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14. ABSTRACT
Force Design has created a gap in fire support available to the 2030 Infantry Battalion between organic infantry fires and Fixed Wing (FW) manned and unmanned fires platforms. Until more capable assets become available to the USMC that can replace mission sets provided by H-1s, the AH-1Z and UH-1Y will still have a role in supporting littoral forces and EABO. H-1s can provide this essential support if the HMLA community is willing to adjust, much like the rest of the USMC will have to, to build a force able to operate in a contested maritime domain. With changes to traditional employment of HMLA squadrons, H-1s will still have a role in supporting littoral forces conducting EABO and supporting the USMC's contribution to future Joint Operations.

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THE ROLE OF AH-1Z AND UH-1Y HELICOPTERS IN FUTURE UNITED STATES
MARINE CORPS EXPEDITIONARY ADVANCED BASE OPERATIONS

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

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Executive Summary

Title: The Role of AH-1Z and UH-1Y (H-1s) Helicopters in Future United States Marine Corps (USMC) Expeditionary Advanced Base Operations (EABO).

Author: Major Andrew W. J. Raich, United States Marine Corps

Thesis: Changes to the traditional employment of H-1s will enable low signature, affordable, and risk worthy attack and utility support to Littoral Force Commanders (LFCs), minimizing the impact of limited H-1 operational range and maximizing the legacy capabilities of H-1s to help ensure the survivability of littoral forces conducting EABO.

Discussion: USMC Force Design has called into question the future relevance of H-1s in support of EABO. This is based on planning guidance issued by the Commandant of the Marine Corps (CMC) and divestments of Helicopter Marine Light Attack (HMLA) squadrons in support of USMC Force Design efforts to meet growing peer competitor threats by the year 2030. Despite arguments to the contrary, H-1s can still fill a critical gap in support to littoral forces created by Force Design divestments. Until more technologically advanced systems are developed, purchased, and fielded by the USMC, H-1s are the best solution to the reactive fires and utility support gap for LFCs. To enable this proposed concept, changes to the traditional employment of H-1s would be required to enable low signature, affordable, risk worthy operations that use limited operational range and legacy capabilities to the advantage, rather than to the disadvantage, of the littoral force.

Conclusion: Force Design has created a gap in fire support available to the 2030 infantry battalion between organic infantry fires and Fixed Wing (FW) manned and unmanned fires platforms. Until more capable assets become available to the USMC that can replace mission sets provided by H-1s, the AH-1Z and UH-1Y will still have a role in supporting littoral forces and EABO. H-1s can provide this essential support if the HMLA community is willing to adjust, much like the rest of the USMC will have to, to build a force able to operate in a contested maritime domain. With changes to traditional employment of HMLA squadrons, H-1s will still have a role in supporting littoral forces conducting EABO and supporting the USMC's contribution to Joint Operations.

Preface

I chose the topic of the role of H-1s supporting EABO because I believe there is an argument to be made for the future relevance of the HMLA community in this mission set. I decided to research this topic not out of personal community pride or career preservation, but because I believe the HMLA community and the AH-1Z and UH-1Y platforms are currently being overlooked and can provide attack and utility support to littoral forces, right now with existing aircraft, in ways that currently fielded manned and unmanned FW platforms cannot. This conversation is important because, as I argue in this paper, the current lack of planned attack and utility support to littoral forces can be solved with the assets we already have. This solution will require adjustments to traditional H-1 employment, but I believe the HMLA community strengths of leadership, aggressiveness, and adaptability can enable this change.

I would not have been able to complete this project without the guidance, assistance, interest, input, and encouragement of the following people:

My Family: Barbara, Luella, and Charles.

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Introduction

In July 2019, General David H. Berger, the 38th CMC, released the *Commandant's Planning Guidance* (CPG) to provide his “strategic direction” for the USMC.¹ The CPG lays out the CMC’s desired institutional changes to ensure the USMC is aligned with the 2018 National Defense Strategy’s (NDS) shift in priorities to great power competition with China and Russia, with a direct emphasis on maritime operations within the Indo-Pacific Combatant Command (INDOPACOM). The specific focus of his CPG is Force Design, with the CMC’s goal for the USMC to be a “naval expeditionary force capable of deterring malign behavior and, when necessary, fighting inside our adversary’s Weapon Engagement Zone (WEZ) to facilitate sea denial in support of fleet operations and Joint Force horizontal escalation.”² The CPG’s renewed focus on naval integration and emphasis on changing “how we will fulfill our mandate to support the fleet” created various planning cells to determine the required USMC force structure and to conduct wargames to test his proposed changes.³ While Force Design studies have proposed numerous changes within the Fleet Marine Force (FMF), the role that USMC Rotary Wing (RW) attack and utility platforms, AH-1Z and the UH-1Y (H-1) helicopters, will play in the future mission of the USMC in INDOPACOM has largely been left unanswered.

The future relevance of H-1 aircraft has come into question during USMC Force Design discussions due to the CPG and pacing threats in INDOPACOM. *Force Design 2030*, released in March 2020, directs numerous divestments in longstanding USMC organic capabilities including cannon artillery, tanks, and RW aviation to reallocate funds for force modernization.⁴ The divestment of assets like these may leave a gap in organic fire support for distributed littoral forces operating in a low intensity contested environment against peer adversaries or proxy forces during future EABO.

Littoral forces executing EABO in a sustained Distributed Operations (DO) environment during either deterrence, below the threshold of armed conflict, or low intensity conflict may still require support from the cost effective, currently operational, and combat proven AH-1Z and UH-1Y attack and utility helicopters. Without the option for easily accessible air support from H-1s, LFCs will be without organic capabilities to conduct Close Air Support (CAS) and reactive close fires, assault support, Combat Assault Transport (CAT), and Casualty Evacuation (CASEVAC). Current Unmanned Aerial Systems (UAS) cannot conduct these mission sets effectively or at all. H-1s also possess the ability to conduct these mission sets in a Contested Degraded Operations (CDO) environment in ways that UAS platforms requiring data links to ground control stations cannot.

Operating outside of the traditional Marine Air Ground Task Force (MAGTF) employment of Aviation Combat Element (ACE) assets will require changes to traditional H-1 employment. This is confirmed by the CMC's statement in the CPG that "we are not defined by any particular organizing construct – the MAGTF cannot be our only solution for all crises."⁵ Until replacement systems with increased capabilities are developed, tested, and fielded, existing AH-1Zs and UH-1Ys from HMLA squadrons will still play a role in future USMC operations to fill the fire support gap for distributed littoral forces created by Force Design divestments.

According to the CMC's statements in *Force Design 2030*, H-1s will continue to remain relevant to the traditional "crisis and contingency missions" executed by Marine Expeditionary Units (MEUs), but are "operationally unsuitable for our highest priority maritime challenges."⁶ The most prominent claims against H-1 relevance in the USMC's "highest priority maritime challenges" of sea denial missions include arguments regarding large signatures, affordability, risk worthiness, limited operational range, and legacy capabilities.⁷ Each of these arguments

concerns the survivability of littoral forces conducting EABO and the ability of H-1s to contribute to the survival of that littoral force. This paper will address how changes to the traditional employment of H-1s will enable low signature, affordable, and risk worthy attack and utility support to LFCs, minimizing the impact of limited H-1 operational range, and maximizing the legacy capabilities of H-1s to help ensure the survivability of littoral forces conducting EABO. This assertion will be validated by addressing associated Force Design publications, the historical relevance of H-1s in conventional and low intensity conflict, the argument against H-1 relevancy in support of EABO, and the argument for H-1 relevancy in support of EABO.

Literature Review

The main documents directing change within the USMC have come from the CMC. These include the CPG, *Force Design 2030*, and the CMC's June 2020 article titled "The Case for Change" in *The Marine Corps Gazette* (hereafter referred to collectively as the CMC's Force Design Guidance). The CPG addresses the naval operating concepts of Littoral Operations in a Contested Environment (LOCE), EABO, stand in forces, DO, and how the USMC needs to change to support these operating concepts. In *Force Design 2030*, released in March 2020, General Berger discussed the first set of Force Design changes that will be instituted to shape the USMC for 2030. The main points of his decisions involved making changes to the existing force structure under the assumption that the USMC will not receive any additional resources, and that the USMC must "divest in some existing capabilities and capacities" and reallocate those resources to new capabilities.⁸ The primary divestments are infantry battalions and much of their accompanying support structure. Planned reductions include three infantry battalions, 16 cannon artillery batteries, two assault amphibian companies, three tilt rotor squadrons, three

heavy lift helicopter squadrons, at least two light-attack helicopter squadrons, all bridging companies, all law enforcement battalions, and all tanks.⁹

The divestments discussed in *Force Design 2030* are intended to free resources to create a USMC “stand in force” that can confront adversary naval forces with an “array of low signature, affordable, risk worthy platforms and payloads” by the year 2030.¹⁰ Platforms that are not considered “low signature, affordable, and risk worthy” by the CMC include H-1s, which he said maintain a “certain amount of relevance to crisis and contingency missions,” but are overall “operationally unsuitable for our highest-priority maritime challenges.”¹¹ This opinion is also expressed in the CMC’s article “The Case for Change,” where he concludes that “attack helicopters lack the range to be relevant against the pacing threat in the Pacific,” and that the USMC force structure is currently organized for sustained ground combat operations ashore and not focused on the need to provide “assured access for elements of the naval or Joint Force” in the Pacific.¹²

The February 2019 article “Stand in Forces” by the late Art Corbett in *The Marine Corps Gazette* advocates for similar operating concepts for great power competition in the Pacific. Corbett, who was a concept developer at the Marine Corps Warfighting Lab (MCWL), preceded the CMC’s announcements regarding Force Design with his argument for the development of “stand in forces equipped with disruptive new tactical capabilities that will persist and operate forward within a peer adversary’s WEZ.”¹³ Corbett advocates for small, cheap, hard to find, unmanned, or minimally manned, platforms that are risk worthy to complement stand in forces; these concepts are in line with the CMCs views in his Force Design Guidance.

Most recently, the Tri-Service Maritime Strategy titled *Advantage at Sea: Prevailing with Integrated All-Domain Naval Power* was released in December 2020. This strategy was

endorsed by the Secretary of the Navy and illustrates the naval strategy created by the service chiefs of the USMC, United States Navy (USN), and the United States Coast Guard (USCG). *Advantage at Sea* focuses on “China and Russia, the two most significant threats to this era of peace and prosperity,” as well as the critical requirements to “generate Integrated All-Domain Naval Power; strengthen our alliances and partnerships; prevail in day-to-day competition; control the seas; and modernize the future naval force.”¹⁴ *Advantage at Sea* supports the naval operating concepts of LOCE, EABO, and DO as well as each respective service chief’s guidance for the 2030 Naval Force. The Tri-Service Maritime Strategy is also in line with the CMC’s Force Design Guidance for the modernization of the USMC to meet rising peer adversaries.¹⁵

In the newsletter *Breaking Defense*, Paul McLeary discussed the themes of smaller, low signature, cheap, and mobile forces in open-source articles examining USMC Force Design. In the articles “Marine Corps’ Builds New Littoral Regiment, Eye on Fake Chinese Islands;” “No Shipbuilding Plan, But Navy Works on New Ships to Counter China;” and “New Ships in Navy Plan = No ‘Slaughter Across the Beach’ for Marines” McLeary discussed the newly formed Marine Littoral Regiment (MLR), the proposed medium logistics ship, and the Light Amphibious Warship (LAW) that will move and supply the MLR. The themes of low cost, low signature, and smaller forces prevail in his articles as well. The MLR is planned to include infantry, logistics, and anti-air elements but no aviation like the traditional MAGTF.¹⁶ The infantry element, or Littoral Combat Team (LCT), will be focused on sea denial through organic fires; the logistics element, or Littoral Logistics Battalion (LLB), will be the organic logistics support for the MLR; and the Littoral Antiair Battalion (LAAB) will conduct air defense, air control, and provide a Forward Arming and Refueling (FARP) capability.¹⁷ The mission of the MLR will be to “maneuver and persist inside a contested maritime environment and conduct sea-

denial operations as part of the naval expeditionary force to enable fleet operations.”¹⁸ The lack of aviation assets, especially RW Offensive Air Support (OAS) assets, is in line with the CMC’s guidance. The replacement for the existing manned RW aviation fire support platforms for newly created forces like the MLR has yet to be provided by any Force Design documents. This begs the question as to what gaps may exist in the support of ground forces if there is no plan to incorporate H-1s into the new DO concepts.

Most recently in February 2021, the Department of the Navy and Headquarters Marine Corps released the *Tentative Manual for Expeditionary Advanced Based Operations (TM EABO)*.¹⁹ This manual’s stated intent is to provide “a baseline of information, focused on *Force Design 2030*, to inform the live, virtual, and constructive experimentation that will test and refine force structure and capability.”²⁰ Largely a product of MCWL, the *TM EABO* is an “authoritative but not definitive” model for the force to begin experimentation and refinement between now and 2023 when the first MLR will be considered to have reached Initial Operational Capability (IOC).²¹ *TM EABO* mimics the intent of the *Tentative Manual for Landing Operations* written by the USMC in 1934 which led to the development of amphibious landing tactics in the inter-war years prior to World War II.²² Contrary to many previous Force Design documents and statements, *TM EABO* discusses the mission sets and roles expected from Marine Aviation which opens the possibility for H-1s to be employed in support of EABO.

Historical Relevance of H-1s in Combat

Much has been written about the success of helicopter gunships in combat, beginning with historical accounts of the Vietnam War. In *Interservice Rivalry and Airpower in the Vietnam War*, Ian Hornwood discusses the advent of the helicopter gunship, beginning with the

armed version of the Bell UH-1 “Iroquois” which came to be known as the “Huey” (figure 1 and 2).



Figure 1. US Army UH-1C “Huey” Gunship, Vietnam.²³



Figure 2. USMC UH-1E “Huey” of VMO-2 at Da Nang Vietnam, 1965.²⁴

The modification of UH-1 “Hueys” from utility helicopters into gunships fulfilled the US Army’s (USA) requirement for armed escort during heliborne assaults and organic airborne close fires for the infantry. Hornwood also chronicles the disputes between the USA and the US Air Force (USAF) over which service had the obligation to provide CAS for the infantry. As much a power struggle as a practical matter, the USA recognized that the USAF was often unable or unwilling to provide responsive CAS for the infantry. This led to the development of a dedicated attack helicopter for the USA, the AH-1G “Huey Cobra” (figure 3).



Figure 3. USA AH-1G “Huey Cobra,” Vietnam.²⁵

Quickly designed by Bell as an offshoot from the original UH-1 “Huey” airframe, the AH-1 incorporated a tandem cockpit for better visibility and a streamlined fuselage, two stub wings to carry a variety of ordnance, and a chin turret.²⁶ The successful introduction of the AH-1G “Huey Cobra” to USA units in 1967 provided a close fires capability more responsive than USAF FW Tactical Aircraft (TACAIR) that worked directly with, and for, ground forces.²⁷ The USMC also saw the benefit of a dedicated attack helicopter and adopted the AH-1G “Huey Cobra” in 1969 and a twin-engine naval variant in 1971, the AH-1J “Sea Cobra,” which also saw combat in Vietnam (figures 4 and 5).²⁸



Figure 4. USMC AH-1G “Huey Cobra,” Vietnam.²⁹



Figure 5. USMC AH-1J “Sea Cobra.”³⁰

In 1971, Operation LAMSON 719 further proved the importance of attack helicopters in support of ground maneuver forces and heliborne air mobile operations. LAMSON 719, an Army of the Republic of Vietnam (ARVN) led operation into Laos, was supported by US air power against the North Vietnamese Army (NVA) operating an “extensive and well-integrated mobile air defense system” consisting of radar, communication systems, and heavy anti-aircraft artillery.³¹ USA and USMC “Huey Cobras” were able to attack NVA forces in close proximity to ARVN forces with “speed and effect” and, especially critical during poor weather, could still operate when low cloud ceilings prevented FW aircraft from conducting CAS.³² The successful introduction of the AH-1G “Huey Cobra” in Vietnam made immediate impacts to CAS as a compliment to TACAIR platforms, bringing additional presence, availability, and capability to ground forces. Several upgraded variants of the AH-1 saw service during the rest of the Cold War, like the USMC AH-1T (figure 6) upgraded to carry Tube-Launched Optically Tracked Wire-guided (TOW) missiles. As an eventual replacement for the AH-1 “Huey Cobra,” the USA designed the AH-64 “Apache” (figure 7) from the ground up as purposefully built attack helicopter. The continued of service of the AH-1 in the USMC and the USA throughout the Cold War, as well as the development and fielding of the AH-64, offer further evidence for the relevance of the attack helicopter in both low intensity and conventional conflict.



Figure 6. USMC AH-1T "Sea Cobra."³³



Figure 7. USA AH-64A "Apache," Operation Desert Shield 1990.³⁴

More modern accounts of successful attack helicopter employment are examined in John F. O'Connell's *How the Helicopter Changed Modern Warfare*, where he examined the role of helicopters in conventional conflict, including the Gulf War. Task Force Normandy, containing eight AH-64 "Apache" attack helicopters from the USA's 101st Air Assault Division, initiated the massive air campaign of Operation Desert Storm with the first blow to the Iraqi Integrated Air Defense System (IADS). On the night of 17 January 1991, AH-64s from Task Force Normandy struck two early warning radar installations 380 nautical miles (NM) inside Iraq to clear a gap in the IADS for follow on coalition fixed wing air strikes.³⁵

Marine AH-1W Super Cobras also proved extremely effective in conventional conflict supporting the 1st Marine Division's push into Kuwait City during the land campaign of Operation Desert Storm.³⁶ The AH-1W "Super Cobra" (figure 8), a further upgraded version of the AH-1T, was modified to carry Helicopter Launched Fire and Forget (HELLFIRE) anti-tank missiles similar to the USA's AH-64 "Apache." The AH-1W proved successful in destroying Iraqi armor as well as providing CAS in support of Marine ground forces.³⁷



Figure 8. USMC AH-1W “Super Cobra,” Iraq 2003.³⁸

Jay A. Stout’s *Hammer from Above: Marine Air Combat over Iraq* documents the 3rd Marine Air Wing’s (3rd MAW) role in supporting the invasion of Iraq during Operation Iraqi Freedom (OIF) in March 2003. Multiple HMLA squadrons supported 1st Marine Division’s push to Baghdad. This is chronicled through several chapters in *Hammer from Above* describing CAS and Armed Reconnaissance (AR) missions conducted by AH-1Ws and UH-1Ns (figure 9) from HMLA squadrons under 3rd MAW.



Figure 9. USMC UH-1N “Huey,” Iraq 2003.³⁹

In his chapter titled “Cobras Over An Nasiriyah,” Stout described the role a three ship division of AH-1W “Super Cobras” from HMLA-267, callsign Orkin 61 flight (figure 10), played in supporting 1st Battalion, 2nd Marines’ (1/2) fight to cross the Euphrates River to enter the city of An Nasiriyah.⁴⁰ On the morning of 23 March 2003, after hours of operations the previous night, Orkin 61 was re-tasked to conduct CAS for 1/2’s approach to An Nasiriyah.⁴¹ Working with 1/2’s Forward Air Controllers (FACs), Orkin 61 flight was able to assist in destroying the Iraqi defenses surrounding the city, including four tanks, transport trucks, anti-aircraft guns, and approximately 60 enemy soldiers.⁴²



Figure 10. Orkin 61 Flight. March 2003, Iraq.⁴³

At the completion of their tasking, Orkin 61 had executed 19 hours of continuous combat operations, 140 NM away from their home airfield at Ali Al Salem in Kuwait (see figure 11).⁴⁴ This was only made possible through the establishment of Forward Arming and Refueling Points (FARPs) so that the AH-1Ws could refuel and rearm significantly closer to ground forces to extend their combat radius and time on station. Continuous forward operations would not have been possible without FARPs as H-1s would have had to return to their home base of Ali Al Salem Airfield at the completion of mission tasking. These forward operations are a historical example of USMC H-1 support to distributed ground forces at significant distance from their home base.



Figure 11. Distance from Ali Al Salem Airfield, Kuwait to An Nasiriyah, Iraq. Distances are measured in NM.⁴⁵

During OIF, H-1s were effectively employed in operations across the spectrum of conflict as actions in Iraq progressed from conventional conflict to security operations to Counterinsurgency (COIN). H-1s also proved their effectiveness in low intensity conflict and COIN operations during Operation Enduring Freedom (OEF) in Afghanistan. The completion of the H-1 Upgrades program introduced the UH-1Y “Venom” (figure 13) to Afghanistan in 2009. The UH-1Y “Venom” possessed increased capability over the UH-1N “Huey” regarding combat radius, endurance, power, and speed. The AH-1Z “Viper” (figure 12), also part of the H-1 Upgrades program, began to replace the AH-1W in fleet squadrons in 2009. However, the full fleet squadron transition from the AH-1W to the AH-1Z was not complete until 2020. The AH-1Z also significantly increased capability over the AH-1W in similar performance characteristics

as the UH-1Y, but also incorporated increased weapons loadout and enhanced weapons employment capabilities over both the AH-1W and the UH-1Y.



Figure 12. USMC AH-1Z “Viper” arriving in Kaneohe Bay, Hawaii.⁴⁶



Figure 13. USMC UH-1Y “Venom,” HMLA-367.⁴⁷

Argument Against H-1 Relevancy in Support of EABO

The relevance of USMC H-1s has been proven by their historical record in combat operations, but continued relevance of H-1s appears to contradict the CMC's direction provided by his Force Design guidance. Much of the current discussion regarding future USMC operations in the Pacific deems RW platforms irrelevant due to limited operational range and legacy capabilities. One of the main arguments the CMC makes in *Force Design 2030* is that the future force must consist of "low signature, affordable, and risk worthy platforms and payloads."⁴⁸ It can be, and has been, argued that H-1s are not relevant to EABO during future competition or conflict in the littorals due to H-1s not meeting the criteria of "low signature, affordable, and risk worthy platforms and payloads" laid out by the CMC in *Force Design 2030*.⁴⁹ The *TM EABO* defines EABO as:

A form of expeditionary warfare that involves the employment of mobile, low-signature, persistent, and relatively easy to maintain and sustain naval expeditionary forces from a series of austere, temporary locations ashore or inshore within a contested or potentially contested maritime area in order to conduct sea denial, support sea control, or enable fleet sustainment.⁵⁰

In addition to low signature, one could also draw the requirement for affordable and risk worthy forces and from this definition of EABO. The argument against H-1 relevancy in support of EABO involves the large signature of H-1s and HMLA squadrons, the cost associated with H-1 operations, the risk worthiness of H-1 operations, the limited operational range of H-1s, and the legacy capabilities of H-1s.

Signature

There are several ways in which the traditional employment of H-1s is not low signature. *TM EABO* describes the requirements for low signature forces as "managing signatures at all times and especially while conducting localized movement and maneuver" in order to allow the

force to “remain postured to achieve the desired operational effects while complicating adversary efforts to find and target them,” all while “leveraging host-nation government and commercial assets to perform select support functions and reduce their reliance on external sustainment.”⁵¹ If based exclusively on these requirements, HMLA squadrons are not low signature if deployed in traditional manners. The AH-1Z and UH-1Y Training and Readiness (T&R) manuals list the Table of Organization (T/O) for HMLA aircraft and aircrew for a squadron, a squadron minus (-), and Detachments (DETs). HMLA squadrons are purposefully built to be able to deploy operationally or for training as a squadron, a squadron(-), or DETs. Figure 14 lists the T/O for AH-1Z and figure 15 lists the T/O for UH-1Y.

HMLA AH-1Z				
TABLE OF ORGANIZATION T/O				
CATEGORY	SQUADRON	SQUADRON(-)	DETACHMENT	DETACHMENT
Aircraft	15	10	5	4
Pilots	36	24	12	9

Figure 14. HMLA AH-1Z T/O.⁵²

HMLA UH-1Y				
TABLE OF ORGANIZATION T/O				
CATEGORY	SQUADRON	SQUADRON(-)	DETACHMENT	DETACHMENT
Aircraft	12	8	4	3
Pilots	30	20	10	7
Crew Chiefs	25	17	8	6
Aerial Gunner / Observer	19	12	6	4

Figure 15. HMLA UH-1 T/O.⁵³

Based on the HMLA AH-1Z and UH-1Y T/Os, a full squadron has 27 aircraft and 110 aircrew; a squadron(-) has 18 aircraft and 73 aircrew; and a DET has either 9 aircraft and 36 aircrew or 7 aircraft and 26 aircrew. These T/Os do not include the required squadron avionics, airframes, ordnance, helicopter mechanics, quality assurance representatives, or maintenance control personnel and technicians. These personnel and aircraft requirements for squadron deployment packages create a large footprint for manpower sustainment like billeting, food, and water; command and control (C2) including squadron flight operations and communications to

higher headquarters; and maintenance support including spare parts, fuel, aircraft fluids (oil, hydraulic fluid), and networked maintenance computer systems. Historical HMLA squadron, squadron(-), and DET deployment constructs have been reliant on higher level maintenance support that comes from either USN aviation logistics aboard ship, or the Marine Air Group (MAG) Marine Aviation Logistics Squadron (MALS) ashore. In other words, HMLA squadron and DET deployments currently have large and concentrated personnel, equipment, and electronic signatures and are reliant on external sustainment.

It has also been argued that H-1 employment operations are not “low signature” during EABO due to helicopter radar detectability. H-1s do not have any “radar signature reduction” technology and can be considered a “conventionally designed helicopter.”⁵⁴ Helicopters generally have a large Radar Cross Section (RCS) and can be detected by modern radars even at slow speeds due to the aircraft’s rotating components like the main rotor disk and tail rotor. If an adversary is using radar to search for helicopters, especially over a featureless body of water, the probability of detection would most likely be high. Without the ability to terrain mask, or place terrain between the radar and the aircraft, helicopters become vulnerable to radar detection. Helicopter operations during EABO have the potential to create a signature that could expose the location of littoral forces or Expeditionary Air Bases (EABs) and increase “the adversary’s ability to target them, engage them with fires and other effects, and otherwise influence their activities.”⁵⁵ The traditional personnel, communication, and sustainment requirements for T/O HMLA squadron or DET deployments, as well as helicopter operations in general, are not “low signature.” This presents a challenge in employing H-1s in EABO based on the *TM EABO* statement that “signature management is critical to the survivability of Marine forces executing EABO missions within the adversary’s WEZ.”⁵⁶

Affordability

It has been argued that H-1s are not an affordable solution to support littoral forces conducting EABO. Part of the intent behind the CMC's push for affordable platforms and payloads is to transition to more unmanned systems for ground, air, and sea operations. As technology advances and matures, unmanned platforms are expected to require less logistical support and either minimal or no human operation with the incorporation of Artificial Intelligence (AI) technology. Force Design reductions in organic fire support for the Marine infantry battalion are planned to be filled with systems like the Organic Precision Fire – Infantry (OPF-I) system, a loitering munition “suicide drone” with a 90 minute loiter time and a 20km range.⁵⁷ OPF-I is planned to be an organic fires capability pushed down to the rifle squad level.⁵⁸

Although development, testing, and fielding costs for technologically advanced systems like the OPF-I are expensive, H-1s are also expensive when the cost to train and maintain proficiency for pilots, aircrew, and maintainers is considered. Seven active component HMLA squadrons, which currently include 105 AH-1Z and 84 UH-1Y aircraft, may also provide a limited ability to support traditional, and new, mission sets when considering the planned reduction of at least two HMLA squadrons per *Force Design 2030*.⁵⁹ From this perspective, manned helicopters with the previously discussed support footprint and training requirements do not appear to be an affordable solution compared to the proposed small UAS loitering munitions that are planned to be integrated down to the infantry squad level by 2030.

In a telephone interview with the author of this paper on 3 February 2021, Marine Brigadier General (BGen) Ryan Rideout stated his thoughts regarding the cost effectiveness of employing H-1s in EABO. BGen Rideout, the previous commander of HMLA-467 and the 24th

MEU, is currently serving as the Director, Military Advisor Group-Iraq. He said USMC AH-1Zs and UH-1Ys have become too expensive and too complicated for the capabilities that they provide, with too much protection and too many systems compared to the previous AH-1W and UH-1N models.⁶⁰ A smaller, simpler, cheaper, and more easily transportable attack helicopter like the 160th Special Operations Aviation Regiment's (SOAR) AH-6 "Little Bird" (figure 16) would be better suited to fill a role in EABO.⁶¹ At this point for the USMC, however, purchasing a different helicopter would be a regression when smaller and cheaper unmanned alternatives are in development. Although inexpensive compared to other "exquisite, manned platforms" like the USMC's F-35B/C Joint Strike Fighter (JSF) and MV-22B Osprey, H-1s still present a cost that may not be worth the risk to employ in support of EABO.⁶²



Figure 16. USA 160th SOAR AH-6 "Little Bird."⁶³

Risk Worthiness

The employment of manned aircraft in support of EABO does not come without risk. “Risk worthy platforms and payloads” can be viewed as balancing the risk regarding cost to employ and cost incurred if lost or destroyed.⁶⁴ The personnel and maintenance footprint requirements previously discussed require H-1s to have a home base of operations where maintenance, C2, and personnel sustainment can take place. A high signature ship or airfield home base for H-1s may not be risk worthy under the requirements for EABO forces to operate “within a contested or potentially contested maritime area.”⁶⁵

The possibility of losing a manned aircraft to enemy action may also not be worth the risk to commanders if other unmanned systems can be used instead. The likelihood that aircraft will be shot down during conflict with a peer adversary is much more probable than what the Joint Force has seen during the low intensity conflict of the last 20 years. The worldwide proliferation of advanced shoulder fired Man Portable Air Defense Systems (MANPADS) has increased the risk to helicopters and tilt rotor aircraft. While legacy Former Soviet Union (FSU) MANPADS variants were the norm during previous low intensity conflicts in the third world, the expectation is that during future peer conflict, modern advanced MANPADS will be employed by the enemy.

The US commitment to recovering downed pilots and aircrew can make manned platforms high payoff targets for an adversary due to the cost incurred from losing the aircraft, potentially losing the aircrew, and diverting resources to conduct Joint Personnel Recovery (PR), USMC Tactical Recovery of Aircraft and Personnel (TRAP), or USN Search and Rescue (SAR). Manned aircraft are expensive and limited resources compared to proposed future unmanned systems and, unlike a loitering munition drone such as the OPF-I system, are not disposable due

to human and material cost. Due to these reasons, H-1s may not provide “risk worthy platforms and payloads” to support littoral forces during EABO. ⁶⁶

Limited Operational Range

The limited operational range of H-1s is another argument against their relevance in supporting littoral forces conducting EABO. The CMC’s article “The Case for Change” specifically states that “attack helicopters lack the range to be relevant against the pacing threat in the Pacific.”⁶⁷ This statement is supported by the manufacturers’ advertised max range and combat radius for the AH-1Z and the UH-1Y. According to Bell performance characteristics, the AH-1Z has a max range of 310 NM and a combat radius of 131 NM while the UH-1Y has a max range of 325 NM and a combat radius of 119 NM.⁶⁸ Compared to the Bell-Boeing MV-22 Osprey with a max range of 860 NM, and the ability to conduct aerial refueling, H-1 range is lacking. Since H-1s cannot conduct aerial refueling, the requirement exists to land at a fuel source (ship, FARP, or airfield) to extend their range. Over land this problem is more easily solved with ground-based fuel sources, but when operating over water H-1s lack the ability to transit significant distances compared to other platforms. H-1s would need to have a land base or a ship connector to place them within operational range of EABs to be employed in support of littoral forces.

Legacy Capabilities

Finally, the argument against H-1 relevance in supporting littoral forces conducting EABO is regarding the legacy capabilities of H-1s. The CMC’s statement in *Force Design 2030* that the HMLA squadron “has a certain amount of relevance to crisis and contingency missions,” but is “operationally unsuitable for our highest-priority maritime challenges” supports this argument.⁶⁹ This statement likens H-1s to tanks, which the CMC also refers to as “operationally

unsuitable for our highest-priority challenges in the future.”⁷⁰ The *TM EABO* discusses the 2030 Marine Expeditionary Unit (MEU) mission and construct, which retains the mission of “crisis-response operations” and well as an HMLA DET in its 2030 MEU ACE T/O.⁷¹ It can be assumed that based on *Force Design 2030*, and the 2030 MEU T/O, the MEU is the only place where H-1s would have relevance based on the MEU’s role in “crisis and contingency missions.”⁷² H-1s are also not currently optimized for certain aspects of potential future peer conflict in the Pacific, hence the CMC’s statement the H-1s are “operationally unsuitable for our highest-priority maritime challenges.”⁷³

One of the primary shortfalls of H-1s is their lack of digital interoperability with other Joint and Naval platforms. H-1s have no integrated data link systems, such as Video Downlink (VDL) or Link-16, which are capabilities that are currently desirable, but in future conflict would be required to integrate with joint and naval platforms and systems. The 2019 Marine Corps Aviation Plan lists Full Motion Video (FMV), LINK-16, Adaptive Networking Wideband Waveform (ANW2), and Tactical Targeting Network Technology (TTNT) as interoperability capabilities planned as future programs but have yet to be fully integrated into fleet H-1 aircraft.⁷⁴

H-1s also do not carry weapons, such as anti-ship missiles, suitable to contribute to the EABO mission sets of sea control and sea denial “within a contested or potentially contested maritime area.”⁷⁵ Currently fielded H-1 weapons are optimized for land targets like personnel, armored vehicles, and tanks in close proximity to ground forces. As UH-1s and AH-1s were originally designed and introduced to support ground combat in Vietnam, the current versions of AH-1Z and UH-1Y are still optimized for engaging land targets and not maritime targets. H-1s do not carry a dedicated anti-ship weapon, do not have an integrated radar to assist with target

acquisition at sea, and lack a long-range weapons capability to influence deep targets or to conduct strike missions over the long distances relevant to conflict in the Pacific.

Argument for H-1 Relevancy in Support of EABO

Overall, the argument against H-1 relevancy in support of EABO overlooks the fact that in the interim, meaning the next 9 years before *Force Design 2030* changes are completed, there is no replacement for H-1s or the capabilities they could provide to a littoral force like the MLR. The replacement platform for H-1s is part of the Joint USA and USMC Future of Vertical Lift (FVL) program. The Attack Utility Replacement Aircraft (AURA) is still undecided and the USMC is awarding contracts to vendors through 2023 to validate concept designs.⁷⁶ In the Fiscal Year (FY) 2021 National Defense Authorization Act (*FY21 NDAA*), the Joint FVL advanced technology program was funded with 156 million dollars, including five million dollars specifically to the FVL maritime strike program, for the future solution to increase the range and speed of currently fielded helicopters.⁷⁷ With the USMC's divestment of artillery and all tanks, as well as the reduction in the organic fire support in infantry battalions, reactive airborne fire support appears to be an overlooked capability that cannot be replaced by existing USMC UAS platforms with the same effectiveness as H-1s.

Current open-source publications and articles discounting the near-term relevance of helicopters supporting EABO are limited and inconclusive since the USMC's Force Design is relatively new. The release of the recent *TM EABO* provides an initial assessment of what role Marine aviation is forecasted to play in support of EABO in its Chapter 6: Aviation Operations.⁷⁸ *TM EABO* offers many possibilities for H-1s to support littoral forces, stating that "the role of aviation in EABO is to support the LFC's mission to conduct sea denial and support sea control operations."⁷⁹ The argument for H-1 relevancy in support of EABO will be addressed with

regard to the signature of H-1s and HMLA squadrons, the affordability of H-1s compared to other current and proposed assets within Marine aviation, the risk worthiness of H-1 operations, the limited operational range of H-1s, and the legacy capabilities of H-1s.

Signature

Traditional employment an HMLA squadron or DET does not present a low signature. However, changes to HMLA squadron operating concepts could easily reduce the signature of H-1 operations and squadron or DET footprints. Signature Management (SIGMAN) is a concept vital to EABO and is also relevant regarding H-1 detectability, HMLA squadron/DET employment, and HMLA squadron/DET sustainment. Adjustments to traditional HMLA squadron and DET operations as well as H-1 employment methods will ensure H-1s remain relevant in support of EABO.

The relevance of H-1 operational signature depends completely on the phase of competition during which EABO is being executed. Chapter 2 of *TM EABO* discusses the operational mindset for EABO. Part of the purpose of EABO is for Naval forces to execute “throughout the competition continuum to deter aggression.”⁸⁰ To accomplish deterrence, littoral forces may be required “to selectively reveal if not overtly signal their presence and capability in the contact layer.”⁸¹ If, in certain circumstances, it would be pertinent to reveal or overtly signal the presence of a stand in force, then the detectability of H-1 operations would not be a significant concern. As EABO is “executed across the competition continuum both above and below the threshold of violence,” there may be circumstances where deterrence calls for a stand in force to overtly signal its presence to deter large scale hostilities.⁸² Doing so could deter large scale hostilities but may also invite low intensity conflict through probing attacks or proxy

forces. In this type of situation, force protection and aviation support for the LFC would still need to be maintained and the detectability of H-1s may not matter.

H-1s also have a limited Electromagnetic Spectrum (EMS) signature and, consequently, few EMS vulnerabilities. The relative simplicity and legacy nature of H-1s could provide a low-tech solution during conflict when high-tech platform capabilities are contested due to a denied or degraded EMS or Global Positioning System (GPS) environment. In situations where SIGMAN is crucial to prevent detection, the lack of H-1 digital interoperability and data link capability dependence becomes a strength. The article “More Than Missiles: China Previews its New Way of War” by Ian Williams and Masao Dahlgren, discusses how the Chinese desire to exploit US dependence on intelligence, surveillance, and reconnaissance (ISR) and C2 networks is a potential threat to UAS platforms that operate on a data link to a ground control station or operator.⁸³ Based on this UAS vulnerability, there will be a place for H-1s to operate in a CDO environment where they can start, fly, navigate, and shoot with no data link vulnerabilities. This may become extremely valuable in future operating environments.

HMLA squadron and DET employment constructs could also be adjusted to decrease the signature of HMLA deployments. Traditional HMLA squadron or DET employment involves flight operations originating from large air bases or air capable amphibious ships acting as home bases to provide logistical sustainment for maintenance and personnel. This can be seen in historical examples from operations in Iraq, Afghanistan, and MEU deployments. Large permanent air bases to support land operations like Ali Al Salem in Kuwait, Al Assad in Iraq, or Camp Bastian in Afghanistan facilitate aviation maintenance and Aviation Ground Support (AGS) but would present large targets for an adversary during EABO. This is supported by the *TM EABO*, which states “it is critical that the composition, distribution, and disposition of forces

executing EABO limit the adversary's ability to target them, engage them with fires and other effects, and otherwise influence their activities.”⁸⁴

DO could be possible for HMLAs to execute to reduce a typical squadron's signature. This could be done by training several H-1 DO packages or teams of aircrew and maintainers to operate independently for several days in support of littoral forces conducting EABO.⁸⁵ Successful employment of this concept would require more senior, mature aircrew and maintainers who could execute mission type orders from commander's intent with the expectation of little to no communications with the ACE or squadron commander for their period of mission tasking.⁸⁶ HMLA DO Teams could operate from a land or ship home base located outside the adversary's WEZ, and upon receiving tasking, move to meet the supported unit, extending range as required by lily padding between fuel sources provided by ships or established land based EABs. This concept is supported by Chapter 6: Aviation Operations in the *TM EABO*, which states “littoral force aviation must be able to configure their combat systems from relatively secure areas, move into operational positions, set up and operate for limited duration missions, retrograde within the enemy's targeting cycle, and then repeat as necessary.”⁸⁷

Employing a H-1 DO Team concept would require an adjustment from traditional ACE General Support (GS) tasking to requesting units. In traditional GS tasking, the Ground Combat Element (GCE) submits a request for air support using a Joint Tactical Airstrike Request (JTAR) for fire support or an Assault Support Request (ASR) for assault support. JTARs and ASRs are typically executed for a single sortie, or the duration of time the aircraft can operate before having to return to a fuel source. The ACE Tactical Air Command Center (TACC) then fills the JTAR or ASR request with an available air asset through the Air Tasking Order (ATO)

allocation process.⁸⁸ During GS employment, if a higher priority request for air is received by the TACC, aircraft can be diverted real time from a lower priority mission to fill a higher priority mission. GS works well supporting traditional GCE ground maneuver in a limited area of operations (AOA) with effective TACC centralized command and decentralized control.

EABO, however, will involve smaller units spread out over greater distances with the potential, and expectation, for contested communications. Taking this into account, Direct Support (DS) employment of H-1s would be better suited to support littoral forces. DS is an operating concept supported by USMC aviation doctrine as well as aviation employment during EABO. According to USMC aviation operations doctrine, “an ACE unit assigned to a direct support role is immediately responsive to the needs of the supported unit.”⁸⁹ According to *TM EABO*, DS “should be established only rarely by the littoral force commander due to the scarcity of aviation assets and the wide range of potential missions that the ACE may undertake in support of the littoral force.”⁹⁰ The proposed H-1 DO Team concept, however, would only put the H1 DO Team in DS of the LFC for the requested period of time, and not the entire HMLA squadron or ACE. Although substantial adjustments to the existing HMLA DET construct would be required to support H-1 DO Teams, the concept of DETs is nothing new. HMLA squadrons have historically sent DETs to reinforce different ACE and GCE units and a DET culture already exists within the HMLA that would facilitate this transition.

In the 1990s and early 2000s, several articles were written for *The Marine Corps Gazette* arguing for non-standard employment methods involving H-1s working directly for Ground Force Commanders (GFCs). In 1995, Patrick Delatte wrote in “Do You Really Need a Forward Air Controller for a Cobra Attack?” that Cobras should be used as a maneuver element for the ground force, under operational control (OPCON) of the GFC. Similarly, in 1996 Jeffery

Hewlett wrote in “The Ground Commander’s Hip Pocket Air Force,” that, contrary to the traditional GS employment of MAGTF air assets, Cobras should be employed in a DS role to maximize the effectiveness of support to the GFC. In 2010, Andrew Graham wrote a similar article, “Embrace Maneuver Warfare,” advocating the employment of H-1s in DS of the GFC to enable mission type orders, responsiveness, and fire and maneuver capabilities for the ground force.

These suggested non-traditional employment methods for H-1s, working in close relationships with the ground force, are in line with the *TM EABO* statement that “aviation support to EABO demands new types of aviation task organizations and additional maritime aviation functions beyond the doctrinal functions of Marine aviation.”⁹¹ Due to the requirement for SIGMAN, littoral force JTAR and ASR submissions may be substantially less than in previous conflicts. When air support is required, however, H-1 DO Teams in DS of littoral forces is one method to successfully fulfill a new type of “aviation task organization.”⁹²

H-1 DO Team composition could include a mix of three to four AH-1Zs and UH-1Ys and their respective aircrews. Operating mixed elements of AH-1Zs and UH-1Ys would not only provide the LFC attack and utility capability, but also cargo and passenger capacity for the DO Team. For over water transits, UH-1Ys would be required to provide a rescue hoist capability for a downed aircraft within the flight. Most importantly, however, UH-1Y crew chiefs would bring a maintenance capacity to the DO Team for minor maintenance issues experienced during the DS tasking window. The intent would be for an H-1 DO Team to operate independently for up to a three-to-four-day JTAR or ASR in support of the LFC.

Current maintenance practices in the Naval Aviation Maintenance Program (NAMP) allow squadron commanders to authorize aircraft to be operated without daily or turnaround

inspections for a period of 72 hours if “aircraft must be operated away from the local area without qualified maintenance support.”⁹³ This is currently practiced in HMLA squadrons, commonly referred to as “cross country rules” if aircraft are operating away from the squadron for up to three days. The NAMP also states that “on a case-by-case basis, MAWs and MAGs may authorize an additional 24 hours (maximum of 96 hours), due to operational necessity.”⁹⁴ Existing maintenance practices would enable an H-1 DO Team to operate away from home base maintenance for up to four days without conducting inspections.

DO Team crews would need to be more senior than standard HMLA aircrew and experienced in executing HMLA Mission Essential Tasks (METs). This experience and seniority would provide the ability for crews to cross train on maintenance responsibilities. In current HMLA squadrons, pilots do not conduct maintenance and maintainers do not cross train in other maintenance specialties. In the DO Team, pilots could be trained to load and arm ordnance, and fuel and service their own aircraft. The potential exists to even put an experienced pilot through a plane captain maintenance syllabus so that the pilot could perform daily (every 72 hours) and turnaround (every 24 hours) inspections on his own aircraft should the need arise. UH-1Y crew chiefs would also need to cross train in maintenance specialties. Currently, UH-1Y crew chiefs come from the flight line shop and are basic aircraft mechanics. Plane captains perform daily and turnaround inspections on aircraft. UH-1Y Aerial Observers (AOs) can come from any maintenance shop, such as avionics, air frames, or ordnance. Just like pilots, crew chiefs and AOs who have already mastered their primary aircrew and maintenance job could cross train on other maintenance specialties to provide the most capability possible on the DO Team to keep the aircraft running during operations away from home base.

H-1 DO Teams would also need to provide their own crew sustainment for the requested period of support. This would include food, water, and shelter carried by the H-1 DO Team to avoid putting an additional logistical burden on the supported littoral force. The UH-1Y brings a small existing cargo capacity to support this. The AH-1Z has no cargo space, but the concept of a cargo pod to carry food, water, essential personal gear, and a small amount of maintenance equipment is a very real possibility and there is fleet interest to explore this option.⁹⁵ The idea of sleeping in the field, eating Meals Ready to Eat (MREs), and either carrying a water supply or purifying available water at an EAB is a practice that is not currently trained in HMLA squadrons, but is not out of the question. During previous conflicts in Iraq and Afghanistan, it was not unheard of for aircrew to sleep next to their aircraft at FARPs. The UH-1Y Huey even has the nickname of the “Bell Hotel” for this very reason. Adjusting to this operational mindset is possible for HMLA aircrew, as the community has always had a closer working relationship with the GCE than other aircraft communities. The ability to be self-sufficient for short periods of time would allow the DO Team to operate, plan, and reside with the littoral force during the requested period of support.

Logistical sustainment would be the most challenging aspect of supporting H-1 DO Teams. Although it is possible to carry a small amount of maintenance equipment in the UH-1Y, maintenance packages consisting of things like ordnance and spare parts would need to be pre-staged with the supported unit. Moving aircraft into concealment once they are shut down would require the pre-staging of tow bars and wheels, as well as a vehicle towing capability provided by the supported unit to reduce the probability of overhead detection for longer duration missions.⁹⁶ Requirements like fuel, oil, and hydraulic fluid could be either pre-staged, or common and shared with the littoral force. *TM EABO* Chapter 6: Aviation Operations discusses

the AGS requirement to provide fuel for air operations, even in austere environments, stating that “Alternative methods of obtaining fuel will be necessary. AGS planners should expect to use fuel from many sources, including host nations, portable fuel bladders, and pre-positioned stocks,” and that “there must be less emphasis on using motor transport assets to move fuel.”⁹⁷

The proposed MLR construct brings the capabilities of a LLB as well as a LAAB, sourced from the ACE with an organic FARP capability.⁹⁸ The *TM EABO* states:

New partnerships between aviation ground support (AGS) units and Marine aviation logistics squadrons will be necessary to provide ordnance in forward areas. Additionally, it will likely be necessary to pre-position ordnance and fuel in forward areas and to resupply FARPs from ports and airfields.⁹⁹

The FARP capability provided by the LAAB would be the best method to support H-1 maintenance packages. The *TM EABO* also discusses aviation maintenance requirements, stating “new methods of delivering maintenance equipment, spare parts, and technicians must be explored so that aviation maintenance capabilities can be distributed across the WEZ to complicate adversary targeting.”¹⁰⁰ It is possible to pre-stage H-1 maintenance packages with MLR support battalions. If pre-planned, these could be transported to EABs through the MLR’s own organic logistical movement. Other maintenance supplies and technicians would need to be sourced and transported to the EAB by the HMLA squadron in maintenance recovery packages in the event of major maintenance or an aircraft recovery effort due to maintenance. Pre-staged maintenance packages would also fulfil the *TM EABO* requirement that “temporary aviation maintenance locations will need to be established for short time periods to conduct specific maintenance functions. Other maintenance functions should be located outside the adversary WEZ.”¹⁰¹

Finally, using the traditional unit deployment model sourced by 3rd MAW HMLA squadrons based in Camp Pendleton California, the Unit Deployment Program (UDP) squadron

could fill the role of providing H-1 DO Teams to support littoral forces executing EABO. Both 3rd MAW (west coast) and 2nd MAW (east coast) HMLA squadrons currently support MEU deployments with an H-1 DET, but 3rd MAW also sources a squadron(-) UDP to Okinawa, Japan. This UDP squadron(-) traditionally augments 1st MAW in Okinawa but could easily be tasked to train with and support the newly formed MLR within III Marine Expeditionary Force (III MEF) in INDOPACOM. Since the first MLR is scheduled to be IOC in 2023, this would be an opportunity the UDP squadron(-) to implement to H-1 DO Team concept in support of the newly formed MLR.¹⁰²

Affordability

Compared to other manned RW and TACAIR platforms, H-1s are low cost to operate. Employment of USMC H-1s in support of littoral forces would also be a comparatively low-cost solution for the service as the H-1 program is no longer receiving substantial funding beginning in FY 2020, as indicated in the *Appropriations Committee Advances FY2020 Defense Funding Bill*.¹⁰³ The *FY20 NDAA* decreased H-1 procurement funding to 53 million dollars due to production line shutdown, and H-1 airframe modification funding to 114 million dollars.¹⁰⁴ The *FY21 NDAA* further reduced H-1 procurement funding to seven million dollars due to the nearly completed fielding of the AH-1Z to the fleet and reserve forces.¹⁰⁵ Comparatively, the USMC's FY21 aircraft acquisition budget authorized 39 million dollars for MV-22, 800 million dollars for CH-53K, and over 1 billion dollars for F-35B.¹⁰⁶ Comparing the USMC's aircraft FY21 acquisition costs, H-1s are substantially cheaper. The USMC's FY21 aircraft modification budget was 75 million dollars for CH-53, 146 million dollars for F-35B, 153 million dollars for H-1s, 196 million dollars for F/A-18, and 334 million dollars for MV-22.¹⁰⁷

FY21 allocation of 153 million dollars in funding for H-1 aircraft modifications including Aircraft Survivability Equipment (ASE), Full Motion Video (FMV) downlink, and AH-1Z Target Sight System (TSS) upgrades is further evidence towards the continuing relevance of H-1s in future conflict.¹⁰⁸ H-1s are currently funded for another 20 years of a 30-year service life, keeping them in service until at least 2040. The acquisitions process, developmental and operational testing, and delivery of the to-be-determined FVL (or other unmanned) platform to the USMC will not happen overnight. It took ten years for the AH-1Z to be delivered to all active-duty fleet squadrons, from 2009 to 2019, and the last delivery to the USMC reserves (USMCR) squadrons is funded in the *FY21 NDAA* for completion in 2021.¹⁰⁹

H-1s also carry cheap weapons compared to other platforms. The *FY21 NDAA* lists weapons procurement funds for TACAIR weapons as 74 million dollars for Guided Bomb Unit (GBU-53) Small Diameter Bomb II (SDBII), 126 million dollars for Air Intercept Missile (AIM-9) Sidewinder air-to-air missiles, 167 million dollars for Air-to-Ground Missile (AGM-158C) Long Range Anti-Ship Missile (LRASM), and 327 million dollars for AIM-120 Advanced Medium Range Air-to-Air Missile (AMRAAM).¹¹⁰ Comparatively, the only RW weapons with approved procurement funds were the HELLFIRE missile with 6 million dollars and the Joint Air-to-Ground Missile (JAGM) with 49 million dollars.¹¹¹ Ammunition procurement funds were 23 million dollars for all types of airborne rockets and 23 million dollars for machine gun ammunition.¹¹² H-1s are one of several uses of both airborne rockets and machine gun ammunition so the associated unguided munition cost is very low.

The comparative low cost of H-1s is in line with the *TM EABO* assertion that EABO forces are inexpensive, “thus inverting an adversary’s cost-benefit calculation when deciding whether to engage and upsetting the cost imposition strategy.”¹¹³ According to *Force Design*

2030, between now and 2030 the USMC will divest of at least two HMLA squadrons.¹¹⁴ The remaining five squadrons, however, will still be able to provide essential capability to the littoral force with a combat proven platform that is the cheapest to operate in manned Marine aviation. Operating the existing, already paid for platforms in conjunction with other developing technology should be an option for distributed littoral forces like the MLR and for continued support to MEUs. If existing and future funding is managed to ensure H-1 operational reliability rather than continuous add-ons and technological upgrades, H-1s will remain the least expensive platform in manned Marine aviation.

Risk Worthiness

Aviation operations in support of EABO cannot be accomplished without commanders accepting risk. As stated in the *TM EABO*, “the mere presence of an adversary WEZ does not obviate the requirement for aviation operating in support of fleet objectives in the context of a maritime campaign.”¹¹⁵ The same is true for littoral forces like the MLR acting as stand in forces at EABs. There will have to be a balance between the required mission of the littoral force and the vulnerability of this force to attack from conventional or proxy forces. The *TM EABO* also states that:

Since littoral forces conduct operations throughout the competition continuum, the potential for and scope of unforeseen contingencies is greatly increased. Commanders must ensure that plans account for the need to anticipate and react to rapidly evolving tactical situations.¹¹⁶

This statement supports the argument that H-1s could provide a contingency capability to littoral forces as the competition continuum shifts towards conflict. Fires to increase force protection, AR, CASEVAC, and assault support are contingency capabilities that a LFC may need to have on request to react to a “rapidly evolving tactical situation.”¹¹⁷

During operations “throughout the competition continuum,” it is likely that H-1s would remain below the targeting priorities of an adversary.¹¹⁸ During competition, it may not be worth the risk to an adversary to escalate to conflict only to target a low flying helicopter. During conflict, adversary targeting priorities may also be focused on higher payoff targets like coalition ships, missiles, TACAIR, and other expensive and exquisite platforms rather than helicopters. Targeting a helicopter during competition or conflict could also expose an adversary signature that could be targeted by coalition assets.¹¹⁹ H-1 signatures must be balanced with the enemy’s targeting threshold.¹²⁰ This could work in the favor of H-1 DO Teams operating in support of littoral forces.

ACE and squadron commanders would also need to become accustomed to more operating risk inherent to H-1 support of EABO. H-1 DO teams would be operating on mission type orders, potentially out of contact with commanders for up to four days. More risk would also need to be accepted regarding H-1 over water transit. MAW, MAG, and MEU Standard Operating Procedures (SOPs) typically include a requirement to be within 50 NM of a divert, either ship or shore, when transiting over water. The risk of not having a divert for in flight emergencies would have to be accepted in order to waive the 50 NM requirement when dealing with the distances required to support EABO.

To be successfully employed in support of EABO, H-1s must remain reliable and easily sustainable to allow for short duration presence. Traditional H-1 support requirements will not be risk worthy to justify H-1 employment. HMLA squadron manpower and concentrated presence on ships and air bases will have to be reduced to allow for mobility and survivability. Just as the *TM EABO* discusses the requirement for an EAB to be “expeditionary in nature” and

“able to change location quickly enough to maintain relative advantage,” H-1 maintenance and support must be able to do the same to be a contributor to EABO.¹²¹

Limited Operational Range

Limited operational range is one of the most compelling arguments against H-1 relevance in EABO. This is especially true when considering the vast distances in present in the Pacific and the inability of H-1s to conduct air-to-air refueling. An H-1 max range of approximately 300 NM severely limits H-1 transit and any possibility to contribute to power projection. These facts support the CMC’s statement in “The Case for Change” that “attack helicopters lack the range to be relevant against the pacing threat in the Pacific.”¹²²

Range for H-1s, however, is only dependent on where H-1s can be refueled. The *TM EABO* states that EABO maneuver “requires multimodal transportation solutions and leveraging prepositioning when possible.”¹²³ This would apply to air assets as well as littoral forces. The nature of helicopters being able to land almost anywhere increases fueling options. In certain aspects, it is also a strength that H-1s cannot conduct aerial refueling. This capability would require H-1s to compete with higher priority platforms, like F-35s, for tanker support. Tankers are already a high demand and low quantity asset for the USMC, USN, and USAF and adding one more platform to the line for gas would not benefit the Joint Force.¹²⁴ The best way to increase range for H-1s is through air capable ships and land based FARPs. Due to their small size compared to other platforms, H-1s can land on almost any air capable ship with a helipad like Destroyers (DDG), Maritime Pre-positioning Ships (T-AKE), or the future MLR LAW. FARP or ship-based fuel sources should also coincide with the movement of an MLR through the littorals.

Figure 17 from the *TM EABO* provides an example of how littoral forces would maneuver to EABs located within the fleet's Area of Operations (AO).¹²⁵

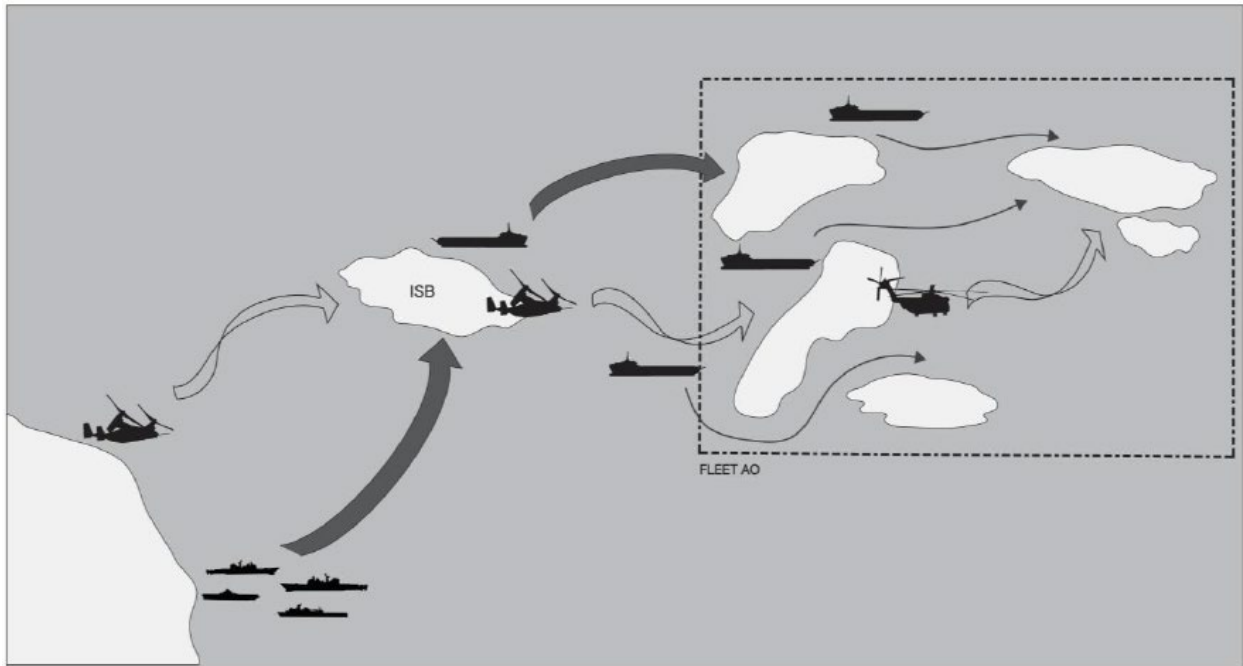


Figure 17. Notional Force Closure—Advanced Naval Base Through Intermediate Staging Base (ISB).¹²⁶

The ISB depicted in figure 17 could contain prepositioned fuel and H-1 maintenance packages delivered from amphibious shipping. This could enable H-1 lily padding from fuel source to fuel source, land or ship, to transit to different EABs throughout the depicted archipelago. *TM EABO* Chapter 7: Sustainment and Littoral Maneuver provides the requirements for naval forces to:

Maneuver tactically within the littoral, including (1) inter-island movement within an archipelago, (2) intra-island movement via ground, surface, or air modes, and (3) even displacement to another littoral operations area (LOA).¹²⁷

Another archipelagic example of this is shown in figure 18. In this hypothetical example depicted in the Hawaiian Islands, H-1s could offload from air capable shipping to an H-1 ISB to act as a temporary small scale home base. From the H-1 ISB, H-1 DO Teams could execute multiple day tasking (up to four days) in support of littoral forces occupying EAB 1 and EAB 2

before returning to the H-1 ISB or air capable shipping. In this example, EAB 1 is within max range of the H-1 ISB for both AH-1Z and UH-1Y. Once established at EAB 1, EAB 2 would be within the combat radius of both AH-1Z and UH-1Y. Fuel at all locations would increase range and support mission duration, whether provided by FARPs ashore or from air capable shipping inside or outside the depicted Fleet AO.

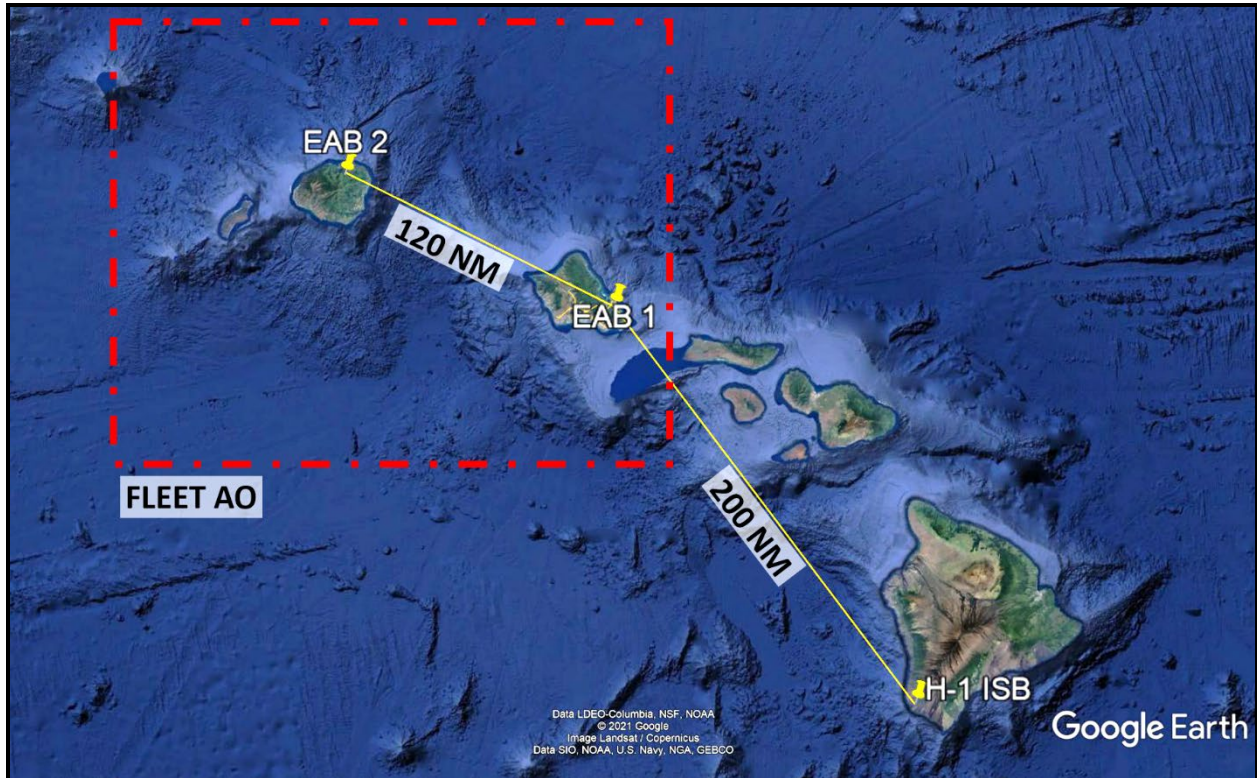


Figure 18. Hawaiian Islands. Distances are measured in NM.¹²⁸

Legacy Capabilities

The legacy capabilities of H-1s are, as the CMC says in *Force Design 2030*, “operationally unsuitable for our highest-priority maritime challenges.”¹²⁹ The highest priority maritime challenges of conducting sea control and sea denial operations to enable Joint Force and Naval Maneuver is a mission that HMLA squadrons cannot directly influence. HMLA squadrons can, however, significantly contribute to the support of littoral forces like the MLR who are conducting sea control and sea denial missions, especially during low intensity conflict.

The AH-1Z and UH-1Y team is flexible in its employment of multiple different HMLA squadron METs to ground forces. CAS, Strike, Strike Coordination and Reconnaissance (SCAR), AR, Forward Air Controller (Airborne) [FAC(A)], Escort, CAT, and CASEVAC would be some of the core METs available to enable the supported littoral force. If the H-1 DO Team model was employed in DS to the LFC, any of these METs could be executed at the direction of the LFC for the requested period of support (up to 4 days). Listed in *TM EABO* Chapter 6: Aviation Operations are maritime aviation support functions including “fires and effects, assault support and mobility, reconnaissance and surveillance,” and “force protection.”¹³⁰ Chapter 8: Littoral Operations also lists considerations for the employment of the littoral force ACE including “air missions in support of task-organized littoral forces (e.g., OAS, Assault Support, aerial reconnaissance, and Electronic Warfare [EW])” as well as “air support, assault support, and medical evacuation request processes.”¹³¹ H-1s can and should be considered as assets to contribute to these employment considerations to support the littoral force.

Finally, fire support for littoral forces should not be discounted. The reactive nature of armed helicopters in close contact with ground troops employing cheap, unguided ordnance has been proven time and again since the introduction of the UH-1 and AH-1 during the Vietnam War. Force Design has reduced legacy organic fires capabilities in the 2030 infantry battalion and company in favor of modern loitering munitions like the OPF-I. Within the 2030 infantry battalion, capability divestments include the weapons company heavy machine gun platoon and TOW missile platoon (figure 19).¹³² Capabilities maintained in the infantry battalion include 81mm mortars, Javelin anti-armor capability, and multiple effects rockets (MAAWS).

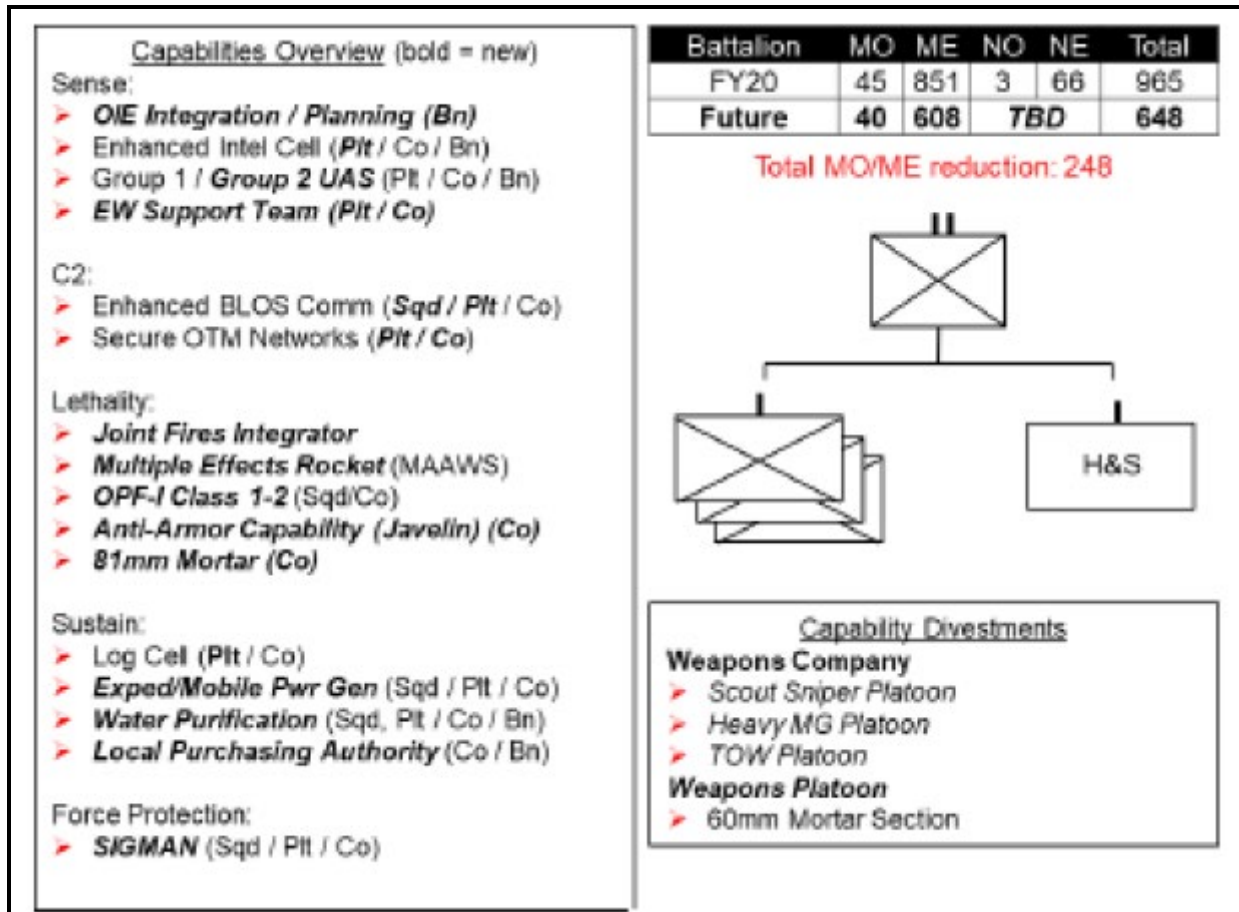


Figure 19. Organization of the 2030 USMC Infantry Battalion.¹³³

Within the 2030 infantry company, capability divestments include the weapons platoon 60mm mortar section.¹³⁴ Capabilities maintained in the 2030 infantry company include anti-armor, medium machine gun, and OPF-I weapons systems (figure 20).¹³⁵ The 2030 infantry battalion/company is the proposed infantry component of the MLR's LCT.¹³⁶

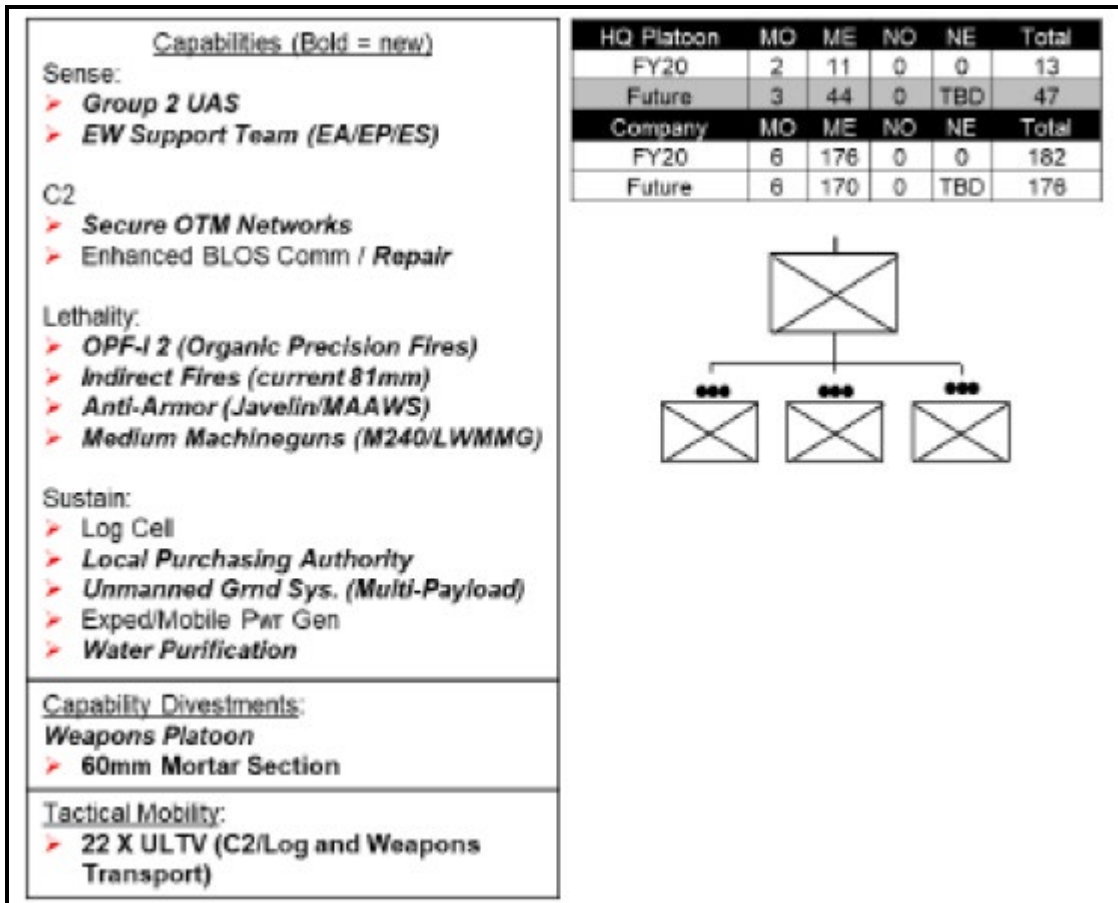


Figure 20. Organization of the 2030 USMC Infantry Company.¹³⁷

Marine infantry has historically been more reliant on air fires due to the USMC’s limited ground based heavy fire support assets. Despite technological advancements and the intent of Force Design, infantry battalions will be put in the position where they lack a fires capability between the OPF-I loitering munition and FW platforms like the F-35 or armed MQ-9 “Reaper” UAS.¹³⁸ The likelihood that F-35s or other FW TACAIR will be conducting OAS for littoral forces during EABO based on competing Joint Force strike and Anti Air Warfare (AAW) requirements will be low. Current ground controlled UAS systems are vulnerable to link degradation in contested environments, and are not reactive. H-1s, when employed in DS of littoral forces, would be the best solution to fill the fires gap for the 2030 infantry battalion.

CONCLUSION

By 2030, USMC Force Design will be complete. Also, by 2030 there will still be five active duty HMLA squadrons, who are still projected to be flying AH-1Zs and UH-1Ys until 2040. Support to crisis response and contingency operations will be an enduring mission for the HMLA MEU DET but relegating the community to this mission set alone would be a mistake. Even if a new FVL platform is fielded prior to 2040, it is not likely that the mission sets of HMLA squadrons will significantly change. During the next nine years, much experimentation and concept validation will need to occur to substantiate the Force Design changes designed to support the USMC's "highest priority maritime challenges."¹³⁹ During this period, it is imperative for HMLA squadrons to also experiment and validate concepts of employment like the H-1 DO Team to contribute to EABO. H-1s can provide essential support to LFCs conducting EABO if the HMLA community is willing to adjust, much like the rest of the USMC will have to, to build a force able to operate in a contested maritime domain. Failure to do so will likely limit the employment options of H-1s to MEUs alone.

Overall, signature reduction will be the greatest challenge to address for HMLA squadrons. HMLA DO concepts of employment may be feasible if seriously tested and evaluated. The affordability of H-1s will remain a compelling positive argument for relevance if future funding supports reliability and presence rather than continuous system upgrades. Accordingly, the risk worthiness of H-1s will be heavily dependent on reliability when employed, which includes the requirement for a substantially reduced and simplified support structure. Range limitations are a serious concern, but the flexibility of H-1s to land on almost any air capable ship or in any FARP presents many options that would most likely coincide with the movement of an MLR through the littorals. Finally, the legacy capabilities of H-1s that

cannot contribute to enabling fleet and Joint Force operations could become extremely valuable for MLR force protection if, and when, higher tech platforms, data links, GPS, and C2 become either degraded or denied by US adversaries.

This argument for the ability of H-1s to provide support to LFCs executing EABO is important because as of 2021, a gap exists in fire support available to the LCT between organic fires systems, and FW manned and unmanned fires platforms. This is the gap that H-1s have traditionally filled. Maintaining a capability to support distributed littoral forces with HMLA attack and utility aircraft will remain essential until future technology becomes more readily available and is purchased, tested, and integrated into the MLR force structure. Until more capable assets become available to the USMC that can replace mission sets provided by H-1s, the AH-1Z and UH-1Y will still have a role in supporting EABO. Force and platform signature, affordability, risk worthiness, range, and capability are all factors crucial to the future force of 2030. With changes to traditional employment of HMLA squadrons, H-1s will still have a role in supporting this future force conducting EABO and in turn supporting the USMCs contribution to Joint Force Operations.

APPENDIX A

Research Design

The author's primary means of research for this paper involved historical accounts of H-1 combat operations, open-source journal and news articles regarding USMC Force Design, USMC Force Design documents from the CMC and Headquarters Marine Corps, USMC doctrinal publications, interviews, and the author's personal experience as an AH-1 pilot. Interviews were conducted with USMC Subject Matter Experts (SMEs) at or above the rank of Lieutenant Colonel including two former HMLA Commanding Officers, two current HMLA Commanding Officers, and the assistant Operations Officer for 3rd Marine Division (Okinawa, Japan).

Apart from the newly released *TM EABO*, limited UNCLASSIFIED information is available regarding USMC Force Design and aviation support to EABO. Accordingly, the supporting arguments for H-1 relevancy in support of EABO were derived from historical precedent, SME interviews, and logical counter arguments to Force Design documents discounting the future relevance of H-1s. As the arguments and conclusions contained within this paper are based on sources, interviews, hypothetical situations, and generalities at the UNCLASSIFIED level, further research including friendly and enemy Tactics Techniques and Procedures (TTPs), force capabilities, and performance data would need to be explored at higher classifications to validate assertions and conclusions made in this study.

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- ¹¹⁸ *TM EABO*, 3-2.
- ¹¹⁹ Col Johnathan Sims, III MARDIV Assistant G3, telephone conversation with the author, December 7th, 2020. LtCol Tase Bailey, CO HMLA-469, telephone conversation January 28th, 2021. H-1 risk worthiness concepts discussed.
- ¹²⁰ Col Johnathan Sims, III MARDIV Assistant G3, telephone conversation with the author, December 7th, 2020. Hypothetical enemy targeting threshold discussed.
- ¹²¹ *TM EABO*, 1-6.
- ¹²² “The Case for Change,” 12.
- ¹²³ *TM EABO*, 7-8.
- ¹²⁴ LtCol Tase Bailey, CO HMLA-469, telephone conversation January 28th, 2021. H-1 limited range discussed.
- ¹²⁵ *TM EABO*, 7-8.
- ¹²⁶ *TM EABO*, 7-8.
- ¹²⁷ *TM EABO*, 7-8.
- ¹²⁸ Google Earth Pro, Hawaiian Islands, Imagery date 13 December 2015. <https://google-earth-pro.en.softonic.com/>.
- ¹²⁹ *Force Design 2030*, 9.
- ¹³⁰ *TM EABO*, 6-1.
- ¹³¹ *TM EABO*, 8-3.
- ¹³² *TM EABO*, A-8.
- ¹³³ *TM EABO*, A-8.
- ¹³⁴ *TM EABO*, A-8.
- ¹³⁵ *TM EABO*, A-8.
- ¹³⁶ *TM EABO*, A-2.
- ¹³⁷ *TM EABO*, A-8.
- ¹³⁸ LtCol Tase Bailey, CO HMLA-469, telephone conversation January 28th, 2021. Infantry fire support options.
- ¹³⁹ *Force Design 2030*, 9.

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