

THE EVOLUTION OF ARMY AVIATION

by

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INTRODUCTION

Military aviation has a long and colorful history; longer than many people suspect. Army aviation, as discussed in this paper, refers to the personnel and aircraft that are organic to Army ground units. From the introduction of balloons in 1861 until the development of airmobile tactics in the 1960's, Army aviation has gone through many transformations. Most of the major changes were caused or aided by wars, or came soon after. Each war has brought an expansion in size and a discovery of new roles, then a drastic cutback or outright elimination of the aviation program. More recently, this reduction in size has not been as drastic, due to the practice of retaining a larger standing army after the wars. Throughout this roller coaster cycle of development, there were always people around who had the foresight to keep the idea of military aviation alive. They saw its potential and continued to promote its growth, in spite of the controversy Army aviation caused in Congress and among the armed services.

Many boards and commissions have met since the First World War in an attempt to settle the arguments over Army aviation and its roles. The recommendations of these boards and the agreements between the services greatly affected the final shape of Army aviation. This paper examines these factors and attempts to show how Army aviation was affected during its two main phases of growth. The first phase covers the early struggle for survival, the Air Corps' search for independence from the Army and the birth of organic Army aviation in World War II. The second deals with the growth and search for new roles after aviation's reorganization in 1947.

THE EARLY YEARS

The Army's first use of aircraft was in 1861. After the outbreak of the Civil War, several balloon enthusiasts went to Washington, D.C. and offered their services to the War Department. They included John Wise, John La Mountain, James Allen and Thaddeus S.C. Lowe. Army officials were skeptical of the

balloon's usefulness, but Lowe was able to overcome some of the skepticism through demonstrations of the balloon's capabilities. On 18 June 1861, Lowe ascended and described the view to President Lincoln by using a telegraph in the balloon. Lincoln was impressed and he sent Lowe to see General Winfield Scott to discuss the increased use of balloons. At first Scott refused to see Lowe, but was later convinced by the President to do so.¹

Lowe was able to use his balloon for other practical purposes after the Union defeat at the First Battle of Bull Run. Washington was filled with rumors that the Confederates were massing to attack the city. Lowe put an end to these fears when he observed the Confederate lines from a balloon and determined that they were preparing defensive positions rather than an attack. Later, in September, he adjusted artillery fire from the balloon by the use of signal flags.

The Balloon Corps was established on 25 September 1861, with Lowe in charge, and attached to the Army of the Potomac. Less than two years later, in June 1863, the Corps was disbanded. It had been placed under the control of the Signal Corps which protested that it did not have sufficient funds or personnel to support the program.² During this brief existence, balloonists had participated in operations along the Mississippi River, at Fort Monroe, and at Mobile, Alabama in addition to their duties with the Army of the Potomac. Their actions met with mixed reviews from the various Union leaders. Some commanders, such as Sedgwick, McClellan and Porter, were convinced that the balloonists had proven useful. On the other hand, Sherman, Pope and Hooker either ignored information provided to them or refused to let the balloonists operate.³

There were several reasons for the failure of the Balloon Corps. The major problem was the inherent unreliability of the early balloons. They could not be operated in strong winds or bad weather and were easily damaged. The support equipment was cumbersome and expensive. Another problem was the balloon's novelty. Commanders did not have the necessary experience to employ the balloons properly. Then there was the additional

handicap of the awkward chain-of-command in the Balloon Corps. In order to employ the balloons, the commander had to give orders to civilian balloonists who, in turn, directed the operations of military support personnel. Finally, the Balloon Corps suffered from the lack of a home. During its existence the responsibility for it shifted from the Topographic Engineers to the Quartermaster Corps to the Corps of Engineers and finally to the Signal Corps.⁴ This made it difficult to obtain the funding and personnel necessary to operate.

Although the Corps was disbanded before the end of the Civil War, it had made an important contribution. The Confederate Army realized this and attempted to use balloons of their own but were handicapped by the lack of material to build them. Whenever the Union forces employed balloons, the Confederates had to resort to increased camouflage. Confederate General E.P. Alexander summed up the harassing effect of the balloons:

Even if the observer never saw anything, they would be worth all they cost for the annoyance and delays they caused us in trying to keep our movement out of sight.⁵

The German Count Ferdinand von Zeppelin had observed the use of balloons during the Civil War and was impressed.⁶ Although several European nations established balloon corps in their armies, the American Army did not again use balloons until the 1890's. There are several possible reasons for this. One was the low funding levels for the military in general during this period. Another was the organization of the Army. It was broken up into small coastal defense detachments and was also scattered throughout the western territory in small, relatively mobile detachments to guard against the threat of Indian attack. The existing technology did not permit the balloon and its attendant equipment to be as mobile as was required by the tactics employed in Indian fighting.

The idea of using balloons to provide information to the ground commander through the use of aerial observation did not die. Brigadier General Adolphus V. Greely, Chief Signal Officer of the Army from 1887 to 1906, drew up plans in 1892 for

attaching a balloon section to each Signal Corps telegraph train. In order to implement this plan, a balloon was purchased in France and used extensively at various locations in the United States until it was destroyed in a storm at Fort Logan, Colorado.⁷ Lack of funds precluded the purchase of additional balloons at the time, but planning continued.

At the outbreak of the Spanish-American War, the Army had only one balloon and no trained operators for it. Named the Santiago, it was a leftover from the Civil War. Fearful of a Spanish invasion of New York City, the Army sent the Santiago there to aid in the defense of the harbor. When this threat failed to materialize the balloon was sent to Tampa, Florida, where it joined the expedition to Cuba. After arriving in Cuba, it was necessary to repair damage to the balloon's fabric and find transportation to the front before Santiago was able to make any ascents and gather information for the Americans.

Its most important mission was its last. During the battle for San Juan Hill, Santiago travelled in the van of the advancing troops. Spanish artillery used the balloon for targeting and fired upon the American troops who were confined to the narrow road through the jungle. Fortunately, before it was shot down, Santiago's crew were able to direct artillery onto the Spanish positions and find another route to the battlefield. This prompted General Greely to state that:

This action enabled the deployment of our troops over two roads. . .and it may possibly have been the determining factor in the gallant capture of San Juan Hill.⁸

Demobilization after the war led to another reduction in funds, so the balloons that had been purchased during the war were placed in storage. A new balloon detachment was organized in 1902 and a new balloon had to be purchased since the equipment in storage had deteriorated beyond repair. The detachment was successfully employed on several maneuvers and additional balloons were purchased in 1907. In 1906 Brigadier General James Allen (no relation to the Civil War balloonist) replaced Greely as the Chief Signal Officer. He too recognized the

importance of the balloon and authorized the above purchases. He also established the Aeronautical Division of the Office of the Chief Signal Officer to "have charge of all matters pertaining to military ballooning, air machines and all kindred subjects."⁹

Aviation enthusiasts had been envying their European counterparts who were experimenting with numerous balloons and dirigibles.¹⁰ General Greely had attempted to procure a dirigible for the Army prior to the Spanish-American War but was unsuccessful. General Allen took on the project and in 1907 was finally able to convince the War Department Board of Ordnance and Fortification to budget \$25,000 for an airship. The contract was let to Thomas Scott Baldwin who said he could build a non-rigid airship and train the crew for \$6,750. After construction of the ship and the training of Lieutenants Frank P. Lahm and Thomas E. Selfridge, U.S. Army Dirigible Balloon No. 1 was accepted on 22 August 1908.¹¹ Several demonstrations were staged, but the craft was not flown again after 1909 and was condemned in 1912.

The balloon program was plagued by many factors, the prime one being inadequate funding. Although the Signal Corps was able to acquire initial funding to purchase equipment, long-range funds for maintenance and training were not always provided for in War Department budgets. Some of the problems were overcome. Lack of gas to inflate the balloons had been a continuous shortcoming. Captain Charles DeForrest Chandler, head of the Aeronautical Division, and Lieutenant Lahm established a hydrogen plant at Fort Omaha, Nebraska in 1908 to remedy the situation.¹² Even with the efforts of Chandler and others the program continued to be hampered by the lack of personnel and equipment. The Army had only five balloons on hand by the start of World War I, but an increased emphasis was placed on the balloon program during the war. Training was increased and more balloons were purchased. By the end of the war, 265 balloons had been sent to France and they were attended by 446 officers and 6365 enlisted men.¹³

Observation balloons were usually sent up and hauled down

with engine-driven winches, and the observers in them could usually see for 10 miles. Their main mission was to locate targets, regulate artillery fire and report on enemy activities. This information was usually passed to the ground by telephone. Although they proved useful, balloons were still limited by several factors. They continued to be unusable in high winds and in storms. A new handicap was their vulnerability to attack by airplanes. The authorized strength was sharply reduced after the war and eventually balloons were phased out of observation duties and replaced by airplanes.¹⁴

Around the turn-of-the century, the War Department had begun to express an interest in heavier-than-air craft (the airplane). This was an interest common to people around the world, both military and civilian. General Greely had been successful in getting a Congressional appropriation of \$25,000 to build one. He convinced his friend Dr. Samuel Langley, Director of the Smithsonian Institution, to build a full-sized test version of the scale-model steam-driven airplane he had flown in 1896. Unfortunately, the full-sized machine crashed on both tests and the project was cancelled by an embarrassed Congress and War Department in 1903.¹⁵

In 1907 the Army tried again. General Allen authorized the Signal Office to advertise for bids on the construction of a heavier-than-air flying machine. Although forty-one bids were submitted, only three were accepted. Captain Chandler notified the bidders to begin construction. Of the three finalists, only the Wright Brothers' plane was delivered for testing. Several flights were conducted and the airplane was finally able to stay aloft for over an hour. Unfortunately, Lieutenant Selfridge was killed when the plane he was riding in as an observer crashed. The pilot, Orville Wright, was severely injured, but after his release from the hospital the plane was modified and testing resumed. Signal Corps Airplane No. 1 was finally accepted by the Aeronautical Division on 2 August 1909.¹⁶

Captain Chandler and others in the Aeronautical Division

were enthusiastic about the airplane and its future. Congress was not so enthusiastic. The funds to purchase Airplane No. 1 had been diverted from other projects by the Signal Corps. When the War Department requested \$200,000 to purchase additional aircraft they were turned down. One member of Congress is reported to have said: "Why all this fuss about airplanes for the Army—I thought we already had one."¹⁷ It was not until fiscal year (FY) 1912 that the Signal Corps was able to get a specific appropriation for military aviation. Prior to this it received small amounts from War Department general funds for maintenance.

Aviation was hurt by personnel problems. When the Aeronautical Division was formed it been authorized only one officer and two enlisted men. By 1912 it had increased to 12 officers and 39 enlisted men.¹⁸ The problem was that many of the officers were only detailed to the Division and could be recalled by their branches at any time. This uncertainty led to a lack of long-range planning. Another irritant was that due to the dangers involved in flying, only unmarried officers were allowed on flying status.

Although several bills had been introduced by Congress to remedy the situation, none were passed until 1914. The Act of 18 July 1914 was a step toward solving the problem. It authorized an increase in the number of personnel and established the Aviation Section of the Signal Corps to replace the Aeronautical Division of the Office of the Chief Signal Officer. It also required that officers be detailed to the section for at least four years, which allowed longer-range planning, and it established higher levels of flying pay.¹⁹

As newer and better aircraft were developed, Army aviators discovered new uses for them. In 1912 the Signal Corps issued specifications for two new types of aircraft. One, to be used for long-range reconnaissance, was a light single-seater able to exceed 65 mph. The other was to be a two-seater for local reconnaissance and artillery adjustment. In the same year the Army experimented with a float plane able to land on water and night flights were performed. Tests were made in which small

arms were fired at targets on the ground. After a test-firing of machine guns at ground targets in 1912, a General Staff officer told reporters that they should not get excited by the test since aircraft were useful only for the reconnaissance role and would never participate in aerial battles.²⁰

THE TEST OF BATTLE

After more aircraft had been procured the Army decided to form them into a unit. The first tactical airplane unit was the First Aero Squadron and it was organized on 5 March 1913. Its first taste of battle was in Mexico after it joined Pershing's forces in March 1916. The aircraft did not perform at all well. They could not fly across the high mountains of northern Mexico. Operations were also hampered by the treacherous mountain air currents, dust and snow storms and high winds. By April 20th only two of the original eight planes were still operational and these were soon condemned. The squadron was rebuilt and joined the American forces participating in World War I.

Aviation tactics were revised as a result of the lessons learned in the war. Prior to the war, American aviators had concentrated on observation, reconnaissance and fire adjustment, although they had performed limited experiments with the use of machine guns and bombs. The war introduced these tactics on a large scale. Bombing, strafing and air supremacy fights became commonplace. One type of aircraft could not accomplish all these missions equally well, thus it became necessary to develop several classes of airplanes. They were reconnaissance, combat planes to escort them, bombers and pursuit aircraft to attack other planes and balloons.

Army aviation had expanded greatly during the war. By its end, there were fifteen observation, several pursuit and several mixed squadrons: this did not include the many balloon companies.²¹ This growth prompted a growing sense of importance for aviation and this led to thoughts among the aviators for aviation's independence from the Signal Corps and the Army. In recognition of aviation's expanded role, President Wilson signed

an Executive Order on 20 May 1918 which removed aviation from the Signal Corps and placed it under the Director of Military Aeronautics in the Air Service.²²

Aviation's primary contributions during the war had been in the areas of pursuit and observation. In order to educate the Army's pilots in all phases of tactics the Air Corps Tactical School was established at Langley Field, Virginia. Instruction was based on the assumption that the air arm should be divided into two distinct sections: the air service would provide observation and an air force, which would contain the combat elements of military aviation.²³ This splitting of functions was reinforced by the program of instruction at the school. Observation techniques continued to be taught using World War I situations without updating them for changing conditions. Pursuit aviation was considered more glamorous and was the most important element of the Air Service until 1926 when bomber doctrine began to assume increasing importance.²⁴

The tactics taught at the school were reflected in the field. Throughout the 1920's and 30's the Air Service developed faster, heavier aircraft to implement their tactics. It was believed by aviation planners that slow-moving, light aircraft were too vulnerable to ground fire and unsuitable for combat use. As will be seen later, this viewpoint conflicted with the needs of the ground commander. So did the trend toward an independent, centrally controlled air force.

THE SEARCH FOR AUTONOMY

The quest for independence began prior to World War I. Representative John Hay, Chairman of the House Committee on Military Affairs, introduced a bill in 1913 that would have removed aviation from the Signal Corps and established an Aviation Corps in the Army.²⁵ Needless to say, the War Department in general, and the Signal Corps in particular, opposed the bill. It was twice defeated after several prominent aviators, including Lieutenants Benjamin D. Foulois and Henry H. Arnold, made statements to the fact that it was premature to give aviation independence since it was still in its infancy.

In 1919 the Secretary of War established a board with the mission of studying aviation in various countries and making recommendations for American aviation. The Crowell Mission (or Board), chaired by Assistant Secretary of War Benedict C. Crowell, recommended that the United States concentrate all its military and civilian aviation in a National Air Service which would be equal in status to the War, Navy and Commerce Departments. The idea was so radical that, officially, it never left the War Department.²⁶ However, in several European countries, including Great Britain, this idea was very popular and had been at least partially implemented.

The Lassiter Board, in 1923, proved a setback to autonomy advocates. Although it proposed a ten-year expansion of the aviation program, it also suggested that aviation be split up. It subscribed to the division of assets into two arms. This was similar to a proposal of Major General Mason M. Patrick who had been Chief of the Air Service. The Board also recommended that each corps, division and army have observation squadrons attached to it; each army have attack and pursuit squadrons assigned it and an independent force of bombing and pursuit aircraft would be attached to the General Headquarters Reserve. The observation and attack squadrons would be integrated with the units to which they were assigned, while the bombing and pursuit forces would be employed in large formations.²⁷ The views of the Board were accepted by the War Department and implemented.

In 1925 two conflicting reports were issued within two weeks of each other; those of the Lampert Committee and the Morrow Board. Both groups drew witnesses from the same general sources but reached opposite conclusions.

The House Select Committee of Inquiry into Operations of the United States Air Services (the Lampert Committee) heard the views of those people who supported a unified air service, to include Brigadier General William "Billy" Mitchell and Major Carl Spaatz; and those who opposed it, which included most War and Navy Department officials and the Army General Staff. It

concluded hearings in March but did not issue its report until 14 December 1925. The following recommendations were made: 1) the separate air arms should be unified in an air force operating independently of the Army and the Navy but providing service to their units; 2) the installation of Assistant Secretaries for Air in the Navy, War and Commerce Departments; and 3) a Department of National Defense, under a civilian Secretary, should be established to coordinate the nation's defenses.²⁸

The President's Aircraft Board (Morrow Board) was appointed by President Coolidge in September 1925 and issued its report on 30 November, two weeks before that of the Lampert Committee.²⁹ It opposed the idea of a Department of National Defense because of the unnecessary complexity it was expected to add. Following traditional War Department thinking, it rejected the idea of an independent air arm, although it did recommend the upgrading of the Army Air Service to the Army Air Corps. It also recommended that an Assistant Secretary for Air be added to the War Department and additional representatives from the Air Corps be placed on the Army General Staff.³⁰ This program was implemented in the Air Corps Act of 1926.

Resentment toward the War Department began to build among Army aviation personnel during the next decade. The Air Corps Act had authorized an expansion to 1800 serviceable airplanes, 1650 officers and 15,000 enlisted men. By the end of the five-year program, the goals were short of being met by 129 airplanes, 396 officers and 1600 enlisted men. This dissatisfaction was increased by the knowledge that the shortfalls were due to the War Department's and the Bureau of the Budget's scaling down of requests for funds rather than to Congressional action.³¹ Another cause for resentment was the Army's promotion system. The number of promotions in any given year was based on Army-wide vacancies and then distributed according to rank on the promotion list. Aviation officers considered themselves discriminated against since the number of vacancies in aviation were usually proportionally greater than in the other branches, and the pilots felt they should be given an equally greater proportion of the

promotions, even though they were lower on the promotion list than their contemporaries, due to the fact that aviation personnel underwent longer training before commissioning and thus had a later date of rank.³²

Another board met in 1934 to examine Air Corps readiness. The President had ordered the Air Corps to deliver air mail during an emergency and there had been several accidents. The War Department Special Committee on the Army Air Corps (the Baker Board) was appointed to investigate the condition of the Air Corps.³³ It examined the findings of fourteen boards which had previously studied the question and interviewed hundreds of additional witnesses. Many of the recommendations were merely restatements of previous reports since conditions had not changed that much. It rejected the consolidation of all aviation in one department as a violation of the separation of civil and military matters. The consolidation of all military aviation and the establishment of a Department of National Defense was viewed as an unnecessary additional financial burden. The separation of the Air Corps from the Army was considered a violation of the principle of unity of command. The Board acknowledged that airpower aided the offensive but its usefulness was limited by several factors: the necessity of fixed bases; the inability to hold terrain by itself; its vulnerability to enemy action when not flying and to severe weather when it is; and its limited load carrying capability. One recommendation was welcomed by the airmen. The Board suggested that all combat aviation units be centralized under the control of a General Headquarters, Air Force while the supply and training functions would be under the Chief of the Air Corps.³⁴ This was to cause a problem later since the two branches were theoretically equal, thus splitting the command of the Air Corps and causing a rivalry for control.

The struggle was not totally solved until the creation of the Army Air Forces in 1941 and the reunification of the two functions under one office. This was further aided when the War Department and the Army were reorganized on 9 March 1942. War Department Circular No. 59 provided for the consolidation

of ground combat forces under the Army Ground Forces. The supply and service arms were placed under the Services of Supply (later renamed the Army Service Forces) and the aviation units were placed under the Army Air Forces. Each Force was headed by a Commanding General who held 4-star rank and was subordinate to the Army Chief of Staff and the Secretary of War. Henry H. "Hap" Arnold was the first one for the Army Air Forces. The Circular also provided for a War Department General Staff.³⁵ What was not specifically spelled out was that the Air Forces were granted virtual autonomy, albeit within the War Department.

THE BIRTH OF ARMY AVIATION

While in the 1930's controversy over autonomy continued, another problem, concerning the use and control of observation aircraft, was brewing. The older biplanes had been replaced by metal, high-speed aircraft. This coincided with the development of similar aircraft for the pursuit and bomber forces. Air Corps doctrine of the 1930's called for faster aircraft which could penetrate deep into enemy territory with less risk to the pilot and the plane. One problem with these new aircraft was that they needed elaborate airfields and maintenance facilities which could not be provided in forward areas. The planes had to be based far behind the front lines. Combining this with the higher fuel consumption of faster, heavier planes meant that the time that the pilot and observer could remain on station and provide useful information to the ground commander was reduced. There was also a difference in tactics. The ground commander desired an aircraft that could remain airborne over a small area for long periods of time while the Air Corps considered this dangerous and preferred fast, short flights.

Another problem is that observation aviation suffered from a lack of emphasis at the Air Corps Tactical School. Intelligent pilots deduced that their careers would be more successful in strategic bombing and pursuit so they avoided observation. The lack of funds for large scale training with ground units resulted in tactics that were little more than theoretical modifications of World War I doctrine.³⁷

The idea of centralization of control of observation aircraft also became dominant in the 1930's. Two factors influenced this trend. One was the growing sophistication of the aircraft used for observation work. They required more elaborate facilities and equipment to service and maintain them. The cost of this equipment was such that it became more economical to build fewer bases and to centralize maintenance activities at higher levels. The other factor had to do with economy of force. It became apparent to War Department planners that giving every division commander aircraft would result in some aircraft not being used all the time. They felt it would be more economical to give a smaller total amount of aircraft to the corps and army commanders. They, in turn, could allocate the aircraft to their subordinates on a priority basis and thus insure a greater utilization of assets. Another factor that may have affected this trend was the concentration of bomber and pursuit aircraft in centralized commands for large-scale operations.

The problems caused by the controversy over the utilization of aircraft were pointed out in several maneuvers conducted by the Army in 1941. Lieutenant General Leslie J. McNair, Chief of Staff of General Headquarters, US Army, criticized the Air Corps for using poor observation tactics; he felt that two hours of low-level flight over enemy territory was too long.³⁸ An attempt to counteract the trends of using heavier aircraft and centralized control was made during these maneuvers. Several Field Artillery officers, led by the Chief of Field Artillery, Major General Robert M. Danford, contracted with Piper Aircraft for the use of light commercial planes flown by civilian pilots. They flew observation missions and adjusted artillery fire in several exercises and received more favorable comments than the Air Corps planes. Danford stated 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.³⁹

The success of these aircraft prompted General Danford to renew a previous recommendation that the War Department make the aircraft organic to the artillery units of each division and corps. He further asserted that division and corps commanders who had participated in the maneuvers were enthusiastic about the plan. Lieutenant General McNair supported it, even though he had previously believed that observation aircraft were an Air Corps responsibility.⁴⁰ An additional factor may have been the success the Germans were having with their light plane, the Fiesler-156 (Storch). It was mostly used for liaison and courier flights and control of convoys. It was also used for artillery fire adjustment, although the Luftwaffe did not believe this was an appropriate mission. The War Department General Staff rejected Danford's plan as a violation of the principle of economy of force, but the idea was tested again after Pearl Harbor and then the Secretary of War approved the purchase of more aircraft and established organic aviation in the Army Ground Forces on 6 June 1942. Two planes were allotted per each artillery battalion or headquarters. The Army Air Forces would supply maintenance support and would procure the aircraft.⁴¹ Organic Army aviation had been born.

The Army Air Forces (AAF) did not yield easily. The first challenge came over pilot qualifications. The AAF was responsible for rating Army Ground Forces (AGF) student pilots. They challenged the quality of those pilots being trained by the AGF at the Field Artillery School at Fort Sill, Oklahoma. This was especially irritating to many ground officers since many of the student pilots provided by the AAF could not meet the demanding tactical flying requirements of the Artillery school.⁴²

In November 1942 the AAF made another attempt to regain control of all Army aviation. It accepted the theory that observation and liaison aircraft be organic to the using units, but on AAF terms. They defined organic as "assigned to the unit", but flown by AAF pilots. Their proposal called for one flight of liaison-type aircraft per army, corps and division. The AAF added that this plan would make the liaison flights more flexible

than by using aircraft assigned to the field artillery.⁴³ General McNair, now Commanding General of the AGF, countered the AAF proposal by stating that it would be preferable to extend organic aviation to non-field artillery units than to depend on AAF support. The maneuvers of 1941 and 1942 had shown how unreliable AAF observation squadrons were.⁴⁴

ORGANIC AVIATION IN WORLD WAR II

As the problem, in part, was one of aircraft, as well as personnel, they must now be examined. The official designation was L (for liaison) and a model number, e.g. L-4. Most of the aircraft used in World War II were L-4's (modified Piper Cubs) and L-5's (made by Vultee-Stinson). The planes were light and highly maneuverable; a characteristic that made them particularly useful to front-line commanders since they were able to take off and land at hastily prepared strips or unimproved roads and cow pastures. This was in stark contrast with the observation aircraft provided by the AAF. The liaison planes increased the ability of the ground commander to control his forces and made him more mobile. The planes' characteristics earned them several nicknames such as "Grasshopper" and "Puddlejumpers".

These organic aircraft were first employed in combat during the invasion of North Africa in 1942, and they started out on an ignominious note. Three L-4's departed from the aircraft carrier USS Ranger on the day after the invasion began. Almost immediately, they came under fire. The problem was that they were still 60 miles from shore and the fire was from ships in the convoy. By flying low they were able to get ashore. Two L-4's landed near a Vichy French fort and were captured. The third took fire from units of the American 2nd Armored Division, was shot down, crashed and burned. Fortunately, all the pilots survived. It appears that Americans were not used to these light planes and mistook them for German Storchs. When one of the convoy's gunnery officers was interviewed after the war about why he opened fire on the Cubs, he replied that the planes were not on his silhouette charts and: "What would you have done in my place? If you were 60 miles at sea and you saw a Cub

putt-putting by, would you believe it?"⁴⁷

The first pilots to report for duty met some of the same problems that the Civil War balloonists had faced. The ground commanders were unaccustomed to having aircraft and therefore were not able to employ them as efficiently as they were to do so later. Some commanders did not want the planes around since they did not have the time to experiment with them while trying to win battles, but by 1945 there were over 1600 organic aircraft and levels of experience had risen. As the commander became comfortable utilizing his aircraft the scope of missions increased. Originally, they were to be used by field artillery units for fire control, limited reconnaissance and liaison. By the end of the war they were also used for laying telephone wire by air; performing emergency resupply and medical evacuation; convoy control; and aerial photography. They flew in all theaters of the war and received glowing comments from many commanders, including this one from General Mark Clark:

They permitted me to observe in a few minutes what it would otherwise have taken days to observe by any other means. I find invaluable the panorama of the terrain and the disposition of the forces that I could quickly fix in my mind when I could observe from the air. . . This was tremendously helpful in the overall direction of the Fifth Army.⁴⁵

The liaison pilots learned many new tactics by experience. They discovered that it was easier to direct counter-battery fire at dusk and dawn because the flashes from the guns were easier to observe then. A technique of self-preservation was the memorization of the locations of friendly anti-aircraft (AA) firing positions. If attacked by enemy aircraft the Cubs would fly to an AA position and the enemy could not follow without himself getting shot down.⁴⁸ The North African campaign also saw the formation of new organizations. The pilots had to develop standard operating procedures for supply, maintenance and administration. Everything learned at the front was relayed to flight school at Fort Sill and taught to the new pilots.

The campaigns in Sicily and Italy saw more innovations.⁴⁹

L-4's took off from improvised flight decks on LST's (a large landing craft). They adjusted all types of gunfire in day and night. In weather that grounded AAF observation planes, Fifth Army commander, General Lucian K. Truscott, used Cubs to obtain aerial photographs which allowed an offensive to be started.⁵⁰ The L-5 was introduced and it was welcomed by many pilots since it had more horsepower and could carry heavier loads than the L-4, although it was not as maneuverable.

These planes were used for many of the same types of missions in other theaters. One innovation introduced in the Pacific was the Brodie Device. It was a system that allowed a light plane to take off from and land on a cable strung between braces. The airplane hung from a hook and sling that was released by the pilot when enough airspeed had been attained. For landing, the plane was maneuvered to engage the hook and the engine shut down. L-4's and L-5's were used to survey the Ledo Road, supply Merrill's Marauders and evacuate British casualties in Burma.⁵¹ One of the more ingenious plans for utilizing L-4's was devised by General Patton's artillery chief, Brigadier General Edward T. Williams. It was determined that 90 L-4's could airlift an infantry battalion across the Rhine River in three hours. This use of the planes was not necessary since the assault on the Rhine was more successful than planned and the reinforcements were not needed.⁵²

Although the liaison planes were used on various types of missions, the most important one was still artillery observation. An example of the respect accorded the Grasshoppers by the enemy is that when one flew over enemy lines, their guns would stop firing so that the positions would not be given away to the aerial observer.

The success of organic aviation widened the breach between the AAF and the AGF. Field Manual 100-20, Command and Employment of Air Power, was issued on 21 July 1943, and it stated that "Land power and air power are coequal and interdependent forces; neither is an auxiliary of the other." But, it also said that "the gaining of air superiority is the first requirement of any major land operation. . . Therefore, air forces

must be employed primarily against the enemy's air forces until air superiority is obtained."⁵³ This philosophy fit in well with AAF doctrine which hoped to demonstrate the decisiveness of strategic bombing and the ability of the air forces to win the war. Therefore, the missions of observation and close-air support were accorded lower priorities. Combat officers of the AGF believed that strategic bombing was nice but the ground arm would bear the burden of winning the war. Necessarily, they placed a higher priority on close air support and observation. However, they probably realized the necessity of air superiority to achieve their goals.

General McNair and the AGF were continually frustrated in their attempts to get AAF support for training exercises in 1943. Although lower echelon air officers were cooperative in attempting to work out problems, the Air Staff at the War Department "openly scoffed at the AGF training plan" and continued to press for more strategic bombing. These people stressed that if air superiority and isolation of the battlefield were accomplished, close support would be unnecessary, and anyway, close air support missions "normally are uneconomical and ineffective". General McNair was so disappointed that he remarked: "It must be admitted that to date air-ground cooperation has been pretty much a paper battle and going through the motions."⁵⁴ Many ground commanders agreed that air superiority was important, but they argued that it would never completely eliminate the need for close air support.

The lack of AAF support for the AGF was not restricted to training troops in America; it also occurred in the combat zone. Ground commanders could not get photographic reconnaissance, protection from enemy fighters or close support missions when they needed them. As Major General Omar N. Bradley noted in 1943:

We can't get the stuff when it's needed and we're catching hell for it. By the time our request for air support goes through channels the target's gone or the Stukas have come instead.⁵⁵

To make up for this lack of support, ground commanders found even more new uses for their grasshoppers. As mentioned above, they had been used in various control and supply missions in addition to their observation roles. Now experiments were conducted using liaison planes for bombing and rocket firing.⁵⁶ AGF pilots had developed numerous tactics that required modifying their L-4's and, although practical, the War Department disapproved the modifications since they appeared to trespass on the AAF's area of responsibility. Some of these modifications were the installation of cameras, the addition of instruments and cockpit lights for night flying and the use of various weapons.

The expansion of roles caused a problem for the AGF. The order establishing organic aviation had limited its use to the field artillery and when the AGF had requested an expanded role for organic aviation, the AAF took advantage of the occasion and attempted to regain control of all Army aviation. However, on 10 October 1944, the AAF did an about face and in a declaration of policy they stated that "assignment [to the ground forces] of a type airplane whose performance approximates but does not exceed, that of the L-5 would be justified" and the ground forces should be encouraged to "make maximum use of the capabilities of the type airplane assigned."⁵⁷ General McNair did not question this change of heart but took advantage of it by having the AGF push for the procurement of the L-5 and for the expansion of authorized roles for organic aviation beyond those of fire adjustment and liaison. This expansion was approved by the War Department on 9 August 1945 but it was never fully implemented due to the end of the war and demobilization.⁵⁸

What had been achieved by this time? From the lowly beginnings of a few balloons, aviation had expanded to thousands of planes of all types. The idea of providing effective aerial observation for the ground commander was never forgotten during these years, although at times it took a back seat to other developments such as the development of strategic bombing.

Once the initial struggle for survival had been won, aviation was able to expand in several directions; air superiority, strategic bombing and observation were all examined. Airpower advocates believed that aviation was important enough to be a separate and equal branch and they lobbied for it until autonomy was finally achieved. While the AAF continued to place a priority on strategic bombing, the AGF had been able to retain a small airplane for the ground commanders use. Although the AAF had acquiesced to AGF requests for organic aviation, the battle for control of aviation was not yet over. After the creation of the United States Air Force and its total independence from the Army in 1947, the conflict would flare up again.

DEMOBILIZATION AND UNIFICATION

The controversy was almost forgotten during the first year after the war. The services were more concerned with the effects of demobilization. The Army's strength dropped from around 8 million in August 1945 to 1 million in April 1947. The system used to demobilize, the point system, insured that the more experienced soldiers, the non-commissioned officers and the technicians, would be released first. This wreaked havoc with the combat readiness of units around the world. As Carl Spaatz, first Chief of Staff of the United States Air Force, pointed out:

Airplanes were stranded in all parts of the globe for lack of maintenance personnel to repair them. . . By 31 October 1946 the world-wide readiness of first line combat aircraft had dropped to 18 per cent, and maintenance personnel had declined to 8 per cent of the number available in January 1945.⁵⁹

AGF organic aviation was also affected by the same factors and by the end of 1945 the number of airplanes had been reduced to around 200 from the 1600 that had been operational in 1944.⁶⁰

The year 1947 was an important one for Army aviation. The National Security Act of 1947 created an independent United States Air Force and called for the transfer of all the AAF's assets to this new organization. Much has been written about the controversy over unification of the services, suffice it

to say here that a Department of Defense was created (after the Act's amendment in 1949), with a civilian Secretary of Defense at its head. It was a cabinet level post and the War and Navy Departments were abolished, with the Departments of the Army and the Navy taking their place. They and their Secretaries were placed subordinate to the Secretary of Defense. A Department of the Air Force was created and joined them on an equal basis. The three services were jointly known as the National Military Establishment. The Act also provided for a Central Intelligence Agency, a Joint Chiefs of Staff, the National Security Council to advise the President on policy, and a National Security Resources Board.⁶¹ Unification was supposed to avoid duplication of efforts and create economies. Instead, it created much friction as each service battled the others for their "rightful share" of the defense budget.

When the Act separated the Air Force from the Army, it allowed the Army to keep its organic aviation assets. The authority for this is Section 205(e) of the National Security Act of 1947:

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.⁶²

In 1948, Secretary of Defense James Forrestal had persuaded the Chiefs of Staff to compromise on the arguments they were having over roles and missions, but the Key West Agreement of April 1948 did not end the strife. The late 1940's were filled with acrimonious debate between the services, mainly the Navy and the Air Force, about which strategy the nation should follow and what roles each service should have under the strategy.⁶³ Although the Army did not get deeply involved in the debates, an emphasis on strategic weapons and nuclear deterrence meant that its share of the budget would remain small. Therefore, the outcome of the debates were important to Army aviation's future.

Air Force advocates believed that strategic bombing had been the most important factor in winning World War II. As

far back as 1945, the Commanding General of the AAF, General Henry H. "Hap" Arnold, had been writing that the Air Force would win the next war. He believed that it would be the first to decisively engage the enemy and, if successful, it would remove the necessity for extended surface conflict. He confidently stated that:

It is entirely possible that the progressive development of atomic explosives, guided missiles and other modern devices will reduce the requirement for employment of mass armies and navies.⁶⁴

This view continued to be expressed for many years. It found much support outside of the military. In July 1947 President Truman established the President's Air Policy (the Finletter) Commission to study the growth of the aircraft industry and its effect on national security. At nearly the same time another group was formed to study the same subject. This was the Congressional Aviation Policy (the Brewster) Board, and their conclusions were nearly the same. The Finletter Commission's report, Survival in the Air Age, recommended that:

The Military Establishment must be built around the air arm. Of course, an adequate Navy and Ground Force must be maintained. But, our military security must be based on air power.⁶⁵

It assumed that any attack on the United States would be by air and it could come any time after 1 January 1953. The attack would be a violent, nuclear surprise. A 70-group Air Force was necessary to counteract the threat.⁶⁶ The main disagreements were between the Navy and the Air Force over who should have strategic air power and what means should be used to employ it. With these views dominating defense thinking, it appeared that Army aviation's future role would be small.

Many regulations were necessary to implement the separation of the Air Force from the Army. One of the most important of them in regards to Army aviation, Joint Army and Air Force Adjustment Regulation (JAAFAR) 5-10-1 dated 29 May 1949, Combat Joint Operations, Etc: Employment of Aircraft for Certain

Missions, defined the roles for which organic Army aviation could be used. Fixed-wing aircraft could not exceed 2500 pounds and rotary-wing aircraft could not weigh more than 4000 pounds when empty. The regulation clarified the Key West Agreement on functions and emphasized that the Army was prohibited from infringing on the Air Force's strategic and tactical support roles. The Army's aircraft were to be primarily used for expediting and improving ground combat procedures in the battle zone; for the maintenance of aerial surveillance of enemy forward areas in order to locate targets, adjust fire and obtain information on hostile defense forces; for aerial route reconnaissance and control of march columns and for the camouflage inspection of ground forces areas and installations. Organic aviation was permitted to perform limited local courier and messenger service, and limited aerial resupply and front-line photography. Finally, it was allowed to perform emergency medical evacuation and emergency aerial laying of telephone wire. The Air Force would be the primary source of the Army's limited and emergency aviation roles and it would provide for depot maintenance, aircraft and parts procurement, and pilot training.⁶⁷

Army policy makers were not entirely satisfied with the provisions of JAAFAR 5-10-1 since it did not modify the provisions of the Air Force "Function Papers" dated 21 April 1948. These papers had been an attempt to define the role of the Air Force in relation to the Army. They established several functions for the Air Force including the provision of air transport, unless otherwise assigned, and close combat and logistical air support to the Army, including airlift, support and resupply of airborne operations. It was also to provide the Army with aerial photography, tactical reconnaissance and interdiction of enemy land power.⁶⁸

Certain Army officials, including the Chief of the Army Field Forces (formerly the AGF), General Jacob C. Devers, had expressed the opinion that the Air Force was placing too much emphasis on its strategic forces and thus neglecting the close air support and transport roles. Fear of inadequate support

in case of war was increased by the belief that Colonel William H. Wise expressed the majority view of the Air Force when he wrote that: "the tactical employment of Air Power, being anchored to surface action, is unlikely to assume a place of importance in any major conflict of the future."⁶⁹ Several solutions of the support problem were discussed; the least likely being a return of tactical air support to Army control, thus allowing the Air Force to concentrate on its strategic mission. A more reasonable approach was to allow Army planners more impact on the design of ground support aircraft and more control over planes assigned to the Army for tactical support. Part of this suggestion arose from the belief expressed by General Devers, his successor General Mark Clark and others that jet aircraft were not practical in the tactical support role. While at first this appeared to be so in the Korean War, after more experience in both services the problem was almost overcome. However, many ground commanders continued to request the assignment of more light planes to their units since they could be based near the frontlines rather than 100 miles behind them as was common with Air Force jets. It must be pointed out that the Air Force was concerned with the survival of its pilots and aircraft rather than just the appropriateness of the aircraft for the close support role.⁷⁰ The ground commander, necessarily, was only concerned with his immediate combat problems.

Another controversy arose over the suitability of Air Force transport aircraft for Army missions. The Air Force Military Air Transport Service (MATS) had concentrated on large, heavy, strategic transport planes. This was in line with Air Force strategic doctrine, but the Army desired smaller planes that could be used close to the front-lines. The Army also complained about the lack of a sufficient number of planes to transport Army units.⁷¹

Many of the Army's argument proved valid when the Korean War broke out. Air Force transport planes could only land in Japan, thus causing delays in getting troops and equipment to

the front. Army plans were also proven wrong by the war. It was again caught with outmoded equipment. The ground troops in Korea had few, adequate anti-tank weapons. Although Army aviation had rebuilt its aircraft strength from the low of 200 to over 700 by the start of the Korean War, most of the fixed-wing aircraft were outmoded L-4's and L-5's. However, they were soon replaced by L-17's (Navion) and L-19's (Birdog). During the war, the number of fixed-wing aircraft increased by 300 per cent. Although this was impressive, the real growth came in helicopters, which increased by 900 per cent.

THE DEVELOPMENT OF THE HELICOPTER

After the Korean War proved its usefulness, the helicopter became the most important part of Army aviation. At this point, it is necessary to look at the development of the helicopter. The military had been investigating it for some time. In fact, there is evidence that both the Confederate and Union forces attempted to build helicopters during the Civil War.⁷² Several different prototypes had been designed and flown in the early 1900's, but they were unstable and prone to crash.⁷³ The Army had been searching for an aircraft that could fly like an airplane, but take off and land in small areas like balloons, thus having the characteristics of the ground commanders' ideal observation aircraft. In 1921 the United States Army signed a contract with an aircraft designer, George de Bothezat, to build a helicopter. Its first flight was in December 1922 and it made over 100 more test flights in the next two years. The Army finally abandoned the project because of the craft's instability and complexity. The final report stated that there was a future for the helicopter if the problems were worked out, however: "These features are such as to rule out its development except in the case of such military urgency that the life of the pilot and the observer is of little consequence."⁷⁴

Development turned to the autogiro, an aircraft with a vertical propeller to pull the plane through the air and a

horizontal rotor to provide lift. The first practical one was developed by the Spanish designer Juan de la Cierva. The Army and the Navy experimented with the Kellett version in the early 1930's and, although the tests proved successful, autogiros were still outperformed by true helicopters in the roles desired by the military. Autogiros needed runways to take off from while the helicopter could go straight up. In 1935-36 the Germans and the French built and flew successful helicopters. In response to this, Congress held hearings to discuss helicopters and autogiros. They appropriated \$2 million for the AAF's development and procurement of helicopters.⁷⁵ After experimenting with several models, the Army finally decided on the Sikorsky R-4 in 1942.

During World War II, the Army ordered 29 R-4's and used it for rescue work and limited observation. The Coast Guard used it in several spectacular rescues, as did the Navy. In Burma, Colonel Philip D. Cochran, Commander of the First Air Commando Group, had four R-4's, although only one was serviceable. It was used for rescue missions and limited troop transport and its success prompted Cochran to say: "Just imagine what we could do with a couple hundred of them."⁷⁶

Helicopters continued to be developed after the war and new ways were sought to employ it. The Air Force took most of the Army's helicopters with it when it gained independence and continued using them for rescue work and fire-fighting. The Navy also used helicopters for rescue missions and tried to develop it for anti-submarine warfare. Army plans called for the use of helicopters in observation roles and for limited resupply missions. The Marine Corps was the only service that showed any real foresight about helicopters.

The Marines realized that the atomic bomb meant the end of amphibious operations, at least as they had been performed in the past. A fleet concentrated in a small area to support landing operations would provide a tempting, profitable target for a nuclear weapon. The helicopter appeared to be the solution to the search for a method of dispersing the invasion

fleet while still concentrating for the invasion. Helicopters could carry troops inland from ships scattered at sea. This would avoid massing troops on the beach and concentrating ships at sea. Planning had begun on these tactics when helicopters could barely carry the pilot and one passenger.⁷⁷

INTER-SERVICE AGREEMENTS

The Army had watched the Marine experiments with helicopters and had begun adopting their theories. Although the Army did not have the aircraft on hand at the start of the Korean War, it was prepared to expand. Several studies had been prepared by the G-3, Department of the Army, and the Office of the Chief of Army Field Forces in 1949 and 1950, calling for the organization of five transport helicopter companies to provide short-range movement of troops and supplies for the division commanders. The companies were to be organized in FY 1952 (beginning 1 July 1951). Planning was speeded up and provision was made for the organization of the companies in the Emergency Supplemental Budget for FY 1951, necessitated by the Korean War.⁷⁸

Four companies were to be equipped with the H-19 (Chickasaw) helicopter and one with the H-21 (Shawnee). One problem remained before this plan could be implemented. The empty weights of these helicopters exceeded the restrictions on weight established by JAAFAR 5-10-1. Generals J. Lawton Collins, Army Chief of Staff, and Hoyt S. Vandenberg, Air Force Chief of Staff, met in late 1950 to discuss this problem. Collins said that the Army needed organic helicopters for short hauls of troops and equipment. Vandenberg believed that the Army was encroaching on the Air Force's mission of providing transportation for the Army. If the Army wanted helicopter transportation, it could be provided by Air Force units.⁷⁹ An impasse developed and it became necessary for the service Secretaries to meet and discuss the issue.

Secretary of the Army Frank M. Pace and Secretary of the Air Force Thomas K. Finletter debated weight limitations in

January 1951. Among other things, Pace pointed out that the development of bigger airplanes and helicopters by the aircraft industry would eventually lead to changes in the weight restriction or force the Army to use obsolete equipment. The Air Force replied that this may be so, but the National Security Act of 1947 gave the role of air transport to the Air Force so it should provide helicopter transport. The first meeting did not settle the helicopter question, but the Air Force agreed to the Army's purchase of some L-20 Beavers which exceeded the fixed-wing aircraft weight limitation by about 500 pounds.⁸⁰

Negotiations continued, and on 2 October 1951 Secretaries Pace and Finletter signed a Memorandum of Understanding. In an attempt to stop the arguments over size, the weight limitations were removed in favor of restrictions to the functions that Army aircraft could perform. It was agreed that organic Army aviation would be used "as an integral part of its components for the purpose of expediting and improving ground combat and logistical procedures within the combat zone," which was an area extending 60 to 75 miles behind the front line. Furthermore, it expanded the functional roles of Army aircraft as established in JAAFAR 5-10-1. Aerial observation was expanded to include locating, verifying and evaluating targets; adjusting fire; studying terrain; and obtaining information on enemy forces not otherwise secured by air reconnaissance agencies of the other services. Control of Army forces and accomplishment of command, liaison and courier missions were no longer considered limited functions; and aerial wire laying and the transportation of supplies, equipment and small units within the combat zone also became primary functions of Army aviation. The Air Force continued to be the primary supplier of airlift to the Army and duplication of Air Force roles in the fields of close combat air support, troop carrier airlift, aerial photography, tactical reconnaissance and the interdiction of enemy forces was prohibited.⁸¹

This 1951 Memorandum can rightly be viewed as a partial victory for Army aviation. It was freed from the weight

restrictions imposed on it by JAAFAR 5-10-1. Its assigned functions were also increased because what had been limited and emergency roles were now primary missions within the combat zone. In November 1951, the Army requested 122 additional cargo helicopters for use in Korea; 50 for the Air Force and 72 for itself. The Air Force disagreed with this request, stating that most of the helicopters would be used for aerial resupply and medical evacuation, Air Force functions. Secretary Pace disputed this and stated that the helicopters were only being used to equip new units in order to fulfill the Army's role of transporting "supplies, equipment and small units within the combat zone", to include medical evacuation.⁸²

The request for additional helicopters was in part a result of the experiences in Korea, and consequent studies by the Army Chief of Transportation and the Army Material Requirements Review Panel. Although the Army appeared to be satisfied with the five transportation helicopter companies approved by the Air Force, commanders in Korea continued to report a need for increased numbers of helicopters. The helicopter's ability to land in confined areas and move rapidly from place to place, ignoring blown bridges, muddy roads and so on, made them invaluable for the movement of supplies and the evacuation of casualties. The Chief of Transportation, Major General Frank A. Heileman, was tasked with studying a request by the Commander in Chief, Far Eastern Command, for 10 transportation helicopter battalions of 500-1000 helicopter total. Heileman agreed with the request and stated that they should be broken down into 3 light cargo (3000 pounds payload), 6 medium cargo (4-6000 pounds per helicopter) and 1 heavy cargo helicopter battalion (8-20,000 pounds per helicopter) in each field army. They would replace the need for such purpose vehicles as amphibious trucks and could carry up to 10 per cent of each army's supplies.⁸³ The Office, Chief of the AFF, received the report and recommended further study.

Continued Air Force insistence that they were the prime supplier of helicopter transportation caused Secretary Pace to consider the Memorandum of Understanding to be abrogated and he

directed the Army Chief of Staff to provide him with a new helicopter program by 8 August 1952.⁸⁴ The Material Requirements Review Panel studied the whole Army aviation program and, among other things, recommended a \$1 billion five-year helicopter procurement program that would provide for 15 transportation helicopter battalions to support a projected 20 division Army. The Chief of Staff reduced this to a \$688 million program providing for 12 battalions and an additional 12 helicopter ambulance units.⁸⁵ This was because of the lower projections in size and number of divisions in the future Army.

The program was submitted to the Joint Chiefs of Staff for approval. The Air Force claimed that aeromedical evacuation was its job, and the Joint Chiefs suspended the plan's activation until an agreement could be reached. Secretaries Pace and Finletter met on 4 November 1952 and issued the Memorandum of Understanding Relating to Army Organic Aviation. The new agreement reinstated a weight restriction on fixed-wing aircraft; this time it was 5000 pounds. The limitations could be reviewed by the Secretary of Defense, in case of technical developments or newly assigned missions, at the request of either service. The combat zone expanded to 50 to 100 miles behind the front line and helicopters continued to be limited only by role, and not weight. Army aviation continued to retain the primary functions assigned to it under the previous Memorandum and picked up two new functions: artillery and topographic survey; and limited aeromedical evacuation, to include "battlefield pickup of casualties, their air transport to initial point of treatment and any subsequent move to hospital facilities within the combat zone."⁸⁶

This agreement restricted Air Force support of the Army. It now could only move supplies, personnel and the like into the combat zone and vice versa, but not within it. Some functions continued to be restricted to the Air Force. It would provide aircraft for the evacuation of personnel and equipment from the combat zone. Airborne operations, with the airlift

of troops, supplies and equipment, continued to be supported by the Air Force for the assault and subsequent phases. It would also evacuate casualties from the landing zones until they were linked up with ground forces.⁸⁷

POST-KOREAN WAR EXPANSION

The two Pace-Finletter Memoranda set the basis for further growth and development of Army aviation. The experiences of the Korean War, and the lack of weight limitations on rotary-winged aircraft concentrated development in this area.⁸⁸ Secretary Pace felt that the helicopter was "becoming as much a part of today's Army as the jeep."⁸⁹ In order to create an orderly growth of the program, the Army set about trying to define its aviation plans. Some of the criteria that had to be examined were the size and number of units, the number and types of aircraft and what mistakes had been made in the past.

In 1954, the Army's Deputy Chief of Staff for Plans and Research directed a review of the Army's aviation program. It was to examine the experiences of the past few years, including the Korean War, and develop a comprehensive, long-range program for the future of Army aviation. The review found that there was a duplication of effort in training, testing and development of aviation doctrine. The competition among branches for aviation personnel and aircraft led to an unsatisfactory career program for aviators. Inefficiency and ineffectiveness hampered aircraft testing, publication of technical information and the training of personnel.⁹⁰

In an attempt to remedy the situation, the Department of the Army developed a plan for the centralization of aviation functions in a separate Army Aviation branch, and sent it to the field for comments and suggestions. The process of centralization would proceed in three phases to minimize disruption. The first phase called for the establishment of an Army Aviation Branch of the Career Management Division, The Adjutant General's Office, to assume control of all Army aviators; and, the establishment of an Army Aviation Center under the control

of the Continental Army Command. The center would be responsible for training aviators, maintenance personnel and air traffic controllers. Additionally, it would develop aviation tactics, doctrine and techniques in coordination with the other service schools. Finally, a Chief of Army Aviation would be appointed with the responsibility for the Aviation Center and for aviator career management. All Army aviation personnel would then be transferred to the Army Aviation branch from the ones they were in.⁹¹

This plan was opposed by the Chief, AFF, and the commandants of the Artillery, Transportation and Aviation Schools. The Command and General Staff College, Infantry School and Armored School commandants favored the concept. Department of the Army noted the comments and in december 1954 it made the following recommendations: an Aviation Center and Board should be established at Camp Rucker, Alabama; G-3 should be responsible for overall supervision of the Army aviation program; the Army should assume depot level aviation maintenance from the Air Force; and, the Chief, AFF, should be responsible for flight training and the development of aviation, its integration into units and the doctrine for its employment. The plan for a separate aviation branch was dropped. On 1 February 1955 the AFF became CONARC.

The way the schools split over the plan to establish a separate aviation branch bears examination. Those branches with the most to lose opposed it. The Transportation Corps had been responsible for aviation since 1952 and was loath to lose this control.⁹³ Field Artillery was responsible for much of the doctrinal development and had part of the Aviation School at its post, Fort Sill. Those who favored a separate branch felt they would gain from it. Infantry and Armor advocates had been asking for the development of faster, more maneuverable helicopters for use in combat. They saw a chance to remove aviation from the control of the Transportation Corps and its concentration on bigger, heavier helicopters.

The branches and agencies concerned with aviation could

not agree on the portion of the proposed Aviation Plan that dealt with the expansion of aviation. In early 1956 a conference was held where the controversial items, such as a reduction in the size of the field army due to replacement of units by smaller, aviation elements, were discussed. It was decided by those present that the Air Force would be asked to develop a better close support aircraft, rather than reopen controversy by attempting to have the support mission assigned to the Army. They also decided that a heavy cargo helicopter, with a 5-11 ton payload, should be developed, as should a fixed-wing cargo plane weighing more than 5000 pounds.⁹⁴ Around this time the Army began examining the idea of arming helicopters for defensive roles, to supplement Air Force support which was perceived to be inadequate.⁹⁵

The rapid growth of Army aviation had really begun to worry the Air Force. The reorganization of aviation and the expansion called for by the Army Aviation Plan, from 3516 aircraft to 8586 by 1959, caused much concern in the Air Staff, and the Air Force Chief of Staff, General Nathan Twining, charged that this expansion would result in a wasteful duplication of Air Force resources.⁹⁶ Both services began lobbying to have their point of view accepted.

Secretary of the Army Wilber M. Brucker began negotiating with Secretary of Defense Charles E. Wilson in September 1956, in an attempt to remove the 5000 pound weight restriction from Army fixed-wing aircraft. After further study of the issues involved, Wilson issued his decision in a memorandum on 26 November 1956. He decided that Army aviation would continue to be allowed to perform the functions it already had, and it picked up the primary functions of photographic reconnaissance and all aeromedical evacuation of Army personnel in the combat zone. This zone was extended to 100 miles on either side of the front line. The 5000 pound empty weight limitation was retained on Army fixed-wing aircraft and a 20,000 pound limitation was imposed on rotary-wing aircraft. The Army was allowed to seek exemptions for the development of specific

aircraft which exceed the weight limitations. Wilson also stipulated that the addition of increased Army airlift should not be a reason for changing Air Force force structure but that it should lead to a reduction of other Army modes of transportation.⁹⁷ The Army was restricted from duplicating Air Force functions in the areas of close combat air support, interdiction of the battlefield and tactical reconnaissance. In addition, the Air Force continued to have the primary responsibility for strategic and tactical airlift of personnel in airborne operations and for movement into and out of the combat zone. The Army was directed to make maximum use of Air Force and Navy research and development facilities to develop new aircraft for its own use; and, it should use existing Navy, Air Force and civilian aircraft when feasible instead of developing new ones.⁹⁸

THE BEGINNING OF AIRMOBILITY

This new policy forced the Army to re-examine its aviation program. The new definition of the combat zone provided an expanded scope for aviation operations and new doctrine was needed to guide the Army in effectively utilizing its aviation. Training Circular 1-7 was the result, and it stated that the atomic age, which caused a need for greater dispersion, created a need for increased mobility in the combat zone. Army aviation would fill the need. Combat transportation units would be assigned at the army level and would be used by the corps and division commanders for various operations: to exploit the effects of an atomic attack in the enemy's rear; to seize critical terrain features in order to expedite the movements of rapidly advancing columns; and, to shift troops and reserves in the defense. The helicopter could also be used to supply isolated units or fast-moving forces which would otherwise outrun their supplies.⁹⁹

Several types of units were believed necessary. These included cargo units, medical evacuation companies and helicopter detachments for liaison and courier missions. A new

concept, Sky Cavalry, was under development. It would combine observation, troop-carrying and armed helicopters in one unit. "Sky Cav" was to be a:

completely air-mobile, air-mounted, fast-moving, hard-hitting, flexible means of searching out, fixing the enemy and performing the traditional missions of cavalry at an accelerated rate on the battlefield of tomorrow.¹⁰⁰

A provisional unit, the Sky Cav Platoon, was formed at Fort Rucker, Alabama in February, 1957 to test the concept. It was expanded and redesignated the Aerial Combat Reconnaissance Platoon, Provisional (Experimental) in November 1957.¹⁰¹ Further work was done and several successful weapons systems were developed. One problem faced by the experimenters was the lack of a suitable helicopter. The introduction of the HU-1 in 1960 provided them with a useful weapons platform.

Army aviation was growing in size and experience, and it gave every sign of continuing to do so. In an attempt to organize this growth, the Army Chief of Staff directed the establishment of an Army Aircraft Requirements Board (Rogers Board) in January 1960 and appointed Lieutenant General Gordon B. Rogers, Deputy Commanding General of CONARC, as its Chairman.¹⁰² Its task was to form a plan of development for Army aviation in the 1960's, after reviewing the suggestions of concerned groups such as the National Aeronautics and Space Administration, the aircraft industry and the Transportation Corps. Forty-five different participants submitted over one hundred design concepts to meet the proposals of the Board in the fields of light observation, manned surveillance and tactical transport aircraft.¹⁰³

In the field of light observation aircraft, the Board decided that a 3-4 place, turbine powered, light observation helicopter should be procured to replace the aging L-19's, H-13's and H-23's. Test and evaluation of at least two models should begin as soon as possible and procurement was planned to begin in FY 1964.¹⁰⁴

The Board recommended that more studies and tests be made

of sensors and avionics equipment for a heavy observation aircraft and, tests be made on the aircraft's survivability before its procurement. The report also suggested that more study be done prior to requesting a new heavy tactical transport. Factors to be considered were payload, airspeed and whether it should be fixed or rotary-winged. Two of the lesser known, but more important of the Board's recommendations were that the Army should begin a policy of replacing each aircraft model every ten years (sooner if assigned functions or technological advances so warranted) and that the feasibility of the concept of air fighting units and their armament should be studied.¹⁰⁵

The second recommendation was the most important for Army aviation's future. It had been proposed by Major General Hamilton H. Howze (a former Cavalry officer who had learned to fly) that aviation units could provide mobility to the infantry and direct fire support from the air in addition to their traditional roles. These "airmobile" units could be used to seize key terrain in advance of larger forces during an offensive; to provide delaying actions or cover for the withdrawal of larger forces during the defense; for raids and penetration of shallow enemy defensive positions to disrupt their rear areas; and the provision of security and reconnaissance to friendly forces. He felt that they could be ideally employed in battle areas where dispersion was necessary and in "brushfire" wars against unsophisticated opponents.¹⁰⁶

The airmobility concept had been discussed in Army circles for several years. Early proponents of the idea included Generals Matthew B. Ridgway, Hamilton H. Howze and James M. Gavin. Gavin, who had been the Army's first Chief of Research and Development, is considered to be one of the earliest advocates of the concept and he saw it as the logical extension of airborne operations. He wrote several articles about it in the mid-1950's, and his book War and Peace in the Space Age (New York: Harper and Brothers, 1958) was very influential. Howze took over the proselytization of airmobility when he became the

first Director of Army Aviation in 1956. The concept had been tested in several maneuvers, such as Exercises SAGE BRUSH and SLEDGE HAMMER in the mid and late-1950's. Airmobility proved promising but was handicapped by the equipment used. It could not perform to the standards envisioned by Howze and others until the introduction of the HU-1.¹⁰⁷

The 1960's were to provide the conditions in which the concept of airmobility would reach fruition. In 1961 the new President, Kennedy, introduced a new military strategy. The Army was accorded a higher priority since this new policy called for a flexible response instead of massive retaliation. The emphasis was to be on fighting limited "brushfire" wars, and the concept of airmobility provided the ideal tool. The Vietnam conflict gave Army aviation a chance for expansion and helped develop the airmobile concept. The first Army helicopter units arrived in Vietnam in December 1961 and were soon involved in the fighting.¹⁰⁸

Secretary of Defense Robert McNamara became concerned that the Army's aviation plans for the 1960's could not support the growing commitment in Southeast Asia. In October 1961 he requested a study of the plan by the Secretary of the Army. The Army reported back in early 1962 and on 17 April McNamara sent a memorandum to the Secretary of the Army informing him that the Army's program was too conservative. It needed to re-examine the basis for its plans and a study should be made of the following subjects: 1) the opportunities provided by new technology should be explored to a greater depth in an attempt to break traditional ties with surface mobility; 2) aircraft operated close to the ground could offer a great increase in efficiency over ground transportation in combat areas; and 3) the Army should establish a board to examine the concept of airmobility.¹⁰⁹

Within a month, General Howze was appointed president of the United States Army Tactical Mobility Requirements Board (Howze Board) and was directed by CONARC to re-examine the role of Army aviation and the aircraft requirements to support

it. The organizational and operational aspects of airmobility were tested in a series of war games and the Board submitted its final report to the Secretary of Defense on 20 August 1962. It called for the establishment of an air assault division which would have 459 aircraft instead of the normal 100 per division and would reduce the number of ground vehicles from 3452 to 1100. The division would be able to airlift one third of its assault elements at one time. The Howze Board also called for the establishment of an air cavalry combat brigade having 316 aircraft, of which 144 would be attack helicopters. Five alternative plans for modernizing the Army's force structure were presented and all of them called for improving the quality and quantity of aviation personnel. Finally, General Howze recommended that further testing of the concept be made and progress be reviewed annually.¹¹⁰ The recommendations stirred up a hornet's nest. The Air Force attacked the ideas as infringements of its functions and members of Congress attacked it as a costly boondoggle. The Board's report was even attacked by conservative elements within the Army because they saw airmobility as a threat to their pet ideas.

On 7 January 1963 the Army's Deputy Chief of Staff for Operations issued instructions to form a division to test the recommendations of the Howze Board. The 11th Air Assault Division was formed and participated in several exercises in the 1963-64 period. Information was exchanged with units in Vietnam and the tactics used there were incorporated into the program. A year and a half of training culminated in Exercise AIR ASSAULT II. In weather conditions that grounded Air Force high-performance aircraft, the 120 helicopters of the test unit moved an air-assault infantry brigade over 100 nautical miles to its objective. Major General Harry W.O. Kinnard, the division's commander, stated:

I am even more impressed by. . .its ability to perform in unique ways. . .it can exert control over a much wider area and with much more speed and flexibility. . .I believe it can widely disperse and yet, when required, quickly mass. . .then disperse again.¹¹¹

The concept was considered proven, in theory. To see if airmobility would stand the test of combat, it was decided to send an airmobile division to Vietnam. The 1st Cavalry Division (Airmobile) was activated on 1 July 1965. Many personnel of the 11th Air Assault Division were ineligible for overseas deployment due to the policy of rotating servicemen's tours of duty to one year in Vietnam, then at least one year back in the United States before being reassigned to Vietnam. After new people were trained, advance elements of the 1st Cavalry arrived in Vietnam in August.

Airmobility underwent several tactical and organizational changes in Vietnam. At first, there were several separate companies spread across the country in support of the Army of Vietnam (ARVN). These units were equipped with H-21 (Shawnee) helicopters, the "Flying Banana", until the HU-1 (Iroquois) went into full production and began to replace the H-21's in 1964. The HU-1 (later redesignated the UH-1 and nicknamed the Huey) was a great improvement since it was turbine-powered and could carry a larger payload with more maneuverability and less time down for maintenance. As aviation's presence in Vietnam increased it proved feasible to combine the separate companies into battalion-size units for greater control and more efficient utilization of the helicopters. Later, after the large troop buildups in 1965, the battalions were consolidated under brigades and began to support the American troops more than the ARVN. This was also the year in which the first airmobile division arrived in Vietnam. Lead elements of the 1st Cavalry Division (Airmobile) left the United States in August 1965 and were followed by the bulk of the division in October. The 101st Airborne Division became the second airmobile division, in 1968, after enough aircraft had been procured to change its organization. It was designated the 101st Air Cavalry Division and then redesignated the 101st Airmobile Division several months later.

There were several stages in the evolution of tactics. Although airmobility proved its worth in Vietnam, it was not

originally designed for this war but for war on the atomic battlefield. Pilots were taught nap-of-the-earth (NOE) flying to increase the survivability of the aircraft in a war against opponents with sophisticated weapons. In NOE the pilot flies low and slow, taking advantage of the terrain to mask his aircraft from the view of enemy anti-aircraft (AA) weapons and high-performance aircraft. Unfortunately, this technique did not work in Vietnam. Aircraft proved vulnerable to small arms fire from the ground, so they had to be flown at higher altitudes. The United States Air Force's command of the air allowed these tactics to be used. As the war progressed, the North Vietnamese Army (NVA) and the Viet Cong began employing increasingly sophisticated weapons, including radar-controlled AA and surface-to-air missiles (SAM). The NVA's use of these weapons forced another change in tactics. The airmobile units began using modified NOE, no longer flying low and slow among the trees but rapidly, just above the treetops. They relied on the firepower of the helicopters massed in the formations and support of the escorting attack helicopters to suppress ground fire.

One controversy that continued to plague Army aviation in Vietnam was the question of aircraft survivability. This problem had been discussed many times since the introduction of the Cubs in World War II. The Air Force insisted that relatively slow, low-flying aircraft were too vulnerable to attack from fighters. Tests were conducted in which several aircraft of the type used by Army aviation were pitted against Air Force fighters. The results were often inconclusive, since the conditions for the tests varied with the different aircraft.¹¹² In Vietnam, the number of helicopters shot down depended on the type of mission and the form of enemy attacked, either NVA or less sophisticated Viet Cong. Lieutenant General (then Major General) John J. Tolson was the commander of the 1st Cavalry Division (Airmobile) from April 1967 until July 1968. He believes that with the proper use of fire support and intelligence information, survivability of helicopters will be high.

He uses his division's statistics for 1967 as proof. In 977,983 sorties, only 688 helicopters were hit; and only 36 of these were shot down and lost.¹¹³ However, he does not mention how many were shot down and recovered or the type of weapons being employed by the enemy.

As the Army expanded its operations in Vietnam, the old Army-Air Force conflict over aviation roles reappeared. One of the earliest differences surfaced during the 11th Air Assault tests. Several Army twin-turbine OV-1 Mohawks were armed with machine guns and rockets and used in the close support role. The Air Force justifiably opposed this use as being a duplication of one of its missions, and the concept was dropped. The arming of helicopters also caused a controversy. Tests were performed by the Utility Tactical Transport Helicopter Company from 16 October 1962 to 15 March 1963 in Vietnam. The UH-1 proved to be a suitable gun platform, so the concepts developed in the late 1950's were given a practical application in tests where armed helicopters escorted troop-carriers and gave them supporting fire. Army commanders felt that these Huey gunships were more responsive than Air Force support and called for the procurement of more gunships. The Huey was replaced by the AH-1 Cobra, an attack helicopter that had been designed for its role. The Air Force tried to limit these helicopters to defensive missions but were not always successful.¹¹⁴

Controversy also arose over the Army's increased use of the C-7 Caribou. This was a fixed-wing, short take-off and landing (STOL) cargo aircraft that had been exempted from the weight restrictions by the Secretary of Defense in 1959. By 1966 the Army was operating six Caribou companies in Vietnam and was considering the expansion of its use and its replacement by a turbine-engined version. The Air Force contended that the Army was duplicating its function of aerial supply, and was doing it inefficiently.

After considerable acrimonious debate between the staffs, an agreement on armed helicopters and the Caribou was signed by the Army and Air Force Chiefs of Staff on 6 April 1966.

General Harold K. Johnson, the Army Chief of Staff, believed that the development of the helicopter was more important to the future of Army aviation and the concept of airmobility than the Caribou. He reasoned that any service could provide transportation for supplies. The agreement called on the Army to relinquish all claims for fixed-wing aircraft designed for tactical airlift, and the transfer of all those presently in the inventory to the Air Force. In turn, the Air Force would relinquish all claims for helicopters designed for and operated in intra-theater movement, fire support and supply roles. The Air Force also agreed to consult with the Army before deciding to replace or eliminate the Caribou.¹¹⁵ The Army had won the right to claim helicopter development and airmobility as its primary functions in the field of aviation. It was thus given a free hand to continue developing armed helicopters and to expand Army aviation along the lines of airmobility.¹¹⁶

CONCLUSION

As organic Army aviation evolved, it faced several critical barriers and was able to surmount them. The first problem was gaining a permanent existence. After having been started and then abandoned on several occasions, the foresight of people like Generals Greely and Allen nurtured the formation of military aviation. The next big test came during the period between World Wars I and II. Army aviation, as it is organized today, once again faced extinction. The advocates of strategic bombing gained control of the Army Air Service and oriented it toward pursuit and bombardment aviation. Observation aviation took a backseat. General Danford and other ground commanders led the struggle to procure light observation aircraft to support the ground forces. On 6 June 1942, Army aviation was reborn.

Although never again really faced with extinction, it still had many battles to face. The Army Air Forces, later the United States Air Force, justifiably continued to guard its prerogatives and tried to confine Army aviation to as small a role as possible. The National Security Act of 1947, which

gave organic Army aviation a legal basis and therefore some protection, also provided the Air Force with the justification to attack any attempt of the Army to expand its aviation roles. Joint Army and Air Force Regulation 5-10-1, dated 29 May 1949, attempted to stop any arguments by defining each services' aviation functions. However, they were not satisfied, and the 1950's were marked by a continuing feud over aviation roles and functions. The Pace-Finletter Memoranda and that of Secretary of Defense Wilson redefined these functions and gave Army aviation an expanded role. The Vietnam War provided an opportunity to develop this new role. The advent of advanced helicopters, such as the UH-1, gave Army aviation the equipment needed to test concepts that had been theorized but never practiced. The concept of airmobility, as proposed by Howze and others, was tested and successfully put into use in Vietnam, although it had been designed for use on a conventional battlefield.

This raises the question of Army aviation's future. NOE tactics have received a new emphasis and training is being re-oriented toward a limited nuclear war in Europe. Although airmobility proved successful in Vietnam, it has never been tested in battle when the United States does not have air superiority. Theory says that it will succeed, but the question remains whether or not the concept of airmobility will find a successful application on the conventional battlefield of the future; or will it have to evolve to another stage of development?

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Designation	Name	Manufacturer	Weight (Gross) ^a	Capacity ^b	Procurement ^c	Remarks
L - 4	GRASSHOPPER	Piper	1,220	2	9,404	Observation, reconnaissance
L - 5	SENTINEL	Vultee-Stinson	2,020	2	3,975	Observation, reconnaissance Could be fitted with one litter
L - 13		Consolidated-Vultee	2,900	3	43	Observation
L - 14		Piper	1,800	3	5	Observation, reconnaissance
L - 15	SCOUT	Boeing	2,116	2	12	Observation, reconnaissance
L - 16		Aeronca	1,300	2	609	Observation, reconnaissance
L - 17	NAVION	Ryan (North American)	3,050	4	657	Utility
L - 18		Piper	1,500	2	730	Observation, reconnaissance Improved version of the L - 4
L - 19 (O - 1)	BIRD DOG	Cesna	2,100 (L - 19A) 2,400 (L - 19E)	2	1,871	Observation, reconnaissance
L - 20 (U - 6)	BEAVER	DeHavilland	4,820	6	654	Utility
L - 21	SUPER CUB	Piper	1,500	2	150	Observation, reconnaissance
L - 23 (U - 8)	SEMINOLE	Beech	7,000	6	328	Utility
L - 24	COURIER	Helio	3,000	4	1	Observation, reconnaissance
LC - 126		Cesna	3,350	4	64	Trainer, utility

^a In pounds.^b Including crew.^c Total procurement, which extends, in some cases, beyond 1954.

TABLE 1: ARMY FIXED WING AIRCRAFT 1942-1954

Designation	Name	Manufacturer	Weight (Gross) ^a	Capacity ^b	Procurement ^c	Remarks
H - 13	SIOUX	Bell	2,450	3	1,159	Observation, reconnaissance, training. Could be fitted with two litters
XH - 15		Bell	2,600	4	3	Reconnaissance, utility
YH - 16		Piasecki	46,700	50	2	First heavy cargo
XH - 17		Hughes	46,000	3	1	First flying crane
YH - 18		Sikorsky	2,400	4	4	Utility
H - 19	CHICKASAW	Sikorsky	7,522 (H - 19D) 6,767 (H - 19C)	12	293	Utility. Could be fitted with six litters
XH - 20		McDonnell		1	2	Observation, reconnaissance
H - 21		Piasecki (Vertol)	13,300	22	294	Utility. Could be fitted with twelve litters
H - 23	RAVEN	Hiller	2,800	3	1,042	Observation, reconnaissance, training, evacuation
YH - 24	ARMY MULE	Sibel	1,540	2	2	Reconnaissance, evacuation
H - 25		Piasecki	5,500	5 to 8	70	Utility
XH - 26		American	810	1	5	Observation, reconnaissance
YH - 30		McCulloch	2,000	2	2	Observation, training, cargo, evacuation
YH - 31		Doman	5,200	4 to 8	2	Utility
YH - 32	MOJAVE	Hiller	1,080	2	6	Reconnaissance
H - 37		Sikorsky	30,342	26	91	Medium cargo. Could be fitted with twenty-four litters

^a In pounds.

^b Including crew.

^c Total procurement, which extends, in some cases, beyond 1954.

TABLE 2: Army Helicopters, 1946-1954¹¹⁸

NOTES

1. United States Air Force, Historical Division, The United States Army Air Arm, April 1861 to April 1917 (Maxwell Air Base, Alabama(MAFB): Air University, 1958), 4. Hereafter referred to as USAF.
2. Richard Tierney, "The Army Aviation Story, Part I", United States Army Aviation Digest (Aviation Digest), 8 (June 1962), 4. Hereafter referred to as Tierney, June 62.
3. USAF, 9.
4. Tierney, June 62, 6.
5. Ibid., 5.
6. Ibid., 5.
7. USAF, 13.
8. Tierney, June 62, 8.
9. R. Earl McClendon, Autonomy of the Air Arm (MAFB: Air University, 1954), 143. Hereafter referred to as McClendon, Autonomy.
10. There are two major types of balloons; free and captive, the latter of which is secured to the ground or guided by personnel on the ground with ropes or cables. Airships are lighter-than-air vehicles powered by some type of engine. They are either rigid (a frame gives it the shape and the lifting gas is in separate containers), non-rigid (gas pressure gives it the shape) or semi-rigid (similar to non-rigid but has a keel added to the bottom of the gas bag to increase load carrying ability).
11. Tierney, June 62, 9.
12. Ibid., 8.
13. Ibid., 9.
14. The Army purchased several airships in the 1920's and the Navy continued using dirigibles in the 1930's.
15. USAF, 20.
16. Ibid., 34.
17. Ibid., 40.

18. McClendon, Autonomy, 3.

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27. Ibid., 63-64.

28. Ibid., 66-67.

29. McClendon hints that the Morrow Board may have been formed to steal the impact of the Lampert Committee.

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40. Weinert, Phase I, 7.

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43. Greenfield, 27.

44. Ibid., 28

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B. Franklin Cooling, "A History of US Army Aviation", Aerospace Historian, 21 (Summer/June 1974), 102-109.

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54. Greenfield, 42.

55. Ibid., 77.

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58. Ibid., 113.

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The use of organic Army aviation in World War II is covered by Tierney, and by Devon Francis in Mr. Piper and His Cubs (Ames, Iowa: The Iowa State University Press, 1973). Francis also writes about the actions leading up the Army's procurement of the Cubs. Kent Roberts Greenfield covers the same period in Army Ground Forces and the Air-Ground Battle Team (Fort Monroe, Virginia: Army Ground Forces, 1948), but he concentrates on the administrative decisions that helped define Army aviation's functions during the war rather than on the missions themselves. Robert F. Futrell's Command of Observation Aviation: A Study in Control of Tactical Air Power (MAFB: Air University, 1956), Robert T. Finney's History of the Air Corps Tactical School 1920-1940 (MAFB: Air University, 1955) and Thomas H. Greer's The Development of Air Doctrine in the Army Air Arm, 1917-1941 (MAFB: Air University, 1955) deal with various aspects of aviation doctrine to include: the correct method of employing observation aircraft; the development of strategic bombing theory and the struggle for dominance by the various schools of thought in the Air Corps.

Several books cover the period from the Korean War to the present. The development of Marine Corps doctrine for the use of helicopters and their use of the helicopters in the Korean War are covered by Lynn Montross in Cavalry of the Sky: The Story of the Marine Combat Helicopters (New York: Harper, Row, 1954). Dario Politella does much the same thing for Army aviation in Operation Grasshopper (Wichita, Kansas: The Robert G. Longo Company, 1958), although he concentrates on the types of missions flown and war stories rather than administrative

changes. R. Earl McClendon does an excellent job examining Army aviation's struggle to define its roles during the Korean War era, in his book, Army Aviation, 1947-1953 (MAFB, Air University, 1954). Richard P. Weinert does much the same thing in A History of Army Aviation 1950-1962, Phase I: 1950-1954 (Fort Monroe, Virginia: United States Continental Army Command Historical Office, 1971). This book also covers the training aspects of Army aviation and administrative changes. He has also written A History. . .Phase II: 1955-1962 (Fort Monroe, Virginia: United States Army Training and Doctrine Command, 1976) which does much the same thing for these years. It also contains excellent chapters on the arming of helicopters and the early development of the airmobile concept. The best book on airmobility is John J. Tolson's Airmobility 1961-1971 (Washington: USGPO, 1973). He uses many examples of actual missions in Vietnam to illustrate how the concept of airmobility evolved through this period. Two other books in the Army's Vietnam Studies series that may prove useful are Sharpening the Combat Edge (Washington: USGPO, 1974) by Julian J. Ewell and Ira A. Hunt, Jr. and, Tactical and Material Innovations (Washington: USGPO, 1974) by John H. Hay, Jr. The first book examines the Army's use of operations research to increase the efficiency of combat operations in Vietnam, while the latter deals with the various innovations the Army was forced to make during the war.

There are several books on helicopters, but most of them deal with civilian uses. The best book for examining the military use of helicopters is Bern Keating's Chopper! (New York: Rand McNally and Company, 1976). However, the book is general in nature and does not get into technical details or the doctrine for employing the helicopters. The best book for examining the development of weapons for helicopters and the doctrine for using them is The Development, Adaption, and Production of Armament for Army Helicopters, 1957-1963, Part I (Rock Island, Illinois: US Army Weapons Command, 1968) by Leonard C. Weston and Clifford W. Stephens.

There are two other sources of information that can prove to be rewarding if the time is available for research. They are the Congressional Hearings and the numerous periodicals. Aside from those documents mentioned above in the notes, there are many others, such as annual appropriations, budget hearings and special investigations. In addition to the Congressional sources there are reports from the Executive branch like the Annual reports of the War Department.

Periodicals and journals can be divided into three broad areas. In the academic area, Military Affairs and Aerospace Historian are among the best. The latter has several articles dealing with Army aviation, although most essays deal with the Air Force. Another area is those magazines published for the aerospace industry. Many of the back issues contain articles dealing with aspects of Army aviation, especially during wars. Two of the more useful periodicals are American Helicopter and Aviation Week and Space Technology. Finally, there is the broad area of official and semi-official publications published by the Army and the other services. Some of them, like Army, are published by organizations that have no official connection with the military, but are sympathetic to their views. The best magazine for researching the topic of Army aviation is the US Army Aviation Digest, published by the Army Aviation School at Fort Rucker, Alabama. Its articles cover topics ranging from explanations of Defense Department decisions to aviation safety and medicine. There are numerous reports on the latest changes in tactics and doctrine. The best guide to finding those articles of interest in all these periodicals is the Air University Library Index mentioned above.

Aside from those works mentioned above, there were several books and periodicals that may have been useful in researching the history of organic Army aviation, but were not available. Two of the books were W.E. Butterworth's Flying Army: The Modern Air Arm of the U.S. Army (Garden City, New York: Doubleday & Company, Inc., 1971) and The Origins, Deliberations and

Recommendations of the US Army Tactical Mobility Requirements Board (Howze Board) (Fort Leavenworth, Kansas: USACDC CAG, April 1969) by Barbara A. Sorrill and Constance J. Suwalsky. One periodical that had several interesting articles listed in the Air University Index, was the Army-Navy Journal. Unfortunately, I was not able to obtain issues between 1909 and 1973.

THE EVOLUTION OF ARMY AVIATION

by

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THE EVOLUTION OF ARMY AVIATION

Army aviation is the personnel and aircraft that are organic to United States Army ground units. These aircraft were authorized in 1942 and were left after the United States Air Force (USAF) gained its independence from the Army in 1947. This paper examines the early development of military aviation, its growth during and after World War I and the search for autonomy by what was to become the USAF. It then reviews the birth of Army aviation in 1942 and its struggle to grow after World War II. The primary focus is placed on those investigating boards and agreements that defined the functions and roles of Army aviation.

Military aviation suffered many changes of fortune between 1861 and 1912. On several occasions balloons were utilized for observation and fire control, but lack of continuous funding led to their abandonment. In 1907 the Chief Signal Officer of the Army, Brigadier General James Allen, established an Aeronautical Division to take charge of all matters pertaining to military ballooning and related subjects. He also presided over the Army's purchase of its first dirigible in 1908 and first airplane in 1909. In 1912 the first appropriation specifically for military aviation was passed by Congress. Military aviation expanded significantly during World War I, and the airplane was to become dominant. The balloon was found to be too vulnerable to the elements and attack from planes.

During the period between the two world wars, new theories were developed for the use of military aviation. These included strategic bombing and air superiority. Several boards and committees investigated the calls from the air forces for independence from the rest of the Army. Some of the more important were the Morrow Board, the Lampert Committee and the Baker Board. The air arm was not to achieve independence until 1947, although it did get virtual autonomy in 1941-42.

While the struggle for autonomy was proceeding, another conflict was brewing. The Army ground commanders desired an aircraft that could be used near the front lines, land on unimproved strips and was under their control for observation, liaison and fire adjustment. The air commanders wanted a heavier, faster, more sophisticated plane that was under their control. Although this conflict was to continue through the Vietnam War, a partial victory was won by the ground commander when organic, light observation aircraft were authorized on 6 June 1942. This was the birth of Army aviation.

After World War II the Army and the Air Force continued to struggle over control of aviation and what were to be the proper functions of each services' aircraft. The National Security Act of 1947 and the Key West and Newport Agreements of 1948 defined the basic functions of each service. The Army sought an expanded role during the Korean

War. Agreements between the Secretaries of the Army and the Air Force, Frank M. Pace and Thomas K. Finletter, set new roles and redefined old ones in 1951 and 1952. These agreements restricted the Army's aircraft to certain weights and missions and defined the area in which they could operate. More agreements were made in 1956 and 1966.

Vietnam provided Army aviation to develop the concept of airmobility and saw it grow rapidly. Airmobility is what Army aviation is based on today and is the role that it will perform in the foreseeable future. Army aviation struggled to grow and expand its functions in the face of Air Force opposition. Through a series of agreements this was accomplished and it developed airmobility.