Lee; Mike Shay, "Naval Logistics Integration," *United States Navy Supply Corps Newsletter* 69, no.4 (Jul-Aug 2006): 14-15.

[29] Steward, 42.

[30] Steward, 40.

Bibliography

Aviation Logistics Support Branch. "Aviation Logistics Initiatives: Examining the Future of Aviation Logistics." *Marine Corps Gazette* 89, no.5 (May 2005): 32-36.

Aviation Logistics Support Branch. "Aviation Logistics." *Marine Corps Gazette* 90, no.5 (May 2006): 41. http://proquest.com/.

Avraham Y. Goldratt Institute. "*AGI Applies* AIR*Speed Methodology to CVN 21 Design.*" The TOC Times (April 2005): http://www.goldratt.com/tocquarterly/april2005.htm (accessed Jan 3, 2009).

Croft, John. "RFID: Be Not Afraid." *Overhaul and Maintenance* 11, no.3 (Apr 2005): 87. (7)

Dailey, John. "Integrated Logistics Support for the F-35 – A Quantum Leap Forward." *United States Navy Supply Corps Newsletter* (May-Jun 2008). http://www.navsup.navy.mil

Gackle, Jonathan. "Redefining MAGTF Logistics." *Marine Corps Gazette* 89, no.8 (Aug 2005): 31-33.

Garant, Pierre, C. "The Transformation of Marine Aviation Logistics." *Marine Corps Gazette* 88, no.5 (May 2004): 33-36.

Hayes, Charles, T. "Marine Aviation Logistics Squadron." Master's Thesis, Marine Corps University, 1992.

Kelly, Richard L. "Logistics Modernization: Lethality and Effectiveness." *Marine Corps Gazette* 89, no.8 (Aug 2005): 16,18-19.

Lee, B.G; Mike Shay. "Naval Logistics Integration." *United States Navy Supply Corps Newsletter* 69, no.4 (Jul-Aug 2006): 13-15.

Miller, Shawn, A. "Aviation and Ground Logistics" *Marine Corps Gazette* 92, no.7 (July 2008): 30-32.

Office of the Under Secretary of Defense for Acquisition, Technology and Logistics. *Final Report of the Defense Science Board Task Force on Sea Basing.* Washington, DC: Office of the Under Secretary of Defense for Acquisition, Technology and Logistics, 15 August, 2003.
http://www.acq.osd.mil/dsb/reports/seabasing.pdf (accessed Jan 24, 2009).

Polowczyk, John P. "Navy – Marine Corps Logistics Integration." *United States Navy Supply Corps* Newsletter 67, no.1 (Jan/Feb 2004): 9.

Steward, Douglas S. "Pushing a Pull System." *Defense AT&L* (Jul-Aug 2008): 40-43.

Stone, Jeff, D. "Marine Aviation Logistics, Seabasing, Integration, Outsourcing and the Future." Master's Thesis, Marine Corps University, 2008.

United States Marine Corps. "*Marine Corps Vision and Strategy 2025 Executive Summary.*" www.quantico.usmc.mil/download.aspx?Path=./Uploads/Files/SVG_MCVS%20EXSUMM%2019%20AUG.pdf (accessed 20 January, 2009).

U.S. Department of the Navy. Assistant Secretary Of The Navy, Research, Development and Acquisition. *Performance Based Logistics (PBL) Guidance Document.* Washington, DC: Department of the Navy, 2002

Yamamoto, Scott; Matt Scott; Randy Hodge; Dennis Connors; Beverly Thomas. "Naval Logistics Integration – Optimizing Support to Naval Expeditionary Forces." *United States Navy Supply Corps Newsletter* 71, no.2 (Mar-Apr 2008): 25-26.