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MASTERS OF MILITARY STUDIES

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***THE FUTURE EMPLOYMENT OF UNITED STATES
MARINE CORPS ATTACK HELICOPTERS:
The Dilemma Facing the Cobra in Supporting New Doctrine***

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THE FUTURE OF USMC ATTACK HELICOPTERS:
The Dilemma Facing the Cobra in Supporting New Doctrine

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EXECUTIVE SUMMARY

Title: THE FUTURE EMPLOYMENT OF UNITED STATES MARINE CORPS ATTACK HELICOPTERS: The Dilemma Facing the Cobra in Supporting New Doctrine

Author: Major Philip R. Kovach, United States Marine Corps Reserve

Research Question: How will the AH-1 support OMFTS/OTH Operations/V-22 employment concept?

Thesis: Under current and future Marine Corps amphibious doctrine, the AH-1 will not be able to effectively support the MV-22 within the scope of the OMFTS/OTH concept.

Discussion: The United States Marine Corps (USMC) attack helicopter has not evolved fast enough over the past three decades to keep pace with technological and doctrinal advances. The AH-1 Cobra, (Attack Helicopter, model one), has been the subject of a series of upgrades to the basic airframe, all of which were reactions to improvements in threat capabilities, and a response to its lagging technological capabilities.

With the manufacture of new production MV-22 “tiltrotor” aircraft in 1997, USMC and U.S. Navy planners envision expanding the capabilities of amphibious operations. In its vision statement, the USMC has coined the term “Operational Maneuver from the Sea” (OMFTS). In OMFTS, assaults are launched from over the horizon (OTH), at distances of up to one hundred and fifty miles from the beach, and up to two hundred miles from the objective area. However, the new capabilities do not come without significant costs. The research and development costs of the MV-22 are high, and with its most precious cargo, (embarked Marines), it is very vulnerable to attack, especially during the en route portion of an operation when attack helicopter escorts cannot support it.

Conclusions/Recommendations: It is imperative that senior leadership in the Marine Corps and in the Navy not discount the need for armed escort when creating doctrine associated with the introduction of new assault support aircraft like the MV-22. With the lengthy acquisition process, the USMC should prioritize the development of a tiltrotor attack aircraft and allocate funding today. The future employment of attack helicopters in the Marine Corps will play a vital role in its warfighting capability across the globe.

Marine attack helicopters, especially the forthcoming AH-1Z, and their aircrew and support structure are still the best in the world, and will dominate attack helicopter tactical doctrine and operations well into the Twenty-First Century. But the future is now, and the Marine Corps must move ahead with programs to replace the AH-1, and put in its place an attack variant of tiltrotor design, or be left behind in the wake of OMFTS.

INTRODUCTION

The United States Marine Corps (USMC) attack helicopter has not evolved fast enough over the past three decades to keep pace with technological and doctrinal advances. The AH-1 Cobra, (Attack Helicopter, model one), has been the subject of a series of upgrades to the basic airframe, all of which were reactions to improvements in threat capabilities, and a response to its lagging technological capabilities. Since its addition to the USMC inventory in the 1960s, the AH-1 has been updated in an attempt to keep pace with the modern battlefield. These ameliorations include increased power and payload, enhanced targeting systems, improved munitions, digital communications and navigational aids, and more sensitive sensors.

USMC amphibious doctrine uses the aging CH-46 (cargo helicopter) "Sea Knight" as the primary means to move assault forces from ship-to-shore, while the AH-1s "escort"¹ en route, providing protection from enemy weapons platforms. Threats to the assault forces include enemy fighter or attack aircraft and helicopters, hostile ground antiaircraft artillery (AAA), surface-to-air missiles

¹ "Escort" is the term used to describe the procedure of flying in close formation with transport helicopters in order to provide security. *AH-1W Tactics Manual*, MAWTS-1 publication

(SAMS), armed surface vessels, and ground troops armed with small caliber weapons. The doctrinal concept of including the AH-1 on helicopterborne missions is known as attached armed escort.

To be operationally effective, tactical standing operating procedures (SOPs) generally call for en route airspeeds to be lower than the maximum capable airspeed of all aircraft models participating in a given mission. Slower en route speeds reduce the apparent motion of the assault support package, thereby making it more difficult to detect from the air. A reduced airspeed on the ingress and egress of a helicopter operation gives the AH-1 escort aircraft a velocity differential compared to the transport aircraft. This airspeed difference allows the AH-1 to “dash” ahead in reaction to threats, or to conduct forward reconnaissance and preparation of a potentially hostile landing zone.

Under current USMC doctrine, a mission described above commences from amphibious shipping positioned about fifty miles offshore, or from a land-based facility located up to one hundred miles from the objective area. Given the doctrinal airspeeds, and with aircraft fuel constraints²,

² The AH-1W carries two thousand pounds of fuel and burns approximately seven hundred pounds per hour, therefore it can stay aloft for about two hours. *AH-1W NATOPS Manual*, NAVAIR publication

assault aircraft have approximately twenty to thirty minutes of time-on-station in the landing zone or objective area before they are required to return for refueling. This is a very real operational limitation of USMC helicopter assets today.³ To provide a long-term solution to this limitation, the USMC has redirected its efforts at modernizing some of its older, more reliable helicopters, and has pursued the procurement of a replacement for the thirty-five year old CH-46. The CH-46 will be replaced with the MV-22 "Osprey" tilt rotor aircraft.⁴

With the manufacture of new production MV-22 "tiltrotor" aircraft in 1997⁵, USMC and U.S. Navy planners envision expanding the capabilities of amphibious operations. The MV-22 takes off and lands like a helicopter with its nacelles and rotors in the vertical position. Once airborne, the nacelles and rotors rotate forward, transforming the MV-22 into a fixed-wing aircraft. In forward flight, the MV-22 performs like a high performance turboprop, capable of traveling at three times the speed of conventional helicopters. As such, the distance to an objective from which an assault package launches will also triple. The enhanced capabilities of

³ William R. Liston, Colonel, USMC, Aviation Training Branch Head, Quantico, VA

⁴ Loren B. Thompson, "'Marine Corps Tilts into the Future'", *Sea Power*, Nov 1997, 1

⁵ *Ibid*, 3

the V-22 requires a new way of thinking about the operational level of war, expeditionary warfare, and amphibious operations. With the improved range, payload and speed, the MV-22 will outpace current helicopterborne assets, the most significant of which is the AH-1 escort aircraft.

In its vision statement⁶, the USMC has coined the term "Operational Maneuver from the Sea" (OMFTS). In OMFTS, assaults are launched from over the horizon (OTH), at distances of up to one hundred and fifty miles from the beach, and up to two hundred miles from the objective area. The MV-22 enables this revolutionary new operational concept. Its operational capabilities spell increased security for naval shipping, and more potential for tactical surprise by spreading the battlespace. The MV-22 gives the USMC a tremendous boost in capability, and will fundamentally change the way the United States conducts warfighting in this millennium.

However, the new capabilities do not come without significant costs. The research and development costs of the MV-22 are high, and with its most precious cargo, (embarked Marines), it is very vulnerable to attack, especially during the en route portion of an operation when

attack helicopter escorts cannot support it. Despite the provision for a turreted gun for self-protection, it remains a relatively defenseless platform, requiring armed escort for defense.

Fixed-wing fighter-attack and vertical short-takeoff and landing (VSTOL) attack aircraft will provide a level of protection⁷ for the innovative tilt rotor assault transport force, but not the intimate security that would be afforded by the AH-1's ability to immediately engage en route threats. Additionally, some of the fixed wing assets, such as the KC-130 refueling aircraft and the F/A-18, are not organic to the Marine Expeditionary Unit (MEU⁸), and would, therefore, have to be tasked to support an amphibious operation from either aircraft carriers or land-based locations. This situation presents a doctrine versus capability dilemma, the examination of which is the object of this paper.

In order to propose a solution to this quandary, a review of the development of the AH-1 throughout its thirty-four year history is required, with an eye toward

⁶ United States Marine Corps, *Warfighting Concepts for the 21st Century*, I-3

⁷ Tactical fixed-wing jet aircraft typically fly detached escort, displacing up to three miles laterally and five hundred to one thousand feet above assault support helicopters, thereby reducing reaction time to threats. MCWP 3-2 *Aviation Operations*

⁸ The MEU is the most basic MAGTF (Marine Air-Ground Task Force), combining organic aviation, infantry, indirect fire support, and logistics assets into a self-contained, stand-alone combat package. MCO 3120.9, *Marine Expeditionary Unit (Special Operations Capable)*

the latest developments incorporated in the new AH-1Z. With this foundation in place, an analysis of OMFTS will follow, along with a presentation of what the MV-22 will contribute to this concept. Then, having described the problems and shortcomings facing future USMC air assault support operations, this paper will conclude by offering options and recommendations to cope with and correct the predicted shortcomings of escort for the MV-22.

CHAPTER 1

HISTORICAL BACKGROUND: Development of the AH-1

The modern day Cobra attack helicopter finds its roots in the early 1960s, with the UH-1 "Huey" utility/medical evacuation (MEDEVAC) helicopter. The UH-1 "gunship" was equipped with machine guns and rockets in Vietnam to escort transport helicopters during assault support operations. This concept proved so effective that the U. S. Army pursued the development of a specialized attack helicopter dedicated to the specific mission of providing aerial fire support. Bell Helicopter won the contract to produce these aircraft, and created a two-place, tandem-seat helicopter, fitted with stub wings on which to attach armament, and a nose-mounted turret. The design team continued the use of proven UH-1 technology wherever possible, retaining the Huey's single engine, transmission, rotor system and "skidded"⁹ undercarriage in this new aircraft. In 1967, the first AH-1G "Huey Cobras" were delivered to the U.S. Army for immediate employment in Vietnam. The lack of sophisticated surface-to-air weapons employed by the enemy, coupled with the threat of small caliber weapons, led to

⁹ Skids are a fixed landing gear system incorporating long aluminum tubes in place of the traditional wheeled configuration.

the development of high altitude¹⁰, diving fire tactics for employment of the AH-1G's rockets, guns, and grenades.

Never slow to recognize a useful weapon system, by 1967 the USMC desired to operate its own AH-1 fleet and requested seventy-two AH-1G helicopter gunships. Procurement was approved in July 1967, with the total reduced to only thirty-eight aircraft. After evaluating the AH-1G, the USMC concluded that it needed: greater engine power provided by two engines, in order to improve over-water safety; a heavier gun armament turret; and modification for shipboard operations with corrosion prevention, naval avionics and a rotor brake. Hence, the 1968 AH-1J model "Sea Cobra" was developed and delivered to Marines in Vietnam in large numbers. The new "marinized"¹¹ AH-1J incorporated twin turboshaft engines and a twenty-millimeter (mm) cannon, replacing the AH-1G's 7.62 mm minigun.

With the acquisition of the Soviet shoulder-launched Grail, SA-7 surface to air missile (SAM), the North Vietnamese Army (NVA) forced the AH-1 community to develop new tactics: specifically, nap-of-the-earth (NOE), whereby

¹⁰ High altitude for helicopters is considered to be above three thousand feet.

¹¹ "Marinization" is a manufacturing process, whereby aircraft components are protected from salt water and sand, avionics compartments are made airtight, and shipboard handling features are installed.

helicopters use terrain masking, flying low-level¹², at relatively high speed, to avoid detection by enemy surface-to-air gunners.

As the Army improved its fleet of AH-1s, the Marines also looked toward improving the twin-engine model. Again forced to react to improvements to threat systems, the USMC incorporated additions like increased fuel capacity, as well as the tube-launched, optically tracked, wire-guided (TOW) precision-guided munition (PGM) antitank missile system, and the improved 20mm turret gun system.

Consequently, in 1977 the USMC began taking delivery of the AH-1T and T-TOW "Sea Cobras." The AH-1T, with an extended fuselage and tailboom, weighed two tons more than its predecessor. In addition to the TOW missile system, the AH-1T also boasted more powerful engines, transmission and larger rotor blades, all of which increased payload and performance¹³. PGM/TOW weapon system capabilities required that USMC attack helicopter pilots develop "TOW Team" tactics, where one AH-1 provides suppression with rockets and 20mm, while the TOW-shooting aircraft engages specific armor and other pinpoint targets. The AH-1T was deployed

¹² Low-level flight is considered to be below two hundred feet. Marine Corps Order 5000 Series, *Aviation Training and Readiness Manual, Volume II*.

¹³ The AH-1J was capable of carrying only 1200 lbs of fuel and 1500 lbs of non-precision weaponry, while the AH-1T had an increased fuel capacity of 2000 lbs and could deliver 2000 lbs of ordnance, including the precise TOW missile. *AH-1J/AH-1T NATOPS Manuals*, NAVAIR Publications

extensively on MEUs around the world, seeing combat action in Lebanon and Grenada.

In the early nineteen eighties, attrition of the aging USMC AH-1 fleet, and the desire for more lift capability, necessitated acquisition of additional, and more modern attack helicopters. Bell Helicopter had been working on an upgrade to the AH-1T by installing more powerful General Electric T-700 engines into the existing airframe, naming the new variant the AH-1T+. The Marines liked the improved engine performance, but also required enhanced weapons systems. To meet the needs of the Marine Corps, Bell added the avionics to accommodate the AIM-9 Sidewinder Air-to-Air missile, the AGM-122 Sidearm Antiradiation missile, and the anti-tank-"fire and forget" Hellfire missile. This new, more powerful and lethal attack helicopter was dubbed the AH-1W "SuperCobra," and the Marine Corps took delivery of it in 1986. Although these improvements did little to increase the speed and range of the older variants, the AH-1W, boasting the highest power-to-weight ratio in the world, was the most reliable and survivable helicopter in the USMC inventory.¹⁴

¹⁴ Doug Richardson, *Aviation Fact File/Modern Fighting Aircraft: AH-1*, Salamander Books Ltd, 1987, 4-13

With the upgrade in armament, the Marine attack helicopter community again developed new tactics to deploy the AH-1W. Already the leader in helicopter air combat maneuvering (ACM¹⁵), and expeditionary warfare, the Marine Corps incorporated the Sidewinder and Sidearm missile systems into its existing AH-1 training syllabus. Additional tactics to employ the laser-guided Hellfire were added to the Marines' repertoire. The Marine Corps finally had the most cost-effective and versatile attack helicopter on the battlefield. It was still able to perform the close air support mission (CAS¹⁶), but also anti-air warfare (AAW¹⁷), the antiarmor mission, and electronic warfare (EW). The main shortfall in the capability of the AH-1W was an onboard laser for the autonomous designation of the Hellfire missile and a night targeting system (NTS).

In preparation for 1987 contingency operations in the Persian Gulf, the Marine Corps funded the Interim Forward Looking Infrared (FLIR) Capability¹⁸, and purchased a number of telescopic sight units (TSUs¹⁹) from the Israeli company Tamam. The Tamam TSUs fit the existing AH-1W cockpit

¹⁵ Marine Aviation Weapons and Tactics Squadron One (MAWTS-1) and Fleet Marine pilots developed the ACM training program in the 1980s.

¹⁶ CAS is the procedure of providing immediate ground attack in close proximity to friendly infantrymen. MCWP 3-23.1 *Close Air Support*

¹⁷ AAW is airborne defense against enemy aircraft. MCWP 3-22 *Anti-Air Warfare*

¹⁸ FLIR is a thermal imaging sensor that allows pilots to acquire and engage targets at night.

without modification, and, with the FLIR, added a night targeting capability, and an organic laser designator and rangefinder. Six fleet AH-1Ws were fitted with the Tamam equipment, and were eventually deployed on Contingency Marine Air Ground Task Forces (CMAGTFs) in the “tanker wars” in the Persian Gulf. Marine AH-1Ws, fitted with the FLIR, performed admirably on Operation Ernest Will missions, escorting U.S. reflagged Kuwaiti oil tankers, as well as attacking Iranian-defended oil platforms and armed Boghammer speedboats while under the cover of darkness. FLIR-configured Cobras continued to deploy on Marine Expeditionary Units (MEUs) and participated in Operations Desert Shield and Desert Storm.

During the Gulf War, AH-1Ws accounted for only twenty percent of attack helicopter assets in-theatre, but flew over fifty percent of attack helicopter flight hours during the campaign. Its ninety-two percent reliability rate was a product of it requiring less maintenance than any other attack helicopter. Low operating cost and the capability to carry more types of ordnance than any other gunship, gives the USMC the most cost-effective and versatile rotary-wing attack aircraft in the world.²⁰

¹⁹ The TSU is an optical device mounted in the nose of the aircraft, and is used by the front-seat pilot/gunner to view the battlefield in search of targets.

²⁰ United States Marine Corps/Bell Helicopter Textron, Inc. Documentary Video, “Cobra” 1992

In the mid-nineties, the USMC funded an improved NTS upgrade for all Cobras, utilizing a higher resolution FLIR and a better auto-target tracker²¹. Within a year, a communications and navigation upgrade package was procured for the AH-W, which added a much-needed global positioning system (GPS), an embedded inertial laser-ring gyro navigational aid (EGI), and modern frequency-hopping radios. These improvements maximized the growth-potential of the AH-1W, making it an even more capable attack helicopter, able to communicate with joint forces, to navigate to within ten meters of a desired location, and to place precision ordnance on target under the cloak of darkness. The AH-1W is scheduled to remain in service until the year 2015.

Presently under development is the last series of the AH-1: the AH-1Z. The Bell Helicopter H-1 Upgrade Program redesigned the basic AH-1 once again by creating a new four-bladed AH-1 for the Twenty First Century. This airframe utilizes proven technology, and incorporates it into a much more maneuverable semi-rigid rotor system, which makes the AH-1Z more survivable and faster, while at the same time, significantly adds to its external stores

²¹ The auto-target tracker allows the front-seat pilot/gunner to “lock-on” to the acquired target with sensors, thereby eliminating the need to manually track the target with the TSU.

carrying capacity of ordnance and fuel.²² The AH-1Z is more “pilot-friendly”, due to its all-digital “glass” cockpit, systems management improvements, hands-on collective and stick (HOCAS) controls, digital moving-map display and weapons management system, helmet-mounted display for navigation and targeting, and vastly improved infrared and electronic optical sensors. These modernization features will reduce pilot workload, and increase his situational awareness, and will enable the Marine Corps to participate on the digital battlefield of the new millennium. The AH-1Z is projected to enter USMC operating forces in 2006.²³

²² The AH-1Z gross weight is 18,500 lbs, fuel capacity 2,800 lbs, and can carry 3000 lbs of ordnance. Lloyd A. Wright, Major, USMC, Attack Helicopter Coordinator, HQMC, APW (Weapons)

²³ Lance Landeche, Major, USMC, AH-1W Program Manager, NAVAIR APP-42, 28 Feb 01

CHAPTER 2

Present Marine Corps Amphibious Aviation Doctrine

USMC amphibious doctrine uses a self-contained MEU embarked aboard a three to four- ship naval Amphibious Ready Group (ARG) to project forces ashore via aviation and surface assets. The Aviation Combat Element (ACE) of the MEU is a composite squadron, composed of approximately twenty-four tactical helicopters and at times, a detachment of AV-8B Harrier VSTOL jet aircraft. Assault support aircraft include twelve CH-46 Sea Knight helicopters, which are the primary combat personnel movers for the USMC infantry Battalion Landing Team (BLT), and four CH-53E Super Stallions, which provide the heavy lift capability to move artillery pieces and other large equipment ashore. Four to six AH-1Ws comprise the armed-escort necessary to protect the helicopterborne force en route to the objective area (OA). Once the Ground Combat Element (GCE) is inserted into the area of operations (AO), the AH-1Ws transition to the offensive air support (OAS) role to supply CAS. Two to four UH-1N Huey utility helicopters serve primarily as command and control and MEDEVAC platforms, but also perform the escort and CAS functions to a limited extent.

A typical scenario finds the main landing force aviation assets (CH-46s and CH-53s) staged aboard the large deck helicopter carrier, while the armed escorts will be “cross-decked”²⁴ with their organic ordnance crews, equipment and weapons to a smaller ship, such as the Landing Platform Dock (LPD). “Cross-decking” allows the aviation assault package to marshal in the air, and then depart the ARG as a single force. Once all Marines are loaded and transport aircraft airborne, escorts join the formation and provide the assault package with close protection from enemy air, sea, and land-based threats en route.

Because of limited fuel and airspeed constraints of the helicopters, the distance of the ARG from the objective area is typically no further than approximately fifty nautical miles. A transport aircraft en route airspeed of ninety knots gives helicopter escort aircraft, (able to sprint at one hundred forty knots), a distinct speed advantage over the transports, enabling them to react to en route threats. This also allows a last-minute dash to the objective landing zones (LZ) to perform LZ reconnaissance

²⁴ Cross-decking is the practice of repositioning the attack helicopters within the ARG to another ship in order to operate more efficiently.

and preparation by fires if the zone is "hot." With a typical fuel load, the total average time aloft for all helicopters is roughly one and a half hours. This operational flight time is consumed as follows:

- Approximately thirty minutes for the ingress route, (with possible delays if an unanticipated threat is encountered.)

- Less than thirty minutes in-zone for unloading Marines and massing combat power ashore.

- Thirty minutes to return to ARG shipping with required fuel reserves.

If subsequent waves of assault forces are required, greater amount of time is necessary for refueling and reloading cycles.

The AH-1Ws will usually stagger launches from the LPD in order to provide continuous and overlapping CAS to the GCE ashore. At some point after the initial wave of the assault force has launched from the ARG, another armed section (two gunships) will depart the LPD and time its arrival in the AO so as to relieve the on-station Cobras before they reach their "bingo"²⁵ fuel state. This overlap of time between different attack helicopter sections allows

²⁵ "Bingo" fuel state is the predetermined amount of aircraft fuel remaining, (as calculated during mission planning), that is required to safely return to base.

the newly arriving aircrew to receive a situation brief from the crews departing the AO. This cycle provides Marines on the ground with continuous fire support throughout the operation, while at the same time allowing fresh shore-bound gunships to escort follow-on waves of transport helicopters on their ingress.

In the event an immediate extract of the ground force is necessary, (possibly due to unpredicted enemy strength or reinforcements), the whole process is reversed. In this situation, it is imperative that the attack helicopters are available to provide suppression and security for the vulnerable withdrawing transport aircraft and embarked Marines. Every possible contingency must be planned for, including Tactical Recovery of Aircraft and Personnel (TRAP²⁶), in case one of the helicopters goes down during the assault. Depending upon the expected level of threat, attack helicopter assets are tasked with the additional duty of providing armed escort for the TRAP package.

In order to facilitate sustained operations ashore, and to reduce turnaround time, a Forward Arming and Refueling Point (FARP) may be established in a secure area in the AO. The CH-53E is capable of providing this service

²⁶ TRAP is an additional task embedded within the assault support mission, whereby transport aircraft pick up downed crews and deliver maintenance personnel and parts to repair broken helicopters. MCWP 3-2 *Aviation Operations*

by lifting fuel and ordnance to the AO and setting up a FARP, but this tasking will detract from its primary mission of flowing combat power ashore. The Marine Corps KC-130 Hercules quad-turboprop aerial refueling aircraft, with its internal refueling cell, associated hardware, and cargo space, is also capable of setting up a FARP. This requires host-nation support (HNS) and a secure airstrip.

The MEU and its ARG are a potent, self-contained amphibious enabler, also capable of executing some smaller-scale contingency missions. The ACE's composite squadron is the key mobility asset of the MEU, and gives the MAGTF commander a long maneuver arm to project his combat power shore. The squadron's organic attack helicopter escort aircraft are a fundamental building block of the MEU and larger MAGTFs. AV-8B Harriers are "nice to have" for CAS and "detached" escort²⁷ of the helicopter assault package, (when they are available), but there is no substitute for the protection afforded by the closely attached AH-1W gunships. The pitfalls of detached escort are increased response time to a threat, decreased situational awareness caused by miles of offset, and increased radar signature from flying at higher altitudes.

²⁷ "Detached" escort is a technique used by attack aircraft to protect transport aircraft from a distance. *AH-1W Tactical Manual (TACMAN)*; *CH-46/53 TACMAN*, MAWTS-1 Publications

CHAPTER 3

Operational Maneuver From The Sea

Marine Corps forward-thinkers are developing Twenty-First Century warfighting concepts that articulate the service's institutional vision. These concepts are broad statements that express ideas, philosophies, and approaches to warfare, but they also describe the operational capabilities that the USMC seeks to achieve. Of these, the capstone operational concept of "Operational Maneuver from the Sea" (OMFTS) was established in 1996.²⁸ OMFTS represents a new approach to the USMC primary mission of *littoral power projection*. OMFTS addresses the full spectrum of challenges faced, the opportunities created by new technologies, and adapts the tradition of maneuver warfare to coastal waters (littorals.) This concept is applicable across a range of missions known as the "three-block war", where Marines may find themselves simultaneously conducting peace operations, humanitarian assistance, and combat within the same area.

OMFTS is a concept for the projection of naval power ashore, enabled by significant enhancements in information

²⁸ Gary I. Wilson, Col, USMC, "OMFTS: Innovation, Deep Maneuver, and Aviation," *Marine Corps Gazette*, Dec 1997

management, lethality of conventional weapons, and primarily by increased battlefield mobility. These enhanced tactical and operational capabilities can have a profound effect on where the USMC fights, whom it fights, and most importantly, how it fights. This will require altering the organization and equipment of Marine units, and their associated SOPs.²⁹

Future threats to U.S. national security will emanate from the littorals. These coastal areas will be increasingly urbanized, and characterized by large cities, densely populated coasts, and the intersection of trade routes where land and sea meet. While presenting a relatively small percentage of the world's surface, littorals provide homes to over three-quarters of the world's population, locations for over eighty percent of the world's capital cities, and nearly all of the marketplaces for international trade. The littorals are likely to be the hotbeds of conflict in this century. Potential adversaries may be expected to tap into the most modern technologies and weapons, and this will require U.S. naval forces to be hard to detect, far ranging, and fast moving.

²⁹ United States Marine Corps, *Warfighting Concepts for the 21st Century*, Concepts Division, MCCDC, II-20

A contrary opinion might posit that this is an arena where Marines and naval forces have been operating and fighting since World War Two. A MEU is a mobile, unpredictable, and regional power projector. From an offshore position in excess of fifty miles from the littorals, one could assume that the ARG is indeed "over the horizon" (OTH), depending upon one's definition of the horizon. The visual horizon is only a few miles, while the radar horizon can be up to thirty to forty miles, given the typical height of ground-based radar antennae. The exception to this lies with airborne radar systems, which can range well beyond fifty miles, but one of the prerequisites for expeditionary operations is air supremacy. Simply stated, the devil's advocate could say that it is "business as usual" for ARGs and MEUs.

OMFTS requires significant changes in the way naval forces are organized, and in the way they move between the sea and the objective. Rapid movement is required, not only from ship-to-shore³⁰, but also from ship to objectives that may be well inland, miles from the coast. To move units from ships lying OTH to objectives far from shore requires the capability to cross hundreds of miles. Many of the techniques and procedures currently used by USMC

operating forces, specifically ship-to-objective maneuver, must be replaced by those that are more in line with OMFTS.³¹

To obtain operational reach through the use of MEU assets, OMFTS leverages emerging technologies to develop greater capabilities in speed and mobility. The primary aviation capability necessary to prosecute OMFTS is the MV-22 "Osprey".

The Osprey is capable of vertical takeoff and landing like a conventional helicopter, but once airborne, cruises at speeds nearly three times as fast as a helicopter. This allows a tripling of the current distances covered by helicopterborne assault forces, in the same amount of time. Evolving doctrine will use a vertical maneuver force composed of the MV-22 and the CH-53E to attack from OTH and strike rapidly at deep objectives, re-embark, and strike other objectives before the enemy reacts. One significant detail not covered in present-day OMFTS planning is the requirement for assault support helicopters, (CH-53s, AH-1Ws, and UH-1Ns), to launch prior to the MV-22 in order to arrive at the objective LZ at the same time as the MV-22

³⁰ MCWP 3-31.5, *Ship-to-Shore Maneuver*

³¹ United States Marine Corps, *Warfighting Concepts for the 21st Century*, Concepts Division, MCCDC, II-16

force. This effect magnifies over time as the force re-embarks and strikes other objectives.

The endurance and speed of the MV-22 permits multiple lifts and extractions of the same unit, providing a flexibility of maneuver not before achieved in vertical assault operations. The ability to insert forces far inland and conduct follow-on bounding maneuver allows the vertical assault force to maintain a rapid tempo, destroying the enemy's forces through supporting fires, without allowing the vertical assault force to become decisively engaged. Current doctrine fails to consider the fact that the prime mover of fire support, the CH-53E, will not be able to keep pace with this high mobility and rapid tempo concept.

By omitting mention of the requirement for armed escort for the MV-22, OMFTS assumes a very permissive threat environment, but analysts disagree. In fact, there exists a significant threat to the MV-22. Patrick Neary, senior executive analyst in the Office of the Deputy Chief of Staff for Intelligence, noted that

shoulder-fired air defense missiles will remain the gravest threat to the USMC...helicopter forces for the foreseeable future...man-portable air defense systems (MANPADS) are available to almost every organized military force on the planet and several disorganized

military forces, such as terrorists and narcotraffickers.”³²

The “Threat” section of the Operational Requirements Document (ORD) for the Medium-Lift Replacement Aircraft (MLR) also states that “advanced integrated air defense systems pose the greatest threat to the MLR (MV-22.)”³³ In addition, fixed-wing and rotary-wing aircraft capable of interdicting the MV-22 can be found in almost every military organization that U.S. forces potentially could face.

³² Sean D. Naylor, “Future Threats Include Old, New Technologies,” *Navy/Marine Corps Times*, 2 Feb 1999

³³ MAGTF Warfighting Center, Revised ORD for the MLR, No. AAS 34.4, 27 May 1992, 3

CHAPTER 4

Future Attack Helicopter Operations

Given the concept outlined in the previous chapter, the future employment of the Marine Corps attack helicopter community warrants serious discussion. The currently fielded AH-1W will be the attack helicopter workhorse throughout this decade, with the AH-1Z projected to be in the operating force until 2025³⁴.

The AH-1Z will have a maximum gross weight of 18,500 pounds, which is a two-ton increase over the AH-1W. The internal fuel capacity of the AH-1Z will add an additional 800 pounds, extending its endurance and combat radius by nearly fifty per cent. Finally, the AH-1Z will be able to carry 3000 pounds of ordnance, representing another fifty per cent increase in weapons capability.³⁵ Despite these enhancements, the AH-1Z's main limitation with respect to supporting MV-22 operations will be its vastly inferior speed disparity.

Both the AH-1W and AH-1Z will be tasked to perform five of the six functions of Marine aviation: AAW, OAS (CAS and interdiction), EW, aerial reconnaissance, and assault support (armed escort). The challenge will be to

³⁴Lloyd A. Wright, Major, USMC, Attack Helicopter Coordinator, HQMC APW (Weapons)

³⁵Ibid

ensure that these assets will be able to accomplish the attack mission in the operational and tactical environment associated with the MV-22's increased speed, range, and endurance. This operational incompatibility is a recipe for disaster on the battlefield.³⁶

Despite the extraordinary systems advancements that the AH-1Z promises, the critical factor, with respect to OMFTS, is aircraft airspeed performance. The projected increase in airspeed of the AH-1Z over the AH-1W is negligible. The AH-1W cannot keep up with the MV-22, nor will the AH-1Z. The MV-22 cruise airspeed in forward flight is twice that of the top speed of any fully loaded AH-1, regardless of the series.

Now, the question of armed escort: If the AH-1 cannot support the doctrinal purpose of the MV-22, how will the USMC protect this asset and the Marines contained within? Who will provide armed-escort, and how will it be managed and planned? Or, will the MV-22 require any en route protection at all on tomorrow's battlefield? Commentators suggest that Marine Corps fixed-wing fighter-attack aircraft, such as the F/A-18 Hornet, will escort the MV-22. Currently, the USMC fixed-wing community has only one

³⁶ Bart J. Connally, Col, USMC, "Cobras & Hueys: Endangered Species," *U.S. Naval Institute Proceedings*, Sept 1995

tactical armed-escort sortie in their training and readiness (T&R) syllabus, and it addresses only detached escort.³⁷ When the fixed-wing community is tasked to support the MV-22, a fundamental shift in the way USMC aviation is employed must take place. For example, an entire support package must be assembled to support MV-22 operations. The support package will include: KC-130 tankers to provide service to the MV-22 and other fixed-wing aircraft; EA-6B Prowler support to provide protection from EW threats; and F/A-18D AAW, as well as F/A-18 and AV-8B CAS aircraft. These assets must be assembled in sufficient numbers and sorties in order to cover the entire operation.

In order for the AH-1 to support OMFTS and MV-22 operations, serious thought must be devoted to the positioning of sea-based platforms that provide fuel, ammunition, and a forward launch position, so that the attack helicopters arrive at the objective area at L-Hour.³⁸ The AH-1 gunships must be on-scene prior to the MV-22s making their transition to landing near the LZ. Again, if we consider the range and speed of the MV-22, detached AH-1 escort will require a FARP and the support and security

³⁷ Marine Corps Order 5000 Series, *Aviation Training and Readiness Manual, Volume IV*

³⁸ L-Hour is the exact time of planned landing of the amphibious assault aircraft.

necessary for it to work. As always, the GCE will require the direct support of the AH-1 in the objective area, so it is critical that warfighters work this into mission planning.

Consideration must also be given to tasking AH-1s to conduct armed reconnaissance of the intended assault support route of flight. If this mission is assigned to attack helicopters, mission planners will again have to calculate the time differential created by the speed disparity between the MV-22 and rotary-wing gunships. However, there is no guarantee of a totally secure ingress route for the transport aircraft, because a smart adversary will quite likely allow the gunships to pass unmolested, and await the arrival of the more lucrative troop-laden assault package. This presents another argument for the necessity of attached aerial armed-escort.

Another possible solution to the considerable speed and range disparity between the conventional helicopters and the MV-22 would be to position a FARP ashore in the littorals. This allows the attack helicopters and CH-53s to marry-up with the inbound MV-22 formation before the final ingress to the LZ and critical landing phase at L-Hour of an amphibious operation. Mission planners should

realize that establishing FARP operations ashore requires a suitable and secure area be identified or created.

On the downside, utilizing either of the methods detailed above (i.e., forward-basing an LPD closer to the littorals, or establishing a FARP ashore), negates the whole OMFTS concept of OTH operational maneuver. The closer presence of naval shipping, and especially a FARP in the littorals, might expose them to enemy threat weapons systems, and remove the element of surprise afforded by the speed, mobility, and range of the MV-22. But the OMFTS doctrinal use of Landing Craft Air Cushion (LCAC) and the Advanced Amphibian Assault Vehicle (AAAV) ignores this consideration as well. If these new landing craft were collocated on amphibious shipping with the MV-22, they would have to depart the ARG much earlier than the MV-22s in order to arrive at the objective area at nearly the same time.

Finally, on the positive side of the equation, there are the tremendous advantages that U.S. technological intelligence capabilities provide. With national assets, such as satellite imagery, electronic and signals-gathering equipment, and aerial photo-reconnaissance platforms, mission planners are able to map routes that utilize

terrain in order to avoid enemy strong points, and attack his critical vulnerabilities.³⁹

³⁹ William R. Liston, Colonel, USMC, Aviation Training Branch Head, Quantico, VA

CHAPTER 5

Recommendations For The Future

It is imperative that senior leadership in the Marine Corps and in the Navy not discount the need for armed escort when creating doctrine associated with the introduction of new assault support aircraft like the MV-22. Training developed now to support the OMFTS concept must include the use of attack helicopters, especially in light of the extraordinary capabilities that will be offered by the AH-1Z. Conversely, the inherent limitations of these weapons platforms, and others, should not be ignored when discussing doctrinal vision.

In addition to the future planning considerations and ideas presented in previous chapters, the Marine Corps, in conjunction with the joint community, should strongly pursue the development and acquisition of a new-generation attack aircraft. The AH-1Z brings much to the fight, but in the age of tiltrotor and VSTOL technology, by 2025 the AH-1 will be at the end of its long and successful 60-year life.

In the 1970s, during initial tiltrotor research and development, Bell Helicopter built the XV-15 for NASA and the U.S. Army. Two of these small, experimental precursors to the V-22 were built, and flew successful flight tests

into the early 1980s.⁴⁰ This agile aircraft demonstrated great potential as an attack platform. A proposal to develop the AV-15 as an attack/escort variant to compliment V-22 tactical operations failed due to a lack of funding. With the idea shelved, the MV-22 was left to fend for itself.

Serious consideration should be given to resurrecting the AV-15 program, or some similar capability, so that the attack helicopter community moves forward, along with, or closely behind the transport helicopter community. The Marine Corps should plant the seeds now in the acquisition process, so that lawmakers can look forward to funding such a desperately needed aviation modernization program. The other services could also benefit from such a program, so joint support should be solicited throughout the Department of Defense.

One final potential solution to the dilemma of how to escort the MV-22 would be to resurrect the mid-1990s plan to find a suitable replacement for the Marine OV-10 "Bronco" observation aircraft, which was retired after the Gulf War. With the dissolution of the last Marine Observation Squadron (VMO-2), a tremendous vacuum was created in Marine aviation, and the AH-1 and F-18

⁴⁰ Loren B. Thompson, "Marine Corps Tilts into the Future", *Sea Power*, Nov 1997

communities had to fill the gap, with respect to the aerial supporting arms control and tactical air control missions. The twin-turboprop OV-10, fitted with proper armament, would be an outstanding escort platform for the MV-22 during the en route portion of an assault support mission.

In the mid-1990s, a follow-on Marine observation and attack aircraft (VMOA) was considered in order to bridge the tactical, operational, and technical gap brought by MV-22 tiltrotor technology and the emerging concept of OMFTS.⁴¹ The requirements for this new aircraft were that it be self-deployable, that it be configured with adequate armament (a flexible gun system, precision-guided munitions, and an option to carry air-to-air missiles), and that it possess a greater range, speed, and endurance capability than the MV-22. Unfortunately, research and development funding was never obtained, and the proposal was scrapped. A revival of this conceptual program as an armed-escort for the MV-22 force could provide an affordable means to synchronize MAGTF assault support in this century.

In the final analysis, an attack variant of the tiltrotor is the ideal solution. This type of escort would

⁴¹ Bart J. Connally, Col, USMC, "Cobras & Hueys: Endangered Species," *U.S. Naval Institute Proceedings*, Sep 1995

provide immediate response time and high situational awareness when supporting the en route MV-22 force. It would also be able to operate in marginal weather with low ceilings and poor visibility, flying low level, below enemy radar coverage. Additionally, such an aircraft might have a limited personnel-carrying capacity, and therefore, could execute immediate en route TRAP missions. Finally, an AV-15, AV-22, or some other similar attack aircraft, could maintain a position in or around the LZ in order to provide CAS to ground forces exiting the MV-22.⁴²

With the lengthy acquisition process, the USMC should prioritize the development of a tiltrotor attack aircraft and allocate funding today. Additional funding should be requested from Congress, with an explanation of the implications of operating without a dedicated and intimate attached armed-escort for the MV-22.⁴³ Additionally, the USMC should ask the Department of the Navy to increase its aviation budget in order to procure this vital replacement for the AH-1.

⁴² Phillip Tucker, Capt USMC, "How Will We Escort the MV-22?" *U.S. Naval Institute Proceedings*, Nov 1999

⁴³ Ibid

CONCLUSION

The future employment of attack helicopters in the Marine Corps will play a vital role in its warfighting capability across the globe. Marine attack helicopters, especially the forthcoming AH-1Z, and their aircrew and support structure are still the best in the world, and will dominate attack helicopter tactical doctrine and operations well into the Twenty-First Century. But the future is now, and the Marine Corps must move ahead with programs to replace the AH-1, and put in its place an attack variant of tiltrotor design, or be left behind in the wake of OMFTS.

OMFTS is a sound and viable concept for American dominance of the littorals in this millennium, but the need to protect our assets and "fight smart" on future battlefields is paramount. The lightly armed MV-22's measurable self-protection is no substitute for the highly successful and time-tested tactics of intimate, attached armed-escort of assault aircraft. The Marine Corps must address the issue of supporting the MV-22 within the context of operational art and future OMFTS combat operations, or pay an ultimate price, when very expensive Ospreys, full of even more valuable Marines, are taken from the skies over future battlefields because of lack of vision.

In his response to the April 2000 MV-22 mishap, where nineteen Marines perished and a \$50 million aircraft was lost, Lieutenant General McCorkle (Deputy Commandant of the Marine Corps for Aviation) said: "Our work as Marines comes with inherent danger and risks, but we strive to do everything we can to minimize those risks."⁴⁴ In order to minimize the high risk associated with unescorted MV-22s conducting assault support missions into hostile areas, the USMC needs to address the deficiency in OMFTS doctrine, and take steps now to develop a capability that will correct this shortcoming.

⁴⁴ McCorkle, Frederick, LtGen, USMC, DCMC(Air), "Transforming Marine Aviation", *Marine Corps Gazette*, May 2000

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