

Reaching Translational Lift:

The History of the Helicopter and Lessons for 21st Century Technology

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Technology has always played an important role in the development of warfare. As weapon systems change and improve, they influence not just the outcome of armed conflict, but the way wars are planned and fought. As the 21st century continues to unfold and technology's advances accelerate, today's military leaders and strategists must keep pace. Dr. I. B. Holley wrote in his conclusion to *Paths of Heaven: The Evolution of Airpower Theory* that "technology advances—novel weapons as well as ancillary equipment—are devised, but until suitable doctrines are formulated to optimize their potential, they remain underexploited."¹ By looking to historical examples of the interaction between technology and doctrine today's military decision makers can learn some important lessons. One example is the development of rotary-wing aviation in the United States military. The integration of helicopters into military doctrine provides several lessons for the modern integration of technology, including Unmanned Aerial Systems (UAS), into military operations.

The aerodynamic success of the helicopter provided a new and exciting technology following the Second World War, and by the Vietnam War all of the military services were fielding helicopter units. The United States Army and Marine Corps fielded the largest numbers of rotary-wing aircraft and spent the most time developing helicopter-specific doctrine. Both services achieved similar results; however the relative speed of their experimentation and doctrinal development differed. Army and Marine Corps approaches to helicopter development were dependent on three important factors: recognition, organization, and leadership. In all three areas the Marine Corps demonstrated a significant initial advantage over the Army. The results should not be surprising; the Marines were the first American force to experiment with, develop, and execute a successful rotary-wing doctrine.

The first successful helicopters were flown in Europe, where Nazi Germany fielded the first military designs. Their aircraft were kept to small production numbers as the Allied bombing campaign rapidly destroyed their factories. In the United States, Igor Sikorsky was the first American designer to successfully compensate for torque effect, the tendency for a helicopter fuselage to rotate opposite to the direction the rotors turn, with his VS-300. The aircraft was rapidly converted to a military design and designated the Sikorsky Aircraft Corporation's R-4.² Late in the Second World War, the aircraft went into full production and four hundred of them were produced by the end of the war. The Army Air Forces Air Rescue Service was the first military organization to use the new aircraft, with the 8th Emergency Rescue Squadron deploying to Burma in the spring of 1944. In May of that year an American pilot logged the first

helicopter combat mission when he rescued four downed airmen behind Japanese lines. The squadron continued to have success and the aircrews completed forty-three rescues by the end of the war.³

Recognition

Despite the fact that the Army was the first of the American armed forces to deploy the helicopter, its post war development of the aircraft ended almost as quickly as it had started. When the United States Air Force was formed the new service took the Army's aviation component with it, including the helicopter units in the Air Rescue Service. However, the Air Force was not interested in the low and slow technology of the helicopter. Their focus on the awesome firepower of the atomic bomb and the technological development of Strategic Air Command's massive bombers left rotary-wing aviation without a patron in the Air Force or the Army.

Conversely, the Marine Corps was not about to let this new technology become an aeronautical footnote. While the Air Force saw the atomic bomb as a great new calling, the Marine Corps saw it as a danger to the doctrine on which it had built its success in the Pacific-amphibious warfare. Marine Lieutenant General Roy Geiger watched the atomic tests at Bikini Atoll following the end of the war with Japan. As the mushroom cloud billowed skyward Geiger saw everything the Marines had learned island hopping going with it. Geiger saw beyond the great power that the atomic weapon gave the United States and realized what such a weapon was capable of in the hands of an enemy. Specifically, he envisioned what it could do to an amphibious assault force as it made its way across the beach. In his quickly-drafted letter to the Commandant of the Marine Corps, he wrote that "since our probable future enemy will be in possession of this weapon, it is my opinion that a complete review and study of our concept of amphibious operations will have to be made."⁴ Geiger demonstrated something that the Leathernecks would continue to display through their early rotary-wing development: technological foresight.

The Commandant, General Alexander Vandegrift, acted immediately. He established a board headed by Major General Lemuel Shepherd to study the possible ways to counter the threat posed by atomic weapons. The board's staff quickly determined that dispersion and rapid mobility would be key elements to the atomic battlefield. The new technology of heliborne forces piqued their interest. They began corresponding with Sikorsky Aircraft Corporation and their competitors at the Piasecki Aircraft Corporation. The board studied the helicopter in depth. They not only checked the capabilities of current designs but also looked to the future by consulting the designers and engineers on where their designs might lead. The board came to the conclusion that the helicopter was "the answer to the amphibious prayer."⁵ Shepherd and his staff made three key recommendations that the Commandant immediately implemented: the establishment of an experimental helicopter unit to test the new aircraft, the creation of a program to study the future of helicopter development, and the initiation of work on a doctrine for the successful employment of the helicopter.⁶

The United States Army trailed the Marine Corps by nearly a decade in their recognition of the helicopter as a vital element of the future of warfare. Following the Second World War the Army focused its development on perfecting the mechanized and armored warfare that it had employed

fighting the Germans. As is commonly found in military history they focused on perfecting the techniques of the last war instead of looking to the next war. The highly mechanized force soon found itself bogged down in Korea, slowed by the harsh terrain and climate that was nothing like the plains of Europe. Army Aviation units flying helicopters deployed to Korea only after initial Marine successes demonstrated the value of the aircraft. The Army units were simply transportation companies and lacked a defined place within the overall Army doctrine.

In 1954 Major General James M. Gavin, a decorated Army Airborne veteran of the Second World War and Korea, wrote an article for *Harper's Magazine* entitled "Cavalry, and I Don't Mean Horses." Gavin used the experience of the Army in the Korean War to demonstrate that a heavy, mechanized army did not have the flexibility to rapidly respond to the wide variety of modern threats. The initial invasion by the North Koreans could have been slowed by a cavalry unit that would have been able to harass the Communists as the Americans and South Koreans regrouped. Instead, the United Nations forces were under constant pressure and were forced all the way to Pusan. Gavin wrote that after the initial success of the Inchon landings "the situation screamed for highly mobile cavalry forces to exploit this unprecedented opening," but no such force was available so the US offensive slowed, allowing much of the Communist army to escape. What the United States Army needed, according to Gavin, was a cavalry force "airlifted in light planes, helicopters and assault type aircraft," that could move quickly to counter enemy offensives and magnify Allied advances.⁷

Besides the lessons of Korea there would be other examples of the helicopter's growing importance to military affairs including a successful heliborne assault launched by the British during the Suez Crisis of 1956. The article by General Gavin sparked discussion within the Army. However, there was no equivalent of the Marine Corps board chaired by General Shepherd and no headquarters-directed effort to study the possibilities that the helicopter created. While individuals within the United States Army began to recognize the value of rotary-wing aviation, there was no official or service-wide movement to develop the concepts tied to the new technology.

Organization

When Marine Corps Commandant Vandegrift ordered the recommendations of Shepherd's board into effect in 1947, the institutions of the Marine Corps quickly fell into formation. The center of Marine Corps training and development had grown around Marine Base Quantico, Virginia. Located just south of Washington D.C., it was the site of Marine Corps Schools and other development commands. They were established at Quantico, conveniently located near decision makers in the Capitol and senior officers. Schools for the education of field and company grade officers had been created, as were tactically-specific schools. The doctrine of amphibious warfare developed in the interwar period was created at Quantico and the methods of close air support mastered during the Second World War also had their doctrinal foundation there.

The Corps was in such a hurry to begin their rotary-wing studies that Marine Helicopter Experimental Squadron One (HMX-1) was established at the end of 1947 with eight officers, one enlisted man, and no aircraft. By February of 1948 Sikorsky delivered the squadron's first HO3S-1 aircraft and the squadron rapidly expanded as it began to experiment with the

capabilities of the aircraft. The pilots practiced formation flying, began development of fighter-evasive tactics, and tested capabilities for support missions such as wire laying and photographic reconnaissance. The squadron was stationed at Quantico where the pilots could not only be observed by senior officers, but could also interact with the staffs conducting the more academic work of developing the new doctrine.

As the pilots of HMX-1 became comfortable with their aircraft and began to develop tactics, the Leathernecks at the Marine Corps Schools began work on a more comprehensive helicopter operational doctrine. The prospects were exciting. Three months after HMX-1 was established the pilots teamed with the Marines developing the new doctrine for their first helicopter exercise. Helicopters moved sixty-six assault troops with several hundred pounds of equipment across the beach-head from an offshore amphibious task force.⁸ The results, while not awe inspiring, demonstrated to everyone involved the promise of the new concept of “vertical envelopment.” Victor Krulak, then a Colonel and Assistant Director of the Senior School at Quantico, stated that “the evolution of a set of principles governing the helicopter employment cannot wait for the perfection of the craft itself, but must run concurrently with that development.”⁹ The forward-thinking perspective of Krulak and his men directly influenced the design process at Sikorsky and Piasecki Aircraft Corporations. Instead of waiting to see what the designers would produce, they studied the challenges, checked the experiments of HMX-1, and then told the engineers what they needed.

World events interrupted the work of HMX-1 and Marine Corps Schools in June of 1950 when the North Korean Army launched a surprise invasion across the 38th Parallel. As the number of pilots and aircraft increased in Korea and dedicated helicopter units were formed and deployed, the doctrine writers in Quantico continued their work. They had embraced the technique of “vertical envelopment” as the cornerstone of their new amphibious doctrine. Reports flowed back from Korea on tactics and capabilities and the men at Marine Corps Schools integrated them into their studies. In December 1955 the Marine Corps issued Landing Force Bulletin 17 (LFB-17). It was a complete rewrite of the manual governing amphibious operations and focused on heliborne air assault, placing the helicopter at the center of the Marine Corps’ future. The bulletin’s summary concluded by saying:

This concept has the ultimate goal of an all-helicopter assault which will endow the amphibious attack with maximum impact and maximum freedom of action ... Eventually, when the concept is fully realized, the beach assault can be eliminated altogether, leaving only follow-up troops and supplies, exploitation forces, and base-development units and material to be landed over beaches or through ports in the beachhead area.¹⁰

The distribution of LFB-17 was quickly followed by the meeting of the Fleet Marine Force Organization and Composition Board. Known as the Hogaboom Board, after the Major General appointed as the Chairman, the group studied the physical and organizational requirements created by the new doctrine. The result was a sweeping reform of the composition of the Marine Corps. Units were redesigned around the goal of making nearly the entire Corps airmobile. The size of the Marine Air Wing was rapidly expanded to be able to carry 876 assault Marines with their 105 millimeter howitzers and all the necessary equipment anywhere within a one hundred

mile radius of a task force at sea.¹¹ By 1960 the Marine Corps could execute multiple battalion-sized assaults from land or at sea aboard the Navy's new class of ship, the Landing Platform, Helicopter. The Marines proved the value of the new doctrine and equipment while deployed during the Cuban Missile Crisis, Operation Sea Gull off the Dominican Republic in 1961, and the pre-Vietnam War intervention in Laos in 1961.

Following General Gavin's article about the possibilities of airborne cavalry, the Army's response was less organized than that of the Marine Corps. In 1955 Brigadier General Carl Hutton took up the cause of helicopter mobility as the Commandant of the Army Aviation School, located at Fort Rucker, Alabama. The school included a Combat Development Office to study future aviation requirements. Colonel Jay Vanderpool, who was not an aviator, was placed in charge of the office and tasked by Hutton to take responsibility for studying the possibilities created by the helicopter.¹²

Soldiers at the Army's Command and General Staff College at Fort Leavenworth, Kansas began to work on the development of a helicopter doctrine. By early 1956 the developers at Leavenworth had a working draft of a doctrine that would allow an infantry battalion to have command of some helicopter assets.¹³ The work on doctrine at Leavenworth and the experimentation and tactical development at Rucker were conducted nearly one thousand miles apart. A field manual was also developed to govern the helicopter as a supply and transportation asset. The Infantry Officer's School at Fort Benning, Georgia studied the possibility of using the helicopter in raids.¹⁴ Work by the transportation community and the infantry, like that of the doctrine writers and pilots, was conducted separately with little official coordination. Experimentation and development continued in 1957, however the Army ran into another problem: the decision makers who controlled the budget and overall Army plans were in neither Kansas nor Alabama. In Washington D.C. the concept of heliborne operations had few allies and there was little money to support the large number of helicopters that would be needed to make Army units airmobile. Army helicopter development stalled until the 1960's and the threats posed by a new conflict in Asia.

Leadership

The importance of good leadership in military affairs is well known. In the development of helicopter doctrine the Marine Corps and Army demonstrated the importance of leadership on different levels. The Marine Corps' institutional leadership was a key element in its early development of the helicopter field. In the Army personal leadership and individual initiative created a situation where helicopter operations could remain in quiet development until they gained institutional acceptance.

Commandant Vandegrift and General Geiger played vital roles in the Marine Corps' acceptance of helicopter aviation. Their ability not only to learn lessons from the previous war but also to prepare their beloved Corps for the next war was central to the future success of their service. The top-level leaders of the Marine Corps created an environment where the helicopter could succeed. When the Navy Department budgeteers denied requests for more aircraft the Marine Corps senior leaders repeatedly fought for funding while telling those at Quantico to continue

with development. They could see beyond the parochialism of their individual warfare specialties and focus not on their personal history, but the future of the Corps.

In Quantico the Marines had created an environment that encouraged innovative thinking. The Marine Corps placed their most qualified officers in staff billets at the Schools. Doing so had proven successful during the interwar period as Quantico had become the center of development for amphibious warfare concepts. At the Marine Corps Schools decorated and revered veterans, such as Lieutenant General Victor Krulak, were assigned along with academics and more junior officers who were looking to create something new. The Marines also had the foresight to locate HMX-1 at Quantico where its pilots could directly interact with the staff officers who were working on the doctrine. All of these factors were the result of a specific policy by the leadership of the Marine Corps to encourage a free-thinking and innovative environment at Marine Corps Base Quantico.

Leadership also saved helicopter aviation in the Army. Despite the disinterest in Washington, men such as Brigadier General Hutton and Colonel Vanderpool continued to experiment and develop their designs on their own initiative. Vanderpool in particular embraced the helicopter as the future of mobile warfare as he tested helicopters as troop transports and weapons platforms. He was a student of military history, particularly the Duke of Wellington's ideas on mobile warfare and cavalry operations. The Colonel used Wellington as a foundation and envisioned armed reconnaissance helicopters, heliborne infantry, and rocket-armed gunships as the light cavalry, dragoons, and horse drawn artillery of the modern battlefield. He and his men not only experimented with armed helicopters and technological elements, but he also spent his free time working on a draft heliborne cavalry doctrine.¹⁵ Undaunted by labels from traditional officers as "Vanderpool's Fools,"¹⁶ he and his supporters quietly continued to develop the concept of air assault and airmobile cavalry for years.

It was the intervention and leadership of Secretary of Defense (SECDEF) Robert McNamara that made rotary-wing aviation a key player in the United States Army.¹⁷ The SECDEF had seen the success demonstrated by the Marine helicopter doctrine in several deployments in 1961 and pressed the Army to take rotary-wing aviation more seriously. In 1962, at the behest of McNamara, the Army established the "U.S. Army Tactical Mobility Requirements Board," and placed General Hamilton Howze as its chairman. The Howze Board was given access to one hundred fifty helicopters and the men of the 82nd Airborne Division to conduct exercises and determine the rotary-wing needs of the Army. General Howze was playing catch-up, forced to do the same work that the Marine Corps Schools had done in developing LFB-17 and the work of the Hogaboom board all at the same time. Luckily he had the years of research and experimentation done by men such as Hutton and Vanderpool to fall back upon. The Howze board was considered a huge success and resulted in the establishment of the 11th Air Assault Division (Test) at Fort Benning in 1963.¹⁸

Results

During the Vietnam War both the Army and Marine Corps tested their helicopter doctrine in combat. First to develop doctrine, the Marines also had the first combat test. In August 1965, the Marines launched Operation Starlite against the 1st Viet Cong Regiment south of Da Nang near

the village of Chu Lai. The UH-34 Choctaws of the 16th Marine Air Wing flew over 500 combat missions during the battle, which was planned as a text-book example of the amphibious doctrine and vertical envelopment of LFB-17. When the remnants of the 1st Viet Cong Regiment finally slipped away they left behind over six hundred dead and took an uncounted number of wounded with them. The Marines suffered only fifty-four dead and two hundred and three wounded.¹⁹

It was only two months later that the Army had its first test of the newly formed 1st Cavalry Division (Airmobile), a unit created from the 11th Air Assault Division (Test). In October 1965 a Special Forces base at Plei Me came under attack by units of the North Vietnamese Army (NVA), and the 1st Cavalry Division, or Air Cav, was ordered to commence search and destroy operations in the Ia Drang Valley. The battle culminated in the famous fire-fight around Landing Zone X-Ray, an event recorded in the book and movie *We Were Soldiers Once...And Young*. The NVA lost over 1,900 troops killed in action and the battle cost the Americans over three hundred.²⁰

The NVA's plan to cut South Vietnam in two had been thwarted. The heliborne operations enabled the Air Cav to cover a large area, search for the enemy, and insert and extract patrols as needed. They also learned the value of reserves and air assault's capability to rapidly deploy those reserves to reinforce units in combat. The Battle of Ia Drang proved the flexibility and lethality of air assault to the Army leadership. However, many of the Vietnamese casualties in the Ia Drang Valley were the result of heavy air support from USAF B-52s. This backup was an important example of successful Joint operations, but also demonstrated weaknesses in the Army's hastily developed doctrine. The Marines, with their doctrine of using both vertical envelopment and more traditional heavy assault forces, did not require last minute support in Operation Starlite.

As rotary-wing aviation continued to develop, the Army became an important player, developing the first dedicated gunships and pioneering the mixing of helicopters with elite special operations forces. Early on, however, the Marine Corps was quick to recognize the value of the new technology, had existing institutions that could help study and take advantage of it, and promoted an open-minded and free-thinking leadership. This was a checklist for success that helped the Marine Corps approach the helicopter as a novel weapon rather than a piece of ancillary equipment, to borrow from Dr. Holley. The Army first thought of the helicopter as ancillary equipment so their development was slow and disorganized. The results put the Marine Corps ahead of the other services in the development of rotary-wing aviation.

Today's Challenges

Just as a changing national defense environment challenged helicopter developers following the Second World War, analogous challenges face today's military leaders. The Marine Corps and Army ran helicopter development programs that were nearly parallel. However, the Marines were repeatedly a step ahead of the Army. The Army's rotary-wing supporters could have saved time, money, and effort by making a greater effort to learn from their counterparts at Quantico. Services must look beyond their individual programs and learn from the successes and failures of other forces, not just American but worldwide. This requires a conscious decision to go to the other services for help, a step that is aided by the modern Joint environment but is still not easy.

Nor does it negate the importance of each service running its own development. While cooperation between services can save time and money, competition between services is the best way to reduce error and develop best practices.

The historical model provided by the Marine Corps and Army experience with rotary-wing aviation offers a framework for success in developing doctrine linked to new technology. Many new technologies ranging from UAS to the networked battlefield have already begun to impact 21st century warfare. UAS development is an example where Joint cooperation is a key to success. The expense of such systems makes dual or concurrent research and development programs a difficult proposition so the leaders of new programs will need to work together and look to historical examples or international experience to formulate their programs and develop doctrine. This does not mean, however, that only one service or organization should be responsible for all UAS development at the expense of others.

Recognition of the value of UAS began over a decade ago as the USAF began deploying remotely piloted assets. All of the Armed Forces of the United States, including the Coast Guard and many American intelligence agencies, have UAS systems deployed or in development. Current progress of UAS doctrine, however, is parallel to the Army's approach to early helicopter development. Generally, the Department of Defense is treating the UAS as a piece of ancillary equipment. During the early years of rotary-wing aviation the Army viewed the helicopter as something like a flying truck. As a result, early mention of helicopters in Army publications and doctrine was limited to the transportation community. The UAS is experiencing a similar situation as it has been classified as a reconnaissance platform.

A search of current UAS doctrine and tactical publications demonstrates the parallel to the Army experience with helicopters. The only Joint publication that addressed UAS technology was former Joint Publication 3-55.1: *Joint Tactics, Techniques, and Procedures for Unmanned Aerial Vehicles*. This publication included descriptions of the different aircraft and communications systems with a very basic discussion of planning UAS operations, focusing on reconnaissance. The contents of the publication were focused on technical inter-operability between the services. Today, the Army and Navy both have service specific publications that contain an elaboration of the systems specific to each service.²¹ Such matters are important to success on the modern battlefield; however, none of the publications takes discussion of UAS technology any closer to doctrine or strategy.

In 2005 the Air Force issued *The U.S. Air Force Remotely Piloted Aircraft and Unmanned Aerial Vehicle [UAV] Strategic Vision*.²² While the title suggests a strategic or doctrinal view, the publication has very little discussion of where the UAS belongs on the battlefield. The recommendations provided by the publication focus on technology development and organizational issues, not use of the weapon system at war.

The final recommendation of the Air Force's *Strategic Vision*, however, is important and begins to move UAS development in the direction of the Marine helicopter lessons. The publication says that "The Air Force must review doctrine, procedures, policies, and legal requirements to determine how unmanned systems fit into the existing framework."²³ This initiates the process of reviewing doctrine that will lead to recognition of the UAS as a novel weapon. The Marine

Corps did not create a helicopter doctrine; instead they integrated the technology into the greater doctrine of amphibious assault. Vertical envelopment was a revolutionary step in the overriding vision of power projection. It was, in the end, part of LFB-17, which was an amphibious doctrine. The Air Force publication is correct in saying we must review doctrine and include UAS technology in all doctrine, for all services, wherever it provides increased capability. Instead of creating UAS communities within each service, the UAS needs to be integrated into existing doctrine and existing communities. The most recent doctrinal publications, such as the Army and Marine Corps counterinsurgency manual, take a step in the right direction by including specific references to UAS employment.²⁴ The manual, however, keeps the UAS firmly in the role of reconnaissance and surveillance.

If recognition of the potential value of UAS is an area for hope, organization and leadership continue to be significant challenges in the process of combining this new technology with doctrine. These two key elements of the Marine Corps' successful integration of the helicopter have been intertwined within the current debate over control of UAS development.²⁵ This debate over the establishment of an "executive agent" for controlling the Defense Department's UAS assets is important because it demonstrates the significance of organization and addresses key questions of leadership. However, the inter-service rivalry it has created has also distracted from employment of the technology as a weapon. The debate centers on technology and procurement, not deployment and doctrine. There is no doubt that significant problems exist within the UAS procurement system. There are many systems in development and the technology needs to be coordinated in order to deal with the costs. There are also command and control and airspace issues that must be worked out.

The other services should look to the experiences of the Air Force to help guide their programs, not only in development of the hardware but also in developing their doctrine. If they ignore the work already done by others, they could find themselves, like the Army on the eve of Vietnam, a decade or more behind. However, this does not mean that the Air Force should be an executive agent for UAS development. Such a designation would place the service at the top of a linear organizational structure and result in a lack of cooperation and competition that might limit the contributions of the other services. For example, airspace considerations are significantly different at sea than over land. Designating the Air Force as an executive agent would risk applying shore-based procedures and techniques to maritime operations that could hold back naval UAS development.

As the Army moved forward in the development of dedicated helicopter gunships during the Vietnam War, the Marine Corps remained open to the new idea and adopted it to support its vision of vertical envelopment. The Marines rapidly integrated the idea proven by the Army's work on armed helicopters into their own doctrine. At first, organic fire support within helicopter units was of greater value to the cavalry units envisioned by Colonel Vanderpool than it was to the simple vertical envelopment designed by the Marines. Had the Marine Corps been placed in command of helicopter development, they would eventually have developed gunships. The deployment of Marine Corps helicopters to Vietnam quickly included a small number of UH-1E models rigged as gunships. However, it would have likely taken longer for dedicated aircraft and tactics to develop, and would have been more costly both in the budget and to the troops under fire in Southeast Asia. It was the competition and cooperation between the two services that

increased the speed of development of dedicated gunships, determined the best systems and tactics, and eventually produced the world's first purpose-designed gunship, the AH-1 Cobra.

After taking the lead in UAS hardware and tactics the Air Force should remember the lessons of the Marines or risk missing new and better ideas. Keeping the USAF on the same organizational levels as the other services has the potential of helping cooperation since the services would remain peers. SECDEF McNamara ordered the Army to begin integrating helicopters into their war-fighting doctrine rather than ordering them to adopt Marine Corps procedures and doctrine. The current SECDEF should designate an agency that considers the needs of all of the services and encourages the services to develop the use of UAS within their own doctrine.

Since there is an obvious need for an organization to oversee and coordinate UAS development within the United States, the next question is one of leadership. Instead of establishing control of UAS with the Air Force, it should be placed in the hands of a Joint organization. The organization selected should have a broad mandate to include input into all the problem areas, but most importantly the agent must address the inclusion of UAS in doctrine. Recent assignment of this task to the Joint Requirements Oversight Council means that UAS development will remain in the hands of acquisition specialists. This continues to encourage the treatment of the UAS as just another piece of hardware, a piece of ancillary equipment. Acquisition is one of the trouble spots with UAS programs, however it is not the only issue.

Prior to the Korean War, Marine Commandant Vandegrift and his senior leadership separated the work of including helicopters into doctrine from the acquisition process. They fought for funds from the Department of the Navy from the very beginning while ordering their Leathernecks to continue working on their doctrine even when HMX-1 was under-staffed and under-equipped. Part of the reason for the lack of support for helicopter development within the Army was that the acquisitions specialists told the Army leadership that the number of aircraft needed was simply too expensive. SECDEF McNamara himself ordered the establishment and manning of the Howze Board to cut through what historian John Carland refers to as the "Gordian Knot."²⁶ The Department of Defense should look into assigning the task of developing UAS to Joint Forces Command or another agency that has visibility on doctrinal issues and is focused on the improvement of all the armed services. This will help the UAS develop from a simple piece of hardware to a novel weapon system.

Technology and warfare have always been linked together. The development of doctrine that takes advantage of new technology is one of the central challenges of planning for the next war. As modern military forces approach the new century, with accelerating technological change, they should remember the Marines' three pillars for success. Recognition, organization, and leadership are vital to a successful interaction between technology and doctrine. The individual services, using these fundamentals in competition and cooperation with the others and coordinated by a Joint agency, will be able to ensure synergy between technology and doctrine. Use of these lessons for the integration of UAS into today's doctrine will help make for a more effective synergy between the new technology and the new doctrine of the 21st century.

Notes

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