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14. ABSTRACT During the Vietnam War, the concept of vertical maneuver was greatly expanded. The enemy recognized the advantages that vertical maneuver provided and began targeting troop transporting aircraft, which necessitated the development of tactics and helicopter escorts to provide protection. Today, in the MV 22, the Marine Corps possesses a revolutionary new capability. However, it has not yet solved the problem of how to protect the new aircraft from enemy ground fire. This study examines the experiences of troop transport and escort helicopters during the Vietnam War. It also examines the current and proposed methods that the Marine Corps is utilizing to escort the Osprey. Finally, it attempts to draw conclusions from the history of Vietnam heliborne operations and apply them to the current escort dilemma. In considering long range air assault operations with the MV-22, current decision makers may be informed by the history of Army and Marine Corps heliborne operations in the Vietnam War, which demonstrated that helicopter escorts capable of providing immediate suppressive fires in the landing zone.					
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**TITLE:**

**IMMEDIATE SUPPRESSION:  
HELIBORNE ESCORT IN THE VIETNAM WAR AND TODAY**

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

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## *EXECUTIVE SUMMARY*

**Title:** Immediate Suppression: Heliborne Escort in the Vietnam War and Today

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**Thesis:** In considering long range air assault operations with the MV-22, current decision makers may be informed by the history of Army and Marine Corps heliborne operations in the Vietnam War, which demonstrated that helicopter escorts capable of providing immediate suppressive fires in the landing zone were essential to preventing a determined enemy from shooting down troop transporting helicopters.

**Discussion:** During the Vietnam War, the concept of vertical maneuver was greatly expanded. Both the Marine Corps and the Army exponentially increased the number of helicopters and the aircraft became the primary form of transportation and tactical maneuver in the battlespace. The enemy recognized the advantages that vertical maneuver provided and began targeting troop transporting aircraft, which necessitated the development of tactics and helicopter escorts to provide protection. Today, in the MV-22, the Marine Corps possesses a revolutionary new capability. However, it has not yet solved the problem of how to protect the new aircraft from enemy ground fire. This study examines the experiences of troop transport and escort helicopters during the Vietnam War. It also examines the current and proposed methods that the Marine Corps is utilizing to escort the Osprey. Finally, it attempts to draw conclusions from the history of Vietnam heliborne operations and apply them to the current escort dilemma.

**Conclusion:** The most effective method of protecting assault support aircraft is with a combination of fixed-wing and rotary-wing escorts. Heliborne operations in Vietnam demonstrated that the most critical component of escort is the ability to direct immediate suppressive fires in the landing zone. Current and proposed methods of escorting the MV-22 are inadequate and the Marine Corps should focus on developing an escort that is compatible with its chosen method of assault support.

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## INTRODUCTION

The Vietnam War has been appropriately referred to by military historians as “the Helicopter War.”<sup>1</sup> The earliest US military combat action in Vietnam was US Army and Marine helicopters flying Army of the Republic of Vietnam (ARVN) troops to engage the Viet Cong insurgency beginning in December, 1961. When the US military began deploying regular combat units to Vietnam in 1965, helicopters became the primary method for tactical maneuver in the battlespace. The dense jungle environment, with limited road infrastructure and the numerous outposts distributed across the operating area, required a method of transportation that could rapidly move troops and supplies. Additionally, both services had been developing concepts for increased heliborne operations since the end of World War II, and Vietnam provided an opportunity to test and expand the concepts. As heliborne operations increased so did the loss of aircraft to enemy fire; and both services recognized a requirement to protect their troop transport helicopters. Early in the conflict, this consisted of arming the transports and utilizing armed fixed-wing aircraft. However, both services eventually recognized the need to incorporate dedicated armed rotary wing escorts that flew at speeds comparable to the troop carriers and could remain over the landing zone to provide immediate fire-support during the critical landing stage of flight. Once implemented, and for the remainder of the conflict, neither service executed the tactical insert of troops without attached armed helicopter escorts.

Today, in the MV-22 Osprey, the Marine Corps has an aircraft that is capable of providing long range assault support. The increased speed and range of the aircraft over the Vietnam era CH-46 predecessor represent a “game changing” capability to the Marine

Air Ground Task Force (MAGTF) and the Geographic Combatant Commander (GCC). Beginning in 2007, the earliest tactical employment of the aircraft was essentially a 1:1 replacement for its medium lift predecessor. H-1 Huey and Cobra helicopters were utilized to provide escort during the critical approach and landing phases of operations in much the same way that they had been utilized in Vietnam. However, since 2013 the Marine Corps has utilized the aircraft for missions that neither the CH-46 nor other aircraft could ever perform. Two Special Purpose Marine Air Ground Task Forces (SPMAGTFs) were created to provide immediate contingency response forces to Africa Command (AFRICOM) and Central Command (CENTCOM). These SPMAGTFs were designed to utilize the MV-22 to provide theater quick reaction forces for contingency operations. The Air Combat Element (ACE) consists of a detachment of Ospreys, C-130s for aerial refueling, and either AV-8B Harriers or F/A-18 Hornets for escort and close air support (CAS). Neither of the SPMAGTFs include helicopter escorts.<sup>2</sup> Further, future Marine aviation plans envision the future ACE supporting long-range over-the horizon operations through extensive use of the V-22, with escort provided exclusively by fixed-wing tactical aircraft.<sup>3</sup> Heliborne operations in the Vietnam War demonstrated that although critical to operations in high-threat areas, fixed-wing aircraft were insufficient to address threats encountered during the final landing phase of the operation. In considering long range air assault operations with the MV-22, current decision makers may be informed by the history of Army and Marine Corps heliborne operations in the Vietnam War, which demonstrated that helicopter escorts capable of providing immediate suppressive fires in the landing zone were essential to preventing a determined enemy from shooting down troop transporting helicopters.

## EARLY US ARMY OPERATIONS IN VIETNAM

### Army Transport Companies

The earliest introduction of operational military forces into the Republic of Vietnam were US Army and USMC helicopter units that provided helicopter support to the ARVN in its counterinsurgency fight.<sup>4</sup> Early in 1961, President Kennedy's military advisor, General Maxell Taylor, visited Vietnam and recognized that the difficult jungle terrain and limited road infrastructure were inhibiting the ARVN ability to combat the National Liberation Front (NLF), also known as the Viet Cong (VC). He recommended that the US military deploy helicopters to provide direct support and enable the ARVN to maneuver to engage the VC. Kennedy approved, and in December 1961, two companies of Army CH-21 "Shawnee" helicopters deployed to Ton Son Nuht airport close to the South Vietnamese capitol of Saigon.

Twelve days after arriving, the 8<sup>th</sup> and 57<sup>th</sup> Transport Companies executed the first airmobile operation of the Vietnam War, the aptly named OPERATION CHOPPER. During the operation, nearly one thousand ARVN troops were airlifted to an enemy position approximately 10 miles from the airfield. Although numerous problems were identified, the operation was largely considered a success as the desired effect of surprising the VC defenders was achieved. CHOPPER was significant in that it was the first airmobile operation of the war and seemed to validate the belief that vertical maneuver could help overcome the mobility challenges that the VC insurgents used to their advantage. This success caused the demand for helicopters to steadily increase. In January of 1962, a third Transport Company, the 93<sup>rd</sup>, joined the 8<sup>th</sup> and 57<sup>th</sup> in Vietnam when it flew from the deck of the USNS *Core* into Da Nang airfield.<sup>5</sup> In the first ten

months of operations, the CH-21s flew without escorts and were armed only with a light machine gun mounted in the door of the aircraft. The Vietnamese Air Force (VNAF) and ARVN artillery were available for escort and fire-support but were described by the helicopter crews as “inadequate, inaccurate, uncoordinated, and useless.”<sup>6</sup> Further, the CH-21s were underpowered and incapable of high performance maneuvering in the equatorial heat of Indochina. The lack of power also prevented the addition of armor protection because the aircraft could not accommodate the added weight.<sup>7</sup>

The VC quickly recovered from the initial shock of OPERATION CHOPPER and began to fight back. Captured documents revealed that the Viet Cong recognized the advantage provided by the US helicopters and that they were determined to shoot them down. A captured VC instructional pamphlet identified the capabilities and vulnerabilities of US heliborne operations and instructed fighters to target the helicopters during the landing phase. The pamphlets also included aim points and detailed instructions for how to lead a moving helicopter.<sup>8</sup> To counter the increasing threat from enemy fire during landing, the Army experimented with arming the CH-21 with a belly-mounted machine gun. The weapon was removed after a short assessment period in which it was determined to be ineffective for the suppression of enemy air defenses because of the aircraft’s poor maneuverability during the landing phase.<sup>9</sup> In July 1962, the Army helicopters reported a significant increase in the amount of effective ground fire. Additionally, the US helicopters experienced their first combat loss when a CH-21 was shot down near the Laotian border and all four US Army aviators died in the ensuing crash. The VC were developing tactics and utilizing weapons to target the helicopters in the landing zone with increased proficiency and the lightly armed Shawnees were

incapable of adequate self-defense. The increasing percentage of aircraft being hit by enemy ground fire as well as the exponential increase in the number of heliborne operations led the Army to recognize early the requirement to provide armed escorts.

### **The First Helicopter Escorts**

In September 1962, the Army initiated an operational test program which involved arming and deploying 15 of the new turbine powered UH-1A “Huey” utility helicopters. The UH-1As were armed with two .30 caliber machine guns as well as rocket pods mounted to the landing skids. Shortly after the arrival of the UH-1As, eleven upgraded UH-1Bs were added to the test unit. The UH-1B incorporated a more powerful engine and included factory-installed mounts for M-60 machine guns and 2.75” rocket pods. The twenty-six UH-1s formed the Utility Tactical Transport Helicopter Company (UTTHC). They were assigned directly to the Military Assistance Command Vietnam (MACV) and given the task of operationally testing the aircraft for suitability for providing armed escort for the troop transport CH-21s.<sup>10</sup> The UTTHC was assigned the unique responsibility of collecting test data for the effectiveness of the suitability of the UH-1 for the escort mission while actually conducting armed escort during combat operations. They were located at Tan Son Nhut Airfield near Saigon and provided direct support to the 57th, 33rd, and 93rd light transport helicopter companies. Additionally, beginning in February 1963, a single platoon detachment flew in support of Marine UH-34s in the higher elevations of the northeastern I Corps area of operations.<sup>11</sup>

Throughout the five month evaluation period, the UTTHC refined the escort mission, dividing the flight into three distinct phases: enroute, approach, and landing. The escorts were assessed to be the most valuable during the landing phase when the

transports were most vulnerable to enemy ground fire.<sup>12</sup> During the UTTHC test period, the company flew 1779 hours and received only 11 hits from hostile fire with one successful Viet Cong shoot down of a UH-1B.<sup>13</sup> The UH-1B loss occurred on a day that MACV learned the difficult lesson that while gunships reduced the risk to heliborne operations, that did not make them impervious to enemy ground fire. The UTTHC Huey was shot down in May 1962 during the Battle of Ap Bac. The battle was an ARVN operation against a Viet Cong stronghold approximately 35 miles southwest of Saigon. The heliborne portion of the operation consisted of 10 CH-21s escorted exclusively by UTTHC UH-1Bs. During the course of the subsequent battle, the ARVN called for reinforcements and an airborne force of Shawnees were diverted to deliver the reaction force. Unbeknownst to the ARVN or the pilots, the selected landing zone for the reinforcements was in the middle of the defending VC headquarters. Immediately upon entering the landing zone, the aircraft were raked with machine gun and mortar fire and four of the CH-21s and one UH-1B were lost to enemy fire while attempting to conduct the reinforcement. The loss of the five aircraft led to the determination that operations into heavily opposed areas required both rotary-wing and fixed wing escorts.<sup>14</sup>

Aside from the losses during the Battle of Ap Bac, the UTTHC experiment was very successful. During the test period, the number of hits on CH-21s that were accompanied by UH-1 escorts dropped by 25 percent. This statistic may seem insignificant, but it coincided with a significant increase in the overall number of helicopter operations and the VC were becoming much more effective in their opposition. During the same period of evaluation, the number of hits on unescorted helicopters doubled.<sup>15</sup> The success of the UTTHC in mitigating the threat of enemy fire to assault

support aircraft contributed to the Army decision to convert the CH-21 troop carrying companies to airmobile UH-1B companies. Each company would consist of 24 UH-1Bs, eight of which would be in the “Hog” armed escort configuration.<sup>16</sup> The conversion began in May 1963 and was complete by June 1964, which coincided with the Army’s official adoption of the airmobile concept which had been in development even prior to the first heliborne operations in Vietnam.

### **The Howze Board**

Concurrent to the early heliborne operations in Vietnam, Defense Secretary McNamara directed the Army to review its plans for the future role of aviation within the service. The secretary envisioned a much greater role for aviation and directed a committee to develop a plan that significantly increased Army mobility as compared to surface vehicles.<sup>17</sup> Lieutenant General Hamilton Howze was selected to head the board and was given a nearly unlimited budget and freedom of action to test the concept of airmobility. The Howze board created an experimental division and utilized over 150 aircraft during the eleven week test period. The board concluded that Army aircraft would significantly improve operations in both conventional and unconventional operations. The Howze Board Report was released in August of 1962 and recommended that the Army adopt the airmobility concept. Central to airmobility was the replacement of traditional ground maneuver vehicles with aviation assets. The report recommended the formation of the air assault division, which would consist of 459 aircraft as compared to the approximately 100 aircraft in the existing division structure. The extra aircraft would form the basis for the division’s transport, reducing the number of vehicles from 3,452 in a standard division to approximately 1,100.<sup>18</sup>

From its inception, the airmobility concept embraced the use of armed helicopters specifically for use as armed escorts and ground attack. This led to an inevitable clash with the Air Force, which viewed the Army's airmobile proposition as an invasion into their domain, specifically the missions intended for armed helicopters and Army efforts to develop armed fixed-wing airplanes. Following the release of the Howze Board Report, Air Force Chief of Staff Curtis Lemay directed a study to refute the results. The report, published by Air Force General Gabe Disosway, stated the Air Force was currently capable of executing the types of missions that the Army sought to achieve with airmobility and that further development of the concept was unnecessary duplication.<sup>19</sup> However, McNamara was committed to the concept of airmobility and approved the Army plan for the development and fielding of armed helicopters and even approved limited Army testing of a fixed-wing attack aircraft.<sup>20</sup>

## **USMC AND OPERATION SHUFLY**

### **Unescorted Operations**

While conducting a review of helicopter requirements in Vietnam, the Commander in Chief Pacific (CinCPac), Admiral Harry Pelt determined that an additional Army Helicopter Company was required to support ARVN and MACV operations.<sup>21</sup> At the suggestion of the commander of the Fleet Marine Force Pacific (FMFPac), General Shapely, the MACV commander, General Paul D. Harkins, requested that a Marine squadron deploy to Vietnam instead of a 4<sup>th</sup> Army Transport Company.<sup>22</sup> The Marines flew the UH-34 "HUS" that was capable of providing a greater lift capability than the CH-21 and was also more tolerable of the Vietnamese environmental conditions, particularly the hot weather and high elevations. In April 1962, Marine

Medium Helicopter Squadron (HMM) 362 deployed to Soc Trang airfield in the Mekong River Delta, which initiated OPERATION SHUFLY and consisted of a four-month rotation of a single Marine HMM squadron and its complement of twenty-four UH-34 helicopters.

Upon arrival in Soc Trang, HMM-362 made the decision not to emplace machine guns in the doors of the UH-34s for fear that they would block the exits and prolong the amount of time in the landing zone, already identified as the most vulnerable portion of the flight. On August 1<sup>st</sup>, HMM-163 replaced HMM-362 and reversed this decision due to the amount of ground fire that was being received. All aircraft were then armed with an M-60 door gun. Additionally, co-pilots were armed with assault rifles that could be fired from the cockpit windows during landing and while in the landing zone.<sup>23</sup> In September 1962, MACV transferred HMM-163 to Da Nang airfield because the H-34 was more capable of operating in the higher elevations of the northern I Corps tactical area. At Da Nang, the SHUFLY crews experienced the same high-volume of ground fire that was reported by the Army CH-21 crews in the south. Like their Army brethren, the HMM crews were going on missions largely without escorts. At the time, Marine Corps doctrine utilized Marine fixed-wing attack aircraft for helicopter escort. However, prior to 1965, attack aircraft were not permitted in Vietnam due to rules of engagement established by the South Vietnamese government. The VNAF was available to fly cover for the larger troop carrying operations. However, like the Army CH-21 pilots, Marines repeatedly cited VNAF ineffectiveness in the protection of helicopters.<sup>24</sup> Additionally, HMM crews began to identify threats that were unique to the troop insert missions in

Vietnam that fixed wing escorts were ill suited to address and proposed the idea that the Marine Corps incorporate armed helicopters to provide escort for the troop transport.<sup>25</sup>

Similar to the Army and Air Force debates over roles and responsibilities in the air domain, there was debate within the Marine aviation community concerning the introduction of armed helicopters into the Marine inventory. The Marine Corps was capped at specific numbers of aircraft and any increase in the number of helicopters would result in a corresponding reduction in the number of airplanes.<sup>26</sup> For this reason, Marine jet aviators were vehemently opposed to the development of an armed helicopter to assume a mission that doctrinally belonged to an airplane. They also argued that an increase in helicopters with a corresponding reduction in airplanes would cause a loss in the distinction between the Marine Corps and the Army.<sup>27</sup> A contrasting argument stated that fixed-wing aircraft were critical components to heliborne operations but that they were not sufficient to address immediate threats. In February 1964, Commandant Wallace Greene reaffirmed the Marine Corps concept of utilizing helicopters for transport and airplanes for escort and close air support. However, he also expressed willingness to accept the possibility of developing and fielding an armed helicopter to complement the fixed-wing escort mission.<sup>28</sup>

### **SHUFLY Escorts**

While the debate continued in the United States, the SHUFLY Marines continued to fly support missions under fire without adequate escort. To mitigate the threat from enemy fire they began to adapt and utilize the aircraft that were available in-country. On March 14 1963, while supporting the recovery of a downed Army O-1B Mohawk observation plane, three UH-34s provided close air support with door mounted M-60s

while another two UH-34s landed to support the evacuation.<sup>29</sup> Dedicated escort for OPERATION SHUFLY arrived in Da Nang in April 1963 in the form of a platoon of six UH-1Bs from the Army UTTHC. The HMM crews reported favorably on the effectiveness and performance of the Army UH-1Bs, which reinforced the argument for a dedicated Marine rotary wing escort platform. However, several obstacles remained before Marine helicopters would fulfill the escort role. First, the debate in the Marine aviation community over the value of armed helicopters was still largely unsettled. Second, MACV announced that the SHUFLY mission would be ending in 1964. Finally, the Marines did not have a deployable platform capable of fulfilling the mission. Since 1962, the Marine Corps had been in the process of procuring a shipboard capable version of the Army UH-1, but the first delivery of this platform to a Marine unit would not occur until February 1964. Further, the Marines' variant of the Huey, the UH-1E, was purchased as an assault support and observation aircraft and was not designed for either the delivery of ordnance or the escort mission.

The number of missions that the UH-34s were flying in SHUFLY outpaced the ability of the single platoon of Army UH-1Bs and the aircraft were still taking repeated battle damage. On April 24<sup>th</sup> the first SHUFLY UH-34 was shot down due to enemy fire. After action reports from the flight indicate that the fixed-wing T-28 escorts struck the incorrect target (approximately 5000m away from the actual objective area) and that the artillery preparation of the landing zone was both late and ineffective. The same reports praised the Army UH-1B escorts for providing the only effective fire-support for the heliborne insert of 567 troops into an extremely hot landing zone.<sup>30</sup> For the remainder of the SHUFLY mission, Army UH-1 gunships accompanied UH-34s on every mission

involving the transport of troops, as well as on all missions flown into areas with known concentrations of Viet Cong fighters.<sup>31</sup>

In January 1964, MACV announced that OPERATION SHUFLY would end in the first half of 1964 as US involvement in Vietnam came to an end.<sup>32</sup> The actual order to redeploy never occurred and the HMM squadrons at Da Nang continued to take battle damage and lose aircraft to enemy ground fire. In August 1964, Commandant Greene directed HMX-1 to develop a defensive weapons kit for the UH-34.<sup>33</sup> The resultant product, “Temporary Kit 1” (TK-1), was delivered to Okinawa for pilot evaluation in the fall of 1964. TK-1 consisted of platforms on both sides of the aircraft which mounted an 18-shot rocket pod and an M-60 machine gun. The evaluating pilots delivered a conclusion that was far from a ringing endorsement, stating that the kit was “better than nothing”, but was “operable only at such short range as to make its overall usefulness doubtful.”<sup>34</sup> The first pods were delivered to HMM-365 in Vietnam in November of 1964 and armed UH-34 “gunships” were flying organic escort within a month of delivery. Due to their instability and low speed, the UH-34 “gunships” proved to be as ineffective as the armed CH-21s had been in 1962. The instability of the aircraft made it inaccurate in delivering fires and the slow speed that they were required to maintain in the vicinity of the landing zone made them easy and lucrative targets for the Viet Cong. In their limited period of operation, the HUS “gunships” accounted for 85% of all hits from ground based fire in Vietnam while flying only 15% of the total flight time.<sup>35</sup> FMFPac Commanding General Victor Krulak was on-hand for the evaluation of the TK-1 and he concurred with the evaluation of the pilots. In his estimate of the kit which he provided to Commandant Greene, he stated, “The proposed arming of the UH-34 will not

provide equivalent protection to replace U.S. Army UH-1Bs.”<sup>36</sup> In the same report, he recommended that the assignment of Marine UH-1Es to the 1<sup>st</sup> Marine Air Wing (1MAW) be expedited for employment in the armed escort role.<sup>37</sup>

The first UH-1E Hueys were delivered to the Marine Corps in February 1964. In October, Commandant Greene directed HMX-1 to develop a kit similar to the TK-1 for the UH-1E, specifically for the mission of providing armed escort to transport helicopters.<sup>38</sup> Bell Helicopter had been producing armed UH-1Bs for the Army for several years, which allowed for the rapid development of “TK-2.” TK-2 included a bomb rack on both sides of the aircraft that could accommodate 2.75” rocket pods or other drop-weapons. The rack also served as a mount for an M-60 machine gun that could be fired from the cockpit or by the crew chief. The kits were delivered to Camp Pendleton in January 1965 for pilot training and evaluation. In May 1965, the first UH-1Es arrived at Da Nang with Marine Observation Squadron TWO (VMO-2). Together with the platoon of Army UH-1Bs the VMO Hueys immediately assumed the role of escorting UH-34 transports. This fact is significant because the UH-1E was developed for the utility and observation role and the debate over armed helicopters was still unsettled in Marine Aviation.

## **THE EXPANSION OF THE WAR AND HELIBORNE OPERATIONS**

### **Operation STARLITE**

At the end of 1964 OPERATION SHUFLY officially concluded and the HMM units in country fell under the newly created Marine Unit Vietnam, which by March 1965 would become Marine Air Group (MAG) 16 and the 9<sup>th</sup> Marine Expeditionary Brigade (MEB). In July 1965, President Johnson announced that the US would increase its

combat role in South Vietnam and US presence would double to 125,000. By August, the Third Marine Amphibious Force (III MAF) had assumed command of 17,500 Marines in the I Corps tactical area that included tactical fixed-wing aircraft. The rapid build-up of troops and equipment had a significant impact on heliborne operations. When MAG-16 began operations in Da Nang in the spring of 1965, six UH-1E Hueys from VMO-2 and platoon of six Army UH-1Bs flew exclusive armed escort for the three HMM squadrons operating in the I Corps tactical area. By June of 1965, the First Marine Air Wing (1MAW) consisted of three MAGs in Vietnam, to include three Marine Attack Squadrons (VMAs) who began flying helicopter escort with the A-4 "Skyhawk."<sup>39</sup>

In August 1965, III MAF executed OPERATION STARLITE, a major combined heliborne/amphibious offensive against the Viet Cong in the vicinity of the new Marine airfield at Chu Lai, which was 60 miles south of Da Nang in the Quang Tin Province. It also represented the largest U.S. led operation against the Viet Cong to date. During STARLITE, a combination of A-4s, UH-1Es from VMO-2, and UH-1B Gunships from the 1<sup>st</sup> Cavalry Division were utilized to escort a battalion lift consisting of eighteen UH-34s. STARLITE highlighted the differences between fixed and rotary-wing escort and demonstrated that the combination of the two was the most effective means to protect the transports from enemy fire. The after action report from the mission states:

While attack aircraft can provide excellent escort service for helicopter formations, there is still a need for last minute landing zone preparation which finds the best solution in the armed UH-1E. It was generally emphasized that this is a brief task, almost coincident with the landing of the initial helicopter waves and that it will be effective only if the armed helicopters are part of the landing formation. The attack aircraft can handle all of the remaining support tasks and can do so with efficiency. Accordingly there was general agreement that we should press for improvements in helicopter armament in order to ensure that the last minute landing zone preparation task is efficiently discharged.<sup>40</sup>

From 1965 to 1972, the Marines executed hundreds of air assault operations, predominantly in the I Corps region with both Marine and ARVN units. The Marines validated the concept of complementing the heavy firepower of attack jets with the instantaneous response and visibility of the gunship.<sup>41</sup> During this period, armed escort was the primary mission of the VMO's UH-1Es. Armed Hueys accompanied the UH-34 and beginning in 1966, the CH-46 "Sea Knight", or "Phrog" as it was better known, on every mission involving the tactical insert or extract of troops.<sup>42</sup>

### **US Army and Airmobile Units**

With the Airmobile concept, the U.S. Army combined armed UH-1 troop transports, known as "slicks", with armed Huey variants, or "Hogs". Since June 1964, combined airmobile companies had replaced all CH-21 companies and the renamed aviation companies (airmobile) provided helicopter support to the ARVN across South Vietnam. With the introduction of U.S. combat troops in May 1965, the 173<sup>rd</sup> Airborne Brigade became the first U.S. Army ground troops in Vietnam. Their introduction was significant both politically and for the escalation of the airmobility concept. Immediately upon their arrival in country, the unit began preparing for heliborne operations. Within weeks, they were accompanying ARVN troops on airmobile operations and within 2 months, were executing combined division sized inserts. In his after-action report, the Commander of the 173<sup>rd</sup>, Brigadier General Williamson, described the role of the gunships in the insert:

The helicopter fire support gunships often frighten new troops. They whip over your heads rather quickly, firing on your flank or in front of you. Don't be fooled by the falling expended cartridges or belt links. Often inexperienced troops mistakenly think that these cartridges and links falling among them are fire from the helicopter. They won't hurt you. The real bullets are on the target. These

helicopter pilots are some of the most efficient; professional men that we have ever observed. If we can identify the target for them they can and will hit it.<sup>43</sup>

Further, the introduction of U.S. ground forces allowed for the expansion of the airmobility concept to a more combined arms approach, to include artillery smoke screens, fixed-wing close air support, and gunship escorts.<sup>44</sup>

### **The First CAV**

In July of 1965, the Army directed that the 11<sup>th</sup> Air Assault Division (Test) and the 2D infantry division combine to form the 1<sup>st</sup> Cavalry (CAV) Division (Airmobile). The 1<sup>st</sup> CAV was formed as prescribed by the Howze board tests. The division consisted of 434 aircraft, primarily the new Delta model UH-1s (UH-1D), but also OH-13 light observation helicopters (LOH), CH-47 “Chinook” Heavy Lift helicopters, CH-54 “Tarhe” Sky Cranes, and (6) fixed-wing OV-1 “Mohawks.” Notably, the division included 62 dedicated Huey gunships. Additionally, forty-three Hueys were assigned to the artillery battalion for the new role of aerial rocket artillery. These aircraft were completely separate from the gunships and their primary role was to provide air delivered area-fire artillery rockets in much the same way that traditional ground-based artillery provided fire support.<sup>45</sup> This demonstrates the difference between the Army and the Marine Corps employment of armed helicopters. For the Marine Corps in 1965, armed helicopters were interim solutions for escorting other helicopters and protecting them from ground-based fires. The Army’s airmobile concept embraced the role of the helicopters as a 1 for 1 replacement for nearly every function that had been accomplished by a ground vehicle or weapon. 1st CAV arrived in Vietnam in October of 1965. With their arrival, the execution of airmobile operations against the Viet Cong and the North Vietnamese Army (NVA) increased exponentially. Beyond the 1<sup>st</sup> Cavalry, the Army

committed to airmobility with the deployment of Assault Helicopter Companies, and later Battalions, that were tasked with the direct support of a ground maneuver unit. Across these units, the organization was generally the same; approximately two thirds dedicated UH-1 troop transport “slicks” and one third dedicated UH-1 gunships. The slicks carried 4-8 combat troops and the gunships provided organic attached helicopter escort.<sup>46</sup>

The massive increase in troops and helicopter operations resulted in an increased effort by the enemy to counter the U.S. mobility advantage. Beginning in 1965, both Marine and Army helicopter crews saw a significant increase in Anti-Aircraft Artillery (AAA) fire. As early as 1965, the NVA and VC began utilizing what became known as the “triangle ambush.” They would position three heavy machine guns or light AAA pieces in a triangle configuration, with each gun approximately 1km from the other two. The first gun would act as bait and would fire on the approaching slicks. When the escorts turned to engage, the other two gunners engaged the exposed tails of the gunships.<sup>47</sup> The enemy were so determined to down US helicopters that they chained the gunners to AAA guns to prevent them from running away. The Army also noted that during the enroute phase of flights, gunships were being diverted to engage targets that fired at the flight. When the gunships broke off the engagement, they were too slow to catch-up with the rest of the flight. This resulted in an effort within the Army to expedite the development of an interim dedicated helicopter gunship platform.

## **THE FIRST TRUE GUNSHIP**

The expansion of airmobile operations in Vietnam led to the further development of the attack helicopter in both the Army and the Marine Corps. The services had different approaches to the procurement and intended employment of the aircraft. Nevertheless, the introduction of the aircraft into Vietnam had a profound effect on the escort mission.

For the Army, the concept of a developing an attack helicopter for the CAS and escort role was not driven exclusively by Vietnam. Following the Howze Board, the Army initiated plans for the procurement of an attack helicopter for the escort and ground support roles. In 1965, the contract for the Army's Advanced Aerial Fire System (AAFS) was awarded to Lockheed Martin for the AH-56 "Cheyenne." However, the aircraft was not scheduled for first delivery until 1970, and the scale and nature of airmobile operations in Vietnam led the Army to solicit contracts for an interim gunship. Bell Helicopter had been developing an attack variant of the Huey. Bell promised the Army a fast delivery schedule and in April 1966, the Army purchased the Bell "Huey Cobra", the first helicopter developed specifically for the attack role. The Cobra was desirable for its commonality with the Huey, which had the benefits of minimal conversion training requirements, and it minimized new logistics requirements because several of the parts were common to the thousands of Hueys already in Vietnam.<sup>48</sup> The Cobra, designated the AH-1G, was a slimmer variation of the UH-1. It was designed with a tandem cockpit in which the pilot sat in the rear seat and a gunner operated turret weapons systems in the front. The aircraft included two stub-wings, each of which housed two ordnance stations capable of carrying rocket and gun pods. The primary weapon was a 7.62mm mini-gun mounted to a traversable turret on the nose of the helicopter, which was later modified to

accommodate a 40mm grenade launcher as well. The first aircraft were delivered for Army operational test and acceptance at Bien Hoa, Vietnam in August of 1967. On October 8<sup>th</sup>, the 334<sup>th</sup> Armed Helicopter Company flew the first combat mission with the new aircraft, which was an armed escort mission for a heliborne insert.<sup>49</sup>

The Army utilized the Cobra as a one for one replacement of the Huey gunships. The AH-1 was faster, could carry more ordnance, and could remain on-station longer than its UH-1 predecessor.<sup>50</sup> The additional speed allowed the Cobra escorts to engage targets that fired upon the slicks during the enroute portion of flight because it was fast enough to catch-up after the threat was suppressed. However, several drawbacks were noted by Cobra pilots who had previously flown Huey gunships. Although faster and more maneuverable, the pilots could not see threats from behind the aircraft. Additionally, the closed cockpit prevented the pilots from hearing the sound of gunfire.<sup>51</sup> Despite these limitations, the aircraft was fast, maneuverable, and could employ a high volume of fire on point targets instantaneously, making it ideal for the escort mission. The Army replaced UH-1B and C gunships with Cobras on a 1 for 1 basis, although hundreds of Huey gunships would continue to operate in Vietnam until the end of the war.

### **Cobras for the Marine Corps**

In 1967, armed escort accounted for two thirds of all missions being flown by Marine UH-Es. This left the VMOs that flew them lacking for assets to perform their primary mission of observation and airborne control of supporting arms.<sup>52</sup> Marine Chief of Staff for Aviation, Lieutenant General McCutcheon, lobbied Congress for an increase in Marine light helicopters, including the purchase of light attack helicopters. In his July

1967 testimony to Congress he stated, “If there is anything that we have learned in Vietnam, it is that we need light helicopters and many of them. One squadron per (division/wing team) is completely inadequate.”<sup>53</sup> Wary of long-term increases in the size of the Marine Corps, Congress approved the increase for the war only. The increase allowed McCutcheon to reorganize the assets within the Air Wing, and in March 1968 he stood-up three new Marine Light Helicopter Squadrons which took over responsibility for flying the UH-1E mission. Simultaneously, two VMOs were decommissioned. The remaining two VMO squadrons continued to fly the traditional observation mission utilizing the OV-1 “Mohawk” and later the OV-10 “Bronco.”

While securing additional Huey gunships and converting VMOs to HMLs, McCutcheon pressed for adding the Cobra to the Marine inventory. In July 1967 the Office of the Secretary of Defense (OSD) approved the USMC purchase of (38) AH-1Gs, approximately half of the (72) requested. McCutcheon continued to press for more of the attack helicopters, specifically because of their value in Vietnam. In January 1968 he provided an update on the Cobra program to the incoming Commandant, General Chapman, stating “the armed helicopter has become an absolute necessity in the delivery of close-in fire suppression during vertical assault operations...While the modified UH-1Es are now doing a credible job, the AH-1 will provide greater speed and firepower and more flexibility in the performance of the armed helo mission.”<sup>54</sup> The first Marine Cobras in Vietnam were delivered to VMO-2 at Marble Mountain in April 1969. Shortly after arriving, the squadron flew the first combat mission in the aircraft, armed escort for a medevac flight. AH-1Gs, and beginning in 1972, twin-engine AH-1J “Sea Cobras”

flew in support of the Marines and ARVN in I Corps. By far, the preponderance of the missions flown were armed escort for troop insert and medevac flights.<sup>55</sup>

### **HELICOPTER OR FIXED-WING?**

In Vietnam, the helicopter gunships demonstrated numerous advantages over attack jets for the escort mission. The speed at which they could deliver accurate suppressive fires on threats in the landing zone was unachievable by fixed-wing aircraft. Further, the effects of gunship fires were smaller than the bombs and high-caliber guns of attack jets and could be applied much closer to friendly forces. The standard “rule of thumb” for the distance required between dropping ordnance in proximity to friendlies was 1 meter for every pound of ordnance. The smallest bomb in the inventory during Vietnam was the 250 pound Mk 81. Conversely, 7.62mm suppression from helicopter gunships was safely employed within 10 feet of friendly forces, which was routinely necessary for opposed heliborne insertion and extraction operations.<sup>56</sup> Another benefit that the gunships brought to the Vietnam War was their ability to operate effectively in marginal weather. Low cloud ceilings were common and prohibited CAS operations by jet aircraft. While the Hueys and Cobras were not impervious to the weather, they effectively supported thousands of operations in marginal weather conditions during the 6 month Vietnamese monsoon season.

However, Vietnam also demonstrated that fixed-wing aircraft were essential components of the heliborne escort team. When flying into areas with overwhelming air defenses, airplanes were required to prepare the landing zone with more substantial ordnance than could be carried by the gunships. The most effective examples of escort in

Vietnam involved a combination of fixed-wing and gunships. Exclusive gunship escort proved ineffective during the early stages of the Battle of Khe Sanh in 1968. The NVA covered the approaches to the landing zones with light and medium AAA and attempts to resupply the base using CH-46s escorted by UH-1E gunships were ineffective due to the inability of the gunships to suppress the heavy fire. As a response, 1MAW came up with the concept of the “Super Gaggle”, which employed a combination of command and control aircraft, fixed-wing strike aircraft, artillery, and Huey gunships. Prior to the employment of the Super Gaggle, fifteen aircraft were lost to enemy fire. After the Super-Gaggle, only two aircraft were shot down, and the crews were rescued immediately by the gunship escorts. The suppressive effect of the gaggle allowed the Phrogs to provide continuous resupply to the besieged Marines at Khe Sanh.<sup>57</sup>

### **ESCORTING THE OSPREY**

In 2007, the MV-22B attained Initial Operational Capability (IOC) within the Marine Corps and began replacing the CH-46E. By April 2015, every active duty HMM was converted to a VMM. The speed and range that the aircraft provides has been described by many as game changing. The aircraft is the most sought after commodity by nearly every Geographic Combatant Commander and it is currently being utilized in ways that were inconceivable for helicopters. In response to the 2012 attacks on the US consulate in Benghazi, Libya, the Marine Corps stood-up Special Purpose Marine Air Ground Task Force Crisis Response Africa Command (SPMAGTF-CR-AF) in April 2013. In October 2014, SPMAGTF Crisis Response Central Command (SPMAGTF-CR-CC) was established. Based in Moron, Spain, and Bahrain respectively, the crisis response SPMAGTFs utilize the MV-22 for assault support in long-range

contingency missions. These contingency missions are designed to provide response forces to developing situations immediately and inherently outrange the capability of H-1 escorts, so fixed-wing aircraft have been utilized exclusively. This includes the aircraft being utilized to transport Company Landing Teams (CLT) great distances to respond immediately to emerging crises. For example, in order to respond to an attack similar to the 2012 attack on the Benghazi consulate, MAGTF-CR Ospreys would have to fly 1,300 miles from Spain to Benghazi.

In addition to contingency missions, concepts such as *Expeditionary Force 21*, envision the use of the Osprey to regularly execute long-range over the horizon operations to counter Anti-Access/Area Denial (A2/AD) threats. Marine Aviation plans to support these operations using the F-35B to provide escort for MV-22s.<sup>58</sup> While the Osprey's speed and endurance are certainly enablers, they result in the aircraft outranging the capability of rotary wing escorts. The discussion concerning how to escort the Osprey has proceeded throughout the Marine aviation community since the aircraft was originally conceived, and, seven years after IOC, the Marine Corps is still trying to come up with the answer. There are essentially three sides to the debate: fixed-wing escorts can provide adequate protection; fixed-wing escorts cannot provide adequate protection and only rotary-wing escorts can accomplish that mission sufficiently; or finally, fixed-wing escort is insufficient and the Marine Corps should invest in the development of an armed variant of the MV-22.

### **The Fixed-Wing Plan**

The Marine Attack Squadron is home to the AV-8B Harrier and has also begun the conversion to the F-35B Joint Strike Fighter. One of the stated missions of the VMA

is the “escort of friendly aircraft.”<sup>59</sup> When flying escort missions, the AV-8B is typically equipped with precision guided bombs and a Litening II targeting pod. The pilots utilize the targeting pod to “sanitize” the landing zone and will address any threat with bombs or 25mm gun. Typically, it takes several minutes to align the aircraft to deliver a bomb and time of fall is usually between 20-30 seconds. The Litening II is one of the best targeting pods available in the world; it can see things that cannot be observed with the naked eye, to include threats that would not be apparent to ingressing Ospreys or rotary wing escorts. However, the major drawback of sanitizing a landing zone exclusively with a targeting pod is the limited field of view available instantaneously. The pilot flying escort can only see what is within the sensor field of view and cannot react quickly to threats that emerge outside of his immediate field of view. Likewise, while the AV-8B is capable of providing a major punch, it is inherently limited in its ability to provide immediate fires. The SHUFLY pilots that flew with T-28 escorts attested to the same limitation of exclusive fixed wing escort. In 1967, Marine Vietnam VMO pilots, Major Rider and Captain Buchanan wrote, “the secret of helicopter escort is *instantaneous* fire suppression; not in 10 or 20 seconds, but instantly.”<sup>60</sup> The authors were experienced UH-1E escort pilots writing on the future role of Marine escort with the introduction of the AH-1G Cobra and the OV-10 Bronco. The authors’ point remains relevant today in the discussion of escorting the V-22 in that fires must be directed at the threat immediately.

The F-35B is a 5<sup>th</sup> generation fighter aircraft and while it is far superior technologically, it still suffers from the same limitations of response time to “pop-up” threats and limited sensor field of view. The Marine Corps is accepting considerable risk to its Company Landing Teams by sending them into landing zones without rotary-wing

escort. This paper does not argue that the Marine Corps should cease these kinds of operations until a solution can be identified. Rather, this discussion highlights the risk that is being accepted. The history of heliborne operations suggests that fixed-wing aircraft cannot respond fast enough to every threat. Writing on the subject of fixed-wing versus rotary wing escort in Vietnam, Colonel (later Major General) Noah New wrote:

When the Marine Corps became engaged in the low intensity, protracted conflict of Vietnam, it became obvious that high speed attack aircraft, despite their outstanding capability in the close air support role, had serious deficiencies in providing close-in fire suppression support for troop carrying helicopters. This was especially true in the jungle where rapid, positive identification of enemy positions is extremely difficult. What was clearly needed was an aircraft capable of delivering continuous suppressive firepower in the vicinity of the landing zone where the vast majority of enemy fire is encountered. To perform this function, an aircraft, or at least one of several aircraft, must stay close enough to the landing zone so that the range of its guns encompasses the enemy, and further must be capable of directing fire at the enemy as soon as a target appears.<sup>61</sup>

The need for immediate fires is as necessary to assault support missions today as it was during Vietnam. Further, although small diameter ordnance has come a long way since Vietnam, the risk estimate distance for ordnance carried by fixed-wing aircraft is too large to address “pop-up” threats in the landing zone. To address these threats, V-22s will be required to suppress the threats with their own crew-served weapons. The risk to assault support aircraft without an immediate fire suppression platform is substantial.

### **Improved Self-Defense Capability for the V-22**

Another suggestion that has been put forth by some Marine aviators is that defensive weapons system upgrades to the V-22, combined with fixed-wing escort will be sufficient.<sup>62</sup> When the V-22 was first fielded, the only defensive weapon available was an M240 machine gun mounted to the ramp on the rear of the aircraft, which left the sides and front of the aircraft vulnerable during approach and while in the landing zone.

The CH-46 had mounted M240 machine guns on both sides of the aircraft to provide nearly 360 degrees of protection. Even the UH-34s of OPERATION SHUFLY had better defensive weapons on the aircraft than the Osprey that first deployed to Iraq in 2007. In 2010, the Marine Corps fielded a limited number of Interim Defensive Weapons Systems (IDWS) to aircraft deploying to Afghanistan. The system consists of a turret mounted 7.62 “mini-gun” that drops from the belly of the aircraft. The gun is aimed using a combined television camera and infrared (IR) sensor and is fired by an aircrewman using a handheld controller and video monitor in the cabin of the aircraft.<sup>63</sup> The weapon is better than nothing but has several critical flaws. The first is that it suffers from the same field of view limitation as the fixed-wing escort with a targeting pod. The second flaw is that, because the gun is turret mounted on the underside of the aircraft, it must be secured during landing, which has historically been the most critical phase of any heliborne operation. The IDWS was also designed to secure automatically when the landing gear is down, which leaves the aircraft vulnerable on final approach and while in the landing zone. The Operational Test and Evaluation of the system in 2012 by Air Test and Evaluation Squadron TWO TWO (VMX-22), identified deficiencies in the limited field of view during landings as well as a requirement for excessive verbal communication with the pilots for target hand-off during the critical stages of landing. However, the system was described as being extremely accurate against the few targets that it could engage.<sup>64</sup>

### **Self-Escort: The V-22 Gunship**

Another suggestion for meeting the challenge of providing escort for the V-22 is creating an armed variant of the Osprey. Proponents recommend arming this variant with

Advanced Precision Kill Weapon System (APKWS) laser guided rockets, and the AGM-176B Griffin “mini-missile.” This proposal currently has traction within Marine Aviation and in November 2014, Bell-Boeing, which produces the MV-22, conducted a test in which the MV-22 fired 2.75” rockets from a cheek-mounted rocket pod. Additionally, in conjunction with Marine Aviation Weapons and Tactics Squadron ONE (MAWTS-1), VMX-22 conducted a successful live-fire test of the Griffin missile. Conducting these tests is beneficial and having a precision guided munition (PGM) available for long-range missions is better than having nothing. However, this is not a viable long-term solution to the requirement for escort. The APKWS and Griffin weapons systems are precision missiles that rely upon sensor target acquisition and designation. They are not suppression weapons designed to address a “pop-up” threat immediately. In heliborne operations in Vietnam the majority of aircraft were hit by fire while on final approach to landing or while on the ground in the landing zone.

In 2014, MAWTS-1 published self-escort tactics for the MV-22 for long-range operations where traditional escorts are not available. The tactic involves utilizing designated aircraft to fill the escort role. The designated “escorts” remain in an over watch position and utilize the IDWS to suppress any threats to landing aircraft.<sup>65</sup> This tactic is comparable to when the Marine Corps attempted to utilize TK-1 equipped UH-34s as “gunships” during the early days of OPERATION SHUFLY. Any escort is better than no escort; however, these aircraft are not designed to operate as gunships. The MV-22 is an amazing aircraft that offers an incredible capability to the U.S. military, but much like the ill-fated HUS “gunships” in 1964, it was not designed for maneuver in

the objective area nor for the delivery of ordnance and will most likely be ineffective in this role.

### **An incompatible Air Combat Element**

The UH-1Y and AH-1Z are the modern successors to the early Huey and Cobra gunships that were rapidly developed for the escort mission during the 1960s. The UH-1Y is capable of carrying dual 2.75” rocket pods and has an integrated aiming system for the APKWS LGR. The AH-1Z is one of the most advanced attack helicopters in the world and is equipped with AGM-114 Hellfire missiles, integrated APKWS, a fire control computer, and a targeting sensor. However, the best capability that both aircraft bring to the escort mission is superior visibility and the ability to address pop-up threats immediately. The AH-1Z is equipped with a 20mm cannon that can be directed on target utilizing the aircraft sensor, from a fixed-forward position, or it can be automatically slewed to either of the pilots’ line-of-sight. This allows for rounds to be directed on target within seconds of identification.<sup>66</sup> The UH-1Y has door-guns on both sides of the aircraft and can utilize either the GAU-17 mini-gun or the GAU-21 .50 caliber machine gun.<sup>67</sup> Much like the UH-1B and UH-1E gunships in Vietnam, the UH-1Y has the added benefit of 360 degree battlefield visibility and the ability to hear gunfire in order to locate a ground-based threat. Fixed-wing escorts provide protection from aviation based threats, wider situational awareness for approaching threats, and the capability to provide precision guided heavy munitions when necessary. This combined rotary and fixed-wing escort team provides the best capability to prevent enemy from affecting troop transporting helicopter and tilt rotor aircraft. Unfortunately, the long-range operations

that the Marine Corps forecasts it will continue to execute do not currently permit Marine aviation to provide this ideal model of protection.

The Osprey provides a capability that the GCCs desire and the inability of current rotary-wing escorts to keep-up is not going to stop them from using it, and this paper does not suggest that it should. However, the Marine Corps must provide truth in its advertising and understand that it and the GCCs are accepting considerable risk to the transporting aircraft and the precious cargo that they deliver to the landing zone when they send them either unescorted or with fixed-wing escort exclusively. The problem has been discussed extensively for the last thirty years but there has been no urgency to provide an answer because no V-22s have been lost to enemy fire. This fact nearly changed in a non-combatant evacuation (NEO) operation in South Sudan by a flight of three Air Force CV-22s in December 2013. The aircraft were supporting the evacuation of American citizens from a United Nations (UN) complex in the remote city of Bor. The aircraft conducted a reconnaissance overflight and then made a final turn to the landing zone. During the final approach, the aircraft were fired upon by a combination of rocket propelled grenades (RPGs), heavy machine guns, and small arms. Fortunately, none of the aircraft were lost, but the mission had to be aborted due to 119 hits sustained by the flight. Additionally, four Special Operations passengers were wounded in the aircraft.<sup>68</sup> The fact that the aircraft were able to survive that many hits, to include damage to fuel and hydraulic systems, is a testament to both the resiliency of the airframe and the skill of the pilots at the controls. As a result of the incident, Air Force Special Operations Command (AFSOC) purchased installable armor kits to protect passengers in the cabin and is also exploring low-cost self-defense armament options. This incident

demonstrates how reconnaissance overflights cannot reveal all threats to aircraft in the vicinity of the landing zone, and further reinforces the argument for escorts capable of providing immediate suppression.

### **Potential Solutions**

In 1962, the Marine Corps had a single helicopter squadron in South Vietnam supporting the local government's attempt to put down an insurgency. It did not know that within three years, an entire Marine Amphibious Force would be in the country executing regimental sized heliborne operations on a regular basis. Today, the Marine Corps is in a similar position. The SPMATF-CR forces are relatively small commitments of the total force. Thus far, they have not been required to execute missions under hostile conditions. However, that fact is likely to change soon. Further, history has shown that enemies will seek to attack the technological advantages of the United States. These immediate contingency operations should utilize the full capabilities of the Joint Force. The SPMAGTF-CR V-22s will likely be unable to be accompanied by helicopter escorts in the objective area, but there are capabilities existing in the joint force that can provide escort beyond what can be provided exclusively by the AV-8B. The AFSOC AC-130 gunship is a potential solution for these long-range missions. The ability to loiter over the objective area for long periods of time and deliver immediate suppression makes this aircraft well suited for the escort mission. The aircraft is described as low-density/high demand. However, these missions do not occur on a frequent basis and this aircraft should be made available to the crisis response SPMAGTFs. Another potential solution is developing a gun pod for armed, unmanned aerial systems (UAS). Another potential

solution is exploring the possibility of adding a gun to the C-130J “Harvest Hawk” in order to provide immediate suppressive fires. However, this solution would have the same limited field of view restrictions as the IDWS and fixed-wing aircraft. These solutions are all short-term and do not address the potential for extensive distributed operations by the Marine Corps beyond the crisis response SPMAGTFs.

In planning for the future Air Combat Element (ACE), the Marine Corps should ensure that its escorts match the capabilities of its assault support platforms. The Department of Defense (DoD) currently has plans for a Joint rotary wing program that will eventually replace all vertical lift across the services. Future Vertical Lift (FVL) has not been designed yet, but the intent is for systems that are faster, have longer range, are cheaper to operate, and essentially just “better” in every way.<sup>69</sup> The likelihood is that the services will continue to develop vertical aircraft based on the emerging technologies that become available. The V-22 will be the Marine Corps’ vertical troop transport for at least the next several decades. Until the Marine Corps successfully adapts a current technology to provide immediate suppressive fires in the landing zone, it will execute long-range operations under considerable risk. The Marine Corps should seek to upgrade the endurance and speed of its attack and utility helicopters. The next generation of Marine light helicopters must incorporate an aerial refueling capability, and should also incorporate emerging high-speed rotor system technologies.

## **CONCLUSION**

Helicopter operations in Vietnam fundamentally changed the way that the U.S. military maneuvered tactically on the battlefield. Lack of infrastructure and enemy dispersed across the country were no longer an issue. The V-22 has had the same effect

on an operational level. Combatant Commanders now have the ability to address contingencies immediately with a company sized force. In the future, the Marine Corps envisions using this capability to launch ground forces from over the horizon sea bases and other expeditionary airfields. In Vietnam, U.S. forces quickly understood that while assault support helicopters were a “game-changer”, they were vulnerable to enemy fire in the landing zone and required attached escorts to suppress the threat. Today, the Marine Corps recognizes the risk but does not currently have a solution to the problem. There is potential that the interim solutions will suffice; however, until an aircraft or capability is fielded that can fulfill the requirement for immediate fires, the Ospreys will continue to be subjected to considerable risk during unescorted combat operations.

## NOTES

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