The Helicopter Innovation in Army Aviation

by

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ABSTRACT

This study was performed to test competing theories of innovation for their explanatory power in describing the series of innovations in United States Army aviation centered on the helicopter. The theories of strategic threat, civilian intervention, and interservice rivalry were applied to the innovations of airmobility, the anti-tank helicopter, and recent developments in Army doctrinal thought.

This study found that while strategic threat and interservice rivalry theories provided adequate explanation for the developmental phases of the innovation, only civilian intervention could fully explain the implementation of these innovations into Army force structure.

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From the mountains of Korea, to the jungles of Vietnam, from the central front in Europe, to the deserts of Iraq the helicopter has supplied the Army with the mobility necessary to the modern battlefield. The helicopter in the United States Army has seen a long history of development but has proven itself time and again by developing new solutions to changing strategic, operational, and tactical situations with a number of innovations. The development of helicopter aviation is a prime test for theories of military innovation because its history includes such often cited factors as the presence of strategic threat, interservice rivalry, and civilian intervention. The use of the helicopter in Army Aviation may also be seen as a series of innovations that has allowed the helicopter to retain an important place in Army doctrine. The focus of this paper is to determine what factors formed the helicopter innovation at times vital to its development. Was the presence of new threats to national security, the intervention of civilian authorities, or competition with other combat branches the most vital element to the helicopter innovation? To answer these questions an appropriate definition of certain terms must first be presented.

In order to further understand the definition of innovation, the term doctrine must first be defined. The doctrine of a military organization states what means shall be used to achieve goals and how these means shall be employed. It is the preferred mode of fighting wars that members of the organization and, to some extent, members of outside organizations, have conceived. This preferred mode of fighting is reflected in the force structure of military organizations and is determined by what the leaders believe the organization will need to face. Doctrine will vary depending on the situation of the organization as to its available assets and position in the political system, as well as the capabilities and situation of the state in which the organization
exists. In short, doctrine decides what tools of war shall be utilized and how those tools are used.¹

Innovation for military organizations can be understood as a dramatic change in the doctrine of that organization. This is not a change from one model of an assault rifle or main battle tank to another, but a change in how these tools of war are used. Innovation takes place in two stages, the acceptance of the doctrinal change, and the implementation of that change. Various factors in either stage can change the form that the innovation takes. Innovation can take place not only with new technologies or ideas but also with the adaptation of technologies or ideas already in use. The impetus for such innovations often occurs on the battlefield itself as officers in command seek more efficient ways to carry out their tasks.² Lower level officers may be the source for these ideas, and their success attracts the attention of higher-level officers. These ideas may then be expanded to larger units of troops to solve overall strategic problems in warfare.³ Innovation is especially difficult with newer ideas or technologies that have not yet been firmly entrenched in doctrine. In summary, innovation is defined as a substantial change to doctrine that significantly alters the capabilities of a military organization.

It should be remembered that innovation does not benefit all parties involved, it means abandoning old ways of accomplishing tasks and effects large groups of people. Some of these people may not wish to change and will resist attempts at innovation. Innovation is a process of “creative destruction” that does not come easily to established organizations.⁴ New ideas within an organization must be presented in forms and language that benefit the whole of an

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organization rather than some small part of it. Attention must be focused away from the narrow parochial interest of one group or set of groups within an organization and focus on mission rather than means. If a platform can be seen as serving Army interests rather than the interests of some small community within the Army it is much more likely to succeed.⁵

A number of theories have been proposed to explain the occurrence of innovation in military organizations that may assist in the understanding of the helicopter innovation. The theory of strategic threat states that innovation will occur in military organizations when military officers realize that developments in the technology associated with warfare, or the international responsibilities of the states to which they belong, have changed. These changes in the international system represent new threats against the state, and therefore the military organizations created to protect them. Changes in technology may alter the effectiveness of doctrine by creating increased costs in battle, as was the case with the introduction of nuclear weapons. A change in the international responsibilities of a state may heighten the threat of war as new international situations develop. These changes in technology or the international situation increase the fear of military defeat, and thereby trigger the search for an innovation. Military officers will begin formulating long-range plans of innovation to counter these threats. If an overall systemic level threat does not exist it is much more difficult for new ideas to gain proponents and expand.⁶ An illustration of the strategic threat hypothesis as an explanation for innovation is the use of aircraft carriers in the United States Navy. The innovation occurred in this case due to America’s increased involvement in the Pacific and the ability of aircraft to increase the striking power of the fleet. Using this argument a testable hypothesis may be formed.

Strategic Threat Hypothesis: Innovation will occur in military organizations when members of that organization perceive the need for change in military doctrine due to the threat of military defeat.

Innovation can also be established in military organizations by the presence of tight integration between civilian and military commands leading to civilian intervention in military affairs. The theory of civilian intervention holds that military organizations by themselves will rarely innovate due to the uncertainties and change that innovation brings about. Military organizations must be persuaded to innovate by the intervention of their civilian authorities.\(^7\) Civilians rarely have the military knowledge needed to create entirely new doctrine. To overcome this problem they often turn to members of the military who propose innovation but are being held back by factors internal or external to the military organizations. If civilians and military innovators are able to form an alliance, innovation is more certain to occur.\(^8\) An illustration of innovation that occurred by this method is the establishment of the Royal Air Force Fighter Command by the British military in the interwar period. In this instance civilian intervention was necessary to change the focus of the RAF from strategic bombing to air defense with fighter aircraft. Civilian intervention was assisted by the presence of military officers within the organization that supported this change. This leads to a second testable hypothesis.

Civilian Intervention Hypothesis: Innovation will only occur in military organizations when forced by civilian intervention.

A third possibility for military innovation comes from the theory of interservice rivalry. Modern warfare is a complex endeavor that necessitates the integration of varying assets for a successful outcome. In deciding which assets to utilize, and what services shall control which assets, ambiguities arise over the roles and missions each service is responsible for. These

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ambiguities over role and mission boundaries lead to tensions among the services as each tries to protect assets it considers vital to their functions. This tension can be further exacerbated by decisions from civilians about national policy and military strategy. If a strategy chosen by civilians is asymmetrical in its allocation of responsibilities and funds, one service may become predominant over others and seek control of disputed roles and missions. This threatens the other services by removing assets and responsibilities they consider vital to their functions and increases fears about the continued viability of the organization. To combat these fears an organization will attempt to make arguments for the inclusion of debated roles and missions into their organization rather than a competing one. These arguments often revolve around innovations created by the organization to solve problems in national military strategy. All services have views on how certain weapons of war should be utilized and which service should control them. These views invariably contradict one another and interservice rivalry results. One example of interservice rivalry is the role of the Marine Corps as an infantry asset vital to the mission of the Navy. The Marine Corps was developed as a force to attack the littorals, a mission the Navy deemed vital to its interests. With the Marine Corps development in this role the Army demanded that since these troops acted as infantry, no matter what their area of operations, they should be attached to the Army not the Navy. In order to protect their assets the Navy led the development of innovations in amphibious warfare. A third testable hypothesis may be derived from this theory.

Interservice Rivalry Hypothesis: Innovation occurs when ambiguities over roles and missions arise that offer the opportunity to expand the assets that an organization considers vital to its functions.

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9 I would like to thank Dr. Owen Cote for his assistance in formulating this theory.
If these theories are correct the events leading to the helicopter innovations should take very specific forms. For strategic threat theory to prove correct a significant change in military technology or the responsibilities of the state that increase the possibility of defeat must occur. These changes will initiate the development of new doctrines within the Army to serve as responses to this threat. The Army alone will influence the development of these ideas. A core of officers supporting the helicopter as the way to meet the new challenges will form and slowly implement their ideas into Army doctrine. Civilian intervention holds that while strategic threat will be important to the formation of helicopter doctrine, the military will be unable to innovate on its own. To achieve innovation civilians will need to intervene in military affairs to force the Army to adopt helicopters as a means of waging war. The adoption of the doctrine will occur when civilian leaders support military officers in favor of helicopter aviation and radical change in doctrine. For interservice rivalry to prove correct in the case of helicopter aviation, an overlap in roles and missions must offer the opportunity for the expansion of Army aviation assets. Debates over where control of aviation assets should be centered will occur with the Air Force, and Army officials will be forced to make a persuasive argument about why these assets should be under Army control. Innovation will occur to bolster these arguments in an attempt to wrest control of vital assets from the Air Force.

To test these hypotheses for the helicopter innovation in the Army, a number of historical cases over a wide range of time will be used. The first case will be that of the development of the airmobility innovation. The initial stage of this innovation occurred in the use of helicopters on a tactical level in the Korean War. The expansion and implementation of the doctrine of airmobility occurred in the 1950’s and early 1960’s, and was heavily influenced by civilian and Air Force leaders. The impact of the Vietnam War on the airmobility doctrine will then be
presented. The Vietnam War served to build the role of the helicopter in warfare, but also caused the need for new innovations in the aviation community. This leads directly to the second case in helicopter innovation, the development of the anti-tank helicopter. With the buildup of Soviet forces in Europe, the Army was forced to innovate again. In the 1970’s and 1980’s Army advocates of the helicopter stressed the strengths of the helicopter as a weapons platform to overcome Soviet forces on the Central Front. The new focus of the Army towards this threat was shaped by events in the Middle East and Europe, as well as by civilian leaders. Desert Storm proved to be a test of the doctrines of both airmobility and the attack helicopter, and so necessitates some discussion. The third case of innovation in helicopter doctrine occurred with the end of the Cold War, and a civilian mandated focus on low intensity contingencies. The attempts at innovation towards these contingencies can be seen in helicopter operations as part of Task Force Hawk in the former Yugoslavia.

The cases presented provide much support for the theory of civilian intervention. In each case civilian intervention was necessary to stimulate the process of innovation, or bring it to its conclusion. Even when Army leaders were presented with a clear and credible threat to the United States and Army doctrine, they were never able to fully develop innovative helicopter doctrine in the absence of civilian intervention. This provides clear proof against the theory of strategic threat. Although changes in the international environment were one factor towards innovation, they do not represent the sole factor. There is mixed evidence for the support of interservice rivalry in the cases of helicopter innovation. While rivalry with the Air Force over the missions of troop transport and close air support was an important factor in the development of airmobility, it was of decreased importance in successive innovations. After the Army-Air Force agreement in 1966 the Army was left to develop helicopters as it saw fit with little
interference from the Air Force. Although not the sole factor influencing the helicopter innovations, civilian intervention emerges as the most important.

The Airmobility Innovation

The Korean War and Early Use of the Helicopter

The first tactical developments in rotary wing flight took place during the Korean conflict. The Korean War offered many obstacles to the field commander. Infrastructure in country was extremely poor hampering mobility in the extreme. The mountainous ranges and boggy valleys of the theater hindered Army operations that relied on heavy armor and straight leg infantry for the movement of forces. Although large-scale helicopter operations did not occur in Korea, a number of commanders used helicopters to improve their positions. Officers first used helicopters for light observation and transportation. They soon proved useful, if limited, in other ways as well. Early in the conflict observation pilots began to run supplies to forward elements that had been cut off from their supply lines, and to evacuate wounded from these same units. Although the loads they carried were necessarily very limited, troops came to deeply appreciate and even depend on the “little birds” for help. Thousands of wounded front line troops were evacuated by helicopters to rear MASH units in mere hours rather than the days it would have taken by ground transport. Helicopters also offered a vertical landing capability that allowed it to operate in a manner that the existing inventory of light fixed wing aircraft could not, thereby making it a far more versatile option.

In addition to the use of helicopters as material transport there was some development of troop transport as well. The Marine Corps had some experience with troop transport by helicopter prior to the Korean War. They had tested the use of helicopters for amphibious

10 Raines, Edgar F. Jr., "The Army and Organic Tactical Air Transport, 1952-1965" (U.S. Army Center of Military History, Unpublished manuscript, 4 November 1997), Pg. 9
landings and developed a doctrine for their use known as vertical envelopment.\textsuperscript{12} On September 21, 1951 the Marine Corps carried out Operation Summit, which landed 224 Marines on two separate sites along the front. This operation would have taken nine hours by road while under direct fire from enemy mortars, but was accomplished in eight minutes using helicopters. The Army observed the success of this deployment and, by the Armistice, had carried out a number of small-scale helicopter deployments on its own.\textsuperscript{13} The helicopter had proven itself a versatile tool on the tactical level, improving units speed, mobility, and supply in an exponential manner.

The use of helicopters was highly lauded by theater commanders in Korea for a number of reasons. Helicopters added flexibility to a force that allowed it to respond to unforeseen circumstances rapidly. They could carry out many light tasks, such as observation, resupply, and the laying of ground wire for communications quickly and with a minimum of preparation. Helicopters could operate from “normal Army depot and troop areas without elaborate special facilities” allowing commanders quick access to aircraft close to the front lines. Even more importantly these forces were at the direct command of the Army officers in charge of operations eliminating the need to go through elaborate chains of command.\textsuperscript{14}

During and after the Korean conflict the deployment of helicopters to Army units increased. Although advocates for expanding the role of helicopters in Army units existed before the Korean War, the ideas had been set aside by Army command due to opposition from the Air Force.\textsuperscript{15} Once helicopters had proven themselves in Korea new steps were taken to supply units with rotary wing assets. Beginning in 1950 the number and types of helicopters began to

\textsuperscript{14} Ibid. Pg. 12
\textsuperscript{15} Ibid. Pg. 11
increase. Industry was asked to develop medium and heavy lift cargo helicopters and by 1952 the first Sikorsky H-19 Chickasaw cargo helicopters reached units in the continental United States. Within two years four more types of utility and light cargo helicopters were deployed.\textsuperscript{16} The Army planned to obtain more cargo helicopters and had programmed the creation of twelve battalions of three companies each for deployment over five years. Budget restrictions and intransigence from the Air Force dampened these enthusiastic ideas and far fewer helicopters were bought and deployed than originally planned.\textsuperscript{17}

The helicopter was a new and largely untried technology at the time of the Korean War and had capabilities not fully utilized in existing Army doctrine. By using the helicopter to overcome the restrictions of movement inherent in the Korean theater, operations were conducted that would have been difficult, if not impossible, using traditional military means. This does not, however, constitute a full-scale innovation. To bring the helicopter to its full potential new doctrine for the use of the aircraft would have to be conceived. When the operations in Korea met with success, officers within the Army began to look at higher-level operational and strategic problems with new solutions in mind. This was particularly true of large-scale military operations on the nuclear battlefield. The Army had to face this possibility due to the adoption of a massive retaliation strategy by the Eisenhower administration, and the introduction of strategic and tactical nuclear weapons to the conventional battlefield.\textsuperscript{18} Korea had proven the utility of the helicopter for tactical use, and now many believed it could be used to counter strategic problems as well.

\textsuperscript{16} Ibid. Pg. 12
\textsuperscript{17} Allen, Matthew. \textit{Military Helicopter Doctrines of the Major Powers, 1945-1992}. (Greenwood Press, Westport, CT, 1993) Pg. 4
\textsuperscript{18} Rosen, Stephen P. \textit{Winning the Next War}. (Cornell University Press: Ithaca, NY, 1991) Pg. 72-3
Development of the Airmobility Innovation

The helicopter had been used in creative ways in the mountains and rice paddies of the Korean Peninsula, but this use does not in itself constitute a true innovation. For the helicopter to truly become an innovation it had to dramatically change the way that the Army fought wars. After the Korean War a new wave of Army thinking about how to fight a war with the Soviet Union in Europe in the nuclear era began to provide that dramatic change. The use of the helicopter evolved from a tool of the battlefield commander to an important element of the war fighting doctrine of the United States Army.

By 1953 the problems of the nuclear battlefield had been much considered and the Army was presenting solutions. Destructive effects of nuclear weapons required the Army to disperse its forces into units small enough to avoid use of nuclear weapons. The Army needed to be able to concentrate rapidly, destroy the enemy, and disperse again before the enemy could reply with nuclear weapons. As Undersecretary of the Army Alexander put it in 1951:

Advances in mass killing power have made battlefield dispersion an indispensable part of tactics and techniques. ¹⁹

This concept rested heavily on the 1st Cavalry Division’s success on the Naktong River in 1950. In this engagement the commander kept most of the division’s assets concentrated in the rear of the force and moved in response to North Korean incursions detected by forward elements. ²⁰ The Army proposed to use this model of deployment on a grand scale covering a battle zone 150-200 miles in depth. To operate in these conditions the Army restructured towards a new Pentomic division, composed of five battle groups of five rifle companies plus one support company to replace the three regiments of the triangular division.

The dispersion on the nuclear battlefield embodied in the Pentomic system increased the Army commander’s need for mobility within his forces. The Pentomic model demanded early detection of enemy forces and the ability to move friendly forces quickly in response. To achieve this mobility helicopter-borne infantry units, dubbed “sky cavalry” were proposed. These units would conduct the traditional roles of the horse cavalry to find, fix, and fight the enemy until reserves could assemble to destroy them.\(^{21}\)

To fully utilize the possibilities of this new form of war fighting the Army stated that the helicopters in the units must be organic to them rather than assembled in Air Force “troop carrier squadrons.” They…

\[\cdots\text{must be under a responsible unit commander and organic to his unit. It is my (Undersecretary for the Army Archibald Alexander) firm belief that the integration of cargo aircraft into tactical operations is mandatory and that a full time requirement for such aircraft exists.}\] \(^{22}\)

These units would deliver artillery and ammunition to inaccessible locations, allow the negotiation of river crossings and other terrain obstacles, and render the units virtually independent of conventional (and vulnerable) lines of communication.\(^{23}\)

One of the biggest proponents of the sky cavalry proposition was Major General James M. Gavin. His article “Cavalry, and I Don’t Mean Horses,” published in the popular Harper’s magazine in 1954, was part of an effort by Army officers to raise support for helicopter aviation. The article argued that only through the use of helicopters in a traditional cavalry role of screening, reconnaissance, exploitation, and pursuit would the Army be able to make the

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\(^{21}\) Stockfisch, J. A. “The 1962 Howze Board and Army Combat Developments.” (RAND, Santa Monica, CA, 1994) Pg. 11

\(^{22}\) Butler, Howard K. The Restoration of the Army Air Corps: 1947-1953. (United States Army Aviation and Troop Command, Saint Louis, Missouri, 1995) Pg. 146-7

\(^{23}\) Ibid. Pg. 896
Pentomic division effective. The further development and deployment of helicopter aviation would thereby serve not just the interests of the few airmobile-minded officers, but the Army as a whole.

Doctrinal ferment within the Army about the development of helicopter aviation soon translated itself into changes within the Army’s training and operational structure. Convinced of the utility of Army aviation by events in Korea, and the arguments of Gen. Gavin, the Army decided to set up a school dedicated to the development of aviation tactics. In 1954 such an institution was established at Fort Rucker, Alabama. Fort Rucker soon became responsible for the training of Army pilots and the testing of aviation concepts. An Aviation Test Board was created there to facilitate the spread and development of ideas as well as concentrate materials for testing. The move to Fort Rucker also coincided with the decision to split rotary wing training from fixed wing training; a move that further emphasized the helicopter’s growing importance.

Following these events, written doctrine about the use of helicopters in combat soon emerged. Through the Command and General Staff College and the Infantry School doctrinal works on the use of “airmobility” and “airmobile operations” were published in the mid-50’s. Field Manual 57-35 on Army Transport Aviation Combat Operations and an aviation-airmobile section in Field Manual 100-5 went a long way in changing the rough concepts advocated by Gen. Gavin and others into viable tactical operations.

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25 Stockfisch, J. A. “The 1962 Howze Board and Army Combat Developments.” (RAND, Santa Monica, CA, 1994) Pg. 8


Perhaps more importantly the Department of Army Staff decided that the new importance of Army aviation warranted representation on the Army Staff. A new division was created, the Aviation Staff Division, which was to be an integral part of the Department of Army Staff. To head the division General Hamilton H. Howze was chosen, an armor officer who had shown great interest in Army aviation and would prove to be key in its development.\textsuperscript{28} By concentrating on the strategic level problems of the nuclear battlefield, aviation had gained standing within the Army. Aviation advocates in conjunction with Army leaders created doctrine, trained troops, and developed tactics that would be vital to winning the next war. By forming this bureaucratic base it was then able to push the innovation of the helicopter forward.

\textbf{Development of the Armed Helicopter for Airmobility}

In 1955 Operation Sagebrush tested the concept of the air cavalry and found that while it increased exponentially the ability of units to find and fight the enemy on the nuclear battlefield a number of problems remained. One of these was fire support for the airmobile units.\textsuperscript{29} To provide needed support for its troops outside the range of artillery, including the vital reconnaissance units, many in the Army proposed using armed helicopters and slow moving fixed wing aircraft internal to Army organization to provide close air support. To provide this support the Army aviation community again mobilized.

After the review of Operation Sagebrush aviation centers like Fort Rucker began experimenting with the helicopter as an armed platform. Brigadier General Carl I. Hutton, Commandant of the Army Aviation School at Fort Rucker, served as supporter and initiator of

\textsuperscript{28} Bradin, James W. \textit{From Hot Air to Hellfire: The History of Army Attack Aviation.} (Presidio Press, Novato, CA, 1994) Pg. 91-2
these experiments. In June of 1956 by liberally interpreting the Continental Army Command (CONARC) training directive on the need for development in “highly mobile task forces with an improved ratio of fire power to manpower,” Gen. Hutton directed a non-rated officer by the name of Colonel Jay T. Vanderpool to develop feasible weapons systems for the helicopter and an organizational structure to deploy them.

The energetic Colonel Vanderpool began experimenting with a Bell H-13 helicopter, the smallest helicopter available in the Army inventory. With a shoestring budget and schematics drawn on a paper napkin, Col. Vanderpool began scouring the military bases and industrial centers of the nation in search of ideas. He and a group of like-minded aviators and civilians, known as “Vanderpool’s Fools,” soon began welding machine guns and launching rails for rockets to their little helicopters. Once these systems had proven feasible Vanderpool developed doctrine and company sized organizations to go with them. By 1957 Col. Vanderpool and his “Fools” were flying around the country and providing demonstrations of how the armed helicopters, or “sky cavalry,” could increase the organic firepower and effectiveness of the Pentomic division.

The ideas inherent in Vanderpool’s work grew within the aviation community and its feasibility and necessity was verified through the work of the Rogers Board in 1960 and the Howze Board in 1962, which will be discussed in greater detail later.

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31 http://www.aircav.com/histavn.html
33 Bradin, James W. From Hot Air to Helfire: The History of Army Attack Aviation. (Presidio Press, Novato, CA, 1994) Pg.94-7
34 Stockfisch, J. A. “The 1962 Howze Board and Army Combat Developments.” (RAND, Santa Monica, CA, 1994) Pg. 10
35 Ibid. Pg. 10
These events seem to confirm the hypothesis of two of the theories listed above. The first is the strategic threat hypothesis. The Army concentrated on solving the strategic level threat of nuclear warfare that challenged how the organization fought wars, and brought the helicopter from a useful tool on the battlefield; to the way the Pentomic divisions would combat enemy forces. The airmobile innovation was developed and accepted at a time when the Army faced a crisis in budgets and feared for its continued utility under the doctrine of massive retaliation. By fitting the innovation into existing Army doctrine on the Pentomic division, and enhancing rather than replacing existing systems, helicopters fit easily within Army thought. By presenting a solution that would enhance the capabilities of the Army as a whole rather than aviators or airborne troops as a community, innovation was fostered and accepted.

The doctrine was also developed as a means to control the missions of troop mobility and lift. This lends credence to the theory of interservice rivalry. The Army argued repeatedly that helicopter units had to be organic to the units in order to allow quick response on the battlefield. Arguments also arose with the Air Force over the use of the armed helicopter and would continue into the period of the helicopter's implementation into the Army force structure. Arguments with the Air Force over roles and missions existed at this point in the development of the helicopter, but it was the strategic problems of nuclear war that first provided the impetus for innovation.

**Implementation of the Airmobility Innovation: the Effects of Interservice Rivalry**

While large-scale strategic threats were a primary factor in bringing the ideas of airmobility to fruition, other factors drove events in the period of implementation. The tensions existing between the Army and the Air Force was one such factor. The place of aviation in American military strategy was a much-debated topic between the Army and the Air Force. The
Air Force believed that all roles and missions involving aircraft should be under the central control of its organization. With the implementation of the massive retaliation strategy under the Eisenhower administration, the Air Force received the means and civilian support to dominate these roles.

Air Force thinking on the centralization of aircraft under an Air Force commander conflicted with Army thinking that aviation assets for intra-theater lift and troop support should be controlled by ground commanders. This conception was further strengthened by events in Korea and the perception that the Air Force that had “flown away” from the Army.\textsuperscript{37} During the nuclear era and the reduction of defense spending, the Air Force focused on its role in the strategic nuclear aspect of American grand strategy and increasingly neglected the mission of close air support and intra-theater transport. Rather than investing its funds in attack aircraft or lift capabilities, the Air Force spent money and time developing long-range bombers and more advanced nuclear weapons.\textsuperscript{38} Desperate to provide the mobility and firepower the Army considered necessary to operate in the new environment of nuclear warfare, many in the Army advocated organic Army aviation to provide for the missions of troop mobility and fire support. The helicopter innovation took place in the Army not only to adapt to strategic change, but also as a means to exploit the overlap in roles and missions, and provide and control aviation capabilities necessary for Army missions.

The Air Force was not willing to relinquish its role in areas of intra-theater transport and close air support, despite its lack of attention to the area. The battles with the Army over intra-theater troop transport further complicated developments in doctrine on transport within the Air Force itself. Throughout the history of the Air Force the troop transport branch had been seeking

\textsuperscript{37} Howze, Hamilton H. \textit{A Cavalryman's Story}. (Smithsonian Institution Press, Washington, DC, 1996)
missions to justify its existence. With the advent of nuclear weapons the branch had been consistently neglected in the budget. It faced the threat of consolidation with other branches, and competition with civilian carriers for peacetime missions. If the Army were to develop its own troop carrying capability it could doom the troop transport community within the Air Force. This intraservice dispute within the Air Force spilled over into discussions about Army transport and provided incentives on both sides for the control of troop mobility.

The Air Force had watched developments in the Army very closely and raised numerous objections throughout the periods of innovation. Since the establishment of the Air Force as a separate service in 1947, limitations had been imposed on the use of aircraft organic to the Army and the types and specifications of aircraft used. The first of these limitations came about in 1948 after the negotiation of the Key West Agreement, which delineated the roles of the military services. According to this document the Air Force was to supply the Army with all “aviation needed for the effective prosecution of war.” While the Army was to provide all land based forces needed for the same while having only “such aviation… as may be organic therein.” What this document suggested was that the Army could only have the low performance aircraft it already maintained. The Army would be dependant on the Air Force for its combat needs and was prohibited from developing them itself. There was some room for interpretation in the document that Army aviators would soon exploit. Especially since the Army’s role was further delineated as:

Expediting and facilitating the conduct of operations on land; improving mobility, command, control, and logistics support of Army forces; and facilitating greater battlefield dispersion and maneuverability under conditions of atomic warfare.\textsuperscript{41}

For Army aviation advocates the demand for improved mobility could be fulfilled by the use of aircraft. This statement, combined with the section concerning organic aviation served to provide enough overlap in roles and missions to justify the development of airmobility.

The first obstacle the Army had to overcome in developing the airmobile idea was the 4000 pound weight limit imposed on rotary winged aircraft by the Joint Army Air Force Regulation 5-10-1 signed by the Chiefs of Staff on May 20, 1949. This weight limit denied the development of the medium and heavy lift helicopters that the Army felt was vital to its new airmobility doctrine.\textsuperscript{42} With the Korean War intensifying and large numbers of requests for helicopters beyond the weight limit flooding the Army command, the two services were forced to work out a compromise. After a number of boards and memorandums between the two services, the service secretaries of the Army and Air Force finally signed a Memorandum of Understanding (MOU) between the services on October 2, 1951. This MOU removed the weight restrictions on Army helicopters allowing the procurement of medium to heavy lift cargo helicopters.\textsuperscript{43} However, the MOU also placed restrictions on the Army helicopters role in combat and limited where helicopters could operate on the battlefield. The Air Force would provide all other functions for Army supply, transport, and assault in areas outside this zone.\textsuperscript{44} As a further

\textsuperscript{41} Bradin, James W. \textit{From Hot Air to Hellfire: The History of Army Attack Aviation}. (Presidio Press, Novato, CA, 1994) Pg. 75-6
\textsuperscript{42} Stephenson, Roy Richard. \textit{Road to Downfall: Lam Son and U.S. Airmobility Doctrine}. (Ph.D. dissertation, University of Kansas, 1991) Pg. 6-7
\textsuperscript{43} Butler, Howard K. \textit{The Restoration of the Army Air Corps: 1947-1953}. (United States Army Aviation and Troop Command, Saint Louis, Missouri, 1995) Pg. 946-7
\textsuperscript{44} Bradin, James W. \textit{From Hot Air to Hellfire: The History of Army Attack Aviation}. (Presidio Press, Novato, CA, 1994) Pg. 76

21
block on the Army’s plans, procurement and testing for helicopters still remained with the Air Force.\textsuperscript{45}

The acquisition of aircraft for the Army in this period was controlled by the Air Force, as was the training of pilots.\textsuperscript{46} This caused severe problems within the Army for equipping its forces. As mentioned previously cargo helicopters had been well considered in the Army prior to Korea but their acquisition was shelved by the Air Force. The Army attempted repeatedly to acquire the machines needed to make its new airmobility concepts work, and was repeatedly rebuffed. Gen. Gavin recalls one such request being answered by the Air Force director of requirements as follows:

\begin{quote}
I am the Director of requirements and I will determine what is needed and what is not. The helicopter is aerodynamically unsound. It is like lifting oneself by one’s bootstraps. It is no good as an air vehicle and I am not going to procure any. No matter what the Army says, I know what it needs and what it does not need.\textsuperscript{47}
\end{quote}

There is no record of Gen. Gavin’s reply. These comments from the director and others like them convinced Army officials they would have to move soon to remedy the situation.

The Army soon realized that to apply the helicopter innovation to the Pentomic division it would have to alter current agreements. Army officials desired an increase in the size of the combat zone, additional combat functions for the helicopter, exclusion of the Air Force from the combat zone, and control of helicopter development and procurement. After another rapid series of boards and memorandums, as well as the intervention of the Secretary of Defense, both service secretaries signed the Pace-Finletter agreement on November 4, 1952. This MOU established the freedom of the Army to use and develop rotary wing aircraft within an extended

\begin{flushright}
\textsuperscript{45} Butler, Howard K. \textit{The Restoration of the Army Air Corps: 1947-1953}. (United States Army Aviation and Troop Command, Saint Louis, Missouri, 1995) Pg. 150-7
\end{flushright}
combat zone free of any Air Force supply assets. It also gave responsibility for development and procurement of helicopters free of any weight limits to the Army. The MOU did place restrictions on fixed wing aircraft, however, and the Air Force was still maintained as the supplier of close air support throughout the theater and air transport to the edge of the combat zone.  

The next battle between the services would come over the issue of the armed helicopter. The experiments conducted by Col. Vanderpool and others in the mid to late 1950’s were done with some element of secrecy, but did not go entirely unnoticed by Air Force officials. Much of Vanderpool’s work had to be done when the officers concerned were off duty and funds came from dubiously named administrative bodies because of resistance from the Air Force and other quarters. By the letter of the law these experiments violated Department of Defense directives on Army roles and missions rather flagrantly. Despite these factors the Army persisted in developing the armed helicopter because of the vital role it would play in Army airmobile operations and the Pentomic division.

The Air Force continually raised their objections to the Army’s attempts at close air support and ridiculed their efforts. They maintained their control of close air support by inserting a clause reiterating their control of all close air support, interdiction, and assault assets into every joint Air Force-Army agreement. At numerous times the Army attempted to calm their fears by offering compromises. They proposed to drop the concept of organic close air support if the Air Force would supply planes specially built for this purpose. The Air Force repeatedly refused,

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47 Bradin, James W. *From Hot Air to Hellfire: The History of Army Attack Aviation*. (Presidio Press, Novato, CA, 1994) Pg. 77


50 “Rotary Aircraft” (Federation of American Scientists, www.fas.com)
claiming they knew the requirements for such aircraft better than the Army did.\footnote{1} Frustrations within the Army around this concept continued to build and in 1958 General Willard G. Wyman, Commanding General of Continental Army Command (CONARC), approved the armed helicopter concept, adding justification and recognition to Col. Vanderpool’s experiments.\footnote{2}

Elements within the Army attempted to raise the question of close air support and the helicopter again in 1960 during the Rogers Board. This board had been convened to study the Army’s aviation needs and decide which helicopter systems to procure in the future. Having been informed of Vanderpool’s developments with the armed helicopter and its employment, board member Gen. Hamilton H. Howze attempted to insert a section on the need for armed helicopter units. The Board sympathized with Gen. Howze’s request but refused to insert the section in the main body of the report for fear of further antagonizing the Air Force. Instead Howze’s report was included in an addendum suggesting the need for more study of the concept’s feasibility.\footnote{3}

Events within the Army seemed to contradict the Rogers Board’s disapproval of the armed helicopter concept. In May of 1960 the Department of the Army approved a plan for the distribution of machineguns and mounts to helicopter companies. Soon materials for other weapons systems followed this. In August of 1960 a committee established by the current Commanding General of CONARC, and ironically headed by Gen. Rogers, recommended that gunnery and weapons tactics be included in helicopter pilot training.\footnote{4} Whether the Air Force liked it or not the Army was working to build organic close air support.

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\footnote{1}{Tolson, Lt. Gen. John J. \textit{Airmobility 1961-1971}. (Department of the Army, Washington, DC, 1973) Pg. 13-14}
\footnote{2}{Stephenson, Roy Richard. \textit{Road to Downfall; Lam Son 71/9 and U.S. Airmobility Doctrine}. (Ph.D. dissertation, University of Kansas, 1991) Pg. 16}
\footnote{3}{Bradin, James W. \textit{From Hot Air to Hellfire: The History of Army Attack Aviation}. (Presidio Press, Novato, CA, 1994) Pg.104-5}
\footnote{4}{Ibid. Pg. 105}
In 1962 tensions between the Air Force and the Army flared again when the findings of the Howze Board were presented. Convened by the direct order of Secretary of Defense Robert McNamara this board went all out in testing the concepts of airmobility and air cavalry that had been developing in the Army for the last decade. The Board recommended the deployment of no fewer than five Air Assault Divisions that included hundreds of helicopters each, as well as a number of fixed wing aircraft for tactical air support. The board also recommended a number of other diverse units including anti-tank helicopters and aerial artillery.\textsuperscript{55}

The Air Force reacted violently. They claimed that the recommendations of the Howze Board violated every past agreement signed between the two services. General LeMay, Chief of Staff of the Air Force at the time, stated that the recommendations of the Howze Board would merely duplicate capabilities already existing in the Air Force and therefore should not be implemented.\textsuperscript{56} Anger in the Air Force intensified with the recommendations concerning armed helicopters in the role of close air support. This was an Air Force role, they claimed, and could not be usurped by the Army according to the Key West Agreement of 1947 and every document and agreement on the subject up to the time of the Howze Board. What upset the Air Force most was the use of fixed wing aircraft organic to Army units operating in the manner the Howze Board proposed. Not only did these aircraft violate past agreements, they were used in manner that challenged established Air Force roles.\textsuperscript{57}

The dispute continued past the Howze Board and finally calumniated in a series of tests to prove which concept would work best on the modern battlefield, organic Army tactical air support supplied by helicopters and other aircraft, or the Air Force supplied close air support

\textsuperscript{55} Stockfisch, J. A. "The 1962 Howze Board and Army Combat Developments." (RAND, Santa Monica, CA, 1994) Pg. 22-3
using fast moving jets designed for multiple roles. The first of these was known as the Disoway Board, convened by Air Force Chief of Staff Curtis LeMay. This board reviewed the findings of the Howze Board and found, not surprisingly, that its tenants were flawed and violated every past agreement on roles and missions. Especially alarming to the Air Force was the perceived ignorance of Air Force capabilities and the use of fixed wing aircraft organic to the Army for close air support.\(^{58}\)

A series of tests were run throughout 1963-4 comparing not only close air support capabilities, but those of lift and transport as well. These tests were known as Goldfire I, a joint test with the Air Force offering CAS, and Air Assault II, a unilateral Army test of airmobile doctrine. These tests served to prove two things. First the Air Force was seen as providing nothing new. It had merely streamlined existing operations to provide the Army with CAS and transport assets. Secondly, the evaluators came to the conclusion that the airmobility innovation offered better mobility, better readiness, and better integration of ground and air assets.\(^{59}\) This was no surprise to the Army who had been propounding this same conclusion for years. The Army solution also offered answers to problems of close air support but the evaluators found that these assets could not stand up to prolonged exposure or an armored threat. While useful in many ways the airmobility concept had its limitations.\(^{60}\) As Gen. Harold K. Johnson, new Chief of Staff of the Army, stated upon viewing the tests back to back “…it was like comparing a gazelle to an elephant.” The Army, he further stated, needed both.\(^{61}\) When Secretary of Defense Robert

\(^{57}\) Ibid. Pg. 25
\(^{58}\) Stephenson, Roy Richard. *Road to Downfall; Lam Son 719 and U.S. Airmobility Doctrine*. (Ph.D. dissertation, University of Kansas, 1991) Pg. 34
\(^{59}\) Krepinevich, Andrew F. *The Army and Vietnam*. (Johns Hopkins University Press, Baltimore, Maryland, 1986.) Pg. 123-4
McNamara approved the formation of the 1st Cavalry Division (Airmobile) on June 15, 1965 the struggle with the Air Force was more or less over.

The competition finally subsided in 1966 with the signing of the Johnson-McConnel agreement. The agreement ended the controversy by solidifying the findings of military and civilian leaders in the wake of the Howze Board. The responsibility for tactical airlift and close air support was split between rotary wing and fixed wing assets. The Army was allowed to move troops within its own rotary wing airmobile units, while the Air Force would assist in resupply of these forces with fixed wing assets. Armed helicopters were also allowed in the agreement to provide fire support for airmobile units. In the agreement the Air Force relinquished “all claims for helicopters and follow-on rotary-wing aircraft which are designed and operated for intratheater movement, fire support, supply and resupply of Army forces.” It also lifted all restrictions on where and how these helicopters could operate, including close air support missions. This provided the Army with an opportunity to develop a helicopter explicitly for this purpose without Air Force interference.

The agreement was not a complete victory for the Army, however. To enable Air Force agreement the Army had to abandon nearly all of its fixed wing assets, including the airplanes it had been using for resupply and the fixed wing platforms it had tested for close air support. No longer would the Army be able to develop fixed wing assets for tactical airlift use. In this manner the Air Force was able to maintain its role in intratheater transport and resupply. It would also

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continue to supply close air support from fixed wing aircraft, supplementing the support
provided by Army helicopters and giving Army units more fire power.\textsuperscript{64}

The presence of arguments over roles and missions between the Army and the Air Force
lends support to the theory of interservice rivalry. The overlap in roles and missions concerning
the use of aviation allowed the Army to innovate and create the doctrine of airmobility despite
protests from the Air Force. The rivalry with the Air Force over the implementation of this
innovation led to a series of agreements and tests of the concept that proved it to be a viable
addition to military means. By seeking control of a disputed mission, the Army successfully
innovated and justified the addition of aviation assets to its basic roles and missions.

\textbf{Implementation of the Airmobility Innovation: the Effects of Civilian Intervention}

Civilian intervention too played its part in shaping the innovation of helicopter warfare.
This intervention came at times vital to the process when many of the doctrinal concepts and
ideas had been created, but funds for their implementation were severely lacking and the
willingness to adopt new ideas low. Interservice rivalry with the Air Force also hampered the
airmobility innovation, and the two services remained deadlocked about their roles and missions.
To alleviate these problems civilian intervention would be needed.

The first such intervention came in 1952 with the signing of the Pace-Findletter
agreement. A nasty situation had developed over the weight limit problem in 1951, but had
ultimately been resolved without having to go to the Secretary of Defense. By mid-1952
however the services were again deadlocked over whether the Army would operate its own
helicopters in the combat zone, or the Air Force would operate the helicopters as a part of its
force structure. This fight soon moved beyond even the service secretaries and came to the
attention of the Secretary of Defense Robert A. Lovett. Members of the Army who supported the

\textsuperscript{64} Ibid. Pg. 382-3
helicopter innovation went directly to the office of the Secretary of Defense and notified him of the conflicting programs of the Army and the Air Force. The Army officers and the Secretary of the Army maintained that this duplication was harmful and could not continue. They demanded that the Secretary of Defense step in and end the conflict.65

On October 13, 1952 a meeting was held to discuss the conflicting programs which included the Chief of Staff of the Army, his counterpart from the Air Force, both service secretaries, and the Deputy Secretary of Defense. The outcome of this meeting was that Secretary Lovett sided with the Army deeming that all transport internal to the combat zone was an Army responsibility alone. The Air Force would not provide supply there, but would continue to do so outside of the combat zone. This decision was finalized in the MOU of November 4, 1952, also known as the Pace-Findletter agreement.66

With the inauguration of the Kennedy administration great changes came about in military thinking and doctrine. Seeking a more versatile military strategy than Eisenhower's massive retaliation, the Kennedy administration sought to rebuild conventional forces for a doctrine of “flexible response.” This doctrine would allow the United States military to fight lower scale conventional wars to contain Communism while also preparing for the ultimate conflict with the Soviet Union.67 As part of this doctrine Secretary of Defense Robert McNamara wrote two memorandums to Army leadership in 1962 demanding a new look at tactical mobility on the modern battlefield.68

66 Ibid. Pg. 206-7
67 Bradin, James W. From Hot Air to Hellfire: The History of Army Attack Aviation. (Presidio Press, Novato, CA, 1994) Pg.105-8
Disappointed with the sluggish pace of Army restructuring and well informed of experiments with air cavalry, McNamara demanded the convening of a committee to study problems in tactical mobility. As head of this board he chose General Hamilton H. Howze, a former cavalryman and current commander of the XVIII Airborne Corps, who had long held a belief in the versatility of the helicopter in war. Also appointed were members of the helicopter industry, civilian research groups and think tanks, members of the Department of Defense, and of course other ranking members of the Army.  

In three months the board collected, tested, and evaluated a number of different formations for the use of helicopters in a variety of combat situations, and ultimately convinced McNamara and military leaders of their utility. The Defense Department authorized the development of the 11th Air Assault Division (Test) and the 10th Air Transport Brigade to further refine these ideas.

Though these units were significantly smaller than what the Howze board had envisioned and did not include many of its ideas, it did help to open the funding spigot. Helicopter procurement before 1962 and the Howze Board had been a slow process with small numbers of new helicopters being deployed each year. After the Howze Board these numbers began to climb steadily and by 1965, when many of the tests carried out by the 11th Air Assault Division had been completed, the numbers grew. By 1970 the total number of Army rotary winged aircraft was over three and a half times that of 1962. (See Appendix I)

The Howze Board also helped put more funds into research and development for helicopter tactics. As one officer who participated in the process later said:

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69 Stephenson, Roy Richard. Road to Downfall; Lam Son 719 and U.S. Airmobility Doctrine. (Ph.D. dissertation, University of Kansas, 1991) Pg. 31-2
71 I am indebted to Lt. Gen. (Ret.) Robert R. Williams at Fort Rucker for this information.
For the first time in the history of the Army, a bunch of people had been turned loose with a high priority on personnel and equipment, and told O.K., here’s the dough, we’ll get the people and equipment; [you] come up with the concept and prove it.

Hundreds of officers and thousands of enlisted men with tons of equipment were dedicated to the process. Helicopter manufacturers were forced to increase production to meet demand. The test units flew all over the country participating in live fire exercises and mock battles. This time, unlike with Col. Vanderpool’s experiments, the government willingly paid the bills.\(^{72}\) Troop strength in the Army also increased because of the Howze board. McNamara approved an increase of 15,000 men to supply the Army with pilots and technicians for its new helicopters.\(^{73}\)

McNamara’s support also helped the Army to overcome the protests of the Air Force in developing armed helicopters for tactical air support. By giving the green light to the formation of the 11\(^{th}\) Air Assault Division the Department of Defense approved the use of the armed helicopter and air cavalry for modern warfare. The Air Force would have to deal with it. Indeed, many felt that the eventual formation of Air Assault Divisions on a permanent basis was a forgone conclusion once the test division had been activated.\(^{74}\) Beyond Secretary McNamara the Army even had the support of the President. President Kennedy is said to have praised the Army’s “helicopter gunships” and demanded their deployment in greater numbers.\(^{75}\)

The Howze Board and McNamara’s support for airmobility also helped the innovation overcome critics within the Army itself. While the idea of the helicopter in Army doctrine had received wide support, differences arose over how the helicopters should be organized. Airmobility advocates supported the idea of entire divisions being moved about by helicopters,

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\(^{72}\) Stockfisch, J. A. “The 1962 Howze Board and Army Combat Developments.” (RAND, Santa Monica, CA, 1994) Pg. 39-42

\(^{73}\) Ibid. Pg. 26

\(^{74}\) Butterworth, W. E. *Flying Army.* (Doubleday and Co., Garden City, NY, 1971) Pg. 96-7
while others believed they should be dispersed throughout the Army to increase quality in all units. Due to this intraservice rivalry the full implementation of airmobility was delayed. Only with the convening of the Howze Board and McNamara’s approval of the 11th Air Assault Test Division was the controversy settled. Even then, the full implications of the airmobility concept were not realized. Rather than five divisions of airmobile troops, only two airmobile divisions were ever organized. The same paring down of numbers was true for the implementation of cargo helicopter units and regiments of aerial artillery. Some helicopter units conceived by the Howze Board, such as the anti-tank helicopter units, were not implemented until much later.  

Nonetheless civilian intervention was able to overcome intraservice concerns and airmobility units were established.

With the convening of the Howze Board the helicopter innovation received a much-needed influx of funds, men, and material. By intervening Secretary McNamara helped to speed the process of innovation by supplying these funds and by silencing the idea’s critics. Innovation was then able to grow in a climate that fostered it rather than dampened it. From this point helicopter aviation reached higher and higher levels in the Army organization.

These events speak to the importance of civilian intervention in the airmobile innovation, but in a way that differs slightly from the theory posited above. The idea for the helicopter innovation was well under way by the time civilian intervention was needed. When the Army moved to implement the innovation, however, more was needed to overcome the intransigence of the Air Force and problems with the budget than Army support alone could provide. By moving the fight for Army helicopters to a higher level, Army proponents of rotary wing aviation

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75 Bradin, James W. *From Hot Air to Hellfire: The History of Army Attack Aviation.* (Presidio Press, Novato, CA, 1994) Pg.105-8

76 Krepinevich, Andrew F. *The Army and Vietnam.* (Johns Hopkins University Press, Baltimore, Maryland, 1986.) Pg. 120-1
were able to trigger civilian intervention from the Department of Defense that helped them bypass these problems. Both Secretaries Lovett and McNamara had been well informed of Army progress on helicopter aviation by members of the Army. When these developments supported the administration’s view of military doctrine, civilians intervened to promote the implementation of innovation. Civilian intervention may not have been key in developing the idea for airmobility, but it was definitely a major factor in its implementation.

The Airmobility Innovation in Vietnam

The innovation of troop carrying helicopters supported by armed helicopters and fixed wing aircraft found a place in Army strategy by answering the strategic problems of the nuclear battlefield. By 1962 doctrine for the use of such units existed and training had been carried out. Though the tests of the Howze Board and the later Air Assault tests had been carried out with the vision that these units would be used on a mid to high intensity battlefield in Europe, events in the early 1960’s led to a different début of the airmobile concept. The Kennedy administration had begun to send American troops to Vietnam to support the southern part of that country against the incursions of the Communists from the north. Airmobility doctrine would be used not against nuclear capable Soviet forces in Europe, but against lightly armed guerilla forces in Southeast Asia.

The Army felt confident that its new doctrine was the answer to problems facing the American Military Assistance Command Vietnam (MACV) and Republic of Vietnam Armed Forces (RVNAF) units in combating guerilla warfare. The counterinsurgency battle was seen as an area war, much like the possible nuclear scenario in Europe was to be.77 American and RVNAF forces would use the helicopters to first find the enemy units, then fix them in place and assemble troops by helicopter to destroy them. Mobility and an increase in firepower enabled by
helicopters became the perfect technological solution to the guerrilla tactics of the enemy.\textsuperscript{78} Though this necessitated some significant changes in the way the airmobility units operated, such as continued reconnaissance of large areas rather than reconnaissance of small portions of a fixed divisional front, Army and civilian leaders felt the helicopter units were the best for the job.\textsuperscript{79}

The newly formed 1\textsuperscript{st} Cavalry Division (Airmobile) was the first true airmobile unit to be sent to Vietnam. Indeed its deployment orders on July 1, 1965 followed its creation nearly simultaneously. By August 27 an advanced element of the division was already “in country” and units in the United States were being stripped of aviators to fully man the division.\textsuperscript{80}

Some helicopter units had already been deployed to Vietnam at the time of the Howze Board tests. These units had been operating as troop carrying helicopters and their experiences helped shape how airmobility doctrine worked in Vietnam. This was especially true of how the helicopters approached a landing zone (LZ)\textsuperscript{81}, and tactics for armed helicopters.\textsuperscript{82} Though the numbers of available helicopter units, aircraft, and especially pilots were extremely low in the dawn of America’s involvement in the Vietnam War, they quickly increased after the introduction of the 1\textsuperscript{st} Cavalry Division. The end of 1965 saw over fifty aviation companies and airmobile units deployed to Vietnam. By 1966 they had been joined by twenty-two more.\textsuperscript{83} Helicopters had become the solution for the Army, and during the Vietnam War they had the numbers to prove it.

\textsuperscript{77} Ibid. Pg. 114
\textsuperscript{78} Ibid. Pg. 109
\textsuperscript{79} Stephenson, Roy Richard. \textit{Road to Downfall; Lam Son 719 and U.S. Airmobility Doctrine}. (Ph.D. dissertation, University of Kansas, 1991) Pg. 42-3
\textsuperscript{81} Stephenson, Roy Richard. \textit{Road to Downfall; Lam Son 719 and U.S. Airmobility Doctrine}. (Ph.D. dissertation, University of Kansas, 1991) Pg. 37
\textsuperscript{82} Ibid. Pg. 22-3
Utility helicopters and their armed escorts were the single most important means of fighting in Vietnam. This served to increase the size of Army aviation in general, and helicopters in particular. By the end of the 1960’s 9,528 helicopters were in the Army inventory compared to 2,489 at the end of the 1950’s. 24,000 pilots and thousands more support personnel flew and maintained the new machines, more pilots than existed at the time in the United States Air Force. By 1972 36 generals and 260 colonels were drawing flight pay with time in helicopters, including Army Chief of Staff Westmoreland. The helicopter had come of age.  

_Lam Son 719 and the Airmobility Innovation_

No true test of the airmobility concept emerged from the early years in Vietnam. Rather than being deployed in the manner originally intended, cavalry formations to find, fix, and destroy the enemy in a mid intensity battle, airmobile units were used for counterinsurgency. Indeed, some leaders both inside and outside of the armed forces believed that airmobility was the wrong way to fight a counterinsurgency war. Near the end of America’s involvement in the conflict an operation was carried out that closely reflected Army thought on mid intensity wars. This operation was known as Lam Son 719, an incursion into the Laotian border area carried out by RVNAF infantry and armor units and supported by MACV mobility and firepower assets. This operation would serve as a true test of the doctrine established by the Howze Board in 1962.  

By 1971 the American forces in Vietnam were beginning to withdraw, and the process of “Vietnamization” had begun. In order to relieve the pressure of North Vietnamese Army (NVA)

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84 Bradin, James W. _From Hot Air to Hellfire: The History of Army Attack Aviation_. (Presidio Press, Novato, CA, 1994) Pg.12-13
85 Krepinevich, Andrew F. _The Army and Vietnam_. (Johns Hopkins University Press, Baltimore, Maryland, 1986.) Pg. 54-6, 62, 75
86 Stephenson, Roy Richard. _Road to Downfall; Lam Son 719 and U.S. Airmobility Doctrine_. (Ph.D. dissertation, University of Kansas, 1991) Pg. 72
incursions into Vietnam, and thereby secure more time for these activities, Lam Son 719 was conceived. The operation would strike the NVA supply route in Laos known as the Ho Chi Minh Trail in order to forestall any major NVA offensives in 1971 and the beginning of 1972. RVNAF armor and infantry units would deploy deep into Laos in order to destroy objectives in Base Area 604, an area of the Ho Chi Minh trail around the village of Tchepone. To reach the area armored units of the RVNAF I Corp would deploy along Route 9, a highway running across the South Vietnamese border into Laos. To secure the road and supply infantry units for support, RVNAF airmobile infantry units from I Corp would be brought in by American helicopters to fire bases on either side of the highway. (See Map 1) No American infantry or armor units were allowed to cross the Laotian border due to a Congressional decision known as the Cooper-Church Amendment. They would only be allowed to provide air support, troop transport, and artillery support from bases located in South Vietnam.

Both MACV and the RVNAF knew that the operation would be difficult with the amount of NVA and Viet Cong (VC) troops in the area. The section of Vietnam that would be used for supply of RVNAF had not been thoroughly patrolled for years and the NVA/VC knew the region very well. These areas would first have to be cleared of enemy activity by MACV forces. Intelligence estimated that there were large amounts of NVA units in the area, especially anti-aircraft regiments. These anti-aircraft regiments had been placed in the area to engage Air Force bombers that attacked the Ho Chi Minh Trail. They had guns in 23mm, 37mm, and 57mm as well as the more common 12.7mm that most American helicopter pilots had faced before. In addition military planners knew that the enemy could quickly reinforce his position due to the

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87 Ibid. Pg. 65
88 Ibid. Pg. 87-9
operation area’s close proximity to North Vietnam. To counter this strict secrecy was enforced throughout the planning period and into the first phase of operations.

On January 29, 1971 at 0400 hours, operation Lam Son 719 was launched. By February 5 American forces had opened Route 9 to Khe Sahn and established supply bases at Vandegrift fire support base (FSB), as well as Khe Sahn, to support the 700 helicopters used in the operation. This phase of the operation was no easy task. Logistical problems due to the state of Route 9 and the landing strips at supporting firebases in South Vietnam caused some delay, as did increasingly inclement weather. As a result the operation became heavily dependant on resupply by land convoys.91

Early opposition by NVA forces also caused delay. From the very first airmobile landing of operation Lam Son 719 helicopters began to take fire heavier than anything yet experienced in the war. The NVA had established easily defensible bunkers and numerous anti-aircraft gun emplacements overlooking every natural LZ in the heavily forested region. Since these LZs had not been thoroughly investigated or prepped by fire due to the secrecy of the operation, the problem was compounded. Alarmingly, NVA armored units had also been spotted in the region, something that the allied commanders had not counted on.92 This initial resistance led RVNAF leaders to slow their advance and consolidate positions.

On February 18 the NVA counterattacked in massive numbers using infantry and armored units to assault the RVNAF FSB’s north and south of Route 9. By February 25 a number of bases manned by RVNAF units had been overrun.93 Antiaircraft fire was so intense

91 Stephenson, Roy Richard. Road to Downfall; Lam Son 71/9 and U.S. Airmobility Doctrine. (Ph.D. dissertation, University of Kansas, 1991) Pg. 110-128
92 Ibid. Pg. 143-50
around these bases that helicopters literally could not approach. 94 NVA infantry units pounded the FSB with indirect fire and then surrounded the base with a ring of anti-aircraft guns. Units would press themselves in as close as they could to the RVNAF perimeters until American TACAIR pilots could not attack them for fear of hitting the RVNAF. The situation became so desperate that many RVNAF units were forced to abandon their bases on foot, dodging NVA patrols in hopes of reaching an area where they could be extracted. To make matters worse the RVNAF had not yet reached Tchefone. 95

This new NVA strategy had a real effect on helicopter operations. With the increase in amount and power of the anti-aircraft fire, resupply by helicopter to RVNAF positions became decidedly difficult. The fire became so intense that all aerial resupply missions, even those consisting of a single cargo helicopter, needed an escort of gunships. The maintenance and resupply of the helicopters themselves also became a problem. By the middle of February replacements for helicopters, especially gunships, were coming from all over Vietnam and even from the United States. 96 The operational readiness of the helicopters dropped to staggeringly low levels. The operational readiness rate (OR) for UH-1C gunships, for example, stood at an alarming 25%. By Army regulations helicopter units needed to maintain an OR of 80% or higher to remain efficient. The situation did not improve until after February 23 when the general in charge of aviation assets was replaced. 97

By February 28 the situation in Laos had become critical and a change of plan was decided upon. Rather than conducting search operations throughout the area, the RVNAF

95 Ibid. Pg. 167-81
96 Ibid. Pg. 163
concentrated on taking Tchepone. Three FSBs with overlapping fire patterns were established on high escarpments along a mountain range running east to west in the direction of Tchepone. Reinforced airmobile units then deployed from these bases, air assaulted into Tchepone, and linked with armored forces on March 8. 98 These forces then remained in the area for a mere two days, conducting minimal search operations outside the boundaries of the bombed out village. By March 10 all RVNAF units began a phased withdrawal that quickly became a rout due to massive NVA attacks. NVA troops even pursued the RVNAF and supporting MACV troops across the South Vietnamese border, forcing the withdrawal of troops from bases in the border area. 99

Lam Son 719 was a bloody trial by fire for the concept of airmobility, one that lead many to question its further utility in mid intensity conflict. Still, many claimed that the concept had not been properly executed in Laos. Rather than moving rapidly through the theater and changing bases every two to three days, firebases were established that stayed in position for extended periods of time. This reduced the mobility of the units inserted to minimal levels and decreased their effectiveness. It also allowed the NVA to concentrate their forces and overwhelm the defenders as RVNAF troops stayed in place. Ultimately it resulted in massive casualties for the RVNAF and MACV troops and the failure of operation Lam Son to reach its objectives. 100 (see Appendix III)

The air defense suppression efforts necessary for airmobility to succeed was also severely lacking in Lam Son 719. When LZs were not properly prepped by TACAIR or artillery, helicopter loss rates could climb as high as 40% per insertion. Over 50% of helicopter losses in

99 Ibid. Pg. 200-37
100 Ibid. Pg. 245-6
the operation came while helicopters entered or left the LZ.\textsuperscript{101} The normal routine of massed formations of helicopters exacerbated this problem. As dozens of helicopters would fly into one LZ many would have to hover while others made their approach. This offered more targets to the NVA troops and severely hampered insertions and extractions.\textsuperscript{102} It also meant that most helicopters damaged or lost were troop carrying helicopters, further increasing the human costs of the operation. (See Appendix II for helicopter loss by type) The operation had its critics, but many believed the destruction of enemy troops and supplies in the operation forestalled a major NVA invasion slated for the rest of 1971 and seriously hampered any plans for the following year.\textsuperscript{103}

Ultimately the effects of Lam Son 719 lead to helicopter losses that cost an estimated thirty million dollars.\textsuperscript{104} The official loss rates from the Army came to 107 helicopters lost (15\%) and at least 544 damaged (77\%) out of 700 used.\textsuperscript{105} Combined with the number of sorties and flying hours, the loss rate per helicopter was calculated as 21 per 100,000 sorties or one helicopter for every 963 flying hours.\textsuperscript{106} At first glance the rate of helicopters lost per sortie does not seem too crippling. The numbers released by the Army are, however, somewhat suspicious. Helicopters that were shot down in Laos but later recovered by American forces, no matter how badly damaged, were not counted as operational losses. If a helicopter crashed on the South Vietnamese side of the border and not directly in Laos, it too was not counted as lost.\textsuperscript{107} These details combined with the fact that helicopters had to be flown in on an emergency basis from all

\textsuperscript{102} Ibid. Pg. 251, 253
\textsuperscript{103} Sorley, Lewis. \textit{A Better War: the Unexamined Victories and Final Tragedy of America's Last Years in Vietnam}. (Harcourt Brace and Company, New York, New York, 1999) Pg. 626
\textsuperscript{104} Ibid. Pg. 259
\textsuperscript{106} Sorley, Lewis. \textit{A Better War: the Unexamined Victories and Final Tragedy of America's Last Years in Vietnam}. (Harcourt Brace and Company, New York, New York, 1999) Pg. 262
over Vietnam, and even supplied from the continental forces of the United States, should raise some questions in the mind of the reader.

After Lam Son many commanders began to seriously question the use of helicopters in warfare. 108 Comments arose that Vietnam had placed too much emphasis on helicopter borne troops. The factors mentioned above, lack of mobility when on the ground especially, caused Army thinking to begin shifting away from airmobility doctrine. By 1974 only the 101st remained airmobile and its existence was in question as well. 109 Lam Son 719, if not completely negating the airmobile innovation, had served to discredit it and prove the need for renewed thinking about airmobility doctrine. 110

The Anti-Tank Helicopter Innovation

Political and Military Situation After Vietnam

Innovation centered on the helicopter did not end with the war in Vietnam; indeed Vietnam almost destroyed the innovation it had helped create. In the aftermath of America’s police action many in the Army sought to forget the ways in which the war had been fought, especially the airmobility concept. Events had occurred in the closing stages of the war, such as Lam Son 719, to reinforce this position. Questions were being raised about the helicopters versatility, vulnerability, and place in future operations.

Events in Europe strengthened these arguments with Soviet deployment of a number of new antiaircraft systems. Radar guided weapons like the ZSU-23-4 23mm anti-aircraft gun blanketed Soviet territory, reinforced by the SA-9 Gaskin and the man portable SA-7 Grail

109 Hamilton, Major Robert J. "Green and Blue in the Wild Blue." (Thesis for Air University, Maxwell Air Force Base, AL, 1993) Pg. xii
surface to air missile systems. Even Soviet tanks had been equipped with heavy machineguns designed for an anti-aircraft role. The presence of a sophisticated command and control network to link these systems further improved their lethality. The capabilities of the SA-7 had been seen even in Vietnam. During the 1972 NVA Easter offensive, five Huey Cobra gunships were lost in thirty minutes to the weapon. These factors made mass flights of troop carrying helicopters a suicide mission. The tactics used by Army aviators in Vietnam had become obsolete and many felt that the helicopter had outlived its usefulness.

The threat to Army aviation expended beyond these mere technical difficulties with the adoption of a new war fighting doctrine within the United States Army. Disappointment and disillusion with the Army’s actions in Vietnam led the Army to focus away from small-scale brush fire wars and towards the coming battle with the Soviet Union in Europe. During the 1960’s and 1970’s the Soviet Union had increased its defense spending and developed many new types of weapons to combat NATO forces in Europe. These new weapon types ranged from the air defenses mentioned previously, to new types of tanks and aircraft. By 1965 the Soviet Union had added five divisions of tanks to the forces stationed in Eastern Europe, and their military production had outpaced that of the United States.

The Army also perceived the need for change in force structure and tactics when they reviewed the events of the 1973 war between Israel and its Arab neighbors. The two adversaries in this war mirrored the situation of United States and the Soviet Union in interesting ways. Israel was supplied with weapons very similar to those in use in NATO, and had built their

\[\text{\footnotesize \cite{10} Ibid. Pg. 255} \]
\[\text{\footnotesize \cite{11} Bradin, James W. From Hot Air to Hellfire: The History of Army Attack Aviation. (Presidio Press, Novato, CA, 1994) Pg. 125} \]
military doctrine with the help of the United States and other allies. The Arab forces had been armed with Soviet technology and their doctrine and tactics reflected those of the Soviet Union as well. The war that erupted in October of 1973 was one of the most intense seen since World War II. Israeli forces nearly collapsed under the intensity of the Arab attack despite the overwhelming confidence most U.S. military officers had in their abilities. The war was a wake up call for military officers in the U.S. Army that led many of them to call for a change in Army doctrine.\textsuperscript{114}

The events of Vietnam also lead to a change in civilian thinking on national security. With the advent of the Nixon administration security policy changed from flexible response and combating of Communism in all parts of the world, to a policy of détente and draw down of American military forces. The draft system was abolished and the military was changed to an all volunteer force. This severely limited the number of troops the Army could call up in time of war. Détente also emphasized political solutions to problems with Communist insurgencies. Instead of sending troops to fight in the world’s brush fire wars military and financial aid was sent to embattled nations.\textsuperscript{115} In the aftermath of Vietnam many in government felt that the United States should steer clear of direct military involvement in developing countries and instead support our established allies and interests in Europe.\textsuperscript{116}

The Army was not stripped of all military missions, however. In order to maintain credibility of military threat, civilian leaders approved increases of troop strength in Western Europe. Nixon’s foreign policy emphasized standing fast in Europe in the face of Communist


\textsuperscript{115} Diamond, Robert A. (Ed.) \textit{Nixon: the Third Year of His Presidency}. (Congressional Quarterly, Washington, DC, 1972) Pg. 47A

\textsuperscript{116} Ibid. Pg. 114 and Romjue, John L. \textit{From Active Defense to AirLand Battle: the Development of Army Doctrine 1973-1982}. (United States Army Training and Doctrine Command, Fort Monroe, VA, 1984) Pg. 2
strength. The Army was to concern itself not with small-scale wars, but the anticipated high intensity fight in Europe. The front in Central Europe was perceived not only as the Army’s most important mission, but also its most challenging. It was the change in national security policy during this era that truly shaped future Army doctrine. The selection of the types of technology and doctrine used depended on civilian decisions on where the next war was to be fought. Doctrinal change developed not only due to changes in the technology and balance of power, but because of objections to Army policies brought by their civilian leaders.

These events lend support to the theories of strategic threat and civilian intervention. As Army leaders perceived the need for change stemming from the Soviet buildup in Europe and the lessons of the 1973 Arab Israeli War, a number of them moved to give new focus to Army doctrine. General William DePuy of the recently formed United States Army Training and Doctrine Command (TRADOC) headed up these efforts, resulting in the adoption of the doctrine of “active defense” for fighting in future wars. These changes in doctrine were affected by civilian insistence through Congress and the President on less intervention in developing countries. By propagating the strategy of détente and reducing the Army’s manpower, civilians forced the Army to concentrate on the Soviet threat to Europe. Through the limitation of roles civilian intervention directed the course of Army strategy.

Development of the Anti-Tank Helicopter

With the new focus of the Army away from brushfire wars and towards heavy armor clashes in the plains of Europe, the helicopter had to adjust to survive. In order to prove their

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118 Diamond, Robert A. (Ed.) Nixon: the Third Year of His Presidency. (Congressional Quarterly, Washington, DC. 1972) Pg. 47A
worth in the Army’s new structure, helicopter advocates changed their focus from troop carrying mobility to weapons mobility. The helicopter, they claimed, was the perfect tank killer and could operate in a high intensity battlefield. This claim rested heavily on the new developments in anti-tank guided missiles that had been taking place within the Army.\(^{120}\)

In the late 60’s and early 70’s development of the Tube-Launched, Optically Tracked, Wire Guided (TOW) Anti-Tank Guided Missile (ATGM) had been steadily moving forward. In 1971 the Army began testing the feasibility of firing this system from helicopter gunships. During North Vietnam’s 1972 Easter offensive into the south, UH-1B’s armed with the system had accounted for twenty-seven tanks and sixty-one other targets in eight months without the loss of a single helicopter. This was a marked improvement over the older SS-11 anti-tank rocket system previously deployed.\(^{121}\) The Arab-Israeli War of 1973 had further proven the destructive capability and cost effectiveness of ATGM systems in a mid to high intensity battlefield, and events had not gone unnoticed in the US military.\(^{122}\) By marrying the twin systems of the TOW ATGM and the AH-1 Huey Cobra helicopter gunship, aviation advocates felt they could create a viable place in the Army’s new force structure.\(^{123}\)

While anti-tank helicopters had long been debated in the Army, and even saw action late in the Vietnam War, many of the ideas for its deployment had to be renewed and revamped. The anti-aircraft capabilities of the Soviets would not allow the use of Vietnam era gunship tactics, such as flying at 600 feet. To solve these problems new tactics were created to minimize exposure. The foremost of these tactics was the development of low-level flight allowing the

helicopter to use the terrain to reduce exposure. By flying in the “nap of the earth” (NOE) helicopters could use their inherent abilities of speed and horizontal flight to weave between obstacles and fly below radar. As night vision systems were introduced, helicopters could further improve their stealth and survivability by operating at night.124 While these ideas had been developed and practiced previously in the U.S. military, and were practiced by American allies in Europe, many Army aviators had to be trained in their use.125

With the use of TOW systems on highly mobile platforms and the use of NOE, Army aviators hoped to convince officials that the helicopter had a place in Central Europe, the new focus of Army missions and doctrine. It was stated that armored divisions facing Soviet tanks on the Central Front could be quickly reinforced or supplemented by helicopter gunships. Lightning strikes to open holes in the Soviet line, or plug holes along Allied positions, could be carried out by such a system and guard against fears of a blitzkrieg attack. In their willingness to discard old ideas and move towards new ones that would benefit the whole of the Army, aviators sought to preserve their place in the force structure. Army aviation’s senior officers told their troops to “forget last year’s war stories… find new ways that Army aviation can contribute to the Army’s mission [and] get out and sell Army aviation.”126

To forward this salesman ship of Army aviation a series of trials to prove the feasibility of anti-armor attack helicopters was carried out. In June of 1972 the Allied militaries conducted the

125 Bradin, James W. From Hot Air to Hellfire: The History of Army Attack Aviation. (Presidio Press, Novato, CA, 1994) Pg. 125
Joint Helicopter Instrumented Evaluation, later known as the Ansbach Trials.\textsuperscript{127} Held in Europe this exercise combined units of scout and attack helicopters defending themselves against armored units reinforced by air defense weapons and fighter coverage. Using nap of the earth flying, pop-up firing tactics, and wire guided missiles helicopters were able to establish an average exchange ratio of twelve to seventeen armored fighting vehicles destroyed for each helicopter killed. In some instances the ratios were as high as 33:1 in favor of the helicopters. Since Allied forces on the Central Front were hypothesized as operating at a numerical disadvantage, a cost effective tank killer like the TOW armed attack helicopter was highly attractive.\textsuperscript{128} The helicopter had once again proven its worth.

With the place of the helicopter once again secured within the Army, doctrine for the use of anti-armor, or attack, helicopters was more fully developed. The role of the helicopter shifted from use as a troop carrier to suppression of enemy air defenses (SEAD) and destruction of enemy armor units with the introduction of the active defense doctrine. This doctrine emphasized utilization of the extended range, mobility, and firepower of newly developed weapons systems to blunt the attack of Soviet armor.\textsuperscript{129} Also emphasized was the need for concentration of forces at critical moments, and use of terrain and concealment to increase the effectiveness of the weapons.\textsuperscript{130} This emphasis had special importance for attack helicopters. Utilizing TOW missiles, NOE, and the inherent mobility of rotary wing aircraft, the helicopter was perfect for the doctrine of active defense. As shown in the Ansbach trails the system was also highly lethal and had good survivability. Airmobility also gained new life in the doctrine of active defense.

\textsuperscript{127} Bradin, James W. \textit{From Hot Air to Hellfire: The History of Army Attack Aviation}. (Presidio Press, Novato, CA, 1994) Pg. 126-7
\textsuperscript{128} Ibid. Pg. 24-5
\textsuperscript{129} Doughty, Maj. Robert A. \textit{The Evolution of US Army Doctrine, 1946-76} (Combat Studies Institute, Fort Leavenworth, KS, 1979) Pg. 44
\textsuperscript{130} Romjue, John L. \textit{From Active Defense to AirLand Battle: the Development of Army Doctrine 1973-1982}. (United States Army Training and Doctrine Command, Fort Monroe, VA, 1984) Pg. 8
The 1976 manual on doctrine and tactics, which established active defense, stated in bold type, "The airmobile doctrine is the most dramatic organizational advance in the US Army." The key to success in active defense was in concentrating combat power rapidly. By providing the needed assets of mobility and firepower the helicopter was able to cement a place for itself in the new Army doctrine.  

Evolving with changes in Army doctrine, the use of the attack helicopter took increasingly more aggressive forms. As active defense was phased out of Army doctrine as too passive, a new strategy formed. This doctrine formed out of ideas developed in TRADOC in the late 1970's emphasizing the need to attack Soviet second echelon, or follow on, forces. While some troops would be responsible for meeting and holding the initial onslaught of Soviet forces, others behind these front line troops would maneuver to interdict the second echelon divisions before they could be committed to battle. This doctrine, known as Central Battle, had a place for the attack helicopter as well. The firepower and mobility inherent in these systems was seen as vital to providing support not only for concentrating fire in the initial holding attack, but also for interdiction against the second echelons.

By 1981 the ideas first developed in the Central Battle doctrine had been greatly expanded and included better coordination of attacks and deeper interdiction of Soviet forces. The concept of AirLand Battle stated that deep attack to relieve pressure on front line forces was not a luxury, but a necessity. By disrupting second echelon forces the Soviets would not be able to bring their greater numbers to bear on NATO troops. The key to deep attack was

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131 Doughty, Maj. Robert A. The Evolution of US Army Doctrine, 1946-76 (Combat Studies Institute, Fort Leavenworth, KS, 1979) Pg. 43
maneuverability and firepower, forces would have to move rapidly and strike hard using the terrain to their advantage.\textsuperscript{133}

The attack helicopter was again seen as vital in this environment. Near the top of the Army's procurement list was the AH-64 Apache, a highly maneuverable anti-tank helicopter that embodied all the key elements of Army doctrine.\textsuperscript{134} Airmobility too was seen as an important element of the AirLand Battle. The airmobile units, together with attack aircraft, would assist in extending the battlefield and disrupting Soviet forces.\textsuperscript{135} By the 1990's the importance of attack helicopters was well set. Army commanders believed that long-range fires from attack helicopters would prove decisive to gaining the initiative in battle. Aviation assets could be committed "en masse" to deep strike operations making air power particularly decisive.\textsuperscript{136} Army aviation was once again an important part of the Army's plans for battle.

\textbf{Army-Air Force Rivalry and Agreement}

During the development of the anti-tank helicopter and AirLand Battle doctrine, leaders in the Army and the Air Force became involved in roles and missions disputes once again. The dispute this time centered on the deployment of the anti-tank helicopter as an aircraft for close air support. Despite the Johnson-McConnell agreement, Air Force leaders became increasingly concerned that the Army's proposed Advanced Aerial Fire Support System (AAFSS) would encroach on the Air Force's mission of CAS. As Gen. McConnell himself stated:

Of course, what the Army intends to do with the advanced helicopter that they are talking about is to use it for close support operations, which is traditionally a mission for the Air Force and one which the Air Force has always done very well... I do not think it

\begin{footnotesize}
\begin{itemize}
  \item 133 Ibid. Pg. 44-50
  \item 134 Ibid. Pg. 47
  \item 135 Ibid. Pg. 67
  \item 136 Hamilton, Major Robert J. "Green and Blue in the Wild Blue." (Thesis for Air University, Maxwell Air Force Base, AL, 1993) Pg. xvi
\end{itemize}
\end{footnotesize}
necessary to build an armed helicopter with a capability for close support of Army forces...\textsuperscript{137}

Instead the Air Force advocated the development of a new fixed wing close air support aircraft through the A-X program. Funding battles raged through the halls of Congress and the Pentagon over the AAFSS and A-X programs as the roles and missions disagreement flared once again. The debate continued through Congressional subcommittees and military investigative boards even after the AAFSS had been deemed too expensive and a search for a less complex Advanced Attack Helicopter (AAH) had begun.\textsuperscript{138} By 1975 the A-X program had culminated in the purchase of the Fairchild A-10\textsuperscript{139}, and the Army's AAH program was well into the development phase.\textsuperscript{140} To justify the purchase of both systems, considered vital due to the military situation on the European front, a joint agreement between the Army and Air Force was signed which finally ended the decades long controversy over CAS.

Signed by both services on September 16, 1975 the agreement stated quite simply that no duplication in missions between the two aircraft existed. They performed two very different functions. The attack helicopter was seen not as CAS, but as an extension of the Army's organic firepower. It would work along and behind the forward edge of the battle area to counter enemy armor, essentially as envisioned by the active defense doctrine. The AAH then was not a duplication of the A-10 but a compliment to it. Both the Army and the Air Force stated that the limited range, speed, and firepower of the AAH, as compared to fixed wing aircraft, made it a

\textsuperscript{138} Ibid. Pg. 519-30  
\textsuperscript{139} Ibid. Pg. 528  
\textsuperscript{140} Bradin, James W. *From Hot Air to Hellfire: The History of Army Attack Aviation*. (Presidio Press, Novato, CA, 1994) Pg. 145
poor candidate for CAS.\textsuperscript{141} The A-10, however, clearly filled a CAS role as defined by the military establishment.\textsuperscript{142} By defining away the problems with CAS, the Army and the Air Force both preserved a role in fire support.

By 1984 the expansion of the helicopter’s role in warfare and other issues inherent in AirLand Battle had created the need for another joint Army-Air Force agreement. In contrast with other Army-Air Force agreements discussed, this agreement covered a wide range of topics necessary to make AirLand Battle work. Called the 31 Initiatives and signed on May 22, 1984 the document had special impact on attack helicopter operations in interdiction. In keeping with the theme of complimentary missions both services agreed to coordinate all interdiction efforts, suppression of enemy air defenses, and intra-theater lift. The document went on to state that all tactics and procedures for these missions would be developed jointly, with equal input from both sides.\textsuperscript{143} Whatever the eventual outcome of these incentives, the fact that legislation was passed in Congress upholding them, and the services jointly signed the document speaks to the easing of tensions between the Army and the Air Force. The two services had abandoned interservice rivalry and embraced jointness in order to expand and protect their roles and missions.

This second wave of innovation in Army aviation supplies us with another case for the testing of theory. In this case it appears that strategic considerations and a threat to the organization again provide the impetus for innovation. In order to maintain the viability of the organization in future wars new concepts and ideas had to be established. By developing the doctrine of attack helicopters for anti-armor operations, the Army was able to provide solutions

\textsuperscript{143} Wolf, Richard I. \textit{The United States Air Force: Basic Documents on Roles and Missions}. (Office of Air Force History, Washington, DC, 1987) Pf. 413-423
to the problems facing it in Europe. In this case civilian intervention is closely linked with this change since the focus on European operations was mandated as the main focus of Army operations. Such a strong statement from civilian leaders virtually dictated the need for innovation in this era. Rather than coming up with new solutions on their own, it could be argued that Army leaders innovated due to civilian commands. Interservice rivalry played a role initially in this innovation but then ceased to be a factor. Indeed, the theory is followed to perfection with the development of the AAH and the A-X. The Army sought fire support for its troops and innovated to create the AH-64. The Air Force perceived a threat to its mission and developed the A-10 to counter Army intransigence into CAS. By ending the rivalry and redefining the roles and missions of both services with regards to support fire for ground troops, both services were able to retain a mission that enabled expansion of capabilities and reduction of uncertainty.

**Helicopters in Desert Storm**

The new role of Army aviation would become particularly apparent in operation Desert Storm. The massive amount of Iraqi anti-aircraft artillery (AAA), radar guided surface to air missiles (SAMs), and infrared-guided (IR) SAMs would pose a substantial threat to any aviation assets.\(^ {144}\) Surprisingly AAA and IR SAMs would cause the highest amount of casualties among allied aircraft.\(^ {145}\) The vast number of these casualties came from the ranks of ground attack aircraft such as the A-10 and the F/A-18, causing much worry among Army Aviators.\(^ {146}\) Helicopters would be used in Desert Storm for all the roles the Army had envisioned for them in the development of AirLand Battle. Not only were attack helicopters used for SEAD and interdiction against armored units, troop-carrying helicopters conducted a massive airmobile

\(^ {144}\) *Conduct of the Persian Gulf War.* (Department of Defense, Washington, DC, 1992) Pg. 177-8
operation deep into Iraqi territory to rapidly expand the battlefield. Though few helicopters would be lost in the war, the presence of vast amounts of anti-aircraft weaponry weighed heavily in the minds of commanders.

**Operation Desert Rendezvous II and the Helicopter Innovations**

The doctrine of airmobility was not removed after the Vietnam War; the 101st Air Assault Division preserved it in the Army’s force structure. In Desert Storm the concept would be tested again in operation Desert Rendezvous II. This operation was conducted to place American forces deep inside Iraq to cut off Highway 8 as an escape route for Iraqi forces leaving Kuwait. The 101st would deploy on the first day of the ground war to a position 80 miles across the Iraqi border named forward operating base (FOB) Cobra. Here a massive refueling and rearm point would be constructed to support operations in area of operations (AO) Eagle, located 85 miles northeast of FOB Cobra and a mere 145 miles southeast of Baghdad. In AO Eagle airmobile infantry forces would be inserted and supported by attack helicopters to deny the enemy use of Highway 8. If this operation were successful it would be the largest and deepest airmobile operation in Army history.147

The officers in charge of planning Desert Rendezvous II were well aware of the weakness of airmobility, especially the fact that the soldier’s mobility would be severely curtailed once inserted. They also knew that such an operation would need to have a massive logistics operation to keep it in the field, and that airmobile operations were very vulnerable to enemy air defenses and nuclear, biological, and chemical attacks. Nevertheless it was felt that the operation could

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146 *Operation Desert Storm: Evaluation of the Air Campaign.* (General Accounting Office, Washington, DC, 1997) Pg. 94

succeed if it could be deployed in such a way as to maximize surprise through use of terrain and mobility. The 101st would deploy its FOB not in an area of heavy enemy activity, but go “where the enemy was not.” The lessons from Lam Son 719 had been learned, and the 101st was determined not make the same mistakes.

Like operation Lam Son 719 some of the greatest difficulties in Desert Rendezvous II would come in keeping the helicopters well supplied with fuel. Army officers knew that all the necessary fuel requirements could not be supplied by helicopter alone, and planned for a massive logistics operation by road. Trucks full of fuel and other supplies would deploy up a little used road running from Saudi Arabia into Iraq dubbed main supply route (MSR) Newmarket. MSR Newmarket would be vital as a way to keep logistics flowing for operations in AO Eagle, as well as acting as a line of communications.149

To assure minimum resistance for operations at FOB Cobra and along MSR Newmarket reconnaissance operations began three days before the beginning of ground operations. It became immediately apparent that Iraqi forces were in the region in some strength and would have to be neutralized before operation Desert Rendezvous II could begin. Reconnaissance of MSR Newmarket conducted by Cobra attack helicopters revealed the presence of large numbers of Iraqis along what was to become MSR Newcastle. On February 18 a battalion size element of Iraqi soldiers in well-camouflaged bunkers was spotted. From their position these troops would be able to fire at will along the MSR. On February 20 air strikes were conducted on the position by attack helicopters and Air Force A-10s, but the Iraqis refused to surrender. Only with the introduction of ground troops and a bombardment of pamphlets, which gave the Iraqis

149 Taylor, Thomas. Lightning in the Storm: the 101st Air Assault Division in the Gulf War. (Hippocrene Books, New York, NY, 1994) Pg. 230-1
instructions on how to properly surrender to Allied forces, did resistance cease. When American troops cleared out the bunkers they found an impressive amount of supplies as well as detailed intelligence on Iraqi units in the area. If these troops had chosen to resist the operation would have been severely endangered.\textsuperscript{150}

Reconnaissance of proposed locations for FOB Cobra also found the presence of Iraqi troops. Rather than attempt operations against these forces it was decided to move the FOB further south. Few doubted that the operation could avoid Iraqi troops once Cobra was reached, but operations did not commence against the enemy units in the region for fear of alerting them to Cobra’s position.

When the 101\textsuperscript{st} deployed for FOB Cobra on February 24 a massive number of helicopters took to the sky. Sixty-seven UH-60s, thirty CH-47s, and ten UH-1 Hueys left their assembly area. These helicopters were laden with the troops, vehicles, and supplies necessary to deny Iraq the use of Highway 8. The LZ at Cobra was “cold,” meaning there was no Iraqi resistance, but shortly after landing patrols came into contact with Iraqi troops north and east of Cobra. Infantry and attack helicopters quickly moved to end the resistance under heavy fire. Fortunately, only one Apache was damaged by AAA fire and human casualties were minimal. By 1039, four and a half hours after landing at Cobra, the area was secured. Eventually 339 Iraqis surrendered to American forces and large amounts of weaponry and ammunition were captured. This action took place about four kilometers north of the FOB, the area first selected for Cobra’s placement.\textsuperscript{151}

By the end of February 24 more than 2000 soldiers and hundreds of thousands of gallons of fuel had been moved into FOB Cobra. To accomplish this task 370 helicopters, including

\textsuperscript{150} Ibid. Pg. 159-63
\textsuperscript{151} Ibid. Pg. 170-4
reconnaissance and attack elements, had made 1,046 sorties. Only one helicopter was damaged by enemy fire, although six more were damaged in accidents. In addition another 2000 troops and 632 vehicles arrived by MSR Newmarket later that day, completing the first of a series of convoys to FOB Cobra. The troops deployed around Cobra’s perimeter, dug in, and prepared for AO Eagle.\(^{152}\)

On February 25 elements of the 101\(^{st}\) air assaulted brigades of the 187\(^{th}\) Infantry into combat positions on Highway 8. The three areas chosen for this phase of the operation were subjected to thorough reconnaissance by attack helicopters. The helicopters laden with infantry were launched at 1500 hours and soon ran into rough weather. Although all LZs were cold and easily secured, increasingly inclement weather meant that some elements were only at half strength for the first twenty-four hours of operations. The troops had only 81mm mortars, a few ground and vehicle mounted TOW missile systems, and demolitions to cut Highway 8 to combat Iraqi troops. Although these elements still preformed their mission well, they could have been easily routed by an attack of enemy armored forces. Only the element of surprise in quickly deploying to AO Eagle saved these troops from being overrun. When the weather cleared and the positions were reinforced, the 101\(^{st}\) was in total control of Highway 8.\(^{153}\)

Due to the speed with which Iraqi positions had fallen, and the success of the 101\(^{st}\) in securing Highway 8, the decision was made to deploy the troops further to the east. They were to move to FOB Viper 93 miles east of Cobra and attack fleeing Iraqi armor in engagement area (EA) Thomas 120 miles to the northeast. Here the attack helicopters organic to the 101\(^{st}\) would harass and destroy any Iraqi targets fleeing north to Baghdad.

\(^{152}\) Ibid. Pg. 174-6
\(^{153}\) Ibid. Pg. 181-91
On the 27th of February infantry units and their vehicles were shuttled to Viper by CH-47 and UH-60. They arrived in a “cold” LZ and quickly established refueling points for the helicopters, as well as artillery for support. In total it took fifty-five CH-47 sorties and 160 UH-60 sorties to fully man and equip the FOB. A convoy from FOB Cobra further enhanced them, although these elements did not arrive till later that evening.

By 1330 that afternoon four battalions of AH-64s arrived at Viper, refueled and attacked targets in EA Thomas. These elements, together with OH-58 Kiowa Warriors for reconnaissance and UH-60s for command and control and search and rescue, found an enormous amount of traffic in the area. Tanks, trucks, and armored personnel carriers all struggled to get through an area already heavily attacked by Air Force and Navy fighter-bombers. Smoke from burning oil wells blotted out the sun and created conditions of poor visibility. Each team stayed in the area for thirty minutes and rarely returned with unexpended ordnance. Due to the poor visibility other aircraft could not operate in the area, it became a kill zone for the Apaches. Soon after this “battle of the causeway” the ground war in Iraq ended.  

By moving rapidly with superior forces, the elements of operation Desert Rendezvous II were able to strike quickly at the Iraqi rear and cut off lines of retreat. By remaining mobile and setting FOBs where resistance was thought to be minimal, the troops were able to inflict maximum damage on Iraqi forces without exposing their vital elements to Iraqi counterattack. The fact that Iraqi troops encountered by the forces in operation Desert Rendezvous II capitulated quickly also assisted the operation. If these forces had resisted, especially along the vital MSR Newmarket, the operation could have had very different results. The troops deployed along Highway 8 were also very fortunate that no concerted Iraqi counterattack occurred when the troops were at low strength levels due to weather. While the airmobile operation was a
success in attacking Iraqi troops at their most vulnerable, it could easily have gone the other way. The dependence of the airmobile units on rapid ground resupply in operation Desert Rendezvous II is problematical. If the supply lines for these units had been cut the situation would have been critical. The utility of deep lift operations in this sort of environment is questionable. Other units, such as mechanized infantry, may have been utilized that reduced the danger to troops while offering more firepower than lightly armed airmobile units. Despite solving many of the problems discovered in operation Lam Son 719, the place of large-scale airmobile operations is still dubious.

The anti-tank innovation proved very successful in Desert Storm. The actions in EA Thomas represent an example of deep strike interdiction by attack helicopters. These elements were able to prove their utility by attacking Iraqi elements in an environment where Air Force and Navy air assets could not operate due to visibility conditions. The fact that these elements where able to inflict maximum damage on Iraqi elements while receiving no casualties themselves reinforced the belief that helicopters could operate successfully in high threat environments. Attack helicopter operations in other areas of the theater also speak to the attack helicopter’s lethality and survivability. Throughout Desert Storm, Apache attack helicopters were responsible for destroying a total of 500 tanks, 120 armored fighting vehicles, and large numbers of artillery pieces, trucks, and fixed targets during which only one Apache was lost due to enemy action. They attacked these targets not only in the usual cavalry roles of screening and reconnaissance, but also in the deep strike and interdiction missions envisioned in AirLand Battle. Rapidly expanding the battlefield and eliminating enemy assets through interdiction and

154 Ibid. 190-207
155 Conduct of the Persian Gulf War. (Department of Defense, Washington, DC, 1992) Pg. 286
deep strikes had proven the helicopter innovations of airmobility and anti-armor attack. Helicopters were not only useful in Desert Storm; at times they were vital to its successful execution.

**Helicopter Innovation in the Post-Cold War Era**

In more recent times the United States Army has once again refocused its operations towards new threats to national security. With the end of the Cold War and the collapse of the Soviet Union, military thinking has shifted from the high intensity battlefields of Europe back to low intensity fighting in underdeveloped countries. During the administrations of Presidents George Bush and William J. Clinton, political leaders have demanded that the military focus not on threats stemming from one or another major power, but from a number of smaller regional contingencies. These contingencies often stop short of war itself and focus on peacekeeping and operations other than war. Those contingencies where armed conflict does occur are seen as largely unconventional in nature. This means that often the fighting may be protracted, asymmetrical, and ambiguous as to whom is winning. In other words it may reflect American involvement in Vietnam more closely than the anticipated war in Central Europe.\(^{157}\) These recent changes have not been easily accepted by military organizations in the United States. The doctrine and equipment in most branches still reflects thinking toward major power conflicts. The process of innovation is developing once again.

As with the changes in strategic thinking seen in the 1950’s and late 1970’s Army aviation is once again seeking new missions to insure its survival. The need for such a shift in thinking and the problems associated with it are readily apparent in recent U.S. military actions.

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\(^{157}\) Cimbala, Stephen J. *Clinton and Post-Cold War Defense*. (Preager, Westport, CN, 1996) Pg. xiv
One such action, the deployment of Task Force Hawk to Albania in 1999, aptly illustrates the search for new roles and missions in Army aviation.\textsuperscript{158}

Task Force Hawk was deployed as part of Operation Allied Force to coerce Slobodan Milosevic into withdrawing Serbian troops from the province of Kosovo and cease his military activities in that region. Task Force Hawk came about when President William J. Clinton offered to deploy AH-64 Apache anti-armor attack helicopters to the region in response to North Atlantic Treaty Organization General Wesley Clark's call for a wider variety of weapons to attack Serbian armor and artillery within the province. The use of Apaches offered the capability of an all weather day/night attack force at a time when Allied air strikes were experiencing decreased effectiveness due to poor weather conditions and visibility. The orders to deploy the force came in early April, and the 11\textsuperscript{th} Aviation Brigade of the Fifth Army Corp based in Illesheim, Germany was chosen for the deployment.\textsuperscript{159} At the time officials stated that Task Force Hawk was not to a movement to send ground troops to the region, but merely an extension of the air war over Kosovo.\textsuperscript{160}

The force structure conceived included 24 AH-64A Apache attack helicopters, 26 utility and lift helicopters (UH-60 Blackhawk and CH-47D Chinook), a number of OH-58D Kiowa Warrior observation helicopters, a battalion of Multiple Launch Rocket Systems (18 MLRS, 350 people) for artillery support, a Task Force Deep Operations Control Center group including signals and intelligence assets, a support battalion, and a mechanized infantry company and military police company for force protection. Originally all of these assets were collected from Army units located in Germany rather than those in the Unites States for purposes of more rapid

\textsuperscript{158} Garamone, Jim. “Air Ops in Yugoslavia Pick Up: Apaches to Albania.” \textit{American Forces Information Service}, April 6, 1999

\textsuperscript{159} Ibid.

\textsuperscript{160} Dickey, Sgt. 1\textsuperscript{st} Class Connie E. “Army Sending Task Force to Albania.” \textit{Army News Service}, April 5, 1999
deployment and force cohesion. In total the force consisted of 2,000 men and women to be based in an airport in Tirana, Albania.\textsuperscript{161}

These forces were deployed to the region with a very specific purpose in mind and that purpose was reflected in the structure of the force. The Apaches of Task Force Hawk were deployed to conduct deep-strike operations in the mountainous terrain along the Albanian border, and within Kosovo itself, to directly attack and destroy Serbian armored and artillery units. Their all weather capability would be especially effective at a time when poor weather conditions were grounding Air Force and Naval flights. The Apache had proven a potent antiarmor weapon in Desert Storm, and NATO planners hoped to use its capabilities in Kosovo.

The problems with Task Force Hawk started before the force was even deployed. Due to political considerations the task force had to be based in Tirana, Albania, rather than an established U.S. military base in Macedonia.\textsuperscript{162} This caused immediate problems for force deployment and security. The airport in Tirana, known as Rinas airport, is extremely primitive with little to no facilities available for the troops and limited space for the aircraft. Infrastructure outside of the airport necessary for supporting the force was also severely lacking. At one time it was calculated that 500 km of roads were needed in the region just to support normal resupply operations.\textsuperscript{163} Also missing were command and control assets and troops necessary for force protection. These factors increased the necessary amount of troops to the 2000+ figure stated earlier. Later the numbers increased to 5000+ when an engineering battalion for infrastructure improvement and large amounts of force protection assets were added.\textsuperscript{164}

\textsuperscript{161} Dickey, Sgt. 1\textsuperscript{st} Class Connie E. "Army Sending Task Force to Albania." \textit{Army News Service}, April 5, 1999 and Seigle, Greg. "Apaches on Attack Alert." \textit{Jane's Defense Weekly}, April 14, 1999
\textsuperscript{163} Ripley, Tim "Analysis, Time to Pull Together." \textit{Jane's Defense Weekly}, May 12, 1999
\textsuperscript{164} "Kosovo Backgrounder." (House Armed Services Committee, Washington, DC, June 30, 1999) Pg. 3
In addition to problems with manning and deploying Task Force Hawk, Rinas airport also served as the base for humanitarian operations in the region (Task Force Shining Hope) and added more problems to the deployment of the task force. Since the runways and air control facilities of the airport could only support daytime landings of two C-130’s or one C-17 at any one time, this lowered the sortie rate for cargo planes to 200 a day.\(^{165}\) While this number is actually rather impressive in light of the conditions, many doubted whether it was adequate to supply two separate task forces with dissimilar missions simultaneously.

The lack of a coordinating command structure for the two task forces further exacerbated matters and caused snarls in deployment. Extreme measures were taken to get even the Apaches, the core of the force, into the region. Many of helicopters were flown from their base in Germany, to Italy, and then across the Adriatic to Albania. Needless to say this can be very hard on the aircraft whose operational range is considered to be around 230 miles. It took the military nearly a month to fully deploy Task Force Hawk, not only due to problems with the airport but also in the need to pull in parts of the force structure from other areas.\(^{166}\) For instance a lack of combat ready pilots caused the need for eleven crews (twenty-two men) to be flown in from Fort Bragg, North Carolina.\(^{167}\) In total the deployment alone cost an estimated $300 million dollars and untold man-hours.\(^{168}\)

Even with these problems the deployment was considered somewhat of a success.\(^{169}\) Due to the surmounting of all the problems deploying and gathering the force, and the weather

\(^{165}\) "Army Chief of Staff Holds Media Availability on Kosovo (Transcript)" Federal Document Cleaning House. May 23, 1999


\(^{167}\) Congressional Testimony, "Readiness of the Army AH-64 Apache Helicopter Fleet." (Military Readiness Subcommittee of the House Committee on Armed Services, Washington, DC, July 1, 1999)

\(^{168}\) "Kosovo Backgrounder." (House Armed Services Committee, Washington, DC, June 30, 1999) Pg. 3

\(^{169}\) "Army Chief of Staff Holds Media Availability on Kosovo (Transcript)" Federal Document Cleaning House. May 23, 1999
problems still facing the United States Air Force one would think that Task Force Hawk would be quickly deployed to justify its expanse and drain on time and manpower. Yet, Task Force Hawk was never deployed in combat and faced significant problems just in training for combat. Three main reasons can be found to explain why the task force was never deployed, two of these reasons can and were more or less remedied by the military, but other deeper problems severely constrained the use of Task Force Hawk.

The first major obstacle faced by Task Force Hawk was flight training. Over half of the pilots deployed with Task Force Hawk had less than 500 hours flight time in Apaches and few had flown in the type of terrain to be encountered in the theater.170 These problems also faced other pilots and crews in Operation Allied Force but it had special impact on the members of Task Force Hawk because of the helicopters themselves. Mountainous terrain poses special problems for helicopter operations due to the physics of rotary wing flight.171 Usually attack helicopter pilots train to fight in areas of flat or rolling terrain such as the plains of Europe and the deserts of Iraq. Seventy-five percent of the terrain they would have flown in Kosovo and Albania is mountainous.172 This factor necessitated exercises in theater to prepare pilots for even basic flight operations.

In addition to training problems for terrain, most pilots also had a low number of flight hours in the aircraft they were to operate. In addition to the lack of basic flight time the pilots also lacked adequate hours in gunnery practice.173 The amount of pilots trained to use the night vision goggles deemed necessary for the operations in theater was also low. All these factors

171 Congressional Testimony, “Readiness of the Army AH-64 Apache Helicopter Fleet.” (Military Readiness Subcommittee of the House Committee on Armed Services, Washington, DC, July 1, 1999)
172 Apache Pilots Take High Ground.” European Stars and Stripes, November 3, 1999
combined meant that the pilots had to spend excessive time in training before deemed ready for operations.\textsuperscript{174} The root of these problems was that the pilots deployed had trained in Germany, whose government placed severe restrictions on U.S. Army training operations due to economic and political considerations. More experienced pilots had to be sent in from Fort Bragg, North Carolina to make up for the deficiencies.\textsuperscript{175}

In addition to the problems of training that affected Task Force Hawk’s conceived mission, problems arose due to the equipment aboard the Apaches. In many cases the onboard equipment for the AH-64 Apache was either faulty, inappropriate for the mission assigned, or both. The night vision system internal to the helicopters was deemed inadequate for the mission assigned, necessitating the use of night vision goggles.\textsuperscript{176} The communications gear in the Apaches worked only by line of sight, which is a serious liability in mountainous terrain. Another helicopter, a UH-60 Blackhawk with special communication equipment, had to be deployed for Task Force Hawk just to maintain communications with command and control.\textsuperscript{177} Finally the countermeasure systems used to warn the pilot of a missile lock on his aircraft was also faulty. It gave false echoes and signatures that set off the warning device even when no weapons are locked on to the aircraft. The system was deemed so untrustworthy that pilots took to ignoring the warning tone or even shutting the system off.\textsuperscript{178} In the rugged terrain of Kosovo where enemy troops are deployed with shoulder fired anti-air missiles as a matter of routine, this could have drastic consequences.

\textsuperscript{174} Ibid.
\textsuperscript{175} Congressional Testimony, “Readiness of the Army AH-64 Apache Helicopter Fleet.” (Military Readiness Subcommittee of the House Committee on Armed Services, Washington, DC, July 1, 1999)
\textsuperscript{176} Ibid.
\textsuperscript{177} Ibid.
\textsuperscript{178} Ibid.
The problems facing Task Force Hawk due to training and equipment were immense, but the primary fault of the operation was in lack of doctrinal thinking. Deep strike operations for attack helicopters are an appropriate role according to Army thought, but not in the manner that Task Force Hawk would have operated. For a deep strike to be successful the position of enemy units must be known. This was far from the case in Kosovo. Armor and artillery assets had been dispersed throughout the region and deployed in such a way to hide them from air attack. In addition helicopters need ground units for SEAD and other functions. Without these factors helicopter operations can be dangerous.

An appropriate contrast can be made with operation Eager Anvil in Desert Storm, a daring attack helicopter strike against enemy air defenses that was used to open a corridor of attack for Allied air power. While these units operated deep within enemy territory they did so against known targets and in an environment that allowed full use of the Apache’s capabilities. The helicopters of Eager Anvil were able to attack their targets from a distance of eight kilometers allowing them to remain out of range of AAA until those elements could be destroyed. In the forests of Kosovo this would not have been the case. Not only were the positions of targets unknown, but the utilization of ground units for SEAD was also in doubt. To deploy the helicopters on hunting expeditions in this manner increased the threats to the aircraft exponentially. This was especially true in Kosovo due to the dispersal of anti-aircraft weaponry in the area. Substantial amounts of these assets were known to be in theater, and U.S. helicopters from other groups had ceased to operate in the region because of them.

\[180\] Ibid.
time of Task Force Hawk a number of retired and active military officers spoke out against its deployment in this role.\textsuperscript{183}

The opportunity to deploy Task Force Hawk in an environment of acceptable risk that offered a high return rate of kills simply never offered itself. Although problems with deployment, training, and equipment were overcome to some extent, the method of deploying the Apaches without ground assets in a way that minimized their risk and maximized their effectiveness never materialized. It was conflict with usual attack helicopter doctrine that grounded Task Force Hawk and militated against its use in this manner. To utilize the attack helicopter like a fighter-bomber in deep strike missions without corresponding combat support elements was and is simply infeasible. To do so would expose the attack helicopter to the possibility of massive risk and casualties.

In the truest definition of the word, the events of Task Force Hawk do not represent an innovation for Army aviation. It was merely an adaptation of existing doctrine and a poor one at that. Task Force Hawk can be seen as an intermediate step on the road to innovation. It is a failure by the Army aviation community to provide necessary assets that could act as a guide for future changes. Task Force Hawk helped to prove that the current weapons and strategies are inappropriate for the desired missions and innovation is once again necessary.

Innovation towards the new missions facing the United States Army is occurring in the new plans towards fielding medium weight brigades. The place of aviation in these plans is somewhat dubious, however. Army leaders are aware of the vulnerability of helicopters for missions like urban warfare and are questioning its utility in Army force structure. It is believed that the vulnerability of the helicopter will continue to increase since even simple expedients can

be used to bring down a helicopter in areas the Army intends to fight. Some Army leaders advocate their replacement by unmanned aerial vehicles, whether unarmed for reconnaissance missions or armed for other missions, or more ground assets to fill their role by less costly means. The expense of Army aviation is a major factor in any debates about a changing role. Currently new weapons systems for aviation, like the Comanche light attack and reconnaissance helicopter and the Apache Longbow system are projected to use much of the Army’s budgets for missions that the Army may no longer engage in. This is leading to intraservice rivalry as to whether or not aviation will receive these assets, or any place in new Army doctrine other than supply and intratheater troop transport. While a number of aviation trained generals responsible for important field commands and doctrinal thinking do exist in the Army, and so form advocacy groups for aviation, their colleges from the more traditional branches of the Army heavily outnumber them. This could have an effect on the development of future Army doctrine if their voices are ignored. The place of helicopter aviation in the Army’s future objective force is dubious. Once again Army aviators must innovate to preserve their place in the force structure.

Task Force Hawk and recent developments in Army doctrine give some evidence for theories of innovation. While no innovations have occurred in aviation the elements are all present. Strategic threat exists in the form of changed missions facing Army leaders. These changed missions, such as the shift from armor heavy engagements to low intensity and urban warfare, challenge the way the Army operates and creates some fears of defeat in battle. To counter these fears new doctrine must be developed to meet new strategic realities. The fact that these missions have been changing since 1989 and little has been done to change Army doctrine

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186 I am indebted to Col. Len Sombrowski for supplying information necessary for these views.
to meet them weakens this theory. Army leaders have done little on their own to change Army doctrine and force structure, and have even resisted change introduced from the outside. The effects of civilian intervention are somewhat more apparent. Civilian leaders have assigned missions to the Army and its aviators that have resulted in at least the planning for large changes in doctrine and force structure. This can be seen in the plans for medium weight brigades and increasing focus on operations other than war and low intensity engagements. Interservice rivalry may be playing an increasing role in Army doctrinal changes. In conflicts since Desert Storm, including Kosovo of which Task Force Hawk was part, the Air Force and Navy have been heavily relied upon for combat. The Army has had minimal presence in these conflicts and has offered few solutions for them. Task Force Hawk can be seen as a way of bringing the Army into the war against Serbia. To maintain the roles and missions of ground attack the Army is being forced into exploring new options for combat in order to protect its resources.

Conclusions

The three theories of innovation presented above provide definite propositions on how innovation occurs in military organizations. Strategic threat theory states that as military technology and or the international strategic environment change military officers will seek innovations to reduce the threat of defeat in battle. Examples of such changes that caused innovation in Army aviation include the presence of nuclear weapons on the modern battlefield and the increased Soviet threat in Europe. For strategic threat theory to prove true the helicopter innovations must be developed and implemented within the structure of the military itself with little to no outside influences. A core of officers supporting the helicopter as the way to meet the new challenges will form and slowly implement their ideas into Army doctrine.
Civilian intervention holds that while strategic threat will be important to the formation of helicopter doctrine, the military will be unable to innovate on its own. Ideas for innovation may arise within the ranks of the Army but officers within the military will resist changes in the traditional means of war and must be pressured by their civilian leaders into accepting innovation. The adoption of the doctrine will occur when civilian leaders support military officers in favor of helicopter aviation by supplying outside influence and pressure as well as the resources needed to implement innovation.

Interservice rivalry states that the helicopter innovation will occur as the Army seeks to exploit an overlap in civilian mandated roles and missions that allow them to increase Army aviation assets and decrease uncertainty in war. By attempting to control its own aircraft for missions the Air Force considers vital to its existence, debates over the control and use of helicopters will occur with the Air Force, and Army officials will be forced to make a persuasive argument about why these assets should be under Army control. Innovation will occur to bolster these arguments in an attempt to wrest control of vital assets from the Air Force. When reviewing the historical data presented above it is obvious that no one theory perfectly explains all cases of helicopter innovation. Evidence to support the propositions of all theories can be found, but often one theory proves more persuasive than others.

In the case of airmobility, factors exist for the validation of all the theories presented, but only civilian intervention offers the best explanation for the implementation of airmobility. In the developmental stage of the airmobility innovation strategic threat and interservice rivalry played a great role. The threat of strategic nuclear weapons and the lessons in mobility from the Korean War served to initiate thinking on airmobility, as strategic threat theory would predict. Due in part to fears of defeat in war, Army officers began experimenting with the helicopter as a means
to counter the problems of nuclear war. Gen. Gavin and others formed doctrine vital to airmobile units and sought to field these units in the Pentomic division of the 1950’s. As the strategic mission of the United States changed to one of confrontation in South East Asia aviation advocates were able to promote the airmobility innovation as a means to fight the counterinsurgency threat as well. Despite a broad base of support for the innovation in Army command, however, airmobility was not implemented on the scale envisioned by its creators until 1962 with the forming of the 11th Air Assault Test Division. The airmobility innovation was implemented not by a self-sustained core of Army helicopter advocates but by the direct order of the civilian Secretary of Defense.

By exploiting language in the 1948 roles and missions agreement Army officers were able to justify experimentation with helicopters as a means of improving their mobility and firepower and thereby securing assets not forthcoming from the Air Force. When the Air Force objected to the use of organic Army aircraft, an interservice rivalry debate ensued exactly as interservice rivalry theory would predict. Though these agreements did secure the place of helicopters in Army force structure, debate over their roles and missions continued. The Air Force refused to relinquish the missions of intratheater transport and close air support even when the superiority of the helicopter for some of these missions was demonstrated. The two services were unable to fully agree on the implementation of airmobility and civilian intervention was needed to end the debate.

In the case of airmobility only civilian intervention offers adequate explanation for the implementation of the innovation. Without the intervention of Secretary of Defense McNamara airmobility would not have been implemented in Army force structure. By convening the Howze Board and recommending the establishment of the 11th Air Assault Test Division McNamara
directly brought about the establishment of airmobility over the objections of the Air Force and Army officers opposed to the innovation. Further support for the implementation of airmobility occurred with the civilian mandated strategy of flexible response. Focusing away from immediate use of nuclear weapons and establishing a policy of confronting the Communist threat in South East Asia gave funds and manpower to Army projects that promised successful warfare. In no case was this increase of funds and troops more apparent than with airmobility. While strategic threat and interservice rivalry offer sufficient explanations of the development of airmobility, only civilian intervention can explain its implementation.

The anti-tank helicopter gives another case for the testing of innovation theories. The failure of the United States armed forces in Vietnam began another process of change within Army doctrine. As strategic threat theory predicts the anti-tank innovation began as a way of countering increased Soviet strength in Europe and as response to problems of increased firepower and lethality discovered in the Arab-Israeli wars. In seeking solutions to these problems Army officers had to rethink strategy once again. As the strategy of active defense matured, Army aviators secured key missions in supporting Army forces and destroying Soviet tanks. This was made possible by shifting the focus of rotary wing assets from troop mobility to weapons mobility. Anti-tank helicopters were developed to assist Army forces both in defense of territory and destruction of enemy forces. By relying on the inherent mobility of the helicopter, and improving its lethality with the addition of the TOW ATGM system, helicopters once again became key to Army doctrine.

The anti-tank helicopter was developed not only in response to the strategic threat of increased Soviet armored forces, but also in response to civilian mandated missions and goals. The strategy of flexible response was rejected by the Nixon administration at the close of the
Vietnam War and political leaders turned to a strategy of détente. This strategy had indirect impact on Army doctrine. The Army’s sole mission under this strategy was to concentrate on defeating the massive Soviet armored forces in Central Europe. While strategic problems did mandate some innovation in Army doctrine, it is difficult to say whether the innovation would have resulted in the anti-tank helicopter if the Nixon doctrine were not in place. By intervening, civilians focused the innovation in Army doctrine on problems of armored warfare in Central Europe and had an indirect influence in its development. By offering a solution to the problems posed by civilian leaders Army aviation was able to implement its innovation.

Interservice rivalry acted early in the process of the anti-tank innovation but then subsided due to agreements between the Army and Air Force. These agreements served to focus Army aviation on developing rotary wing assets rather than fixed wing options. While this served to focus the development of the anti-tank helicopter interservice rivalry had little impact on how these assets would be implemented into Army force structure.

In the case of the anti-tank helicopter, civilian intervention seems to have slightly greater influence. While intertwined with strategic threat it is doubtful that without the indirect influence of the Nixon doctrine the Army aviation community would have chosen to focus on the anti-tank helicopter. When civilians mandated that the Army focus on the mission of destroying Soviet armored forces in Europe, Army officers were forced to find solutions on one problem only. Though the influence is indirect, civilian intervention seems the best explanation for the anti-tank helicopter innovation.

The last case presented does not concern innovation through all its phases but does represent the impetus for new innovations for the current strategic situation. After Desert Storm, which offered perfect tests and validation for the anti-tank innovation, the focus of United States
foreign policy shifted again. The concern with a heavy armored threat in Europe began to 
dissipate and fears of low intensity conflicts in undeveloped nations and former Communist 
states began to arise. These threats mandate new thinking on the part of Army aviators and 
demands renewed innovation. Civilian leaders have assigned new missions to the Army, 
missions that may not require the heavy firepower of the anti-tank helicopter or the rapid 
dispersal and deployment of airmobility. Army aviators are in the process of meeting these 
demands as can be seen from incidents like Task Force Hawk in Kosovo. An additional impetus 
for innovation comes in the expanding prestige of Air Force and Naval aviators, who are 
increasingly turned to for solutions in the modern age. Yet, true innovation has yet to occur.

These events provide the root causes for innovation contained in all three theories of 
innovation. Strategic realities have changed causing doubt as to whether Army forces can operate 
effectively in their assigned missions. Civilians have intervened to change the assigned missions 
of the Army and have expressed discontent with current Army force structure. The Army also 
faces the threat of being overshadowed by its sister services as they are increasingly turned to 
provide the means of waging war. Strategic threat, civilian intervention, and interservice rivalry 
all operate in this case but none can be validated until innovation occurs. The fact that no 
innovation in helicopter aviation has yet surfaced to meet these challenges questions the future of 
rotary winged flight in the military.

Taken as a whole, civilian intervention seems to offer the best explanation for Army 
aviation innovations. While strategic threat and interservice rivalry theories offer explanations 
for the development of innovations they lack strength in explaining their implementation. 
Civilian intervention directly affected the implementation of airmobility in a situation where the 
adoption of the doctrine was in question. While some evidence exists to support interservice
rivalry and strategic threat theory, they are insufficient to explain the implementation of the innovation. In the case of the anti-tank innovation civilian intervention offers less justification but did indirectly influence its outcome through a change in national security policy. Strategic threat is not sufficient alone to explain the origin and implementation of the innovation. In the third case although no innovation has occurred elements of all three theories are in place. Future developments in Army aviation may provide more adequate grounds for testing.

While the findings presented above may prove true for the cases of innovation in Army helicopter doctrine, it may not prove true in all cases. A helpful study to expand these findings may consist of an investigation into helicopter developments in the Marine Corps. In that case the strategic threats are similar, as well as the presence of civil-military integration that could lead to civilian intervention. Interservice rivalry could also occur between the Marine Corps and the Army. Such a study is beyond the scope of this paper but may help expand its conclusions.
### Appendix I

<table>
<thead>
<tr>
<th>Year</th>
<th>Numbers of Rotary Winged Aircraft in Army Inventory from 1961-1970</th>
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<td>1961</td>
<td>Total of Army rotary winged aircraft at end of fiscal year was 2753</td>
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<tr>
<td>1962</td>
<td>Total of Army rotary winged aircraft at end of fiscal year was 2811</td>
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<td>1963</td>
<td>Total of Army rotary winged aircraft at end of fiscal year was 3106</td>
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<td>1964</td>
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<tr>
<td>1965</td>
<td>Total of Army rotary winged aircraft at end of fiscal year was 4412</td>
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<tr>
<td>1966</td>
<td>Total of Army rotary winged aircraft at end of fiscal year was 5632</td>
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<td>1967</td>
<td>Total of Army rotary winged aircraft at end of fiscal year was 7115</td>
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<td>1968</td>
<td>Total of Army rotary winged aircraft at end of fiscal year was 8239</td>
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<td>1969</td>
<td>Total of Army rotary winged aircraft at end of fiscal year was 9328</td>
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<td>1970</td>
<td>Total of Army rotary winged aircraft at end of fiscal year was 9918 (4000 on order)</td>
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APPENDIX III

(From Into Laos, Pg. 258-9)

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<tr>
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<td>19360</td>
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<td>57 (captured)</td>
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