A HISTORY OF THE MISSIONS OF ARMY AVIATION PERFORMED IN SUPPORT OF THE FIELD ARMY

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A HISTORY OF THE MISSIONS OF ARMY AVIATION PERFORMED IN SUPPORT OF THE FIELD ARMY

An abstract for a thesis presented to the Faculty of the U. S. Army Command and General Staff College in partial fulfillment of the requirements of the degree

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by
FRANKLIN L. WILSON, Major, Infantry

Fort Leavenworth, Kansas
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ABSTRACT

In recent years Army Aviation has become an essential tactical and logistical tool for Army commanders. Army aircraft now support the land battle by performing a variety of missions throughout the combat zone, though commanders have not always enjoyed the magnitude of organic aviation support which is currently available. It is useful, therefore, to examine the missions which Army Aviation has performed in past years as a means of understanding how Army Aviation has come to have its present capabilities, and what further mission requirements may be desired.

The purpose of this thesis, therefore, is to trace the historical development of Army Aviation in terms of the missions it performs in support of the field army. Army Aviation is defined as "personnel, aircraft, and allied equipment organically assigned to Army organizations by appropriate tables of organization and equipment, tables of distribution, tables of allowances, or other competent authority," and specifically, in this thesis, as those aircraft and aviation units which are organic to elements of a type field army. The field army is selected as the level of command for discussion because at this level of operation are found all of the Army Aviation units which have the basic mission of supporting Army combat operations.

In order to trace the evolution of missions performed by Army Aviation, this thesis is divided into chapters, each of which covers an event or period of time which had its own particular effect on Army

Aviation. Since the mission capability of Army Aviation during any particular period of time was closely related to the type of aircraft available and to the manner in which aviation units were organized, each chapter includes a discussion of aircraft employed and aviation unit organization concurrent to the period of time being discussed. As an aid in evaluating the overall spectrum of missions performed by Army Aviation, a tabulation of the missions discussed within each time period (chapter) is included. To further aid in evaluating the effect of aircraft characteristics and capabilities on the mission capability of Army Aviation, tabulation of characteristics of all aircraft discussed in the thesis is also included.

A consideration of the discussions of the evolution of Army Aviation's mission capability leads to a conclusion that the most important factor which has affected the growth of this capability has been the physical characteristics and capabilities of aircraft and aviation peculiar equipment available at any given point in time. From this conclusion, taken in view of the capabilities of the present family of Army aircraft, the author suggests that logical future developments in Army Aviation will include an expansion of two present capabilities, specifically the groups of missions categorized as aerial fire support and transportation.

Consideration of these discussions also leads to a conclusion that inconsistent departmental policy has also affected the growth of Army Aviation's mission capabilities. History shows that the greatest progress in Army Aviation has come about during periods of war. From this conclusion, the author suggests the prudence of recognizing that Army Aviation will perform its missions more effectively in war when

modernization and expansion of mission capabilities is accomplished during peacetime, thus reaffirming the validity of the motto of the United States Army Command and General Staff College, "Ad Bellum Pace Parati," (Prepared in Peace for War).

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INTRODUCTION

In recent years Army Aviation has become an essential tactical and logistical tool for Army commanders at all levels. Army aircraft now support the land battle by performing a variety of missions throughout the combat zone, though commanders have not always enjoyed the magnitude of organic aviation support which is now available. There have been periods in the United States Army's history when lack of organic aviation support has been a subject of much concern to the ground forces. It is useful, therefore, to examine the missions which Army Aviation has performed in past years as a means of understanding how Army Aviation has come to have its present capabilities, and what further mission requirements may be desired.

The purpose of this thesis, therefore, is to trace the evolution of Army Aviation in terms of the missions it performs within the field army. Army Aviation is defined as "personnel, aircraft, and allied equipment organically assigned to Army organizations by appropriate tables of organization and equipment, tables of distribution, tables of allowances, or other competent authority."[1] This definition separates aviation support provided by organic Army aircraft from aviation support provided by the present United States Air Force. However, prior to the establishment of the separate Department of the Air Force

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[1] U. S. Department of the Army, Dictionary of United States Army Terms, AR 320-5 (Washington: U. S. Government Printing Office, April 1965), p. 43.

in 1947, all aviation support which falls within the scope of this thesis was organic to the Army. Therefore, the definition of Army Aviation, as stated, encompasses all aviation support provided by the Air Service in World War I, its successor the Army Air Corps of the 1930's, and the World War II Army Air Forces. However, since the purpose of this thesis is to discuss missions performed by organic aviation support within the field army, only those elements of the Air Service, Army Air Corps, or Army Air Forces which were assigned to field armies are discussed. The field army is selected as the appropriate level of discussion because this level of operations encompasses all of the typical Army Aviation organizations which have the basic mission of supporting ground combat.

In order to describe the history of missions performed by Army Aviation in support of the field army, each chapter of this thesis is based on a period of time significant in the history of military aviation. The missions performed during each period are developed in relation to the aircraft used and the aviation organizations assigned to a typical field army of that period. In describing the missions performed by Army Aviation in support of the current Army structure, a type field army is used. This type field army is extracted from a Common Subjects and Reference Data for Army Aviation in the Field Army handbook published by the United States Army Aviation School in January 1966.[2] The field army model used is also the same as that used currently by the United States Army Command and General Staff

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[2] U. S. Army Aviation School, Common Subjects and Reference Data for Army Aviation in the Field Army (Fort Rucker, Ala.: U. S. Army Aviation School, January 1966), p. 2.

College for instructional purposes. Current Army Aviation operations in South Viet Nam are not discussed separately since all missions performed by the aviation organizations in that country are included within the framework of support performed for the field army. Similarly, the airmobile division concept is not discussed separately since divisions organized under that concept are not yet included in the type field army structure.

As aircraft and Army structures have changed over the years, so has aviation terminology changed. Terms such as missions, tasks, roles, and functions have been used interchangeably or with different meanings, at different periods of time. In order to insure clarity as to what is meant by the word "missions" in this thesis, "missions performed by Army Aviation" refers to specific tasks which Army Aviation organizations can perform, or have performed, in support of field army operations. The tabulation of Army Aviation mission capabilities is simplified by grouping all missions discussed into four basic mission categories selected by the author. These categories are observation, transportation, command and control, and firepower.

Aircraft designations have likewise changed over the years. In different time periods, for example, the same Army aircraft, such as the OH-13 Sioux, have been referred to as reconnaissance helicopters and as observation helicopters. Similarly, the same troop carrying helicopters, such as the CH-34 Choctaw, have been referred to as light transport helicopters and light cargo helicopters. In addition, in 1962, the Army established a functional designation system for its

aircraft, and many aircraft were given new designations.[3] For example, the L-20 Beaver became the U-6A Beaver. Therefore, in order to insure clarity in identifying Army aircraft discussed in this thesis, the aircraft designation stated in the text corresponds to the time frame of the discussion, and the official nickname of the aircraft, which has not changed, is also given.

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[3] William H. Smith, "Aircraft Designators," United States Army Aviation Digest, VIII, No. 11 (November, 1962), pp. 3-5.

CHAPTER I

BACKGROUND

The Early Years of Flight, 1861-1918

Balloons

Army Aviation began in 1861. It was in that year that Thaddeus S. C. Lowe, a New Hampshire meteorologist, ascended in a balloon at Washington, D. C., and from an altitude of 800 feet, sent a telegraph message to President Lincoln. As a result of this demonstration, President Lincoln authorized the formation of an Army Balloon Corps, commanded by Lowe, to serve the Army of the Potomac. Lowe worked for the Union Army for two years, taking part in the battles at Bull Run and Chancellorsville and in the Richmond Campaign. Then in 1863, in the wake of arguments and lack of interest by Union commanders, the Balloon Corps was disbanded. During his two years of service, Lowe performed two basic missions--operating both day and night, he observed the enemy's positions and movements, and he directed artillery fire.[1] He transmitted information by telegraph and by dropping messages and terrain sketches to troops waiting below.

In 1892, the Army re-established a Balloon Section in the Signal Corps. However, such little interest was shown in this section

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[1] Alvin M. Josephy Jr. (ed.), The American Heritage History of Flight (New York: American Heritage Publishing Co., 1961), p. 65.

that when the Spanish-American War started in 1898, the section had but one balloon. This balloon was shipped to Cuba, where it was soon riddled with bullets, thereby serving no useful tactical purpose. Although its mission was to provide observation of the enemy, it never performed this mission successfully, and because of this failure, the Balloon Section was disbanded in 1899.[2]

Early Airplanes

The next few years brought no new developments in aviation. Then on 17 December 1903, at Kitty Hawk, North Carolina, Orville and Wilbur Wright made the first powered flight in an airplane. Their small aircraft barely flew, but Army observers recognized its military potentialities. Thus, in 1907, the Army created an Aeronautical Division in the Office of the Chief Signal Officer.[3] The purpose of this Division was "to study the flying machine and the possibility of adapting it for military purposes," and it was charged with "all matters pertaining to military ballooning, air machines, and all kindred subjects."[4] By 1908, President Theodore Roosevelt was convinced of the possibility of putting the airplane to military use, and the Army was granted funds to purchase a plane from the Wright Brothers. The desired specifications for this plane were that it should carry 2 men and enough fuel for a flight of 125 miles, be able to fly 10 miles nonstop, and

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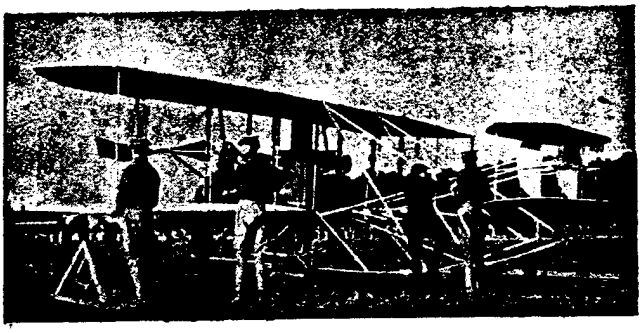
[2]Historical Office of the Army Air Forces (ed.), The Official Pictorial History of the AAF (New York: Duell, Sloan and Pearce, 1947), p. 15.

[3]David C. Cooke, The Story of Aviation (New York: Archer House, 1958), p. 148.

[4]Historical Office of the Army Air Forces (ed.), The Official Pictorial History of the AAF, p. 15.

maintain an average speed of 40 miles per hour. The missions this airplane was to perform were not stated.[5] This first Army airplane (shown in Figure 1) was known as the Wright A Flyer.



WRIGHT A FLYER. First airplane procured by the Army in 1909. It was a warped wing two-seater which rose from a track and landed on skids. Powered by a 30 horsepower engine, the Flyer attained a speed of 40 miles per hour. It had a 36 foot 4 inch wingspan, was 28 feet long, and weighed 1,200 pounds.

Fig. 1.--The Army's First Airplane: Wright A Flyer.[6]

It was flight tested at Fort Myer, Virginia in 1909, and was delivered to the Army in that year. It was the Army's only airplane until 1911 when Congress appropriated money for five more.[7] The next five airplanes, known as Wright B Flyers were in use from 1911 to 1914, but they performed no military missions. The airplane had not yet begun its useful military service; however, these Wright B Flyers did permit pioneer experiments with radios, bombs, bomb sights, machine guns, and

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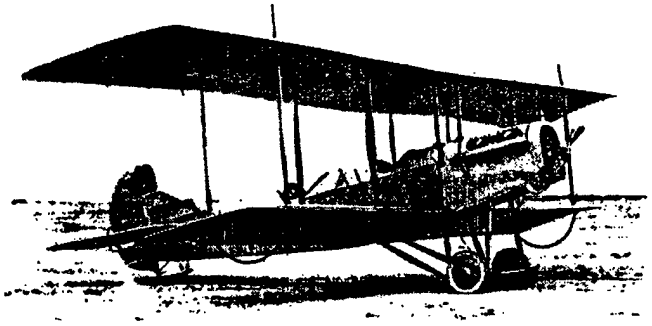
[5] Ibid., p. 22.

[6] Ibid., p. 170.

[7] Alvin M. Josephy Jr. (ed.), The American Heritage History of Flight, p. 164.

pontoons.[8]

The first Army tactical aviation unit was formed in 1913 when the First Aero Squadron was organized at San Diego, California. The squadron was equipped with Curtiss R-2 airplanes shown in Figure 2.



R-2. A 1916 vintage airplane which saw service on the Mexican border. Powered by a 160 horsepower engine, it attained a speed of 90 miles per hour. The R-2 had a 43 foot wingspan, was 28 feet 5 inches long, and weighed 2,800 pounds.

Fig. 2.--Curtiss R-2 Airplane[9]

In March 1916, eight airplanes from this squadron were assigned to General Pershing on the Mexican border to assist in the pursuit of Pancho Villa. This, the Army's first attempt to use airplanes in combat, was a dismal failure. The aircraft were not able to overfly the 12,000 foot Sierra Madre mountains; furthermore, they encountered dust storms, turbulent air, high winds, and snow. By April, only two of the airplanes remained flyable, and these were sent back to San Diego. Thus the Army was unable to employ its airplanes for desired tactical

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[8]Historical Office of the Army Air Forces (ed.), The Official Pictorial History of the AAF, p. 27.

[9]Ibid., p. 172.

missions; however, they were used to carry messages and couriers.[10]

World War I

Aircraft.--While the United States Army was encountering difficulty in employing aviation, Europe had become embroiled in war, and, by 1916, both sides in that war were using airplanes and balloons in a variety of missions. Tight censorship in the combat zone of Europe prevented much of the knowledge of advances in aviation technology from reaching the United States. In addition, American apathy toward the war, coupled with proclamations of neutrality served to reduce American interest in military aviation. Thus, when the United States entered the war in 1917, its aviation program lagged far behind that of the Allies.[11]

Because of its late entry into the war, the United States Army did not develop any significant new aviation equipment or tactics during World War I. Instead, the Allies, who had been involved in the war since 1914, passed on their knowledge of air warfare to the Americans. Since American aircraft industry was just starting to expand in 1917, most of the aviation equipment used by American Air Service units was purchased from the French or British. The first American made airplane arrived in France in May 1918, and the first American squadron completely equipped by American production crossed German lines on

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[10] Arch Whitehouse, Decisive Air Battles of the First World War (New York: Duell, Sloan and Pearce, 1963), p. 28.

[11] Alvin M. Josephy Jr. (ed.), The American Heritage History of Flight, p. 164.

August 7, 1918.[12] America produced only one warplane--the observation plane known as the DeHaviland DH-4. The two best known airplanes which served the American Expeditionary Force in World War I were the DH-4 and the French built SPAD 13. These aircraft are shown in Figure 3.

In retrospect, the years 1914-1918 saw rapid development in the use of airplanes for war. Even though America entered the war in its final stages and used airplanes and tactics developed by its Allies during the earlier phases, significant experience was gained and a major contribution was made by American aviation units toward the ultimate victory. By and large, the characteristics of World War I aircraft made them suitable for supporting the land battle. They were light, slow, and built with a rugged landing gear. They could operate from sod strips as near to the front lines as the range of enemy artillery would permit. From this proximity, corps and army commanders were able to establish close working relationships with their Air Service comrades. The limited operating range of the aircraft was another reason for locating airfields as close to the front as practicable.

Organization.--There were numerous types of aviation units assigned to the American ground forces. These units were organized according to the missions intended for their aircraft.

There were several mutations in the organization of American forces, but by the end of the war a definite table of organization was developed. Figure 4 is an extract of a table of organization, dated September 1918, which shows how the Air Service was organized to support

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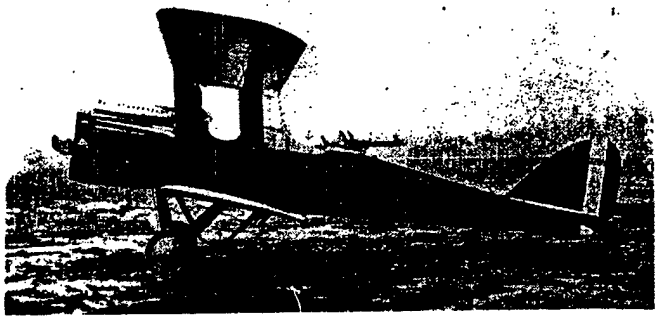
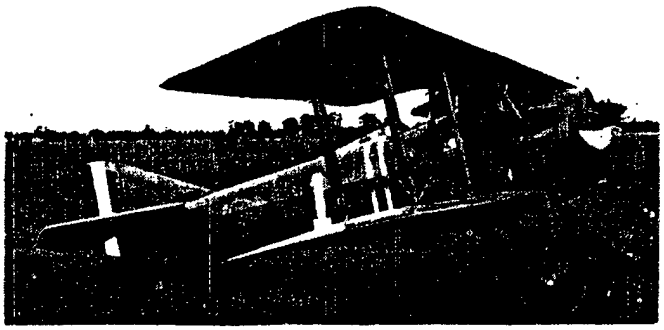
[12]Historical Division, Department of the Army, United States Army in the World War, 1917-1919, Reports of Commander-In-Chief A. E. F., Staff Sections and Services, Part I (Washington: U. S. Government Printing Office, 1948), p. 5.



DH-4. The only American built warplane of World War II. The DH-4 was a two-seater designed for day bombing, but because of its speed and high service ceiling (20,000 feet), it was used for observation, photography, and as a fighter. Powered by a 400 horsepower Liberty engine, the DH-4 attained a speed of 130 miles per hour. It had a 42 foot 7 inch wingspan, was 29 feet 11 inches long, and weighed 3,532 pounds. Normal armament was 2 forward firing machine guns and 2 Lewis guns in a Scarff mount in the rear cockpit.



SPAD 13. The SPAD (Societe pour Aviation et ses Derives) was a French built pursuit plane flown by many American squadrons. Powered by a 226 horsepower engine, the SPAD 13 attained a speed of 130 miles per hour. It had a 27 foot 1 inch wingspan, was 20 feet 4 inches long, and weighed 2,069 pounds. Normal armament was 2 machine guns.

Fig. 3.--De Haviland DH-4 Observation Plane and SPAD 13 Pursuit Plane[13]

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[13]Historical Office of the Army Air Forces (ed.), The Official Pictorial History of the AAF, pp. 179 and 186.

AIR SERVICE

No. of Units	Type Unit	No. of Personnel
	Corps Air Service	
1	Headquarters	29
1	Observation Group	
	Headquarters (1 airplane)	10
	Supply and Trans. Section	18
	Engineering Section	5
	Photo. Section	31
	3 Squadrons (72 airplanes)	630
	Attached Medical, Ord., etc.	79
1	Balloon Group	
	Headquarters	42
	5 Companies (5 balloons)	390
	Attached Medical Dept.	24
CORPS TOTAL--73 planes, 5 balloons		
	Army Air Service	
1	Headquarters	31
2	Air Parks, each consisting of--	
	1 Headquarters Section	3
	1 Supply and Trans. Section	114
	1 Engineering Section	40
	Attached Medical Dept.	3
2	Army Observation Wings, each consisting of--	
	1 Headquarters	31
	1 Photo. Section	31
	1 Air Park	162
	3 Observation Groups (219 airplanes)	2082
1	Balloon Wing, consisting of--	
	1 Headquarters	16
	3 Balloon Groups (15 Balloons)	2796
1	Monoplane Pursuit Wing, consisting of--	
	1 Headquarters (1 airplane)	30
	1 Air Park	162
	3 Monoplane Pursuit Groups (288 airplanes)	1818
1	Day Bombardment Group, consisting of--	
	1 Headquarters	10
	1 Supply and Trans. Section	13
	3 Day Bombardment Squadrons (75 airplanes)	633
	Attached Medical Dept., etc.	18
ARMY TOTAL--219 Observation planes, 289 Pursuit planes, 15 Balloons, and 75 Day Bombardment planes		

Fig. 4.--Extract of Table of Organization for Army Air Service, September, 1918[14]

[14]Table of Organization for Army Air Service, September, 1918

land armies. As shown in Figure 4, Air Service units were organic to only corps and field armies. No aviation support was organic to divisions. Instead, each corps assigned or attached elements of its observation squadrons to support each of its divisions. Figure 4 shows that only observation units were organic to corps, while observation, pursuit, and day bombardment units were organic to field armies.

Missions.--World War I was the first period of experimentation and broad use of aircraft in combat. In the war's early stages the available aircraft were of limited effectiveness over the battlefield. However, by 1917 when America entered the war, aircraft had been considerably improved and air operations had become a daily routine. In contributing to the Allied victory in World War I, the American Air Service performed the following missions:

1. Observation. World War I observation aircraft were almost as fast as the pursuit airplanes, and were well armed. They operated over the front lines and well into enemy territory, both day and night. Visual observation was probably the most important mission performed by the Air Service.[15] Because air to ground radios were not in general use, it was necessary to report observed activity by message drop or upon return to base.

a. Artillery registration and adjustment. The type of artillery adjustment conducted by aerial observers was primarily a

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quoted in Historical Division, Department of the Army, United States Army in the World War, 1917-1919, Organization of the American Expeditionary Forces (Washington: U. S. Government Printing Office, 1943), pp. 135-136.

[15] Historical Division, Department of the Army, United States Army in the World War, 1917-1919, Organization of the American Expeditionary Forces (Washington: U. S. Government Printing Office, 1948), p. 262.

matter of giving the signal to lift or move barrage fires on signal from troops on the ground.[16] Although some radios were developed and used during the last months of the war, most adjustment instructions were written messages dropped at the artillery position or at a ground observer's location. For this reason, most artillery observers were forced to remain close to friendly lines.

b. Reconnaissance. Reconnaissance was all visual, but was conducted during both day and night. During World War I, most reconnaissance missions were referred to as patrols. One type of mission was the artillery patrol which had the task of locating enemy artillery positions. Another mission was the counterattack patrol which was used to locate and drop flare markers on counterattacking enemy troops. Cavalry reconnaissance patrols consisted of aerial observers, flying at very low altitudes, scanning the terrain immediately in front of infantry troops, and dropping messages indicating the location of enemy machine gun nests, strong points, and obstacles. Contact patrols had the task of locating friendly front lines and dropping flares or panels to mark the lines. They also reported the location of friendly tanks. Although most reconnaissance missions were oriented to the area of the front lines, long range reconnaissance missions were conducted to a depth of about sixty miles into enemy territory.[17] The aircraft had a slightly longer operating range; however, during World War I, a field army commander's area of interest on the battlefield was

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[16] Historical Division, Department of the Army, United States Army in the World War, 1917-1919, Reports of Commander-In-Chief . . ., p. 231.

[17] Ibid., p. 231.

accepted as extending approximately fifty miles forward of his front lines, and therefore there was no need for corps and field army aircraft to penetrate deeper. All Air Service aircraft were able to operate throughout this area.

c. Aerial photography. A surprising number (18,000) of aerial photographs were taken during World War I.[18] The camera systems used were quite simple, with the camera being held over the side of the cockpit to take the photographs. Nevertheless, the results were quite useful, and the finished photographs were normally delivered to Army commanders within a few hours after the airplanes returned to their bases. As shown in Figure 4, each observation wing and group had an organic photosection to process the photographs.

2. Command and liaison. Command missions included the transporting of commanders and staff officers, couriers, and messages between higher headquarters.[19] Such missions were among the least important missions performed during World War I.

3. Fire support.

a. Air combat. Combat in the air was oriented to air superiority. Typical missions included counterreconnaissance, which refers to the destruction of enemy reconnaissance planes, and balloon "busting."[20] Other combat missions involved bomber escort. Air combat missions were performed by the pursuit aircraft assigned to the field army.

b. Bombing. Day bombardment units were assigned to the field army. Initial efforts at bombing led to heavy losses until

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[18] Ibid., p. 225. [19] Ibid., p. 231. [20] Ibid., p. 231.

formation flying and gunnery techniques were perfected.[21] Later, additional protection for bomber formations was provided by formations of pursuit aircraft. Bombing raids conducted by these units, being tactical in nature, rarely penetrated beyond the fifty mile area of interest of the field army commander.

Night bombing procedures were developed during the last months of the war (in 1918), though this type of bombing was not undertaken by field army bombardment units. Instead, it was done by night bombardment units assigned to a General Headquarters (GHQ) Reserve Air Service which was composed of pursuit groups and bombardment groups not assigned to field armies. About a third of the missions performed by the GHQ Reserve Air Service were support of the field armies; however, most of the time the GHQ Air Service performed long range bombing missions which were more strategic than tactical.[22] Though the GHQ Air Service units were not assigned to field armies, their operations during the closing months of World War I are of historical importance because of the interest which military leaders showed in strategic bombing concepts immediately after the war. As an example of operations of the GHQ Air Service, the largest single bombing raid of the war was carried out on 9 October 1918 when over 200 bombers, 100 pursuit planes, and 53 triplace planes took part in a raid on a cantonment area near Mavrille, France, to destroy a German counterattack force some twenty miles behind the front lines. With over thirty-two tons of bombs being dropped, the raid cost one plane lost, while twelve enemy planes were

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[21] Ibid., pp. 234-235.

[22] Alvin M. Josephy Jr. (ed.), The American Heritage History of Flight, p. 167.

shot down.[23] The deepest penetration of a bombing raid during World War I was some 160 miles into enemy territory. Late in 1918, General William Mitchell, commander of the GHQ Air Service, had command of a force of about 1,500 Allied planes.

c. Ground support. Machine gun fire and bombs were used for low altitude attacks on enemy troops and equipment. Other ground support missions included attacking enemy antitank guns and smoking enemy observation positions with phosphorous bombs.[24]

Between the World Wars, 1919-1941

The 1920's

With the close of World War I, the United States began a rapid and almost complete disarmament. The Army's fleets of DH-4's were sold off to civilian pilots and those retained gradually became obsolete. The world's interest in the air turned from air aces to feats of the "barnstormers," cross country races, and altitude records.[25]

Within the military, the role of air power became a family squabble when General William Mitchell's bombers sunk the old German dreadnaught Ostfriesland in July 1921, using eight Martin bombers, dropping 2,000 pound bombs from an altitude of 2,500 feet.[26] This

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[23]Historical Division, Department of the Army, United States Army in the World War, 1917-1919, Reports of Commander-In-Chief . . ., pp. 234-235.

[24]Ibid., p. 234.

[25]Historical Office of the Army Air Forces (ed.), The Official Pictorial History of the AAF, p. 55.

[26]Alvin M. Josephy Jr. (ed.), The American Heritage History of Flight, pp. 200-201.

Service controversy affected almost every United States government action concerning aviation development from that day to the beginning of World War II.

The basis for the arguments was closely related to the United States' return to a foreign policy of isolationism after World War I. Within the framework of such a policy the line for defense of the United States was drawn at her own shore lines, and became known as the policy of hemisphere defense. There were many persons who, like General Mitchell, believed that the development of long range bombardment techniques during World War I was proof that an immense fleet of bombers, rather than naval vessels or land armies, should be the first line of defense for America. A corollary to the argument was that enemies of the United States could base fleets of bombers in Central and South America, and could employ those bombers to destroy the United States' naval and ground forces before they could be employed effectively to protect her shores. Therefore, the Mitchell faction argued that the Air Service should become America's primary defensive striking force, and that the paramount interest within the organization of the Air Service should be the creation of a massive GHQ strategic bombardment capability, coupled with a strong GHQ force of pursuit-interceptor airplanes to protect our own bombers and ward off enemy bomber fleets.[27]

During the 1920's, there was little change in aircraft design from that of World War I; and strategic air power continued merely as a theory in the minds of aviation leaders.[28] Nevertheless, the concurrent

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[27]H. H. Arnold and Ira C. Eaker, Winged Warfare (New York: Harper and Brothers, 1941), pp. 149-153.

[28]Albert F. Josephy Jr. (ed.), The American Heritage History of Flight, p. 202.

arguments concerning air power versus sea and land power, and strategic versus tactical air power, did distract attention away from the important contribution of military air power to the conduct of the land battle. There was also no appreciable change in the missions which Army Aviation was expected to perform and little improvement in the effectiveness with which the Air Service could perform the missions it had developed during World War I.

The 1930's

Aircraft.--The 1930's, however, saw a surge in advancement of aircraft design much like the first dozen years after Kitty Hawk. The decade of the '30's also saw great changes in the use of aircraft as world powers began a race for military air power. New aircraft were designed, but the designs usually became obsolete before the planes could be produced. Major design achievements of the 1930's included the change from biplanes to monoplanes with all metal construction, retractable landing gears, and more powerful engines.[29] For purposes of comparison, two observation aircraft of the 1930 decade are shown in Figure 5. One is the Curtiss O-40, used in the early 1930's, and the other is the North American O-47, which is considerably heavier and faster, used at the end of the decade. A comparison of these two planes illustrates the change to faster, heavier aircraft, which in turn required longer, hard surfaced runways to operate from. Since long, hard surfaced runways are not generally found close behind the line of contact, it became necessary for aviation units for support of

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[29]Historical Office of the Army Air Forces (ed.), The Official Pictorial History of the AAF, p. 73.

The 1935 Reorganization.--Just as aircraft design changed rapidly during the 1930's, military aviation organizational concepts likewise changed progressively to keep pace with new aircraft capabilities and with world developments. National defense became increasingly more important as events in Europe unfolded.

An important study of the 1930's was that conducted by the "Baker Board" in 1934. Headed by Newton D. Baker, the former Secretary of War, this board studied air power as a defense problem because by 1934, the United States' national defense policy was based primarily on defense of the homeland, overseas possessions, and commercial activities.[32] The "Baker Board" recommended an immediate buildup to replace old planes, and creation of a GHQ Air Force on a level with the Army Chief of Staff.[33] From these recommendations evolved the creation in 1935 of the GHQ Air Force as an autonomous air arm coordinate with the ground armies, and capable of strategic bombing. This reorganization was coincident with the development of the Boeing B-17, the most powerful bomber of the era.[34]

The GHQ Air Force was to be the striking force of military aviation which comprised all air combat units and auxiliaries trained and capable of operating in close cooperation with ground forces or independent thereof. It was planned that in time of war, the GHQ Air Force would be under direct control of the commander-in-chief of field

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[32]"Air Board Report May Speed Plane Program," Army and Navy Journal, July 28, 1934, p. 980.

[33]Ibid., p. 981.

[34]Historical Office of the Army Air Forces (ed.), The Official Pictorial History of the AAF, p. 80.

forces. The GHQ Air Force would conduct air operations beyond the sphere of ground forces in furtherance of the Army strategical plan. Also the GHQ Air Force would conduct operations in immediate support of ground forces; performing such missions as interdiction, air reconnaissance, and attack of enemy concentrations, movements, ammunition dumps and reserves.[35] The GHQ Air Force was authorized to be organized as shown in Figure 6.

GHQ AIR FORCE

		No. of Planes
GHQ Air Force Headquarters and Headquarters Squadron		
1 Pursuit Wing of 3 Groups	(120 each)	360
1 Observation Group		61
2 Air Divisions, each		
Air Division Headquarters	(5 each)	10
1 Bomb Wing Headquarters	(3 each)	6
2 Bomb Groups	(61 each)	244
1 Attack Group	(121 each)	242
1 Observation Group (2 Squadrons)	(35 each)	70
	TOTAL PLANES . .	993

Fig. 6.--Organization of GHQ Air Force, 1936[36]

The purpose of the pursuit aviation (Figure 6) was air combat. Its missions were to protect bombers and observation aircraft and to interdict enemy bombers and enemy attack aircraft.[37] The GHQ observation aviation had the missions of maintaining sustained frontier air patrols, providing security and information to support offensive air operations, and providing air service for the ground forces. In performing these missions, GHQ observation planes would undertake photography, visual

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[35]Headquarters Third Army, "Third Army Reference Documents for Commanders and Staffs of Large Units, 1936," Document No. 17, "Air Corps Data" (File No. M506-A7-D9.73, Fort Leavenworth, Kansas Library), p. 4.

[36]Ibid., App. 2.

[37]Ibid., p. 24.

observation, reconnaissance, surveillance and trailing (following enemy planes). These aircraft, armed with machine guns for protection, could operate at altitudes up to 20,000 feet and could penetrate enemy territory to a depth of about 300 miles.[38] Bombardment aviation was the principal arm of the GHQ Air Force. Its mission was to neutralize enemy aviation and to destroy naval vessels and territorial objectives vital to the functioning of the enemy's lines of communication and supply.[39] GHQ attack aviation was tactical rather than strategic. Its mission was to protect bombardment aircraft by neutralizing or destroying enemy ground anti-aircraft establishments and to support ground operations by attacking enemy materiel targets beyond artillery range.[40] These missions for the GHQ Air Force were theoretical because required numbers of aircraft were not on hand, and the organization was never tried in war.

The 1935 reorganization also provided for aviation units to be an integral part of corps and field armies. Corps and Army Air Forces were to be organized as shown in Figure 7. Like the GHQ Air Force, there were not actually enough aircraft on hand to form complete Corps and Army Air Forces as shown in Figure 7, so the organization was largely theoretical.

The Corps and Army Air Forces were to be equipped and trained to operate as an integral part of the ground force to which assigned. Figure 7 shows that only observation aviation units were assigned to

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[38] Ibid., pp. 16-17.

[39] Ibid., Document No. 15, "Characteristics and Tactical Employment of Aviation Organizations," p. 8.

[40] Ibid., pp. 2-4.

Corps and Army Air Forces. There was no organic division aviation. Divisions were to receive aviation support on a missions basis from corps aviation resources and by attachment of aviation units from the Corps Air Force of the corps to which they were assigned.[41]

ARMY AIR FORCE

	No. of Planes
1 Army Aviation Headquarters	5
4 Airdrome Squadrons	
1 Observation Group	
1 Headquarters and Headquarters Squadron	5
Service Squadron	4
4 Observation Squadrons (13 Planes each)	52
TOTAL PLANES . .	66

CORPS AIR FORCE

1 Corps Aviation Headquarters	3
1 Observation Group	
Headquarters and Headquarters Squadron	5
Service Squadron	
4 Observation Squadrons (13 Planes each)	52
1 Balloon Group	
Headquarters and Headquarters Squadron	
4 Balloon Squadrons (2 balloons each)	8
Service Squadron	
TOTAL PLANES . .	60
BALLOONS .	8

Fig. 7.--Organization of Corps and (Field) Army Air Forces, 1936[42]

In view of the increased emphasis placed on GHQ aviation, the 1935 reorganization of the Army Air Corps was a very significant action in relation to the control of air power and the missions which organic

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[41] Ibid., Document No. 17, p. 8.

[42] Ibid., Document No. 16, "Army Air Corps," p. 4.

aviation performed in support of the field army.[43] All combat aviation units were removed from the direct control of the field army commander. Even though GHQ observation units performed long range observation and reconnaissance missions in support of the ground forces and GHQ attack units performed combat support missions beyond the range of the ground forces artillery, the only aviation support which a field army commander had direct control of was observation units, and these aviation units operated from airbases far to the rear of the front lines.

As a result of the 1935 reorganization, the missions now performed by Army Aviation in support of the field army were limited to command and various forms of aerial observation. These missions, never performed in war, were tested in some field maneuvers. As stated in 1936, missions now performed by Army Aviation were:

1. Observation. Only visual means were used, with observers being in continuous radio contact with ground force elements. Observation was performed both day and night.

a. Reconnaissance. Reconnaissance was also performed by visual means, during both day and night. In 1936 terminology, reconnaissance referred to observation of particular routes or portions of the battlefield for the purpose of obtaining specific information of terrain or enemy activities. Distant reconnaissance was accomplished by observation units operating under field army headquarters. Close reconnaissance was accomplished by observation units operating within the corps area of responsibility. Battle reconnaissance, which was

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[43] The Air Corps Act of 1916 changed the name of the Air Service to the Army Air Corps (Alvin M. Josephy Jr. ed.), The American Heritage History of Flight, p. 202.

continuous observation of enemy forces in contact, was accomplished by corps observation units operating in support of divisions.[44]

b. Artillery adjustment and registration. By 1936, aircraft radios had been improved to such an extent that artillery observers were able to direct artillery fires anywhere over the battlefield within range of the artillery. Radio range was approximately 30 miles by voice and 100-200 miles by telegraph.[45]

c. Infantry missions. Aerial observers located front lines, reported and relayed signals from infantry troops, located and reported obstructions to friendly advance, and reported friendly and enemy shell bursts.

d. Aerial photography. Aerial cameras had been developed to the extent that they were mounted in fixed installations in the aircraft and were operated automatically. Night aerial photography had not yet been perfected. Photographs were processed at the airfields, but delivery to using units was dependent on ground vehicles, and could, therefore, be delayed by road and traffic conditions.[46]

2. Command. Aircraft radios made it possible to use the observers to relay messages and instructions between ground headquarters.[47] Command missions also included checking locations of troop units and verifying conflicting reports.

Observation Planes for the Artillery

Even though the 1936 organization of the Army Air Corps

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[44] Headquarters Third Army, "Third Army Reference Documents . . .," Document No. 15, pp. 16-17.

[45] Ibid., p. 14. [46] Ibid., p. 14. [47] Ibid., pp. 16-17.

provided for observation aviation to be assigned to corps and field armies, and even though one of the primary missions of the organic observation aviation was to support artillery units, artillerymen were dissatisfied. Their dissatisfaction took the form of two arguments. The first argument was that because the observation units operated from airbases some distance to the rear of the front lines, there was not sufficient responsiveness in securing requested observers over the front or in securing requested aerial photographs. The other argument was that the observer should not be an Air Corps observer, but an artilleryman trained in artillery fire direction. By 1938 an idea was voiced by ground force officers that it might be possible to develop a much lighter observation airplane which could be assigned to divisions, or even to artillery units. In that year, Ernst Udet, a famous German air ace, demonstrated a German Feisler-Storch airplane at the Cleveland Air Races and at Wright Field.[48] The Feisler-Storch was a light and slow observation plane which was able to take off and land on very short fields. Ernst Udet's demonstration impressed many officers in both the Army Air Corps and ground forces. A year later, the Air Corps invited American aircraft manufacturers to build a lighter observation plane. The design winner was the Vultee-Stinson O-49 (later designated the L-1).

Paralleling this design competition, Army mobilization led to large scale field maneuvers. The use of air support came under close scrutiny in several of these maneuvers, and maneuver reports often contained references to a lack of air support for ground forces. For

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[48] Andrew Ten Eyck, Jeeps in the Sky (New York: Commonwealth Books, Inc., 1946), p. 17.

example, in his final critique of the Third Army maneuvers held 5-25 May 1940, Major General A. J. Brees stated:

> It is my conviction that we need two distinct types of observation aviation. The division or corps aviation should be a slow but highly maneuverable ship, and one with the best possible visibility for pilot and observer. It should be capable of landing and taking off at slow speeds, in small areas, and on almost any type of terrain. Time will not permit the preparation of suitable landing fields for our present ships. For long range observation under the Army, a speedy ship and one with a greater range than the present O-47 is necessary.[49]

In another example, the recommendation of Major General P. P. Bishop after the Fourth Army, VII Corps maneuvers held in August 1940 included this statement:

> Serious consideration should be given to incorporating in the triangular division a detachment of observation aviation for the purpose of command, close and battle reconnaissance, control of columns and adjustment of fire.[50]

Such statements as these, coupled with a flood of articles published in Army periodicals concerning the need for organic ground force aviation, plus considerable numbers of letters written to the War Department on this same subject, led to an authorization from the War Department for the Army to use off the shelf airplanes such as Piper Cubs, Taylorcraft, and Aeroncas in subsequent maneuvers. These aircraft were provided by the manufacturers and were flown and maintained by civilians. These light planes, or "grasshoppers" as they were labeled, were flown in maneuvers and demonstrations in Louisiana in August 1940;

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[49] Headquarters, Third Army, "Annexes to Report, Third Army Maneuver, May 5-25, 1940, Sabine Area," Vol. II, Annex 21, "Final Critique, 25 May 1940" (File No. M506-A7-D9.73, Fort Leavenworth, Kansas Library) (Mimeographed), p. 24.

[50] Headquarters, Fourth Army, "Final Report, Fourth Army, VII Corps Maneuver, FY 1941, Little Falls Area, August, 1940," Comments and Recommendations (File No. M506-A7-D9.73, Fort Leavenworth, Kansas Library) (Mimeographed), p. 23.

Fort Knox in February 1941; Camp Bowie, Texas, in March 1941; Tennessee maneuvers in June 1941; desert maneuvers at Fort Bliss in July 1941; and, finally, in the Louisiana maneuvers in August 1941. Reports from these maneuvers concerning the value of light planes led the Secretary of War, in February 1942, to authorize the conduct of additional tests at the Artillery School at Fort Sill, with the 2d Infantry Division at Fort Sam Houston, and with the 13th Field Artillery Brigade at Fort Bragg.[51] After these additional tests, the War Department issued the order which authorized liaison planes in Field Artillery units. The implementing document, "Memorandum for the Commanding General, Army Ground Forces, Subject: Organic Air Observation for Field Artillery," dated June 6, 1942, reads in part as follows:

> (1) Liaison airplanes will be authorized for Field Artillery units at the rate of 2 per light and medium Artillery Battalions, 2 per Division Artillery Headquarters and Headquarters Battery or Field Artillery Brigade Headquarters and Headquarters Battery.
> (2) Personnel will be authorized at the rate of 1 pilot and ½ airplane mechanic for each liaison plane authorized.[52]

Establishment of the Army Air Forces

Concurrently with the events which occasioned the authorization for liaison airplanes in Field Artillery units, changes were taking place in the organization of the Army Air Corps proper. Changes were made in 1939 and in 1940 relative to the command of the GHQ Air Force; however, these changes did not affect the missions which Army Aviation

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[51] Richard K. Tierney, "The Army Aviation Story," Part I, United States Army Aviation Digest, VIII, No. 6 (June, 1962), pp. 15-18.

[52] Memorandum, Headquarters, War Department for the Commanding General, Army Ground Forces, June 6, 1942, Subject: "Organic Observation for Field Artillery," quoted in Richard K. Tierney, "The Army Aviation Story," Part II, United States Army Aviation Digest, VIII, No. 7 (July, 1962), p. 12.

now performed. In June 1941, an autonomous command, the Army Air Forces, was established to replace the Army Air Corps. The GHQ Air Force was assigned as a subordinate element of the Army Air Forces and was concurrently renamed the Air Force Combat Command, which was the organization in being when the United States entered World War II.[53] Figure 8 shows a simplified diagram of the organization of the Army Air Forces after it was established in 1941. Figure 8 reflects that all of the aviation units which had been part of the GHQ Air Force, and all of the aviation units which had been part of the Corps and Army Air Forces were now placed under the direction of the Air Force Combat Command. All aviation units which would provide observation or combat support for field armies were assigned to an Air Support Command which shows in Figure 8 as a subordinate element of a numbered Air Force. By this change all aviation support was withdrawn from the ground commander's direct control, and was placed on a basis of support by coordination. Due to this withdrawal of organic aviation support, the authorization for organic liaison airplanes in field artillery units became more important to ground officers than might have been the case had the reorganization of the Army Air Corps not taken place.

When the United States entered World War II, its Army Aviation structure consisted of the air sections with liaison airplanes which were authorized in artillery units. All other former Army aviation units were then organic to the Army Air Forces.

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[53]Historical Office of the Army Air Forces (ed.), The Official Pictorial History of the AAF, p. 88.

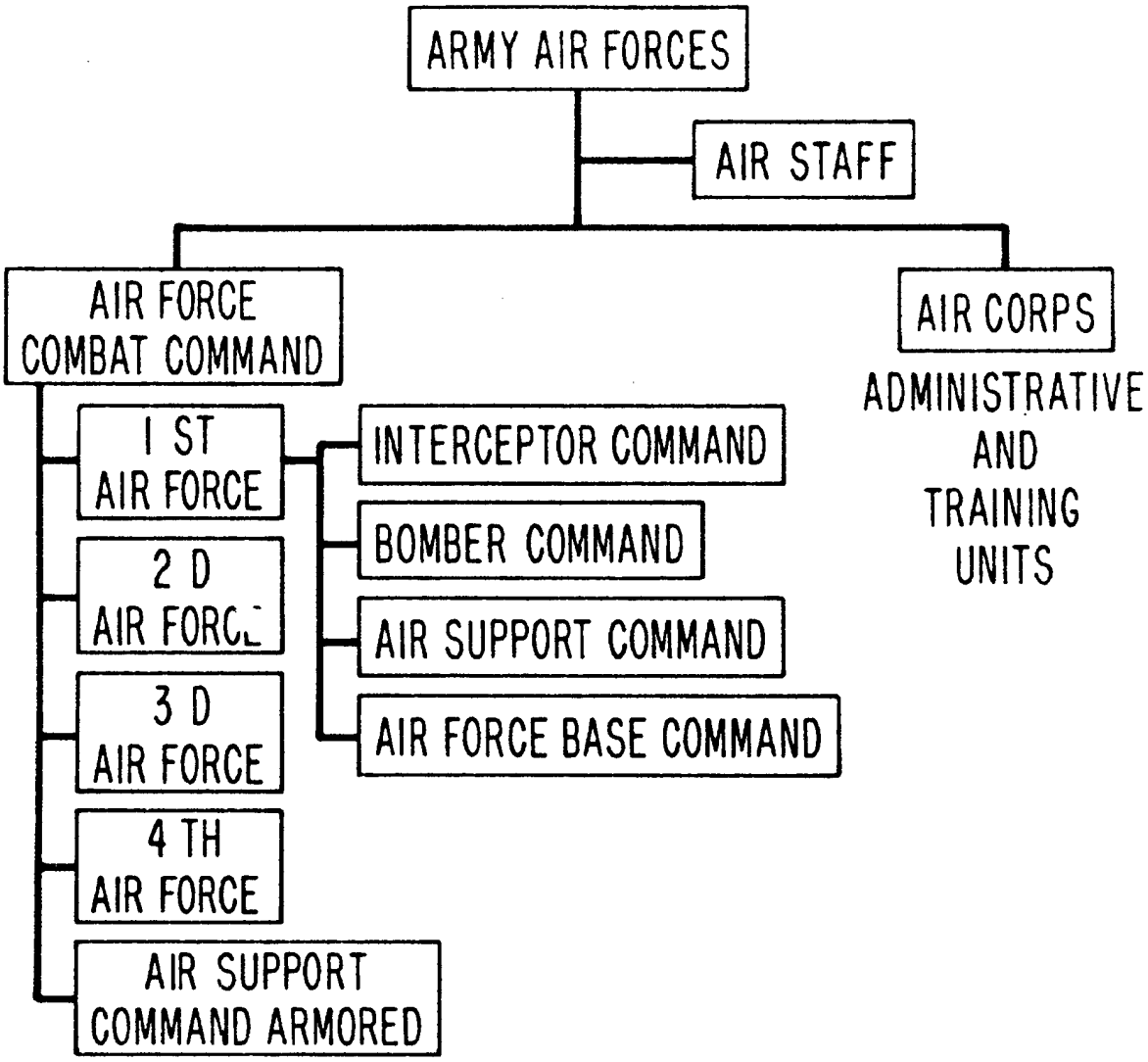

Fig. 3.--Organization of the Army Air Forces, 1941[54]

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[54] Ivan L. Foster, "With the Other Arms and Services," Pt. VI, "The Army Air Forces," Field Artillery Journal, XXXI, No. 12 (December, 1941), p. 971.

CHAPTER II

WORLD WAR II (1942-1945)

Aircraft

When the United States entered World War II, Army ground forces employed two makes of liaison airplanes: the Piper L-4 and the Consolidated Vultee-Nelson L-5, both of which served throughout the war (shown in Figure 9). These frail, fabric covered "grasshoppers" returned Army Aviation to the ground force commander, for the pilots, mechanics, and planes lived in the field even closer to the troops they served than did the air units of World War I. The L-4 and L-5, because of their simplicity of construction, were able to operate in the field for long periods of time with only little field echelon maintenance.[1] Also, because of their light weight and slow speed, the "grasshoppers" were able to operate from very short airstrips, usually near the command post of the organization served. The L-4 could operate from a 200 yard strip and the L-5 could operate from a 300 yard strip.[2] Any flat area of sufficient length became a potential landing field for Army aircraft. In fact, when the Army introduced its liaison planes to combat in the 1942 invasion of North Africa, the airplanes first took off from the

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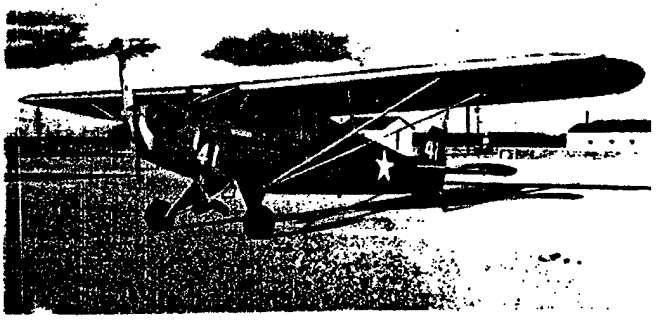
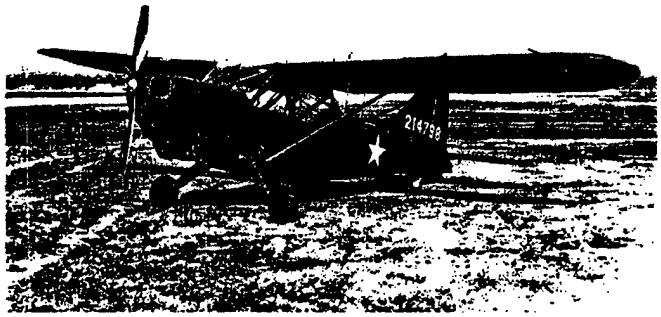
[1] Andrew Ten Eyck, Jeeps in the Sky (New York: Commonwealth Books, Inc., 1946), p. 55.

[2] U. S. War Department, Army Ground Forces Light Aviation, FM 20-100 (Washington: U. S. Government Printing Office, September 1947), pp. 6-7.

deck of an aircraft carrier. Before the war was over, other Army airplanes had operated from Navy LST's with plank decks, fields, roads, trails, stream beds, beaches, lakes, mountain slopes, and even from a suspended cable system known as the "Brodie Device."



L-4. A military version of the Piper Cub. Powered by a 65 horsepower engine, the L-4 attained a speed of 80 miles per hour. It had a wingspan of 35 feet 3 inches, was 22 feet 5 inches long, and weighed 1,220 pounds.



L-5. A World War II Army observation plane. Powered by a 185 horsepower engine, the L-5 attained a speed of 105 miles per hour. It had a 34 foot wingspan, was 24 feet 1 inch long, and weighed 2,045 pounds.

Fig. 9.--World War II Army Liaison Aircraft: Piper L-4 and Consolidated Vultee-Stinson L-5[3]

The Brodie Device consisted of a cable extended alongside a LST on

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[3] Historical Office of the Army Air Forces (ed.), The Official Pictorial History of the AAF (New York: Duell, Sloan and Pearce, 1947), pp. 134-185.

> which, by means of a carriage, a take off run down the cable could launch an airplane into the air. When the plane had completed its mission, it landed safely by engaging a nylon sling on the carriage with a hook extended upward from the airplane cabin.[4]

The evolution of missions performed by Army Aviation during World War II was closely related to the simplicity of construction and the low and slow flying characteristics of the airplanes employed.

Organization

There was also a marked simplicity in the organizational structure of Army Aviation during World War II. When the Army first received authority in 19 to employ light planes, the liaison type air sections were authorized only for field artillery units. They were initially authorized for light and medium artillery battalions, division artillery headquarters, and artillery brigade headquarters. As the war progressed, more and more Army elements were authorized air sections. By war's end, air sections were authorized within a field army for such units as field army, corps, and division headquarters; corps artillery, field artillery brigade, field artillery group, and division artillery headquarters; combat command, tank battalion, and reconnaissance battalion headquarters; infantry regiment, field artillery battalion, and engineer combat battalion headquarters; mechanized cavalry group and mechanized cavalry reconnaissance squadron headquarters; and signal battalion field operations companies.[5]

The incorporation of liaison planes into Army tables of organization and equipment was essentially the same regardless of level of

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[4] Ten Eyck, Jeeps in the Sky, p. 44.

[5] U. S. War Department, FM 20-100, p. 3.

command the aircraft served. Figure 10 shows a typical example of a World War II ground force table of organization and equipment which included organic liaison aircraft.

ORGANIZATION

	Specification Serial No.	Technical Grade	Battalion Headquarters	Maintenance Section
First Lieutenant Liaison Pilot	1981		2	
Mechanic, airplane & engine	747	3		1
Mechanic, airplane & engine	747	5		1

	Operation Plat. Operations & Fire Direction Section
Airplane, Liaison	2

EQUIPMENT

Army Air Forces	No. of Items
Airplane, liaison type, complete with fire extinguisher, without radio	2
Message drop bag	2
Kit, interpreter, photographic type	1
Parachute, 24 foot, back type	4
Set, tool airplane mechanic FA	1
Set, tool pilot's, FA	1
Radio set SCR 619 (per airplane)	1

Fig. 10.--Extract of Table of Organization and Equipment 6-36, Headquarters and Headquarters Battery, Motorized, Field Artillery Battalion, 155 mm Howitzer, or 4.5-Inch Gun, Truck Drawn or Tractor Drawn, 27 September 1944.[6]

The typical World War II Army Aviation air section was composed of two pilots, two mechanics, and two liaison airplanes.

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[6]U. S. War Department, Headquarters and Headquarters Battery, Motorized, Field Artillery Battalion, 155mm Howitzer, or 4.5-Inch Gun, Truck-Drawn or Tractor-Drawn, TOE 6-36 (Washington: U. S. Government Printing Office, 27 September 1944), pp. 2-15.

Missions

Along with consideration of the type of aircraft employed by Army Aviation during World War II and the typical Army Aviation organization of that period, it is also necessary to consider the area of interest of ground force commanders on the World War II battlefield as a means for better understanding of the missions performed. An Army ground force commander's area of interest on the battlefield during World War II was generally as shown in Figure 11.

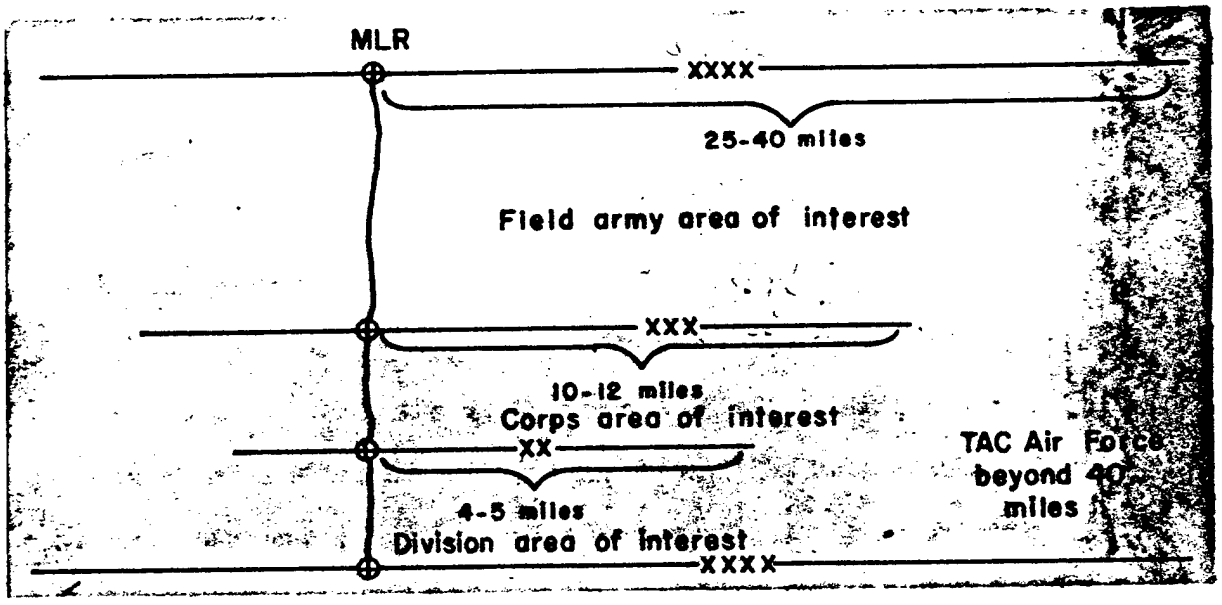

Fig. 11.--Army Commander's Area of Interest on World War II Battlefield Based on Third Army Reference Documents (Figure 7).

Primarily because of enemy air defense weapons and enemy fighter aircraft, Army liaison aircraft were not able to operate freely throughout the depth of the area of interest shown. In most cases, the Army liaison planes were flown within the zone of friendly anti-aircraft fires and high enough to escape enemy small arms fire. This practice enabled the liaison pilots to escape from enemy fighter aircraft.[7] Yet

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[7] Ten Eyck, Jeeps in the Sky, p. 40.

there were many instances wherein Army liaison planes were flown deep into enemy territory--particularly when accompanying armored units in pursuit operations. In referring to Figure 11, Army liaison planes were the part of the aerial observation team that performed the bulk of the close in observation along the line of contact, while commanders depended on Army Air Force observation squadrons for the bulk of aerial observation in the deeper portion of their area of interest.

The missions performed by Army Aviation during World War II were definitely related to the characteristics and capabilities of the aircraft employed and the organization of the air sections. Missions performed were:

1. Observation. This was the primary mission and took the following forms:

a. Surveillance. These missions were of several hours' duration, with the usual purpose of maintaining a continuous overwatch of a selected specific portion of the battlefield. During combat, many commanders adopted a system of keeping an observer in the air constantly because enemy soldiers often did not move or fire when Army aircraft were overhead.[3]

b. Target acquisition. These missions were often referred to as intelligence gathering missions. The purpose was to gather specific information about the enemy.

c. Artillery registration and adjustment. Since Army Aviation air sections were initially authorized only for field artillery units, and since the bulk of Army aircraft which served in World War II

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[3] Ibid., p. 31.

were assigned to artillery units, the mission of artillery adjustment was among the most important missions performed. Observers used voice radio (Figure 10) from the airplane to call for and adjust fires.

d. Counterbattery. Counterbattery missions were actually a type of artillery adjustment mission, but specifically referred to instances wherein artillery fire was directed against located enemy supporting weapons.[9]

e. Naval gunfire. Army artillery observers who operated near a coastline were often able to adjust fires from United States Navy vessels standing offshore. Such missions were performed in the European, Pacific, and North African Theaters.[10]

f. Air strikes. Direction of close air strikes was not a primary mission for Army observers, although most air strikes were ultimately directed from liaison aircraft. The "horsefly" system which was used so successfully for direction of close air strikes was a system wherein liaison planes, operating from forward airstrips, were flown by experienced fighter pilots who controlled the air strikes. Still, Army artillery observers were occasionally called upon to control the Army Air Force planes.[11]

g. Reconnaissance. Reconnaissance missions took many forms depending on the specific purpose of the reconnaissance. One of the most common missions was road reconnaissance, or route survey as it was often called. Armored units were particularly adept at using their aircraft to reconnoiter routes for their spearhead forces.[12] Other front

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[9] Ibid., p. 48

[10] Ibid., p. 54.

[11] Ibid., pp. 92-93.

[12] Ibid., p. 54.

line reconnaissance missions were concerned with gathering information of disposition, strength, and movement of enemy troops.

h. Search. Search missions might be considered as a form of reconnaissance in which the specific information desired was the location of downed pilots or lost troops. In jungle areas such as China and Burma, Army aircraft were often used in search missions.[13]

i. Aerial photography. Photography was an important task, though not performed in a sophisticated manner such as the Army Air Force could do. The type of aerial photography accomplished by Army liaison planes generally involved use of a hand held K-20 camera through an open window of the aircraft. The advantage to Army ground commanders was that their own liaison type aircraft were immediately responsive to their need for photographs of the battle position, and their aircraft were often able to fly in weather conditions which kept Army Air Force aircraft grounded. Photographs thus obtained could be interpreted immediately by combat unit staffs and artillery target analysts.[14]

2. Transportation. World War II lisiaon planes could not carry much weight or bulk. The L-4 was able to carry only about 430 pounds of payload, and the L-5 was able to carry only about 660 pounds of payload. Likewise, both aircraft were limited by the size package which could be hung under the wings or placed on the passenger seat.[15]

a. Resupply. At one time or another, liaison pilots delivered or dropped almost anything their aircraft could carry. Such

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[13] Ibid., p. 84.

[14] Roy N. Landon, "Division Air Photographer," Infantry Journal, XLXIII, No. 1 (July, 1945), pp. 38-43.

[15] Ten Eyck, Jeeps in the Sky, p. 89.

items as ammunition, maps, food, medicine, blankets, water, and even straw were supplied to combat troops.[16] Packages were dropped from the wings or were hand dropped from the cockpit. In some instances, the aircraft were able to land and deliver the needed supplies.

b. Evacuation. Since liaison aircraft could land in very short fields, they could be used to evacuate persons from areas very close to the front lines, or even from behind enemy lines. The L-4 and L-5 were not designed for carrying litters, but were often used for medical evacuation of wounded soldiers from forward areas. Sometime during the w[illegible] a device was developed which allowed a litter to be fastened in a semi-enclosed pod on top of the fuselage of the L-5. Generally, however, the patient was strapped in the passenger seat of the aircraft. The L-5 had a more powerful engine, and often evacuated two patients, both of whom were strapped in the passenger portion of the cockpit.[17]

c. Rescue. Once the object of a search was located, it then became a problem of rescuing the located person or persons. Army liaison aircraft could be used for rescue only if there was a location near the lost party where the airplane could land. There were instances when Army airplanes sneaked behind enemy lines to pick up downed pilots or members of patrols.[18]

3. Command and control. In a general sense, command referred to the use of airplanes by Army commanders to view their battleground and to permit making their plans. Many Army generals took daily flights in their "grasshoppers" to look over the battle

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[16] Ibid., pp. 49-50. [17] Ibid., p. 37. [18] Ibid., p. 53.

lines. Many also used the aircraft radios to control their subordinate units by issuing instructions from the airplane. Armored units in particular used aircraft to control moving columns.[19]

a. Courier. Army aircraft often saved many hours on the road for couriers who might otherwise have had to ride over difficult roads. Here again, the capability of the liaison airplanes to land on roads and short fields was instrumental in enabling Army Aviation to provide courier service between headquarters which established a landing strip near their command posts.

b. Message drop. It was not always possible for pilots to contact ground units by radio. In many instances the pilot had to drop messages to troops below. It was often necessary to devise some system for message pickup as well.

c. Column control. Armored unit commanders often found their liaison planes most useful for control purposes when their units were engaged in exploitation operations. By remaining near the guns of the armored columns, the planes received a measure of protection against enemy aircraft, and were therefore able to operate deep in enemy territory along with the exploiting forces.[20]

d. Radio relay. Army observers often acted as radio relay stations between headquarters which experienced difficulty in maintaining communications.[21]

e. Wire laying. It was often possible to use Army aircraft to lay wire between headquarters which were not more than a

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[19] U. S. War Department, FM 20-100, p. 98.

[20] Ten Eyck, Jeeps in the Sky, p. 81. [21] Ibid., p. 55.

mile apart, but were separated by a terrain obstacle. Special bags and coils of wire were required to accomplish this mission. The aircraft could lay two lines simultaneously, one from each wing.[22]

f. Leaflet drop and audio propaganda. It was relatively easy to use Army liaison planes to scatter propaganda leaflets over enemy positions. There were also instances wherein propaganda messages were broadcast from the aircraft by attaching a loudspeaker to the aircraft.[23]

4. Firepower. Some instances of aerial attack were attributed to Army liaison pilots, although these were uncommon as missions. Instances were recorded in which liaison pilots and observers used their imagination to hook up rocket launchers or small bombs to the wings of their aircraft, and to fire pistols, rifles, or submachine guns from the windows of the aircraft.[24]

In recounting the method of operation of Army Aviation during World War II, it is apparent that aircraft were returned to the ground commander and were available to him when he wanted them. The L-4's and L-5's were limited in their capabilities, but they did perform many day to day tasks such as visual observation, reconnaissance, artillery adjustment, and command and control more effectively than could be accomplished by ground means.

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[22] Ibid., p. 54. [23] Ibid., p. 55. [24] Ibid., p. 55.

CHAPTER III

THE NATIONAL SECURITY ACT OF 1947

The Instrument of Separation

World War II brought about the development of true strategic air power and the employment of atomic weapons. Air power had become an immensely powerful force which operated hundreds of miles away from the land battle. This combination of events demonstrated that a major portion of the nation's air power was focused on strategic targets well separated from the combat zone. Also, the Army ground forces had developed a different type of aviation expertise with their small liaison aircraft. After World War II drew to a successful conclusion, efforts were begun to correct the major weaknesses in the United States' national defense structure which had become apparent during the war. Therefore, one of the objectives of reorganization conferences was to separate the Army Air Forces from the Army and create an autonomous Air Force.

In time, the Congress passed the National Security Act of 1947 in an effort to redesign the national military establishment for modern global warfare. In its simplest terms, the National Security Act created a unified military structure of three departments (Army, Navy, and Air Force), controlled by a Secretary of Defense and the Joint

Chiefs of Staff.[1] The Act itself contains no delineation of missions for Army Aviation and leaves room for considerable interpretation in this regard.[2]

Subsequent Interpretations

Over the succeeding years since 1947, several documents have been published by the Department of Defense to provide specific interpretation of the National Security Act of 1947. The first major document promulgated to give substance to the Act of 1947 was the "Key West Agreement" of 21 April 1948. The Secretary of Defense met at Key West with the Joint Chiefs of Staff in March 1948 to reach agreement on the functions of the Armed Forces and the Joint Chiefs of Staff. In the resulting document, the only mention of Army Aviation is a statement which says: "The United States Army includes land combat and service forces and aviation and water transport as may be organic therein."[3] This statement was obviously not sufficient guidance on which to base a new structure for Army Aviation. For lack of more finite parameters, Army Aviation organization and equipment continued as it had been during World War II. Likewise, there was no change from World War II in missions to be performed by Army Aviation. Because of the lack of change, the Army entered the Korean War in 1950 with World War II Army Aviation concepts.

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[1] U. S. Congress, National Security Act of 1947, Public Law 253 80th Cong., 1947, Sec. 202-211.

[2] Douhet Mitchell (pseud.), "Aircraft for the Ground Battle," Army, XIII, No. 7 (February, 1963), p. 24.

[3] U. S. Secretary of Defense, Key West Agreement, Notes by the Secretaries to the Joint Chiefs of Staff on the Functions of the Armed Forces and the Joint Chiefs of Staff, 21 April 1948 (File No. M-15361.1, Fort Leavenworth, Kansas Library), p. 7.

In 1952, during the Korean War, the Department of Defense published a document which formally defined the type aircraft which would be organic to the Army, and the missions which these aircraft were expected to perform. The Secretary of the Army and the Secretary of the Air Force, after conferring in 1952, issued a document which had as its purpose "to delineate functions of Army Aviation." This document, titled Memorandum of Understanding Relating to Army Organic Aviation, but better known as the "Pace-Finletter Agreement," was published for the Army as Special Regulation Number 95-400-5, dated 19 November 1952.[4] Pertinent quotations from the Army Special Regulation follow:

> Army organic aviation will consist of aircraft primarily utilized by the Army within the Army combat zone as an integral part of its components for the purpose of expediting and improving ground combat and logistical procedures, subject, however, to the limitations that such aircraft will not duplicate the functions of the U. S. Air Force in providing the Army, by fixed-wing and rotary-wing aircraft, close combat support, assault transport, and other troop carrier airlift, aerial photography, tactical reconnaissance and interdiction of enemy land power and communications. Army organic aircraft are defined as fixed-wing utility or observation type aircraft with an empty weight of not to exceed 5,000 pounds and rotary-wing type aircraft, the total lift and propulsion of which are achieved solely from rotors, designed and utilized for the performance of the following functions; and these functions shall be used by the Army exclusively as a basis for developing Army requirements for the procurement of Army aircraft:
>
> a. Aerial observation to amplify and supplement other Army methods of observation for the purpose of locating, verifying and evaluating targets, adjusting fire, terrain study, or obtaining information on enemy forces not otherwise obtained by air reconnaissance agencies of other Services; this includes limited aerial photography incident to these purposes.
>
> b. Control of Army forces.
>
> c. Command, liaison and courier missions pertinent to the combat zone and training therefore.

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[4] U. S. Departments of the Army and the Air Force, Flying, Memorandum of Understanding Relating to Army Organic Aviation, SR 95-400-5, AFL 55-5 (Washington: U. S. Government Printing Office, 19 November 1952), p. 1.

d. Aerial wire laying within the combat zone.

e. Transportation of Army supplies, equipment, personnel and small units within the combat zone.

f. Aeromedical evacuation within the combat zone, 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.

g. Artillery and topographical survey.

. . . . . .

The weight limitation on Army fixed-wing aircraft will be subject to review by the Secretary of Defense upon request by the Secretary of the Army or the Secretary of the Air Force as required to keep this limitation realistic in the light of technical developments and assigned missions.[5]

The Army Special Regulations defines Air Force functions in support of the Army as follows:

a. Airlift of Army supplies, equipment, personnel, and units from exterior points to points within the combat zone.

b. Airlift for the evacuation of personnel and materiel from the combat zone.

c. Airlift for the air movement of troops, supplies, and equipment in the assault and subsequent phases of airborne operations.

d. Aeromedical evacuation for casualties from the initial point of treatment or point of subsequent hospitalization within the combat zone to points outside of the combat zone; and in airborne operations, the evacuation of all casualties from the objective area until such time as ground link-up is attained.[6]

Finally, the Army Special Regulations defines the ground commander's area of battlefield interest:

The combat zone comprises that part of the theater of operations required for the conduct of war by the field forces. . . . For the purpose of computing aircraft requirements, it is understood that the combat zone will normally be from 50 to 100 miles in depth.[7]

The significance of the "Pace-Finletter Agreement" was to narrow the Army's aviation scope to the combat zone, which was itself given a precise definition. The document further served to channelize Army efforts in the direction that the Army must consider aircraft as

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[5] Ibid., pp. 1-2. (Italics mine.)

[6] Ibid., p. 2.

[7] Ibid., p. 3.

as equipment participating in the land battle, to assist in carrying out sustained operations on land.[8] To this end, missions for Army Aviation were stated in specific terms. Included within the stated missions were the same missions which Army Aviation had performed during World War II and was performing in Korea at that time.

In addition to specifying the missions for Army Aviation to perform, the Memorandum of Understanding also specifically limited the size of the aircraft which the Army could employ to accomplish those missions. However, at the time the Memorandum of Understanding was published, the Army employed only small liaison type airplanes and small observation type helicopters. Therefore, in 1952, the weight limitations imposed on Army aircraft were not particularly restrictive, although within the next few years these limitations had a noticeable effect on Army efforts to modernize and expand its organic aviation.[9]

The Memorandum of Understanding remained in effect until 1957. By that time it had become obsolete because larger helicopters were available and the Army required larger aircraft to operate over the greater distances envisaged in combat in an environment of atomic warfare.[10] Two years prior, in 1955, the Secretary of Defense directed the Joint Chiefs of Staff to review the entire Army Aviation program. Following this review, the recommendations of the Joint Chiefs of Staff were formalized by the Department of Defense Directive Number 5160.22,

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[8] U. S. Secretary of Defense, Key West Agreement, p. 7.

[9] James M. Gavin, War and Peace in the Space Age (New York: Harper and Brothers, 1958), p. 160.

[10] Clifton F. Von Kann, "Army Aviation, The Goal is an Air-Minded, Air-Mobile Army," Army, XI, No. 4 (November, 1960), pp. 41-42.

dated 13 March 1957, Subject: Clarification of Roles and Missions of the Departments of Army and Air Force Regarding Use of Aircraft. This directive superseded the 1952 Memorandum of Understanding. The Department of Defense Directive of 1957 served as an interpretation of the original National Security Act of 1947. Significant portions of the directive follow:

> The combat zone is defined as extending not more than 100 miles forward of the general line of contact between U. S. and enemy ground forces. Its extension to the rear of the general line of contact will be designated by the appropriate field commander, and normally extends back from the front lines about 100 miles.
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> . . . . . .
>
> The U. S. Air Force will, as required, provide the following:
>
> a. Airlift of Army supplies, equipment, personnel and units from exterior points to points within the Army combat zone.
>
> b. Airlift for the evacuation of personnel and materiel from the Army combat zone.
>
> c. Airlift for the air movement of troops, supplies, and equipment in the initial and subsequent phases of airborne operations.
>
> d. Aeromedical evacuation from Air Force operating locations within the combat zone through Air Force casualty staging units to hospital facilities outside the combat zone; and the aeromedical evacuation from an airhead or an airborne objective area where airborne operations includes air landed logistical support by the Air Force.
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> . . . . . .
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> The U. S. Army Aviation Program will consist of those types of aircraft required to carry out the following functions envisaged within the combat zone, and shall be used by the Army exclusively as a basis for developing Army requirements for aircraft and for the normal employment of Army Aviation. This capability is essential to the quality of responsiveness, and responsiveness is a quality essential to that aviation whose day-to-day operations must be intimately coordinated with the actions of surface forces. Army organic aircraft will be used by the responsible Army commander as he considers necessary for the discharge of his military mission.
>
> a. Command, liaison, and courier and communications: This includes aerial wire laying and aviation to assist in the direction, coordination and control of Army forces in the field.
>
> b. Observation, visual and photographic reconnaissance, fire adjustment, and topographical survey: This includes aerial observation to amplify and supplement other Army methods of observation for the purpose of locating, verifying and evaluating targets, adjusting fire, terrain study, or obtaining information on enemy forces complementing that obtained by air reconnaissance agencies of the other Services; this includes limited aerial photography

incident to these purposes.

c. Airlift of Army personnel and materiel: Transportation of Army supplies, equipment, personnel, and small units within the Army combat zone in the course of combat and logistical operation. Includes the movement of small units to execute small scale air landed operations, the movement of reserves, and the shifting or relocation of small units and individuals within the combat zone as the situation may indicate. Includes expeditious movement of critically needed supplies and equipment, or both, within the combat zone, supplementing the ground transportation system operating within the field army. Does not include the execution of joint airborne operations.

d. Aeromedical evacuation: Aeromedical evacuation within the Army combat zone to include battlefield pickup of casualties (except those from an airhead or airborne objective area which is supported by Air Force air landed logistic support), air transport to initial point of treatment and any subsequent moves to hospital facilities within the Army combat zone.

. . . . . .

The U. S. Army Aircraft Program, carrying out the functions set forth . . . will be subject to the following limitations:

1. Fixed wing aircraft, convertiplanes, and vertical/short take-off and landing aircraft shall have an empty weight not to exceed 5,000 pounds. Rotary wing aircraft shall have an empty weight not to exceed 20,000 pounds. Specific exceptions to weight limitations for specific purposes may be granted by the Secretary of Defense after consideration of U. S. Army requirements and appropriate U. S. Air Force functions and capabilities.

. . . . . .

The U. S. Army Aviation Program will not provide for aircraft to perform the following functions:

a. Strategic and tactical airlift, . . .
b. Tactical reconnaissance.
c. Interdiction of the battlefield.
d. Close combat air support.

. . . . . .

The U. S. Army will use existing types of U. S. Navy and U. S. Air Force or civilian aircraft when they are suitable, or may be suitably modified, to meet Army requirements, rather than attempt to develop and procure new types.[11]

The 1957 Department of Defense Directive contained several important changes from earlier interpretations of the National Security Act of 1947. One important change was the definition of the combat

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[11]Directive No. 5160.22, Headquarters, Department of Defense, 18 March 1957, Subject: "Clarification of Roles and Missions of the Departments of Army and Air Force Regarding Use of Aircraft" (File No. N-17893.6, Fort Leavenworth, Kansas Library), pp. 1-5. (Italics mine.)

zone. The combat zone, as defined in 1957, encompassed an area much larger than in 1952. This gave the Army a requirement to develop aircraft which could operate throughout the enlarged combat zone. Another important change was in the weight limitations imposed on Army aircraft. While the weight limitation on fixed wing aircraft remained at 5,000 pounds, the weight limitation on rotary wing aircraft was raised to 20,000 pounds. This allowed the Army to procure cargo helicopters to provide much needed troop and supply haul capability within the combat zone. A rather broad clause was included in the 1957 directive to allow specific exceptions to the weight limitations. Specific exceptions granted by the Secretary of Defense under this clause included authorization for the Army to procure the OV-1 Mohawk, the CV-2 Caribou, and the CH-47 Chinook. In 1962, the Secretary of Defense completely removed the weight limitation on Army aircraft.

Another important difference between the 1957 Department of Defense Directive and the 1952 Memorandum of Understanding concerns the expanded definition of functions (missions) in the 1957 directive. Specifically, the Army was authorized to perform more aerial photography than had been permitted since 1952, and the mission of transportation was expanded to include small scale air landed operations. These changes, plus more precise definition of other forms of observation missions, gave Army commanders greater latitude for employment of their organic aircraft. In addition, the door was opened for the Army to procure transport type helicopters which would make possible the conduct of air landed operations.

Thus the National Security Act of 1947, through a series of interpretations, became Army Aviation's license for normal operation.

It laid down specific missions which Army Aviation could perform, and other specific missions which Army Aviation could not perform. It also dictated the types of aircraft which the Army could employ in the conduct of its assigned missions. The license proved flexible enough to be adjusted to changes in tactical concepts and aircraft development.

CHAPTER IV

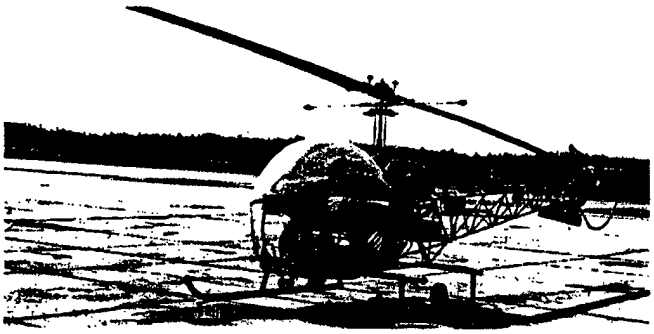
WAR IN KOREA (1950-1953)

When hostilities began in Korea in 1950, Army Aviation was operating under its new license, the National Security Act of 1947. Aviation equipment on hand was of World War II vintage, and no interpretation of the 1947 Act had been made to open any new missions for Army Aviation. The Army entered the Korean War with the same aviation organization that was in operation at the end of World War II. Additionally, even though atomic weapons were available, none were used in Korea; and the war was fought over the same conventional frontages and areas of interest that were used in World War II (Figure 11).

Aircraft

Army Aviation equipment employed in the early stages of the war in Korea was basically of World War II manufacture; but, by the end of the war in 1953, considerable new equipment was on hand. When the initial United States Army elements (24th Infantry Division) arrived in Korea in 1950, they were accompanied by L-4 and L-5 aircraft. As other American units arrived, more L-4 and L-5 aircraft came along, and several other types of aircraft also were brought in. For example, some L-17 aircraft were brought in because these were the only Army planes which were equipped with very high frequency (VHF) radio and could, therefore, communicate with United States Air Force aircraft. The

first helicopters, models of the Bell OH-13 Sioux (Figure 12), arrived in Korea in December, 1950.[1]



H-13 Sioux. A two-place observation helicopter. Powered by a 200 horsepower engine, the H-13 attains a speed of 70 miles per hour. It has a 5 foot 2 inch main rotor diameter, has a fuselage length of 31 feet 5 inches and weighs 2,350 pounds.

H-19 Chickasaw. An early utility helicopter. Powered by a 550 horsepower engine, the H-19 attains a speed of 75 miles per hour. It has a 53 foot main rotor diameter, has a fuselage length of 42 feet 2 inches, and weighs 7,300 pounds. Normal capacity is 5 troops or 1,000 pounds of cargo.

Fig. 12.--Army Rotary Wing Aircraft Introduced During the Korean War: H-13 Sioux and H-19 Chickasaw.[2]

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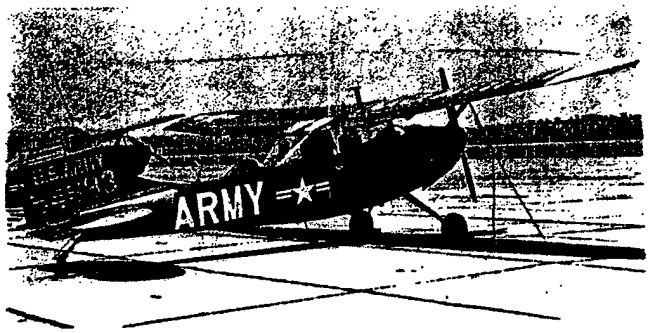
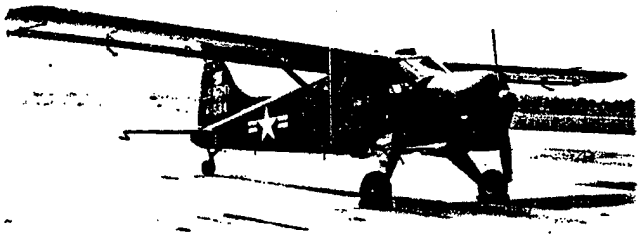
[1]Dario Politella, Operation Grasshopper (Wichita, Kansas: The Robert R. Longo Co., 1953), pp. 177-179.

[2]U. S. Army Infantry School, Army Aviation Handbook (Fort Benning, Ga.: The U. S. Army Infantry School, June 1961), pp. 8 and 11.

In early 1951, several important equipment changes occurred. In January, issue of the new observation airplane, the L-19 Bird Dog, was begun (Figure 13).



L-19 Bird Dog. A two-place observation airplane. Powered by a 213 horsepower engine, the L-19 attains a speed of 90 miles per hour. It has a 36 foot wingspan, is 25 feet 10 inches long, and weighs 2,400 pounds.



L-20 Beaver. A sturdy utility airplane. Powered by a 450 horsepower engine, the L-20 attains a speed of 120 miles per hour. It has a 43 foot wingspan, is 30 feet 5 inches long, and weighs 5,100 pounds. Normal capacity is 4 passengers or about 1,000 pounds of cargo. It can carry 500 pounds externally on its wing shackles.

Fig. 13.--Army Fixed Wing Aircraft Introduced During the Korean War: L-19 Bird Dog and L-20 Beaver.[3]

This new aircraft rapidly became the most used and most popular of all Army aircraft. Its principal advantages over the World War II fabric

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[3] Ibid., pp. 8 and 11.

covered planes were its sturdy all metal construction, a more powerful engine which gave better performance, and more reliable radios which had a wider frequency range. By December of 1951, issue of the new L-20 Beaver was begun (Figure 13). This aircraft found use between higher headquarters as a cargo and troop transport. A year later, in December of 1952, an L-23 Seminole was brought in to be used as a command airplane for the commanding general, Eighth Army. This was the first Army multi-engine airplane placed in field use. One other new helicopter was introduced to combat use during the Korean War. In February 1953, the H-.9 Chickasaw (Figure 13) was introduced into the combat zone to be used for cargo and troop hauls.[4] In essence, a new family of Army aircraft was battle tested during the Korean War.

No completely new missions were performed by Army Aviation in Korea as a result of the introduction of new aircraft. The introduction of helicopters and utility fixed wing aircraft did, however, afford Army units the opportunity to transport more passengers and tonnage than was possible at the beginning of the war. Also, and of significance in mountainous terrain areas such as Korea, helicopters gave Army units the capability of placing troops and supplies in places inaccessible to ground transport means.

Organization

Along with changes in the aircraft employed, a gradual but important change likewise took place in the organization of Army Aviation. It had become apparent to Aviation Officers that mission demands were so great, and maintenance problems so acute, that the small

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[4] Politella, Operation Grasshopper, p. 154.

aviation sections were having a difficult time fulfilling all mission requests. In several divisions, notably the 7th Infantry Division, attempts were made to eliminate mission overlap and centralize maintenance by combining smaller unit aviation sections into a division aviation company. These experiments did achieve a better maintenance program, eliminate much duplication of effort, and reduce pilot fatigue. As might be expected, this change was not welcomed by commanders who had become accustomed to having their own airplanes all of the time and who also insisted that pilots be of a particular branch in order to fly for them.[5]

A related problem was the difficulty in finding suitable landing strips immediately adjacent to each command post. Korea, being a land of mountains and rice paddies, proved to be different from Europe where, in World War II, Army liaison planes could operate from almost any field or road. The absence of suitable landing areas in Korea helped force Army Aviation units to combine their resources on a common airfield. The final result of this experimenting with organizational aviation concepts came in January 1953 when General Maxwell Taylor, Eighth Army commander, ordered the artillery and infantry regiment aviation sections of all divisions in Korea to be combined into a single aviation unit at division level. By the time hostilities ceased, all United States divisions in Korea were using some type of consolidated division aviation company organization.[6]

Another significant organizational development of the period was the combat testing of cargo helicopter companies. The 6th Transportation Company (Helicopter) arrived in Korea in February 1953 with

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[5] Ibid., p. 101.

[6] Ibid., p. 154.

21 H-19 helicopters. This was the first cargo helicopter company to be activated in the United States Army, and the first to be employed in a combat zone.[7] A few months later a similar unit, the 13th Transportation Company (helicopter), was brought in. The operation of these two units in hauling supplies and troops, under fire and in marginal weather conditions, was the beginning of Army Aviation's expansion into the transportation field.

Missions

Since the Korean War was primarily a fixed wing operation for Army Aviation, missions performed during the war did not differ greatly from World War II. The introduction of helicopters, however, allowed for a variety of missions to be performed more efficiently. The missions performed by Army Aviation, employing both fixed and rotary wing aircraft, were:

1. Observation. The basic mission performed was observation of some type. Observation missions were flown both day and night, and were accomplished by visual means.

a. Surveillance. As throughout the war there was no interference from enemy aircraft, it was easy to perform battlefield surveillance at critical times during the battles.[8] After aviation sections were combined into company-type units, it was easier to maintain a constant surveillance over given portions of the battle positions.

b. Target acquisition. Targets were located visually during any observation mission. Techniques used were the same as had

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[7] Ibid., p. 162.

[8] Ibid., p. 34.

been employed during World War II.

c. Artillery registration and adjustment. Upon acquiring a target within artillery range, observers called for supporting fires to engage the target. It was estimated that ninety per cent of the artillery fire missions during the Korean War were adjusted by Army aerial observers.[9] The L-19 Bird Dog proved to be a superb aircraft for artillery observation. Lack of enemy interference in the air made it possible for Army artillery observers to operate to the maximum range of friendly artillery.

d. Counterbattery. Counterbattery missions were another type of artillery adjustment performed when the aerial observer was able to locate flashes of enemy guns and bring retaliatory fire to bear on the enemy emplacements. Techniques used were the same as those used during World War II.

e. Naval gunfire. Since the battle lines usually extended to both coastlines of the Korean peninsula, there were many occasions when Army air observers were able to call for supporting fires from Navy vessels standing off the coast.

f. Direction of close air strikes. During the first month of the war there was difficulty in controlling air strikes from Army aircraft because of a lack of radios in the Army aircraft which could communicate with Air Force fighter-bombers. This difficulty was partially corrected during July 1950 when Army L-17's, which were equipped with VHF radios that could net with Air Force aircraft, were brought into Korea. Very shortly however, the same "horsefly" or

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[9] Ibid., p. 73.

"mosquito" system was set up to operate as during World War II. The air strike control missions were then flown by Air Force pilots in light planes of the AT-6 Trainer or similar type aircraft.[10]

g. Reconnaissance. Among the important tasks performed by Army Aviation were reconnaissance missions. In many parts of Korea, terrain obstacles and lack of roads made it difficult for Army units to accomplish much reconnaissance other than by air.[11] The lack of enemy air power made it easier for Army aircraft to penetrate into enemy territory to the maximum range of friendly artillery. However, difficulty in performing deep reconnaissance missions did show the need for an observation aircraft considerably faster than the L-19.[12] Various specialized reconnaissance missions were flown. Among these were ambush reconnaissance, which refers to missions aimed at locating groups of "refugees" preparing to set up an ambush; and straggler reconnaissance, which refers to missions aimed at locating groups of friendly soldiers lost from their units.

h. Search. As a type of mission, search referred to the mission of searching for downed pilots or lost or cut off patrols. Army Aviation had no search units as such; however, any aviation unit could be called on to employ one or more of its planes for search missions.

i. Aerial photography. The bulk of aerial photo-

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[10]Robert F. Futrell, The United States Air Force in Korea, 1950-1953 (New York: Duell, Sloan and Pearce, 1961), pp. 77-78.

[11]Politella, Operation Grasshopper, p. 14.

[12]John J. Tolson, Jr., Remarks to Air Mobility Symposium quoted in Army, XIV, No. 5 (December, 1963), pp. 69-71.

graphs of deep enemy positions and specialized work such as strip mosaics was provided by Air Force photo-reconnaissance aircraft. Army aerial photography was primarily front line photography which was accomplished with hand held cameras or with cameras installed in locally fabricated mounts. Even utilizing such limited equipment, aerial photography missions were important to Army ground commanders because they were able to obtain aerial photographs of their local areas more rapidly than by requesting photos through normal Air Force channels.[13]

2. Transportation. Transportation of troops and supplies was not a new mission for Army Aviation, but during the Korean War this type of mission enjoyed notable expansion.

a. Resupply. During most of the war, aerial resupply was accomplished in exactly the same manner as during World War II by dropping bundles from the wings of observation airplanes or placing cargo on the passenger seat. Food, water, ammunition, medical supplies, and even flamethrowers were delivered in this manner.[14] When L-20 Beaver aircraft were introduced to the combat zone in late 1951, these aircraft, with their 4 passenger or 1,000 pound cargo capacity, were used extensively for routine hauls between rear and forward airstrips. Then a new dimension in battlefield resupply became common during the final months of the war when the cargo helicopter companies arrived. On 20 March 1953, the 6th Transportation Company (Helicopter), with its 21 H-19 Chickasaw helicopters, carried some 34,000 pounds of critical

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[13] Politella, Operation Grasshopper, pp. 102-103.

[14] Ibid., p. 33.

supplies to troops of the 3d Infantry Division on Jackson Heights on the central front in Korea when that position was cut off from ground resupply by a local flood. In another instance, in May 1953, the 6th Transportation Company carried some 622,684 pounds of food, fuel, and ammunition in 3 days to 3 regiments of the 25th Infantry Division when flooding behind the front lines cut those units off from their normal ground supply lines.[15]

b. Troop haul. The capability of using utility helicopters to lift troops into combat was not used in actual tactical operations by the Army during the Korean War. The 6th Transportation Company and its sister unit, the 13th Transportation Company (Helicopter), did, however, take part in several demonstrations in Korea, when they carried combat troops into simulated objectives.[16] Each of these helicopter companies could transport approximately 100 troops in a single lift at low altitudes.

c. Medical evacuation. From the early part of the war, H-13 Sioux helicopters were used extensively for medical evacuation. These helicopters were organized into separately numbered helicopter detachments and were attached to Army surgical hospitals. They then answered calls for emergency casualty evacuation throughout the battle area. Later in the war, after the arrival of the 6th and 13th Transportation Companies, the larger H-19 Chickasaw helicopters were also used for evacuation. Another innovation in aeromedical

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[15] Richard K. Tierney, "The Army Aviation Story," Part VII, "The War Years," United States Army Aviation Digest, VIII, No. 12 (December, 1962), pp. 37-38.

[16] Politella, Operation Grasshopper, p. 164.

evacuation was the use of helicopters to evacuate casualties from shore to ship; from surgical hospitals to floating hospitals standing off the coast.[17]

d. Rescue. There was little difference between evacuation and rescue except for the connotation of the term. Rescue referred to the mission of recovering downed pilots and also to instances wherein helicopters were used to recover cut-off patrols.

3. Command and control. Army aircraft were used in a variety of missions to assist in the command function. Rugged terrain and poor roads often made it difficult for commanders to view their positions other than from the air. Many commanders, therefore, used Army aircraft for daily flights along their battle lines.[18] As helicopters became more plentiful, commanders found that using these aircraft for their daily flights gave them the advantage of being able to land at the command posts of their subordinate commanders, thus saving many hours of road travel in making personal visits.

a. Messenger and courier. Army aircraft were used extensively to carry messengers and couriers between various headquarters. Improved radio equipment in the L-19 Bird Dog made it easier for pilots to contact units on the ground; however, it was often necessary to drop messages from the aircraft when radio contact was not possible. Radio relay was a mission referring to instances when lack of ground communication means made it necessary for commanders to keep an airplane in the air for long periods of time to maintain contact with

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[17] John J. Westover, Combat Support in Korea (Washington: Combat Forces Press, 1955), pp. 111-113.

[18] Politella, Operation Grasshopper, p. 19.

and relay messages to subordinate units.

b. Column control. During the early months of the war when the opposing armies were moving rapidly, Army aircraft were often used to control moving troop units. Later, in 1952 when the war stabilized in trenches, this mission was little used.

c. Camouflage inspection. As commanders and staff officers made their frequent flights along the front lines, they were able, among other things, to check the progress in construction and camouflage of battle positions.

d. Wire laying. Because of the many terrain obstacles in Korea, laying telephone wire to outlying units by using Army aircraft was often necessary.[19] Pilots found that in most cases it was more efficient to use helicopters to perform wire laying than to use observation airplanes for this purpose.

e. Leaflet drop. Propaganda missions were a common employment of Army aircraft. It was easy to drop bundles of leaflets from the L-19 Bird Dog, and allow the wind to scatter the propaganda messages across enemy lines.[20]

4. Firepower. There were instances when Army pilots and observers were credited with attacking ground targets. Again, as in World War II, Army pilots dropped light bombs from their wing shackles, rigged rocket launchers under their wings, or fired some sort of weapon out of the window of their airplane. These were isolated instances; and, although they did take place, they cannot be considered as typical missions for Army Aviation during the Korean War.

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[19] Ibid., p. 70.

[20] Ibid., p. 29.

It is readily apparent that during the Korean War, as during World War II, Army aircraft lived in the field with the troops they served. Even though the consolidation of aircraft into division level units did withdraw aircraft from the immediate grasp of some commanders, Army aircraft were available when and where they were wanted. The significant progress in Army Aviation's mission capabilities which came about during the Korean War was not, however, attributable to changes in organizational concepts, but to the demonstrated value of the helicopter in combat. Observation helicopters greatly expanded the value of Army aircraft in performing command missions and medical evacuation. The use of utility helicopters for resupply was only a small beginning, but from this beginning stemmed the great strides in battlefield transport which were to mark the next decade.

CHAPTER V

TESTING AND BUILDING (1953-1962)

Aircraft

The decade following the Korean War was one fruitful for Army Aviation. Development of new Army aircraft brought about important changes in mission capabilities. Among the important aircraft developments was the adoption of the AO-1 Mohawk as a long range observation airplane (Figure 14).

AO-1 Mohawk. The Army's current medium observation airplane. Powered by two 960 horsepower engines, the Mohawk attains a speed of 230 miles per hour. It has a 42 foot wingspan, is 41 feet long, and weighs 14,018 pounds. Normal equipment includes cameras and radar or infrared sensors.

Fig. 14.--Army Medium Observation Airplane: The AO-1 Mohawk[1]

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[1] U. S. Army Infantry School, Army Aviation Handbook (Fort Benning, Ga.: U. S. Army Infantry School, May 1963), p. 14.

The Army's interest in this type of aircraft stemmed from the Korean War which showed the need for a fast aircraft capable of operating throughout the commander's area of battlefield interest and capable of carrying electronic sensors to supplement visual means of observation.

In 1955, during Exercise Sagebrush, the Army tested its long range reconnaissance capabilities against new atomic battlefield concepts.[2] On this simulated atomic battlefield Army long range aerial reconnaissance requirements were equated to the range of weapons systems controlled by commanders on the battlefield.[3] These distances were generally accepted to be as shown in Figure 15. Exercise Sagebrush demonstrated to the Army that an entirely new aircraft system was required. The resulting search for a new aircraft system led to the activation of Project Long Arm at Fort Rucker in 1956. Long Arm was a test of several types of aircraft, including small jet aircraft, and electronic sensor systems.[4] Tests conducted during Project Long Arm resulted in the development of the AO-1 Mohawk and the aerial radar, infrared, and camera systems which it carries.

With the adoption of the Mohawk, which was authorized by the Secretary of Defense in 1960 as an exception to the weight limitation on Army fixed wing aircraft, the words "all weather" were added to Army Aviation's capability for reconnaissance and surveillance.[5] The Mohawk

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[2] John G. Norris, "Flexibility, Mobility Vital: Army Reshapes Units for Atomic Warfare," The Washington Post and Times Herald (November 8, 1955), pp. 1 and 10.

[3] John M. Oswalt, "The Case for Organic Aerial Observation," Army, IX, No. 7 (February, 1959), p. 42.

[4] Ibid., p. 43.

[5] "The Last Three Years of Army Aviation," United States Army Aviation Digest, IV, No. 4 (March, 1958), pp. 45-46.

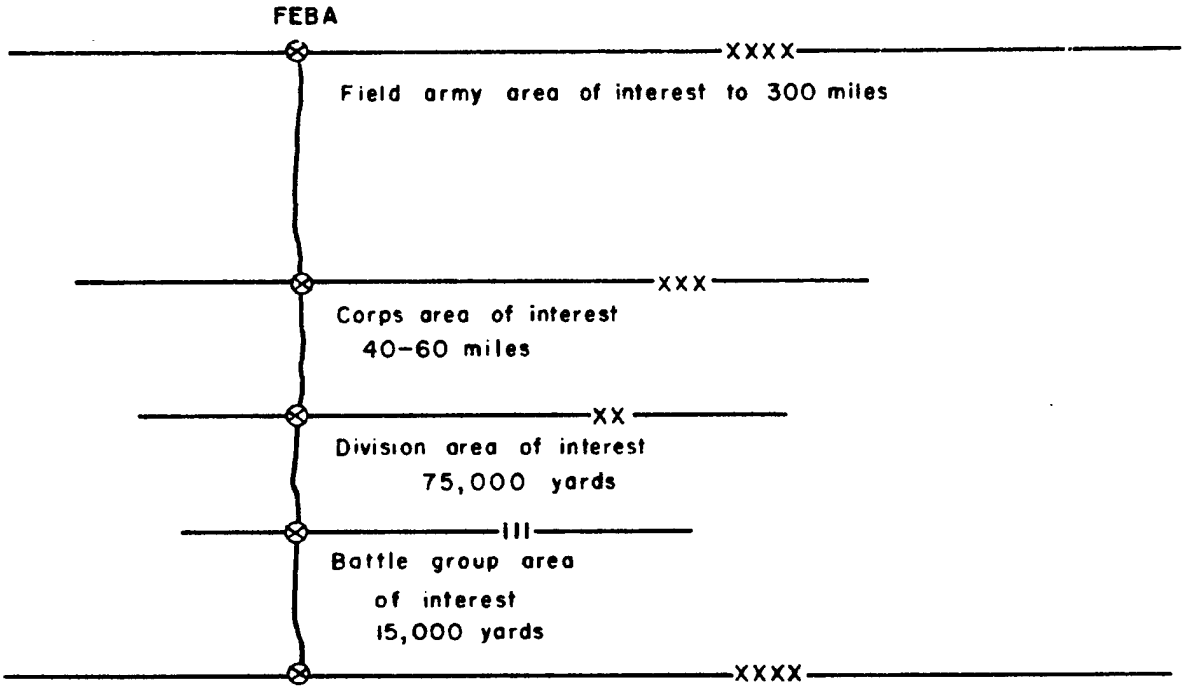

Fig. 15.--Army Commander's Area of Interest on Pentomic Battlefield[5]

itself was instrumented for weather flying, and the radar and infrared systems which were designed for it gave the added capability of gathering information without regard to visual observation of the terrain. In addition, an effective camera system for vertical and oblique aerial photography was developed for the Mohawk. Thus, for the first time, Army Aviation possessed an observation aircraft which was capable of all weather performance of visual and electronic reconnaissance and surveillance missions to the maximum anticipated ranges of Army commanders' area of battlefield interest. The Mohawk is one of the few Army aircraft developed for the purpose of performing one basic mission.

Most other Army aircraft have been designed to perform a number of missions. Important examples of this design concept are the transport aircraft which were developed following the Army's experience with

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[6]Oswalt, Army, IX, No. 7, p. 44.

H-19 Chickasaw utility helicopters during the Korean War. Actually, the Army became interested in both fixed wing and rotary wing aircraft for transport of troops, supplies, and equipment within the combat zone. Reports resulting from Exercise Sky Drop II, held in 1954 at Fort Bragg, stressed the desirability of having fixed wing transport units for hauls longer than 50 miles and rotary wing units for shorter combat zone hauls.[7] Based on this concept, in 1955 and 1956 the Army procured both types of aircraft.

Fixed wing transport units were organized around the U-1A Otter shown in Figure 16. Although the Otter did prove to have excellent characteristics for short field operation, it was limited in weight and volume carrying capacity. The resulting search for an improved transport airplane culminated in 1960 when, as an exception to weight limitations on Army fixed wing aircraft, the Secretary of Defense authorized the Army to procure the AC-1 Caribou (Figure 16).[8]

Within the same span of years, a series of rotary wing transport aircraft were added to the Army inventory. Though the H-19 Chickasaw successfully proved to the Army the value of cargo helicopter operations, it was not a large enough helicopter to carry the amount of cargo desired. Therefore, in 1954 the Army began building transport helicopter units around the H-21 Shawnee (Figure 17), and similarly in 1955 around the H-34 Choctaw (Figure 17).

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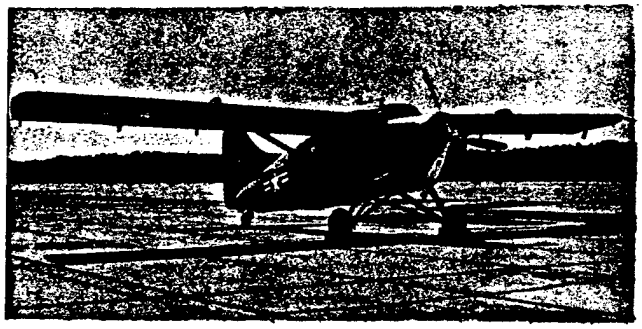
[7]"The Last Three Years of Army Aviation," United States Army Aviation Digest, IV, No. 4, pp. 7-8.

[8]Ibid., pp. 45-46.



U-1A Otter. The Army's first light transport airplane. Powered by a 600 horsepower engine, the Otter attained speed of 120 miles per hour. It had a 58 foot wingspan, was 48 feet 10 inches long, and weighed 7,600 pounds. Normal load was 10 troops or 2,000 pounds of cargo.

AC-1 Caribou.[9] The Army's current transport airplane. Powered by two 1,450 horsepower engines, the Caribou attains a speed of 170 miles per hour. It has a 95 foot 6 inch wingspan, is 72 feet 6 inches long, and weighs 28,500 pounds. Normal load is 31 troops or 8,300 pounds of cargo.

Fig. 16.--Army Transport Airplanes: The U-1A Otter and AC-1 Caribou.[10]

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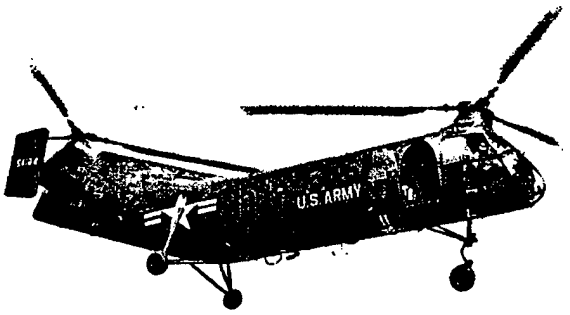
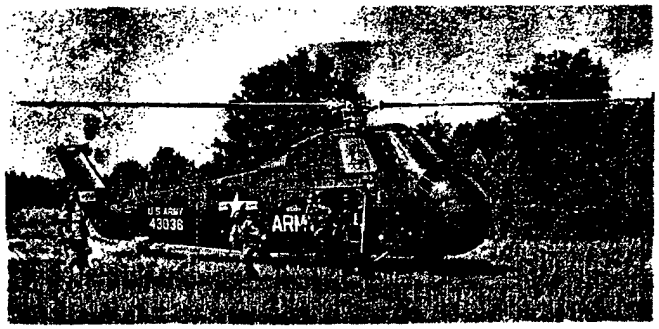
[9]In April 1966, as this thesis was being edited prior to publication, the Secretary of Defense announced that the Caribou (now CV-2) is to be transferred to the United States Air Force within the next year.

[10]U. S. Army Infantry School, Army Aviation Handbook, pp. 18 and 23.



H-21 Shawnee. One of the first Army cargo helicopters. Powered by a 1,421 horsepower engine, the Shawnee attains a speed of 80 miles per hour. It has two 44 foot diameter main rotors, a fuselage length of 52 feet inches, and weighs 13,500 pounds. Normal load is 12 troops or 3,000 pounds of cargo.



H-34 Choctaw. A current Army cargo helicopter. Powered by a 1,425 horsepower engine, the Choctaw attains a speed of 85 miles per hour. It has a 56 foot diameter main rotor, a fuselage length of 46 feet 9 inches, and weighs 13,300 pounds. Normal load is 12 troops or 4,600 pounds of cargo.

Fig. 17.--Army Light Transport Helicopters of the ATFA-Pentomic Period: The H-21 Shawnee and H-34 Choctaw[11]

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[11] Ibid., pp. 19-20.

Although the Shawnee and Choctaw were each capable of carrying a squad of troops or an equivalent weight of hard cargo, neither could lift artillery pieces or trucks larger than one quarter ton size. Therefore, the Army developed requirements for larger transport helicopters. In 1956 the Secretary of Defense granted another exception to the weight limitation on Army aircraft by authorizing the Army to procure the H-37 Mojave (Figure 18), the Army's first medium transport helicopter.[12] Additional transport helicopter units were organized around the Mojave until 1962 when the Army began procurement of the H-47 Chinook (Figure 13). These larger transport helicopters each had the capability of carrying approximately one platoon of troops, and more importantly, they gave Army Aviation the capability of transporting artillery pieces, small tactical rockets, and medium sized trucks and weapons carriers within the combat zone. Thus, by employing light and medium transport helicopter and fixed wing units in combination, Army Aviation reached the capability of supporting true air landed (air-mobile) combat operations.

An important feature of each of the individual transport aircraft discussed was its mission versatility. Although each of these aircraft was basically a cargo carrying aircraft, none were designed for one specific mission. Each aircraft could carry troops or hard cargo or could be used for medical evacuation. The helicopters could carry loads internally or externally, depending on the dimensions of the load or the desired method of delivery. Two of the aircraft, the H-21 Shawnee and the H-34 Choctaw, were also used extensively in the

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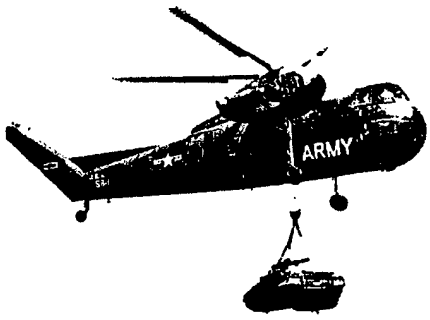
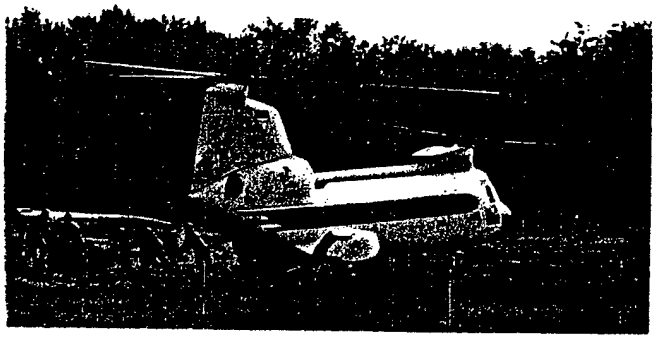
[12] U. S. Army Infantry School, Army Aviation Handbook (Fort Benning, Ga.: U. S. Army Infantry School, June 1961), p. 3.

Army's first experiments with armed helicopters.[13]



H-37 Mojave. The Army's first Medium Transport Helicopter. Powered by two 1,900 horsepower engines, the Mojave attains a speed of 95 miles per hour. It has a 72 foot diameter main rotor, a fuselage length of 64 feet 11 inches, and weighs 31,000 pounds. Normal load is 22 troops or 6,600 pounds of cargo.



H-47 Chinook. Current Army Medium Transport Helicopter. Powered by two 2,200 horsepower engines, the Chinook attains a speed of 150 miles per hour. It has two 59 foot diameter main rotors, a fuselage length of 49 feet 10 inches, and weighs 33,000 pounds. Normal load is 32 troops or 7,400 pounds of cargo.

Fig. 18.--Army Medium Transport Helicopters of the Pentomic-ROAD Period: H-37 Mojave and H-47 Chinook.[14]

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[13] Ibid., p. 41.

[14] U. S. Army Infantry School, Army Aviation Handbook (May 1963), pp. 25-26.

Army Aviation planners discussed arming helicopters as early as 1951, but the first real impetus for this concept came in 1955 when the Army Aviation School organized a test unit at Fort Rucker to experiment with various means of employing Army helicopters as weapons platforms. Over the next few years, a number of weapons installations were tested, including 30 and 50 caliber machine guns, 1.5 inch rockets, and SS-10 guided missiles.[15] Experimentation ultimately resulted in the standardization of some armament kits in 1962 and 1963 for observation and utility helicopters. By the acquisition of helicopter armament kits, Army Aviation was enabled to perform new missions involving offensive and defensive firepower.

Because of its versatility as a weapons platform one other new aircraft which came into the Army inventory during the decade following the Korean War had an important effect on the mission capability of Army Aviation. This new aircraft was the HU-1A Iroquois utility helicopter which, starting in 1956, replaced the older H-19 Chickasaw. The HU-1A Iroquois, shown in Figure 19, and the later model HU-1B became the helicopter around which was built the bulk of the Army's aerial weapons systems. In addition, the Iroquois also became the nucleus for Army Aviation's capability to conduct airmobile operations.

Organization

Along with important changes in aircraft capability, the decade following the Korean War brought important changes in Army Aviation organizations. The concept of consolidation of aircraft into company

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[15] Thomas R. Hill, "ARSA, The 'Saber in the Sky' Grows Larger and Sharper; Promises to be a Major Force of Modern Army," United States Army Aviation Digest, VI, No. 5 (May, 1960), p. 2.

HU-1A Iroquois. The current Army utility helicopter. Powered by a 960 horsepower engine, the HU-1A attains a speed of 95 miles per hour. It has a 44 foot diameter main rotor, a fuselage length of 39 feet 6 inches, and weighs 6,900 pounds. Normal load is 6 troops or 1,500 pounds of cargo. The newer model UH-1B is powered by an 1,100 horsepower engine, enabling it to attain a speed of 120 miles per hour and carry a normal load of 7 troops or 2,400 pounds of cargo. The newest model UH-1D is slightly longer. It is powered by an 1,100 horsepower engine, which enables it to attain a speed of 120 miles per hour, and carry a normal load of 11 troops or 3,000 pounds of cargo. These aircraft can be equipped with armament kits which include 2.75 inch rockets, multiple 7.62mm machine guns, or SS-11 guided missiles.

Fig. 19.--Army Utility Helicopter: HU-1A Iroquois.[16]

size units, which originated in Korea, was continued and enlarged.[17] Some of the company size units, such as the transportation helicopter companies, were organized around one type of aircraft to accomplish a basic set of missions.[18] Other aviation companies, and this was an

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[16] U. S. Army Infantry School, Army Aviation Handbook (May 1963), pp. 21-22.

[17] U. S. Army Infantry School, Army Aviation Handbook (June 1961), p. 3.

[18] U. S. Department of the Army, Transportation Light Helicopter Company, TOE 55-57D (Washington: U. S. Government Printing Office, 14 December 1959), p. 3.

important change to the consolidated aviation unit concept, were built around several different types of aircraft. Such organizations exhibited considerable flexibility in performing a wide variety of missions for the Army elements they supported.[19]

Within the framework of new Army Aviation organizations developed after the Korean War, there were three predominant activities. One of these development activities which had a progressive effect on Army Aviation mission capabilities was the development of the "Sky Cav," or armed helicopter concept. This concept was given a preliminary test during Exercise Sagebrush in 1955. When subsequent experimentation at Fort Rucker with helicopter armament systems showed promise, the Army was given authority, in 1958, to activate the 7292d Aerial Combat Reconnaissance (ACR) Company (Experimental) at Fort Rucker.[20] The ACR Company constituted a completely airmobile reconnaissance unit equipped with helicopters carrying machine guns, rockets, and guided missile armament systems. Based on the tests of the ACR Company, in 1959 United States Continental Army Command directed the Armor School at Fort Knox to design an organization for an armed helicopter airmobile force to perform the traditional missions of armored cavalry. The Armor School designed an organization which it named an Aerial Reconnaissance and Surveillance Troop (ARST). This concept and a provisional ARST were tested extensively in the 2d Infantry Division

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[19] U. S. Department of the Army, Corps Aviation Company, TOE 1-127D (Washington: U. S. Government Printing Office, 13 April 1959), p. 1.

[20] John W. Oswalt, "Shooting Copters, Why and How Army Aviation Arms for Battle," Army, VIII, No. 10 (May, 1958), pp. 39-42.

at Fort Stewart, Georgia, in 1960.[21] The original ARST organization, shown in Figure 20, included an aerial scout platoon, an air transportable rifle platoon, and an aerial weapons platoon--all helicopters being armed. In 1963, the Army established an air cavalry troop organic to armored cavalry squadrons.[22] The air cavalry troop was not designed to perform the Air Force mission of close air support, but rather to employ helicopter mobility in the performance of reconnaissance and security missions. It did, however, for the first time since World War I, give Army Aviation the capability of employing organic armed aircraft in support of the land battle.

Another organizational development of the decade following the Korean War had a progressive effect on Army Aviation mission potential. This was the organization of fixed and rotary wing transportation companies. The transport unit concept took shape rapidly following the Korean war, and by 1956 newly developed doctrine was published in the form of Training Circular 1-7, Employment of Army Transport Aviation, dated 26 January 1956. The following statements quoted from Training Circular 1-7 explain the added capability which Army Aviation units now had for support of the land battle.

> Army aviation helicopter and airplane units provide increased mobility for the tactical maneuver of troop units and provide air movement for critically needed equipment and supplies within the combat zone.
> . . . . . .

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[21] Ibid., pp. 39-42.

[22] U. S. Department of the Army, Air Cavalry Troop, Armored Cavalry Regiment, TOE 17-58E (Washington: U. S. Government Printing Office, 2 June 1963), p. 1.

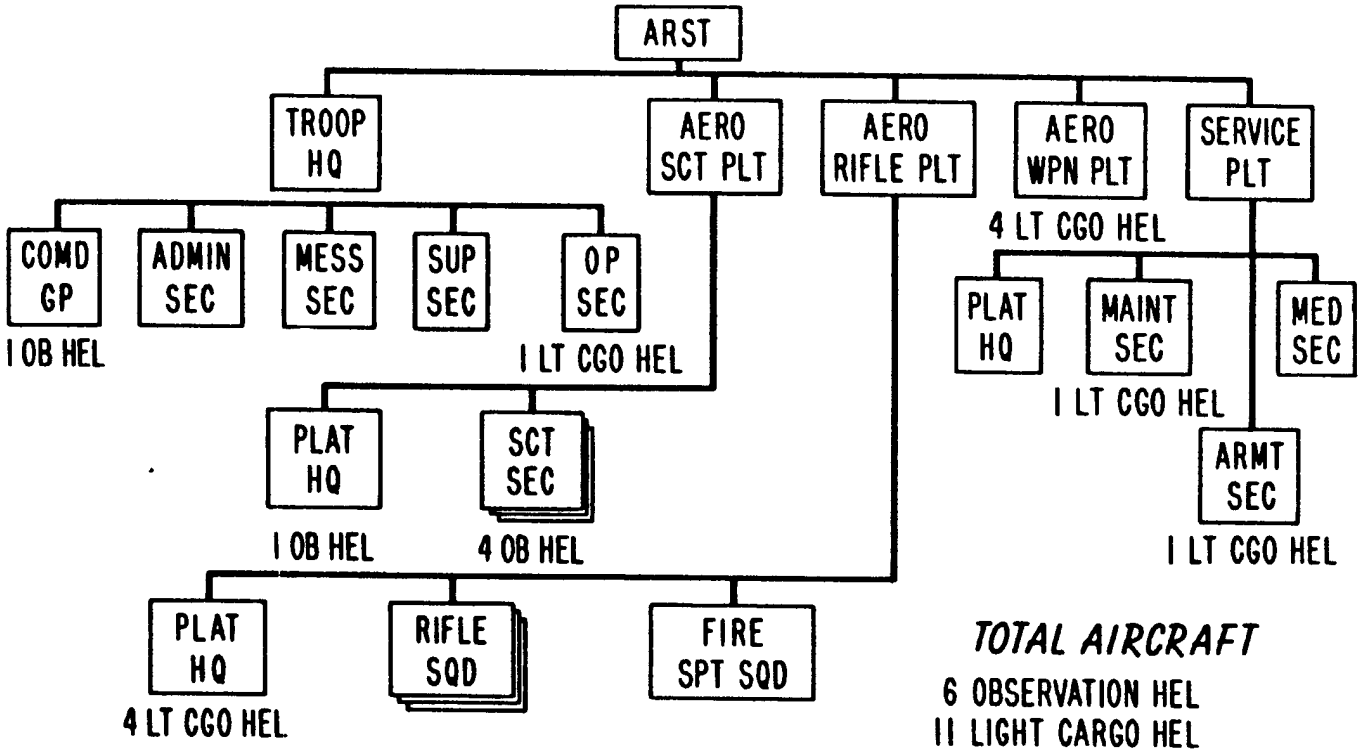

Fig. 20.--Organization of Original Aerial Reconnaissance and Surveillance Troop, 1960[23]

[23]Hill, United States Army Aviation Digest, VI, No. 5, p. 3.

> . . . provide combat forces with the means of executing operations within the combat zone involving maximum mobility, and to airlift supplies, replacements, personnel, and medical patients.
>
> . . . . . .
>
> The deployment of the field army complement of Army transport aviation units is controlled at army level. . . . In view of the detailed planning, coordination, communications, and logistic support required, Army transport aviation units normally are not attached below division level.[24]

As explained by the above quotation, the basic purpose of Army transport aviation units within a field army is to provide the ground force commander with a mobility/flexibility advantage over the enemy. As examples of such flexibility, Training Circular 1-7 lists the following types of operations as being typical of the wide range of possible uses of Army transportation aviation units in the combat zone:

1. Rapidly exploiting effects of nuclear weapons.
2. Enveloping defended areas or traversing natural barriers.
3. Assisting all types of tactical maneuvers.
4. Assisting armored or motorized forces in exploitation or pursuit.
5. Seizing critical terrain features.
6. Reinforcing units cut off, surrounded, or isolated.
7. Moving reserves.
8. Resupply by air.
9. Concentrating dispersed forces in preparation for a tactical operation.
10. Dispersing forces following a phase of operations.
11. Combating partisan or guerrilla forces.
12. Attacking enemy airborne or air landed forces.
13. Movement of reconnaissance forces and patrols.
14. Evacuation of casualties.
15. Ship to shore movement in amphibious operations.[25]

While Army transport aviation companies were being organized around a single type of aircraft to perform missions ordered by corps and field army commanders, there were also concurrent developments in a

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[24] U. S. Department of the Army, Employment of Army Transport Aviation, TC 1-7 (Washington: U. S. Government Printing Office, 26 January 1956), pp. 1-2.

[25] Ibid., pp. 2-3.

division aviation organization composed of several types of aircraft. These several types of aircraft were to perform a variety of missions for lower level combat elements. The first large scale test of Army concepts for the reorganization of its divisions to fight in a nuclear environment took place in Exercise Sagebrush in 1955.[26] By then Department of the Army had agreed on the need for greater mobility for divisions operating on an atomic battlefield. Anticipated requirements for dispersal to present a less lucrative target for the enemy carried inherent need for better ground vehicles and more aircraft to enable combat forces to concentrate rapidly at the point of decision and then disperse rapidly.[27]

In Sagebrush, the reorganized division concept tested was called ATFA, which stands for "Atomic Field Army." The basic structure of an ATFA division was the combination of a division base and three tailored combat commands much like a World War II armored division. Within the division base was included a combat aviation company. As shown in Figure 21, this aviation company was composed of four types of aircraft, including helicopters and airplanes. The aircraft of the combat aviation company could perform a variety of missions for elements of the ATFA division. Capabilities which were built into the ATFA combat aviation company are as follows:

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[26] "The Last Three Years of Army Aviation," United States Army Aviation Digest, IV, No. 4, pp. 45-46.

[27] Norris, The Washington Post and Times Herald (November 3, 1955), pp. 1 and 10.

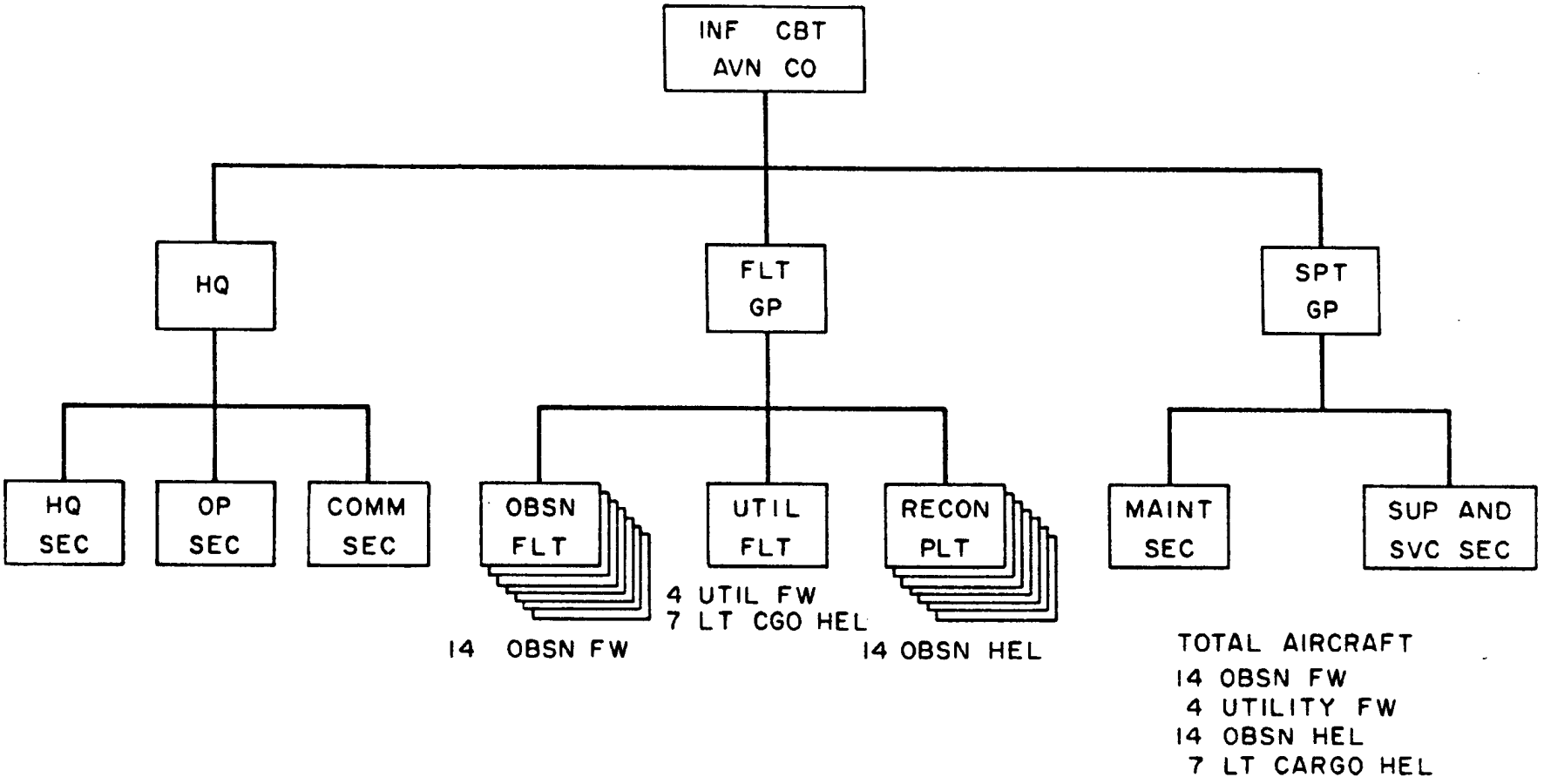

Fig. 21.--AFTA Division Combat Aviation Company, 1954.[23]

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[23]Office, Chief of Army Field Forces, Combat Aviation Company, Infantry Division, TOE 1-7 AFTA (Fort Monroe, Va.: 30 September 1954), p. 2.

1. Aerial observation, reconnaissance, and surveillance (both day and night) of the line of contact area and, within capabilities of the aircraft, enemy areas within the division zone of action for purposes of locating, verifying, and evaluating targets; adjusting artillery and mortar fire; and terrain reconnaissance.
2. Supplemental aerial photography to include daylight oblique photography with hand held cameras, daylight vertical and oblique photography with mounted cameras and limited vertical night photography.
3. Air movement of troops, supplies, and equipment by Army cargo aircraft.
4. Battlefield illumination.
5. Command, reconnaissance, and liaison transportation.[29]

The AFFA concept was never adopted for a general Army reorganization. Instead, it was the test bed for a new Army organization which became known as the "Pentomic" structure. The general reorganization of the Army into the Pentomic structure began in 1954 and ushered in a new era of usefulness for Army Aviation. Aviation sections and companies were made organic to many headquarters within a Pentomic field army as shown in Figures 22 and 23.

At division level, an aviation company patterned after the AFFA combat aviation company contained the majority of Army aircraft organic to the division. As shown in Figure 24, the division aviation company included six different types of aircraft organized in some eight separate elements within the company. This company was a consolidated organization whose separate elements operated under decentralized control. The fixed wing aircraft continued to operate from a division base airfield; however, helicopter elements more often operated from command posts or separate locations. Thus Army aircraft were living in the field with the troops and commanders they supported.

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[29]Office, Chief of Army Field Forces, TOE 1-7 AFFA, p. 3.

UNIT DESIGNATION	TOE NUMBER	Fixed Wing					Rotary Wing				Drone	Total Acft	Units in Field Army	Acft in Field Army
		Obsn	Med Obsn	Comd	Util	Light Trans	Obsn	Util	Transport LH	Transport MH	SD-1			
Aviation Co (Airborne Div)	1-57D	10			4		18	20				52	**	52
Aviation Co (Armored Div)	1-17D	14	4		4		14	8	6		12	62	3	186
Aviation Co (Infantry Div)	1-7D	14	4		4		17	4	6		12	61	9	549
Aviation Co (Armored Cav)	1-67D	9	4				7		6		12	38	5	190
Aviation Co (Corps)	*1-127D	6		1	6		10	6				29	3	87
Aviation Co (Army)	*1-137D	4		3	6		6	6				25	1	25
Aviation Co (Corps Arty)	*1-117D	34	4		1		3	3				45	3	135
Air Cavalry Troop	*17-						16	7	4			27	27	729
Hq Engr Combt Group	5-192C	2										2	9	18
Hq Engr Combt Battalion	5-36D						1					1	27	27
Medical Air Ambl Co	*8-137D							25				25	3	75
Signal Air Phone R & D Co***	11-54D	11			1							12	1	12
Hq Co Tank Bn 90mm	17-26C	1										1	9	9
Hq Co Tank Bn 120mm	17-36C	1										1	9	9
Hq & Hq Det Avn Gp	*1-102T			1			3					4	1	4
Hq & Hq Det Trans Bn (Trans Acft)	55-56D				1		3					4	4	16
Avn Co (FW) (Light Transport)	1-107T					16						16	4	64
Trans Co (Light Helicopter)	55-57D						2		20			22	12	264
Trans Co (Med Helicopter)	55-58T						2			16		18	4	72
Hq Trans Acft Maint & Supply Bn	*55-456D				1				1			2	1	2
Trans Acft D, S Company	*55-458D				1				1			2	7	14
Hq Inf Brigade	7-52D	4			1		8	3				16	1	16
TOTALS		398	80	7	93	64	807	380	458	64	204			2555

* - Proposed TO & E
** - As Required
*** - Organic to ARS Bn

Fig. 22.--Recapitulation of Army Aircraft and Aviation Organizations in a Type Field Army, Pentomic Period.[30]

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[30] U. S. Army Infantry School, Army Aviation Handbook (June 1961), p. 47.

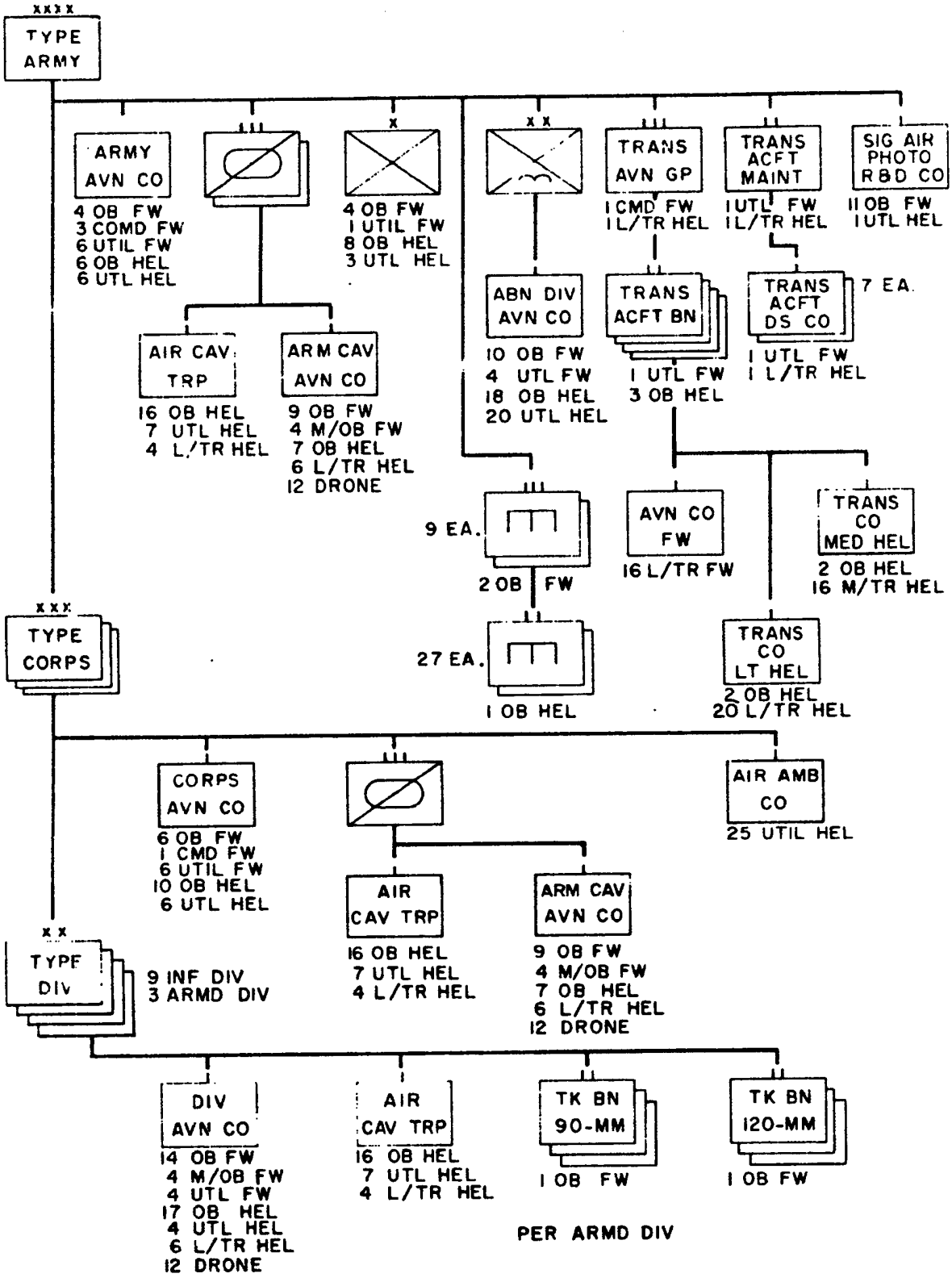

Fig. 23.--Pentomic Type Field Army Organizations with Organic Army Aircraft.[31]

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[31] Ibid., p. 47.

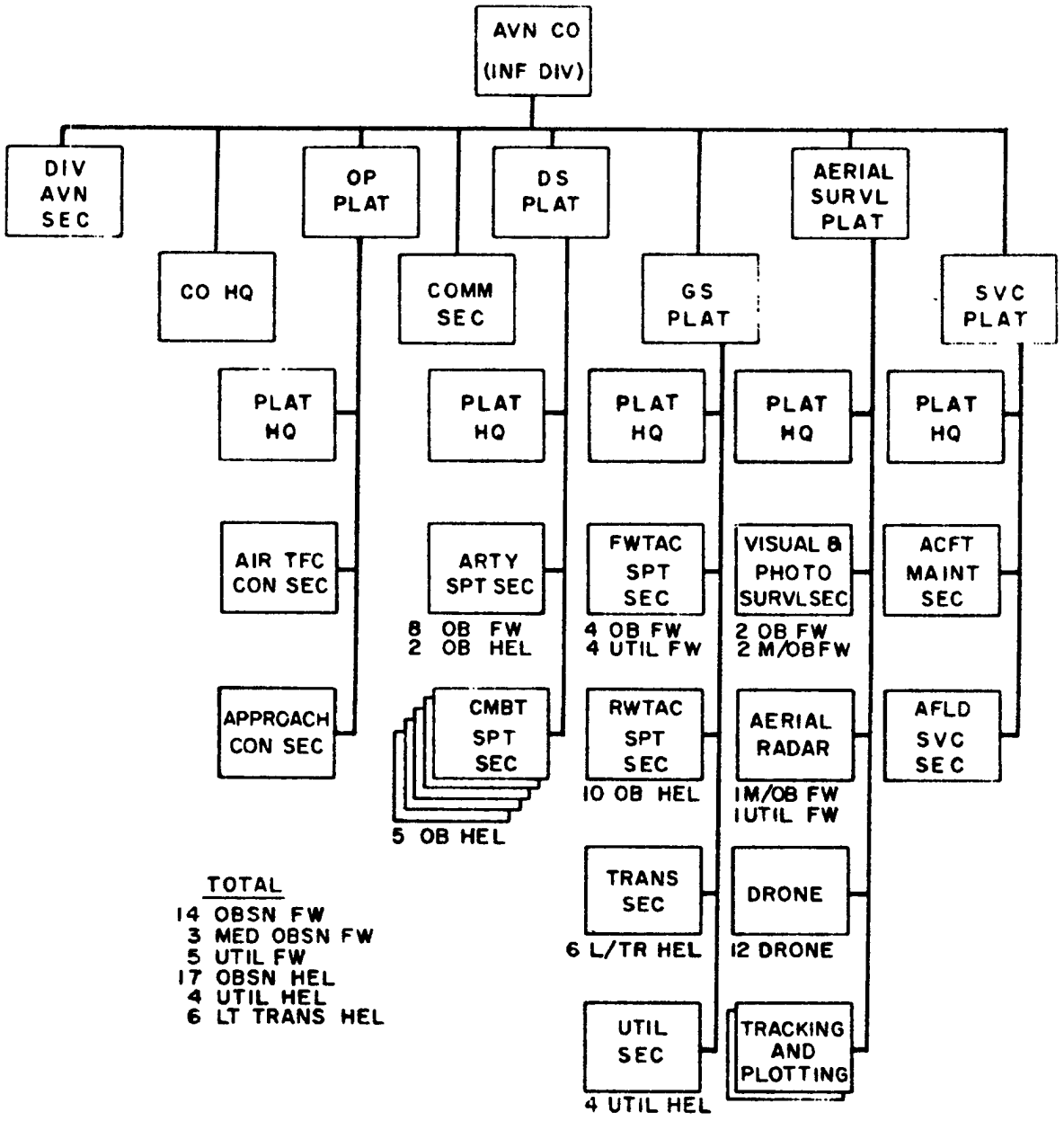

Fig. 24.--Division Aviation Company, Pentomic Infantry Division.[32]

Figure 23 shows that an air cavalry troop was to be organic to

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[32]U. S. Department of the Army, Infantry Division Aviation Company, AOE 1-7D (Washington: U. S. Government Printing Office, 1 February 1960), p. 2.

each armored cavalry squadron found at division, corps, and field army level. Though proposed, the air cavalry troops were not organized until after the Army reorganized from the Pentomic structure beginning in 1962. Therefore, aviation support for Pentomic divisions was provided mainly by their division aviation company.

Aviation support for corps units was provided by two types of company size organizations. One type company, such as the corps aviation company (Figure 23), was composed of different types of aircraft to provide a variety of aviation services to corps units.[33] The other type of company, such as the air ambulance company (Figure 23), was composed of one type of aircraft to provide a specific corps-wide service.[34] The corps artillery aviation company, shown in Figures 22 and 23, was a proposed organization which was not approved during the time period that the Army was organized under the Pentomic structure. However, no other aviation organization in the Pentomic field army provided the corps commander and the corps controlled fire support units with long range observation aircraft (AO-1 Mohawk) under their direct control.

Aviation support for field army units (Figure 23) was provided by three types of aviation units. The army aviation company, for example, was a composite organization which performed a variety of services for field army units. The field army transportation aviation battalions, on the other hand, were organized into company size units, each

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[33] U. S. Department of the Army, Corps Aviation Company, TOE 1-127D, p. 1.

[34] U. S. Department of the Army, Medical Air Ambulance Company, TOE 8-137D (Washington: U. S. Government Printing Office, 24 February 1960), p. 1.

employing a single type of aircraft to perform the basic transportation mission. The third type of aviation organization organic to field army units was the small aviation detachment or section consisting of one or two aircraft. These aviation sections served control headquarters, such as engineer combat groups, which had a continuing requirement for aviation support.[35]

In considering the number of different types of Army aircraft and Army Aviation organizations within a 1962 Pentomic field army, it is apparent that Army Aviation had grown remarkably in size since the Korean war years. With the concurrent developments in transport aircraft, long range reconnaissance aircraft, and armed helicopters, Army Aviation also grew in usefulness. The most important feature of Army Aviation organic within the Pentomic field army was the attempt to provide to each headquarters which had a need for aviation support, the mix of types and numbers of Army aircraft to perform the missions required by that headquarters.

Missions

The number of headquarters requiring aviation support was large. Missions performed by Army Aviation were likewise numerous. The following discussion explains what missions were performed by Army Aviation in support of the Pentomic field army. Though the United States was not at war during this period, these missions were performed during numerous maneuvers and field exercises.

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[35] U. S. Department of the Army, Headquarters and Headquarters Company, Engineer Combat Group or Airborne Engineer Combat Group, TOE 5-192C (Washington: U. S. Government Printing Office, 18 November 1955), p. 2.

1. Observation. Observation aircraft, both fixed wing and rotary wing, were authorized in divisions and in corps and field army units (Figure 22) to provide required support. Any Army aircraft employed for observation was capable of operating day or night.

a. Surveillance. Visual surveillance of the portion of the battlefield along the line of contact was provided by fixed wing aircraft authorized in division, corps, and field army controlled aviation units. Long range surveillance was performed by medium observation airplanes (AO-1 Mohawk) authorized in divisions and armored cavalry regiments. The ... awk's surveillance sensors included aerial radar and infrared systems to supplement visual methods of surveillance. Missions flown by these aircraft were normally requested by division or corps G-2 Sections to collect and report information for the combat intelligence system.[36]

b. Target acquisition. Any Army aerial observer could detect, identify, and locate targets. Generally, the same aircraft that performed surveillance missions accomplished the bulk of target acquisition. Electronic sensors carried by the AO-1 Mohawk aircraft made it possible to acquire targets at night and in inclement weather.[37] Observation aircraft were available to division, corps, and field army fire support units to acquire targets for the weapons systems controlled by those levels of command.

c. Artillery registration and adjustment.

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[36] U. S. Department of the Army, Army Aviation, FM 1-100 (Washington: U. S. Government Printing Office, April 1959), p. 57.

[37] Ibid., p. 58.

Theoretically, any Army aircraft could be used for fire direction. The Pentomic aviation structure did not authorize aircraft for artillery battalions (Figure 22) as was the case during World War II. However, observation aircraft authorized in division, corps, and field army aviation companies were programmed for daily use in support of fire support elements. Usually, fire missions for field army controlled weapons systems were flown by AO-1 Mohawk airplanes.[38] Observers performed counterbattery missions by adjusting fires on enemy batteries.

d. Naval gunfire adjustment. The same aircraft used for artillery adjustment were utilized to adjust naval gunfire when that type of fire support was being provided. So long as the aerial observer could communicate with the ship's fire direction center, he could adjust naval gunfire as easily as his own field artillery.

e. Reconnaissance. Observation airplanes and helicopters were available to any organization within the field army for reconnaissance purposes. The choice of aircraft best suited for a reconnaissance mission depended on the location of the specific area to be reconnoitered and the type of information required. Reconnaissance missions deep into enemy territory were to be performed by AO-1 Mohawk airplanes. Figure 23 shows that Mohawks were organic to division aviation companies and armored cavalry regiment aviation companies. The lack of long range reconnaissance aircraft under direct control of corps and field army headquarters was one of the significant gaps in the Pentomic aviation structure. In spite of this shortcoming, Army aircraft supported numerous combat and combat support headquarters by

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[38] Ibid., pp. 61-63.

performing such specialized missions as route reconnaissance, position area reconnaissance, engineer reconnaissance, signal reconnaissance, and axis of communication and wire route reconnaissance.[39]

f. Aerial combat reconnaissance. This type reconnaissance was a new terminology coined during the Pentomic period to denote the type of reconnaissance performed by armored cavalry units employing light transport helicopters to maneuver troop elements and armed helicopters for fire support. It represented an application of modern aerial mobility to the fire and maneuver reconnaissance traditionally perfor.. d by armored cavalry units. The principal advantages gained from this type of mission were tactical surprise and the ability to maneuver ground reconnaissance forces deeper into enemy territory.[40]

g. Survey. Many different combat and combat support units used Army aircraft for survey operations peculiar to their own type of unit. Such missions as route survey, topographic survey, artillery survey, traffic survey, and radiological survey were performed. In each of these typical missions, Army aircraft could be employed to transport the surveyor or surveying party and its equipment, or to act as a reference point for the surveying teams. By taking advantage of the speed of aircraft and the ability of helicopters to land survey teams on prominent terrain features, it was possible to conduct rapid and accurate survey operations over difficult terrain. Of the various types of survey operations supported, radiological survey was the mission which was newly derived during the Pentomic period. It was found that large areas could be monitored for radiological contamination when

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[39] Ibid., pp. 46-50. [40] Ibid., p. 54.

radiological monitoring devices were flown at low altitude over the area by helicopter. Thus, many hours were saved in establishing the limits of contaminated areas.[41]

h. Search. The purpose of search operations was to locate downed pilots or troops isolated by enemy forces. Search missions were performed by one or more aircraft depending on the locale and purpose of the search. Once the aircraft located their search objective, it became a separate mission to return the lost persons to friendly lines. In general terms, Army Aviation search operations were considered to be restricted to the depth of a division sector because of the relatively short range and high vulnerability of the aircraft employed.[42]

i. Aerial photography. While some hand-held cameras were still used to obtain aerial photographs, the bulk of Army aerial photography was performed by cameras mounted in AO-1 Mohawk aircraft. The Mohawk's camera systems provided both vertical and oblique photographs. At night, only vertical photography was possible. In addition, the Mohawk's radar system provided electronic imagery when employed at night or in inclement weather. Divisions and armored cavalry regiments were also provided a drone system (Figure 23) to obtain aerial photographs when it was too dangerous to send manned aircraft into heavily defended enemy areas. When compared to the Air Force capability to produce aerial photographs and photomaps, Army Aviation did not have an impressive aerial photography capability. The Army did, however, realize two significant advantages from the capability to

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[41] Ibid., pp. 64-68. [42] Ibid., pp. 179-186.

produce aerial photographs as required. Most significant was the speed with which Army aircraft could respond to a photography request and the speed with which Army photolabs could produce prints and distribute them to using units. The other advantage was attributed to the capability of Army aircraft to fly in weather conditions which prevented Air Force photo-reconnaissance aircraft from accomplishing photo missions. Army Aviation, therefore, used its aerial photography to supplement the Air Force capability, and not as a replacement for support normally provided by the Air Force.[43]

2. Transportation. In the field of transportation Army Aviation enjoyed great progress during the Pentomic period. As shown in Figure 23, not only were utility airplanes and helicopters included in most aviation organizations, but a significant lift capability was also incorporated into the division aviation companies and the transportation transport aviation battalions controlled by the field army.

a. Resupply. Any Army aircraft was capable of performing resupply missions within its cargo carrying capacity. In this sense, resupply was not a new mission for Army Aviation. The significant progress in the field of resupply was attributed to the increase in numbers of transport aircraft available within the Pentomic aviation structure (Figure 22), and to the increased carrying capacity of the individual aircraft employed.

(1) Organic to many aviation organizations were one or more L-20 Beaver utility airplanes or one or more HU-1A Iroquois utility helicopters. For small resupply missions, each Beaver could

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[43] Ibid., pp. 51-57.

carry about 1,000 pounds of cargo, and each Iroquois could carry about 1,500 pounds of cargo.

(2) Incorporated into each division aviation company was a general support platoon (Figure 24) which was authorized six light transport helicopters and four utility helicopters. Used in conjunction, the six light transport helicopters (H-21 Shawnee or H-34 Choctaws each carrying 3,000 pounds of cargo) and the four utility helicopters (UH-1A Iroquois each carrying 1,500 pounds of cargo) gave the division a theoretical single lift capability of 24,000 pounds of cargo resupply.

(3) Under field army control, the aviation group (Figure 23) comprised four transportation transport aviation battalions--basically one such battalion to support each subordinate corps.[44] Each transportation transport aviation battalion was composed of one fixed wing transportation company, three light helicopter transportation companies, and one medium helicopter transportation company. In theory, the fixed wing company (employing 16 U-1A Otters each carrying 2,000 pounds) could transport 32,000 pounds of cargo in a single lift. The three light helicopter transportation companies (each employing 20 H-21 Shawnee or H-34 Choctaws each carrying 3,000 pounds of cargo) could transport 180,000 pounds of cargo in a single lift. The medium helicopter transportation company (employing 16 H-37 Mojaves each carrying 6,600 pounds of cargo) could transport 105,600 pounds of cargo in a single lift. Thus a corps commander could expect to have available to him a minimum theoretical single lift capability (considering 75 per

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[44] U. S. Army Infantry School, Army Aviation Handbook (June 1961), p. 19.

cent of authorized aircraft flyable) of 238,200 pounds or 119 short tons of supplies and equipment.

b. Troop haul.

(1) The utility airplanes and helicopters authorized in many aviation units in the Pentomic field army provided the capability of transporting small teams or staffs within the combat zone. Each L-20 Beaver carried four passengers, and each UH-1A Iroquois carried six passengers.

(2) Within each division aviation company, the six light transport helicopters (each carrying 12 troops) and the four utility helicopters (each carrying 5 troops) provided the division a theoretical single lift capability of 92 troops, or about half of an infantry company.

(3) Each of the four field army controlled transportation transport aviation battalions had a significant troop haul capability. In theory, the fixed wing transportation company (employing 16 U-1A Otters each carrying 10 troops) could transport 160 troops in a single lift. The three light helicopter transportation companies (each employing 20 H-21 Shawnee or H-34 Choctaws each carrying 12 troops) could transport 720 troops in one lift. The medium helicopter transportation company (employing 16 H-37 Mojaves each carrying 22 troops) could transport 352 troops in one lift. Thus, each transport aviation battalion had a theoretical single lift capability (considering 75 per cent of authorized aircraft flyable) of 924 troops, or approximately the combat infantry strength of one battle group.

c. Airmobile operations. The concept of uni-service

Army air landed, or airmobile, operations was developed during the pentomic period. Since organic divisional troop carrying aircraft were capable of lifting less than one company of combat troops or equivalent weights of vehicles no larger than one quarter ton size, the division did not, within its own resources, have a true airmobile capability. However, each transportation transport aviation battalion, employing its medium helicopters, was capable of lifting approximately a five company force or equivalent weights of one quarter and three quarter ton vehicles or 105 millimeter howitzers. Therefore, by supporting its divisions with one or more transport aviation battalions for specific operations, the Pentomic field army had the capability of supporting battle group size airmobile operations.[45]

d. Medical evacuation. Theoretically, every Army aircraft except the AO-1 Mohawk could be used for medical evacuation, and therefore, any Army Aviation organization within the field army was capable of performing medical evacuation for any supported element. In addition, to each corps was attached an air ambulance company (Figure 23). These air ambulance companies were to operate by platoons from hospitals within the corps sector. They had the specific missions of evacuating casualties from forward aid stations and of emergency movement of medical personnel, equipment, and supplies within the combat zone.[46]

e. Rescue. This mission was much the same as

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[45] U. S. Department of the Army, FM 1-100 (April 1959), pp. 22-23.

[46] U. S. Department of the Army, Medical Air Ambulance Company, TOE 8-137E (Washington: U. S. Government Printing Office, 24 February 1960), p. 1.

evacuation; however, it did not connote pickup of casualties. Rescue missions had the task of picking up, and returning to friendly control, pilots who had been shot down or troops that had been isolated by enemy forces.[47] No particular aircraft or aviation organizations were specifically tasked for this mission. Most rescue operations were performed by helicopter because of the ability to land helicopters in almost any terrain. Because of the helicopter's ability to hover over a given spot, several aircraft in division aviation companies and air ambulance companies were equipped with a hoist which enabled the aircraft crew to rescue persons in water or jungle areas where the helicopter could not land. Because of the helicopter's slow speed and vulnerability to enemy fire, rescue operations by Army aircraft were not considered feasible in general war beyond the range of Army artillery.

3. Command. Because so many Army aircraft were provided throughout the field army for use of commanders and their staffs, a wide variety of command missions was performed. With the wide dispersion expected of units required when operating in a nuclear environment, commanders could take advantage of the speed of aircraft to be able to accomplish their normal movements around the battlefield. In addition, helicopters could assist commanders by enabling them to view their units' operations from an aerial vantage point, and to move rapidly to critical points to personally influence the action.[48]

a. Messenger and courier. Depending on the distance between headquarters, and the terrain at the point of delivery, any of

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[47] U. S. Department of the Army, FM 1-100 (April 1959), pp. 179-180.

[48] Ibid., p. 12.

several types of aircraft could be used for messenger service. Observation helicopters, in particular, were used in making messenger runs between forward combat units. Fixed wing observation and utility airplanes were used between headquarters served by an airfield. Again, the wide dispersion of combat units forced the different levels of command to rely on Army aircraft to deliver messages and other material requiring physical distribution. Army Aviation also made it possible for officer couriers to deliver rapidly a large portion of low precedence and classified traffic which might otherwise overburden electrical signal communications facilities.[49]

b. Message drop and pickup. With the much increased use of helicopters in the forward area of the combat zone, message drop and pickup was made easy because of the ability of the helicopter to land or hover almost anywhere. However, since observation airplanes were the primary aircraft for aerial observation, it was necessary for pilots to be prepared to drop messages or make a flying message pickup. Little additional equipment was necessary, so pilots could be prepared to meet emergency communication situations at all times.[50]

c. Photo delivery. Any Army unit could use its organic aircraft to pick up or deliver aerial photos processed by Army agencies. One aviation organization, however, had the specific mission of delivering aerial photos from Air Force reconnaissance airfields to Army users. This unit was the signal air reproduction and delivery company assigned to the field army.[51] Its aircraft were to make several delivery

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[49] Ibid., pp. 15-16.

[50] Ibid., pp. 14-15.

[51] U. S. Department of the Army, Signal Air Photo Reproduction and Delivery Company, TOE 11-54D (Washington: U. S. Government Printing Office, 16 October 1957), p. 1.

flights daily to division, corps, and field army headquarters. In this way, the Army attempted to reduce to a minimum the time required to get aerial photos taken by the Air Force into hands of the requesting units.

d. Column control. Movement of columns over widely separated axes of advance made it difficult for commanders to exercise the desired degree of control over their forces. Army aircraft provided the necessary means for visual and radio contact between commanders and march columns. Helicopters proved most useful for this mission because the commander could land beside a column and confer in person with his subordinate commanders. In addition, observation helicopters and airplanes both had homing devices built into their frequency modulated radio system, enabling the commander to locate his forces.[52]

e. Radio relay. With better multichannel radio installations in Army aircraft, the employment of aircraft to relay messages and orders between command posts was greatly increased. The Army aircraft could act as a radio relay station as an incidental mission during any flight, but commanders often found it necessary to keep fixed wing aircraft in the air for extended periods of time in order to maintain communication with subordinate elements. Army helicopters were also used to position ground radio relay teams on prominent terrain features.[53]

f. Camouflage inspection. Commanders found that the best way to test their unit's camouflage discipline was to check it from the air. Air observers were trained to check camouflage as an

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[52] U. S. Department of the Army, FM 1-100 (April 1959), pp. 13-14.

[53] Ibid., p. 13.

incidental mission during flight. In addition, most commanders scheduled frequent flights to make more detailed inspections of battle positions, logistics installations, and traffic focal points.[54]

g. Wire laying. Both airplanes and helicopters were used in laying wire. Because of its slower speed and its ability to hover over a spot, the helicopter proved to be easier to use for wire laying, whereas a fixed wing aircraft could lay wire only when a special wire dispenser with inversely wound coils (doughnut rolls) of wire was available. On the other hand, any sort of a spool or reel placed in a helicopter could be used. The use of Army aircraft to lay wire was considered desirable only when terrain barriers prevented establishing wire circuits by ground means, or when speed in establishing communication was paramount. For this reason, Army units used aerial wire laying chiefly when operating in jungle or mountainous areas.[55]

h. Leaflet drop and audio communication. Propaganda dissemination by Army aircraft was neither new nor difficult. The easiest method of supporting special warfare operations was the aerial distribution of propaganda leaflets. By taking advantage of favorable wind conditions, the aircraft could drop leaflets with but limited exposure to enemy ground fire. When it was found to be more desirable to reach the target audience with spoken words, a loudspeaker system could be mounted on the aircraft. There were no specially designed loudspeaker systems used, but systems available within Army units were easily modified for temporary installation on Army aircraft. As an outgrowth of the employment of Army aircraft for audio propaganda missions,

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[54] Ibid., p. 63.

[55] Ibid., pp. 17-18.

it was found that the same loudspeaker installations were useful in broadcasting warnings to persons on the ground, and also in riot control operations.[56]

i. Battlefield illuminations. There were no special aircraft installations designed for Army aircraft to perform battlefield illumination. When required, illumination was accomplished by hand dropping aircraft flares. The length of time one Army aircraft could provide illumination depended on the number of flares which could be loaded aboard. The advantage of using Army aircraft for this mission was the rapidity of reaction possible when commanders called upon organic aircraft. Air Force aircraft were capable of providing illumination for longer periods of time over larger areas. Therefore, Army aircraft usually provided illumination over critical areas until Air Force flare ships arrived over the area.[57]

During the nine years from 1953 to 1962, Army Aviation experienced remarkable growth in overall size and mission capabilities. Significant among the developments of the period was the advance made in helicopter design, and the organization of these helicopters into transport aviation battalions which enabled Army commanders to conduct airmobile operations by transporting troops and their equipment around the battlefield. However, as impressive as this progress was, the next several years showed even greater growth and expansion of mission capabilities.

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[56] Ibid., pp. 19-20.

[57] Ibid., pp. 109-110.

CHAPTER VI

ROAD (REORGANIZATION OBJECTIVE ARMY DIVISION) ORGANIZATION (1962-)

Aircraft

During the period 1957-1962 when the United States Army was organized under the Pentomic concept, Army Aviation expanded in numbers of aircraft and in the mission capabilities of its several types of aircraft. However, even with this substantial growth, Army Aviation was not fully capable of providing the desired degree of mobility for ground combat operations. Therefore, when the Army began its reorganization in 1962 to the more flexible ROAD (Reorganization Objective Army Division) structure, there was an accompanying increase in numbers of Army aircraft within the field army. Figure 25 shows that, as envisaged in 1966, a type ROAD field army contains 3,045 Army aircraft of eight different types. This number represents an increase of 490 aircraft over the type Pentomic field army (Figure 22) of 1962.

In addition to a pure increase in numbers, important aircraft improvements are incorporated into the ROAD aviation structure. As shown in Figure 25, observation airplanes (O-1 Bird Dog) have been eliminated and replaced in tables of organization and equipment by light observation helicopters. In a like manner, utility airplanes (U-6A Beaver) have been eliminated in favor of utility helicopters. (UH-1B and UH-1D Iroquois). Only two types of fixed wing aircraft are still

UNIT DESIGNATION	TO&E NO.	FIXED WING					ROTARY WING						
		OBSN	MDM OBSN	CMD	UTIL	MDM TRANS	LT OBSN	UTIL	MDM TRANS	TOTAL ACFT	UNITS IN FLD ARMY	UNITS IN FASCOM	TOTAL ACFT
Avn Bn (Inf Div)	1-75E		4				10	31		45	3		135
Hq & Hq Co Bde (Inf Div)	7-42E						6			6	9		54
Hq & Hq Btry, Div Arty (Inf Div)	6-302E						10	(2)		10	3		30
Air Cav Trp (Inf Div)	17-106E						9	17		26	3		78
Trans Acft Maint Co (Inf Div)	55-89E							2		2	3		6
Avn Bn (Mech Div)	1-75E		4				10	31		45	6		270
Hq & Hq Co Bde (Mech Div)	37-42E						6			6	18		108
Hq & Hq Btry, Div Arty (Mech Div)	6-302E						10	(2)		10	6		60
Air Cav Trp (Mech Div)	17-106E						9	17		26	6		156
Trans Acft Maint Co (Mech Div)	55-89E							2		2	6		12
Avn Bn (Armd Div)	1-75E		4				10	31		45	3		135
Hq & Hq Co Bde (Armd Div)	17-42E						6			6	9		54
Hq & Hq Btry, Div Arty (Armd Div)	6-302E						10	(2)		10	3		30
Air Cav Trp (Armd Div)	17-106E						9	17		26	3		78
Trans Acft Maint Co (Armd Div)	55-89E							2		2	3		6
Hq & Hq Co Avn Gp	1-102T						3			3	3		9
Avn Co (Corps)	1-217E			2			10	10		22	3		66
Aerial Surv Co (Corps)	1-128E		18				1			19	3		57
Hq & Hq Co Airmobile Bn	1-126P						3			3	6		18
Airmobile Co (Lt)	1-77E							25		25	12		300
Aerial Weapons Co	1-157T							12		12	6		72
Mal Co (Mdm Trans)	1-258P						2		16	18	12		216
Sep Bde Avn Co	1-47E						18	14		32	3		96
Corps Arty Avn Btry	6-517T		6				4	9		19	3		57
Hq & Hq Trp (Armd Cav Regt)	17-52E						2	8		10	4		40
Hq & Hq Trp (Armd Cav Sqdn)	17-56E						2	2		4	12		48
Air Cav Trp (Armd Cav Regt)	17-58E						9	17		26	4		104
Hq & Hq Btry ADA Gp	44-12E			(1)			(2)				5		
Hq & Hq Btry Arty Gp	6-401E						2			2	12		24
FA How Bn 155mm (Towed)	6-425E						2			2	6		12
FA How Bn 8" (Towed) (SP)	6-415E						2			2	15		30
FA How Bn 155mm (SP)	6-455E						2			2	12		24
FA How Bn 175mm (SP)	6-435E						2			2	12		24
Hq & Hq Co Engr Bde (Cbt) (Corps)	5-101E							2		2	3		6
Hq & Hq Co Engr Gp (Cbt)	5-52E						4	8		12	9		108
FA TAB	6-515E						(3)				3		
Engr Co (Topo) (Corps)	5-327E							3		3	3		9
Sig Co (CO)	11-17E			(2)				4		4	6		24
Hq & Hq Co Trans Gp (Acft)	1-252P						3			3		1	3
Hq & Hq Co Trans Acft (Bn)	1-256P						3			3		4	12
Avn Co (Army)	1-217E			4			10	10		24		1	24
Avn Co (AATC) (Army)	1-207E												
Avn Co (FW)	1-257E	2				16				18		4	72
Mal Co (Mdm) Trans	1-258E						2		16	18		8	144
FA Mal Bn (Pershing)	6-615E							4		4	2		8
Hq & Hq Co Engr Bde (Cbt) (Army)	5-101E							2		2	1		2
Engr Bn (Topo) (Army)	5-305E							3		3	1		3
Med Co (Air Amb)	8-137E							25		25		3	75
Med Det (Air Amb)	8-500D (RA)							6		6		12	72
Hq & Hq Co Sig Bde (Army)	11-202E						6	2		8		1	8
Hq & Hq Co Sig Bn (Co)	11-96D			(4)			2			2		1	2
Trans Co (Acft) (DS)	55-457E							2		2		16	32
Acft Maint Co (GS)	55-458E							2		2		12	24
Hq & Hq Bn ADA Bde	44-2E				(1)		(4)				2		
MID (Air Recon Spt) (Fld Army)	30-6D			5				3		8	1		8
TOTAL BY TYPE		8	120	15	0	64	981	1537	320	GRAND TOTAL		3,045	
TOTAL BY CATEGORY		207					2,838						

( ) Indicates augmentation, but not included in totals.

Fig. 25.--Recapitulation of Army Aircraft in Type Field Army (ROAD).[1]

[1] U. S. Army Aviation School, Common Subjects and Reference Data for Army Aviation in the Field Army (Fort Rucker, Ala.: U. S. Army Aviation School, January 1966), p. 9.

authorized in any number. These are the OV-1 Mohawk, which is the current medium observation airplane, and the CV-2 Caribou medium transport airplane which has replaced the older U-1A Otter in fixed wing transport aviation companies. Thus, the most important aircraft change is represented by a major shift to rotary wing aircraft. Overall, this change is intended to lessen the requirement for fixed wing runways, and to provide more aircraft with rotary wing flexibility.

Only three basic rotary wing aircraft types are authorized in ROAD tables of organization and equipment. The first of these is the light observation helicopter (LOH), a new type of helicopter developed in 1964 to replace observation airplanes and observation helicopters.[2] Light observation helicopters have not yet been issued to Army units (April 1966), and the missions these new aircraft are to perform are still being performed by older OH-13 Sioux and OH-23 Raven helicopters. These older aircraft lack the speed and passenger capacity of the LOH, but basically they can perform the intended missions.

Currently (April 1966), utility helicopters in use are models of the UH-1 Iroquois. The UH-1B is authorized in units which use them as weapons platforms or for general cargo hauling. Units which use them primarily for troop carrying are authorized the UH-1D. The current medium cargo helicopter is the CH-47 Chinook which is authorized in all medium helicopter transport aviation companies. There are no light cargo helicopters authorized in the type ROAD field army, the light transport helicopters of the CH-21 Shawnee and CH-34 Choctaw types having been replaced.

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[2]"World Aviation Encyclopedia," American Aviation, XXIX, No. 6 (November, 1965), p. 91.

Organization

Though there are fewer types of Army aircraft authorized in a ROAD field army, these several types of aircraft are distributed to many more units than was the case in the Pentomic field army. The concept of consolidation of aircraft into company size units is the basic method of organization used in 1966; however, there are exceptions in all cases. There are still three basic types of aviation units found in the ROAD field army. These are: (1) company size organizations built around one type of aircraft, (2) company size organizations built around several types of aircraft, and (3) small aviation sections containing one or more aircraft.

Under field army control are examples of each of these three types of aviation organization, as shown in Figures 26 and 27 (and in Figure 25). The major change in aviation organization in field army controlled units is the inclusion of aircraft in field army fire support elements. It is also important to note in Figure 27 that the field army support command (FASCOM) controls a transportation aviation group which is composed of four transportation aircraft battalions. These battalions are intended to perform logistic missions within the combat zone.

The Army aviation organization at corps level is shown in Figure 28. It should be noted that corps controlled fire support elements are authorized light observation helicopters for command and target acquisition missions, thus filling a gap which had existed in the Pentomic aviation structure. Also, a corps artillery aviation battery has been added to provide corps fire support elements the long

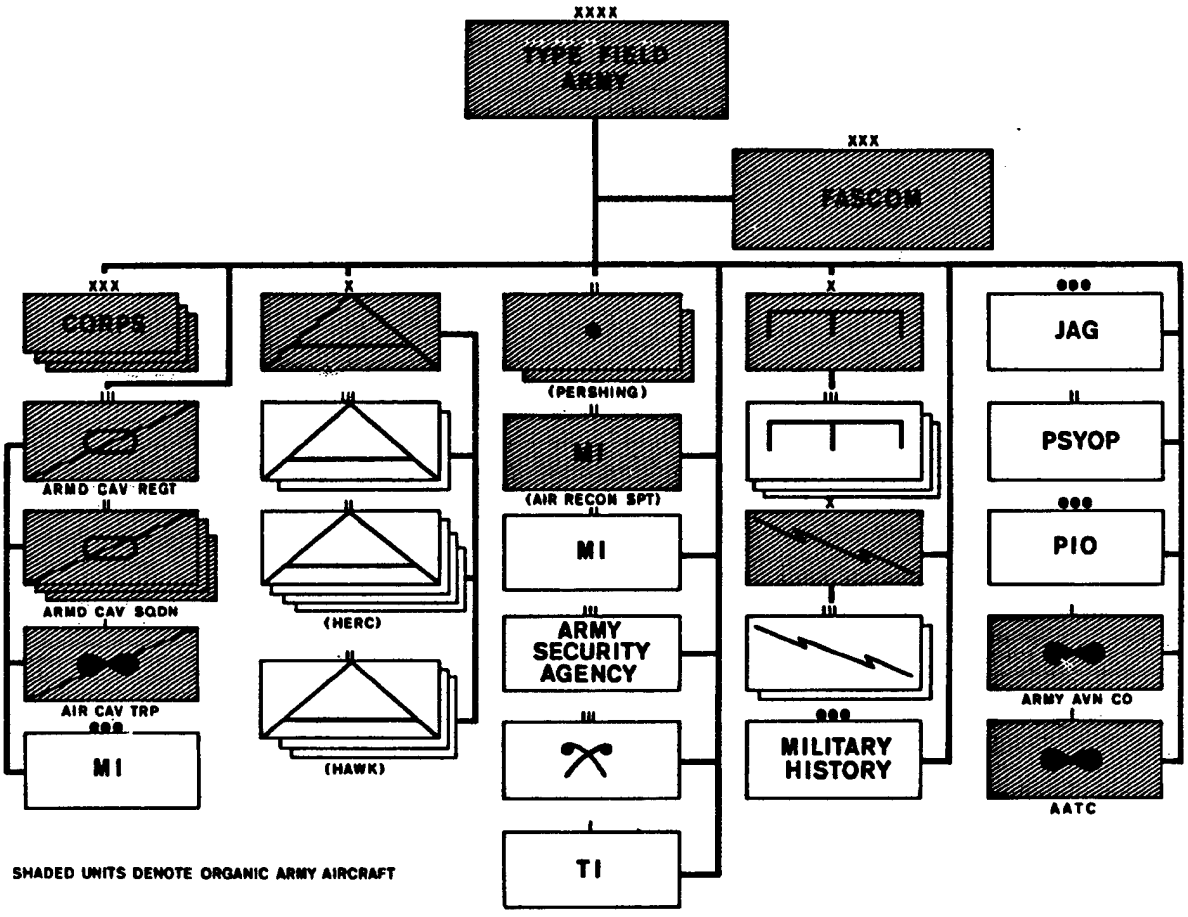

Fig. 26.--Army Aviation in Organizations of Type Field Army (ROAD).[3]

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[3]U. S. Army Aviation School, Common Subjects and Reference Data for Army Aviation in the Field Army (January 1966), p. 2.

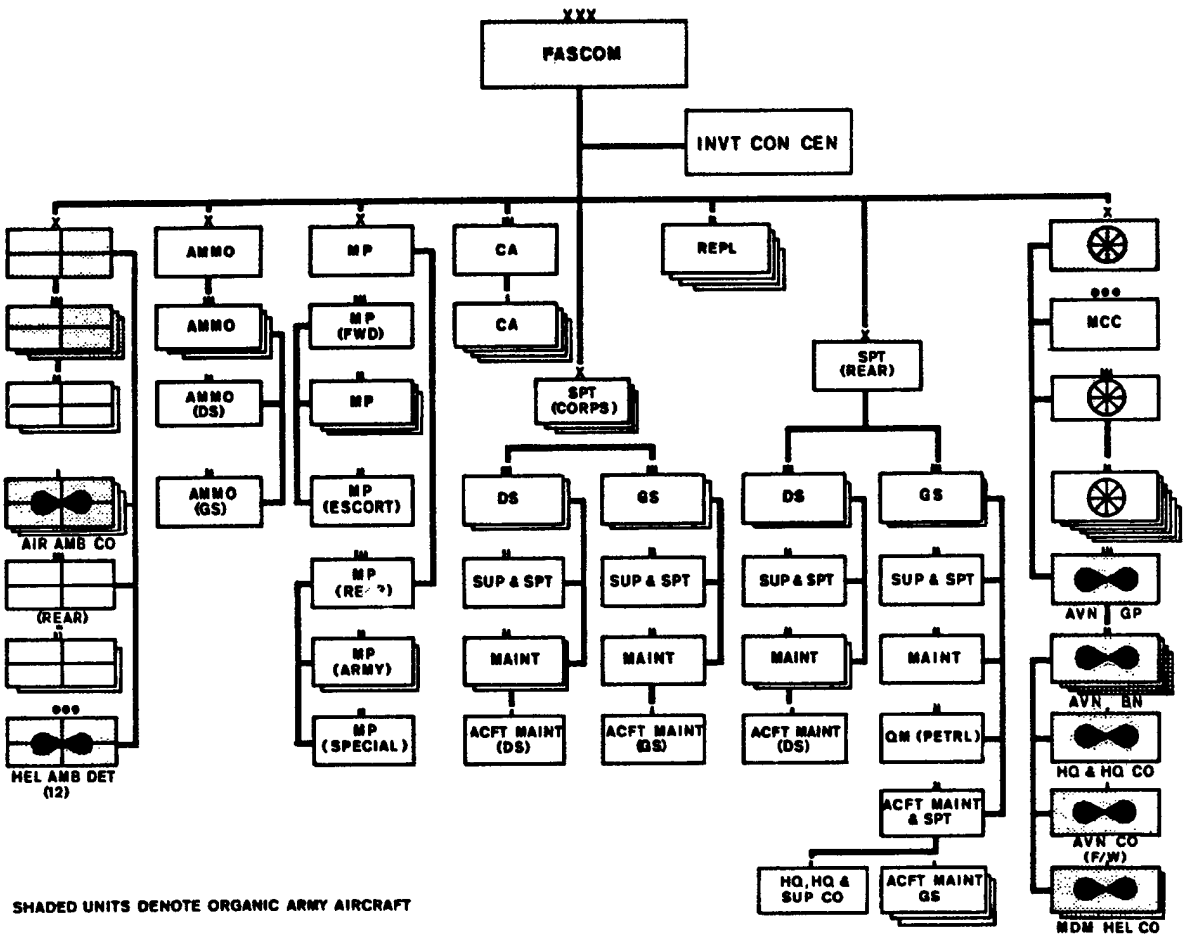

Fig. 27.--Army Aviation in Organizations of Type Field Army Support Command (FASCOM) (ROAD).[4]

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[4] Ibid., p. 3.

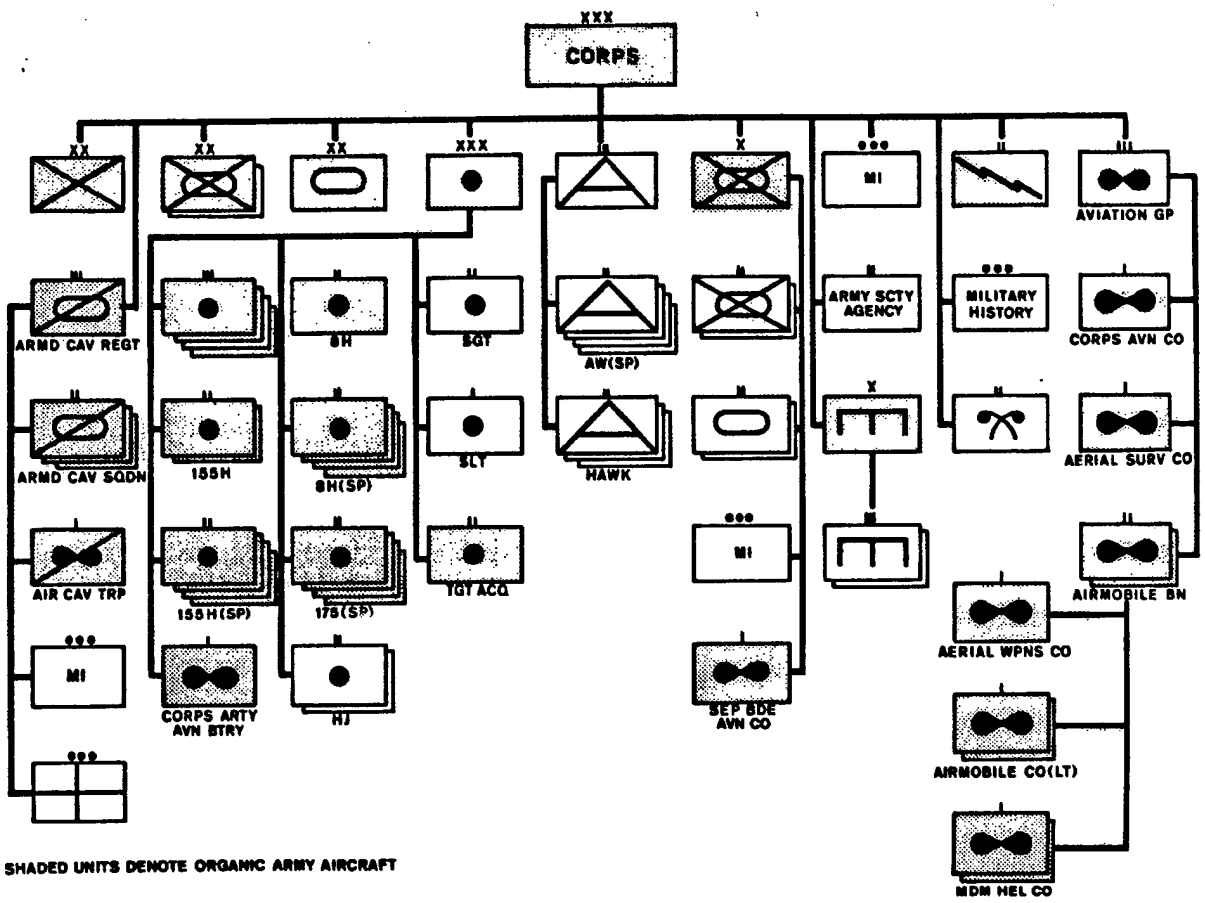

Fig. 28.--Army Aviation in Organizations of Type Corps (ROAD).[5]

range target acquisition capability which had been conspicuously missing in the Pentomic aviation structure. However, the most important Army Aviation organization controlled by corps is the aviation group shown in Figure 28. This aviation group fills another gap in aviation support which had not been available to a corps in a Pentomic field army. One subordinate element of the corps aviation group is an aerial surveillance company. This company is authorized eighteen long range observation airplanes (OV-1 Mohawk) which give the corps headquarters

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[5]Ibid., p. 4.

its own aircraft for reconnaissance and surveillance for corps intelligence agencies. In addition, there are two airmobile battalions included in the corps aviation group for the purpose of supporting airmobile operations.

The number of Army aircraft in ROAD divisions is double the number formerly authorized in Pentomic divisions. Figure 29 shows that within each division and its immediate subordinate headquarters (brigades, and division artillery, but not the division support command) there is organic aviation support. It should be noted that only four fixed wing aircraft (OV-1 Mohawk) are authorized in a division while the remaining ninety-seven aircraft are helicopters. It should also be noted that, with the exception of the four Mohawks, every aircraft in the division is authorized some sort of armament kit. A more detailed diagram of the organization of the division aviation battalion is shown in Figure 30. This organization is considerably larger than the aviation company of the Pentomic division. The mission capabilities are also proportionally increased.

Figure 31 shows the organization of an air cavalry troop. Whereas the air cavalry troops were proposed for the Pentomic field army, but never activated, they have been activated in current ROAD division armored cavalry squadrons and in corps and field army controlled armored cavalry regiments. In each case, the organization of the air cavalry troop is essentially the same.

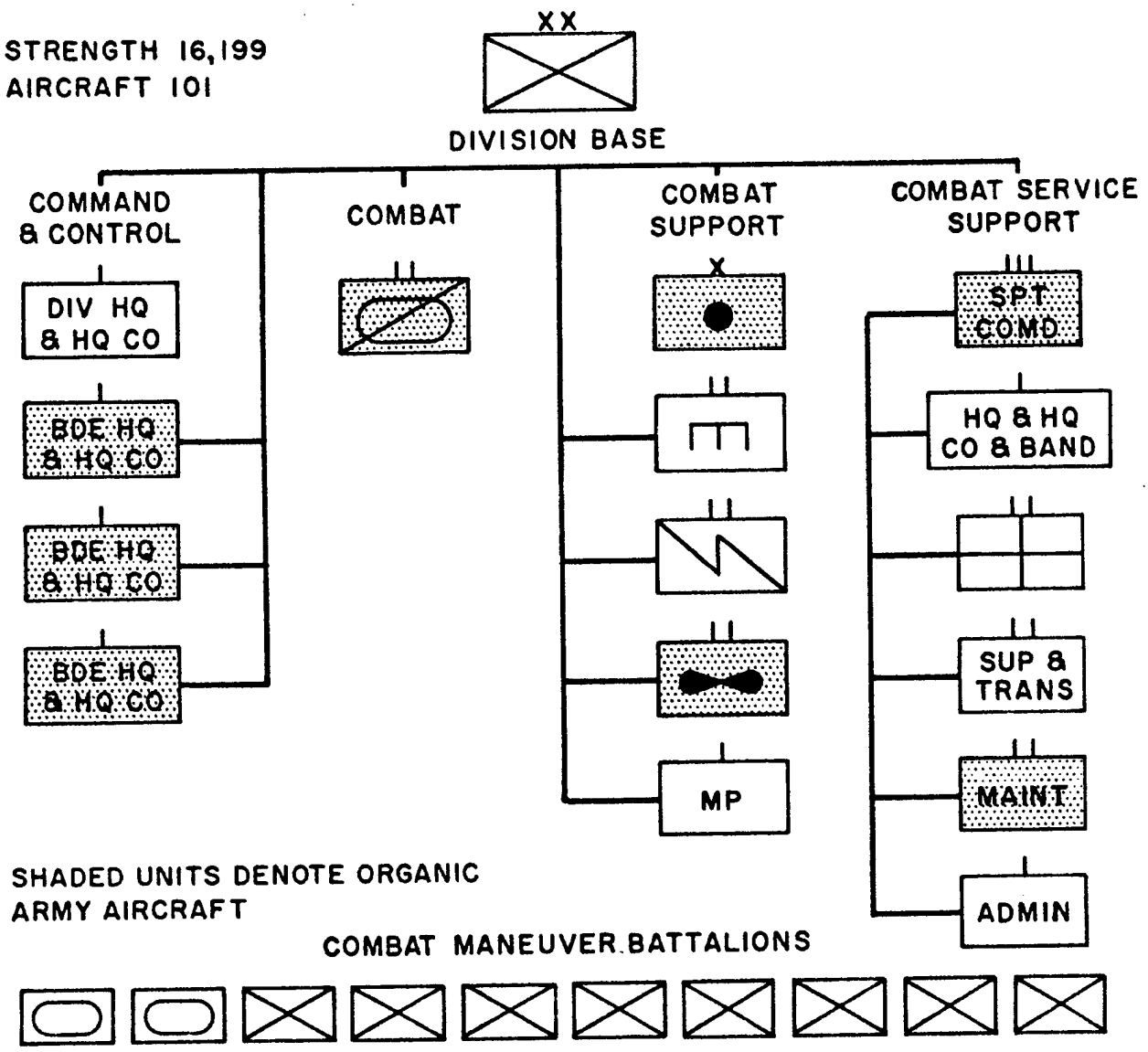

Fig. 29.--Army Aviation in Infantry Division (ROAD).[6]

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[6]U. S. Department of the Army, Infantry Division, TOE 1-7 (Washington: U. S. Government Printing Office, 15 July 1963), p. 2.

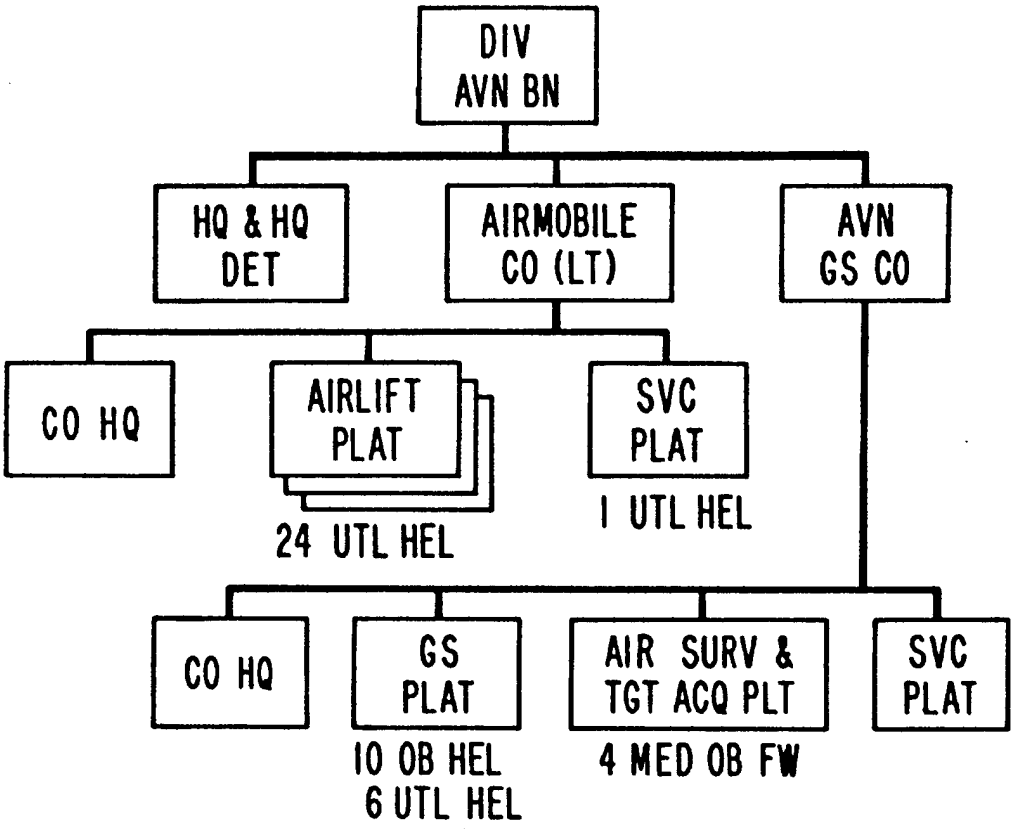

Fig. 30.--Aviation Battalion in Infantry, Mechanized, or Armored Division (ROAD).[7]

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[7] U. S. Department of the Army, Aviation Battalion, Armored Division or Aviation Battalion, Mechanized Infantry Division or Aviation Battalion, Infantry Division, TOE 1-75E (Washington: U. S. Government Printing Office, 15 April 1963), p. 2.

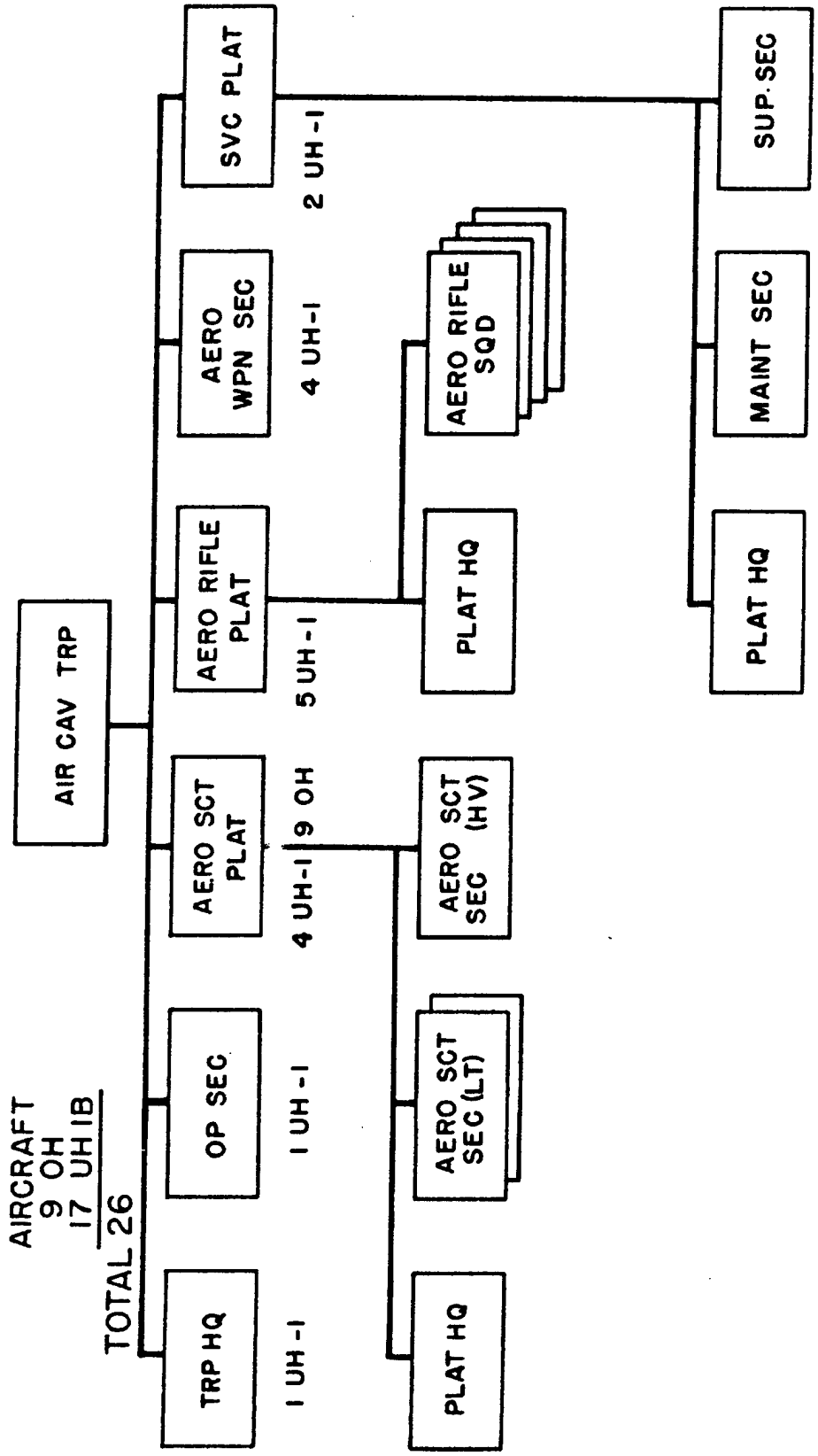

Fig. 31.--Air Cavalry Troop.[8]

[8]U. S. Department of the Army, Air Cavalry Troop, Armored Cavalry Squadron, Armored Division or Air Cavalry Troop, Armored Cavalry Squadron, Infantry Division or Air Cavalry Troop, Armored Cavalry Squadron, Infantry Division (Mechanized), TOE 17-108E (Washington: U. S. Government Printing Office, 15 July 1963), p. 2.

Missions

With such an increase in Army aircraft, especially in rotary wing aircraft, in a type ROAD field army, aviation support is available to more units and on a greater scale than was possible during the Pentomic period. For most units, aviation support provided has the flexibility advantage of rotary wing type aircraft. In general, Army Aviation in the current field army has acquired new missions and an increased ability for performing most of its former missions. Missions which Army Aviation performs for a ROAD field army are:

1. Observation. All Army aircraft can be operated day or night. Therefore, all of the missions which are a form of observation can also be performed day or night. Observation missions which require deep penetration of enemy territory or long endurance are performed by OV-1 Mohawk aircraft. Those observation missions which are required along or behind the friendly line of contact are performed by observation or utility helicopters. Thus, Army commanders have aircraft available which can operate throughout their areas of influence and interest on the battlefield (Figure 32). Since helicopters generally have a shorter flight endurance time than fixed wing aircraft, observation missions along the line of contact tend to take the aspect of take off, look from low altitude, and land rather than lingering for long periods over an area as was possible when observation airplanes of the O-1 Bird Dog type were used.

a. Surveillance. Surveillance involves a continuous and systematic observation of a specific area; thus, the OV-1 Mohawk is the appropriate aircraft to be used for this type of mission. [9]

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[9] U. S. Department of the Army, Army Aviation, FM 1-100 (Washington: U. S. Government Printing Office, June 1963), pp. 22-23.

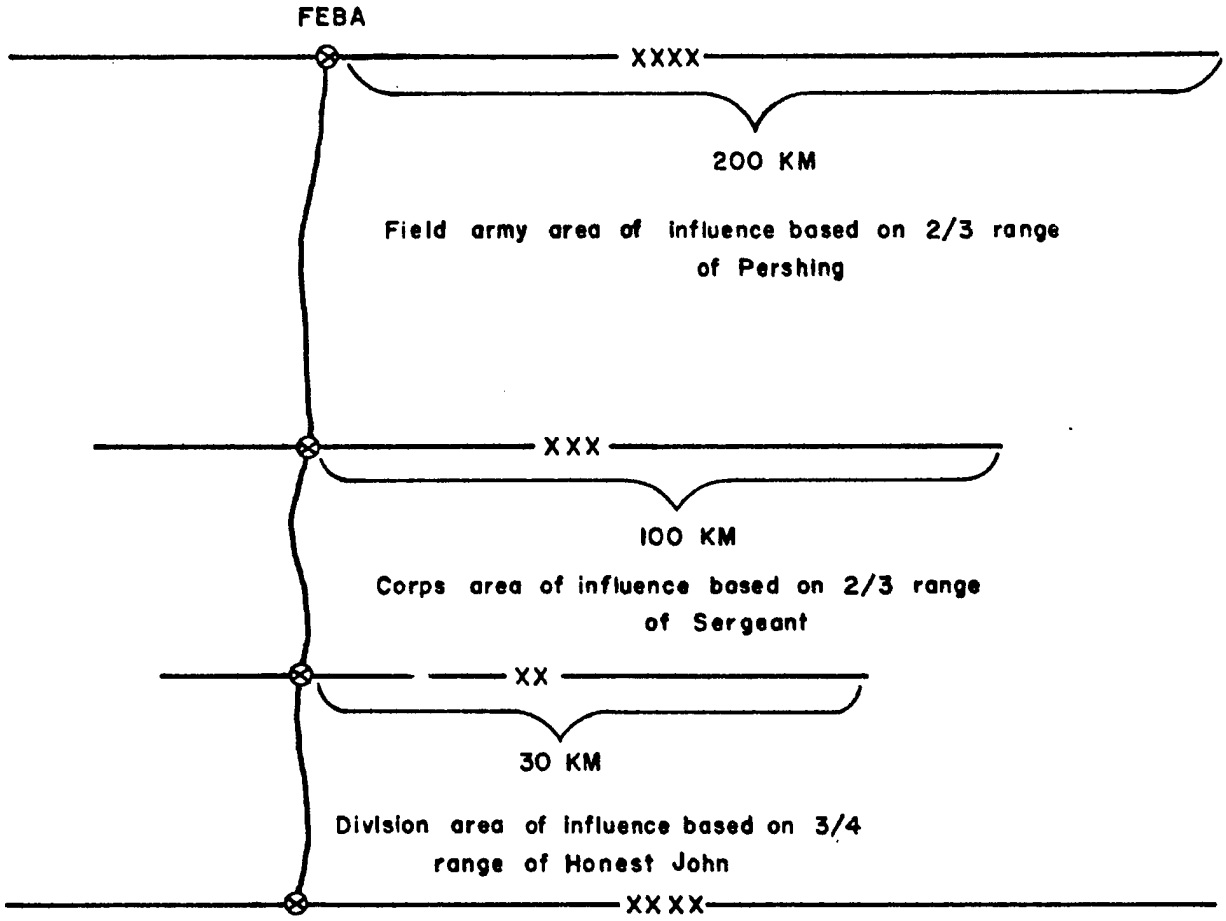

Fig. 32.--Army Commander's Area of Influence on Battlefield, ROAD Period.[10]

Each corps employs an aerial surveillance company (Figure 25) of eighteen OV-1 Mohawk aircraft which are capable of operating throughout the corps and field army areas of interest.[11] Each division

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[10] These distances for the commander's area of influence on the battlefield are as used by the United States Army Command and General Staff College, Fort Leavenworth, Kansas, for instructional purposes during the FY 66 period (Section 3.21, Subject: Areas of Influence, RIM Faculty Memorandum Number 2, U. S. Army Command and General Staff College, dated 18 October 1965).

[11] U. S. Army Aviation School, Common Subjects and Reference Data for Army Aviation in the Field Army (January 1966), p. 136.

employs four OV-1 Mohawk aircraft within its area of interest. These high performance airplanes can make a pass along the division's front in approximately ten minutes while their aerial radar sensors penetrate forty miles deep into enemy territory. Backing up the radar system is an infrared system which, in conjunction with the radar, gives Army Aviation its all weather capability for performing observation/surveillance.[12]

b. Reconnaissance. The same OV-1 Mohawk aircraft perform long range reconnaissance missions required by field army units. The bulk of reconnaissance missions are performed by observation or utility helicopters in the vicinity of the line of contact. With the wide dispersion of these helicopters within the field army, theoretically any unit commander can obtain aviation support for his reconnaissance requirements. All such missions have the purpose of gathering specific information by observation. Normally the information required concerns enemy strength, disposition, and activity or terrain characteristics. Within these parameters, reconnaissance missions are often referred to as route reconnaissance to obtain information of enemy forces and obstacles along a given route; zone reconnaissance to obtain information of routes, terrain, and enemy forces within a defined zone; or area reconnaissance to obtain information of routes, terrain, and enemy forces within a larger defined area.[13] When performing zone or area reconnaissance it is often necessary to employ teams of aircraft because of the large size of the area to be covered.

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[12] Ibid., pp. 66-67.

[13] U. S. Department of the Army, FM 1-100 (June 1963), p. 23.

c. Armed aerial reconnaissance. With the arming of helicopters and the activation of air cavalry troops has come the capability of performing reconnaissance over larger areas, especially when fire support is needed and troops must be brought in to conduct a portion of the reconnaissance on the terrain.[14] This mission is merely the adaption of Army aircraft to provide added mobility to armored cavalry units in conducting traditional cavalry reconnaissance by fire and maneuver.

d. Target acquisition. The ROAD field army is provided ample aircraft for the purpose of detecting, identifying, and locating targets.[16] Theoretically, any air observer can accomplish target acquisition by visual means from any type of aircraft. Acquisition by electronic means is accomplished by OV-1 Mohawk aircraft.[17] Each division has four Mohawks to perform such missions while corps fire support agencies call upon Mohawk aircraft of the corps artillery aviation battery (Figures 25 and 28) for target acquisition.[18] The inclusion of the corps artillery aviation battery in the ROAD aviation structure fills a need for aviation support by corps units which was not available in the Pentomic field army.

Mohawk mission scheduling is normally accomplished by division

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[14] U. S. Army Aviation School, Common Subjects and Reference Data for Army Aviation in the Field Army (January 1966), p. 72.

[15] U. S. Department of the Army, FM 1-100 (June 1963), p. 23.

[16] Ibid., pp. 23-24.

[17] U. S. Army Aviation School, Common Subjects and Reference Data for Army Aviation in the Field Army (January 1966), pp. 66-67.

[18] Ibid., p. 188.

or corps intelligence staff sections in response to their own and subordinate unit requirements for target acquisition deep in enemy territory. Most target acquisition close to the line of contact is performed by helicopters controlled directly by maneuver and fire support units. Specifically, each division artillery has aircraft as do most corps fire support units (Figures 25 and 29). If the division artillery headquarters battery is augmented with a Visual Airborne Target Locater (VATL) section, a much expanded capability for rapid target acquisition is added for division artillery. The VATL system employs two utility helicopters which carry electronic equipment that is used in conjunction with ground stations to locate enemy weapons.[19] This is a new use for Army aircraft, although it is, in a sense, just one more way to perform the mission of target acquisition.

e. Artillery registration and adjustment. In many instances, the aircraft which performs target acquisition will also call for fires to destroy the target. Such is normally the case for artillery observers who operate in close proximity to the line of contact in maneuver brigade or division artillery aircraft. However, this procedure does not normally apply to targets acquired by electronic means, although an observer in a Mohawk deep in enemy territory is capable of adjusting fires if the enemy permits the Mohawk to linger long enough to complete a fire mission. Radio equipment in any Army aircraft which may appear over the battle area is adequate for maintaining

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[19] U. S. Department of the Army, Headquarters and Headquarters Battery, Armored Division Artillery or Headquarters and Headquarters Battery, Infantry Division Artillery or Headquarters and Headquarters Battery, Infantry Division (Mechanized) Artillery, TOE 6-302E (Washington: U. S. Government Printing Office, 15 July 1963), pp. 2-3.

contact with fire direction agencies. Aerial observers also perform the related mission of counterbattery fire when they detect the location of enemy batteries and direct fire against the enemy weapons.

f. Naval gunfire adjustment. Any aerial observer who adjusts Army artillery fires should be capable of adjusting naval gunfire. This is a normal mission when the Army unit is engaged in amphibious operations or is operating near a coastline.

g. Survey. Army aircraft assist survey operations in several ways. In some instances, such as when performing route and traffic survey, the aircraft is used as an observation platform. At other times, as when assisting in topographic and artillery survey, the aircraft is used to move survey teams and their equipment. The aircraft may also become an integral part of the actual survey when the party is unable to extend control along the ground. Artillery and maneuver units use their own organic aircraft for these missions, while military police or other supporting units obtain aviation support from a division aviation battalion or corps or army aviation company. Engineer battalions under corps and field army control are authorized utility helicopters (Figure 25) which are employed as required in survey operations.[20]

Army aircraft also provide the capability of conducting radiological surveys to determine the extent of radiological contamination in a given area. Helicopters are well suited for this mission because of their slow speed and ease of handling at low levels of flight. The only additional equipment necessary is for an observer to have a monitoring instrument with him in the aircraft to read the intensity of

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[20] U. S. Department of the Army, FM 1-100 (June 1963), p. 26.

radiation at different locations. This method of radiological survey is not as accurate as a ground survey, but it saves hours in approximating the extent of contamination.[21]

h. Damage assessment. The same aircraft performing radiological surveys can also be used for assessing damage within an area attacked by nuclear weapons. On the other hand, Mohawk airplanes can be used to assess the effect of friendly nuclear strikes. In most instances, when Army commanders employ nuclear weapons, they will likely schedule an aircraft to make a damage assessment run over the target as soon as it is safe for the aircraft to enter the target area.[22] Army aircraft are also employed within friendly controlled areas to assess damage from natural disasters such as floods or hurricanes.

i. Search. The basic purpose of search is to locate missing aircraft and crews or units which have been cut off by enemy forces. The Army does not employ special search and rescue units as does the Air Force; however, any Army aviation unit can be tasked for search missions as the need arises. Depending on the locale of the search, one aircraft might be sufficient, or it might be necessary to employ a platoon or company of Army aircraft. Because of the coordination necessary, most search operations are directed by the aviation staff at a command headquarters.[23]

j. Photography. Army Aviation in the ROAD field army uses the same photographic equipment as was available during the Pentomic period, with the exception that drone sections are no longer

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[21] Ibid., pp. 26-27. [22] Ibid., p. 49. [23] Ibid., pp. 33-35.

authorized in any units of the ROAD field army. OV-1 Mohawks carry vertical and oblique cameras which can be used both day and night. Electronic sensors carried by the Mohawks also produce photographic imagery, and are therefore useful at night and during inclement weather. From these long range Army aircraft come the bulk of Army aerial photos of terrain areas under enemy control within the field army commander's area of interest.[24] Aerial photography beyond his area of interest, and complex photography such as mosaics are provided by Air Force photo/reconnaissance units.

Army units also still use hand-held cameras for some photographs when time is more important than precision. Division aviation battalions, corps artillery aviation batteries, and corps aerial surveillance companies are authorized mobile photolabs which are usually positioned at the airfield from which their Mohawks operate. Positioning these photolabs at the base airfields insures the most rapid processing and delivery of aerial photos to requesting units. One specific Army unit, the military intelligence battalion (air reconnaissance support) under field army control (Figure 25), is authorized aircraft for the purpose of delivering aerial photographs from Air Force photo/reconnaissance airfields to requesting Army headquarters. Thus, the entire spectrum of aerial photography for Army combat use is geared to rapid processing and immediate delivery of photos.

2. Transportation. One of the major improvements in the ROAD field army aviation structure over the Pentomic aviation structure lies in the increased number of aviation units which have the mission

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[24] Ibid., p. 23.

of transporting troops, equipment, and supplies within the combat zone.[25]

a. Resupply. Almost all Army aircraft can be used for resupply if the cargo to be delivered can be carried. Even the smallest observation helicopters are used to deliver cases of rations and ammunition and cans of water to foot patrols and combat units in isolated positions. Under average conditions an observation helicopter (OH-13 Sioux) can lift about 500 pounds of supplies. Under the same conditions a utility helicopter (UH-1D Iroquois) can deliver about 3,000 pounds of supplies. A perusal of Figure 25 indicates that sufficient observation and utility helicopters are authorized in divisional and corps units for aerial resupply of small units at any time.

(1) Each division aviation battalion (Figure 30) has a section of six utility helicopters in its general support company. These aircraft habitually support the division support command in performing requested resupply missions. Also, the division's airmobile company can employ its twenty-five utility helicopters in resupply operations. As an example of the amount of cargo which the air mobile company can carry, these 25 UH-1D Iroquois helicopters (each carrying 3,000 pounds of cargo) provide the division a theoretical single lift capability of 75,000 pounds of supplies. Considering an average of 75 per cent availability of aircraft, the division air mobile company has a single lift capability of 56,250 pounds of supplies.

(2) As shown in Figure 28, each type corps employs two airmobile battalions. These battalions are organized for tactical airmobile operations; however, the aircraft can be used for resupply

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[25] Ibid., pp. 14-16.

missions as required. Each of the two air mobile companies (light) has 25 utility helicopters (UH-1D Iroquois each carrying 3,000 pounds of cargo), thereby providing the two companies a combined single lift capability of 150,000 pounds of supplies. The two medium helicopter companies each employ 16 medium cargo helicopters (CH-47 Chinooks each carrying 7,400 pounds of cargo), and therefore the two companies have a combined single lift capability of 236,800 pounds of supplies. Accordingly, each corps airmobile battalion is capable of transporting (with 75 per cent of its troop carrying aircraft available) approximately 290,100 pounds of cargo.

(3) Under control of the field army support command (Figure 27) are four transport aircraft battalions which are employed throughout the combat zone to provide logistical support for Army units.[26] These battalions are also employed in airmobile operations; but their primary mission is to provide logistical airlift, which encompasses movement of troops, supplies, and equipment. The aviation fixed wing company of each battalion employs 16 medium cargo airplanes (CV-2 Caribous each able to transport 8,300 pounds) which gives a single lift capability of 132,800 pounds of supplies. The two aviation medium helicopter companies are authorized a total of 32 medium cargo helicopters (CH-47 Chinooks each carrying 7,400 pounds of cargo) which gives a single lift capability of 236,800 pounds of supplies. Taken as an entity, each of the four field army transport aircraft battalions has a theoretical single lift capability of 369,600 pounds, or with 75 per cent availability of cargo aircraft, a single lift capability

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[26] U. S. Army Aviation School, Common Subjects and Reference Data for Army Aviation in the Field Army (January 1966), pp. 202-204.

of 277,200 pounds (or almost 139 tons) of supplies. The inclusion of these transport aircraft battalions in the ROAD field army support command fills a gap in combat zone logistical airlift which was a definite deficiency in the Pentomic field army.

b. Troop haul. Again, a perusal of Figure 25 indicates that throughout the ROAD field army most units have available to them on a mission basis, observation and utility helicopters which are capable of transporting individuals, staffs, and small teams of personnel.

(1) Within each division aviation battalion (Figure 30) the airmobile company (light), with its 25 UH-1D Iroquois, has a single lift capability of 275 troops. With 75 per cent of its aircraft available, the airmobile company has a single lift capability of 206 troops, which equals the requirement for movement of one rifle company.

(2) The corps controlled airmobile battalions have tactical trooplift as their primary mission. The two airmobile companies (each having 25 UH-1D Iroquois suitable for moving 11 troops apiece) have a combined single lift capacity of 550 combat troops. The two medium helicopter aviation companies (each employing 16 CH-47 Chinooks carrying 32 troops apiece) have a single lift capability of 1,024 combat troops. Considered as a unit, each of the corps' two airmobile battalions has a theoretical lift capability of 1,574 combat troops. With an average of 75 per cent of its troop carrying aircraft operational, each airmobile battalion can lift approximately 1,180 combat troops, or essentially the rifle company strength of two infantry battalions.

(3) Although the field army controlled transport aircraft battalions are normally used for logistics airlift, these units can carry a significant number of troops. For example (Figure 27), the aviation fixed wing company employs 16 CV-2 Caribou airplanes (each able to haul 31 troops), thus having a single lift capability of 496 combat troops. The two aviation medium helicopter companies employ a total of 32 CH-47 Chinooks (each carrying 32 troops), thus having a single lift capability of 1,024 combat troops. Therefore, when considered as an entity, each of the four transport aircraft battalions can carry 1,520 combat troops in one lift. With an average of 75 per cent of its aircraft flyable, each battalion has a single lift capability of approximately 1,140 troops.

c. Airmobile operations. By using Army aircraft to move troops and their equipment about the battlefield, Army Aviation supports tactical airmobile operations. The ROAD field army contains sufficient aviation units to conduct frequent airmobile operations of battalion or brigade size. As stated, each division airmobile company (light) has the capability of transporting an airmobile force of one rifle company and its organic weapons and communications. Backing up the division's modest capability are the two airmobile battalions attached to each corps. Each of these battalions can lift the equivalent combat strength of an infantry battalion with its organic weapons and weapons carriers of 1/4 ton and 3/4 ton size. The medium transport helicopters are capable of transporting 105 millimeter howitzers. This capability makes it possible to employ balanced airmobile forces which include artillery support as well as rifle and light weapon strength. The corps airmobile battalions also contain an aerial weapons company

(Figure 28). These companies, authorized twelve armed utility helicopters each, are a new Army Aviation unit which originated in the ROAD field army structure. The aerial weapons company employs its UH-1B Iroquois helicopters, armed with machineguns and rockets, to escort and provide fire support for airmobile forces.[27]

When brigade size airmobile operations are planned, transport aircraft battalions from the field army support command can be attached to a corps to add to the lift capability of corps aviation units. Both corps and field army commanders also have the flexibility of tailoring aviation battalions for specific operations by attaching fixed or rotary wing companies from one battalion to another.

d. Ship to shore operations. Army utility and cargo helicopters can operate from Navy helicopter carriers when Army forces are conducting amphibious operations. Ship to shore movement is essentially the same as an airmobile operation; the only noticeable difference being smaller aircraft formations used because of the time consumed in launching and recovering individual aircraft on the carrier deck.[28]

e. Medical evacuation. Except for the OV-1 Mohawk, all Army aircraft can be used for evacuation missions. Therefore, every field army unit which receives aviation support has an emergency medical evacuation means available. It is also a principle of economic aircraft use to carry some cargo on the return trip after a load has been delivered. Therefore, it is customary to use empty cargo aircraft to evacuate casualties from forward aid stations to surgical hospitals in

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[27] Ibid., p. 153.

[28] U. S. Marine Corps Educational Center, Lesson Plan S (S)42051, Ship-to-Shore Planning (Quantico, Va.: U. S. Marine Corps Educational Center, Marine Corps Schools, 1963), p. 15.

the rear. Although every Army aviation unit has a secondary mission of medical evacuation, one type of aviation unit is organized specifically for medical support. This unit is the air ambulance company, three of which are assigned to the field army support command medical brigade (Figure 27). Each of these companies is organized with four platoons of six UH-1D Iroquois helicopters each. One air ambulance company normally supports one corps or independent task force. Its aircraft operate by platoons from hospitals throughout the zone of the maneuver force being supported to answer calls for casualty evacuation from forward aid stations or combat units. The primary mission of air ambulance units is to complement ground evacuation means, but they also transport critically needed medical personnel and supplies.[29]

In addition to the three air ambulance companies, the FASCOM medical brigade also has twelve helicopter ambulance detachments, each of which is authorized six UH-1D Iroquois helicopters. These detachments are employed to augment air ambulance companies and to support independent forces.[30] One advantage of air ambulance units over other aviation units for casualty evacuation is that the air ambulance crews are trained and equipped to provide medical treatment.

e. Rescue. After a successful search operation, the next problem is recovering and evacuating the located personnel. Army rescue operations are usually limited to areas within range of helicopters, and within range of supporting weapons.[31] Although no specific Army aviation units are specially equipped for rescue operations, it is normal for utility and cargo helicopter units to have several aircraft

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[29]U. S. Army Aviation School, Common Subjects and Reference Data for Army Aviation in the Field Army (January 1966), p. 211.

[30]Ibid., p. 220.

[31]U. S. Department of the Army, FM 1-100 (June 1963), p. 33.

equipped with a hoist which is useful for rescuing persons from water or jungle areas where helicopters cannot land.

f. Area damage control. Army aircraft can be used in many ways to provide necessary mobility for area damage control operations. The principal advantage of using aircraft is that control parties and decontamination crews and equipment can be delivered to damaged areas with a saving of hours of road travel and a reduction of personnel exposure to radiation.[32]

3. Command and control. Necessary dispersion of military forces in a nuclear environment has substantially magnified problems incident to command and control. Army aircraft provide the necessary mobility and speed to overcome some of these problems.

a. Command. Aircraft are provided for commanders and staffs of brigades, divisions, corps, and the field army. Intermediate commanders also use Army aircraft for command purposes on a mission basis. Observation and utility helicopters are used for short trips, and when it is necessary for the commander to land at command posts of his subordinate echelon. A recent innovation is the inclusion in the corps and army aviation companies of utility helicopters specifically equipped as aerial command posts.[33] By using these aircraft, the commander and key members of his staff are able to exercise command and staff supervision from a mobile tactical command post. Fixed wing command airplanes are also authorized in corps and army aviation companies to carry commanders between higher headquarters.

b. Messenger, courier, and liaison. Air observers and pilots often take messages which they deliver in person or by

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[32] Ibid., pp. 18-19. [33] Ibid., p. 10.

radio. Officer couriers are often used to carry low priority classified material and lengthy communications which would overload electrical communications means.[34] Most divisions and higher headquarters use scheduled air messenger service to pick up and deliver routine written communications. Such service saves many hours of road travel, and is relatively safe from ambush. For these same reasons, exchange of liaison officers is often accomplished by air.

c. Message drop and pickup. The Army's expanded use of rotary wing aircraft has largely eliminated the requirement to drop messages or make a flying pickup. However, there are instances when radio contact is not possible, and an aircraft cannot land at a given troop location. In such instances, a pilot must drop his message. No special equipment other than a hand line or small bag is required for this purpose.[35]

d. Column control. Control of unit movement by air is an important mission because, from the air, it is possible to detect obstacles and impassable areas in advance of the moving forces. Aircraft are the only means of transportation which enable a commander to move between and maintain control of separated moving columns. In a similar manner, aircraft are often used by command headquarters and military police units for traffic control. This type of control is more concerned with areas to the rear of the line of contact, while column control is concerned with movement forward of the line of contact. However, both missions have the basic purpose of using aircraft to insure the uninterrupted movement of Army forces.[36]

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[34] Ibid., pp. 11-12. [35] Ibid., pp. 12-13. [36] Ibid., p. 11.

e. Radio relay. A major problem related to dispersion of military forces is the problem of extending the range of frequency modulated radio communications. Army aircraft are used in two ways to overcome this problem. Frequently, a ground relay site is the best solution, and helicopters are used to carry radio relay teams and their equipment to prominent terrain features which are not accessible by road. More often, Army aircraft are used to relay messages through their own radios. This might be accomplished on an immediate mission basis when radio contact between units is lost, or it might be a scheduled mission which requires the aircraft to remain airborne for long periods of time to insure instantaneous communications between headquarters.

f. Wire laying. With helicopters available to combat units, the mission of wire laying is less time consuming than was the case when fixed wing aircraft were used. The type aircraft most often available to maneuver battalions is the observation helicopter. This aircraft is suitable, but has a cargo carrying limitation in that only about one mile of wire can be carried at a time. When longer distances must be spanned, a utility helicopter is used because it is possible to lay wire from larger reels placed in the cargo compartment.[37]

g. Propaganda dissemination. No specific aviation units are earmarked for propaganda dissemination; however, any aircraft available can be used if it is able, considering range and vulnerability to enemy fire, to operate in the desired area. Dropping leaflets from aircraft is the easiest method of distributing written propaganda over towns and villages. A more rapid method of bringing propaganda to

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[37] Ibid., p. 13.

groups of people is by means of loudspeakers affixed to the aircraft. The basic disadvantage of this means of communication is the possible danger to the aircraft from lingering over an area while messages are being broadcast.[38] The use of loudspeaker systems is not limited just to propaganda operations. They are also used to broadcast warnings to units and to assist in riot control operations.

h. Battlefield illumination. Army aircraft provide illumination for limited portions of the battlefield by purely non-mechanical methods. High intensity aircraft flares are loaded into the cargo compartment of a helicopter, and are dropped at regular intervals by the crew. A utility helicopter can be loaded with enough flares for about 1½ hours of continuous illumination.[39] Illumination over a target area can be obtained for longer periods by employing aircraft in relays. When large areas must be lighted for longer periods, illumination is provided by Air Force flare aircraft.

i. Smoke screening. Equipment is available which enables Army utility helicopters to perform smoke screening missions. Thickness of the screen is dependent on the number of aircraft and amount of chemical agent used. Vulnerability of the helicopters to ground fire is the major consideration when making the decision to use Army aircraft to establish a smoke screen, as opposed to using field artillery or requesting Air Force support for this purpose.

j. Riot control. Army aircraft are used in several ways during riot control operations. Spotting trouble areas from the air is basically an observation function. Moving troops to critical

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[38] Ibid., p. 13.

[39] Ibid., p. 57.

points is basically a transportation function. In addition, loudspeakers are used to broadcast warnings and ultimatums, and if the situation warrants, irritant gases are dispensed from aircraft onto the rioters. Riot control agent dispensers are authorized in airmobile companies. These dispensers are mounted in the cargo compartment of the utility helicopters, and the agent is dispensed downward through nozzles below the aircraft.[40] The same dispenser can be used in tactical operations if irritant gases are to be employed on enemy positions.

4. Firepower. With the advent of the ROAD field army structure, arming of Army aircraft has become a reality. Armament kits are now provided for all divisional aircraft other than the OV-1 Mohawks. This is true also of aircraft in corps airmobile battalions and armored cavalry regiments and separate brigades. Observation helicopters are armed with one of several systems depending on their intended employment. One armament system includes pods which carry 48 2.75 inch rockets. Another system includes four machineguns on flexible mounts. A third system includes a direct fire, turret mounted 40 millimeter grenade launcher. A fourth system includes six antitank guided missiles.[41] From these developments, Army Aviation has acquired several new missions related directly to aerial fire support.

a. Armed aerial escort of airmobile forces. Division aircraft are used to escort small airmobile force air serials. Elements of the air cavalry troop are especially suited for this mission. Corps employs its aerial weapons companies to escort larger airmobile

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[40] Ibid., p. 11.

[41] U. S. Army Aviation School, Common Subjects and Reference Data for Army Aviation in the Field Army (January 1966), pp. 269-273.

forces. The mission of the escort is to suppress enemy fires along the flight route, and to provide fire support in the objective area to assist the landing of the airmobile force.[42]

b. Convoy cover. Depending on the size of a convoy, and anticipated danger of ambush, fire teams, platoons, or companies of armed helicopters are used to protect convoys from ground attack. In many instances the limited endurance of helicopters makes it necessary to employ the aircraft in relays in order to maintain constant cover. Generally, aircraft with rockets and machineguns are required to provide the suppressive fire necessary to defeat enemy ambush. Elements of an air cavalry troop are also well suited for this mission.[43]

c. Armed reconnaissance. The use of armed helicopters for reconnaissance by fire is a typical mission for scout sections of an air cavalry troop or fire teams from airmobile companies. The purpose of the mission is to seek out the enemy, and by the application of fire, to cause him to reveal his position.[44]

d. Aerial fire support. Both offensively and defensively, armed helicopters assist in tactical operations. Specific tasks may include engagement of enemy reconnaissance forces, engagement of enemy armored vehicles, protection of other Army aircraft, or suppressing fire on ground elements.[45] Since aircraft armament kits are detachable, a commander can determine which of his aircraft he will

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[42] Ibid., p. 278.

[43] Ibid., p. 279.

[44] U. S. Department of the Army, Armored Cavalry Platoon and Troop, Air Cavalry Troop, and Divisional Armored Cavalry Squadron, FM 17-36 (Washington: U. S. Government Printing Office, December 1961), p. 172.

[45] Ibid., pp. 276-277.

employ armed during specific operations. In this way, armament for Army aircraft has added to the overall flexibility of employment of all Army Aviation.

In summary, Army Aviation within the ROAD field army today has such a high degree of flexibility and can perform so many missions of importance to the success of combat operations that a commander must constantly decide how he will employ his organic aviation to derive the most benefit from it. There can never be enough aircraft available to address all possible missions at all times. Therefore, commanders are obliged to place increased reliance on recommendations of principal staff officers and aviation staff officers to determine the most effective employment of their aviation resources. This increased awareness of the usefulness of Army Aviation required of commanders and staff officers at all echelons is the trademark of today's mobility minded Army.

CHAPTER VII

APPRAISAL

Upon considering the numerous and varied missions which Army Aviation performs for the ROAD type field army, it is evident that aviation support is important, and sometimes vital, to the conduct of land battles. Reflecting back through the century since the initial use of air vehicles to gain military advantage, it is possible to determine the most important forces which have led Army Aviation to its present state of effectiveness. As an aid in evaluating the evolution of Army Aviation's usefulness, a tabulation of the missions performed by Army Aviation during important periods in its history is included in Appendix I.

Another tabulation, a compilation of performance and physical characteristics of the aircraft which have been employed by Army Aviation over its life span, is included in Appendix II. A comparison of the data contained in Appendices I and II indicates that during each period of time when Army Aviation was able to accept new missions, new types of aircraft had to be introduced which possessed the characteristics which made the new missions possible. This comparison therefore leads to an inescapable conclusion that progress in the development and capabilities of aircraft have been the most important factor in the evolution of missions performed by Army Aviation. Army commanders have,

through the years, required their organic aircraft to perform almost every conceivable task which the aircraft were capable of undertaking. Likewise, throughout these same years, limitations on the quantity and quality of available aircraft to perform many tasks have degraded the usefulness of Army Aviation. Therefore, the requirement of the Army for aircraft to perform existing as well as certain new tasks, together with the physical capabilities of available and foreseen aircraft, have largely determined the path of Army Aviation.

The earliest example of total employment of the capabilities of available aircraft occurred during World War I. In the short span of fifteen years from Kitty Hawk to the Armistice, airplanes developed from the barely flyable Wright airplane with its 12 horsepower engine and 20 mile an hour speed to the comparatively powerful DH-4 with its 400 horsepower engine and 130 mile an hour speed. Even during the four years of war, the pattern of employment changed dramatically from a single mission, that of observation, to more than a dozen different missions.

When the war began in 1914, available aircraft were capable of only observation tasks. Because ground radio communications were quite poor and commanders needed information rapidly when fighting was in progress, the missions of contact patrol and counterattack patrol were developed. Also, because photographs of enemy positions were needed, aerial cameras were developed. Later, when larger and faster aircraft came into being and as weapons were attached to the aircraft, the missions of bombardment and air combat were developed. Throughout this war, military aircraft were able, because of their slow speed and rugged landing gear, to operate from sod strips close behind the front.

Then came the period of years between the two world wars when changes in aircraft capabilities in terms of speed, firepower, and payload were even more dramatic as heavy bombers (such as the B-17) and swift, all metal pursuit planes (such as the P-38) appeared. However, the characteristics of these aircraft were not suited for the missions required by Army ground forces for day to day aviation support, and it became necessary to develop a slower type of aircraft to perform observation missions for the ground forces. Even the observation airplanes of the 1930's, like the O-47, were so heavy and fast that they had to operate from fixed airfields too far from Army maneuver force headquarters to be responsive to the wishes of those commanders. Nevertheless, the capabilities of these aircraft led to new missions in support of the field army. For example, an increased ability to remain aloft led to the mission of surveillance to satisfy Army desires for maintaining continuous overwatch of portions of the battlefield. Also, the development of reliable radios led to the use of aircraft for radio relay and, most important of all, to the effective conduct of artillery fire missions.

These observation aircraft, however, still failed to meet the Army's requirements for observation, liaison, and command and control and, in World War II, an entirely different aircraft was developed for Army aviation needs. While bombers grew larger and pursuit planes became more powerful, Army Aviation developed a plane (the L-4) which was lighter and slower than even World War I aircraft. Because the L-4 was lighter and slower, it was able to operate from roads and fields quite close to the supported Army combat elements. Furthermore, with this capability, an entirely new family of missions evolved in addition to

the reconnaissance, surveillance, and conduct of fires missions for which the L-4 was so well suited. These new missions were related to command and control, including such tasks as command, column control, courier, and wire laying.

Following World War II, another new type of aircraft was perfected which changed the entire complexion of aviation support for Army combat forces. This new aircraft was the helicopter, which was first used by the Army in combat during the Korean War. Then there were two different types of aircraft employed by the Army. Light, slow fixed wing observation airplanes still performed observation and command missions efficiently, but the new type of aircraft generated another group of missions. Because helicopters were found to be able to operate from almost any cleared area, and could land on terrain which was inaccessable by roads, the transportation group of missions was acquired. Army Aviation now performed resupply, troop haul, medical evacuation and rescue on a small scale.

But the Army needed more aviation support and industry was able to produce aircraft which could do more. The period of years from the Korean War through the Pentomic period continued the progress in Army Aviation. One example of advancement was the development of the OV-1 Mohawk, plus its electronic sensors. Prior to development of the Mohawk, no Army aircraft was capable of long range visual and electronic reconnaissance, surveillance, and aerial photography throughout the corps and field army commander's area of battlefield interest. Even more important examples of progress were related directly to the capabilities of cargo helicopters such as the H-34 Choctaw and H-37 Mojave, newly developed during the Pentomic period. The demand for extra

mobility to cope with problems of conducting dispersed operations in a nuclear environment raised the call for transport helicopters. When such aircraft were developed, Army Aviation acquired the capability of supporting tactical airmobile operations and ship to shore operations.

Finally, the ROAD field army of 1966 takes advantage of two more aircraft developments to provide even more mission support for combat operations. Most dramatic is the fire support capability which ROAD Army Aviation possesses by virtue of the development of the UH-1B Iroquois helicopter as a versatile weapons platform. From this capability, Army Aviation has derived the missions of aerial fire support, armed escort, convoy cover, and armed reconnaissance. Less dramatic, but equally as important, is the ROAD field army's increased capability for support of large scale airmobile operations brought about by development of larger and more versatile cargo aircraft such as the CV-2 Caribou and CH-47 Chinook.

Since progress in the effectiveness of Army Aviation is closely linked to the capability and quantity of aircraft which are available, and since new aircraft are developed to meet needs and desires of users, what might be the next important progress for Army Aviation? From a perusal of Appendix I, which lists over forty typical missions by Army Aviation for a ROAD field army, it might appear that there is really little more that Army aircraft can do to support combat operations. Nevertheless, techniques for waging war and peace are constantly changing; commanders' needs are never completely satisfied; and the ultimate in aircraft design is never completely attained.

Considering the entire spectrum of aviation support available to a ROAD field army in light of aircraft capabilities, it appears that

two facets of that support are likely to be more fully developed in response to additional Army requirements. One likely possibility is the use of Army aircraft as more efficient weapons platforms, particularly as an antitank weapons system and as a tactical nuclear weapons delivery system. The other logical area for further development lies in the development of more efficient and less complex cargo helicopters (or vertical/short take off and landing aircraft) which will enhance the Army's battlefield mobility by less down time for maintenance, and by transporting more troops and more equipment farther and faster than present Army aircraft now have the capability of doing.

Apart from mechanical aspects of aircraft capabilities, the other major factor which has influenced the rate of progress of Army Aviation's mission capability is purely a human function: that of establishing departmental or national level policy which determines operations criteria and guidance for development of aviation by the Military Services. In recounting the century of progress since the beginning of Army Aviation, eight periods of time stand out when policy and human opinions affected the development of Army Aviation.

The first period was one of apathy. It began about 1911 and lasted until the United States entered World War I. Recalling the first flight at Kitty Hawk in 1903 when two Americans pioneered powered flight, and in 1909 when the United States pioneered military aviation; it is an unflattering contrast that, in 1916 when the Allies were employing rather advanced airplanes in armed combat, the United States Army failed miserably in military operations on the Mexican border when only badly worn training planes were used. In a space of about three years, the United States had fallen well behind European powers in the development

of military aviation because there was no governmental interest and scarcely any money appropriated for aviation; and hence, no national support for aviation.

Then followed a period of two years of war when the national policy swung to go all out for the development of a formidable and modern Air Service. Hence in 1917 and 1918, when there were interest, motivation, and money to spur the development of military aviation, a fairly creditable Air Service was developed.

The next period of time, when opinion and policy affected the development of aviation, was an extended one. It might be referred to as a period of combined isolationist national policy and military belief in strategic bombing which prevailed from the end of World War I until the beginning of World War II. The policy, referred to in Chapter I as the policy of hemisphere defense, was basically a desire of America to avoid future war by hiding behind her own shores. Such a policy de-emphasized the need for a large standing army, and hence there was a dearth of interest and little money for developing forces for fighting land battles. At the same time, however, the idea of hemisphere defense was reinforced by a growing military interest in strategic bombing as championed by General William Mitchell. Thus, when the industrial breakthrough in the 1930's produced modern, all metal, high speed aircraft, policy and opinion demanded the emphasis of aviation development be placed on long range bombers and high speed interceptor planes which would protect America's shores. As previously stressed, such aircraft were not suitable for performing the missions required by Army ground operations.

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large land mass armies. To be sure, America's strategic air arm grew to a force of immense power during World War II; but again, as during World War I, there was interest, motivation, and money to enhance the development of the Army's aviation needs.

Two years after the end of World War II, the unification of United States armed forces, brought about by the National Security Act of 1947, created a policy situation which again restricted the development of Army Aviation. As discussed in Chapter III, the National Security Act, as written in 1947, did not give meaningful interpretation to the functions of organic Army Aviation. In fact, it was not until 1952, during the Korean War, that the Departments of the Army and the Air Force published the Memorandum of Understanding to actually define a policy for the missions of Army Aviation. Therefore, for a period of five years, finally interrupted by a war, there was no firm policy to guide the growth of Army Aviation. The net effect was, as pointed out in Chapter IV, that the Army entered the Korean War with the same aircraft and the same policy for employing those aircraft as it had at the close of World War II.

Again a war came along to provide motivation and money for progress in Army Aviation. Considerable progress in mission capability was made during the Korean War by the introduction of helicopters to combat. Nevertheless, the Memorandum of Understanding placed very specific restrictions on the size and missions for Army aircraft, but there was a firm written policy--a policy which could have hindered the further development of missions for Army Aviation had not events forced a softening of the restrictions and the granting of exceptions to the policy.

Exceptions to written policy made the years following the Korean War fruitful for Army Aviation. New long range observation airplanes and cargo helicopters were taken into the Army inventory, and Army Aviation's mission capability expanded in the areas of observation, transportation, and command control.

Finally, the Army's reorganization to its current ROAD structure coincided with increased involvement in South Viet Nam. Again, riding the wave of wartime popularity, Army Aviation mission capability has substantially increased in the realm of aerial fire support and airmobile operations because of a freer policy which has allowed the arming of Army helicopters and a vast increase in the number of Army aircraft in support of the land battle.

In recounting the effect that policy and opinion had on the evolution of Army Aviation's mission capability during each of these eight periods of time, it is evident that the greatest progress for military aviation comes during periods of war. It is also evident, in hindsight, that the lack of foresight from 1914 to 1916, which caused the United States to fall so far behind European nations in military aviation, was deplorable; and it was only good fortune which permitted the United States to catch up so rapidly. The Army of the 1930's should have spent more effort developing suitable observation and command airplanes instead of placing all of its attention in aviation to heavy bombers and swift fighters. Had this been done, there would undoubtedly have been refinements in the off the shelf L-4's and L-5's which would have enabled these planes to perform missions better. Similarly, there should have been a firm and equitable policy laid down for Army Aviation immediately following the enactment of the National Security Act of

1947. Had this been done, Army Aviation could have been modernized before the Korean War, and would have performed more effectively in that conflict.

Where then will the forces of policy lead Army Aviation after 1966? So long as war continues in South Viet Nam, policy should remain permissive and Army Aviation will continue to increase its mission capabilities. When, and if the war in Viet Nam is successfully concluded and military budgets are then reduced, policy will most likely again become more restrictive on acquisition of new equipment and a slow down in progress will follow for Army Aviation.

Though the history of Army Aviation does not give a clear insight to the future, it does indicate that Army Aviation, in order to be most effective in time of war, must be actively developed in time of peace. Those who direct the fortunes of Army Aviation should heed the motto of the United States Army Command and General Staff College--"Ad Bellum Pace Parati," (Prepared in Peace for War).

APPENDIX I

MISSIONS PERFORMED BY ARMY AVIATION (1861-1966)

Period and Event	Mission Description			
	Observation	Transportation	Command and Control	Firepower
1861 Balloon	Surveillance, day and night Artillery adjustment Locate friendly lines Terrain sketch			
1909 Mexican Border (R-2)	Reconnaissance		Courier Mail Message drop	
1918 World War I (DH-4, SPAD 13)	Artillery registration Artillery adjustment Visual reconnaissance, day and night Counterattack patrol Artillery patrol Artillery reconnaissance Cavalry reconnaissance patrol Contact patrol Photography, day		Courier Message drop	Air combat Bomber escort Counterreconnaissance Balloon busting Bombardment, day Ground support Straffing lines Bombing lines Smoke screen Attack antitank guns

APPENDIX I--Continued

1936 Hemisphere defense (O-40, O-47)	Visual observation, day and night Surveillance Frontier patrol Visual reconnaissance, day and night Artillery registration Artillery adjustment Battle reconnaissance Infantry missions Front line location Relay signals Locate obstacles Shell reports Photography, day		Radio relay	
1942-1945 World War II (L-4, L-5)	Visual observation, day and night Surveillance Target acquisition Artillery registration Artillery adjustment Counterbattery Naval gunfire adjustment Direct air strikes Reconnaissance Search Route survey Photography, day	Resupply (225 lbs each) Medical evacuation Rescue	Command Courier Message drop Column control Radio relay Camouflage inspection Wire laying Leaflet drop	Attack ground targets Drop grenades Small bombs Rifle/pistol Submachine gun

APPENDIX I--Continued

Period and Event	Observation	Transportation	Command and Control	Firepower
1950-1953 Korean War (L-4, L-5, L-19, L-20, H-13 H-19)	Visual observation, day and night Target acquisition Artillery registration Artillery adjustment Counterbattery Naval gunfire adjustment Direct air strikes Reconnaissance, day and night Ambush reconnaissance Straggler reconnaissance Search Photography, day	Resupply 6th Transportation Company 12 tons/lift Troop haul 6th Transportation Company 100 troops/lift Medical evacuation Rescue	Command Courier Message drop Column control Wire laying Leaflet drop Radio relay Camouflage inspection	Attack ground targets Drop grenades Rifle/pistol Submachinegun "Bazooka"
1959-1962 Pentomic Period (L-19, L-20, AO-1, U-1A, H-13, HU-1A, B, H-21, H-34,	Visual observation, day and night Surveillance, day and night Visual Electronic Radar Infrared Target acquisition Visual Electronic	Resupply Division Aviation Company 12 tons/lift Corps/Army Transportation Aircraft Battalion (4 per army), 119 tons/lift	Command Messenger Courier Photo delivery Message drop and pickup Column control Radio relay Camouflage inspection Liaison	

H-37)	Artillery registration Artillery adjustment Counterbattery Naval gunfire adjustment Reconnaissance, deep-close in Route Position area Engineer Signal Wire route Aerial combat reconnaissance Survey Route Topographical Artillery Traffic Radiological Search Photography, day and night, hand held, vertical, oblique Electronic Drone	Troop haul Ship to shore Airmobile operations Division Aviation Company 92 troops/lift Corps/Army Transportation Aircraft Battalion (4 per army), 924 troops/lift Medical evacuation Rescue	Wire laying Leaflet drop Audio-communication Battlefield illumination	
1962-ROAD Period (U-6A, U-8, OV-1, CV-2B,	Visual observation, day and night Surveillance, day and night Visual Electronic	Resupply Division Aviation Battalion 28.1 tons/lift Army (FASCOM) Transportation	Command Aerial Command Post Courier, messenger liaison Message drop	Aerial fire support Armed helicopter Machinegun Rocket Guided missile Armed escort

APPENDIX I--Continued

Period and Event	Observation	Transportation	Command and Control	Firepower
OH-13, UH-1B/D, CH-47)	Radar Infrared Target acquisition Visual Electronic Artillery registration Artillery adjustment Counterbattery Naval gunfire adjustment Reconnaissance, route, zone, area Armed aerial reconnaissance Survey Route, topographic Artillery, traffic Radiological Damage assessment Search Photography, day and night, hand held, vertical, oblique Electronic Drone	Aircraft Battalion (4 per army), 138.5 tons/lift Corps Airmobile Battalion (2 per corps), 145 tons/lift Troop haul Ship to shore Airmobile operations Division Aviation Battalion 206 troops/lift Army (FASCOM) Transportation Aircraft Battalion (4 per army), 1140 troops/lift Corps Airmobile Battalion (2 per corps), 1180 troop/lift Area damage control Medical evacuation Rescue	and pickup Column control Radio relay Wire laying Propaganda dissemination Leaflet drop Loudspeaker Battlefield illumination Smoke screening	Convoy cover Armed reconnaissance

APPENDIX II

HISTORICAL COMPARISON OF ARMY AIRCRAFT CHARACTERISTICS[a]

Date	Aircraft[b]	Wing Span (ft & in)	Rotor Diameter (ft & in)	Speed (mph)	Cargo Load (pass/lbs)	Weight (lbs)	Engine Horse-power
1861	Lowe Balloon	15,000 cu ft	--	--	3	--	--
1898	Cuba Balloon	30,000 cu ft	--	--	3	--	--
1903	Wright Plane	40'	--	40	2	750	12
1909	Wright A Flyer	36' 4"	--	44	2	1,200	30
1916	R-2	48'	--	90	2	2,800	160
1917	DH-4	42' 7"	--	135	2	3,582	400
1917	SPAD 13	27' 1"	--	132	1	2,069	226
1932	O-40	44' 1"	--	193	2	4,565	650
1935	O-47	46' 4"	--	200	3	7,594	975
1940	O-49 (L-1)	50' 10"	--	122	2	3,400	295
1942	L-4	35' 3"	--	70	2/430	740	65
1942	L-5	34'	--	105	2/662	1,472	185
1947	H-13 (OH-13)	--	35' 2"	70	2/500	2,350	200
1950	L-19 (O-1)	36'	--	105	2/500	2,400	213
1951	L-20 (U-6A)	48'	--	120	5/1,500	5,100	400
1951	H-23 (OH-23)	--	35' 5"	70	2/700	2,700	200
1952	L-23 (U-8)	45' 4"	--	185	5	7,000	2/320
1952	H-19 (UH-19)	--	53'	75	5/1,200	7,300	550
1954	H-21 (CH-21)	--	2/44'	80	12/3,000	13,500	1,421
1955	U-1A	58'	--	120	10/2,300	7,600	600
1955	H-34 (CH-34)	--	56'	85	12/4,600	13,300	1,425
1956	H-37 (CH-37)	--	72'	95	22/6,600	31,000	2/1,900
1956	HU-1A (UH-1A)	--	44'	95	5/1,500	7,200	960
1957	UH-1D	--	44'	120	11/3,000	8,700	1,100

APPENDIX II--Continued

Date	Aircraft[b]	Wing Span (ft & in)	Rotor Diameter (ft & in)	Speed (mph)	Cargo Load (pass/lbs)	Weight (lbs)	Engine Horse-power
1959	AC-1 (CV-2B	95' 6"	--	180	31/8,300	28,500	2/1,450
1960	AO-1 (OV-1)	42'	--	230	2	14,018	2/960
1961	H-47 (CH-47)	--	2/59'	150	32/7,400	33,000	2/2,200
1962	S-64	--	72'	115	68/20,760	38,000	2/4,050

[a]Figures given for speed and cargo load are not absolute, but are average figures for cruising speed and normal carrying capacity. Likewise, figures given for weight represent normal gross weight, and are not absolute. The data given is derived from the same source as the pictures which appear in the body of the thesis.

[b]Aircraft designations given in parenthesis are the current designations for the "family" of Army aircraft. The first listed designation is the designation of the aircraft at the time of its initial procurement.

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