MV–22 flies over Gulf of Mexico during training mission at Hurlburt Field

U.S. Air Force (Andy M. Kin)

MV–22B Osprey
A Strategic Leap Forward

By GLENN M. WALTERS

In early October 2007, the amphibious assault ship USS *Wasp* steamed through the Gulf of Aqaba, turned into the wind, and made final preparations for flight operations. The *Wasp*'s mission was to launch a squadron of Marine Corps assault support aircraft, so they could make their way into Iraq to replace a helicopter squadron that was nearing the end of its 7-month combat deployment in support of Operation *Iraqi Freedom*. Although shipboard flight operations occur daily throughout the world, there was nothing routine about this particular launch. As the wheels of the MV–22B Osprey aircraft ascended from the *Wasp*'s deck, aviation history was made.

At that same moment more than 500 miles away, a CH–53D Sea Stallion squadron, Marine Heavy Helicopter Squadron 362, from Marine Aircraft Group 24 (MAG–24) of the 1st Marine Aircraft Wing, in Kaneohe Bay, Hawaii, was preparing for flight operations at Al Asad Airbase in Iraq. This squadron's CH–53 predecessor aircraft flew their maiden combat voyages in 1966 south of Da Nang, Vietnam, yet their service was still required more than 40 years later. The clarion call of combat operations in Iraq and Afghanistan had touched nearly every aspect of Marine aviation, and now it was time for the Corps' newest asset, the Osprey, to fulfill decades of promising tests and technical improvements.

Marine Medium Tiltrotor Squadron 263 (VMM–263), of MAG–26, 2d Marine Aircraft Wing, from Marine Corps Air Station New River, North Carolina, is the Corps' first operational Osprey squadron. The *V* in VMM–263 signifies this is not a helicopter squadron, but a tiltrotor unit, equipped with the MV–22B. And on this day in October, the squadron's lead aircraft made the 500-mile flight into Iraq seem routine, landing with more than 2 hours' worth of fuel remaining.

History of Challenges

According to some, this was a day that should not have happened. Since its conceptualization in 1981 and its designation as a program in 1984, the V–22 has had more than an equitable share of opponents, who have cited technical challenges, reliability, physics, affordability, and safety concerns as their rationale to oppose the program. They predicted failure at every milestone. Even after the squadron deployed to combat and began to prove itself, two separate but equally malicious articles were published denouncing the aircraft, as well as the leadership and abilities of the Marines who operate it.

Bell-Boeing's V–22 program is currently producing aircraft for the Marine assault support mission, as well as filling a critical long-range requirement for U.S. Special Operations Command. Moreover, it is positioned to provide fleet support and search and rescue missions for the Navy. Originally, when it still held the nascent designation of *JVX*, the Army was a large part of the program and, in fact, was designated the lead service in JVX acquisition. During the same period, the Army was pursuing the RAH–66 Comanche program,

which was a low-observable technology, to replace its inventory of scout helicopters. Either through a desire to limit its efforts in expanding technology in vertical lift, or a prescient read of the tea leaves from rhetoric regarding JVX program support, or a more pressing need for better scout helicopters, the Army opted out of V–22 development. This left the Marine Corps and special operations community as the remaining proponents of V–22 technology.

How did the V–22 survive the many debates in the Department of Defense, nonpartisan think tanks, national media, and the halls of Congress? Numerous articles written over the years attribute its survival solely to congressional will to buy the aircraft. This claim, while a pat answer, cannot be the only reason the V–22 Osprey endured. The detractors of the aircraft cite technical challenges, including its aerodynamic viability, complexity, and sophisticated system integration requirements, faced during its development. All of these challenges were identified during modeling, developmental testing, and operational evaluations. Dedicated engineers, pilots, and program managers identified and analyzed problems, developed solutions, and implemented changes. A cursory study of the history of the V–22 program is replete with stories of this process and its success.

The key element that underscores the developmental process is the magnitude of the effort in bringing this revolutionary aircraft to the field. Opponents have often cited the relative ease of replacing the CH–46 with a newer helicopter. They are correct in that options for replacements were myriad, but the ultimate goal of the V–22 program was to replace a horse with an automobile rather than with a faster horse. Replacing the CH–46 with a newer helicopter would correct some deficiencies and vulnerabilities incurred with using 1960s rotor technology, but an improved helicopter platform would not completely change the equation. The V–22 is not only the next step in helicopter design, but also a leap forward in vertical lift. Because of this, the V–22 can accomplish the helicopter mission more efficiently while reducing those critical vulnerabilities intrinsic to conventional helicopter design. A newer helicopter would fly through the threat envelope faster yet still be constrained to similar flight parameters. Conversely, the V–22 can fly over or around threats, thereby reducing the exposure to them to minutes instead of hours. The design of the aircraft incorporates vulnerability reduction so if and when a threat engages the aircraft, it has a higher probability of survival.

Colonel Glenn M. Walters, USMC, is Head, U.S. Marine Corps Aviation Plans, Programs, and Budget. A test pilot, Colonel Walters was the Commanding Officer of VMX–22 from 2003 to 2006 and saw the MV–22B through operational evaluation and its full rate production decision.

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Today, in 90 minutes, a two-plane flight of V–22s can execute a battlefield circulation mission that would have taken six CH–46 aircraft to do the same thing, and the flight can be accomplished without refueling. These mounting empirical data of the V–22 successfully executing its mission as a medium-lift assault support aircraft in al Anbar province are being ignored by its critics who continue to rely on decades-old helicopter experiences in Vietnam as a basis for assessing combat operations today. Citing reduced risk in making evolutionary steps and "kicking the can down the road" is one of the central themes routinely espoused about the V–22 program.

Steadfast Vision

This phenomenon of publicly advocating risk avoidance seems to have been more prevalent in the past two decades than in the previous years when the American will to further technological boundaries was strong. The risks associated with developing nuclear submarines and jet aircraft in the 1950s were far higher than what we face now. The mishaps, missteps, and hard lessons learned then were just as costly, but the country was willing to take them in the name of advancement. So what, beyond the strong support of Congress, keeps the country on a path to developing a revolutionary vertical lift aircraft? The V–22 had support in both the Marine Corps and special operations communities. Why did senior officers across two decades support a tiltrotor concept in the early 1980s, its developmental phase through the 1990s, and finally its introduction to combat in 2007? Has not the threat shifted from the conventional/nuclear during the Cold War to irregular warfare as applied to the current war on terror? How could an aircraft developed *then* be the correct aircraft *now*?

The answer lies in establishing a vision consistent with the principles of war. In the same manner that amphibious operations planning was considered anachronistic after the failure at the Battle of Gallipoli in World War I, the Marine Corps endeavored to look beyond the last conflict and envision a future undefined by the past. Consistent with this

MV–22 in Iraq

U.S. Marine Corps

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thought process is ensuring that evolutionary steps and all new concepts remain true to those principles attributed to Clausewitz. In this way, the Marine Corps can conceptualize advances in warfare yet remain cognizant of its key tenets.

The difficulty over the two-decade process between conception and deployment has been to maintain this vision. The easy solution would have been to cancel the program and acquire a newer helicopter. If the Marine Corps had given up on its vision of the future, the result would have been additive improvements in several of the principles of war (for example, mass and economy of force) as opposed to the exponential increases seen in the majority of the principles provided by the V–22. Taken in turn, each of the principles of war is enhanced, enabled, or accelerated by vertical lift technology with the speed, range, and payload of the V–22:

Mass at the Point of Decision: The advantage of tiltrotor technology coupled with the increased power in the airframe means that the V–22 can carry 24 combat-loaded Marines regardless of ambient temperature. This equates to twice the payload of the CH–46 in the winter and a factor of four during the summer months.

Offensive: The V–22 has a significant increase in capability. It provides a six-fold differential in range, a doubling of the payload, and the ability to approach landing zones from higher altitudes, all of which give the Marine air-ground task force (MAGTF) commander a greater ability to project operations across the entire theater.

Surprise: The dynamic flight profile of the V–22 greatly reduces the probability of compromising missions. Vehicle noise, whether aviation- or ground-based, is one of the simplest methods to preempt a mission. The noise from approaching helicopters combined with a cell phone call can negate detailed raid planning. Modify the profile to high-altitude approach combined with the mass effects provided by increased payload, and the enemy's reaction time is reduced exponentially.

Objective and Maneuver: Operations up to the introduction of the Osprey were limited by the range of the helicopter and/or the limits of the aviation ground support elements to provide logistics support in order to extend the range of the helicopters. The V–22 provides the MAGTF commander a six-fold increase in possible objectives on which to operate. Additionally, the MAGTF commander and, by extension, the joint force commander are no longer limited to traditional helicopter ranges. The maneuver space for the V–22 must be considered on a theater-wide scale versus merely the specific area of operations of the MAGTF. This capability is a force multiplier for the entire joint force.

the V–22 is equipped with a dedicated console for the ground commander in the rear of the aircraft that provides situational awareness updates during the flight through to the landing zone. This ensures the ground commander has access to the same real-time information as the aircrew, which greatly increases his situational awareness and reduces the time required to take control of the landing zone once the boots are on the ground.

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Simplicity and Economy of Force: Increased payload and shorter flight times equate to fewer platforms required to accomplish the mission, reduced complexity intrinsic to an aerial assault, and greater ability to account for contingencies. Anyone who has planned a helicopter-borne operation understands that the fewer platforms required combined with fewer waves to accomplish the insert increases the probability of success for the insert.

Unity of Command: Sound planning and application of Marine Corps doctrine ensure that assault support missions delineate the chain of command in the air. Additionally,

Security: This is a culmination of the other principles in that the joint force/MAGTF commander has the ability to conduct large-scale operations into objectives previously considered untenable with a smaller number of aircraft, a major reduction in the time required, and while retaining the element of surprise. Given these elements, the enemy would be hard pressed to gain an unexpected advantage.

Exceeding Expectations

Marine Corps leaders who envisioned the utility and success of the V–22 likely also

Marine aircrew mans machinegun on back of MV–22B

U.S. Marine Corps (Michael L. Haas)


U.S. Marine Corps (Michael Kropiewnicki)

Marines tow CH–53D Super Stallion helicopter across flightline at Al Asad Air Base, Iraq

saw the potential for refinement of tiltrotor technology in follow-on and future designs. The visionaries who produced the submarine and the jet did not believe the first renditions would be the last; instead, they understood that these productions were necessary rungs on the evolutionary ladder—raising the level of technology to the advanced systems of today. If they had been focused on this first jet or submarine, we would still be operating diesel boats and subsonic aircraft. These technologies have the potential for continued refinement either to secure viability or expand usefulness. The V–22 Osprey is to vertical lift aviation what the USS *Nautilus* was to our submarine fleet and the Bell–X–59A was to our tactical fighter arm.

Today, we watch as tiltrotor technology undergoes its most critical evaluation: its use in combat. The VMM–263s bear that test now. They departed Marine Corps Air Station New River in mid-September and transited the Atlantic, Mediterranean, and Suez Canal. They flew a 500-nautical-mile flight into Al Asad, Iraq, without refueling and arrived with enough gas in their tanks to fly for another 2 hours. This kind of operational flexibility was unheard of before the Osprey arrived on the scene.

In the first 30 days in combat, the Ospreys have flown in excess of 68 hours per aircraft, which is three times their planned peacetime usage. They have overflown their assigned sorties by 15 percent and the burden on the maintenance Marines has been reduced, in terms of maintenance man-hours per flight hour, by 50 percent when compared to the traditional helicopters they replaced. The value of this technology is evident now. It is exceeding predictions and expectations. What is unknown is how much we can get out of this aircraft. That will be left to the dedicated, intelligent, and hardworking Marines and Airmen who will fly Ospreys into harm's way and develop even better tactics, techniques, and procedures that will continue to define how the V–22 Osprey, and its follow-on siblings, changes the face of assault support operations.


U.S. Marine Corps (Michael L. Haas)

MV–22B refuels at Al Asad Air Base, Iraq

There is no expectation that the opponents of the aircraft will retract their statements or admit they were wrong, but in time perhaps they could evaluate the Osprey on the merit of its accomplishments. Every discovery by failure during the development of this aircraft was exhaustively studied and has resulted in improvements to the version flying today in combat. The development of this aircraft was not perfect, and many of the lessons learned were bought at a terrible price. This is not a Machiavellian conclusion by any means, but rather an affirmation that as the Marine Corps moves forward with quiet confidence and clarity of purpose, it will not forget the lessons learned and the sacrifices that provided for its future. **JFQ**