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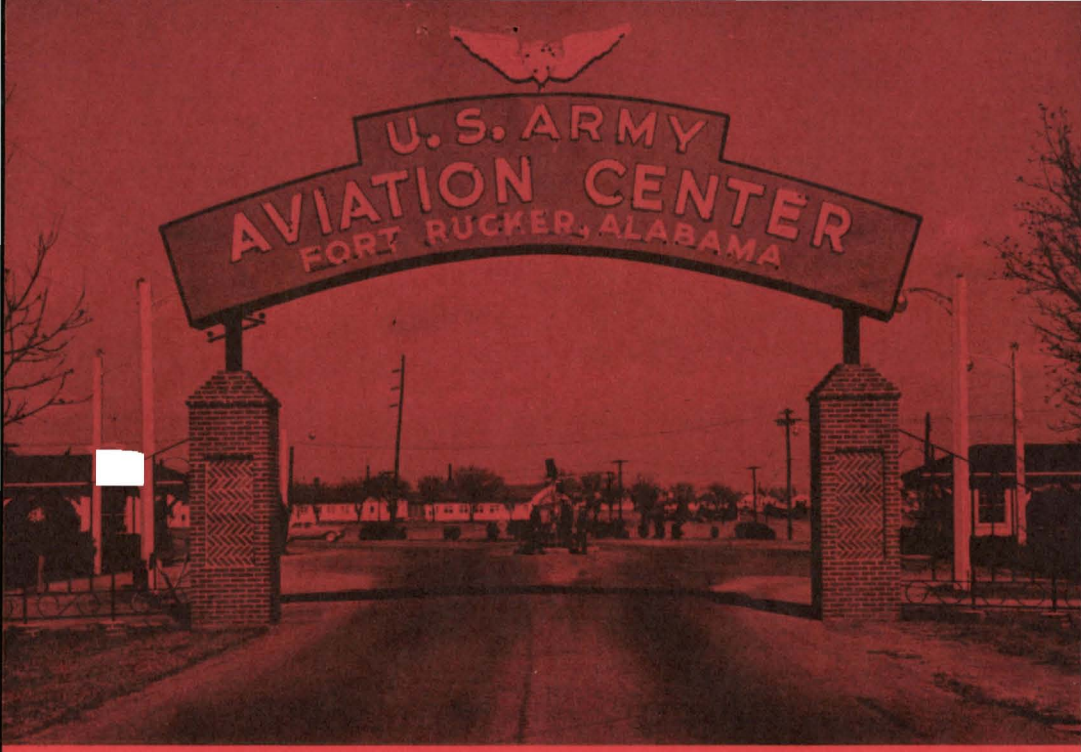
JUNE 1956 VOLUME 2 NUMBER 6



ARMY AVIATION SCHOOL

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ARMY AVIATION
DIGEST

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COVER: Combat equipped troops disembarking from an Army H-21 helicopter. The H-21's cabin space, 20 feet long, 5 feet 6 inches high, and 5 feet 8 inches wide, accommodates 20 combat equipped troops or 12 litter patients plus 2 medical attendants.

This copy is not for sale. It is intended for more than one reader.

PLEASE READ IT AND PASS IT ALONG

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Manuscripts, photographs, and other illustrations pertaining to the above subjects of interest to personnel concerned with Army aviation are invited. Direct communication is authorized to: Editor-in-Chief, ARMY AVIATION DIGEST, Army Aviation School, Fort Rucker, Alabama.

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THE COMMANDANT'S COLUMN

Brigadier General Carl I. Hutton, *USA*
Commanding General, The Army Aviation Center

The views expressed in this article are the author's and are not necessarily those of the Department of the Army.—The Editor

Everybody's Flying Collision Courses

WHY IS THERE now, in 1956, such widespread interest in mid-air collisions in continental United States?

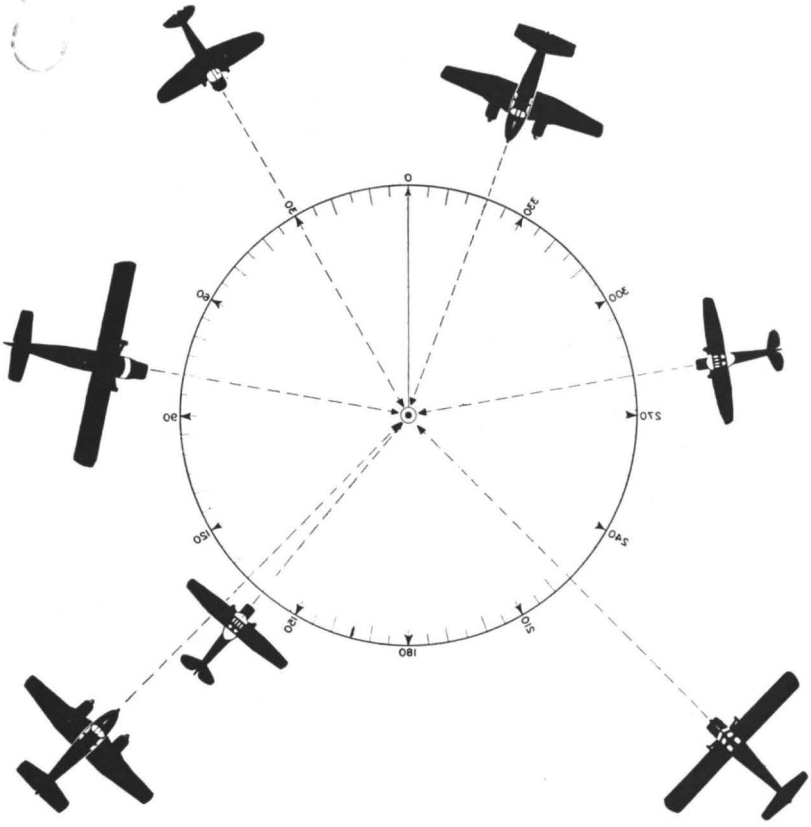
Two obvious reasons are usually given: (1) There are more airplanes, (2) The CAA now encourages reporting of near misses without filing a violation against the reporter.

Both of these are factors. The first, however, must be a question of direct ratios. To suggest that the second has caused near misses to increase is getting the cart before the horse. There must be some other explanation.

A recent Flight Safety Foundation Accident Prevention Bulletin (No. 56-6) perhaps contains the clue. OMNI may be the villain. Bulletin 56-6 describes how three airplanes happened to be above an Omni station on instruments and within 500 feet. It is possible that this is true more frequently in VFR flying than in IFR flying.

Everybody is flying on collision courses. Altitude selection by direction of flight really aggravates the situation, since airplanes of all speeds are going in the same direction at the same altitude. It is important to remember that slowly converging courses are comparatively the most dangerous and head-on courses are least dangerous.

As wonderful as OMNI is for navigation, it causes converging courses, as well as focal points of congestion and danger. How many near misses would we have on the highways if we brought all automobiles to central points which they crossed at 100 to 400 mph,



without stopping? Parallel OMNI, or TACAN, courses will improve conditions temporarily but will probably result in another saturable system. The ultimate solution should be one which capitalizes the universality of the atmosphere. All of the atmosphere is a highway, and it should not be necessary to channelize traffic and increase collision exposures.

Anyone who has experienced the wonders of radar—departures, positioning, GCA, and transition to landing systems will naturally search in that direction for a long range solution. Whether such a system will involve a radar in every airplane with a checkerboard target system on the ground, or some sort of unmonitored ground radar system on the ground with a question-and-answer radio in the aircraft is a matter for the technicians. The problem is to use all of the air thereby reducing the bottlenecks which have been introduced into air traffic.

AERIAL VEHICLE TRANSPORT FOR COMBAT UNITS

Colonel Charles W. Matheny, Jr., *Artillery*

The views expressed in this article are the author's and are not necessarily those of the Department of the Army or of The Army Aviation School.—The Editor

THE WAY to make major improvements in the tactical mobility of Army combat forces is through the use of aerial vehicles, vehicles that move through the air, without roads, above the fields, rivers, mountains, and oceans. The speed of ground vehicles is dependent on the condition of the earth's surface and the condition of the roads constructed on this surface. The speed of aerial vehicles is not dependent on the terrain but primarily on the design of the craft. If the speed of movement of Army forces is to be greatly increased from the present 20-mile-per-hour rate of march, it must be done through the use of aerial vehicles. Even in their present state of development, helicopters can increase this rate of march to some 100 miles per hour. This means an increase by a factor of 5. Oddly enough, when the Army discarded horses for trucks, rate of movement was increased by this same factor of 5. The speeds and operating capabilities of aerial vehicles are going to continue to improve, moving this factor further upward.

Long-Range Benefits

Since the use of aerial vehicles offers improvement of tactical and logistical mobility as well as combat procedures, it is essential that development of aviation be emphasized in the long-range objectives of the Army, particularly when considering tactics and techniques of employment. A combination of the following methods

Helicopters and Comparable Vehicles

appears to be the best way of gaining the overall, long-range benefits and advantages offered by aerial vehicles.

a. Integration of aircraft into combat and service organizations wherever mobility will be improved or combat effectiveness increased.

b. Replacement of ground vehicles by aerial vehicles in tactical units wherever mobility and combat procedures will be improved.

c. Organization of supermobile airphibious-type combat organizations equipped with aerial vehicles instead of ground vehicles.

Systems of Employment

Several systems of aerial vehicle employment can be used to make infantry, artillery, and armored units air-mobile.

System 1—Providing complete organic aerial vehicle transport to combat units by replacing ground vehicles (airphibious organization).

System 2—Providing a certain amount of organic aerial-vehicle transport to the combat unit and having sufficient

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Colonel Matheny became an Army aviator in 1952, and subsequently served in Korea as Division Air Officer of the 25th Infantry Division, and as the Senior Army Aviation Advisor, U. S. Military Advisory Gp to the Republic of Korea. Returning to the ZI late in 1953, he was assigned to the Army Aviation School, Fort Sill, Okla., and served as Director, Combat Developments, and Deputy Commandant, until receiving his present assignment in 1954. In his comparatively short span as an Army aviator Colonel Matheny has become qualified in all types of rotary- and fixed-wing aircraft. —The Editor

TC helicopter units available to provide 100 percent mobility as required.

System 3—Providing TC helicopter units to airlift standard combat organizations equipped with organic ground vehicle transport.

System 4—Providing Air Force air transport units to airlift standard combat organizations equipped with organic ground vehicle transport.

The first two systems are those now used and found to be most satisfactory with present ground vehicle transport. Experience over a period of many years has proved that artillery and armored units can operate most effectively and efficiently when *all* transport is provided organic to the unit, as shown in system 1. Now note system 2, infantry units operate under this system and have found it most satisfactory to have some transport vehicles organic to the unit and additional transport provided from TC units or other sources when the unit moves.

Organic Transport Best

In studies which have been conducted at the Artillery and Guided Missile Center to determine the best method of providing aerial vehicle support to artillery units, we have found the system now employed, that of 100 percent organic transport, to be the most efficient, effective, and economical (system 1). This system also provides the best operational capabilities because the unit has available within its own facilities the superior mobility inherent in helicopter transport. If ground vehicles are retained by the combat unit and nonorganic aerial transport provided as required (system 3), then the mobility of the unit is reduced to the operational capabilities of ground vehicles when it is separated from aerial transport. The replacement of vehicles with helicopters eliminates the requirement for larger size and number of helicopters necessary to transport heavy trucks. The cost of complete organic helicopter transport required for an artillery unit has been estimated to be one-third the cost of helicopters required by a TC unit to transport the same artillery unit with standard organic motor transport. Further, the additional personnel required for the TC units to provide separate transport is about three times the additional personnel requirement when organic helicopter transport is provided.

System 4 has the same disadvantages as system 3, except that

additional problems of command and control are added when Air Force units are used. Also, the additional personnel requirements are believed to be greater for Air Force units.

Changes In Operations

One might jump to the conclusion that the provision of helicopter transport organic to certain combat units as outlined above would eliminate requirements for Transportation Corps helicopter units, medical helicopter ambulance units, and other technical service units or perhaps reduce aviation responsibilities of the Transportation Corps. Such a conclusion, however, would definitely be erroneous and misleading. As the use of helicopter transport expands in the Army, the functions and operations of the Transportation Corps in its field of responsibility will naturally expand. As helicopter transport increases, there should be a decrease in truck transport. It can also be expected that more extensive use of helicopter transport will cause many adjustments in operations and organizations within the Army.

Military Organization

Our military organization and the conduct of military operations are quite different today from what they were in 1812, 1917, or 1941, and changes are continuing to take place. In 1812 the Army's primary means of transport was the horse. In 1917 the horse was still the dominant means of transportation, but the truck was beginning to appear. In 1941 the truck entirely replaced the horse and transport aircraft began to be used. By 1945 the airplane had become commonplace, and the atomic bomb and many other new devices had been developed, resulting in new methods and improvement. Now the helicopter and other vertical takeoff and landing aircraft are being developed, perfected, and are coming into use by the Army. During the next 10 years the increasing use of helicopters will replace a portion of our military trucks, and in time trucks may become obsolete transport for our combat units.

It is unmistakably evident that our Army will soon have "airphibious" tactical units, with aerial vehicles replacing ground vehicles. This will enable troop units to operate on the ground but move through the air. These "airphibious units" will range in size from infantry and artillery battalions to whole divisions, and they

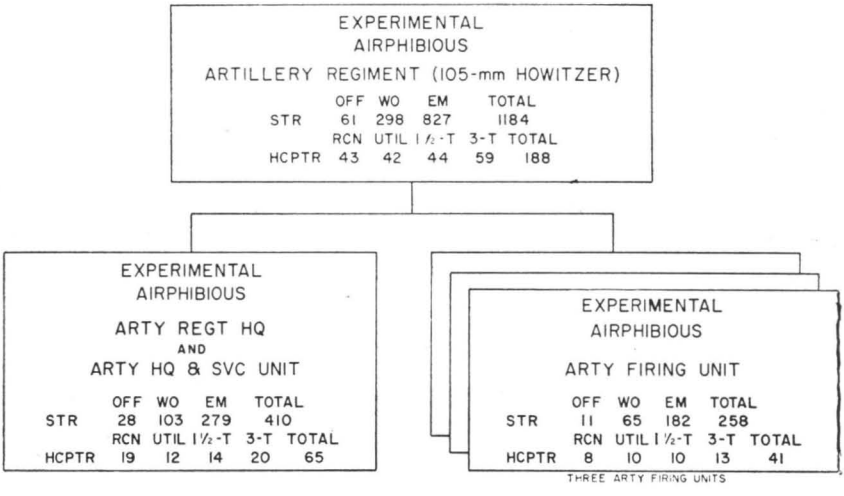
will move through the air in their own helicopters. You are probably wondering about the term "airphibious." This term means, "existing both on land and in the air," or, in other words, an airphibious artillery unit is one which can move, communicate, and operate on the land or in the air.

Airphibious Artillery

Let us consider a concept for an artillery organization incorporating aerial vehicles. This organization has been developed in great detail over several years, the concept having been originated in 1950 and the first TOE for it completed early in 1956. We are certain that this concept is feasible; in fact, we are as sure of the feasibility of this new airphibious organization as we were about that of the transportation helicopter company when that new organization was originated in 1950.

Changes in Army aviation and its capabilities require changes in the provisions under which it operates. In order for the Army to employ all types of helicopters under these new concepts, existing provisions had to be changed to permit wider utilization of Army aircraft. In 1950, a project was initiated at Department of the Army to revise the existing Army-Air Force agreement. The first revision

ORGANIZATIONAL CHART



was effected in 1952, thus starting the relaxation of limitations previously imposed on Army aviation.

This experimental airphibious artillery organization is a supermobile artillery unit with the capability of providing continuous fire support in normal operations. It also has the exceptional capability of providing fire support for airborne, armored, and other types of combat units where mobility is essential.

Operational Capabilities

The concept of tactical employment of an airphibious artillery organization is similar to that of the standard motorized artillery unit. However, the speed and flexibility of operations with this organization utilizing helicopter transport will be much greater than that with units equipped with ground transport. The new-type organization can move, communicate, and operate over land without roads or airfields, and it does not need to use any type of land transport. It can also move across water without the use of any type of water transport. Our studies show that the operational capabilities of artillery units equipped with organic aerial vehicles, therefore, far exceed those of present motorized units. With the increased frontages and greater dispersion of combat units required in atomic warfare, it will be necessary for artillery units to exploit mobility to the greatest extent and have the best possible operational capabilities.

Some of the unusual capabilities of an airphibious artillery organization are:

a. It could occupy positions which could not be readily occupied by, or are inaccessible to units utilizing ground transport, including areas surrounded by the enemy. It should also be able to evacuate isolated or surrounded position areas with minimum interference from enemy action.

b. The occupation of position by helicopter transport eliminates vehicle tracks and reduces other evidence which normally tends to disclose the location of artillery positions.

c. The movement of sensitive communications or electronic equipment can be accomplished by helicopter without the damaging effects normally experienced when such equipment is transported by truck.

d. The rapidity of movement, away from roads or other

normal routes, reduces the possibility of detection by the enemy.

e. The speed of flight reduces the time the unit is exposed to enemy observation or enemy fire during movement.

f. It is especially adaptable to mountain, arctic, and jungle operations.

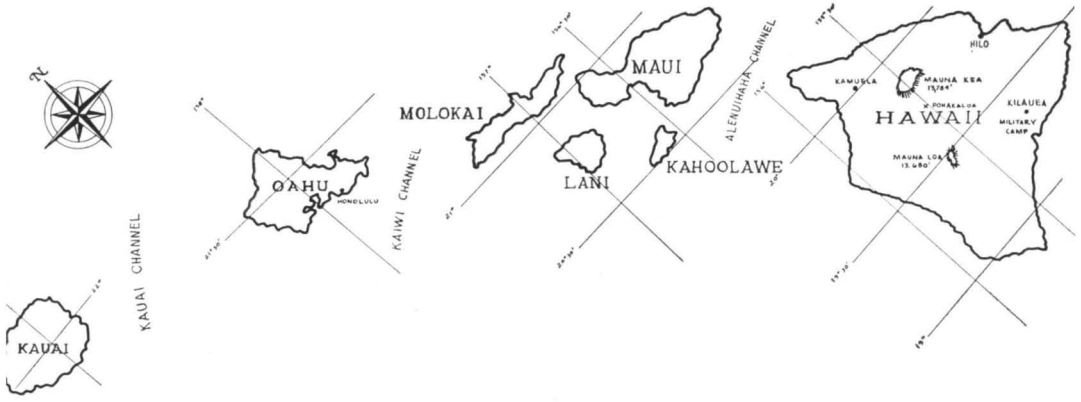
One might think that providing an artillery unit with organic helicopter transport would prohibit these vehicles from being used for other purposes; however, such is not the case. The organic motor transport of artillery units is now used for general transport purposes to meet the requirements of a particular situation, and helicopter transport can be utilized in a similar manner. The approximate equivalent of a light transportation helicopter company can be provided by the airphibious artillery firing unit for limited periods while weapons are in position and the unit still retain sufficient transport for normal firing operations.

Operating Limitations

It is difficult to analyze the operating limitations of helicopter transport because there are so many aspects and facets to such an analysis. The best analysis may be made by comparing the helicopter, as an aerial vehicle, with the truck as a ground vehicle. Certainly, the helicopter cannot be compared with the airplane because their operating capabilities are so different, about the only similarities being that they are both aircraft and move through the air. To study the relative capabilities of the helicopter and the truck is like comparing the truck with the horse—the advantages of each are obvious, but who wants to go back to horses?

All vehicles, air and ground, can be used both day and night or in good or bad weather, but each requires different types of auxiliary equipment or appurtenances to operate effectively. For example, the operating capabilities of the truck are entirely dependent on the condition of the road or ground surface. If the roads are good, higher speeds can be attained and heavier loads can be transported; but, if the roads are poor, nonexistent, or jammed with traffic, operating capabilities are reduced, sometimes to the point that the truck becomes inoperational. Truck operations are also affected by the weather in that travel on icy, wet, muddy, foggy, or

(Continued on page 27)



PACIFIC OPERATIONS

PILOTS of the 25th Infantry Division Air Section logged 1,500 hours and flew 185,000 miles in fixed-wing aircraft and 200 hours and 10,000 miles in helicopters during the Tropic Lightning Division's 7½-month infantry battalion test on the island of Hawaii last year.

The helicopters were based 6,200 feet above sea level, and higher altitudes were frequently necessary to complete missions. Altitudes as high as 9,500 feet were required to clear high ridges, and in one mission a pilot took his H-13 over Mauna Kea, a 13,784-foot peak.

During the tests, L-19 and L-20 aircraft operated over almost 200 miles of open sea between Wheeler Field on the islands of Oahu, Kamuela, and Hawaii. The majority of the pilots lacked previous over-water flight experience.

Fixed-wing aircraft of the section performed a variety of operations in support of the infantry battalion. More than 1,000 military personnel were transported round-trip. In addition, airplanes resupplied units with signal, quartermaster, ordnance, engineer, chemical, and medical equipment and supplies. Cargo ranged in size from the smallest radio tubes to 400-pound lots of wire and a 600-pound tank transmission. The aircraft also made daily flights carrying mail, personal baggage, and movie films for the troops on Hawaii.

As a precautionary measure, a survival training program was instituted for all personnel making the over-water flight. Using training aids and survival equipment, pilots preceded each flight with a

30-minute orientation in the evacuation procedure of the aircraft and the use of life rafts, mae wests, and parachutes.

Weather conditions for the flight to Hawaii were normally good. However, during poor visibility the pilots had to bypass Kamuela, go on to Hilo, and make instrument approaches at Lyman Field.

The most important phase was the tactical employment of the aircraft during battalion tests, including artillery observation, reconnaissance, and leaflet drops. They proved extremely valuable in safety surveillance, insuring that artillery fire was over the heads of advancing infantry.

Maintenance for the L-19 and L-20 planes operating on Hawaii was performed at Kamuela, where two division mechanics were on duty at all times. Trans-Pacific Airlines cooperated with the division air section by providing weather facilities, equipment, and information.

Helicopters Also

Two air section H-13's ferried to Hawaii by Navy LST and based at Kilauea Military Camp, were also used to support the battalion tests. During the ferrying journey the helicopters were covered with waterproofing paper and canvas shelter halves to protect them from the corrosive effects of salt water. The H-13's operated from the battalion test site at Pohakuloa, a rugged lava-covered area some 6,000 feet up on the saddle road between the peaks of Mauna Loa and Mauna Kea. In preparation for high altitude operation, the helicopters were stripped of all unessential equipment, including radios, landing lights, and head sets.

The H-13 proved particularly valuable in reconnaissance work since battalion officers were able to check deployment of troops during the defensive phase and progress made during the attack. The movement of visitors and inspectors from Hilo and Kamuela to the Pohakuloa training site was also accomplished by helicopter.

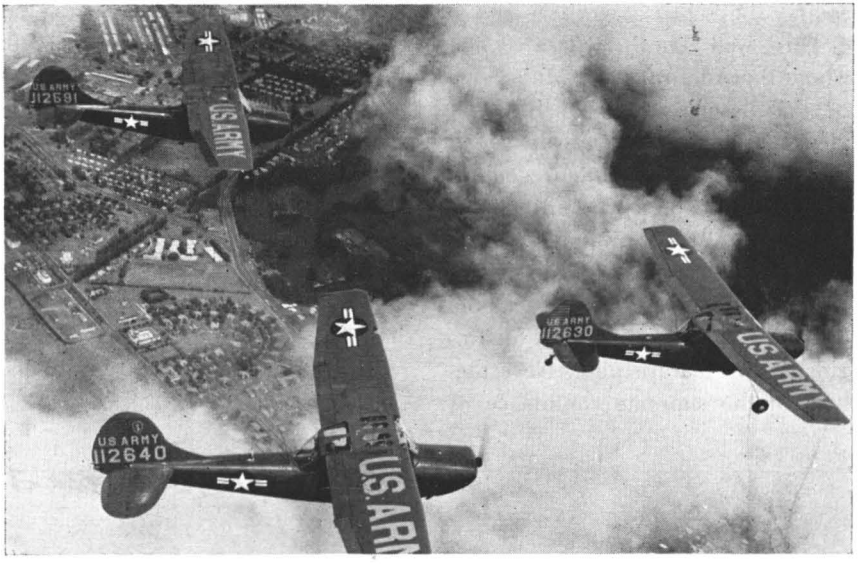
Maintenance requirements on the helicopters more than doubled during Pohakuloa operations. The large amount of volcanic ash and dust in the area was largely responsible. Normally oil can be changed every 25 hours, but at Pohakuloa a change was required every 10 hours and filters were cleaned daily.

This article was prepared by ***SP3 Alan H. Simon*** *of the public information office of the 25th Infantry Division. Views expressed are not necessarily those of the Department of the Army or of The Army Aviation School.—The Editor*

In a letter to Major Donald A. Baker, Division Aviation Officer, Major General Herbert B. Powell, Tropic Lightning commander, commended the Air Section's operations in supporting the division.

> "The significance of this accomplishment is important . . . it heavily underscores the importance of Army Aviation to operations of an infantry division in the field. When necessary, personnel and equipment can be transported in all kinds of weather over 200 miles of open ocean successfully and safely, utilizing Army aircraft.
>
> " . . . accomplishment of a feat of this proportion, without accident, is an unqualified testament to the proficiency and ability of the mechanics and pilots of the 25th Infantry Division and to you as Division Aviation Officer."

The Tropic Lightning tests provided pilots with valuable experience in over-water flying and other operations under simulated combat conditions.



Three L-19's of the 25th Division Air Section fly in formation above Schofield Barracks. The planes were used for artillery observation, reconnaissance and leaflet drops during the Tropic Lightning battalion tests conducted on the Big Island of Hawaii.

Ace of The Base

Writing in the February *Approach,* Admiral D. V. Gallery observed in his editorial that "The most dangerous period of any naval aviator's career is his first couple of years out of Pensacola when he knows he is the world's greatest aviator, but is afraid most other people don't."

Therein is contained a lesson which, unfortunately, is often learned painfully from individual experience. This, we hold, is not necessary.

This well known character to whom the Admiral refers, this "Ace of the Base," occurs during that phase of pilot learning in which the young pilot, with more enthusiasm than experience, mistakes a period of rapid learning for a state of complete mastery of his art.

Admittedly good, he yet lacks the depth of experience which distinguishes the mature pilot. Nevertheless, in the supreme confidence of his new prowess, the young pilot finds in the "800-hour period" a new freedom from the parental guidance of the training command. With zestful curiosity he explores his domain to obtain answers to queries of "How Fast?" "How Hot?" "How close?"—the sum of which qualify him for the local title of "Ace."

But there's a flaw. He is no longer a free agent, but a member of a combat team organization which is based on headwork, not headlines.

So, Aces, be informed there's no room in our high-performance club for the hot-rock pilot; but we're awfully short on the professional military aviator. Tiger type? Yes, by all means, but a professional tiger.

There's no rebuttal, Aces. The overwhelming weight of accident statistics is against you. So, buy our lesson and be an Old Pro tiger—it's for free and anyone can qualify. Any other answer is costly in pilots.

M. B. Williams

The above editorial was written by Captain M. B. Williams, USN, Director of the U. S. Naval Aviation Safety Center, in the April 1956 issue of APPROACH magazine.—The Editor

HOW FAR SHALL AN INSTRUCTOR LET A STUDENT GO?

Harrison E. Shipman

The views expressed in this article are the author's and are not necessarily those of the Department of the Army or of The Army Aviation School.—The Editor

MUCH HAS been said about the need to let the *student commit errors in order to learn to fly*. It is not my intent to deny this theory in its entirety, but it is my contention that this is a greatly abused and exaggerated technique of teaching that has a very limited use in flying instructions.

Flight instructors have often been heard to say: "Sure my traffic pattern was too big and my altitude varied excessively, but I had to let the student see what he was doing wrong, didn't I?" Or, "Yes, my final turn and approach leg were low, but I had to let the student see this in order to correct it, didn't I?" Or, "I'll admit that was a dangerous landing and almost resulted in an accident, but don't you have to let the student go a bit if he is going to learn anything?" Or, "Well, we were going sideways and the airspeed was down to 75 on that ITO, but won't he learn to make an ITO much faster if I stay off the controls as much as possible?" My emphatic answer to all these questions and any other like them is *no*.

This provocative article is reprinted from INSTRUCTORS JOURNAL, *Fall 1955, by permission of the editor.* INSTRUCTORS JOURNAL *is published quarterly by Air Training Command, United States Air Force. The instructional doctrine of The Army Aviation School is in consonance with the thoughts expressed by the author.—The Editor*

One can learn to swim by plunging in on his own, but he probably will not be as skilled at swimming as the one who learned through the coaching of an instructor who restrains useless strokes and kicks while insisting on the proper timing of strokes and kicks.

The person who learns to type by the hunt and peck system finds it much harder to learn the touch system that permits rhythm and speed than the person who has not used a typewriter at all.

One may learn to roller skate or ice skate by strapping on a pair of skates and taking off on his own with another amateur. He will stumble and fall until he gradually learns to skate, and he may eventually become fairly good. His rate of progress in becoming good, however, will be much slower than it would be under a skilled instructor who skates with the student and teaches from the beginning by coordinating pressures and timing between himself and the student. The same is true of dancing and many other sports and labor skills.

In learning this way, bad habits that would eventually need to be broken before attaining a high degree of skill are not ever formed.

The professional golf instructor insists that the student should not think nor worry about what he did wrong on the last stroke or last hole. He wants the student to concentrate on what to do right at the next stroke or hole. The good golf instructor will not allow a student to continue to swing at a ball if his timing is bad, he is off balance, and his swing in general is incorrect. He may not even let him hit a ball until he has corrected the swing a certain amount. To let a novice continue to swing away at a golf ball before he has perfected some of the fundamentals is a waste of time, and usually a bar to progress.

Many of us learned to steer the family car by sitting on our fathers' laps and applying pressure in conjunction with pressure being applied by our fathers. He controlled our movements of the steering wheel to keep us from running off the road or into another car. Gradually he was able to lessen the pressure and control to the steering wheel until all at once we were steering completely by ourselves and could hardly believe that nobody was helping. We learned to steer without being allowed to run off the road or into another car

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Mr. Harrison E. Shipman *is Flight Operations Supervisor, Serv-Air Aviation Corporation, Stallings Air Base Contract Primary Flying School, Kinston, N. C.—The Editor*

to show us our error. This same principle is used in the dual controlled automobiles used to teach driving today.

Many of us also learned to fly the same way. We were allowed to apply pressure and movement to the controls, but we always felt our instructors come in with the proper pressures on the controls when we began to get into trouble. As we progressed we felt these pressures less and less until all of a sudden we were flying all by ourselves. It was not necessary for us to scare ourselves, our instructors, and everyone else in sight of us to death to see that it was the wrong thing to do and thus learn what not to do. We were taught the correct thing to do and *told* what *not* to do.

The traffic pattern is *one* of the maneuvers where there is practically no need whatsoever to "let the student go." If he does not turn at the right place and in the proper manner, the instructor should immediately tell him so. The fact that the instructor had to tell him where to turn lets the student know that he made an error and, at the same time, shows him the proper place and way to turn. The fact that he is immediately called upon for correction when his altitude varies excessively impresses upon him the importance of the altitude. If he is allowed to vary 75 to 100 feet and nothing is said about it, he naturally does not attach much importance to the altitude.

We all know that proper instrument flying requires a very rapid crosscheck of all instruments. If a student is allowed to lose directional control more than 6 or 7 degrees during the instrument take-off he becomes so busy with this that the pitch and power control also go to pot and he becomes so frustrated that he learns very little and in many cases throws up his hands completely. If his pitch is allowed to increase to the extent that he is nearing a stall he becomes so engrossed in correcting this airspeed that his rudder and aileron control are forgotten and then his other instruments read danger. To avoid this condition of frustration that at times turns to a condition of fear and to speed-up the learning process, the *instructor should set certain limits of error*, and when these are reached he should come into action and restrain movements of the controls so as to keep the errors within reason. The student feels these pressures and knows what he has done wrong and at the same time has not lost complete control and value of the instrument take-off maneuver. He will see what should be done and what the instruments should read.

The student should be allowed to commit occasional errors

during landing practice for only one reason—that being to check his corrective action. He must *not* be allowed to make errors *in the corrective action.* The instructor must come into play immediately if the proper correction is not administered at once because there is usually only one chance left.

After demonstrating the slow roll to the student, the instructor does not continue to allow the student to split S out of it, but rather helps apply rudder and elevator pressures as needed until the student learns to apply these pressures. The instructor does not find it necessary to continue to let the student fall out of the maneuver to show him his error.

Many instructors control the problem of how far to let the student go by handling certain controls completely until the student masters others. The instructor then adds one control at a time until the student gradually masters them all.

Neither the Air Force nor Serv-Air Aviation Corporation advocates the method of instruction whereby a student is allowed to commit unnecessary errors in order to see what not to do. *Our policy at Serv-Air is proper instruction to the student to show him the correct way to perform the maneuver.* There have been several dual accidents, at this base and others, where the instructor allowed the student to go too far and thus got them both into a position from which they were unable to recover. The *instructor is not doing his job when this happens.* The student is depending on the instructor not to let him go too far and to keep him out of trouble. The student would not be there if he did not have this faith. A student who knows no better may complain about his instructor "riding the controls" with him, but he would complain a great deal more if his instructor allowed him to crack-up on an instrument take-off or some other maneuver because of not taking over soon enough.

Note that I do not say that the student shall not have any "slack in the reins" at all, but insist that this slack shall be very limited. I maintain that this practice is not only conducive to *safer* flying but also *speeds-up* the learning process. The question, "How far to let the student go?" has no definite answer, but will vary in relationship to *two* things. The first one of these is the maneuver being performed and the second one is the experience level of the student. Notice that I do *not* base it on the experience or ability of the instructor. When it becomes necessary for the instructor to call on exceptional skill to

(Continued on page 36)

H-13 HELICOPTER TRAILER

E. A. Cutchen

The views expressed in this article are the author's and are not necessarily those of the Department of the Army or of The Army Aviation School.—The Editor

"NECESSITY is the mother of invention." A trite but nevertheless true axiom, for the need of something better, or the need for something not yet in existence, seems to provide the stimulus that starts man to thinking. The necessity for new and improved methods, techniques, tools, and equipment is probably as great in the field of aircraft maintenance as in any other single field. The advent of rotary-wing aircraft, the constant change in aircraft design, and the adaptation of aircraft, especially rotary-wing aircraft, to many jobs previously done by other means of transportation have created numerous problems.

Many people are devoting much time and effort to the solution of these problems, the manufacturer, the Transportation Research and Development Command, and others. However, it often is the user of the product who sees the need more clearly for a special tool or piece of special equipment.

One such item "invented" at The Army Aviation School is the helicopter trailer which can be used with all H-13 or H-23 helicopters equipped with the skid type landing gear. There are many uses for this trailer (Figures 1 and 2) in the aircraft maintenance operation at almost any level of maintenance. Each use means man-hours saved, ground handling made safer, and reduced costs.

Before a trailer for hauling the H-13 helicopter was designed and fabricated by the aircraft maintenance contractor at The Army Aviation Center, much time and effort was expended when helicopter recovery was necessary. A flatbed truck, a wrecker with adequate overhead winches and at least four men were required for the recovery of one aircraft. Much time and meticulous effort was necessary to prevent damage to the aircraft during loading, transporting, and unloading.

Now aircraft recovery for a distance of many miles from the maintenance area poses no greater problem than can be solved by two men, with little special skill, a jeep, tug, or similar towing vehicle, and the helicopter trailer. When an helicopter is grounded away from the maintenance area because of mechanical failure the aircraft's location is reported by radio and within minutes the recovery crew is on the scene, and the helicopter is promptly loaded and returned to the maintenance area. Crash-damaged aircraft can likewise be transported on the trailer if the cross tubes are not damaged badly or torn from the helicopter.

Obviously much time is saved in aircraft recovery alone, but other advantages are just as evident. Any ground handling of more than a few yards finds the trailer very useful. Movement between flightline and maintenance shops again brings it into play. True, the helicopter may sometimes be flown for such movements, but often it can not, and in the latter case the trailer is a necessity. Only two persons are required, in view of the two scissors type jacks mounted on the trailer, and the vehicle when loaded can negotiate ground far rougher than is possible using the ground handling wheels of the aircraft itself.

There are certain precautions which should be observed. A minimum of two people should be used at all times while loading or unloading aircraft from the trailer. However, two people are adequate. The tug, jeep, or other towing vehicle should be disconnected from the trailer before loading or unloading the helicopter. The trailer can easily be manipulated by hand by one man. The terrain should be level where the aircraft is loaded or unloaded. If the terrain is not level special care should be taken to prevent damage to the underside of the cabin or to the cross tubes.

Fabrication of the trailer can be accomplished at most any machine or field maintenance shop where welding facilities are available. Materials required consist mainly of two-inch angle iron, two-inch tubing, heavy service all-purpose industrial wheels and tires, size 6:00 x 9, one-half inch steel plate, and two automotive scissor-type jacks of one and one-half ton or greater capacity. Ground clearance of the trailer frame must never be less than seven and one-half inches. Aircraft wheels can be used if the tire diameter does

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Mr. E. A. Cutchen *is project engineer for the Aeronca Manufacturing Corporation.—The Editor*

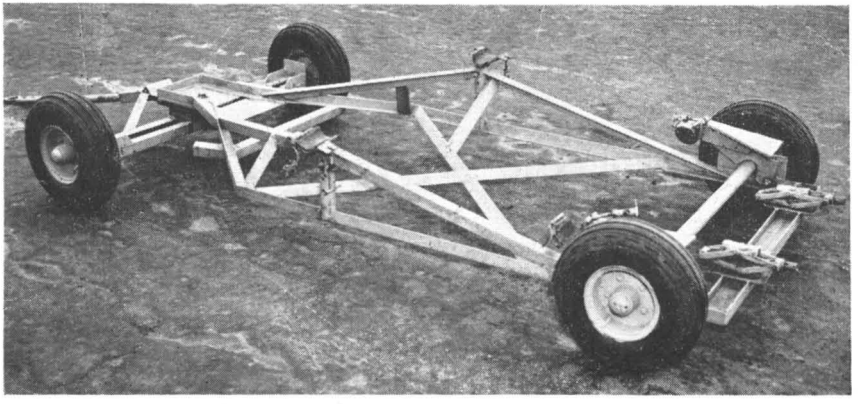

Figure 1

not exceed twenty inches.

A slight modification of the H-13 trailer is necessary to make it adaptable for H-23 type helicopters equipped with the skid-type landing gear. One additional precaution is required, however; the tail rotor drive shaft should be disconnected if the H-23 is to be

(Continued on page 36)

Figure 2

BOOKS

For The Army Aviator

STRATEGY—*Hart, Liddell, B. H. (Frederick A. Praeger, Inc., 105 W. Fortieth St., New York 18, N. Y., 1954)*

Those who have followed Liddell Hart's extensive military writings will have accurate foreknowledge of what to expect in this book. It is a sort of summing up. It combines summarizations of previous historical work, and it is tied together at the end by several chapters dealing with policy, grand strategy, and tactics. There is nothing essentially new about the subject matter nor the treatment.

Sometimes it has seemed that Liddell Hart's search for examples of the "indirect approach" has led him to work backward from success and to find indirectness where he wished it. The theory of the indirect approach would appear of much less help to a general than would combinations of movement and surprise. Strategy was formerly defined in our Field Service Regulations as the movement of armies in the theater of operations to increase the probability of victory to enhance the consequences of victory and to minimize the consequences of defeat. This puts strategy clearly within the sphere of the art of the general, and gives the general a clear picture of his function.

World War II shed a good deal of light upon Liddell Hart's theory which he has stated many times before, and restates in this book. World War II illustrated that the blockade, perhaps either naval or air, is effective in direct proportion to the strain put upon industry by the war effort. Thus, the British failure to support the Western Front in World War II very nearly led to disaster, and this mistake was only retrieved by the German folly in entering the Russian campaign. They thereby put the necessary strain upon their own industry themselves. Consequently, the air blockade became increasingly effective.

Mobility is the key to strategy and, at present, some ground soldiers at least are looking to their own aircraft to give them the mobility which is required to match present firepower.

A FLIER'S WORLD—*Langewiesche, Wolfgang (McGraw-Hill Book Company, Inc., 330 W. Forty-second St., New York 36, N. Y., 1950. $4.50)*

A FLIER'S WORLD will appeal to everyone who has ever felt an inner lift from watching a plane in flight. Wolfgang Langewiesche, one of America's foremost test pilots, has that rarest of writer's gifts—the ability to make you actually live his subject. You can experience through his words the feel of flying. He explains the world of aviation and the experiences that fliers go through in such a way that both the reader who has never left the ground and the experienced pilot is stimulated to a new appreciation of the air world.

He takes the interrelated scheme of things that is flight and translates it into terms that everyone can understand. He first explores some of the basic laws of flight—what makes an airplane fly, why we do not fly higher or faster than we do, what instrument flight is like. Langewiesche discusses the mental adjustments that make the earth-habituated animal at home in the air. He explains factors which make the weather and how the winds that blow straight up affect planes and chicken hawks.

In presenting a pilot's view of the world, the author makes you feel what it is like to come upon lonely Gander, Newfoundland after hours over bare northern wastelands. You see what the leaning tower of Pisa looks like over the wing tip. You realize that the greater part of the world is desert or mountain or jungle or ice or ocean, and the little man-made cities and frontier "boundaries" are only a very small part of the earth. In the final section of the book you see what the United States looks like to a flier—how the design of the American landscape as seen from the air is a design for independent men.

Langewiesche says that most scientific explanations are dull; but when they aren't: "There's a little electric spark that jumps, some place inside you, the moment you really understand something. It feels good. Watch for it." Presenting in startlingly clear terms what it is like to fly, the principles behind flight, the new horizons opened up by flying, "A Flier's World" is an intensely interesting

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Book reviews are compiled by the ARMY AVIATION DIGEST staff. Views expressed are not necessarily those of the Department of the Army or of The Army Aviation School.—The Editor

adventure in the new world of flight.

ACROSS THE HIGH FRONTIER — *Lundgren, William R. (William Morrow & Company, Inc., 425 Fourth Ave., New York 16, N. Y., 1955. $3.75)*

In the star-studded history of American aviation three individual achievements stand out from the rest—the Wright brothers at Kitty Hawk, Lindbergh's crossing the Atlantic, and Chuck Yeager's breaking the sound barrier. Here for the first time is the complete account of this third pioneering achievement—swift-paced, many-faceted, immensely readable.

This is the story of an airplane—the X-1—from the time it was just a gleam in the eye of Robert Woods, chief design engineer at Bell Aircraft Corporation, through all the thousands of stages of design, manufacture and testing that go into the making of a pioneer plane. Then, after months of deliberation, Colonel Albert Boyd picked Yeager as the man for the job ("the coolest pilot I've ever known," Dick Frost, Bell project engineer, later said). And so plane and pilot came together to accomplish the feat for which the X-1 had been built.

It is also the story of Yeager's life—his childhood, his marriage, his wartime career as a fighter pilot and his dramatic escape from the Nazis, his experiences as an experimental test pilot—and his momentous victory in the air when he became the first human to crash through the sonic barrier. Until Chuck Yeager's epoch-making flight in October 1947, no one knew—even theoretically—what would happen to plane and pilot at the moment they reached the speed of sound . . . many believed that in that instant the careening plane would be crushed to bits . . .

Finally, this is the story of a test pilot's devoted family—and the quiet heroism of his gallant wife, who shared with him all the anxiety and nerve-racking tension that inevitably accompanied his job.

There is warmth, humor, and real excitement in "Across The High Frontier," plus a tremendous insight into the newly discovered world of supersonic aviation.

(AERIAL VEHICLE TRANSPORT FOR—*continued from page 12)*
snow-filled roads is restricted and sometimes impossible. None of the above weather conditions except the fog and icing conditions restrict helicopter operations, and equipment will be developed which will enable helicopters to operate with fog or zero-visibility conditions at the surface. If the ceiling is as high as 200 feet, helicopters can continue to operate in a normal manner. De-icing equipment, now being researched, will also permit them to operate in extreme cold at lower or higher altitudes. High winds do affect helicopter operations, whereas they do not affect truck operations. However, winds are helpful to helicopters almost as often as they are harmful; it is seldom that winds prevent helicopters from flying.

The present state of the science of helicopter development in comparison with motor vehicle development is such that helicopters require more maintenance and the cargo capacities are not yet as great as those of trucks. However, helicopter maintenance is being reduced and should continue to be reduced just as this has happened in the past with trucks and airplanes. Correspondingly, the cargo capacity of the helicopter is increasing and may exceed that of the truck just as the capacity of the airplane has been developed to exceed that of the truck.

Conditions of air superiority do not affect helicopter transport any more than they affect truck transport, and experience will probably show that helicopters are much less affected than trucks. Losses in combat units equipped with either aerial vehicles or ground vehicles must be expected when enemy aircraft control the sky, but ground combat units can still continue to function and carry out their missions.

Economies of Organic Transport

Tables 1, 2, and 3 illustrate the striking savings in transport equipment costs and operating personnel possible with organic helicopter transport. There is another important area of economy: the reduced construction and maintenance costs for facilities and the reduced personnel costs with organic transport as opposed to separate transport.

The operating cost of helicopters has caused considerable discussion. It is well known that the direct operating cost of helicopters is greater than that of airplanes. The direct operating cost of a

AIRCRAFT COST COMPARISON
(Estimate)

HELICOPTER TRANSPORT REQUIRED EQUIP AIRPHIBIOUS FA FIRING UNIT					ADDITIONAL HELICOPTER TRANSPORT REQUIRED AIRLIFT VEHICLES 105 TRUCK-DRAWN FA BATTERY (Not Within Capabilities of Helicopters Now Available)									C-123 ASSAULT TRANSPORT REQUIRED AIRLIFT 105 HOW TRUCK-DRAWN BATTERY
Hcptr		*Cost*		*Total Cost (Millions)*	*Vehicles*			*Weight (lbs)*	*Hcptr Required*			*Cost (Millions)*		
8-Rcn	@	$ 30,000	=	$ .24	7-¼T	@	2,400	16,800	4-3T	4	@	$ .35	=	$ 1.4	TOTAL WT: 346,000 LBS
10-Util	@	130,000	=	1.30	6-¾T	@	6,000	42,000	6-4T (Not available)	6	@	.50	=	3.0	REQUIRE: 22 C-123
10-1½T	@	250,000	=	2.50	11-2½T	@	13,000	143,000	11-8T (Not available)	11	@	1.00	=	11.0	COST: $16.5 MILLION
13-3T	@	400,000	=	5.20	11-Trailers			15,000	3-3T	3	@	.40	=	1.2	Operations limited to airfields or other selected areas.
				$9.24				216,800						$16.6	

Total Wt (Equip & Pers) — 99,120 lbs
NOTE: ONE (1) B-52 COSTS $8 MILLION

Aircraft Costs				*Aircraft Loads*
C-123 —	$ 750,596	H-19	$133,692	C-123 — 16,000 lbs
C-124 —	2,813,887	1½T Hcptr —	250,000 (Est)	C-119 — 16,000 lbs
H-13 —	30,387	3T Hcptr —	350,000 (Est)	C-124 — 50,000 lbs

Table 1

PERSONNEL REQUIREMENT COMPARISON
AIRPHIBIOUS FIELD ARTILLERY FIRING UNIT
(Estimate)

1. Personnel required for operation and maintenance of trucks for a truck-drawn FA battery equipped with six 105-mm howitzers	24 men
2. Personnel required for operation and maintenance of airplanes to airlift a standard truck-drawn FA battery equipped with six 105-mm howitzers (approximately 1/3 Air Force troop carrier wing) . .	1,000 men
3. Personnel required for operation and maintenance of helicopters to airlift a standard truck-drawn FA battery equipped with six 105-mm howitzers (approximately one Transportation Corps helicopter battalion)	400 men
Note: Not within capabilities of units with available types of helicopters; equipment loads exceed helicopter capacity.	
4. Personnel required for operation and maintenance of helicopter transport of an airphibious FA firing unit equipped with six 105-mm howitzers	143 men

Table 2

convertiplane might reasonably be expected to be more than that of a helicopter. The airplane is, however, a somewhat more simple device than the helicopter, and the convertiplane is somewhat more complex than the helicopter.

In military operations, these relationships are not necessarily the same for *indirect operating costs*. In fact, the indirect operating costs concerned with airplane transport are much greater than those for helicopter transport. These large indirect costs for airplane transport perhaps more than equalize the higher direct operating costs for helicopters.

First, let us consider some of the indirect costs involved with ground transport. Ground transport requires roads. Track vehicles,

AIR TRANSPORT REQUIREMENTS AND COST

FA BN 105-mm HOW
SP, ARMD (FM 101-10)

(Strength 643) (18 How) Total Wt: 1,527 tons	(Strength 676) (18 How) Total Wt: 911 tons	(Strength 1184) (18 How) 508 more pers than Bn
Air Force Req	*Air Force Req*	
Acft — *Cost* 49-C123 — $ 36.8 46-C124 — 129.4 $166.2 Mil	*Acft* — *Cost* 90-C123 — $67.6 1-C124 — 2.8 $70.4 Mil	*Acft* — *Cost* 43-Rcn — $ 1.3 42-Util — 5.6 44-1½-ton — 11.0 59-3-ton — 20.7 188 Total — $38.6 Mil
Pers Acft Opn 2 Tp Carrier Wings— Approx 6000 men	*Pers Acft Opn* 2 Tp Carrier Wings— Approx 6000 men	*Pers Acft Opn* Off — WO — EM — Total 12 — 295 — 335 — 642
TC Hcptr Units Not within capabilities using hcptr available or projected.	*TC Hcptr Units* Not within capabilities using hcptr available or planned production.	*TC Hcptr Units* 1 TC Gp (Hcptr)-1500 men (Est) & 189 Hcptrs Not furnish types of hcptrs in quantity required.

Cost

C-123 — $ 750,596
C-124 — 2,813,887
H-13 — 30,387
H-19 — $133,692
1½-ton Hcptr — 250,000 (Est)
3-ton Hcptr — 350,000 (Est)

Loads

C-123 — 16,000 lbs
C-124 — 50,000 lbs

Table 3

and sometimes trucks, require rail or truck transport for movements of considerable distance. For over-water movement, port facilities and equipment are required for loading and unloading. Depending on the proposed tactical mission, vessels of various types must be available to move ground transport equipment across the water.

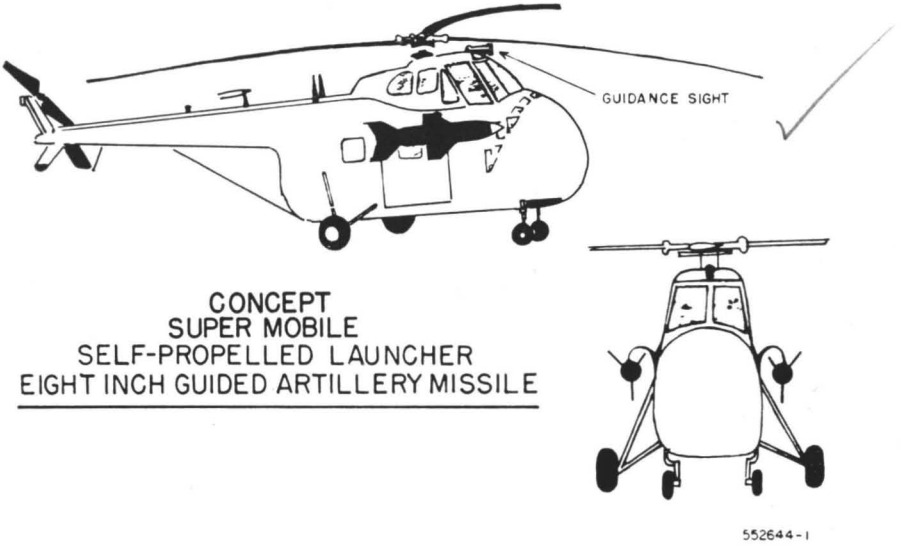
Now, what are the indirect costs involved with airplane transport? Airplane transport requires landing fields of varying magnitudes of size and cost. Further, using an airplane does not do away with ground vehicles because wherever the airplane takes off or lands, the cargo must be loaded onto a vehicle for movement to a more forward loading point or to final destination. Roads are still required for ground vehicle movement of cargo to and from the airfield.

It would seem that helicopter transport requires practically none of these additional facilities or indirect operating costs. Helicopters can operate from any small open area. They can load cargo at the point of departure and unload it at the ultimate destination. The magnitude of these indirect costs for other means of transport perhaps equalizes, or may even more than equalize, the higher direct operating cost of helicopters utilized in tactical military operations. In addition, there are the factors of saving time and increasing operating effectiveness, which alone appear to justify the utilization of the higher-cost equipment. A helicopter costs more than a truck or an airplane, but, when all the cost factors concerned with land combat operations are considered, helicopter transport may be found more economical than either vehicle or airplane transport. The trucks that we use today cost considerably more than horses, but the Army discarded horses years ago because in the overall picture, trucks became more economical and efficient.

Supply with Helicopter Transport

In utilizing organic helicopter transport, it appears that food, ammunition, POL, and other supplies required by the artillery in combat could readily be obtained directly from depots or supply ships at a distance of at least 100 miles from frontline positions in the same length of time that such items are now received by motor transport from forward supply points located only 15 miles to the rear. In some cases, depot supply ships might be anchored off shore and helicopters landed on deck to load and transport supplies directly to frontline troop positions. During the Korean operations,

casualties were evacuated from the frontlines directly to hospital ships anchored in the harbor near Seoul. Depot ships might have particular application in similar combat situations, as in Korea where the fighting moved up the coast and even the most interior units were not over 100 to 150 miles from the ocean. In the Mediterranean area or in Europe, supply ships could follow the movement of combat along the coast, or perhaps navigate the rivers, to keep close to the combat area so that helicopters could always move supplies directly from the ship to units. These procedures, possible

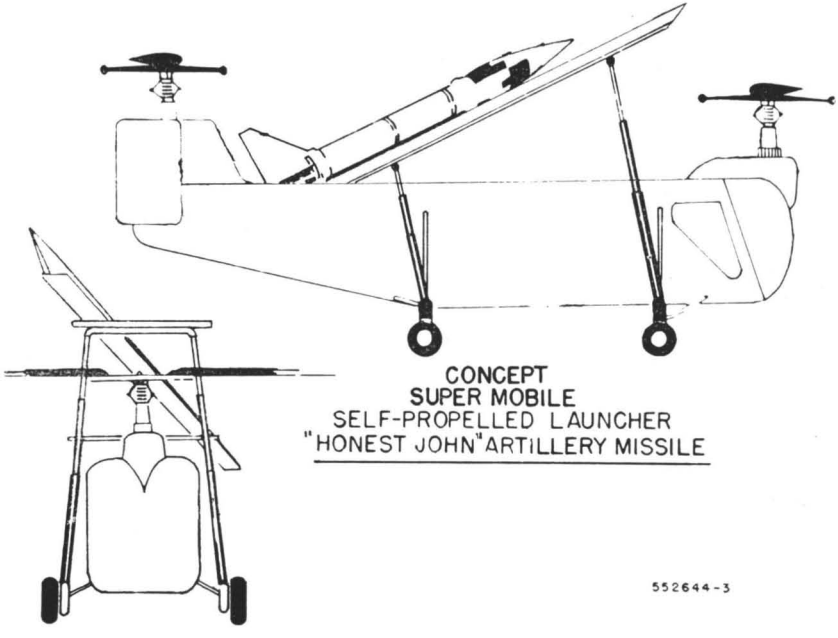


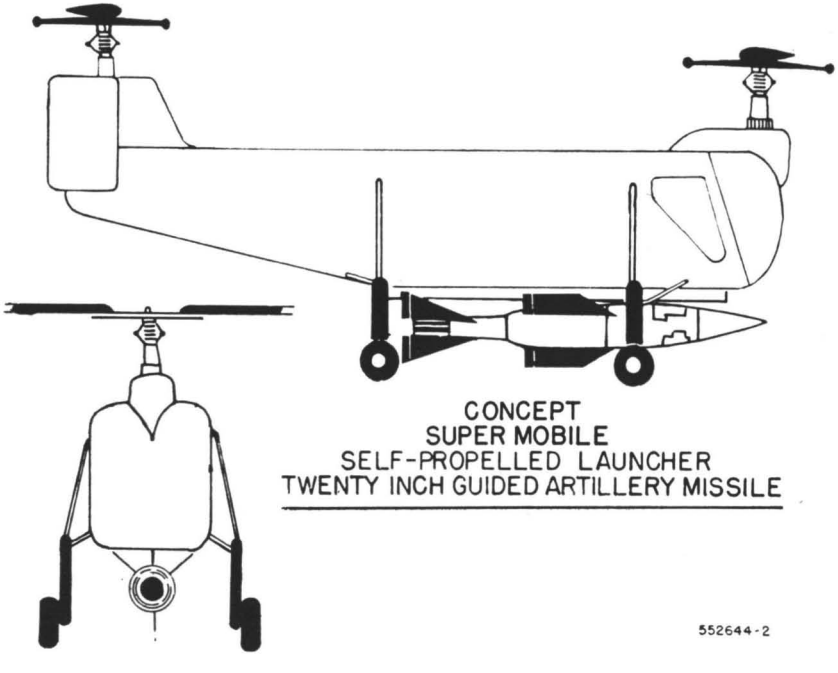
with helicopter transport, would involve a savings in support personnel, transportation cost and time, stock piles of supplies, and certain facilities such as ports, harbors, and railroads.

Future Possibilities

You probably know that The Artillery and Guided Missile School has been developing the techniques of using helicopters as prime movers for the 105-mm howitzer since 1953. Several of our present towed artillery weapons can be transported by a helicopter prime mover instead of a truck or a tractor.

The aerial vehicle also has great possibilities as a self-propelled carriage for artillery missile launchers, as well as other types of

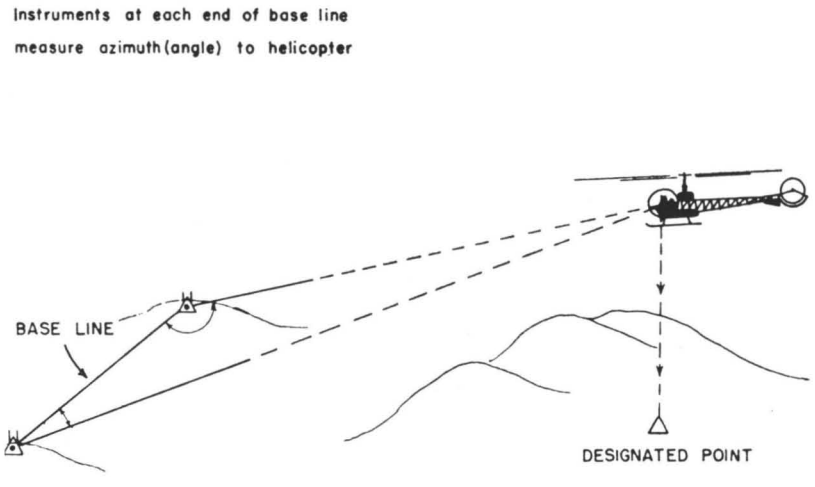

CONCEPT
SUPER MOBILE
SELF-PROPELLED LAUNCHER
"HONEST JOHN" ARTILLERY MISSILE
552644-3


CONCEPT
SUPER MOBILE
SELF-PROPELLED LAUNCHER
TWENTY INCH GUIDED ARTILLERY MISSILE
552644-2

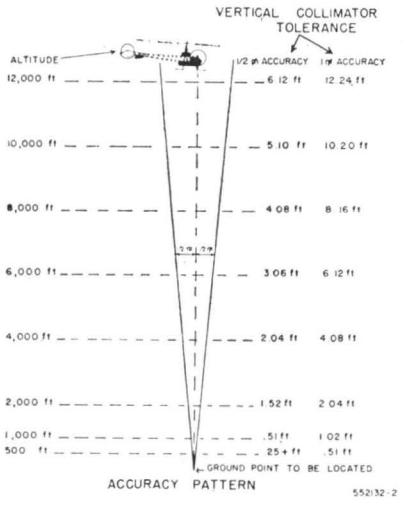
new and standard weapons. It is certainly feasible to develop an artillery helicopter self-propelled missile launcher for the Honest John and other new types of missiles. Concepts of some of the helicopter self-propelled weapons for the future are shown in the accompanying illustrations.

It may be possible to make artillery weapons air-mobile by some of these various methods. This would provide lightweight weapons efficiently transportable by helicopter and suitable for use in airphibious units.

In order to provide new and rapid means of survey and communications for artillery units, it may be possible to develop new equipment and techniques suitable for this purpose. A lightweight device with a high speed reel for use in an aerial vehicle or a ground vehicle to lay or recover wire at high speed would be such a development. Another device which may help facilitate artillery survey operations is a gyroscopic vertical collimator mounted in a helicopter. Figures below illustrate such a device, how it might operate, and degrees of accuracy possible with it.



SCHEMATIC CONCEPT SHOWING USE OF THE GYROSCOPIC VERTICAL COLLIMATOR



These are but a few of the new developments which may be possible in the future. There is unlimited opportunity in this field, and the more people who think about such things and understand them the sooner these capabilities will be realized.

Utilizing aerial vehicle transport adaptable to operation in army combat units, our Army can achieve mobility surpassing that of any other land force in the world. It is hoped that this will come about in the very near future, without the long delays often associated with the acceptance of new concepts.

General Billy Mitchell originated the concept of airborne troops in 1918, just before the end of World War I. General Pershing approved of this idea; but, before troops could be trained for a parachute drop behind the barbwire entanglements of the static front, the war ended. Although General Mitchell proved the feasibility of airborne troops at Kelly Field soon after the war, the concept was not accepted and it was eventually forgotten by the United States. As a consequence, airborne operations first became commonplace in the Russian army. Then the Germans developed airborne troops and, finally, the Americans accepted airborne operations, but not until after the beginning of World War II, some 20 years after the idea was conceived by General Mitchell.

We must not close our minds to new concepts because without them, we have no change, and without change there is no progress.

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(How Far Shall An Instructor—*continued from page 20)*
allow dangerous and unorthodox maneuvers or gyrations to teach flying, then the student has been carried along too fast and is not ready for that maneuver.

Again I say our policy should be to teach the student the correct way to fly rather than to teach him the incorrect way not to fly.

(H-13 Helicopter Trailer—*continued from page 23)*
transported for an appreciable distance.

The large number of reconnaissance-type helicopters in use at Fort Rucker, and the severe use to which these aircraft are subjected, makes these trailers a must for the Army Aviation Center: however, it is believed that any unit, of whatever size, employing two or more reconnaissance-type helicopters will find this trailer advantageous. Detailed drawings have been prepared by Aeronca Manufacturing Corporation, maintenance contractor at Fort Rucker, and are available to any interested Army unit on request. Write to the Commanding General, The Army Aviation Center, Fort Rucker, Alabama, ATTN: Deputy Chief of Staff for Maintenance.

SEVERE WEATHER FORECASTS

Severe storm warnings for both military and civil aircraft now are being issued from Kansas City, Missouri. The military's tornado and severe local storm-warning unit (now called "Severe Weather Warning Center" or SWWC) which formerly operated at Tinker Air Force Base, Oklahoma City, now operates side-by-side with the Weather Bureau Severe Local Storm Center (SELS) at Kansas City. The activities of both units will be coordinated, but SELS will continue to issue the warnings for civil use, while SWWC will carry on the warning service for the military. Eventually, the two units will collaborate in the issuance of a single warning for all users. Major Robert C. Miller is in command of SWWC at K. C.—Flight Safety Foundation.

The Gray Hair Department

WHAT HAPPENS WHEN pilots fail to complete prescribed checks? The following examples show the results of incomplete checks. Failure in these instances cost the Army $50,876.48.

Example 1

A pilot took off in an L-23B on a ten-minute flight to another airfield. He entered the pattern but was unable to contact the control tower (which operates on 126.3 mc), although he was able to contact another Army aircraft in the traffic pattern. The pilot stated that he was certain he put the landing gear switch in the "down" position while on the down-wind leg. Witnesses at the airfield observed the

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Lieutenant Colonel Carl I. Sodergren, *the very senior Army aviator pictured above, is director of the Department of Fixed Wing Training at The Army Aviation School, Fort Rucker, Ala. His aviation experience dates from class number 29, which graduated at Fort Sill in 1943. During World War II, he was Air Officer of the 76th Infantry Division in Europe and subsequently served as Assistant First Army Air Officer upon his return to the ZI. During the Korean War he was X Corps' Artillery Aviation Officer in 1951 and 1952, then served as the First Cavalry Division's Aviation Officer in Japan until his assignment to The Army Aviation School in 1953. In his 13 years of flying he has become qualified in all types of Army fixed- and rotary-wing aircraft in addition to becoming qualified as an instrument examiner.—The Editor*

aircraft on final approach and subsequent landing with the wheels retracted. Inspection of the aircraft immediately after landing indicated that all landing gear controls and warning devices operated normally, except the landing gear warning horn which sounded continuously instead of intermittently. In a statement, the pilot assumed full responsibility for the accident and attributed it to the fact that a hurry-up landing was attempted without a proper check.

Following are the findings excerpted from the accident report:

Primary Unsafe Act: "Failure of pilot to perform the prescribed prelanding check."

Unsafe Physical Condition: "An inspection of the landing gear controls and warning devices after the accident revealed that the landing gear warning horn sounded continuously instead of intermittently as it should. All other landing gear controls and warning devices functioned normally."

Contributing Factors: "An inspection of the aircraft VHF radio after the accident indicated that the radio transmitter channel selector was set on 126.18 mc. . . . [The] . . . control tower receiver operates on 126.3 mc, and normally will not receive 126.18 mc."

Recommended Further Action: "(1) Consideration should be given to providing a landing gear switch identifiable by touch as well as by sight (UR will be submitted). (2) Agencies responsible for training should emphasize habitual use of check lists."

Statement of Reviewing Official: "The Review Board concurs in the corrective action and analysis of the accident by the AAIB. Attention is invited to section 8b (1) of DA Form 285. It is the opinion of this headquarters that more emphasis should be placed on such features as human engineering in an effort to reduce aircraft accidents caused by 'movement of the wrong control'."

Example 2

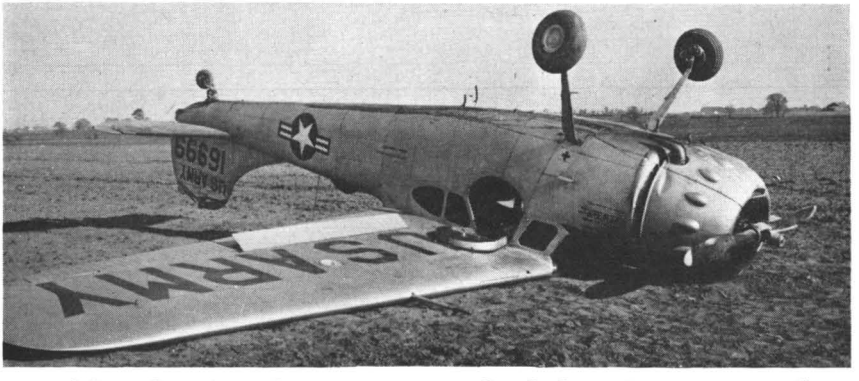
Two pilots were preparing for a routine hooded flight in an LC-126 type aircraft. In the preflight inspection the fuel strainer drain handle was checked to be in the "off" position; however, no fuel was drained from the strainer.

After the preflight inspection, but before the engine had been started, a set of orange Plexiglas was installed over the windshield.

The Gray Hair Department *is prepared by the* ARMY AVIATION DIGEST *staff with information obtained from the files of the Army Aviation Safety Board. The views expressed in this department are not necessarily those of the Department of the Army or of The Army Aviation School.—The Editor*

During installation some difficulty was encountered and both pilots changed seats several times while trying to position the Plexiglas.

Approximately 25 minutes after takeoff the pilots noted that the fuel gauges were indicating empty. Having completed an external ground check of fuel tanks prior to takeoff and finding tanks full, it was elected to continue flight. Approximately 5 minutes later, engine failure occurred at an altitude of 4,500 feet. A restart was attempted but failed. During the restart attempt, approximately 2,500 feet of altitude was lost. At this time it was decided to make a forced landing on a dirt road. While on a base leg for the road, it was noted that wires alongside the road made the landing unsafe. At this point it was elected to make a down-wind landing in a large plowed field. Touchdown was executed safely, but on the landing roll a depression in the ground caused the aircraft to bounce, the main gear dug into soft ground and the aircraft nosed over.



After the aircraft came to rest, lead deposits were noted on the bottom of the fuselage. Upon further investigation the fuel strainer valve was found to be in the "open" position.

Following are the findings as recorded in the accident report:

Primary Unsafe Act: "Failure to make proper and complete pre-starting and pre-takeoff checks."

Contributing Factors: "(1) Failure to completely investigate when fuel gauges indicated a rapid diminishing of fuel supply. (2) Failure to select a suitable field into the wind before attempting a restart."

Action Taken to Prevent Further Similar Accidents: "A copy of this report being forwarded . . . for submission of UR regarding redesign or relocation of fuel strainer valve handle currently being used in the LC-126 type aircraft."

Statement of Reviewing Official: "Non-concur in recommendation as there is no evidence to indicate a malfunction of the valve. As indicated in the primary unsafe act, this accident is the result of pilot error in failing to make the check prescribed in paragraph 2-7 'N' of the Flight Operating Instructions for the LC-126 . . ."

Example 3

Returning from a routine flight a pilot, flying a litter-equipped H-13G, entered traffic and started a right descending turn onto base leg. A loud cracking sound was heard. The pilot immediately checked for anti-torque control and upon finding that all controls functioned properly he proceeded to land. Examination after the landing disclosed that the right litter top had come loose and had been blown against the stabilizer bar and main rotor blades. The litter top was then knocked back down by the main rotor blades and swung to the rear where it hung from the aft bungee until the aircraft had landed. Damage to the main rotor blades, stabilizer bar

and litter pod was not to the extent that aircraft could not be flown on a one time flight basis to field maintenance. Bungee was found undamaged, showing that it could not have been fastened in the bottom ring of the litter floor, thus leaving the forward end of the litter top free.

Following are the findings excerpted from the accident report:

Primary Unsafe Act: "Failure of the pilot to properly check the security of the front bungee on the right litter pod."

Contributing Factors: "Pilot fatigue due to extended operations under simulated combat conditions."

Recommended Further Action: "All pilots be given additional training in pilot's preflight check procedures."

Statement of Reviewing Official: "Concur in findings of Board. Corrective action as recommended is considered adequate. No recommended action by higher authority."

Comment of the Army Aviation Safety Board: "This board concurs with the findings of the Aircraft Accident Investigation Board as stated under Item 8, above. Circumstantial but conclusive evidence contained in the report of accident indicates that the pilot on preflight neglected to check the security of the front litter cover bungee cord. This resulted in the litter cover coming loose in flight and damaging the rotors and stabilizer bar of the aircraft."

Soldiers operate radio remote controls that can pilot a TV robot plane up to 40 miles away. The unmanned aircraft sends back aerial views of distant sites, using light TV equipment.

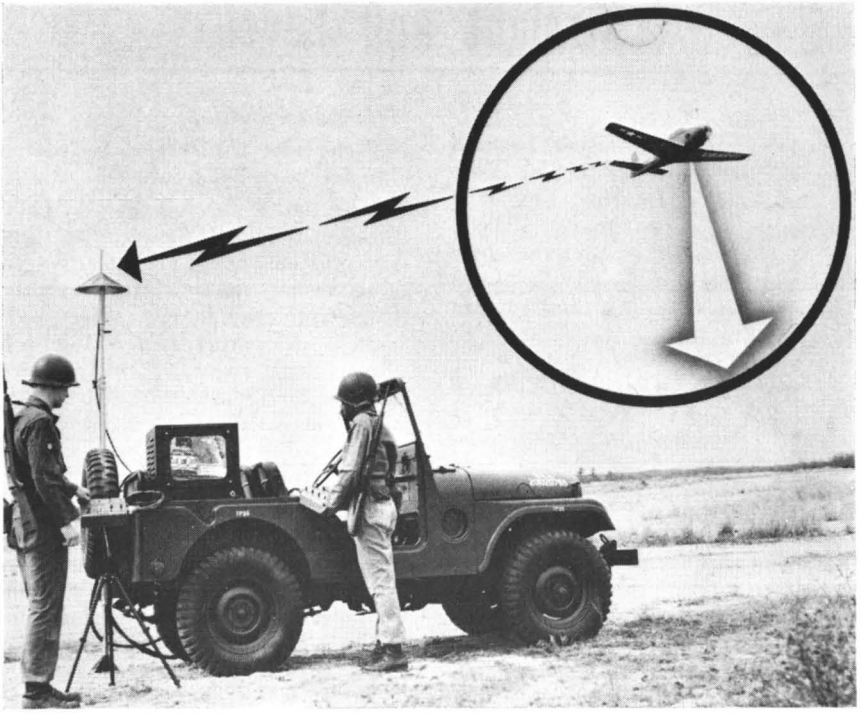
TELEVISION EQUIPPED AERIAL DRONE

A TELEVISION pickup from an experimental aerial drone system designed to aid combat commanders in getting an immediate ground evaluation was recently announced by the Department of the Army.

Live TV shots can be made of strategic territory by using the pilotless system and then broadcast to a ground control station. The converted L-17 planes being used will currently cover a 25-mile area, which later will be augmented by using radar.

Results will be "instantaneous for immediate ground evaluation" with unlimited potentialities according to Signal Corps Engineering Laboratories' scientists.

The pilotless system consists of an L-17 modified for television photo-drone operation; an auto-pilot which provides effective remote



A camera, mounted in an L-17 drone, can point downward or forward through the plane's belly. The ground remote control unit can aim and focus the aerial camera.

control by means of on-off type radio signals; and a ground control station that can be carried in a jeep.

Signals transmitted from the ground station to the L-17's 42-pound auto-pilot regulate stability, altitude and airspeed. Complying with remote commands, the aircraft will perform a scheduled climb or glide. Special control provisions prevent stalls, overspeeding, excessive loss of altitude and other hazardous conditions.

When the drone's mission is completed, the ground controller flicks on "approach" switch which automatically positions landing gear, flaps, prop pitch and power in proper sequence for landing.

The 250-pound ground station is weather and shock resistant. It includes radio links for commanding the drone and for communicating with a safety pilot. Still photos may also be made using this system.

Straight and Level

TO: Editor-in-Chief

...Current distribution list authorizes one copy per fort or camp in the Zone of Interior. This post currently has approximately six (6) air sections or units and therefore this unit has little opportunity to view this *Digest* and it does contain information that is very useful to this unit.

EDWARD A. STEWART
Captain, TC
Commanding
580th Transportation Co.
Fort Bragg, N. C.

TO: Editor-in-Chief

...We do not get sufficient distribution for everyone to see a copy. In fact, on some issues we do not get any copies. Can we get an increase in distribution?...

HAROLD SMITH
1/Lt, USAREUR

TO: Editor-in-Chief

...Can some arrangements be made so that we can get enough copies of the *Digest* in our air section? Currently we get one and it gets lost before 19 pilots have seen it....

CHARLES LANGFORD
Captain, Korea

Beginning with the May issue, Digest distribution was increased by Department of the Army from 3,200 to 6,000 copies per issue. This should give everyone directly concerned with Army aviation access to a copy. —The Editor

TO: Editor-in-Chief

Reference TM 1-1L-19A-1, dated Jan 55, page 23, figure 2-4.

The figure 2-4 indicates to chop throttle to idle RPM on down-wind leg, and off course clearing the engine every thirty (30) seconds. Our experience in Korea has been that if this procedure is followed during the extreme cold winter months, the cylinder head temperature gauge drops down out of the normal operating range (Green) which produces an undesirable situation.

In case of a missed approach necessitating a go-around the reapplication of power to the cold cylinders presents a dangerous condition. To correct this, most aviators here are maintaining 1500 to 1700 RPM's in the traffic pattern to retain the cylinder head temperature in the green and chopping the throttle just prior to landing.

Your comments please.

PETER L. STRENNEN
Major, Infantry
Aviation Officer
Korea

This procedure seems to be unwritten SOP in cold weather operations with the L-19. How about a word on it from the boys in Alaska?

Letters of constructive criticism are welcomed by the ARMY AVIATION DIGEST. To appear in this column they must be signed.—The Editor

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NG: State AG (10)

USAR: None

For explanation of abbreviations used see SR 320-50-1.

ARMY AVIATION SCHOOL CREST

When reproduced in full color, the colors red, blue, and yellow are used in the crest to indicate representation of all branches of the Army in The Army Aviation School. The school's aviation training mission is symbolized by the perched falcon denoting the art of falconry with its patient training of swift, keen birds for hunting. The mailed fist depicts the military ground arm which exercises the control, training, and direction of the flight.