The Reestablishment Of The Amphibious Marine Expeditionary Brigade And Its Implication For The Aviation Combat Element

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EXECUTIVE SUMMARY

Title: The Reestablishment of the Amphibious Marine Expeditionary Brigade and its Implication for the Aviation Combat Element

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Thesis: Recently the 32d Commandant of the Marine Corps, General James L. Jones, reestablished the Marine Expeditionary Brigade (MEB) by re-designating the Marine Expeditionary Force (FWD) within each of the three MEFs as the First, Second, and Third MEBs. Although this middle tier Marine Air-Ground Task Force (MAGTF) has been "doctrinally resurrected", deploying the MEB via amphibious shipping presents significant challenges for the Aviation Combat Element (ACE).

Discussion: In December 1991, the Marine Corps Force Structure Planning Group (FSPG) recommended disestablishing the standing MEB Command Element (CE) headquarters within each of the MEFs in order to comply with mandated force reductions post Operation Desert Shield/Desert Storm. The intent was for MEB sized force packages to continue to deploy. Their CEs, however, became embedded within each of the MEFs and were designated the MEF(FWD). The MEF(FWD) concept, however, was ambiguous and lacked the doctrinal clarity necessary to have utility in today's joint environment. Since the reestablishment of the MEB in 1999, this seemingly "lost" brigade has the potential to fill a current operational void.

Today, the critical vulnerability of the United States lies in its dependence upon permissive foreign Aerial Ports of Debarkation (APODs) and Seaports of Debarkation (SPODs) for force projection. The US has decreased its overseas bases from 115 in 1956 to 27 in 1995. Additionally, by 2006, the United States Air Force will reduce its strategic airlift fleet by 35 percent of its Gulf War force level. The relevance of the Amphibious MEB resides in the fact that it is the only force capable of conducting sustained, forcible entry operations; either unilaterally, or in conjunction with Airborne and Air Assault forces without dependence upon a permissive environment from which to introduce combat forces.

Though the 1997 National Military Strategy implies a direct forcible entry role for Naval expeditionary forces, little is being done to realize it beyond the MEU level. The Navy is in the process of reducing its amphibious fleet to twelve three-ship Amphibious Ready Groups (ARGs) (36 ships). Constrained by limited shipping, and required to meet the National Command Authority and Combatant Commander's MEU forward presence schedules, the amphibious MEB will only be capable of forming under ad hoc conditions. Presently, there are not enough amphibious ships available to support the current MEU rotation cycle and provide lift for a MEB assault echelon. Furthermore, due to damage stability problems associated with the LHA and

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LHD class ships, the ACE will be unable to embark the requisite number of assault support and tactical jet aircraft necessary to support a MEB in a Mid Threat Level environment. Future increases in aircraft size and weight will significantly limit the ACE's combat force projection capability if necessary ship modifications are not completed.

Conclusion: If the Department of the Navy only procures a 36 ship amphibious fleet and continues with current ARG/MEU deployment requirements, the forcible entry MEB will only be capable of forming under ad hoc conditions. Faced with this reality, the only optimum alternative to the haphazard formation of a brigade sized force, is to muster all available shipping within the respective fleet command and composite the standing MEUs. This will require defined command relationships as well as the development of a MEB mission statement and associated core competencies. Additionally, MEU tables of equipment (T/Es) and tables of organization (T/Os) will require revision in order to enable the ARG/MEUs to form the MEB assault echelon without creating any deficiency in combat power. To accomplish this, it is imperative that the LHA and LHD damage stability modifications be completed to ensure the ACE can adequately support the forcible entry MEB.

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Preface

When I began researching the Marine Expeditionary Brigade (MEB) as a topic for my Masters in Military Studies, I was unsure how my thesis would evolve. The concept of the MEB was foreign to me. I entered the Post Desert Storm "Fleet" in 1991 and began deploying with SOCAL MEUs shortly thereafter. Standing MEB headquarters no longer existed. The term MEB seemed to have vanished with them. I needed to understand the historical doctrine and concept of employment of the MEB before I could begin to address the implications regarding its reestablishment. I felt it important to include past doctrinal and Force Structure Planning Group (FSPG) information in this paper in order to provide a historical foundation for understanding the MEB and also to serve as a future reference for others studying this reemerging topic.

After studying the current MPF MEB employment proposals, it became readily apparent that this nation's critical vulnerability lies in its dependence upon permissive foreign Aerial Ports of Debarkation (APODs) and Sea Ports of Debarkation (SPODs) for force projection. This paper focuses upon the MEB from an amphibious forcible entry perspective. It discusses both the available shipping and aviation capabilities that will comprise the 2010 and 2015 amphibious MEB.

The 1990 Department of the Navy Amphibious Lift Requirements and USMC Air Support Requirements Study (DoN Lift II) proved extremely helpful in analyzing this seemingly "lost" expeditionary brigade capability. Though this study was conducted ten

years ago, much of the planning data is still useful today. Additionally, I extracted information from the recently released LHA(R) (LHA replacement) Mission Area Analysis (MAA). This document was authored by the Studies and Analyses Division of the Marine Corps Combat Development Command (MCCDC). The LHA(R) MAA updated portions of the DoN Lift study and provided examples of a MEF, MEB, and MEU in various 2015 Operational Maneuver from the Sea (OMFTS) and Ship to Objective Maneuver (STOM) scenarios. This study, for the first time, delineated the future MAGTF's capability set and has identified required ship capabilities that will drive the LHA(R) design. Thus the ship is no longer determining the MAGTF's combat potential.

There are significant differences, however, between the DoN Lift II and LHA(R) MAA ACE. The basis for the DoN Lift II study was a forecast 2010 environment that defined three potential threats: high, medium, and low. The study also included a classified intelligence annex. Based upon the Mid Threat level, DoN Lift determined the combat assets required to successfully conduct an amphibious assault. The LHA(R) MAA provides a generic MEB scenario against a "Third Tier" threat, characterized by an inability to execute a synchronized combined arms attack. Though this is the first attempt to apply futuristic OMFTS concepts, such as sea basing and ship to objective maneuver (STOM), the study utilized the MEB in a Sea Lines of Communication (SLOC) scenario where DoN Lift focused on conducting an amphibious assault. If DoN Lift II planning assumptions are viewed as "out dated", than it may be time to conduct a new global threat analysis and initiate a new study. In addition to standardizing future OMFTS/STOM and DoN Lift III studies, an updated threat estimate would assist in

determining the appropriate quantity of combat assets required of naval expeditionary forces that are tasked to perform combat missions "across the spectrum of conflict".

Today, with the advent of OMFTS, many view the traditional amphibious assault as passé and profess that future STOM amphibious operations will not be tied to the beachhead or require a lodgment ashore. The LHA replacement MAA states that "The maneuver warfare discussion in DoN Lift II has been replaced by OMFTS and its supporting concepts, particularly STOM."[1] Additionally, the Marine Corps' *Concept for Ship-to-Objective Maneuver* states:

> "*By executing ship-to-objective-maneuver, landing forces will exploit advanced technologies which will permit combined arms maneuver from over-the-horizon attack positions through and across the water, air, and land of the littoral battlespace directly to inland objectives. True ship-to-objective maneuver is not aimed at seizing a beach, but at thrusting combat units ashore in their fighting formations, to a decisive place, and in sufficient strength to ensure mission accomplishment. Landing forces will engage enemy units only as necessary to achieve the freedom of action to accomplish operational objectives."*[2]

However plausible this may sound, the STOM concept, when viewed through the forcible entry lens, fails to recognize that seizing a beachhead or airhead may be precisely what the Joint Force Commander requires in order to enable the follow on flow of forces via strategic air and sea lift. Thus, inherent to the core competency of this MEB sized Amphibious Task Group (ATG) should be the ability to seize a port (or beachhead) and an airfield (airhead) to facilitate the rapid Reception, Staging, Onward Movement and Integration (RSOI) of Assault Follow On Echelon (AFOE) forces.

This forcible entry scenario, in conjunction with an updated threat assessment, should serve as the mission level basis for all future OMFTS and STOM analyses. Currently,

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[1] United States Marine Corps Combat Development Command. *Mission Area Analysis: LHA Replacement (U).* Study. Contract: GS-35F-4506G, Order M0024699F2408, January 2000, 6-1.

the Marine Corps Intelligence Activity (MCIA) has not conducted a detailed threat analysis for the 2010-2015 MEB. Therefore, DoN Lift II's aviation assets required estimates were used as the primary reference point until a DoN Lift III study, is completed.

I feel the relevance of the future MEB resides in its potential to conduct amphibious forcible entry operations and serving as an enabler for follow on forces into a future conflict theater. It is in this OMFTS arena that the MEB fills the current strategic operational void and becomes relevant. I will leave the detailed planning for a brigade sized OMFTS force for future DoN Lift III planners and potential authors. This paper simply identifies the capabilities, limitations, and shortfalls associated with employing a fiscally constrained Amphib MEB in the near term. If the prospects of employing this amphibious MEB under current/projected budgetary and operational tempo constraints appears unacceptable, than it is time for the Secretary of Defense, the Combatant Commanders (CINCs), and the Joint Chiefs to reevaluate the desire to "maintain" this forcible entry capability.

[2] Unites States Marine Corps. *Warfighting Concepts for the 21st Century: A Concept for Ship-to-Objective Maneuver*. (Quantico VA: Marine Corps Combat Development Command, January 1996): II-6 to II-7.

Chapter 1

Introduction

The Amphibious MEB and Forcible Entry

> *Forcible entry is considered a joint core competency for the Marine Corps in our National Military Strategy....The complexity of the future requires that we maintain the capability to project power ashore against all types of resistance...and [deal with situations involving] the entire spectrum of armed threats.*
>
> —Gen James L. Jones
> 32d Commandant of the U.S. Marine Corps[3]

Today, *Operational Maneuver from the Sea* has been adopted as the Marine Corps' "Jules Verne vision" for the 21st Century. But what exactly is the combat backbone of OMFTS? Is it an operational MEU, operational MEB, or operational MEF from the Sea? Given a thirty-six ship amphibious fleet, it appears to be operational fantasy. Though considerable effort has gone into conceptualizing what the future OMFTS force capability ***should*** be, we must first ground ourselves in the fiscal realities of what this OMFTS force ***can*** be. An amphibious MEB is the minimum combat force capable of fulfilling OMFTS forcible entry requirements. However, given the limited number of

[3] LtCol J. Scott Cramer, USMC, " An Atrophied Capability." *Marine Corps Gazette*, vol. 83, no. 11 (Nov 1999): 87.

future amphibious shipping, and the reliance upon a continuous two-Marine Expeditionary Unit (MEU) forward presence, this MEB would only be capable of forming under ad hoc conditions. This is not the optimum MEB employment strategy, especially, when this force may called upon to rapidly execute missions of national and strategic level importance.

The Marine Corps concept paper *MAGTF Aviation and Operational Maneuver from the Sea*[4], states:

> *"The Marine Air-Ground Task Force (MAGTF) will employ OMFTS principles as a self contained combined arms force to accomplish strategic, operational, and tactical objectives. Task organized and integrated at all levels, it provides a unique* ***forcible entry capability*** *(emphasis added)...to serve as an exploitation force, a decisive force, or as an enabler for follow on forces. The OMFTS MAGTF will conduct missions across the spectrum of conflict, providing mission depth without losing momentum or affect. This enduring commitment to naval expeditionary operations as a core competency will proactively steer the Marine Corps into the next century, and will continue its primacy as the nations forward deployed air-ground force in readiness."*[5]

Without consensus within the Department of the Navy, this concept will never leave the drawing board. Though the Marine Corps has adopted OMFTS as its future cornerstone amphibious capability, it must ensure the Navy concurs with this mutually supported endeavor. Not only do amphibious ships and related platforms need to be designed to accommodate future advancements in Marine aircraft and ground combat equipment, they also need to be procured in sufficient quantity to be able to provide for a "ready MEB" without disrupting the MEU rotation cycle. Consequently, a ready OMFTS brigade sized force would also require additional Marines and sailors to ensure

[4] Unites States Marine Corps, Concepts Division. *MAGTF Aviation and Operational Maneuver from the Sea.* (Quantico VA: Marine Corps Combat Development Command, January 19 99), www.concepts.quantico.usmc.mil/aviation.htm, p. 4.
[5] Ibid.

operational and personnel tempo levels, and service retention losses are kept to a minimum

The National Military Strategy of the United States states that the "U.S. must be able to introduce military forces into foreign territory in a non-permissive environment...and be able to gain access to sea ports, airfields and other critical facilities that might otherwise be denied."[6] Though forcible entry operations directly imply a naval expeditionary role, it should not be assumed that only the Navy and Marine Corps exclusively provide this mission capability. Forcible entry operations, as well as all military ventures of the future, need to be viewed within the broader context of the Joint environment. Specifically, " How do naval expeditionary forces compliment Army, Air Force, and coalition forces in providing the Joint Force Commander with a variety of options essential to gaining access to a foreign shore, ultimately leading to successful mission accomplishment?" By jointly adopting the OMFTS concept and working in unison to provide the Nation with the forcible entry capability mandated by the Chairman of the Joint Chiefs, the Navy and Marine Corps will be filling a current Joint operational void.

For the Corps to remain "relevant, ready, and capable" for the future, it must preserve and enhance its cornerstone amphibious capability beyond the MEU level. A MEU does not possess the requisite combat power to execute forcible entry operations. Furthermore, it is foolish to assume that all the major contingencies of the future will present the Marine Corps with a permissive environment to initiate combat operations. To paraphrase Clausewitz, *one should never plan on fighting the next war, like you fought*

[6] Chairman of the Joint Chiefs of Staff. National Military Strategy of the United States of America. *Shape, Respond, Prepare Now: A Military Strategy for a New Era.*. (Washington, DC: 1997): 25-26.

the last. Without an Aerial Port of Debarkation or Sea Port of Debarkation, U.S. forces will be unable to deploy and respond to contingencies that are vital to the national security of the United States or its allies. A potential adversary may be able to destroy airfields and ports, but he cannot adequately defend an entire coastline against a sizable force from the sea. In order for Operational Maneuver from the Sea (OMFTS) to transcend its concept stage, it seems obvious that this force should be tailored to a MEB assault echelon. The Navy and Marine Corps team must be able to field, train and fight to this level of competency.

Doctrinally, there have been several ways to employ a MEB. The brigade could be deployed via amphibious shipping (Amphib MEB), its Fly In Echelon (FIE) could marry up with Maritime Prepositioning Force (MPF) shipping (MPF MEB), it could fly in as a complete Air Contingency Force Package (ACF MEB), or it could be employed as a Norway Air Landed MEB (NALM), marrying up with prepositioned equipment in the Norwegian countryside. The only method of employment capable of supporting OMFTS forcible entry operations, however, is the Amphibious MEB.

The following chapters will reexamine previous MEB doctrine and the disestablishment of the standing MEB HQ elements, analyze the projected amphibious fleet's capability, shortfalls and limitations, and assess the impact this constrained fleet will have on aviation operations in support of the 2010 and 2015 amphibious Marine Expeditionary Brigade.

Chapter 2

The Demise of the MEB

> *The challenge was to find a course of action that would allow the Corps to remain the relevant, ready, and capable force that it was created to be, while at the same time complying with the need to become even leaner and more efficient in the future.*
>
> —MajGen Charles C. Krulak[7]

In 1952, Congress passed Public Law (PL) 416. This document was signed into law eight days later by President Truman. The House-Senate documents that accompanied the legislation stated that the Corps should be a "versatile expeditionary force in readiness" and "most ready when the nation is least ready."[8] The Marine Corps faced significant force structure reductions following the Persian Gulf War. Mandated to reduce forces from 194,000 to 159,000 by 1997, the Corps was challenged to simultaneously cut forces while honoring Title 10's clearly defined mission. In August 1991, Marine Corps Commandant Carl E. Mundy, Jr. "charged then BGen Charles C. Krulak to provide an executable plan to attain the most effective and capable force for the

[7] MajGen Charles C. Krulak, USMC, "A Corps of Marines for the Future: Relevant, Ready, Capable", *Marine Corps Gazette*, (June 1992): 15.
[8] Vincent C. Thomas, Jr., "Special report: The restructuring of the Marine Corps-a look at yesterday and tomorrow." *Sea Power*, vol. 35 no 9 (Sep 1992): 32.

Marine Corps at 159,000 while honoring Title 10."[9] Sixteen officers and one civilian formed the 1991 Force Structure Planning Group (FSPG) chaired by Gen Krulak at MCB Quantico. As a result of the FSPG, the Corps eliminated ten combat battalions (25%), five Combat Service Support (CSS) battalions (20%), nine fixed-wing tactical aircraft squadrons (TACAIR) squadrons (26%) and one Marine Expeditionary Force (MEF) and six MEB operating Headquarters (40%).[10] Additional cuts included 30% of the Corps' towed artillery and 50% of its tanks.

The FSPG recommended eliminating the 1st, 4th, and 5th MEBs; consisting of 51 officers and 118 enlisted Marines each. The rationale behind this decision was that an "organization of 159,000 men could no longer afford the luxury of layered command elements and compositing for combat."[11] To compensate for this CE reduction, the FSPG built in an "organic capability within each MEF with the flexibility to deploy a MEF Forward [MEF(FWD)] organization that could assume the role of the traditional MEBs."[12] Based upon lessons learned in Operation Desert Shield/Desert Storm, the FSPG also recommended validating the Table of Organization (T/O) and Table of Equipment (T/E) for "a deployable MARFOR HQ [for FMFPAC and FMFLANT] capable of satisfying the functional requirements of a Component Command in a Joint/Combined environment."[13]

[9] Ibid., p.34.
[10] Gen Carl E. Mundy, USMC, "Carl E. Mundy, Jr. Before Congress". *Marine Corps Gazette*, (April 1992): 36.
[11] Commandant of the Marine Corps. Memorandum to the Assistant Commandant of the Marine Corps and others. Subject: "The Marine Corps Force Structure Plan." 16 December 1991.
[12] Ibid., Tab A, Paragraph 1.
[13] Ibid., Tab A, paragraph 2.

A Doctrinal Dilemma

Although the 1991 FSPG deactivated the MEB CEs, "Gen Krulak stated that "MEB force packages will continue to be deployed when required, but their command elements will be sourced from the command element of the MEF."[14] This intent was never translated into doctrine. The 2 March 1992 edition of the Fleet Marine Force Reference Publication (FMFRP) 1-11, *Fleet Marine Force Organization -- 1992*, was one of, if not, the last doctrinal publication which described the MEU, MEB, MEF Marine Air Ground Task Force (MAGTF) organization and employment concept *(see appendix D).* Marine Corps Reference Publication (MCRP) 5-12D, *Organization of Marine Corps Forces*, did not replace FMFRP 1-11 until 13 October 1998. This document makes no reference to any notional brigade-sized force within the MAGTF. Though the MEF(FWD) is mentioned, its concept of employment is ambiguous. MCRP 5-12D states that "the deployment of the MEF(FWD) does not necessarily mean that all forces of the standing MEF will follow." It is no wonder why the CINCs and service chiefs are unaware of the Marine Corps' inherent force projection capability. Where various Marine Corps doctrinal publications of the past have actually delineated the various MEB organizations and notional force structures,[15] there is no equivalent MEF(FWD) force list in the doctrinal literature. Current doctrine only defines the MEU to MEF MAGTF spectrum. This seems contrary to Gen Krulak's intent. The FSPG merely traded six standing CE HQs for two MEF(FWD) CE HQs. Though there was a concurrent

[14] MajGen Charles C. Krulak, USMC, "A Corps of Marines for the Future: Relevant, Ready, Capable", *Marine Corps Gazette*, (June 1992): 17.
[15] The following Marine Corps reference publications provided notional MEB force structure: NAVMC 2710 (1985), FMFRP 2-5A (1989), and FMFRP 2-12 (1991).

reduction in combat forces, the middle tier MAGTF capability -the MEB- was never eliminated. It was "repackaged" under a MEF(FWD) Command Element.

Today at 172,641[16] active duty forces, the Corps is certainly not as robust as in 1990. However, to honor our Title 10 commitment and remain a "versatile expeditionary force in readiness", the Corps must reexamine this "lost" brigade capability, and together with the Navy, reinstate it into its doctrine and training.

[16] United States Marine Corps. Marines Magazine: *Almanac 2000* . (Washington, DC: Division of Public Affairs, Marine Corps , Dec 1999), (USPS 013-867), 24.

Chapter 3

Pre-FSPG 1991: Doctrinal Brigades, the Gulf War and Aviation Task Organization

Doctrinally, every MAGTF is made up of a Command Element (CE), a Ground Combat Element (GCE), an Aviation Combat Element (ACE), and a Combat Service Support Element (CSSE). As the forward echelon of the MEF, the MEB was commanded by a Brigadier General and consisted of a Command Element, a Regimental Combat Team (RLT), a composite Marine Aircraft Group (MAG), and a Brigade Service Support Group (BSSG). The composite MAG was comprised of both fixed and rotary wing aircraft, a Marine Air Control Group (MACG) Detachment, detachments from two Marine Wing Support Squadrons (MWSS), and a composite Marine Aviation Logistics Squadron (MALS) *(see appendices A-D).*

Prior to the force structure plan approval in December 1991 and the subsequent establishment of the MEF(FWD), there were several doctrinal employment strategies for the MEB. This middle tier MAGTF could be deployed as an Amphibious MEB, a Maritime Pre-positioning Force (MPF) MEB, as the Norway Air Landed MEB (NALM), an Air Contingency Force (ACF) MEB or be task organized to accomplish a specific

mission.[17] Several pocket sized Marine Corps publications delineated the MEB force structure that comprised each of the three principle MEBs (Amphib, MPF and NALM).[18] The three cornerstone publications, in order of supersession, which described the MEB notional task organization were: NAVMC 2710, *Marine Air-Ground Task Forces*, May 28, 1985; FMFRP 2-5A, *Marine Air-Ground Task Force Pocket Guide*, August 16, 1989; and FMFRP 2-12, *Marine Air-Ground Task Force: A Global Capability*, April 10, 1991[19].

Amphibious (Amphib) MEB

The amphibious MEB, was capable of conducting combat operations for 30 days and consisted of approximately 20 amphibious ships, 16,775 Marines, and 900 Navy personnel[20]. The number of aircraft assigned to the composite MAG varied from 179 (1985)[21] to 198 (1989)[22] and represented 12 to 13 different Type/Model/Series (T/M/S) aircraft. The CE, GCE and selected units from the ACE and CSSE formed the Assault Echelon (AE) of the Amphib MEB and deployed aboard Navy amphibious shipping as a balanced force. When a MEB (or MEF) Amphibious Task Force (ATF) is formed, the shipping is composed of the Assault Echelon (AE) and AFOE. The assault echelon is defined as the element of a force that is scheduled for initial assault on the objective

[17] Fleet Marine Force Reference Publication (FMFRP) 2-12, *Marine Air Ground Task Force: A Global Capability*, (Washington DC, HQ USMC, 10 April 1991): 22.
[18] Due to the scope of this paper, only the Amphibious and MPF MEBs will be discussed.
[19] See annexes A-D for a description of the doctrinal MEB task organizations.
[20] Fleet Marine Force Reference Publication (FMFRP) 2-12, *Marine Air Ground Task Force: A Global Capability*, (Washington DC, HQ USMC, 10 April 1991): 27. Note also, that Naval Mobile Construction Battalions (NMCB) - *Seabees*-provided support to MEB and MEU forces and are included in these figures.
[21] United States Marine Corps Plans, Policies and Operations (PPO) Pamphlet NAVMC 2710. *Marine Air Ground Task Forces (MAGTFs)*, (Washington DC: HQ USMC, 28 May 1985): 10. See table 3-1 and Annex A.
[22] Fleet Marine Force Reference Publication (FMFRP) 2-5A, *Marine Air Ground Task Force Pocket Guide*, (Washington DC, HQ USMC, 16 August 1989): 17. See table 3-1 and Annex B.

area.[23] In this case it consists of the Navy amphibious ships and the assault troops, vehicles, non-self deployable aircraft, equipment and supplies required to initiate the assault landing.[24] The AFOE is defined as the echelon of the assault troops, vehicles, aircraft equipment, and supplies, though not needed to initiate the assault, is required to support and sustain the assault. [25] It is composed of Military Sea Lift Command (MSC) and/or commercial shipping which carry the remainder of the force and its supplies and equipment. The Amphib MEB ACE was task organized to support the MEB from amphibious ships, existing sites ashore, or from Forward Operating Bases (FOB).

Maritime Prepositioning Force (MPF) MEB

The Maritime Prepositioning Force MEB is slightly larger than an Amphibious MEB and is heavily equipped with armor and mechanized assets designed to combat a sophisticated mechanized force. Through prepositioning of MPF equipment, the MEB was able to reduce its strategic airlift requirements and improve its global response time. The MPF MEB was designed to rapidly project combat power ashore in a *benign* environment and be prepared to conduct subsequent combat operations in 7-10 days. The MPF MEB was capable of sustaining operations for 30 days, and was comprised of approximately 16,000 Marines and 900 Navy personnel.[26] The ACE was a task organized MAG, that varied from 147 aircraft and 13 T/M/S (1985)[27] to 126 aircraft and 11 T/M/S (1989).[28]

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[23] *Department of Defense Dictionary of Military and Associated Terms*, Joint Pub 1-02, Joint Terminology Master Data Base as of 10 June 1998. , under the word "Assault Echelon."
[24] Ibid.
[25] Ibid., "under Assault Follow On Echelon."
[26] Fleet Marine Force Reference Publication (FMFRP) 2-12, *Marine Air Ground Task Force: A Global Capability*, (Washington DC, HQ USMC, 10 April 1991): 24.
[27] United States Marine Corps Plans, Policies and Operations (PPO) Pamphlet NAVMC 2710. *Marine Air Ground Task Forces (MAGTFs)*, (Washington DC: HQ USMC, 28 May 1985): 15. See table 3-1 and Annex A.
[28] Fleet Marine Force Reference Publication (FMFRP) 2-5A, *Marine Air Ground Task Force Pocket Guide*, (Washington DC, HQ USMC, 16 August 1989): 21. See table 3-1 and Annex B.

Marine Corps Bulletin 3501 (MCBUL 3501): *Maritime Prepositioning Force (MPF) Marine Air-Ground Task Force (MAGTF) Force Lists*[29], was the principal Marine Corps document which provided a baseline brigade sized force list for MPF planning. This document served as a basis for planning and could be tailored to support a specific mission. The three Maritime Prepositioning Ship Squadrons (MPSRONs), comprised of 13 ships, were assigned to the following MEF commands:

(1) **I MEF**: MPSRON-2 (5 ships, Diego Garcia)

(2) **II MEF**: MPSRON-1 (4 ships, Mediterranean) * *will receive 5th ship in 2000.*

(3) **III MEF**: MPSRON-3 (4 ships, Guam-Tinian)[30]

MCBUL 3501's notional brigade sized force list consisted of 17,644 Marines and Navy personnel (CE: 789; GCE: 6,393; ACE: 7,276; CSSE: 3,186). The ACE consisted of 140 aircraft, two full MWSS (fixed & Rotary wing), and detachments from the MACG and MALS *(see table 1).*

Table 1. Doctrinal Amphibious and MPF MEB Aircraft

Doctrinal Amphibious & MPF MEB Aircraft

Aircraft T/M/S	NAVMC 2710 *1985*		FMFRP 2-5A *1989*		FMFRP 2-12 *1991*		MCBUL 3501 *1996*		I MEF G-3 *1999*	
	Amp.	MPF	Amp.	MPF	Amp.	MPF	Amp.	MPF	Amp.	MPF
F/A-18A/C	24	24	24	24	24	24	N/A	24	N/A	24
F/A-18D	0	0	0	0	12	12	"	12	"	12
AV-8A/B	20	20	40	20	40	20	"	20	"	16
A-6E	10	10	10	10	10	10	"	0	"	0
EA-6B	4	4	4	0	6	6	"	5	"	5
RF-4B	4	4	4	4	0	0	"	0	"	0
OA-4M	5	5	0	0	0	0	"	0	"	0
OV-10A/D	6	6	6	6	6	6	"	0	"	0
KC-130	6	6	6	6	6	6	"	12	"	12
Sub Total	***79***	***79***	***94***	***70***	***104***	***84***	***"***	***73***	***"***	***69***
AH-1T/W	12	24	12	12	12	12	"	18	"	18
UH-1N	12	12	12	12	12	12	"	9	"	9
CH-46E	48	12	48	12	48	12	"	24	"	24
CH-53A/D	20	12	16	12	12	0	"	8	"	0
CH-53E	8	8	16	8	16	16	"	8	"	16
Sub Total	***100***	***68***	***104***	***56***	***100***	***52***	***"***	***67***	***"***	***67***
Total A/C:	**179**	**147**	**198**	**126**	**204**	**136**	**"**	**140**	**"**	**136**

[29] This bulletin was canceled in Jan 98. A HQMC sponsored MPF Force Base lining working group was held at Camp Pendleton, CA on 23-24 Sep 99 with the purpose of developing a current notional MPF MAGTF. The results of the working group were briefed at the USMC General Officer's Symposium @ Nov 99.

[30] Additional source: I MEF MAGTF Staff Training Program (MSTP) Pamphlet XX-X, 2nd Working Draft, 22 Sep 99, P.1-27.

Operation Desert Shield/Storm 1990-1991

The last time Marine Expeditionary Brigades deployed was during the Persian Gulf War, 1990-1991. During Operation Desert Shield/Desert Storm, the 4th and 5th MEBs, based out of II MEF and I MEF respectively, deployed via amphibious shipping to the Arabian Gulf *(see Appendix F)*. The 1st and 7th MEBs deployed to Saudi Arabia and married up with MPF shipping. 4th MEB, was commanded by MajGen Harry W. Jenkins Jr., and was composed of 2d Marine Division's Regimental Landing Team 2 (RLT 2), MAG-40, and BSSG-4.[31] In contrast to the notional Amphib MEB aircraft force lists, MAG-40 consisted of 84 aircraft spread loaded between 12 amphibious assault ships of Amphibious Group 2 (PhibGru 2). The following depicts the aviation forces and shipping assigned[32]:

USS *Nassau* (LHA-4):	(20) AV-8B Harriers
	(3) AH-1T Sea Cobras
	(6) UH-1N Hueys
USS *Guam* (LPH-9):	(24) CH-46E Sea Kights
USS *Iwo Jima* (LPH-2):	(12) CH-53E Super Stallions*
	(2) OV-10 Broncos (loaded for transit)
USS *Trenton* (LPD-14):	(2) CH-53E Super Stallions*
USS *Raleigh* (LPD-1):	(2) CH-53E Super Stallions*
	(6) AH-1W*
USS *Shreveport* (LPD-12)	(6) AH-1W*

[31] Col Ronald J. Brown, USMC (Ret). *U.S. Marines in the Persian Gulf, 1990-1991 with Marine Forces afloat in Desert Shield and Desert Storm*, Monograph, H.Q. United States Marine Corps, History and Museums Division. (Washington, DC: 1998): 22.
[32] Ibid., p. 25.

* 12 AH-1Ws of HMLA-269 were flown directly to the Gulf. When these aircraft were released by 3d MAW in December 1990, they were returned to MAG-40 and embarked aboard the USS Raleigh and USS Shreveport. The author assumes that once in the Gulf, all of MAG-40's 16 CH-53Es were consolidated aboard the USS Iwo Jima.

All of MAG-40's aviation command and control equipment was embarked on board the USS *Spartanburg County* (LST-1192).

5th MEB, commanded by BGen Peter J. Rowe, was composed of 1st Marine Division's Regimental Landing Team 5 (RLT 5), MAG-50, and BSSG-5. The 5th MEB was originally embarked with the intent of relieving the 4th MEB before President Bush ordered a doubling of the forces in the Gulf.[33] In mid January 1991, the 5th MEB arrived in the Gulf and eventually disembarked its forces in Saudi Arabia to become the I MEF reserve.[34]

T-AVB

During Operation desert Shield, MPSRON-2 and MPSRON-3 were deployed to Saudi Arabia. This also marked the first time that aircraft maintenance support ships were used during contingency operations.[35]

At the request of U.S. Central Command, the aircraft maintenance support ships USNS *Wright* (T-AVB 3) and USNS *Curtis* (T-AVB 4) were activated and deployed to the Arabian Gulf.[36] The Curtis set sail from Point Hueneme on 7 August 1990. The ship was embarked with 225 maintenance personnel and loaded with 279 mobile fixed-wing

[33] LtGen Bernard E. Trainor, USMC (RET.), "Amphibious Operations in the Gulf War", *Marine Corps Gazette*, vol. 78, no. 6,(Aug 1994): 58.
[34] Ibid.
[35] 4th MEB After Action Report (AAR), Sect. I, pp.9-11 as quoted in Col Ronald J. Brown, USMC (Ret). *U.S. Marines in the Persian Gulf, 1990-1991 with Marine Forces afloat in Desert Shield and Desert Storm*, Monograph, H.Q. United States Marine Corps, History and Museums Division. (Washington, DC: 1998): 26.

and rotary-wing facilities and cargo containers[37]. The *Curtis* was employed in the operational mode and conducted repairs on spare parts not ready for issue. Upon arrival in theater, it off-loaded fixed-wing equipment in Manama, Bahrain and repositioned to Port Jubayl on 28 September. The *Curtis* was then assigned to MALS-16 as the afloat rotary-wing logistics support complex.[38] The *Wright* was activated on 12 August 1990 at the Philadelphia Naval Shipyard and carried 77 rotary-wing maintenance vans, 191 fixed-wing vans, and 324 intermediate maintenance activity Marines[39]. The *Wright* was specially configured with its rotary-wing vans accessible so in-stream maintenance support was available if maintenance departments were overburdened.[40] Once in the Gulf, it too unloaded fixed-wing equipment and supplies and moved to the port of Manama, Bahrain and provided interim and intra "I" level support to 3d MAW and 4th MEB rotary-wing aircraft until December 1990.[41]

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[36] LtCol David G. Henderson, USMC (Ret.), "T-AVB ships: Vital Ingredients for MAGTF (Marine air-ground task force) Sustainment." *Marine Corps Gazette*, vol. 77, no. 1 (Jan 1993): 18.
[37] Ibid.
[38] Ibid.
[39] Ibid.
[40] Ibid.
[41] Ibid., p. 19.

Chapter 4

Current MEB Employment Planning Issues

> *With a perception of a declining global threat, fewer countries will be willing to sponsor a large U.S. presence within their borders over the next decade. The U.S. has already decreased its overseas presence from 115 major bases in 1956 to 27 in 1995. The ability of the United States to rapidly move and sustain forces in times of crisis will be increasingly reliant upon sea lift to meet joint overseas commitments. More and more, the first forces available in a crisis will be* ***afloa****t and forward* ***deployed****.*
>
> Challenges to Naval Expeditionary Warfare, 1997
> Office of Naval Intelligence[42]

Marine Commandant James L. Jones released his planning guidance on 2 July 1999[43]. In this message he emphasized that the Corps " must be prepared to deploy units of varying scale - small, mid-sized, or large - using a variety of means: aboard amphibious shipping, as maritime prepositioning forces, by strategic air lift, or through a combination of these methods." In August, HQMC tasked each Marine Force (MARFOR) commander to assess the feasibility and impact of re-establishing the MEB

[42] Office of Naval Intelligence. *Challenges to Naval Expeditionary Warfare*. Report. March 1997, p.7.
[43] Commandant of the Marine Corps, Message to all Marines (ALMAR 23/99). Subject: "Commandant's Guidance", 02001Z July 1999.

and requested courses of action for establishing one or more standing command elements.[44] The MARFOR responses were received in September and briefed at the General Officer Symposium. During the three star Executive Off-site at MCAS Miramar, 14-16 October 1999, the Commandant decided to re-establish the MEB by redesignating the MEF (FWD). The command elements would remain embedded within the I, II, and III MEF headquarters.

Whereas past doctrine delineated amphibious or MPF employment capabilities, current I and II MEF plans have inextricably linked the MEB to the MPF, utilizing a MEU as a force enabler. An MPF force baselining working group was held at Camp Pendleton in September 1999. The intent was to compare I and II MEF Tables of Organization (T/Os) and Tables of Equipment (T/Es) in order to agree upon a standard MPF MEB force structure. There was great disparity between the MEFs. For example, the ACE Fly In Echelon (FIE), composed of short tons (ST) of cargo and personnel varied from 4,000 STs and 4,800 Marines (3d MAW) to 6,570 ST and 6,595 Marines (2d MAW). 146 strategic lift (stratlift) sorties were required to lift the I MEF MPF MEB FIE; compared to 358 sorties for II MEF.

Challenges: Maritime Prepositioning Forces

The major problem associated with this one-sided deployment strategy is that it can only be successfully executed in a permissive environment. Amphibious operations provide the means for forcible entry, while MPF permits rapid deployment into a permissive area where force introduction is essentially unopposed and is expected to

[44] Commandant of the Marine Corps. Message to Commander MARFORLANT, MARFORPAC and MARFORRES. Subject: "Reestablishing the Marine Expeditionary Brigade (MEB)", 060001Z August 1999.

remain so through the arrival and assembly phase.[45] The *National Military Strategy of the United States* states:

> " *The United States must be able to introduce military forces into foreign territory in a non-permissive environment. While the U.S. will pursue the cooperation of other governments to allow US forces access, it must not assume that such cooperation will always be forthcoming. A forced entry capability ensures that the US will always be able to gain access to seaports, airfields, and other critical facilities that might otherwise be denied. It reassures allies that our ability to come to their aid cannot be denied by an enemy. It also allows future joint force commanders to retain operational freedom of action and gives the United States the ability to go anywhere that US interests require*."[46]

As the Commandant stated, the Marine Corps must *"maintain the capability to project power ashore against all types of resistance...and [deal with situations involving] the entire spectrum of armed threats."*

The Amphib MEB is the Marine Corps' smallest MAGTF capable of forcible entry operations. This invalidates the MPF MEB employment concept for use in these types of operations. The Marine Corps can not afford to assume that there will always be secure APODs and SPODs to facilitate the rapid deployment of combat forces into a conflict theater. The *Marine Corps Mid Range Threat Estimate -- 1997-2007*[47] states:

- *In 16 percent of the world's potential hot spots there are no C-5/C-17 capable airfields.*
- *42 percent of these potential locations are classified as possessing few C-5/C-17 capable airfields and present restricted egress into the national transportation net.*
- *For the transport and transhipment of military goods, more than 90 percent of the supplies will come from the seas.*

[45] Marine Corps Warfighting Publication (MCWP) 3-32, *Maritime Prepositioning Force Operations* (Draft), (Washington, DC, HQ USMC, June 1999): 1-2.
[46] Chairman of the Joint Chiefs of Staff. National Military Strategy of the United States of America. *Shape, Respond, Prepare Now: A Military Strategy for a New Era.*. (Washington, DC: 1997): 25-26.
[47] Marine Corps Intelligence Agency, *Marine Corps Midrange Threat Estimate-1997-2007:Finding Order in Chaos (U*), Defense Intelligence Reference Document, MCIA-1586-001-97, August 1997, 53-54.

- *The presence of modern port facilities is a critical factor in expeditionary operations. It is estimated that 6 percent of these same potential contingency areas have no MPF capable ports. 48 percent are classified as having few ports, and again, present restricted egress into the national transportation net.*

One may argue that ports are not required for an MPF operation but it will definitely complicate and slow down the evolution.

The off-load of a MPSRON can be conducted pierside, instream, or a combination of both. An amply sized beach area and approaches must be evaluated for hydrographic supportability as well as being swept for mines and other hazards.[48] Environmental considerations, e.g., sea state, are a major factor in affecting the decision to conduct such an off-load. The two methods for instream off-load are Lift-On/Lift-Off (LO/LO) and the Roll-On/Roll-Off Discharge Facility (RRDF).[49] LO/LO operations are extremely slow. All embarked containers are lifted off via the ship's crane, placed in lighterage and then moved to the beach landing sites. The RRDF is floating pier constructed of embarked lighterage and is the preferred instream off load method. However, the lighterage required to construct this facility represents a significant portion of the embarked MPF assets. Furthermore, due to the distribution of lighterage among the MPF ships, the entire MPSRON will be required to assemble the platform without degrading the ship-to-shore capability. To further complicate the matter, all three MPSRONs have different RRDF ramp certifications: AMSEA - 88,000 lb., MAERSK - 29,000 lb., and WATERMAN - 135,520 lb.[50]

The close proximity of airfields is essential to receive the FIE combat troops and equipment. And it is imperative that a suitable transportation network exists between the

[48] Marine Corps Warfighting Publication (MCWP) 3-32, *Maritime Prepositioning Force Operations* (Draft), (Washington, DC, HQ USMC, June 1999): 1-4.
[49] Ibid., p. 4-11.

port and/or beach, airfields, and assembly areas to enable the timely arrival and marrying-up of airlifted units with sea lifted equipment and supplies.[51]

Challenges: Amphibious lift

Today, there exists insufficient amphibious lift to deploy a complete MEB into a contingency short of a major theater of war and still maintain the Navy's current operational commitments. In the last ten years, the U.S. Navy has reduced its ships by 43 percent, some 235 ships since 1988.[52] In 1991, the year of Desert Storm, the Navy possessed 66 support forces ships.[53] In 1999 there were 40 amphibious ships, including the 2 LSTs in the reserve fleet.[54] The Navy's current ship investment plan is geared to achieve a 36 ship force comprising 12 Amphibious Ready Groups (ARGs), each with three ships.[55] By FY 2009, the amphibious fleet will consist of (7) *Wasp* (LHD-1) class, (5) *Tarawa* (LHA-1) class, (12) LPD-17 *San Antonio* class, and (12) LSD-41/49 *Whidbey Island/Harpers Ferry* class ships.[56] The Amphibious fleet will be capable of providing 2.5 MEB equivalents of assault echelon lift during ***wartime*** and sustaining three forward deployed MEUs in peacetime.[57] By 2015, the amphibious fleet will be comprised of (8) LHD, (4) LHA(R), and (12) LPD-17s. The LHAs will reach their end of service life (ESL), at a rate of one per year, beginning in 2011. The emphasis placed on MEU forward presence coupled with the sizable reduction in amphibious shipping, will not only constrain the peacetime training and exercise employment of a MEB sized

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[50] Ibid., P. 4-11 to 4-12.
[51] Ibid., p. 1-4.
[52] United States Department of the Navy, "Vision Presence Power: A Program Guide to the U. S. Navy," (Washington, DC, Feb 1999), 109. See figure 13.
[53] Department of Defense, *Defense 91: Almanac*, (Washington, DC: GPO, 1991), ISSN 0737-1217, September/October, 40.
[54] Department of the Navy, Naval Vessel Register. Online. Available: http://www.nvr.navy.mil/nvrships/active/fleet.htm. 11 October 1999.
[55] Department of Defense. *Annual Report to the President and the Congress, 1998. (*Washington DC: GPO, 1998), 42.
[56] Ibid.
[57] United States Department of the Navy, "Vision Presence Power: A Program Guide to the U. S. Navy," (Washington, DC, Feb 1999), 64.

amphibious force, but more importantly, it will foster the creation of an ad hoc brigade response to future real world contingencies.

Fielding and deploying the 4th and 5th Amphib MEBs during the Gulf War proved to be an extremely difficult evolution and these MEBs possessed standing CE headquarters. LtCol Ronald J. Brown (History & Museums Division, HQMC) described the following embarkation issues:

> "*A shipping crisis ensued because the 4th MEB force allocation required about two dozen amphibious ships but Amphibious Group 2 ...could only muster nine... After four days of intense negotiations, four more amphibious ships were finally made available;[bringing the total to 13]... The amphibious lift available was not sufficient to embark the 4th MEB and all its gear. The shortfall of at least seven amphibious ships prevented loading all assault echelon cargo on board amphibious shipping. This forced the 4th MEB to load the overflow on board Military Sealift Command (MSC) ships. Unfortunately, these MSC ships were not intended for amphibious assaults and were neither self sustaining nor capable of in-stream off-loading...[Additionally], no amphibious command ship (LCC/AGF) was assigned to the Amphibious Task Force (ATF) and this hampered command and control and limited combat capabilities.*"[58]

Embarking and deploying the 5th MEB confronted these same issues. It should be emphasized that during this time, the Marine Corps possessed standing MEB HQs and the Navy's amphibious fleet consisted of 66 amphibious ships.

The Navy/Marine Corps team should draw from the amphibious lessons learned during Operation Desert Shield/Desert Storm in order to prevent this type of painful evolution in the future. Without a properly configured brigade sized amphibious force, and sufficient numbers of amphibious shipping, the Navy and Marine Corps will be unable to execute forcible entry operations across the spectrum of conflict.

[58] Col Ronald J. Brown, USMC (Ret). *U.S. Marines in the Persian Gulf, 1990-1991 with Marine Forces afloat in Desert Shield and Desert Storm*, Monograph, H.Q. United States Marine Corps, History and Museums Division. (Washington, DC: 1998): 22.

Challenges: Strategic Air Lift

Air Mobility Command's (AMC) primary mission is rapid, global mobility and sustainment for America's armed forces.[59] In 1991, the U.S. Air Force possessed a total of 343 intra-theater strategic airlift (Stratlift) assets. The aircraft comprising this impressive air fleet were (109) C-5 *Galaxies* and (234) C-141 *Starlifters*.[60] During the Gulf War, this impressive fleet logged over 13,000 air deployment sorties[61]. Presently, the USAF strategic airlift assets (active & reserve) total 254 (**C-5**:104, **C-17**: 46, **C-141**: 104)[62] aircraft; 26 percent fewer than in 1991.[63] The current plan calls for the departure of the C-141 from regular service in 2003 and out of the total force inventory by 2006.[64] The Air Force is programmed to receive a total of 120[65] C-17 *Globemaster III* aircraft (the *Starlifter's* replacement) by 2005.[66] Compared to the size of the force that existed during the Gulf War, this modernization will cut the strategic lift fleet by 35 percent; reducing it to a total of 224 aircraft (**C-5**: 104, **C-17**: 120). Though the C-17 is capable of lifting 60 percent more cargo than the C-141, doing more with less aircraft limits operational flexibility, especially, if tasked to support a dual Major Regional Contingency (MRC) scenario.

In March 1989, the last C-5Bs were added to the 76 C-5As in the Air Force airlift force structure and all 50 are scheduled to remain in the active duty force.[67] In 1998, the

[59] Head Quarters Air Mobility Command. Online. Available: h ttp://public.scott/af.mil/hqamc/library/facts/amcfact.htm. 12 October 1999.
[60] Department of Defense, *Defense 91: Almanac*, (Washington, DC: GPO, 1991), ISSN 0737-1217, September/October, 41.
[61] Ibid., p. 56. Figure represents 3,980 C-5 sorties & 9,085 C-141 sorties as of 7 June 1991.
[62] 1999 Dept. of Defense Almanac. Online. Available: http://www.defenselink.mil/pubs/almanac/almanac/forces/ashlights.html. 23 February 2000.
[63] Head Quarters Air Mobility Command. Online. Available:http://public.scott/af.mil/hqamc/library/facts/amcfact.htm. 12 October 1999.
[64] John A. Tirpak, "Heavy Lift: The condition of the Strategic Mobility Force continues to improve." *Air Force*, vol. 81, no. 11 (Nov 1998).Online. Available: http://.www.afa.org/magazine/1198heavy.html. 13 October 1999.
[65] There is a potential for Congress to fund an additional 15 C-17s to replace the 15 C-141 Special Operations aircraft. AMC Stratlift will be significantly affected if these additional aircraft are not purchased.
[66] United States Air Force. Online. Available: http//www.af.mil/news/factsheets/c_17_globemaster_III.html. 12 October 1999.
[67] United States Air Force. Online Available: http//:www.af.mil/news/factsheets/c_5_galaxy.html. 12 October 1999.

Galaxy had the lowest mission capable rate, the lowest departure reliability, the highest cost per flying dollar and the highest maintenance per flying hour in the USAF.[68] As of 1999, the C-5 fleet had utilized only 20 percent of its projected service life and its mission capable rates are still well below the 75 percent target. Conservative estimates project the required C-5 avionics modernization and the Reliability Enhancement Re-engining Program (RERP) could cost more than $6 billion.[69] In lieu of the *Galaxy's* numerous maintenance challenges, it poses a definite stratlift concern during the transition from the C-141 to the C-17, because the C-5 will be the "backbone of air mobility."[70]

One additional source of strategic lift assets comes from the Civil Reserve Air Fleet (CRAF) program. Under this program commercial carriers agree to be on call for national emergencies and are prepared to carry troops or materiel to a far-off contingency.[71] However, this is a national airlift capability during wartime and it cannot be assumed that every contingency will warrant its activation. Furthermore, these aircraft can only accommodate limited types and quantities of cargo. There is no substitute for a C-5 that is capable of transporting helicopters, tanks, RADARS, and airfield arresting gear.

During the 1999 MPF baseline planning conference at I MEF, it was estimated that moving the 1st MEB would require (21) C-5s, (91) C-17s and (34) 747s; totaling 146 sorties. This represents 20 percent of the total C-5 and 76 percent of the FY 2005 C-17 inventories. In comparison, Marine Corps Doctrinal Publication 3, *Expeditionary*

[68] John A. Tirpak, "Heavy Lift: The condition of the Strategic Mobility Force continues to improve." *Air Force*, vol. 81, no. 11 (Nov 1998). Online. Available: http://.www.afa.org/magazine/1198heavy.html. 13 October 1999.
[69] John G. Roos, "Air Power's Backbone." *Armed Forces Journal International*, (Feb 1999): 38.
[70] John A. Tirpak, "Heavy Lift: The condition of the Strategic Mobility Force continues to improve." *Air Force*, vol. 81, no. 11 (Nov 1998). Online. Available: http://.www.afa.org/magazine/1198heavy.html. 13 October 1999.
[71] Ibid.

Operations[72], states that 250 sorties are required to fly in Navy and Marine forces into theater to marry-up with a MPSRON.

The C-5 Galaxy is the only aircraft capable of lifting the MPF MEB ACE heavy lift helicopters into a theater contingency. It should be noted, however, that strategic airlift is not always the most expedient way of amassing aviation forces. The primary limiting factor will be the size of the airfield (APOD). Airfields are rated by their Maximum On Ground (MOG) ratio. This identifies the maximum number of wide body aircraft able to operate at a particular airfield at any given time. This is a factor of actual ramp and parking space available to accommodate large body aircraft loading and unloading as well as crash and fire rescue capabilities. The MOG factor directly affects the number of Air Mobility Command (AMC) aircraft that can be scheduled and flown into the APOD. Thus a low MOG capable airfield will significantly impact the build-up of Fly In Echelon forces. In addition to parking space, there must also be a suitable ramp area to facilitate the build-up of ACE helicopters that were dismantled for loading on the C-5. For example, only two CH-53E helicopters can be loaded per C-5. Eight C-5s are required to lift a CH-53E squadron of sixteen aircraft. This does not include all of the main body cargo and personnel. Loading a Super Stallion helicopter on a C-5 requires the removal of the main rotor blades, main gear box, tail rotor blades, tail rotor gear box, auxiliary fuel tanks and "bat wings", and replacing the wheels with smaller aircraft tires, taken from the old A-4 *Skyhawk*. A crane capable of lifting the 10,000 lb. Main gearbox is also required at the APOD to re-assemble the helicopter. It takes approximately 2-4 days to assemble the CH-53E and perform Functional Check Flights (FCFs) to render the aircraft

[72] Marine Corps Doctrinal Publication (MCDP) 3, *Expeditionary Operations, (*Washington, DC, HQ USMC, 16 April 1998): 79.

Full Mission Capable (FMC). In addition to ramp and billeting space, fuel will also be required for the aircraft. Two CH-53Es require 4,400 gallons of JP-5.

Stratlift provides a tremendous capability to the deploying MEB, unfortunately, the quantity of these strategic assets is inversely proportional to their current level of operational tasking. "A large part of the U.S.-based fleet that would be required to support a major deployment of U.S. forces from bases in the U.S. is actually operating outside the country on any given day supporting routine deployments, contingency operations, humanitarian missions, and other "real-world" activities."[73] Furthermore, Fly In Echelon forces in conjunction with an MPF off load, require a permissive environment and the operation is far from expedient in execution. There are numerous planning factors, each unique to the contingency, which have the potential for drastically affecting the build-up of forces and decreasing the desired response time.

[73] John G. Roos, "Air Power's Backbone." *Armed Forces Journal International*, (Feb 1999): 37.

Chapter 5

DoN Lift II

A future international security environment that includes reduced U.S. access to foreign bases and airfields, and that is going to require unilateral military action at various overseas areas, is likely to put a premium on our ability to provide seabasing alternatives. While aircraft carriers are seabasing alternatives to forward based tactical air forces, amphibious task forces are alternatives for forward-basing of land forces—with all the advantages of unilateral action and flexibility of positioning seabasing affords. Aircraft carriers and amphibious ships are the centerpiece for a future naval strategy that may focus increasingly on seabasing as a means of power projection in the lower levels of conflict.

--Dept. of the Navy Integrated Amphibious Operations and USMC Air Support Requirements Study (DoN Lift II) (U) 8 January 1990[74]

On 6 March 1989, the Secretary of the Navy tasked the Chief of Naval Operations (CNO) and the Commandant of the Marine Corps (CMC) to conduct a study that addressed future program requirements and funding issues affecting Naval forces. The study was titled the *Department of the Navy Integrated Amphibious Operations and USMC Air Support Requirements (U)*, otherwise known as DoN Lift II. This document contained a classified intelligence annex and unclassified chapters that defined the lift and support requirements, including aviation, in scenarios ranging from low intensity

[74] Department of the Navy. Integrated Amphibious Operations and USMC Air Support Requirements (U). Study. January 1990, 61.

conflicts to general war. At present, DoN Lift II and the LHA(R) MAA are the source documents for MEB and MEF sized amphibious planning. Currently, no plans have been made to conduct a DoN Lift III study. Though the study analyzed the employment of amphibious MEFs and MEBs, the Navy is currently only programming for a 2.5 amphibious MEB capability. In order to determine the assets that will comprise the 2010 and 2015 MEB ACE, we must first understand the basic planning assumptions developed in DoN Lift II and contrast them with the current and projected force capabilities and fiscal constraints.

Threat

The study utilized a worldwide threat assessment based on each nation's ability to oppose power projection from the sea. A generic force structure, complete with T/E and T/O for ground, naval and air forces was developed for three levels of threat: high, mid, & low.

High Threat countries were defined as those possessing weapons, technology and manpower to conduct intense, large-scale anti-landing operations.[75] These countries were capable of conducting harassing operations against the forming Amphibious Task Force (ATF) and had significant air reconnaissance, fighters, electronic counter measure (ECM), and long range bomber assets.

Mid Threat countries were characterized as having limited photo and signal intelligence (SIGINT) satellites and relied on third country support for near real time imagery of the transiting ATF.[76] Their bomber and interceptor aircraft were considered capable of operating up to 400nm from coastal territory. The motorized rifle divisions

[75] Ibid., p. 3.
[76] Ibid.

(MRDs) of these particular countries were believed to possess as many as 250 tanks, 36 artillery tubes, and four long-range surface-to-surface missiles.[77] The study estimated that Mid-Threat coastal countries include approximately 90 percent of South America, 40 percent of Africa, 95 percent of Southwest Asia, and 80 percent of Southeast Asia.[78] It further stated that these specific types of countries pose the greatest threat to future U.S. expeditionary operations in the Third World. This paper, like DoN Lift II, will focus on MEB employment in the Mid-Threat environment.

Low Threat countries lack any significant capability to attack the ATF from beyond 20nm. They do, however, have the capability to employ indirect fire weapons along the coastal areas.[79]

The threat to the landing force was modeled after the Soviet Motorized Rifle Division (MRD) and the force structure varied depending on the threat level. The study presumed the high and mid-threat MRDs would conduct a mobile defense of an area approximately 200km long and 50km in depth. The strength of the defense resided with the mobile reserve whose mission is to rapidly attack the landing force.[80] The study estimated that a high threat MRD can respond with the lead battalion within 90 minutes and with a regimental sized force within three-five hours.[81] A mid threat analysis resulted in a closure rate of 90-110 minutes, with the Motorized Rifle Regiment (MRR) achieving full strength in 4.5 to 5.5 hours (270-330 minutes).[82] The threat analysis and assumptions dictated the size and speed of the ATF force required to be in the Assault

[77] Ibid., p. 18
[78] Ibid., p.17.
[79] Ibid., p. 3.
[80] Ibid., p. 5.
[81] Ibid.
[82] Ibid., pp. 37-38.

Echelon. Based upon this planning data, the naval air and sea assets required for each threat were determined.

Amphibious Operations

DoN Lift II's amphibious operations were based on over the horizon maneuver warfare initiated from 25nm off shore. The scheme of maneuver consisted of combined vertical and surface assaults, either simultaneously or sequentially, of two battalion landing teams (BLTs). The vertical assault landing zones (LZ s) were assumed to be 24nm inland. The air assault consisted of lifting one infantry battalion and one direct support artillery battery. Tables 2 and 3 illustrate the DoN Lift II MEB organizational units lifted during the vertical and surface assault phases. For comparison, the LHA(R) MAA scenario involved the amphibious MEB also conducting a surface assault from 25 NM, however, the ATF launched the vertical air assault forces at 75 NM from the ATF designated Landing Zones (LZs).

Table 2. DoN Lift II MEB Assault Echelon Troops and Vehicles to be Landed

	Lift Class	MEB Vertical Assault	MEB Surface Assault
Troops	Troop	1544	2091
HMMWV/Radio Vehicles	Medium	111	127
M923 Trucks (5-tons)	Heavy[1]	38	105
Trailers	Medium	16	27
LVS (Logistic Vehicle)	LCAC	0	1
Artillery (M198)	Heavy	8	14
Forklifts	Medium	6	7
Tanks/(LAV) [Mobile Electronic Warfare Support System (MEWSS)]	LCAC/Hvy	3 LAV	17
AAVs	LCAC	0	62

Source: DoN Lift II Table IV. (U) Troops & vehicles to be landed, p. 35, corrected with data from table D-ii, p. D-1-2.

1. DON LIFT II proposed externally lifting that M923 5-ton trucks by CH-53E helicopters. This is not a NAVAIR certified external load and cannot be lifted by the CH-53E.

Table 3. DoN Lift II Assault Echelon Organizational Units

	MEB Vertical Assault	MEB Surface Assault
Infantry	Battalion	Battalion
AAV		Company
Tanks		Company
D/S Artillery	Battery	Battery
G/S Artillery		Battery

The infantry battalion AE was comprised of (4) rifle Co., (1) weapons Co., (1) H&S Co., (2) TOW sections, (1) LAAD section, (1) Combat engineer platoon, and (1) AAV Co. The surface and vertical assault forces also have appropriately sized detachments of Combat Service Support, Command Elements, Radio Battalion, Surveillance, Reconnaissance & Intelligence (SRI) and a Communications Det.

Source: DoN Lift II Table III. (U) Organizational Units, p. 35 and table D-i, p. D-1-1.

Based on the threat scenario and mission to expediently lift two battalions ashore, DoN Lift II determined the Ship to Shore (STS) assets and sorties required to accomplish this task. Table 4 depicts the STS assets required to lift a MEB in high, medium and low threat environments and contrasts this data with the current LHA(R) MAA.[83]

Table 4. DoN Lift II & LHA(R) MAA MEB Ship to Shore Assets Required

Total Assets Required	MV-22	CH-53E	LCAC
High Threat	84	32	30
Medium Threat	60	20*	24
Low Threat	48	16	18
LHA(R) MAA Scenario	*36*	*32*	*24*

Source: DoN Lift II table VIII, P. 39 & table B-xxxvi, p. G-6-1 and LHA(R) MAA table H-5,appendix H, p. 5.
Note: 20 CH-53Es = one Sqd of 16 plus one Det of four.

Tables 5 and 6 illustrate the number and type of fixed wing and rotary wing aircraft (land or sea based) required to support a mid-threat MEB.

Table 5: DoN Lift II MID THREAT Carrier Air Wing (CVW) Equivalents and <u>Shore Based</u> USMC Aircraft Requirements

Phase	CVW*	F/A-18C	F/A-18D	AV-8B	EA-6B	KC-130	AH-1W	UH-1N	CH-60	CH-53E
Assault	1.7	23	19	20	4	10	26	8	35	51
Sustained	2.8	31	25	28	6	10	26	8	35	51
Reduced	1.7	19	14	16	3	7	18	7	18	19

* Notional Carrier Air Wing (CVW) for this study was 20 F-14s, 20 F/A-18Cs, 20 med attack, & 5 EA-6Bs.
**Note: CH-60 used vice MV-22. Therefore, CH-53E A/C figures require adjustment.
Source: DoN Lift II, table IX, P. 48.

[83] It should be noted that at the time of this study, the MV-22 program was canceled and the CH-60 helicopter was analyzed as the CH-46 replacement. This option, however, increased the number of CH-53Es required to 80/52/40 for a Hi/Med/Low MEB Threat.

Table 6. DoN Lift II MID THREAT Sea Based USN & USMC Aircraft Requirements

Phase	CVW*	F-14D	F/A-18C	F/A-18D	AV-8B	Med Attack	EA-6B	KC-130	AH-1W	UH-1N	*CH-60*	CH-53E
Assault	1.7	68	23	19	20	12	4	10	26	8	35	51
Sustained	2.8	97	31	25	28	30	6	10	26	8	35	51
Reduced	1.7	68	19	14	16	12	3	6	18	7	18	19

* Notional Carrier Air Wing (CVW) for this study was 20 F-14s, 20 F/A-18Cs, 20 med attack, & 5 EA-6Bs.
**Note: CH-60 used vice MV-22. Therefore, the number of CH-53E A/C require adjustment.
Source: DoN Lift II, table H-xv, p. H-28.

The Barrow Letter

The DoN Lift II study presented the lift requirements for the MEB AEE), including the naval support element. However, one critical factor that affected AE lift planning was the "Barrow Letter". On 4 November 1982, CMC, Gen Barrow, delivered a memorandum to the CNO, which became known as the “Barrow letter”. This memo was originally included as Annex C to DoN Lift II.[84] "In this letter, General Barrow outlined key degradations to Marine Corps amphibious lift objectives in response to fiscal realities as the DoN strove to achieve a 600 ship Navy.[85] The following excerpts from Commandant Barrow's letter were obtained from the LHA(R) MAA[86] and are provided for historical reference.

- *We have agreed to degrade the Defense Guidance mid-term objective for an amphibious capability to lift one MAF (AE) and one MAB. Our objective now is to lift one MAF (AE) and one MAB (AE) in amphibious shipping. Future planning will provide for a MAB AFOE.*

[84] United States Marine Corps Combat Development Command. *Mission Area Analysis: LHA Replacement (U).* Study. Contract: GS-35F-4506G, Order M0024699F2408, January 2000, 6-23 to 6-25. This document provides a complete discussion of the Barrow letter and its implications.
[85] Ibid.
[86] Ibid.

- *While the DoN Lift study objective is to have a 600 ship Navy by 1990, we have agreed that it will not be possible to achieve the one MAF (AE) and one MAB (AE) amphibious lift objective until 1994. Even then, however, we will be required to scale down our desired force levels to conform to the amphibious shipping provided by the FY84 DoN POM and EPA.*

- *We have reduced the Defense Guidance requirement for the simultaneous deployment and off-load of five MAGTFs to four (two MPS and two amphibious). We believe this to be well within the art of the possible.*

- *We have deleted our requirement for dedicated deck spots to support AV-8s in addition to those required to support our ship-to-shore operations by helicopter. Henceforth, we will base our deck spot requirements on helicopters, with the understanding that the operational commanders have the flexibility to take substitutions of AV-8s when appropriate.*

- *And, finally, we have agreed to disregard the 15 percent overhaul "add-on" we enjoyed during the Carter Administration. Simply stated, we agree that the Navy should count all active ships in matching lift to requirements, even if they are unavailable due to overhaul, SLEP, etc.*

Today, the Barrow letter no longer represents the official USMC position on amphibious lift and air support requirements and "will no longer be used to constrain or shape future Marine Corps amphibious requirements."[87] It should be noted that because of the Barrow letter, the DoN Lift II planning data assumed no VMA squadrons would be embarked aboard the MEB's assault echelon shipping. In that study, all AV-8Bs were shore based as part of the AFOE.

Force Level Capabilities

The Navy-Marine Corps (NAVMC) Board directed the study group to focus on three specific mission level capabilities which were characterized as (1) minimum peacetime capability, (2) peacetime plus insurance, and (3) wartime capability.[88] These

[87] Ibid., p. 6-25.
[88] Department of the Navy. Integrated Amphibious Operations and USMC Air Support Requirements (U). Study. January 1990, 8.

three levels were redefined as Contingency I, Contingency II, and Regional War *(see table 7*). The number of ships required for each mission level ranged from 39 for Contingency I, to 47 for Contingency II, and ultimately 55 for Regional War. Due to today's fiscally driven ship constraints, the 2010 Navy is forecast to be deficient in every DoN Lift II mission level (*see table 8*). It becomes apparent from this table that the Navy cannot adequately support any of the mission level capabilities that were specifically delineated by the Navy/Marine Corps Board when the DoN Lift study was initiated.

The study assumed that the most likely challenges to U.S. interests would come in the form of third world conflicts and the mission level capabilities were sized to the mid threat level.

Contingency I factored in ships maintenance cycles and provided amphibious lift for "ARG B" (31st MEU) and a 3:1 rotation of two forward deployed MEUs (equals six three-ship PHIBRONS), and one MEB (AE) capable of sailing within 168 hours[89] (7 days).

Contingency II also accounted for maintenance and the 31st MEU, but provided for a 3:1 rotation for *one* forward deployed MEU, and *two* MEB (AE)s capable of sailing within 168 hours. This contingency assumed that one forward deployed MEU would become the lead element of a MEB; i.e., compositing.

The Regional War contingency provided amphibious lift for the AE of one MEF and one MEB and air support to sustain in excess of two MEFs.

Table 7. DoN Lift II Mission Levels and Capabilities

Mission Level	Peacetime Plus Insurance		Total Warfighting Capability	
	Amphibious Contingency Force	Forward Deployed ARG/MEUs	Amphibious Lift (Deployment)	Aviation (Employment)
REGIONAL WAR 31st MEU + 1st MAW included	1 MEF(AE) and 1 MEB(AE) in other Theater	0	1 MEF(AE) ***and*** 1 MEB(AE)	Sustain 2 MEFs
CONTINGENCY II 31st MEU & 1st MAW supported	2 MEB(AE)	1	3 MEB(AE) ***or*** 1 MEF(AE)	Sustain 2 MEFs
CONTINGENCY I 31st MEU and 1st MAW supported	1 MEB(AE)	2	2 MEB(AE) ***or*** 1 MEF(AE)	Sustain 3 MEBs

Source: DoN Lift II, figure 64, p. 67.

"The lift goal has been stated for a number of years as lift for a MEF(AE) plus a MEB(AE)."[90] Based on this requirement, and assuming that forces for each mission level were sized to the Mid Threat, the study determined the desired capability set. Tables 7-9 summarize DoN Lift II's mission levels and lift requirements.

Table 8. DoN Lift II Amphibious Ships Required for Each Mission Level

Mission Level	LHA Req/Avail	LHD Req/Avail	LSD-41/49 Req/Avail	LPD-17 Req/Avail	Total Amphibs Required	2010 Ship Deficit
Contingency I	5/5	7/7	13/12	14/12	39	-3
Contingency II	5/5	9/7	13/12	20/12	47	-11
Regional War	5/5	9/7	13/12	28/12	55	-19

Source: DoN Lift II, table XIV, p. 69.

[89] Ibid., p. 9.
[90] Ibid., p. 59.

Table 9. DoN Lift II Ships Required to Lift a MEB and MEF Assault Echelon

Force Size	LHA/LHD Req./Avail	LSD-41/49 Req./Avail	LPD-17 Req./Avail	LCAC	Total Amphibs Required	2010 Ship Deficit
MEB	4/12	3/12	7/12	24	**14**	**N/A**
Ready MEB	5/12	4/12	8/12	24	**17**	**N/A**
MEF	10/12	10/12	21/12	78	**41**	**-5**

Source: DoN Lift II, p. 68-69. Ready MEB takes into account ship maintenance and MEU rotation cycles.

DoN Lift II stated that the Contingency I MEB would require global sourcing. However, even if the three globally sourced ARGs composited with a forward deployed ARG/MEU, two additional LPDs would still need to be sourced in order to meet the 14 ship MEB(AE) requirement (*see table 10*). Additionally, 6-8 MSC "black bottom" ships (or MPF Future MSC ships) would be required to lift the MEB's AFOE.

Table 10. Notional ARG Availability to Lift a Contingency I MEB

	31st MEU	**PAC**	**LANT**			
Total ARGs	**1**	**5**	**6**			
ARGs in Maint.	0	-1	-1			
ARGs Deployed	-1	-1	-1			
ARGs Preparing to Deploy	N/A	-1	-1			
ARGs Returning to CONUS	N/A	-1	-1	**Total ARGs Avail**	**Contingency I ARG Requirement**	**Deficit**
ARGs Available to Lift MEB	**N/A**	***1***	***2***	**3**	**4.7 ARGs (14 Ships)**	**1.7 ARGs (5 ships)**

Source: DoN Lift II, p. 68-69. Note. This table merely provides a notional MEB sourcing scenario based upon maintaining the 3:1 ARG/MEU rotation & 31st MEU to comply with personnel and operational tempo criteria as stated in the study (p. 66). It also assumes that homeports are generally divided between east and west coasts. With 36 ships, the Navy/Marine Corps will only be able to globally source ***one*** amphibious MEB if composited with a forward deployed MEU. The alternative is to deploy the "ready ARG/MEUs" that are in a "Prepare to Deploy" (PTD) status. This will have a significant impact on operations and personnel tempo.

The dreams of a 600 ship Navy are but distant memories. Driven by current fiscal realities, it is evident that sourcing an amphibious MEB would have a significant impact on operations and personnel tempo (Optempo/Perstempo). Granted, if the magnitude of the contingency warrants it, operational and personnel tempo will not be a factor. However, the study assumed that these deployment concerns would be expected during execution of a Contingency II mission level, not level I.

If the Department of the Navy only procures a 36 ship amphibious fleet and continues with current ARG/MEU deployment requirements, *the forcible entry MEB will only be capable of forming under ad hoc conditions*. This is not the optimum MEB employment method, especially, when this force may called upon to rapidly accomplish missions of national and strategic importance. How combat effective is a brigade sized OMFTS/STOM force if it can never train for battle?

Chapter 6

Sourcing the 2010 Amphibious MEB Shipping

The 2010 ATF, as distinct from the ARG/MEU (SOC), will be a more capable and adaptable force, rapidly deployable, and able to operate independently, as an element of a larger naval expeditionary task force, jointly, or in a combined or coalition environment. An ATF sized to deploy a MEB will be able to project power ashore in an amphibious assault…Due to its flexibility, combat power, deployability and responsiveness, it will remain the initial "force of choice" for many US security issues.

--*The Naval Amphibious Warfare Plan: Decisive Power from the Sea*[91]

In order for the MEB to become the "force of choice" for future U.S. security issues, it will require dedicated amphibious shipping. It is no mystery that given a 36 ship amphibious fleet, the Navy/Marine Corps will be unable to maintain a 3:1 ARG/MEU rotation cycle and simultaneously provide enough ships for 2d or 3d Fleet to embark an amphibious MEB(AE). The DoN Lift II study stated that shaping an amphibious force to meet only a Contingency I mission level response provided a limited capability[92] and would consequently require "swinging ships". The only alternative method left is to

[91] Chief of Naval Operations. *Naval Amphibious Warfare Plan: Decisive Power from the Sea*, Naval Expeditionary Warfare Division (N85), (Washington, DC). Online. Available: http://www.exwar.org/what'snew/awp/splash.htm. 8 March 2000. See Chapter 2: The Amphibious Task Force.
[92] Department of the Navy. Integrated Amphibious Operations and USMC Air Support Requirements (U). Study. January 1990, 66.

muster all available amphibious shipping and composite this ad hoc Amphibious Task Group (ATG) with a deployed ARG/ MEU. Even if this methodology were adopted, only 2d Fleet would be capable of assembling the 14 ships necessary to embark 2d MEB (*2d Fleet could potentially muster 15 ships. See table 12*). 3d Fleet, however, would only be capable of providing 11 amphibs for 1st MEB (*see table 11*). This assumes that the 31st MEU could not be counted on for support. In this scenario, 1st MEB requires the global sourcing of three additional LPD-17s in order to embark the AE.

Globally sourcing an amphibious MEB is not recommended. I & II MEF aviation, ground, and combat service support units would have to be hastily pieced together in order to create the MEB(AE). Complementary force lists, combat load plans, and task organizations, sourced between two Marine Expeditionary Forces, would need to be created. These forces would have to be identified on a rotating basis. Mutually supporting Time Phased Force Deployment Data (TPFDD) and detailed ship load plans, tailored to an agreed upon generic mission level competency, would also require periodic validation. Further complicating matters would be the command & control of an organization coming together for the first time, under combat conditions at sea, and expected to successfully execute an operational contingency with minimal loss of life. It is not strategically prudent to rely upon such a “paper” capability. Furthermore, depending upon the number of ships available, aviation squadrons would have to be broken up into multiple detachments (Dets) to facilitate dual coast embarkation. The same would hold true for the ground combat element.

There are five possible solutions to the MEB sourcing dilemma. First, the Navy can procure more amphibious shipping (a total of 48 would provide for one "ready" MEB &

54 would create two). The second option would be to place ARG/MEUs on prepare to deploy (PTD) tethers vice maintaining a forward presence. This would facilitate the embarkation of two "ready" MEBs capable of sailing in 168 hours. The third option would be to alternate the alert status between the First and Second MEF's ready MEBs. This would allow for two forward deployed MEUs (31st and an East or West Coast MEU). The forth choice would be to continue with business as usual and form hasty, ad hoc OMFTS MEBs from all assets not in maintenance and dismiss OPTEMPO/PERSTEMPO concerns. Or finally, the Navy/Marine Corps can disregard the need to maintain a forcible entry capability and motion to eliminate this requirement from the National Military Strategy. After a quick review of the choices, it is evident that the only politically and economically feasible option is to maintain the status quo and prepare to form ad hoc MEBs, as required.

The following analysis describes the difficulties associated with forming a 2010 amphibious MEB. The formation of two notional MEBs was analyzed (1st MEB, I MEF and 2d MEB, II MEF) from the standpoint of both the projected 2010 ship availability and the resident aviation capability. The global sourcing option ("swinging ships") as previously discussed was discounted. Instead, all available ships from the sourcing fleet command are mustered in order to constitute a MEB capable of sailing within 168 hours. This assumes that all ARG/MEUs that were deployed, returning to CONUS or preparing to deploy, formed the MEB ATF. Additionally, current LPD-17 program data was used to determine the home ports for the twelve new *San Antonio* class ships that become full operations capable by 2009. Six LPD-17s will be assigned to 2d Fleet, 5 assigned to the 3d Fleet, and one home ported with 7th Fleet in Sasebo, Japan. Under this methodology,

1st MEB is assigned eleven amphibs and 2d MEB fifteen (*see tables 11 and 12*). Due to the lack of indigenous shipping, the 3d Marine Expeditionary Brigade stationed in Okinawa, Japan, was not considered amphibious MEB "capable" for the purpose of this paper (*see table 13).* 3d MEB is limited by both the number of amphibs assigned (four), and also by the number of projected type, model, and series (T/M/S) amphibious capable aircraft assigned (60 x MV-22, 12 x CH-53E, 9 x AH-1Z, and 5 x UH-1Y). This paper analyzed the two MEBs that had adequate amphibious shipping and forces assigned to facilitate embarkation and rapid deployment within seven days. It was also assumed that two CONUS ARGs (one per each coast), approximately 16 percent, would be unavailable for deployment due to scheduled shipyard maintenance.

Table 11 summarizes the 1st MEB 2010 notional amphibious net lift capacity. Ship vehicle square and cargo cube planning factors were taken from the LHA(R) MAA study. The Mid Threat requirement was obtained from DoN Lift II and current HQMC (PP&O) programming figures. 1st MEB's notional amphibious shipping was comprised of (1) LHA, (3) LHD, (2) LSD-41, (1) LSD-49, and (4) LPD-17s. This eleven ship Amphibious Task Group was able to meet or exceed the DoN Lift II air spot, LCAC, and cubic feet of cargo requirements. However, only 90 percent of the troops (11,757) and 73 percent of the vehicle square footage (218,369 ft^2) were capable of being embarked. Three additional LPD-17s would give 1st MEB the ability to lift the Mid Threat requirement while also providing for an additional 817 troops, 309,275 ft^3 of cargo space, and six additional LCACs. Utilizing the LHA(R) MAA MEB fingerprint of 12,758 troops and 323,695 ft^2 of vehicles results in an embarkation limit of 92 percent of the troops and 67 percent of the vehicle square.

2d MEB (*table 12*) was comprised of (2) LHAs, (3) LHDs, (3) LSD-41 class, (2) LSD-50 class, and (5) LPD-17s. This notional combination exceeded all DoN Lift II requirements and yielded 221 air spots, 15,545 troops, 305,033 ft^2 of vehicle space, 971,511 ft^3 (174%) of cargo space, and 37 LCAC spots. If the LHA(R) MAA figures were utilized, 2d MEB would meet 94 percent (-18,662 ft^2) of the vehicle square foot requirement.

3d MEB's limited four ship ARG embarkation capacity is listed in table 13. The notional 2010 3d MEB was comprised of (1) LHA, (2) LSD-41 class, and (1) LPD-17. This ARG is only capable of meeting 25-31 percent of the DoN Lift requirement and is provided for comparison.

Table 11. 1st MEB 2010 Notional Adjusted Amphibious Net Lift Capacity

1st MEB 2010 Notional Adjusted Amphibious Net Lift Capacity					
Ship Type	**Air Spots**	**Troops**	**Vehicle (Ft^2)**	**Cargo (Ft^3)**	**LCACs**
LHA-1	***In Maintenance***				
LHA-5 (MEU)[1]	40	1,713	25,400	105,900	1
LHD-2	42	1,813	15,303	124,567	3
LHD-4	42	1,872	15,303	124,567	3
LHD-6	42	1,964	15,463	127,509	3
Sub total:	***166***	***7,362***	***71,469***	***482,543***	***10***
LSD-45	1	505	16,201	10,905	4
LSD-47	1	504	16,187	10,905	4
Sub total:	***2***	***1,009***	***32,388***	***21,810***	***8***
LSD-49	***In Maintenance***				
LSD-52 (MEU)[1]	1	506	19,712	58,322	2
Sub total:	**1**	**506**	**19,712**	**58,322**	**2**
LPD-18	***In Maintenance***				
LPD-20 (MEU)[1]	2	720	23,700	43,800	2
LPD-21	2	720	23,700	43,800	2
LPD-22	2	720	23,700	43,800	2
LPD-24	2	720	23,700	43,800	2
Sub total:	***8***	***2,880***	***94,800***	***175,200***	***8***
Grand Total *(11 ship capacity)*	**177**	**11,757**	**218,369**	**737,875**	**28**
Mid Threat Requirement	*175*[2]	*13,100*[4]	*300,000*[4]	*560,000*[2]	*24*
Delta & % of Requirement[3]	(+2) (101%)	**(-1,343) (90%)**	**(-81,631) (73%)**	(+177,875) (+132%)	(+4) (+116%)
Delta with 3 additional LPD-17s	*(+8) (106%)*	*(+817) (106%)*	*(+2.4)*[3] *(101%)*	*(+309,275) (+155%)*	*(+10) (+142%)*

Data compiled from LHA(R) MAA dated 13 Jan 00, tables 6-49 & 6-50, pp. 6-55 &-6-56; DoN Lift II, table J-i, p. J-1; www.navy.mil; and LPD 17 Program Update brief from PMS 317, 1 Jan 00.

1. Assumes one ARG in maintenance and one ARG/MEU deployed
2. DoN Lift II, figure 10, p.7 lists 630 KCUFT of cargo space and 185 air spots are required for the MEB(AE). 560 KCUFT is the HQMC (PP&O) programming figure. DoN Lift II table G-xl, p. G-6-2, states the MV-22/CH-53E air spot requirement is 175 for a Mid Threat & 145 for a Low Threat.
3. A deficiency of 1,343 combat troops and 81,631 ft^2 of vehicle space results when only 5 LPD-17s are assigned, for embarkation. A total of seven LPD-17s are essential for 1st MEB to meet the DoN Lift II troop and Square requirement. This would require globally sourcing three additional LPD-17s. An additional LHA or LHD is also required in order to sea base 60 MV-22s.
4. The LHA(R) MAA table 5-14, p. 5-19 utilized a MEB troop fingerprint of 12,758 and a vehicle square requirement of 323,695 Sq. ft. Given these figures, the 11 ships could embark 92% of the troops, but would be deficient 105,326 Sq. ft. of vehicle space.

Table 12. 2d MEB 2010 Notional Adjusted Amphibious Net Lift Capacity

2d MEB 2010 Notional Adjusted Amphibious Net Lift Capacity					
Ship Type	**Air Spots**	**Troops**	**Vehicle (Ft^2)**	**Cargo (Ft^3)**	**LCACs**
LHA-2 (MEU)[1]	40	1713	25,400	105,900	1
LHA-4	40	1713	25,400	105,900	1
LHD-1	***In Maintenance***				
LHD-3	42	2,107	16,246	138,620	3
LHD-5	42	1,921	15,997	125,223	3
LHD-7	42	1,964	15,463	127,509	3
Sub total:	***206***	***9,418***	***98,506***	***603,152***	***11***
LSD-41	***In Maintenance***				
LSD-44	1	505	16,201	10,905	4
LSD-46	1	505	16,201	10,905	4
LSD-48	1	505	16,201	10,905	4
Sub total:	***3***	***1,515***	***48,603***	***32,715***	***12***
LSD-50 (MEU)[1]	1	506	19,712	58,322	2
LSD-51	1	506	19,712	58,322	2
Sub total:	**2**	**1,012**	**39,424**	**116,644**	**4**
LPD-17	***In Maintenance***				
LPD-19(MEU)[1]	2	720	23,700	43,800	2
LPD-25	2	720	23,700	43,800	2
LPD-26	2	720	23,700	43,800	2
LPD-27	2	720	23,700	43,800	2
LPD-28	2	720	23,700	43,800	2
Sub total:	***10***	***3600***	***118,500***	***219,000***	***10***
Grand Total *(15 ship capacity)*	**221**	**15,545**	**305,033**	**971,511**	**37**
Mid Threat Requirement	*175*[2]	*13,100*	*300,000*	*560,000*	*24*
Delta & % of Requirement	(+46) (126%)	(+2,445) (119%)	(+5,033) (102%)	(+411,511) (174%)	(+13) (154%)

Data compiled from LHA(R) MAA dated 13 Jan 00, tables 6-49 & 6-50, pp. 6-55-6-56; DoN LIFT II, table J-i, p. J-1; www.navy.mil; and LPD 17 Program Update brief from PMS 317, 1 Jan 00.

1. Assumes one ARG in maintenance and one ARG/MEU deployed.
2. DoN Lift II, figure 10, p.7 lists 630 KCUFT of cargo space and 185 air spots are required for the MEB(AE). 560 KCUFT is the HQMC (PP&O) programming figure. DoN Lift II table G-xl, p. G-6-2, states the MV-22/CH-53E air spot requirement is 175 for a Mid Threat & 145 for a Low Threat.
3. The LHA(R) MAA table 5-14, p. 5-19 utilized a MEB troop fingerprint of 12,758 and a vehicle square requirement of 323,695 Sq. ft. Given these figures, the 15 ships could embark 94% of the required vehicle square, resulting in an 18,662 Sq. ft. deficiency.

Table 13. 3d MEB 2010 Adjusted Amphibious Net Lift Capacity

3d MEB Notional 2010 Adjusted Amphibious Net Lift Capacity					
Ship Type	**Air Spots**	**Troops**	**Vehicle (Ft^2)**	**Cargo (Ft^3)**	**LCACs**
LHA-3	40	1713	25,400	105,900	1
Sub total:	***40***	***1,713***	25,400	105,900	***1***
LSD-42	1	504	16,201	10,905	4
LSD-43	1	513	16,201	10,905	4
Sub total:	***2***	***1,017***	***32,402***	***21,810***	***8***
LPD-23	2	720	23,700	43,800	2
Sub total:	***2***	***720***	23,700	43,800	***2***
Grand Total *(4 ship capacity)*	**44**	**3,450**	**81,502**	**171,510**	**11**
Mid Threat Requirement	*175*	*13,100*	*300,000*	*560,000*	*24*
Delta & % of Requirement	**(-131) (25%)**	**(-9,650) (26%)**	**(-218,498) (27%)**	**(-388,490) (31%)**	**(-13) (46%)**

Data compiled from LHA(R) MAA dated 13 Jan 00, tables 6-49 & 6-50, pp. 6-55-6-56; DoN Lift II, table J-i, p. J-1; www.navy.mil; and LPD 17 Program Update brief from PMS 317, 1 Jan 00.

Note: DoN Lift II, figure 10, p.7 lists 630 KCUFT of cargo space and 185 air spots are required for the MEB(AE). 560 KCUFT is the HQMC (PP&O) programming figure. DoN Lift II table G-xl, p. G-6-2, states the MV-22/CH-53E air spot requirement is 175 for a Mid Threat & 145 for a Low Threat.

Chapter 7

Damage Stability and ACE Embarkation Challenges

> *Victory is the beautiful, bright colored flower. Transport is the stem without which it could never have blossomed.*
>
> —Winston Churchill
> The River War, viii, 1899[93]

The 2010 MEB will be comprised of all newly replaced or modernized aircraft, the CH-53E being the exception. Most of these new aircraft will be significantly larger and heavier than the models they are replacing. This presents a problem for the future amphibious MEB ACE since these modern aircraft will embarked upon a class of amphibious shipping that was never structurally designed to accommodate them.

Damage Stability: Status of the "Big Deck" Fleet

Stability is defined as the ability or tendency of a ship to return to upright position when inclined from the vertical by an outside force. Today, amphibious ships are

[93] Quoted from US Transportation Command Brief to the USMC Command & Staff College, 4 January 2000.

designed to survive 15% structural damage below the waterline and still survive.[94] This design requirement enables the ship to survive a three compartment flooding scenario. According to CDR Stephen Burke (HQMC, Amphib Programs, POE), *'The problem with LHA/D stability concerns the KG (the measurement from the ship's keel to the ship's center of gravity). The greater the distance between K and G for a given design, the less stable the ship. Regarding LHA/Ds, as heavier equipment is added above the ship's optimum center of gravity, which is below the hangar bay, the KG rises, causing the ship to become less stable. The less stable the ship, the greater likelihood the ship will not survive when damaged."*[95]

Naval Sea Systems Command (NAVSEA) conducted inclining experiments on the *USS Peleliu* (LHA-5) in August 1994 and the *USS Wasp* (LHD-1) in 1996. A Combat Cargo Survey was also conducted on the *USS Kearsarge* (LHD-3) in October 1997.[96] The experiments determined that the stability problems were worse than the ship builder originally calculated. Additional experiments revealed that LHDs 1-4 are currently at their stability limit.[97] Information obtained from the Naval Surface Warfare Center (NSWC), Carderock, reveal that the LHA-1 class is currently in Stability Status 2. This means that neither an increase in weight nor a rise in the ship's Center of Gravity (COG) is acceptable.

[94] CDR Stephen Burke, USN, *LHA/LHD Class Damage Stability (U)*, Information Paper (Washington, DC: HQMC (POE), January 2000).
[95] Ibid.
[96] Griffin, J. A. (GriffinJA@nswccd.navy.mil). "LHA/LHD Instability Issues." E-mail to the author. 10 March 2000. This e-mail response was prepared by the Naval Surface Warfare Center (NSWC) code 244 Carderock, Indiana and from NAVSEA (PMS 377F). The total aircraft weights stated were: 599,648 lb. (268 LTs) for LHA-5 and 748,720 lb. (334 LTs) for the LHD-1 experiments.
[97] CDR Stephen Burke, USN, *LHA/LHD Damage Stability*, Information Paper (Washington, DC: HQMC (POE), January 2000).

LHD 1 class is currently in Stability Status 3, which means that an increase in the ship's weight is acceptable, but a rise in the ship's center of gravity must be avoided.[98] This poses a problem for the ACE given the substantial increase in weight of the MV-22 and JSF and the fact that these ships have a 40-year service life. With 12 MV-22s embarked, the flooding of three compartments would sink the ship. "In order to keep damage stability at current levels, a one for one replacement of MV-22 for CH-46 is not possible."[99] Five MV-22s weigh approximately as much as 12 CH-46Es, and without stability upgrades, this would be the maximum tiltrotor aircraft allowed to safely operate and deploy aboard LHA and LHD 1-4 ships.

The LHD 5-7 class ships are currently in Stability Status 1. This means that a rise in the ship's COG will not require any compensation ***unless*** the magnitude of the additions are so large as to make the ship approach stability limits.[100]

Future Stability Planning Issues

Due to future ACE and GCE equipment growth, a thorough amphib damage stability analysis is required. For example, the standard 2000 LHA/LHD embarked MEU aircraft load is comprised of (12) CH-46E, (4) CH-53E, (4) AH-1W, (2) UH-1N, and (6) AV-8Bs; weighing in at approximately 520,570 lb., without fuel & ammo (*see Appendix E, table E-1*). In contrast, the 2010 LHD will consist of (12) MV-22, (4) CH-53E, (4) AH-1Z, (3) UH-1Y, and (6) JSF; producing a top side weight of 804,280 lb. (*see Appendix E, table E-9*). This represents an increase of 283,710 lb. The MV-22 and the JSF also possess larger fuel tanks than their predecessors. This difference, or *delta*, must also be

[98] Griffin, J. A. (GriffinJA@nswccd.navy.mil). "LHA/LHD Instability Issues." E-mail to author 10 March 2000. This e-mail response was prepared by the Naval Surface Warfare Center (NSWC) code 244 Carderock, Indiana and from NAVSEA (PMS 377F).
[99] CDR Stephen Burke, USN, *LHA/LHD Damage Stability*, Information Paper (Washington, DC: HQMC (POE), January2000).
[100] Griffin, J. A. (GriffinJA@nswccd.navy.mil). "LHA/LHD Instability Issues." E-mail to author 10 March 2000. This e-mail response was prepared by the Naval Surface Warfare Center (NSWC) code 244 Carderock, Indiana and from NAVSEA (PMS 377F).

taken into account because it additionally contributes to the topside weight increase. The standard CH-46E fuel load for troop lift missions is 3,000 pounds. The maximum MV-22 fuel load is 9,880 lb. Replacing the CH-46E with the MV-22 produces a fuel increase of 82,560 lb. Modernizing the ACE with six JSFs incurs a fuel increase of 61,800 lb. After factoring in the AH/UH upgrades, the 2010 embarked Marine ACE aircraft will carry an additional 152,070 lb. of fuel (*see Appendix E, table E-13*). The 2010 ACE combined fuel and aircraft weight increase due to modernization yields an 84 percent weight increase (435,780 lb.) from today's standard LHD embarked ACE. Compared to the 2000 figures, it is the projected that the 2015 ACE fuel requirement will increase by 150 percent or 232,186 lb. The notional 2015 MEB ACE will weigh 125 percent (651,696 lb.) more than today's standard MEU ACE. It should be noted, however, that this calculation does not take into account the CH-53E heavy lift helicopter replacement which has yet to be designed.

Ship center of gravity problems become more acute when the GCE equipment is factored into the equation. For example, the Advanced Amphibious Assault Vehicle (AAAV) weighs 21,500 lb. more than the older Amphibious Assault Vehicle (AAV). The M1A2 weighs 2,800 lb. more than the M1A1 tank. The Medium Tactical Vehicle Replacement (MTVR) 7-Ton truck will weigh 6,500 lb. more than the 5-Ton truck. Though these ships may be able to accommodate a 2.5 % growth factor, equivalent to 1000 LTs,[101] further study is required in order to determine whether this significant increase in topside weight will negatively affect the ship's COG.

[101] 1 Long Ton (LT) = 2,240 lb.

Even if the LHA and LHD stability problems are corrected, it remains uncertain whether or not these ships can safely compensate for the increased weight of the JSF and GCE vehicle weight growth. Depending on the results of further engineering studies, the Marine Corps may be incapable of embarking the desired mix of MEB aircraft.

The MV-22 weighs approximately 16,000 pounds more than the CH-46E. The Joint Strike Fighter is projected to weigh 12,000 pounds more than the AV-8B. The AH-1Z will be 1,300 pounds heavier than the AH-1W and the UH-1Y will weigh approximately 4,100 pounds more than the UH-1N variant. Aircraft weight growth will significantly impact the future MEB aircraft mix by restricting the combinations of T/M/S aircraft able to be embarked aboard aviation class shipping. The number of available air spots becomes irrelevant if ship stability limitations determine aircraft spot factors. For example, if an LHD has 44.32 spots available for USMC air assets but is restricted to a mix of (5) MV-22, (4) CH-53E, (4) AH-1W, (3) UH-1N, and (6) AV-8B, this leaves 15 (14.61) air spots that cannot be filled because of weight restrictions.[102] This same aircraft combination on the LHA yields 12 (11.90) unusable air spots.[103] With these limitations, the notional 1st MEB would lose 39 potential air spots while 2d MEB would lose *36 (see chapter 8, tables 16 and 17*).

Corrected for damage stability, the "big decks" would be able to embark 12 MV-22s and the number of unusable air spots would be significantly reduced. For comparison, the LHAs would lose 2.10 spots and the LHDs 4.46 spots (*see Appendix E, tables E-5 and E-6*). [104]

[102] See Appendix E, table E-3.
[103] See Appendix E, table E-4.
[104] These calculations serve mainly to highlight the possible problems associated with ACE aircraft weight growth. Ship COG and stability calculations require a much more detailed analysis. Ultimately, the engineers at NAVSEA will have to determine the future combinations of aircraft and GCE equipment which will be capable of embarking aboard LHA and LHD class shipping.

It should also be noted that since the time of the DoN Lift study, aircraft have also increased in overall size. Prior to ship stability concerns, aircraft size was the primary factor that determined the number of aircraft T/M/S combinations capable of being embarked aboard amphibious shipping. The MV-22 takes up 1.45 CH-46E air spots on an LHD. Theoretically, two squadrons of MV-22s (34.8 air spots) could easily embark aboard an LHA or LHD if there were no instability restrictions.

The amphib MEB is already operating at a deficit of air spots when the Harriers or JSFs are embarked because of Commandant Barrow's 1982 agreement with the CNO. Though this letter may no longer be valid, its legacy is manifested in the LHD class ships which will not begin to reach their end of service life until 2029 (LHD-1). In order to conduct a Mid Threat MEB amphibious assault, DoN Lift II calculated the number of air spots, void of AV-8Bs, to be 175. The notional 1st MEB's 22 AV-8Bs require 41 (40.62) air spots for embarkation and employment. Thus, 216 air spots would represent the corrected number required to adequately conduct the amphibious assault with organic fixed wing attack aircraft. An additional LHD would be needed to fulfill this requirement. Given the projected amphibious fleet structure in 2010, this option could be supported with the production of LHD-8 and assigning it to the Third Fleet. However, this capability would be short lived. LHAs 1-5 will reach the end of their 35 year service life starting in 2011 at a rate of one per year until 2015.[105] The current proposal is to build only four LHA(R)s since the decision has already been made to build LHD-8. The author assumes the LHA(R)s will be evenly assigned between 2d and 3d Fleets. The *USS Belleau Wood* (LHA-3), home ported in Okinawa, Japan, would have to be replaced by

[105] CDR Stephen Burke, USN, *LHA Replacement Overview Brief*, Power Point Brief, (Washington, DC: HQMC (POE), Oct 99).

2013. Since it is assumed that the LHA(R)s will be stationed in CONUS, an LHD from 3d Fleet would have to transferred to 7th Fleet in Japan for assignment to support the 31st MEU. Thus the best big deck capability 1st MEB can achieve will ultimately be composed of two LHA(R)s and two LHDs.

Further complicating issues is the increased weight of the JSF. Three JSFs are the equivalent of six AV-8Bs in weight. Based upon the significant ACE aircraft weight growth and ship stability concerns, it appears unlikely that a one for one replacement of AV-8Bs for JSFs can take place on LHA or LHD class shipping. According to the NSWC, "the JSF amphibious suitability, including interfaces, are [currently] being reviewed in the primary stages of the fighter's development." The Joint Strike Fighter issue is complicated, from both a political as well as an engineering perspective. However, if ship suitability analyses of the JSF prove to be incompatible with the Marine Corps' desired LHD aircraft mix, then a high level decision will have to be made regarding whether or not to substitute assault support aircraft for TACAIR assets in order to embark six JSFs. This course of action would further degrade the vertical assault lift capacity of the MEB. The "Barrow Letter" is a moot point if sufficient quantities of the Marine Corps' AV-8B replacement are unable to embark aboard all LHD class ships. Depending on the results of ongoing Joint Strike Fighter ship suitability and amphib ship engineering studies, Marine procurement of a Navy aircraft carrier (CVN) compatible variant may be justified. This potentially sobering reality may force the Marine Corps to reevaluate its requirement to equip the Marine TACAIR fleet entirely with Short Take Off and Vertical Landing (STOVL) fighters. Otherwise the Marine Corps may be procuring a capability without an adequate platform from which to employ it.

LHA/LHD Stability Upgrade Funding Status

Presently, stability modifications are considered "above core" and are not funded[106]. However, Program Objective Memorandum 2002 (POM 02) guidance from the Naval Programming Division (N80) directed the Naval Expeditionary Warfare Division (N85) to fund $70M for four LHA class stability modifications (FY02 $40M and FY03 $30M). As of March 2000, Sponsor's Program Proposals (SPPs) were being briefed in preparation for (POM 02).[107] The 28 March 2000 N85 SPP brief called for $23M in FY 02, $30M in FY 03, and $18M in FY 06 to be allocated towards correcting stability problems with four of the five LHAs. Though these funds are included in POM 02, the Program Budget Decisions (PBDs) will not be finalized until the August-September 2000. Therefore, it is uncertain whether or not these necessary alterations will be funded as planned. It should be noted that even if these funds were appropriated, the final LHA alteration would not be completed until FY 07.

Unless similar stability modifications are funded for LHDs 1-4, their capability will fair no better than the LHAs they were conceptually designed to replace. This will negatively impact the ACE's ability to embark the requisite number of aircraft essential to supporting the MEB in a Mid Level threat scenario. Without these necessary upgrades, 1st MEB could only embark 56 percent (27 out of 48) of its MV-22s (*see Chapter 8, table 16*). 2d MEB would not fare much better; embarking 65 percent (39 out of 60) of its required Ospreys (see Chapter 8, table 17). Based on these facts, the Marine Corps cannot even field a Low Threat sea based MEB aviation capability until this deficiency is

[106]Germain, Maj John T., USMC, Amphibious Programs Branch, HQMC (POE-51), (germainjt@hqmc.usmc.mil). "R/E LHA/D Mod Info." E-mail to the author 29 March 2000.
[107] Bose, CDR Kelley S. USN, HQMC (P&R,PD,RPD), (boseks@hqmc.usmc.mil). "R/E LHA/D Mod Info." E-mail to author 29 March 2000.

corrected. The DoN Lift II minimum low threat vertical assault requirement called for 48 Ospreys.

Currently no LHD alterations are planned or funded. NAVSEA has acknowledged that LHDs 1-6 will require fuel compensating system modifications, however, no plan or funding exists to implement them. It is believed that these necessary ship enhancements will not take place until the LHA stability problems are corrected.

Recently the Studies & Analysis Division of the Marine Corps Combat Development Command (MCCDC), under contract with Logicon, Inc, completed a Mission Area Analysis (MAA) of the LHA replacement, or LHA(R). This represents the first time that future aviation and operational requirements are influencing modern ship design. The LHA(R), if procured, will greatly enhance the Navy/Marine Corps expeditionary capability. If the Congress and Defense Department expect the Navy & Marine Corps to provide the nation with a forcible entry capability when equipped with an absolute minimum number of amphibious shipping, it is imperative that in the near term the damage stability of the LHA and LHD class ships be corrected, and a minimum of four LHA(R)s be funded.

Chapter 8

MEB 2010 and the ACE

> *For nearly a century, the U.S. military has relied upon access to forward basing and forward bases as a key element in its ability to project power….However, U.S. forces long term access to forward bases, to include air bases, ports, and logistic facilities cannot be assumed….The QDR, in our view, accorded insufficient attention to our ability to project power under these circumstances.*
>
> —National Defense Panel, 1997[108]

1st MEB ACE

There are two major factors that greatly affect the ACE embarkation plan. One is the weight restriction placed on the LHA and LHDs due to stability problems and second is the increase in size of ACE aircraft, in particular, the MV-22 in relation to the CH-46E. Regarding embarkation of MV-22s, the author assumes that the necessary LHA and LHD ship stability alterations were successfully completed by 2010. The weight restricted air spot figures in tables 16 and 17 serve to illustrate the worst case scenario if the stability upgrades in fact were not completed. Furthermore, even though the JSF Initial

[108] National Defense Panel, "Assessment of the May 1997 Quadrennial Defense Review," Arlington, VA, 15 May 1997, as quoted by LCDR Paul N. Nagy, USN, "Access is key to Power Projection", *Proceedings*, (February 1999): 159.

Operations Capable (IOC) date is tentatively set for 2010, AV-8Bs were used in the 2010 notional MEBs to highlight the transition capability of the MEB ACE before all new T/M/S have entered the inventory.

The DoN Lift II operational aircraft spot factors (*see table 14*) were used to determine the number of aircraft that could be embarked aboard the LHA and LHD ships. NAVAIR provided the AH-1Z, UH-1Y and JSF spot factors. The 2.0 JSF spot factor is used for planning purposes until dynamic ship modeling is completed. The unrestricted USMC air spots reflect the total LHA or LHD air spots available minus the two Navy SH-60 SAR requirement. The weight restricted USMC air spot factors represent the total number of usable air spots if the MV-22 embarkation is limited to only five aircraft.

Table 14. Operational Aircraft Spot Factors in CH-46E Equivalents.

SHIP Type	Total/USMC Avail. Air Spots[1]	CH-46E	SH-60	MV-22	CH-53E	MH-53E	AH-1W	AH-1Z	UH-1N	UH-1Y	AV-8B	JSF
LPH	27/25	1.00	.077	1.92	1.85	2.00	0.82	N/A	0.79	N/A	1.35	N/A
LHA	43/41	1.00	0.77	1.40	1.79	1.87	0.86	1.07	0.81	1.12	1.65	2.00
LHD	46/44	1.00	0.84	1.45	1.88	1.88	0.84	1.02	0.82	1.05	1.92	2.00

Source: DoN Lift II tables J-vii & J-ix, p. J-2-2. Data originally sourced from Naval Air Engineering Center, NAEC AWS 91-855, "Operational Spotting Factors for LHD, LHA, LPH Class ships (U)", Confidential, Nov 1984.

1. USMC air spots derived by subtracting two SH-60 aircraft spot factors from total available.
2. AH-1Z, UH-1Y, & JSF spot factors were obtained from NAVAIR.
3. Two UH-1N per LPH/LHA/LHD was assumed to be organic to these ships for conduct of SAR, safety, and administrative missions. Today, two CH-46Es are used for SAR and their replacement may be the SH-60. Thus, two spots must be subtracted from the total available to yield the number of spots available for USMC and Naval Support Element aircraft (p. J-2-2, paragraph B).

Constrained by limited shipping and restricted by weight and space limitations, the 1st MEB will only be able to embark 48 of 60 MV-22s. Furthermore, unless a total of

seven LPDs are allocated to 1st MEB, the assault echelon will be heavy lift deficient; lacking four CH-53E aircraft. The following aircraft mix reflects DoN Lift II requirements for the Mid Threat MEB:[109]

- 5 MV-22 Squadrons (60 aircraft)
- 1 CH-53E Squadron (16 aircraft)
- 1 CH-53E Det (4 aircraft)
- 2 AH-1W Squadrons (1990 Primary Aircraft Assigned (PAA) of 12 aircraft/sqd. Corrected to 2000 PAA:18 aircraft/sqd)
- 1 AH-1W Det (4 aircraft)
- 1 UH-1N Squadron (1990 PAA:12 aircraft. Corrected to 2000 PAA: 9/HMLA sqd)
- 1 AV-8B Squadron (1990 PAA: 20 aircraft/sqd. Corrected to 2000 PAA: 16 aircraft/sqd.)
- 1 AV-8B Det (6 aircraft)

Because of the increased size and weight of the MV-22, 1st MEB will not have sufficient "big deck" air spots available to embark all five squadrons of Ospreys, two HMLA(-) squadrons, or a complete complement of Super Stallions essential to conducting a brigade sized amphibious assault. Also, the LHA/LHD damage stability problems coupled with the increase in both the size and weight of the MV-22 and JSF may have embarkation implications for the amphibious forces in the standing Operation Plans (OPLANs) Time Phased Force Deployment Data (TPFDD).

[109] Department of the Navy. Integrated Amphibious Operations and USMC Air Support Requirements (U). Study. January 1990, G-6-7, table G-li. Note that the HMLA squadron is represented as a HML squadron and a HMA squadron. Today's the HMLA squadron contains 18 AH-1Ws and 9 UH-1Ns. This would equate to 40 Cobras and 9 Hueys. Additionally, table A8 and table 1 depict the desired sea based aircraft mix.

The LPD-17s would have to be utilized in order to embark as many aircraft as possible. Even though the LPDs will be configured with a hangar bay, splitting up the HMLA squadron into numerous detachments throughout the ATF may ultimately have a negative impact on aircraft maintenance. This is due principally to the fact that the bulk of the squadron's maintenance personnel, and the Aviation Intermediate Maintenance Division (AIMD) will be located on board the LHAs and LHDs. The author assumed a maximum of six AH-1 and/or UH-1s per LPD was acceptable and conducive to flight operations. Simply "stuffing" aircraft aboard available ships to merely conduct a transit to the conflict theater does not facilitate sea based aviation operations and should be discouraged. Inherent to the sea basing of the MEB's aircraft is the essential provision of a sufficient number of air spots that not only permit aviation operations during the assault echelon's movement ashore, but also allow flight operations and training during the transit. Permanently basing aircraft aboard the LSDs is not recommended because the single take off and landing spot and the lack of a maintenance hangar facility. In lieu of these limitations, the 1st Marine Expeditionary Brigade would be able to embark approximately 134 aircraft. In accordance with DoN Lift II, at best this force would only be capable of supporting a Low Threat MEB contingency. As indicated in table 16, 1st MEB simply would not possess the tiltrotor and heavy lift assets required to efficiently support a Mid Threat MEB Assault Echelon.

This will temporarily improve when the Navy procures LHD-8 and assigns it to 3d Fleet. Currently, this ship is expected to be commissioned sometime between 2006 to 2008. Though this additional ship will provide the 1st MEB ACE the capacity to meet or exceed all of DoN Lift II's Mid Threat aviation requirements, it will be short lived. Since

only four total LHA(R)s will be procured, LHA-3, in Okinawa, will eventually require replacement around 2013, most likely by an LHD from 3d Fleet. This will once again leave 1st MEB with a big deck shortfall. Therefore, LHD-8 was not factored in the 1st MEB analysis until 2015 to illustrate the worst case base scenario.

Table 15. DoN Lift II MEB Sea Based Aircraft Required Vs. Threat Level

Threat Level	MV-22	CH-53E	AH-1Z	UH-1Y	AV-8B/JSF
LOW	48	16	18(18)	9(7)	22(18)
MID	60	20	36(26)	9(8)	22(28)
HIGH	84	32	54(35)	9(10)	32(37)

Source: DoN Lift II, p. H-27-29: tables H-xiv,H-xv,H-xvi and p. G-6-1:tables G-xxxvi and G-xxxvii.

Figures in parenthesis are DoN Lift II numbers that represent 1990 squadron PAAs of (12) per HMA (AH-1Ws), (12) per HML (UH-1Ns), and (20) per VMA (AV-8Bs). Figures not in parenthesis reflect 2000 PAAs. This equals a PAA of (18) AH-1W and (9) UH-1N for an HMLA squadron and (16) AV-8Bs per VMA squadron. Squadrons were not broken up beyond the normal MEU Det level. Thus where DoN Lift II calculated 26 AH-1Ws (2 sqds(+)), this study assumes 2 squadrons of 18 AH-1Ws; totaling 36 aircraft.

Table 16. 1st MEB 2010 Notional Embarked Aircraft Capacity

1st MEB 2010 Notional Embarked Aircraft Capacity								
Ship Type	**Unrestricted USMC Air Spots**	**Weight Restricted USMC Air Spots**		**MV-22**	**CH-53E**	**AH-1Z[1]**	**UH-1Y[1]**	**AV-8B**
LHA-1	***In Maintenance***							
LHA-5 (MEU)[1]	41	30		5/12	4	4	3	6
LHD-2	44	30		5/12	4	4	3	6
LHD-4	44	30		5/12	4	4	3	6
LHD-6	44	N/A		12	4	6	3	4
Sub total	***173***	***134***		***27/48***	***16***	***18***	***12***	***22***
LSD-45	1	N/A						
LSD-47	1	"						
Sub total:	***2***	***N/A***		0	0	0	0	0
LSD-49	***In Maintenance***							
LSD-52 (MEU)[1]	1	"						
Sub total:	1			0	0	0	0	0
LPD-18	***In Maintenance***							
LPD-20 (MEU)[1]	2	"				0[1]		
LPD-21	2	"				6		
LPD-22	2	"				6		
LPD-24	2	"				6		
Sub total:	8				0	***18***		
Grand Total *(11 ship capacity)*	**184[4]**	**145[4]**	***113-134 A/C***	**27/48[5]**	**16**	**36**	**12**	**22**
Mid Threat Requirement	*175*			*60*	*20*	*36[2]*	*9[2]*	*22[3]*
Delta	***+9***	***-30[5]***		***-33/-12[5]***	***-4***	***0***	***+3***	***0***

1. Assumes one MEU/ARG forward deployed and that LPD-20 was not available for additional aircraft loading at the time of the contingency.
2. DoN Lift II table G-li, p. G-6-7, lists the requirement for two HMA squadrons and one HML squadron, each comprised of 12 aircraft. These figures were adjusted in order to compensate for today's HMLA squadron which has18 AH-1W and 9 UH-1N Primary Aircraft Assigned (PAA). Table 6 of this paper provides the actual DoN Lift II sustained requirement as 26 AH-1 and 8 UH-1 helicopters.
3. DoN Lift II table G-li, p. G-6-7, states that 1 VMA squadron of 20 aircraft and one Detachment of 6 aircraft are required. This figure was adjusted to compensate for today's VMA squadron which has a PAA of 16 AV-8Bs. Table 6 of this paper lists the actual sustained DoN Lift II requirement as 28 AV-8Bs.
4. Not included in these figures is Naval Support Element (NSE) requirement of 8 MH-53E Airborne Mine Counter Measures (AMCM) helicopters necessary to support the MEB(AE). If these aircraft were embarked aboard MEB shipping (as DON LIFT II assumed), the ACE would loose and additional 15 air spots (LHD); yielding 169-130 total air spots (dependent upon stability upgrades) which is under the established Mid Threat limit.
5. If stability upgrades are not completed, 1st MEB will lose 39 potential air spots and be unable to embark 55% (33) of the DoN Lift II required MV-22 Ospreys. With stability enhancements, the MEB will still be deficient 12 MV-22s. Additionally, without 7 LPD-17s, the MEB AE will also incur a heavy lift shortfall of 4 CH-53Es.

2d MEB ACE

Due to the number of ships assigned to 2d Fleet, the 2d MEB could potentially be assigned fifteen amphibious ships, including all of the ARG/MEUs (*see table 17*). 2d MEB shipping would be comprised of (2) LHA, (3) LHD, (3) LSD-41, (2) LSD-49, and (5) LPD-17s. Provided that damage stability upgrades and alterations have been implemented on the LHAs and LHD 1-4, this fifteen ship armada meets or exceeds all MEB programmed assault echelon lift requirements for the Mid Threat level. The 2d MEB ACE is capable of embarking (60) MV-22 s, (20) CH-53Es, (36) AH-1Zs, (21) UH-1Ys, and (28) AV-8Bs; totaling 169 aircraft. Compared to 1st MEBs amphibious task force, 2d MEB is able to embark 35 more aircraft. There is adequate space for two HMLA squadrons (minus) and an extra Detachment of six AV-8Bs. This demonstrates the advantage to having five "big deck" amphibs assigned to the MEB. Based on this notional planning data, it becomes evident that a minimum of five LHA/LHDs are required to adequately support a 2010 Mid Threat MEB.

Table 17. 2d MEB 2010 Notional Embarked Aircraft Capacity

2d MEB 2010 Notional Embarked Aircraft Capacity								
Ship Type	**Unrestricted USMC Air Spots**	**Weight Restricted USMC Air Spots**		**MV-22**	**CH-53E**	**AH-1Z**	**UH-1Y**	**AV-8B**
LHA-2 (MEU)[1]	41	30		5/12	4	4	3	6
LHA-4	41	30		5/12	4	4	3	6
LHD-1	***In Maintenance***							
LHD-3	44	30		5/12	4	4	3	6
LHD-5	44	N/A		12	4	6	3	4
LHD-7	44	N/A		12	4	4	3	6
Sub Total	***214***	***178***		***39/60***	***20***	***22***	***15***	***28***
LSD-41	***In Maintenance***							
LSD-44	1	"						
LSD-46	1	"						
LSD-48	1	"						
Sub total:	***3***	***N/A***		***0***	***0***	***0***	***0***	***0***
LSD-50(MEU) [1]	1	"						
LSD-51	1	"						
Sub total:	***2***			0	0	0	0	0
LPD-17	***In Maintenance***							
LPD-19 (MEU)[1]	2	"				0[1]		
LPD-25	2	"				6		
LPD-26	2	"				6		
LPD-27	2	"				6		
LPD-28	2	"				0	6	
Sub total:	***10***					***18***	***6***	
Grand Total *(15 ship capacity)*	**229**	**193**	***141-169 A/C***	**39/60**	**20**	**40**	**21**	**28**
Mid Threat Requirement	*175*			*60*	*20*	*36*[2]	*9*[2]	*22*[3]
Delta	***+54***	***+ 18***		***-21/0***	***0***	***+4***	***+12***	***+6***

1. Assumes one MEU/ARG forward deployed and that LPD-19 was not available for additional aircraft loading at the time of the contingency.
2. DoN Lift II table G-li, p. G-6-7, lists the requirement for two HMA squadrons and one HML squadron, each comprised of 12 aircraft. These figures were adjusted in order to compensate for today's HMLA squadron which has18 AH-1W and 9 UH-1N Primary Aircraft Assigned (PAA). Table 6 of this paper provides the actual DoN Lift II sustained requirement as 26 AH-1 and 8 UH-1 helicopters.
3. DoN Lift II table G-li, p. G-6-7, states that 1 VMA squadron of 20 aircraft and one Detachment of 6 aircraft are required. This figure was adjusted to compensate for today's VMA squadron which has a PAA of 16 AV-8Bs. Table 6 of this paper lists the actual sustained DoN Lift II requirement as 28 AV-8Bs.
4. Not included in these figures is Naval Support Element (NSE) requirement of 8 MH-53E Airborne Mine Counter Measures (AMCM) helicopters necessary to support the MEB(AE). If these aircraft were embarked aboard MEB shipping (as DoN Lift assumed), the ACE would loose and additional 15 airspots (LHD); yielding 163 total spots which is under the established Mid Threat limit.
5. If stability upgrades are not completed, 2d MEB will lose 36 potential airs pots and be unable to embark 35% (21) of the DoN Lift II required MV-22 Ospreys. No net deficiency exists if stability upgrades are completed.

Chapter 9

The 2015 MEB ACE

> *The ability to make a forcible entry cannot be overemphasized. A nation may not have the most formidable of forces with the most exquisite means of strategic mobility, but if the combination of the two cannot ensure successful entry except by invitation, then the nation has only a reinforcement capability.*
>
> --LtGen Bernard E. Trainor
> United States Marine Corps (RET)[110]

If all unfolds according to plan, the amphibious 2015 MEB ACE will be comprised of the Joint Strike Fighter, MV-22, AH-1Z, UH-1Y, and the CH-53E. The four LHAs will have been replaced by the LHA(R)s; the Navy's first truly 21st Century amphib. Augmenting this lean, yet impressive ATF would be the MPF Future fleet of AFOE shipping.

[110] First Marine Expeditionary Force (I MEF). *Tactical Standing Operating Procedures (TACSOP) (U)*, (Camp Pendleton, CA: March 1999).

1st MEB ACE

Though the notional 3d Fleet will have two LHA(R)s and three LHDs assigned, it is projected that the 1st MEB ACE would still be unable to embark the Mid Threat DoN Lift II aircraft requirement. Again, since no DoN Lift III has been completed, DoN Lift II was used as the base line for the purpose of this analysis.

Currently, HQMC is drafting a Mission Needs Statement (MNS) for the LHA replacement. There is $21M in Navy Research, Development, Test and Evaluation (RDT&E) to facilitate obtaining Joint Requirements Oversight Council (JROC) approval. Additionally, the Center for Naval Analyses is conducting a MAA that will eventually lead to an Analysis of Alternatives (AOA). This AOA is expected to last two years. In order to fund this effort, the Navy is seeking $133M RDT&E over the Future Years Defense Plan (FYDP) to determine whether the LHA(R) will be a modified LHD or a new class of amphibious ship (LHX).[111]

Aircraft planning factors received from HQMC (APP) were used to produce a notional reinforced squadron of the future. This LHA(R) squadron (REIN) was comprised of (12) MV-22, (4) CH-53E, (6) AH-1Z, (4) UH-1Y, and (10) JSFs. Since no JSF ship feasibility study has been completed to date, this analysis presents a worst case scenario, assuming a one for one replacement of the AV-8B with JSFs was not possible on the LHD class ships due to an unacceptable topside weight increase. This planning assumption may in fact be refuted as engineering studies are completed by NAVSEA.

[111] Germain, Maj John T., USMC, Amphibious Programs Branch, HQMC (POE-51), (germainjt@hqmc.usmc.mil). "R/E LHA/D Mod Info." E-mail to the author 30 March 2000.

The notional aircraft mix for the LHA(R) is (12) MV-22, (6) AH-1Z, (4) UH-1Y, (4) CH-53E, and (10) JSF.[112] This combination yields a total aircraft weight (including two CH-60 SAR A/C)[113] of approximately 940,080 lb. and requires 56.92 LHD CH-46E equivalent air spots (*see Appendix E, table E-10*). This is a 419,510 lb. increase from today's classic MEU aircraft load out, without considering fuel capacity differences. If procured, LHA(R) will provide the Naval expeditionary forces a substantial forward presence projection capability and set the standard for future amphibious ship design.

Table 18 summarizes the notional 2015 1st MEB embarked ACE capacity. The notional LHD reinforced composite squadron was composed of (12) MV-22, (4) CH-53E, (4) AH-1Z, (3) UH-1Y, and (3) JSF. This combination of aircraft utilized 38 (37.79) air spots. This is a conservative estimate until a more detailed JSF shipboard compatibility study is completed. Even though only three JSFs were embarked aboard the LHDs, a 12 MV-22 deficiency resulted. There was an increased capacity, however, to embark additional JSFs. Based upon planning assumptions and available amphibious shipping, the notional 1st MEB would be capable of embarking 146 aircraft.

Once again, when assigned five total "big decks", the 2d MEB ACE exceeded all of the DoN Lift II requirements; embarking a total of 174 aircraft. Table 19 summarizes the 2d MEB's amphibious shipping and embarked aircraft capacity.

[112] Clayton, LtCol Christopher M., HQMC (APP-41),(claytoncm@hqmc.usmc.mil). "R/E MEB Aviation Issues." E-mail to author 9 February 2000.
[113] If two MV-22s replace the CH-60 for SAR, the total aircraft weight increases to 978,760 lb.

Table 18. 1st MEB 2015 Notional Embarked Aircraft Capacity

1st MEB 2015 Notional Embarked Aircraft Capacity								
Ship Type[1]	**Unrestricted USMC Air Spots**	**Weight Restricted USMC Air Spots[5]**		**MV-22**	**CH-53E**	**AH-1Z**	**UH-1Y**	**JSF**
LHA(R)-6	59	N/A		12	4	6	4	10
LHA(R)-8	59	N/A		12	4	6	4	10
LHD-4 (MEU)[2]	44	38		12	4	4	3	3
LHD-6	***In Maintenance***							
LHD-8	44	38		12	4	4	3	3
Total Spots	***206***	N/A		***48***	***20***	***20***	***14***	***26***
LSD-45	1	"						
LSD-47	1	"						
Sub total:	***2***	***N/A***		0	0	0	0	0
LSD-49	***In Maintenance***							
LSD-52(MEU)[2]	1	"						
Sub total:	1	N/A		0	0	0	0	0
LPD-18	***In Maintenance***							
LPD-20(MEU)[2]	2	"				0[2]		
LPD-21	2	"				6		
LPD-22	2	"				6		
LPD-24	2	"				6		
Sub total:	8				0	***18***		
Grand Total *(11 ship capacity)*	**217[4]**	**205**	***146 A/C***	**48[5]**	**20**	**38**	**14**	**26**
Mid Threat Requirement	*175*			*60*	*20*	*36[3]*	*9[3]*	*22[4]*
Delta	***+42***	***+30***		***-12***	***0***	***+2***	***+5***	***+4***

1. Assumes that LHD-2 will replace LHA-3 at Sasebo, Japan and two LHA(R)s will be home ported in San Diego, CA.
2. Assumes one MEU/ARG forward deployed and that LPD-20 was not available for additional aircraft loading at the time of the contingency.
3. DoN Lift II table G-li, p. G-6-7, lists the requirement for two HMA squadrons and one HML squadron, each comprised of 12 aircraft. These figures were adjusted in order to compensate for today's HMLA squadron which has18 AH-1W and 9 UH-1N Primary Aircraft Assigned (PAA). Table 6 of this paper provides the actual DoN Lift II sustained requirement as 26 AH-1 and 8 UH-1 helicopters.
4. DoN Lift II table G-li, p. G-6-7, states that 1 VMA squadron of 20 aircraft and one Detachment of 6 aircraft are required. This figure was adjusted to compensate for today's VMA squadron which has a PAA of 16 AV-8Bs. Table 6 of this paper lists the actual sustained DoN Lift II requirement as 28 AV-8Bs. HQMC projects that ten Joint Strike Fighters (JSFs) will be forward deployed with future MEUs.
5. Weight restricted USMC air spots are derived by assuming that the maximum number of aircraft that can be embarked are comprised of the following: Aircraft/(Rqd air spots) = 12 x MV-22 (17.40) + 4 x CH-53E (7.16) + 4 x AH-1Z (4.08) + 3 x UH-1Y (3.15) + 3 x JSF (6.00) = 37.79. 46 total LHD air spots - 2 x SH-60 SAR (1.68) - 37.79 USMC air spots = 6.53 unusable air spots if damage stability restrictions are proven applicable.
6. Not included in these figures is Naval Support Element (NSE) requirement for dedicated Airborne Mine Counter Measures assets. To date no decision has been made regarding the embarkation of organic Navy mine warfare aircraft.

Table 19. 2d MEB 2015 Notional Embarked Aircraft Capacity

2d MEB 2015 Notional Embarked Aircraft Capacity									
Ship Type	**Unrestricted USMC Air Spots**	**Weight Restricted USMC Air Spots[4]**		**MV-22**	**CH-53E**	**AH-1Z**	**UH-1Y**	**JSF**
LHA(R)-7	59[1]	N/A		12	4	6	4	10
LHA(R)-9	59[1]	N/A		12	4	6	4	10
LHD-1	***In Maintenance***							
LHD-3 (MEU)[1]	44	38		12	4	4	3	3
LHD-5	44	38		12	4	4	3	3
LHD-7	44	38		12	4	4	3	3
Sub Total	***250***	***241***		***60***	***20***	***24***	***17***	***29***
LSD-41	***In Maintenance***							
LSD-44	1	"						
LSD-46	1	"						
LSD-48	1	"						
Sub total:	***3***	***N/A***		***0***	***0***	***0***	***0***	***0***
LSD-50(MEU)[1]	1	"						
LSD-51	1	"						
Sub total:	***2***			0	0	0	0	0
LPD-17	***In Maintenance***							
LPD-19 (MEU)[1]	2	"				0[1]		
LPD-25	2	"				6		
LPD-26	2	"				6		
LPD-27	2	"				6		
LPD-28	2	"				3	3	
Sub total:	***10***					***21***	***3***	
Grand Total *(15 ship capacity)*	**250**	**232**	**174 A/C**	**60**	**20**	**45**	**20**	**29**
Mid Threat Requirement	*175*			*60*	*20*	*36[2]*	*9[2]*	*22[3]*
Delta	***+75***	***+ 57***		***0***	***0***	***+9***	***+11***	***+7***

1. Assumes one MEU/ARG forward deployed and that LPD-19 was not available for additional aircraft loading at the time of the contingency.
2. DoN Lift II table G-li, p. G-6-7, lists the requirement for two HMA squadrons and one HML squadron, each comprised of 12 aircraft. These figures were adjusted in order to compensate for today's HMLA squadron which has18 AH-1W and 9 UH-1N Primary Aircraft Assigned (PAA). Table 6 of this paper provides the actual DoN Lift II sustained requirement as 26 AH-1 and 8 UH-1 helicopters.
3. DoN Lift II table G-li, p. G-6-7, states that 1 VMA squadron of 20 aircraft and one Detachment of 6 aircraft are required. This figure was adjusted to compensate for today's VMA squadron which has a PAA of 16 AV-8Bs. Table 6 of this paper lists the actual sustained DoN Lift II requirement as 28 AV-8Bs. HQMC projects that ten Joint Strike Fighters (JSFs) will be forward deployed with future MEUs.
4. Weight restricted USMC air spots are derived by assuming that the maximum number of aircraft that can be embarked are comprised of the following: Aircraft/(Rqd air spots) = 12 x MV-22 (17.40) + 4 x CH-53E (7.16) + 4 x AH-1Z (4.08) + 3 x UH-1Y (3.15) + 3 x JSF (6.00) = 37.79. 46 total LHD air spots - 2 x SH-60 SAR (1.68) - 37.79 USMC air spots = 6.53 unusable air spots if damage stability restrictions are proven applicable.
5. Not included in these figures is Naval Support Element (NSE) requirement for dedicated Airborne Mine Counter Measures assets. To date no decision has been made regarding the embarkation of organic Navy mine warfare aircraft.

Table 20 provides a comparison between the DoN Lift II and LHA(R) MAA studies. The LHA(R) MAA vertical lift requirements analysis was based only on the Assault Element of the Assault Echelon and did not factor in subsequent operations ashore or follow-on sustainment operations. It should be noted that the LHA(R) study increased the number of amphibious MEB TACAIR assets by 171 percent over the DoN Lift II AV-8B requirement. Additionally, MV-22s were reduced by 40 percent and the CH-53E requirement was increased by 60 percent. Overall, rotary wing assault support aircraft incurred a 17 percent reduction from the DoN Lift II study. This is contrary to the *MAGTF Aviation and Operational Maneuver from the Sea* concept paper which places a high demand upon the ACE for operational sustainment and tactical logistics support. A DoN Lift III study, utilizing OMFTS/STOM concepts in conjunction with a detailed logistics analysis would assist in calculating the proper aviation assets required to adequately sustain a MEB sized force from the sea.

Table 20. DoN Lift II and LHA(R) MAA MEB Sea Based ACE Comparison

	Number of Sea Based AE Aircraft		
Aircraft Type	**DoN Lift II**	**LHA(R) MAA**	**MAA Delta**
AH-1W/Z	26	18	**-8 (31%)**
AV-8B	28	*N/A*	*N/A*
CH-53E	20	32	+12 (60%)
JSF	*N/A*	76	*N/A*
MV-22	60	36	**-24 (40%)**
UH-1N/Y	8	9	+1
total	142	171	**-29 (20%)**
Total TACAIR	28	76	**+48 (171%)**
Total RW/Tiltrotor	114	95	**-19 (17%)**

Source: LHA(R) MAA, Appendix H, table H-5, p. H-5 and tables 4 and 6 of this paper.

Chapter 10

Conclusion

> *To be credible both as a deterrent and as a viable warfighting option for policy enforcement, our armed forces must be capable of deploying and, if necessary, fighting to gain access to geographical areas controlled by hostile forces. Operational applications of forcible entry operations range in scope from an operation designed as the initial phase of a campaign or major operation, to a forcible entry that is a single major operation to achieve strategic and/or operational objectives. Armed forces of the United States train and rehearse three primary entry capabilities or options:* ***amphibious assault****, airborne assault, and air assault.*
>
> —March 2000 draft of Joint Pub 3-18,
> *Joint Doctrine for Forcible Entry* Operations, p. vii.

1999 marked the re-establishment of the seemingly lost Marine Expeditionary Brigade. Once shrouded by doctrinal ambiguity as the MEF(FWD), it now has the potential to reassert itself as the "force of choice" to conduct amphibious forcible entry operations. This middle tier MAGTF, in conjunction with Naval amphibious forces, is the minimum force capable of fighting to gain access on hostile foreign shores.

Today, like it or not, fiscal realities are driving strategic capabilities. And as a result, the MPF MEB has become the "cheapest" and most expedient mode of choice to get to the fight. Here lies the critical force projection vulnerability of the United States: *Its dependence upon access rights to permissive foreign air and sea bases from which to*

project combat power. The NCA's reliance on seven ARGs, providing a continuous two MEU global presence detracts from the Naval expeditionary force's capability to form anything but an ad hoc amphibious MEB. Though the Navy may have a 2.5 MEB capability on paper, it is evident that a capacity to lift a MEB does not necessarily equate to an ability to deploy a MEB. Forcible entry, as the Commandant has stated, is *"considered a joint corps competency for the Marine Corps."* Yet nothing is being done to realize it beyond the MEU level. It is tragic to consider that the Marine Corps' cornerstone 2020 amphibious capability - OMFTS- resides solely on the formation of an ad hoc brigade sized amphibious force that has never trained to conduct combat operations " across the spectrum of combat." Some may argue that this is an acceptable risk. However, Title 10 legislation charged the Marine Corps to be "a balanced force in readiness...a ground and air striking force ready to suppress or contain international disturbances short of large scale war...an expeditionary force for service overseas...with the fleet or on land***...a force that should be most ready when the Nation is least ready."***[114] Today the Nation is less ready to respond to a contingency than it has ever been. Between 1956 and 1995 the US has decreased its overseas bases from 115 to 27. In comparison to the Gulf War force levels, by 2006 the USAF will possess 35 percent fewer strategic airlift assets. The U.S. Navy's amphibious fleet will shrink to 36 ships by 2010. It is in this strategic environment that the amphibious MEB has the potential to fill the current forcible entry void.

It is unfortunate that dollars are driving capabilities, but the Marine Corps currently has no choice but to adapt to the 36 ship MEU-centric amphibious fleet of tomorrow. In

[114] Gen Carl E. Mundy Jr., "Remarks of General Carl E. Mundy Jr. Before Congress", *Marine Corps Gazette*, (April 1992): 34. Gen. Mundy is referring to the House-Senate conference report that accompanied Public Law 416, passed by Congress on 20 June 1952 and signed into law by President Truman

order to remain "ready, relevant and capable", the Marine Corps, and Navy, must pursue various options to ensure they are able to respond to crises with the requisite combat power. It is doubtful that the NCA and the Unified CINCs will relinquish their dependence upon the MEUs. Furthermore, it may be some time before the Navy procures sufficient amphibious shipping. Based on these assumptions and current fiscal realities, the only way the Navy-Marine Corps can form an amphibious brigade is to composite all standing ARG/MEUs within their respective Fleet Command and MEF. All available amphibious ships not in the yard will have to be mustered. This concept will require further study to determine just how the MEUs will composite to form a MEB sized ATF.

New MEB command relationships will have to be forged in order to facilitate the expedient assignment and compositing of Naval and Marine forces. Perhaps more importantly, however, is to create a relationship among the Naval expeditionary forces which minimizes the ad hoc nature imposed by today's fiscal and OPTEMPO constraints while simultaneously providing the nation with the amphibious forcible entry capability which it demands and expects. Figure 1 illustrates a notional 1st MEB command relationship. In this diagram, the MEB is the MEF's initial warfighter. The forward-deployed MEU is its enabler, or spear tip. Unless the contingency requires the entire MEF to deploy, the major subordinate commands (MSCs) become force providers to the MEB. Likewise, the Navy Amphibious Group becomes a force provider to the MEB. From a broader vantage, ultimately 3d Fleet and I MEF, in this case, become force providers to the theater CINC or Joint Force Commander as required for the contingency.

Once the Command relationships are agreed upon, the next priority is to develop a basic MEB mission statement and identify the core competencies essential to mission accomplishment. The following is a proposed MEB mission statement:

> **On order, X MEB provides an amphibious forcible entry capability to the Joint Force Commander by being prepared to seize airheads, beachheads, and advanced naval bases as necessary in order to link-up with air assault, airborne assault, MPF, FIE forces, or a combination there of, in order to facilitate the rapid deployment of U.S. and coalition forces into the contingency theater of operations. Upon completion of assigned forcible entry operations, be prepared to conduct follow-on combat operations ashore.**

Though the capability to seize an airhead or beachhead may not be required in all contingencies, it should be an amphibious MEB core competency. Based upon this mission statement and an updated threat analysis, Amphib MEB tables of organization and tables of equipment (T/Os and T/Es) must be modified and standardized to facilitate compositing while taking into account the limited amphibious shipping available for embarkation. Ultimately, this concept will have to be incorporated into the Navy and Marine Corps' Doctrine, Organization, Training, Equipment, and Supporting Establishment (DOTES).

The future MEB ACE faces many embarkation challenges in order to provide the MEB GCE adequate aviation support. As this analysis has shown, the ACE requires five LHA/LHDs in order to embark the sixty required Mid Threat MV-22 tiltrotors. However, it remains uncertain whether new aircraft and GCE vehicle weight growth will in fact limit the embarkation of aviation assets required to support the MEB in a Mid Threat Level environment. Furthermore, the OMFTS concept places an "unprecedented reliance upon ACE capabilities...and shifts much of the MAGTF sustainment burden to the ACE, requiring it to provide operational sustainment and tactical logistics support

both for itself and the MAGTF."[115] Doing "more with less" in this demanding environment of the future is a recipe for failure.

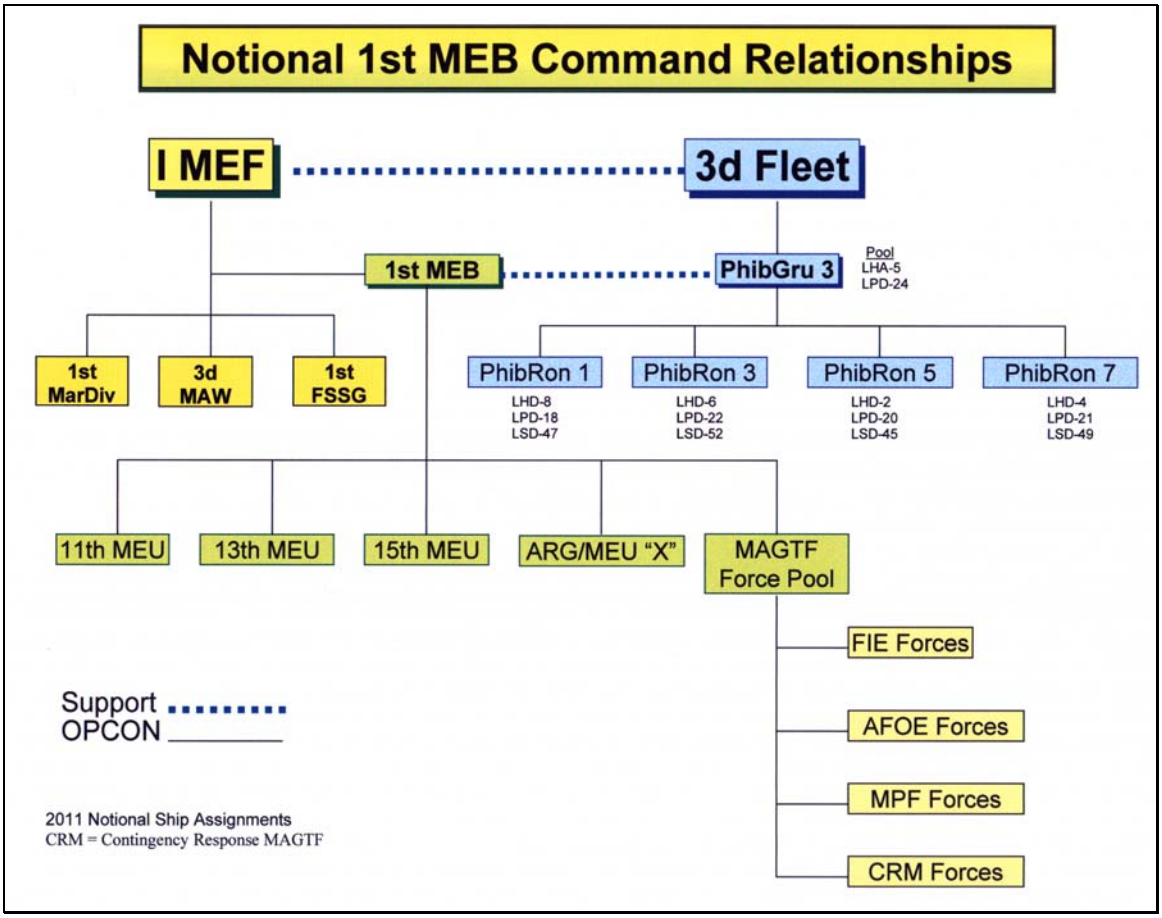

Figure 1. Notional 1st MEB Command Relationships

Naval amphibious shipping must be able to accommodate sufficient numbers of assault support aircraft to ensure both expedient vertical assaults as well as facilitate follow on transport of sea-based sustainment. Therefore, it is imperative that the damage

[115] Unites States Marine Corps. Marine Corps Concept Paper: *MAGTF Aviation and Operational Maneuver from the Sea*, (Quantico VA: Marine Corps Combat Development Command, January 1999). Online. Available: http://www.concepts.quantico.usmc.mil/aviation.htm. 3 October 1999.

stability problems associated with the LHA and LHD class ships be corrected. Especially since the LHD class of ships will not begin to reach their end of service life until 2029, culminating with LHD-8 around 2047.

Configuring amphibs with more than six JSFs also poses problems in this respect because it restricts the number of air spots available for assault support. It is hard to imagine a brigade sized MAGTF from the sea executing operations against a future hostile shore void of the support of a carrier battle group. Though the LHA(R) should have the ability to embark sufficient Joint Strike Fighters, the Marine Corps must ensure that the JSF version chosen is also compatible with fixed wing carrier (CVN) operations. Perhaps future developmental testing will validate the need for two JSF variants. However, one thing is certain. Given the increased demands of assault support requirements of the future, the Marine Corps cannot afford to divorce itself from traditional Naval fixed wing carrier aviation.

The Navy and Marine Corps must mutually adopt an amphibious vision of the future and jointly sail the course leading to its fruition. A DoN Lift III study may provide the first step in forging this essential relationship.

Appendix A: NAVMC 2710: Marine Air-Ground Task Forces (MAGTFs) May 1985

This appendix lists NAVMC 2710's notional Amphib and MPF MEB task organizations.

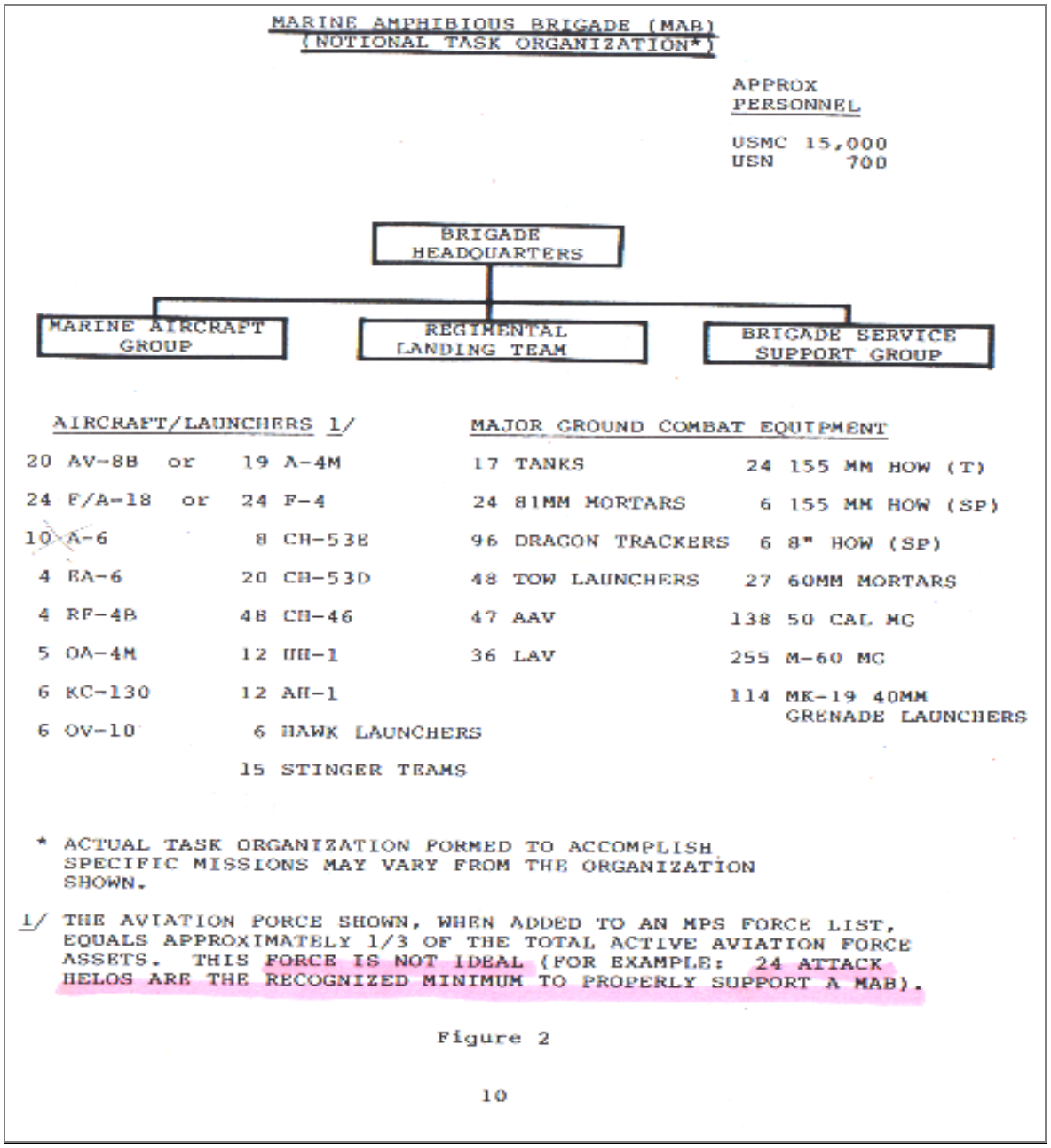

Figure 2: NAVMC 2710 Marine Amphibious Brigade (MAB)

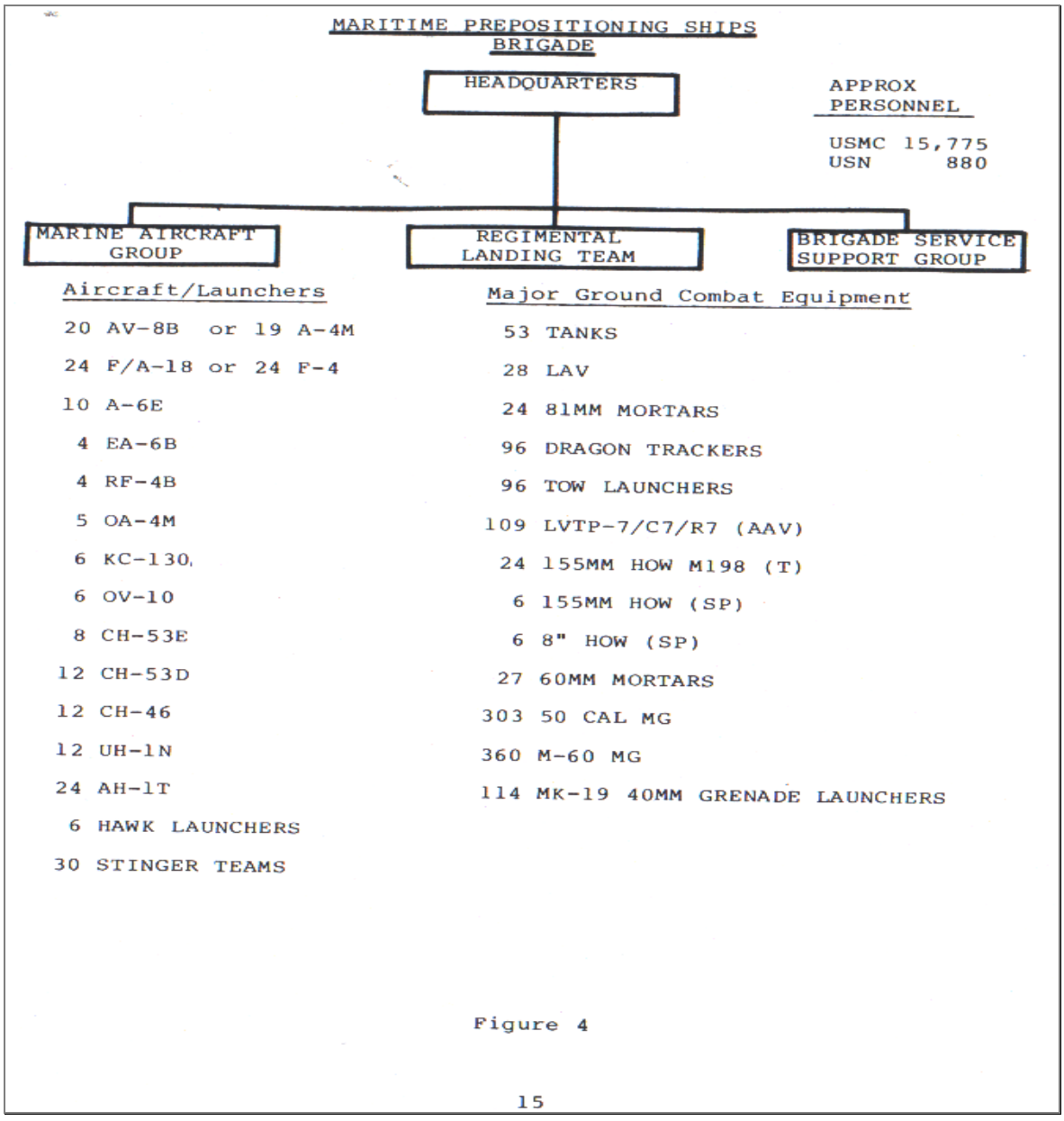

Figure 3: NAVMC 2710 MPF Brigade

Appendix B: FMFRP 2-5A: Marine Air-Ground Task Force Pocket Guide August 1989

This annex lists FMFRP 2-5A's Amphib, MPF, and NALM MEB task organizations.

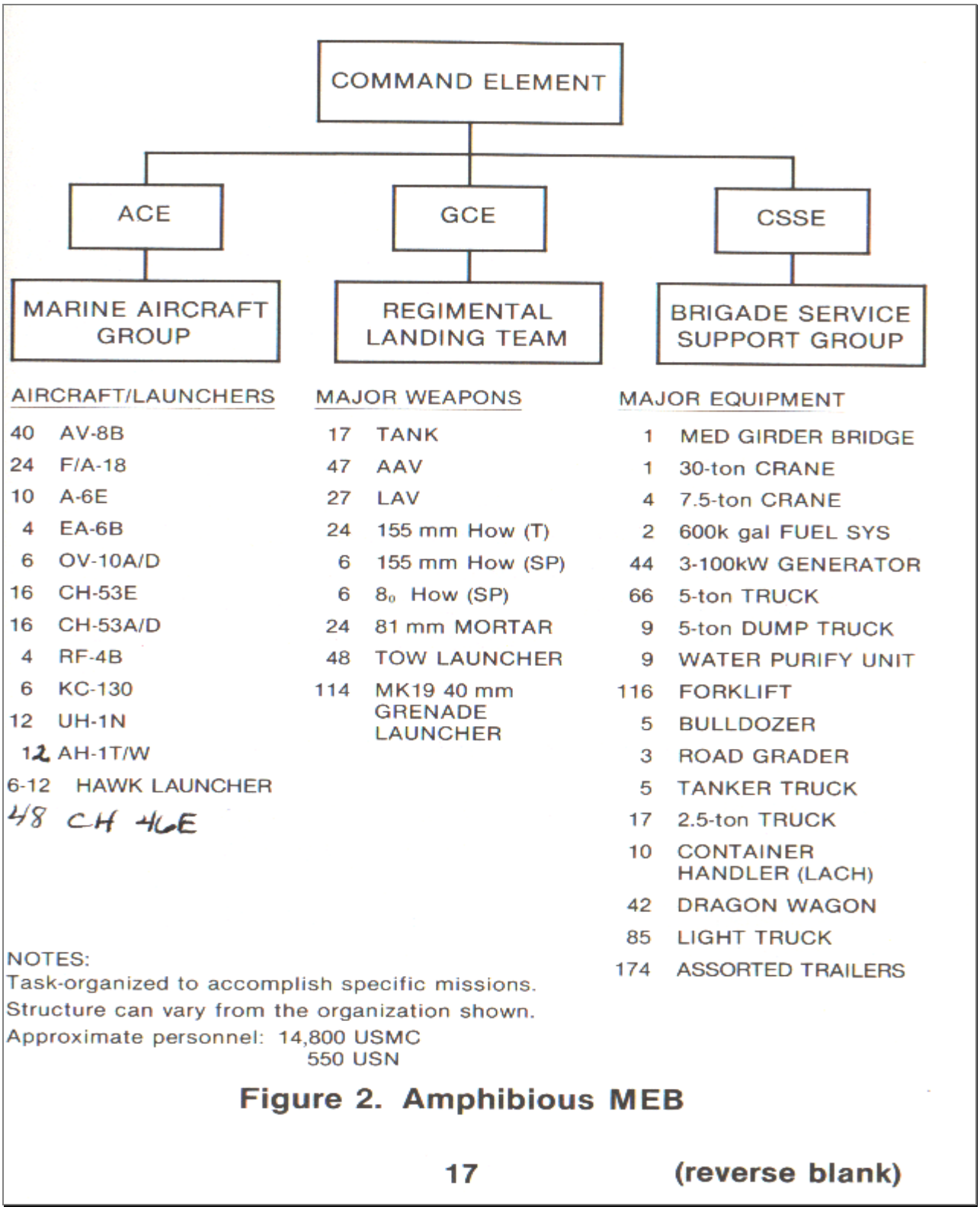

Figure 4: FMFRP 2-5A Amphibious MEB

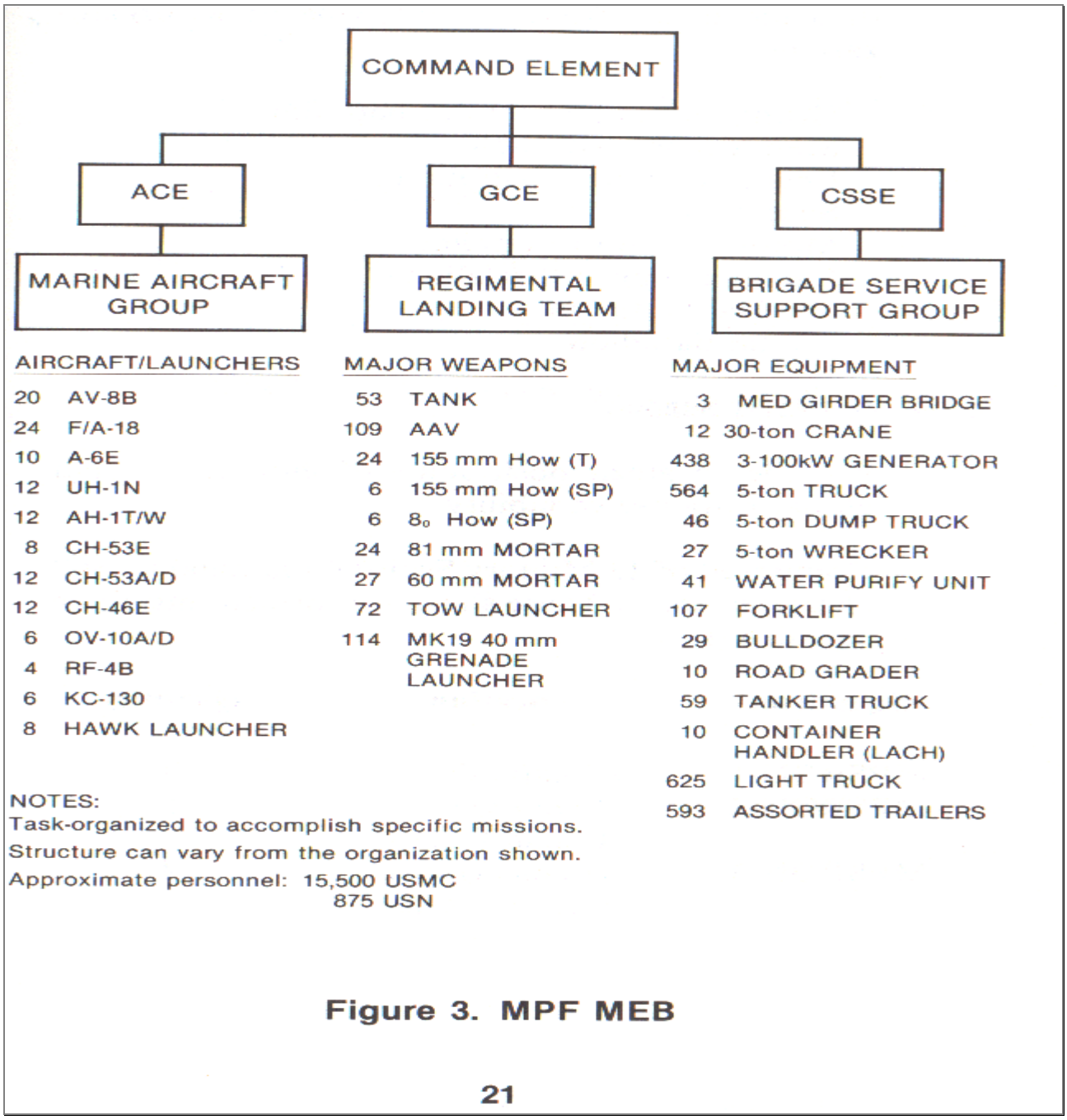

Figure 5: FMFRP 2-5A MPF MEB

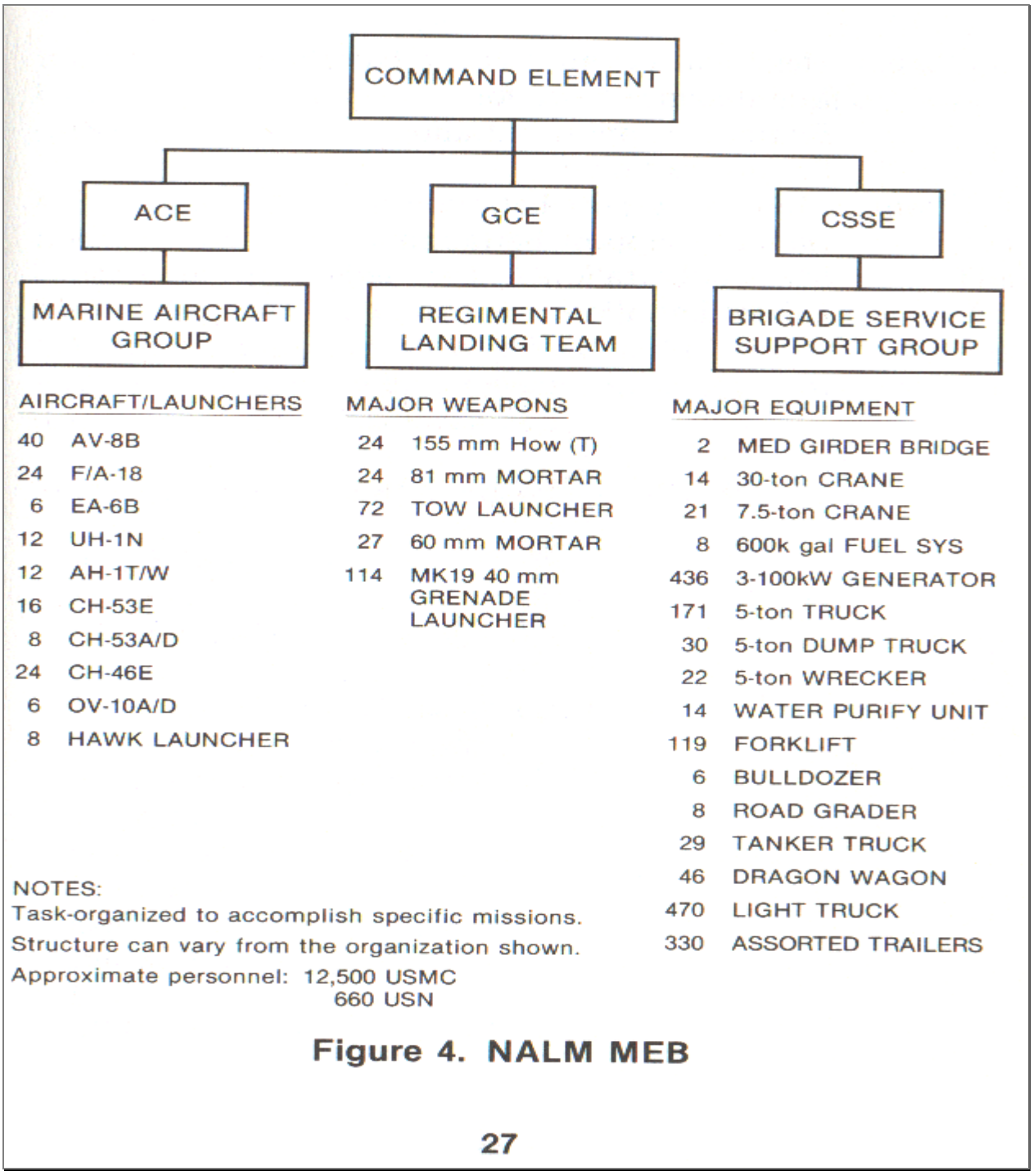

Figure 6: FMFRP 2-5A Norway Air-Landed MEB (NALM)

Appendix C: FMFRP 2-12: Marine Air-Ground Task Force: A Global Capability (1991)

This appendix lists FMFRP 2-12's notional brigades and their associated major weapons and aircraft.

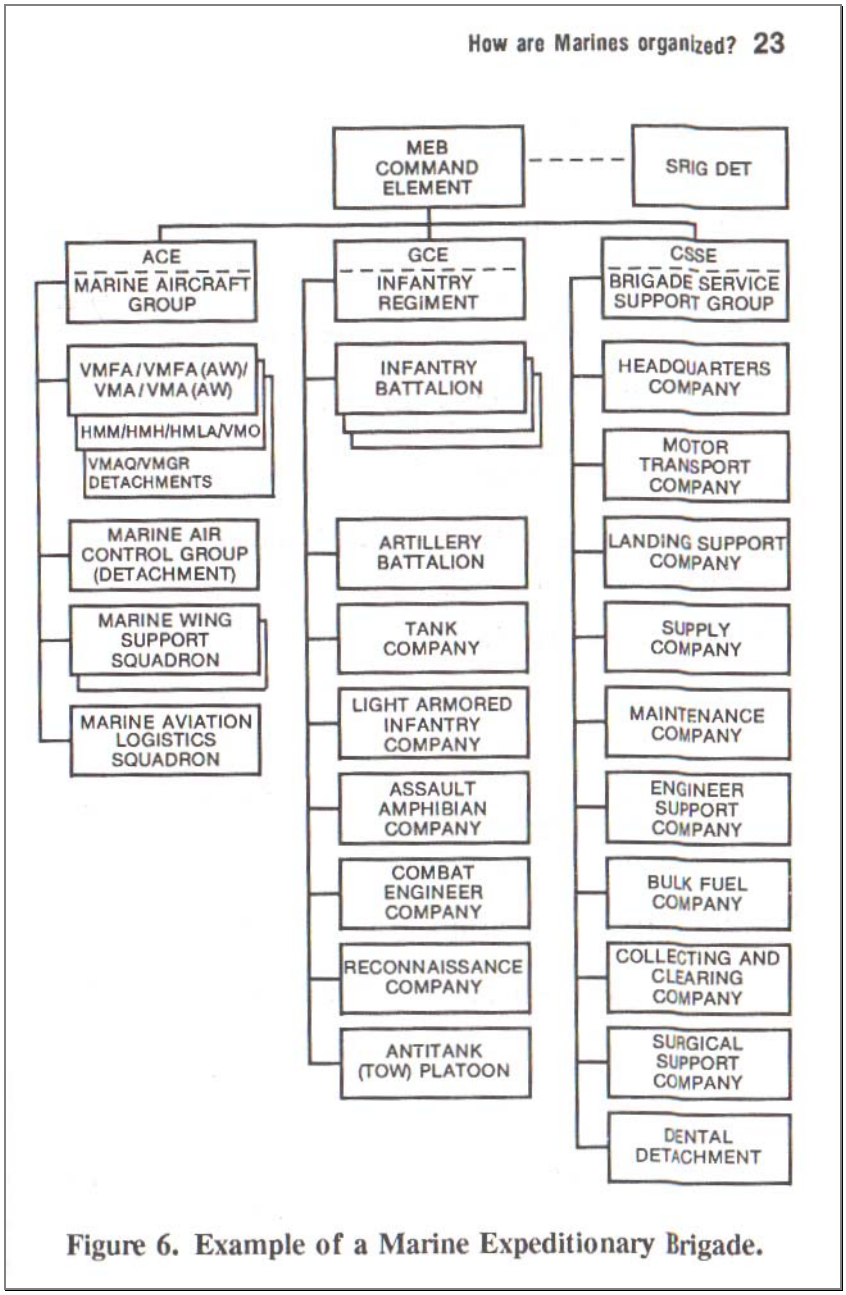

Figure 6. Example of a Marine Expeditionary Brigade.

Figure 7: FMFRP 2-12 Notional MEB

Appendix A

Major Weapons and Aircraft*

	MEU	NALM	AMPHIBMEB	MPFMEB	MEF
Tanks M-60/M-1A1	4	14	14	44	44
AAV	12	47	47	109	208
LAV	8-17	27	33	27	110
155mm How (T)	4	36	36	36	96
105mm How	4	—	—	—	—
81mm Mortars	8	24	24	24	72
60mm Mortars	12	36	36	36	108
MK-19 40mm Grenade Launchers	26	114	114	114	600
TOW Launchers	8	72	48	72	144
Dragon Launchers	24	72	72	72	216
.50 caliber Machine Gun	20	138	138	339	435
M-60 Machine Gun	50	206	206	289	601
Hawk Missile Launchers	—	8	8-16	8	16
Stinger Missile Teams	5	45	45	45	90

* Quantities listed are typical.

Figure 8: FMFRP 2-12 MAGTF Major Weapons and Aircraft (Part 1)

64 Appendix A

	MEU	NALM	AMPMEB	MPFMEB	MEF
AV-8B	6	40	40	20	60
F/A-18A/C	–	24	24	24	48
F/A-18D	–	12	12	12	24
A-6E	–	–	10	10	10
EA-6B	–	6	6	6	6
CH-53A/D	–	–	12	–	12
CH-53E	4	16	16	16	32
AH-1W	4	12	12	12	24
CH-46E	12	24	48	12	60
UH-1N	4	12	12	12	24
KC-130	2	6	6	6	12
OV-10A/D	2	6	6	6	12

Figure 9: FMFRP 2-12 MAGTF Major Weapons and Aircraft (Part 2)

Appendix D: FMFRP 1-11: Fleet Marine Force Organization—1992

This appendix lists the Fleet Marine Force organization prior to the disestablishment of the standing MEB command elements.

Chapter 2

Organization

2001. Definition

An FMF is a balanced force of combined arms comprising land, air, and service elements of the U.S. Marine Corps. A Fleet Marine Force is an integral part of a U.S. Fleet and has the status of a type command. It may consist of a headquarters, FSSG, one or more Marine divisions, one or more Marine aircraft wings, and may include one or more Marine expeditionary brigades. At the present time there are two such forces in existence: FMF, Atlantic (FMFLant), with headquarters at Norfolk, Virginia, and FMF, Pacific (FMFPac), with headquarters at Camp H. M. Smith, Hawaii. As an example, the administrative and training organization of FMFLant is shown schematically in figure 2-1 and FMFPac is shown in figure 2-2. It should be noted that FMFLant and FMFPac differ considerably in organization.

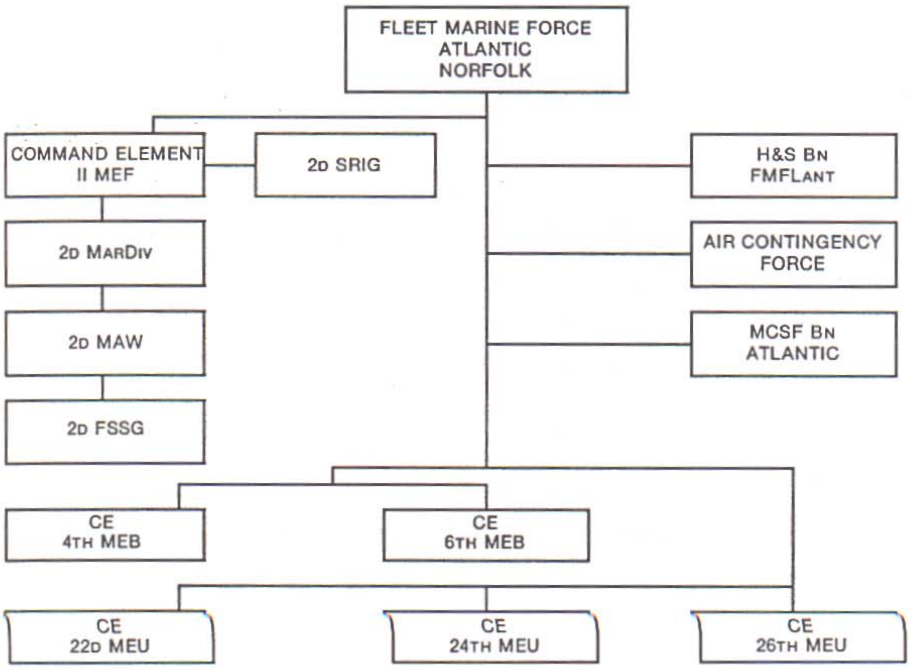

Figure 2-1. Fleet Marine Force Atlantic.

2-1

Figure 10: FMFRP 1-11 Fleet Marine Force Atlantic-1992

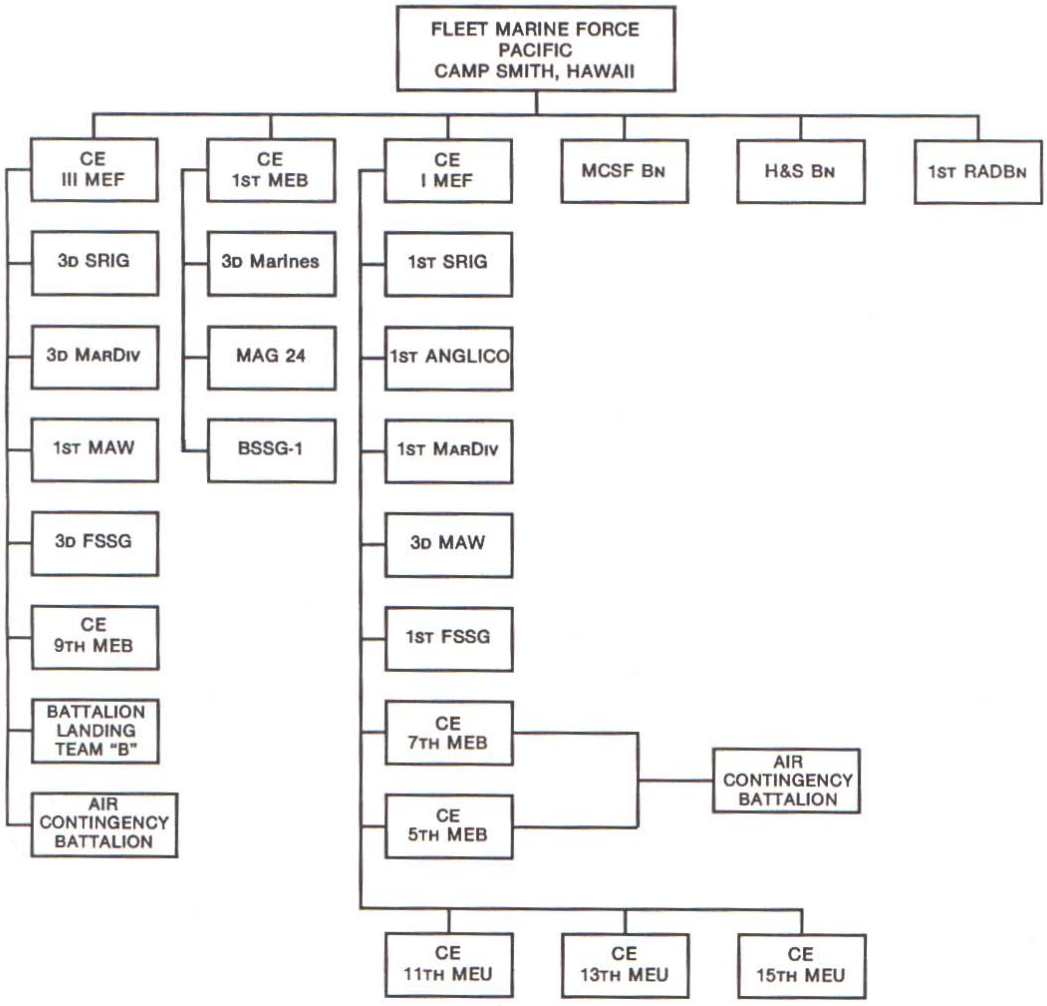

Figure 2-2. Fleet Marine Force Pacific.

2-2

Figure 11: FMFRP 1-11 Fleet Marine Force Pacific-1992

Appendix E: Notional MEB Aircraft Embarkation Calculations

Projected Notional MEB LHA/LHD Aircraft Embarkation Requirements & Limitations

2000

2000 MEB A/C	Approx. Weight (Lbs)	Spots Reqd.	LHA Spots Avail.
2 x CH-46E	34,200	2.00	(NAVY SAR)
12 x CH-46E	205,200	12.00	
4 x CH-53E	146,000	7.16	
4 x AH-1W	43,680	3.44	
2 x UH-1N	14,690	1.60	
6 x AV-8B	76,800	9.90	**43**
total:	520,570	36.10	-36.10
		Delta:	***6.90***

Table E-1

2000 MEB A/C	Approx. Weight (Lbs)	Spots Reqd.	LHD Spots Avail.
2 x CH-46E	34,200	2.00	(NAVY SAR)
12 x CH-46E	205,200	12.00	
4 x CH-53E	146,000	7.16	
4 x AH-1W	43,680	3.44	
2 x UH-1N	14,690	1.64	
6 x AV-8B	76,800	9.90	**46**
total:	520,570	36.14	-36.14
		Delta:	***9.86***

Table E-2

2001

Without Damage Stability Upgrade

2001 MEB A/C	Approx. Weight (Lbs)	Spots Reqd.	LHA Spots Avail.
2 x CH-46E	34,200	2.00	(NAVY SAR)
5 x MV-22	165,700	7.00	
4 x CH-53E	146,000	7.16	
4 x AH-1W	43,680	3.44	
2 x UH-1N	14,690	1.60	
6 x AV-8B	76,800	9.90	**43**
total:	481,070	31.10	-31.10
		Delta:	***11.90***

MV-22 limited due to weight

Table E-3

2001 MEB A/C	Approx. Weight (Lbs)	Spots Reqd.	LHD 1-4 Spots Avail.
2 x CH-46E	34,200	2.00	(NAVY SAR)
5 x MV-22	165,700	7.25	
4 x CH-53E	146,000	7.16	
4 x AH-1W	43,680	3.44	
2 x UH-1N	14,690	1.64	
6 x AV-8B	76,800	9.90	**46**
total:	481,070	31.39	-31.39
		Delta:	***14.61***

MV-22 limited due to weight

Table E-4

2001

With *Damage Stability Upgrade*

2001 MEB A/C	Approx. Weight (Lbs)	Spots Reqd.	LHA Spots Avail.
2 x CH-46E	34,200	2.00	(NAVY SAR)
12 x MV-22	397,680	16.80	
4 x CH-53E	146,000	7.16	
4 x AH-1W	43,680	3.44	
2 x UH-1N	14,690	1.60	
6 x AV-8B	76,800	9.90	**43**
total:	713,050	40.90	-40.90
		Delta:	***2.10***

Table E-5

2001 MEB A/C	Approx. Weight (Lbs)	Spots Reqd.	LHD 1-4 Spots Avail.
2 x CH-46E	34,200	2.00	(NAVY SAR)
12 x MV-22	397,680	17.40	
4 x CH-53E	146,000	7.16	
4 x AH-1W	43,680	3.44	
2 x UH-1N	14,690	1.64	
6 x AV-8B	76,800	9.90	**46**
total:	713,050	41.54	-41.54
		Delta:	***4.46***

Table E-6

Projected Notional MEB LHA/LHD Aircraft Embarkation Requirements & Limitations

2007

2007 MEB A/C	Approx. Weight (Lbs)	Spots Reqd.	LHA Spots Avail.
2 x SH-60	27,600	1.54	(NAVY SAR)
12 x MV-22	397,680	16.80	
4 x CH-53E	146,000	7.16	
4 x AH-1Z	48,800	4.28	
3 x UH-1Y	34,200	3.36	
6 x AV-8B	76,800	9.90	**43**
total:	731,080	43.04	-43.04
		Delta:	***-0.04***

Table E-7

2007 MEB A/C	Approx. Weight (Lbs)	Spots Reqd.	LHD Spots Avail.
2 x SH-60	27,600	1.68	(NAVY SAR)
12 x MV-22	397,680	17.40	
4 x CH-53E	146,000	7.52	
4 x AH-1Z	48,800	4.08	
3 x UH-1Y	34,200	3.15	
6 x AV-8B	76,800	11.52	**46**
total:	731,080	45.35	-45.35
		Delta:	***0.65***

Table E-8

2010

2010 MEB A/C	Approx. Weight (Lbs)	Spots Reqd.	LHD/ LHD(Mod) Spots Avail.
2 x SH-60	27,600	1.68	(NAVY SAR)
12 x MV-22	397,680	17.40	
4 x CH-53E	146,000	7.52	
4 x AH-1Z	48,800	4.08	
3 x UH-1Y	34,200	3.15	
6 x JSF	150,000	12.00	**46**
total:	804,280	45.83	-45.83
		Delta:	***0.17***

Table E-9

2015

2015 MEB A/C	Approx. Weight (Lbs)	Approx. Spots Reqd.	LHA(R) Spots Avail.
2 x SH-60	27,600	1.68	(NAVY SAR)
12 x MV-22	397,680	17.40	
4 x CH-53E	146,000	7.52	
6 x AH-1Z	73,200	6.12	
4 x UH-1Y	45,600	4.20	
10 x JSF	250,000	20.00	**TBD**
total:	940,080	56.92	**?**
		Delta:	**?**

Table E-10

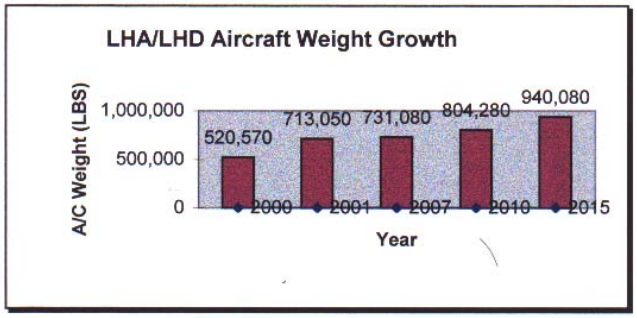

Table E-11

MEB ACE Aircraft Data

A/C	Empty Weight (lb.)[1]	Fuel Capacity (lb.)[1]	Spots Rqd. LHA/LHD
CH-46E	17,100	3,000	1.00/1.00
MV-22	33,140	9,880	1.40/1.45
AH-1W	10,920	2,086	0.86/0.84
AH-1Z	12,200	2,766	1.07/1.02
UH-1N	7,345	1,381	0.81/0.82
UH-1Y	11,400	2,584	1.12/1.05
CH-53E	36,500	15,500	1.79/1.88
AV-8B	12,800	7,700	1.65/1.92
JSF	25,000	18,000	2.00/2.00
CH-60	13,800	3,500	0.77/0.84

Table E-12

MEB ACE Fuel Calculations

MEB ACE	Fuel Capacity (lb.)	Total Fuel (lb.)	Fuel Increase (lb.)
2000			
12 x CH-46E	3,000	36,000	
4 x CH-53E	15,500	62,000	
4 x AH-1W	2,086	8,344	
2 x UH-1N	1,381	2,762	
6 x AV-8B	7,700	46,200	
	total:	**155,306**	
2010			
12 x MV-22	9,880	118,560	
4 x CH-53E	15,500	62,000	
4 x AH-1Z	2,766	11,064	
3 x UH-1Y	2,584	7,752	
6 x JSF	18,000	108,000	
	total:	**307,376**	152,070 (98%)
2015			
12 x MV-22	9,880	118,560	
4 x CH-53E	15,500	62,000	
6 x AH-1Z	2,766	16,596	
4 x UH-1Y	2,584	10,336	
10 x JSF	18,000	180,000	
	total:	**387,492**	232,186 (150%)

Table E-13

1. A/C weights obtained from LHA(R) MAA & Bell HelicopterTEXTRON official website at www.bhti.com. JP-5 (6.8 lb./gal) utilized in fuel calculations.

Appendix F: Operation Desert Storm Task Organization

This appendix lists the Operation Desert Storm task organization obtained from Col Ronald J. Brown, USMC (Ret). *U.S. Marines in the Persian Gulf, 1990-1991 with Marine Forces afloat in Desert Shield and Desert Storm*, Monograph, H.Q. United States Marine Corps, History and Museums Division. (Washington, DC: 1998): 227-234.

ARG A/LF7F
PhibRon 5
- USS *Okinawa* (LPH 3)
- USS *Fort McHenry* (LSD 43)
- USS *Ogden* (LPD 5)
- USS *Cayuga* (LST 1184)
- USS *Durham* (LKA 114)

13th MEU (SOC)
- HQ
- BLT 1/4
- HMM(C)-164
- MSSG 13

4th MEB
- HQ
  - H&S Co
  - SRISG 2
- RLT 2
  - HQ Co, 2d Mar
  - BLT 1/2
  - BLT 3/2
  - 1st Bn, 10th Mar (Rein)
  - Co A, 2d AAV Bn
  - Co A, 2d Tk Bn
  - Det 2d LAI Bn
  - Det 2d Recon Bn
  - Det 2d Trk Co, HQ Bn, 2d MarDiv
- MAG-40
  - HQ
  - VMA-331
  - HMM-263
  - HMM-365
  - HMH-461
  - HMLA-269
  - MALS-14
  - Det H&HS-28
  - Det MACS-6
  - Det MWCS-28
  - Det MASS-1
  - Det Btry A, 2d LAAD Bn

MWSS-274
BSSG 4
HQ
Det H&S Co, 2dFSSG
Det 8th ESB
Det 2d LSB
Det 2d Maint Bn
Det 2d Med Bn
Det 2d Dent Bn
Det 2d Supply Bn
Det 8th MT Bn
Det 8th Comm Bn
Det 2d MP Co

PhibGru 2
Transit Group 1
USS *Shreveport* (LPD 12)
USS *Trenton* (LPD 14)
USS *Portland* (LSD 37)
USS *Gunston Hall* (LSD 44)
Transit Group 2
USS *Nassau* (LHA 4)
USS *Raleigh* (LPD 1)
USS *Pensacola* (LSD 38)
USS *Saginaw* (LST 1188)
Transit Group 3
USS *Iwo Jima* (LPH 2)
USS *Guam* (LPH 9)
USS *Manitowoc* (LST 1180)
USS *LaMoure County* (LST 1194)
MSC Support Ships
USNS *Wright* (T-AVB 3)
MV *Cape Domingo* (T-AKR 5053)
MV *Strong Texan* (T-AK 9670)
MV *Bassro Polar* (non-NRV)
MV *Pheasant* (non-NRV)
MV *Aurora T* (non-NRV)
MV *PFC William Baugh Jr.* (T-AK 3001)
MV *1st Lt Alex Bonnyman Jr.* (T-AK 3003)

Operation Eastern Exit
Amphibious Task Unit
USS *Guam* (LPH 9)
USS *Trenton* (LPD 14)
Contingency Marine Air-ground Task Force

Command Element
- HQ Det 1
- Det 2d SRISG
- Det 8th Comm Bn
- Det 2d Intel Co
- Det 2d Force Recon Co

Ground Combat Element
- Det HQ Co, 2d Mar
- Co C, BLT 1/2 (-) (Rein)
- Seal Team 8 F (USN)

Aviation Combat Element
- HMM-263
- HMM-365
- Det HMLA-269
- Det HMH-461

Combat Service Support Element
- Det HQ Co, BSSG 4
- Det 2d MP Co
- Det 2d LSB
- Med Det

Support
- Det VMGR-252
- Det VMGR-352
- Mogadishu MSG Det
- Det 1st SOW (USAF)

PhibGru 3

USS *Tarawa* (LHA 1)
USS *Tripoli* (LPH 10)
USS *New Orleans* (LPH 11)
USS *Denver* (LPD 9)
USS *Juneau* (LPD 10)
USS *Mobile* (LKA 115)
USS *Vancouver* (LPD 2)
USS *Anchorage* (LSD 36)
USS *Barbour County* (LST 1195)
USS *Frederick* (LST 1184)
USS *Mount Vernon* (LSD 39)
USS *Germantown* (LSD 42)
USS *Peoria* (LST 1183)
USNS *Flickertail State* (T-ACS 5)
MV *Cape Girardeau* (T-AK 2039)

5th MEB Operations Ashore

5th MEB

- HQ
  - H&S Co (-) (Rein)
  - SRISG 5
    - Det 1st Radio Bn
    - Det Co A, 9th Comm Bn
    - Det 4th Recon Co
    - Det 4th MP Co
- RLT 5
  - HQ Co, 5th Mar
  - BLT 2/5
  - BLT 3/5
  - BLT 3/1
  - 2d Bn, 11th Mar (Rein)
  - Co B, 1st Recon Bn (Rein)
  - Co A, 4th Tank Bn (Rein)
  - Co A, 4th AAV Bn (Rein)
  - Co D, 1st LAV Bn (Rein)
  - Co F, 2/25 (-) (Rein)
  - Co B, 1st CEB (Rein)
  - Co A, 4th CEB (-)
  - TOW Plat, HQ Co, 23d Mar
  - Prov Trk Co, 6th MT Bn
- MAG-50
  - HQ, MAG-50
    - Det MACG-38
    - Det MACS-7
    - Det MALS-39
    - Det MALS-16
    - Det MALS-24
    - Det MWHS-3
    - Det MWHU-3
    - Prov MWSS (RW)
    - Prov MWSS (FW)
  - HMM(C)-268
  - HMM-265
  - HMLA-169 (-)
  - HMA-773 (-)
  - Det HMH-466
  - Det MWSS-372
  - Bty A (-), 3d LAAD Bn
- BSSG 5
  - MSSG 11
  - Det H&S Bn, 1st FSSG
  - Det H&S Bn, 4th FSSG
  - Det 1st LSB

Det Prov Comm Co
Det 6th MT Bn
Det 7th MT Bn
Det Med & Den Bns
Bridge Co, 6th ESB
Det 6th ESB
Det 4th Supply Bn
Det 1st Supply Bn
Det 1st Main Bn
Det 4th Main Bn
Prov POG, Jubayl

ARG A/LF7F, Mar91
PhibRon 1
USS *New Orleans* (LPH 11)
USS *Denver* (LPD 9)
USS *Germantown* (LSD 42)
USS *Peoria* (LST 1183)
USS *Mobile* (LKA 115)
11th MEU(SOC)
HQ
BLT 3/1
HMM(C)-268
MSSG 11

Operation Sea Angel
Amphibious Task Force
USS *Tarawa* (LHA 1)
USS *Juneau* (LPD 10)
USS *Vancouver* (LPD 2)
USS *Anchorage* (LSD 36)
USS *Mount Vernon* (LSD 39)
USS *Barbour County* (LST 1195)
USS *Frederick* (LST 1184)
USNS *Passumpsic* (T-AO 107)

5th MEB
HQ
RLT 5
BLT 2/5
BLT 3/5
2d Bn, 11th Mar
MAG-50
HQ
HMM-265

HMLA-169
HMH-772, Det A
Det 3d LAAD Bn
Det MWSS-372

BSSG 5

HQ
Med Det
Maint Det
Supply Det
Engspt Det
LdgSpt Det
Prov Trk Co, 6th MT
Comm Det
MP Det

Appendix G: Notional L-Class Aviation Ship Service Life Projection

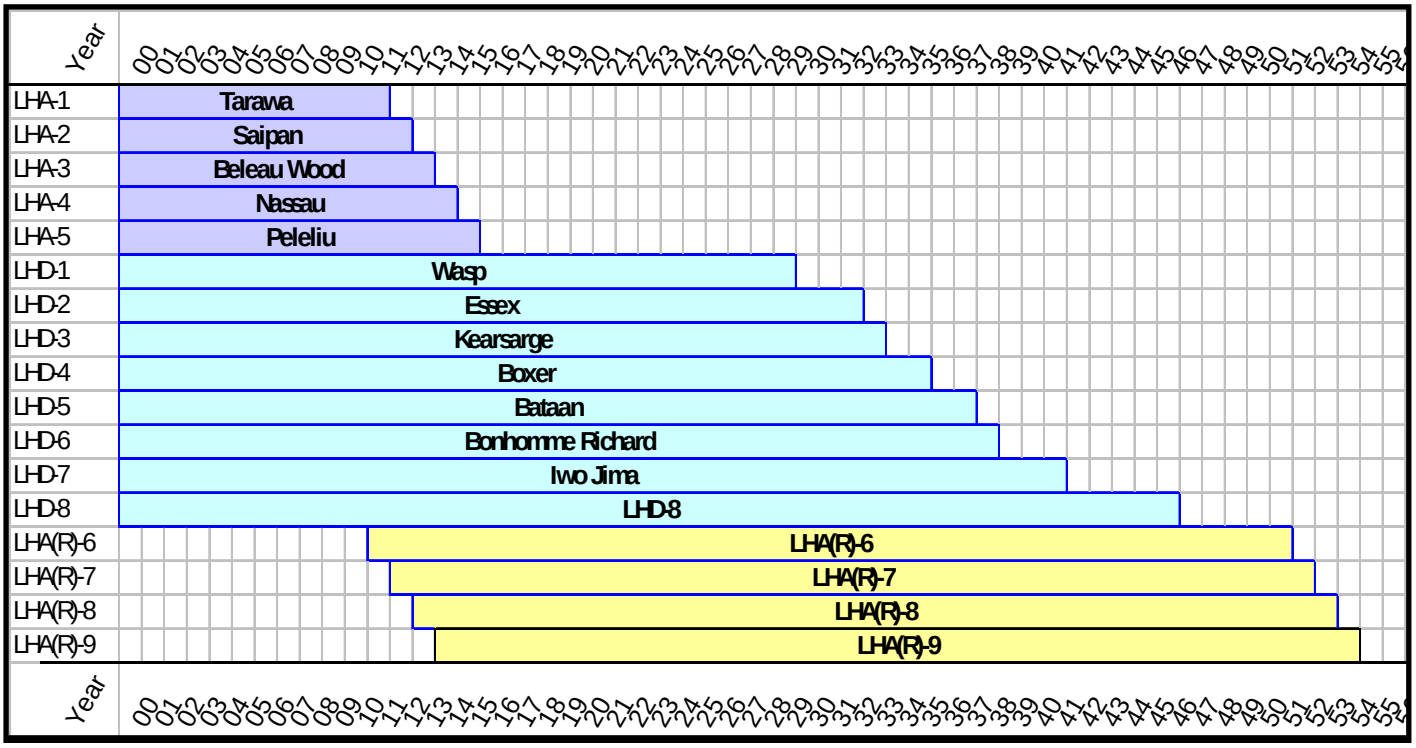

Figure 12: Notional LHA/LHD-Class Service Life Projection

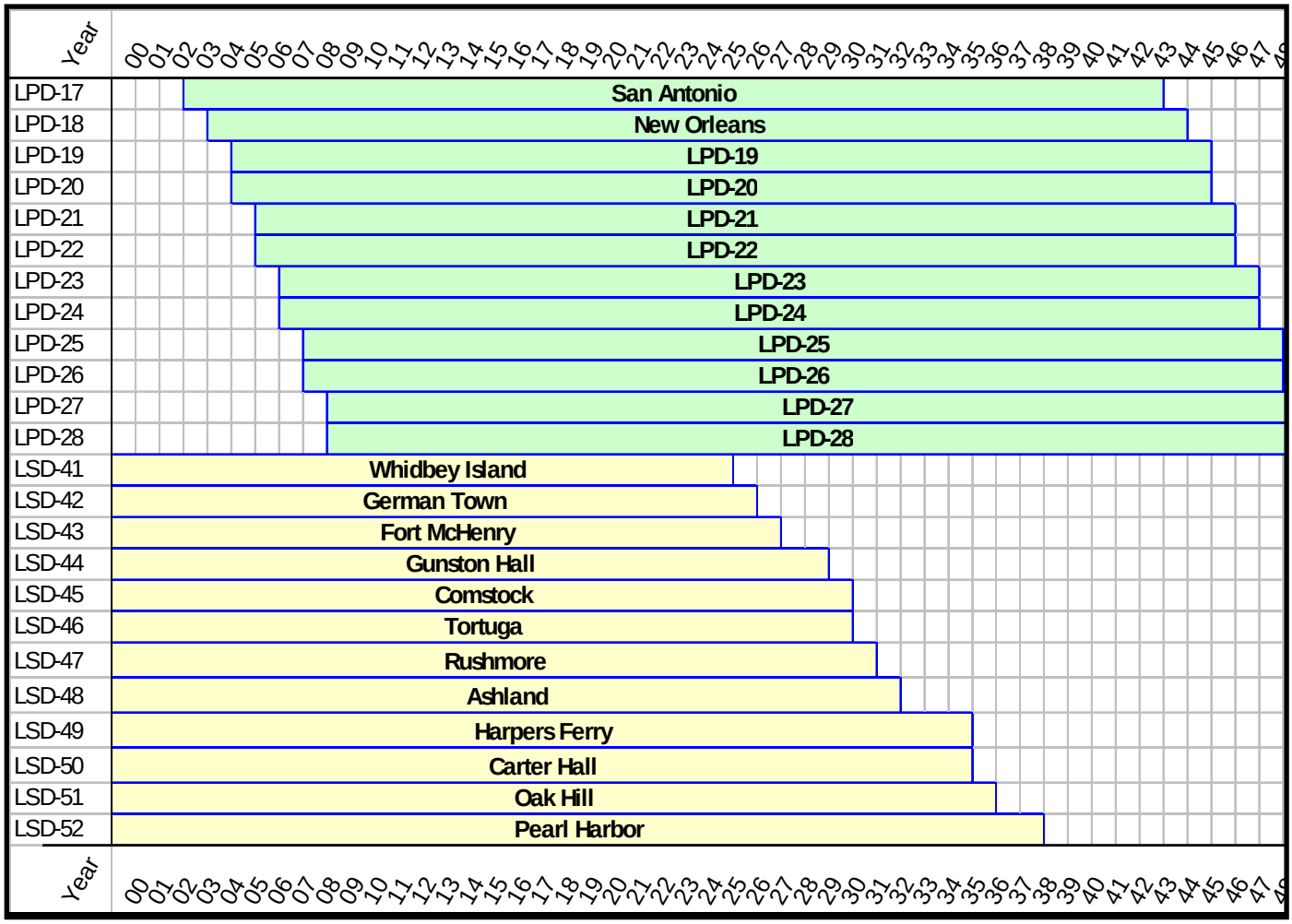

Figure 13. LPD/LSD-Class Service Life Projection

Glossary

This glossary provides a list of abbreviations and acronyms that are commonly used in Marine Corps correspondence, publications, and daily dialog. This Appendix is provided for reference purposes only. Not all listed acronyms are included in this publication.

A-4	McDonnell Douglas *Skyhawk*
A-6E	Grumman *Intruder*
AAAV	Advanced Amphibious Assault Vehicle
AAV	Assault Amphibious Vehicle
ACBL	Amphibious Cargo Beaching Lighter
ACE	Aviation Combat Element
AE	Assault Echelon
AFOE	Assault Follow-On Echelon
AH-1W	Bell Super Cobra
AMC	Air Mobility Command
AMCM	Airborne Mine Counter Measures
AMPHIB	Amphibious Assault Ship
AOA	Amphibious Objective Area, Analysis of Alternatives
AOR	Area or Responsibility
APOD	Aerial Port of Debarkation
APOE	Aerial Port of Embarkation
ARG	Amphibious Ready Group
ATF	Amphibious Task Force
ATG	Amphibious Task Group
AV-8B	McDonnell Douglas *Harrier*
BLT	Battalion Landing Team
BSSG	Brigade Service Support Group
C 2	Command and Control
CAP	Combat Air Patrol
CAS	Close Air Support
CATF	Commander Amphibious Task Force
CE	Command Element
CF	Coalition Force
CH-46E	Boeing Vertol *Sea Knight*
CH-53D	Sikorsky *Sea Stallion*
CH-53D	Sikorsky *Super Stallion*
CINC	Commander-in-Chief
CINCENT	Commander-in-Chief, U.S. Central Command

CLF	Commander Landing Force
CMC	Commandant of the Marine Corps
CNA	Center for Naval Analysis
CNO	Chief of Naval Operations
COG	Center of Gravity
COMMARFORLANT	Commander, Marine Forces Atlantic
COMMARFORPAC	Commander, Marine Forces Pacific
COMMARFORRES	Commander, Marine Forces Reserve
CONOPS	Concept of Operations
CONUS	Continental United States
CRAF	Civil Reserve Air Fleet
CRM	Contingency Response MAGTF
CSSE	Combat Service Support Element
CV	Aircraft Carrier
CVN	Aircraft Carrier, Nuclear
DASC	Direct Air Support Center
Det	Detachment
DoD	Department of Defense
DoN	Department of the Navy
DoN Lift II	DoN Integrated Amphibious Operations and USMC Air Support Requirements Study (U), 8 Jan 1990
EA-6B	Grumman *Prowler*
ESL	End of Service Life
F-4/RF-4	McDonnell Douglas *Phantom*
F/A-18A/C/D	McDonnell Douglas *Hornet*
FARP	Forward Arming and Refueling Point
FCF	Functional Check Flight
FMC	Full Mission Capable
FMF	Fleet Marine Force
FMFRP	Fleet Marine Force Reference Publication
FOB	Forward Operating Base
FSPG	Force Structure Planning Group
FW/CAS	Fixed Wing/Close Air Support
FY	Fiscal Year
FYDP	Future Year Defense Plan
GCE	Ground Combat Element
HMLA	Marine Light/Attack Helicopter Squadron
HMH	Marine Heavy Helicopter Squadron
HMM	Marine Medium Helicopter Squadron
HQMC	Headquarters, U.S. Marine Corps
ISB	Intermediate Staging Base
JLOTS	Joint Logistics Over the Shore
JROC	Joint Requirements Oversight Council
JSF	Joint Strike Fighter
KC-130	Lockheed *Hercules*
LAAD	Low Altitude Air Defense

LCAC	Landing Craft Air Cushioned
LCC	Amphibious Command Ship
LCM	Landing Craft Mechanized
LCU	Landing Craft Utility
LCUR	Landing Craft Utility Replacement
LF	Landing Force
LFOC	Landing Force Operation Center
LHA	Amphibious Assault Ship – General Purpose
LHA(R)	LHA Replacement
LHD	Amphibious Assault Ship – Multipurpose
LIC	Low Intensity Conflict
LKA	Amphibious Cargo Ship
LO/LO	Lift On/Lift Off
LPD	Amphibious Transport Dock
LPH	Amphibious Assault Ship
LSD	Dock Landing Ship
LST	Tank Landing Ship
LT	Long Ton
LVS	Logistics Vehicle System
LVSR	Logistics Vehicle System Replacement
LW155	Lightweight 155mm Howitzer
LZ	Landing Zone
MAA	Mission Area Analysis
MAB	Marine Amphibious Brigade
MAF	Marine Amphibious Force
MACG	Marine Air Control Group
MAG	Marine Aircraft Group
MAGTF	Marine Air-Ground Task Force
MALS	Marine Aircraft Logistics Squadron
MAU	Marine Amphibious Unit
MAW	Marine Aircraft Wing
MCB	Marine Corps Base
MCCDC	Marine Corps Combat Development Command
MCDP	Marine Corps Doctrinal Publication
MCIA	Marine Corps Intelligence Activity
MCM	Mine Countermeasures
MCU	Marine Corps University
MCWP	Marine Corps Warfighting Publication
MEB	Marine Expeditionary Brigade
MEF	Marine Expeditionary Force
MEF(FWD)	Marine Expeditionary Force (Forward)
MEU	Marine Expeditionary Unit
MEU(SOC)	Marine Expeditionary Unit (Special Operations Capable)
MEWSS	Mobile Electronic Warfare Support System (LAV variant)
MIO	Maritime Interception Operation
MNS	Mission Needs Statement

MOG	Maximum On Ground
MOE	Measure of Effectiveness
MPF	Maritime Prepositioning Force
MPF-F	Maritime Prepositioning Force – Future
MPS	Maritime Prepositioning Ships
MPSRON	Maritime Prepositioning Ship Squadron
MRD	Motorized Rifle Division
MRR	Motorized Rifle Regiment
MSC	Military Sealift Command
MTVR	Medium Tactical Vehicle Replacement
MTW	Major Theater War
MV-22	Bell-Boeing *Osprey*
MWSG	Marine Wing Support Group
MWSS	Marine Wing Support Squadron
N-8	Deputy Chief of Naval Operations for Warfare, Requirements, and Assignments
N-80	Navy Programming Division
N-82	Navy Fiscal Management Division
N-85	Navy Expeditionary Warfare Division
N-88	Navy Air Warfare Division
NAVAIR	Naval Air Systems Command
NAVMC	Navy-Marine Corps
NAVSEA	Naval Sea Systems Command
NBG	Naval Beach Group
NCF	Naval Construction Forces
NEF	Naval Expeditionary Force
NM	Nautical Miles
NMCB	Naval Mobile Construction Battalion
NSE	Navy Support Element
NSFS	Naval Surface Fire Support
NSWC	Naval Surface Warfare Center
OMFTS	Operational Maneuver from the Sea
OPTEMPO	Operational Tempo
OTH	Over-the-Horizon
OV-10	Rockwell International *Bronco*
PAA	Primary Aircraft Assigned
PAX	Passengers
PERSTEMPO	Personnel Tempo
PHIBGRU	Amphibious Group
PHIBRON	Amphibious Squadron
POM	Program Objective Memorandum
QDR	Quadrennial Defense Review
RDTEN	Research Development Technology Navy
RERP	Reliability Enhancement Reengining Program
RLT	Regimental Landing Team
RO/RO	Roll On/Roll Off

RRDF	Rapid Roll On/Roll Off Discharge Facility
RWCAS	Rotary Wing Close Air Support
SAR	Search and Rescue
SLCP	Ships Landing and Characteristics Pamphlets
SIGINT	Signals Intelligence
SLEP	Service Life Extension Program
SLOC	Sea Lines of Communication
SPOD	Sea Port of Debarkation
SPOE	Sea Port of Embarkation
SPP	Sponsor's Program Proposal
SRI	Surveillance, Reconnaissance, and Intelligence
SSC	Small Scale Contingency
ST	Short Ton
STOM	Ship-to-Objective Maneuver
STRATLIFT	Strategic Air lift
STOVL	Short Take-Off Vertical Landing
TACAIR	Tactical Air
T-AVB	Aviation Logistics Ship
T/M/S	Type/Model/Series
TPFDD	Time Phased Force Deployment Data
UH-1N	Bell *Huey*
USA	United States Army
USAF	United States Air Force
USMC	United States Marine Corps
USN	United States Navy
VMA	Marine Attack Squadron
VMFA	Marine Fighter Attack Squadron
VMAQ	Marine Tactical Electronic Warfare Squadron
VMFA(AW)	Marine All Weather Fighter Attack Squadron
VMGR	Marine Aerial Refueler Transport Squadron
VMU	Marine Unmanned Aerial Vehicle Squadron
V/STOL	Vertical/Short Take-off and Landing
VTOL V	Vertical Take Off and Landing

Airhead. A designated area in a hostile or threatened territory which, when seized and held, ensures the continuous air landing of troops and materiel and provides the maneuver space necessary for projected operations. Normally it is the area seized in the assault phase of an airborne operation.

Amphibious Operation. An attack launched from the sea by Naval and landing forces, embarked in ships or craft involving a landing on a hostile or potentially hostile shore.

Assault Echelon. The element of a force that is scheduled for initial assault on the objective area. In an amphibious task force, it consists of Navy amphibious ships

and the assault troops, vehicles, non-self-deployable aircraft, equipment and supplies required to initiate the assault landing.

Assault Follow-On-Echelon. In amphibious operations, that echelon of the assault troops, vehicles, aircraft equipment, and supplies which, though not needed to initiate the assault, is required to support and sustain the assault. In order to accomplish its purpose, it is normally required in the objective area no later than five days after commencement of the assault landing.

Beachhead. A designated area on a hostile or potentially hostile shore that, when seized and held, ensures the continuous landing of troops and materiel, and provides maneuver space requisite for subsequent projected operations ashore.

Forcible Entry. Seizing and holding a lodgment in the face of armed opposition.

Lodgment. A designated area in a hostile or potentially hostile territory that, when seized and held, will enable continuous landing of troops and materiel to achieve immediate objectives or, provide space for subsequent operations. A lodgment may be an airhead, a beachhead, or a combination thereof. A lodgment may have established infrastructure (such as those found in international air and sea ports), or may simply have an undeveloped landing strip, an austere drop zone, or an obscure assault beach.

Lighterage. A small craft designed to transport cargo or personnel from ship to shore. Lighterage includes amphibians, discharge lighters, causeways, and barges.

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