MILITARY INNOVATION AND THE HELICOPTER:
A COMPARISON OF DEVELOPMENT IN THE UNITED STATES ARMY AND
MARINE CORPS, 1945-1965

DISSERTATION

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Since 1989, the American military has sought to adapt to the changing missions and threats in order to secure American strategic objectives. The Army and the Marine Corps have sought to provide a force sufficient for current missions/contingencies while creating a force to defeat future threats. To meet this objective, leaders gaze into history looking for a shred of enlightenment as to how to proceed, or, just as importantly, what to avoid repeating. In this paper understanding the process of change is more important than the final product.

The development of American vertical envelopment and airmobility doctrines are significant for two reasons. First, they are examples of the complex inter-relationship between strategic threats, bureaucratic politics, technology, operational adaptation, and doctrinal development in modern warfare. The major difference between the Marine Corps and the Army in this area was that the Marine Corps came to the brink of irrelevance after World War II. While successfully seeking Congressional assistance, this adversity also helped to keep the Marine Corps focused on developing a new doctrine for the nuclear era. The Army also suffered from a reduced role in the nation’s defense, but at no time did the Army ever doubt its importance, nor did anyone seriously believe that there was no need for a good Army. Without much external “push” the Army’s development of airmobility occurred gradually and incrementally. The Army’s
conceptual visions of airmobility provided the impetus for change, and technology provided the means to achieve it. While the rapid pace of technological change directly influences the United States Army’s current transformation, this was definitely not the case in the twenty years following World War II.

The second comparative theme is the Army’s attempt to reinvent itself in the 1945-1965 period is much like the Army’s efforts today. The airmobility concept was considered revolutionary during its time much like the Army’s current efforts to obtain information dominance and use the precision weapons are considered the key components of today’s “revolution in military affairs.” The insights extracted from the Army’s experiment with airmobility and the Marines’ successful transition to vertical envelopment may serve as a guide for the Army’s current dilemma of meeting the demands of modernization, personnel recruitment and training, and mission within the constraints of limited funding.
Dedicated to my wife Kimberly and my son Kyle. Kimberly, without your patience, understanding, love, and editing skills this project could never have been possible. Kyle, may this inspire you to in your quest to seek enlightenment, knowledge, and understanding throughout your life.
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INTRODUCTION

Since the end of the Cold War, the American military has sought to adapt to the changing missions and threats in order to secure American strategic objectives. Foremost among the services to “transform” have been the Army and the Marine Corps. They have sought to provide a force sufficient for current missions/contingencies while creating/building a force to defeat future threats. As they try to meet this objective, leaders look back into history in the hope that it can provide a shred of enlightenment as to how to proceed, or, just as importantly, what to avoid repeating. In this paper understanding the process of change is more important than the final product.

The development of vertical envelopment and airmobility doctrines in the United States armed forces are significant for two reasons. First, they are examples of the complex inter-relationship between strategic threats, bureaucratic politics, technology, operational adaptation, and doctrinal development in modern warfare. Both services were affected by the strategic context in which they operated from 1945 to 1965. Except for a period of three years during the Korean War, the two decades were ones of tight defense budgets, which contributed to interservice rivalries. The major difference between the Marine Corps and the Army in this area was that the Marine Corps came to the brink of irrelevance after World War II. This crisis forced the Marines to seek Congressional assistance and to emphasize their unique skills. While this adversity also
helped to keep the Marine Corps focused on developing a new doctrine for the nuclear era, the Marines were already working on the concept of vertical assault prior to the roles and missions debate began to get vicious. The Army also suffered from a reduced role in the nation’s defense, but at no time did the Army ever doubt its importance, nor did anyone seriously believe that there was no need for a good Army. Without much external “push” the Army’s development of airmobility occurred gradually and incrementally. Technology did not serve as the driving factor in tactical and doctrinal innovation. Instead, the conceptual visions of airmobility provided the impetus for change, and technology provided the means to achieve it. Helicopters and ancillary equipment were designed to meet military requirements and not the other way around. While the rapid pace of technological change directly influences the United States Army’s current transformation, this was definitely not the case in the twenty years following World War II.

The second comparative theme is the Army’s attempt to reinvent itself in the 1945-1965 period is much like the Army’s efforts today. The airmobility concept was considered revolutionary during its time, much like the current efforts at applying digitalization in the Army to obtain information dominance and to use the precision weapons considered the key components in the “revolution in military affairs” of today. The insights extracted from the Army’s experiment with airmobility and the Marines’ successful transition to vertical envelopment may serve as a guide for the Army’s current dilemma of meeting the demands of modernization, personnel recruitment and training, and mission within the constraints of limited funding.
The Marines’ conversion to vertical envelopment began in 1946 and essentially ended by 1960. The Army took a bit longer, beginning in World War II and ending with the 1st Cavalry Division’s deployment to Vietnam in 1965. To facilitate understanding, this study is broken down into four phases: the interwar years between World War II and the Korean War; the Korean War; the Eisenhower Administration’s peacetime years; and, for the Army, the period from the Rogers Board in 1960 to the deployment of the 1st Cavalry Division (Airmobile) to Vietnam in 1965. In each of these phases the rate of development varied, based on current national strategy, the inter-relationship between strategy and doctrine, the competition of bureaucratic politics, and the rate of technological developments. Chapter One provides background information on the development of light aviation for ground forces and helicopters through World War II.\(^1\) Chapters Two through Four examine the efforts made by the Marines and the Army towards integrating the helicopter into their force structure and doctrine from 1945 to 1950. Chapter Five conclusively demonstrates the success of the Marines’ innovation during the Korean War. Conversely, Chapter Six examines the Army’s failed efforts to develop and employ transport helicopters in Korea, and how this lack of success influenced future Army developments. Chapters Seven and Eight explore the impact of New Look defense policies on the development of airmobility. In Chapter Nine the years

\(^1\)Since the development of airmobility is intricately tied to the development of organic Army aviation, it is not possible to examine one without understanding the other. However, this is not a history of Army aviation but a study of the development of a novel concept within an organization that is normally resistant to radical change. The term “organic” when used in context of Army organization describes whether the unit “owns” and has administrative control of the specialized equipment or resources in question. The term is to be contrasted with “attached,” whereby the resource is assigned when needed from a larger and separate pool of the specialized capability. These are not necessarily mutually exclusive concepts, however. For example, each Army division has an organic medical battalion, but most Army medical units are “independent” and assigned where needed.
from 1960 to the Army’s early involvement in Vietnam are discussed. Chapter Ten analyzes the efforts of the British, French, and Soviets at developing an airmobile capability and how their efforts impacted on American developments. Chapter 11 provides some concluding thoughts.

Except for the emphasis on nuclear weapons, the period immediately following World War II is often portrayed as an era of intellectual sterility in the United States armed forces. Scarcity of fiscal resources and a lack of political emphasis on defense issues created an environment unfavorable for innovation within conventional forces. An exception to this was the innovation centered on the development and use of the helicopter. In his book *Winning the Next War*, Stephen Peter Rosen described the development of Army airmobility as the most expeditious case of peacetime innovation that he had studied. Unfortunately, he counts only the eleven years from 1954 to 1965 as required for transforming it from an idea into a functioning combat capability. The period from 1945 to 1954 was deemed insignificant by Rosen due to a lack of progress and interest expressed by the Army. What Rosen and others ignored was the development of the United States Marine Corps’ version of airmobility doctrine, known as vertical envelopment, during this time period.

The Marine Corps and Army each followed very different paths towards developing airmobility. In the Marine Corps the improbability of a future naval campaign, and the belief that nuclear weapons would prevent large amphibious operations in World War III, threatened the Marine Corps’ existence. After studying the

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situation, the Marine Corps developed a solution using helicopters to conduct vertical
assaults. The Marine Corps’ intellectual nimbleness allowed it to promulgate and
implement the idea throughout the Marine Corps very quickly. The centralized planning
and control for developing the concept ensured the maximum gain with minimum time.
Periodic reviews of the concept ensured that modifications were made based on the state
of technology and the changing strategic context.

The Army’s path towards airmobility took much longer and was more torturous.
Although it was the first to use helicopters in World War II, the Army took almost ten
years longer before it started to seriously explore using helicopters on the battlefield.
The primary reason for the Army’s delay was an institutional culture that did not foster
innovation. When the Army’s role in national defense was threatened, it took a
conservative approach to improving its capabilities. While enlightened individuals
advocated greater use of the helicopter, the lack of a single, powerful agency to
coordinate experiments, developments, and education ensured a haphazard approach and
reinforced the importance of individuals to affect change in the Army. While the Army’s
focus on tactical nuclear weapons, missiles, and fighting in a nuclear environment took
most of its energy and research funding after the Korean War, the Army did small
experiments, and its educational system increased awareness and understanding of the
helicopter. However the message was conflicting – was the helicopter a logistics vehicle
or a combat system? Was it an additional asset to units or should organizations be built
based on the helicopter? The 1960s Rogers Board waffled on the helicopter and its role
in the Army, which furthered the frustrations of many visionaries. The Army’s lethargy
was finally erased after the Secretary of Defense ordered the Army to re-examine the
helicopter and its potential for revolutionizing warfare. This led to the creating of the Howze Board and the 11th Air Assault Division (Test) and eventually the 1st Cavalry Division (Airmobile). While it took civilian leaders’ urging to push the Army, once the next step was taken, the Army devoted most of its energy to developing the concept.

An analysis of military innovation requires a detailed examination of the internal operations of a particular organization. Military innovation is “a fundamental, basic change in the context within which war takes place.” Essentially, this means that a military organization has to change significantly how it fights over a long period of time for it to be an innovation. Further clarification is needed, though, to differentiate between a strategic/operational innovation and a tactical innovation. A strategic/operational innovation changes the way a combat arm uses its forces to win a campaign, whereas a tactical innovation affects the application of individual weapons against a target in a battlefield environment. Therefore, a strategic/operational innovation usually achieves a change in the working relationship between combat arms and may result in the discarding of obsolete doctrinal concepts and weapon systems. If a change in the formal doctrine of a military organization does not change the essential workings of that organization, then it is not an innovation, using this definition.4

There are four basic areas that must be examined in order to understand the innovation process as it relates to the development of airmobility. The first requirement is to understand the strategic context under which the services were operating: What was the influence of the services’ perceived external threats and where did they expect to

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fight? What was the impact of the lessons from the last war? What was the
interrelationship of strategic planning and operational doctrine? The second area
necessary for developing an understanding is the importance of technology in innovation.
Specifically, do technological developments inspire military innovation or do military
requirements drive technological improvements? The third requirement is to evaluate the
influence and importance of organizational politics. Organizational politics encompass
many components, to include inter-service and intra-service relations, the service culture,
force structure, roles and missions, and the responsibilities for research and development.
Finally, it is necessary to understand the relationship between civilian bureaucracies and
military organizations. In this case, what was the role of government and industry within
the airmobility innovation process? Did they accelerate or hinder the innovation?

Currently, there is a growing interest in the growth and development of Army
aviation within military circles. This attention is primarily a result of the desire in
fostering innovation within the military. As such, the development of the helicopter and
associated airmobility doctrine has been cited as an example of successful military
innovation with strategic threat, interservice rivalry, bureaucratic politics, technology,
and individual leadership have all been argued to explain it developmental process.
Despite the interest, the historiography on the development of airmobility is surprisingly
small, considering its long maturation period and eventual impact in Vietnam. While
there are currently ten published studies that discuss the various aspects of airmobility's
evolution and development from 1945 to 1965, they are incomplete in coverage, research,
or perspective. Five of these are official histories, which provide a very good summary

4Rosen, Winning, 7-8.
of events but do not contain a high degree of analysis or criticism. Richard P. Weinert, *A History of Army Aviation, 1950-1962*, chronicles the role played by the Continental Army Command in the development of organic Army aviation.\(^5\) The most detailed account of the development and importance of aviation logistics is found in Howard K. Butler, *The Restoration of the Army Air Corps, 1947-1953*.\(^6\) Eugene W. Rawlins, *Marines and Helicopters, 1946-1962*, and Gary W. Parker, *A History of Marine Medium Helicopter Squadron 161*, use primary documents to provide a thorough, organizational account of the development of the helicopter in the Marine Corps.\(^7\) General John J. Tolson, *Airmobility, 1961-1971*, provides a very good account of the importance of the airmobility concept in the Vietnam War, but lacks perspective and provides only a brief examination of the maturation of airmobility prior to 1965.\(^8\)

Of the five commercial publications, three were written prior to 1969 by authors who lacked access to primary sources. The other two accounts, although written later, were not able to utilize all available archival material due to fiscal and temporal constraints. In *The Army Aviation Story*, Richard Tierney and Fred Montgomery use interviews to create the first narrative of the development of army aviation from 1942 to


\(^{8}\)John J. Tolson, *Vietnam Studies: Airmobility, 1961-1971* (Washington, D.C.: Department of the Army, 1972). General Tolson directly participated in the development of airmobility starting in 1953 as a Colonel and wrote this monograph while still on active duty. Although Tolson draws from hundreds of documents and personal correspondence, the lack of documentation only provides the reader with a starting point for additional research.
In 1969, General John R. Galvin wrote *Air Assault: The Development of Airmobile Warfare*, a narrative of airborne operations and their impact on the development of airmobile operations. In the 1980 book *The Army Gets an Air Force*, Frederic A. Bergerson analyzes the development of Army Aviation by studying the bureaucratic process. He concluded that the creation and expansion of the post-World War II aviation component was primarily due to the actions of a large number of junior officers. Christopher C.S. Cheng presents an opposing view in his *Airmobility: The Development of a Doctrine*. Cheng recognizes the desire of the lower ranking officers for aviation assets, but he also asserts that the Army's senior leadership strongly supported these developments and optimistically concludes that they were the key to the Army’s ultimately successful acceptance of airmobility. However, the fact that the Army’s leadership did not end the development of aviation programs does not necessarily translate into senior Army leaders’ acceptance and further propagation of the airmobility concept.

The most common approach to examining military innovation is through the use of bureaucratic politics and organizational theory. Political scientists employ this technique in many important books. Michael Armacost, *The Politics of Weapons Innovation: The Thor-Jupiter Controversy* saw the competition for weapon system development as an example of adversarial process in defense politics. In this view the

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external and internal political factors are the central explanation in weapons innovation.\textsuperscript{12} In 1984, Barry Posen, \textit{Sources of Military Doctrine}, and Jack Snyder, \textit{The Ideology of the Offensive}, both successfully applied social science theory to analyze the development of military doctrine, with Posen advocating that civilian intervention is needed to force militaries to innovate.\textsuperscript{13} In \textit{Innovation and the Arms Race}, Matthew Evangelista used organizational theory to explain the development of the Soviet-American arms race. Principally examining strategic systems, Evangelista focused his analysis on the willingness of the military to accept and incorporate new technology. His conclusion was not very novel. Evangelista concluded that if an armed service believes that the technology is an enabler for its mission, the process will proceed with little opposition, but if the technology challenges the mission, opposition quickly builds.\textsuperscript{14} A more comprehensive examination of the conditions under which military organizations are likely to change military doctrines is found in Kimberly Zisk’s \textit{Engaging the Enemy}.\textsuperscript{15} She argues against the theory that military institutions are conservative and undertake drastic changes only when compelled by external factors. Instead, she believes that military organizations “develop innovative doctrines on their own, in the absence of civilian intervention,” in response to changes in the national security environment by


other nations. Alain C. Enthoven and K. Wayne Smith, *How Much is Enough? Shaping the Defense Program, 1961-1969* argued that civilian intervention was the primary reason for the Army’s airmobility revolution in the 1960s. They argued that civilian officials within the Department of Defense bypassed the conservative military leadership and brought the concept to Secretary of Defense McNamara’s attention. While their theories on organizations are insightful, the weakness of all these works is their attempt to apply a bureaucratic model to explain military innovation. This theoretical model lacks historical research to create a perspective that integrates the relationship between technological development, strategy, and military institutions.

There is very little published material that uses innovation as the framework for evaluating change in the post-WWII American military. Only Steven Rosen, *Winning the Next War*, discusses the development of airmobility in terms of an innovation process -- and this is done in a single chapter consisting of only twenty pages. Rosen puts strategic threat as the primary cause for militaries to change. Military leaders change doctrine and organization only when they perceive it necessary to avoid a military defeat. *Military Innovation in the Interwar Period* does not deal with airmobility, but it is the only serious historical work that examines modern military innovation as a process. Although it is a collection of essays written by a prestigious group of historians, the authors do provide a useful model to explore military innovation. Each of the ten essays uses an international comparative approach to describe the development and

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implementation of innovation in the major powers of World War II. To ensure 
continuity, all the essays explore the innovation process by examining, at a minimum, 
three concepts: the strategic framework, organizational politics within institutions, and 
the services’ doctrinal framework. 18

The official doctrinal publications are useful tools for tracing the evolution of 
organizations and tactics within the military. The acceptance of a new concept at the 
official level is reflected in field manuals, circulars, and training guidance provided by 
senior military officials. How quickly a concept is added to official publications and the 
depth of thought in the writing, indicate the willingness of the military to adapt. The 
relatively long time period it took for the Army to produce a field manual (FM) 
specifically addressing the employment of helicopters is an excellent example of this 
phenomenon; the inclusion of helicopters into combined arms training and doctrine is 
another. The year was 1957 -- more than ten years after the Army had first used 
helicopters. This long lead time indicates that the Army’s leadership, for many reasons 
to be explored later, could not commit quickly to the helicopter as a battlefield combat 
system.

The articles, letters, and discussions in the professional journals of the various 
services and military organizations also provide insight into the attitudes and 
characteristics of the organizational culture. These sources reflect an overall attitude 
concerning Army aviation that cannot be gained from any one account and as such they 
complement the primary documents.

18Williamson Murray and Allan R. Millett, eds., *Military Innovation in the Interwar Period* (New 
The professional journals themselves fall into two categories: strategic journals and tactical journals. The strategic journals are publications from the various war colleges and universities. Of all the journals, *Military Review* provides the greatest insight into the development of the Army’s doctrine because the majority of articles were written by officers who were then involved in the development and implementation of doctrine both as students and as instructors at the Army’s Command and General Staff College. Unfortunately, these articles are too often general in nature and rarely advocated or explored new doctrinal concepts. While the articles usually endorsed the doctrine being taught at the service schools, the journal did publish articles that criticized the then current Army doctrine. The tactical journals examine issues that usually concern small units of brigade and lower. The quality of the writing in these journals varies greatly, but they all reflect the serious concerns of the junior and middle-level leaders in the services which may not be represented in the higher service journals. Unfortunately, there was a great deal of feuding among these periodicals. Each branch sought to position itself as the key one in fighting the next war, and this led to the

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19 Until 1971, the Army’s senior journal was *Military Review* published by the Command and General Staff School at Fort Leavenworth, Kansas. After 1971, *Parameters*, the journal of the United States Army War College at Carlisle, Pennsylvania, became the senior Army publication. The Marine Corps’ main journal is the *Marine Corps Gazette* which began publication in March 1916. The Air Force’s senior journal, *Air University Review*, began in 1947 as the quarterly periodical from the Air University at Maxwell Air Force Base, Alabama. The latest iteration of this venerable journal is *Aerospace Power*.

20 As an example, the Army’s shift to emphasizing tactical nuclear weapons received much criticism in *Military Review* as being impractical and unnecessary.

21 In the Army, each branch usually has its own journal which provides a forum for developments at the tactical unit level (in this case no higher than a brigade-sized unit of approximately 5,000 personnel). *Army Aviation Digest, Armor, Infantry,* and *Field Artillery* are the journals with the most significance in this study.
publishing of some very parochial articles. An example of this posturing was the armor community’s efforts at emphasizing its superior ability, compared to the unprotected infantryman, to fight and survive in a tactical nuclear environment. Another example was the Field Artillery’s fight to procure a 280mm cannon capable of firing nuclear munitions. Once the arm obtained the 280mm cannon, the Field Artillery Journal immediately began promoting the unprecedented destructive capability of field artillery as the key component of any future ground campaign.

There are two other types of publications that warrant perusal. The first type includes the journals of the professional associations for the Army, Navy, Air Force, and Marines. Despite being official publications, they are usually edited by military retirees and civilians. These periodicals provide both propaganda and criticism of national strategy and military policy, and provide valuable research material.

The second type are the civilian journals concerned with national security issues. They provide useful information concerning the policy-making process within the national defense establishment that the standard military publications cannot. Authors in these journals include senior political and military leaders, both active and retired.

The current state of the scholarly literature dealing with the development of airmobility is poor. While there is an increased interest in the development of Army aviation, the only recently published pieces have been a few small articles in tactical

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22 As an example, in the decade following World War II, Armor magazine began touting armor as the branch best suited for fighting in a nuclear environment. The Infantry School Quarterly countered by emphasizing the strategic mobility of the airborne forces to seize enemy nuclear weapons bases.

23 In the order of the above listed services (with year of first publication): Army (1922), Proceedings of the Naval Institute (1874), Air Force (1918), and Marine Corps Gazette (1916). Army actually remained fairly quiet in its political activism until the Eisenhower Administration.
journals. The only exception is the official monograph from the Center for Military History. Edgar F. Raines, *Eyes of Artillery: The Origins of Modern U.S. Army Aviation in World War II*, provides a very detailed examination of the how and why the Army developed organic aviation. As of yet, there is no monograph that thoroughly examines the development of airmobility from 1945 to 1965. Using a combination of the previously mentioned published sources and archival material, this study can help span the current gap in the historiography.

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24 Examples are (titles may have changed over the years): *Armed Forces Journal International, Aviation and Space Weekly, Jane’s Defense Weekly, Royal Uniformed Services Institute*

CHAPTER 1

A BABY EAGLE:
THE HELICOPTER AND LIGHT AVIATION THROUGH 1945

The development of airmobility in the Army is intricately tied to the development of organic Army aviation. This chapter discusses the development of Army Ground Forces organic aviation and the experiments performed with helicopters prior to 1945. It provides the background material necessary for understanding the pace and course of the development of airmobility doctrine in the United States Army after 1945.

The earliest disagreements on the application of air power began with the American involvement in World War I. During that war, the American Expeditionary Forces (AEF) controlled all aviation assets at the field army level. Modeled after the French system, this centralized control was due in part to expediency and in part to its efficiency. It was Colonel Billy Mitchell who proposed the first air assault mission in 1918.26 The commander of the AEF, General Pershing, anticipated having to attack the fortress city of Metz in the Spring of 1919. A frontal assault would be costly, but there

26Billy Mitchell was the foremost promoter of air power in the United States. An aviation officer in the Army during World War I, he became notorious for his outspoken attacks in the 1920s against senior military leaders for their failure to recognize the potential of the airplane. Court-martialed for his public criticism of his superiors, Mitchell became the martyr for the United States Air Force. Mitchell’s advocacy for an air assault operation is ironic considering the USAF’s lack of support for such missions 30 years later.
was no flank to attack. Mitchell proposed using 1200 bombers to parachute a whole
division (approximately 12,000 men), behind German lines. The potential havoc that this
operation could inflict on the Germans enticed Pershing to approve the operation.
Mitchell immediately began planning the operation but the Germans agreed to an
armistice before the operation could be executed.27

The debate over the control of aircraft began to escalate during the interwar years.
The establishment of an independent Royal Air Force by the British and the air power
theories of Giulio Douhet, Count Caproni di Taliedo, and Lord Hugh Trenchard
combined with the preaching of Billy Mitchell ensured that the debate remained in the
public eye.28 Nevertheless, during the interwar years, “the normal predilection of ground
commanders to have control of their air support prevailed, and U.S. Army Air Corps
aviation was accordingly parcelled out among corps areas and overseas departments.”29
Finally, after many tumultuous years, the War Department General Staff grudgingly
accepted the concept that air power could be organized and employed as a separate
entity. A General Headquarters Air Force (GHQ AF) was established in 1935 and was
assigned almost all of the Army’s aviation assets in the continental United States; the
chief of the GHQ AF became directly responsible to the War Department General Staff.


28All were advocates of air power in the years between the world wars. Italy’s Giulio Douhet was
the most famous advocate of air power. He saw aircraft as the key to any future war. He believed that the
best defense was a good offense and therefore one must strike first. Since the bomber would always get
through, it was the weapon of choice. Lord Hugh M. Trenchard commanded the Royal Air Force and
believed that the airplane provided the British with the capability of breaking the enemy’s will quickly and
efficiently. Italian Gianni Caproni is the recognized father of bomber aircraft. His writings reflected his
belief in the capability of his aircraft to quickly win a war. For more information see Lieutenant Colonel
The Second World War provided a laboratory in which the American military tested new techniques of warfare. One of these ideas was the use of light aircraft to provide observation for the adjustment of artillery fire. In the decade prior to World War II, observation aircraft evolved from fabric covered biplanes to all metal monoplanes.\(^{30}\) While the aircraft became more modern, the performance of aerial observation units continued to deteriorate. For pilots in the Army Air Corps (AAC), a career as an observation pilot was unrewarding and appeared to preclude the opportunity for career advancement. Pilots quickly transferred to the growing bomber fleet, preventing the retention of trained observers. As funding became more scarce, so did the amount of flying time, which caused a rapid decrease in morale. It was these factors combined with the lack of appreciation within the Air Corps of the necessity of this mission for ground forces which significantly retarded the advancement of observation aviation.\(^{31}\)

The two decades between the world wars were ones in which great expectations had been held for civilian aviation. One aspect that was eagerly anticipated was the use of the light airplane as an everyday vehicle for American families. These great expectations failed to materialize and forced light aircraft manufacturers to seek alternative markets. Recognizing that the current observation aircraft in the Army were

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\(^{30}\) Weinert, *A History of Army Aviation -- 1950-1962*, 3; Wakefield, *The Fighting Grasshoppers*, 12. The primary American observation aircraft at the outbreak of World War II were the North American O-47, the Stinson O-49, and the Curtis O-52 Owl. While these aircraft incorporated numerous features which made them relatively modern aircraft by American standards, they were all too large, complex and hard to maintain. These characteristics made the aircraft cumbersome to fly and very poor observation aircraft.

not satisfactory, the manufacturers tried to sell their aircraft to the military. Their efforts initially met with little success and encouraged laughter from senior members of the AAC.32 While AAC officers chuckled, field artillery officers had experimented with using autogiros for both day and night adjustment of artillery fire as early as 1936. While success was mixed, the potential as well as the need for using aircraft clearly existed.33 Later in 1940, Major General Robert M. Danford went to England to observe British military training. Greatly impressed by the operation of British Air Observation Posts, Danford returned from his trip with a determination to acquire similar planes for his artillery.34 That summer, with the blessing of General Danford, Brigadier General Robert O. Whiteaker (chief of artillery for the 36th Infantry Division) asked William T. Piper (president of Piper Aviation) for some of his aircraft in order to test Captain Joseph M Watson’s theories for controlling artillery fires from the air.35 Piper provided three aircraft (one of which he flew) and successfully demonstrated their value during the maneuvers in Louisiana.36 After the demonstration, Piper notified Robert A. Lovett, soon

32Hardy D. Cannon, *Box Seat Over Hell* (San Antonio, TX: Privately Published, 1985) 14-15. At a Presidential conference on mobilization plans for aviation, the AAC paid no attention to the light aviation manufacturers. When one manufacturer, Ed Porterfield, inquired as to the role of their aircraft he was laughed at and informed that the Air Corps and Navy saw no military value for their tiny aircraft.


35Since he was a 1st Lieutenant in the 61st Field Artillery Brigade, Texas National Guard, Joseph McCord Watson, Jr., had repeatedly advocated the use of light aircraft for artillery spotting. He had been experimenting with the technique since 1937, including the use of radios.

36Hardy D. Cannon, *Box Seat Over Hell* (San Antonio, TX: Privately Published, 1985) 23-25. Piper, Watson, and Tom Case (Piper’s sales manager) flew the aircraft for 14 days. At one point one of the aircraft spotted Brigadier General Whiteaker’s jeep from the air and dropped a flour sack in the middle of the vehicle.
to be Assistant Secretary of War for Air, of the success that his aircraft had in adjusting artillery fire. Lovett made note of it but took no action.\textsuperscript{37}

In February 1941, Brigadier General Adna R. Chaffee, Chief of Armored Forces and Commander of I Armored Corps, asked Piper to send an aircraft to Fort Knox. Chaffee wanted to experiment with the control of armored columns from the air. Tom Case flew a Piper J-3 to Fort Knox for the experiment. Upon completion of the experiment, Chaffee concluded that all branches of the Army needed organic aviation assets.\textsuperscript{38} Soon after this, \textit{Field Artillery Journal} published an article advocating getting rid of the AAC’s unwieldy observation planes and using instead the Piper J-3 for directing artillery fire. This publicity raised the awareness of the potential of light aviation for military duties.\textsuperscript{39}

The Army’s 1941 maneuvers provided the first large-scale glimpse of the potential of liaison aircraft for military operations. Their outstanding performance compared to that of the Army Air Forces’ units provided much support to the later request for organic aviation. Anxious for military orders to replace a non-existent civilian market, the three major American light aircraft companies provided aircraft and pilots for the Army’s maneuvers free of charge in the hopes that they could generate production orders.\textsuperscript{40} The September 1941 Louisiana Maneuvers showed the little liaison aircraft to be excellent for artillery observation. By contrast, the observation squadrons

\textsuperscript{37}Aviation Chronology 6.
\textsuperscript{38}Aviation Chronology 6.
\textsuperscript{39}Major William W. Ford, “Wings for Santa Barbara” \textit{Field Artillery Journal} (May 1941).
\textsuperscript{40}History of Army-Air Force Conflicts Concerning the Functions of Army Organic Aviation (No other bibliographic data available, found at MHI Library) page 1, para 2.; Weinert, \textit{A History of Army Aviation -- 1950-1962}, 4. The companies provided 8 Piper Cubs, 4 Aeroncas, and 4 Taylorcraft for the maneuvers. They also provided the pilots, mechanics, and support for the aircraft.
of the AAF, controlled by the air support commands which were created on 25 July 1941, proved to be completely unsatisfactory. In the post-exercise comments, Major General Robert M. Danfield, the Chief of Field Artillery, noted that the “only uniformly satisfactory report of air observation during the recent maneuvers comes from those artillery units where...light commercial planes (Piper Cubs) operated by civilian pilots, were used.” Citing the unanimous support of the division and corps commanders involved in the exercise, Danfield advocated the inclusion of organic aviation into every field artillery unit.42

His efforts were successful, and in December 1941 he received permission from General George C. Marshall, the Chief of Staff of the Army, to experiment with the use of aircraft for spotting field artillery.43 At the same time, Marshall instructed the General Headquarters’ Materiel Division to begin negotiating to purchase 617 light aircraft.


42Kent R. Greenfield, Army Ground Forces and the Air-Ground Battle Team Including Organic Light Aviation, Study no. 35 (Fort Monroe, VA: Historical Section, Army Ground Forces, 1948) 23. See memo of Chief of Field Artillery for Chief of Staff, United States Army, 8 October 1941, subj.: Air Observation. General Headquarters Records, 322.082/5 (Air Corps).

43Memorandum from Brigadier General Harry L. Twaddle, Assistant Chief of Staff (signed by Lieutenant Colonel W.H. Maris, Acting Executive Officer) to Adjutant General, G-3, War Department, dated 8 December 1941, Subj.: Air Observation. Copy of document included in History of Army-Air Force Conflicts Concerning the Functions of Army Organic Aviation, Tab A; Memorandum from Brigadier General I.H. Edwards, Assistant Chief of Staff to Commanding General, Army Air Force, dated 6 June 1942, Subj.: Organic Air Observation for Field Artillery. Found in History of Army-Air Force Conflicts Concerning the Functions of Army Organic Aviation, Tab B. See also Kent R. Greenfield, Army Ground Forces and the Air-Ground Battle Team Including Organic Light Aviation, Study no. 35 (Fort Monroe, VA: Historical Section, Army Ground Forces, 1948) 23, which cites (1) Memo from Secretary of General Staff for G-3, War Department, 3 December 1941; War Department letter AG 320.2 (8 December 1941) MTC to Chief of Field Artillery, 19 December 1941, subj.: Air Observation. GHQ Records, 322.082/5 (Air Corps); (2) War Department letter AG 320.2 (5 February 1942) MTC to CG, Field Forces, 25 February 1942, subj.: Service Test of Organic Air Observation for Field Artillery. 353/1 (FA Air Observation). See also Weinert 4.
Within a year, this initial procurement was increased by more than a factor of ten.\(^{44}\)
Although senior officers in the United States Army Air Forces (AAF) questioned the concept’s soundness, they relented out of a belief that the ground forces would find the concept too burdensome and reject it.\(^{45}\) The attitude of the air officers who came in contact with the ground force’s test units in the field was, “This is a good idea. Give airplanes to Ground Forces and let them try to operate them. They will be glad to give them back to us shortly. Then we won’t have any more trouble with them wanting to fly.”\(^{46}\)

Using twenty-three borrowed O-59s (the Army designated them as L-4s) from the Army Air Forces, the Army’s maneuvers from December 1941 until November 1942 verified the utility of field artillery aerial observation posts.\(^{47}\) The successful performance of the aircraft combined with their minimal need for maintenance forced the United States Army Air Forces to reconsider its position. Recognizing that the Army’s experiments were a success, the AAF responded by organizing liaison squadrons designated to perform the same mission for the Army. Once created, the United States Army Air Forces recommended that the organic army aviation program be discontinued.

\(^{45}\) John E.P. Morgan Papers, Diary, 2 June 1941-1 October 1943, page 30. Found at MHI. Morgan remarked that the Army Air Forces “kept stating that the little airplanes would be shot out of the sky and that the ground forces were completely incompetent to operate them.”
\(^{46}\) *History of Army-Air Force Conflicts Concerning the Functions of Army Organic Aviation* 1, para 5.
\(^{47}\) Memorandum from Brigadier General I.H. Edwards, Assistant Chief of Staff, to Commanding General, Army ground Forces, dated 6 June 1942, Subj.: Organic Air Observation for Field Artillery. Found in *History of Army-Air Force Conflicts Concerning the Functions of Army Organic Aviation*, Tab C.
because an AAF equivalent already existed.\textsuperscript{48} No official response to the United States Army Air Forces’ request can be found in the archives; what we do know is that the AAF liaison squadrons were created and sent overseas and that field artillery units retained their organic aircraft.

In the beginning of 1944, an Army staff report confirmed that the field artillery’s use of organic aircraft was an unqualified success while the performance of the United States Army Air Forces’ liaison squadrons was much less spectacular. The liaison squadron’s poor performance was primarily a result of two factors. The first was due to the relatively poor quality of equipment and personnel assigned to the squadrons. The other and more important reason was the lack of a common understanding between the Army and the United States Army Air Forces over the mission of the air units.\textsuperscript{49} An additional, but much less discussed, reason is that commanders made a conscious decision to not utilize the squadrons, except when necessary. This decision would only strengthen the Army’s argument for an expansion of organic aviation.\textsuperscript{50} As a result of the air liaison squadron’s poor performance, the commander of American forces in Europe recommended the disbanding of the squadrons and the reassignment of those aircraft to

\textsuperscript{48}Memorandum from Major General George E. Stratmeyer, Chief of Air Staff, to the Army Chief of Staff, dated 19 November 1942. Found in \textit{History of Army-Air Force Conflicts Concerning the Functions of Army Organic Aviation}, Tab D.

\textsuperscript{49}\textit{History of Army-Air Force Conflicts}

\textsuperscript{50}The significance of these events is that the Air Force’s lack of effectiveness in the support of ground forces was used by the Army to retain support for its own aircraft controlled by ground units. The Air Force continued this pattern of behavior through most of the Cold War.
directly support other, non-artillery, units. The Army Chief of Staff disapproved this request.51

Despite the problems that the AAF had with strategic bombing, General Henry H. Arnold (the Commanding General, Army Air Forces) still found time to make one last effort at eliminating organic army aviation. In response to the Army’s efforts at increasing the horsepower of the liaison aircraft from 65 to 190, Arnold sent a memo that recommended the reassignment of organic army aviation from the field artillery to the United States Army Air Forces. He believed this would improve economy and flexibility.52

General Leslie J. McNair (the Commanding General, Army Ground Forces) countered General Arnold’s memorandum, emphasizing that the War Department authorized organic aviation over the protests of the United States Army Air Forces. He continued by remarking that since the birth of military aviation, the Air Corps performance of aerial observation had been completely unsatisfactory and that there was no reason to believe that it would improve by returning the mission to AAF control.53 The War Department sided with McNair and refused Arnold’s request. This support was qualified by the remark that any future request for expansion would give the Army Air


52Memorandum from General H.H. Arnold, Commanding General, US Army Air Force, to (Army) Chief of Staff, dated 29 January 1944, Subj.: Liaison Aircraft in the Army Ground Forces. Found in History of Army-Air Force Conflicts Concerning the Functions of Army Organic Aviation, Tab E. The Army requested this due to combat experience in Italy. The high altitude required to fly in the mountainous terrain of Italy, necessitated more power.

53Memorandum from Lieutenant General Leslie J. McNair, Commanding General, AGF, to Chief of Staff, U.S. Army, dated 16 February 1944, Subj.: Liaison Aircraft in the Army Ground Forces. Copy in History of Army-Air Force Conflicts Concerning the Functions of Army Organic Aviation, Tab G.
Force an opportunity to resubmit its claim. This simple statement would later be seen as a modern Sword of Damocles for organic aviation proponents following the war’s end.

Testing the War Department, the Commanding General, Army Ground Forces, Lieutenant General Joseph W. Stilwell, on 24 May 1945, asked Army Chief of Staff General George C. Marshall for additional aircraft to be assigned to other ground units. The War Department promptly referred the request to the AAF for comment. Earlier that year, the Army Air Forces had undertaken an analysis of what its postwar policy should be towards organic aviation. The study concluded that the AGF’s request for an expansion of organic aviation was acceptable, justified, and posed no threat to AAF programs and missions. Despite being well-received by many members of the Air Staff, it was rejected by Arnold, who, understanding the seriousness of this proposal, formed a committee in June 1945 to consider the expansion request and establish a policy position on the organic assignment of aircraft to non-Air Force units. After only two days of deliberations the committee recommended that the War Department should deny the Army’s expansion request because the Army Air Force could provide the necessary liaison activities. The War Department quickly returned the AAF’s response to

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54 Memorandum from MG Ray E. Porter, Assistant Chief of Staff, G-3, to the Deputy Chief of Staff (Army), dated 7 February 1944, Subj.: Liaison Aircraft in the Army Ground Forces. Copy in History of Army-Air Force Conflicts Concerning the Functions of Army Organic Aviation, Tab H.


57 Memorandum from Brigadier General Patrick W. Timberlake, Deputy Chief of Air Staff, to Lieutenant General Hoyt S. Vandenberg, MG Frederick I. Anderson, and Brigadier General Lauris Norstad, dated 2 June 1945, Subj.: Organic Assignment of Aircraft Other Than to the Air Forces. Found in History of Army-Air Force Conflicts Concerning the Functions of Army Organic Aviation, Tab J. The
Lieutenant General Ira Eaker, Deputy Commander, Army Air Forces, with the suggestion that it “go along with the proposal wholeheartedly and not reluctantly” since all theater commanders supported the plan.\textsuperscript{58} The disagreement was resolved in July 1945 with the establishment of an agreement between General Jacob Devers (Commanding General, AGF) and Eaker.\textsuperscript{59} Since there existed no further disagreement between the ground and air component, the War Department authorized the expansion of organic aviation on 9 August 1945. While increasing the number of aircraft in the division, it also assigned aircraft to independent battalions and groups. Six days later the war ended and the fulfillment of these new authorizations was never accomplished.\textsuperscript{60}

By the end of the Second World War, the Army Ground Forces possessed a fairly large organic aviation component with tremendous potential for expansion.\textsuperscript{61} The war confirmed the ground force’s need for organic aviation while displaying the Army Air Forces’ reluctance to undertake the mundane, but necessary, ground support missions. The Army Air Forces’ leadership made numerous efforts at eliminating organic aviation by arguing that it was a waste of resources, a duplication of effort, and that the aircraft memo correctly predicted that the resulting policy would last for 15 years. For the committee’s final recommendations, see War Department General Staff Disposition Form, File Number WDGGT 452.1 (5 January 1945), Subject: Liaison Type Aircraft found in History of Army-Air Force Conflicts Concerning the Functions of Army Organic Aviation, Tab K.

\textsuperscript{58}Memorandum from MG I.H. Edwards, Assistant Chief of Staff, G-3, to Chief of Staff, Army Air Forces: Attention MG C.C. Chauncey, dated 12 July 1945, Subj.: Liaison Type Aircraft. Found in History of Army-Air Force Conflicts Concerning the Functions of Army Organic Aviation, Tab L.

\textsuperscript{59}Lieutenant General Ira C. Eaker, Deputy Commander, Army Air Forces, Disposition Form, “Liaison Type Aircraft, Comment #2,” 3 August 1945.

\textsuperscript{60}Greenfield \textit{Light Aviation} 62-65, 100-108, 113.

\textsuperscript{61}By May 1945, the AGF owned over 700 aircraft for its own use. The Army’s proposals to expand organic aviation to all units would more than triple that number.
were not survivable on the battlefield. The performance of aerial observation posts showed all of these assertions to be false.\textsuperscript{62}

While the Army’s air and ground components waged their own war over the roles and missions of aviation, the development of the helicopter progressed with little controversy. During World War II, the helicopter made its operational debut. While the idea for the helicopter sprang from the imagination and creativity of many famous people, the impetus for its development prior to World War II was due primarily to military requirements.\textsuperscript{63}

As early as 1473, inventors proposed the idea of flying via a rotary wing, but prior to 1937 only a few designs managed to fly. The early helicopter designs were extremely complex and fragile and casual observers could not be faulted for believing that the potential of such a contraption for military use was minimal.\textsuperscript{64} The Army began its helicopter development program in 1921 centered around a helicopter designed by a Russian scientist, Dr. George deBothezat. Using his plans, the Engineering Division of the Air Service built it at McCook Field in Dayton, Ohio. Major T.H. Bane, Chief of the

\textsuperscript{62}While overall statistics do not exist, the survivability and usefulness of the aircraft are highlighted by the following statistics. Liaison aircraft of the First United States Army from June 1944 to April 1945 flew a total of 56,488 combat missions, 4,392 training missions, and 13,733 administrative missions for a total of 74,613 flights (and 78,665 operational flight hours). A total of 136 aircraft were lost (less than half were due to enemy fire) for a sortie loss rate of only 0.17\% -- easily the lowest of any class of aircraft in the war. For more information see Ken Wakefield, \textit{The Fighting Grasshoppers} (Leicester, England: Midland Counties Publications, 1990) 103, 151.

\textsuperscript{63}Albert Newton (Lieutenant Colonel, USA), \textit{The Use of the Helicopter in Military Cargo Operations} (Unpublished MA Thesis, University of Southern California, June 1952), 13-14.

\textsuperscript{64}\textit{Army Air Force Helicopter Program}, Classified document compiled by Historical Division, Intelligence (T-2), (Wright Field: Air Materiel Command, October 1946) 3. One “helicopter” design (in fact it was a ground-effect vehicle) needed twelve propellers to sustain flight: four for lift, two for forward movement, and six for control and stability. In 1918, the Army evaluated a small helicopter design by Peter Cooper Hewitt but found it to be incapable of performing any military mission. Another design proposed in 1919 used twenty propellers driven by belts and gearing.
Air Service Engineering Division, piloted the first free flight on 18 December 1922.\textsuperscript{65} More than 100 test flights were made in the craft but it failed to reach any of the performance specifications listed in the contract. The Engineering Division concluded that its lack of stability and complicated its structure made it a poor risk for further development funding. It was their opinion that the key to solving these problems was a single central lifting rotor. In an effort to keep his lucrative contracting assignment, deBothezat revised his design in 1923. While the Air Service bought the designs, they concluded that it would cost almost $200,000 to build a single copy and did not build it.\textsuperscript{66} By 1926, the Air Service had lost interest in helicopters and no funds were set aside for helicopter development in 1926 and 1927.\textsuperscript{67}

As interest in the helicopter waned in the 1920s and through most of the 1930s, it was partially replaced by the autogiro. In the two decades prior to World War II, the Marines expressed an interest in the development of this type of rotary wing aircraft. In 1932 they actually employed the Pitcairn Autogyro under combat conditions in Nicaragua.\textsuperscript{68} Although it worked, it could only carry a very small useful load. Despite their initial promise, the autogiros suffered from poor performance and reliability issues.

\textsuperscript{65}Army Air Force Helicopter Program 7. Free flight refers to the aircraft not being restrained or assisted in any way during the test. During this test, the helicopter reached an altitude of six feet and remained in the air for one minute and forty-two seconds.

\textsuperscript{66}Brigadier General Hollingsworth Franklin Gregory, \textit{The Helicopter (Anything a Horse Can Do)} (New York: A.S. Barnes and Company, 1976) 24-31. Army Air Force Helicopter Program 6-10. Despite the lack of success of the program, deBothezat received more than $13,000 for his two years of work. The program’s cost amounted to a total of $230,000 ($1,960,000 in 2001). It is difficult not to conclude that deBothezat was a con man who very successfully strung the Air Service along. His machine was a ground effect hovering vehicle that was incapable of true, controlled flight. Its deficiencies were inherent to the basic design and could not have been fixed.

\textsuperscript{67}Army Air Force Helicopter Program 11.

\textsuperscript{68}The Pitcairn Autogyro used a normally mounted radial engine to pull the aircraft forward. Once it achieved sufficient speed, the rotary wings provided lift and thereby enabled it to have a relatively small take-off distance.
causing the Marine Corps to shift its focus to more conventional aircraft. What captured the imagination of aspiring pilots was the development of increasingly bigger and faster fighter and bomber aircraft. It was not until the Germans displayed their successful helicopter, the Focke-Achgelis Fa-61, in 1937 did a renewed interest occur in developing the helicopter.

The German helicopter demonstrated its uniqueness among vehicles. Completely independent of terrain, the helicopter needed only enough space to accommodate its rotors to take off and land; at the destination, this was not a necessary consideration since it could hover above the ground to load or discharge passengers and cargo. From a military standpoint, the helicopter’s unique characteristics meant that it did not need extensive ground installations: ships required docks, aircraft required runways, and ground vehicles lost efficiency when leaving roads. Its ability to follow the contour of the ground and yet not be limited by the terrain, made it well suited for military tasks. However, the helicopter’s limitations of the time included a lack of range, speed, and lift capability as well as an inability to navigate by instruments which limited the extent of the given task but not the variety. Further research into improving the technology would improve the helicopter’s performance.

On 30 June 1938, the Seventy-fifth Congress passed HR-8143, also known as the Dorsey Bill (named for Representative Frank J.G. Dorsey of Pennsylvania). The act allocated $2,000,000 for the development of autogiros, gyroplanes, and rotary wing aircraft. The original intent of the bill was to purchase autogiros and gyroplanes made by two manufacturers (Pitcairn Autogiro Company and Kellett Autogiro Corporation)

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located in Philadelphia. However, after some discussion, Congress altered the emphasis away from gyros and toward rotary wing aircraft. Apparently, Congress perceived shortcomings in the gyros and believed the helicopter possessed greater potential and mandated that at least $300,000 be allocated for the Army Air Corps helicopter program.\textsuperscript{70}

In its 1939 design competition, the Army Air Corps ignored the older autogiro companies and selected a new ‘start-up’ aircraft company to build its experimental helicopters.\textsuperscript{71} The successful performances of the Sikorsky and Focke-Achgelis machines had encouraged others to enter the helicopter industry. Platt-LePage became one of those when he organized his company in 1938. Soon after, he had convinced the Army Air Corps to give him a contract to build what became the XR-1. The first test flights occurred on 12 May 1941 but it took another 31 months until the first successful flight of this aircraft. Platt-LePage Aircraft Company of Eddystone, Pennsylvania officially received a $199,075 contract on 12 July 1940 to build a twin rotor, counter-rotating helicopter for research and testing. Designated XR-1 by the Army Air Corps, the design was based on the German Focke-Achgelis Fa-61 model that had made headlines only a few years earlier.\textsuperscript{72} If successful, the XR-1 would then be ordered into quantity

\textsuperscript{70}Army Air Force Helicopter Program 4. In 2001 the cost would be $3.18 million; opportunity cost would be $35.5 million in 2001.

\textsuperscript{71}Army Air Force Helicopter Program 13. Although many companies submitted proposals, only four companies met the design parameters of the proposals: Vought-Sikorsky Aircraft Company in Bridgeport, CT; Platt-LePage Aircraft Company in Eddystone, PA; Kellett Aircraft Corporation in North Wales PA; and Pitcairn Autogiro Company in Philadelphia, PA. The first two submitted helicopter designs; the last two proposed autogiros.

\textsuperscript{72}Army Air Force Helicopter Program 11. Laurence LePage had acquired the manufacturing rights to the FW-61 when he was in Germany in March 1938. He showed MG Oscar Westover, Chief of the Air Corps, a movie of the FW-61 flying in Deutschland Halle, Berlin. Westover was very impressed and thought it worthy of further development. Using Westover’s name, LePage secured assistance in
Design changes and an inability to get small machined parts delayed the first unrestrained flight of the XR-1 until 23 June 1941. Four years of testing followed in which the XR-1 continually suffered from control problems. After an inspection of Platt-LePage facilities revealed that the technical staff lacked a scientific approach to solving the problems, and instead relied on the “hit-and-miss method” of problem solving, the contract was canceled in April 1945.\(^{74}\)

While the Platt-LePage firm failed to meet performance expectations, other firms were more successful. One of these was the Vought-Sikorsky Division of American Aircraft Company of Bridgeport, Connecticut, headed by a Russian emigrant, Igor Sikorsky. Although he first attempted to build a helicopter in 1909, it was most unsuccessful and Sikorsky spent the next quarter century building large bomber and transport aircraft. When the Focke-Achgelis helicopter flew in 1937, Sikorsky took up the challenge again and began work on what became the VS-300. In less than two years Sikorsky’s helicopter was operational and able to perform controlled flight. On 20 May 1940, he demonstrated to the military the outstanding maneuverability of his aircraft.\(^{75}\) The successful demonstration earned him a contract to design the VS-316, an

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\(^{73}\) *Army Air Force Helicopter Program* 5. The military designations go as follows: X=experimental; Y=service test; R=rotary wing (later to be changed to H=helicopter); the numerical designation refers to the order in which the design was considered (e.g. XH-1 is an experimental helicopter, first design submitted for evaluation). The manufacturers did the same thing except that they used their company’s name in the designation. Thus, the XR-1 was known in the company as the PL-3.

\(^{74}\) Gregory, *Anything a Horse Can Do*, 64-72; *Army Air Force Helicopter Program* 15-18.

\(^{75}\) *Army Air Force Helicopter Program* 22. The helicopter flew straight up, sideways, backwards, and pivoted. The only concern, and one it was not ready for, was whether the VS-300 could fly forwards. When asked about this important aspect of performance, Sikorsky replied, “That is one of the minor engineering problems we have not yet solved.”
experimental helicopter that the Army designated XR-4.\textsuperscript{76} In 1941, Igor Sikorsky displayed his VS-316 helicopter to military officials. Its performance convinced the Army Air Corps to purchase the single rotor helicopter and to continue the experimentation with helicopters. First tested in December 1941, the XR-4 became the primary Army helicopter for experimentation in the field.\textsuperscript{77}

The first helicopter delivered to the Army Air Force was an XR-4 flown from the Sikorsky plant in Stratford, Connecticut, to Wright Field, Ohio, on 17 May 1942. In the following eight months of tests the XR-4 “had far exceeded expectations.”\textsuperscript{78} On 6 and 7 May 1943, one of those tests demonstrated the practicality of a helicopter landing on a small deck of a moving tanker. Although the tanker was empty and in calm waters, and despite having to land in the confined center area of the ship, the helicopter’s successful performance of this task meant that individual air protection against submarines could be provided for merchant ships.\textsuperscript{79}

Because of the wartime emergency, a contract for 15 YR-4A helicopters (13 for the Army Air Forces and two for the British) was placed by the Army Air Forces on 4 May 1942 while testing was still on going with the XR-4.\textsuperscript{80} Sikorsky delivered the first YR-4A to the Army Air Forces in July 1943. Equipped with floats, this YR-4A and the

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\textsuperscript{76}Gregory, \textit{Anything a Horse Can Do}, 73-75. \textit{Army Air Force Helicopter Program} 23-24. The War Department awarded the contract of $3,000 (money from the Dorsey Bill) on 19 July 1940. This small amount was all that could be spared since the remainder of the Dorsey Bill funds were already committed.
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\textsuperscript{77}Albert Newton (Lieutenant Colonel, USA), \textit{The Use of the Helicopter in Military Cargo Operations} (Unpublished MA Thesis, University of Southern California, June 1952), 13.
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\textsuperscript{78}\textit{Army Air Force Helicopter Program} 27. It was considered fully qualified for short-range liaison missions and had demonstrated its ability to operate from ships for escorting convoys.
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\textsuperscript{79}For a detailed account see Gregory, \textit{Anything a Horse Can Do}, 111-114.
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XR-4 conducted tests on the United States Army transport ship James Parker to demonstrate the feasibility of operating helicopters from a moving ship. They executed 162 landings and take-offs without incident. Quickly realizing the potential military utility of the helicopter, the British requested an additional thirteen YR-4A helicopters and the United States Navy requested one also. Both navies wanted to test the helicopter’s ability to perform anti-submarine warfare. The American Navy was already working with the PV-2 helicopter for use at sea. Begun in 1940 as the P-V Engineering Forum, the Piasecki Helicopter Corporation began its experiments with the PV-2, a single, three-bladed helicopter. First flown in March 1943, it impressed the Navy enough to award Piasecki a contract for the development of a tandem rotor cargo and transport helicopter to be known as the XHRP-X.

The four sent to the China-Burma-India (CBI) Theater in 1944 by the AAF met with limited success. One of the helicopters was damaged during shipment to the theater and another two were crashed in India by a pilot who had previously destroyed two airplanes. An additional helicopter was later sent to the theater to give it three operational aircraft. The surviving helicopters participated in operations with the 1st

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80 Army Air Force Helicopter Program 28. While the basic design was the XR-4, the YR-4A had better performance due to a more powerful engine, larger rotor diameter, and numerous other minor modifications. It also had provisions for the external attachment of 300 pounds of bombs or one litter.

81 For a detailed account see Gregory, Anything a Horse Can Do, 124-128; Army Air Force Helicopter Program 29. Unfortunately, the YR-4A crashed in Pennsylvania while enroute to Wright Field.

82 Gregory, Anything a Horse Can Do, 76-85, 124. Due to the helicopter’s limited useful load, naval officials saw the helicopter’s value primarily in spotting submarines ten to twenty miles out from the convoy and notifying escort ships and aircraft of the submarine’s location. It was hoped that early detection would prevent any torpedo attack, but not necessarily result in the destruction of the enemy sub.


84 Army Air Force Helicopter Program 29-30.
Air Commandos, Project 9 Force, to support the British Long Range Penetration Group in Burma, performing courier service and delivering small amounts of supplies. On 23-24 April 1944, a Sikorsky YR-4 helicopter executed the first heliborne combat search and rescue (CSAR) mission. A light aircraft from the First Air Commando Group with four passengers had landed behind Japanese lines in Burma and was unable to take off again. On 23 April the YR-4, piloted by Lieutenant Carter Harman, United States Army Air Forces, picked up two of the men and returned them to friendly territory. Upon return, the engine overheated and Harman had to wait until the next day to collect the others.\textsuperscript{85}

Later on 16 June 1945, the 11\textsuperscript{th} Cavalry Regiment conducted a medical evacuation by helicopter, saving a four day road trip during the Luzon Campaign.\textsuperscript{86} The success of these operations and others convinced the Army Air Forces of the helicopter’s potential in rescue operations.\textsuperscript{87}

The final number of YR-4 helicopters delivered by Sikorsky totaled seven for the British, six for the Navy, and sixteen for the Army Air Forces. The British and the Navy used their YR-4A helicopters for training pilots. Designated the R-4 by the Air Corps, it was the helicopter used in all Army Air Forces basic helicopter pilot training and all


\textsuperscript{86}Letter, Wayne K. Roberts to Dr. John W. Kitchens, 25 May 1996, found in Aviation Chronology.

\textsuperscript{87}Joint Intelligence Collection Agency, China-Burma-India Report, 3 May 1944, Subj.: Burma -- First Combat Use of Helicopter in. Found in CMH Archives, File Misc. 452.1 Helicopters. The report concluded that the “helicopter is believed to be the answer to one problem – the use of aircraft in areas that do not permit a horizontal landing.”
The R-4 was also used in a variety of activities to gain operational experience to aid in the future design of helicopters. Sikorsky made the R-4, the production version of the YR-4, from March 1944 until December 1944. The total production run was 130 helicopters with 55 delivered to the Army Air Forces, 52 to the British, and 23 to the Navy.

The success of the XR-4 led to a request for a larger helicopter that had a greater utility with an ability to perform convoy escort, coastal and harbor patrol, observation and fire control, liaison and communication, and ambulance duties. The Chief of the Experimental Engineering Section at Wright Field requested the procurement of two VS-327 helicopters (designation to be XR-5) from Vought-Sikorsky in May 1942. The British sought to purchase approximately 250 larger helicopters to perform anti-submarine duties from ships at sea and expressed a strong interest in the XR-5 program. After reassuring the Joint Aircraft Commission that this program would not interfere with Navy engineering projects at the plant, Vought-Sikorsky quickly arranged to provide four

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88 Army Air Force Helicopter Program, 5. The X-4 was a two-place, single rotor helicopter with an auxiliary tail rotor. It cost $60,000 ($660,115.53 in 1999) per X-4.

89 Army Air Force Helicopter Program 29. One of the helicopters was sent to Ladd Field in Alaska for winterization tests; another went to Langley Field for National Advisory Committee on Aeronautics (NACA) wind tunnel tests; three remained with Sikorsky for research. The remaining ten performed operational missions with six assigned at Wright Field for pilot training and four sent to the CBI theater to perform rescue missions.

90 Army Air Force Helicopter Program, 30.

91 The VS-327 helicopter weighed 4,200 pounds (gross) with a useful load of 1,225 pounds (compared to the X-4’s 2,400 pound gross weight and 500 pound useful load), a crew of two, a maximum speed of 123 mph, a service ceiling of 15,000 feet, and with an endurance of 4.17 hours at operating speed. The cost per VS-327 was approximately $325,000 (equivalent to $2.98 million in 2001).

92 Army Air Force Helicopter Program, 31. The strong British interest in the program was due to the War Department’s Material Command in Washington, D.C. The War Department suggested that the helicopter program would progress more quickly if it was known that the British would firmly commit to buying a large number. The British delegation received approval from the Munitions Assignments Committee in August 1952 to procure 250 large helicopters.
experimental models with delivery to start in June 1943. The long delay in building the helicopter was due to the wartime shortage of vital materials. Initially designed to be an observation helicopter, the helicopter needed small modifications to allow for the carrying of four litter capsules, two on each side, and for bomb racks on the helicopter’s belly. The XR-5’s initial flight tests in August 1943 were “reasonably successful,” but the modifications needed to make it more stable prevented the first XR-5 from entering service until 12 June 1944. Provisions were made to subsequent models to allow for the installation of electronic and magnetic detection equipment.

Even before testing had finished on the XR-5, the decision to mass produce the R-5 helicopter had been authorized. At the Joint Aircraft Committee meeting in August 1942, Colonel Hollingsworth Frank Gregory (the Army’s rotary wing project officer and one of the first helicopter pilots) believed that the “procurement of 250 XR-5 aircraft was somewhat a gamble.” Gregory justified his concern by noting that R-5 was the largest helicopter at the time being considered for mass production; given the helicopter’s large size, the large numbers to be procured, and the immature state of the technology, Gregory recognized that any design flaws would lead to large cost overruns and very slow production. Gregory said this in view of the problems that the military was having with the XR-1 aircraft. General H.H. Arnold (Chief of Staff, Army Air Corps) replied by

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93 Army Air Force Helicopter Program, 30-31. Vought-Sikorsky submitted an offer to provide the vehicles at a steep discount, with the procurement cost sufficient to cover the design and manufacturing expense plus $1. The total cost was $972,600 ($8.48 million in 2001) to be split evenly between the Army Air Force and the British lend-lease fund.

94 Army Air Force Helicopter Program, 32-33. The XR-5 was powered by a R-985-AN-1 engine that produced 450 horsepower and delivered that power to the main and auxiliary rotors through a reduction gear transmission system. The crew of two sat in tandem in the helicopter’s nose. Its gross weight was 4,900 pounds of which 1,225 was useful load. Its unit cost was $531,000. The YR-5A service test model had a much more powerful engine; the YR-5C was a YR-5A with an even more powerful engine, a larger main rotor, and a larger cabin that could carry 5 passengers. See also Gregory 133-141.
saying that the Army Air Force was willing to take a chance and that “the Army Air
Force had taken ‘flyers’ prior to this time and had not been too unsuccessful.”
Considering the solid work done by Sikorsky to this point, the Army Air Forces believed
that it was a worthwhile, calculated risk, and placed productions orders totaling 450 R-5
helicopters in 1943-44.95

Due to the commencement of production prior to the completion of testing, the
everal R-5 production models, procured at an average cost of $55,000, suffered from many
problems associated with large-volume production. Major structural alterations were
needed for both performance and safety reasons which stopped production for six
months. Despite the initial problems, the Engineering Division at Wright Field
concluded that the military’s urgent need for the helicopter outweighed the normal series
of time-consuming tests. Thus, despite the problems, delays, and additional expense, the
helicopters entered the force a year earlier than they would have if the full testing
regimen had been followed. By the summer of 1944, the majority of problems had been
solved but not to the point that the helicopters could be deployed in a field environment.
The lack of availability did not retard the increased need which commanders had for the
helicopter. By July 1945 the requirement for helicopters was twice the number of
helicopters being produced.96

Convinced that Sikorsky was too busy doing research and experiments, the Army
Air Forces tried to pressure Sikorsky in focusing only on producing a serviceable R-5.
Sikorsky replied that the helicopter was no longer “a queer, new plaything” and that

95Army Air Force Helicopter Program, 34, 36-37. The breakdown of the orders were: 250 for the
British, 150 to the Army Air Force, and 50 to the Navy.
every effort was being made to make the R-5 service ready. As the war drew to a close in mid-1945, the orders were reduced to a total of 60 aircraft. By May 1946, the 60 R-5 helicopters had been delivered and production ceased.

Another helicopter developed during the war by Sikorsky was the XR-6. The XR-6 was essentially a XR-4 with a more powerful engine and a larger fuel tank in order to give it a six hour endurance. It was designed to carry 600 pounds of bombs or depth charges for anti-submarine duty or two enclosed litters for air-sea rescue operations. It initially flew on 15 October 1943, but control problems required an additional four months of work before the first delivery was made to the Army Air Forces. A total of six XR-6 helicopters were delivered (three going to the Navy) ending with the delivery of the last one in January 1945. Again, the production run of the R-6 helicopter began before much performance testing had been completed, but since it was very similar to the R-4, the Army Air Forces believed that the helicopter would be "suitable for immediate production."\(^{98}\)

The rushing of the R-4, R-5, and R-6 helicopters into large volume production was due to the urgent need for light aircraft to support ground forces. Since the second half of 1942, the Army requirement for liaison planes was 510 above the actual maximum production capacity available. The Army thought that the helicopter could not only fill the shortage, but that its performance would actually be better than the light aircraft currently in service. The Army Air Forces wanted to contract for 600 XR-6

\(^{96}\)Army Air Force Helicopter Program, 34-35.  
\(^{97}\)Army Air Force Helicopter Program, 36.  
\(^{98}\)Army Air Force Helicopter Program 38-40.
helicopters to make up this shortage, although it doubted that enough helicopters could be produced in 1943 to cover the liaison aircraft shortage.

In January 1943 the Director of Military Requirements authorized the procurement of 900 XR-6 helicopters, 800 for the Army Air Forces and 100 for the Navy. A production schedule of 100 per month was envisioned, but the manufacturing facilities at the Sikorsky plant could not handle such a large quota. The Production Division at Wright Field tried using the facilities of Nash-Kelvinator Corporation in Detroit to build the helicopters under license, but Vought-Sikorsky was not willing to release the engineering and design information. Vought-Sikorsky refused because it wanted to control the proprietary information and to ensure that the helicopter was as perfect as possible. The Army Air Forces felt that the R-6’s current state of development was sufficient and desired production to start in May 1944. While production by Nash-Kelvinator eventually started in May 1944, it never reached the goal of 100 per month. Prior to the cancellation of the program in December 1945, 219 R-6A helicopters had been delivered. Since a number of its components were unsatisfactory, testing remained uncompleted in May 1946, which allowed the helicopter to be utilized only on a limited basis.

Development of even larger helicopters occurred during the war. In 1942, the Office of the Air Surgeon desired an aircraft that could transport a minimum of four litter

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99 *Army Air Force Helicopter Program* 41. The contract, as approved by the Secretary of War on 21 September 1943, totaled $42,680,420 with a fixed fee of $1,707,220.80.

100 *Army Air Force Helicopter Program* 42. The production schedule contracted for in December 1943 would begin with two R-6As in May 1944 and increase to 100 per month by December 1944.

101 *Army Air Force Helicopter Program*, 43. The Army Air Force received 156, the Navy received 36, and the British 27.

102 Gregory, *Anything a Horse Can Do*, 142-144.
patients. The Army Air Force believed that such a design was “feasible and practicable” and contracted with the Kellett Autogiro Corporation of Philadelphia to build the XR-10 helicopter. At the time, this helicopter would be the largest ever built. It was a two engine, two intermeshing rotor design with a gross weight of 11,000 pounds and a useful load of 2,200 pounds. It had a crew of two sitting side-by-side and could carry six litters inside its fuselage.\(^{103}\)

Four companies originally responded to the request for designs. The Kellett design was selected as the most favorable and a contract was let for developing a prototype. The design from Sikorsky was considered to be a close second, and the committee asked for a prototype to be built for comparison with the Kellett design. This last request was rejected by the Material Division in Washington because of a perceived favoritism towards Sikorsky. “Although it was believed that “the honest thing to do is to approve both proposals since it is consistent with our present policy,” fear was expressed that “we may be misunderstood and we will certainly provide ammunition for criticism before Congress” that it was best from a political perspective to select only the Kellett model. Numerous engineering and production problems prevented even one XR-10 from being built.\(^{104}\) Despite the AAF problems with twin rotor helicopters like the XR-10, the Navy persevered with its experiments with a twin rotor, twin engine, transport type helicopter. McDonnell Douglas Aircraft Company of St. Louis (principle stock holder in the Platt-LePage company) was the primary contractor. The Engineering Division at

\(^{103}\)Army Air Force Helicopter Program 46-47.

\(^{104}\)Army Air Force Helicopter Program, 49-50. To be more blunt, one historian referred to the Kellett and Platt-LePage machines as “aerodynamic abortions, utter failures.”
Wright Field received the specifications for the Navy’s 10,000 pound helicopter in March 1945. 105

The unique performance characteristics of the helicopter required a change in the methods for letting contracts. The military’s demand for a medical evacuation helicopter and the development of other, larger helicopters could not be justified under the military characteristics describing liaison type aircraft. The policy prior to 1944 established military requirements based on mission performance and not on the aircraft to perform the mission. As a result, all helicopters were procured using the characteristics of liaison or observation aircraft. 106 Since larger helicopters were being developed to perform a wide variety of missions, in 1944 the Requirements Division of the Office of Commitments and Requirements created a set of military characteristics specifically for large type helicopters. This action cleared the path for the future development of the transport helicopter.

In conclusion, World War II displayed the potential of air power to accomplish military objectives at all levels of war. At the tactical and operational levels of war, the American use of air power suffered from institutional rivalries which restricted the development of doctrine and appropriate tactics for light aircraft and helicopters. The Army Ground Forces’ efforts at expanding the employment of its organic aircraft reflected its need for aircraft and tactics to support the ground forces. Since the Army

105 Army Air Force Helicopter Program, 21.
106 Army Air Force Helicopter Program, 45. These military requirements described the helicopter as “The primary tactical mission of aircraft covered by these requirements shall be short range observation, liaison, control of artillery fire, Army cooperative missions, rescue missions, and general spotting photographic missions.”
Air Force overwhelmingly emphasized the strategic aspect of its mission, this meant that the ground component needed to take the initiative.

The experiences of the Army in World War II provided many lessons regarding the use of light aircraft in ground operations. The aircraft performed superbly in a number of ways: artillery fire observation, liaison activities, aerial ambulance, aerial reconnaissance, wire laying, and emergency transport of small amounts of supplies. The Army Air Forces’ liaison squadrons were supposed to provide the ground forces with support for these missions, but were unable to because they were poorly manned and equipped. The Army Air Forces simply had no desire to perform these mundane tasks which benefited ground forces only. Yet the Army Air Forces was reluctant to give up any airspace to ground commanders out of the fear that their eventual independence would be compromised and from their fear that organic aviation would erode their responsibility for all aerial missions. The half-hearted efforts by the Army Air Forces satisfied no one. The allocation of air assets for ground support was seen by senior air commanders as a waste of men, airframes, and funding. The Army Air Forces’ poor performance only verified for ground commanders that if they wanted continual and effective air support, it would have to come from within the forces they controlled and not from a disinterested third party. The development of aircraft intended to support ground forces met with little support in the circles of the Army Air Forces. This lack of enthusiasm and support was reflected in the poor performance in World War II of the aircraft primarily designed for close air support. The successful development of the helicopter during this time had more to do with the Army Air Forces’ need for rescuing downed pilots than for developing an aircraft to move ground troops and supplies. The
requirements for air-sea rescue provided the impetus and funding necessary to continue
the helicopter’s development. That the basic research in the helicopter supported both
these missions proved fortuitous for the future of army aviation. While debates raged
over the role of aviation, the Army ground forces and the Navy looked upon the
helicopter as a vehicle with great potential. In 1945 one aviation journal described the
intense interest in the helicopter:

> During 1943, the first year in which Sikorsky’s craft was given
> wide-spread publicity, a rash of excitement swept the aviation-
> minded and every other kind of public. There were helicopter
> fashions, helicopter advertisements--from everyone but the
> helicopter manufacturers--and every moving picture with a
> postwar sequence featured a helicopter as the private plane to
> come. The fever has now abated. In the wake of the hallelujahs
> has come a sober awakening and an attempt to realize facts. 107

As a result, all the services pressed for greater research into improving the
helicopter. While planners and designers both envisioned greater uses for the helicopter,
the immature state of the technology prevented the helicopter from playing a larger role.
Nevertheless, the technological advancement of the helicopter could never have been
accomplished in such a short time without the emergency funds designated for helicopter
development. The war brought not only funds, but a sense of urgency and creativity
which would not have occurred as rapidly in peacetime. The small helicopter industry
created by the war was the most advanced in the world in 1945. However, because of the
needs of the war effort, the AAF placed most of its orders with manufacturers who could
produce in large quantities. As a result, Sikorsky provided all the service model
helicopters used in the war. This meant that the few firms that actually benefited from

107 Army Air Force Helicopter Program, 5-6.
wartime experience were poised to best exploit their experience in the anticipated post-war helicopter boom.

The five years following VJ Day proved to be a challenging time for advocates of organic aviation. The obstacles that needed to be conquered were a lack of strategic mission, a lack of money, and a lack of personnel with technical expertise due to the creation of the Air Force as an independent service. Despite the United States Army Air Forces’ opposition, the Army’s ground forces had been authorized to expand organic aviation to most of the branches in the Army. It was only because of the war’s end and the austere measures that followed which prevented this expansion.
Early in 1942 Igor Sikorsky predicted a great future for the helicopter in both civilian and military applications. Continuing a theme similar to the “Winged Gospel” that swept America between the two world wars, Sikorsky and many others envisioned the sale of hundred of thousands of helicopters as replacement for the American automobile.\(^{108}\) Harold Pitcairn had envisioned a similar future for the autogiro in the 1930s, but the technology was lacking; by 1947 helicopter technology was sufficiently advanced and was generating great anticipation for commercial success.\(^{109}\) Unfortunately the commercial success that Picairen and Sikorsky envisioned never materialized. Lacking a satisfactory market, the helicopter designers continued to compete for an increased presence in the only large market for helicopters -- the military.


\(^{109}\) Warren R. Young, *The Helicopters* (Alexandria, VA: Time-Life Books, 1982) 99. By 1947 there were more than 70 companies working on helicopter development. A very large number of requests for the establishment of short-haul helicopter routes overwhelmed governmental oversight agencies. The Greyhound Bus Company even submitted a request to provide inter-city helicopter service.
By the end of the Second World War, the Army Ground Forces possessed a fairly large organic aviation component with tremendous potential for expansion.\textsuperscript{110} The war confirmed the ground force’s need for organic aviation while displaying the Army Air Forces’ reluctance to undertake the mundane, but necessary, ground support missions. The Army Air Forces’ leadership made numerous efforts at eliminating organic aviation by arguing that it was a waste of resources, duplication of effort, and that the aircraft were not survivable on the battlefield. The performance of the aerial observation posts showed all of these assertions to be false.\textsuperscript{111}

The surrender of the Japanese on 2 September 1945 brought an end to the most destructive war in history. The American desire to end the war quickly was now replaced by the desire to demobilize and return to “normalcy.” In America, the general belief during and after the war was that the United States would suffer a recession just as it did after World War I. The faster that the large military could be dismantled, the less of a burden it would place on the economy. The public’s desire for a small military was also understandable from a security standpoint. The defeat of the Axis left America without an enemy and as the only dominant power. While a gulf grew between the United States and the Soviet Union during WWII, it was not until President Truman’s March 1947

\textsuperscript{110}By May 1945, the AGF owned over 700 aircraft for its own use. The Army’s proposals to expand organic aviation to all units would more than triple that number.

\textsuperscript{111}While overall statistics do not exist the survivability and usefulness of the aircraft are highlighted by the following statistics. Liaison aircraft of the First United States Army from June 1944 to April 1945 flew a total of 56,488 combat missions, 4,392 training missions, and 13,733 administrative missions for a total of 74,613 flights (and 78,665 operational flight hours). A total of 136 aircraft were lost (less than half were due to enemy fire) for a sortie loss rate of only 0.17% -- easily the lowest of any class of aircraft in the war. For more information see Ken Wakefield, \textit{The Fighting Grasshoppers} (Leicester, England: Midland Counties Publications, 1990) 103, 151. For more reading see B.F. Cooling, (ed.), \textit{Case Studies in Close Air Support} (Washington, D.C.: Office of Air Force History, USAF, 1990); Edgar F. Raines, \textit{Eyes of Artillery: The Origins of Modern U.S. Army Aviation in World War II} (Washington, D.C: CMH, 2000).
speech that the Soviet Union occupied the position as the number one enemy. Hence, American military policy was shaped by three factors. One was the belief that nuclear weapons provided security and the utility of ground forces was limited. Second was the political focus on the security of Europe. The final factor was the emergence of the Soviet Union as America’s main rival.

At the national level, the desire of the public to return to normalcy meant a rapid reduction in military forces along with a very small military budget. Senior civilian and military leaders thought that they could maintain an efficient, but credible, defense based on America’s nuclear monopoly. As a result, their efforts at increasing efficiency centered on unification and nuclear weapons. The employment of nuclear weapons in August 1945 created an era in which military professionals and intellectuals widely expected a new “revolution” in warfare in which conventional forces were no longer necessary except for ‘mopping-up’ operations and occupation duties. Many experts went so far as to predict that nuclear weapons ensured only two states -- peace or annihilation.

To fulfill its primary mission, the USAAF created the Strategic Air Command (SAC) on 21 March 1946. Composed mostly of B-29 and B-50 heavy bombers, its mission was to conduct strategic bombing operations with either conventional or nuclear weapons. Despite its status as the first line of defense, the demobilization of the military impacted negatively on SAC too. In 1947, SAC possessed just six groups, but only two were fully equipped and manned. Stationed at Roswell Army Air Forces Base, New Mexico, the 509th was the only group which flew the modified B-29 aircraft capable of

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112 The budget became even smaller with the election of a Republican Congress in 1946 which passed through, over President Truman’s veto, a tax reduction bill which reduced federal revenues by approximately $5 billion. See Weigley, *The American Way of War*, 373.
carrying nuclear weapons. Unfortunately, like most of SAC, the unit suffered from a severe shortage of trained crews. By 1948, SAC did not have a single crew capable of executing its mission in a professional manner.\textsuperscript{113}

In October 1948, President Truman appointed Lieutenant General Curtis LeMay the commanding general of SAC. LeMay quickly began to remedy the deficiencies that existed within the command. By 1 January 1950 the nuclear capable bomber fleet totaled 225 aircraft, between 196 and 263 combat ready crews, and eighteen bomb assembly teams.\textsuperscript{114} Production of nuclear weapons also increased during this time period.\textsuperscript{115} Despite these improvements, the effectiveness of the planned nuclear strikes against the Soviet Union suffered from many deficiencies. One was the actual targeting of Soviet facilities. The lack of serious intelligence forced planners to use German aerial photographs taken in the 1940s and Tsarist era maps to locate potential targets. As a result of these problems, among others, the Harmon Committee report published in May 1949 “seriously questioned whether the planned nuclear air offensive could cause Soviet capitulation or prevent the Soviets from overrunning Western Europe and the Middle East in the event of war.” Thus, strategic bombing with nuclear weapons would not be enough to defeat the Soviet Union in a major conflict. Despite this weakness, the report acknowledged that “the atomic bomb would be a major element of Allied military strength in any war with the USSR” and would constitute “the only means of rapidly


\textsuperscript{114}Rosenberg, 29. Sources differ on the number of crews trained and available for combat.

\textsuperscript{115}Rosenberg, 26. On 30 June 1948 there were 50 bombs; by 30 June 1950 there were at least 292 bombs.
inflicting shock and serious damage to vital elements of the Soviet war-making capacity.” The report advocated the early use of nuclear weapons and the making of every reasonable effort to increase nuclear strike capabilities. ¹¹⁶

A memo from Vandenberg to Eisenhower in 1949 reflected the Air Force’s position on military matters. In the correspondence, Vandenberg emphasized increasing the Air Force’s retaliatory power and enhancing the mobile striking power of the Army. Much of the Navy in the current defense structure was not essential and needed to be eliminated. To alleviate the fiscal restraints imposed on military spending he recommended significantly reducing the Navy and Marine Corps. This could be done because the Soviet Union did not possess much in naval forces, the Soviets did not rely on sea line of communication, and because the United States was aligned with the world’s second greatest naval power, Great Britain. As a result, Vandenberg proposed a budget that had neither fleet nor attack carriers, but did support a strong anti-submarine naval force. In addition, the Marines were to be reduced to six battalions (not even a whole division) with no aviation, since their mission could be done by the Army. The Army did not escape Vandenberg’s ax either, calling for a force that totaled approximately 15 divisions (with only one armored division and five cavalry regiments). The Air Force would remain near its overall current strength, but with greater emphasis.

on its nuclear retaliation capability. Out of the minimum 63 groups, only five would be capable of tactical operations.\textsuperscript{117}

As illustrated by Vandenberge, this acceptance of the nuclear weapon as the guarantor of peace also enabled the United States to quickly revert back to a peacetime military establishment. Since nuclear weapons made conventional combat unnecessary there was not a need for large ground and naval forces. This meant a massive reduction in the size and capabilities of the American armed forces. For the Army, its force structure decreased by over 77 percent in less than a year.\textsuperscript{118} The Marine Corps also suffered greatly with its force decreased by 68 percent in the same time frame.\textsuperscript{119}

While the Air Force enjoyed its quick ascent as the predominant service in the nation’s defense establishment, the Army endured a much less enviable position. Gutted by its rapid de-mobilization, the Army struggled to maintain a viable force dispersed throughout the world. Army leaders in Washington tried to present their views that the nuclear age had not altered the need for large conventional forces. The Army instead emphasized the need for strategically mobile forces that could execute lightning type strikes and could seize and defend overseas bases for American bombers to attack the


\textsuperscript{118}Russell F. Weigley, \textit{The American Way of War: A History of United States Military Strategy and Policy} (Bloomington: Indiana University Press, 1977) 368. When the Japanese surrendered on 2 September 1945, the Army numbered over 8,267,000 (2 million in the Air Forces); by 1 January 1946, that number had been reduced to 4,228,936; by 30 June 1946 the number stood at 1,891,011 (300,000 in the Air Forces). The final force level was set at 1,070,000 with 400,000 of that belonging to the Army Air Forces (AAF), but this level was never reached.

\textsuperscript{119}Allan R. Millett, \textit{Semper Fidelis: The History of the United States Marine Corps} (New York: Macmillan Publishing Company, 1980), 438-440. The Marine Corps ended World War II with a total strength of 458,053, including nearly 100,000 in Marine aviation) in six Marine divisions and four Marine Air Wings (MAWs). By the summer of 1946, the Marine Corps was down to just 155,592. Even more
Soviet Union. To transport the Army, there needed be an extensive air lift (and sealift) capability. Unfortunately, its desires for a 70 wing strategic bomber force meant that the Air Force neglected most other forms of aircraft. The lack of transport aircraft undermined the Army’s ability to make itself a more valuable resource within the defense establishment. Besides not having enough transport aircraft to move Army units, the Air Force’s focus on strategic aircraft impinged on the development and procurement of tactical aircraft, both fixed wing and rotary, assigned to the Army.

Marine planners recognized the low probability of the next large war requiring the seizing of advanced naval bases as part of an extensive naval campaign as had been done in the Pacific in World War II. Unwilling to relinquish their specialty to the atomic altar, the Marines chose a similar course of action as the Army and presented themselves as the nation’s quick reaction force which could deploy to protect American interest in the western Pacific or serve as United Nation peacekeepers. Unlike the Army, the Marines had access to the shipping necessary for strategic mobility. The Navy dissented from its sister services’ focus on Europe and nuclear weapons and looked to the Middle East and the region’s oil reserves as being key terrain in any future war. Navy planners supported maintaining a sizeable Marine Corps (with integrated air) so that a Fleet Marine Force (FMF) could quickly secure the oilfields at the beginning of any war. To accomplish these tasks, without encroaching upon the Army’s mission, the Navy envisioned a FMF in the Eastern Mediterranean and one in the Western Pacific.120

120Telling is the fact that by the end of 1946, the FMF Pacific consisted of just 15,300 marines (Millett, *Semper Fidelis*, 447).

120Millett, *Semper Fidelis*, 451-452. See his endnotes on 702. The Marines wanted to have a two FMF force each composed of two divisions and two Maws.
The Navy adjusted its force allocations and deployments based on the nation’s priorities. Whereas in World War II the majority of capital ships served in the Pacific, in the Cold War it became a backwater area. The Atlantic Ocean became the primary theater for the Navy with most of its ships deployed there; the Pacific would have only one carrier group.\textsuperscript{121} Although this meant operating within range of land based aircraft, based on its experience in World War II, the Navy was confident the qualitative superiority of its aircraft could enable it to successfully operate against the massive Soviet air power.

Representative of many senior leaders, recently retired Rear Admiral Miles Rutherford Browning assumed that countermeasures to nuclear weapons would be developed in the near future. He believed that the navy could withstand the future by adapting the new weapons to their use and by developing counter weapons and passive measures.\textsuperscript{122} One potential use of the nuclear weapon for the Navy was against the principle naval threat to United States security, the Soviet submarine.

Lacking any major combatants, and suffering badly from geography, the Soviets turned to the submarine to project naval power. At the end of World War II the Soviets captured many of the new German submarines (to include production facilities and their designers) entering service at the end of the war. Armed with this knowledge, the Soviets leapt to the forefront of submarine technology. With these advanced submarine


designs, the Soviets possessed a weapon, if used in large quantities, which could sever the sea lanes between the United States and Western Europe.

At the June 1946 naval warfare conference, which Deputy Chief of Naval Operations Vice Admiral Forrest P. Sherman attended, Rear Admiral Jerauld Wright concluded that snorkel equipped submarines reduced the effectiveness of anti-submarine warfare (ASW) aircraft (which were the greatest threat to submarines) by 95 percent. 123 The presentation only further reinforced Sherman’s belief that the submarine threat to sea lines of communication was the greatest naval threat to American security and as such he centered his strategy on combating it. Admiral Chester Nimitz, Chief of Naval Operations, concurred with Sherman and “assigned [anti-submarine warfare] a priority equal to that for the Atomic Bomb Tests.”

Sherman believed that the easiest and obvious solution was to destroy the submarines before they got to sea. “As you know, the strategic counter to this sort of thing is high emphasis on the attack at the sources of the trouble.” 124 Although attacks on U-boat pens had been unsuccessful in WWII, the Pacific campaign had shown that precision strikes on bases yielded superior results over high altitude area attacks. 125 Assuming that the Soviets would build hardened pens, the development of the super carrier to carry the next-generation, heavy attack plane (to carry A-bombs or heavy


conventional loads) would be necessary for their destruction. The inability to defend against the Soviet subs thus required the Navy to go on the offensive.\textsuperscript{126} To do this, the Navy needed a very large carrier capable of handling the large and heavy jet aircraft needed to carry nuclear bombs. The inability to get its super carriers built upset many senior naval officers. Their efforts resulted in the unsuccessful ‘Revolt of the Admirals’ and forced many of the participants to be denied promotion or forced into retirement. One effect that it had on the Navy was the early promotion of naval officers who brought with them new concepts and a revised perspective of the Navy’s role in the defense of the nation which benefited the Marines’ efforts at transformation. However, the extensive funding to counter Soviet submarines consumed resources.

On at sea, the Soviet navy was like a goldfish, on land it was as big and ferocious as a bear and ready to swallow Western Europe. The years immediately following the end of World War II were ones in which the Soviet Union was at a distinct disadvantage. Lacking a nuclear capability the Soviets relied on their large ground forces to serve as a deterrent, but the devastation wreaked upon the country kept them from supporting such a large military and forced a large reduction in its force size too. In the 1945-48 period the Soviets also drastically cut the size of their ground forces from approximately 500 divisions to 175.

\textsuperscript{125}House Committee on Armed Services, \textit{Sundry Legislation Affecting the Naval and Military Establishments}, 81st Congress, 2d Session, 1950, p. 5952.

Unlike their Western counterparts, the Soviet leadership emphasized the importance of using armored forces in large numbers to affect deep penetrations into enemy territory and increased the capabilities of their remaining divisions through mechanization and armor. The number of armored and mechanized divisions during this time frame increased from 39 to 65. Acknowledging lessons from the war, the Soviets increased the size of their divisions and made all regiments combined-arms organizations. The demobilization also allowed the Soviets to make their remaining 110 rifle divisions fully motorized. Soviet doctrine during this time remained almost unchanged from that used in the Great Patriotic War. The Soviets maintained between 25 and 30 divisions in Eastern Germany, most of which were armored or mechanized. Thus, the Soviet threat remained a legitimate one during 1945-1950. Although smaller, the Soviet military was still significantly larger than all of the armies in the West combined.

The balance of power that existed between the American nuclear forces and the Soviet conventional forces ended with the Soviet exploding of a nuclear device on 29 August 1949. No longer could America hide behind a defense policy entirely predicated on possessing a nuclear monopoly. While it would be some time before the Soviets could develop the necessary numbers and delivery systems, American military leaders

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127 Claude Vincent, “The Soviet Army is an Entirely Armored Army” Military Review 30:10 (January 1951) 80-84. The Soviet High Command recognized that its success in a ground campaigned depended on numerical superiority and as a result Soviet tank production stayed at 65,000 tanks per year.


129 Memorandum for DCS by ACA For Intelligence, dated 13 April 1950 found in the Matthew Ridgway Papers, United States Army Military History Institute. The actual number of divisions fielded varies depending on the source and the numbers were normally inflated. See also John Erickson, “The Ground Forces in Soviet Military Policy,” Strategic Review 4 (April 1976) 65.
saw it necessary to re-evaluate American defense policy. Without the ability to guarantee
the nation’s and its allies’ security with nuclear weapons, an increased need for a larger
conventional capability became apparent. In April 1950, the national security council
presented the document known as NSC-68 to President Truman. It argued for the
creation of a balanced military structure capable of responding in kind to any Soviet
aggression.130

Given this strategic context, each service saw its role in implementing national
policy and strategy differently; the only consensus on military matters in the five years
after World War II was that there was none. The three services, pressured by budgetary
restraints and efforts at increasing military efficiency through unification, in addition to a
demoralized and understaffed forced, made strenuous efforts at promoting their mission
and demonstrating their viability in a world expected to be dominated by nuclear
weapons. The Air Force, the service with the greatest amount of influence due to its
exclusive nuclear capability, set the agenda from which the other services reacted.

The strategic environment had an impact on the development of aviation in both
the Army and the Marine Corps. America’s need for a strong but economical defense led
to the restructuring of the national military establishment in 1947. The National Security
Act of 1947 (NSA 1947) ‘unified’ the services under the auspices of the Department of
Defense. While it made many changes, the one that had the foremost impact on the
development of army aviation was the establishment of the Air Force as an independent

130 Carter, 13.
service. Air Force leaders had long-sought autonomy and now that they had it, were not
going to allow anyone to come close to impinging on their roles and missions.

The Army did not fight the creation of an independent Air Force since the senior
leadership recognized prior to 1947 that this was inevitable and had prepared for it.
While the separation was amicable, disagreements still sprang forth over a variety of
issues: the roles and missions of organic Army aviation, pilot training and ratings,
logistical support for army aircraft, and the command and control relationships in the
field and within the bureaucracy. The NSA 1947 failed to provide guidance on any of
these issues. In Section 205 (e) of the document it stated:

In general the United States Army, within the Department of the
Army, shall include land combat and service forces and such
aviation and water transport as may be organic therein. It shall be
organized, trained, and equipped primarily for prompt and sustained
combat incident to operations on land.\textsuperscript{131}

The vague language of “aviation as may be organic therein” created much friction
between the Army and the Air Force. Each had their own interpretation of the definition
of this statement and the resolution of this problem would require almost two decades of
fighting.

The executive branch made numerous attempts to resolve these inter-service
conflicts. Unfortunately, these resolutions in the form of documents on national security
used similar, vague wording. Executive Order 9877 (26 July 1947), the “Functions of the
Armed Forces and the Joint Chiefs of Staff” of 21 April 1948 at Key West, and the 1949
revision of the National Security Act all failed to provide any further clarification of the
The effects of this were twofold. While the vague wording allowed for a great disparity in its meaning and served as a major point of friction between the Army and the Air Force, the lack of clarity provided the Army an opportunity to proceed with the development of Army aviation. The Army interpreted the documents as allowing for the expansion of its aviation and responsibilities; the Air Force believed the exact opposite. While these acts did not expand the mission of Army aviation, they did not further restrict it either.

After the Key West Agreement of 21 April 1948, the Army published AR 95-5, which provided the guidance under which army aviation would operate in the new environment. The regulation delineated the Army’s responsibilities while ensuring that they did not infringe upon the Air Force’s responsibilities. It established three missions for army aviation. The first was to expedite and facilitate the conduct of operations on land. Next was to improve mobility, command, control, and logistic support of Army forces. Finally, organic aviation was to facilitate greater battlefield dispersion and maneuverability under conditions of atomic warfare.

Another attempt at resolving the conflict between the Air Force and the Army was the creation of ‘adjustment documents’ which better defined the responsibilities of Army aviation. One of these documents, issued on 29 May 1949, was known as The Joint Army and Air Force Adjustment Regulations (JAAFAR) 5-10-1, “Combat Joint

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Operations, Etc.: Employment of Aircraft for Performance of Certain Missions.” Besides imposing weight regulations on Army aircraft, it allowed the Army to use its organic aviation for “the purpose of expediting and improving ground combat procedures in forward areas of the battlefield.” While maintaining this general statement, the regulation provided more specific guidance similar to the missions authorized for the liaison aircraft of World War II:

1. Maintenance of aerial surveillance of enemy forward areas in order to locate targets, adjust fire, and obtain information on hostile defense forces.
2. Aerial route reconnaissance
3. Control of march columns
4. Camouflage inspections of ground forces areas and installations
5. Local courier and messenger service
6. Emergency aerial evacuation
7. Emergency aerial wire laying
8. Limited aerial resupply
9. Limited front line aerial photography

This agreement placed responsibility for the first four missions with Army aircraft, while the Air Force provided liaison aircraft units to perform missions five through nine.

For Marine Corps aviation, the post-World War II years were a period of particular struggle. With the Marine Corps facing extinction, the aviation component faced personnel reductions and small budgets. Under the guidance of General A.A. Vandegrift, the Marine Corps established a special board to screen senior Marine aviators for retention. Those aviators who meet the screening criteria were offered reassignment to ground duty with the only option being resignation. This helped to bring the aviation
and ground components closer together, something that the Marine Corps Headquarters felt was lacking in World War II.\textsuperscript{134}

The next two chapters examine the Marine Corps’ and the Army’s initial efforts at developing air mobility. For the Marine Corps the innovation resulted in new tactics, techniques, and procedures (TTPs) being applied to an existing doctrine. The experiences of the Korean War refined these TTPs and solidified the use of the helicopter in USMC operations. For the Army, the concepts were explored on a limited basis but with no tangible results. It would take another war before the Army became sufficiently moved to employ the helicopter.

\textsuperscript{134}Millett, \textit{Semper Fidelis}, 447-448. During World War II, the national emergency meant that a large portion of the Marine aviators never served in the ground forces, nor receive training in ground operations. This lack of common experiences, combined with many of the pilots’ lack of civilian and military education, caused the ground officers in Headquarters to see a fracture in the culture of the Marine Corps.
CHAPTER 3

THE FIRST WAVE:
THE MARINES’ DEVELOPMENT OF VERTICAL ASSAULT,
1945-1950

The years immediately following the end of World War II were ones of great consternation for the Marine Corps leadership. Similar to the Navy, the Marine Corps encountered many difficulties from 1945 to 1950; repeated attempts to eliminate the Marine Corps, an indifferent Navy focused on carrier aviation, and the advent of nuclear weapons. Through deft handling and public relations, the Marine Corps’ leadership managed to take care of the first by getting Congress to guarantee its permanent existence by writing its force structure into law. The Navy’s focus on carriers suffered a significant setback with the cancellation of the super carrier, the USS United States. The unsuccessful “Revolt of the Admirals” resulted in the replacement of the Navy’s senior leadership and less focus on naval aviation.135 It was the third problem which posed the greatest long-term threat to the USMC’s reason for existence.

The July 1946 testing at the Bikini Atoll showed the vulnerability of a large amphibious force to nuclear weapons.\(^\text{136}\) These tests also endangered the Marine Corps since nuclear weapons now threatened to make its primary mission, amphibious assaults, virtually impossible. Marine Corps Lieutenant General Roy S. Geiger observed the Bikini Atoll tests. As a former commander of the III Amphibious Corps in World War II, he expressed his concerns about the future of amphibious warfare: “Since our probable future enemy will be in possession of this weapon...I cannot visualize another landing such as was executed at Normandy or Okinawa.”\(^\text{137}\)

Motivated by a combination of mission preservation and the natural desire to solve the problem, the Commandant of the Marine Corps (CMC) General Alexander A. Vandegrift quickly reacted to these observations and convened a Special Board on 13 September to find a solution. Composed of three major generals who had extensive experience in amphibious operations, the board quickly produced their report on 16 December.\(^\text{138}\) In the first Marine Corps study, Marine officers recognized the potential of the helicopter to alter radically the conduct of all future amphibious operations. “Personnel can be landed in the proper formation on the flanks and rear of the hostile position. The helicopter method

\(^{136}\)For a good account of the Bikini tests see W.A. Shurcliff, *Bombs at Bikini: The Official Report of Operation Crossroads* (New York: William H. Wise and Co., 1947). The preliminary statement by the evaluation commission concluded that “protection from catastrophe...lies rather in wide spacing of task forces...We are convinced distance is the best defense.” (page 204 of Shurcliff).


\(^{138}\)Major General Lemuel C. Shepherd, Jr., commanded the 1st Marine Provisional Brigade at Guam and the 6th Marine Division at Okinawa; Major General Oliver P. Smith was the ADC for 1st Marine Division at Peleliu and the Deputy CoS with Tenth Army for Okinawa; Major General Field Harris was Commander of Aircraft in the Northern Solomons campaign and was currently the Director of Marine Aviation. The Special Board also consisted of a three officer Secretariat: Colonel Merrill B. Twining, Colonel Edward C. Dyer, and Lieutenant Colonel Samuel R. Shaw. It was the Secretariat that did most of the research and recommendation formulation. They concluded that the helicopter appeared to be the “answer to the amphibious prayer.”
would be used primarily for the initial assault only...but helicopter units will have further use subsequent to the assault in operations ashore by providing a valuable means for the movement of troops and cargo when speed is a necessary element.” Although the findings emphasized the belief that the helicopter probably provided the best solution to the problem, the immature state of both the helicopter and its production industry led the board to propose initiating two parallel programs to develop both a transport seaplane and a transport helicopter. The report recommended the creation of an experimental helicopter squadron to train personnel and test ideas. It proposed assigning the Marine Corps Schools the task of developing a tentative doctrine for helicopter employment.139

The Shepherd Board’s final report also included specifications for a helicopter to execute amphibious assaults: 5,000 pounds of payload for 200-300 miles at 100 knots at altitudes ranging from 4,000-15,000 feet. Although these requirements exceeded then-current capabilities, both Sikorsky and Piasecki said they could produce an aircraft that would fulfill this “wish list” of specifications.140

General Vandegrift agreed with the report and authorized on 19 December 1946 the creation of a provisional helicopter squadron to be based at Quantico, Virginia.141 The unit’s mission was to test the feasibility of the aforementioned concept and to create the necessary tactics, techniques, and procedures for mission execution.142 At the same

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140Mersky, U.S. Marine Corps Aviation, 125.
141Rawlins, Marines and Helicopters, 1946-1962, 105. Actually the CMC had already expressed interest in evaluating the helicopter. In a letter to the CNO, dated 18 June 1946, he outlined the establishment of a helicopter development program which included one officer and two enlisted men to be added to his staff. On 8 August 1946, Major Armand H. DeLalio became the first Marine helicopter pilot.
142In addition, the squadron was to also study operations and maintenance of the helicopters; develop flight proficiency of pilots and crewmen; develop and maintain proficiency of the mechanics; and
time the Commandant outlined the concept of future amphibious operations. The concept was to have the assault fleet dispersed over a large area to minimize its value as a nuclear target. The initial assault would be conducted by helicopters which would approach from different directions and then meet at the objective (whether it be on the beach or behind it) to drop off their troops.

In a letter he sent to the Chief of Naval Operations (CNO), Fleet Admiral Chester W. Nimitz, Vandegrift described the Marine Corps plan for future amphibious operations. Called the Vertical Assault Concept for Amphibious Operations, Vandegrift emphasized that the helicopter was the key to making amphibious operations work in the nuclear era.\textsuperscript{143} Almost a year after authorization, the first Marine Corps helicopter squadron, HMX-1, was commissioned on 1 December 1947. Colonel Edward C. Dyer, the first commander of HMX-1, chose Quantico as the base of operations for HMX-1 for two reasons. The first was Quantico’s proximity to Connecticut, which was the home of the Sikorsky and Piasecki plants. The second, more important reason was that he wanted to remain close to the Marine Corps Schools from which the unit drew many of its personnel and to help indoctrinate student officers as they attended courses there.\textsuperscript{144}

While waiting for the formation of the experimental squadron, the Marine Corps Schools staff created additional committees to more closely study the vertical assault concept and to find solutions to make the concept successful in conventional and atomic environments. Naturally, those who worked on the Shepherd Board, like Twining and

\textsuperscript{143}CMCS letter to CMC, dated 10 March 1947, Subject: Employment of the Helicopter in Amphibious Warfare.
Dyer, were selected as heads of the various study groups. Additionally, helicopter supporters recruiting efforts brought new disciples into the fold like Lieutenant Colonel Victor H. Krulak.

One study group, formed to consider requirements for procuring a helicopter in 1952-53, concluded that the Marine Corps needed a helicopter with a useful payload of 3,000 to 3,500 pounds or 13-15 combat loaded troops for a distance of 250 nautical miles. Since the helicopter was going to conduct amphibious assaults, it had to be of a size small enough to be carried and stowed aboard an escort aircraft carrier, something that could not be done with the big Piasecki XH-16. It also recommended that the budget for FY1954 include funding for two Marine assault transport helicopter squadrons with HMX-1 developing the organizational structure for them.\textsuperscript{145}

Within the school system, students in the Marine Amphibious Warfare School’s Junior and Senior Courses also began exploring the new potential offered by the helicopter. Many of these used Phib-31 as the basis for their writings. Recognizing that the helicopters still had room for improvement, one officer argued that it was sufficient for immediate use in amphibious assaults if enough helicopters were purchased.\textsuperscript{146}

Another recognized that the helicopters available in 1949 were capable of landing an entire RCT’s assault units in less time than it took to land four assault platoons in a

\textsuperscript{144}Mersky, \textit{U.S. Marine Corps Aviation}, 125.
\textsuperscript{145}Mersky, \textit{U.S. Marine Corps Aviation}, 127.
conventional landing and occupying an area in depth of approximately 170 acres as opposed to just a few yards of shoreline.\textsuperscript{147}

The long delay between the authorization of HMX-1 and its forming was a result of having to operate within a peacetime bureaucracy. Various agencies within the office of the CNO had to review and comment on the proposal before a final decision could be made. The biggest problem was funding; fiscal year 1949 was the earliest that funding could be authorized in the budgets to equip and man the experimental unit.\textsuperscript{148}

Under Nimitz, the CNO office exhibited strong support for the Marine Corps program and often interceded to resolve problems. One issue was the necessity of modifying the escort and light aircraft carriers’ elevators to transport the 5,000 pound helicopters that the Marines needed. Another was the reallocation of the funding priorities between assault helicopters, of which the Piasecki HRP appeared to be the most likely candidate, and anti-submarine warfare (ASW) helicopters at a time when the Navy was strapped for procurement and research and development funds. On 4 November 1947, Nimitz made the assault helicopter a higher priority over the ASW helicopter.\textsuperscript{149} This priority status was undermined, though, by the Navy’s Bureau of Aeronautics (BuAer), which linked the development of the assault helicopter to the Air Forces XH-16 program.\textsuperscript{150}

\begin{footnotesize}
\begin{itemize}
\item [\textsuperscript{148}] Rawlins, Marines and Helicopters, 1946-1962, 15. There was no support for taking money from existing programs to begin faster procurement for the unit’s helicopters.
\item [\textsuperscript{149}] CNO letter to BuAer, dated 4 November 1947, Subject: Assault and ASW Helicopter Program. (Naval Archives)
\item [\textsuperscript{150}] BuAer letter to CNO, dated 24 December 1947, Subject: Amphibious Warfare Assault Helicopter Program--Joint Air Force-Navy Participation. (Naval Archives)
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Although advocates for the Marine Corps viewed this decision with suspicion, the Navy’s BurAer was under great pressure to develop aircraft within a very restricted budget; the joining in the XH-16 program with the Air Force was not one made out of animosity, but rather with a great deal of practicality. Including development costs, the unit cost of each HRP helicopter would cost a little under $1 million each. Since the Department of Defense was created, in part to reduce waste and redundancy, the joining of two programs that had similar requirements was logical.\footnote{RG 72; \textit{Air Force Officer’s Guide}} However the aviators supervising the program from both services suffered from a lethargy that resulted in the program languishing from technological problems. The delays seriously disrupted the Marine Corps time table for fielding a vertical assault capability. It was not until the Korean War broke out that the Navy revised its decision on the method for developing and procuring an assault helicopter.

While the Marine Corps focused the majority of its efforts on the helicopter, it continued to explore the competing options of transport seaplanes and transport submarines in the amphibious assault. Students in the Marine Corps Schools wrote many papers that explored the potential use of both and often concluded that these were viable alternatives. The transport seaplane was more often favored because its range of 3000 miles while carrying up to 100 Marines gave it a strategic transport capability that the helicopter lacked. In addition, the seaplane also gave the Marine Corps the option of completely by-passing the beaches and landing on in-land lakes and rivers. Partly for these reasons the Navy exhibited a continued strong interest in seaplanes for a variety of roles until the early 1960s, to include as fighters, transport, and patrol aircraft.
Another program that the Navy pursued enthusiastically was the conversion of WWII submarines. Although they developed five specialized submarines, the two of greatest interest to the Marine Corps was the cargo and the troop transport submarines. Early in 1946 the Navy requested the Marine Corps to provide an estimate for the size and composition of a force to be landed by troop carrying submarines (designated SSP). Initially, the Marines answered with a BLT-type force that could be landed in twelve submarines.\footnote{Lieutenant Colonel J.B. Miles (USMC), “Project Study: The Employment of Submarines in Amphibious Operations,” Individual Research Paper, 1948-1949 Senior Course, Amphibious Warfare School, 19-20. Found at MCRC. The unit composed 54 officers, 1357 enlisted men, and a variety of heavy equipment to include jeeps, 75mm howitzers, recoilless guns, and engineer equipment. Each sub also carried a LVT.}

The transport submarine also received attention from both the Marine Corps and the Navy through most of the 1950s. The transport submarine also provided strategic mobility (although at much slower speeds than seaplanes) with a range of 3000 miles and the capability to transport 120 Marines. Initially, the plans called for converting old WWII submarines to carry approximately 100 Marines. Future submarines would be designed for the mission with an increased capability. The main advantage of the submarine was the strategic and tactical stealth gained from its ability to move underwater which would provide the Marines with an element of surprise for any assault. At the tactical level, besides the concern as to how to keep Marines in shape for long voyages, the main difficulty associated with using submarines for the amphibious assaults was how to quickly transport them from the sub to the beach. Eventually, it was decided that the best method was to have the transport submarines carry their own
landing craft. Strategically, the main problem with the submarine was the projected cost – in an era of tight military budgets, the transport submarine was simply not practical.

Within the Marine Corps not everyone agreed with the Commandant’s decision to stake the Marine Corps’ future on the helicopter. Veteran Marine aviators opposed the change in emphasis. Already hurt by the loss of good pilots and miniscule budgets, they sought to modernize the air wings with jet aircraft like their Air Force and Navy counterparts. Jet aircraft were expensive and the rapid pace of technological improvement meant that obsolescence occurred very quickly. With the high costs, the Navy’s Bureau of Aeronautics initially opposed providing the Marines with jets. This changed with the appointment of Admiral John D. Price as the DCNO (Air) on 27 January 1948. Price ordered the BuAer to quickly procure the aircraft. The Marines received their first jets in 1948 and began replacing them with better aircraft in 1950. The development and procurement of helicopters would incur similar high costs and rapid obsolescence and would only further retard the Marines’ ability to modernize their air wings. Advocates of Marine close air support, like Brigadier General Vernon Megee, feared that this capability would be reduced or lost if helicopters counted against the fixed quota of aircraft authorized by the Navy. While helicopters did count against the final total, vertical assault champions like Krulak and Twining convincingly argued that the two were inseparable and necessary in the atomic age. Those Marine aviators who

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153 An example of this quick turnover in aircraft was the Marines’ second jet squadron, VMF-311. Formed in August 1947 at MCAS El Toro, California, the squadron trained for almost a year before they received their first jet fighters, the Lockheed TO-1, which were the Marine version of the Air Force’s F-80C Shooting Star. By mid-August it received its full complement of twelve fighters and began an aggressive training program. By 1 October 1949, VMF-311 was assigned to MAG-12 and received its first real Navy jet fighter, the Grumman F9F-2 Panther in February 1950. See Mersky, *U.S. Marine Corps Aviation*, 123.
remained unconvinced were not in a position to challenge the Commandant’s decision since they were in the minority to the ground officers who occupied the key positions on the headquarters staff.

A more significant issue than the whining of some pilots was that no helicopter operational in 1947 could carry more than a couple of fully equipped marines, but the planners were confident that technology would catch up with tactics if they could point out the urgent need for such a craft. The publication that the Marine Corps School produced was entitled *Amphibious Operations -- Employment of Helicopters (Tentative)*. Completed in 1947, this was the first military manual in the world to discuss the concept, tactics, and techniques to be used for operating helicopters in amphibious operations. Supervised by Colonel Robert E. Hogaboom, the manual established the doctrinal basis for all aspects of helicopter employment during amphibious operations. 154

Given the nomenclature of *Phib-31*, the manual’s vision for the helicopter was significantly more advance than the state of helicopter technology. 155 Years later General Krulak, who had written the introduction to the manual as a Lieutenant Colonel, remarked that “Dyer was unhappy with [the introduction’s wording], and properly so,

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154 Marine Corps Schools, *Phib-31 Amphibious Operations, Employment of Helicopters (Tentative)* (Quantico, VA: Marine Corps Schools, 1948) Found in Marine Corps Historical Center Library. The authors of the publication consisted of members from HMX-1 and the Helicopter and Transport Seaplane Board (this board was to create a concept for both the transport helicopter and the assault seaplane; *Phib-31* was its first product).

155 Marine Corps Schools, *Phib-31 Amphibious Operations, Employment of Helicopters (Tentative)* (Quantico, VA: Marine Corps Schools, 1948). The booklet was designated as such because it was the 31st booklet in a series of publications concerning amphibious operations. Its 52 pages were divided into eight sections which discussed organization, employment, command, tactics, fire support, logistics, and communications among others. The Marine Corps School initially used it as an instructional guide and later as a basis for planning in Packard II.
because no helicopters of that era could do these things, or even approach them.”\textsuperscript{156} As for the body of the manual, Krulak commented that “We had so little to go on; no data; just conviction.”\textsuperscript{157} Yet, the wording emphasizing the importance of continually developing the concept ahead of technological advances remained. The end of the introduction concluded that “the evolution of a set of principles governing the helicopter employment cannot await the perfection of the craft itself, but must proceed concurrently with the development.”\textsuperscript{158} This early recognition of the need to develop the concept meant that the technology could be shaped to meet the vision of vertical assault instead of the concept being shaped by the state of the technology. This also allowed for a greater understanding of the concept by Marines at all levels, and hence increased readiness to execute the concept once the state of the technology was sufficient.

On 9 February 1948, HMX-1 received the first of its helicopters, a Sikorsky HO3S-1, a modified version of Sikorsky’s commercial S-51 model. The unit spent the following months training its pilots and maintenance crews. Their rapid progression enabled them to participate in Operation Packard II in late May 1948.\textsuperscript{159} Despite possessing only five aircraft, the squadron performed very well during this exercise and


\textsuperscript{159}Rawlins, \textit{Marines and Helicopters, 1946-1962}, 24. Operation Packard II was a Marine Corps School (MCS) amphibious command post training exercise held annually by the Navy and the Marine Corps. This joint exercise simulated a ship-to-shore assault landing against an enemy defended beach. The squadron transported sixty-six Marines from the escort aircraft carrier Palau (CVE-122) to Camp
demonstrated the validity of the helicopter in amphibious assaults. Packard II was an epiphany for most of the participants and observers. “As a result, Marine Corps planners became more firmly committed to the new techniques of vertical assault in amphibious warfare. This was truly the beginning.”

The delivery of the first Piasecki HRP-1 helicopter on 19 August 1948 gave the squadron a helicopter truly capable of conducting air insertion missions. By April 1949 the unit operated nine Piasecki HRP-1 helicopters and had practiced enough to conduct its first public demonstration. The unit impressively demonstrated its capabilities before members of Congress and senior Department of Defense officials on 9 May 1949.

Later that month HMX-1 provided an even more vivid demonstration of the helicopter’s capabilities when the squadron participated in the Marine Corps School’s amphibious command post exercise for 1949, Operation Packard III. Packard III was the most ambitious use of the helicopter up to that time. During this exercise, the unit executed three different missions to further the development of tactical doctrine. Operating its HRP-1 helicopters from the aircraft carrier USS *Palau* the squadron quickly transported 230 Marines and 14,000 pounds of cargo onto the beach without incident, whereas the choppy seas swamped several landing craft during the operation. It also performed search and rescue operations using HO3S helicopters based on land. Finally, its HTL-2 helicopters executed liaison missions and artillery and infantry observation from a Landing Ship Tank (LST). While the helicopters all performed well, the most

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160Lejeune, North Carolina. This exercise was the first opportunity to demonstrate the helicopter’s potential for amphibious assaults.

160Rawlins, *Marines and Helicopters, 1946-1962*, 25. Its success helped the authors of *Phib-31* envision the day when a RCT could be lifted in by helicopters in one move.

impressive performance were by the HRP-1s. Their performance confirmed the initial conclusions formulated during Packard II, namely that the helicopter could successfully transport and support an amphibious assault by a regimental combat team.\(^{162}\) The successful exercise confirmed that the developing doctrine and tactics were “sound and workable in all respects.”\(^{163}\)

In the months following Packard III, the squadron continued to experiment with air assault procedures and conduct pilot training. Despite the grounding of the HRP-1 helicopters from 25 November 1949 to 5 April 1950 because of a problem with the mid-transmission pump, the unit managed to conduct numerous public demonstrations. The unit also began its first night operations in December 1949 using the HO3S in 45 minute flights. The flights were successful but they also demonstrated the need for landing lights and lighted instruments before they could conduct any large formation night operations.\(^{164}\) In April 1950, the unit participated in Operation Crossover. During the exercise the unit transported troops and 75mm pack howitzers into designated landing zones. The unit also performed wire-laying, resupply, and aeromedical evacuation missions.\(^{165}\) Another opportunity to gain increased exposure for their efforts arose in June 1950. With all aircraft operational, HMX-1 executed a flyby with thirteen helicopters for a Lieutenant General Shepherd’s change of command for the Marine

\(^{162}\) HMX-1 Squadron History, 1 December 1947-30 June 1949, p. 15. File found at the Historical Reference Section, History and Museums Division, Headquarters, USMC.

\(^{163}\) HMX-1, Amphibious Command Post Exercise Operation PACKARD III, 18-24 May 1949, p. V-1. File found at the Historical Reference Section, History and Museums Division, Headquarters, USMC.

\(^{164}\) HMX-1 Squadron History, 1 July 1949 - 31 December 1949, p. 3. File found at the Historical Reference Section, History and Museums Division, Headquarters, USMC.

\(^{165}\) HMX-1 Squadron History, 1 January 1950 - 30 June 1950, p. 1-5. File found at the Historical Reference Section, History and Museums Division, Headquarters, USMC.

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Corps Schools. In attendance were many senior civilian and military leaders, including President Truman. Although Truman disliked the Marine Corps, the demonstration continued to garner support from members of Congress.\(^{166}\)

The success of these operations convinced many observers that the helicopter was the answer to the problem of dispersion and could revolutionize military mobility. The experience gained in this exercise and others allowed the Marine Corps to develop a working doctrine which could be refined during and after the Korean War.

While HMX-1 conducted the experiments that refined the vertical envelopment doctrine, the fact that future amphibious operations may encounter defenders equipped with tanks. In response, the Marine Corps decided to experiment with arming helicopters to provide close air support. In a letter to the Marine Corps Equipment Board (MCEB) on 17 August 1948, the Commandant asked the board to examine the possibility of arming helicopters with anti-tank weapons. The MCEB required almost five years before they concluded their tests. The reasons for the delay included the shortage of helicopters and weapons, and having to work with the Navy’s Bureau of Aeronautics. The BuAer was the only organization that could test weapon effects on the helicopter and determine the helicopter’s airworthiness with weapons mounted. Test helicopters included HO3S-1, HTL (models 1 through 4), HRP-1 and 2, the HRS, and other helicopters under development. Weapons tested included recoilless rifles, rocket launchers, the Davis Gun (MK 15-1917 3” gun), and the T-41 Energa grenade. The MCEB concluded that it was

\(^{166}\)Representative Gordon McDonough letter to President Truman, dated 21 August 1950; President Truman letter to Representative McDonough, dated 2 September 1950. Found in Truman Library. The correspondence between President Truman and Representative Gordon McDonough clearly showed Truman’s loathing of the Marine Corps. The contents of Truman’s reply became public and created an outcry in the media and former Marines.
technically feasible to mount and fire anti-tank weapons from helicopters, however the effectiveness of the then-available helicopter-weapon combinations were too limited to continue investigation. It recommended the project’s termination until helicopter and aircraft armament performance improved. The Commandant approved the report and the project was terminated, and with it the Marine Corps’ willingness to procure armed helicopters for almost another two decades.167

The Marines’ successful experiments with helicopters were due to four main factors. First, the external stimuli that the Marine Corps perceived to threaten their very existence made it essential to re-examine their methods. This review was aided by the second factor -- the innovation-friendly culture of the USMC. The Marine Corps’ experiences in developing amphibious warfare in the 1920s and 1930s created an organization which encouraged new methods for solving problems. If not always embraced, change was accepted by the Marines as the road to survival. Once accepted, Marine planners frenetically developed the doctrine and tactics necessary to make the concept work. The third factor was the support the USMC received from external organizations. The Marines made sure they kept government support by having Congressional leaders observe Marine Corps experiments and partake in helicopter flights. The Navy, recognizing the FMF as an important component of sea power and focusing on retaining the largest number of aircraft carriers possible, did not hinder the Marine Corps’ efforts. Finally, the technology existed to support ever larger air assault

167Marine Corps Equipment Board, Report of Project T-596, Test of Helicopter Mounted Anti-Tank Weapons, August 1953. Found at MCR. The tests showed that moving and stationary tanks could be hit fairly consistently with the rocket launchers and grenades, however the range of 350 yards was too small for combat. Interestingly, no experiments were made using heavy machine guns or for attacking ‘soft’ targets.
operations. This allowed for the extensive testing of the new doctrine’s theoretical concepts and their eventual inclusion into the official doctrine.
CHAPTER 4

GROUNDED: THE ARMY AND THE HELICOPTER, 1945-1950

The Army monitored the Marine Corps’ exercises from 1947 to 1950, but failed to aggressively pursue its own experiments. While the development of the helicopter during World War II resulted in greatly improved performance, its use was mostly for rescue and administrative missions. After 1945, the military development of the helicopter continued at a much slower pace. The reasons for this lack of emphasis were many but they all stemmed from one basic problem -- the scarcity of funding.

At the political level, a large, heavy ground army was not perceived by the political leadership as vital and therefore received less funding than the other services. With its limited funding the Army chose to emphasize its strategically mobile airborne forces. This overemphasis on the airborne increased the rate of neglect in the rest of the Army, including the development and use of the helicopter. Within the Army there was support for the expansion of light aviation, but Air Force opposition and low funding prevented this from happening.

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After the end of World War II the Army conducted an extensive re-examination of its doctrine. On a strategic level, the development of America as the world’s only nuclear power afforded a certain freedom for the Army to experiment and change the doctrine, organization, and equipment necessary for the national defense. Unfortunately, this opportunity was restricted by the new attitudes that developed among the politicians, military planners, and the general public during the same time period. The nuclear monopoly appeared to make a large conventional military superfluous. The technology of the 1940s was not capable of producing small-yield nuclear weapons or ones that were small and light enough to be carried by anything other than large bombers. As a result, the Air Force maintained a monopoly on the delivery of the nuclear weapons required to end future wars quickly. The reliance on nuclear weapons for America’s defense seemed to forecast the demise of ground combat. The Army’s contribution to the nation’s defense appeared insignificant and made any debates about the Army’s equipment and tactical doctrine seem unnecessary. Thus, the traditional reliance on ground combat as the major means of implementing American policy fell into disfavor.169

In the immediate post-war years, the Army searched for an organization and doctrine that would provide increased mobility and firepower to fight another war in Europe. Despite a flurry of activity, the United States Army remained essentially unchanged between the end of the Second World War and the beginning of the Korean War. The lack of funding, the development of nuclear weapons, and the numerous Army studies had little effect on the basic organization, equipment, and doctrine of American

ground forces. American tactical units entered the Korean War with a doctrine that was essentially the same as that used in World War II. The infantry and airborne divisions remained the centerpiece of the Army’s structure and the Army’s efforts to improve its flexibility and firepower. The problems confronting the Army after World War II (the impact of atomic weaponry, the changing nature of mobility and the demand for greater and more accurate firepower) would continue to evolve and “challenge the Army’s tacticians and doctrine writers for the next three decades.”

Despite the bleak outlook for the Army, its leadership continued to advocate the need for a large ground capability. In the final report of the 1946 War Department Board on Army Equipment (Stilwell Board), it was argued that the next war might begin with a surprise attack to which the United States would respond with nuclear bombing, but complete victory could only be gained through “occupation of the hostile territory.”

The Army’s search for an organization to provide increased mobility and firepower continued in 1945-1946 as the General Board of the United States, European Theater of Operations, conducted an exhaustive review of past and future organizations. Using the lessons derived from World War II, the Army attempted to alleviate some of the combined arms operational problems experienced in World War II by adding armor as an integral part of the infantry division structure. Armored divisions received a 25% increase in medium tank and infantry strength and gained additional artillery. The goal

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170 Doughty, Evolution, 6.
171 Office of the Chief of Staff, War Department, Report of the War Department Equipment Board, 29 May 1946 (also commonly referred to as the Stilwell Board) 10; Doughty, Evolution, 2.
was to make the division more modern and to increase flexibility and coordination.\textsuperscript{172}

Unfortunately, the postwar demobilization prevented the implementation of the majority of these changes needed to develop a better combined arms team, but the effect was to make the division larger without any significant increase in mobility, command and control, or firepower.\textsuperscript{173}

Besides modifying organization, the Army looked at its doctrine too. The Army’s examination of doctrine occurred at the numerous postwar conferences held at Fort Knox, Fort Benning, and other posts. While each conference focused on improving the capabilities of its branch, a common thread independently developed. Every conference retained the basic assumption that the next war would remain non-atomic. As a result, the 1949 edition of Field Service Regulations (FM 100-5) contained only a brief discussion of the dangers of radiation and atomic fallout and no mention of how to fight on a nuclear battlefield.\textsuperscript{174} Applying the lessons from the last major conflict and observing the global responsibilities of the United States, during 1945-1947 “the major consideration was terrain rather than different types of combat along a spectrum of warfare.”\textsuperscript{175} The 1949 Field Service Regulations embodied this orientation towards

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\item \textsuperscript{173} Colonel E.T. Conley, “The Combined Infantry-Armored Division,” \textit{Military Review} 28:3 (June 1948) 34-37.
\item \textsuperscript{174} Field Manual (FM) 100-5, \textit{Field Service Regulations, Operations} Washington, D.C.: Department of the Army, August 1949) 60. Doughty 2.
\item \textsuperscript{175} Doughty, \textit{Evolution}, 2. This included combat operations in urban areas, jungles, mountains, extreme cold (especially the Arctic and Greenland), and the desert.
\end{itemize}
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terrain. While terrain varied, the principles of war did not. Thus, methods developed in World War II were considered still valid and emphasized in the manual.\footnote{Doughty, \textit{Evolution}, 2-3.}

Despite a flurry of activity, the doctrine of the United States Army remained essentially unchanged between the end of the Second World War and the beginning of the Korean War. The lack of funding, the development of nuclear weapons, and the numerous Army studies had little effect. American tactical units entered the Korean War with a doctrine that was essentially the same as that used in World War II. The infantry division remained the centerpiece of the Army’s structure and the Army’s efforts to improve its flexibility and firepower.\footnote{Doughty, \textit{Evolution}, 6.} The impact of atomic weaponry, the changing nature of mobility and the demand for greater and more accurate firepower provided the Army’s strategists and tacticians with problems that required innovative solutions.

The Army’s efforts at increasing its effectiveness evolved around the one core component -- its strategically mobile airborne forces. The emphasis on the employment of airborne forces reflected at all levels. General Omar N. Bradley, the Army Chief of Staff, presented his vision of future warfare in a 1949 article in \textit{Military Review}. In the article, Bradley imagined war in three distinct phases. In phase one, the United States would employ its strategic weapons against the enemy, and, in the second, American military forces would seize strategic bases from which the enemy’s homeland might be bombed or from which the enemy might bomb the United States. The strategic mobility
of airborne forces made them especially useful in this second phase. The third and final phase would be a large-scale ground assault to defeat the enemy.178

Major General Leslie R. Groves agreed with Bradley’s assessment. Groves believed that the mere threat of using nuclear weapons would require a reduction in the size of combat units. Concentrations of troops and supplies would not be possible anymore because they would be too easily attacked and destroyed. He continued by emphasizing the logistical problems by stating, “I do not see how large armies can be supported in combat. I anticipate the use of widely dispersed small forces -- combat team size and even smaller -- their equipment light -- their supplies limited -- not only air-supported but probably air-transported and air-supplied.”179 Other members of the Army also recognized the need for mobility on the battlefield. One was Lieutenant General Raymond S. McLain.180 He saw limits being placed on the use of nuclear weapons and thus other, conventional weapons were still important. In an unusual, though completely legitimate tact, McLain saw the importance of air, land, and sea services varying, depending on the capabilities of the enemy being faced at the time.181

While a portion of the Army concurred with Bradley and saw the use of airborne forces as an extension of current doctrine, others saw future warfare as being faster

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178General Omar N. Bradley, “Creating a Sound Military Force,” Military Review 29 (May 1949) 3-6; Doughty 2. The British held similar views. See P.H.H. Bryan’s digested article from the British “The Fighting Forces” (August 1949) entitled “The Ground Offensive in Atomic Warfare” Military Review 30 (July 1950) 106-110. Bryan sees next war as being atomic oriented. This article is an insane proposal for using airborne troops to seize a base deep in enemy territory to destroy enemy nukes and resupply them from the air.

179Military Review 30:4 (July 1950) 110.

180A former National Guardsman who commanded XIX Corps in WWII, McLain was the Chief of Information, Department of the Army, at the time of writing this article.
moving and much deadlier. They argued that forces needed to be dispersed but have the ability to quickly concentrate on the battlefield of the future. Consequently, many predicted that airborne operations in any future war would be on a scale and magnitude never before seen. They recognized that World War II was primarily a war of surface movement but saw the next big war as a war of movement in space and using surface movement for the support of strategic missions. Describing airborne forces as “the type of soldiers who would play a major role in any future war” and fighter-bombers as “the artillery of airborne operations” the Army continued to push for joint training exercises and in fact training of these forces intensified just prior to the beginning of the Korean War.

In the immediate post-war environment, two leaders stood out in their avocation for airmobile forces for strategic purposes. One was Lieutenant General Lewis Hyde Brereton. Brereton’s World War II experiences placed him in an uncommon position among Air Force officers of understanding the unique capabilities of airborne forces. In a 1947 speech to the Air War College Brereton stated:

To consider airborne operations only in the tactical field restricts exploitation of its most important attributes; namely, dispersion at the bases, and mobility, range and speedy concentration of mass at the

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184 Quotation from General J. Lawton Collins in an abstract of a New York Times’ article; found in “Airborne Training” *Military Review* 30 (April 1950) 64.

185 Among his many assignments, Lieutenant General Brereton commanded the Ninth Air Force (October 1943-August 1944) which provided the air support for the invasion of France, and the First Allied Airborne Army (Operations Market Garden and Varsity).
objective. These characteristics make airborne operations a strategic factor of the greatest importance.\textsuperscript{186}

The other vocal proponent was Lieutenant General James M. Gavin. Commander of the 82nd Airborne Division in World War II, Gavin presented a similar argument in his book, \textit{Airborne Army}:\textsuperscript{187}

\begin{quote}
The future of our armed forces is in the air. All fighting men and everything they need to fight with in the future and live on as they fight must be capable of movement by air. Only through flight can we wage a future war in accordance with the principles of surprise, mass and economy of means.\textsuperscript{188}
\end{quote}

Both leaders also emphasized the necessity of developing new cargo aircraft to move the heavy equipment needed by the Army to conduct large scale operations from an airhead.\textsuperscript{189}

The importance of mobile forces at the strategic level was not lost on either military or business leaders. Most thought in a conventional manner and focused on solving the bulkiness and weight of heavy ground equipment. Fairchild Corporation on its own accord presented a novel solution by designing a series of vehicles, to include a wheeled tank, that could perform heavy duties but in their normal configuration were very light. The weight savings was primarily achieved using new light alloys and a scoop that could add “ballast” to increase the vehicle’s weight when needed. They believed that by adopting these vehicles into the Airborne division’s weight would be lowered from 31 million pounds to under 10 million pounds with a 50% reduction in the

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\item \textsuperscript{186}Lieutenant General L.H. Brereton, “The Airborne Army,” Paper presented to the Air War College, 19 February 1947, page 8. \textit{(AU Archives)}
\item \textsuperscript{187}During the Second World War, Gavin served as the commander of the 505th Parachute Regiment prior to assuming command of the 82nd Airborne Division.
\item \textsuperscript{188}Lieutenant General James M. Gavin, \textit{Airborne Army} (Washington, D.C.: Infantry Journal Press, 1947), 140.
\end{enumerate}
\end{footnotesize}
different types of vehicles and a 25% reduction in the overall number of ground vehicles. While their approach was very novel, it was not practical, especially in terms of cost. Although they did not mention a potential price, there is no doubt that the cost per piece of equipment was much higher than conventional ones.

The major deficiencies with airborne forces were their lack of tactical mobility, limited firepower, and reliance on resupply from the air until linking up with ground forces. Despite the increased need for tactical mobility, only a small number in the Army of the late 1940s saw the helicopter as a potential solution. Lieutenant Colonel Chester F. Allen was one of those who recognized that the fundamental nature of warfare had not changed with the development of nuclear weapons. He saw the need for increased dispersal which created the need for greater mobility and flexibility. Among other development trends, he saw the helicopter as a “possible solution to transportation problems” in rugged terrain and “especially desirable for a variety of military uses” in other land campaigns. Allen saw another use during amphibious operations, the “helicopter may prove a valuable means for ship-to-shore movement.”  

This was just one of many articles that addressed the helicopter only as a form of cargo hauler and not as a fighting vehicle.

The extensive discussion of strategy, doctrine, and force structure in military periodicals revealed an Army that saw itself as still strategically significant and as the final arbiter of victory regardless of the use of nuclear weapons. Since the Army considered ground combat as not obsolete it continued to develop its doctrine on the basis

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189Brereton, “Airborne Army” 11; Gavin, Airborne Army, 142.
of the lessons learned in the European theater in World War II. As relations with the Soviet Union worsened in the post-war environment, the Army began to focus on the problem of defending Western Europe from a Soviet attack. While the Army acknowledged the possibilities of fighting elsewhere, its doctrine remained focused on large scale operations on a European battlefield reminiscent of World War II since maintaining European security was the cornerstone of American national security policy.191

As early as August 1944, the United States Army began examining its needs for equipment, to include Army aviation, in a post-war environment.192 The demands of the war delayed the implementation of this directive until December 1944 when Major General Gilbert R. Cook convened the board.193 After more than six months of deliberations, the board released its findings on 20 June 1945. It called for an extremely large tactical air force within the Army Ground Forces (AGF). Acknowledging the roles and importance of missions as established by the Army Air Forces, the board identified five missions for which purpose-built aircraft would be needed to provide the tactical support that the Army desired: photographic, tactical reconnaissance, liaison, fire support, and transportation. These missions represented the Army’s wartime

191Doughty, Evolution, 2-3.
192Memorandum from Major General Russell L. Maxwell, Assistant Chief of Staff, G-4, to the Commanding General, Army Ground Forces (AGF), 19 August 1944, Subject: Equipment for the Post War Army.
193Memo Number 40, Major General E.F. Olsen, Headquarters, Army Ground Forces, to Major General Gilbert R. Cook, December 5, 1944, Subject: Equipment Review Board. This board is often referred to as the Cook Board. Also on the board: Major General Floyd E. Jones, Brigadier General Benjamin G. Ferris, and Brigadier General Rupert E. Starr. See History, Army Ground Forces Board Number 1 (AGFB) (Fort Monroe, Virginia, 1948) pp 114-117.
disappointment with the poor support of close air support (CAS) and reconnaissance missions. Essentially, it advocated the duplication of some aspects of tactical support between the Army Air Forces (AAF) and the AGF’s projected tactical air force stating “the organic ground support aviation should have as its sole mission the close support of ground troops in combat.” The large number of aircraft needed to do this required a decentralized command and control in order to be effective. The board saw the helicopter’s potential to fulfill the Army’s tactical needs and advocated in Annex I of its final report an extensive acquisition program for light, medium, observation, transport, and armed helicopters.194

During fiscal year 1945, the Army acquired a total of 34 R-5 and 193 R-6 Sikorsky helicopters with many of the helicopters being sent to the 82nd Airborne Division.195 Under the auspices of the Army Ground Forces Board, the 82nd Airborne Division experimented with using the R-6 helicopter for a variety of tactical missions. The board concluded that the experiment was highly successful and they believed that the helicopter could be substituted for a number of ground vehicles. They recommended that helicopter development be given the highest priority, including the development of larger helicopters for the transport of airborne troops.196 As a result of these reports the AGF

requested on 28 November 1945 for the AAF to procure a variety of helicopters to facilitate the development of new doctrine, tactics, and organization.197

Testing of the helicopter did not stop after the release of the reports. The Army Ground Forces (AGF) Air Support Service Test Section began testing in December 1945 on a wide range of concerns: rockets and aircraft guns for use against ground targets, aerial reconnaissance and photography equipment, helicopters, parachutes, and gliders. In December 1945, the Airborne Board, using a Sikorsky XR-6A borrowed from the AAF, mounted and fired rockets.198 On 7 December 1945 the Department of Air Training at Fort Sill became the Army Ground Forces Air Training School with Brigadier General William W. Ford as its first commander. The mission of the school was to provide tactical training to support combat arms that were acquiring organic aviation. Its existence was short-lived, though, and was disestablished in April 1946 when the AAF organized the Air University at Maxwell Air Force Base, Alabama.199

The Army continued to conduct numerous studies at various locations after the war concerning the potential use of the helicopter. The primary document was the 1946 War Department Board on Army equipment. After analyzing the capabilities of the helicopter, the board concluded the helicopter as suitable only for moving supplied from

197Howard K. Butler, Restoration, 740. These included a single seat helicopter for use as an aerial motorcycle; a two-seat helicopter for field artillery observation; transports and ambulances of the small (2,000 pound) and medium (up to 6,000 pounds) helicopters; and heavy (20,000 pound) cargo helicopters.

198Howard K. Butler, The Army Ground Forces and the Helicopter, 1941-1945 (St. Louis, MO, Historical Division, United States Army Aviation Systems Command, 1987); Historical Study No. 1 in “A History of Army Aviation Logistics, 1935-1961.” This testing was done at Mackall, North Carolina.

ship to shore or for resupplying airborne troops.\textsuperscript{200} The June 1946 Infantry Conference at Fort Benning viewed the helicopter in a more favorable light. In its conference report it noted that the helicopter was “particularly adaptable to uses such as supply and evacuation, reconnaissance, observation, photography, column control, wire laying, and liaison and courier missions.”\textsuperscript{201} At the Fort Sill, Oklahoma, a demonstration of an R-5 helicopter at the branch’s senior leader conference sparked a great deal of interest.\textsuperscript{202}

In 1946 the first helicopters entered the AGF’s inventory. These were thirteen Bell YR-13 helicopters. The AGF Board No.1 began experiments to see if the YR-13s could serve as a replacement for light fixed-wing aircraft.\textsuperscript{203} After observing a demonstration of the Bell Helicopter’s YR-13 in 1946, the Army Ground Forces bought fourteen for experimentation. Seven of these helicopters were sent to the 82nd Airborne Division to investigate potential applications. In the tests, the helicopter displayed an unprecedented maneuverability which gave it an almost unlimited number of tactical possibilities. Its performance during these tests sufficiently convinced General Jacob L. Devers, the Commanding General of the AGF, to request funding from the Army Chief of Staff, General Dwight D. Eisenhower, for an additional fifty helicopters.\textsuperscript{204}

The conflicting conclusions drawn from these conferences and reports show the difficulty in developing a vision based on an immature technology. Helicopters at this

\textsuperscript{200}Doughty, \textit{Evolution}, 4.
\textsuperscript{201}\textit{Lectures and Demonstrations}, Infantry Conference, Fort Benning, GA, June 1946, Tab D-3, p. 46, Found at USACGSC 13561.
\textsuperscript{202}Colonel Delbert Bristol, interview by Colonel Ralph J. Powell and Lieutenant Colonel Ronald K. Andreson, 1978, p.8 (tape 2). Found in Army Aviation Oral Histories. (MHI)
\textsuperscript{203}AGF Board #1; Raines, “The Army and Organic Tactical Air Transport, 1952-1965,” 4.
time were still small and fragile; to foresee the helicopter as having a major combat role in a high intensity environment required a vivid imagination. More significantly, the Army did not have a single permanent agency established to experiment and develop the helicopter. The results were conflicting interpretations of the helicopter and its military utility. As the Army toyed with the helicopter it failed to more closely follow and learn from the Marines’ efforts. This lack of interest was not due to the information being unavailable. Many of the Army’s tactical journals carried bits of news and the popular media found the Marine helicopter experiments to be newsworthy.

One potential reason for the Army’s failure to closely follow the USMC’s efforts with helicopters was the belief that large-scale amphibious operations were outdated. This was reflected in General Omar Bradley’s testimony as Chairman of the Joint Chiefs of Staff to Congress on October 19, 1949, during the “Revolt of the Admirals.” In it, Bradley did not believe that providing support for amphibious operations could be one of the reasons used for justifying the cost of aircraft carriers. He predicted that “large-scale amphibious operations will never occur again...Frankly, the atomic bomb properly delivered almost precludes such a possibility. I know that I shall never be called upon to participate in another amphibious operation like the one in Normandy.”

Since he was Army Chief of Staff in the 18 months prior to being named the first chairman of the JCS

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204John R. Galvin, *Air Assault: The Development of Airmobile Warfare* (New York: Hawthorn Books, 1969), 256. Eisenhower approved this request but ordered that the funding come from the existing appropriations for other Army aircraft.

on 16 August 1949, Bradley’s views no doubt permeated downward and the importance of observing amphibious operations would be considered negligible.206

After World War II, some of the most emphatic support for the helicopter came from Army airborne officers who were veterans of World War II. To them the helicopter possessed the potential to give the airborne the enhanced tactical mobility it needed. The army’s experimentation with helicopters, however continued to be limited by its inability obtain a sufficient quantity. The problems with acquisition stemmed from the Army’s reliance on the Air Force for procurement approval. While the National Security Act of 1947 created the Air Force as a separate service it did allow the Army to retain organic aviation for its units. Unfortunately, the act also allowed the Air Force to retain complete development and procurement authority for Army aircraft, to include helicopters.207

Even if the National Security Act of 1947 had not made the Air Force responsible for aircraft procurement, the Army lacked expertise and money. Most of the Army officers with experience in aircraft procurement went to the Air Force after the separation of the services in 1947. At the same time, the military was under great pressure to maximize the value of every dollar. One way it did this was by eliminating duplication of effort like the research and development associated with parachutes, to include those used by the Army. Both the Navy and Air Force operated separate programs, however it

206 Bradley was the Army Chief of Staff from 7 February 1948 to 16 August 1949. It must also be said that Bradley’s remarks concerned large scale amphibious operations like Sicily and Normandy, although he did not see a future amphibious campaign like that conducted in the Pacific during World War II. Bradley did not consider landings like those at Inchon to be of the “large-scale” type.

was recommended that the Air Force become the primary responsibility for this in order to save money.\textsuperscript{208}

While all services suffered with the stringent budgets after World War II in the research and development budget for the Department of Defense the Air Force was hit the hardest. Approximately 75\% of any budget reductions in the Aircraft Equipment R&D came from the Air Force’s programs. Since the Air Force had the largest part of the budget and the most development programs, this is not surprising. What is surprising was that the few programs related to the helicopter were not affected.\textsuperscript{209}

By 1950, the research and development in all areas suffered from a lack of funds. This was most apparent in the aviation fields. The Aviation Equipment board summarized the problems fairly well in that the “budget for aircraft equipment is dangerously inadequate and is further aggravated by increasing complexities arising in the development of new high performance aircraft.” The Panel continued by noting the dependent relationship that future advanced aircraft development was on aircraft equipment development.

The surviving procurement programs focused on the development of jet fighters and strategic bombers while transport aircraft and helicopters were neglected. As an Air Force spokesman said in 1949 “Our top level planners must first insure (sic) the

\textsuperscript{208}Research and Development Board, Committee on Aeronautics, Panel on Aircraft Equipment. Minutes of the Eighth Meeting Held at Wright-Patterson AFB, 30-31 August 1949. Found in RG 330 Records of the Office of the Secretary of Defense, R&D Board, Records Concerning Organization, Budget …., Box 65 Panel on Aircraft Equipment, File 3: Minutes RAE

\textsuperscript{209}Panel on Aircraft Equipment. Report of the Panel on Aircraft Equipment to the Committee on Aeronautics Concerning Review of the FY 1950 Programs and Areas in Research and Development Where Economies Might Be Effected. 6 October 1949. Found in RG 330 Records of the Office of the Secretary of Defense, R&D Board, Records Concerning Organization, Budget …., Box 65 Panel on Aircraft Equipment, File 3: Minutes RAE. The reduction was approximately 15\% for each service: the Army by $19,500; the Navy $257,000, and the Air Force by $931,100
adequacy of our defensive and striking weapons before they can give consideration to the improvement of auxiliary equipment even though its desirability is readily admitted. Viewed in this light it is gratifying...to see helicopters accorded as much attention as they are in these trying times...” The army could expect very little help in the improvements in helicopter techniques. The Air Force continued to develop and test only small observation helicopters, under a very restricted schedule.\textsuperscript{210}

The Air Force shared the same concerns that most Army leaders did about the helicopter’s combat potential. When combined with the Air Force fascination with the big bomber and nuclear weapons, there existed little urgency for the Air Force to develop the helicopter. Lieutenant General James M. Gavin experienced the Air Force’s lethargy when he tried to discuss the development of the helicopter with the Air Force’s director of requirements, Major General Carl Brandt. The Air Force general bluntly informed Gavin: “The helicopter is aerodynamically unsound” and that it was “like lifting oneself by one’s bootstraps” and concluded that “No matter what the Army says, I know that it does not need any.”\textsuperscript{211}

Despite these concerns, the helicopter’s potential to enhance airborne operations convinced the Army to buy a small number more during the Berlin Crisis. Using the $10 million in the supplemental budget for fiscal year 1948 dedicated towards buying Army aircraft, the Army allocated $800,000 to buy 100 L-16X and 25 L-17 liaison aircraft, $1.6

\textsuperscript{210}Galvin, \textit{Air Assault}, 256.

million for helicopters (especially the H-13\textsuperscript{212}), $6.9 million for gliders, and $278,000 for 38 other liaison aircraft.\textsuperscript{213} This was important for the Army since most of its liaison aircraft were nearing the end of their five year life cycle and needed to be replaced. The Army could have replaced them with helicopters, but did not.\textsuperscript{214} While the Berlin Airlift continued, Army and Air Force negotiators continued to find time to try and resolve their differences. Eight days after the Soviet Union lifted the blockade on Berlin on 12 May 1949, the product of their efforts was released. Known as Joint Army-Air Force Regulation 5-10-1 (JAAFR 5-10-1), it listed the missions that army aircraft could be used. It also established weight limitations for Army aircraft at 2500 pounds for fixed wing aircraft and 4000 pounds for helicopters.\textsuperscript{215}

The Army’s increasing interest in the helicopter prior to the Korean War culminated on 17 November 1949 with the report of the Commanding General, Army Field Forces Board No. 1. The Board concluded that the Army needed six types of helicopters including a flying crane capable of lifting ten tons for a distance of 100 miles and a medium transport helicopter capable of lifting four tons for 200 miles.\textsuperscript{216}

\begin{itemize}
\item \textsuperscript{212}In 1948 the Air Force changed the designation for helicopters from R to H. See Gordon Swanborough and Peter Bowers, \textit{United States Military Aircraft Since 1909}, 551.
\item \textsuperscript{214}The first models of the Bell YH-13 reached CONUS units in 1949.
\item \textsuperscript{215}History of Army-Air Force Conflicts Concerning the Functions of Army Organic Aviation. pg 3, para 18. It authorized Army aviation to perform aerial surveillance, route reconnaissance, artillery adjustment, emergency transportation, and emergency MEDEVAC. The weight and mission limitations would also be included in the joint regulation AR 700-50 and AFR 65-7 on 23 March 1950. See also Stephenson, 6.
\item \textsuperscript{216}Report of the Army Field Forces Board No. 1, dated 17 November 1949.
\end{itemize}
upon this report, the Office of the Chief of Army Ground Forces generated requirements for light, medium, and heavy-lift helicopters.\textsuperscript{217}

General Galvin makes the claim that “The real limitation on the army’s helicopter program, however, was the continuing emphasis on the parachute as the means for providing air mobility to ground troops.”\textsuperscript{218} In the rapid post-war demobilization, the Army went from more than 89 divisions to less than 20 in less than 18 months. The Army made an extra effort to keep two airborne divisions among the survivors, the 11th and the 82nd Airborne Divisions. Their status as elite units kept them fully manned and allowed them the opportunity to participate in almost every major field exercise from 1945 to 1950. The Army also made extensive efforts at improving the equipment used in airborne operations. It replaced canvas and wood gliders with all metal ones and developed the C-82 “Flying Boxcar” as a replacement for the venerable C-47.\textsuperscript{219} The importance of the airborne units also exemplified in other ways like the focus on improving parachutes and the large quantities ordered. Whereas the total parachute units produced from 1 January 1941 to 17 March 1947 equaled 2,650,000 the Army ordered a total of 754,160 parachute units in a span of five months in 1950 – this was 28.5\% of the total produced in all of World War II.\textsuperscript{220} Obviously, the Army’s focus on its airborne component kept these forces well-trained and well-equipped. While Galvin’s claim has

\textsuperscript{218}Galvin, \textit{Air Assault} 256
\textsuperscript{219}Galvin, \textit{Air Assault}, 256. The C-82 was a twin engine transport that utilized a monorail system to drop large loads out its rear door. First used in Exercise Combine at Fort Benning in 1947, the C-82 greatly increased the efficiency of airdrops.
\textsuperscript{220}The 1950 total included only 9,512 G-11 100-ft parachutes for heavy aerial delivery, which equal 190,240 parachute units. This quantity of parachutes was sufficient for approximately 2,800 heavy kits, when training attrition was factored in. The quantities ordered between 1/1/50 and 12/15/50 constituted 28.5\% of those produced in WWII.
merit, it is also true that the support of the airborne allowed for additional testing and limited procurement with the expectation that the airborne would derive the greatest immediate benefit.

In conclusion, the period between the wars was one of contrasting performances in the development of air mobility. The Marine Corps had a vision and successfully began its exploitation of the helicopter. The Army perceived some of the helicopter’s potential but did relatively little to develop the situation. The reasons for the dichotomy in performance are many and complex. Each service interpreted the impact of nuclear weapons on their mission very differently. Their mere presence appeared to make large armies obsolete, but did not completely remove the need for an Army to occupy and control the defeated enemy. Forces with great strategic mobility, like airborne units, were needed to seize enemy bases and nuclear weapon sites. As the Soviet Union and its large conventional forces emerged as the primary threat in the late 1940s, the Army focused on refining its organization and doctrine to make its conventional forces more mobile and powerful. Little attention was paid to the use of nuclear weapons on the battlefield. Unlike in the Army, nuclear weapons threatened to make the Marine Corps’ primary mission, large amphibious assaults, impossible. With its very existence threatened, the Marine Corps embraced the helicopter as the solution to modern amphibious assault operations.

While survival of the Marine Corps dictated that this change had to occur, the Marines’ previous experience with innovation had created an environment conducive to innovation and the creation of a new doctrine. In addition, the relationship that the Marine Corps had with the Navy was significantly better than that which the Army had
with the Air Force. While the Navy was concerned with maintaining naval aviation, it did little to impede the Marine Corps’ efforts. In contrast, the Army bureaucracy did not see the need for any extensive changes. While receptive to the helicopter, the Army did not have a directorate responsible for developing Army aviation. This resulted in a lack of leadership to direct the aviation program and prevented aviation from having an important voice on the Army staff. The development of all aspects of Army aviation suffered from Air Force opposition to any expansion of the organization, roles, and missions of Army aviation.

The result was that the Marine Corps was able and willing to fund the development of its ‘vertical assault’ concept. The Marines took great care to promote the success and importance of the concept both within the beltway and in the popular media thus ensuring appropriations. The Army could not do this. Suffering from a small budget and extensive commitments, it had to be very careful in how it apportioned funds. It lacked the will to set aside a significant amount of scarce funds and personnel on a contraption that was both expensive and unproven. The helicopter’s limited capabilities also made it hard for the average person to envision the helicopter’s potential to alter the ways future wars would be fought.
It was the Korean War that first brought widespread attention to helicopters. The Marine Corps’ exploits with the helicopter were recounted in periodicals across the nation. Used to transport men and supplies into the combat zone, the helicopter provided the Marines an unprecedented degree of tactical mobility on land. The Marines’ experiences verified their belief in the helicopter, enhanced support for the helicopter program’s development, and aided in the further refinement of their doctrine.

The Army entered the Korean War much less prepared than the Marine Corps to exploit the helicopter’s capabilities. Whereas the Marines wrote a doctrinal document for helicopter assaults and created an experimental unit to test and refine it, the Army could only bleakly look to its limited experiments with the 82nd Airborne Division. Despite this negligible effort, soldiers quickly found many uses for this versatile machine. Wire laying, command and control of columns, messenger service, artillery spotting, and transporting supplies were a few of the missions performed. The most well known use was aerial medical evacuation (medevac). The successful use of the helicopter to save
American lives brought much needed publicity while also permanently changing the support of forces on the battlefield. By the end of the war, the Army’s experiences displayed the helicopter’s potential as a logistics tool, but efforts at expanding its role as a combat transport had been confined due to a lack of vision within the Army and to disagreements over roles and missions with the Air Force.

The Marine Corps’ use of the helicopter to transport troops in a combat zone began a new era in helicopter operations. For the first time in a combat environment, the helicopter demonstrated its ability as more than a vehicle for supply. The Marine Corps’ willingness to use the helicopter in this capacity stemmed from its experiments and exercises conducted in the years prior to the Korean War. The experiments with vertical assault gave the Marine Corps a great deal of experience in mass helicopter flying. These experiences resulted in the creation of Phib-31, the first tactical doctrine for helicopter assault. In contrast, although the Army had monitored the Marines’ experiments at Quantico, by contrast it lacked any experience until the 6th Transportation Company (Helicopter) participated in Exercise Southern Pine in the summer of 1951.

When the Marines landed in Korea on 2 August 1950, the commander of the 1st Provisional Marine Brigade, Brigadier General Edward A. Craig, found the helicopters of VMO-6 to be extremely useful. Craig frequently employed the unit’s Sikorsky HO2S-1 helicopters to control his brigade, which at one point was fighting at points 25 miles apart in the Pusan Perimeter. Since the helicopters were too small to carry troops,  

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22The Sikorsky HO2S-1 helicopter was a two seat reconnaissance and observation helicopter built by Hughes.
Craig also used them for reconnaissance, liaison, laying wire, evacuating casualties, and rescuing downed pilots. While these missions were not glamorous, they were essential and continued to emphasize the helicopter’s versatility on the battlefield. Large scale heliborne activities could not be conducted because of the small number of helicopters in theater at the time. It was not until 30 August 1951 that the first Marine transport helicopter squadron arrived in Korea. Designated Marine Helicopter Transport Squadron 161 (HMR-161) and commanded by Lieutenant Colonel George W. Herring, it was equipped with fifteen of the larger and more capable Sikorsky HRS-1 helicopters. With the arrival of this unit “A new era of military transport had dawned.”

Prior to the Korean War, the Marine Corps had made detailed plans for the commissioning of at least two helicopter transport squadrons by 1953. The Korean War had the effect of speeding up the Marine Corps’ plans for expansion of its helicopter units. The terrain in Korea quickly confirmed the requirement and need for helicopters and the war placed an urgency that, along with emergency funding, allowed for the rapid creation of these new units. The war provided an opportunity to test the new doctrinal concepts in a combat environment. However the acceleration in forming units was

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223Mersky, *U.S. Marine Corps Aviation*, 131. Supporting the brigade was Marine Air Group 33 which included the helicopters of squadron VMO-6. The first Marine helicopter rescue occurred on 10 August 1950 when Lieutenant Gustave F. Leuddeke rescued Captain Vivian M. Moses of VMF-323 after Moses’ Corsair had been shot down. On another mission, Lieutenant Leuddeke was joined by Brigadier General Craig who wanted to personally assess the helicopter’s capabilities. On this mission, the pilot they rescued was Second Lieutenant Doyle H. Cole. Upon entering the cabin, Cole “slapped what he thought was an enlisted man on the back and said, “Thanks, Mac.” He was somewhat chagrined to find he was addressing the brigade commander.”

224The designation HMR-161 means: H=Helicopter; M=Marine; R=Transport; West Coast Units were part of the First Wing and designated 161, 162, etc.; units on the Eastern Coast were part of the Second Wing and designated 261, 262, etc.

contingent on having a helicopter that met the necessary performance criteria and could also be produced in significant quantities in a short period of time.

The Marines’ preference for the Sikorsky design over the Piasecki helicopter had less to do with performance than with the immediate need for helicopters. Both companies’ helicopters had similar performance characteristics, but Piasecki’s production line was busy fulfilling the Air Force’s artic contract and was not able to deliver until September 1951. Sikorsky, having lost the Arctic contract, could begin production immediately with delivery of the first helicopter six months later in January 1951, eight months faster than Piasecki. Since the situation in Korea was critical and the Marine Corps was already beginning to equip units with helicopters, the immediate availability of the HRS-1 convinced the Marine Corps [who in particular?] to award Sikorsky the contract.226

While the procurement process was underway, the Marine Corps had taken the 5th Marines and Marine Aircraft Group 33 (MAG-33) to make the 1st Provisional Marine Brigade in July 1950 and rushed it over to Korea in defense of Pusan. The MAG-33’s observation squadron, VMO-6, included four HO3S-1 helicopters and seven officers and thirty men from HMX-1.227 The helicopters provided yeoman service and received great praise from the Marine commanders in Korea. The commander of VMO-6 noted that “perhaps the most important use of the helicopter in the early months of the Korean War concerned command and control. The flexibility provided the Brigade Commander...in a dynamic fast moving situation provided a new dimension to tactical control of the

226Rawlins, Marines and Helicopters, 1946-1962, 40-41.
227Rawlins, Marines and Helicopters, 1946-1962, 42.
battlefield in a difficult terrain setting.”

General Edward A. Craig, commander of the brigade, recommended that the Marines send over more helicopters and that all Marine observation squadrons be equipped with eight liaison and two transport type helicopters. Foreshadowing later airmobile tactics, Craig advocated the deployment of a transport helicopter squadron as being ideal for solving the problem of flank and rear area security in the mountainous Korean terrain.

The Marine Corps commissioned HMR-161 on 15 January 1951. Commanded by Lieutenant Colonel George W. Herring, the squadron drew a large portion of its personnel from HMX-1. However, the unit did not receive its first helicopter until 7 April 1951 and only totaled three by the end of the month. The helicopters were the capable Sikorsky HRS-1.

The Marine Corps accepted the HRS-1 as an interim aircraft in July 1950 because the helicopters proposed by the Marine Corps Board in 1949 had not been funded. Despite the lack of aircraft, the squadron embarked on an ambitious flight training program and logged 339.1 rotary-wing hours by the end of the month.

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229 Rawlins, *Marines and Helicopters, 1946-1962*, 43. See Special Action Report, 1st Provisional Marine Brigade, 1950, extract in Lieutenant General Edward A. Craig letter to H&M Division, dtd 7 April 1975 in Comment File, “Developmental History of the Helicopter in the USMC 1946-1962.” In the extract he wrote: “…The mountainous terrain of Korea presents a difficult problem for security of flanks and rear and of bivouac areas. The troop carrier type of helicopter would be ideal for use…to post patrols on high, dominating terrain which it would take hours to climb and which quickly exhausts the troops…It is believed their use would materially contribute to the effectiveness and security of our operations and insure the earlier defeat of the enemy.”

230 Herring had previously been the executive officer for HMX-1.

231 The HRS-1 was an aircraft with a single main rotor and a vertical tail rotor. A ten-place aircraft, it was designed with a crew of two and a full load of oil and fuel, to cruise at 90 knots while carrying a payload of 1,420 pounds at sea level. The HRS-1 could lift 1,500 pounds or 4-6 combat-equipped troops or 3-5 litter casualties when operating in mountainous terrain. The large variance in field capabilities depended on the altitude, temperature, fuel load, and pilot experience.

For the next four months as the unit continued to slowly receive its helicopters, the training of pilots and maintenance crews continued to be the squadron’s priority.

The urgent demand for helicopters in Korea necessitated the deployment of the unit to Korea earlier than planned. The conflict provided an opportunity to “complete the testing of the HRS and the evaluation of tactical concepts.” Receiving the alert notification on 10 July 1951, the unit began its preparation for deployment. During their preparations, they performed a demonstration at Camp Pendleton, California, on 18 July. Carrying assault troops, 75mm pack howitzers, supplies, and simulated casualties, the unit introduced to the national press the Marine doctrine for using helicopters in combat. Departing the United States in mid-August, the unit arrived in Korea on 30 August 1951. Administratively attached to the 1st Marine Aircraft Wing, the squadron fell under the operational control of the 1st Marine Division, an arrangement that continued throughout the Korean War.233

On 13 September 1951, the squadron executed Operation Windmill I. The unit’s helicopters transported a day’s worth of supplies to the 2nd Battalion, 1st Marines which was preparing for an attack from one hill to another. The battalion had been relying on 400 Koreans of the Korean Service Corps to carry its supplies over a treacherous four miles of foot trails through the mountains. The Koreans’ valiant efforts could not adequately support the logistical requirements of the battalion in combat. Using HMR-161 to make up the shortage, the helicopter squadron moved 18,848 pounds of cargo and

233 Parker, *Squadron 161*, 3.
evacuated 74 casualties a distance of seven miles.\textsuperscript{234} Two days later the unit repeated the mission after getting the request at 1130 hours that day. Dubbed Windmill II, the squadron transported, on very short notice, more than six tons of supplies in one hour with just ten aircraft and a total of 18 flights.\textsuperscript{235} While these operations were more experimental than necessary, they allowed the air and ground units to develop standard operating procedures and served as a rehearsal for the next operation that would alter how future wars would be fought.

On 21 September 1951, the Marines conducted the first ever combat movement by helicopter during Operation Summit. Since both Major General Gerald C. Thomas, commander of the 1st Marine Division, and Colonel Victor H. Krulak, the division’s chief of staff, were avid helicopter enthusiasts, they decided to use helicopters to fulfill a requirement to relieve a ROK regiment occupying a remote hill.\textsuperscript{236} Although an airlift of such proportion by helicopters had never been done before, the performance of the unit in its first few weeks in country convinced them that it could be done.

In a period of four hours, HMR-161 landed 224 Marines of the Division Reconnaissance Company at two sites on a hill in the main line of within enemy mortar range. The initial assault squads descended from the hovering helicopter down a thirty foot knotted rope. Once on the ground they quickly cleared landing zones for the follow-on flights. Each helicopter carried five fully equipped Marines and transported the force from its assembly area to the objective in only eight minutes; much shorter than the nine

\textsuperscript{234}Parker, \textit{Squadron 161}, 4. For an after action account, see Colonel F.B. Nihart, Comments on draft manuscript (of Parker’s official history), dated 16 February 1968 in HMR-161 Comment File.

\textsuperscript{235}Parker, \textit{Squadron 161}, 4.

\textsuperscript{236}Millett, \textit{Semper Fidelis}, 505.
hours it would have taken the Marines to roadmarch through the mountainous terrain.\textsuperscript{237} After moving all the men and equipment, the squadron took only fifteen minutes to lay eight miles of communication wire that connected the reconnaissance company with the division command post. The successful movement of the Marines to the renamed “Mount Helicopter,” earned front page coverage in many newspapers throughout the United States.\textsuperscript{238}

Despite being an unopposed operation, Operation Summit’s success encouraged the division’s leadership to conceive an even more ambitious operation. Since the communist forces utilized the hours of darkness to maneuver and attack, the Marines desired a way to counter the enemy’s tactics in a quick and decisive manner. Intended to gain experience in operating in adverse weather conditions, Operation Blackbird was a plan to move a company from the division reserve to a pre-designated position near the front. The squadron practiced flying at night and conducted a full dress rehearsal during daylight hours which prepared both the ground and the air units for the operation. On 27 September, Operation Blackbird commenced, and as planned the unit conducted a night transport of E Company, 1st Marines, from its reserve position to a position on the front line. Although HMR-161 successfully moved all 223 men and equipment, there were many problems with the operation including inadequate lighting at the landing zone, helicopters lacking night instrument lighting, a lack of a night navigation system to direct the helicopter to the landing zone, and the fact that the landing zone had been mined by the ROKA. The hazards of operating at night in the vicinity of the enemy convinced

planners to restrict future such night movements to within friendly territory, but the unit continued to conduct night indoctrination flights for its pilots.239

Operations quickly involved the movement of larger units. In Operation Bumble Bee, HMR-161 moved the entire 3rd Battalion, 7th Marines, from its reserve area near Inje to a position near the front on 11 October so that it could relieve a battalion of the 5th Marines as the regimental reserve.240 Using twelve HRS-1 helicopters, they lifted the entire battalion of 958 combat-equipped marines in an operation that lasted approximately six hours, required 156 flights and again made headlines. Four days later, six helicopters from HMR-161 transported 19,000 rounds of ammunition to a surrounded ROK unit and then evacuated 24 wounded. The unit continued its hectic pace for the remainder of the month performing additional troop and supply lifts, reconnaissance for commanders, evacuating casualties, and laying communication wire. By the end of its first two months in Korea, HMR-161 had flown more than 1,200 flight hours on over 1000 flights (to include 192 medical evacuations), lifted over 150 tons of supplies, and transported more than 1400 Marines.241

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238Parker, *Squadron 161*, 4; Millett, *Semper Fidelis*, 506. The squadron flew 65 flights which also included lifting a total of 17,772 pounds of cargo.

239Parker, *Squadron 161*, 5. The squadron’s success was due to the great skill of the pilots and crew. The unit’s log acknowledges that the equipment available at the time was unsuited for conducting large scale operations at night within the range of enemy fire. See HMR-161 Squadron Historical File (HistRefSec, Hist&MusDiv, HQMC).

240Memo from Colonel H.W. Edwards to CG 1st Marine Division dated 9 November 1951. Found in 3d Battalion, 7th Marines Historical Diary, H&M Division, HQ USMC, 1999 part of the Korean War CD #23 of 25. Its more precise movement was from the Inje reserve area to a reserve area vicinity DT297423 in the lee of the Main Line of Resistance. All personnel except some members of the battalion service group were lifted by helicopter. The daily summary on page 4 notes that the operation commenced at 1000 hours and concluded with the complete occupation of the assembly area by 1800. Upon arrival at the assembly area, I Company displaced to vicinity DT29431 to man defensive positions under the operational control of 2d Battalion, 7th Marines Command

Throughout the rest of the war, the squadron found itself in constant demand and performing operations of ever-greater magnitude. The largest support mission was performed in February 1953 when the squadron transported supplies for two regiments for five consecutive days.\textsuperscript{242} The division experimented with HMR-161 performing many other types of missions. One of these was conducting counter-guerrilla operations. Operation Bushbeater was the first of these efforts. Begun in October 1951, the helicopters landed armed patrols in selected rear areas of the division. The terrain and weather conditions made it extremely hard for the Marines to disembark from the helicopters, but careful study of the terrain and weather eased some of that difficulty. In December 1951, the division again employed the squadron to carry armed reconnaissance troops and to cover areas that could not be reached by ground patrols. If they found anything unusual they were to lower a Marine patrol by knotted ropes to investigate.

During another relief in place mission in mid-December, Operation Farewell, the Marine innovator Colonel Keith B. McCutcheon took command of HMR-161 from Lieutenant Colonel Herring. McCutcheon continued to develop new tactics, techniques, and procedures for moving troops and supplies in the Korean theater. When the 1st Marine Division moved to the Western Front, the squadron also moved. Its first operation in this new sector occurred on 5 April. Given only three and half hours notice, the squadron successfully transported 662 troops and 10,000 pounds of rations in 99 flights and 115.9 hours of flight time. Known as Operation Pronto, the round trip average distance of 57 miles was the longest performed up to that point for any mass movement. Colonel McCutcheon recognized the significance of the mission’s success by

\textsuperscript{242}Parker, \textit{Squadron 161}, 11. This was Operation Haylift II.
proclaiming “This airlift, more than any other in which HMR-161 has participated, proved that a Marine transport helicopter squadron can successfully operate as an ‘on-call’ tactical tool.” More significantly, it showed that the concept of vertical assault from ships far off shore was becoming practical and safe.

Another experiment was the movement of rocket batteries by helicopter. Called Operation Ripple One, it began on 19 August 1952 and evaluated the helicopter’s ability to select firing positions from the air and to rapidly redeploy rocket launchers and their supporting personnel and equipment from one firing point to another. The rocket launchers created large dust clouds when fired, revealing their position and making them very vulnerable to counter-battery fire. Prior to the starting of the exercise, the 1st 4.5-inch Rocket Battery and the HMR-161 developed TTPs and practiced them. The coordination resulted in new methods for sling loading and the development of procedures which ensured minimal time to establish a firing position, fire the rockets, and then shift to another position. The operation demonstrated the practicability of using the Sikorsky H-19 helicopter to rapidly displace rocket artillery over large distances in

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244 Training between the two units began on 1 August. The rocket battery conducted daily training on embarkation and the use of helicopters to transport launchers and ammunition to the firing positions. A team of seven men were sent to HMR-1612 for instruction, personnel embarkation teams were designated, and schedules for displacement and firing were effected. On 7 August firing positions, resupply areas, landing sites, and assembly points were selected by helicopter reconnaissance. In the course of the rehearsal on 18 August, one of the lifting hooks released in flight, demolishing the rocket launcher, reminding everyone of the dangerous nature of their operation. For more information see 1st 4.5” Rocket Battery Battalion, Command Diary, August 1952, pages 5-7, found in Marine Corps Historical Center, Korean War CD #19.

245 1st 4.5” Rocket Battery Battalion, Command Diary, August 1952, pages 6-7, found in Marine Corps Historical Center, Korean War CD #19. After firing a mission at 1835, ten helicopters from HMR-161 transported three launchers, their crews, the ammunition, and the headquarters group. One helicopter was forced to land with its launcher due to mechanical troubles so only two launchers actually arrived at the landing site and began firing at 1902. On 21 August HMR-161 again executed this mission, displacing the battery twice and doing so without any mishaps. See also Parker, *Squadron 161*, 10.
restricted terrain and suggested that it might be an appropriate technique for early employment of artillery weapons in an amphibious landing.\textsuperscript{246}

Consistent with the initial intent of testing ideas, the Marine Corps conducted twelve Marine Landing Exercises (MARLEX) beginning in June 1952 and continuing throughout the rest of the year. The purpose was to evaluate various aspects of the vertical assault concept. Due to a lack of an available carrier, the early exercises substituted the island of Sung Bong-do, approximately 40 miles southwest of Inchon to represent the carrier. These early exercises encountered very few difficulties and confirmed the basic tenets of Phib-31.

It was not until the first two days of September 1952 that a carrier (the USS Sicily) became available for these exercises. Designated as MARLEX 7, the mission was to transport by helicopter a Marine company from the Sicily to a pre-designated area on Blue Beach at TOKCHOK-TO Island. The intent of the operation was to gain experience for HMR-161, the carrier’s crew, and Marine company personnel in vertical envelopment combined as part of an amphibious operation.\textsuperscript{247}

During MARLEX 7 twelve HRS helicopters (plus one spare aircraft) of HMR-161 participated. The marine company required 319 air spaces (302 for personnel, 17 for crew served weapons to be transported to the site. Due to the weather conditions, humidity and available power of the engine now installed in the HRS type helicopter, it

\textsuperscript{246}1st 4.5” Rocket Battery Battalion, Command Diary, August 1952, Appendix IV, Enclosure 2, found in Marine Corps Historical Center, Korean War CD #19. To better verify this, the rocket battalion commander recommended additional operations over longer distances (twenty miles).

\textsuperscript{247}Memo from Commanding Officer, HMR 161 [J.F. Carey] to Commanding General, First Marine Division, Subj: MARLEX SEVEN, report on, dtd 12 September 1952; found in HMR-161 Unit Files, Korean War CD (#8 of 25), History and Museum Division, HQ, USMC, 1999 at the USMCHC at the
was decided to transport four troops with gear in each helicopter. The USS Sicily had six landing zones, while the beach had three unloading zones. This disparity dictated that the helicopters flew in four flights of three. Estimated time to transport the whole company was one hour and thirty minutes.\textsuperscript{248}

Under ideal weather conditions, on the morning of 1 September HMR-161 conducted squadron qualification and tactics before it began the actual vertical assault mission at 1305. The operation lasted a total of two hours and forty-one minutes. The first aircraft left the Sicily at 1305 and landed on Blue Beach at 1329. In the next two hours and forty-one minutes, the squadron transported 302 personnel and 16 crew served weapons to the beach and back to the carrier. It also conducted night qualification after 1930 with three aircraft and qualified 21 pilots for night operations.\textsuperscript{249}

The next day, the morning was spent evaluating net type and cargo type sling hoists. Despite the fair weather turning into scattered rain and reduced visibility, be deployed first; instead they were used to the afternoon was spent transporting 308 personnel and twenty weapons were moved to the beachhead in support of Dog-Day plus one operations. Significantly, as everyone became more familiar with the operation went much more quickly with times to load, transport, and unload being almost a third quicker. Overall, HMR-161 flew a total of 131 sorties and carried 604 troops on day one and 82

\textsuperscript{248}Memo from Commanding Officer, HMR 161 [J.F. Carey] to Commanding General, First Marine Division, Subj: MARLEX SEVEN, report on, dtd 12 September 1952; found in HMR-161 Unit Files, Korean War CD (#8 of 25), History and Museum Division, HQ, USMC, 1999 at the USMCHC at the Washington Naval Yard.

\textsuperscript{249}Qualification for night operations was four landing per pilot on the right side. After the fourth landing, the co-pilot replaced the pilot and a new pilot served as co-pilot.
sorties and 308 troops on day 2 for a total of 213 sorties, 964 troops and crew served weapons.\textsuperscript{250}

However, not all aspects of vertical assault were practiced. Since the landing area on the beach was hard-packed sand, the Shore Party and Air Delivery Platoon did not need to clear the landing area and instead were used as signal men and troop coordinators. Another aspect that made operations easier was that the Sicily anchored five miles to the south of the beach, thereby removing some of the difficulties associated with landing and taking off from a moving ship.\textsuperscript{251}

During the exercise they experimented with many ideas. One was the approach patterns used for carrier operations. They tried left hand and right hand patterns and found both to be satisfactory, with the latter being better for moving landing zones.\textsuperscript{252} Another was the evaluation of cargo baskets versus cargo nets. While pilots noticed no difference in transporting the two types, the cargo nets were more easily handled by personnel in the landing zone than were the cargo baskets.

The exercise provided the participants with many good lessons. A major concern before the exercise, communications between aircraft and from air to ground were satisfactory, at least for the distance traveled. The Air Delivery Platoon could load from

\textsuperscript{250}Memo from Commanding Officer, HMR 161 [J.F. Carey] to Commanding General, First Marine Division, Subj: MARLEX SEVEN, report on, dtd 12 September 1952; found in HMR-161 Unit Files, Korean War CD (#8 of 25), History and Museum Division, HQ, USMC, 1999 at the USMCHC at the Washington Naval Yard.

\textsuperscript{251}Memo from Commanding Officer, HMR 161 [J.F. Carey] to Commanding General, First Marine Division, Subj: MARLEX SEVEN, report on, dtd 12 September 1952; found in HMR-161 Unit Files, Korean War CD (#8 of 25), History and Museum Division, HQ, USMC, 1999 at the USMCHC at the Washington Naval Yard.

\textsuperscript{252}The right hand pattern had the advantage of allowing the pilot (the first pilot sat on the right side) to always see the carrier, however this violated the current carrier operations SOP which used left hand turn patterns.
three loading zones just as fast as from six thereby allowing an easier approach for three
aerials rather than six. The after action report recommended that the same number of
loading sites on the carrier be used as unloading sites on the beach, preferably the same
as the number of aircraft in the sections being used for each lift, which in this case was
three.253

A near repeat of this exercise occurred on 18 November 1952 with MARLEX 10.
Six aircraft from HMR-161 lifted off at 0900 and in the next hour transported
approximately 280 personnel of Fox Company, 2nd Battalion, 7th Marine Regiment. The
unavailability of the USS Sicily required the Marines to simulate using a CVE (Soya-Do
Island) from which to attack a landing zone on Blue Beach (Tokchok-To Island).254 For
this operation the Marines established only three uploading and three landing zones.
With a round trip distance that averaged just five nautical miles the assault required
approximately 57 round trips (9.5 trips per aircraft) based on the average availability of
six aircraft and the maximum of 5 troops or 4 troops with a crew served weapon per
aircraft. This showed that the concept as envisioned could not be executed with the
current technology. More disturbing, however, was that the exercise did not encourage
the attacking force to better develop its actions on contact. Instead, the air landed

253Memo from Commanding Officer, HMR 161 [J.F. Carey] to Commanding General, First
Marine Division, Subj: MARLEX SEVEN, report on, dtd 12 September 1952; found in HMR-161 Unit
Files, Korean War CD (#8 of 25), History and Museum Division, HQ, USMC, 1999 at the USMCHC at the
Washington Naval Yard. This AAR was distributed to the 1st MAW, all the HMR Squadrons then in
service (8), all three MAGs, and the senior Marine Corps and Navy leadership.
254Type “B” Report (Command Diary) of Marine Helicopter Transport Squadrob 161, 1st Marine
Aircraft Wing, Fleet Marine Force, Period 1 November 1952 through 30 November 1952. Annex E.
marines were to seek cover and wait for further instructions. The exercise was repeated the next day with similar results. While these exercises demonstrated the efficacy of the vertical assault concept, the failure to make greater use of the training opportunity meant that doctrine still had to be developed and tested after the Korean War. Unfortunately, the squadron executed only two more large-scale landing exercises in 1953 before the armistice on 27 July.

Throughout the Korean War the 1st Marine Division continued to train for their amphibious warfare mission. Besides scheduling amphibious warfare training exercises for its subordinate units, the division did provide opportunities to train with helicopters. Besides the MARLEX exercises, the division even issued a memo that designated helicopter landing sites. More typical was the experience of the 5th Marines. When the US Army’s 14th Infantry Regiment relieved the 5th Marine Regiment on 1 May 1953, the 5th Marines relocated to Camp Casey and began preparing for their RCT Landing Exercise conducted 10-17 May. Although they conducted a normal amphibious assault, part of their training prior to the exercise was with helicopters and movement by

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256 They performed the mission again on the 19th transporting 282 troops on 57 flights with a total time of 59 minutes. (0900-0959). Type “B” Report (Command Diary) of Marine Helicopter Transport Squadron 161, 1st Marine Aircraft Wing, Fleet Marine Force, Period 1 November 1952 through 30 November 1952. Annex E.

257 Parker, Squadron 161, 9-12.

258 This was Division Memo 97-53. See 5th Marines Command Diary for May 1953, Appendix I, found on CD #21. Referenced Div Memo 97-53, Subject: Designation of helicopter landing sites.
helicopter. However, they were not able to actually practice during the operation with helicopters.

By the end of the Korean War, the Marine Corps had performed the first helicopter lift of a combat unit in history. The two Marine helicopter units had transported more 60,046 men and 7.5 million pounds of cargo. The helicopter units swiftly transported 9815 seriously wounded personnel from the front to medical facilities which resulted in many more saved lives than could have been possible using the traditional ground evacuation procedures. Among many other things, the Korean War enabled the Marine Corps to put into action what it had developed in the years prior to 1950. While not used in a combat amphibious assault, the mass movement of large numbers of troops and supplies combined with the Marine landing exercises validated the concept of vertical assault. The extensive and continuous activities of HMR-161 and VMO-6 demonstrated the helicopter’s durability and showed that the helicopter could survive on the modern battlefield and still perform its support missions for ground troops. Its performance “convinced Marine planners that the helicopter would eventually revolutionize Marine Corps operations. A new era for Marine air-ground cooperation had dawned.”

The Marines successful exploitation of the helicopter was due to a combination of factors. First, the nature of the threat and the terrain in Korea provided an excellent opportunity to test doctrine and aircraft in a combat environment. Second, the Marine

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259th Marines Command Diary for May 1953, Training Syllabus, Phase III, found on CD #21. It must be noted that training with helicopters constituted a very small part of the program.

260 Moskin, *USMC Story* 663, 812. The HMR-161 transported all of the men and cargo; it also evacuated 2,748 wounded. The smaller helicopters of the VMO-6 performed many utility missions and also evacuated 7,067 wounded during the war.
Corps’ integrated air-ground team ensured that communication was not a problem. This allowed the development of doctrine, tactics, and equipment for ground and air units before the war. These were invaluable in that they provided a basic level of performance from which the Marines quickly progressed to more advanced and difficult missions. A more important third factor was the Marine Corps’ embracing of the helicopter as an essential component for performing its mission prior to and during the Korean War. This created a positive environment which allowed a great deal of experimentation in a combat setting. Leaders of both the ground and air elements were receptive to new ideas and willing to implement them in the desire to increase effectiveness. It is also significant that the commanders of the HMR-161 Squadron all had previous experience in the HMX-1 unit prior to the Korean War. Their experiences in that unit proved useful in refining doctrine while also encouraging further experimentation. It was the confluence of these factors in Korea which allowed the Marine Corps’ to make great strides in the development of vertical assault.

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262 Not mentioned in this essay, in August 1952 Lieutenant Colonel John F. Carey assumed command of HMR-161 from Colonel McCutcheon. Carey had previously commanded HMX-1.
CHAPTER 6

THE ARMY IN KOREA:
LITTLE VENTURED, LITTLE GAINED

When the North Koreans invaded South Korea on 25 June 1950, there were only a few light fixed-wing aircraft and no helicopters available to the American forces in the Far East.\textsuperscript{263} In fact, the Army as a whole possessed only 56 utility/observation helicopters and no cargo helicopters on 30 June 1950.\textsuperscript{264} Korea’s geography of high and rugged mountains combined with a primitive surface infrastructure to make the movement of supplies and personnel a challenging one at best. This was not an environment suited to the mechanized and motorized Army that fought victoriously in Europe only five short years before. Reliant on the few available roads, American forces became predictable targets that the enemy often ambushed. The helicopter, unrestricted by terrain and obstacles, could provide at least a partial solution to this problem.

Early in the war, requests for more helicopters came to Washington with increasing frequency from Korea. Having observed firsthand the many uses of the helicopter in Korea, General Douglas MacArthur’s Far East Command (FEC) made

\textsuperscript{264}John W. Kitchens, “Cargo Helicopters in the Korean Conflict” \textit{U.S. Army Aviation Digest} (November-December 1992) 38. 52 were the Bell H-13B Sioux and 4 were the older Bell YH-13A.
repeated requests to Washington requesting additional aircraft, especially helicopters.  

These helicopters would be used to perform a myriad of tasks much like their Marine counterparts: liaison activities, reconnaissance, medical evacuation, short transport of supplies, wire laying, and artillery spotting were only a few of the many missions. After observing the Marines use the helicopters of HMR 161 to transport 950 troops on 11 November 1951, General Matthew B. Ridgway became convinced that the Army needed a similar capability. Ridgway recommended that four Army helicopter battalions be made available to the FEC to supplement the Marine squadron. While the Army made plans for an extensive increase in the number of helicopter units, its efforts were delayed by almost two years. It was not until 1953 that the Army deployed its first helicopter company to Korea. By the end of the war, the Army had fewer than 200 helicopters in theater operating in two transportation companies, medical evacuation detachments, and independently.

The successful employment of the utility helicopter in the medevac role garnered most of the public recognition. At the same time, the Army and Marines continued to experiment with using the helicopter in other ways. The significance of these concurrent developments remained obscure until the announcement of the Marine Corps’ much publicized Operations Summit and Bumble Bee. The Army’s intentions failed to generate much public fanfare compared to other helicopter developments and the

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Marines’ exploits in Korea. As a result, little public fanfare met the announcement that the Army was forming transport helicopter companies; only those people associated with the development of helicopters and transportation found it exciting.

On 1 December 1950, the Army activated the 6th Transportation Helicopter Company at Fort Sill, Oklahoma, under the provisions of T/O&E 55-57T. Authorized 21 helicopters per company, the mission of the unit was “to provide short-haul air transport to expedite tactical operations and logistical support in the forward areas of the combat zone.” This mission included both “logistical and tactical.” It was intended that a helicopter transport company be capable of moving an infantry rifle company in one lift. These and other missions in the document provided the first glimpses at what would later become airmobility. Unfortunately, acquisition delays prevented the company from reaching full strength until 6 December 1951, over a year after being activated, and it would not receive its first cargo helicopter until the summer of 1952. Still, the company participated in many exercises which demonstrated the unit’s capabilities and versatility and garnered much respect and praise from the ground commanders and increased the awareness of the helicopter and its potential.269

268 This was the Transportation Helicopter Company Tables of Organization and Equipment (TO&E) 55-57. See the report prepared for the Army Chief of Transportation entitled Army Helicopters Transport Cargo: An Evaluation of 1950-1953 Experiences as a Basis for Current and Future Programming (1 January 1954) no pagination.

269 The major exercises were Southern Pine (13-17 August 1951), Snowfall (17 January -16 February 1952), and Longhorn (25 March-15 April 1952). In Exercise Longhorn, Air Force opposition denied the Army an opportunity to integrate for the first time a helicopter unit into ground combat operations. The helicopters were to perform two air mobility type missions -- moving an infantry company from a reserve to a position on the front and the evacuation of an infantry company from an exposed position but were denied by the Deputy Maneuver Commander, an Air Force officer, because they violated Air Force policy. For more information see Jean R. Moenk, A History of Large Scale Army Maneuvers in the United States, 1935-1964 (Fort Monroe, VA: Headquarters CONARC, 1969) 153, 163, 170-179; “Army Helicopters to Fly Cargo at Longhorn,” Transportation Corps Notes, Department of the Army, March 28, 1952, p.2. Army Helicopters, Transport and Cargo Annex A, C, D, and E.
The unit minus its helicopters arrived in Korea on 5 January 1953. During the next few months the helicopters were ferried in and it was not until 24 March 1953 that the company reached its strength of 20 H-19 helicopters. It performed its first mission on 20 March 1953 when it transported 17 tons of supplies in just 80 minutes to forward elements of the 3rd Infantry Division which were cut off due to flooding. During the next four months the 6th Transportation Company executed six operations to determine the feasibility of using helicopters to support large tactical units. While none of these missions were performed under the threat of enemy fire, they still provided excellent experience and verified the helicopter’s capabilities in the harsh environment of Korea. These operations also convinced military leaders of the helicopter’s combat potential. Lieutenant General Isaac D. White commented: “The helicopter delivery of lightly equipped combat elements, directly to critical blocking and holding positions in advance of the main body of a striking force, is a practical maneuver.”

The Korean War provided aviation supporters like the Army G-3, Major General Charles L. Bolte, with an opportunity to finally increase the size and role of army aviation. Army studies in the years prior to the Korean War had shown the helicopter to be a very versatile tool which could provide the short-haul capability needed at all levels. Once the war began, he immediately had his G-3 staff implement a program in

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271 *Army Helicopters Transport and Cargo*, Annex Q. This is an extract from CG, X Corps to CG, EUSA dated 4 July 1953.

272 The most far-reaching was the Army Field Forces Board No.1 of 1949. See Aircraft Service Test Section, Army Field Forces Board No.1, 16 November 1949, “Report of Study Project Number GA 249.”
August 1950 to field the five helicopter transport companies. The Army’s interest in the helicopter continuously increased and by the end of the war there were proposals envisioning an aviation component exceeding 10,000 aircraft at a cost of over a billion dollars. The Army G-3 even recommended creating experimental helicopter transport units as organic components of divisions and lower to test the feasibility of substituting helicopters in lieu of ground vehicles.

An even more voracious proponent of the helicopter was Major General Frank A. Heileman, the Army’s Chief of Transportation. A short, smart officer with a reputation for speaking his mind, he considered the cargo helicopter to be a vital piece of the Army transportation system and pushed for a plan in June 1951 to begin procurement of 3,000 helicopters. He argued that the helicopter represented “a greater relative addition to the ability of the Army than the introduction of the motor vehicle” and could provide an element of surprise in military operations by its ability to improve mobility and concentrate forces at critical points. Heileman also proposed that the Army should employ helicopters to tactically deploy troops much like what the Marines were doing. He envisioned the helicopter as having an almost unlimited role on the battlefield.

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273 Memorandum from Major General Charles Bolte, Army G-3, to Chief, Army Field Forces, 9 August 1950; Richard P. Weinert, *A History of Army Aviation -- 1950-1962* (Fort Monroe, VA: Office of the Command Historian, USA TRADOC, 1991), 15-16; Joseph Bykofsky, *The Support of Army Aviation, 1950-1954* (Washington, D.C.: Department of the Army, Office of the Chief of Transportation, 1955), 15-17. These companies were to be equipped with the H-19 Chickasaw helicopter. The last company would not be formed until the second half of FY 1951, since it was to be equipped with the H-21 Workhorse helicopters which were not expected to be in service until the Fall of 1951.

274 Memorandum for File: Discussion with Secretary Pace, General Collins, General Hull, Army: Under Secretary McConne and General Vandenber, Air Force; Subject: Liaison Aircraft Helicopters (sic) Copy found in *History of Army-Air Force Conflicts Concerning the Functions of Army Organic Aviation* (No other bibliographic data available, found in MHI library) Tab M.

275 General Frank Schaffer Besson, Jr., interview by Colonel Raymond L. Toole. Army Senior Officer Debriefing Program, 170. (MHI).

276 *Army Helicopters, Transport and Cargo*, Annex B.
Emphasizing centralized control under the field army G-4, Heileman envisioned helicopter battalions providing “short haul air transport for combat divisions on a basis similar to that of our present truck companies.” In addition to helicopter transport companies, Heileman thought it possible to use “helicopters in battalions and companies of combat units to complement and to replace, partially, the present vehicular transport of these units.”

The Department of the Army initially rejected any expansion beyond five companies because of the cost, Air Force reluctance to procure, and questions concerning the helicopter’s ability to reliably perform the transportation mission in a combat environment. After the Marines received extensive publicity for their Operation Summit in September 1951, the Army found the money to expand the program to ten companies. The Air Force’s uneven performance of tactical support missions in Korea combined with a greater understanding of the helicopter to convince Army Chief of Staff General J. Lawton Collins in August 1952 to authorize a modified program of twelve transportation battalions. Procurement was to be over a five year period at a cost of $688 million and would require 6,000 personnel. In October 1952, the Secretary of the

277 “Air Transport,” Officer’s Call 3:12. To ensure the rapid development of the helicopter program, Heileman recommended the forming of a panel to oversee the development of the transport helicopter program for the Army Chief of Staff. See (1) Memorandum from Department of the Army, Assistant Chief of Staff, G-3, to Chief of Transportation, 19 November 1951, Subject: Requirements for Cargo Helicopters. (2) Letter from Chief of Transportation to Department of the Army, Assistant Chief of Staff, G-3, dated 4 December 1951, Subject: Army Helicopter Program, with 1st Endorsement ATTNG-22 457 (4 December 1951).

278 Weinert, History of Army Aviation 23-24. Cite of Letter from Chief, Army Field Forces, to Department of the Army, Assistant Chief of Staff, G-3, 29 January 1952. (1) Summary Sheet G-3 452 (4 March 1952), Department of the Army G-3 O&T Division Organization R&D Branch, dated 28 April 1952, Subject: Requirements for Cargo Type Helicopters. (2) Bykofsky 22-23. The 1951 and 1952 budgets authorized procurement of 97 H-19s and 85 H-21s while the 1953 budget added another 80 H-19s.

279 This program was based on the Materiel Requirements Review Panel of 1952. In addition a research and development program funded at $15 million per year was to be established to support the
Army approved the program and thus began the expansion of the Army aviation program. 280

The most significant reason for the slow deployment of cargo helicopter units by the Army was the acrimonious disagreements between the Army and the Air Force concerning procurement, roles, and missions. The Army believed that it had the responsibility to perform transport missions within the combat zone and sought to use larger liaison aircraft (like the L-20 and L-23) and helicopters to meet the Army’s requirements for transportation. 281 The Air Force disagreed, maintaining that it had primary responsibility for providing airlift for the Army. Since the Air Force had primary responsibility, the Army’s helicopter companies by definition must therefore be conducting limited and secondary missions. 282 Using these definitions, the Air Force justified filling its own helicopters units before allocating critical aircraft for the Army to perform a limited function. 283 Many efforts were made to resolve these differences.

280 Weinert, A History of Army Aviation, 38. Cite of (1) Memo from General J. Lawton Collins to the Secretary of the Army, dated 28 August 1952, Subject: Army Helicopter Program. (2) Memo from Secretary of the Army Frank Pace Jr. to Army Chief of Staff, dated 2 October 1952, Subject: Army Helicopter Program.

281 History of Army-Air Force Conflicts Concerning the Functions of Army Organic Aviation, Tab Q.

282 The Air Force argued that “As such, this Army function was not intended to duplicate nor eliminate the Air Force function of providing the Army with assault transport and other troop carrier airlift....The function of aeromedical evacuation has been and is an Air Force responsibility.” History of Army-Air Force Conflicts Concerning the Functions of Army Organic Aviation Tab R, S, T.

283 Weinert, A History of Army Aviation, 33-34.
The National Security Act of 1947 and its 1949 amendment described roles and missions in vague terms which resulted in different interpretations by each service.\textsuperscript{284} Realizing that it could not eliminate Army aviation, the Air Force sought to use the National Security Act and other agreements to limit the growth of Army aviation. Furthermore since the Air Force retained responsibility of procurement for Army aviation, it slowed Army aviation growth through selective procurement and fielding. Referred to as “command editing” the Air Force selectively procured aircraft for the Army regardless of the fact that Congress specifically authorized the aircraft. When the Air Force could not stop procurement, it still denied the Army by redirecting the new aircraft to recently formed air assault and medical air evacuation units.\textsuperscript{285}

Initially, the service secretaries and the Chiefs of Staff met to resolve the issue on 16 February 1951. It was at this meeting that the Army laid out its plan to procure a total of 10,600 helicopters and liaison aircraft by the end of 1952 with the eventual total to be a fleet of approximately 20,000 at a total initial fielding cost of $2.6 billion.\textsuperscript{286}

\textsuperscript{284}Although not discussed here, these acts also defined the conduct of pilot training, performance of maintenance, and limits on size of aircraft. The Air Force also tried to limit Army aircraft to just one engine, but back down because of the testing being done on the McDonald Douglas “Little Henry” helicopter that had a ram jet on each tip. See Colonel Delbert Bristol, interview by Colonel Ralph J. Powell and Lieutenant Colonel Ronald K. Andreson, 1978, p.41. Found in Army Aviation Oral Histories. (MHI)


\textsuperscript{286}Memorandum for File: Discussion with Secretary Pace, General Collins, General Hull, Army: Under Secretary McCon and General Vandenberg, Air Force; Subject: Liaison Aircraft Helicopters (sic) as found in History of Army-Air Force Conflicts Concerning the Functions of Army Organic Aviation, Tab M. The 1952 budget included 1156 H-19 helicopters (72 were in the 1951 budget) with an estimated procurement cost of $487,200,000; and 813 H-21 helicopters at an estimated cost of $610,000,000. The total cost for just these two items equaled $1,102,000,000, with all the helicopters delivered by 1955. The remainder of the planned Army program would, when including spare parts, total another $1.5 billion. This budget did not include any of the related costs: facilities, training, ground equipment, and maintenance depots. The equivalent cost in 2001 would be $15.2 billion with an opportunity cost of $78 billion.
magnitude of the Army’s proposed program shocked General Vandenberg who noted that
the proposed fleet would be more than the entire procurement of aircraft for the Air
Force. General Vandenberg proposed that the Army’s backorder of one hundred
helicopters currently be requisitioned from the Air Force but emphasized that this would
not change the existing weight limitations. The services would revisit the subject once
the Army’s experiments had concluded and the Army had a firm number on what aircraft
it actually needed. The Army representatives agreed with Vandenberg’s proposal and
very happily left the room with all of their immediate objectives accomplished. This
began the Army’s gradual shift away from fixed-wing aircraft since the Army managed
to convince the Air Force to procure a limited number of the congressional authorized
cargo helicopters, but could not get the Air Force to procure any L-20 and L-23 airplanes
for Army use nor did it get a removal of the limitations on aircraft weight.

Despite this agreement, interservice disputes over roles and missions continued.
These arguments eventually led to two agreements between the Secretary of the Army
Frank Pace and the Secretary of the Air Force Thomas K. Finletter. The first agreement,
completed on 2 October 1951, removed the weight limitation on Army aircraft and

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287 Especially since they knew that the helicopter industry could not produce such large numbers of
helicopters.

288 Once the Air Force finally agreed in February 1951 to procure a sufficient number of the
Congressionally authorized helicopters to equip the Army’s five transport helicopter companies, the
program still moved slowly. This time the delay was due to the helicopter industry’s infant status.
Production capacity was limited, and the orders for the Air Force and Navy programs had tied up almost
the entire capacity. The Army’s requisitions had to wait until the orders for the other services had been
filled. Memorandum for File: Discussion with Secretary Pace, General Collins, General Hull, Army:
Under Secretary McCone and General Vandenberg, Air Force; Subject: Liaison Aircraft Helicopters (sic)
copy found in History of Army-Air Force Conflicts Concerning the Functions of Army Organic Aviation,
Tab M. Memorandum for Secretary Pace from Office of the Secretary of the Air Force, dated 1 August
1951 found in History of Army-Air Force Conflicts Concerning the Functions of Army Organic Aviation,
Tab N.
instead limited aircraft only in terms of the missions to be performed. Relatively quickly, different interpretations of this document arose between the Army and the Air Force. The Army’s program to field twelve transport helicopter battalions and twelve helicopter ambulance units directly clashed with the Air Force’s efforts to create assault groups. Unable to resolve the issue, both services continued to organize and equip aviation units to perform the same mission. Eventually, Secretary of Defense Robert A. Lovett accepted the Army’s position on helicopter operations. However, Lovett did place limitations on the Army’s use of fixed-wing aircraft to ensure no duplication of the Air Force’s troop transport mission.

The Secretary of Defense’s decision led to the 4 November 1952 modification known as the second Pace-Finletter Agreement. This new agreement limited Army fixed-wing aircraft to 5000 pounds but allowed for the Secretary of Defense to make future adjustments based on advancing technology and mission requirements. It ensured the Army of a definite and continuing requirement for helicopter units. The helicopter was defined solely in terms of performance of functions and not on size. The agreement recognized the Army’s support of its ground units in the combat zone to be a primary

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291 *History of Army-Air Force Conflicts Concerning the Functions of Army Organic Aviation*. pg. 5, par. 35, See also Tab V.
function but limited Army aviation to aerial observation, C2, transportation, and medevac within the combat zone.\(^{292}\)

The second Pace-Finletter Agreement proved to be satisfactory enough for all parties and ‘normalized’ relations between the Army and the Air Force for the remainder of the war. The stabilized relationship allowed the Army to rapidly increase its procurement of helicopters. By the end of the war, the Army had over 800 helicopters of which 84 were cargo helicopters. The Army acquired two-thirds of these helicopters in the final year of the conflict, but less than 200 helicopters made it to the Far East.\(^{293}\)

Yet the delay in creating such a program could have been averted if started earlier. Interest in the helicopter became a low priority after World War II. With a lack of priority came a lack of funding. The lack of interest, combined with the doubts surrounding the helicopter’s durability and capability, ensured that practical experiments would not occur. Despite the Army’s lack of experience in helicopter operations, the Army staff could have drawn upon the knowledge already accumulated by the Marine Corps. The two services on occasion did work together in the Pentagon. While the Army was slowly getting H-13 and H-23 helicopters, it was also wanted to purchase the H-19 helicopter but the Air Force was dragging its feet. In exchange for an M-46 tank

\(^{292}\)DA SR 95-400-5, 19 November 1952; History of Army-Air Force Conflicts Concerning the Functions of Army Organic Aviation. pg. 6, par. 38; History of Army-Air Force Conflicts Concerning the Functions of Army Organic Aviation Tab W; In airborne operations the Air Force had responsibility from the objective area until ground link-up was achieved. In normal ground operations, the combat zone was defined as 50-100 miles behind the forward edge of the battle area (FEBA). This would be a point for further disagreement as helicopter performance improved. See also United States Senate Committee on Armed Services, Hearings Before the Special Subcommittee on Close Air Support of the Preparedness Investigating Subcommittee...., 92nd Congress, 1st Session (1972) 15; Bykofsky, 27-29.

\(^{293}\)John W. Kitchens, “Cargo Helicopters in the Korean Conflict” U.S. Army Aviation Digest (November-December 1992) 38. Of the 800 helicopters 460 were Bell H-13s (including 405 of the newest E models), 262 were Hiller H-23s, 72 were Sikorsky H-19C cargo helicopters [with a crew of two, could
which the Marines wanted to test, the Marines gave the Army its first H-19 helicopter.\footnote{Colonel Delbert Bristol, interview by Colonel Ralph J. Powell and Lieutenant Colonel Ronald K. Andreson, 1978, p.22. Found in box \textit{A History of Army Aviation, Senior Officers Debriefing Program}, MHI} Unfortunately, and for reasons that still remain unclear, the Army failed to develop a better relationship and take advantage of the Marines’ experiences. In fact, the Army appears to have remained relatively ignorant of the Marine Corps’ progress with helicopters both before the Korean War and during it. Many of the key leaders in Army aviation remained unaware of the extent that the Marines had experimented with the helicopter.\footnote{It is still hard to fathom how General Robert R. Williams and General Hamilton H. Howze, two of the most knowledgeable people on aviation activities, could claim minimal knowledge of the Marines’ progress. See General Robert R. Williams, Interview by Colonel Robert J. Powell and Lieutenant Colonel Philip E. Courts, 28-29 March 1978, and Hamilton H. Howze, Interview by Robert Reed, 5 February 1973. Both found in box \textit{A History of Army Aviation, Senior Officers Debriefing Program}, MHI} When asked about helicopters transporting troops in Korea, General Hamilton H. Howze remarked that he believed that the first time was “when a squad or two, not more than that, of Marines were put on top of a hill in Korea … and it led to no subsequent action … on the part of the Marines.”\footnote{General Hamilton H. Howze, interview by Dr. Herbert P. Lepore, 5 December 1986, found in box \textit{A History of Army Aviation, Senior Officers Debriefing Program}, MHI} This ignorance of Marine activities remained despite the popular media’s and military journals’ coverage of the Marine helicopter operations prior to and during the war.\footnote{“Navy XHRP-1 Helicopter” \textit{Military Review} 27:5 (September 1947) 70; “Helicopter Squadron” \textit{Military Review} 28:4 (July 1948) 71; “Marines Put on Show” \textit{Infantry Journal} (July 1949) 41; Sergeant John S. Boyd, “Helicopter Warfare” in \textit{To the Editors Infantry Journal} (June 1950) 32-33.} In addition, reports coming back from Korea repeatedly describe Marine Corps operations. This failure to capitalize on the experience of the Marines needlessly resulted in an Army program that had to suffer extensive intellectual growing pains to develop T/O&Es, doctrine, tactics, techniques,
and procedures. This increased the time needed to organize, equip, and train helicopter units for deployment to Korea.

By the time the Korean War ended, there was a greater appreciation and awareness for the helicopter’s capabilities. General Maxwell D. Taylor, commander of the Eighth United States Army wrote that helicopter operations in Korea “have left little doubt as to the capability of the cargo helicopter to fly units and supplies to points beyond the means of other methods of transportation. The cargo helicopter, employed in mass, can extend the tactical mobility of the Army far beyond its normal capability. I hope that the United States Army will make ample provisions for the full exploitation of the helicopter in the future.”

Despite accolades like this, there was relatively little thought to applying the helicopter in combat. It would take the publication of a small article in a popular magazine to spur interest in the next ‘revolution’ in warfare.

The Army’s efforts in this time period provide some insights into military innovation. Despite being the first to field a regular helicopter unit (the 6th Transport Helicopter Company in December 1950), it took the Army over eighteen months longer to conduct its first combat mission using a helicopter transport company. Why did the Army take so long compared to the Marine Corps and why did it not employ its helicopters for mass combat transport of soldiers? There is the obvious fact that the lack of helicopters played a significant part. The helicopter industry’s limited production capacity combined with interservice arguments denied the Army from fielding helicopter transport companies until late 1952. However, even if the Army had helicopter units available it is unlikely that any mass movement on a regular basis would have occurred.
due to the Army’s inexperience with, and lack of doctrine for, employing helicopters. Without an organization on the Army staff there was no agency to supervise and control developments and experiments or to articulate the needs of aviation to other staff sections. By the time a sufficient number of cargo helicopters and trained personnel did arrive in Korea, the situation had become relatively static and the opportunity to employ helicopters in the offense had long passed. Thus its only experiences were on a static battlefield which emphasized the helicopter’s logistical utility rather than its mobility differential.

The Army’s leadership failed to capitalize on the opportunities available to them in Korea. Whereas the Marine Corps used the war as an opportunity to perform more realistic experiments, the Army was content with limited operations. The Army had begun to move men and equipment in exercises in the United States, but it was not willing to push the conceptual envelope in Korea. The limited capabilities and small numbers of helicopters in the theater combined with the late arrival of the cargo helicopters prevented any thorough experiment with air mobility. The helicopter had conclusively shown its value for air rescue and aerial medical evacuation missions, but the same could not be said for the air mobile and logistical operations. The capability of performing these missions while opposed by the enemy had not been tested.299

The Army’s experiences during the Korean War had a lingering effect on its future efforts at developing its aviation component. The operations in Korea, the

298Army Helicopters Transport and Cargo Annex P.
299Jay D. Vanderpool Interview by Lieutenant Colonel John R. McQuestion, Senior Officers Oral History Project 83-12, page 41. Found in Oral History Box, The Jay D. Vanderpool Papers at MHI. The Air Force’s rescue helicopters did operate under combat conditions, but only with fighter escort.
Medical Department’s active campaigning for a helicopter dedicated to medical evacuation, and a desire to allay Air Force fears pushed the Army to emphasize the helicopter’s utility as a logistics vehicle. Under Heileman, and his successor Lieutenant General Frank Besson, the Transportation Corps’ focus on using the helicopter as a logistic tool was correct for its mission. As the concept of warfare changed, the pattern for supply and logistics also needed to keep pace. The Transportation Corps, which provided the means of distribution for supplies, had to be flexible in its approach and appreciation to meet those new demands. The problem was that other uses for the helicopter received less attention and funding. So while Transportation Corps provided a valuable service by taking a moribund helicopter program in 1952 from an indifferent Ordnance Corps, the potential still remained that the helicopter might only be seen as an aerial truck. To prevent this required the establishment of an independent agency on the Army staff dedicated to exploring aviation’s full utility. 300

Next, the Army’s inability to obtain adequate quantities of aircraft in a timely manner, despite having a legitimate need and having Congressional funding, convinced many in the Army that it needed to gain total control over its own aircraft procurement and development. 301 Despite being an immature technology, the helicopter had quickly become an issue between the two services. The helicopter was in the “unusual position of being an aviation vehicle whose major applications lie in non-aviation fields or in

300 The aviation program for the Army had become so important, expensive, and controversial, that Secretary of the Army Pace established the Army Aviation section in the Army G3. The three assigned officers were to be the focal point on the Army Staff for all aviation matters. See Williams, “From Balloons...” 22.

301 Williams, “From Balloons...” 22.
applications not yet encompassed by air thinking.” Once the war began the Army quickly made plans for increasing the size of its aviation assets. Its expansion plans were foiled by strong Air Force opposition. The Air Force restricted growth through “command editing” in the procurement process and through the enforcement of bureaucratic agreements restricting size and missions.

Finally, aviation supporters realized that the only way to gain greater support was to develop it themselves. Aviation needed to have a broad base of support both in the Army and in Congress in order to ensure understanding and expansion. This need would ultimately result in the creation of a program known as Eagle Flights for rising field grade officers, the creation of an aviation director, and the forming of a helicopter unit to shuttle the President and members of Congress around.

CONCLUDING THOUGHTS, 1945-1954

The Marine Corps’ and the Army’s efforts at incorporating the helicopter into their force structures from 1945 to 1954 are illuminating examples of the innovation process. The Marine Corps was the first to grasp the potential of the helicopter for transporting combat forces on the battlefield. The helicopter’s ability to move men and equipment from ship to shore allowed the invasion fleets to be more dispersed and less vulnerable to nuclear attack.

The possession of compelling reasons in all four areas of the innovation process helps to explain the Marines’ successful experiments with helicopters. First, the external stimuli that the Marine Corps perceived to threaten its very existence made it essential to

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302L. Welch Pogue, “Helicopter’s Air Power Role Misunderstood,” *Aviation Week* February 28

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re-examine its methods. This review was aided by the second factor -- the innovation-friendly culture of the United States Marine Corps. The Marine Corps’ experiences in developing amphibious warfare created an organization that encouraged new methods for solving problems. If not always embraced, especially by the Marine fixed wing aviators, the majority of the ground commanders strongly supported the new concepts and ensured that it became accepted by the Marines as the road to survival. Furthermore, this change was reinforced at the Marine Corps School which continued to run war games, refine doctrine, and teach it to the rising generations of officers.

The third factor was the support the Marine Corps received from external organizations. Although the relationship between the Marines and the Navy could be described as a “behind closed door domestic dispute,” it was still better than that of the Army and Air Force. The Marines and the Navy readily accepted the helicopter and the associated change in the doctrine for amphibious assaults because of their experiences between World War I and World War II. During this time, innovations included the development of naval (carrier) aviation and submarine warfare for the Navy; for the Marines it was the development of amphibious assault doctrine. The junior officers of that period embraced the innovations and became the senior officers who effectively


303 Although Marine aviators lamented the increasing number of helicopters since it meant a corresponding decrease in the number of fixed wing aircraft, they also recognized that the vertical envelopment concept meant a greater need for CAS than the previous doctrine.

304 The potential reasons for this are threefold. One was the Marine Corps’ ability to mobilize key members of Congress to preserve its existence and funding. Although its force structure, procurement of equipment, and manning levels varied from 1945 to 1965, the Marine Corps’ existence as a significant component of the armed forces was never seriously challenged after the 1947 National Defense Act. The Douglas-Mansfield Act of 1952 fixed the structure of the FMF as 3/3 in Title 10, USC. The second was the close relationship and combat experience of senior leaders that was developed in the Pacific. Finally, the Navy had a shared interest in maintaining the amphibious assault mission. This mission was a component of sea power and brought prestige as well as funding to the Navy.
implemented them in the Second World War. In the immediate postwar years, the Navy’s institutional culture was more tolerant of innovation and change than at any other time in its history; the senior officers were in a position to continue to effect this change and did so as needed.\textsuperscript{305} The Marines also made sure they kept government support by having Congressional leaders observe Marine Corps experiments.

Finally, technology continued to improve and indicated that larger vertical assault operations would be feasible in the near future. This allowed for the extensive testing of the new doctrine’s theoretical concepts and their eventual inclusion into the official doctrine.

For the Marine Corps, the innovation process essentially ended with the forming of transport helicopter squadrons during the Korean War. After the conflict ended, the Marines continued to refine their doctrine and create additional helicopter units, but it did not make any major changes in organization and employment until the Vietnam Conflict. Although the Marines’ highly successful small scale experiments with helicopters were novel, the entire doctrine did not change. Despite the initial assaults being conducted from over the horizon from dispersed amphibious forces, the marines recognized that the follow-on waves would move, in the traditional manner, by ship. Also *Phib 31* did not change how forces were structured. The helicopter squadrons remained part of the Marine Aircraft Group and not integrated with the ground forces. This was compensated by the thorough procedures and close relationship traditionally enjoyed between marine air and ground components.

\textsuperscript{305} A qualifier on this must be placed. Almost always the willingness of a military organization to innovate is due to a problem that needs a solution and not necessarily because the leadership is searching
In contrast to the Marines, the Army lacked most of the conditions necessary for successful peacetime innovation. The Army’s leadership did not perceive the strategic situation as one that threatened its existence nor its traditional mission. The most serious threat came from the Air Force which opposed any attempt to expand Army aviation.

The Army lacked the innovative culture of the Navy and Marine Corps. With the creation of the Air Force as an independent service, almost the entire population of experienced and combat tested light, fixed-wing pilot leadership departed with it. This left the Army with only junior pilots who had never seen combat and those aviators who wanted to fly but did not aspire to command. Both of these types of pilots lacked credibility when compared to their combat arms counterparts who had commanded units.

Throw into the mix the helicopter’s being in its technological infancy and the Air Force’s ambivalence towards the helicopter and the result is an innovation process with a much longer gestation period. Thus, the Army left the Korean War with helicopter units that had moved supplies under combat conditions, but not men. It was an Army that had many different agencies examining helicopter development and employment, but no central agency with overall authority to provide direction. It had a working paper on helicopter usage, but no formal doctrine or field manual (that would not occur until 1957). Finally, it was an Army that would fund the helicopter in wartime, but could find little room in the tighter, peacetime budgets.

As a result, the Army’s post-Korean War developments followed a haphazard course. Advocates of army aviation and helicopter enthusiasts believed that the

for innovation for innovation’s sake. Besides the use of helicopters in amphibious assaults, the Navy readily adopted the use of nuclear power for its major surface and undersea combatants.
helicopter was the next logical step in airborne-type operations. Opposition within the Army centered on the immature state of the technology and a belief that helicopters would continue to remain frail machines too vulnerable to ground fire. They saw the helicopter’s usefulness as being a logistical tool operating in areas far away from enemy direct fire weapons. The establishment of the Office of Army Aviation, although a step forward, lacked the centralized authority to guide the development of the helicopter and experiments with tactical doctrine. Instead, the Army pursued diverging efforts at making the helicopter a replacement for the wheeled cargo vehicle, an assault vehicle, and an anti-tank weapons platform.
CHAPTER 7

A NEW LOOK AT VERTICAL ASSAULT: THE BIRTH OF VERTICAL ENVELOPMENT

The Marine Corps’ development of vertical assault doctrine continued after the end of the Korean War. The Marines proceed along three different, but related routes. First, the Marines pushed for the procurement of newer and better equipment necessary to make the concept work. The two major pieces of technologies were a new heavy helicopter and purpose-built helicopter assault shipping. Second, the Marines continued conducting amphibious exercises to expand and refine the application of helicopters for amphibious assaults. Third, the Marines continued to educate their leaders on the concept in anticipation for the day that they actually possessed the capability to conduct large-scale helicopter assaults.

The Korean War brought an expansion to Marine aviation. By June 1952, the Marine Corps had three Marine Aircraft Wings (MAW) each composed of three fixed wing Marine Air Groups (MAG) and one helicopter group, designated MAG (HR). Significant, the helicopter’s performance in Korea had convinced many that this was

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306 Mersky, *U.S. Marine Corps Aviation*, 192. To be self-sufficient each MAW also had a two squadron fixed wing transport group, a photo-reconnaissance squadron, and an observation squadron (which also included helicopters). The helicopter group contained three squadrons of helicopters.
the future for Marine aviation and it had become the focal point of the Marine aviation programs as seen in the growth from one squadron in 1950 to nine squadrons in 1953. In addition new helicopter designs of significantly greater performance were in various stages of design by the time the Korean War ended.  

While the fighting in Korea had not ended, the chiefs of the services began preparing for the next big fight – garnering their fair share in the post-war defense budget. Remembering the near-destruction of the Marine Corps after World War II, senior Marine officers took their responsibility for developing the tactics, techniques, and equipment used by landing forces in amphibious operations very seriously and were determined to stay ahead of the technology curve. Since helicopters were to play a large role in the future Corps, securing funding for future aircraft and equipment needed to completely develop the doctrine was of paramount importance. Anticipating future budgetary reductions the Commandant of the Marine Corps, General Lemuel Shepherd, formed the first Advanced Research Group (ARG) in 1953. He instructed the members to examine the problems associated with amphibious operations, developing a final overall concept for future amphibious operations, and then determine the resources needed to execute the concept. If the board could do this, then the Marine Corps could take a strong position in the upcoming defense funding battles and, more importantly, provide the country with the best amphibious force to meet American policy objectives.

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307Mersky, *U.S. Marine Corps Aviation*, 192. These included the Kaman HOK, an improved Sikorsky HRS, a Sikorsky HUS, and the very large Sikorsky HR2S.

The formation of the ARG was also important for the intellectual development of the Marine Corps’ leaders. Up to this time, the only course in the Marine Corps Schools system that dealt with issues of specific concern to the Marine Corps was the Amphibious Warfare School’s Senior Course, which was then for colonels and lieutenant colonels, but it emphasized the tactical and operational aspects of warfare. As a result, General Shepherd believed that this limited the intellectual development of Marine officers and prevented the advanced study of problems associated with amphibious operations. This meant that there were few officers in the Marine Corps who were looking at current trends and anticipating the future. The forming of an Advance Research Group was intended to address this deficiency. Its mission was “to provide opportunity for advance study and original research for Marine Corps officers of the rank of colonel” and which specifically included the “advancement of theories and practices relating to landing operations.” Shepherd wanted the group to make assessments and propose solutions without fear of retribution. As a result, he made it a prerequisite that members had to be colonels who were not eligible for selection for brigadier general in the next four years. The committee served for nine months, which corresponded to the MCS academic year, and tackled problems chosen by the Commandant of the Marine Corps.

The inaugural ARG met in the fall of 1953 and began work on four projects. The first and most important project was developing a concept of future amphibious

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operations that maximized the utilization of the Fleet Marine Force as a mobile force in readiness. In addition they were to assess the validity of current doctrine, organization, training, and equipment to executing this new concept.\textsuperscript{312} Shepherd’s instructions indicated that he was concerned about three things. One was ensuring that the Marines were best prepared to execute amphibious operations in a rapidly changing and increasingly complex environment. Second was to ensure that they, and only they, could provide this unique service to the nation’s defense establishment. Third, he wanted to build the force of the future without sacrificing capabilities needed in the present.

The ARG’s new concept for conducting amphibious assaults in the nuclear era completely integrated Marine air/ground landing forces. These forces were “organized, trained and equipped to exploit the speed and flexibility of the helicopter” which provided both wide dispersal and rapid concentration of the force. The entire assault element would be structured and equipped so they could be completely transported by helicopter. To get the landing force near the chosen invasion site, the Marines needed “amphibious shipping specially designed to transport troops, equipment and helicopters to the objective area at speeds comparable to that of the supporting fleet aircraft carriers.”\textsuperscript{313}

The sequence of events began while the invasion fleet was still more than a thousand miles away. The supporting fleet provided concentrated neutralization fires using guided missiles and high performance long range carrier aircraft delivering nuclear


\textsuperscript{313}General Randolph McCall Pate (Commandant, USMC) speech to Army War College, 16 January 1957. Found in CARL; MG R.O. Bare (USMC) speech to Army War College, 25 February 1955.
weapons. As the fleet closed, additional lighter aircraft also attacked while the fleet
maintained air defense coverage. The enemy’s nuclear capability was the greatest threat
and priority of effort was dedicated to destroying the enemy’s delivery capability. The
targeting also included command and control nodes, military forces, and industrial
installations. When the task force was approximately one hundred miles out, the assault
would begin, while still steaming, with the ship to shore movement of forces by
helicopter. Supply and reinforcement of the landing force would be “primarily by air.”

There were many advantages to executing such an operation. Previously the
fleets had to move very close to the beach, halt, and disembark the assault force who
would then move forward at a speed of four knots in landing craft. The enemy’s ability
to plan for a defense against vertical envelopment was much harder since the invasion
force was no longer restricted by geography for its attack. The enemy needed to remain
deployed and mobile because of the Marine capability to land almost anywhere. Any
fixed defenses not destroyed in the preparation phase were to be bypassed and the
helicopter borne forces would land at their initial objectives which could be miles inland.
By the time the ship-to-shore phase was complete, the beachhead would be controlled by
a series of Marine-held positions.

It is important to understand that the use of helicopters in the assault was only a
part of the Marine effort to ensure that amphibious assaults remained practical in the
nuclear era. Once the beachhead was secured, Marine aircraft would redeploy from

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The similarity of the content of the two lectures indicate that the Marines had settled on the basic concepts
and now were refining the doctrine.

314 General Randolph McCall Pate (Commandant, USMC) speech to Army War College, 16
January 1957. Found in CARL; MG R.O. Bare (USMC) speech to Army War College, 25 February 1955.
carriers to ashore. They would use portable catapults and arresting gear to alleviate the need for large airfields. Offshore tankers would pump fuel through a pipeline to portable tank farms ashore and then directly to the user. Cargo helicopters and assault transport aircraft would directly resupply units, avoiding the need for supply depots (which could become a significant nuclear target), increasing responsiveness to force needs, and eliminating the need for an elaborate ground supply infrastructure. This meant that the traditional problems of clearing supply routes, creating beach exits, and building roads and bridges were minimized.\footnote{General Randolph McCall Pate (Commandant, USMC) speech to Army War College, 16 January 1957. Found in CARL; MG R.O. Bare (USMC) speech to Army War College, 25 February 1955.}

General Pate believed that this concept would work best in the nuclear environment but would also be effective in a conventional conflict. Sounding much like his Air Force counterparts, Pate argued that using nuclear weapons would reduce the time needed to execute a successful landing while increasing the economy of forces and logistics. Nuclear weapons saved time in preparation of the objective area and would require less forces to provide fire support while reducing the logistical support that would be needed if the preparation was by conventional munitions only. Without nuclear support, the cost in time, forces needed, logistical support, and lives would increase. “Nevertheless in the non-atomic war we are confident that our new concept will give us a terrific advantage over what we could do in the past. For just as nuclear weapons multiply the effectiveness of fire power, so does the helicopter increase the mobility and flexibility of the landing forces.”\footnote{General Randolph McCall Pate (Commandant, USMC) speech to Army War College, 16 January 1957. Found in CARL; MG R.O. Bare (USMC) speech to Army War College, 25 February 1955.}
At the time of his speech in 1957, the Marine Corps could execute the operation described only on a limited scale. The tactics and techniques had been tested and verified in the Korean War. The Marine Corps was buying helicopters in large quantities and the FMF air and ground units continued to train in helicopter operations. The Navy already had converted one aircraft carrier into a helicopter assault ship and there were plans to build new ships specifically for the purpose of helicopter assaults for the next few years. He anticipated by 1960 the Marine Corps would possess enough helicopters and ships to lift simultaneously the division in the amphibious assault.\footnote{General Randolph McCall Pate (Commandant, USMC) speech to Army War College, 16 January 1957. Found in CARL.}

In summary, the ARG’s final paper constructed a concept that had six main parts. First was the quick movement (20 knots or faster) of helicopter assault forces to the objective area with a fast carrier task force providing escort. Inherent in this was the need for a ship specifically assigned the role of transporting, launching, and recovering assault helicopters. The second part emphasized the use of tactical nuclear weapons to destroy air bases and aircraft within striking range of the objective area and to neutralize forces in the landing area, to include enemy reserves or forces on the flanks. The use of tactical nuclear weapons was in concert with the current overall American doctrine that increasingly emphasized the use of nuclear weapons to counteract numerical inferiority. Americans expected the employment of nuclear weapons by both sides in the next major war. The third aspect used helicopter assault forces to exploit the initial shock of the atomic preparatory fires and to seize key terrain in the objective area. The fourth phase used heliborne troops maneuvering, in conjunction with atomic and conventional fire
support, to expand the area controlled by the landing forces. During the assault phase, helicopters were to also provide logistical support.\textsuperscript{318}

This concept expanded upon the ideas initially proposed by the Shepherd Board in 1946. Whereas the helicopter was previously used as a component in the initial phases of the amphibious assault, the ARG’s overly optimistic concept now relied almost exclusively on the helicopter in all phases of the operation. They believed that the helicopter, if fully exploited properly, gave the Marine Corps an unprecedented degree of speed, mobility, and flexibility in deploying a division-sized force while reducing its vulnerability to enemy action.\textsuperscript{319}

However for this “all-helicopter” concept to work the ARG had to make some fantastic assumptions. First, it required the Navy to provide sixteen helicopter carriers or Landing Platform Helicopter (LPH) ships. Second, it assumed the Navy and Marine aircraft could gain and maintain local air superiority and also clear landing zones for the helicopters. Finally, the committee relied on the Sikorsky claims that the HR2S helicopters currently in development would be able to lift at least 12,500 pounds for a distance of 100+ miles. The lift capacity was very important since this meant that the helicopters could transport ashore the division’s 155mm howitzers and 6x6 2 ½ ton trucks.

The committee acknowledged that the Marine Corps in 1953-54 did not have that capability and recommended a course of action that incrementally built the required force. Since the future laid with the helicopter, the ARG believed that the Marine Corps

required a minimum of 180 Sikorsky HR2S large transport helicopters to equip the nine helicopter squadrons needed for the vertical assault mission.\textsuperscript{320} Marine fixed-wing aviators provided the most vocal opposition to this new version of the vertical assault. Already feeling like second class citizens because of personnel shortages, the aviators saw the ARG plan as taking more people and aircraft from fixed-wing aviation.\textsuperscript{321} Naval aviators also had reservations about the ARG concept. They wondered where the carriers were going to come from and who would pay for this expensive program? Also of concern was that there would be less Marine aircraft available for naval missions and carrier defense. To try and pacify Marine aviators, the ARG declared that armed helicopters were not needed, and instead relied on fixed wing Marine close air support to clear the helicopter landing zones and along the aerial routes using either conventional or nuclear weapons.

Despite the concerns of aviators and the questionable validity of some of the ARG’s basic underlying assumptions, General Shepherd approved the ARG’s proposals in April 1954 and “directed that these new concepts now represented the long-range objectives of the Marine Corps.”\textsuperscript{322} The Chief of Naval Operations, Admiral Arleigh Burke, also informally agreed with the program but withheld formal approval until 8 December 1955. In a letter to Shepherd, Burke strongly supported the Marines’ need to

\textsuperscript{319}The ARG reported that even if nuclear weapons were not used, the helicopter provided an enhanced capability to successfully execute amphibious assaults.
\textsuperscript{321}Millett, \textit{Semper Fidelis}, 524. After the Korean War the Marine Corps suffered from personnel problems. Marine Corps Headquarters directed that the ground divisions had priority of replacements over the Marine Air Wings. Also, because the Navy had fixed the Marine Air ceiling at 1425 aircraft, any expansion of the helicopter program meant a corresponding decrease in the number of fixed wing aircraft as well as further losses in pilots and air crews.
convert to transition to the new doctrine. Burke reiterated that achieving the desired end state depended on many factors. One of the most important factors being the Congressional funding of the naval shipbuilding and conversion program. On 13 December 1955, just five days after receiving the CNO’s approval, the Marine Corps School formalized the ARG vision with the publication of Landing Force Bulletin 17 (LFB-17). Introducing the term vertical envelopment, the only other change was that sufficient lift was now needed for a division plus its supporting MAW’s ground support element. While LFB-17 was a significant increase in terms of desired capability, it was more of a symbol since the Marines did not possess, nor did they anticipate getting during the New Look, the men and equipment needed to execute the concept. Although important, this was not the first new doctrinal publication since Phib-31. Earlier in the decade the Marines published LFB-2 *Interim Doctrine for the Conduct of Tactical Warfare* and LFM-24 *Helicopter Operations*. These publications were the means by which the theoretical concept was translated into practice. They helped units develop the specific tactics, techniques, and procedures for unit training and created a dialogue for exchanging ideas. These publications created a feedback loop which encouraged participation and assisted in the final development by the Marine Corps Test Unit 1 and the ARG.

In order to implement the ARG vision, the Marine Corps examined its force structure, organization, training, and equipment. The Marine division needed to shed elements of its organization that could not support the all-helicopter doctrine. A new

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training program was needed and the division’s equipment needed to get smaller and lighter for helicopter transport. Finally, the Marines needed to obtain nuclear weapons for division use, build a more robust logistics system using helicopters, and find new amphibious shipping.

The Marine Corps started by fielding another experimental unit, Marine Corps Test Unit 1 (MCTU 1), on 1 July 1954 at Camp Pendleton, California. Although officially a regimental size unit, in actuality it was a reinforced infantry battalion with the mission to develop the tactics, techniques, and procedures needed for helicopter operations. One area of particular interest was whether atomic weapons could be used to directly support an amphibious assault. As part of Exercise Desert Rock V, MCTU 1 conducted operations in conjunction with a nuclear strike. Supported by 39 HRS helicopters from MAG(HR)-16, the unit utilized the vertical assault tactics and concluded that heliborne forces could successfully operate in close proximity to a nuclear explosion while supporting an amphibious assault.325

The following year the new ARG chose to build upon the new all-helicopter concept by determining the Marine Corps’ requirements for types and numbers of helicopters. The group recognized the Marine Corps required a family of light, medium, and heavy helicopters to perform all of the combat and logistical tasks in an amphibious operation. Since the Marine Corps lacked a heavy helicopter capable of lifting heavy equipment and large numbers of troops was essential for landing operations, the group chose to focus on this. They anticipated by 1957 that all HMRs would be equipped with the HR2S. With the HR2S the Marines could deploy from farther away, get there faster,
and deploy more troops and equipment in a shorter time. Their analysis indicated that the Marines needed 180 helicopters (20 per squadron) to meet interim helicopter requirements instead of the 135 already ordered. With a reported 12,500 pound payload, the HR2S was needed to move the division’s two most important assets – the 155mm howitzer and the 6x6 2 ½ ton truck.

Another board convened in January 1955 to determine the requirements for a new medium helicopter. Composed of senior Marine officers and headed by Lieutenant General Oliver P. Smith, the board was concerned with the Marine Corps’ focusing too much on the HR2S. The board determined that the HR2S was too big and required too much maneuver space on the battlefield than was desirable. The board still recommended the procurement of 180 of the heavy transport helicopters as being necessary for operations, but it also sought the development of a medium helicopter to complement the HR2S. It also recommended the addition of two medium helicopter squadrons to each wing and the HUS was the most likely selection. If accepted, the board’s conclusions would almost double the number of helicopters in the Marine Corps and could do so only at a one for one reduction in fixed wing aviation. Due to the very high procurement cost the Navy rejected the proposal.

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325 Desert Rock V Report, NARA.
326 The ARG estimated that the HRS had a radius of 20 miles with an average payload of 1,300 pounds. The HR2S would average 8,000 pounds at a radius of 50 miles. This meant that a MAG using HRS helicopters (three squadrons of 15 helicopters) in 1954 would take seven hours to land the assault elements of a single BLT whereas a MAG equipped with HR2S helicopters could land an entire division in 15 hours. See Rawlins, 64.
327 Smith had previously served on the 1946 Special Board and was very familiar with the issues surrounding vertical envelopment. Other officers on the board were Major General Robert O. Bare, Director of Marine Corps Education Center; Major General Homer L. Litzenberg, Inspector General of the Marine Corps; and Brigadier General John C. Munn, Assistant Commanding General, FMFLANT.
Problems with the HR2S development program forced the Marine Corps and the Navy to consider other alternatives. Ultimately, the two services agreed to procure just thirty four of the original 158 HR2S ordered. This was an insufficient number to make the vertical envelopment work. To offset the drastic reduction in lift capability, the Navy bought 140 HUS medium helicopters by 1959. Although the HUS was smaller, had a shorter radius of action, and could not lift nearly as much as the HR2S, it was cheaper to procure, operate, and maintain. The change to smaller, lighter helicopters forced the Marine Corps to reassess its capabilities and doctrine. In order to make the concept work, the ground units needed to change their organization and get lighter. Possessing nine squadrons totaling 180 HRS light helicopters in 1956, the Marine Corps would then have to use the HUS as a substitute as it came into service. By 1960 the G-3 estimated that the total force would consist of 285 helicopters, 240 light helicopters (HUS and HRS) in 12 squadrons and 45 medium helicopters (HR2S) in three squadrons.

To thoroughly explore how the Marine Corps should modify its efforts two studies were undertaken. The G-3, HQMC study was the first to appear in May 1956. Examining the employment of helicopters in the Fleet Marine Forces through 1960, the G-3’s study focused on the question of whether helicopter squadrons should be distributed equally among the three divisions or concentrated so that a single division had

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329 Rawlins, *Marines and Helicopters, 1946-1962*, 68. There were three main problems with the HR2S: because of the increase in the helicopter’s weight, combat radius had decreased by 2/3 to just 50 miles and the ability to hover out of ground effect decreased to almost ½ of the required altitude. A final, extremely important deficiency was the inability of the HR2S to automatically fold its blades which greatly reduced its operational use.

330 CNO Burke authorized the initial reduction in April 1956 to just 46 HR2S helicopters; as the years progressed the number actually dropped lower.

331 Mersky, *U.S. Marine Corps Aviation*, 193. The HUS was also used in the Army as the H-34, the Navy as the HSS-1, and Sikorsky as the S-58.
the greatest amount of lift available. It concluded that every division needed to have a minimum capability to lift simultaneously a BLT of two companies and a command group in the first wave up to a distance of 25 miles. As the new HUS and HR2S came into service, the helicopters a priority of fill was established as 1st Marine Division, followed by the 2nd, and lastly the 3rd. While Marine Corps commanders were not thrilled with this reduced capability, they recognized that it allowed their staffs to conduct accurate planning for the immediate future and would better prepare them for an anticipated future expansion of lift capabilities beyond 1960.

Struggling to balance the need to maintain current capabilities while developing its vision for the future force, the new Commandant, General Randolph McCall Pate, ordered the convening of another board “to conduct a thorough and comprehensive study of the entire FMF, including aviation, with the purpose of making recommendations for the optimum organization, composition, and equipment of the FMF.” For the board’s president, Pate chose Major General Robert E. Hogaboom, the Deputy Chief of Staff (Plans). Officially titled the 1956 FMF Organization and Composition Board, and

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332 Rawlins, *Marines and Helicopters, 1946-1962*, 70. See Figure 4 at bottom of page.

333 Rawlins, *Marines and Helicopters, 1946-1962*, 71. This minimum capability was a much reduced requirement when compared to the 1953 ARG Project IV recommendation of a helicopter lifter four BLT initial assault force. It was also a much smaller force than the goal set by CMC General Lemuel Shepherd in 1955 to lift a 1½ divisions. SEE G-3, HQMC Study No.3 – 1956 memo to CMC, dated 8 May 1956, Subject: Employment of Helicopters within the FMF during the period 1956-60; CMC letter to Chief of Staff, dated 24 May 1955, Subject: Board to Study Composition and Functions of Marine Corps Aviation.


337 Rawlins, *Marines and Helicopters, 1946-1962*, 73. Hogaboom attended the National War College in 1949 and served as the Marine Corps’ liaison to the CNO in 1951 and 1952. In July 1952 he became the 2d Marine Division’s assistant division commander. In 1954 and 1955 he was the assistant commander for the 1st Marine Division in Korea and later its commanding general.
commonly referred to as simply the Hogaboom Board, the recommendations that the board made would serve as the main guide for force development through the early 1960s. On the board there were 15 other senior officers, to include Brigadier General Edward C. Dyer and Colonel Keith B. McCutcheon.\textsuperscript{338}

The board received a long letter from Pate that provided specific guidance on concepts and criteria. The helicopter was to be the primary means for achieving tactical surprise and flexibility in amphibious assaults. However, until a sufficient number of better performing helicopters could be obtained, the Commandant acknowledged that landing craft and ground vehicles would still provide the majority of transport for the assault landings, tactical maneuver, and logistical support on the objective. As the number of helicopters increased, Pate expected a corresponding reduction in the number of other vehicles in the division. Its specific mission was to “to determine what the FMF needed to meet the initial requirements for achieving the new concept for amphibious warfare, beginning with Fiscal Year 1958 and provide a plan for future development.”\textsuperscript{339}

The board’s conclusions focused on how to best employ the currently available technology and equipment in the FMF. The board envisioned “an operation wherein the flexibility of the helicopter-borne assault forces would be exploited to uncover and secure the beaches and to seize critical areas which will be required to enable us to phase in the additional means to maintain the momentum of the assault and secure the objective

\textsuperscript{338}Rawlins, Marines and Helicopters, 1946-1962, 73. Dyer joined the board when Brigadier General Ronald D. Salmon was relieved of board duties on 16 July 1956). Both Dyer and McCutcheon had previously commanded HMX-1 and in Korea HMR-161.

In doing so, the Hogaboom Board rejected the concept of the entire landing force and its equipment being completely deployed by helicopter in the near future. The Board recommended reorganizing the divisions with the net effect that each division had 2,000 less personnel. Most of the changes affected the ground components, but it did recommend reorganizing the FMF’s aviation wing to execute the essential tasks for a given mission and not as a T/O unit. For the rotary wing groups, the committee recommended that the light helicopter units have an organization and sufficient equipment to transport the division’s reconnaissance battalion and that the two organizations work together to develop tactics and techniques for combat. The Board desired an increased reconnaissance capability in each MAG and added more helicopters per squadron for this reason.

The Hogaboom Board also understood that certain developments needed to occur for the concept to reach its full potential. It stated a need for more helicopters of improved performance, more LPH and amphibious shipping, and lighter, helicopter transportable equipment like anti-tank and other crew served weapons. These developments were necessary to ensure that eventually the entire assault force was helicopter transportable and the division completely air transportable. The report also included a program for development divided into three phases. The first phase was through 1958 and had the objective of obtaining the capability to air land and support one battalion landing team (BLT) in each Marine division. In phase two the goal was to land

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341 Hogaboom Board, Part III, p. 10. Found in Historical Amphibious Files, MCRC, Quantico, VA.
342 Hogaboom Board, Part III, p. 10 and Part V, p. 7. Found in Historical Amphibious Files, MCRC, Quantico, VA.
and support one regimental landing team (RLT) in each division by 1961. The final phase from 1961 to 1965 was to continue to develop helicopter lift capability to a total of 15 squadrons and to obtain seven additional LPH ships for the fleet’s amphibious forces for a total of 12 LPHs, six for each coast.

The board’s recommendations resembled the five year plan that was previously published in July. The Hogaboom Board’s proposal emphasized a continual, if gradual, improvement in capabilities. While not discarding the possibility of an eventual all air capability, the Board accepted the reality that the Eisenhower Administration’s limited funding for defense made this goal unrealistic within the next 15 years. Instead, it struck a balance between maintaining the capability of the legacy force while still pushing for the development of a future all-air capability. The Hogaboom Board presented its recommendations to Pate in December 1956. The Marine Corps completed field testing on the new organizations and structures in June 1957 and completed the re-organization of all FMFs by September 1958.

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343 Hogaboom Board, Part V, p. 8. Found in Historical Amphibious Files, MCRC, Quantico, VA.
344 Rawlins, Marines and Helicopters, 1946-1962, 77-78. Ultimately, the Hogaboom Board resulted in the “M” Series T/O which changed the helicopter group’s structure. The VMO squadron was trimmed to just twelve light fixed wing observation aircraft and a composite squadron of twelve HOK and twelve HRS light helicopters re-designated from HMR(L) to a Marine Helicopter Reconnaissance Squadron or HMR(C). The other two light helicopter squadrons remained unchanged except for the increase in helicopters from 20 to 24. The testing of the composite squadron by MAG-26, commanded by Colonel Keith McCutcheon, revealed some serious deficiencies. McCutcheon wrote that the MAG lacked the flexibility to perform its mission with just two light transport squadrons instead of three. He recommended the disbanding of the composite squadron, the reforming of the third light transport squadron, increasing the VMO’s strength to 12 HOK and 12 OEs, and the assignment of the HUS helicopters to light transport squadrons “as expeditiously as possible.” McCutcheon’s recommendations were eventually followed and by February 1960, the Marine Corps returned to a more standard structure. Also see CMC letter to CNO, dated 14 March 1958, Subject: Establishment and redesignation of certain Marine squadrons; Commanding Officer, MAG-16 Letter to CMC, dated 14 March 1958, Subject: Organization of MAG-16, pp. 1-7; Commanding Officer, MAG-16 letter to CMC, dated 22 April 1959, Subject: Organization of MAG-16.
The Hogaboom Board’s recommendations took on an even greater importance because constraints in defense expenditures forced the Marine Corps to reduce its force structure. The Marine Corps had to reduce its total personnel from 200,000 on 30 June 1957 to approximately 175,000 by midyear 1959 with an expectation that the force could shrink even more through 1962. This 12.5% manpower reduction was accompanied by a 15% reduction in aircraft from 1,425 to 1,200 by 1 July 1959 and then to just 1,000 aircraft by mid-1962 – a loss of 30%.\(^{345}\) It was a difficult task made harder by the dual goal of keeping three Marine air wings while not slowing the development of the vertical envelopment concept. The Hogaboom Board’s recommendations were based on a 1424 aircraft force structure which was implemented, but with some aircraft units having only an 80% fill of men and equipment. Helicopter units emerged from this restructuring fairly well. The major problem was the inadequate funding that could support only three of the planned six medium helicopter squadrons. However the HR2S helicopter still suffered from mechanical problems in 1957, resulting in reduced procurement and caused the Marine Corps to increase the number of HUS light helicopters to 210 to make up for the shortfall in the near term.\(^{346}\)

Competing for funds were the Marine fixed wing aviators. During this period the performance, size, and cost of aircraft continued to increase exponentially. Aircraft that were cutting edge in 1950 were obsolete by 1954. The modernization costs for the fixed wing fleet was significant but by the early 1960s the Marines had completed most of its

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transition to the next generation of aircraft (specifically the Douglas A-4 Skyhawk, the
Chance Vought F-8 Crusader, and the McDonnell F-4 Phantom II) that carried them into
the Vietnam War and beyond.\textsuperscript{347}

Despite the drawdown of the Marine Corps, the aviation modernization programs
continued to progress. In February 1957, the HUS-1 began replacing the HRS
helicopters while the HR2S-1 entered service with HMR(M)-461 in March 1957.\textsuperscript{348}

With the rapid introduction of the HUS-1 starting February 1957, the Marine Corps
planned to expand the number of light transport helicopter squadrons from ten to fifteen.
While the number of helicopters assigned to each squadron would vary, the increased
structure meant that the Marine Corps would have much greater flexibility when
conducting operations.\textsuperscript{349} By 1962, the Marine Corps’ rotary aviation had exceeded its
own expectations in terms of numbers with 337 helicopters planned in the force, while
409 were actually operating in six MAGs, and a few special units like HMX-1, in 1962.\textsuperscript{350}

The one shortfall of the program was the lack of a medium transport helicopter, with just

\begin{footnotesize}
\textsuperscript{347}Mersky, \textit{U.S. Marine Corps Aviation}, 194-7.
\textsuperscript{348}Rawlins, \textit{Marines and Helicopters, 1946-1962}, 79. Cites Aviation Unit History Files,
Reference Section, History and Museums Division, HQMC. See also CMC letter to CG, FMFPac and CG
FMFLant, dated 11 May 1956, Subject: Assignment of Marine Observation Squadrons to Marine
Helicopter Groups; CNO spdltr Op-332D to CMC, dated 18 February 1959, cited in UD RUC 01074, reel
14-59, p. 99; CMC letter to Distribution List, dated monthly, 1956 and 1957, Subject: Aviation Status
Board Photographs, dist, of, encl (1). The HUS-1 was a larger and more powerful helicopter that had
superior performance and capabilities compared to the HRS. It was also nearly identical to the Navy’s
HSS-1 which allowed the flight evaluation to be waived and enabling it to be sent to field units much faster
than normal.
\textsuperscript{349}Rawlins, \textit{Marines and Helicopters, 1946-1962}, 81. The on-hand number of HUS-1 in the
Marine Corps and the unit’s mission were the primary factors in determining equipment level in the HRL
squadrons. Squadrons contained between 18 and 24 aircraft, with the larger number going to those
deployed at sea.
\textsuperscript{350}Mersky, \textit{U.S. Marine Corps Aviation}, 203. The size and composition of each of these MAGs
(MAG-13, -16, -26, -36) varied greatly between groups.
\end{footnotesize}
a total of 31 in service in two squadrons.\textsuperscript{351} Although the Marine Corps had six different helicopters in its fleet, the majority were the HUS, the HOK, and the HR2S; the HUS was the most numerous and composed approximately 65\% of the fleet (225 out of 341).

Besides new helicopters, the other piece of technology the Marine Corps needed was new amphibious assault ships that could carry the helicopters needed for vertical envelopment. Amphibious exercises conducted during and after the Korean War demonstrated the need for a ship whose purpose was to conduct helicopterborne operations. As early as 1951 the Marine Corps’ Tactics and Techniques Board recommended the conversion of four light aircraft carriers for helicopter operations. The Navy denied the request saying they “urgently” needed the aircraft carriers for anti-submarine warfare in Korea.\textsuperscript{352} The Navy offered the use of some Casablanca class escort carriers and the Marine Corps accepted in order to continue working on the concept. The escort carriers were very small and had not been converted for helicopter operations and maintenance. In addition, they could not carry a troop contingent and had to be accompanied by a troop transport ship. In order to execute an assault, troops had to be transferred from the transport ship and loaded into helicopters. This awkward and time intensive procedure was unsatisfactory and precluded any timely assaults.\textsuperscript{353}

A variety of factors finally convinced military and political leaders to provide the Marine Corps with a ship solely for helicopter operations. At the operational and tactical

\textsuperscript{351}Rawlins, *Marines and Helicopters, 1946-1962*, 81. Cites CMC letter to CNO, dated 8 March 1960, Subject: CMC letter of 31 March 1959, encl (2), Aircraft Operating Program; CMC letter to Distribution List, dated monthly January 1960 – December 1962, Subject: Aviation Status Board Photographs. However, the revised planning made by the Division of Aviation in 1959 envisioned only 28, so the actual numbers were 10\% higher than anticipated.

\textsuperscript{352}Amphibious Warfare and the Evolution of the Helicopter Carrier, 18. The Board recommended using the *Commencement Bay* class.
levels, the amphibious operations at Inchon and Wonsan during the Korean War demonstrated that they were still viable in the Cold War. The extensive and successful use of helicopters in the conflict hinted at the vast potential that rotary wing aircraft had once the technology became more mature. At the strategic level, the United States had entered into numerous alliances with countries throughout the world. In order to quickly meet these widespread obligations, it needed a self-sufficient force that could be quickly deployed throughout the world.

The Marines could not fulfill this role unless they had better ships. The majority of amphibious transports used in World War II lacked all the qualities needed to execute global contingency missions. Operations in the Mediterranean and European Theaters required ships that could hold large numbers of troops and heavy equipment for moderate periods of time. Since the enemy was defending in large numbers and strong positions, the key requirement was transporting the largest number of troops for only a short period of time. As a result, the Allies built ships designated as Landing Ship Tank (LST) that had the seaworthiness to travel moderate distances and could hold large numbers of heavy vehicles or troops. In the Pacific, American forces had to travel long distances and faced an enemy that was smaller in number. The American Navy moved troops and equipment over long distances to the island objective in attack transports (APA) and attack cargo ships (AKA). Once near the objective, troops and vehicles were transferred directly into smaller landing craft for the assault onto shore.\textsuperscript{354} Although this process prevented the deployment of large numbers of troops and heavy equipment in the first

\textsuperscript{353}Amphibious Warfare and the Evolution of the Helicopter Carrier, 18-19.
\textsuperscript{354}Discuss ship capabilities briefly and compare European numbers to Pacific numbers.
wave, it was not needed since the Japanese forces were much smaller and less heavily equipped. During World War II Allied forces did not require ships with great speed and range, seaworthiness, and extensive quartering facilities to house large numbers of marines for an extended period of time.

The Navy began to address the shortcomings in its amphibious capabilities by building new assault and support ships. The process began in 1954 with the launching of the USS Thomaston (LSD 28). This was the first of a class of eight new ships known as dock landing ships (LSD). Supporting the LSDs were new attack transports and a new amphibious cargo ship. All of these ships had large range, a speed of at least 20 knots, self-sustaining, and could house troops for extensive periods of time.

In September 1954 an assault forces study group concluded that the helicopter’s performance in Korea demonstrated its importance in any future highly mobile contingency force. The committee recommended a fifteen year plan to replace the World War II era assault transport and cargo ships with helicopter ships for moving troops and equipment to and assaulting the objective. They believed that future amphibious operations would move most of the men by air and most of the heavy equipment arriving by waterborne landing craft.

In 1955-56 the Navy converted the Casablanca class escort carrier Thetis Bay (CVE 90) into a helicopter carrier. Although there had been consideration for building

355 The attack transports was the two ship Paul Revere class (APA 248) and the cargo ship was the USS Tulare (AKA 112).
358 Actually, two ship conversions were authorized by the fiscal year 1955 budget. The second ship, the USS Block Island (CVE 106) was not started until January 1958 and cancelled soon after due to budget cuts.
a new ship for this role, the Navy looked upon amphibious operations as being a secondary mission to its main one of protecting the North Atlantic from Russian submarines and the development of nuclear warships. Considering that the vertical envelopment concept was still relatively novel and uncertain, it was not surprising that the Navy chose to convert an existing ship because it was cheaper. The Navy had a large number of escort carriers which it was removing from service so if the experiment failed, then there would be no long term degradation of capabilities.\footnote{Amphibious Warfare and the Evolution of the Helicopter Carrier, 23. Interestingly, the first helicopter carrier entered into service in 1956 while the last escort carrier exited service that same year.} It was never intended for the Thetis Bay to be the prototype for future LPH ships, but merely as an opportunity for the Marine Corps to better assess the viability of the vertical envelopment concept and to determine future LPH characteristics.\footnote{Rawlins, Marines and Helicopters, 1946-1962, 79. SEE CNO letter to CMC, dated 11 April 1956, Subject: Amphibious Assault Ship requirements to support the mobility of the FMF.}

Laid down on 23 December 1943 and commissioned on 21 April 1944, the Thetis Bay used a merchant vessel’s hull with a length of just 512 feet, a beam of 65 feet (the flight deck extended to 108 feet), displaced 9,570 tons, and had a maximum speed of 19 knots.\footnote{Amphibious Warfare and the Evolution of the Helicopter Carrier, 23. Interestingly, the first helicopter carrier entered into service in 1956 while the last escort carrier exited service that same year.} To make it the type of ship truly needed by the Marines, it needed to undergo an extensive conversion program. However, funding was limited and the conversion consisted of adding accommodations for a marine battalion of 1000 men, removing most of the ship’s gun armament, and modifying the carrier to support the Marines’ new HR2S Sikorsky helicopters. In its original configuration, the Thetis Bay could operate the older HRS helicopter, but the new HR2S was much larger and was expected to weigh more than 40,000 pounds. In actuality, the HR2S typical takeoff weight was somewhat less at
31,000 pounds (including the 10,000 maximum cargo weight). The expected heavy weight required the flight deck and elevators to be reinforced to support 50,000 pounds. The large size of the new helicopters necessitated the cutting away of the stern of the ship and the installation of a crane to move the helicopters to and from the hanger deck and the flight deck. No amount of cutting could expand the carrier’s small size. The Thetis Bay could only carry 20 HRS-type helicopters and its flight deck only had five launching spots. As a result, the Thetis Bay could not deploy more than a company at a time in the assault. Additional forces could not land by sea since the ship also lacked a well deck, could not embark landing craft, and had very limited stowage for cargo and equipment. The conversion took a year and on 20 July 1956 the Thetis Bay, the first helicopter carrier, was commissioned as CVHA 1 and sent to the Far East.

Marines continued practicing their helicopter assaults and ensured that exercises received the appropriate amount of publicity. In spring 1956 a Marine Battalion Landing Team from the 3d Division executed a helicopter assault landing during Operation FIRMLINK -- the SEATO demonstration at Bangkok – which impressed the military members of the alliance. The Anglo-French attack on Egypt in late 1956 further

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362 *Amphibious Warfare and the Evolution of the Helicopter Carrier*, 26. Built by Sikorsky, the helicopter was known by the company as the S-56 and by the Army (which received the majority of the helicopters built) as the H-37 Mojave.


365 *Amphibious Warfare and the Evolution of the Helicopter Carrier*, 26-27. The CVHA designation is: aircraft carrier (CV), helicopter (H), and assault (A). Later on 30 January 1959 the Navy redesignated as LPH 6. LPH stands for Landing (L), Platform (P), and helicopter (H).

366 General Randolph McCall Pate (Commandant, USMC) speech to Army War College, 16 January 1957. Found in CARL.
strengthened the Marines’ case for a purpose built ship. The British used a combination of airborne, amphibious, and heliborne forces to attack and seize the Suez Canal. This is generally considered to be the first use of air assault tactics in combat. Leaders within the Navy (WHOM?) noted the potential of the helicopter and re-examined the current program of converting old aircraft carriers.

Leaders within the Marine Corps had hoped to have many LPHs in service by the late 1950s but were disappointed by the slow progress. The tight defense budgets combined with having to compete with higher priority ships for the Navy (like nuclear powered ships and ballistic missile submarines) meant that by 1960, there was not yet a single purpose built helicopter assault ship. While the Commandant had initially supported idea of converting escort aircraft carriers in 1954, the rapid growth in the size of helicopters meant that these ships would have a very short operational life.

In May 1956 he instead advocated the building of ships designed as LPHs. However, the budget crunch meant that it would be years before any of these ships came into service. In the meantime, the Marine Corps’ vertical envelopment concept would languish and possibly cease without ships. These factors forced him to compromise and agree to a program that converted one escort aircraft carrier and built one new LPH for the Marine Corps every year for the five years from 1958 to 1962. However, the average conversion time was two years and new construction was three, which left the Marine Corps without the amphibious ships necessary to execute the vertical envelopment.

Rear Admiral Frederick N. Kivette of the Navy’s Long Range Shipbuilding and Conversion Standing Committee, proposed using Essex class Anti-Submarine Warfare carriers as an interim solution. These carriers possessed the necessary size to be used for
helicopter operations without extensive and time consuming conversions. Since some of these carriers were scheduled for retirement, their use in amphibious operations would not reduce the fleet’s strength. While this idea had been considered by the Marine Corps back in 1954, it was not proposed because of the fear that the CNO would rule against the proposal, and with it the entire vertical envelopment concept. The CMC waited until the reports from LANTPHIBEX 1-58 concluded that the CVS (unconverted Essex class carriers) were a suitable interim LPH before he wrote the CNO and accepted the offer.

When the limitations of the Thetis Bay quickly became apparent the Navy in 1957 decided to convert a much larger ship, the Block Island, into a helicopter carrier with the designation of LPH 1. It was never built and instead the funds were used to build the first purpose built helicopter carrier, the Iwo Jima (LPH 2). During its construction, there arose an immediate need for a vertical assault capability for use in the Middle East and East Asia. The Navy took three Essex class aircraft carriers and redesignated them

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367 CNO letter to CMC, dated 11 April 1956, Subject: Amphibious Assault Ship Requirements to Support the Mobility of the FMF; CNO letter to CMC, dated 27 June 1956, same subject; Colonel Samuel R. Shaw memo to Chairman, Standing Committee, Shipbuilding and Conversion, dated 14 August 1957, Subject: Use of CVS (Unconverted Essex) Aircraft Carriers as LPH.

368 Rawlins, Marines and Helicopters, 1946-1962, 66. Cites Head, Policy Analysis Division memo to the Chief of Staff, dated 28 April 1954, Subject: Proposed CMC letter to CNO re Use of CVS or CVA for Helicopter Operations.


370 This was a Commencement Bay class escort carrier.

371 Amphibious Warfare and the Evolution of the Helicopter Carrier, 34. It was also the largest amphibious ship ever built when completed in 1961.
as LPHs for use as helicopter carriers.\textsuperscript{372} They were chosen because of their large size which made it easy to operate the bulky helicopters,\textsuperscript{373} a high speed of approximately 30 knots, the minimal cost for adapting to amphibious operations, and their immediate availability. They entered service between January 1959 and July 1961 and were used extensively throughout the world to great success despite suffering from a large crew complement (which the Marine Corps had to contribute officers and men to help run the ship\textsuperscript{374}), the lack of a well deck, the lack of cargo space, and high operating costs.\textsuperscript{375} Due to their impressments into service, these carriers lacked the necessary modifications to make them efficient for helicopter operations. The complement of thirty HR2S or sixty HUS-1 helicopters was very small considering the ships’ large size.\textsuperscript{376}

The Navy’s and Marine Corps’ experience with the Essex class helicopter carriers convinced the military leadership of the need for a purpose built ship. Because the Essex class lacked the ability to embark landing craft and had insufficient aviation space, one study concluded that to meet the Marine Corps’ requirement to lift one division per coast

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\textsuperscript{372}Amphibious Warfare and the Evolution of the Helicopter Carrier, 29. The three ships were the Boxer (LPH 4, formerly CV 21), Princeton (LPH 5, formerly CV 37), and Valley Forge (LPH 8, formerly CV 45).
\textsuperscript{373}The Essex class had an 889 foot flight deck with 14 or more HUS launching locations and three aircraft elevators which allowed for large scale operations and quick turn around times. See Rawlins, 88 – cite of Jane’s Fighting Ships, 1959-1960 (London: Jane’s Fighting Ships, Ltd., 1960), 366-371. See also U.S. Army Armor School, United States Marine Corps Reference Data (Fort Knox, KY: March 1966), V3-V7.
\textsuperscript{374}Rawlins, Marines and Helicopters, 1946-1962, 88.
\textsuperscript{375}Amphibious Warfare and the Evolution of the Helicopter Carrier, 30-31. Essex carriers displaced 42,000 tons and had a top speed of 25 knots. Crewed by approximately 1000 sailors, each carried 30 HR2S helicopters and between 1,200 and 1,600 marines. Modifications included removing most of the gun armament and deactivating four of the eight boilers to reduce crew requirements. Troop and equipment spaces were added, but the hanger could only hold 10 HR2S helicopters with the remaining 20 being stowed on the flight deck (four in flight position and the remaining 16 folded). Because they were converted fleet carriers, none of the ships had a well deck and did not embark landing craft.
\end{flushright}
required at least 24 converted helicopter carriers. Some thought was put into converting twenty additional Essex class carriers to meet this requirement. While it would be cheaper to convert the Essex carriers than to build a new ship, the Essex carriers were less capable, cost more to operate, and would not last as long. Only a new design could provide the necessary features and capabilities desired for an amphibious assault ship at a lower cost over a twenty five year period.

The Navy built the Iwo Jima class of seven amphibious warfare ships in response to these concerns. From the outset, the lack of funds limited the design of the new LPHs to be a small, single purpose ship and necessitated that it borrowed many features from other proven designs like merchant ships. When launched in 1961, the Iwo Jima was the largest amphibious ship yet built and could operate twenty HR2S or thirty HUS-1 helicopters and 1,500 marines. Its 590 foot flight deck with just eight deck spots for HUS-1 helicopters and the two aircraft elevators meant that flight operations proceeded at a slower pace than from the Essex class carriers. Unlike the converted ships, the Iwo Jima class incorporated a very efficient design for stowing, maintaining, and operation of helicopters expected to enter service in the 1960s. Thus when these helicopters, specifically the CH-46 Sea Knight in 1964 and the CH-53 Sea Stallion in 1966, entered

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376 *Amphibious Warfare and the Evolution of the Helicopter Carrier*, 33. The Thetis Bay carried 1/3 less helicopters as almost as many marines while only having ½ the length, ½ the crew size, and ¼ the displacement.

377 *Amphibious Warfare and the Evolution of the Helicopter Carrier*, 33. The study concluded that to lift one Marine division and its air wing would require one command ship, twelve converted LPHs (each with 20 HR2S), four APAs, three AKAs, twelve LSTs, nine LSDs, one assault submarine, and one APD.

378 *Amphibious Warfare and the Evolution of the Helicopter Carrier*, 34-35. The hull design and propulsion units came from contemporary merchant ships. The Iwo Jima’s design differed in that its hull extended upwards to the flight deck enabling an enclosed bow and a rounded flight deck. The engines were less efficient than a standard warship’s 1200psi steam turbines, but they were easier and cheaper to maintain. Operating a single shaft, the two 600 psi steam turbines moved the 18,000 ton, 600 foot ship up to speeds of 22 knots.
service minimal modifications were needed by the Iwo Jima class to operate the aircraft.³⁷⁹ The modern command and communication facilities and the most modern cargo handling equipment helped to counteract these deficiencies. However, the ship’s relatively small hull volume meant that accommodations for the crew and Marine complement were sacrificed (but better than in the Essex carriers) in order to maximize the storage space for the helicopters and the Marines’ equipment. In addition, the ship could not stow additional equipment like artillery, vehicles, and landing craft that the Marines desired. All together the new LPHs were designed to transport and support a Marine BLT with the embarked transport helicopter squadron.³⁸⁰

The inability to operate landing craft was of particular concern since the ship would be useless in adverse weather conditions. Navy officials responded to the criticism by pointing out that all the LPHs (converted and purpose built) were not intended to operate independently, but as part of a larger force of other specialized amphibious ships. In the years between Korea and Vietnam, the Navy had more than one hundred amphibious ships in the active fleet. By combining these ships into task forces, the Navy had the needed amphibious shipping to accomplish its missions. While massing shipping was a technique, this also made them vulnerable to nuclear weapons, which was one of the reasons that the Marines had developed the doctrine of vertical envelopment.

³⁷⁹ Amphibious Warfare and the Evolution of the Helicopter Carrier, 40-41. The Iwo Jima class could carry 24 CH-46 helicopters or 20 CH-46 and four CH-53.
³⁸⁰ Amphibious Warfare and the Evolution of the Helicopter Carrier, 35-36. One new feature was the installation of two deck edge elevators
To compensate for the *Iwo Jima* class’ weaknesses, the Navy built a new class of ships known as amphibious transport dock (LPDs) designed to operate with the LPHs. The USS *Raleigh* (LPD 1) came into service in 1962 and had a well deck for landing craft, a helicopters flight deck, stowage for heavy equipment and vehicles, and facilities for housing marines. It lacked the hanger and maintenance facilities for helicopters and therefore did not possess its own helicopter assets – those were to come from their sister helicopter carriers.381 Once the ships entered service, the Navy quickly realized that the two types of ships may not always be able to serve together

Overall, the development of amphibious warships progressed at a relatively slow rate due to it being a secondary mission and thus lacked adequate funding to build complete ships for the doctrine. By 1965, the Marine Corps possessed the capability to simultaneously land two regiments with the seven helicopter assault ships in service.382 This was short of the full division envisioned by the Marines back in 1956. However, the senior leadership made the correct decision based on the known threat and allocated resources in a manner that supported the most essential policy objectives.

Between 1954 and 1965 the Marine Corps conducted more than 100 amphibious training operations. Of those exercises a few stand out. One was the 1958 Atlantic Amphibious Exercise 1-58 off Onslow Beach, North Carolina. This exercise, the largest

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382 In service were the USS Boxer (CVS-21 to LPH-4 commissioned on 30 January 1959); USS Princeton (CVS-37 to LPH-5 on 2 March 1959); USS Valley Forge (CVS-45 to LPH-8 on 1 July 1961); USS Iwo Jima (LPH-2 on 26 August 1961); USS Okinawa (LPH-3 on 14 April 1962); USS Guadalcanal (LPH-7 on 20 July 1963); and USS Guam (LPH-9 on 16 January 1965). There was one in construction at the time in 1965, the USS Tripoli (LPH-10 on 6 August 1966) and one planned, the USS New Orleans (LPH-11 on 16 November 1968). It must be noted that at no time did the Marines envision all the LPHs being used together for one operation. For dates of commission for all amphibious warfare ships see
vertical envelopment operation at the time, lifted a complete RLT from the 2d Marine Division from ship to shore. It also verified the simultaneous use of more than one LPH and that the CVS could serve as an interim LPH. Another was PHIBLEX 33-60 (BIG TOP) the Marines’ first large-scale, night-assault amphibious exercise at Camp Pendleton, California, conducted in May 1960.

With all the improvements in equipment, albeit at a more gradual pace than the Marines desired, the success of heliborne assaults were not guaranteed. In order to best utilize the equipment, the Marine Corps Schools revised its curriculum to address the incorporation of the helicopter, new amphibious warfare ships, and nuclear weapons into amphibious warfare. This was explicitly stated in 1956: “Primary emphasis is placed on advanced instruction in doctrines and techniques of amphibious warfare to include the large scale all-helicopter assault and the employment of atomic weapons. Instruction designed to broaden the professional background of the students is included as well.”

After the Korean War, the Senior School’s mission changed from training career field grade officers to educating the officers (usually colonels and lieutenant colonels) expected to command regiments or groups, and for service on division, wing, and landing force staffs. Previously the majority of the curriculum concerned the tactical and operational levels of war, but starting in 1953 it reflected the growing importance of the

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384Index of United States Marine Corps Training Exercises (Including Vietnam). HAF 676, Training Exercises Including Vietnam (Box 37) at MCRC.

helicopter in conducting amphibious assaults by placing emphasis on both ground and air operations instead of the almost sole focus on ground operations as it did prior to the Korean War.\textsuperscript{386} Beginning with the 1954-55 academic year, the Senior Course also devoted 54 hours to atomic warfare.\textsuperscript{387} To better acquaint the theory of vertical envelopment with reality, the course was taught using a combination of class lectures, field problems, and demonstrations which culminated with Operation Packard – the one-month long amphibious command post exercise for two Marine divisions and two MAWs which included an actual landing at Camp Lejeune, North Carolina.\textsuperscript{388} Although the Marines’ still lacked the capability to conduct large-scale helicopter assaults, the teaching of the doctrinal concept to match an eventual capability was reminiscent of the Marine Corps School in the 1930s.\textsuperscript{389} To ensure widest dissemination throughout the force, the \textit{Marine Corps Gazette} was full of material on the evolving doctrine and served as the forum for exchanging ideas outside the classroom.

The period after the Korean War was a period of strife for the Marines. The reduction in size, the lack of funding, and public concern over recruit training created some internal discord and made the achievement of the all-helicopter amphibious operation impossible to achieve. Compounding the problem was the disappointing performance of the heavy and expensive Sikorsky HR2S helicopter upon which the Marine Corps had based its new doctrine and force structure.


\textsuperscript{387}Bittner, \textit{Curriculum Evolution}, 40. This was out of 854 total hours (not including the month long amphibious command post exercise, Operation Packard) for a little over 6\% of the course.

\textsuperscript{388}Later in 1956 the school adopted the seminar style of instruction instead of using lectures. See Bittner, 42.

\textsuperscript{389}Bittner, \textit{Curriculum Evolution}, 44.
While funding and mission controversies shaped the strategic environment, it was the lack of the heavy helicopter that forced the Marines to revise how they would execute vertical envelopment. Not willing to abandon the idea, the Marine Corps altered organizations, equipment, and tactics to match the helicopter technology then available. Future Marine forces would be lighter, more mobile, and more austere than those that fought in Korea.

With the introduction of the LPH and the turbine helicopter, the Marine Corps concept of vertical envelopment reached a new level of effectiveness. The Marines continued to make adjustments based on the available funding and the state of the technology. They spent the majority of the 1960s refining the operational aspects of the concept through exercises and experience in Vietnam. Although the all-helicopter vertical assault never emerged, the helicopter became the primary vehicle for conducting amphibious assaults.
CHAPTER 8

HOVERING IN PLACE:
The Army in the Eisenhower Years

In 1955 the United States Army found itself in a situation that looked very similar to its position prior to the Korean War just five years earlier. Despite having a former Army general as President, the Army had returned to being on the lowest rung of the national security ladder. The New Look military program emphasized the concept of massive retaliation and forward, collective defense by allies with American air and naval support to guarantee American and NATO’s security. The Air Force’s strategic bombers were the nation’s first line of defense while the Navy secured a sidekick role by emphasizing the strategic capabilities of its carrier aircraft. The Army, understanding that wars are won only when the lowly infantryman occupies and secures the enemy’s terrain, searched for a way to demonstrate its importance and usefulness in the thermonuclear era. The formulation and implementation of the Pentomic Division concept was intended to provide the Army with a new force structure that was smaller and used technology to increase mobility and firepower. In this new organization the helicopter should have played a major part, but it did not. The reasons for the Army’s
insufficient employment of the helicopter in the Pentomic organization was due to a combination of Air Force opposition, the lack of money, the state of helicopter technology, and the Army’s military culture which did not have a clear understanding of the helicopter.

During President Eisenhower’s two terms the catch phrases of “Massive Retaliation,” “Security through Solvency,” and “More Bang for the Buck” represented the official policy of providing maximum defense with minimal spending. Eisenhower was determined to keep defense spending at no more than ten percent of the gross national product – approximately $38 billion. Throughout his presidency, the defense budget hovered around $40 billion dollars. The majority of the money went to the Air Force and its strategic bomber programs for delivering nuclear weapons. Since the most expensive component of any military is its personnel, the Department of Defense targeted the Army’s force structure to pay for other programs. The Army’s budgets decreased and so did its force structure from 1954 to 1960. In 1953, the Army had 1.5 million soldiers and a budget of $16.2 billion; by 1955 this had been reduced to 1.1 million personnel and $8.9 billion. In the last year of Eisenhower’s presidency, the Army was down to just 859,000 men, but the budget improved slightly to $9.6 billion.  

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390 Not only was Eisenhower an Army guy, he was also a pilot, having learned to fly while assigned to the Philippine Islands in the 1930s. See Colonel Delk Bristol Interview, 18.

391 President Eisenhower believed that the long term security of the United States depended on a strong economy. He did not believe that the United States could afford to spend too much on defense because it would hamper economic growth. This economy-centric security policy meant that the Department of Defense had to develop a national military strategy which was effective, but inexpensive. The military’s New Look emphasized nuclear striking power and a small ground force to deter the Soviet Union from general and limited war while at the same time saving money. The Air Force became the first line of defense for the nation and consumed more than half of the defense budget during the Eisenhower Administration’s two terms.

The Army under Eisenhower’s New Look policy continued to emphasize its relevancy through both mission and technology. Adjusting to President Eisenhower’s reliance on nuclear weapons and the austere military budgets, the Army sought to reorganize its forces and revise its doctrine. It did this through a three pronged approach. First it developed surface to surface missiles and tactical nuclear weapons to increase the firepower of ground units. Second, the Army created the Pentomic division that took maximum advantage of the increased firepower while using less manpower. Finally, the Army intended to develop its organic aviation so that it could “synchronize the mobility of the maneuver elements and missile firepower within the deeper battlefield.” Simply put, “the Army need[ed] air mobility to carry out its ground fighting missions.”

While the fighting on the Korean Peninsula promoted the necessity of conventional forces for military defense, it was still expected that the next BIG war would involve nuclear weapons. The anticipated battleground was Central and Western Europe with the Soviet Union and its Warsaw Pact allies as the opponent.

In the 1950s, the situation for Soviet ground units changed as a result of two things. First was the successful test of a nuclear device on 29 August 1949 by the Soviets, which ended the American monopoly on nuclear weapons. Following this test, the Soviets placed greater resources and emphasis on developing their nuclear arsenal; correspondingly, the importance of the ground forces to Russian security decreased. The second event of significant importance was the death of Stalin in 1953. His death allowed Marshal Georgi Zhukov to return to power in the military. Zhukov soon began a major reorganization of the Soviet ground forces with the main emphasis on preparing...

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them to fight in a nuclear environment. He implemented a doctrine that utilized nuclear weapons to destroy front line defenses and used mechanized and armor-heavy forces for the subsequent exploitation. He streamlined the army’s organization which eased logistical requirements while enhancing command and control. These efforts created an organization with enhanced mobility but less reliant on the concept of combined arms. 394 The Soviet ground forces became even smaller when, in 1960, Nikita Khrushchev placed a heavier emphasis on the Strategic Rocket Forces. The Soviet Army shrank to a Cold War low of 140 small divisions due to the expectation that any future war must be nuclear. 395 Despite these reductions, the Soviet conventional threat was still very significant throughout the decade with Ridgway estimating the communists could field 437 divisions at the beginning of a war. 396

Countering the large Soviet armor and mechanized forces without spending too much money was the object of Western Europe policy in the 1950s. The United States military operated on a budget that was quite small and placed emphasis on the Air Force first, Navy second, and the Army last. Therefore, the manpower and equipment needed to oppose the large, standing, conventional force of the Warsaw Pact could not be provided by the United States. Small military budgets pre-dominated our European allies

394 House, 142-145. The reason for this emphasis is based on the fact that armored vehicles provide a significantly greater degree of protection from a nuclear blast and radiation than infantry in trucks or in the open.
395 House, 145.
396 General Matthew B. Ridgway, “Military Strategy: Today and Tomorrow” lecture to Army War College, 30 March 1955. This total included 93 in Eastern Europe, 175 in the USSR, 24 in North Korea, 6 in Mongolia, 15 in North Vietnam, and 124 in China. See also Lieutenant Colonel John C.H. Lee, Jr., (with Sidney Shalett) “We Must Put Wings on the Infantry” Saturday Evening Post (17 May 1952): 42. Lee, a member of the Joint Airborne Troop Board calculated that the Soviet Union with a population of 205 million and its satellites’ population of 575 million could raise 300 ground divisions while America with its 150 million people could at best provide 100 divisions.
as well and precluded them from fulfilling the commitments they made at Lisbon in February 1952. The solution to this vexing problem came in the form, again, of technology. To counteract the Soviet superiority in conventional forces, NATO’s defense policy became increasingly reliant on the use of nuclear weapons at all levels of war as stated in MC 14/2. Alternative solutions included the employment of guided missile and introducing helicopters onto the battlefield. Guided missiles possessed the potential to drastically alter the balance on the battlefield to favor the defense, but the ability of regular ground forces in maneuvering and employing these weapons en masse could not be accomplished with a small ground force. A better solution was arming light aircraft and the helicopters with guided anti-tank missiles.

General Matthew B. Ridgway, the Army Chief of Staff, believed that the cornerstone of military power was the infantryman and his ability to seize and defend ground in any environment, nuclear or non-nuclear, that determined victory. Ridgway understood the bureaucratic environment under which the Army was now operating and recognized that the Army had to change in order to remain a viable component in the nation’s security policy. Reflecting his background, Ridgway believed that one method for improving the Army’s capabilities on the nuclear battlefield was through the use of aircraft. The Army had to be a “streamlined, hard-hitting force” capable of rapidly deploying to anywhere in the world. It needed to have the strategic and tactical mobility

397Dean Acheson, *Present at the Creation: My Years in the State Department* (New York: W.W. Norton & Company, 1969) 757-758. The cable from Secretary Acheson to President Truman dtd 1 December 1951, acknowledges the likelihood that the European allies would not be willing to meet their defense obligations in the near future.

398Ridgway also believed that a strong military was needed to make diplomacy effective, thus the soldier was the “statesman’s partner.” See General Matthew B. Ridgway, “Military Strategy: Today and Tomorrow” lecture to Army War College, 30 March 1955.
that only aircraft could provide. The fixed lines of communication for this force also had
to have the same qualities – the era of ground logistics and their associated large supply
dumps was forever gone. Learning from America’s experiences in Korea, Ridgway saw
a future Army that would do most things through the air: transport soldiers, supplies,
evacuate casualties, and provide communications.\textsuperscript{399}

This vision of army transformation relied on one component outside of Ridgway’s
control – the strategic transport capability of the Air Force. After the Korean War the Air
Force’s focus was on meeting its expanded role in the nation’s security policy. The New
Look’s emphasis on massive retaliation meant that this was the Air Force’s most
important mission.\textsuperscript{400} As such, the Air Force correctly placed its emphasis on developing
a force capable of carrying out the strategic bombardment mission. This in turn directed
the force requirements for the Air Force. The majority of the Air Force’s research and
development, procurement, training, and manpower focused on perfecting the art of
nuclear targeting and attack. The Air Force was expanding its strategic bomber force and
dispersed the bombers throughout the nation. To protect against enemy attacks, the Air
Force also procured special high performance interceptors that could fly high and fast to
shoot down enemy bombers, but could do little else. Any diversion from these primary
missions potentially endangered the nation’s security and was not an acceptable risk.

Since developing this fleet of strategic bombers was expensive, it left the Air Force with
few resources for its other subordinate commands. When requests for air lift forces were

\textsuperscript{399}Matthew B. Ridgway, “An Army on Its Toes” \textit{The Army Combat Forces Journal} (December
1954): 10; Ridgway, \textit{Soldiers}, 312; General Matthew B. Ridgway, “Military Strategy: Today and
Tomorrow” lecture to Army War College, 30 March 1955.

\textsuperscript{400}A speech given by Secretary of State John Foster Dulles in January 1954 outlined the
Eisenhower Administration’s basic premise for massive retaliation.
partially met, it was on the basis of what airlift was needed to sustain the bomber force.

While the Air Force supported some tactical airlift as a function of Tactical Air Command, the command relegated airlift to a low priority.\textsuperscript{401}

The cost of the Air Force’s narrow focus on its mission was very great for the Army. Without the Air Force’s strategic lift capability, it could not deploy forces rapidly.\textsuperscript{402} Without the tactical fighter aircraft needed to establish air superiority and the ‘low and slow’ attack aircraft to support ground operations, the Army’s ability perform on the battlefield against a numerically superior enemy was insufficient. More significantly, it also effectively denied the Army the rationale for its transformation.

While the airlift mission was secondary to the Air Force, the Army viewed it as very important for its continued viability in the defense establishment. The Army needed strategic airlift in order to deploy world-wide and perform its primary function -- ground combat. Without airlift and sealift, the Army would always be the third string in the nation’s defense team. Any future small conflicts would be resolved by the Air Force, Navy, and Marines without the Army. Since the Air Force, the JCS, and the Eisenhower Administration were in agreement with the concept of massive retaliation as the centerpiece of American defense, the Army needed to go to Congress, the institution directly responsible for creating and sustaining the Army, in order to obtain its own lift capabilities.\textsuperscript{403} The Army carefully cultivated relations with important members of Congress to include Senator Stuart Symington (Chairman of the Airpower

\begin{footnotes}
\item[401] Sorenson, 48.
\item[402] This was extremely important for the four divisions that made up the Strategic Army Corps (STRAC) created in 1958.
\item[403] Sorenson, 48; Department of the Army, “1957 Army Aviation Guide,” Annex 1, Appendix D, 2.
\end{footnotes}
Subcommittee), Senator Henry Jackson (member of that same committee),
Representative Daniel Flood (member of the Defense Appropriations Committee), and
Representative George Manon (Chairman of the House Military Appropriations
Subcommittee). 404

While loyalty to the President made direct appeals by Army officers almost
impossible, it did not hinder those who retired. Generals Matthew B. Ridgway, Maxwell
Taylor, and James Gavin were the most significant officers who took this course of action
in order to publicly express their grievances with Eisenhower’s defense policies to
Congress and the media. While it made headlines, the impact of these individual efforts
had little impact on the Army’s budget, and only earned the scorn of the President. Semi-
official organizations met with similar feelings from Eisenhower. The forming of the
Army Aviation Association of America in 1957 did little to improve relations with
Eisenhower. Composed of active and retired military personnel and business leaders the
“Quad A” provided a forum to call attention to aviation concerns. The Association of the
United States Army (AUSA) was a national organization that lobbied on behalf of the
military in the name of the nation’s defense. Its members included active, reserve, and
national guard military and also included politicians and business leaders. Its monthly
journal, Army quickly became the voice piece for the military’s needs and often criticized
the Eisenhower Administration for its neglect of the Army, to include Army aviation.

404 References made in: “Army Aviation Seeks Faster, More powerful Planes” p. 11; “Army Air
Arm Gets Big Building Boost; Rucker Work Alone Totals $7.3 Million,” Army, Navy, Air Force Journal
(14 July 1956): 11; and “Why Doesn’t the Army ‘Make a Fight’ to Kill Restrictions on Air Arm?” Army,
The clashes between the Army and the Air Force existed primarily at the doctrinal level. The Air Force, charged with providing America’s deterrence force believed that centralized control of all aviation assets was the most efficient use of resources and strategic bombing was the quickest and cheapest means for winning a war. This differed greatly from the Army’s which acknowledged the importance of air power, but did not believe that any one service could win a war by itself. Future wars required a joint effort from the three services to achieve victory; and the basic building block of that team was the lowly infantryman. The Army’s efforts aimed at providing the front line soldier with as much support as possible. To do this from the air, the Army’s philosophy emphasized that some de-centralization of aircraft on the battlefield was needed and that the control of these aircraft should be with the ground force commander. This method was the one that could guarantee timely air support for ground units, something that did not consistently occur during World War II and the Korean War.\textsuperscript{405}

This difference in philosophy resulted in two decades of debate over the roles and missions assigned to each service. The Air Force attempted to limit the expansion of the Army’s organic aviation through a variety of ways: a series of agreements limiting aircraft weight and capabilities; an unwillingness to apply Congressionally designated funds to research and development of helicopters; reallocating helicopters purchased for the Army to Air Force units; and occasional efforts at completely eliminating the Army’s organic aircraft fleet. Two factors limited the Air Force’s attempts. The first was the mixed record of support provided first in World War II and then later in Korea. The

\textsuperscript{405}Alfred Goldberg and Lieutenant Colonel Donald Smith, \textit{Army-Air Force Relations: The Close Air Support Issue (U): A Report for the United States Air Force Project RAND}, (Santa Monica, CA:}
second factor was the Air Force’s focus on the strategic nuclear forces. Maintaining a modern, credible offensive and defensive capability took the majority of the Air Force’s energy (and funding). This left little funding and resulted in the neglecting of the other commands within the Air Force -- most noticeably in Tactical Air Command (TAC) and Mobility Air Transport Service (MATS) -- which also supported ground forces.\textsuperscript{406} By the late 1950s these two factors restrained the Air Force’s ability to seriously hinder the Army’s experiments at providing its own tactical transport support.

In order to be effective on the modern battlefield the Army required three types of airlift support -- battlefield air logistics, tactical airborne operations, and the capability for a long-distance, rapid, strategic deployment of forces. Since the Air Force emphasized strategic bombing, the difference in mission importance lead to serious conflicts between the two services in the decades following the end of World War II. Every time the Army tried to expand its aviation capabilities, the Air Force viewed it as an attempt to usurp Air Force functions with the ultimate goal of seizing control of all tactical air forces.\textsuperscript{407}

The first of these conflicts centered on the use of aircraft used for moving and supplying troops on and near the battlefield. In the Air Force the Tactical Air Command

\footnotesize{\textsuperscript{406}Sorenson, 43, 90. Air Force airlift doctrine developed along four themes. First was the use of aircraft to move men, equipment, and supplies. Second was the use of aircraft to transport high-value items in the logistical system (O-2 priority parts, etc.). Third was to support tactical airborne operations. The last concept was the strategic movement of forces. While valid concepts, “these doctrines were not near the core of predominate Air Force thinking. the strategic nuclear bombing mission was the most important mission in the Air Force.” As such, the Air Force’s logistical efforts focused on those missions which supported SAC (the first two themes). Thus, “Air Force thinking on how to deploy troops for a strategic operation stopped after World War II. Within MATS, doctrinal emphasis was the secondary mission -- specialized logistics.”}

\footnotesize{\textsuperscript{407}Cheng, \textit{Air Mobility}, 76.}
provided aviation support (combat, logistical, etc.) to the Army. Since it was not central to the Air Force’s primary mission, the Tactical Air Command was a tier below SAC in terms of support for equipment, manpower, and funding. Within Tactical Air Command, the airlift mission received a low priority status. Emphasis was on the fighter wings needed to gain air superiority. The low priority assigned to the airlift capability meant a fleet of obsolete aircraft whose capabilities were insufficient for the world of the late 1950s. In 1956 the Air Force had just 11 wings of airlift out of a force of 137 wings (less than 9%). The 11 wings could airlift one division, minus the division’s 30 to 35 thousand tons of heavy equipment (which would have to be transported by other means).  

However, to accomplish this, the Air Force had to suspend all other air operations except for SAC. In addition, in times of general war, some of that airlift had to be used to move and support SAC which took precedence over Army needs meaning that the Army could not plan on moving more than a brigade. Unless the Eisenhower Administration provided more money, at least $6 billion, the shortage of airlift was not going to improve.

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408 General Richard C. Lindsay (USAF) estimated that to lift one division of 7,000 short tons required ten and a half wings totaling 507 C-130 planes.


410 Council on Foreign Relations Study Group Reports: Nuclear Weapons and Foreign Policy Sub-Committee III. Digest of Discussion, 15 February 1956, page 5. Found in James M. Gavin Papers, Box 17A: Post War Duty Retirement, File “Transcripts of 2nd and 8th Meeting on Nuclear Weapons, 1956, 1975-81” at MHI Archives. General Richard C. Lindsay (USAF) estimated that to lift one division of 7,000 short tons required ten and a half wings totaling 507 C-130 planes. The initial procurement cost of this fleet was approximately 5.5 billion dollars with an expected monthly operating costs of $45 million – or $540 million a year.
Unable to rely on the Air Force, the Army entertained the idea of developing its own capabilities for operating on the modern battlefield. This envisioned the use of aerial trucks to transport troops and supplies and aircraft based weapon platforms for providing the close air support. Since the Air Force was unwilling to develop the aircraft for the Army, Ridgway believed the Army needed to take the initiative to continue to remain viable on the modern battlefield. Besides continuing to support the twelve battalion transport helicopter program, he ordered the Army to develop a comprehensive Army aviation plan to provide guidance for future developments.\textsuperscript{411} The result was a five year plan that envisioned an Army with 8,486 aircraft by 1959. It also recommended the establishment of an Army aviation branch within the Army G-3 staff and the establishment of an Army aviation center at Camp Rucker at which numerous agencies could develop Army aviation.\textsuperscript{412} Opened on 1 February 1955, Brigadier General Carl I. Hutton was the inaugural commander. An Army aviation zealot, he quickly began programs that explored the development and use of armed helicopters and Sky Cav type organizations. Most of these activities were done with minimal fanfare and knowledge, even within the Army.

The Army’s experiences prior to and during the Korean War had a lingering negative effect on its future efforts at developing its aviation component. Prior to the Korean War, the Army had done a poor job of figuring out how to use helicopters causing one participant to remark, “Nobody really knew how they were going to use the

\begin{footnotesize}
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\item At Camp, later Fort, Rucker there was the Army Aviation School (pilot training and development of aviation doctrine and tactics) and the Army Aviation Board (aka CONARC Board #6) which experimented with a variety of aviation related subjects.
\end{enumerate}
\end{footnotesize}
helicopter. It was the common belief that they were not going to barely be [sic] of any use in combat.\textsuperscript{413} The late and limited use of Army transport helicopters during the Korean War meant that helicopter doctrine had not progressed.\textsuperscript{414} The combination of the limited operations in Korea, the Transportation Corps’ focus on logistical aircraft, and a desire to allay Air Force fears pushed the Army to initially emphasize the helicopter’s utility as a logistics vehicle after the Korean War.

The Transportation Corps’ focus on using the helicopter as a logistic tool was correct for the branch’s mission. Under General Heileman the Transportation Corps grasped the helicopter’s potential to revolutionize logistical support. As the concept of warfare changed, the pattern for supply and logistics also needed to keep pace. The Transportation Corps, which provided the means of distribution for supplies, had to be flexible in its approach and appreciation to meet those new demands. The problem was that other uses for the helicopter received less attention and funding. So while Transportation Corps provided a valuable service by taking a moribund helicopter program from an indifferent Ordnance Corps in August 1952, the potential still remained that the helicopter might only be seen as an aerial truck.\textsuperscript{415}

\textsuperscript{413}Williams Oral History, 35. Gavin agreed saying “I don’t think the Army by that time [1954] had recognized at all the potential of the helicopter.” See Hamilton H. Howze interview by Colonel Glenn A. Smith and Lieutenant Colonel August M. Cianciolo, 8.

\textsuperscript{414}See Hamilton H. Howze interview by Colonel Glenn A. Smith and Lieutenant Colonel August M. Cianciolo, 8. As a result, “The Army hadn’t grasped at all from its experience in Korea, the real utility of light aircraft and what could be done by really integrating them into the tactics and combat support of the Army.”

\textsuperscript{415}While the Transportation Corps worked on developing a family of 1½ ton, 3 ton, and 5 ton cargo helicopters in 1955, it was “envisioned as a means for carrying out emergency transportation missions, as well as a primary carrier, when terrain and battlefield conditions prevent the employment of surface media.” See Harry A. Jacobs, “Army Transportation -- Zeroing In,” \textit{Military Review} (August 1955): 51.
If innovative ideas were to come from any area of the Army, it would have to be from the combat arms branches. Lieutenant General James M. Gavin was one of the few leaders in the United States Army to envision and exhort the potential of the helicopter for tactical operations. The Korean War had proven the utility of the helicopter for administrative missions, and Gavin wanted to develop it for a combat role. In his now-famous 1954 article “Cavalry, and I Don’t Mean Horses,” he emphasized the need for cavalry units to regain the mobility differential necessary for its success. He understood that the Army Organization Act of 1950, which combined armor and cavalry into one branch, effectively destroyed the cavalry thought and tactics which had served the nation well over the years. Instead, the result was a cavalry equipped with the same equipment as the heavy armor units and possessing a mobility that was at best equal to the enemy, if not worse.

The idea for the Sky Cav came from Gavin’s experiences and reflections upon the airborne operations in Normandy in June 1944. The more he studied the operation the more it occurred to him that the airborne troops were acting in the traditional cavalry role. Initially paratroopers captured key pieces of terrain to block enemy movements which allowed the landing forces to attack and seize the beachheads without hindrance. They also provided timely information on enemy forces. Unlike traditional cavalry, once the paratroopers were on the ground, they lacked mobility and “were no longer cavalry.” Gavin wanted the Sky Cav to combine the strategic mobility of airborne forces with the tactical mobility of the helicopter. Gavin saw the helicopter as having the

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416 James M. Gavin Papers, Box 2, Folder: Chapter 6, page 190.
potential to restore this mobility differential and he encouraged further support of the
development and employment of helicopters.\textsuperscript{418} He ultimately recommended a research
and development program for VTOL aircraft, helicopters, and a family of small tactical
nuclear weapons and the creation of a high mobility force using aircraft that could control
a battlefield of over 1,000 square miles.\textsuperscript{419}

Gavin tried to experiment with light aviation when he was with CINCSOUTH in
Naples, Italy. He saw a requirement for aviation that could transport small units, conduct
reconnaissance, and enhance command and control in the mountains. As the chief of
staff he unsuccessfully tried to get authorization to create such a unit but the Army had
no aircraft to spare during the Korean War. Gavin’s ideas did influence others on the
staff, like Earl Wheeler, Glenn Goodhand, and Delbert Bristol who would be important in
the development of Army aviation and airmobility over the next decade. It also helped
convince Gavin that there needed to be a more powerful staff organization to facilitate
the development of Army aviation.\textsuperscript{420}

General Gavin’s vision did not include using helicopters to directly attack an
enemy where it was strongest. Over the next decade he argued with army leaders like
John Norton and Harry Kinnard that the helicopter was best utilized to provide the
commander with “information, time, and a little space.” The helicopter was best used in

\textsuperscript{417}James M. Gavin Papers, Box 2, Folder: Chapter 6, page 168; James M. Gavin Papers, Box 1,
Senior Officers Debriefing Program Conversations Between, page 28-29.

\textsuperscript{418}James M. Gavin, “Cavalry and I Don’t Mean Horses!” \textit{Harper’s Magazine} (April 1954): 54-56.

\textsuperscript{419}James M. Gavin Papers, Box 2, Folder: Chapter 6, page 169. He envisioned a force using
VTOL aircraft (fixed wing and helicopters), scout vehicles equipped with electronic sensors and long range
communications, fighter gunships to engage and destroy enemy armor, personnel carriers for moving large
groups of riflemen, and the necessary logistics and C2 vehicles to control the force.
operations where it could bypass the strong enemy concentrations that would neutralize the helicopter’s tactical mobility and make it more vulnerable to air defenses.\textsuperscript{421}

Ultimately, Gavin foresaw the use of unmanned drones equipped with an extensive sensor array flying all over the battlefield and providing real time surveillance of enemy disposition and composition.\textsuperscript{422} This far farsighted article caught the imagination of some people in the Army, but as a whole, “It was not too well received by the Army.”\textsuperscript{423}

When Ridgway issued his order for a review of army aviation on 4 September 1954, it was the first time since 1926 that the Army prepared a long range program for the development and use of its own aviation. In response to Ridgway’s request, OCAFF provided the greatest input into the overall Department of the Army final submission.\textsuperscript{424}

In the traditional manner of its predecessor organization, the AGF, OCAFF broke the problem down into three areas -- training, combat developments, and the testing and development of equipment – and submitted separate plans for each area on 30 September

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\item[421] James M. Gavin Papers, Box 1, Senior Officers Debriefing Program Conversations Between, page 29.
\item[422] James M. Gavin Papers, Box 1, Senior Officers Debriefing Program Conversations Between, page 30.
\item[423] James M. Gavin Papers, Box 2, Folder: Chapter 4 and 5, page 157.  An example of this is that the Armored School at Fort Knox, KY, “rejected the whole concept on the grounds that it was too revolutionary.”  See also General Hamilton H. Howze, interview by Colonel Glenn A. Smith and
\item[424] Richard P. Weinert, \textit{A History of Army Aviation} (Fort Monroe, VA: TRADOC, 1991), 104.  On 10 March 1948 the Office of the Chief of Army Field Forces assumed the responsibilities of the Army Ground Forces (AGF). According to Jean R. Moenk, \textit{A History of Command and Control of Army Forces in the Continental United States, 1919-1972} (CONARC: 15 August 1972), 29, “OCAFF was the field operating agency of the Department of the Army within CONUS for the general supervision, coordination, and inspection of the training of all units and individuals employed in a field army. OCAFF also retained functions relating to the development of tactical and technical doctrine and the supervision of research and development. The six CONUS armies and the Military District of Washington were made major commands under the direct control of the Chief of Staff of the Army.”
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1954. The quick response to Ridgway’s request indicates Army agencies had been exploring the problem for some time and were waiting for the right opportunity to present their ideas.

The Department of the Army took OCAFF’s recommendations and returned a proposed plan on 9 November to OCAFF entitled Army Aviation Plan, FY 1955-FY 1959 (AAP). To ensure that the proposal received proper consideration, OCAFF asked the Army War College, the Command and General Staff College, and various service schools for comments and recommendations. OCAFF submitted its reply to the Department of the Army on 1 December and reiterated its position at a conference attended by General John E. Dahlquist, the Chief of Army Field Forces, and Major General Paul D. Adams, the Deputy Assistant Chief of Staff, G-3, Department of the Army. Dahlquist and his staff focused on two issues that needed resolution for a successful AAP. The first was the need to clearly define with the Air Force the missions that Army aviation would perform. The second concern was the organization of Army

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425 Weinert, 104. Each of the plans focused on its particular issues. The training plan included a listing of the needed aviation courses, the locations of those courses, and the numbers of students needed for instruction through 1960. OCAFF’s role in combat developments and its relationship with the Army Aviation School were the main subjects in the combat developments proposal. The testing and development plan advocated the creation of three new organizations. The first was the Army Aviation Board. Located at the Army Aviation School, it replaced the Army Aviation Service Test Division of OCAFF Board No. 6 at Camp Rucker, and assumed the same mission. Second was the Aviation Branch, Aviation and Metro Division, Army Electronic Proving Ground, Fort Huachuca, to test avionics and communication equipment. Third was the Air Transportation Division, Transportation Research and Development Command, Fort Eustis; here was the current body of knowledge in the Army on helicopter development. For more information see: (1) DA ACoS G-3 Army Aviation Division summary of major Events and Problems, FY 1955, p.1. (2) CONARC Summary of Major Events and Problems, FY 1955, G-3 Sec Doc and Req Div, Jul-Dec 1954, p.7.

aviation to execute its assigned missions. Until these issues were addressed, Dahlquist did not believe the plan should be presented to the Chief of Staff of the Army.\textsuperscript{427}

After the conference the Department of the Army submitted a revised that addressed most of the OCAFF concerns and included a general officer added to the Office of the Assistant Chief of Staff, G-3, Department of the Army, and responsible for the overall supervision and coordination of the Army aviation program. Although it received positive feedback from OCAFF, the plan was not endorsed in its entirety. As a result, the G-3 forwarded piecemeal specific recommendations to the Chief of Staff for approval instead of a comprehensive and integrated plan. The following month the Army Policy Council approved the individual recommendations for Army aviation submitted by the G-3. These included the formation of the Army Aviation Center and the Army Aviation Test Board.\textsuperscript{428}

Dahlquist opposed the Army’s efforts to usurp the CAS role because it required one of two things – either an increase in funding to cover the costs of assuming that mission or a reduction in the ground component to create savings to use for manning, equipping, and supporting adding organic light attack aircraft for close air support. Since the Eisenhower administration showed little inclination to allocate more dollars, the latter was the likely course of action. Overlooked in the AAP, Dahlquist believed that the Army should place a firm requirement on the Air Force for the development of an

\textsuperscript{427}Weinert, \textit{A History of Army Aviation -- 1950-1962}, 104-105. In addition OCAFF also presented additional recommendations to make the plan more complete. Among them included the establishment of an aviator career management program, the expansion of training facilities, the establishment of an Army Aviation Center, and the Army’s assumption of responsibility from the Air Force for depot supply and maintenance. Also desired was a shortening of the aircraft development and procurement cycle and the use of Air Force and Navy procurement facilities.

\textsuperscript{428}Weinert, \textit{A History of Army Aviation -- 1950-1962}, 105-106.
optimum close support aircraft. The procurement and testing of currently available light aircraft and munitions would not contribute towards that goal. Instead, he argued that if the Army was to assume this role, then it needed to study what technology would be available by the early part of the 1960s and then develop an optimum weapon system to meet the requirements of warfare during that period.429

After several months, the debate over the parameters for the Army Aviation Plan finally resulted in a 24 January 1956 conference in Washington to resolve differences and to agree on a plan to present to the Chief of Staff of the Army. Among others, the DA G-1, G-3, G-4, and Major General Hamilton H. Howze, the Director of Army Aviation, met with General Dahlquist, CONARC commander, and his deputy, Lieutenant General Willard G. Wyman who would assume command of CONARC in March. After much discussion, the conference recommended that there needed to be increased cooperation with the Air Force in developing and employing close air support aircraft. They also decided that a lack of funding precluded fully equipping the National Guard with aircraft. Most importantly, the conference report concluded that the Army needed to develop and procure a heavy helicopter that could lift a minimum of five tons and could operate a crane to lift eleven tons over short distances. The final conference report recommended the H-16 as the most likely candidate to meet those requirements. They also supported the obtaining of a fixed wing cargo aircraft that weighed more than 5,000 pound empty that could operate from rustic, forward bases believing it “an economical and essential

complement to the helicopter for troop movement and logistical support within the combat zone.”

Later that day, General Howze presented the conference recommendations to the Army Chief of Staff, General Maxwell D. Taylor. On 5 March 1956 Taylor approved all the recommendations save one – the requirements for close air support. Instead he sent a memorandum to the Chief of Staff of the Air Force that stated the Army’s requirements for a close air support aircraft and inquired as to how the Air Force planned on meeting the Army’s need. Apparently, the Air Force never sent a reply. With Taylor’s approval, the first Army Aviation Plan (AAP) finally began publication on 16 March 1956. General Gavin’s ideas appeared to take root for in the Army Aviation Plan approved in March 1956 it included the use of “air mobility for land reconnaissance.”

The AAP specifically included the use of air cavalry units which used aircraft to enhance their speed and flexibility and provided the much needed ‘mobility differential’ that Gavin addressed only two years earlier. These units, given the catchy phrase Sky

430 Weinert, A History of Army Aviation -- 1950-1962, 107-108. The participants agreed that the Army should immediately develop aircraft to control the trajectories of ground launched missiles against point targets. For the Close Air Support mission, they recommended that the Air Force develop an aircraft specifically for that role using Air Force money, but the Army would participate in all phases of its development. In wartime the Army would gain operational control of the aircraft. As for the allocation of Army aviation assets, the conference concluded that twenty-seven National Guard division required organic aviation, but this was a total that could not be met since procurement for the Army was limited to 40 divisions, and nineteen of those were active duty. The solution was to fully equip the six National Guard divisions with the highest mobilization priority and the remaining 21 divisions would split the aircraft allocation for fifteen divisions. The Army Reserve division would receive no organic aircraft. The participants agreed that no separate aviation units were needed in the National Guard; the Reserve would be authorized only as needed to support the forty division force.


Cav, were to perform many of the traditional roles that cavalry had played through the centuries: reconnaissance, security of open flanks, seizure of critical areas, pursuit, and to some extent exploitation.\footnote{433}{Department of the Army, Office of the Deputy Chief of Staff for Military Operations, “Army Aviation Plan FY 56 – FY 60,” Washington, DC, 5 March 1956, Annex 1, Appendix D, p. 1. Hereafter cited as DA, 1956 “AAP.”} The Sky Cav concept appeared to provide the means for Pentomic divisions to secure the large gaps between their battle groups.

The conditions appeared to be set for Army aviation to become an important component in the Army’s plans for the next war. However, the composition of Air Force opposition, immature technology, and the fact that the Army was not quite ready for aviation’s larger role made sure that the Army continued to conduct experiments with small helicopter units for combat purposes. Still, despite their small scale, the efforts by the Army to increase its aviation capability upset the Air Force. Since the National Security Act of 1947, the Army and Air Force continued a running battle over Army aviation. Previous attempts at Key West in 1948 and the Pace-Finletter agreements of 1951 and 1952 tried to resolve the services’ disagreements.\footnote{434}{History of Army-Air Force Conflicts Concerning the Functions of Army Organic Aviation. pg 7 (found at MHI).} This last agreement limited Army fixed-wing aircraft to 5000 pounds but allowed for the Secretary of Defense to make future adjustments based on advancing technology and mission requirements. It ensured the Army of a “definite and continuing requirement for helicopter units” and defined the helicopter solely in terms of performance of functions and not size.\footnote{435}{History of Army-Air Force Conflicts Concerning the Functions of Army Organic Aviation. pg. 6, par. 38.} The agreement also recognized the Army’s support of its ground units in the combat zone to be a primary function but limited Army aviation to aerial observation,
command and control, transportation, and medical evacuation within the combat zone.\textsuperscript{436}

The second Pace-Finletter Agreement proved to be satisfactory enough to normalize relations between the Army and the Air Force for the remainder of the Korean War and allowed the Army to increase its procurement of helicopters.

The inter-service arguing increased after the Korean War’s end. Secretary of Defense Charles Wilson issued a series of directives in 1956 and 1957 in an attempt to resolve the issues surrounding missiles and Army aviation, which to the latter the Air Force occasionally provided “violent opposition.”\textsuperscript{437} Among other things, the 1956 directive specified arbitrary operating limits for Army aircraft of 100 miles forward and to the rear of “the general line of contact between U.S. and enemy ground forces.”

Within this 200 mile combat zone the Army could use its organic aircraft to support ground operations. The directive did not restrict aircraft performance, but specified a weight limitation of 5,000 pounds for fixed wing aircraft and 20,000 pounds for helicopters. However, the Secretary of Defense retained authority to grant exceptions to the weight restrictions as needed.\textsuperscript{438} Later on 18 March 1957, Department of Defense

\textsuperscript{436}DA SR 95-400-5, 19 November 1952.; \textit{History of Army-Air Force Conflicts Concerning the Functions of Army Organic Aviation} Tab W. In airborne operations the Air Force had responsibility from the objective area until ground link-up was achieved. In normal ground operations, the combat zone was defined as 50-100 miles behind the forward edge of the battle area (FEBA). This would be a point for further disagreement as helicopter performance improved. See also United States Senate Committee on Armed Services, \textit{Hearings Before the Special Subcommittee on Close Air Support of the Preparedness Investigating Subcommittee...}, 92nd Congress, 1st Session (1972) 15; Joseph Bykofsky, \textit{The Support of Army Aviation, 1950-1954} (Washington, D.C.: Department of the Army, Office of the Chief of Transportation, 1955), 27-29.

\textsuperscript{437}Goodhand, “Army Aviation Policy,” 1.

\textsuperscript{438}Cole (ed.), \textit{The Department of Defense: Documents on Establishment and Organization, 1944-1978}, 306-312; “Why Did the Ball Bounce as it Did? The Roles and Missions Decisions.” Army ___ (January 1957): 16-17. Issued on 26 November 1956 and entitled “Clarification of Roles and Missions to Improve the Effectiveness of Operations of the Department of Defense.” The Secretary of Defense also ruled that tactical and strategic airlift were “adequate in the light of currently approved strategic concepts,” Army surface to surface missiles limited to a range of 200 miles, and the Air Force gained responsibility for all intermediate range ballistic missile systems.
Directive 5160.22 confirmed the previous agreements, Wilson’s 1956 modifications, and included additional wording forbidding duplication between the services.\textsuperscript{439} Lieutenant General James Gavin, Chief of Army Research and Development, interpreted these restrictions as a significant setback which arbitrarily restricted the Army’s research and development efforts and “close[ed] the vast area between the Army’s light air vehicles and the large vehicles of the Air Force to further exploration and research.”\textsuperscript{440} Taylor also saw it as an effort by the Air Force and the Department of Defense to keep the Army dependent on the Air Force.\textsuperscript{441} 

Much more positive was Howze, who saw Wilson’s efforts as helping to define current Army aviation capabilities and allowing for future growth. He published an article that eventually envisioned Army aviation as a part of all ground operations, to include using “air mobility for ground reconnaissance.”\textsuperscript{442} Lieutenant General C. D. Eddleman, the Army’s Deputy Chief of Staff for Military Operations expressed support for the measures and did not believe that they would keep the Army from developing its aviation.\textsuperscript{443} Howze’s interpretation proved correct. The directives allowed the Army to

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\footnote{James Gavin, \textit{War and Peace in the Space Age}, 160. In his testimony to the Senate in 1958, Gavin believed that the restrictions hindered the Army’s efforts, not with helicopters, but with fixed wing aircraft. Noting that helicopters tend to cost twice as much to buy, five times as much to maintain, and the limitations of operating helicopters with greater than a 3 ton payload, he believed the Army needed to pursue the development of fixed wing VTOL/STOL. See Senate, \textit{DoD Appropriations FY 1958} (Washington, D.C.: GPO) 520.}

\footnote{Maxwell Taylor, \textit{The Uncertain Trumpet}, 168-169.}

\footnote{Major General Hamilton H. Howze, “Future Direction of Army Aviation,” \textit{Army} 7 (December 1956): 5.}

\footnote{Memorandum from Lieutenant General C.D. Eddleman, DCS for Military Operations, to Chief of Staff, US Army, no date, Subject: Clarification of Roles and Missions, SecDef Memorandum of 26 November, 1956; DCS Summary Sheet to Chief of Staff, “Analysis of SecDef’s Memo. Dtd 26 Nov 1956,}
develop the aircraft necessary to operate within the 200 mile zone. The Air Force had previously opposed the Army’s use of transport helicopters in assault operations in enemy territory as a duplication of its mission to provide airlift for airborne operations. The Secretary of Defense’s memo actually authorized the Army to conduct air assault operations behind enemy lines. It restricted the Army to providing airlift for “small combat units and limited quantities of materiel to improve local mobility” so as to not duplicate the Air Force’s mission. This was the last direct effort by the Secretary of Defense to solve the roles and missions conflicts. Through the remainder of the decade, Wilson and his successors, although aware of the Army’s aviation developments, did nothing further to limit Army aviation. Occasionally, the Department of Defense even considered removing all restrictions on Army aircraft.444

While both services interpreted the directives to meet their goals, the Army demonstrated some unusually adept political maneuvering that allowed the Army’s continued expansion of its aviation program. Stronger protest by the Air Force might have resulted in a different outcome, but the Air Force had problems of its own to confront, especially the sudden rise in Soviet missile technology. The perceived bomber and missile gaps reinforced the Air Force’s emphasis on its strategic bombardment forces at the expense of everything else. The lack of support for its tactical air combined with

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444Goodhand, “Army Aviation Policy,” 1; “Why Doesn’t the Army ‘Make a Fight’?” 1, 20. Wilson was followed by Neil McElroy (9 October 1957 – 1 December 1959) and Thomas Gates (2 December 1959-20 January 1961) were the subsequent SecDefs.
the doctrinal differences over the employment for tactical air, ensured that the Army’s needs would not be met.\footnote{History of Army-Air Force Conflicts Concerning the Functions of Army Organic Aviation. pg 7}

One fascinating aspect about the roles and missions debate in the 1950s is that the Navy argued that its aircraft had a strategic mission that was a duplication of the Air Force’s mission. By contrast, the Army’s efforts at developing its organic aviation was in an area that was of no interest to the other services. The Air Force simply feared the expansion of Army aviation because it did not know where the Army would stop.\footnote{General Robert R. Williams, interview by Colonel Robert J. Powell and Lieutenant Colonel Philip E. Courts, 28-29 March 1978, transcript. Army Aviation Oral Histories, Military History Institute, Carlisle, PA. See pages 17-18. Air Force leaders believed that if allowed to continue unabated, the Army would emerge from the next war with more pilots than either the Air Force or the Navy. While on the Air Staff as a Colonel in the months following the end of WWII, General Robert R. Williams had a Major write a background paper on how he foresaw the structure of the services twenty years into the future based on the trends he saw. The final paper had two main points. The first was that unless the Air Force took away aircraft from the ground forces, that there would be a logical expansion of organic aviation into increasingly larger aircraft to include multi-passenger models (at the time, the organic aviation consisted of two-seater cubs). Eventually this would develop into a ground force controlled air transport command. The second point foretold using missiles to replace fighter and attack aircraft. Therefore, if the Army controlled its own aircraft and missiles, the role of the AF in 20 years would be very limited. This paper was subsequently buried. See also Lieutenant Colonel (USAF) Neil Sorenson, The Development of the Air Mobility Strategy: A Case Study of Strategy Making in the United States, Student Research Paper, Air War College, Air University, April 1980, 45; Lieutenant Colonel Jimmie L. Jay, “Evolution of Military Airlift Doctrine.” Research Report, Air War College, (1977), 49.}

The Air Force’s emphasis on strategic bombardment was displayed in its budgets and demonstrated in the lack of aircraft for strategic airlift and tactical strike. General O.P. Weyland, Commander of Tactical Air Command (TAC), told a Senate committee that his command’s airlift capability was “marginal” and would remain “marginal” in the Air Force’s 137-wing program.\footnote{"U.S. Air Power Today – USAF commanders analyze its capabilities and its needs: A Quarterly Review Report". Air University Quarterly Review 8, no. 4 (Fall 1956): 73-74. This was to the Subcommittee on the Air Force of the Committee on Armed Services, United States Senate in the Spring of 1956.} Similar remarks were also made by Army leaders.\footnote{History of Army-Air Force Conflicts Concerning the Functions of Army Organic Aviation. pg 7}
After 1957, the Office of the Secretary of Defense became reluctant to deal directly with the services on resolving roles and missions disputes and instead attempted to exert its will through the authorization of weapon systems. The rising costs of new technology placed great strains on the military to modernize with new equipment without cutting force structure. In the words of one Army officer, “The mounting cost of weapons has become the BIG FACT [sic] not only in its impact upon the U.S. economy and future tax bills but upon the current military planning and budget making for 1956-1960 and for the long range projections to the 1970s.”

On average in the 1950s, military hardware costs grew by a rate of five percent per year. Both the Army and the Air Force had missile programs and this duplication of effort could not be tolerated. Despite the Army programs being much more advanced and successful, the end result was that by 1959 the Army lost its Intermediate Range Ballistic Missile and Continental Air Defense programs to the Air Force. In return, the Army assumed responsibility for battlefield air defense and a greater use of both fixed and rotary wing aircraft in Army aviation. Although it was a blow to Army prestige, the loss of the large and expensive missile programs allowed the Army to focus more on the development of its organic aviation.

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452This was especially true since the Titan, Atlas, Thor, and Jupiter missile programs suffered from large cost overruns starting in 1957. For the mounting pressure on the Secretary of Defense’s efforts to control rising costs see E. Bruce Geelhoed, *Charles E. Wilson and Controversy at the Pentagon, 1953 to 1957* (Detroit, MI: Wayne State University Press, 1979), 174.
One area of interest was the development of fixed wing aircraft for tactical transport and reconnaissance. With Wilson’s 1956 directive he had also included an exception to the weight limitations and allowed the Army to purchase and test five DeHavilland DHC-4 airplanes. This twin engine aircraft proved very successful ultimately led to the development and purchase of the CV-2 Caribou.\footnote{The Caribou was a medium tactical transport that weighed 16,920 pounds. It was also known as the AC-a in the Air Force.} When the Army surrendered the IRBM program to the Air Force in 1959, Taylor requested that the Army get in exchange the CV-2 Caribou for use in battlefield transport. Secretary Wilson agreed.\footnote{Colonel Delbert Bristol, interview by Colonel Ralph J. Powell and Lieutenant Colonel Ronald K. Anderson, 1978, p.41-42. Found in Army Aviation Oral Histories. (MHI). Interestingly, Bristol put together the final package for the Caribou that Wilson approved, but forgot to include the cost of the engines. The Army managed to get spare Air Force C-54 engines for use on the aircraft.} The Army also received an exception to test a turbo-prop tactical reconnaissance aircraft designated the OV-1 Mohawk.\footnote{The Mohawk weighed in at nearly 10,000 pounds.} The Air Force viewed these developments with great suspicion, and would become alarmed when the Army later armed the Mohawk and using it in a close air support role in Vietnam.

Another area of interest was developing an aerial tank destroyer using helicopters or liaison aircraft to counter the large Soviet armored formations in Eastern Europe The army’s operational concept utilized the philosophy that “close support means immediate response to the needs of field combat commanders and the capability of efficient performance of tasks in support of the ground maneuver.” The Army wanted a simple, rugged aircraft capable of delivering a wide variety of ordnance, primarily anti-tank, in close support of the combat divisions. Used primarily in daylight, it would also provide local armed reconnaissance and limited night attack capability.
The Department of the Army instructed the Continental Army Command to determine the viability of arming small aircraft for use as anti-tank close air support in the spring of 1955. This was not the first time the Army experimented with the idea. Previously the Army had experienced success using liaison aircraft to attack targets using rockets and bombs. Tests at Fort Sill in March 1945 demonstrated that weapons could be fired from small aircraft and recommendations were made that further experiments be conducted employing liaison type aircraft in an attack role.  

The 1955 study, named Project Able Buster, examined the manuals, test reports, and other literature to determine the feasibility of firing weapons from Army helicopters and light fixed wing aircraft. The panel members also made liaison visits to the Artillery School, Marine Corps Equipment Board, the AFF Board No. 3, and the Infantry School to assess their experience with light aircraft and helicopters. They concluded that it was infeasible to safely fire heavy machine guns and recoilless rifles without major (and costly) modifications. The best weapons for use were the Browning .30 caliber machine gun and rockets.

The study proposed a troop test to further exploration of the viability of using existing Army aircraft as flying tank destroyers with the troop tests completed by 1956.

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456 Headquarters, Army Aviation School, “Report of Phase I (Feasibility) Test of ‘Project Able Buster’ (U),” (Camp Rucker, AL: 28 October 1955). Reports from overseas theaters during World War II indicated that liaison type aircraft could be successfully employed on bombing missions and when armed with rockets or recoilless weapons, may be used in direct attack of ground targets, such as tanks and pillboxes, and in marking targets for fighter bombers. In March 1945 the Commandant, Field Artillery School, Fort Sill, Oklahoma, received a directive from Headquarters Army Ground Forces to conduct an experimental project in the employment of liaison type aircraft in attacks of targets with bombs, rockets and/or recoilless guns.

457 Headquarters, Army Aviation School, “Report of Phase I (Feasibility) Test of ‘Project Able Buster’ (U),” (Camp Rucker, AL: 28 October 1955). The Oerlikon 8cm rockets could penetrate nine inch armor plate with a HEAT warhead. The Oerlikon Tool and Arms Corporation made 80 of these missiles...
The flying tank destroyer would operate at very low altitude (approximately 200 feet above the ground) against enemy armor. It would be organized into an Army Aviation Attack Company with one organic to each combat division and would operate in direct support of RCTs and combat commands. The unit would operate from forward airfields dispersed throughout within the division zone and was to be 100 percent mobile with organic transport.\textsuperscript{458}

A platoon size test unit of 12 aircraft was created to replicate an Army aviation attack company organic to the division and in direct support of a RCT or Combat Command. Although the intent was to test the feasibility of using existing aircraft in the role, they were hampered by the lack of munitions suitable for the task. There were no aerial rockets that had the range and explosive capabilities to destroy tanks. The wire guided Dart missile suffered from engineering difficulties and wire breakage that precluded its use in the testing. The munitions then in use available for destroying or neutralizing a tank were the high explosive GP bomb, the napalm bomb, a toxic bomb or spray, and the 8cm Oerlikon Rocket.\textsuperscript{459}

The aircraft considered for the test included one helicopter, the Bell H-13. In assessing the feasibility of using the helicopter in the flying tank destroyer role, the study found the helicopter capable of lifting a variety of weapon systems to include machine

\footnotesize{\textsuperscript{458}Headquarters, Army Aviation School, "Report of Phase I (Feasibility) Test of ‘Project Able Buster’ (U),” (Camp Rucker, AL: 28 October 1955). The aircraft would fill the Army’s need for a close support aircraft through 1965. After that, it was expected that “unconventional aircraft capable of vertical take off and landing” would be developed for that role. Desired characteristics included a usable payload of 1,000 pounds, an endurance of 3 hours and a range of 200 nautical miles, a maximum speed of around 200 knots, and a high degree of maneuverability and stability in operation.

\textsuperscript{459}There was no existing Army Ordnance Corps rocket armament suitable for the tested mission.}
guns, rockets, and bombs. However, the testing agency rejected the H-13 because of its insufficient performance. The helicopter had insufficient speed to escape from the blast area after dropping a bomb, its rotor wash dispensed toxic gas and liquids in unpredictable patterns, and the cockpit vibrations prevented the accurate launching and guiding of aerial rockets, especially when using optical sights.\textsuperscript{460}

The tests demonstrated the feasibility to hit and destroy or neutralize a tank with an Army type aircraft using current munitions. However, using Army aircraft was infeasible due to the performance characteristics needed for success and survival. CONARC Board No. 1 concurred “that a requirement exists for an Army controlled, airborne, weapons system for destroying hostile tanks.” However, the board believed that any aircraft “light and slow enough to fly from hastily prepared fields, and simple enough to be maintained in the field on an army aviation basis, will not be able to survive ground fire.” Simply put, maneuverability was not a substitute for high speed in avoiding ground fire.

The test board concluded: “It would appear that the Army should not be content with a single purpose combat air vehicle, i.e., a flying tank destroyer. It would seem to be more logical to develop a multi-purpose combat airplane to include the capability of destroying tanks.” This shows fiscal responsibility but a dilution of the intent of the aircraft -- a complaint they had with Air Force aircraft doing ground support. Also shows

\textsuperscript{460}CONARC Board #4 dealt with the DART. CONARC considered the possibility of adapting the DART to army aircraft with a stable sighting system since the sighting equipment was optical and required a stable base. It was found that the Hiller Flying Platform or similar device were stable enough for the DART. “present equipment used with the DART indicates a more simple adaptation to the fixed wing aircraft than to the rotor wing. Studies of utilizing a gyro-stabilized base for the sighting of the DART in a rotor wing will be explored.” The firing tests conducted on 9 and 12 September indicated that the control of the DART after launching was not perfected.
that many in the Army want to expand the scope of Army aviation beyond just the immediate needs. Significantly, the Army Aviation Command conducted the tests with minimal fanfare. In its initial guidance to the school, CONARC directed that “In view of the radical departure from current concepts, it is desired that all correspondence, plans, and reports be classified and that no publicity be given this project .... Communications with Navy or Air Force agencies will be forwarded through this [CONARC] headquarters.” The only other direct communications authorized were with the Chiefs of Transportation, Ordnance, and Signal.

While the Army struggled with maintaining its position in the nation’s defense establishment during the New Look, its leadership wrestled with the organizational structure, doctrine, and equipment necessary to ensure success in the next war in Europe. Facing a fully mechanized and numerically superior enemy, and unable to procure sufficient conventional forces from the American government and its NATO allies, the Army turned to the use of tactical nuclear weapons to restore balance to the battlefield. Anticipating the requirements for fighting on a nuclear battlefield, the Army reorganized its tactical units into Pentomic Divisions. This new organization relied on three tenets for successful operation: dispersion, mobility, and flexibility. Units needed dispersion to survive a nuclear attack, mobility to rapidly consolidate, and flexibility to mass, engage, and destroy the enemy at any given time.\(^{461}\) While the helicopter’s capabilities made it well-suited to the Pentomic organization’ requirements for dispersion, mobility, and

flexibility, the helicopter played just a small role in the Pentomic division’s organization and operations.

Gavin interpreted the Army’s efforts to transform its divisions from “the old pyramid” organization into an “amorphous biological cell.” Integrating atomic weapons into their organization, Gavin believed that the Pentomic divisions were going to be something along the lines of his air cavalry concept.\textsuperscript{462} Gavin believed that Sky Cav organizations were needed on the nuclear battlefield against the Soviets:

I figured that if we should ever mass a strategic attack on the Soviet Union, the forces to do the initial reconnaissance and landing had to be Sky Cav type; things that weren’t committed to roads and radio [sic] contaminated areas. And Sky Cav, I thought, was uniquely equipped to deploy in a very wide front, leap front unit over unit and go very, very far into the nuclear contaminated areas.\textsuperscript{463}

The Pentomic Division came in three forms – armored, infantry, and airborne. The armored division retained its combat command configuration with modifications made for the incorporation of some new technology such as missiles – it essentially did not change. The infantry and airborne divisions were more radically transformed. These divisions changed from the triangular concept of three regiments with three battalions and replaced them with five battle groups, each with five companies.\textsuperscript{464} The result was an elimination of a layer of command and a reduction in the number of personnel. The loss in firepower from combat units was more than made up through the organic nuclear

\textsuperscript{462} Council on Foreign Relations Study Group Reports: Nuclear Weapons and Foreign Policy Subcommittee III. Digest of Discussion, 15 February 1956, page 6. Found in James M. Gavin Papers, Box 17A: Post War Duty Retirement, File “Transcripts of 2\textsuperscript{nd} and 8\textsuperscript{th} Meeting on Nuclear Weapons, 1956, 1975-81” at MHI Archives.

\textsuperscript{463} James M. Gavin Papers, Box 1, Senior Officers Debriefing Program Conversations Between, page 34.
fire support provided by new technology like atomic cannons, Honest John missiles, and the Davy Crockett.\textsuperscript{464} The smaller command structure was supposed to increase flexibility and new aviation-type equipment would enhance its mobility. The logistical support for the division was very small and also awaited the development of “new logistical support systems and procedures.”\textsuperscript{466} Each Pentomic division also had the number of helicopters increased, but not enough to increase mobility.\textsuperscript{467} The Pentomic re-organization began with the 3d Infantry and 1\textsuperscript{st} Armored Divisions, but it was the re-activation of the 101\textsuperscript{st} Airborne Division that earned the most press. In the words of the Secretary of the Army Brucker, the division was intended to “pioneer in the most advanced concepts of organization and equipment. We expect to tailor it exactly to the requirements of the atomic battlefield.”\textsuperscript{468} While the division expressed great spirit it suffered from a shortage of key equipment to include helicopters and fixed-wing aircraft that were to replace ground vehicles and enhance mobility. In the division’s

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\item\textsuperscript{464} In the Pentomic infantry division, there were actually four rifle companies and one heavy mortar battery per battle group. See Colonel Theodore C. Mataxis, “The Marines’ New Look” \textit{Military Review} (February 1959): 12.
\item\textsuperscript{465} The Pentomic Infantry division also had an armor battalion, a cavalry squadron, division artillery, and an engineer battalion. See Major John H. Cushman, “Pentomic Infantry Division” \textit{Military Review} (January 1958): 19-21.
\item\textsuperscript{466} Bacevich, \textit{Pentomic Army}, 108. \textit{Semiannual Report of the Secretary of the Army, FY 1956} (Washington, D.C.: Department of the Army, 1957), 87. The infantry division’s logistics included a trains headquarters, a quartermaster company, a medical battalion, ordnance battalion, and an administration company. It also pooled its APCs as part of a transportation battalion.
\item\textsuperscript{467} Discussion with General Cushman, August 2002 at Army Historians Conference, Washington, D.C. As a battle group commander, Cushman also stated that there were too few helicopters available to do much of anything with them.
\item\textsuperscript{468} “The Talons of the Screaming Eagle are Resharpened for the Nuclear-Missile Age,” \textit{Army} (October 1956): 51.
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reconnaissance troop there was a Sky Cav platoon, but the organization was too small to derive much from experiments except that more was needed.\footnote{469}{The Talons of the Screaming Eagle are Resharpened for the Nuclear-Missile Age,” *Army* (October 1956): 52. Interestingly, Major General Paul D. Adams, who later served as the Commander of V Corps in Europe and the first CinC of US STRIKECOM (Strike Command), was the XVIII Airborne Corps (under which the 101st fell) commander at this time.}

While conceptually imaginative, much of the envisioned equipment necessary to make the Pentomic concept work never arrived. Interestingly, the one technology that was available that could have provided greatly increased dispersion, mobility, and flexibility was the helicopter. In the infantry and armored Pentomic divisions there was only one aviation company that had 49 aircraft. Despite having to conduct aerial troop movement as part of its mission, the aviation possessed just six light transport helicopters which could airlift only one infantry platoon at a time.\footnote{470}{U.S. Department of the Army, U.S. Army Infantry School, *Infantry Reference Data* (Fort Benning, GA: U.S. Army Infantry School, 1961), 67-68. The company contained 22 fixed wing aircraft: 14 light observation planes, 4 medium utility planes, and 4 utility airplanes; the 27 helicopters consisted of 17 observation helicopters, 4 utility helicopters, and 6 light transport helicopters. The company’s mission was “To increase the combat effectiveness of the infantry division by providing the division and its elements with immediately responsive aviation support.”}

While aviation support was important to the success of the division, the light Pentomic divisions’ Sky Cav troop was a ground-air organization used only for long range target acquisition for the missile artillery.\footnote{471}{Colonel George C. Dalia, “Atomic Punch for the Ground Gainers,” *Army Information Digest* 13 (November 1958): 2-10; Stubbs and Connor, *Armor-Cavalry*, 250-251.}

In all the Pentomic divisions the number of aircraft was woefully inadequate for the missions assigned; various Army studies indicated that the Pentomic divisions needed at least 100 aircraft, of which 20 should be organic transport helicopters.\footnote{472}{*Army Aviation Handbook*, (Fort Knox, KY: U.S. Army Armor School, August 1959), 4.}

One reason for the inadequate number of helicopters was the small size of the American helicopter industry. Another was the state of the technology which resulted in

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\footnote{469}{The Talons of the Screaming Eagle are Resharpened for the Nuclear-Missile Age,” *Army* (October 1956): 52. Interestingly, Major General Paul D. Adams, who later served as the Commander of V Corps in Europe and the first CinC of US STRIKECOM (Strike Command), was the XVIII Airborne Corps (under which the 101st fell) commander at this time.}

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\footnote{472}{*Army Aviation Handbook*, (Fort Knox, KY: U.S. Army Armor School, August 1959), 4.}
high procurement costs and high operating expenses. Since the helicopter lacked a sufficiently large civilian market, manufacturers focused on meeting military requirements. The Army’s 1952 Materiel Requirements Review Board recommended the Army emphasize the development of light, medium, and heavy cargo helicopters, and paid scant attention to utility helicopters which were more technologically mature. The increasing complexity of the larger helicopter designs made for development programs that cost more and took longer to complete, and often were not successful. The tri-service heavy H-16 program suffered extensive problems and was cancelled by the end of 1956. The Army’s search for a flying crane focused on the XH-17, but it too suffered from technological complexity that slowed development and increased research costs. The lethargic pace forced the Army to place a lower priority on the flying crane and instead used most of its research funding on developing better aircraft engines and the OV-1. The H-37 medium transport helicopter also suffered mechanical problems but did enter production in the mid-1950s. However, all three services had contracted for the helicopter and in the 1950s mass production of helicopters was an unheard concept within the helicopter industry due to the complexity of helicopter designs. By May 1960, the Army had just 90 in its inventory.

Although a lack of industrial capacity also hindered the Army’s procurement of helicopters, the Air Force ensured that it procured helicopters for itself before purchasing them for the Army. For purchasing helicopters, the Army submitted a military inter-


departmental purchase request (MIPR) that provided the Air Force with the funds to buy Army aircraft. In September 1950 the Army requested purchasing 21 H-21 helicopters. The Air Force rejected the order and instead purchased the helicopter for their own transport helicopter companies. It was the Air Force’s way retaining its airlift responsibility for the Army by just providing the minimal amount of support to the Army. It took the involvement of the service secretaries before the issue was resolved.\footnote{\textit{Helicopter Design Lags Behind Needs}, \textit{Aviation Weekly} (12 March 1956): 259, 265.}

The impact of the Air Force’s restricted procurement and the industry’s limited production base was that, like the Marine Corps, the Army adjusted its plans for creating transport helicopter companies.\footnote{Colonel Del Bristol Oral History, 22-23. The Air Force did the same thing when procuring 125 Beavers; See also Transportation Corps, “Army A/c P&P Programs,” 41-44.} The inability to get larger helicopters forced the Army to turn to the H-19 utility helicopter and the development of STOL fixed wing aircraft.

Often times hand built, helicopter costs also sky-rocketed as designers tried to improve performance to meet military requirements.\footnote{\textit{A History of Army Aviation -- 1950-1962}, 197-202.} Normally this meant reducing the weight of the helicopter by using exotic and costly materials. As the military required greater payloads and performance, the size of the helicopter increased, with an exponentially larger increase in cost.\footnote{A rule of thumb was that to double payload the cost increased by a factor of 4. In 1956 a 1 \(\frac{1}{2}\) ton helicopter like the H-21 and H-24 cost approximately $229,000; a 3 ton H-37 cost over $1 million in 1957. See Brigadier General Carl I. Hutton, (CG, Army Aviation Center), “Economics of the Military Helicopter,” \textit{United States Army Aviation Digest} (October 1956): 3-4; House of Representatives, \textit{Army...}}

These efforts directly resulted in high procurement costs. However, there was only so much weight that could be eliminated --
the real problem was the engine. The piston engines used by the helicopters could not deliver enough power to lift heavy loads or move at high speeds. In addition, piston engine helicopters were loud and required a disproportionate amount of maintenance for every flying hour. The solution to this problem appeared in the development of the gas turbine engine. Much simpler and quieter design than the piston engines, turbines engine offered much greater performance, especially the power to weight ratio, although at the expense of fuel economy.

The Navy had tested a gas-turbine powered helicopter as early as 1951; three years later the Air Force tested for the Army its own turbine powered helicopter. The power and efficiency of the turbine led the Army to contract with the Bell Helicopter Company to develop the turbine powered XH-40. In November 1956 Bell Helicopter Corporation tested the first version of the aircraft, the HU-1 Iroquois. The tests went well, but some modifications were needed and delayed the Army from receiving its first production helicopter until 1959. However, the Soviets, British, and French had also tested, and the Soviets actually fielded, turbine powered helicopters in the mid-1950s.

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480 “Turbine Powered Copter,” *Army Navy Air Force Journal*, 89 (22 December 1951) 495. “Turbo ‘Copter Completes Flight,” *ANAF Journal*, 92 (25 December 1954) 506. This was the Kaman K-225 helicopter, the first American turbine powered helicopter, and possibly the first in the world. Tested on 12 December 1951, it was equipped with a Boeing YB-502 turbine engine. This Navy-sponsored development showed that the helicopter could fly with a gas-turbine engine.


The successful application of the turbine engine for helicopter flight marked the turning point in the development of air mobility for a variety of reasons. First, and most importantly, it greatly increased lift capacity. Now helicopters could actually begin fulfilling the potential that was ascribed to them in the previous decade. This increased lift factor allowed for more combat loaded troops to be carried at one time. In addition, helicopters could be fitted with self-sealing fuel tanks and armor to enhance survivability. Second, the turbine was a much simpler design with much fewer moving parts. The smaller size of the turbine engine made it, in principle, less vulnerable to enemy fire, while allowing more space in the fuselage for crew, cargo, and passengers. The fewer parts also made maintenance on the aircraft simpler and cheaper to operate. As a result, turbine equipped helicopters would enjoy a significantly higher operational readiness rate than their piston engine equipped counterparts. Finally, an armed helicopter could now escort troop carrying helicopters to and from the objective. Previously, armed piston-engine helicopters could not maintain a high enough speed (due to increased weight and drag) to fly with the transport helicopters. Instead, they had to link up in vicinity of the objective in order to support the air landings. This required careful planning and coordination; something that was hard to do in the days of analog communications.

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483 This was very important since an H-21 or H-34 helicopter took five times as many maintenance hours to keep flying compared to an L-19. The adoption of the turbine engine eliminated the need for a heavy clutch which improved payloads, rate of climb, and the service ceiling. Additional improvements also included new power and servo-control systems; new rotor head and RPM controls; and standardized rotor blades which were interchangeable.

484 Apparently, the radios used in the helicopters were not of sufficient power for extended ranges because those radios would be too heavy and bulky. This problem was alleviated by the late 1950s.
Obviously, technology was not the issue with the employment of the helicopter in the Pentomic Division. The turbine powered helicopter was much more advanced in 1956 than many of the other vehicles that the Army envisioned for the Pentomic force. The HU-1 helicopter most likely would have entered production earlier had a greater priority been placed on its development and refinement. As it was, the first production models began rolling off the line in 1959, yet there was no change to the aviation portion of the MTOEs for the Pentomic divisions in 1959 or 1960. Considering the Army’s willingness to change organizations before all the applicable technology was available to make it work, this does not explain why the helicopter was not used more extensively.

By the late 1950s, the Army’s vision of the future at times seemed to parallel that of science fiction. The cover of the November 1956 *Army* was entitled “Soldier of the Futurarmy” and depicted a soldier in a suit that was reminiscent of a Starship Trooper with nuclear powered transports zipping through the air and releasing three man aerial platforms for blasting enemy positions. Inside the issue, the article described an U.S. Army by 1974 composed of three-dimensional units that would undertake ‘Aerial Blitzkrieg’ through vertical envelopment. At the May 1957 Airborne Conference held at Fort Bragg, the majority of observers agreed that by the mid-1970s the Army was going to be mostly air mobile using aerial jeeps, aerocycles, drone, nuclear powered and tilt wing transport aircraft, helicopters, and nuclear missiles. They came to this conclusion after watching the combat demonstration using helicopters. During the

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485Cover, *Army* (November 1956). This was the annual meeting issue. Also see Robert Heinlein, *Starship Troopers*.
exercise, a variety of aircraft used contour flying to transport troops, heavy weapons, and supplies onto the objective. They also conducted reconnaissance, took aerial photos, laid wire, and evacuated casualties. It was the Sky Cav that provided the most impressive demonstration. Using H-13, H-21, and H-23 helicopters equipped with machine guns and rockets, the Sky Cav initially popped out of defilade positions to attack targets and then moved forward, firing while charging another set of targets. As one impressed observer described it, “Visions of a line formation of hundreds of helicopters came to mind – rising from behind hills to bounce up and down, firing in defense or counterattack, or attacking enemy flanks and outposts and lowering troops for three-dimensional tactical envelopment.”

Despite demonstrations like these that captured the soldier’s imagination, and the extensive writings by aviation supporters like Gavin and Howze that created dialogue within Army circles, progress towards air mobility was at best methodical. An example of this was the Army’s fielding of pathfinder units. Testing during the Korean War demonstrated a need for pathfinder units to establish landing zones and used special equipment for terminal guidance -- something very important during periods of limited visibility. General John E. Dahlquist, the Chief of Army Field Forces, ordered the activation of two pathfinder units in 1954 with the goal of having one team per aviation

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battalion. By the end of the decade the Army only possessed the original two teams. Another example of this slow progress was the publishing of the Army’s aviation field manual FM 57-35 in June 1958, three years after the first draft had been written and two years after the AAP had been approved. Entitled “Army Transport Aviation -- Combat Operations,” this field manual described the basic tactics and techniques that would prove valid during the 11th Air Assault Division’s experiments five years later and used by the 1st Cavalry Division’s initial experiences in combat in Vietnam. Once available, it took even longer before the officers and men read the manual and began implementing the concept.

The key to a greater use of the helicopter as a combat vehicle was the acceptance of the helicopter within the Army itself. Although there was already a staff section for aviation matters, it lacked influence, funding, and permanence – all things already possessed by the Transportation Corps in its efforts at retaining proponency for the helicopter. To solve this problem, aviation supporters set out to establish an office on the DA staff to coordinate aviation expansion, to build a base of support in senior leaders, to increase the Army officers’ knowledge of the helicopter and its potential, and to gain experience with helicopters through tests and exercises. This happened in 1955 with the

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491 Tolson, Airmobility, 5. It took only two months to produce a draft, but the staffing and input from all the other Army agencies delayed its final approval. In between, the Infantry School published a draft as Special Text 57-35-2 in June 1957. The DA finally approved the draft in June 1957 pending some revisions. In October 1958 the Army had yet to begin widespread publication and distribution of the field manual.

492 O. Glenn Goodhand, interview by Colonel Bryce R. Kramer and Lieutenant Colonel Ronald K. Andreson, 1978, p. 66. Found in Army Aviation Oral Histories. (MHI) In the Army’s operational side, there was the perception that the Transportation Corps’ efforts at creating transport helicopter battalions
creation of the Director of Army Aviation as part of the Department of the Army’s Office of the Deputy Chief of Staff, Operations. Also created was the Army Aviation Center at Camp Rucker, Alabama.

Next, it was important to fill the director’s position with a leader who possessed credibility to combat arms leaders, a clear vision, and could provide the continuity needed to see change through to the end. This was especially important in an organization like the Army that continually shifts its personnel into new jobs and new locations. Prior to 1956, there “was no ground swell at all” for the expansion of Army aviation, “except for Army aviators beating their own drum.” As the Army’s first Director of Aviation from 1955 to 1957, Brigadier General Hamilton H. Howze provided the vision and the dynamic leadership which laid the foundation for Army aviation’s future expansion. Fortunately, Howze had a new document upon which to start his crusade. On 29 March 1955, the Department of the Army published Training Circular 1-7, Employment of Army Transport Aviation. Written by OCAFF/CONARC, the circular was based on the premise that the primary function of Army transport aviation was combat support (specifically, moving army combat units by air) with service support (like

was an effort to assume complete control over Army aviation. Looking back, Goodhand sees it as a “tempest in a teapot.”

The aviation program for the Army had become so important, expensive, and controversial, that Secretary of the Army Pace established the Army Aviation Branch of the Army G3. The three assigned officers were to be the focal point on the Army Staff for all aviation matters. See Lieutenant General Robert R. Williams, “From Balloons to Air Mobility: the Early Years of the Struggle 1942-1954,” Army Aviation (December 1992), 22.

O. Glenn Goodhand, interview by Colonel Bryce R. Kramer and Lieutenant Colonel Ronald K. Andreson, 1978, transcript. Army Aviation Oral Histories, Military History Institute, Carlisle, PA. See page 46. Goodhand was (give credentials here)

General Gavin was instrumental in the establishment of the position and personally picked Howze for the position. Although Howze was a cavalryman, he was vocal in his belief that mobility was the key to battlefield success and believed that Army aviation could provide this mobility. See Hamilton 210
moving supplies and aeromedevac) being an additional function.\footnote{Department of the Army, Training Circular 1-7, \textit{Employment of Army Transport Aviation} (Washington, D.C.: 29 March 1955), 1. [Found at MHI] Prior to this, another example of the Army’s forward looking stance in its schools was a study done by the Army Aviation School in May 1954. Entitled “Measures for the Protection of Army Aviation from Enemy Action” the report concluded that Army aviation could operate and survive on the modern battlefield. Although the emphasis on the report appeared to focus on fixed-wing aircraft, throughout its study it addressed Army aviation’s mission to conduct helicopter assaults forward of friendly line. Despite this mission, the report did not view the helicopter as a combat aircraft and did not mention any long term improvements in helicopter design. As a result, the report saw the helicopter as not worthy of adding armor or weapons, but did mention that the convertiplane possessed the best characteristics for future survival. The report’s conclusions are dubious because it had no historical analysis and it was very general in assessing the enemy threat and weapon capabilities. Interestingly, the report did not describe the use of the helicopter in the initial stages of an offensive operation. Instead, it described helicopter operations to move reserves and in the pursuit. No mention was made for use in defensive and retrograde operations. See Report of Study, “Measures for the Protection of Army Aviation From Enemy Action” (Fort Sill, OK: Army Aviation School, 24 May 1954), CARL Archives, Fort Leavenworth, KS.} This changed with the 1956 version of TC 1-7 which articulated aviation’s primary role as providing “increased mobility for the tactical maneuver of troop units.”\footnote{Department of the Army, Training Circular 1-7, \textit{Employment of Army Transport Aviation} (Washington, D.C.: 26 January 1956), 1. Found at MHI.}

Howze had instant credibility throughout the combat arms since he came from an Army family and was a highly decorated cavalry officer.\footnote{Add a little detail here about his family and his decorations/actions. Howze’s father earned the Medal of Honor and eventually became a General Officer. The family also had extensive political contacts and were personal friends of Theodore Roosevelt.} He came into the job with no preconceived notions about Army aviation and without pilot wings, something he mastered flying very quickly. He was a gifted speaker with a quick wit and a sharp sense of humor.\footnote{O. Glenn Goodhand, interview by Colonel Bryce R. Kramer and Lieutenant Colonel Ronald K. Andreson, 1978, transcript. Army Aviation Oral Histories, Military History Institute, Carlisle, PA. See page 46.} These skills were extremely valuable since he saw his primary role as selling the Army on the value of organic aviation. Howze’s goal was to educate the rest of the Army about Army aviation and what its aircraft and pilots could do for ground
The lack of Army personnel with helicopter experience was especially apparent in the senior ranks. With the creation of the Air Force as an independent service, almost the entire population of experienced and combat tested light, fixed-wing pilot leadership departed with it. This left the Army with only junior pilots who had never seen combat and those aviators who wanted to fly but did not aspire to command. Both of these types of pilots lacked credibility when compared to their combat arms counterparts who had commanded units.

Howze and other Army aviators realized that the only way to gain greater support was to develop it themselves. Aviation needed to have a broad base of support both in the Army and in Congress in order to ensure understanding and expansion. Part of Howze’s solution to this problem was to implement a program referred to as Eagle Flights. Similar to the Navy’s aviation program of the 1930s, the Eagle Flights provided the Army with a “kind of top-level management experience” which the aviation program lacked. The program carefully picked its participants and provided flight training and ultimately pilot wings for them. The graduates of this program left with a better understanding of Army aviation and a vested interest in its expansion. While the Eagle Flights created some animosity with the older aviators who had been there since the

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500 An example of this is Major General Hamilton H. Howze, “Soldiers With a Double Skill,” *Army* (January 1957): 30-34. The newness of aviators progressing up the ranks, created some problems in terms of managing their careers and ensuring they received the necessary duty positions for professional growth. In order to facilitate a better understanding of Army aviators, Major General Howze wrote an article in *Army* magazine explaining to commanders their role in tactical units and how aviators can better serve the Army. Interestingly, the article contained pictures showing a non-stop helicopter cross country helicopter flight with refueling done in the air and hovering above ground.


502 The lack of experienced pilots may have increased the legitimization of the helicopter as an alternative aircraft within the Army.
beginning, the program worked. It was much “faster and easier to teach a general to fly than to teach a lieutenant to be a general.”

Howze believed that a few light aircraft could produce decisive effects on the battlefield. He “preach[ed] that sermon” to as many people and departments as possible, especially the civilian and military workforce in the Pentagon. However, the most important presentations he gave were to the students at the branch schools, Fort Leavenworth’s Command and General Staff College (CGSC) and the Army War College in Carlisle, Pennsylvania, since they were the leaders who could turn his vision into reality. When visiting these schools he took existing tactical problems and inserted a few aircraft on one side. The addition of the aircraft “revolutionized the solution” for the side with aviation. Howze also stimulated dialogue on Army aviation throughout the New Look era by writing articles for military journals and by traversing the country giving lectures and presenting tactical problems and solutions to military, governmental, and

503 O. Glenn Goodhand, interview by Colonel Bryce R. Kramer and Lieutenant Colonel Ronald K. Andeson, 1978, transcript. Army Aviation Oral Histories, Military History Institute, Carlisle, PA., pages 48, 50-51. Some of the older aviators felt that these guys were coming in late when it was easy; why did they not show up when it was rough? Goodhand notes that “We had plenty of guys to fly airplanes but most, many of them weren’t even interested in staff work and very few of them were West Point types, very few.” See also Delbert Bristol, interview by Colonel Ralph J. Powell and Lieutenant Colonel Ronald K. Andeson, 1978, transcript. Army Aviation Oral Histories, Military History Institute, Carlisle, PA. See pages 37-38. While Del Bristol saw the Eagle Flights as important for the future of Army aviation, this was not the first time this had been done. Immediately after World War II a number of field grade officers like Carl Hutton (future Commandant of the Aviation School), Bill Leeney (then a Lieutenant Colonel in the Infantry), and Warren Williams undertook flight training.

504 Vanderpool Transcript, “Attack Helicopter: The Key to Army Air Mobile Operations,” page 45. Found at MHI. This training was also extended to civilian officials like Dr. Harold Brown (a future Secretary of Defense in 1977). See Williams Oral History, tape 2 side 2, page 11.


industrial audiences. One example was an article which described how Army aircraft would be used to solve the problems of dispersion and depth on the battlefield. Howze followed that with specific examples for the defense on how to blunt enemy thrusts by atomic strikes and counterattack by helicopter-borne infantry. In the offense, Howze described how helicopter-borne infantry could be used to exploit atomic strikes in support of both armor and infantry units while other helicopters maintained aerial lines of communication. He envisioned a future of large, completely mobile units based on the Sky Cav model. To take maximum advantage of this new type of force, the tactical schooling of Army leaders needed to change.

Howze used his position to “spread the gospel” but the reality was that the Director of Aviation and his staff had minimal control over aviation development. His directorate had few people and a long list of responsibilities. To counteract this weakness, Howze periodically met with Army aviators who were serving on the DA staff and in the major commands. Meeting at the Pentagon, the assembled aviators received orders from Howze which served to informally coordinate the development of Army aviation. Except for these meetings, the main contribution of Howze’s office was the annual report on the development of Army aviation and coordinating with the other staff sections. The reality was that developments occurred in a very de-centralized manner.

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507 Howze wrote more than a dozen articles between 1955 and 1960 discussing various aspects of army aviation and the need for greater mobility in the Army.

508 Major General Hamilton H. Howze, “Combat Tactics for Tomorrow’s Army,” Army 8 (October 1957): 24-29. An example is the absolute necessity of seizing and holding dominating terrain which would not be a necessity in the Sky Cav army of the future.

with almost every Army branch and staff sections having some stake in developing Army aviation. This created problems when responsibilities overlapped and rivalries developed. The Infantry School envisioned an airmobile company composed of infantry, transport helicopters, and armed helicopters, as the basic unit. The Army Aviation Center also worked on the airmobility issue and anticipated a more formal structure that included aviation battalions at the division level. Within the Aviation School was the Combat Developments Office where Colonel Jay Vanderpool worked. While it explored the integration of aviation into ground units, the office also pursued the development of combat aviation.

While building support for airmobility through small groups of individuals was important, it was essential that the Army’s institutions develop an air mobility doctrine and ensure its understanding and acceptance. The role of the officer-education system in the development of Army aviation was more important than has previously been given credit and played a twofold role. First, since many of the best officers and men served as instructors, it was a center of knowledge and was an active participant in the development of new equipment, organizations, and doctrine. New equipment, new organizations, and changes in doctrine often are experimented first within the school.

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511 Pinney, 65.
system before being tested by regular units. Second, the primary mission of the military schools was the education of its leaders on the officially approved concepts. The educational base for the officer corps thus began at the schoolhouse.  

At the Army War College, students received an increasing amount of instruction on Army Aviation and its uses and incorporated the use of Army aviation assets into higher level planning. The increased interest was also reflected in the topics of the papers that each student wrote. The greatest interest in helicopters per se was in the years from 1952 to 1956 when a total of fourteen papers were written and another five concerning mobility. Interest in these two subjects also occurred again in 1958/59 and 1960/61. Besides the normal course of instruction, the senior field grade officers also received lectures from the Marine Corps on the vertical envelopment concept. These lectures described the Marine Corps’ doctrine for amphibious operations and increasingly emphasized the use of the helicopter to accomplish the mission in both nuclear and non-nuclear warfare. Interestingly, at the time of these lectures, the Marine Corps was capable of executing the operation described only on a limited scale. However, the tactics and techniques had been tested and verified in the Korean War and the Marine Corps continued to buy helicopters in large quantities and the FMF air and ground units continued to train in helicopter operations. The Navy already had converted one aircraft carrier into a helicopter assault ship and there were plans to build new ships specifically


\[514\] Directory – Present and Former Staff and Faculty, Graduates, and Students by Class, 1905-1987 (Carlisle Barracks, PA: US Army War College, 5 January 1987). From 1952 to 1956 there were a total of 750 papers written, which means only 2.5% concerned aviation and mobility. The AY 1958/59 papers included three on helicopters, two on mobility, and one on Airmobility out of a total of 199 or
for the purpose of helicopter assaults for the next few years. By 1960 the Marine Corps would possess enough helicopters and ships to lift simultaneously a division in the amphibious assault. Although there is no record, the Army War College students surely noted the stark difference in each service’s use of the helicopter. Most should have departed Carlisle Barracks with an understanding of both the current capabilities and the limitless potential of the helicopter for combat operations.

The Army’s Command and General Staff College (CGSC) was also instrumental in the developing of doctrine in the employment of helicopters. The instruction included lectures and discussions about Army aviation which increased the students’ understanding about Army aviation. More importantly, the curriculum included field and staff exercises that required the planning, organization, and use of helicopters in combat and logistical roles at levels from brigade/battle groups through corps. Starting in the 1951-52 yearlong regular course, besides the logisticians emphasis on the helicopter as an aerial truck, the students actually planned an assault river crossing using notional helicopter units in the first wave. Considering that the Army had done very little up to this point with helicopters, the inclusion of helicopter assaults into the course is amazing. By the 1958-59 regular course, the curriculum had expanded to include an entire section on Army aviation subjects encompassing 29 hours of classroom time. In addition, the use of helicopters in both combat and logistical roles were included in the majority of the

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515 General Randolph McCall Pate (Commandant, USMC) speech to Army War College, 16 January 1957. Found in CARL; MG R.O. Bare (USMC) speech to Army War College, 25 February 1955.

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exercises and problems to include offensive, defensive, and miscellaneous operations.\textsuperscript{516}

NOTE: What size units by the end of the decade?

The instructors at the CGSC were also instrumental in the early recognition and promulgation of the helicopter’s importance on the battlefield. In 1953 an instructor at the CGSC published a paper that advocated that an infantry division could execute a helicopter-only air assault. The key in his opinion was to develop a helicopter that could quickly transport a 155mm howitzer with the troops.\textsuperscript{517}

In the September 1954 Field Manual 100-5, \textit{Field Service Regulations}, \textit{Operations} doctrinal writers acknowledged that the helicopter was one of many aerial vehicles that could give the Army the tactical mobility it needed to fight in the Atomic Age.\textsuperscript{518} The manual clearly stated the value of helicopter-borne forces:

\begin{quote}
Air Movement is a means of transportation used to rapidly launch units into battle, or deliver troops, supplies, or any combination thereof, to a secured objective area, or an area inaccessible to other means of transport.
\end{quote}

\textit{…Currently, the two types of aircraft which may be employed for air}

\textsuperscript{516}CGSC POIs found in Combined Arms Research Library, Archives Section. While this was an improvement, the Army aviation topics constituted less than 2\% of the 1627 hours of instruction.

\textsuperscript{517}Lieutenant Colonel John M. Kinzer, “Airborne Assault by an Infantry Division,” \textit{Military Review} 33 (October 1953): 45-53. However, he made no mention of the possibility of using armed helicopters to provide mobile artillery.

\textsuperscript{518}See General Maxwell D. Taylor (CoS, USA), “The Army’s Resources,” \textit{Army} 8 (December 1957): 34. This was his speech to the AUSA Annual Meeting. (2) “Association of the U.S. Army 1958 Resolutions,” \textit{Army} 8 (December 1957): 88-89. Resolution number 6 was to revise upward the weight restrictions on Army aircraft and missiles.
movement of troops, supplies, and equipment are fixed-wing and rotary-wing. 519

With this publication, the use of helicopters as a means for transporting units into battle became doctrine, and as such, required commanders of units to start training on the concept. An article by Lieutenant Colonel Stuart Seaton, a member of the CGSC faculty, recognized the need to start training soldiers on helicopter operations. Advocating the CGSC faculty’s position that the helicopter was going to be of great importance in the future, especially in solving the Army’s tactical mobility problem, he wrote, “We must not wait until the helicopters descend upon us in quantity before we learn to use them.”520 Even though Seaton saw a bright future for the helicopter, he did not believe that heliborne forces were currently suitable for the direct attack of enemy defenses. Again, the primary concern was the lack of artillery fires. Fire support would best be accomplished by air movement of 105mm howitzer (the largest possible at the time for helicopter movement) before and after the assault. Apparently, the idea of armed helicopters utilized as flying artillery still was not viewed as likely or feasible.521

However, the belief in the helicopter as a combat vehicle was not universally accepted. An infantry officer and instructor at the CGSC, Lieutenant Colonel Clarence DeReus, discussed the impacts of nuclear weapons on battlefield operations. He believed

519 FM 100-5 (1954).
520 Lieutenant Colonel Stuart M. Seaton, “The Helicopter in Early Link-Up Operations,” Military Review (January 1956): 33. Seaton was a field artillery officer serving on the faculty of the CGSC; this article was in consonance with the instruction then being taught at the CGSC. He subsequently provided an outline of how and what to train for tactical units’ to include commanders and staffs.
that amphibious operations by large forces like Normandy were now impossible against an enemy who had nuclear weapons. Although he did not mention USMC exercises, the author acknowledged that helicopters and convertiplanes were a solution because they could take off from far off at sea and land behind beaches prepared by atomic weapons.\textsuperscript{522} However he only mentioned helicopters as a logistical re-supply tool and did not see them as a solution for combat maneuver and firepower because of their fragility and limited lift capability.\textsuperscript{523}

Nevertheless, the staff at the CGSC searched for solutions to the tactical and strategic problems. Their solutions almost always required the use of aircraft. One article in 1955 explored the methods necessary for defeating the Soviets in Western Europe. Lieutenant Colonel Crosby Miller’s ideas on conducting the mobile defense were ideal for air mobile forces, however no mention of this was in the article.\textsuperscript{524} Another article advocated that the Army obtain its own CAS aircraft but made no mention of helicopters.\textsuperscript{525} One insightful article took a swipe at the restrictions on Army

\textsuperscript{523}Lieutenant Colonel Clarence C. DeReus, “Through the Atomic Looking Glass,” \textit{Military Review} (June 1955): 4-11. He also concluded that amphibious operations by large forces like Normandy are now impossible against an enemy who has nuclear weapons. Although he did not mention USMC exercises, the author acknowledged that helicopters and convertiplanes were a solution because they could take off from far off at sea and land behind beaches prepped by atomic weapons.
\textsuperscript{525}Colonel Jules E. Gonseth, “Tactical Air Support for Army Forces,” \textit{Military Review} (July 1955): 3-16. The author, a signal officer and the XO of the Aviation school, was highly critical of USAF lack of support and advocates increasing Army aviation to provide CAS. Curiously, no mention was made of helicopters (obviously not thinking in terms of armed helicopters).
aircraft by arguing that air power ought to be defined in terms of mission and not aircraft characteristics.\(^{526}\)

As directed by Ridgway in 1955, the CGSC also produced a tentative manual (WHICH ONE?) for an infantry division’s command and control of helicopter operations. The organization of the division’s aviation assets precluded the division from executing a deep raid without asking for additional resources from higher headquarters. In addition, none of the helicopters were armed so that any operation would require the support of organic artillery (which restricted the depth of the operation) or Air Force support (with all the associated problems of executing joint missions). As a result, the school recommended that commanders only conduct an air assault against an unopposed landing site. If one did not exist, then the operation should not be conducted.\(^{527}\)

Obviously, the quality of the doctrine being produced was not always the best – but it did show the increasing importance of the helicopter at one of the Army’s key educational institutions.

The weakness in the school system was at the lowest level. Apparently little indoctrination occurred at the advanced and basic courses for company grade officers. These officers made up the commanders and staffs at the battalion and company levels. Their ignorance of Army aviation and airmobility operations meant that training in those units was very limited, if at all. So when they tried executing airmobile missions during field exercises it was not surprising that the results were disappointing.

\(^{526}\)Major James A. Huston, “Are We Flying Toward Strategic Disaster?” *Military Review* (October 1955) 53-64.

The other aspect to developing a greater understanding of Army aviation was in the many tactical training tests and exercises. Although the Korean War had provided a greater appreciation and awareness for the helicopter’s capabilities, the Army’s limited use of cargo helicopters apparently restricted the vision of non-pilot helicopter proponents to just improving operations undertaken in the Korean War.\footnote{By the end of the war, the Army had over 800 helicopters of which 84 were cargo helicopters. The Army acquired two-thirds of these helicopters in the final year of the conflict, but only 200 helicopters made it to the Far East. Of the 800 helicopters 460 were Bell H-13s (including 405 of the newest E models), 262 were Hiller H-23s, 72 were Sikorsky H-19C cargo helicopters, and 13 were Piasecki H-25A Army Mule cargo helicopters. The Piasecki H-21C did not enter service until September 1954. See John W. Kitchens, “Cargo Helicopters in the Korean Conflict” \textit{U.S. Army Aviation Digest} (November-December 1992) 38.} The linear and positional nature of the Korean War’s last two years highlighted the helicopter’s value in performing a myriad of logistical tasks. This limited view defined the initial experiments in the mid-1950s. Its combat role was relegated primarily to reconnaissance and patrolling. This view was exemplified by the many articles, like those discussed above, in service and branch journals which focused only on these few roles.\footnote{Although I am not entirely convinced of this, my reviews of the journals make this appear to be the case. It could be that editors were the restraining influence or it could also be that I have not searched deep enough. While the latter is definitely true, the former might explain why Gavin published his article in a commercial periodical.}

Fortunately, there were others who saw combat uses for the helicopters. The Commanding General of X Corps, Lieutenant General Isaac D. White, wrote that “the helicopter delivery of lightly equipped combat elements directly critical to blocking and holding positions in advance of the main body of a striking force is a practical maneuver.”\footnote{\textit{Army Helicopters Transport and Cargo: An Evaluation of 1950-1953 Experience as a Basis for Current and Future Programming} (Washington, D.C.: Office of the Chief of Transportation, 1954), Annex Q. He was sending the report to Maxwell Taylor, then commander of Eighth Army.} General Maxwell D. Taylor, commander of the Eighth United States Army, wrote that helicopter operations in Korea “have left little doubt as to the capability
of the cargo helicopter to fly units and supplies to points beyond the means of other methods of transportation. The cargo helicopter, employed in mass, can extend the tactical mobility of the Army far beyond its normal capability. I hope that the United States Army will make ample provisions for the full exploitation of the helicopter in the future.”

Despite these accolades, in military journals there was relatively little thought to using the helicopter for combat.

One way to develop support and formulate doctrine was to create a large test unit composed of ground forces and integrated aircraft. This combined arms organization would have the advantage of streamlined command and control and the necessary knowledge from habitually training together to best assess the efficacy of airmobility operations. There were numerous proposals for creating an organization (usually at the battalion or brigade level) and CONARC actually submitted a request to General Taylor in 1958. The Army decided not to create a large test unit because it was too conservative in its thinking. Planning on fighting on a nuclear battlefield, there was a paramount need to immediately increase mobility throughout the Army and it was to these tactical units that the Army Staff allocated the limited numbers of helicopters. They believed that creating a large test unit would take helicopters away from the “real Army” and deny “real units” an increased opportunity to succeed. This decision was very short-sighted. The piecemeal distribution of helicopters meant that no unit possessed sufficient lift to do much – and hence less incentive to experiment and train

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with airmobility. By treating the helicopter as just another vehicle, the Army lost an opportunity to further develop the concept. This again shows that the Army’s senior leadership was not aggressive in developing the concept. When compared to the Marine Corps in the late 1940s, the Army shared many of the same problems but took a conservative course, which meant minimal gains from working with helicopters.

One option was to convert airborne units into airmobile units since both types had similar objectives, just different means of transportation. Since testing the helicopter in 1945, paratroopers saw the helicopter as a solution to most of their problems. Dropping via parachutes into a landing zone was inefficient and imprecise. Once on the ground, they lacked tactical mobility and organic firepower. Finally, airborne forces had to rely on the availability of Air Force transports operating from large, fixed airbases for initial deployment and logistical re-supply. In addition, the rapid pace of development and increased effectiveness of guided surface to air missiles potentially made large airborne operations costly, if not obsolete.

The helicopter appeared ideal in that it could operate from almost anywhere and land forces almost anywhere in any formation. Using terrain contour flying, helicopters could avoid radar detection and achieve surprise. With the helicopter’s small size, they speed across at tree-top level making it very hard to get hit from small arms fire. The disadvantage of the helicopter was its limited tactical range – large fixed wing transports were still needed for strategic mobility. In addition, the helicopter already limited useful load varied greatly based on air temperature and altitude. These limitations made

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paratroopers advocate a hybrid capability using parachutes for the initial force delivery and helicopters in the immediate follow on operations to move small units over short distances.\textsuperscript{534} The only other way to use helicopters in strategic operations was to deploy them from ships like the helicopter carriers used by the Marines.\textsuperscript{535}

The Air Force saw the use of helicopters in airborne operations as an attempt by the Army to usurp its mission. Seeing this as a form of airborne operations (even if using straight-leg infantry), the Air Force made an aggressive effort to deny the Army the transport helicopters needed to make this work. After much arguing, the Secretary of Defense Charles Wilson gave the Army a limited victory and allowed the development of this mission for small units over limited distances. To use airborne units, even if renamed, could have sparked renewed controversy. In the end, no airborne units were converted.

The confusion over the role of the helicopter on the battlefield was seen in the Army’s major tactical exercises after Korea which almost always included the helicopter in some role. Conceptually, the different branches of the Army viewed helicopters differently resulting in three versions of Sky Cav circulated in the late 1950s. Besides the Transportation Corps’ continued view of the helicopter as a logistical tool, which it performed well in every Army exercise, there was the Aviation Center’s concept of Sky Cav that was “completely air-mobile, airmounted, fast moving, hard-hitting, flexible means of searching out, fixing the enemy, and performing the traditional missions of


cavalry” at a rate much faster than ever seen on the battlefield.\textsuperscript{536} The military intelligence community’s version of Sky Cav entailed using helicopters stuffed full of sensors like radar, infrared, and television to enhance battlefield target acquisition. This version was completely passive and not intended to have to fight for intelligence. Efforts by the 1\textsuperscript{st} Missile Command at Fort Bliss demonstrated the possibilities of this mission.\textsuperscript{537} The armored folks wanted the addition of light helicopters and fixed wing aircraft to armored reconnaissance units. Not helping was the fact that the concept received mixed critiques during maneuvers like Exercises LIFT, SAGE BRUSH, JUMPLIGHT, and SLEDGE HAMMER. (LOOK AT MOENK AGAIN)

In May 1954 the Army conducted Exercise LIFT which included moving an infantry battalion by helicopter. The poor performance of the troops provided ammunition for critics of helicopter operations. A thorough examination of the after action reports indicated that the failure was due to poor planning. Although heliborne troops did not require the specialized training of airborne soldiers, the planning of air assaults were much more complex than normal ground attacks.

The enlarged nuclear battlefield required new units. Sky Cav was initially envisioned as a reconnaissance unit using a variety of air and ground vehicles at the company/troop level and intended to greatly enhance the intelligence gathering of a division’s cavalry squadron.\textsuperscript{538} Gavin saw an urgent need to develop this capability and


\textsuperscript{537}1\textsuperscript{st} U.S. Army Missile Command (Medium), “Concept of Employment: Sky Cavalry Squadron” (7 August 1958). Found in CARL Archives.

\textsuperscript{538}Lieutenant Colonel John T. Collier, “Cavalry of the Sky,” \textit{Army Information Digest} (November 1957); See also James M. Gavin Papers, Box 2, Folder: Chapter 6, page 169.
directed CONARC to start sky cavalry tests in order to determine new weapons, equipment and formations needed for successful employment.\textsuperscript{539} 

With the prodding of the Army G-3, CONARC formed a test troop with the intent on testing the Armor version of Sky Cav at Exercise SAGE BRUSH. From June to August 1955 the 82d Division formed the test unit using the 82d Airborne Reconnaissance Company as its nucleus, with the remainder coming from a variety of other sources.\textsuperscript{540} The intent was to test the unit as part of the aggressor force in Exercise Sage Brush with a follow on evaluation conducted by the Deputy Director (Army) of the exercise in December and January. Exercise SAGE BRUSH, which ran from 31 October to 15 December 1955, was the first major joint exercise that emphasized atomic warfare. Involving 110,000 Army and 30,000 Air Force personnel and centered around Fort Polk, Louisiana, this five phase, theater scale, free play exercise developed and tested the validity of the Army’s and Air Force’s independently-arrived-at concepts for using tactical nuclear weapons.\textsuperscript{541} More importantly it allowed each service to observe how well these ideas worked in a coordinated air-ground maneuver. The Army specifically tested its Atomic Field Army (ATFA) concept and the employment of a troop of Sky Cav (referred to as the Provisional Reconnaissance Troop).\textsuperscript{542} Initially, the maneuver

\textsuperscript{539}CONARC (Continental Army Command) was responsible for equipping and training the field armies. 

\textsuperscript{540}Weinert, \textit{A History of Army Aviation -- 1950-1962}, 183. Among others, the unit also received men and equipment from 8\textsuperscript{th} Transportation Battalion (Helicopter), the Army Pictorial Center, the Army Electronic Proving Ground, XVIII Airborne Corps Artillery, the 25\textsuperscript{th} Reconnaissance Battalion at Fort Hood. 

\textsuperscript{541}Moenk, \textit{A History of Command and Control of Army Forces in the Continental United States}, 205-220. 

\textsuperscript{542}Major General John D. Stevenson, “Exercise Sagebrush: Massive Air-Ground Lesson in Atomic Warfare” \textit{Air University Quarterly Review} 8, no. 4 (Fall 1956): 15-38. See also “Copter Controversy,” \textit{Aviation Week} (28 November 1955): 11; “‘Without Prejudice,’ Says Air Force,” \textit{Army},
director, Air Force General O.P. Weyland (Commander of Tactical Air Command) refused to allow the Sky Cav unit to participate. However, after much complaining from the Army, the Secretary of the Air Force directed that the Sky Cav be included. The opposition of the Air Force garnered additional attention from the Secretary of the Army Brucker and Army Chief of Staff Taylor. Because of his strong interest in the Sky Cav, it was the first unit Taylor visited at the exercise.

Unfortunately, the unit’s performance was poor throughout the exercise. Part of the problem was that due to unfamiliarity with the helicopter and Sky Cav concept, the unit was assigned missions that its aircraft were not designed for and lacked the necessary performance characteristics.\(^\text{543}\) The other problem was the readiness of the test unit. The troop had less than three months to prepare for the exercise – a time too short to develop adequate tactics, techniques, and procedures. Nevertheless, the 435 man company tried hard to integrate the menagerie into a fighting organization. However the damage had been done and in the final report the evaluators recommended that Sky Cav units not replace ground units or even become components of the mechanized reconnaissance units in any organizational level.\(^\text{544}\)

\(^{543}\)Weinert, \textit{A History of Army Aviation -- 1950-1962}, 184. The troop had just 14 light cargo helicopters, 5 reconnaissance helicopters, 4 utility airplanes, and 5 observation airplanes.

In addition to the Sky Cav concept, the use of transportation helicopters proved equally fruitless. A transport helicopter battalion participated in the exercise with the objective of assessing how well the organization could be integrated into operational support to include moving supplies and men. The battalion lacked experience operating its equipment and suffered from being vastly understrength with only one and one third companies instead of the authorized four. Upon arriving at the exercise, the one full company of twenty-one H-34 helicopters was immediately grounded due to problems with the helicopters’ fuel lines. As a result, the aviation battalion could provide only a platoon’s worth of lift using H-21 helicopters for most of SAGE BRUSH. A river crossing exercise in the third phase demonstrated that even if these problems did not exist, it is doubtful that the use of the transport helicopters would have been much better due to the unfamiliarity of the ground forces in employing the helicopter. The exercise’s report stated that although the principles for helicopter usage stated in TC 1-7 were sound, until the Army possessed more aircraft, the primary use of helicopter units should be the direct support of tactical units. To ensure more responsive helicopter support, the exercise evaluators recommended that the Army G-3 be responsible for the transport aircraft. They also believed that the Army ought to establish an Army air arm

545 Office of the Chief of Transportation, “Army Transportation in Exercise SAGE BRUSH,” 15-18. The transport battalion supported the 3d Infantry Division in its crossing of the Red River. Haphazard and inconsistent communication between the two units resulted in poor planning barely completed to the crossing of the line of departure. Since the pilots and the infantry had not trained together, no one knew what to do at the loading sites and landing zones, making for awkward and slow operations. The pilots were not qualified to fly at night and thus were limited to daylight hours. However, since there were no facilities that allowed for night maintenance, maintenance had to be done during daytime which further restricted helicopter usage to a limited period of the day.
to develop and manage a career program for specialized aviation personnel. The Chief of Transportation disagreed on all three accounts.\textsuperscript{546}

When he received the fairly negative reports from the exercise’s observers Taylor’s enthusiasm was not dampened – the concept just needed some refining.\textsuperscript{547} CONARC was less optimistic and had the test unit deactivated even though the Commanding General, Third Army, requested the unit remain with the XVIII Airborne Corps for further evaluation. This failure caused Gavin to reconsider the steps to develop the Sky Cav. He decided that only an airborne division or the airborne school would understand what he was trying to do and “it was innovative enough to get them excited.” He soon settled on Fort Rucker, Alabama, as a good location to develop the concept. The Aviation School possessed the aircraft and pilots and was located only 120 miles south of the Airborne School at Fort Benning, Georgia, close enough for joint training.\textsuperscript{548}

The poor showing of the Sky Cav at SAGE BRUSH directly affected the reorganization to the Pentomic organization that began in November 1956. The Sky Cav troop was not included as an entity in the new division, but the force managers understood that the helicopter could help cover the very large distances that separated units on the nuclear battlefield. The Pentomic division did have a target acquisition section to support the division cavalry squadron’s reconnaissance and surveillance

\begin{footnotes}
\item[547]“Army Looks to Sage Brush’s SkyCav Operation as Basis of Permanent Unit,” \textit{Army, Navy, Air Force Journal} (10 December 1955): 1, 3.
\item[548]James M. Gavin Papers, Box 2, Folder: Chapter 6, page 188-189.
\end{footnotes}
platoon. Some utility helicopters were also added to the division cavalry which could then provide airlift for the reconnaissance units.\footnote{Lieutenant Colonel John T. Collier, “Cavalry of the Sky,” \textit{Army Information Digest} (November 1957): 24-25;}

Still interested in the armor school’s version of the Sky Cav concept, CONARC continued testing it in Exercise SLEDGE HAMMER. Designating the Project as SKY CAV II, CONARC converted the 64\textsuperscript{th} Transportation Company (Light Helicopter) into a Sky Cav company and made it organic to an armored reconnaissance battalion.\footnote{Letter, OPS OT DC, DA DCSOPS to CONARC, 19 July 1956, Subject: Sky Cavalry Company; CONARC Summary of Major Events and Problems, FY 1957, Volume III, G-3 Sec Org & Equip Div, pp. 21-22. The composition was based on the CONARC developed TOE 17-48T, Sky Cavalry Company, Armored Cavalry Battalion, Armored Division (15 October 1956). Its organization was supposed to possess the electronic sensors, aerial reconnaissance, and transport aviation necessary to provide the division greater coverage and faster intelligence.} This conversion was done hastily with the result that the units lacked equipment and training. The delay in creating the Sky Cav unit meant that it did not arrive at Fort Polk until the second week in February for training with the 1\textsuperscript{st} Armored Division. With less than three months to train the unit and to train the rest of the division on how to use the Sky Cav the performance of Sky Cav was again disappointing. As a result observers of the exercise recommended “that the concept of Sky Cav as an entity be discarded.”\footnote{Bonin, 106. Cites: Headquarters, CONARC to DSCOPS, DA, 21 August 1957, Subject: Final Report, Exercise SLEDGE HAMMER, page 1. Later on page 26 in the report a more stinging comment about the slapstick assemblage of the test unit was made by Brigadier General Thomas Van Natta: “We may be a little lazy and hope we don’t have to go to the trouble of working out new tactics and techniques. Anyway, we keep labeling things ‘cavalry’ in pious hope that if we call it that, maybe that is what it will become…it won’t work.”} The highly critical comments that emanated from the exercise did not surprise CONARC and the command ordered additional evaluations. A large scale exercise was planned for with an
existing squadron of Sky Cav at Fort Hood but the lack of aircraft, personnel, funds, and
an agreeable concept for organization and employment cancelled the test.\footnote{Bonin, 107.}

It was the Aviation School’s concept of Sky Cav that proved the most fruitful.\footnote{Leonard C. Weston and Clifford W. Stephens, \textit{The Development, Adaption, and Production of Armament for Army Helicopters, 1957-1963} (Rock Island, IL: Headquarters, U.S. Army Armament Command, N.D.), Part I, 19-20.} Unlike the other versions of Sky Cav, the troop commanded by Colonel Jay Vanderpool at Fort Rucker was composed entirely of aircraft and included arming the helicopters and using them to attack ground targets. While this was not authorized based on the agreements between the two services, Hutton justified it by associating it with the Army’s goal of developing “highly mobile task forces with an improved ratio of fire power to manpower.”\footnote{CONARC Training Memorandum No. 13, “Mobile Task Force-Type Operations,” dated 4 June 1956.} Hutton wrote General Wyman, the CONARC commander, advocating that the only way to improve upon World War II mobility was through the use of fighting aerial vehicles and requested permission to begin testing helicopters. Wyman agreed and authorized Hutton to experiment with existing helicopters.\footnote{The memo was carefully worded so that it did not explicitly state the arming of helicopters, but it also did not forbid this either. See Weinert, 161. Cites: Ltr, Brigadier General Carl I. Hutton, Commandant Army Aviation School to General W.G. Wyman, CG CONARC, dated 27 June 1956; Letter, Wyman to Hutton, dtd 13 July 1956; CONARC Summary of Major Events and Problems, FY 1956, Volume VI, G-3 Section Training Division General Training Branch, January-June 1956, p.7; Lieutenant Colonel Charles O. Griminger, “The Armed Helicopter Story,” \textit{United States Army Aviation Digest} (July 1971): 15-17; Colonel Jay Vanderpool, “We Armed the Helicopter,” \textit{United States Army Aviation Digest} (June 1971): 4; Weston and Stephens, \textit{Helicopter Armament}, Pt I, pp. 8-17.} Under Vanderpool’s direction the experimental unit tested every available type of helicopter with a variety of weapons. To their surprise, the helicopter proved to be a more robust platform than expected and could handle the majority of the heavy machine guns and rockets. The main problem was on aiming the weapons accurately, but they quickly
resolved that problem. Doctrinally, Vanderpool “plagiarized the last field manual written for horse cavalrymen in 1936.”

In order to avoid the wrath of the Air Force, the “project was more nearly a conspiracy than a program” and received no formal support and no publicity. The resourcing of the experimental unit with equipment, personnel, and funding came from the Center itself. No requests were made for outside assistance. Although this sounds sinister, the smallness of the program (personnel and dollarwise) and the hectic activity as the Army prepared to transition to the Pentomic organization with which most leaders focused on could also explain the initial obscurity of the program. The unit, affectionately known as Vanderpool’s Fools, remained hidden until its coming out party at the Association of the United States’ Army Aviation Symposium at Fort Rucker, Alabama. On 6 June 1957 the Sky Cav, now renamed Aerial Combat Reconnaissance Company (Experimental), conducted a live fire maneuver that stunned the viewers. Despite this demonstration, the uncertainty of surviving in a high threat environment remained.

The Army’s efforts at testing helicopters to move combat troops in a nuclear environment suffered from a lack of helicopters and an increasing need to showcase the exercises for public and governmental officials. These troop tests were to gain better knowledge of the capabilities and limitation of nuclear weapons on the battlefield so that

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558Weston and Stephens, Helicopter Armament, Pt I, 5-8.
559Vanderpool Oral History, 23-25.
“the employment of atomic weapons would be more firmly entrenched as a normal tool of the soldier to be employed in successful warfare.”

A good example of this was the DESERT ROCK exercises in 1958. Originally, DESERT ROCK VII and VIII were intended to test the veracity of an infantry battalion to conduct a helicopter borne operation to seize a deep objective in conjunction with the detonation of a nuclear weapon, but this changed threefold. The first objective was to determine the troop support, equipment, and material needed to establish a defensive position that possessed sufficient protection from the effects of nuclear weapons. To this end a battle group constructed hasty defensive positions within the effects radii of the nuclear weapon. The other two objectives were to test the feasibility of using helicopters to transport a reinforced company task force and then re-supply that task force in a nuclear environment. Unfortunately, these exercises became a demonstration for the general public to see the Army at its best. The limited forces participating and the excessive, artificial restrictions imposed on the participants precluded them from being useful exercise to test doctrine, tactics, and techniques related to atomic warfare.

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561 This was vividly displayed on the final report’s cover which shows nuclear explosions in the background with large numbers of helicopter transporting and landing troops and equipment in the foreground.

562 However, the evaluation of the troops’ ability to use the position after the explosion could not occur due to their being too much radioactive contamination in the area. See Report of Test – Infantry Troop Test Exercise Desert Rock VII & VIII (22 January 1958), Section 1 – Introduction, 1.

The lack of airmobility training was reiterated at the 1957 Infantry Instructors’ Conference.\textsuperscript{564} At the conference it was concluded that unit commanders and staffs needed to accept the utility of Army aviation and conduct training to gain experience. Colonel Robert R. Williams differed in that he believed the problem was integrating Army aviation into field units and not convincing ground commanders of aviation’s increasing importance.\textsuperscript{565}

During the Korean War there was minimal use of the helicopter in Europe.\textsuperscript{566} While the idea of using the helicopter to increase mobility had not reached Europe, the presence of only a handful of helicopters probably was the major reason. This state quickly changed after the end of the Korean War.

In Europe, the Seventh Army did some extensive, large scale tests with Army aviation. As part of the United States Army, Europe (USAREUR) the Seventh Army was the most important force in the 1950s Army, aviation proponents watched with great interest in the conduct and results of the exercises.\textsuperscript{567} The exercises started small due to

\textsuperscript{564}Infantry School, “1957 Instructors’ Conference,” 49. While specialized training for airmobile troops was not needed like those in airborne units, the planning of air assault operations was much more complex than normal ground operations.

\textsuperscript{565}“Interview with Army’s No. 1 Aviator,” \textit{American Aviation} (10 March 1958): 55.

\textsuperscript{566}Hamilton H. Howze, interview by Dr. Herbert Lepore, 5 December 1986, page 2, found in Army Aviation Oral Histories box, MHI. After serving the first part of the Korean War as the Director of the Intelligence Division in the Army G-2, Howze was promoted to Brigadier General and served as the Assistant Division Commander with the 2d Armored Division in Bad Kreuznach for two years (starting in spring 1952) and one year as the Deputy Chief of Staff for Operations with the 7th Army in Stuttgart.

\textsuperscript{567}RG 549 Records of the U.S. Army Europe, Box 152, File 250/15 Organizational Planning Files, 1958. Correspondence between Brigadier General Ernest F. Easterbrook, Director of Army Aviation, ODCSOPS, and CinC USAREUR, dated 23 April 1958 and 2 August 1958, Subject: Army Aviation Organization and Employment. Brigadier General Ernest F. Easterbrook, the director of Army aviation, took great interest in Exercise SABRE HAWK and asked for feedback on the organization and self-sufficiency of the aviation units. He also wanted any recommendations for improving the procedures and techniques needed “to facilitate the timely movement of combat troops” with organic Army aviation.
the lack of helicopters. One of the first experiments was conducted when Colonel Delk Oden was Chief of Staff for the tiny Austrian theater. Oden understood the potential of Army aviation after he left the Army War College in 1953. While in Austria his small force executed numerous maneuvers and tactical exercises at high altitudes using the small flight of fixed wings and helicopters, noting that “we really used the helicopters a hell of a lot on our maneuvers.” Although the aviation units worked with infantry, the exercises were limited due to the lack of troop lift type helicopters; thus the majority of the effort went to working with the armored cavalry regiment. The nearest troop lift helicopters were H-19s stationed up in Stuttgart. “So you could use aviation for everything and I could see it and I didn’t have to be a flier to appreciate it.”

Gavin also conducted some experiments with helicopters when he was Chief of Staff for Headquarters, Allied Forces South East in Italy and Austria in 1951-1952 and as the Commanding General of VII Corps in Bavaria from 1952 to 1954. While there he conducted a series of tests, troop maneuvers, and war games that convinced him that a helicopter based organization would prove invaluable in the defense of Germany, especially in a nuclear environment. If atomic weapons were not used, then the Corps would still have mobility and communications for an effective defense.

When Brigadier General Hutton arrived in Europe to command the 8th infantry Division’s artillery, he was very disappointed by the lack of airmobility training in the

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568 Delk Oden, interview by Colonel Glenn Smith and Lieutenant Colonel August Cianciolo, 1978, Army Aviation Oral Histories, Carlisle, PA. p.7-8. For his contributions Oden was later inducted into the Army Aviation Hall of Fame.

569 James M. Gavin Papers, Box 2, Folder: Chapter 4 and 5.
theater. \footnote{Carl I. Hutton, “Helicopter-Borne Operations,” 5. Hutton had recently left his position as commanding general of the Army Aviation Center.} In 1958, Seventh Army encountered problems in testing Sky Cav similar to those experienced by CONARC in executing Exercise DESERT ROCK. USAREUR conducted Exercise SABRE HAWK on 10-19 February 1958 which used and tested Army aviation on the largest scale to date. \footnote{SABRE HAWK was normally to separate corps exercises, but a lack of training funds and available units made 7th Army combine them for that year.} In this exercise, 125,000 soldiers deployed in a two sided exercise. Included in the goals of the exercise was the evaluation of Army aviation’s capabilities of supporting tactical units. Unfortunately, USAREUR lacked sufficient helicopters in both type and number to fully equip its Pentomic divisions. As a result, helicopters were consolidated into a single unit at the Army level to maximize their utility during the exercise. During SABRE HAWK, “cargo helicopters were particularly effective,” but USAREUR commented that the unit lacked adequate number of personnel and the appropriate equipment to do its mission. The exercise also showed a need for better air-space control and navigational aids for pathfinders. \footnote{Final Report FTX Sabre Hawk 10-19 February 1958, Headquarters Seventh Army, May 1958. 237}

At the unit level the tactics, techniques, and procedures for air mobile type operations needed revision. USAREUR found that the established technique of using chalk numbers on aircraft during loading operations restricted the flexibility to employ the helicopters and often created confusion for personnel in the loading zone. The command instead recommended a system that permitted “flexibility in the use of aircraft and [permitted] a faster means to manifest, load, and deliver personnel and equipment” but required a much greater degree of coordination between the air and ground commanders. In addition, the exercise revealed a need to develop an air traffic control
system for use in the combat zone.\textsuperscript{573} Finally, the maneuver revealed that the aviation units lacked the desired logistical self-sufficiency for operations from more than one airfield and over an extended front during the long summer days in Europe. This last concern mainly dealt with aviation POL and USAREUR proposed a solution of increasing the number of personnel and ground fuel vehicles to ensure enough POL support was available to support extended operations.\textsuperscript{574}

Although USAREUR recommended these changes to improve the capabilities of aviation units, it believed that the Seventh Army could continue to operate effectively under the current TOEs. USAREUR agreed with the Seventh Army’s assessment noting that there was no room to authorize the additional personnel or aircraft. This mixed message was a reflection of the current defense environment – mainly that the Eisenhower administration was not going to authorize additional personnel, and that any increases would come at the cost of other units. It did provide the feedback that would prove valuable when the environment proved more acceptable for increased authorizations.

In Italy, the situation was less secure for the Sky Cav concept. Despite the presence of General Gavin in the Southern Command in the early 1950s, the growth of army aviation and the Sky Cav concept was limited. There were never a large number of

\textsuperscript{573}USAREUR later implemented a geographic based system to control Army flights up to 8,000 feet in altitude, the recognized maximum altitude of Army responsibility. See RG 549 Records of the U.S. Army Europe, Box 152, File 250/16 Organization and Operations Planning Files, 1958. Memorandum from CinC, USAREUR to Commanding General, Seventh United States Army, dated 30 October 1958. Subject: Tactical Flights by Army Aircraft (U).

troops or aircraft. In the Fall of 1955 the Southern European Task Force (SETAF) had only a limited number of small helicopters and fixed wing aircraft. In July 1956, the Department of the Army authorized SETAF heavy helicopters and fixed wing aircraft that could transport special weapons components, like the Honest John and Corporal tactical nuclear missiles. They created a unit with the 1\textsuperscript{st} U.S. Army Missile Command to test the military intelligence version of Sky Cav. By 1958, SETAF had a Sky Cav battalion comprised of 46 aircraft located at Vicenza. However the future status of Sky Cav in SETAF was dependent on the pending reduction of forces by 1900 billets. If the full reduction took place, and indigenization occurred, SETAF planned to reduce the Sky Cav to an American strength of just 225, keeping only the aircraft needed for electronic and photographic missions. Without indigenization, USAREUR would have to absorb the full 1900 reduction and the Sky Cav would consist only of the electronic and photographic aircraft.\textsuperscript{575}

In the era of the Pentomic Division, it is not surprising that one of the first uses envisioned for the Sky Cav was performing reconnaissance and observation for nuclear fires. Since there was very little published concerning unit organization and concept of employment, the experimental unit of the 1st U.S. Army Missile Command had to develop its own organization and doctrine.\textsuperscript{576} For more than a year the experimental unit used trial and error in field exercises to develop a workable doctrine. Their experiments showed that with an increase in personnel and aircraft and supported by specialized

equipment, the unit would have “greater lateral and depth deployment, flexibility and air mobility.” The unit deployed radar sections in pairs to cover the central avenues of approach to determine enemy traffic patterns. Within each avenue of approach, airborne teams were inserted to find and report significant targets. Both could be used in support of the Honest John missiles, but only the air inserted teams and the organic aircraft could cover the Corporal’s maximum range and beyond, to a distance of 100 miles. While this organization performed satisfactorily in support of tactical nuclear missiles, it lacked the robustness needed to conduct traditional cavalry missions. Despite the efforts of the Command, this use for the helicopter did not become a standard organization before the Army transitioned to a doctrine of Flexible Response and the ROAD concept.

This successful testing of the military intelligence version of Sky Cav by the 1st U.S. Army Missile Command led to a 1958 proposal that advocated a squadron-sized unit designed to provide detailed tactical reconnaissance. Composed of a mixture of helicopters, light fixed wing aircraft, airborne infantry, and ground based radar the unit would locate targets for the Army’s nuclear tipped Honest John and Corporal missiles. It

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576 1st United States Army Missile Command was part of the Southern European Task Force (SETAF) and stationed in Italy.


578 The R&S platoons used the MPQ-10 radars modified with a moving target indicator to conduct surveillance and aircraft vectoring. Possessing a maximum range of 40,000 yards, the radars tracked traffic through a series of checkpoints along an avenue of approach. The difference in numbers of vehicles moving could then reveal potential concentrations of vehicles between the two points. However, weather and masking terrain limited their effectiveness and thus the greatest reliance was placed on positioning airborne reconnaissance teams for visual observation.

579 These teams could be air dropped or air landed into pre-selected drop zones located near the suspected target or along an avenue of approach. Each team had a safe area that provided protection (like caves) and provided a base from which to conduct target observation operations. After the team reported a
advocated deploying the squadron to northern Italy to observe the most vital passes through the Alps.\(^{580}\) This proposal met with approval from the United States Army, Europe (USAREUR), especially since the command desired the capability to lift a combat echelon of three battle groups at any one time.\(^{581}\) The lack of personnel, equipment, and funding kept the unit from ever being tested.

In an effort to remedy the training deficiency in Europe and in CONUS, the Army published TC 20-1 on 1 May 1959. In it, the circular emphasized that airmobile operations were a normal part of ground operations and again emphasized incorporating airmobility operations into unit training.\(^{582}\) This was the only official effort to improve the situation and the results were disappointing. An example was the 82d Division’s training in 1960. Helicopters were used for missions like displacing mortar platoons, airborne command posts, and logistical re-supply. Helicopter use by the division’s battle groups was non-existent.\(^{583}\)

The overall poor performance of air mobility in training maneuvers was directly linked to the Army’s lack of emphasis on developing and using airmobility. Howze

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\(^{581}\) RG 549 Records of U.S. Army Europe, Box 152, File 250/15 Organizational Planning Files, 1958. Message from USAREUR G-3 to DA DCSOPS dated 23 September 1958. Reference TELECOM Colonel Williams, USAREUR – Lieutenant Colonel Shea, DCSOPS, 22 Sep 58. Subject: Operational requirement to FY 65 for medium helicopters. For this, the USAREUR desired medium helicopters to provide one third of the lift requirements. This requirement was expected to change based on changes in organization in the New Look era and on future aircraft developments.

\(^{582}\) Department of the Army, Training Circular 20-1; see also “Airmobility Training Broadened in Army” Air Force Times (18 May 1959): 18.

identified the problem to be primarily at division level and lower. At these levels, units focused their training on their most essential tasks that allowed them to accomplish their mission. Airmobile operations was no where near the top of that list, despite the importance placed by TC 20-1. The fact that the DA staff and the Army Chief of Staff never ordered the Army to train on it indicates the lack of priority assigned to airmobility. All that could be done was to have aviation proponents produce training circulars and the Army Aviation Director to try to increase awareness.

It did not help that the Army itself prevented units from conducting large scale airmobile operations by its poor distribution of lift assets. Starting in 1956 the Army began receiving transport helicopters in quantity to allow large troop movements. As a rule of thumb, one light (1 ½ ton) transportation company could lift an infantry company at a time. Instead of concentrating helicopter companies into just a few divisions which would allow large scale airmobility exercises, the companies were distributed evenly throughout the active Army. Thus, a Pentomic division normally had the capability to lift a company, instead of the 5-7 needed to lift a battle group. Thus, divisions did not practice using them. Compounding this situation were difficulties associated with pilot training, including instrument qualification, flight safety, and aircraft maintenance. The combination of these factors resulted in pilots who neglected tactical nap of the earth flying in favor of flying from fixed airfields within established air corridors at Air Force altitudes. While this increased safety, the loss was in combat/tactical effectiveness.

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585 Safety stats: (p.128)
shortage of trained maintenance personnel adversely affected readiness rates and delayed the activation of new helicopter units.  

While the lack of conceptual focus enabled the Army to experiment with the helicopter, it also limited the development of helicopters in the combat role. By the end of the decade, the Army’s experience with combat helicopters was limited to the one test unit commanded by Colonel Vanderpool. The Army lacked sufficient numbers of helicopters and the funding to try too many ideas. Although Gavin believed that “the potential of the helicopter had to be developed as a matter of highest priority” at no time in the 1950s was research and development of the helicopter the highest priority while Gavin was head of the Army’s R&D. Instead, the Army pursued a wide variety of expensive projects: long range surface to surface missiles, atomic cannons, tactical nuclear weapons, VTOL aircraft, continental air defense missiles, flying jeeps, drones, as well as helicopters. A more focused program for developing the helicopter could have helped yield a better helicopter faster. Technology was not the reason for the slow development of airmobility – it was a conceptual problem.  

Organizationally and doctrinally, the Army only conducted limited airmobility/skycav experiments during

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588 Bonin, 122.
589 James M. Gavin Papers, Box 2, Folder: Chapter 4 and 5, page 160. Brigadier General O. Glenn Goodhand remarked that “The program was small, dollar-wise. It didn’t attract a lot of attention. It wasn’t a competitor at that particular time, with any other one.” See Interview with Brigadier General O. Glenn Goodhand by Colonel Bryce R. Kramer and Lieutenant Colonel Ronald K. Andreson, Army Aviation Oral History, page 38. Found at MHI.
the 1950s. The result was an unclear path for aviation’s progress going into the next decade.

In conclusion, the Army’s progression towards an air mobility doctrine was slowed by a variety of factors. The Army possessed a narrow vision for helicopters that had to be gradually broadened. Why such a narrow concept to start with coming out of Korea? It was partly due to the lack of a mission. With national security relying on massive retaliation, land combat was considered essentially obsolete. The Army’s under-equipped, under-manned, and under-funded ground forces transformed itself into a force reliant on tactical nuclear weapons. This transformation was necessary to demonstrate to the President and the public that the Army was keeping pace with the changing nature of warfare and to ensure a degree of funding. Priorities within the Army were not focused on the development of army aviation, but on molding itself into a force that best suited the nation’s stated defense policies.

The key to a greater use of the helicopter was the acceptance of the helicopter within the Army itself. However, the changing and managing of organizational culture is complex. As British Army Colonel John Mitchell once stated, “In no profession is the dread of innovation so great as in the army.” While this has accurately described the United States Army throughout much of its existence, this simply was not the case in the years between the Korean and Vietnam Wars. Operating under great duress, the Army of the 1950s willingly embraced new ideas, technologies, and concepts. The Army aggressively pursued the use of guided missiles, especially in continental air defense, the

development of space rockets, and the fielding of tactical nuclear weapons. Despite the enthusiasm displayed by officers in the service journals, the majority of the Army was skeptical about the Pentomic organization and the concept of limited nuclear war. During this time period, Army aviation continued to develop and expand, but did so fairly quietly. Organic aviation never received high priority in the Army’s research and development efforts, nor did Army aviators wanted to be a major program, yet. The key to the permanent development of Army aviation and its use was in the building of a base of support in senior leaders, increasing the Army officers’ knowledge of the helicopter and its potential through the school system, and the gaining of experience with helicopters through tests and exercises no matter how small or poorly resourced.

Still, it does not take a lot of men or money for doctrinal thinkers to envision the future needs of the Army. The various equipment boards, troop tests, and training exercises showed that the Army was trying to project ahead. The efforts were very apparent within the Army’s school system which saw a fourfold increase in the courses and problems that used helicopters in a tactical setting. However, the decentralized nature of doctrinal development meant that there was overlap among the various agencies which resulted in disagreements over priorities and procedures. By the end of the 1950s, the mindset for air mobility was expanding, but as exercises like Sabre-Hawk revealed, a consistent message had not filtered down to the lower levels of the Army. To

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592 At the time, the “ambitions were small so it avoided many problems associated with large programs.” “The program was small, dollar-wise. It didn’t attract a lot of attention. It wasn’t a competitor at that particular time, with any other [Army program].” See O. Glenn Goodhand, interview by Colonel Bryce R. Kramer and Lieutenant Colonel Ronald K. Andreson, 1978, transcript. Army Aviation Oral Histories, Military History Institute, Carlisle, PA. See page 38.
successfully innovate and transform requires many things: excellent senior leadership with vision and longevity, adequate funding, the necessary technology, and time. During the Pentomic Era the Army lacked all of these quantities in sufficient quantity. Hence the helicopter became just a small part in the rushed and ill-thought out Pentomic Army.

1954-1960: Korea Revisited?

After the Korean War the Army made great strides towards the development of airmobility. By the end of the decade the Army gained control of training all of its pilots, the majority of logistical support for its organic aviation, and even gained a foothold in the procurement of its own aircraft. The Army also continued to garner support for expanding Army aviation from Congress and the public through demonstrations that showed the helicopter to be a versatile, durable, and reliable machine. The roles and missions of Army aviation became more firmly established and ensured that the Army would always possess its own aviation assets.

Internally, the Army developed and adjusted organization of aviation units and their parent organizations as helicopters of ever increasing capabilities came into service. To best utilize their growing capabilities, the Army established bureaucratic organizations at the Department of the Army and major command levels which helped to organize aviation thought. The men who headed these staff sections were bright, innovative, energetic, and determined to push the Army towards a new way of doing
things. The Army utilized its educational system to increase awareness about developments in Army aviation and conducted exercises in the classroom and in the field that taught students (the future commanders in the Army) on how to best employ their aviation assets. Military journals published an increasingly larger number of articles that discussed uses of the helicopter and increasing the Army’s tactical mobility. New doctrinal publications like FM 57-35, FM 100-5, and TC 1-7 also furthered strengthened the importance of aviation in Army operations.

However for all these advances, the Army remained woefully behind in the development of an airmobile doctrine and organization when compared to the Marine Corps. The reason for this essentially comes down to one point – the Army did not place a priority on the development of aviation. There was no master plan and therefore all of the developments listed above came a la carte. Once the helicopter caught the attention of soldiers, there was no shortage of new ideas and a willingness to try them. However, developments were done haphazardly – some were redundant others were limited because they did not have the resources needed to execute their ideas. Each branch had different ideas as to the importance of the helicopter and what should be its primary role on the battlefield. This was compounded by the fact that the Army felt constrained to avoid raising excessive animosity with the Air Force over something that was not yet proven in the minds of the Army’s most senior leaders. Instead, the focus on developing the more traditional aspects of the Army remained – the ground forces (Pentomic organization) and firepower in the form of missiles. Although an organization like the Pentomic Division desperately needed the helicopter in order to make it effective, the aviation element was drastically insufficient and no one seemed to care too much.
Although many claim that helicopter technology was insufficient for the Army to do much with it in the 1950s, one only has to look to the Marine Corps to see that this is not a valid reason. The Marine Corps’ success was due to its centralized control of the innovation. From the very beginning the Marines established the development of vertical assault/envelopment as the number one priority and applied the maximum resources to making the concept work. The Marines consistently experimented and trained with the concept, making adjustments as technology changed and funding allowed. Although they did not realize their ultimate objective, they never lost sight of it. Their schools continued to emphasize the basic concept and still also taught the current capabilities.

Others will argue that the Air Force and its strong opposition to organic aviation was the primary reason the Army did not develop its air mobile concept earlier. Again this is not a sufficient reason. Besides the fact the Rogers Board in 1960 only re-affirmed the Army’s conservative efforts for organic aviation, the Air Force’s ability to restrict the development of Army aviation decreased throughout the decade. Although the Air Force could still impede progress, it could not stop the Army if the Army wanted to pursue a more aggressive course of action. The Marine Corps benefited in that the Navy saw utility in the FMF as an important part of naval power. However, the Marines were constrained by the ceiling on aircraft and a small budget. Unlike the Army, the Marine Corps was solely reliant on another service to provide the aircraft and amphibious shipping needed to make the concept work.

From this there are some important things we can conclude. First, the importance of having a centralized plan that can monitor and guide developments cannot be over-emphasized. This ensures that there is minimal redundancy and maximum gain from the
efforts of those involved. However, it is extremely important to have the controlling organization (whether it is a command or staff does not matter) filled with individuals who are bright, determined, and articulate. The Marine Corps succeeded because the people that worked on the doctrine were some of the very best that any service could offer. The Army got as far as it did by the determination and energy of many key leaders who spread the gospel of the helicopter. The decentralized execution of the development of air mobility actually resulted in a form of self-organization. Many ideas at many different places ultimately coalesced into something akin to a concept or vision. While this technique allows for potentially even more “thinking outside of the box” the end result of the Army’s development were not essentially much different from the Marine Corps’.

Interestingly, the degree of impact that the Marines’ efforts had on the Army’s efforts is very hard to ascertain. Senior Army leaders repeatedly claim that it was little or none but this is hard to believe. Besides having to work together on the Joint Amphibious Board, the Army always had observers at the Marine Corps exercises and the CGSC and AWC classes received lectures and observed Marine demonstrations of the concept. When combined with the extensive publicity that the Marine Corps received for its developments, it is more likely that Army leaders in the combat arms were cognizant of the Marines’ efforts but hesitant to borrow anything from a rival service. The Army’s actions and experiments in the decade following the Korean War support this claim. Repeatedly the Army conducted exercises which replicated earlier Marine efforts (like at Desert Rock) and little mention was made in the Army’s military journals and those of AUSA to the Marine efforts. Most likely, the Army was at least indirectly
influenced. They read and saw what the Marines did but until they did it themselves, the Army’s culture could not accept the Marines’ conclusions without verification.
CHAPTER 9

THE HOWZE AND WHYS OF ARMY AIRMOBILITY DEVELOPMENT, 1960-1965

The early 1960s continued to be a time of great change for the Army. As the Eisenhower Administration exited, so did its policy of massive retaliation and conservative defense budgets. The Kennedy Administration entered with a defense policy intent that provided options throughout the entire spectrum of warfare. This “flexible response” required a balance of conventional and nuclear forces. The United States needed this increased military capability since it began to undertake a more interventionist foreign policy, especially against communist insurgencies. To ensure that the defense budget did not get out of hand, the Kennedy Administration chose businessman Robert Strange McNamara as its Secretary of Defense. Previously the head of Ford Motor Corporation (although only for a few months), McNamara entered the Secretary’s position determined to make it cost-effective while increasing capabilities.594

594McNamara brought into the procurement process the civilian management technique of system analysis called Planning-Programming-Budgeting System (PPBS). This system focused on the cost-effectiveness of all aspects of the Department of Defense’s expenditures. If a service wanted to procure a new weapon system it had to justify why the system was needed and how it was better than other alternatives. See Senate, Hearings Before the Committee on Government Operations, Planning-Programming-Budgeting, Part 2, 90th Congress, 1st Session (Washington, D.C.: GPO, 1967), 105; “Curtail Pilot Shifts, DoD Orders Army; Aviation Buildup Plans Threatened,” Army Navy Air Force Journal (8 April 1961): 1, 36.
For the Army, this meant having to fight conventional and unconventional wars. In response the Army gained two divisions for a total of 16 and quickly reorganized its forces into a more conventional structure better able to fight conventionally.\textsuperscript{595} For a blueprint, the Army used the CONARC study “The Reorganization Objectives Army Division 1965” which President Kennedy approved on 25 May 1961. Known as ROAD, this eliminated the division’s battle groups and reorganized the division into three brigades of a varying number of battalions.

This reorganization almost doubled the number of aircraft in the division and the division now had an aviation battalion (as opposed to the Pentomic Division’s company). In the aviation battalion there was a general support company and an airmobile company with the intent for each division to be able to lift an infantry company by helicopter.\textsuperscript{596} At the corps level there were three airmobile companies and an aviation corps company.\textsuperscript{597} These changes increased the Army’s requirement for aviation and by 1963 it possessed 6001 aircraft.\textsuperscript{598} While this growth seemed impressive, the overall impact was minimal. The dispersion of aviation assets ensured that each division had some airlift capacity, but not enough to conduct any kind of decisive operations. The aerial cavalry units provided an increased reconnaissance capability, but again were not sufficiently large to significantly change operations on the battlefield.

\textsuperscript{595}This increase was partly due to the Berlin Crisis in mid-1961. The Army increased from a 1959 end strength of 861,964 to 1,066,404 in 1962 with a slight drop back to 975,916 in 1963. See
\textsuperscript{596}Lieutenant Colonel Morris G. Rawlings (Director, Combat Developments Office, US Army Aviation Center), “Army Aviation and the Reorganized Army Division,” \textit{United States Army Aviation Digest} (February 1962): 2-4. Also authorized in the aviation units were weapon kits for helicopter self-defense.
The Army’s efforts at developing airmobility in the 1960s centered around a few major events: the 1960 Rogers Board, the 1962 Howze Board, the 11th Air Assault Division Tests, and the deployment of the 1st Cavalry Division to Vietnam. In an effort to develop a coherent Aviation program for the decade, on 15 January 1960, Army Chief of Staff General Lyman L. Lemnitzer convened a board of officers to review the Army’s aviation future requirements. Meeting at Fort Monroe, the Army Aircraft Requirements Review Board was chaired by Lieutenant General Gordon B. Rogers, then the deputy commanding general of the Continental Army Command. Known as the Rogers Board, its make-up was heavily pro-Army aviation with Major Generals Robert J. Wood, Hamilton H. Howze, Thomas F. Van Natta, Alva R. Fitch, Richard D. Meyer, and Ernest F. Easterbrook; and Brigadier Generals Lawrence J. Lincoln, William M. Thames, Jr., and Clifton F. von Kann comprising the Board. Colonel Robert R. Williams, then Chief of the Airmobility Division, Office of the Chief of Research and Development, served as Secretary without a vote. Brigadier General John Tolson, the Deputy Director of Army Aviation, also served on the Board without vote. Also serving on the Board were members from NASA, the Marine Corps, and the Army’s Signal and Transportation Corps.

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600 Colonel Robert R. Williams served as the Secretary for the board. Also see Weinert, *A History of Army Aviation -- 1950-1962*, 116.
The board had three special operating requirements which focused its efforts in exploring three areas. First was the requirements for a light observation aircraft for the 1960-1970 time period. The other two areas were to examine the alternatives available to the Army for improving its tactical transport and battlefield surveillance. The board was to submit specific recommendations for the funding of aviation developments for the fiscal year 1961 budget. It also had to estimate the Army’s aviation needs through 1970 and develop a procurement program to meet those requirements. The board asked the aviation industry for assistance on the current and future capabilities of aircraft. They received and evaluated the industry’s design proposals which included everything from autogiros to fixed-wing VTOL aircraft. From these initial proposals the board assessed which approach would be the most useful for the Army and then developed the specifications needed for each type of aircraft. Its conclusions advocated the development of new aircraft types focusing on rotary wing aircraft as opposed to a mixture of fixed-wing and helicopters. Among its conclusions, the Rogers Board advised that the UH-1 utility helicopter should have top procurement priority and anticipated the development of satisfactory air to surface point weapon systems for use on helicopters. The Board’s conclusions provided the foundation for the materiel development of Army aviation and was used by General Robert R. Williams, the head of

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aviation R&D in the Office of the Chief of Research and Development (OCRD), to

Howze also wrote an addendum to the report because he believed that there
should be something that addressed the doctrine for using aircraft and suggested that a
study be conducted on the viability for air-fighting units.\footnote{Howze, \textit{A Cavalryman’s Story}, 235-236. Howze actually wanted to write a whole annex but the Board rejected it because it exceeded the scope assigned to it. See also O. Glenn Goodhand, interview by Colonel Bryce R. Kramer and Lieutenant Colonel Ronald K. Andreson, 1978, p. 72-73. Found in Army Aviation Oral Histories. (MHI). Letter, Army Aircraft Requirements Review Board to Chief of Staff Army, dated 10 March 1960. Subject: AACFT Rqr Rev Bd, also known as the Rogers Board Report.} While the Rogers Board was
primarily concerned with the development of aircraft, especially the Light Observation
Helicopter, it did see the potential for using aircraft tactically to reposition units on the
battlefield. Their recommendation for a future study took form in the Howze Board two
years later.

In his efforts to make the Department of Defense a streamlined, efficient
organization, Secretary of Defense Robert Strange McNamara encouraged services to
develop new weapon systems jointly and to experiment with new ways of accomplishing
missions. McNamara believed that the Army needed to do more to develop air mobility.
In late 1961, McNamara’s staff threatened the Army with taking funding away for
aviation unless it could better support its requirements. When the Army submitted its
justifications for its requirements, “it was pretty sad.”\footnote{General Robert R. Williams, interview by Colonel Robert J. Powell and Lieutenant Colonel Philip E. Courts, 28-29 March 1978, \textit{A History of Army Aviation, Senior Officers Debriefing Program}. p.53. (MHI)}
Since the Department of Defense’s operations analysis people had a good working relationship with him, they brought it to Brigadier General Robert R. Williams. Williams reviewed it and discussed the issue with General Arthur Trudeau, the Deputy Chief of Staff for Research and Development, and other members of the Army Staff. Williams requested, and Trudeau approved, assigning Colonel Edwin L. Powell (the Chief of Airmobility in the Office of the Chief of Research and Development) to write a response to the Army. They wrote two letters. One directed the Secretary of the Army to establish a board to review Army aviation’s potential to improve the Army’s fighting capabilities and included naming the board president and many of the members of the board. The second letter instructed the Secretary of the Army to produce a study that would be transmitted from the board president through the Secretary of the Army to the Secretary of Defense “so that it would not be diluted by the reactionary nature of the Army staff.” Williams gave the letters to the operations analysis people and departed to command the Army Aviation Center.

Unhappy that the Army appeared unwilling to try any bold, new approaches, and instead on 19 April 1962, McNamara signed these two letters on 19 April 1962 (which were almost exactly the same as the letters submitted by Williams) which instructed the Army to re-examine methods for improving tactical mobility and evaluate new

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605 A 1924 graduate of the United States Military Academy, Trudeau was familiar with the efforts to develop the helicopter. He was Deputy Commandant of the Army War College from 1950 to 1952 when a Marine General Officer spoke to the school about the Marines’ efforts at vertical assault. He subsequently commanded the 7th Infantry Division at Pork Chop Hill in 1953. In 1954 he became the Army G-2, Chief of Intelligence. In 1958 he succeeded General Gavin as Chief of Research and Development and held that post until he retired in 1962.

concepts. McNamara put a very short time suspense on completing the study because the results needed to be included in the upcoming fiscal year’s budget. The Army Tactical Mobility Requirements Board was quickly established under the direction of General Hamilton H. Howze. Its instructions were: “The board...will conduct an extensive program of analyses, exercises, and field tests to evaluate the new concepts of battlefield mobility in terms of cost-effectiveness and transport-effectiveness factors...[It] will determine the extent to which air vehicles, operating in the environment of the ground soldier, can be substituted for conventional military surface systems, both tactically and logistically.”

Convinced that airmobility provided the means to regain the future mobility differential so crucial in combat, General Howze focused the board on exploring the airmobile methodology. Despite the short suspense placed on the board, the lack of proper methodology for testing, and the necessary equipment needed to conduct valid tests, the board produced a comprehensive and visionary document which would become the basis for future air mobility doctrine. The board seized upon General Gavin’s vision of “cavalry as a conceptually different arm of mobility than armor” and recognized that the mobility differential would come about from the “shock effect through firepower that also screens both time and information.”

Since the mission of the cavalry unit is to deny the enemy intelligence and prevent his attempts at gaining surprise while allowing

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607 Although the exact reason explaining how McNamara came to this conclusion and why he decided he needed to do this is unclear, it appears that this was again due to Robert R. Williams. Goodhand remarked “I’m absolutely certain that Bob Williams was at the center of it and primarily responsible for getting it through.” See O. Glenn Goodhand, interview by Colonel Bryce R. Kramer and Lieutenant Colonel Ronald K. Andreson, 1978, p. 75. Found in Army Aviation Oral Histories. (MHI).

friendly forces to gain these same things, the Howze Board envisioned the air cavalry as the natural successors to the cavalry of bygone years. While the Howze board was not innovative in its concept, it was innovative in its specifics.

On 1 September 1962, the Howze Board submitted its conclusions to the Secretary of the Defense. The report recommended the creation of three organizations: an air assault division, an air transport brigade, and an air cavalry brigade. The Howze Board’s findings were intensely scrutinized for months. After much debate, the Secretary of Defense authorized the Army to create two organizations to test the conclusions drawn by the Howze Board: the 11th Air Assault Division and the 10th Air Transport Brigade.

The 11th Air Assault Division was an unique organization created from scratch in order to test the airmobility concept as expressed in the conclusions of the Howze Board. It was never intended to become a deployable combat element and would suffer from this deficiency a few years later when ordered to deploy as the 1st Cavalry Division. The 11th Air Assault Division activated at Fort Benning, Georgia, in February 1963. Its organization was similar to that of the standard ROAD infantry division. Using the ROAD’s ‘tailoring’ principle, it consisted of three brigades which varied in composition depending upon the mission. This task organization at the brigade-level and lower was intended to give the division greater flexibility to fight.

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609Shelby L. Stanton, “Lessons Learned or Lost -- Air Cavalry and Mobility,” Military Review (January 1989): 75-76.

610The Howze Board also envisioned the future use of drone aircraft, position-fixing navigation systems, and airborne target locating systems.

611United States Continental Army Command, Annual Historical Summary, Fiscal Year ’64 2 February 1966: 121-128.


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Initially, the cadre of the 11th Air Assault Division was taken from available units.\textsuperscript{613} The soldiers used later to “fill out” the division’s structure were taken as they graduated from basic training. While slow, this process created a unit that possessed a non-doctrinal attitude while allowing the unit to develop, test, and refine tactics. Although the division would eventually reach a strength of 14,542 personnel, it never reached its programmed goal of three full air assault brigades. Instead, it managed to create one air assault brigade, one airmobile brigade, and a divisional artillery component equipped with a battalion of rocket firing helicopter, three 105mm howitzer battalions, and a Little John missile battalion transported by CH-47 Chinook helicopters.\textsuperscript{614}

A key difference between the air assault division and the standard ROAD division was the paucity of ground vehicles. Ground vehicles were replaced by the aviation assets of the 11th Air Assault Aviation Group. Commanded by Colonel George P. Seneff, the group served as the centralized control and distribution for the division’s aviation assets. The division had enough aircraft to lift one-third of its combat units at a time.\textsuperscript{615} The division’s aviation complement included a surveillance and escort helicopter battalion, two assault helicopter battalions for infantry lift, an assault support helicopter battalion for artillery and cargo lift, and a general support helicopter company.\textsuperscript{616} A fixed wing squadron of OV-1 Mohawks and Caribou cargo aircraft gave the division additional reconnaissance and lift assets.

\textsuperscript{613} For a more detailed explanation of the exact sources of initial fill personnel see Shelby L. Stanton, \textit{Anatomy of a Division}, 28.

\textsuperscript{614} Stanton, “Lessons”: 79.

\textsuperscript{615} Rathbun, “Tasks”: 39. While the 1/3 lift capacity was well-short of the Howze Board’s recommendations for 100% lift capacity, it served as a starting point for tactical unit training. The 11th Air Assault Division would continually fight to retain aircraft, pilots, and trained soldiers from their siphoning off to Vietnam.
The 10th Air Transport Brigade also formed in February 1963 as an experimental unit to support the 11th Air Assault Division. Commanded by Colonel Delbert L. Bristol, its Manning and equipping was also accomplished in increments proportional to that of the 11th Air Assault Division. At full strength the brigade was composed of 3,541 men and 130 aircraft. It served as the “retail delivery” of supplies for the division and possessed the capability to lift the division’s needed supplies (800 short tons) to a distance of 175 miles every day. The Army obtained aircraft for both the 11th Air Assault Division and 10th Air Transport Brigade by taking them from units throughout the country and by a rapid increasing factory production.

Three concepts were to be the basis for the air assault division’s future success. The first was its independence from terrain and obstacles. The second concept and advantage that the air assault unit possessed over its contemporary sister units was its ability to quickly focus its attack power on the enemy and not on the terrain. Finally, the air assault division operated on the premise that it could achieve tactical surprise. To assist in the evaluation and refining of the division’s doctrine and organizational structure, a Test, Evaluation, and Control Group (TEC) commanded by Brigadier General Robert R. Williams was created. The TEC focused its evaluation on six general areas: reconnaissance and security, mobility, combat support, combat service support, control and communication, and air traffic control. The analysis of the air mobility concept came from continuous observation of command post exercises, field exercises, and specific functional tests. Examples of the latter include determining the “methods and means of

616Stanton, “Lessons”; 79.
617Frank F. Rathbun, “Air Assault’s Second Year” Army May 1964: 14.
low-level navigation, basic time data for refueling and rearming aerial rockets, and the 
 mobility of an infantry company in day and night operations.”

The experiments of the 11th Air Assault Division focused on how to properly take 
advantage of the increased flexibility and mobility that the helicopter gave it -- to regain 
the mobility differential that General Gavin envisioned a decade earlier. Taking a page 
from the Army’s past, the techniques of the light cavalry were revived. The 11th Air 
Assault Division was uniquely suited to execute the traditional cavalry missions of 
reconnaissance, screening, and economy of force. Using hit and run tactics, raids, 
ambushes, and mobile defenses the airmobile units proved their value in the defense.

More importantly, the airmobile units proved more adept at offensive operations. The 
airmobile unit’s ability to bypass terrain and obstacles combined with its capability to 
mass quickly anywhere on the battlefield forced the enemy commander to defend his 
entire sector and deny him the ability to concentrate forces at any single point.

Prior to attacking, the air mobile division required extensive reconnaissance and 
intelligence in order to maximize its striking potential. This intelligence was gained 
through nighttime insertions of reconnaissance teams, overflights by fixed-wing OV-1 
Mohawk reconnaissance aircraft, and the traditional signal intelligence gathering assets.

Generally, air reconnaissance units (like the Mohawk units) would find the 
enemy. Air cavalry units in helicopters would utilize extensive diversionary tactics (such 
as fake air assaults and air drops) to confuse the enemy and then maneuver to fix the

618 Stanton, Anatomy of a Division, 28.
619 Rathbun, “Air Assault’s”: 16. The TEC and the 11th Air Assault Division comprised the two 
major commands of Project TEAM (Test and Evaluation of Air Mobility), itself under the command of the 
commanding general of the Infantry Center, Major General C.W. Rich.
enemy while an air assault infantry battalion would fly nap-of-the-earth (to avoid
detection by the enemy radar and air defenses) to fight and complete the destruction of
the enemy. When the sky cav troopers were fighting on the ground, they were supported
by the unit’s flying artillery: helicopters and slow flying fixed wing aircraft armed with
machine guns and rockets. Of course, all this required the Air Force to maintain control
of the air and increased the army’s reliance on the Air Force’s ability to interdict the
enemy.\textsuperscript{620}

Due to the 11th Air Assault Division’s initial under strength status, a timeline for
testing focused initially on squad and company sized formations. As the division gained
strength in personnel and equipment, the level of testing would focus on the battalion and
brigade level. The Army implemented a three-phased testing program on 18 January
1963. Phase I started with the 11th Air Assault Division at one-quarter strength, due to
the limited resources available for staffing the unit. During this phase, the division
consisted of a reinforced battalion and a small air transport brigade. Despite their small
numbers, the forces trained intensively together in airmobile operations and formed the
nucleus for a “progressive expansion in November.”\textsuperscript{621}

Phase II began in November 1963 with the division enlarged to a brigade and
focused on brigade level operations to culminate with a joint exercise. Phase III was to
begin in October 1964, when the division was at full strength, and test division-level
operations over a one year period. This last phase was to demonstrate the division’s

\textsuperscript{620}“Opportunity to Test Air Assault Concepts” \textit{Army} February 1963: 12-14. Throughout the
period of 1962-72, the Army took great pains to try to convince the Air Force that it was not trying to
usurp the Air Force’s preeminent dominance in the air. Unfortunately, inter-service rivalry and suspicious
hindered the process throughout the decade, and continues today in a more muted form.

\textsuperscript{621}Stanton, \textit{Anatomy of a Division}, 27.
abilities in all three levels of warfare: limited, medium, and all-out nuclear war.622 However, Phase III would never be completed due to the unit’s deployment to Vietnam.

The 11th Air Assault Division in Phase I was authorized a personnel strength of 3,592. Colonel George S. Beatty commanded the sole brigade, the 1st Brigade, which itself consisted of a single battalion, the 3rd Battalion, 187th Infantry Regiment, commanded by Lieutenant Colonel John T. “Jack” Hennessey. After a short period of organization, the first exercises were conducted by the test unit. The subsequent series of intensive and grueling exercises forged a strong bond between ground troops and air crews to make airmobility work.623

The exercises tried to resolve the issues identified from operations in Vietnam where American strength was building up.624 Experience showed that the most difficult aspect of planning an airmobile raid was the selection of landing zones. The location of a large-enough landing zone in proximity to the objective was of prime importance since the troopers of the sky cav possessed limited ground mobility. Unfortunately, landing zones could be templated by the enemy for defense. A strong defense at the landing zone was the greatest concern to airmobile forces. In order to counteract the enemy’s defense of landing zones, all available firepower had to be made available to protect arriving and departing helicopters. Suppressive fires would be placed around the landing zones just before the helicopters arrive and continue until the last helicopter departed. Within the landing zones, troops moved quickly from the center to the perimeter, using fire and

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623 Stanton, Anatomy of a Division, 28.
movement techniques. To orchestrate these complicated operations, an airborne command post was found to be very effective for controlling all the forces.

On 2-3 January 1963, the first sizable use of air mobility in Vietnam occurred near the village of Ap Bac. In this battle, approximately 1500 ARVN troops and their advisors unsuccessfully attacked 340 Viet Cong guerrillas. The plan envisioned using two American helicopter companies to airlift a battalion of ARVN infantry to the north and behind the enemy while two South Vietnamese Civil Guard battalions, supported by a company of M113 armored personnel carriers, attacked from the south through the hamlet. Faulty intelligence, bad weather, and the indecisiveness of the ARVN military leadership enabled the Viet Cong to withstand the attack and withdraw in good order with few casualties. The attacking force suffered the loss of five American helicopters (1/3 of the helicopters used) and more than 80 dead. Although this battle was widely reported in the American media, it quickly lost its significance as the pace of counterinsurgency operations increased. The battle was the harbinger for a new phase involving the of airmobility and mechanized operations in the Vietnam War. The lessons to be learned were many, but the ones for airmobility proponents included the need for detailed planning based on accurate intelligence, decisive leadership, the vulnerability of helicopters to ground fire, and the need for fire support throughout the operation.

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624 Bryce Denno, “Sure Wins 1 and 2” Army June 1963: 47. The first American helicopter assault operation was mounted just before Christmas in 1961. The following year saw the introduction of the first HU-1 ‘Huey’ gunships into combat.

625 The airlift was provided by the Utility Tactical Transport Helicopter Company (5 UH-1 armed helicopters) and the 93rd Transportation Company (10 H-21 transport helicopters). The airlifted unit was the 2nd Battalion, 11th Infantry Regiment of the 7th Infantry Division (ARVN).

626 For the most thorough account of the battle, the events that led up to it, and its significance, see David M. Toczek, The Battle of Ap Bac, Vietnam: They Did Everything But Learn From It (Westport, CT: Greenwood, 2001).
The first large-scale testing of the air mobility concept began in the Fall of 1963. Named Air Assault I, the exercise was conducted at Fort Stewart, Georgia, and tested the capabilities of a reinforced air assault battalion. This test consisted of four tactical phases that made the battalion perform a diverse range of air assault activities in order to collect data. In the first phase, the battalion moved 179 air miles (the maximum range of the resupply helicopters) from Fort Benning to Fort Stewart in order to assault and then hold its objective in a guerrilla-infested area. Then the battalion was required to expand its base to a brigade sized area and to live off its air lines of communications for a period of one week. The second phase evaluated the battalion’s ability to recover one of its companies from an area that contained well-trained guerrillas who were supported by a para-military organization. Phase three tested the battalion’s capability to “occupy a base, set up blocking positions, and execute a mobile defense.” The fourth and final phase evaluated the battalion’s ability to transition from one operation to the next in different geographic areas.\(^{627}\)

The focus of opposition against airmobility centered on the capabilities of the helicopter. As demonstrated at Ap Bac, opponents argued that the helicopter was vulnerable in combat and could not operate under adverse weather conditions, including night. General Kinnard, intent on disproving these arguments, stressed that the division’s flight operations must be as realistic as possible. Stateside safety conditions were relaxed and, as a result, allowed for the unit to practice low-level flights, flying at night, and aerial gunnery. The regulation forbidding formation flying was waived. Thus the division consistently rehearsed formation flying regardless of the mission and weather in

\(^{627}\)Rathbun, “Air Assault’s”: 16-17.
order to better transport troops over long distances to their objectives. While this demanding training produced many promising results, the continual siphoning of pilots and equipment to Vietnam prevented the 11th Air Assault Division from maximizing its training gains.\(^{628}\)

Pilot training emphasized low-level flying (coined “nap-of-the-earth”) and flying at night and in adverse weather. The disadvantage of flying nap-of-the-earth in Vietnam was that the helicopters often took ground fire from the Viet Cong located on the sides of the valley above. Helicopter navigation needed improvement. Although the Howze Board realized that technological developments would eventually solve this problem, the technology was not expected to be available for at least another decade. An interim solution advocated the use of a co-pilot who could serve as the aircraft navigator. Unfortunately, the unit suffered from a lack of qualified pilots and proposed the use of untrained crew chiefs to assist in this endeavor.\(^{629}\)

These initial operations displayed the enhanced mobility and flexibility gained by trading ground vehicles for aircraft. At the same time, the tests highlighted many problems. The most important of which was the need to reduce the bulk and weight of supplies. Another issue of great importance was the arming of helicopters, specifically, the need for a stand off capability against infantry and armored vehicles.\(^{630}\) Finally, communication equipment, while adequate for these tests, needed to be smaller, lighter,

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\(^{628}\) Stanton, *Anatomy of a Division*, 31.

\(^{629}\) Charles C. Prentice, “Heavy Weather for the Air Cav Section,” *Army* October 1963: 56-58. Other proposals included using fixed-wing aircraft and pathfinder teams to help guide the helicopters to the objectives, but these techniques required air supremacy and may sacrifice surprise.

\(^{630}\) Rathbun, “Air Assault’s”: 17-18.
and more powerful in order to operate on the extended frontage envisioned for future operations.

Particularly beguiling for the division was its consistent shortage in aviators and aircraft. Low-level flying was routine in airmobility operations and necessitated constant rehearsal and training to maintain proficiency. To do this, additional training and techniques needed developing for new aviators. Since operating at night was the preferred method for operations, the pilots had to do more night flying than was usual for light aircraft pilot training of the time. This “post-graduate” pilot training also forced a greater emphasis on safety. Pilots received additional instructions and practice in special techniques for these operations. Also whenever possible, newly graduated pilots were paired with Vietnam veterans when flying.\textsuperscript{631}

The original testing plan called for joint-testing to be conducted with the Air Force from September 1964 until mid-1965. However, in March 1964, the Pentagon announced that the testing of the 11th Air Assault Division would be accelerated so that separate Army and Air Force evaluations could be completed by the end of the year.\textsuperscript{632} The Department of the Army proposed this acceleration of the testing program and the elimination of the joint evaluation.\textsuperscript{633} The Secretary of Defense accepted this proposal and the 11th Air Assault Division used the time to refine its division and brigade operations.\textsuperscript{634}

\textsuperscript{631}Ibid. 18.  
\textsuperscript{632}Stanton, \textit{Anatomy of a Division}, 30.  
\textsuperscript{633}Rathbun, “Air Assault’s”: 18.  Although this decision allowed the Army more time to develop and evaluate air mobility operations, few senior leaders believed that this decision was related to a desire to prove the airmobility concept versus the Air Force’s desire to prove what it can do in close support of a standard ROAD division.  
\textsuperscript{634}Ibid. 14.
From February 1963 until May 1964 the division grew from a single battalion to a
brigade of three battalions. But in order to test the concept at a level higher than brigade,
the 2nd Infantry Division loaned a reinforced brigade to the 11th Air Assault Division.
This attachment brought the division to a strength of approximately 14,000 men.\textsuperscript{635}
During these exercises, the division operated as two brigades of three battalions each and
used its third brigade headquarters to focus on command post operations.

The division moved to the Carolinas for Exercise Hawk Blade, a dress rehearsal
for its big test in October, Exercise Air Assault II. Exercise Hawk Blade took place from
15 June to 30 June 1964 and allowed the 11th Air Assault Division to exercise as a
brigade task force. Operating in a 1.5 million acre area northeast of Fort Jackson, South
Carolina to the North Carolina border, the exercise included some 7,500 men of the 11th
Air Assault Division along with the 10th Air Transport Brigade.\textsuperscript{636} Overall, it proved to
be very useful in preparing the unit for the main exercise.

In October and November 1964, the division executed Exercise Air Assault II to
verify the capabilities of division-level air mobility operations. Despite the extreme
weather conditions (caused by Hurricane Isabel) and the constant shortage of trained
pilots and troopers, the 11th Air Assault Division successfully executed all of its assigned
missions with very few mishaps. The one month exercise demonstrated that, without a
doubt, air assault units could seek out, fix, and destroy the enemy over a large area
despite very unfavorable weather.\textsuperscript{637} While the 11\textsuperscript{th} Air Assault Division was conducting

\textsuperscript{635}Ibid. The ‘loaned’ unit included a brigade headquarters, three infantry battalions, and two
artillery battalions.
\textsuperscript{636}Ibid.
\textsuperscript{637}Stanton, \textit{Anatomy of a Division}, 33.
its tests focusing on operations in Europe and the Middle East, the Army continued to
 gain experience from operations in Vietnam.

   In Vietnam, the Army’s doctrine for helicopter operations emphasized speed and
   surprise. In a typical airmobile operation, the assault force approached the objective
   along pre-planned routes that avoided concentrations of anti-aircraft weapons. Using nap
   of the earth flying technique to minimize detection and exposure to enemy fire, higher
   performance armed helicopters escorted the troop transports to the objective. If needed,
   higher performance aircraft of the other services could also be used to provide additional
   air cover. Depending on the situation and the degree of surprise desired, heavy
   preparatory fires may be used. Following the preparation, airmobile forces would seize
   the objective with armed helicopters acting as aerial artillery to provide the close in
   support. The combination of surprise, mobility, and firepower was believed to provide
   the best possible chance of success and could significantly alter the conduct of future
   wars. 638

   The Viet Cong quickly recognized the impact that the helicopters had on
   operation in South Vietnam. They published and issued a handbook entitled “Comments
   on Countering Heliborne Landings and Raids” which described the adverse impact that
   the helicopters had against their insurgency, and proposed some measures to minimize
   the ARVN’s increased operational mobility and flexibility. 639

   638DCSOPS Talking Paper, dated 4 March 1963, Subject: Armed Helicopters (U). Found in CMH
   Archives, File: HRC 452.1 Helicopters.

   639DCSOPS Talking Paper, dated 4 March 1963, Subject: Armed Helicopters (U). Found in CMH

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The Army noted that armed helicopters operating in Vietnam were very successful in increasing the effectiveness of the South Vietnamese Army against the Viet Cong and their countermeasures. In a period from February 1961 to 28 January 1963, Army helicopters flew more 63,172 sorties during which 164 helicopters were hit and only four were lost. They transported 270,976 troops and 7,732 tons of cargo.\textsuperscript{640} During operations gunnery techniques improved to such a degree that “present weapons systems have a degree of accuracy equal to – or better than – that which [was] attained with high speed fixed wing aircraft.” In the 38 missions flown by armed helicopters they were credited with inflicting 306 casualties on the Viet Cong. In addition, the after action reports concluded that helicopters could operate in a combat environment. Like the Army’s other thin skinned vehicles, helicopters performed better when operating in conjunction as part of the combined arms team and executed missions that had good tactical planning. Transport helicopters proved to be significantly less vulnerable to enemy fire when escorted by armed aircraft (either fixed wing or helicopter).\textsuperscript{641} However the Army remained adamant that it “has never intended that the armed helicopter replace the attack aircraft. The Army has consistently stated that there is a continuing requirement for close air support from the US Air Force or other Services (with attack aircraft). The armed helicopter is a means of providing highly mobile supporting fires

\textsuperscript{640}DCSOPS Talking Paper, dated 4 March 1963, Subject: Armed Helicopters (U). Found in CMH Archives, File: HRC 452.1 Helicopters. Although approximately 50% of the sorties were combat missions, the loss rate was just .0126% of sorties.

which cannot be provided by any other means.”  With the lessons coming back from Vietnam and the successful testing of the 11th Air Assault Division, the Army appeared to have an organization that was capable of achieving decisive results throughout the spectrum of warfare and regardless of geographic area.

Vietnam in 1965 provided the first opportunity for the Army to test on a large scale its air mobility concepts and organizations in combat. The results became readily apparent during the Ia Drang Valley Campaign. The thirty-five day campaign showed that “air assault reigned supreme in the attack phase of airmobility.” When contact was made with the enemy, troops were quickly displaced from areas of less importance to the critical battle points. Commanders in their airborne command posts retained radio communications and were able to monitor the progress of the battle. As the sky troopers assaulted out of helicopters with their automatic weapons, they were supported by the attack helicopters spewing forth covering rocket and cannon fire. The rapid shifting of artillery by helicopter ensured that the attacking units maintained artillery support around the landing zones. The result was a clear tactical victory for the United States and for the concept of airmobility. General Westmoreland summed it up best, “The ability of the Americans to meet and defeat the best troops the enemy could put on the field of battle was once more demonstrated beyond any possible doubt, as was the validity of the Army’s airmobile concept.”

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643 Stanton, Anatomy of a Division, 46.
644 Tolson, Air Mobility, 83.
The Ia Drang Valley Campaign of 1965 stands as one of the most successful ‘first-battles’ ever fought by American forces. The 1st Cavalry Division’s superior combat performance in this campaign was a culmination of more than two years of doctrinal debate, and experimental force training, rehearsal, and field exercises. Experience in Vietnam was consistently sought out by the 11th Air Assault throughout its testing and was incorporated into the SOPs whenever possible. Vietnam served as an invaluable source for verifying the validity of the airmobility concept and for the survivability of the helicopter on the modern battlefield. The tactics utilized by the 11th Air Assault Division while training in the Carolinas were directly transferred to Vietnam where they served as the basis for all successful operations in 1965.

While the 1st Cavalry’s success in Vietnam can be attributed to the experiments of the 11th Air Assault, the outstanding leadership and morale of its officers, NCOs, and men also played as great a part. This “First Team” spirit combined with a thorough understanding of the contributions of each aspect of the combined arms team to produce a fighting force unequaled at the time. “The 1st Cavalry Division perfected the art of the air assault during its 1965 Ia Drang Valley Campaign and hounded the enemy during its 1966 coastal campaign of sustained pursuit.” From 1967 until 1970 it demonstrated its ability to execute clearing operations, the division cavalry raid, a corps cavalry screen, and a large scale cavalry exploitation.645

Operations in Vietnam prior to 1966 also indicated the inherent weakness of the airmobile concept – its durability in ground combat. While some battalions performed very well in Ia Drang, others suffered such heavy casualties once on the ground that the
units became combat ineffective.\textsuperscript{646} Although the helicopter had removed the tyranny of terrain in the movement of the airmobile units to the battlefield, once landed the First Team troopers had “almost as little as foot mobility as their foe had helicopter mobility.”\textsuperscript{647} More significantly, the Ia Drang campaign served notice that airmobile infantry required airmobile artillery, both helicopter mounted and traditional carriage types. The wide scale movements and extensive use of supporting fires presented a logistical dilemma not fully envisioned in the Carolina exercises performed in a mild climate and over flat terrain. The high humidity and rain in Vietnam reduced the 1\textsuperscript{st} Cavalry to approximately 50\% availability rate. This meant that much of the logistical resupply and close air support had to be provided by Air Force aircraft.\textsuperscript{648}

The end result was that the performance of the 1st Cavalry Division in Vietnam verified the Howze Board’s assessments about the worthiness of airmobility and survivability of the helicopter in the combat zone, but it is clear that airmobility advocates were still looking towards a more conventional fight in Europe or the Middle East. This is clear in the weapons systems that the Army was developing in the early 1960s. The Army’s efforts at arming helicopters included a variety of weapons useful for the very close fight.\textsuperscript{649} However, the Army spent the majority of its aircraft armaments

\begin{itemize}
  \item \textsuperscript{645}Stanton, “Lessons”: 81.
  \item \textsuperscript{646}Units like Lieutenant Colonel Hal Moore’s 1/7 Infantry and 1/8 Infantry performed very well, whereas 2/7 Infantry and 2/8 Infantry suffered heavily from enemy ambushes and aggressive close-quarters assaults.
  \item \textsuperscript{647}David R. Palmer, \textit{Summons of the Trumpet} (San Rafael, CA: Presidio Press, 1978), 97.
  \item \textsuperscript{649}DCSOPS Talking Paper, dated 4 March 1963, Subject: Armed Helicopters (U). Found in CMH Archives, File: HRC 452.1 Helicopters. These included the XM-1 (Cal .30 twin machine gun, M37) and
\end{itemize}
budget on modifying the SS-11 for use as a helicopter-based anti-tank missile system.\footnote{DCSOPS Talking Paper, dated 4 March 1963, Subject: Armed Helicopters (U). Found in CMH Archives, File: HRC 452.1 Helicopters. 55\% of the FY 1963 budget ($13.1 million of 28.81 million) was allocated to the SS-11 program and it was to increase to $43.7 million out of $61.6 million in FY 1967 (71\% of the budget).} It is also clear because the Army never had more than two air assault divisions. While success was achieved by the 1st Cavalry in the highlands, jungles, and mountains of Vietnam, the Army failed to adequately “grasp air cavalry principles” and transformed the division after 1973 into a heavy ground force.\footnote{651}

In conclusion, the Army’s rapid development of the airmobility concept in the early 1960s was due to two main factors. First, the intervention by civilian leaders into military developments was very important. The civilians’ willingness to try new things in order to increase effectiveness and efficiency allowed a small group of visionaries like Howze and Williams a chance to present their ideas. The methodologies brought into the Department of Defense forced the Army to re-examine why and how it developed new equipment and to more clearly state the need for such equipment. If the Army could not speak with one voice, it was not going to get the funding. Proponents of Army aviation used the quantitative methodologies and models to show that the helicopter could survive in a high threat environment. The frustration with the slow pace of change in the Army convinced McNamara to sign the letters that created the Howze Board. The civilian intervention occurred at a key point in time and overcame the inertia within the Army. Up to this point the Army remained tentative as to what degree it needed airmobility, especially concerning the high cost (and ever growing) associated with aviation. And by

XM-2 (7.62mm twin machine gun, M-60) for observation helicopters, and the XM-3 (2.75” FFAR Rocket System), XM-5 (40mm Grenade Launcher), and the XM-6 (7.62mm Quad machine gun, M-60) for the UH-1 and cargo helicopters.
having the report submitted to the Secretary of Defense it ensured that the Howze board’s conclusions was not “torn apart, delayed, and shredded” by the Army staff. However, this last part was not necessary due to the strong leadership exhibited by the top Army leaders. Secretary of the Army Cyrus Vance, Chief of Staff General Buzz Wheeler, and the Vice Chief of Staff General Eddleman viewed Army aviation favorably and ensured that the Army Staff obeyed Secretary of Defense McNamara’s instructions.

As a conservative institution, the Army did not have to change just because of McNamara’s instructions. The Howze Board managed to “package [airmobility] into a saleable form” to the rest of the Army. The Army’s culture during this time period had grown accustomed to the helicopter and accepted it as another battlefield vehicle. However, the Howze Board and the Army thereafter could never had proceeded at such a rapid rate if not for the extensive work that had already been done by the Army in school problems, field exercises, and numerous studies. Integrating helicopters was easier because more leaders understood how to use it from these exercises. In addition, McNamara’s directive was actually written by two officers who wanted to push the Army faster along the road to airmobility. There were no civilians working in the Department of Defense that had the imagination and operational experience to construct such clear and direct letters. The role of civilians rapidly diminished after 19 April 1962. The Howze Board’s analysis, the testing by the 11th Air Assault Division, and the subsequent

653Delk Oden, interview by Colonel Glenn Smith and Lieutenant Colonel August Cianciolo, 1978, Army Aviation Oral Histories, Carlisle, PA. p.7-8. Oden was the Director of Aviation in DCSOPS at the time of the McNamara memorandum.
success of the 1st Cavalry Division in Vietnam were all a result of military officers and soldiers creativity and hard work to make a concept work. Important to note is that strategic threats, especially the situation in Vietnam, had no influence whatsoever on the creation of the Howze Board\textsuperscript{654} and played a very small part in the testing of the 11\textsuperscript{th} Air Assault Division.

The success of the 11\textsuperscript{th} Air Assault Division’s testing highlights three very important points for future test units. First, the Army allocated sufficient resources to gain a reasonable expectation of the capabilities of this new fighting formation. The incremental expansion from battalion to division was not part of the initial plan, but it worked well in allowing the tactics, techniques, and procedures to be fully developed prior to enlargement. This simplified the training program and ensured uniformity throughout the division. Second, the Howze Board and various Army schools had been working on developing the doctrine and organization that could best employ the helicopters and fixed wing aircraft. This provided a base from which the test unit could explore what worked best through training and field exercises. Third, and most importantly, the Army allowed the unit and its commanders a great deal of latitude in their operations. General Kinnard was not restricted in making changes to his organization, equipment, and doctrine for employment.\textsuperscript{655} The unit was granted waivers removing the administrative flying safety standards in order to determine the tactics needed to make the concept most effective. When accidents occurred and mistakes were


made, the testing continued. These factors allowed the testing to be comprehensive, accurate, and useful. No where was this best exemplified than by the transforming of the division into a fighting force in just a few months despite the large turnover in personnel.
CHAPTER 10

INTERNATIONAL DEVELOPMENTS IN AIR MOBILITY AND THEIR INFLUENCE ON THE US ARMY, 1945-1965

The development of air mobility doctrine is identified throughout the world as being a uniquely American development due to their extensive use in America’s intervention in Vietnam from 1965 to 1974. Less known is the development and use of the helicopter by other powers in the world; the three most significant from 1945 to 1965 are the British, French, and Soviets. While other countries also pursued the development and employment of the helicopter, these three did it on a much greater scale.

Although the British, French, and Soviets all developed similar ideas on employing the helicopter, the degree of development and implementation of air mobility differed based on the interaction of strategic requirements, funding, and military culture.

The British development of helicopter aviation was affected most by strategic context and military culture. Strategic context was shaped by the need to conduct counter-insurgencies in places like Malaya and Borneo, to maintain large forces to defend the Continent, and a desire to remain an economic and military power throughout the Commonwealth. These aims often came into conflict when military budgets were too small to support these objectives while creating a new social welfare state.
The British emerged from the Second World War exhausted and bankrupt. The destruction caused by World War II, the heavy debt incurred while financing the war, and the permanent disruption of cheap raw materials from the Empire contributed to the slow rebuilding of Britain’s infrastructure and industrial economy. The rebuilding costs and, later, the increased costs of social welfare programs meant restricted budgets for the armed forces. The emergence of the Soviet and global communist threat posed active threats to many areas of the British Empire. The expense of maintaining and protecting a far-flung empire could not be maintained, especially without the support of the indigenous colonial populations.

The British military faced the unusual situation of having won the war, but needing to immediately modernize its forces. By 1945, the majority of British tanks, aircraft, and ships were obsolete. It also possessed a large amount of materiel that theoretically needed to be returned under lend-lease agreements. The desire to possess nuclear weapons was an additional, and expensive, factor in formulating military budgets. Despite the high costs associated with the development of nuclear weapons, the British pressed on in order to possess its own nuclear weapons. The RAF was responsible for conducting strategic nuclear bombardment and guaranteed a large portion of the nation’s military budget. The RAF spent a large portion of its budget supporting this mission, which left little available for tactical operations to include support for the British ground forces.

The British first began working with helicopters during World War II. In 1943, the British received seven Sikorsky R-4 helicopters from the United States for evaluation. Renamed the Hoverfly Mk.1, the British conducted numerous experiments on land as an
observer and liaison aircraft.\textsuperscript{656} At sea, the British found it useful as an anti-submarine warfare (ASW) aircraft that would fly with the convoy, locate submarines, and direct the escorts to the submarines. The British also noted the mixed success of the American use of R-4 helicopters in the Burma campaign of 1944-45. These wartime experiences exposed the British to the helicopter’s military potential and caused the Royal Navy to form the world’s second naval helicopter squadron (after the American HMX-1) in May 1947 at the Royal Naval Aviation Station Gosport. Designated No. 705 Squadron, it was equipped with a Sikorsky R-4B and two Sikorsky R-6 helicopters. In January 1950, it received its first WS-51 Dragonfly helicopter. The squadron was much like HMX-1 in that it was initially the country’s only helicopter squadron. Besides training pilots, the squadron was used for demonstrations, trials, and search and rescue.\textsuperscript{657}

In 1946, the Air Ministry received from the War Office a request for three types of helicopters needed for future Army operations. These were a small two seat helicopter to serve as an aerial observation post (AOP), a ten seat general purpose helicopter, and a large cargo helicopter that could lift more than 22,000 pounds.\textsuperscript{658} Later in 1949, the British Army wanted a utility helicopter for liaison work, artillery spotting, and medical evacuation with little alteration. The Royal Navy wanted to procure a helicopter to perform ASW and search and rescue (SAR) missions. These requests were formalized in a 1950 requirement for a helicopter that could carry four people, travel at almost 90 mph with a range of 460 miles, and possess the ability to hover out of ground effect at 5,000


feet. Its primary mission was casualty evacuation, but it also had to be capable of a quick conversion for carrying passengers or cargo.659

Although it was a little large, the Bristol Type 171 Sycamore (named because of someone thought it resembled a sycamore leaf) seemed suited to the AOP requirement. While development on the Sycamore progressed satisfactorily through 1947, the military withdrew its support because of financial constraints.660 Bristol continued development and on 20 January 1949 demonstrated to all three services a version of the Sycamore for evacuating casualties. Later that year an urgent requirement came from Malaya for helicopters to perform aerial medical evacuation. Although the ‘Buy British’ policy was in effect, neither the Fairey Gyrodyne nor the Bristol Type 171 Sycamore could meet the deadline for an Autumn 1949 shipment.661 Instead, the Westland WS-51 Dragonfly (the licensed Anglicized version of the American designed Sikorsky S-51) was sent because it was the only one ready to fly.662

The Westland WS-51 Dragonfly was the only helicopter used extensively by the British military from 1945 to 1955. Built under license from the United Aircraft Corporation (which owned Sikorsky), Westland built the aircraft entirely with British

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661The Fairey Gyrodyne took the best of the autogiro and the helicopter. The rotor provided only lift, while a propeller mounted on the starboard stub wing provided for forward propulsion. This arrangement counteracted torque and simplified meant less power was needed for the rotor, reducing the loads on the transmission and the rotor, and allowed for more simple controls. The Air Ministry really liked the Fairey Gyrodyne and anxiously awaited its completion so that it could replace the helicopter. For more information, see John Everett-Heath, British Military Helicopters (London: Arms and Armour Press Limited, 1986), 61.
parts and materials since they could not afford to buy from the Americans. The lower quality and higher weight of the British components had the unfortunate effect of significantly decreasing the performance of the Dragonfly when compared to the original S-51. Compounding the problem was the very small staff at Westland, which had to convert the design to fit British materials and machinery. Overcoming these problems delayed the completion of the first prototype until 16 months later in October 1948. After successful testing, the Royal Navy and RAF placed large orders. It took another lengthy period for full tooling before the first helicopters rolled off the production line late in 1949.\footnote{John Everett-Heath, \textit{British Military Helicopters} (London: Arms and Armour Press Limited, 1986), 43.}

The problems in helicopter production delayed their introduction into active military operations in Malayan Emergency until 1950. While the Royal Navy (RN) had initial priority for the helicopters, after receiving their first six Dragonflies the RN allowed the next three to go to the RAF for use in the Far East Casualty Evacuation Flights (FECEF).\footnote{John Everett-Heath, \textit{British Military Helicopters} (London: Arms and Armour Press Limited, 1986), 73, 75.} Receiving the helicopters in March 1950, the RAF immediately shipped them to Malaya.\footnote{Lady Mountbatten has been given partial credit for the idea for using helicopters as a Far East Casualty Evacuation Flight. After her return from Malaya in 1949, she pushed the Ministry of Defence for the establishment of a helicopter unit to evacuate casualties. See John Everett-Heath, \textit{British Military Helicopters} (London: Arms and Armour Press Limited, 1986), 75.} Formed on 1 April 1950, the FECEF conducted its first casualty evacuation on 14 June 1950.\footnote{John Everett-Heath, \textit{British Military Helicopters} (London: Arms and Armour Press Limited, 1986), 75.} This and many other successful operations convinced commanders in the theater that more helicopters were needed. The Dragonfly
for all its success was limited by its small payload which prevented its use for transporting fully armed troops. It often had to limit fuel to just 30 minutes flying time when performing medical evacuation missions so that it could lift one or two people. In addition the helicopter required an elaborate system of relocating lead weights to maintain a consistent center of gravity. In addition, the curved shape of the canopy prevented the fitting of windshield wipers making operations in the rain an adventure.667

Used primarily for medical evacuation, the three Westland WS-51 Dragonflies also demonstrated how useful their hovering and VTOL capabilities were in the jungle environment. Impressed by the helicopter’s performance, General Sir Gerald Templer, the Director of Operations in Malaya, proclaimed that the helicopters were “essential to success” and asked for many more.668

The geography of Malaya made the helicopter an optimal vehicle for operations. Malaya is a peninsula of which eighty percent of the land is dense jungle. The only major road and railway was within thirty miles of the west coast for a length of 600 miles. The nature of the terrain made the use of motorized and mechanized forces nearly impossible since the CTs used the dense jungle as cover for their operations. The British did use trucks to transport units in reaction to CT attacks, but their pursuit of the

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guerrillas was primarily on foot. Helicopters enabled the British to deploy a relatively small number of forces to fight the insurgency in jungle terrain.669

There were two phases to the war in Malaya. The first, defensive phase began with initial hostilities in June 1948 and lasted until the end of 1951. During these three years, large bands of Chinese guerrillas terrorized the people and tried to gain control from the government of a large area to establish a base camp from which they could transform their guerrilla units into a conventional army. During the first three years, the British employed company-size camps that were not fortified strong points, but merely administrative bases on which they lived. From these camps located near, but not in villages, the British forces aggressively responded to attacks on any of the nearby hamlets and drove off the guerrillas while inflicting casualties. The CTs learned that their large bands lacked the strength and skill to engage the British companies and were too cumbersome to quickly disengage when attacked and in 1951 decided to operate in

669 The first Director of Operations in Malaya, Lieutenant General Sir Harold Briggs, developed a plan for combating the Chinese terrorists (CT) in Malaya. Although he served in the position for only eighteen months, the plan he developed served as the framework for the eventual British success. Known as the Briggs Plan, it had three main aims. The first was to bring the entire population under the effective administration and protection of the government, to include the resettlement of up to 500,000 Chinese “squatters.” Second was the concurrent expansion of police and local defense forces. Finally, the plan required the creation of a central command and control network to coordinate the various civilian, military, and government forces for effective anti-terrorist operations. The Briggs Plan allowed the British Army to primarily concern itself with conducting offensive operations against the insurgents. However, these correct policies needed an efficient military force to contain and destroy the insurgency. A key component of the British military’s success was the expanded use of the helicopter from 1950 to 1964. It is important to note that during the thirteen years of fighting the two sides maintained approximately equal numbers of combatants. The guerrillas never numbered more than 10,000 and were initially supported by up to 500,000 Chinese villagers. The Commonwealth forces numbered only 23 infantry battalions totaling approximately 9,000 men. Equivalent to the Chinese villagers, the British were supported by another 30,000 soldiers in administrative units, and 40,000 police. There were also the 250,000 members of the Home Guard used to defend Malay kampong’s and Chinese ‘new villages.’ See Richard L. Clutterbuck, “Communist Defeat in Malaya,” in Reference Book (RB) 31-2, Internal Defense Operations, A Case History Malaya, 1948-60 (Fort Leavenworth, KS: U.S. Army Command and General Staff College, 1 November 1960), 18. See also Harry Miller, Jungle War in Malaya: The Campaign against Communism, 1948-60 (London: Arthur Barker Ltd., 1972), 25.
platoon size groups of 15 to 20 men. During these operations, helicopters performed mostly yeoman duties like liaison, observation, and medical evacuation.

Based on the limited success in Malaya, the British Army announced in 1951 a new requirement for a helicopter that could lift 10,000 pounds with a 100 mile radius of operation. At this time, Bristol was working on its Type 173, Britain’s first twin-engine helicopter. This helicopter was an outgrowth of the initial 1946 requirement for three types of helicopters. Intended to fill a ten passenger requirement, it did not meet the requirements of the British Army in 1951, but both the RAF and RN, as well as the civilian British European Airways, expressed interest in the helicopter. In mid-1952 the Air Ministry approved the procurement of three Type 173 helicopters (which could carry a useful load of 2,646 pounds) but not a helicopter with a useful load of 22,046 pounds as first proposed in 1946 because of the projected high research and development costs.

With the Malayan population fairly secure and willing to supply intelligence against the CTs, the British began the offensive phase in 1952 which lasted until 1960 when all but about 400 guerrillas were either killed or captured. The offensive operations took the form of long range jungle patrols and ambushes intended to kill the small insurgent units. A key component for these operations was the application of air power. The most important mission being the aerial re-supply and airlift of ground

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forces. As one British officer noted, “Although this was not an air war, aviation was essential to the operations in Malaya.” Unfortunately, the small Dragonfly and Sycamore helicopters had little to offer in terms of moving large numbers of troops and supplies.

Described by British soldiers as “war winners,” the RAF’s transport helicopters enabled the British to deploy from their bases to small jungle clearings in a matter of minutes, thus saving the infantrymen long hours of marching with a heavy rucksack on their back. While this provided increased mobility and tactical flexibility for the counterinsurgency effort, the CTs adapted quickly to the British use of helicopters. As a result the British could not just descend vertically on a CT camp because the CTs heard the approaching helicopters and dispersed. Instead, the British developed a tactic of landing forces in a wide ring around the enemy camp to form “stops” while a small assault force moved forward into the camp. If the CTs tried to disperse, they often ran into one of the stops. As the number and quality of the helicopters improved, the British modified their tactics to take advantage of the increased capabilities, to include “the prompt exploitation by a large force of any information gained from reconnaissance patrolling.”

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The need for a larger helicopter with a greater useful load was apparent to the military. So when Sikorsky’s S-55 made its first successful flight in November 1949, the British Westland company quickly made a licensing agreement to produce a British version. A much more thoughtful design, with a large area immediately below the rotor so the center of gravity was rarely affected by the amount of cargo, Westland was now more experienced at ‘Anglicizing’ the aircraft and delivered the first WS-55 Whirlwind to the Royal Navy in July 1954 and the Royal Air Force’s Transport and Coastal Command in August 1954. Unfortunately, the use of British components made the WS-55 five percent heavier than its American counterpart, negatively impacting performance to such a degree that in Malaya the helicopter could only carry one soldier.\(^{676}\) In addition, the redesign of the fuel system meant that almost 40 gallons of fuel could not be used.\(^ {677}\) During its service in Malaya, the Whirlwind’s operational readiness rate hovered around 50%, while the American S-55 was at approximately 80%.\(^ {678}\)


The British deployed their first cargo helicopters in Malaya in January 1953.\textsuperscript{679} It did not take long for the British to make extensive use of this new airlift capability for on 24 May 1953 eight S-55 helicopters from Squadron 848 participated in Operation Commodore. To begin the operation, they lifted 564 troops a distance of nine miles over terrain that would have taken two days to traverse by foot. By the time Operation Commodore ended two weeks later, the squadron’s S-55 helicopters had performed 415 sorties to move 1,623 troops and 35,000 pounds of supplies. Its Dragonflies contributed with 94 reconnaissance and communication sorties.\textsuperscript{680}

A few months later on 3 July 1953, the British used these helicopters to transport 2,000 British and Gurkha soldiers and accompanying police dogs to trap a group of 80 CTs in a 25 square mile area of thick jungle. The first wave rappelled down ropes and used saws and axes to clear landing zones in just 30 minutes for follow-on waves of helicopters that flew in four abreast. Within a few hours of the first landing the British force identified and killed its first guerrilla.\textsuperscript{681} Later in October 1953, four British infantry battalions executed Operation Valiant with the objective of destroying the

\textsuperscript{679}Robert Jackson, \textit{The Malayan Emergency: The Commonwealth’s Wars, 1948-1966} (London: Routledge, 1991), 95. To provide more complete coverage, a detachment of three S-55s and two Dragonflies deployed to Kuala Lumpur to provide coverage for north and central Malaya. Another detachment of the same composition remained at Sembawang while the other four S-55s were held in reserve. This arrangement lasted for a year. On 15 February 1954, the 303 Wing disbanded and the two squadrons became part of the RAF Kuala Lumpur Flying Wing. These were No. 849 Naval Air Squadron’s ten Royal Navy Sikorsky S-55 helicopters which were obtained from the United States under the Mutual Defense Assistance Program. Located at Royal Naval Air Station Sembawang, the squadron was joined by No. 194 Squadron which had nine Dragonfly helicopters in February 1953. The two squadrons were then formed into the No. 303 (Helicopter) Wing.


Malayan Communist Party’s Central Politburo and a number of terrorist camps located deep in the jungle. The helicopter transport enabled a quick, successful deployment since once again the terrain did not facilitate dismounted movement. The S-55 helicopters were used in the initial deployment of a battalion’s 500 troops into two small landing zones in the middle of the jungle. The remaining units were then transported by the S-55s to locations as the current situation dictated. By the time the operation ended in November, Squadron 848 had moved more than 2,700 troops. Squadron 848 finished 1953 transporting a total of approximately 12,000 troops during 1,700 hours of flying.\(^{682}\)

Despite the obvious small successes, it took a large operation to generate support from the politicians at home. From May to September 1954, the No. 848 Squadron participated in the largest combined operation of the war, Operation Termite. During this period, the squadron flew 2,448 sorties averaging 40 minutes in duration to move approximately 5,000 troops.\(^{683}\) The success of this operation convinced the British to increase their helicopter presence in Malaya. In the Director of Operations’ report for 1954, it recommended that a minimum of eighteen medium and eighteen light helicopters was needed for daily operations in the theater. A helicopter force of this size would provide a capability to airlift two infantry companies to different areas of Malaya in any given day. It could also provide the capability needed to conduct six ninety man airlifts for use against targets of opportunity or pursuits of CT forces.\(^{684}\) The need for more helicopters was underscored by the fact that due to the very high operations tempo, on 28


August only one S-55 and one Dragonfly were operational.\textsuperscript{685} Fortunately in October of that year, the RAF added the helicopters of No. 155 Squadron and by 1955 had three squadrons numbering 40 helicopters in the theater. This effectively doubled the helicopter troop lifting capability in the theater.\textsuperscript{686}

The additional capability was immediately put into use and by the end of 1955 those 40 helicopters flew more than 20,000 sorties.\textsuperscript{687} Despite this increased capability, it a very long time to move units -- two days for the transport helicopters to move an entire battalion and two infantry companies totaling 600 men to their operational areas.\textsuperscript{688} Nevertheless, the number of troops moved continued to increase to 25,700 in 1956.\textsuperscript{689}

The movement of troops in 1957 suffered from problems with the Whirlwinds and Sycamores which forced their groundings for periods of up to a month at a time. Despite these troubles, the helicopters still managed to average 2,000 troops airlifted per month.

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\textsuperscript{686}Concepts Division, Aerospace Studies Institute, Project No. AU-411-62-AI, Insurgency and Counterinsurgency Studies, \textit{The Accomplishments of Airpower in the Malayan Emergency (1948-1960)}, (Maxwell Air Force Base, AL: Air University, May 1963) 36-37. See also Robert Jackson, \textit{The Malayan Emergency: The Commonwealth’s Wars, 1948-1966} (London: Routledge, 1991), 96, 100. The No. 195 Squadron performed liaison and medevac missions with its 14 light helicopter Sycamores; No. 155 Squadron flew two Sycamores and nine medium helicopter WS-55 Whirlwinds; and No. 848 Fleet Air Arm Squadron flew the American made Sikorsky S-55 medium helicopters. The total number of medium helicopters was 26 and were used primarily as troop carriers. All three squadrons operated from Kuala Lumpur.
\textsuperscript{688}Whereas in the Korean War, the Marine Corps moved a similar size unit in less than 6 hours.
\end{flushright}
after May. In 1958, despite being beset with maintenance problems, the transport helicopters continued to support the Army. The most significant operation occurred in August during Operation Tiger in which 4,133 troops were shifted throughout the jungle of south Malaya – the most of any month in the twelve year war. The helicopters continued to support operations through the end of the war, although at a lower rate due to the threat being gradually reduced. Their extensive use led the Air Headquarters to place restrictions concerning landing zones and other operational considerations in order to minimize losses. By the end of the war, more than 110,000 troops had been transported by the helicopter squadrons. Despite this apparent success, the lack of sufficient helicopters in large numbers kept the British from developing a more advanced concept, like the American Sky Cav or Air Assault doctrines.

The high sortie rate in Malaya is misleading in that the British built helicopters suffered from poor performance. Although *Jane’s* rated the Whirlwind medium helicopter as capable of carrying ten fully armed troops, its actual performance in Malaya was much less with a capability of carrying just two fully equipped soldiers. When operating at altitudes of up to 2,000 feet, it had a useful load of just 720 pounds over a

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691 Concepts Division, Aerospace Studies Institute, Project No. AU-411-62-AI, Insurgency and Counterinsurgency Studies, *The Accomplishments of Airpower in the Malayan Emergency (1948-1960)*. (Maxwell Air Force Base, AL: Air University, May 1963), 37-40. These restrictions were stated as such: “All helicopter landing zones had to measure at least 150 feet in diameter with the center 90 feet being cleared to ground level with no obstructions. Growth on the 30-foot fringe could not exceed two feet in height. In addition, an approach path 120 feet wide had to be provided to permit approach and exit angles of 30 degrees or less at sea level to 3,000 feet. Landing zones between 3,000 and 4,000 feet had to accommodate approach angles of 20 degrees; and those above 4,000 feet could not exceed 10 degrees. Furthermore, a 10 degree approach angle could not be exceeded if the helicopter was to carry its maximum load.”
distance of 50 miles, 800 pounds for thirty miles, and 850 pounds for 16 miles. For altitudes above 2,000 feet, the useful load decreased by 100 pounds for each thousand feet. Adverse weather further restricted performance. To make matters worse, the Whirlwind used 290 pounds of fuel per hour when traveling at just 60 knots and could only operate for nine hours per day due to maintenance requirements. Despite its smaller size, the British Sycamore helicopter performed almost as well as the Whirlwind. These limitations made the helicopter best suited for patrols, since only a small number of troops could be carried in the first waves on any heliborne assault and that these assaults could only take place in a relatively small area in Malaya without any additional helicopter staging areas.

While the British helicopter units demonstrated their versatility and usefulness throughout the entire war in Malaya made them the most desired asset in theater, their small numbers and maintenance issues prevented their greater use. To ensure they were not “frittered away” the RAF controlled all three helicopter squadrons from its Air Headquarters and did not authorize any missions until it was satisfied “that the helicopter

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693 Concepts Division, Aerospace Studies Institute, Project No. AU-411-62-AI, Insurgency and Counterinsurgency Studies, *The Accomplishments of Airpower in the Malayan Emergency (1948-1960)*, (Maxwell Air Force Base, AL: Air University, May 1963), 40-41. At altitudes up to 1,500 feet, the Sycamore had a useful load of 540 pounds over 75 miles, 600 pounds for 50 miles, and 700 pounds for 25 miles. For every 1,000 feet higher, the useful load decreased by 170 pounds. Fuel consumption was 175 pounds of fuel per hour at 60 knots.

was both the best suited and most economical means to achieve the desired results.”

While this had minimal effect on the sortie rate in 1955, the concern over long term costs was a real one. Recognizing that counterinsurgency operations were conducted over long periods of time, the British needed to be economical where possible. The helicopter was much more expensive to procure, operate, and maintain when compared to fixed wing aircraft. The helicopter procurement cost was ten times higher than a comparable fixed wing aircraft and cost more than twice that of the fixed wing aircraft to operate.

The toll on helicopter pilots was also very great since their aircraft’s small payloads meant they almost always operated at the helicopter’s maximum flight envelope. To ensure that helicopters were not lost needlessly, the RAF implemented a rigorous training program for its helicopter crews. Prior to being assigned to helicopters, pilots had to have 1,000 hours in fixed wing aircraft and another 100 hours in helicopter flying prior to being certified for combat operations.

The small number of helicopters and their relatively poor performance in theater meant that other aircraft were needed to support helicopter operations. Fixed wing

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696 Concepts Division, Aerospace Studies Institute, Project No. AU-411-62-AI, Insurgency and Counterinsurgency Studies, *The Accomplishments of Airpower in the Malayan Emergency (1948-1960)*, (Maxwell Air Force Base, AL: Air University, May 1963), 62, 74-75. The S-55 helicopter cost $137,500 in 1955 while the Pioneer cost $35,000 and the Auster was less than $10,000. The cost per flight hour for the Whirlwind and S-55 medium helicopters was $218 and the Sycamore light helicopter was $162; the fixed wing Pioneer was $98 and the Auster just $36 and both of these carried four people and the Pioneer could carry 800 pounds of cargo.

aircraft were used to recon helicopter landing zones and to suppress enemy forces in the vicinity of landing zones. While helicopters could have done either, it would have meant less available for the more highly valued mission, troop carrying.\textsuperscript{698}

During the next twelve years, the helicopters performed a variety of missions to include aeromedical evacuation, liaison operations, reconnaissance, herbicidal spraying, and crowd control. More importantly, the British also attempted to move troops by helicopter during military operations. Efforts at moving troops were disappointing because of insufficient numbers of helicopters and the poor performance of their helicopters. Even if they were better powered, the British helicopter industry was very immature and plagued with many design and production problems that precluded large scale production. As a result, the British never fielded more than forty helicopters at any one time in Malaya.\textsuperscript{699} In order to maximize their capabilities, the British employed a centralized system for helicopter missions. This enabled the British to dedicate helicopters based on mission requirements. Overcoming these difficulties, by the time the war was declared over in 1960, the British helicopters had transported more than 110,000 troops and 1,250 tons of supplies.\textsuperscript{700} They had proven invaluable for British forces to quickly traverse great distances and clear the guerrillas from the deep jungle.\textsuperscript{701}

Despite these successes, the development of a British air mobility doctrine never reached


fruition. Small unit tactics, techniques, and procedures existed for small units, but nothing coherent and lasting resulted from these operations.

The British began moving men in true assault type missions in combat before anyone else, including the United States Marine Corps. The helicopter’s mobility and versatility gave commanders in the theater much more flexibility in the conduct of operations. The British success with the helicopter was constrained by the lack of sufficient quantities and the poor performance of the British built helicopters. The RAF’s centralized control of helicopters helped to partially negate the shortcoming in numbers, but could not overcome the lack of performance. Thus, the short-range, limited useful load, and extremely high costs all conspired to prevent a much wider use during the twelve year conflict.

The impact that the Malayan operations had on the American military was different for each service. The Army studied the use of the helicopter and its role within the framework of a low intensity conflict. It recognized that the piston engine helicopter lacked the performance needed to adequately perform in a higher threat environment. However the Army Aviation community continued to experiment with the Sky Cav concept and the arming of helicopters throughout the latter half of the 1950s. In its studies on the counterinsurgency effort in Malaya, the United States Air Force noted that air power could prove decisive in supporting ground forces. The Air Force also recognized the usefulness of helicopters, but emphasized the need to centralize control of the helicopters to increase economy and effectiveness.

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Despite the successful application of airpower, and especially the helicopter, it is important to understand that the major lessons the British derived from these operations was the need for a coordinated intelligence network, a campaign to win the people’s hearts and minds, a well-integrated command system, and the recognition that there is no such thing as a quick victory in a counterinsurgency.  

The success of the helicopter in Malaya prompted all three British services to establish an experimental unit to test new concepts. Formed at RAF Middle Wallop on 1 April 1955, the Joint Experimental Helicopter Unit (JEHU) developed tactics and techniques for helicopter employment and was initially equipped with six Mk.14 Sycamores. Paid for from Army funds, the small Sycamores were barely satisfactory for testing equipment and conducting organizational trials. It was not until the unit also obtained Whirlwind helicopters in March of 1956 that it could test logistical operations, including loading and unloading of troops. The unit was scheduled to conduct field tests with the British Army of the Rhine in the Autumn of 1956, when the Suez Crisis presented an opportunity to test the unit in combat.

When the unit participated in Operation Musketeer, the assault on Port Said, the JEHU also included six of the larger and more powerful Westland Whirlwind Mk. 2 helicopters. On 5 November 1956, the first day of the operation, the JEHU ferried supplies to the paratroopers who had seized Gamil airfield and evacuated casualties back

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704 For this operation, the experimental was temporarily dropped from the JEHU’s designation in order to reassure the troops who would be boarding the helicopters.
to the carriers stationed eight and a half miles off shore.705 The following morning, the
JEHU, accompanied by nine Royal Navy Whirlwinds from the Fleet Air Arm’s No. 845
Squadron, ferried ashore troops of the 45 Commando, Royal Marines. Since the
helicopters had a small carrying capacity (the Whirlwind carried seven troops and the
Sycamore only three), they had to fly in a circuit from the light fleet carriers HMS Ocean
(carrying the JEHU) and HMS Theseus (carrying 845 Squadron) to the unsecured landing
zone. Flying in three ship formations, the helicopters sped low over the water at 81 mph.
At the landing zone near De Lesseps Statue, there was room for only six helicopters to
land simultaneously, therefore the timing of each wave was critical. Despite the
complexity of the operation, the squadron transported all 415 commandos, with weapons
and ammunition, in less than 85 minutes. At the two and a half hour mark, the unit had
also transported 56,000 pounds of equipment and supplies. Despite the limited numbers
of helicopters, the operation was a success. The objectives were achieved with surprise
and only one Whirlwind helicopter was lost when it ran out of fuel.706

British historians proudly point to Operation Musketeer as the first time
helicopters were ever used in an opposed amphibious assault, with one historian
announcing that, “A new dimension had been introduced into amphibious warfare and the
lessons were taken to heart with the emergence of the Commando carrier.”707 Although
not a decisive part of the operation, only twenty-one helicopters participated, this combat
experiment demonstrated the practicality of such operations in modern warfare and

706 John Everett-Heath, British Military Helicopters (London: Arms and Armour Press Limited,
served as a starting point for the British Navy and Marines to further develop this concept. The Royal Navy and Marines subsequently created a permanent unit that consisted of helicopters and marines deployed on an aircraft carrier from which they could conduct operations anywhere in the world.\textsuperscript{708} Due to the success of this operation, the British converted the light fleet carrier HMS \textit{Bulwark} and commissioned her as a Commando carrier in the summer of 1959.\textsuperscript{709}

The British developments showed an increasing awareness of helicopter capabilities and a greater willingness to develop and implement new methods for using the helicopter to increase military effectiveness. However, these ideas were not new. The United States Marine Corps had developed its vertical assault doctrine in 1948 and the United States Navy commissioned its first helicopter assault ship, \textit{Thetis Bay}, in 1956 for similar operations.\textsuperscript{710}

The successful mission at Port Said also allowed the JEHU to continue for another three years until its disbandment on 31 December 1959. While the JEHU provided many lessons on tactics and techniques for successful heliborne operations, development of the concept varied among the services. While both the British Army and Royal Navy continued with experiments in vertical assault on a small scale, it was the

\footnotesize{\textsuperscript{707}John Everett-Heath, \textit{British Military Helicopters} (London: Arms and Armour Press Limited, 1986), 48.}\n
\footnotesize{\textsuperscript{709}John Everett-Heath, \textit{British Military Helicopters} (London: Arms and Armour Press Limited, 1986), 90.}\n
\footnotesize{\textsuperscript{710}The \textit{Thetis Bay} was originally an escort carrier that began conversion in 1955 and was re-commissioned on 20 July 1956 with the designation CVHA-1. See Surface Ship Design and Engineering Directorate, \textit{Amphibious Warfare and the Evolution of the Helicopter Carrier} (Arlington, VA: Total Ships Concepts Division, Naval Sea Systems Command, March 1998), 23-26.}
Royal Navy that had the need and funding to develop the concept. The Army continued to do some work within its 1906 Helicopter Flight unit, but this tested ideas for reconnaissance and light helicopters.\textsuperscript{711} While the RAF retained control of transport helicopters, it was a very low priority and through most of the 1960s there were not enough transports to lift a single battalion in one lift.\textsuperscript{712} Thus, the British Army did not have an airmobile capability of any note. Instead, the helicopter more an expensive and capable battlefield logistic vehicle than a tactical transport. Lacking in funds and still reliant on the RAF for helicopter procurement the British Army considered the helicopter to be a luxury compared to the need for new main battle tanks, artillery, and armored personnel carriers. Unlike the British Army, the Royal Navy continued to develop its air assault capability. Key to this was the Westland WS-58 Wessex Mk.5 assault helicopter that entered service in late 1964 and could carry a dozen combat loaded marines. The Royal Navy also procured WS-58 helicopters modified to be gun ships to provide fire support during amphibious operations.\textsuperscript{713}

Despite the experience gained from their operations in Malaya and the Suez, the British possessed only a limited capability when they began their operations in Indonesia in 1962. In order to have sufficient helicopters in theater, the British had to use all three services’ helicopters. Operating primarily in Borneo and possessing never more than 75 helicopters at any one time, British helicopter units executed a wide range of missions.

\textsuperscript{711} At the time of the JEHU’s disbandment, the RAF received all the helicopters because of the law that the Army could not operate helicopters that weighed more than 4,000 pounds.

\textsuperscript{712} John Everett-Heath, \textit{British Military Helicopters} (London: Arms and Armour Press Limited, 1986), 210. In 1966, both services agreed that there needed to be a world-wide helicopter fleet capable of moving six infantry companies. In Europe, this meant that the BAOR would only possess enough lift for one company to be used as an emergency reserve in the rear areas or on the flanks.
including casualty evacuation and logistical support but the primary mission was the movement of troops and equipment against guerrilla forces. To facilitate these operations, the recently formed British Army Air Corps implemented a decentralized control system that placed the helicopters under the control of battalions and brigades. This system placed the aviation assets near their supported units and made them much more responsive to the ground commander’s operational requirements. Although the RAF strongly objected, this decentralized system provided the “speed, mobility, and flexibility” needed for the British ground forces to quickly respond to guerrilla movements and attacks.

In addition to troop transport, the RAF used its helicopters to transport 105mm howitzers through the region. Operating in pairs, with one helicopter carrying the gun and the other the ammunition, the helicopters shifted artillery to pre-planned positions. When at a firing position, the guns were lowered, ranged to the target, and fired within minutes of landing. Once the fire mission was complete, the helicopters displaced the artillery to a new position a few miles away, being careful to move at treetop height to


avoid detection. This gave the Indonesians the impression that the British forces
possessed much more artillery than existed.\(^{716}\)

The Royal Navy used the aircraft carrier HMS \textit{Albion} as a floating base to launch
patrols. The most significant operation was the insertion of a Gurkha battalion into
ambush positions by No. 845 Squadron’s Wessex helicopters in late September 1963.
The Gurkhas surprised the Indonesian raiding force and inflicted heavy casualties. The
operation was repeated in late December 1963 to a similar effect – with all but six of the
Indonesian raiding party killed or captured.\(^{717}\)

At the strategic level, the helicopter provided the British with economy of force –
the British Army in Indonesia numbered only ten battalions despite having to operate in
more than 10,000 square miles.\(^{718}\) Unfortunately for the British, problems still plagued
their domestic helicopter industry and this meant that the numbers of helicopters
available was always less than what the commanders desired. Fortunately, the
performance qualities of the British helicopters had improved greatly with larger
helicopters like the Bristol Type 192 Belvedere, and turbine powered helicopters, like the
Whirlwind Mk. 10.\(^{719}\)

In spite of their extensive experience using helicopters, the British developed only
a very limited concept of air mobility in the two decades following World War II. The
most important factors to explain this were the small defense budgets which limited the


\(^{719}\)Allen, \textit{Military Helicopter Doctrines of the Major Powers}, 130.
development of a domestic helicopter industry and the number of helicopters procured, a divided responsibility for helicopters between two services, and, most importantly, a military culture that lacked the vision to see the helicopter’s potential and possessed only a limited desire to see it developed as a combat weapons system. Today there are some military authors who argue that the British still have not developed an “all-encompassing theory for helicopter employment.”

Compounding the problem was the military’s haphazard issuing of requirements and the government’s inconsistent funding for helicopter developments. The only people who had an adequate knowledge of helicopters were located in the military’s junior ranks and it took time for them to progress into positions that influenced the procurement process. As a result, the helicopters that entered service were not the best ones for the mission. One example was the RAF’s Belvedere which was designed for naval ASW, and hence, not well-suited for tactical transport. The Navy’s choice of the Wessex was also as an ASW aircraft, but then it was pressed into service as a tactical transport and as an assault helicopter for which it was too vulnerable and lacked the maneuverability to survive in a high intensity environment like Europe.

Today, British aviation responsibilities continue to remain divided between the Army and the RAF. The Army possesses light reconnaissance helicopters and armed/utility helicopters while the RAF operates the light transport and medium lift helicopters. This division of responsibility has precluded the development of a true assault transport helicopter and the formulation of a coherent doctrine for what we now

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call air assault.\textsuperscript{722} The Royal Navy pursued the helicopter in a more steadfast manner and developed a capability of conducting vertical envelopments of battalion size by the early 1960s. Since the Royal Navy valued this capability and could allocate money from its own budget without having any arbitrary weight restrictions, the Royal Navy quickly developed the capability and doctrine to go with heliborne amphibious assaults.

The French experience was much different from the British, despite fighting similar wars. After 1945, the French fought in two major regional wars – Vietnam and Algeria.\textsuperscript{723} These two conflicts were extremely different in their origins, the conduct of operations, and the problems that France needed to overcome for victory. In Indochina, the French had to travel half the world, face an experienced, determined, and well-equipped enemy, and do so with a war-ravaged economy that could not afford large expenditures. Therefore, French forces in the region were too small to control the population or to launch offensive operations against the Viet Minh. The terrain in theater was mostly jungle and mountains – terrain which favored guerrilla operations and limited the maneuver of mechanized forces. Limited primarily to operating from ground vehicles, the French lacked the mobility to quickly react to guerrilla attacks or to pursue them in the rough terrain. The inability to decisively engage and destroy the insurgency was due in large measure to the French inadequate flexibility and mobility. The lack of


prior success was an important factor in the eventual decision to go to and fight at Dien Bien Phu. At the time, only a few primitive helicopters, which were not designed to operate in the hot climate and high altitudes, were used in these operations and these were primarily for medical evacuation.

Most discussions of the French efforts in Algeria usually divide the war into three phases. Phase I began with the Army of National Liberation’s (ALN) first attacks in 1954 and ends with the reorganization of the ALN into a more formal military. During this time, the Arab nationalism movement transformed into an insurgency. The indigenous police and French military garrison could not cope with the ALN’s increased scope and scale of operations. The second phase began in 1956 with the French reorganization of its military and government in Algeria and reflected the recognition that this was now a counterinsurgency operation. The French increased their military forces from 50,000 in 1954 to 260,000 in 1956 and 400,000 by 1958. The French Army also constructed barriers at the Tunisian and Moroccan borders to block external support and developed a grid system, quadrillage, for garrisoning and maintaining control in the interior. These measures successfully denied the ALN its external logistical support for continued growth of the insurgency. The final phase began in 1958 with the French formation of a strategic reserve to rapidly respond to ALN movements and to conduct offensive operations to destroy the insurgent forces. During this phase the French reduced the ALN from a 40,000 man force to one that had less than 12,000 in 1960. However, the French on the continent had grown weary of the human and financial toll the war was taking and in 1960 the French began negotiations with the National
Liberation Front (Front de la Liberation Nationale, or FLN) which ultimately lead to an end to the war in 1964.\footnote{By 1958 the French government spent between three million and four million dollars per day to support the 400,000 troops deployed to Algeria. See Victor J. Crozat, “The Algerian War,” in Reference Book (RB) 31-4, Internal Defense Operations, A Case History Algeria, 1954-62 (Fort Leavenworth, KS: U.S. Army Command and General Staff College, 1 November 1967), 6.}

Although the end result was the same for the French, another defeat in the twentieth century, the French military arguably succeeded in accomplishing its objective of crushing the ALN and re-establishing control over the territory. This has caused some historians to argue that it was a military victory that was given to the Algerians at the conference table.\footnote{Charles Schrader, The First Helicopter War (Westport, CT: Greenwood Press, 2000).} The extensive use of the helicopter in combat operations by the French was due to the availability of good helicopters and the French military’s willingness and openness to experiment with new concepts in order not to lose Algeria.

As in all conflicts, geography dictated how the French fought the war. Encompassing 855,000 square miles, the size of the United States east of the Mississippi River, Algeria’s Atlas Mountain chains divide the country into three lateral compartments.\footnote{In European terms, Algeria is about four times the size of France.} In the north along the Mediterranean Sea is the narrow coastal plain which is bordered on the south by the Tellian Mountains. The central band between the Tellian Mountains and the Sahara Mountains is mostly plains, while south of the Saharan Mountains is the Saharan Desert.\footnote{Concepts Division, Aerospace Studies Institute. Project No. AU-411-62-AI, Insurgency and Counterinsurgency Studies. Guerrilla Warfare and Airpower in Algeria, 1954-1960 (Maxwell Air Force Base, AL: Air University, March 1965), 10-11.} While Algeria possessed a sufficiently modern highway system to support the economy in the North and center, much of it ran through the mountains. The mountainous terrain was well suited for guerrilla ambushes and
made the job of finding and destroying the insurgents very difficult. In the center and south, the sparsely populated open plains and the Sahara provided excellent fields of observation for the French forces to find insurgents and their logistic convoys and provided freedom of action for destroying them. However, the vast distances and poor road network in the southern areas made it difficult for the French to succeed using just ground forces.

In Algeria, the strategic situation was much different than that of Indochina. Many of the French viewed Algeria as being part of Metropolitan France and hence an extension of France itself. The higher value meant an increased willingness by the French people and legislature to support the counterinsurgency operations with money and personnel. The war was much easier to support because it was separated by only a few hundred miles of Mediterranean Sea. This short distance simplified the movement of forces and supplies into the theater and also ensured that the war remained in the public eye.\(^{728}\) Perhaps most importantly, the French Army had learned from Indochina and believed that this was a war that the country could not afford to ever lose.\(^{729}\)

The most significant difference between Vietnam and Algeria at the operational and tactical levels was the French use of good helicopters. In the first phase of the war, the French Air Force was consumed with supporting French forces in Indochina. It was not until late 1955 that the French Air Force began operating in force in Algeria. Although the French used jet aircraft, the majority of the aircraft were propeller-driven,


By September 1956, French troop carrying helicopters (the Sikorsky S-55, Vertol H-21, and Bell 47G-2) were flying more than a third of the 700 weekly missions conducted by the French Air Force. Throughout most of the campaign, the main mission of the French Air Force was transporting troops, interdiction along the borders, and medical evacuation. Although the French Air Force controlled the helicopters its headquarters in Algiers served as a coordinating agency and did not initiate missions – leaving that instead to the ground component commanders.\footnote{Robert Farrell, “Special Report from Algeria, Part I: French Meet Guerrillas With Helicopters,” \textit{Aviation Week} (September 17, 1956): 28.}

When open hostilities began on 1 November 1954, the initial success of the Army of National Liberation (ALN) surprised the French.\footnote{Concepts Division, Aerospace Studies Institute. Project No. AU-411-62-AI, Insurgency and Counterinsurgency Studies. \textit{Guerrilla Warfare and Airpower in Algeria, 1954-1960).} Maxwell Air Force Base, AL: Air University, March 1965, 9. Cites Major Edgar O’Ballance, “The Algerian Struggle,” \textit{The Army Quarterly and Defense Journal}, October 1960, 94. See also Human Relations Area Files, Inc., \textit{Special Warfare Area Handbook for Algeria} (S), (written under contract for the U.S. Army, 1958), 549. French military reacted slowly to these developments declaring a state of emergency in April 1955, not significantly increasing its military presence until early 1956 when it had 260,000 troops in the Algerian theater. These troops came from 220 battalions of various types which were intended for a conventional conflict in Europe and were ill-equipped and trained for counterinsurgency operations. They were quickly reorganized and re-equipped into light battalions that matched the foot mobility of the ALN. The lack of heavy weapons and the
lack of any mobility differential made the French efforts at destroying the ALN very difficult.  

Prior to the large deployment of helicopters in 1956, the French counterinsurgency efforts achieved little success. When a guerrilla attack took place, the French noisily assembled several battalions in order to surround the area. The French Air Force then attacked suspected hiding places before the French ground forces moved in to search the area. These actions prevented surprise from ever being achieved and allowed ALN units to disperse and escape more often than not. Once complete, the French forces departed and the guerrillas returned and conducted reprisals against the local inhabitants who had aided the French efforts. As one report put it, “In short, the Moslem population was treated to the sight of an elephant trying to stomp a flea.”

In 1956 the French reorganized their forces and changed tactics to better meet the demands of waging a counterinsurgency campaign. The French established barricades along the Tunisian and Moroccan borders that closed any ground re-supply to the ALN by 1958. In the interior, a key component of this revised effort was the use of the

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735 Concepts Division, Aerospace Studies Institute. Project No. AU-411-62-AI, Insurgency and Counterinsurgency Studies. *Guerrilla Warfare and Airpower in Algeria, 1954-1960*. Maxwell Air Force Base, AL: Air University, March 1965, 28 and 32. The French constructed these barrages with minefields, electrified fences, radar, and alarm systems and combined them with rapid reaction forces to deny any penetration of the barriers. It is important to note that the limiting factor in the size and effectiveness of the ALN was the availability of arms. There was an abundance of manpower and the majority of the ALN was composed of Moslem French Army veterans who were selectively recruited based on their knowledge of the terrain, military experience, and intelligence. On average, the ALN soldier was “rigidly disciplined, specially trained in guerrilla tactics, a sharpshooter from childhood…[and] highly efficient, marching 18 out of 24 hours and going several days without regular meals as a normal way of life in the field.” See also
helicopter’s mobility and versatility. While jet aircraft and P-47s executed armed reconnaissance and long range strike missions, the helicopters provided the majority of troop and heavy weapon transport.

Using the experience gained in Vietnam, the French turned to the helicopter to provide a technological solution to their mobility problems. Using French elite units to support loyal Algerian militia, the French also created a commando assault doctrine to integrate aviation and ground components. The sequence began when a French Army commander spotted a guerrilla force and requested assistance for his attack. A flight of three helicopters responded to the call and flew forward, usually 50-75 miles, to the link-up point. The link-up point was located whenever possible near a fuel dump so that the helicopters had the maximum flight time for the mission. At the link-up point, groups of 8-15 troops loaded into the helicopters. The temperature and altitude for that mission determined the maximum number that could be carried on each flight. The distances that the troops were carried was usually very short – 10 miles or less – but was often over terrain that would have taken infantry all day to traverse. At the landing zone the helicopters either landed or hovered a few feet off the ground and the troops disembarked. When the landing zone was extremely small, the helicopters formed a queue and disembarked one at a time. For larger missions, a queue of six to ten ships was not unusual. Fortunately for the French, the Algerian rebels did not possess light-weight surface to air missiles and lacked a sufficient number of automatic weapons necessary to hit the waiting French helicopters. Once unloaded, the helicopter returned
to the link up point, embarked more soldiers, and repeated the process until the entire unit was moved to its new position. Thus, the helicopter gave the French the capability to react quickly and place troops around the Algerian rebels who could not retreat or disperse without running into the French commandos.

The rivalry between the French Army and Air Force had minimal effect on the success of operations. As a result of inter-service disagreement, an unusual command arrangement was used in Algeria. Dividing the country into two regions, the army was responsible for the helicopter requirements in eastern Algeria and the air force in western Algeria. These areas of responsibility remained throughout the war, with the army jealously guarding its area even when the air force was looking to expand its helicopter presence in Algeria to better support the ground forces. The division of command was not the only conflict between the Army and the Air Force; a similar difference of opinion existed concerning the procurement of transport helicopters. The French air force flew the single rotor Sikorsky S-58 and believed it superior because of its better performance characteristics such as speed, range, rate of climb. The army liked the tandem rotor Vertol H-21 because of its utility and versatility. The army’s most important criteria

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738 Robert Farrell, “Special Report from Algeria, Part I: French Meet Guerrillas With Helicopters,” *Aviation Week* (September 17, 1956): 30-31. The H-21 had two doors which allowed for fast unloading (important when landing in unsecured areas) and greater ease of handling of bulk cargo. In addition, the H-21 had a cargo sling, could carry 12 litters as opposed to the S-58’s 8, allowed free access between the pilot and troop commanders while inside, and had the fuel tank in the aft section away from crew and troops.
was the number of combat troops that could be carried. The H-21 theoretically carried more troops, but in actual operations in the high altitudes common to Algeria, they both carried twelve combat loaded troops.\footnote{Robert Farrell, “Special Report from Algeria, Part I: French Meet Guerrillas With Helicopters,” \textit{Aviation Week} (September 17, 1956): 30-31. Despite the Army’s preference for the H-21, it did push Vertol to add self-sealing fuel tanks (which the S-58 had already) and recommended the installation of a turbine engine, since the helicopter was designed to carry more than its current engine provided. As an aside to this debate, it is interesting to note that, as the first branch in the French military to use helicopters, the French Navy used both the S-58 and the H-21 in its operations in the 1950s. Since the H-21 was too big for the elevators on French aircraft carriers, the Navy employed them from land bases. Despite being too large, the French Navy actually had more H-21s on order in 1956. For carrier service, the French Navy ordered the S-58.} Despite the differences of opinion, the French made great use of available helicopters. Between June 1955 and August 1956, Air Force helicopters in western Algeria had transported 35,681 troops, evacuated 1,571 casualties, and carried 283 metric tons of cargo.\footnote{Robert Farrell, “Special Report from Algeria, Part II: Algerian Terrain Challenges Helicopters,” \textit{Aviation Week} (September 24, 1956): 88-89. By Autumn 1956, Air Force officials believed that the Army was becoming too reliant on helicopters. They complained that the Army used helicopters in areas where units could move by foot just as well and for a lot less cost: “The ground forces just don’t appreciate how much it costs to run these machines.” The average cost per flight hour were: $85 for the Bell 47G light helicopter, $285 for the S-55, and $400 for the S-58.}

The early success with the helicopters sufficiently impressed the French Defense Ministry to increase its orders of large transport helicopters in 1956 despite budgetary restrictions and a disagreement between the army and air force over the utility of larger helicopters.\footnote{Robert Farrell, “Special Report from Algeria, Part II: Algerian Terrain Challenges Helicopters,” \textit{Aviation Week} (September 24, 1956): 88-89.} The lack of a domestic helicopter industry forced France to use foreign designed helicopters. In 1956, the French helicopter fleet was entirely of American design, with some of the Bell 47 and Sikorsky S-55 helicopters built under license. Recognizing the need for more helicopters in Algeria, the French had on order with American firms approximately 600 helicopters, of which one hundred were the large
Vertol H-21 and 220 were for the Sikorsky S-58 helicopters. Unlike the British, the poor state of the French helicopter industry did not deter the French from seeing the value of the helicopter and developing a doctrine to take advantage of the advances in air mobility.

By 1958, the French had arrested the growth of the ALN, but could not eliminate it despite employing almost half of the French armed forces. In 1959, under the guidance of a new Commander-in-Chief of French Forces in Algeria, French Air Force General Maurice Challe, further revised the offensive tactics from the piston and cylinder method to a “netting” technique that maximized the use of air power. In these operations, the French relied on intelligence provided by aircraft to identify potential targets and the creation of a strategic reserve of forces that was moved into position during the early morning. At dawn, fighter aircraft attacked with daisy cutters (large conventional explosive bomb) and cluster bombs, followed by armed helicopters supporting the landing of paratroops in the center of the guerrilla area. Aircraft would continue to attack any guerrillas attempting to leave the area until ground troops occupied the net’s perimeter. Once in position, the troops then closed the net while directed by the ground and air component commanders who flew around in an airborne command post during the entire operation. The operation would conclude by sundown and the troops withdrawn.

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744 The French favored use of Alouette helicopters as aerial CPs because they provided better visibility and could land at any point to discuss the situation directly with ground commanders. See
To execute this new operational concept, the French employed three wings of helicopters in Algeria, two from the air force and one from the army. The squadrons themselves were allocated based on the current situation and divided into Helicopter Intervention Detachments (DIH) of two light helicopters and six to eight cargo helicopters. The DIH was a significant organizational development that improved the effectiveness of helicopter transport units because it allowed mission specialization. Since the DIH’s primary mission was the transport of troops to the battle area, it became well practiced in planning and conducting these operations. When operating in the field, the DIH used its own mobile support organizations in conjunction with the supported Army unit to which it was attached in order to meet its logistical needs. This new system enabled the French to combat land more than 300,000 troops in 1959.

Considering that only three hundred helicopters were in theater at the time and the maintenance problems the French encountered, this is an astounding number.

Helicopter assets did not transport all ground units from their initial bases. In Algeria north of the Sahara, there were sufficient road infrastructure to transport troops from various bases by truck for most of the distance. The standard practice for transporting ground units was to first establish numerous landing zones (LZ) that would

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conceal the build up of forces. At these sites, the French units disembarked from trucks and waited for the helicopters to arrive and transport the ground forces the last 15 kilometers to their final destination, the drop zone (DZ). Thus, only the first wave of commandos were directly airlifted into the DZ. When this first wave arrived the commandos began jumping out of the helicopters when they were two meters above the ground so that the last man was jumping out as the helicopter’s wheels touched the ground. The DIH subsequently shuttled between the LZ and DZ to bring in the following waves of troops. The careful planning and rehearsal of the operation provided the exact time interval needed so that it took only eight transport helicopters to move four companies of 480 men without having to refuel. If a more rapid buildup of forces was needed, then troops would parachute into the DZ between helicopter waves with the helicopters transporting the discarded parachutes on their trip out. After landing the Army units, the DIH refueled, performed maintenance, and prepared for aeromedevac or for additional maneuvering of the ground force by helicopter. As empty helicopters returned to the LZ they carried spare parts and maintenance teams while ground convoys brought the fuel and petroleum products. These tactics met with great success, and by 1960 less than 12,000 ALN soldiers remained operating in units of squad size or lower.

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Actual helicopter operations were often planned and rehearsed in great detail prior to starting, but both ground and air commanders recognized the fog and friction inherent in warfare and maintained the greatest flexibility by keeping things as simple as possible. Whenever possible, both commanders would sit side by side in the aerial CP during operations; however, if one was absent, the other had full authority over the operation. The commander of the DIH always retained control during the actual helicopter landings and had the final decision concerning the utilization of the helicopter drop zone for discharging troops.  

An important development during the war in Algeria was the French employment of armed helicopters. Prior to dropping troops into the DZ, the Air Force attack it with bombs. Although the timing between the departure of the Air Force bombing aircraft and the first helicopter landings was usually less than two minutes, the ALN learned to come out from cover after the last bomb and engage the first helicopters as they started their hover. This gap in fire support, and the occasional bad weather that prevented fighter support, provided the impetus for the development of the armed helicopter to protect the cargo helicopters from ground fire and to provide firepower during the initial deployment of forces in the DZ.  

While both services agreed that the ideal ratio was one armed helicopter for every five cargo helicopters, the French Army and Air Force developed and employed their

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helicopters somewhat differently. The Army placed fixed, axially mounted .30 caliber machine guns and either 37mm or 68mm rockets in beehive mounts. As the armed helicopter lead the approach to the DZ, it sprayed its fire into the area on its first pass and returned to fire in support of the landed forces. The Air Force preferred the use of side-mounted 20mm cannon on a shockless flexible mount in the cabin door. As the flight approached the DZ, the Air Force armed helicopters circled the area at 1500 feet in order to identify and pin down targets.\textsuperscript{751} Whereas the Army could only equip a small number of its helicopters with weapons, the Air Force’s system had the added advantage in that all the cargo helicopters were equipped with the mount and could act as armed escorts when not being utilized as transports, thereby increasing the firepower available on the battlefield and increasing the flexibility available to the battlefield commander. The French Air Force also armed its helicopters with the SS-10 and SS-11 wire guided missiles. These missiles proved extremely useful at attacking caves located beneath rock overhangs in deep ravines.\textsuperscript{752}

The success of the armed helicopter can be measured by the fact that no matter what other support was available during the operation, every heliborne assault wanted and always received an armed helicopter escort to the DZ. In a more tangible evaluation, the French credited the armed helicopters as the primary reason that no helicopters were

\textsuperscript{751}Concepts Division, Aerospace Studies Institute, Project No. AU-411-62-AI, Insurgency and Counterinsurgency Studies, \textit{Guerrilla Warfare and Airpower in Algeria, 1954-1960} (Maxwell Air Force Base, AL: Air University, March 1965), 69-70. Not surprisingly, the Air University’s study concluded that the French Air Force’s techniques “offered greater accuracy, heavier concentrated fire, more endurance, and greater safety for the helicopter and crew.”

\textsuperscript{752}
lost to ground fire in 1959 while delivering 300,000 troops into DZs; on the same note,
twenty-two fixed wing aircraft were downed by ground fire during the same year.\textsuperscript{753}

Besides the use of helicopters to move troops, equipment, and supplies across Algeria, the French often used helicopters to gather intelligence.\textsuperscript{754} One technique was to fly several helicopters to a remote village in ALN-controlled territory, surprise the inhabitants, gather up to one hundred at random, and whisk them to the nearest French base for interrogation. Those willing to talk would be detained and the rest returned back to the village.\textsuperscript{755}

While these operations appear similar to the American airmobile concept, there were some differences. In Algeria, the helicopters made every effort to avoid being involved in the combat area. Their vulnerability to ground fire made this a necessity, yet despite the development and employment of armed helicopters, there was little effort to push for a more aggressive concept like the Marines’ vertical envelopment. This was partly due to the French Air Force retaining command responsibility for the helicopters; the Army lacked the means for pushing for more aggressive tactics because it did not have the needed equipment.


\textsuperscript{754}In 1959, the Air Force helicopters alone aeromedevaced 7,500 soldiers, delivered 1,200 tons of cargo, and transported 48,000 passengers in support operations. See Human Relations Area Files, Inc., *Special Warfare Area Handbook for Algeria* (S), produced under contract for U.S. Army, 1958.

The war in Algeria also exposed a glaring weakness in helicopter operations – the cost of maintaining the helicopters for duty. In Algeria, the French suffered through a very long period of poor operational readiness. When airmobile type operations began in mid-1956 the French had more than one hundred helicopters. Called commando assault operations, the high operational tempo placed a great strain on the French pilots and the maintenance system. By September, the operational fleet was down to under ninety due to maintenance failures and accidents.\textsuperscript{756} The main problems were the dusty environment and the nature of the missions were overloaded the engines and caused them to fail at a much faster rate. Except for increasing the numbers of helicopters employed, there was not much anyone could do about it. As one S-55 pilot stated “When I have eight to pick up, I can’t stop counting at five and tell the rest to walk,”\textsuperscript{757} The other part of the problem was the lack of adequately trained helicopter mechanics, especially in the Army. Although there was a core of experienced mechanics (some were veterans of Indochina) who attended a 30 day course taught by Vertol in America, there was not a formal command-driven training program for new mechanics. As a result many of them appeared to just keep the aircraft clean without learning their craft. This was reflected in the lack of specialized sections like metal working or engine repair, and that routine inspections often took days to conduct instead of a normal afternoon.\textsuperscript{758}

\textsuperscript{756}Robert Farrell, “Special Report from Algeria, Part I: French Meet Guerrillas With Helicopters,” \textit{Aviation Week} (September 17, 1956): 29. Of these, only nine were S-58s and thirteen H-21s (including the Navy’s two H-21s working with the Army).


The French during the Algerian conflict were the first to employ helicopters on a large scale and in almost every conceivable role. While the helicopter itself was not decisive for French military success, the development of proper tactics, adequate logistics, and aggressive leadership ensured the best use of the available helicopter technology. During the ten year conflict, the world watched events unfold and the militaries of the world took note of the increasing usefulness of the helicopter in operations of any nature. In America, the French use of armed helicopters reinforced the efforts of some Army aviators to field armed helicopters. The world also noted the increasing cost associated with creating, operating, and maintaining a force that used these expensive, complex, and often fragile machines. French officers from the two services also disagreed as to the value of the helicopter in a more regular war. Air Force helicopter pilots flying in Algeria argued that airmobile type of operations could not be performed in a high threat environment like the Central European plains. Army officers disagreed and argued that this increased mobility was a necessity for nuclear, and also conventional, wars. Future conflicts would require the use of helicopters that could carry up to one hundred combat-ready troops. Helicopters of this size would need two or three rotors and the twin rotor H-21 was giving the Army experience it would need with these future helicopters.\textsuperscript{759} One point that the French emphasized and their operations displayed was that airpower could not defeat an insurgency by itself. Airpower, to include the use of helicopters, could exert a significant, and perhaps decisive, effect on the war, but it still took ground troops to secure terrain and defeat the insurgency. It

would not take very long until the world would see the next generation of helicopters in action in a remote place called Vietnam and also to see that airpower by itself was not decisive.

Since the early days of its existence, the Soviet Union had worked on the development of helicopters and autogiros with approximately one hundred of the latter in military service when the Germans invaded in June 1941. Intended to serve as observation and artillery spotting aircraft, they were quickly destroyed by the Germans without ever seeing combat. Despite this, some design work continued during the war and the results were first displayed on 18 August 1946 at Tushino Airfield near Moscow for Aviation Day. The helicopters on display were very crude by the standards of the day but they did fly to the astonishment of thousands of spectators. However, by 1947 none of those helicopter designs were practical. During that year, the Soviets arranged a competition for three design bureaus to develop a light helicopter practicable for both civilian and military purposes. The winner was the Mil’ OKB Mi-1 Hare. With the ability to carry three passengers, the helicopter entered service with the Soviet Air Forces (Военно-воздушные сили or VVS) in 1951 as a light utility and artillery spotting helicopter.

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The next big step in the development of Soviet helicopters was in October 1951. Prior to the Korean War, the Soviet Union’s military paid very little attention to helicopters. Josef Stalin, after being informed of the successful United States Marine Corps helicopter operations in Korea during September, wanted a similar capability. Subsequently, the Soviet Union “embarked on a helicopter building boom” with the goal “that the gap [with the United States] be closed at once, at any cost.”\(^{762}\) Stalin instructed Mikhail Leont’yevich Mil’ (the chief engineer for the Mi-1 Hare) to design a helicopter capable of carrying twelve soldiers while he instructed Yakovlev to design a helicopter that could carry twenty-four.\(^{763}\) The designers’ efforts were made even harder by Stalin’s demand that the first prototype be ready to fly in just twelve months.\(^{764}\) Fortunately, the technical aspects of designing these helicopters were not nearly as great as Stalin’s threats. The first prototypes flew within a year. The Mil’ Mi-4 Hound helicopter demonstrated good overall performance and entered production near the end of 1952. It could carry fourteen combat equipped troops or 3,500 pounds of cargo, including Jeeps or anti-tank guns.\(^{765}\) The tandem-rotor Yakovlev Yak-24 Horse suffered from vibration to support this assertion except that they were not visualizing heliborne armies. See also John Everett-Heath, *Soviet Helicopters: Design, Development, and Tactics*, (London: Jane’s, 1988).

\(^{762}\) Lev Chaiko, *Helicopter Construction in the USSR* (Falls Church, VA: Delphic Associates, May 1986), 3-5. Chaiko writes it was because of the extensive successful use of helicopters at Inchon that awakened Stalin to the helicopter’s potential. However, helicopters were not used to ferry troops at Inchon; most likely he is referring to the successful employment that occurred in the latter half of 1951.

\(^{763}\) The specifications for the Mi-4 were taken from the latest Sikorsky helicopter; and to aid in the development, portions of a downed American helicopter from Korea were brought back to the Mil’ design team. See Lev Chaiko, *Helicopter Construction in the USSR* (Falls Church, VA: Delphic Associates, May 1986), 71.

\(^{764}\) Chaiko, *Helicopter Construction in the USSR*, 3-5; see also Allen, 73;

\(^{765}\) Chaiko, *Helicopter Construction in the USSR*, 5. The short development cycle meant that the initial production models suffered from many bugs that had to be worked out in the field and were done so. Powered by a supercharged ASH-82V piston engine that generated 1,700 horsepower, the helicopter had a maximum speed of 112 mph and a maximum altitude of approximately 17,000 feet, enabling it to be used in the mountains.
problems and resulted in only a small number being built from 1954 to 1960.\textsuperscript{766}

Recognized within the Soviet Union as the leading helicopter designer by 1952, Mil’ developed new helicopters on his own initiative. The most important Mil’ helicopter was the turbine powered Mi-6 Hook which established fourteen world records for speed and load to altitude categories from 1957 through 1962. More significantly, the helicopter could carry seventy combat troops over a distance of more than 350 miles.\textsuperscript{767}

By 1962, the Soviet Union had designed and produced six different helicopters and had another five designs in progress and destined for production by 1966.\textsuperscript{768} While the technological development of the helicopter progressed at a rapid rate in the Soviet Union, the doctrinal thinking needed to take advantage of the helicopter’s new and increasing capabilities lagged through the early 1960s. Part of the reason lay in the Soviet general staff inability to figure out how to employ the helicopter considering its initial fragility, short range, and limited payload. While the development of the Mi-6 profoundly changed their ideas about the helicopter, Mil’ did not design it with any specific military guidance or need. When the General Staff’s Helicopter Department did start providing guidance, it was based on the need for transporting equipment and supplies. Thus, helicopters were designed during this time period with a payload and

\textsuperscript{766}The first Horse helicopter was sighted in East Germany on 25 July 1956. See USAREUR Staff Message dated 27 August 1956. Found in NARA, RG 549 USAREUR ACoS, G-2, Intel, Box 110 Cables, 1956-1959.

\textsuperscript{767}Allen, \textit{Military Helicopter Doctrines of the Major Powers}, 73; Robert Jackson, \textit{The Dragonflies: The Story of Helicopters and Autogiros} (London: Arthur Barker Limited, 1971), 112-115; Chaiko, \textit{Helicopter Construction in the USSR}, 7. The outstanding performance was due to the Mi-6’s two D25V turboshaft engines each rated at 5,500 horsepower.

\textsuperscript{768}Chaiko, \textit{Helicopter Construction in the USSR}, chart on page 14.
cargo bay needed to transport the largest pieces of equipment.\textsuperscript{769} It was not until the Vietnam War that the Soviets began formulating the concept of a “flying army.”\textsuperscript{770}

In the two decades following World War II, the Soviets saw the development and employment of nuclear weapons as a “Revolution in Military Affairs.” In order to fully exploit the use of nuclear strikes, the Soviets increased their army’s mobility and protection through full mechanization. The Soviets also expanded the size of their airborne forces since they could exploit the use of nuclear weapons and complete the destruction of enemy groupings even faster than mechanized ground forces.\textsuperscript{771} This greater importance can be seen in the writings of Soviet military leaders. Marshall V.D. Sokolovskii recognized the growing importance of airborne forces when he wrote in 1962, “it should be expected that the role of airborne troops in the operations of a future war and their importance among Ground Troops will increase considerably.”\textsuperscript{772} Later in 1966, an article in a classified Soviet General Staff journal provided a more detailed program for developing airborne forces and included the use of helicopters for tactical landings.\textsuperscript{773}

During the Khrushchev regime, the role of conventional ground forces decreased as a greater reliance was placed on the use of tactical nuclear weapons. However,

\textsuperscript{769} Chaiko, \textit{Helicopter Construction in the USSR}, 6, 71-72. Even with the development of the Mi-6, the Soviets emphasized its usefulness in supporting economic activities in remote areas of the country.

\textsuperscript{770} Chaiko, \textit{Helicopter Construction in the USSR}, 16.


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Airborne forces continued to expand because of their capability to rapidly exploit success at the theater level. New weapons and vehicles like the ASU-57 and later the ASU-85 were developed to provide increased mobility, firepower, and protection once the airborne forces had landed. New equipment and larger forces required transport aircraft to reach their objective. For the Soviets, the major restriction on the use of airborne forces was possessing a sufficient number of large aircraft to transport airborne forces. While the Antonov design bureau developed newer and bigger transports like the AN-8 and AN-12 aircraft which made possible the employment of massed airborne forces over large distances, the Soviets could not produce enough of them. Marshall Sokolovskii noted that for tactical operations the helicopter promised to alleviate the transportation shortage allowing the fixed wing transports to conduct operational landings. The employment of helicopters in this role became even more important as the effectiveness of the West’s anti-aircraft defenses improved. One senior Soviet leader wrote in 1965 that if the use of operational landings by airborne forces was not going to be as widespread, then the tactical landings by helicopters to achieve limited objectives were going to be the “most important means of maintaining high offensive tempos of ground forces.” Despite this growing awareness of the decreasing utility of airborne operations and the need for airmobile type operations, it took until the late 1950s before the Soviet General Staff took an active interest in the design of new helicopters by


774 Holcomb and Turbiville, Exploiting the Vertical Dimension, 6-8.
775 Sokolovskii, Military Strategy, 414.
specifying the military missions and capabilities they desired for the new helicopters.\textsuperscript{777} It was not until 1969 that the Soviets published their first training manual for air assault operations.\textsuperscript{778}

The 1956 Tushino air show demonstrated how far the Soviets had come and hid how far they still needed to go. They demonstrated the results of their efforts at a celebration of Soviet Air Force Day on June 24, 1956, at Tushino airfield, on the northwest outskirts of Moscow.\textsuperscript{779} After the latest sleek fighter aircraft flew by and the bombers executed several low flying attack runs, the Soviets unveiled their latest tactical development. Flying in close formation with their blades almost touching, the 36 MI-4 transport helicopters flew in low and landed simultaneously near the reviewing stand. As the helicopters touched ground, a battalion of infantry exited the helicopters from side doors and jeeps and light field artillery pieces exited from the rear cargo doors. A minute later the helicopters were airborne and the soldiers were parading past the stand in their wheeled vehicles. This was very impressive considering that it was not until 1952 that the Soviets had a workable transport helicopter. While the demonstration impressed the Western military correspondents and American military officers, it did not accurately reflect the Soviets’ true mindset. In Soviet doctrine, the helicopter was primarily to transport troops and cargo and as such, the helicopters belonged to the Soviet Air Force’s

\textsuperscript{777}Chaiko, \textit{Helicopter Construction in the USSR}, 20.


\textsuperscript{779}It is important to note that this was not the first such demonstration. On 20 June at Brandenburg Airfield, the Soviets performed a demonstration by 15 helicopters and 28 MiG 17s. The next day at Oranienburg Airfield, three Hound helicopters provided a hovering demonstration and five Hound helicopters moved ten motorcycles with sidecars onto the field as part of another demonstration. See
air transport branch (Voyenno-transportnaya aviatsiya or VTA).\textsuperscript{780} Despite observing the British success with helicopters in the 1956 Suez Crisis and the US Marine Corps’ amphibious exercises the Soviets did not develop its own naval air assault capability until the early 1980s.\textsuperscript{781} In 1956, the Soviets also had no plans to conduct vertical assault operations like those of the US Marine Corps nor the Sky Cav concept advocated by members of the US Army, both of which had the helicopters as part of the ground force’s organization.

Following the air show, the Soviets continued to experiment with using helicopters at the tactical level. From 30 July until 3 August 1956 the Soviets conducted river crossing exercises in the Elbe River South Training Area using a mechanized regiment supported by heavy tanks, self propelled artillery, engineer, and aviation assets to include thirteen Hound and one Horse helicopters. The sighting and employment of the Soviet helicopters indicated an increased air transportability capability in East Germany.\textsuperscript{782} Throughout that summer, the Soviets made a significantly greater use of aviation assets in its maneuvers with helicopters providing an increased assault and resupply capability.\textsuperscript{783}

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\textsuperscript{781}Holcomb and Turbiville, Exploiting the Vertical Dimension, 15-16.
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\textsuperscript{782}Memorandum from G2, USAREUR to US CINCEUR J2, dated 10 August 1956, Subject: August EUCOM J2 Indications Report; USAREUR Weekly Intelligence Summary No. 35, dated 3 August 1956. Found in NARA, RG549 USAREUR ACoFS, G-2 Intelligence, Box 110 Cables, 1956-1959.
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\textsuperscript{783}Memorandum from G2, USAREUR to US CINCEUR J2, dated 10 August 1956, Subject: August EUCOM J2 Indications Report; USAREUR Weekly Intelligence Summary No. 35, dated 3 August 1956. Found in NARA, RG549 USAREUR ACoFS, G-2 Intelligence, Box 110 Cables, 1956-1959.
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In the early 1960s the Soviets began emphasizing attacks throughout the depth of the battlefield, partly because it was necessary for fighting and winning a nuclear war. They believed that victory could only be achieved through the offensive and envisioned extensive use of tactical airborne landings by helicopters in future wars. While the Soviets placed a much greater emphasis on the development and support of airborne troops, it also helped to advance the use of the helicopter in the tactical assault role using dismounted infantry units. This had the advantage of freeing air transport for missions at the higher levels of war. It was also easier to do this since the ground units transported by the helicopters did not need the special, expensive, and time consuming training required by airborne troops. Tactically, the Soviets noted that helicopter transported units did not suffer from dispersion like their air dropped counterparts and could immediately enter combat. By 1965, the Soviet Union had an inventory of approximately 2,400 transport/utility helicopters.

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785 Colonel A.A. Sidorenko, *The Offensive* [translation] (1970; Washington, D.C.: US Air Force, 1973), 1-4, 102-103. Sidorenko was a well-known military theorist at the Frunze Military Academy and earned the very prestigious and rare academic rank of “Doctor of Military Science” after the publication of this book. This book was placed on the recommended reading list for Soviet Army officers and students in higher military schools and hence was very influential in the military development of officers.


787 Department of the Army Study, *Aviation Requirements for the Combat Structure of the Army* (June 1965), I-B-1 and I-B-2.
Considering how quickly the Soviet helicopter capability advanced in two decades, it is still unclear as to why the Soviets did not start developing an air mobility doctrine earlier. Most likely, it required the development of a generation of officers who possessed an awareness of the helicopter and its capabilities and recognize the benefits offered on the modern battlefield. Soviet military culture did not encourage innovation within its ranks and this is the most plausible explanation of why it took longer to develop than in the United States.

When World War II ended the major powers started on a fairly even slate as far as helicopter development and doctrine were concerned. By 1965, this was no longer true. The United States was the foremost advocate of the helicopter as reflected in the Army’s airmobile operations and the vertical envelopment concept used by the Marines in their amphibious doctrine. The development of air mobility doctrine throughout the world progressed at a much slower pace for a variety of reasons. For the French and the British the immediate strategic concerns of opposing communist insurgencies meant that little time or troops could be given to the development of a more encompassing doctrine for the helicopter. The expense associated with research, development, and production of helicopters and the fielding and supporting of helicopter units was more than either country was willing to commit considering their other pressing domestic and defense needs. The Soviet experience differed in that its focus was not constrained by budgets and domestic concerns. It also did not have the strategic necessity of combating insurgencies. As an early pioneer of the helicopter, the Soviet Union recognized its potential to operate across the entire spectrum of warfare. However, it too saw the
helicopter primarily as a logistical vehicle and did not begin to develop an air assault capability and mindset until the 1960s.

The question should be asked as to what degree did foreign developments have on the development of air mobility in the U.S. military. The answer is that although studied, the British and French had little to offer, since they used American helicopters and conducted operations of limited distance and limited durations in limited conflicts. The United States Air Force noted the usefulness of helicopters in almost all of its studies on the counterinsurgency efforts in Malaya, Algeria, and Indonesia. However, each of the studies emphasized the need to centralize control of the helicopters to increase economy and effectiveness. They also noted that air power could prove decisive in supporting the ground forces; thus joint operations was the key to successful counterinsurgency operations.

The American army monitored the use of the helicopter by its allies in their colonies, especially the British in Malaya and the French in Algeria. This was of even greater interest because American helicopters were being used to fight the insurgencies. In Malaya, the British used the S-55 (H-19) helicopter while the French used American made transport helicopters to transport commando teams to assault rebel columns. American manufacturers sent representatives to Algeria, sometimes at the behest of General Gavin, to assess the performance of their helicopters and based on French experience, sent reports back making recommendations on operations, maintenance, and

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788 Colonel George P. Seneff, Jr., Air Mobility Division, Office, Chief of Research and Development, “Mixture for Mobility,” *Army*, March 1959, p. 49.

789 James M. Gavin Papers, Box 2, Folder: Chapter 6, page 190. Gavin asked the Piasecki Corporation in Philadelphia to send observers to Algeria to report on helicopter operations and what could be done to improve them. The report sent back was “most helpful.”
tactical use of their helicopters. In a few instances, the manufacturers brought back French officers to get the most current information on their use of helicopters. Various agencies in the Army, including the Army Aviation Center, considered these reports in their development of the helicopter. Of particular interest was the French experience in arming some of their helicopters to serve as escorts for the troop transports. As a result, in February 1958, Brigadier General Bogardus Cairns, the Commandant of the Army Aviation School, used the French experience in Algeria as the justification he needed to strongly advocate the need for arming American helicopters. The American doctrine for employing armed helicopters and the ratio of escort helicopters to transport helicopters mirrored that of the French in Algeria. The French experiences provided a useful starting point from which the Americans adjusted their developing airmobility doctrine.

The Army monitored Soviet developments closely and used any improvements to justify additional funding for Army aviation. When the Soviets demonstrated their air

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793 Brigadier General Bogardus S. Cairns, Address to the Military Order of World Wars, Fort Benning, no title, 20 February 1958. In the Department of the Army Study, *Aviation Requirements for the Combat Structure of the Army* (June 1965) there are numerous mentions using the French experiences in Algeria as well as the initial American experiences in Vietnam. See also: Brigadier General Bogardus S. Cairns, Commanding General, United States Army Aviation Center, “Army Aviation = Battlefield Mobility,” *Army Information Digest* (August 1958): 10.

794 Department of the Army Study, *Aviation Requirements for the Combat Structure of the Army* (June 1965), I-B-1 and I-B-2.
mobility capability at Tushino in 1956, the Chief of Staff of the United States Air Force, General Nathan Twining, was also in attendance.\textsuperscript{795} Although the demonstration showed the rapid progress that the Soviets were making in their helicopter program, it appears that it had little influence on the Army high command. Neither the Army Chief or his Staff mentioned it in their speeches and congressional testimony nor did official Army aviation plans address Soviet efforts. From this it can be concluded that the high command’s support for Army aviation was not due to Soviet progress.\textsuperscript{796}

While senior leaders may not have been overly concerned with Soviet developments, many of the Army’s lower leaders used the Soviets’ progress as a justification for furthering the growth of Army aviation.\textsuperscript{797} This gradually grew to a crescendo in the late 1950s. In the June 1959 issue of \textit{Army Navy Air Force Journal}, Brigadier General Clifton von Kann, Director of Army Aviation, wrote that the Army needed to better use its internal aviation assets and to stress further development of capabilities. Focusing on the Soviets, he wrote that “our enemies are not asleep to the possibilities in this field. So there is pressure upon us to develop our capabilities faster than he.”\textsuperscript{798}

Three months later in September 1959, Brigadier General Ernest Easterbrook, Commandant of the Army Aviation School, urged the Army to expand its aviation component. Observing that the Soviets had a comprehensive program for increasing its

\textsuperscript{796}Cheng, \textit{Air Mobility}, 67.
battlefield mobility using the helicopter, Easterbrook believed it essential that the Army develop the same capability. The Soviets recognized the value of tactical mobility in achieving surprise. Easterbrook estimated that the Soviets were building a fleet of more than 2,000 transport helicopters with the intention of forming air mobile units for offensive missions. To support the transport helicopters, Easterbrook noted that the Soviets also had a program for arming their helicopters. He blatantly stated that “One thing appears certain, if our Army doesn’t capitalize on the ability to utilize the air medium, others will take the lead.” To compensate for the Soviet build-up in air mobile forces, Easterbrook advocated the development of air mobile forces, better surveillance aviation, and armed helicopters that could engage other helicopters in air to air combat.  

While the foreign developments provided additional support for encouraging Congress to fund Army aviation, the events abroad did not do much to promote the ideas of air mobility in the American military. The Air Force was preoccupied with strategic aviation and the Navy and Marine Corps continued to develop their amphibious capabilities that were superior to the rest of the world. In the Army, the helicopter continued to gain respectability but development programs ran afoul of a lack of money in the Eisenhower years and the obstacles interspersed by the Air Force to slow the Army’s expansion of its organic aviation.

CHAPTER 11

EPILOGUE AND FINAL THOUGHTS

In 1966 the Army and the Air Force finally reached an agreement that clearly defined aviation roles, missions, and equipment. Since the test of the 11th Air Assault Division the Air Force had grown increasingly concerned about the expansion of Army aviation in terms of both numbers and equipment. The success of the CV-2 Caribou in Vietnam had convinced Army planners that it needed the costly next generation CV-7 aircraft as a replacement as the Caribous reached the end of their useful life. This and the expanded use of the Mohawk from performing just tactical reconnaissance to having to fight for reconnaissance to using as a CAS aircraft in a pinch caused the Air Force to pressure Secretary McNamara for action. Having said that he would not support tactical airlift forces, the Army staff understood this to mean that future Army aviation budgets were not going to include funding for light aviation. The Army Chief of Staff, General Harold K. Johnson, agreed to turn over the Caribous to the Air Force with the understanding that the Army would continue operating the aircraft in support of Army

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800 Apparently, the Air Force Vice Chief of Staff had served as McNamara’s commanding officer at the end of World War II. See Colonel Delbert Bristol, interview by Colonel Ralph J. Powell and Lieutenant Colonel Ronald K. Andreson, 1978, p.56. Found in Army Aviation Oral Histories. (MHI)
units in Vietnam. In exchange the Army gained full control of the use of rotary wing aircraft for performing its missions, to including arming helicopters.

The Army went to great lengths to expand its aviation capabilities after 1966. It fielded the Bell AH-1 Cobra attack helicopter. With the end of the Vietnam War, the Army gladly shifted its focus back to fighting the Soviets on the plains of Europe. This change in geographical focus was accompanied by a shift in mindset. While the Army focused on technology, the doctrinal and organizational aspects for using airmobility withered. Thinking conventionally, the Army discarded the tenets of airmobile operations based on concerns of survivability (as demonstrated at Lam Som 719) and upward spiraling costs. Upon departing Vietnam, the 1st Cavalry Division transitioned back into a regular heavy ground division, leaving just one airmobile division in the Army’s inventory. Over the next three decades Army aviation has expanded and became more bureaucratic. The costs associated with training pilots and maintaining their skills directly lead to the birth of a separate aviation branch. The separation of aviation from the ground components increased efficiency in the management of aviation personnel, but it also came at a great cost. The aviation branch advocated for increasingly larger, more capable and complex aircraft with a high price tag which increased the branch’s importance, but left the front line ground forces lacking in air support. As aircraft increased in cost, the less could be bought, and they became too valuable for attacking just a tank or two. Aviation assets became centralized at division and corps to maximize

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802 Actually, the AH-1 Cobra proved its survivability and usefulness in this operation. It simultaneously displayed the vulnerability of the UH-1 which were already known. Critics however used this as ammunition for attacking the airmobility concept.
their impact on the battle. As ground officers rose through the ranks, they very rarely saw or trained with aviation units. As a result, ground commanders and their branches came to see Army aviation as not theirs, but as an Army version of the Air Force with which they had to compete with for funding.

In the United States Marine Corps, these problems have been mostly avoided. The integrated air-ground team has been a hallmark of the Marines. The education and training of all Marines reinforces this joint concept. The Marines’ main problem has been the procurement of aircraft. The increased costs of new planes and a requirement to operate from carriers meant that the Marine Corps normally has to buy the same aircraft as the Navy. Navy aircraft have limited requirements for attacking ground targets which ultimately led the Marines to purchase a number of Cobra attack helicopters and, later, AV-8 Harriers. Conceptually, the Marines today remain inventive and are consistently accessing the validity of their doctrine in light of new technologies and changing threats. Their current doctrine is based on conducting amphibious operations hundreds of miles from shore (to avoid anti-ship missiles and small attack craft) using a combination of helicopters and fast landing craft. That they continue to employ the concepts of deception, surprise, and maneuver advocated by the Shepherd Board in 1946, shows the permanence of this innovation.

The Army on the other hand has ignored or forgotten the airmobile concept. Whereas Howze advocated the creation of at least five airmobile divisions (out of 16 divisions) the Army currently fields only one out of ten. This one division, the 101st, lacks the mobility that Howze, Gavin, and others envisioned. It has more ground vehicles than aircraft, cannot move itself as whole on the battlefield, and requires corps
assets for any kind of extended operations. No where was any of this more apparent than in its use in Desert Storm. Instead of being the decisive element on the battlefield, the 101st was placed on the flank and jumped forward twice and then sat. By not utilizing the mobility of the 101st to achieve operational surprise, the division did not have a significant effect on ground operations.

The comparison of the development of an airmobile doctrine in the two services provides some insights into military innovation. What it shows is that there is no set pattern or model that needs to be followed to achieve success. Some paths allow for a quicker and more efficient development. The Marine Corps development exemplifies that change does not have to be gradual to be effective. In fact, it indicates the opposite – a radical change in doctrine when directed by strong leadership stands a very good chance at succeeding. The strong leadership of the Marine Corps inspired support within the organization. The Marines considered all the viable alternatives available at the time for amphibious warfare, including the helicopter, transport seaplanes, and transport submarines. They created experimental units to develop and test concepts for all three technologies before focusing on the helicopter. Once settled, the Marine Corps education system formulated doctrine and taught it to the Corps.

The Army took a different path because it lacked the external motivation that provided incentive to make drastic changes. The efforts by the Army to become strategically mobility (foiled by the lack of Air Force transports) and better suited for Nuclear War with the Pentomic divisions (an inherently flawed organization) were examples of its efforts to adapt to the changing environment, but they still retained the same way of fighting. With no external reason to change, the reason to change had to
come from within. The Army pursued a course that lacked strong central direction. A small number of officers scattered throughout the Army advocated change. Once the Army established a directorate on the Army staff, better coordination and direction was provided, but competing visions of the helicopter still remained and diluted their efforts. Experiments conducted by the Army were done at a low level and often without specific official sanction. The Army’s main focus up until the Howze Board in 1962 was to increase the scope and size of its aviation component to support ground combat. Only after the Howze Board did the Army finally embrace the possibilities of the helicopter. This was made easier because the previously decentralized efforts had already exposed small numbers of officers and men to the helicopter. The Army’s school system also contributed to the gradually increasing awareness by addressing the use of helicopters in its lectures and employment in staff exercises and field maneuvers. The Army’s intellectual development kept pace with the improvements in helicopter technology, which meant that it took longer to incorporate the turbine helicopter operations. Other factors also affected the Army’s efforts, especially the lack of funds and Air Force opposition, but they were not decisive. The Army chose to emphasize development of weapons, especially missiles, to increase firepower over mobility. The Air Force, fearful of being usurped by the Army, fought a delaying action against the Army’s efforts at expanding Army aviation. If presented the opportunity, the Air Force would most likely have eliminated Army aviation. The opportunity did not exist because the Air Force’s focus on strategic bombing gave the Army a valid case. The Army’s cautious approach also ensured that the Air Force did not have a good case for mission duplication.
However, the Army’s rapid progress may have been lost if not for the deployment of the 1st Cavalry to Vietnam. While studies and wargames indicated the effectiveness of the airmobile units in combat, many still doubted the airmobile units’ viability, especially the helicopter’s ability to survive on the modern battlefield. Howze envisioned using the unit in Europe or the Middle East in a general war. The success enjoyed by air cavalry units in Vietnam did not surprise him given the flexibility and utility of the organization.

The question remains whether the Army’s and Marine Corps’ development of airmobility and vertical envelopment were good examples of military innovation. For the Army it is definitely not because it did not change how the Army waged war. The Army basically took its cavalry doctrine, substituted helicopters for horses, and viola – sky cavalry. The rest of the Army used the helicopter as a substitute for other vehicles or as an additional capability.

Simply put, the Army still has not embraced the airmobile concept. It did not alter how the Army planned on waging war either in organization or doctrine. Howze envisioned the Army having a third of its force as airmobile divisions possessing minimal ground vehicles. At no time did the Army ever approach this capability. Today it has just one division, the 101st Air Assault Division, and that division has more ground vehicles than aircraft and requires external assistance to deploy. The Army’s doctrine is still based on waging a ground campaign with ground vehicles.

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803 The division currently consists of approximately 230 helicopters (70 AH-64, 100 UH-60, 20 OH-58D, and 40 CH-47) and thousands of ground vehicles.

804 In Operation Desert Storm, the division was used on the flank and made two movements. The first was an air-assault into Forward Operating Base Cobra approximately 100 miles into Iraq. Once established there, the division flew another 60 miles to attack and cut off Highway 8 from the Iraqi supply lines.
The Marine Corps is different in that it did alter how it conducted operations. Although the Marines have yet to achieve the all-helicopter assault that it desired, it was not for a lack of trying. The Marine Corps altered its doctrine, organization, and education system to best exploit the anticipated technology. This better exemplifies innovation than the Army’s experience.
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