JANUARY 1965

UNITED STATES ARMY AVIATION DIGEST

UNITED STATES ARMY AVIATION DIGEST

JANUARY 1965 VOLUME 11 NUMBER 1

DIRECTOR OF ARMY AVIATION, ACSFOR
DEPARTMENT OF THE ARMY
Brig Gen John J. Tolson, III

COMMANDANT, U. S. ARMY AVIATION SCHOOL
Maj Gen Clifton F. von Kann

ASST COMDT, U. S. ARMY AVIATION SCHOOL
Col Robert F. Cassidy

EDITORIAL STAFF

Capt Richard C. Anglin
Fred M. Montgomery
Richard K. Tierney
William H. Smith
Diana G. Williams

GRAPHIC ART SUPPORT

H. G. Linn
H. A. Pickel
D. L. Crowley
A. Lofe

USABAAR EDUCATION AND LITERATURE DIV

Pierce L. Wiggin
William E. Carter
Ted Kontos
Charles Mabius

CONTENTS

The mission of the U. S. ARMY AVIATION DIGEST is to provide information of an operational or functional nature concerning safety and aircraft accident prevention, training, maintenance, operations, research and development, aviation medicine, and other related data.

The DIGEST is an official Department of the Army periodical published monthly under the supervision of the Commandant, U. S. Army Aviation School. Views expressed herein are not necessarily those of Department of the Army or the U. S. Army Aviation School. Photos are U. S. Army unless otherwise specified. Material may be reprinted provided credit is given to the DIGEST and to the author, unless otherwise indicated.

Articles, photos, and items of interest on Army Aviation are invited. *Direct communication is authorized to: Editor-in-Chief, U. S. Army Aviation Digest, Fort Rucker, Alabama.*

Use of funds for printing this publication has been approved by Headquarters, Department of the Army, 27 November 1961.

Active Army units receive distribution under the pinpoint distribution system as outlined in AR 310-1, 20 March 62, and DA Circular 310-57, 14 March 63. Complete DA Form 12-4 and send directly to CO, AG Publications Center, 2800 Eastern Boulevard, Baltimore, Md. For any change in distribution requirements, merely initiate a revised DA Form 12-4.

National Guard and Army Reserve units submit requirements through their state adjutants general and U. S. Army Corps commanders respectively.

LETTERS

Sir:

I have just received the October 1964 issue of the AVIATION DIGEST, which you so courteously forwarded, and your letter. It is indeed a timely and well written article that appears over my name. Were I, in fact, the author of this fine piece of writing, I would be quite proud to admit it. I merely reviewed and forwarded it. How the mixup in authorship occurred I can only imagine.

If you will call the Department of Tactics, I am sure they will give you all the particulars of authorship and other details. I am genuinely sorry that I, through some administrative or other error, might have been the cause of some embarrassment to you and your fine publication. Please write or call me if I can furnish more detail or be of service in any way.

HARMON HOWARD
Lt Col Arty
Omaha, Neb.

● *The mixup occurred during review of the article, The M-6E3 before submission to the DIGEST for publication. Belated credit goes to CWO Billie J. Long, Armament Div, Dept of Tactics, USAAVNS.*

Sir:

I have just finished reading an article in the AVIATION DIGEST, October 1961 issue, concerning the Army Flying Hour program, written by Victor J. Schulte, Jr.

I think this article is a very good one and perhaps it should be reprinted with the needed changes to some of the referenced TM, AR, and SB.

I feel that the information contained in the article would be of great interest to many maintenance officers here in Korea, where we are always overflying the program and feel the pinch of the parts shortage that is aggravated by this practice as well as normal supply shortcomings.

SP/5 JAMES H. SHOEMAKER
59th Aviation Company (Corps)
APO 358
San Francisco, Calif.

● *Copies of the October 1961 DIGEST are available on request.*
—Editor

TAN SON NHUT, Vietnam — The Army Aviators of the United States Army Support Command, Vietnam, do their job effectively, reliably. They can be expected to be there when needed. This is ordinarily their most lavish compliment. However, a letter was written by the Senior Advisor, I Corps Army Advisor Group, Da Nang, Vietnam which says much that is often left unsaid.

Maj General Delk M. Oden, USA
Commanding General
United States Army Support
Command, Vietnam
APO 143, U. S. Forces

Dear General Oden:

I just thought I would drop a line to put down on paper the things I have been thinking. These young pilots of yours are terrific.

You know, we who have a job to do tend to take for granted that those who support us have a job to do and they will do it, regardless. We tend to forget, sometimes, that they have feelings, fears that are at their heartstrings and nerves.

I shall never forget one of them, the night before his rotation. A formation for decorations, a big party at the club, when the call came in, a Special Forces flight, medical evacuation and ammunition resupply, Huey escort was necessary. None of the new people knew the area, so away he went. The look on his face shook me, but he went, fought well, and returned. Yes, we take it all for granted.

Your young pilots are always ready day or night. Nothing but service lies before them. You should be proud of them, all of them, fixed (wing) or rotor (helicopter). I just wanted you to know you have a satisfied customer.

JOHN H. WOHNER
Colonel, Infantry
Senior Advisor

Sir:

In the September edition of your magazine appeared an article, "Indications of Leadership," by a Captain R. B. DeFrance. As a Senior Army Aviator I would like to take issue with this article.

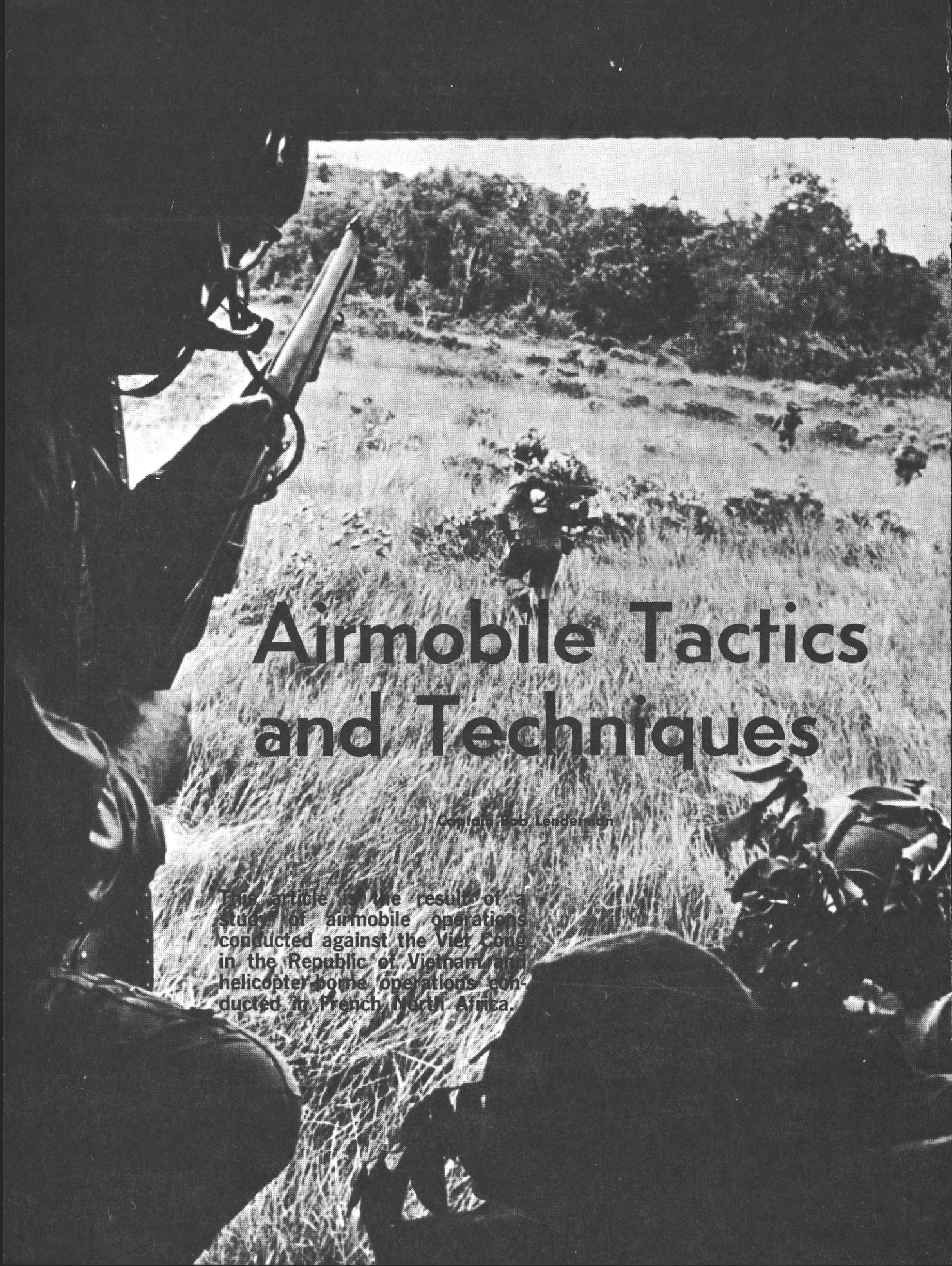
First of all, until I read it in Captain DeFrance's item, I'd never heard his trite comment that, "Army Aviators are bred in pinochle games and born at the Officers' Club bar." I've asked several other aviators if they had heard this and received a flat "NO" for an answer. His comments pertaining to uniform, esprit, etc., give me the idea that Captain DeFrance has either served in some rather slip-shod units or has flown very little at all.

Why he concludes that military discipline and etiquette are forgotten by aircraft crew members is beyond me. I've been flying for a number of years and have come to just the opposite conclusions.

My experience, including North America (United States, Canada and Alaska), Europe, Far East and Mid East, as a TO and TD Aviator, Operations Officer, S3 and commander of aviation units and non-aviation units, has developed very definite ideas in my mind. One of these is that any man who initially puts forth the extra effort required to be an Army Aviator will continue to put forth this same initiative, effort and energy in all other areas of endeavor. He dresses better (more soldierly, not expensively); maintains a closer rapport with his subordinates and superiors (without sacrificing one iota of discipline); pays far more attention to important details (without nit-picking); and has a far better than average officer's ability to adapt to duty assignments that are new and unfamiliar.

To summarize my reclama to his article — given two officers, of equal rank and service, one of which is an Army Aviator, place both in a situation, staff, command, civil advisor, attache, R&D, etc., that neither has faced before, and — my money is on the Army Aviator every time!

MAJ JACK J. NELSON
Field Test Directorate
Test, Evaluation & Control
Group
Fort Benning, Ga. 31905



Airmobile Tactics and Techniques

Captain Bob Lenderman

This article is the result of a study of airmobile operations conducted against the Viet Cong in the Republic of Vietnam and helicopter borne operations conducted in French North Africa.

IN THE PAST, commanders and staffs have felt that a well planned, well coordinated, and deliberately executed airmobile operation was the answer to the problems that existed in combating a guerrilla force. Far too often, however, results gained from such actions are most disappointing due to intelligence which often proves faulty, inadequate communications, and the elusive nature of the enemy. In many cases planning has been good and the aviation portion of the operation carried out in accordance with sound doctrine. However, upon arrival in the objective area the absence of guerrillas indicates that their intelligence network was excellent, or that our intelligence was outdated.

Some of the fault of these failures is a direct result of the time consumed in slow and deliberate planning. Reaction time may be improved by the preparation of unit SOPs and contingency plans. When time permits, operating procedures and plans should be rehearsed on terrain similar to that in the expected objective area.

Probably the most important element, once a guerrilla force is located, is time. You've got to get to the guerrilla and destroy him before he has a chance to disperse and blend in with the civilian population. The advantages of speed and flexibility afforded by the helicopter are lost when valuable time is wasted in lengthy preparations resulting from a lack of proper planning and training.

When an airmobile reaction force is committed, the problems of command and control are often difficult or impossible to effect through a ground command post. This difficulty may be reduced and more efficient command and control effected through establishment of an *airborne* command post. Maximum authority should be delegated to the airmobile force commander to give him the degree of flexibility required for a rapidly changing situation. *Unity of command must be maintained throughout the operation.*

A detailed map reconnaissance will nearly always be conducted before an airmobile operation. An aerial reconnaissance, especially in a transport helicopter, will alert guerrilla units in the objective area; however, an aerial recon is often necessary to assist the aviators, commanders, and staffs in determining flight routes, landing zones, hazards, and key navigation points.

Alternate routes to and from the objective areas must be determined, as well as alternate landing zones. As many aviators as possible should be familiar with the area to facilitate changes in the plan of maneuver once the operation is under way.

If an aerial reconnaissance is made, it should be made in a type aircraft which habitually flies over the area and is not associated with the actual operation. Care must be taken to avoid revealing the purpose of the flight. One flight over the area without turns or maneuvers at high altitudes may be necessary. Photographs may be used to good advantage in determining whether or not obstacles are present that cannot be detected visually by a high-level reconnaissance.

When planning to terminate the flight at a hover in the landing zone, the reconnaissance simply may need to determine that the area is relatively free of obstacles and large enough to accommodate the number of helicopters being used.

Because of the fast reaction required in these operations and since aerial reconnaissance of any type might alert the guerrillas, often it will be necessary to select landing zones solely through a map reconnaissance. Due to the aviation unit commander's knowledge of aircraft capabilities, selection of landing zones should depend heavily on his recommendations. To provide for contingencies, alternate landing zones should be selected.

In the final selection of landing zones, several important factors must be considered. One is the location of the enemy. Landing directly on the objective should be avoided if it is heavily occupied and defended. Another important factor is the direction and velocity of the wind.

Airborne command and control can enhance mission accomplishment

Capt Lenderman is CO, Officers Candidate School, U. S. Army Infantry School, Ft Benning, Ga.

In preparing for airmobile operations, several flights over objective area by same type aircraft will allay suspicions and avoid revealing purpose of flight

Except in an emergency, the final approach should be made into the wind. However, if the wind is less than 10 knots, the final approach may be made in any direction.

It is extremely important that all possible landing zones within an area of operations be catalogued and designated for possible future use. These landing zones should be given a number or name so that once an objective area has been identified, a corresponding landing zone is readily apparent. Location and designation of these landing zones should be committed to memory as much as possible by all aviators, commanders, and staffs involved in conducting airmobile operations.

Complete encirclement is normally a must for airmobile operations against guerrillas. The most critical phase of this maneuver is the establishment of the initial line of encirclement. This may best be accomplished by use of airmobile forces. An airmobile force may also be used very effectively as a blocking force to cut off escape routes of an enemy force being attacked by friendly forces moving over land on foot, by armored personnel carriers, or other means of ground transportation.

Nap-of-the-earth flying offers the best means of securing the movement of helicopters. However, on long flights the strain of extended nap-of-the-earth flying reduces crew efficiency. Flying so close to the ground also presents a navigational problem for the pilot, and makes the helicopter an extremely vulnerable target over open terrain. A good compromise is to fly above 1,500 feet until 16 to 24 kilometers from the objective area, and then make a rapid descent to treetop level for the rest of the flight. Surprise is retained, the crew can avoid the constant strain of long periods of nap-of-the-earth flying, and the flight is less vulnerable to ground fire. On a short flight, low-level flying can be accomplished all the way from pickup to landing zone, taking advantage of the terrain corridors as much as possible.

Alternate landing zones within operations area should be thoroughly catalogued and committed to memory by all aviators, commanders and staffs involved

Flying above 5,100 feet until within 16-24 kilometers of objective reduces strain of nap-of-the-earth flying, vulnerability to ground fire; does not compromise surprise element

Helicopter armament should be mounted to provide effective area fire coverage during critical debarkation of troops

Multiple lifts into the same landing zone should be avoided when possible. Helicopters normally have the advantage of surprise the first time. But as succeeding flights come in, the probability of engagement by ground fires increases because the guerrilla has been alerted by the first flight.

A control aircraft may be employed very effectively to provide navigational assistance to the air column as it approaches the objective area. The control aircraft employed should be capable of: remaining in the objective area for the duration of the airmobile phase of the operation, marking the landing zones with smoke when required, and communicating with the airmobile force commander and any supporting tactical aircraft in addition to the airlift aircraft. The requirement for navigational assistance to the air column is increased when operating over rugged terrain and at low altitudes.

The use of armed helicopters helps reduce attacks on transport helicopters, and their fires should be employed whenever available. If the decision is made to land the transport helicopters on or close to the objective to achieve surprise, the role of the armed helicopter in protecting

the transport helicopter is particularly significant. The critical phase of such an airmobile movement is the approach, landing, and liftoff in the landing zone.

Some capability should be provided for delivery of suppressive fires from the transport helicopters. This is particularly important when armed escort helicopters are not available. In arming the helicopter, a good technique is to mount a machinegun in one door of the aircraft and station the crewchief with an automatic weapon in the other door. Machineguns should be mounted in different doors among various helicopters so the entire landing area may be covered by machinegun fire in all directions during the extremely c r i t i c a l debarkation phase of the operation.

Because of the nature of operations against the guerrilla and the presence of civilian populace, it is often impossible to distinguish friendly personnel from opposing forces. For this reason indiscriminate supporting fires are not feasible; only coordinated close air support combined with airmobile operations is of value.

Troop training for airmobile operations is mandatory. A familiarization orientation of the helicopter should be conducted by the aircraft crews of the supporting aviation unit. This will involve the use of several rehearsal helicopters. The orientation should include a briefing on safety, emergency procedures, and troop commander responsibilities; practice loading and unloading to include unloading from a hover; an orientation flight; and a critique. At the completion of the instruction and the practical exercise the troops should be capable of conducting a simple airmobile operation without confusion.

Orientation of the troops is a major problem that must be overcome. The troops should be informed by their commander before flight that the objective will lay to their right front, etc. At the moment of touchdown, the crewchief points in the general direction they are to proceed. He, of course, is oriented by the pilot just before touchdown. A second technique is to mount a large compass card made of cardboard with a large black needle to show them the direction of landing. A third and highly desirable technique is to allow the ground commander to ride between the pilot and copilot, looking out the front of the helicopter to maintain his orientation during the flight to the objective.

Troop training, orientation, briefings on safety emergency procedures, command responsibilities are mandatory

Night airmobile operations are feasible during certain phases of the moon which would permit identification of landmarks and obstacles. Airmobile operations are not feasible on overcast or hazy nights, since navigation and termination of approaches would be extremely difficult. This does not preclude the movement of troops from one prepared area to another prepared or semiprepared area that has been reconnoitered.

Upon being alerted that an airmobile operation is either pending or that a decision has already been made to execute one, a liaison officer from the aviation unit should be immediately dispatched to the ground unit that is going to conduct the operation. The primary mission of this officer is to provide assistance to the airmobile force commander in planning the operation. Because of his knowledge of the capabilities and present status of the aircraft, all phases of the planning should be closely coordinated with him. He can be a valuable asset to the ground commander in recommending flight routes, landing zones, loading zones, and many other facets of the operation.

Rotary Wing Armament Training

Major Thomas W. Liliker

A COMBAT commander will most certainly make use of any weapons carrier that has complete mobility, zero to 120 kt airspeed at altitudes from nap of the earth to 12,000 feet over any type terrain. A choice of weapons systems is presently available for this weapons carrier. This includes weapons that

- Can fire 2,200 rounds per minute of 7.62 mm machinegun ammunition with a combat load of 6,700 rounds. An average burst of fire 2 seconds in duration will allow 90 target engagements with 70 rounds per target (UH-1B/M-6).
- Can fire up to 6 pairs (12 rounds) per second of 2.75″ HE rockets with a combat load of 48 rockets (UH-1B/M-3).
- Can fire an antitank guided missile capable of destroying any known armored vehicle with a combat load of 6 missiles and a proved high hit capability (UH-1B/M-22 ATGM).

These weapons systems are authorized, in quantity, to combat element TOEs. Army Aviation units throughout the world are now receiving them.

Do you think first of the vulnerability of these thin-skinned machines? Is their vulnerability greater than that of a thin-skinned soldier when both are employed, using the same combat techniques of fire and maneuver, taking cover in the terrain, stalking targets, etc.? The helicopter may be a bigger target, but its vital areas are no larger than the vital areas of an infantry fire team — the individual soldiers. The greater mobility of the helicopter should more than compensate for its size, if properly employed.

"The weapon is only as good as the man who operates it" is an old Army adage. Training aviators and enlisted gunners will require live firing on ranges. Therefore, when these weapons are assigned, a commander's major training problem is an aerial gunnery range.

Maj Liliker is with the Rotary Wing Suppressive Fire Branch, Aviation Armament Division, Dept of Tactics, USAAVNS.

RANGE REFERENCES

Army aircraft armament range requirements are contained in Appendix I to Annex F, USCONARC Training Directive, dated 13 April 1964, and in paragraph 10k, Army Aircraft Armament (Armed Helicopter Program), dated 11 September 1963, Headquarters, U. S. Army Materiel Command, Washington 25, D. C.

Training circulars published on weapons systems may also contain range requirements, but they are likely to be outdated by instructions contained in the above references.

RANGE REQUIREMENTS

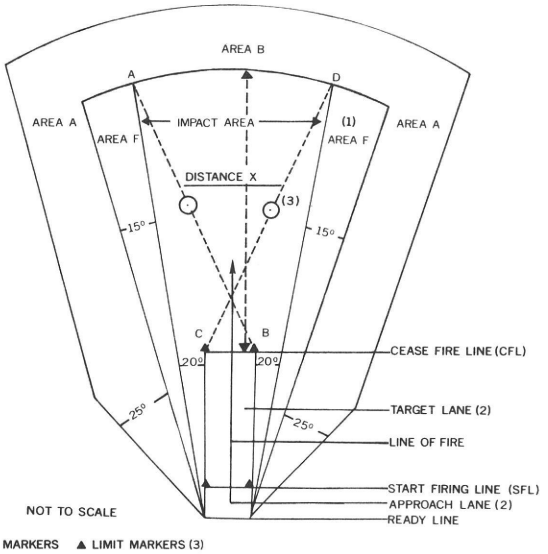
The following data, extracted from the USCONARC Training Directive, Annex F, may be used for information and planning to determine danger zones and safety precautions for use when firing these weapons from helicopters.

The danger zone diagram (fig. 1) is applicable to all the weapons listed below. This table gives the dimensions necessary to complete figure 1 for various ammunition.

Figure 1

1. Area F is not required when firing is conducted from a static position, i.e., aircraft on the ground. The requirement of area F for firing from a moving helicopter depends on the gunner's level of competence. Area F may be eliminated when, in the opinion of the range control officer, the gunner has individually demonstrated ability to keep all impacts within the prescribed area. 2. Dimensions of the target lane and approach lane are not specified. 3. Limit markers may be established on lines AB and CD. Cross firing in the firing lane will be permitted provided all firing is conducted within limit markers. All limit markers must be visible from any helicopter position in the target lane.

HELICOPTER ARMAMENT RANGE DIAGRAM



⊙ LANE MARKERS ▲ LIMIT MARKERS (3)

Weapon	Width A (Meters)	Width B (Meters)	Distance X (Meters)
Cal .30	500	500	3,500
7.62 mm	500	500	4,000
2.75"	500	500	9,200*
40 mm	200	200	2,400
M-22	1,000	1,000	4,900

*May be decreased to 7,360 meters in the event 2.75" rocket motors are at least 4 years old.

RANGE SAFETY

All firing will be conducted under the direct supervision of the range control officer (RCO). Firing will be conducted in the target lane only, beginning at the start firing line and stopping at the cease fire line.

USAAVNS EXPERIENCE FACTORS

The United States Army Aviation School, Fort Rucker, Ala., regularly conducts firing with the M-6, M-22, and M-3 armament systems. Based on this experience, the following additional safety information was developed and subsequently proved valid:

- An average firing lane should be 400 meters wide and 1,600 meters long. Longer ranges are desirable (up to 3,000 meters) if range area is available.
- Since dimensions for approach lanes are not specified, danger zone diagrams with the approach lanes deleted have been used extensively for a 10-month period without any safety problems.
- An ideal firing lane has the start firing line on as nearly level ground as possible, with a minimum 500 meters range area visible from that point. This facilitates boresighting, test firing, demonstrations, etc.
- The average target-firing lane will contain 5-10 targets (fig. 2), which are arranged according to terrain. Target placement on forward slopes and crests of rolling terrain is most practical. For full utilization of a firing run, additional targets are placed down range from the cease fire line out to the maximum effective range of the weapon. Engagement of these targets is discontinued at the cease fire line.
- Danger zone diagrams, to include adjacent aerial gunnery ranges, artillery, and small arms range impact areas, may be overlapped, but the aircraft, flight pattern, and firing lanes of each aerial gunnery range must remain clear of all other impact areas. The establishment of a marked aircraft turn-around line will be necessary to prevent penetration of overlapping range areas.

• Minimum slant range from the helicopter to ground impact is 100 meters for 7.62 mm ammunition, 800 meters for M-22 ATGM, and 300 meters for 2.75″ rockets.

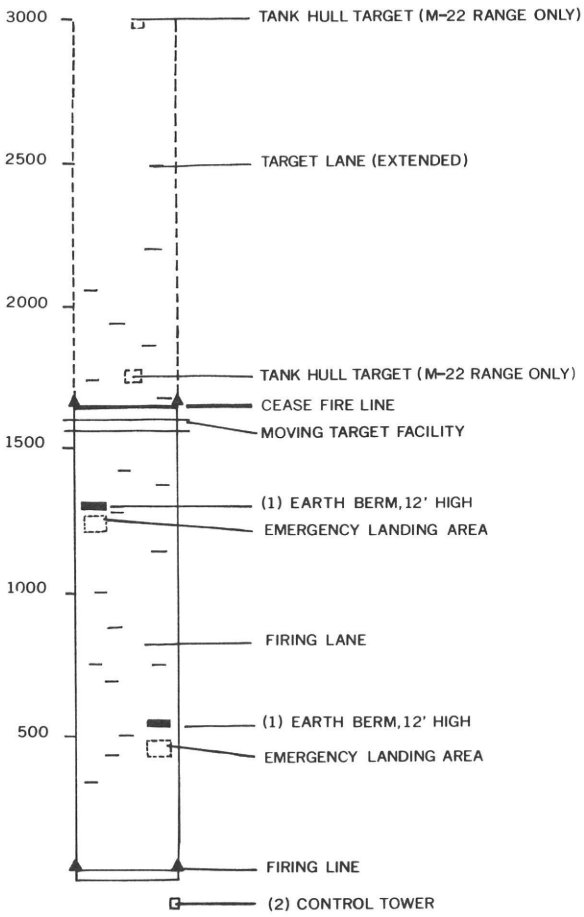
• Fire line markers (fig. 1) are valid only for firing directly from the firing line and can appear misleading to an aircraft down range. Construction of limit markers visible from the firing lane is impractical due to distances involved and screening by average rolling, wooded terrain. The solution at USAAVNS has been to use aircraft compasses in determining the 20° left and right limits from the azimuth of the firing lane. A visual representation of the aerial gunnery impact area is presented by placing markers within 100 to 500 meters from the firing line.

Figure 2

Targets: 10′ x 10′ panels (numbered consecutively), car body targets (painted distinctive colors), or squad formation silhouettes (5 yard interval). Firing lane markers: red painted 10′ triangles made of welded PSP mounted on telephone poles recommended. Earth berms required only on level terrain where natural defilade positions are not available to conduct bobbing fire. Control tower equipment: two-way radio communication (continuous), range telephone line, and emergency warning device.

RANGE FACILITIES

M-2, M-6, XM-3, M-22 (SS-11) ARMAMENT SUBSYSTEMS



RANGE SOP AND SAFETY

The commander's next problem is safe operation of the firing range(s). Traditional Army safety standards for ground firing of light machineguns has usually involved digging in the tripod, driving limit stakes into the ground on each side of the barrel, putting red helmets on the biggest NCOs in the unit and stationing them behind the guns while range officers, with loudspeaker amplification, direct every move.

Problems involved with safe operation of multiple weapons systems, flexibly mounted on multiple helicopters operating at speeds up to 100 kt on aerial gunnery ranges, are not solved by traditional Army safety standards. The safe use of a range depends on a comprehensive unit SOP and the thorough knowledge and compliance by all personnel on the range. The unit SOP should cover in detail the following general areas:

All applicable references.

Definition of terms.

Responsibilities of all supervisory and aviator personnel.

Range briefing for support personnel.

Safety briefings for all personnel.

Sequence of range operations — radio calls, traffic patterns, reports, arming and dearming procedures, etc.

Crash or emergency plan.

LESSON PLANS

Another problem of the commander is the preparation of a lesson plan. The lesson plan should prescribe firing tables, composed of firing exercises as required, which present the major and intermediate steps in the progression of training. An objective type lesson plan, which clearly defines the techniques of firing and aircraft maneuvers, is a necessary part of range safety as well as effective training. Training should progress through individual, unit (team), and advanced unit (team) training.

Master lesson plans for individual training in the M-6 (quad 7.62 machinegun) and M-22 ATGM systems are available. Submit requests on DA Form 17, without letter of transmittal, to:

Commandant, USAAVNS

ATTN: Department of P&NRI

Fort Rucker, Ala., 36362.

MLPs on the M-2 (twin 7.62 machineguns) and M-3 (2.75″ rkt) systems are now in preparation at USAAVNS..

Armament systems for Army aircraft have introduced the problems of adequate training for gunners.

Simulator Training for the M-22 Gunner

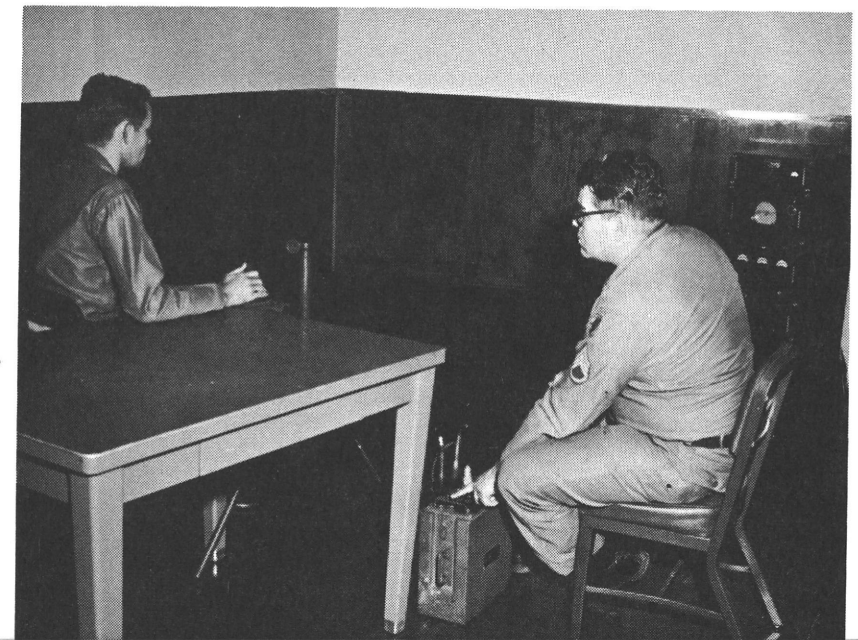
Major Dan R. Smith

ADVANCEMENT in any field usually carries with it new problems to be solved. The concept of the armed helicopter is now a reality. With its coming of age, a new dimension has been added to Army Aviation — armament training.

One of the armament systems on which the Army is currently conducting training is the M-22 antitank guided missile (ATGM). Training gunners in this system poses some unique problems. A high degree of hand-eye coordination is absolutely necessary for success with this weapons system. Furthermore, the cost of missiles is such that the training must be accomplished with as few rounds as possible.

As a matter of economic necessity a simulator is used during the M-22 training program to develop the gunners' skills. Successful completion of simulator training is a prerequisite for the actual firing of the missile. Only those students who prove on the simulator that they have the hand-eye coordination required are permitted to fire the missile. This, however, is not the only use for the simulator. Before going to the range each day, the student is given a warmup period on the simulator. Once trained, the simulator is used by the qualified gunner to maintain his coordination and control touch much as the instrument pilot continues to use the synthetic instrument trainer.

S-55 instructor with student



The simulator used at the U. S. Army Aviation School is the S-55. Basically it consists of an oscilloscope on which is projected a blue dot of light, simulating the flares of the missile. Varying conditions can be programmed into the simulator. These, in turn, require different responses by the gunner, who controls the movement of the dot with a control stick identical to the one used in the aircraft.

Thirty-eight 15-minute exercises are scheduled for the student. During this time his reflexes and control touch are con-

---

Maj Smith is now serving in Vietnam.

ditioned before the firing of the first missile. In addition, the student receives academic and practical training on the weapons system and test equipment and classes on technique of fire and mission planning.

Certain problems are inherent with the use of the S-55 simulator. Eye strain is severe, due to concentrating on the dot of light projected on the oscilloscope. To alleviate this, the student is not allowed more than 15 minutes per hour on the simulator.

Secondly, the S-55 simulator is inadequate from the standpoint of trajectory simulation. A piece of clear acetate with an outline of a target is placed on the face of the oscilloscope. Since the oscilloscope then represents both the target and the missile flare, there is no means to simulate depth. This makes transition from the simulator to the missile somewhat difficult.

Finally, the S-55 simulator cannot accurately simulate the actions of the missile and the effects of gusty winds and turbulence. Varying conditions can be programmed on the S-55; however, once settings are made, they influence the control of the dot in a constant manner until setting changes are made on the face of the simulator.

To assist in bridging the gap from the S-55 simulator to the missile, the Giravions Dorand Company of France has developed the DX-43 simulator. This simulator consists of an optical unit which allows the operator to view actual terrain and a point light source which superimposes a luminous spot of light on the terrain in view, simulating the flares of the missile. Angular movement of the spot of light is made by the operator with a control stick which provides signals through the CS-6 electromechanical computer. The intensity of the spot of light is steadily diminished throughout the preset time of flight, thereby simulating the missile moving away. At the end of the preset time of flight, the spot momentarily brightens, simulating missile impact, then disappears from view.

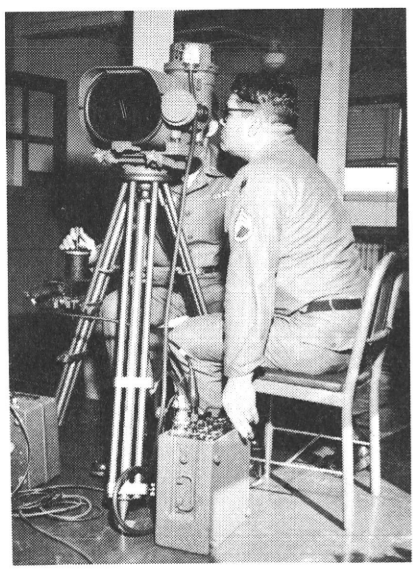
Varying effects of wind and turbulence can be simulated by making appropriate settings on the CS-6 computer. The instructor, who is seated next to the student, can change the settings after each firing, if he so desires, without moving from his seat. A monocular sight on the left side of the optical unit allows the instructor to view the proceedings and critique the progress of the student.

The entire DX-43 system is designed for outdoor use and is sealed against the effects of moisture. Relatively insensitive to shock, the DX-43 is easily transportable and ruggedly constructed. Due to these features, it can be moved around to make maximum use of varied terrain and can be taken to the range to be used for warmup exercises before and critiques after missile firings. It can, additionally, be used indoors without adverse effects by placing it before a window.

The DX-43 has been purchased by the U. S. Army. It is used at the U. S. Army Aviation School and for maintenance of gunner proficiency in units having the M-22 antitank guided missile armament subsystem.

With the realistic simulations possible with the DX-43, it can be anticipated that the problem of transition from the simulator to the missile will be considerably eased. If this anticipation is realized, and higher hit percentages result, it could allow reduction in the number of missiles required for initial qualification and maintenance of proficiency.

DX-43 simulator



The DX-44 is another simulator recently purchased by the Army. It is primarily designed for classroom use. It projects a light (dot) on a screen which may be used with a variety of training films depicting tanks, troops, fortified positions, etc. With the exception of the projector, the rest of the equipment is similar to that used with the DX-43 system.

Even the most basic facilities for transient personnel are nonexistent at many Army airfields.

HECK O

T

ON A FRIDAY night not long ago I received a call to make an early morning flight involving a couple of Code 7s. Rolling out of bed at 0500 I made tracks to one of the Army's busiest airfields to get into the air. Going first class, too — a Seminole F model. At 0545 Ops was asked to have someone bring the plane around. It turned out no one was on hand who could taxi the U-8F. This was no particular sweat, just a matter of a half mile hike down the line.

After the flight plan was filed the crewchief came in, apologizing for being late. The only crewchief for the Seminole, he had worked 18 straight days crewing the plane, including many late and early starts, and had finally gone home the night before at 2230. He left immediately to bring the airplane around while I looked for a coffee machine. No coffee machine in this operations and the field snack bar wasn't open. The crewchief returned to announce a delay to gas the plane. It had not been refueled after returning past midnight. The crewchief said he could get coffee at the mess hall and left, taking a big thermos from the plane.

Looking out the window I could see a gas truck by the aircraft. The crewchief came back and reported no coffee; the mess hall didn't open until 0800 on Saturdays. I took the flight plan back and requested four inflight lunches at destination.

Wheels finally were off at 0700, and 4:15 later I was requesting a GCA at destination AAF only to be informed that GCA was not operating weekends. After a radar vector and descent, we cancelled IFR and landed at the Army Aviation gateway to one of our most important military areas. A 10-minute delay ensued while an alert vehicle was located to guide our aircraft in. Then a short wait while tower debated whether or not our passengers could be picked up on the main ramp. This was finally approved and we parked. As we stopped, the alert vehicle pulled away and left.

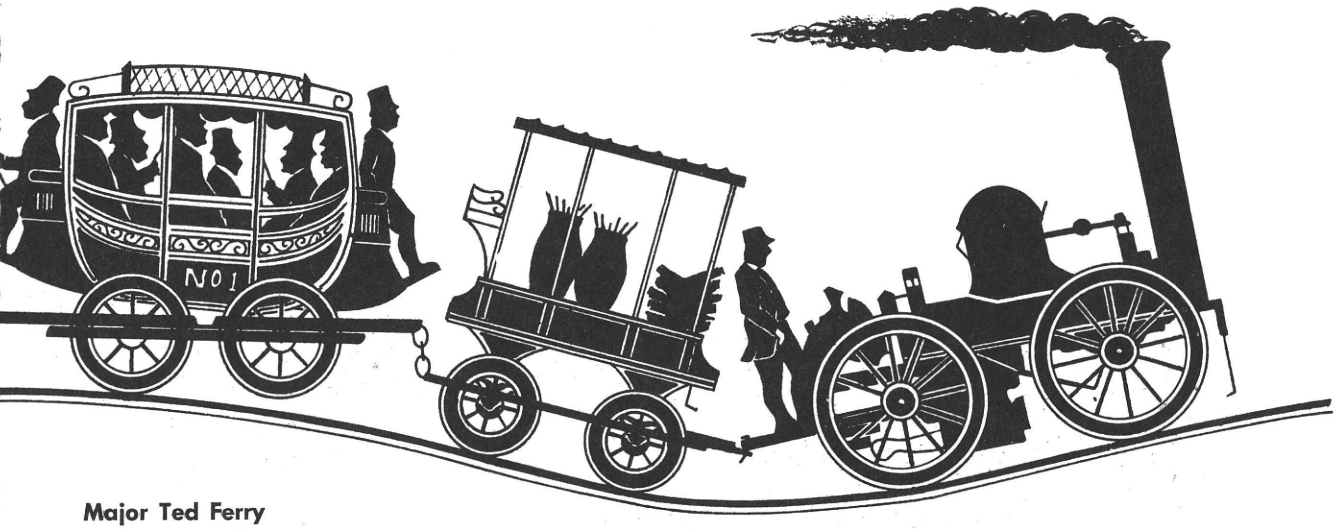
We crawled out of the U-8 and unloaded the cargo. As we struggled towards Ops a GI came and stood in the alert shack doorway. After being called he came over. I mentioned that our number 2 engine was rough on the shutdown check; would he check it? He was a new man, didn't know anything about aircraft, and didn't know where a mechanic could be found. How about refueling? Go to the alert shack and fill out a request for gas and another for oil.

This was considered an improvement over the last time there when alert was changing

---

Maj Ferry is commander, Academics Branch, Dept of Fixed Wing Tng, USAAVNS, Ft Rucker, Ala.

F A WAY
O RUN A RAILROAD



Major Ted Ferry

shifts. That time it took 8 men and 30 minutes to decide who would do the job. Then they found that the gas truck was not grounded and it took another 45 minutes to rig a ground wire on the truck. Today things were different. The alert man would look for a gas truck driver and a U-8 mechanic.

We carried the cargo into Ops and met the passengers. It was explained that a slight delay was necessary while we located a mechanic and refueled. One colonel looked out the window and remarked that there was no mechanic nor refueling truck at the airplane. Operations advised that inflight lunches were not available, this in spite of the fact that more VIPs probably pass through here than any other Army airfield. The other colonel, chief of staff at one of our biggest posts, remarked that this was "a heck of a way to run a railroad."

A sergeant came in, reported smartly, and inquired about our mechanical trouble. In about 15 minutes he returned and reported a broken valve and damage to at least one cylinder. Nothing could be done until Monday and maybe not then, depending on the local workload.

I inquired about transportation to home station for our passengers. Ops said nothing was scheduled in our direction, and he didn't have a schedule for tomorrow, and further he didn't know who did. On inquiring

about a replacement Seminole from the many on the ramp, no one seemed to have authority to consider this. Asking for the CO's telephone number, I was informed that he was on leave and no one could find his deputy. They had wanted the deputy since morning. Looking over the roster of assigned officers, I found the name of an old friend and called him. He offered to drive right out from his home 20 miles away to help. Alert came in with the news that our broken aircraft had been refueled.

Our two "full bull" passengers offered to buy us lunch at the snack bar. "Sorry," chimed in Ops, "snack bar is closed after 1630 weekdays and on weekends."

"Heck of a way to run a railroad," mumbled our passenger again. Besides that, it would take 30 minutes to obtain transportation to get to the snack bar on main post.

Going into the next room for weather information we found that no forecaster was on duty nights and weekends. The sign said to call the forecaster at Flight Service, Lowry AFB, thousands of miles away. (Thought flight service went out years ago.)

"How about weather from the local Air Force Base?"

"No dice," said Ops, "we don't have an agreement with them."

"How about FAA?"

"Not allowed," said Ops.

A turbine whine from outside called attention to a Mohawk taxiing in. We went to the window to watch. He parked, got out, and came in without benefit of an alert man. Turned out to be a transient needing fuel and oxygen. He was informed that they would find a driver for the gas truck, but the oxygen was locked up for the weekend and no one had a key.

"Better than the last time," he remarked. "I had to RON because they were out of JP fuel."

In came my old buddy and, to make a long story short, he found us an airplane and got us on the way in apple pie order. Thank God for old buddies!

The trip back was uneventful. On the ground, wheels were waiting for our passengers (we had called). Our crewchief, who hadn't been informed of the change of aircraft, was also waiting. I suggested a cup of coffee at the mess hall. "Too bad," said the crewchief, "mess hall closes at 1730 Saturdays, and it is almost 1900."

At home my wife thought it was funny when I asked for a bowl of cereal and a slice of toast.

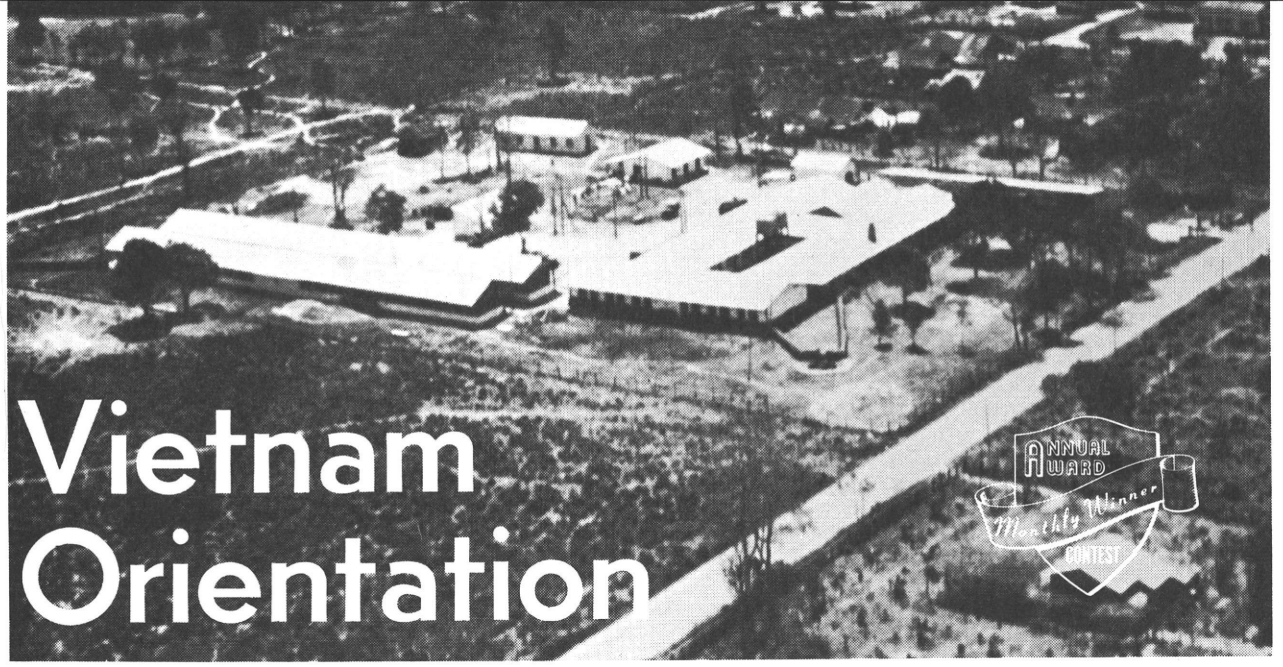
Just a routine flight, a routine frustrating flight. This is the agonizing procedure on too many flights to Army airfields — unless you have an old buddy at the other end to help out.

A few bright spots exist — like one Army airfield where there is now a 24-hour snackbar, or the one where special permission is granted to go and eat in the Officers Club in flight clothes, or the one small field where the tower operator asks every transient if an inflight lunch is desired and then gets it from the mess hall in 30 minutes.

All too often though, the Army Aviation gateway to a post is only a place where service is slow or nonexistent. Food and transportation are not readily available, and even a friendly smile is sometimes hard to come by.

When will commanders realize that the airfield is the front door to their post and the visitor's first impression?

I have to agree with my passenger: It's a heck of a way to run a railroad.



Vietnam Orientation

Army Aviators are well aware of the aviation commitment in the Republic of Vietnam, but little has been published about the peculiarities of an assignment there. This article will acquaint you with the general nature of the country and facts of a personal nature which may be helpful to the prospective assignee.

CWO Donald H. Bishop, Jr.

THE REPUBLIC of Vietnam lies on the eastern edge of the Indochina Peninsula. It extends north - south in the form of an elongated S and is 562 miles "as the crow flies" from the demarcation line between North and South Vietnam, which was set up by the Geneva Convention in 1954, to Pointe De Camau. Width varies from about 40 miles at Hue, the country's narrowest point, to about 210 miles at its widest point, which parallels the Mekong River.

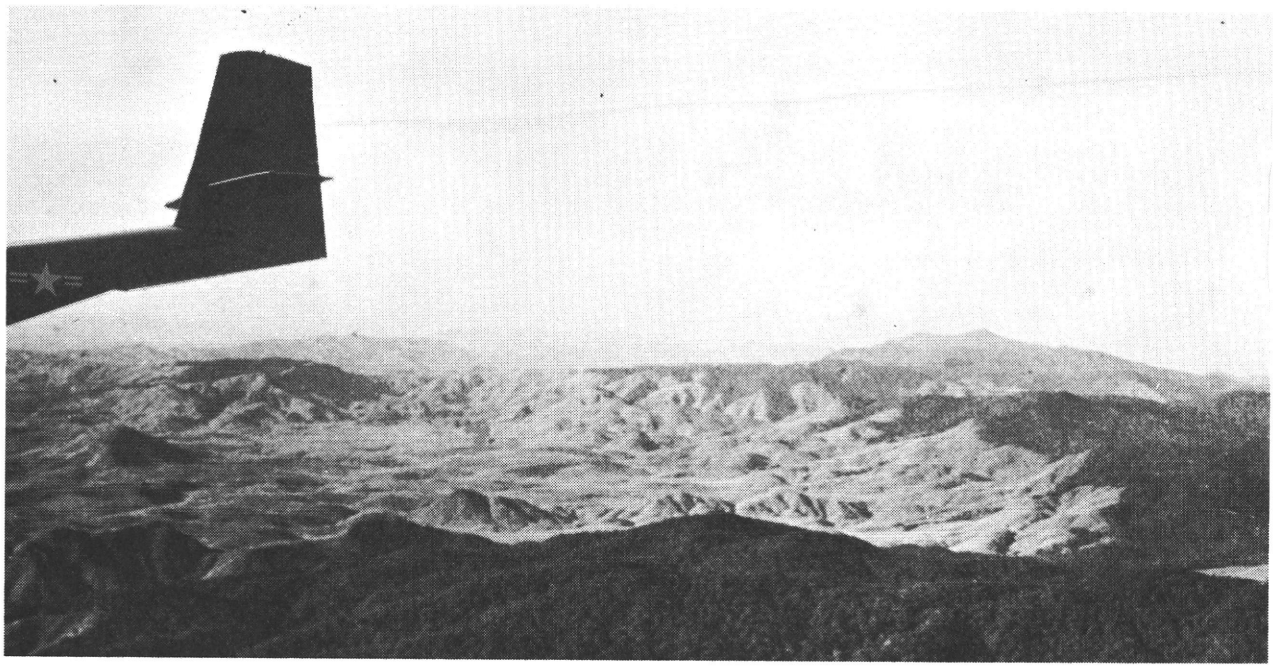
Vietnam may be divided into three main geographic features: delta area, mountain region, and coastal plain. The Mekong River Delta starts a little north of Saigon and extends south to the sea. It is flat, poorly drained land, crisscrossed by tributaries of the Mekong and Bassac Rivers and an intricate network of canals and smaller streams. Elevation rarely exceeds 20 feet above sea level. The area is dominated by rice paddies and mangrove swamps with some jungle areas. Major cities are Saigon-Cho Lon, Bien Hoa, Vung Tau, Vinh Long, Can Tho and Soc Trang.

The Hoanh - Son Cordillera Mountains dominate the country, with peaks rising 5,000 to 6,000 feet. Highest point on the range is 8,443 feet above sea level. The southern section of the range is made up of plateau areas from 1,000 to 3,000 feet above sea level. This area is densely covered with rain and monsoon forests of tropical broad leaf pine and evergreens, with bamboo forests on the lower slopes, interspersed with farms and tea and rubber plantations. The major cities are Pleiku, Ban Me Thuot, and Dalat.

The coastal plain is located on the eastern seaboard. Less than 25 miles wide, its surface is level, densely populated, and intensely

---

CWO Bishop is a Senior Army Aviator presently assigned to the R/W Suppressive Fire Branch, Dept of Tactics, Ft Rucker, Ala.



Missions might be flown over delta or mountainous terrain. Temperatures are mild throughout the country, from 60° F in January in the mountains (6,000-8,000 feet high) to 70° F in January in Saigon.

cultivated. The plain is broken at three points by mountain spurs extending to the sea. Major cities are Da Nang, Qui Nhon, and Nha Trang.

The climate can be summed up rather quickly with two words — hot and wet. Heaviest rainfall is at Hue with an annual average of 128 inches, while Saigon has an average of 80 inches. Winter monsoons occur from November through March and produce a foggy, cloudy rainy season from Dalat north, and almost no precipitation to the south. This is almost reversed during the summer monsoons, except the delta area has almost no fog. Cloud formations build quickly and more than 6 inches of rain in one day are not unusual. A broken cloud condition is normal.

Temperatures vary from the delta to the mountains, with minimums in the northern sector of 78° F in June and 65° F in January. At Saigon, the mean maximum is 95° F in April; the minimum, 70° F in January. The lowest temperature ever recorded in Saigon was 57° F. In mountain areas, the temperatures are lower, ranging from 60° F to 68° F in the winter. Humidity is always high in all areas.

Population of the Republic of Vietnam is estimated at 14,616,-646, with at least 85 percent ethnically Vietnamese. The principle minority groups are Chinese and the highland tribes known collectively as Montagnards, with smaller groups throughout the country. Approximately 95 percent live in the delta area. Saigon and its sister city Cho Lon have a collective population of about 2,000,000.

Buddhism is the dominant religion and is embraced by about 85 percent of the population. Another 10 percent are Christians, mostly Roman Catholic. The other 5 percent are of mixed beliefs.

Vietnamese is the spoken language. It is closely akin in sound phrasing to some Chinese dialects. Although now comparatively few, the number of people who speak English is increasing rapidly. A large majority of business people are bilingual, with French the second language.

As far as personal equipment is concerned, it is suggested that you travel light. Flight clothing and fatigues are, of course, necessary. Remember, seldom can a uniform be worn two consecutive days. One Class A winter uniform (greens to be used if you exit the country during the winter on medical evacuation or leave) and one Class A summer uniform (khaki or TW for any formal occasion which may occur) will meet normal needs for these uniforms. Additional uniforms are available from a sales store in Saigon.

"Wash and Wear" slacks and shirts are all you need in civilian attire, with perhaps swim-

ming trunks included. Dry cleaning facilities are few and far between, and are not very good. Tailor-made clothing purchased on the economy is inexpensive and is readily available in all large cities. Two pairs of boots, one pair of tennis shoes, and whatever low quarters you desire should be taken with you.

Toilet articles and personal items should be taken, but no emphasis is made on any items, for everything is available in the post exchanges. It is recommended that personal firearms be left at home. Not only is the high humidity and salt air hard on weapons, but ammunition for the calibre of weapon that you own may not be available, especially if you are ever stuck out somewhere where you may have to use it.

You will be issued a set of lightweight fatigues, one pair of jungle boots, and standard field gear. In addition to this, you will get a survival knife, flak jacket, groin protector, .45 cal. pistol, and a semi-automatic weapon of some kind (if available) in your unit. Keep in mind that everything you own, because of the climatic conditions, must be kept in a heated closet, or be subject to mildew.

Flight missions can be placed into two categories: assault missions or administrative flights. Assault missions are flights which carry RVN troops directly into combat, or potential combat. The staging area may be an airfield, or it may be a field site. As a general rule, this mission will be supported by a minimum of five armed UH-1s with machineguns and rockets, and, if it is a large operation, by Vietnamese Air Force T-28s and/or AD-6s.

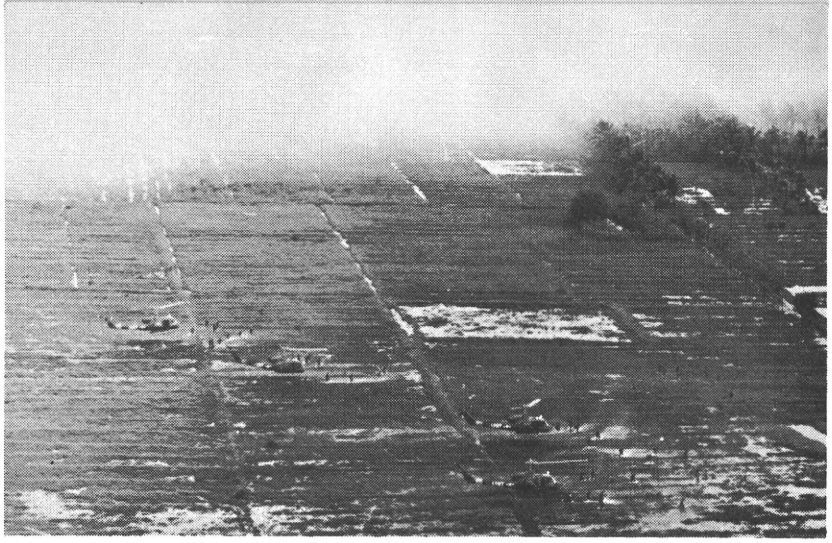
Administrative and resupply flights are common. You must remember that almost all resupply and travel to or from outposts and strategic hamlets must be by air. Many times the alternative to a helicopter flight is a full-scale ground operation.

The heavily populated Mekong Delta area, as a forinstance, has hundreds of outposts and hamlets, with few passable roads, none which are considered safe. An administrative flight might very well be a Vietnamese or American Army Class A agent going out to pay the troops, or a province chief seeing how the construction of a new post is coming along. Resupply could be rice to a new hamlet which has not had time to put in its own crop, or ammunition to an outpost that got hit by the Viet Cong or expended in support of a big operation. Rotation of troops in the outpost usually is made by helicopter, also.

Included in both categories of flights would be medical evacuations. No matter what the mission, all landings and takeoffs are made with the enemy in mind, for snipers are everywhere. Climbs and descents are generally made over the airfield, outpost, or hamlet, with steep approaches and maximum performance takeoffs advocated. The "order of the day" is a minimum of 1,500 feet above terrain en route, and usually more if you can get it. Another item to keep in mind is the scarcity of radio navigational facilities. As a consequence, almost all flying is done by good old pilotage and dead reckoning — so brush up.

Security of airfields and unit areas is usually good, and is usually accomplished by Vietnamese Army regulars, with secondary security provided by the American unit concerned. Most isolated troop compounds have mine fields, concertina wire, and breastworks surrounding the area, with watchtowers and searchlights sometimes in evidence. Some aviation units live right on the airfield, while others live in military compounds in town. A few live in hotels and villas, or other leased facilities.

Flights can be categorized into two missions: assault missions and administrative flights. Med evac missions could be in either category.



You'll find Army Aviation in the middle of the fighting in the Republic of Vietnam — providing support and advice

All large towns, in addition to having Vietnamese troop security, have large internal security forces. Each area will have its own security regulations and curfew laws; you will be briefed by the unit to which you are assigned. Personal weapons (or sidearms of any kind) will not be carried in town, except on official business.

Your pay will be issued from the finance office in Saigon. You will receive $200.00 cash each month, and the balance will be paid by check. This check must be sent to the States, since there are no banking facilities in Vietnam. Although no checks will be cashed for you by any facility in Vietnam, purchases made in the PX and your Officers' Club bill may be paid by check for the exact amount. Almost all clubs operate on a credit basis, using "chit books" instead of money, with bills payable at the end of the month.

Meals eaten at your home station are listed as a collection on your pay voucher to be deducted from your pay. Meals eaten elsewhere are generally paid for in cash. You will find $200.00 to be more than adequate under normal circumstances. Maid service (houseboy) varies from unit to unit, but usually costs no more than $5.00 per month, with laundry facilities running about the same. (Living expenses will normally run a little higher if you are living on the economy in leased facilities.) Officers' Club dues vary from nothing to $2.00 and mixed drinks are $.20 or $.25, with other drinks relative.

Vietnamese money, called piasters, is available from your unit pay officer or the Saigon finance office at the rate of 73 piasters to $1.00. It is unlawful to change money at other than approved finance facilities.

Another enemy besides the Viet Cong exists in the Republic of Vietnam: time. Knowing this, the Army and Navy have made available many recreational facilities. At the unit level are the normal items, such as Ping-pong, pool, horseshoes, cards, etc. Most installations have a basketball-volleyball-tennis court. In addition, many posts now have craft shops where hobby items may be purchased. Movies are shown every night at most posts, and USO shows put in their appearance about every three months at the larger installations. (Those USO shows are very good, with enough variety to suit almost every taste.) Saigon has several swimming pools which are made available to American servicemen, as well as an 18-hole golf course and a bowling alley complete with automatic pinsetters. Many people use their spare time cutting stereo tapes for their personal music library. Special Service, with a very extensive selection, issues tapes on a loan basis to the unit level.

Perhaps you now have some idea of what an assignment to Vietnam is like. It will be an interesting assignment, and at times, very enjoyable. At the very least, it will be educational. As in all assignments, this one is exactly what you make it.

A main street in Saigon. Recreation in this city includes golf, swimming, USO shows, bowling alley.

Game Ole Dame

Major Milton P. Cherne

SMOKE AND FIRE belched forth as the engine roared to life with deafening reverberations. Minutes later, the first CH-21 made her ungainly debut before the Vietnamese audience that thronged around the baby flattop anchored at the base of Tu Duo Street in Saigon.

Awkwardly, perhaps clumsily, she hovered momentarily over the crowded carrier deck as the pilot talked to her in soothing tones before coaxing her into a downwind overwater takeoff. With the frivolity of a teenager, she shed her ungainliness and changed into a thing of grace as she ascended into flight. The crowd cheered with glee and admiration as the banana-shaped helicopter circled the city, asserting her reign and dominance over the countryside. The skies were hers, and hers alone. Jealous, temperamental, fickle, understanding, mean, ornery, and hardheaded she was. But she liked to be treated like a lady.

That was 3 years ago. Since then she has been used and abused, cussed and discussed, but never has she been ignored. We pampered and pleaded with the ole gal and sometimes seemed to lift her into the air with sheer will power. She shuddered and vibrated to let us know that this work wasn't appreciated, but she knew the job had to be done — and do it she did.

Pigs, chickens, dogs, women and suckling babes have swelled her innards. Iceboxes, rice, lumber, plumbing, wire and an endless list of items have been speedily transported across the land. Guns, mortars, and men were her primary interest, and when they riddled her with bullets, she gallantly continued on.

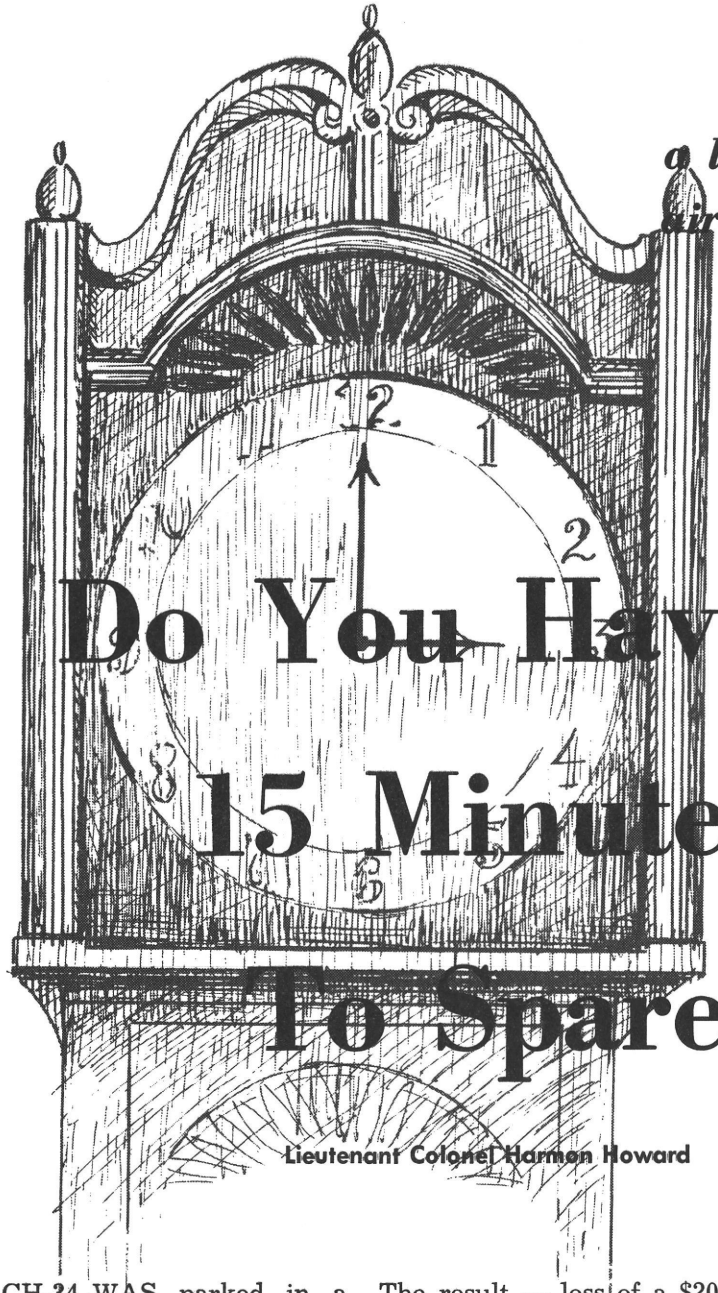
Occasionally the strain would be too much and our lady would rebel. Like a Missouri mule, she just quit doing what she was doing and really didn't care where she was. This seasoned many a young pilot and greyed a few more. Once in a while she would roll over on her side and thrash her blades on the ground like a child having a tantrum. We'd pull and tug to get her on her feet and with tender loving care feed her a new engine, a shiny transmission or two, and bribe her with the thought of six new blades to take her into the air again.

As her hair became white and her muscles became knotted and sore, she wisely noted the young upstarts were doing more and more. The Hueys were trim and sleek while she was patched and old. Her memories were vivid and she could recall the legion of firm hands that had guided her history. This game ole dame had pioneered a new frontier. Sadly, she recalled the valiant young men who had given their all. Proudly, she could point to her accomplishments and the dedicated men who have ridden her to glory.

Recently, the last of her kind retired. Ironically, Lt Col Robert Dillard, who introduced the lady to Vietnam in December 1961 flew one of the original CH-21s (old 049) on her last flight. He brought her down from her unit and prepared her for shipment home. The excitement and confusion of her arrival will be missing. No doubt, no one will wave and cheer as she leaves. But we all will have a sadness in our hearts as we bid farewell to a dear old lady that has taught us so much and worked so untiringly.

Maj Cherne is assigned to Standards Division, DOI, USAAVNS, Ft Rucker, Ala.

a little time can save your aircraft and your life . . .



Do You Have 15 Minutes To Spare?

Lieutenant Colonel Harmon Howard

A CH-34 WAS parked in a hangar overnight. Condensation formed inside the pilot valve boots. Then the aircraft was moved outside the hangar for a 72-hour runup, and the moisture froze inside the boots. When the primary servo system was turned off, the auxiliary system also failed because of the ice. The collective pitch went to the full up position, and the aircraft flipped over on its back. The result — loss of a $200,000 aircraft.

Lt Col Howard is TDY to the University of Omaha, Neb.

Part of the normal preflight consists of checking the boots for ice, condensation, foreign matter, etc. A 15-minute preflight would have prevented this accident. This is probably the most common reason heard for not pulling an adequate preflight: "I was only going to run up the aircraft."

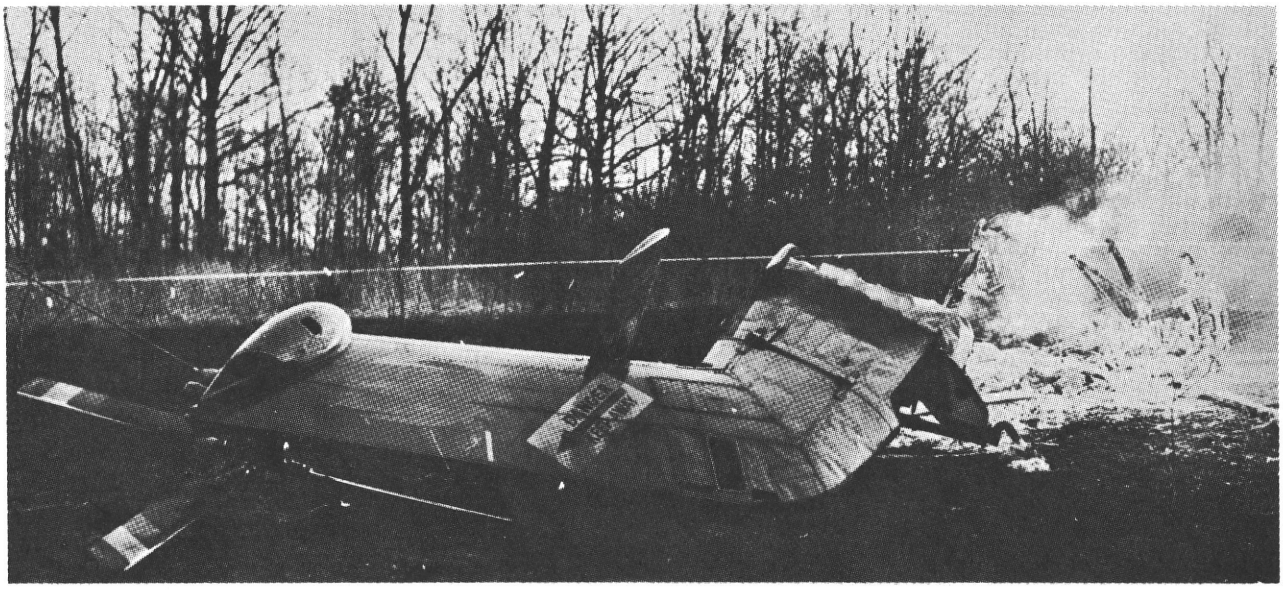
Another reason given for failure to perform an adequate preflight is being late for a mission, either by arriving late, having to turn down an aircraft for some reason and then not having the proper time to preflight the replacement, or by receiving the mission too late to perform an adequate preflight.

A crew arrived a few minutes before the scheduled departure of a CH-34 on a VIP flight with a general officer aboard. They filed out, started up, and departed — all within a 15-minute period. Between this flight and the flight of the day before, the crewchief lubricated the head. He rotated the blade cuffs to ensure proper lubrication, checked the bearings for roughness, and ensured that there was no binding in the blade spindle bearings.

At an altitude of approximately 250 feet, one blade became unlocked from the horn pin, started to flap and tumble, and tore loose from the head. From this point, the aircraft started to come apart in the air, nosed over, crashed to the ground, and burst into flames, killing all six persons aboard.

The horn locking pin knurled knob was still safetied, but the horn locking pin was only extended 1/16 inch to 1/8 inch instead of the required 3/4 inch. Another probable cause of this accident was the crew's dependence upon the crewchief to have the ship ready. How many times have you heard the statement, "If Smith says the ship is ready to go, you can depend on it being ready"?

In this accident, the crewchief had an outstanding reputation. In fact, he may have made only



Result of a hurried departure

one mistake in the 11 years he was in aircraft maintenance. Also, for 3½ years he had been a chewchief of the same ship that carried him to his death. During the time he was servicing the head he had the help of a UH-19 crewchief. The knurled knob of the two aircraft turn in opposite directions to extend the horn locking pin.

In the case of the VIP flight, or any flight for that matter, the passenger is not likely to say "No" if it is explained to him that another 15 minutes is needed to perform an adequate preflight.

Still another reason why many pilots fail to perform an adequate preflight is probably the physical discomfort of doing so in inclement weather. If the flight is scheduled for early morning, or if it is cold or raining, the pilot is not likely to perform as thorough a preflight as he would in more comfortable circumstances.

A pilot picked up the UH-1B which had a load of troops aboard. The FM antenna was mounted backwards, and the tail rotor pulled the antenna into the tail rotor blades and threw it into the main rotor. The accident resulted in a change of both main and tail rotor blades. An antenna mounted backwards is very noticeable to a pilot performing a careful and thorough preflight. The pilot who is looking for a discrepancy is likely to find it, but it is hard to find something wrong if it is not expected.

USABAAR lists 7 major fixed wing and 11 major rotary wing accidents since 1957 caused by failure to check fuel supply.

An O-1 pilot started the engine, and during runup switched to the right tank with only a glance at the gauge. The empty and full indications are quite close together, and a cursory look can give the wrong impression, especially if the pilot is under the assumption that the aircraft has been refueled.

Shortly after takeoff the engine quit from lack of fuel, and the aircraft crashed. The pilot had approximately 1,500 hours flying experience, and his initial flight training was in this type aircraft. He should have realized the possible consequences of a failure to check the fuel supply before starting the flight.

A CH-21 experienced fuel starvation while flying over water, autorotated and sank in 20-30 seconds. The result was two fatalities and loss of a $250,000 aircraft. During a fuel stop, the crewchief had checked the fuel gauge and specified a certain amount of fuel be pumped aboard. No dipstick was in the aircraft. The time flown was not checked to compare with the amount of fuel consumed. The instructor pilot had approximately 1,000 hours flying experience, the pilot approximately 650 hours.

A CH-34 refueled and departed on a mission. During flight the engine quit over a heavily wooded area and the aircraft crashed, resulting in a $200,000 loss. When the aircraft had been refueled, the cargo door was open and the truck driver, not being familiar with the CH-34 refueling procedures, did not know that the fuel cap for the center tank was behind

How long does it take to visually check fuel supply? Less than 15 minutes?

the open cargo door. In the writeup, the fuel quantity probe and the fuel quantity gauge were written up as being inoperative. The pilot and copilot had approximately 2,000 hours flying experience.

During a 1-year period, four major accidents costing $130,000 are listed for either failure to remove tiedowns or failure to see that the skids were free prior to takeoff. A pilot with approximately 800 hours flying experience started to preflight an OH-13. He had untied three of the four tiedowns when he was distracted. Between the time he started to pick the aircraft up and the time it crashed on its side, he probably remembered the fourth tiedown. This accident cost approximately $30,000.

According to the pilot's statement, his preflight instructions had been rather sketchy when he was checked out in the machine. Other pilots in the unit stared that although their preflight instructions had covered every aspect of the preflight inspection, they did not feel that they had r e c e i v e d detailed enough information about the aircraft. They felt that they could run through a complete preflight, but were not sure of what they were looking for during the inspection. Nor did they know the allowable tolerances for the close fitting parts, or the problem areas that require special attention. Can this same statement be applied to our knowledge of the aircraft we fly?

Another accident that happened as the result of not checking to see that the skids were free before takeoff of an OH-13 occurred this way. A pilot landed on a slight slope and dropped off a passenger. He sat in the ship, waiting for the passenger to return. When the pilot started to pick the aircraft up to a hover, one of the skids was caught under a root. The aircraft rolled over on its side, caught fire and burned, resulting in a $41,500 loss.

What can be said for the pilot who goes ahead with the flight when he knows discrepancies exist that should ground the aircraft? USABAAR lists six major rotary wing accidents and six major fixed wing accidents as the result of taking off with known discrepancies.

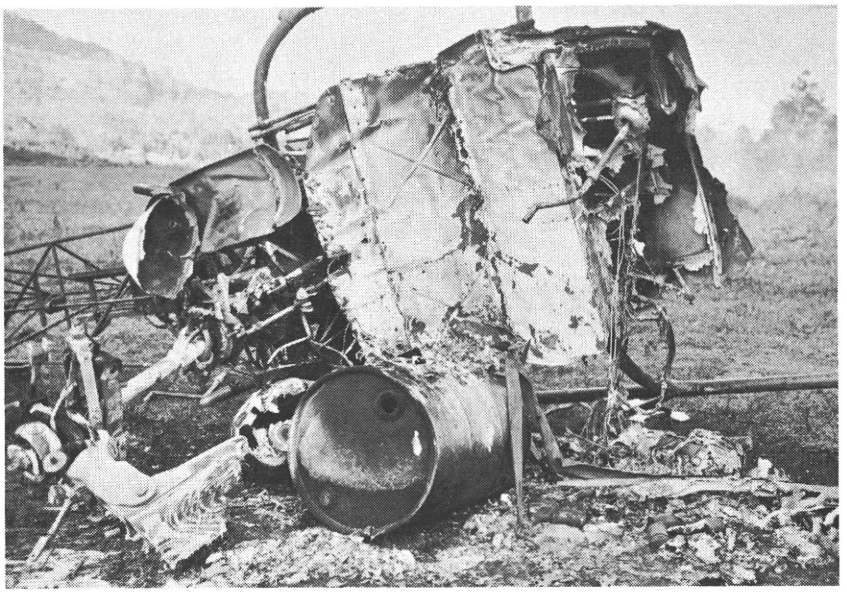
A UH-1A made a precautionary landing to determine the cause of dropping engine oil pressure. After checking the oil reservoir and the engine for oil leaks, the pilot decided that the oil pressure warning light and the gauge must be playing games with him, so he took off

again. About 25 feet in the air, he heard a loud noise and immediately bottomed the pitch and flared the aircraft. The engine had to be shut off after the aircraft was on the ground.

It was determined that the engine was still developing power, even though the oil pump had a sheared drive shaft and would have eventually resulted in an engine failure. The aircraft was a total loss, for a cost of approximately $250,000. The pilot had about 1,000 hours flying experience.

An 0-1 pilot on a ferry flight mission noticed that the engine would cut out with the throttle in the idle position. The pilot had to keep pumping the throttle to keep the engine from dying. On approach, the pilot cut back the throttle and the engine promptly died. The pilot almost completed the ferry flight; in fact, he only missed by a few hundred yards. A later runup of the engine indicated low rpm (300) due to improper adjustment of the idle stop.

An accident that was just waiting to happen involved another OH-13. A 55-gallon drum was used to refuel the aircraft. As the pilot started to leave, someone came up with a couple of packages for him to take along. He frictioned down the cyclic and placed the packages in the aircraft. As he picked the aircraft up to a hover, it started to drift right and he was unable to stop the lateral movement because of the cyclic being frictioned down. The right skid contacted the drum. The left fuel tank cap was in the open position, and raw gas and fumes poured over the engine and burst into flames. The aircraft crashed on its right side and was totally destroyed, resulting in a $41,500 loss.



Locked cyclic friction resulted in this costly accident

This pilot had approximately 1,500 hours flying experience. Earlier in the day this same pilot had attempted to pick the aircraft up with the cyclic friction still on. Also, the same day he had started to take off with a large chamois-covered funnel still in the right fuel tank. It was just a matter of time before he had an accident.

Insufficient time, distractions, inattention, carelessness, physical discomforts, dependence on someone else to do the job, etc., are *excuses* given for poor preflight inspections. Make sure your unit SOP overcomes these lethargical and dangerous habits.

In each of these accidents, spending a matter of 15 minutes, or less, on making a thorough preflight would have prevented an accident. Do *you* have 15 minutes to spare?

Westward Ho! Army Aviation Style

THE RECENT deployment of a flight of three CV-2 Caribou from Fort Benning, Ga., to Saigon successfully demonstrated Army Aviation's long range deployment capabilities.

Delivering the Caribou to the Republic of Vietnam via a Pacific route set a new record for this type aircraft. Total elapsed time from CONUS was 64 hours and 41 minutes. The previous Caribou deployment exercise required more than four days longer.

Flight crews of the 37th Air Transport Battalion, 10th Air Transport Brigade, departed from Travis AFB, Calif. Their route took them to Hawaii, Wake Island, Guam, the Philippines, and Saigon.

Copters—Mobile or Immobile?

Captain Richard Hazlewood

HAVE YOU EVER tried to push an OH-13 across a cotton field? Almost everyone who has will agree that there must be a better method.

Moving the OH-13 short distances over the ground was a major problem facing the aviation units participating in exercise SWIFT STRIKE I. A division requirement stated that all OH-13 type helicopters would be moved into a treeline for camouflage after landing. This entailed moving the helicopter over plowed fields and other rough, uneven terrain. The OH-13 ground handling wheels were unsatisfactory because the small diameter allowed insufficient clearance between the ground and the skids, and the narrow width afforded little flotation.

One solution to this problem was the use of salvaged O-1 main landing tires and wheels. These were attached to a fabricated steel handle having larger and heavier components than that now being used on OH-13 ground handling wheels. (See photographs for comparison.) Components used were one each ¾ inch, 1 inch, and 1¾ inch steel bars, large cotter pins, and O-1 wheel locking nuts.

The ¾ inch bar was heated and bent into the shape shown in figure 1. The 1¾ inch bar was used for mounting the wheel, and the 1 inch bar was used for attaching the assembly to the skid mount. The 1¾ inch bar was machined and threaded for the wheel and locking nut and drilled for the cotter pin. To lock the assembly on the skid, the 1 inch bar was drilled so the OH-13 ground handling wheel locking pin could be inserted. No other machining was required. The 1 inch and the 1¾ inch bars were welded to the ¾ inch bar.

This design for ground handling wheels was tested extensively at Fort Campbell, Ky., before SWIFT STRIKE I and proved under varying conditions during the maneuver. At the conclusion of tests at Fort Campbell and SWIFT STRIKE

Capt Hazlewood is now serving in USAEURA.

I, the results indicated that machining and welding must be done by experienced and competent personnel for this design to be reliable. The tests also showed both advantages and disadvantages with this type of ground handling wheel.

The greatest advantage was that two or three men could easily roll the helicopter over most terrain with the added stability provided by the width of the tires. Despite appearances to the contrary, no difficulty was encountered in locking the wheels in the down position; however, if more leverage is needed, it can be obtained by inserting the starter crank on the handle.

Not to be overlooked among the advantages of this type of wheel assembly is the availability of parts and labor. For this particular assembly, all parts were procured within the 101st Airborne Division and all labor was done by the division aviation field maintenance shop.

Among the disadvantages of this type of assembly is that the aircraft cannot be landed with the wheels on the skids; even in the up position the tires extend below the skid. Because of the length of the lift handle, this design cannot be used when litters are attached to the aircraft. A shorter handle would require more leverage, and tests indicated that one man could not put the wheels down with a shortened handle. It must also be stated that a lathe, drill press, and welding equipment are needed to fabricate this design.

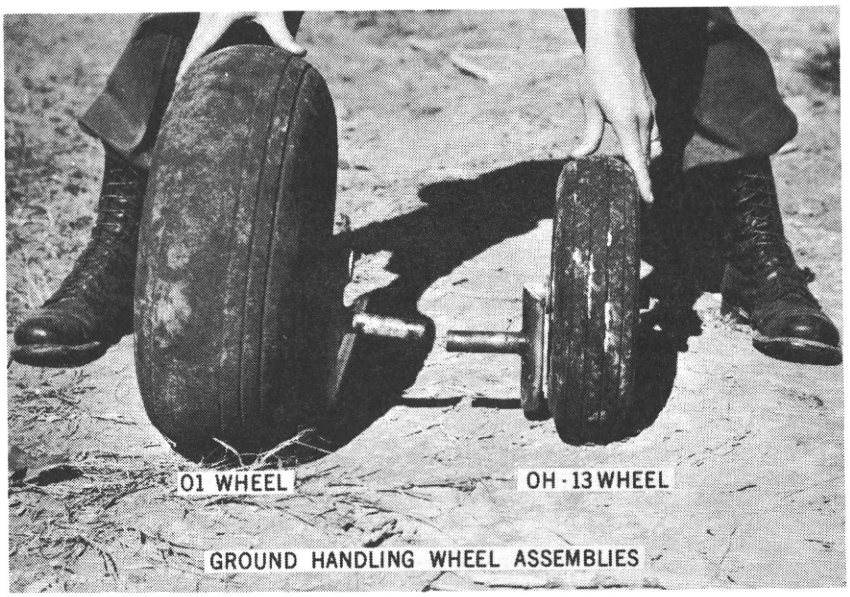


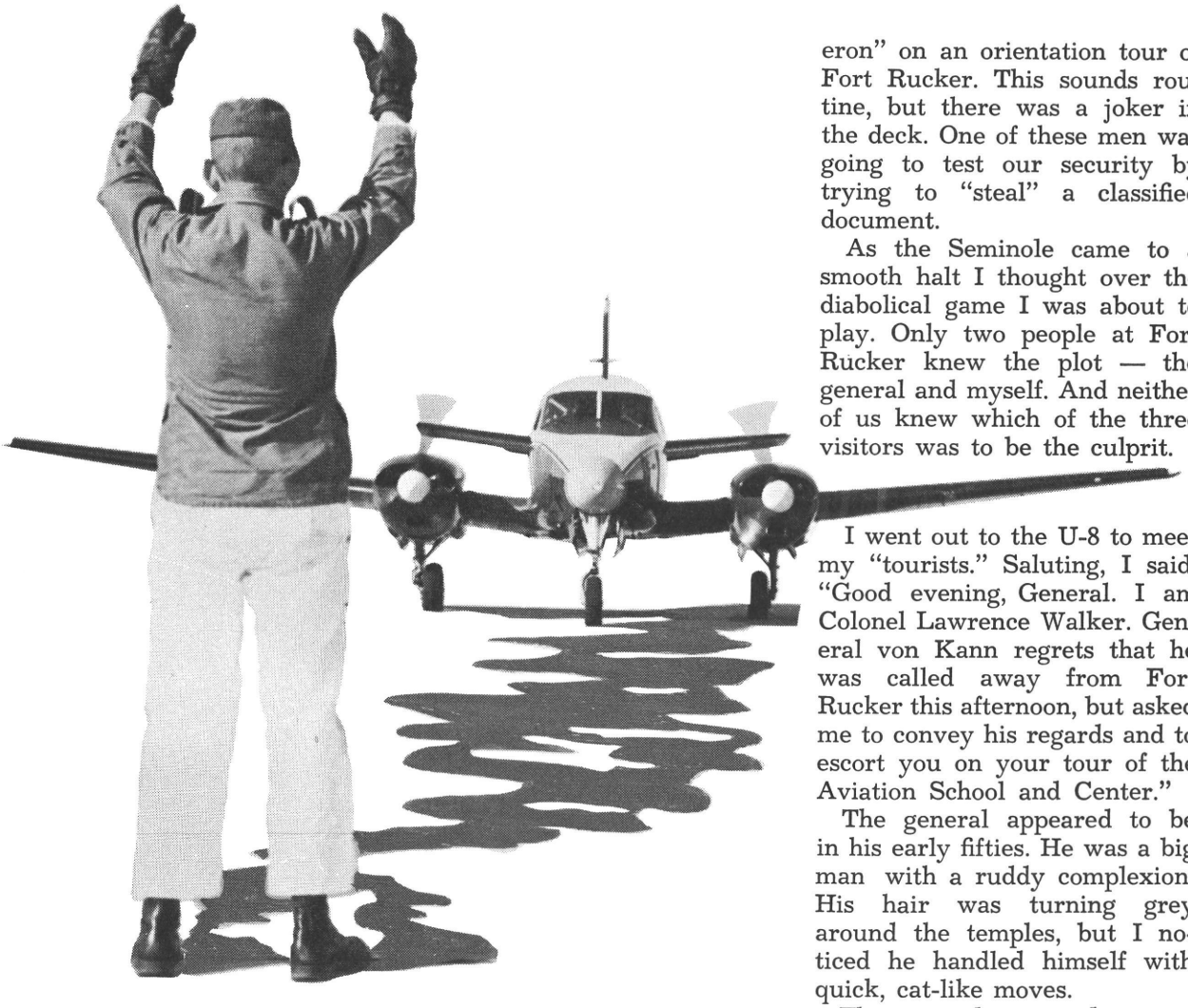
Figure 2. Ground handling wheel assemblies

This wheel design is not the only solution to moving helicopters over rough terrain. Tow bars, plywood tracks, roller conveyors, PSP, PAP, winches, block and tackle, and UH-1 hydraulic wheels were among the methods tested. (See DIGEST, Oct 63.)

The UH-1 assembly is superior to the system outlined here because it is hydraulically operated, has dual wheels, and can be used on the skids during the flight. However, UH-1 wheels cost in excess of $500 each if they are not available from aircraft assigned to the unit. Also, the UH-1 mount is more difficult to construct than the O-1 wheel mount, which requires only 6 manhours to fabricate.

For survival on the battlefield, future wars may require ground mobility of helicopters as well as air mobility. Although the O-1 type ground handling wheel assembly may not be the best method, it does offer a practical and simple means of moving the OH-13 helicopter to a camouflage area.

Figure 1



The Visitors

Richard K. Tierney

THE SLEEK U-8 touched down lightly, then kicked up a spray as it streaked along the runway which had just been doused by a heavy shower.

I felt uneasy as the beautiful bird gracefully moved to the ramp in front of operations. As passengers it carried a brigadier general, a colonel, and a lieutenant whom I had to "chaperon" on an orientation tour of Fort Rucker. This sounds routine, but there was a joker in the deck. One of these men was going to test our security by trying to "steal" a classified document.

As the Seminole came to a smooth halt I thought over the diabolical game I was about to play. Only two people at Fort Rucker knew the plot — the general and myself. And neither of us knew which of the three visitors was to be the culprit.

I went out to the U-8 to meet my "tourists." Saluting, I said, "Good evening, General. I am Colonel Lawrence Walker. General von Kann regrets that he was called away from Fort Rucker this afternoon, but asked me to convey his regards and to escort you on your tour of the Aviation School and Center."

The general appeared to be in his early fifties. He was a big man with a ruddy complexion. His hair was turning grey around the temples, but I noticed he handled himself with quick, cat-like moves.

The general returned my salute. "How do you do, Colonel? I am General Ira Stanton." Motioning toward his companions, he continued, "This is Colonel 'Bull' Garman and the lieutenant here is Herb Little, my aide."

As we walked to the staff car and exchanged introductory pleasantries, I learned that the colonel, sturdy and strikingly handsome, was a Master Army Aviator who went through flight school at Fort Sill in the '40s. In 1954 he made the move with the Aviation School to Fort Rucker and now was at the Pentagon.

Lieutenant Little was (almost literally) a horse of a different color. He hadn't smiled yet, and

with his slight build, low forehead, dark eyes, and sagacious air reminded me of a fox about to pounce on a rabbit.

While riding from Cairns to the main post I was cursing the situation in my mind — trying to figure which of my guests was the security tester — when Colonel Garman broke the silence.

"Cairns Field hasn't changed too much since I came through here in 1959. I noticed a few new buildings though, and I didn't see many aircraft parked across the field."

"That's right," I answered. "We've built a new hangar on the east end of the field and the Test Board has a new building behind its old one.

"We were able to move those aircraft from the sod on the south side of Cairns last year. It all came about as sort of a chain reaction when we opened Shell Army Airfield. This gave us a new home for Primary Fixed Wing Training which had been at Lowe Army Airfield. When Primary left Lowe, we moved Advanced Fixed Wing Training from Cairns to Lowe. This emptied the parking area near the east end of Cairns and we filled it with those aircraft you used to see parked on the sod."

I noticed the general didn't appear particularly interested in our conversation; nor did his aide, who seemed to be staring right through me.

Colonel Garman was speaking again, " . . . Shell Field? Where's it located?"

"About 10 miles to the west—out toward Enterprise. But, Primary's already been moved out of there. Last October Primary and Advanced were merged into the new Department of Fixed Wing Training. At about the same time all primary instruction, which we call phase A, began moving back to Lowe where it now shares the facilities with phase B, the contact portion of advanced training."

"What about Shell Field?" the general asked. "What's out there now?"

"The Department of Rotary Wing is training instructors out there now in preparation for the opening of our basic helicopter instrument course for students next month.

"Of course phase C, fixed wing instrument training, remains at Cairns. We have two significant changes here: A student must now successfully complete phase C before he can graduate. This has been in effect about two years. Also, last year a civilian contractor began conducting phase C instruction. We expect another significant change in the near future. The Test Board has evaluated four different twin-engine airplanes and one may be picked to replace the U-6 as the fixed wing instrument trainer."

The general perked up. "Which airplanes were evaluated?"

"Well, sir, I believe they were the Piper Aztec, the Beech Baron, the Cessna 310, and Aero Commander's 500B."

"I see," the general answered. "Did they pick one?"

"That information has not been released yet, sir."

The general's question made me wonder. Could he be the "spy"? He certainly must have known that such information could not be released at this level, even it it were known.

Colonel Garman interrupted, "Is the Department of Rotary Wing expanding so fast that it has outgrown Hanchey Army Airfield and needs to expand to Shell? I read recently that Hanchey now covers almost 6 million square feet and is the largest known heliport in the world."

"That's true, Colonel. Actually, Hanchey covers 5,940,000 square feet and registers about 10,000 landings and takeoffs a month. The Army is stepping up its rotary wing program, especially helicopter instrument flight. In fact, this has resulted in a reorganization of the department.

"Students still receive primary, or phase 1, training at Fort Wolters, Texas, and report here for phase 2. Until recently phase 2 consisted of advanced instruction, instrument familiarization in the UH-1, and transitioning into various cargo type helicopters. Phase 3 was handled by the Department of Tactics and included a practical field exercise.

"But under last winter's reorganization, phase 3 training has been incorporated into phase 2. This leaves phase 3 open exclusively for the basic instrument course."

Figure 1. One of 1,528 family housing units at Rucker

Figure 2. Barracks like these house nearly 3,000 EM and WO candidates

"Yes," Colonel Garman responded. "I've heard a great deal of talk about stepping up the helicopter instrument program. Have they also made it mandatory that a helicopter student successfully complete phase 3 before he can graduate?"

"No, he can get his wings without phase 3. But he might get his instrument ticket later by attending the Helicopter Instrument Flight Course for rotary wing aviators."

We arrived on post and after my party had a chance to freshen up and get squared away in their quarters we drove out to the new Lake Lodge Officers' Club on Lake Tholocco for dinner.

I was still racking my brain trying to figure what kind of clue the "spy" might let slip when I began to suspect Lieutenant Little. His attitude changed suddenly and he took a particular interest in Fort Rucker.

"What's the daily population at Fort Rucker now, sir?" he asked.

"We have over 18,000 people on post each working day. This includes about 2,000 officers and warrant officers and about 5,700 enlisted men. Then, roughly speaking, we have 5,000 military dependents, 1,600 Department of the Army civilians, 400 non-appropriated fund employees, and 3,500 people working for contractors."

This particular question didn't disturb me, but I had a strong feeling the general's aide was trying to set me up for something.

"Amazing!" Colonel Garman mused, mostly to himself. "Back in 1954 we started out here with less than a third of that — and that included contract people."

"How many contracts have been let here now?" the lieutenant quickly chimed in. He and the colonel seemed intensely interested, but the general appeared to be back in the "never-never land" he'd slipped into while riding from Cairns to post.

I answered, "We have five major contracts and a number of minor ones supporting activities here now. The largest is for maintenance of the 710 aircraft in the center fleet at an annual cost of $11.7 million. There also is a $1.8 million contract for maintaining the Army Aviation Test Board's 64 aircraft and $1.3 million contract for primary fixed wing and instrument training. Then we have a $450,000 contract for refueling aircraft and our newest — a $624,000 contract for conducting rotary wing instrument training."

Riding back from the lake that night, I was sure that none of my party had yet been able to obtain any classified information. I'd watched them like a bird dog all evening. In fact, I'd decided to really play cloak and dagger with my adversary. Before leaving the club I'd made arrangements to have my guests' quarters watched all night. The next morning I was informed that none of them had left his room. So I was still ahead. All I had to do was keep my man straight until he left at 1600.

Our trio had finished breakfast and now were receiving a briefing from the G-3. I walked down to the briefing room and sat several rows behind General Stanton and his party. The briefing was in progress:

. . . including aircraft, which are valued over $115 million, equipment and stock at Fort Rucker are valued over $160 million. If we include the U. S. Army Aviation Test Board's equipment, this figure approaches $181 million.

All three of our visitors seemed avidly interested in the briefing. Colonel Garman began taking notes as the briefing officer continued:

. . . Fort Rucker's 61,000-acre reservation is estimated to be worth about $800,000 and with improvements soars over $78.5 million. We have more than 2,000 buildings, 1,161 of which are temporary.

I observed my chief suspect — Lieutenant Little — closely. He seemed nervous and fidgety. I was hoping this wasn't my imagination and that he really was beginning to worry about how he could lift a classified document.

. . . most of our permanent housing consists of 1,528 units of family housing, like you see in this slide [fig. 1]. We also have a number of permanent barracks like those shown in this slide [fig. 2]. We have enough of these buildings to accommodate about 3,000 enlisted men and warrant officer candidates. We also are putting up some new classrooms,

such as are shown here . . . [fig. 3], and BOQs [fig. 4].

. . . we also have four major airfields. In fiscal year '64 Cairns AAF recorded 135,606 VFR and 30,874 IFR landings and takeoffs. Hanchey had 101,710; Shell, 390,858; and Lowe about 175,308. For comparative purposes I might mention that O'Hare airport in Chicago recorded ½ million landings and takeoffs over a similar period.

. . . In the past 10 years we've invested over $50 million in permanent construction. It will take that much more and another 10 years before our long range construction plans reach maturity.

General Stanton interrupted to inquire about the activities located at Fort Rucker.

Sir, Fort Rucker, for all intents and purposes, is divided into the U. S. Army Aviation Center and the U. S. Army Aviation School.

As commanding general of the Center, General von Kann coordinates with and assists the Class II activities and various support units on the post. As commandant of the School he is responsible for training all of the Army's aviators, organizational maintenance personnel, and others whose activities are related to Army Aviation. He maintains the post for Third U. S. Army and conducts the school for USCONARC.

So far everything had been perfectly routine. I really didn't have a good reason to suspect anyone. The general was speaking to the briefing officer . . . "What Class II activities are located here?"

We have five, sir. There's the U. S. Army Aviation Test Board which conducts service and logistical tests of all aircraft, associated subsystems, and aviation ground support equipment the Army is interested in procuring. [See "Kitchen Testing Army Aircraft and Components," DIGEST, March 1964.]

Another Class II activity is the U. S. Army Combat Developments Command Aviation Agency which helps determine future aviation hardware needs, doctrine and organization. [See "The Aviation Combat Developments Agency," DIGEST, April 1963.]

We also have the U. S. Army Board for Aviation Accident Research, which investigates, analyzes and disseminates aviation accident prevention data. [See "USABAAR and Your Accident Prevention Program," DIGEST, September 1962.]

The Aeromedical Research Unit is the newest Class II activity at Fort Rucker. It conducts research on all types of medical problems associated with Army Aviation.

And last is the U. S. Army Human Research Unit. This is a joint military-civilian organization researching areas of training, motivation, leadership, and training device needs.

I watched my guests closely as the briefing officer stressed the advantages of having the Class II activities at one location where they can pool resources and cooperate on various projects. He then began discussing the School's various officer specialty courses, which cover medicine and other functions related to Army Aviation.

Following the briefing we toured the airfields. At Lowe, we watched students training in the O-1 Bird Dog; at Shell, instructors were being prepared for the basic instrument flight course in the UH-1 Iroquois; and at Hanchey, we saw students transitioning into the UH-1, the UH-19 Chickasaw, the CH-34 Choctaw, and the CH-47A Chinook. I explained to our visitors that before departing at 1600 they would get to see fixed wing instrument training and OV-1 Mohawk and CV-2 Caribou transition training at Cairns.

We ate lunch at the main club and then visited the Department of Maintenance — where the "spy" was to make his move, without my realizing it.

We sat in on a maintenance briefing:

Figure 3. Recently completed classroom

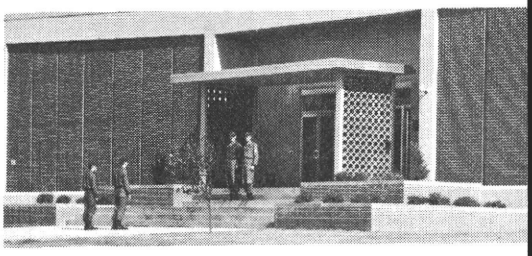


Figure 4. New BOQ at USAAVNS

An Army can boast of airmobility, but without good 1st and 2nd echelon maintenance support it's not going to move across the street.

Realizing this, the Department of Maintenance continually . . .

In an hour and a half these visitors would be leaving. If anything had been stolen I certainly couldn't prove it. At this point I felt certain I was still safe.

. . . these efforts have paid off. This recently was brought out when Brig Gen Joseph W. Stilwell, reflecting on his experiences in Vietnam, commended the caliber of the Aviation School's maintenance graduates on duty in Vietnam.

The basic aircraft maintenance course deals primarily with forms, records and engine operation. It teaches students to assist in the servicing of fixed and rotary wing aircraft.

The general asked a question concerning students. Hunting through my pockets I found a slip of paper with some notes I'd jotted down. I read from the list. "Last year we graduated 10,611 students. This included 1,272 from fixed wing aviator courses, 1,063 from rotary wing aviator courses, 171 from officer specialty courses, and 8,105 from maintenance courses. During the next fiscal year we expect to graduate 14,746 students. This is an increase of about 4,400 graduates."

Then the general jolted me. "What about Project Blue Boy?" he asked the briefing officer.

The general was asking about a secret after action report concerning deployment of maintenance equipment and personnel overseas.

Again I quickly intervened. "Sir, that is a classified project and I'm afraid we're not prepared to discuss it at this briefing."

The general cast me an inquiring glance, smiled, and then dropped the matter. The briefing officer resumed his talk.

A few minutes later we left the briefing room. In the outer office the general stopped at the desk of a secretary and began questioning her about her duties. Then he picked up a copy of "Project Blue Boy" from her desk and walked over to me with it. He began flipping open the pages and started to speak. But the secretary had quickly followed the general and politely, but firmly, refused to let us keep the document. She explained that our "need to know" would have to be established by her supervisor and until then we would not be allowed to see the document.

The general started to insist, but then asked me about securing permission for him to see the document.

Suddenly the general's aide interrupted. He reminded the general that time was running short and stated that a copy of "Project Blue Boy" could be obtained in Washington for the general to review.

I was completely confused now. The general wasn't acting like a spy and Lieutenant Little — my chief suspect — had come to my rescue.

Later at Cairns Airfield my visitors were preparing to leave and I was still bewildered. If one of them had lifted a classified document, he had completely fooled me.

Then it happened. Two counterintelligence agents in civilian clothes walked up to us and arrested the general's aide.

It was not until the next day in the G-2's office that I learned how Lieutenant Little had "stolen" a document — and how our people caught him. The G-2 explained it to me: "Remember when the general walked over to you with the secret document and the secretary followed him? Well, Colonel Garman accompanied her, but Lieutenant Little remained at the secretary's desk.

"While you were occupied with the general, Lieutenant Little tore a significant page out of another classified document that was on the desk.

"There were two reasons the secretary became suspicious. First, she knew there was another classified document on her desk and she was aware that Lieutenant Little had remained near her desk. Second, Lieutenant Little showed a marked change in conduct when he suddenly became quite anxious to leave and persuaded the general to drop the matter about Project Blue Boy."

I still had a question. "Lieutenant Little only tore out one page. I certainly didn't hear him tear it out. How did the secretary know a page was missing?"

"She didn't," the G-2 answered. "But she was smart enough to check. When she discovered the theft she called me. It was a routine matter to pick up the lieutenant. The secretary was simply following procedures she learned in the security training program we conduct annually."

I smiled. "I guess we can thank that young lady for her alertness. She sure made us look good."

"Yes," the G-2 replied, "even better than you realize — you see, *Colonel Garman* was the man who was *supposed* to steal a classified document. But he didn't get a chance, and had to get an assist from the general's aide."

HUNTING DAISIES OR STALKING LIONS

Lieutenant Joe W. Dickens

DENSITY ALTITUDE is 8,500 feet. The chopper is a CH-21C with a full crew, three passengers, and 100 pounds of equipment. Your mission is to take an Army map survey team to the crest of a 4,000-foot mountain. Outside temperature is 110° F on the ground, and winds at the 4,000-foot level are 10 to 15 knots.

Circling the mountaintop you select your landing area, nailing down the wind, the best approach angle and direction. Time comes for the final descent; you say a prayer and start down. As you descend, you compensate for drafts. The landing area draws closer. Your mind starts its "mental checklist" — amount of power available at the landing — rocks on left and a 10-foot cactus to the right — lead with throttle before pitch — better end approach at a hover rather than a complete touchdown, for the area is rocky. Over the intended landing area, you set the aircraft down. The crewchief gets out to check the location of the wheels, gives an OK sign. Then you reduce rpm and shut down the aircraft. This is a typical approach while operating in the mountain-desert area of southwestern Arizona supporting an Army map survey team.

Aircraft supporting this operation were supplied by Libby Army Airfield, Fort Huachuca, Ariz. The survey covered about 4 months and 200 flying hours by this organization. All flying was conducted on weekends because the survey area was within an active Air Force gunnery range during weekdays.

During this operation several

Lt Dickens is assigned to Libby Army Airfield, Ft Huachuca, Ariz.

flying techniques were used, and much experience was gained while a lot of sweat was lost.

Maintenance was a problem while supporting the survey operation. The sand blast when landing caused much wear on chopper blades. Operating in this high temperature area caused high cylinder head temperature which results in excessive engine wear.

Also noted by the pilots at Libby was the amount of fatigue involved in this type operation. Flying in this high temperature and altitude can make one wish for the day's end.

To get to the point, a high altitude desert operation can make one appreciate sea level flying. Mountain flying is a ticklish art. Perhaps it can be divided into two categories: weather, and pilot and aircraft capabilities.

Mountain Weather

The best to be said about mountain weather is that it is rarely monotonous. Thunderstorms come and go with the unpredictability of a woman. Barometer changes occur in a matter of minutes. The mountain pilot knows that what preknowledge he has on the weather is sometimes at best not more than an educated guess, and the mountain is an expert double-crosser.

An aviator can never trust the wind. Here in Arizona, from one valley to another there can be a shift in the wind direction; or it can be gusty in one valley, calm in the next.

Aircurrents normally move smoothly and directly. However, mountains make a difference, creating rapids in the air, just as rocks poking above the surface can turn a placid river into a boiling current of water. Flying techniques in the violent turbulence and downdrafts are developed with experience. The most important thing is to find the wind and to know how to cope with it once it's found.

Pilot and Aircraft Capabilities

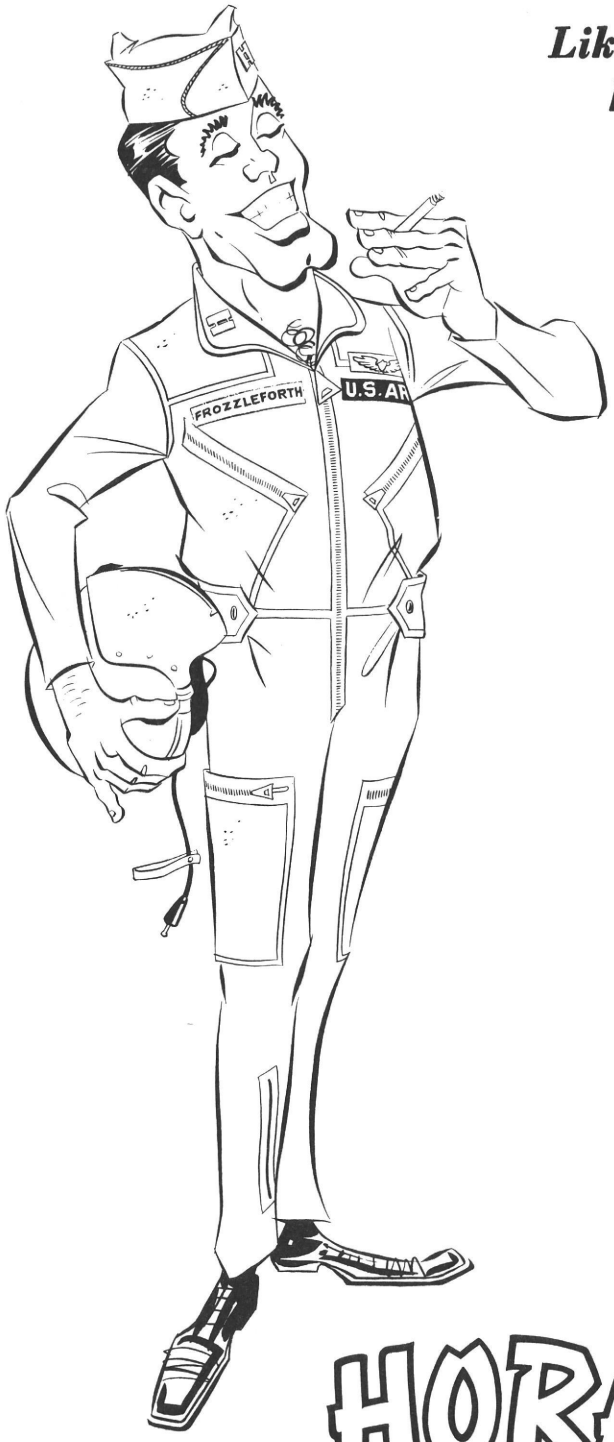
Today much is in newspapers and newsreels about the feats of the helicopter. Granted the chopper is a great machine, but the experience and knowledge of the man behind the controls has much to do with the acts of the machine.

During this survey, only one accident occurred. The aviator was hovering a CH-21C with right main gear on the edge of a crest, allowing two members of the survey team to exit on top of the peak. The approach was set up fine, with winds about 5 knots on the ground. The aircraft came to a hover at the desired place. The first passenger had made his exit when the pilot noticed the chopper settling. Power was added, but to no avail. The aviator slipped off the side of the mountain to gain control of the CH-21, but in the process the main gear struck a huge boulder and was sheared. The chopper was flown to a nearby airbase and landed on a stack of automobile tires.

What caused the Shawnee to lose effective lift? The CH-21 had been hovering crosswind to obtain maximum lift. At that level the wind was gusty and when it ceased in velocity the extra lift was lost. So, to put it mildly, the chopper had been "riding a gust." When hovering on the windward side of a mountain, extra lift is obtained. However, when the wind lets go — look out.

An aviator without mountain flying experience should not be given solo missions requiring mountain work until he has had some extensive training. A newly graduated aviator does not have the training to cope with the mountain elements. Needless to say, the Army flight training program could use a block of practical flight instruction on high altitude operation, if nothing else but to adjust a student to the altitude and turbulent wind.

Mountain work is advance work, a kind of graduate degree the pilot acquires by study and experience after he has received his undergraduate diploma. As an aviator, nothing but hard unrelenting training and attention to detail converts the relatively inexperienced aviator into a mountain man able to cope with the high country. Perhaps to compare sea level flying with mountain flying, one can say, "As much alike as hunting daisies and stalking lions."



Like some other aviators we've known, Frozzleforth modestly considers himself the world's greatest

HORATIO FROZZLEFORTH, IP

Captain Lawrence F. Beyer

ROTTEN HOUR to be taking off," thought Capt Horatio Z. Frozzleforth, III. "I wonder why the old man needs to leap off at 0530 anyway?... That party last night sure was a swinging affair!"

If Frozzleforth hadn't considered himself the world's greatest aviator, he'd have been in no condition to fly.

"Weather at destination is forecast at 700-2 with light rain, sir."

That was Lieutenant Smith speaking. Frozzleforth considered the young lieutenant. He seemed a nice enough chap, but something of a plodder. He must have spent 30 minutes preparing a flight plan, checking weather, NOTAMs, etc. With a sigh, he thought that Fort Rucker just wasn't

---

Capt Beyer wrote this article while TDY with USABAAR

HORATIO FROZZLEFORTH, IP

turning out kick-the-tire, light-the-fire tigers any more. Why he remembered the time when he . . .

"Hadn't we better get going, sir?"

"What? Oh yes, might as well."

With a flourish, Frozzleforth scrawled his illegible signature across the bottom of the 175 without reading the boring details.

The mission had originally been planned as a local tactical checkout for Lieutenant Smith, but the plans were altered when the brigade commander had called for transportation to Cowpatch AAF. "The way these gravel agitators make demands on us," thought Frozzleforth, "you'd think we didn't have anything else to do but support them. Oh well, the day won't be a complete loss. We can get some instrument practice, then do the tactical work after we get back this afternoon."

Colonel Hardpants, attache' case in hand, was pacing next to the Beaver when they arrived.

"Did you get the word, Captain, that I wanted to be off the ground by 0530?"

"Yes siree, Colonel," replied Frozzleforth, flashing his most engaging smile. "It's only 0525 now. We'll be airborne on time, no sweat!"

"These ground pounders," Frozzleforth mumbled to himself. "They think every flight is such a big deal. Climb in, Lieutenant. Since the old man's so hot to trot we won't waste any time on a walk-around."

They would have almost made the 0530 takeoff, if Frozzleforth hadn't run off the taxiway when he looked down to make his mag check on the roll. By the time he and Smith shut down, got out to push the U-6 out of 6 inches of mud in which they had become mired, got in, restarted and finally took off, it was 0600.

"Better use all the fuel out of the rear tank first, Lieutenant. It will improve the c.g. We can transfer wing fuel later." It wasn't exactly according to the -10 of course, but Frozzleforth had his own little procedures and the aircraft really was easier to fly if it wasn't so tail heavy.

"Let me show you something about leaning out this dude that they never showed you in school. You won't find this in the book, but if you just pull the mixture back a skosh more than they rec . . . "

Suddenly there was nothing but silence from the engine.

"This - uh - won't happen if the carburetor mixture is adjusted properly. It's getting so you can't trust your mechanics any more," said Frozzleforth, as he jammed the mixture to full rich. In the process, his hand also pushed the propeller to full increase and, as the engine roared back to life, the prop revved past 2450 before Lieutenant Smith was able to pull it back within limits.

"Well anyway you - ah - get the idea about leaning it out. Remind me to write up that overspeed." As he spoke, Frozzleforth stole a look at Colonel Hardpants and was relieved to see that the color was beginning to return to his face.

"Sorry about that, sir. Couldn't happen again in a million years!"

It wasn't long before they entered the forecast weather, and Frozzleforth thought he'd best practice some partial panel work as he hadn't done any since his last instrument check some 10 months ago. "The whole secret of partial panel is being extra smooth on the controls. Just watch how your old dad does it."

Time passed. Frozzleforth squirmed in his seat. He was dreadfully uncomfortable. His feet were wet and cold from wading in the mud before takeoff. His left shoe was actually full of mud. He almost wished he'd worn boots for a change rather than low quarters. Perhaps if he just slipped off his left shoe and dumped some of the mud out of it he'd feel better.

Lieutenant Smith was busy doing something with his computer. "No need to bother him," thought Frozzleforth. "A sharp IP can do two things at once."

Carefully, the world's greatest aviator bent forward and began to untie his shoe. "Needle, ball and airspeed. Everything looks fine. Good grief, a knot. Won't take a moment to . . . "

"What are you doing?"

Frozzleforth looked up. The airspeed was 63 knots, altitude increasing and turn needle slightly deflected to the right. Instinctively he reacted, adding power, pushing the control column forward, and— rolling *right?*

Lieutenant Smith snatched the cardboard cover from over the attitude indicator as they went through the inverted position and the gyro tumbled. Frozzleforth noted that the airspeed was going through 140. He pulled off all power and attempted to straighten the turn needle. About that time they broke out of the overcast, heading straight down. Both he and Smith hauled back on the controls in an effort to make the U-6 swap ends. The old Beaver groaned under the stress,

". . . We'll just cancel our IFR and press on under the overcast"

but finally leveled 500 feet above the pine trees.

Frozzleforth turned with an apologetic grin to the colonel and was much relieved to see him sleeping peacefully. Or had he fainted? Well no matter. However, the colonel's attache' case had flown up from the floor during the gyrations of the recovery and had dealt him a nasty bop on the eye. "He'll have trouble explaining that shiner to Mrs. Hardpants," thought Frozzleforth with a chuckle.

"No need to tell ATC about our - -ah unscheduled descent, Smith. We'll just cancel our IFR and press on under the overcast."

For a while everything went smoothly. Even the colonel had awakened (revived) and was mumbling much less to himself than he had been. The forward tank went dry on schedule and Lieutenant Smith switched to the center tank and started fuel transfer. Thirty seconds, a minute, five minutes passed. The forward tank gauge showed no increase. With a sick feeling in his stomach Frozzleforth reached for the maintenance forms, knowing what he'd find even before he looked. There it was, just as he feared: the wing tanks had not been filled.

Smith rapidly spun his computer and announced, "If the center tank was full when we started, and if we make our ETA at Cowpatch, we'll have 1 gallon at arrival. That's a pretty slim reserve."

"Plenty of fuel," replied Frozzleforth. "I know that Cowpatch ramp like the back of my hand. We don't have to taxi 50 yards after we turn off the runway."

Lieutenant Smith opened his mouth to say something, but thought better of it. He shook his head in resignation and put on his parachute.

Thirty miles out from Cowpatch the visibility was so poor and the ceiling so low that even Frozzleforth had to admit that he couldn't fake it VFR any longer.

"Cowpatch Approach Control. This is Army 56669. Over."

"Army 56669. This is Cowpatch Approach Control. Go ahead."

"Roger, Cowpatch, 669 a U-6, 30 miles south at 1,500 feet. I'd like to pick up an IFR clearance to Cowpatch and a radar approach straight in."

"Army 56669 is cleared to the Cowpatch VOR direct to hold on the 170° radial. Climb to and maintain 2,500 feet. Expect further clearance at 20. Over."

The time was then 45.

"Negative!" Frozzleforth almost screamed. "I'm unable to hold due to fuel considerations. Request an immediate approach. Over!"

"Army 56669, are you declaring an emergency? Over."

"Well - ah - negative, Cowpatch, but I'm a bit short on petrol and would appreciate an immediate approach. Over."

"Army 669, I'm unable to approve. Hold as instructed. Over."

With a sob that was nearly audible, Frozzleforth gave in. "Cowpatch Approach Control. Army 56669. My fuel state is - ah - more - ah - critical than I realized and I'm declaring an emergency. Over." The last words of his transmission had a peculiar note of resignation in them.

"Roger, Army 669. Radar contact 25 miles south. Climb to 2,500 feet. This will be a straight in precision approach to runway 17. Weather at Cowpatch is 300 feet broken, 1 mile in light rain. Wind 080 at 12 knots, gusting to 18. Altimeter 29.85."

Frozzleforth glanced at Smith.

"A piece of cake my boy. Just you watch old H. Z. drive this bird down final like it was on a wire."

Lieutenant Smith didn't answer. He was occupied adjusting his shoulder harness and tightening his helmet chin strap.

Frozzleforth considered it an excellent approach. True, his heading did wander 10° either side of course. But his vertical speed on final stabilized between 1,000 fpm down to 500 fpm up, and his airspeed was pegged between 55 and 120 knots.

The controller mentioned to his watch supervisor that some nut was doing acrobatics on final and to alert the crash crew. To his credit, he stuck with it.

Frozzleforth, a self-satisfied smile on his lips, bore down on the gauges (and the ground). Smith tightened his shoulder harness and watched the instruments in horror. Colonel Hardpants just sat there, the tears trickling down his cheeks. He wondered why he had survived Anzio, Omaha Beach, Bastogne, the Pusan perimeter, and 13 months as an advisor in Vietnam only to meet his end at the hands of Capt Horatio Z. Frozzleforth, III.

But clean living and determination paid off. For, only 150 feet below minimums, they broke out and were, by some lucky chance, within sight of the runway.

"You've got it, old man! Show your old dad how you can land this machine."

The startled Smith grabbed the controls and tried to bend the Beaver around to align it with the runway. He made a valiant effort and almost pulled it off.

"You forgot your flaps, Lieutenant. What's the matter with you today?" Frozzleforth growled. "You can't let a little weather fluster you. Don't bother with them now. I'll get them for you."

With that, the intrepid IP pumped down takeoff flaps, which immediately ballooned the U-6 back into the overcast.

"I've got it," said Frozzleforth, congratulating himself on how quickly he reassumed control. "An IP's got to be quick in recognizing a potentially dangerous situation and taking the proper corrective action," he told himself.

They broke out again. "You've got it."

Smith tried. He really tried. He rounded out, lowered a wing as much as he dared, and kicked rudder hard in an attempt to get the Beaver as nearly aligned with the runway as was possible before touchdown.

The U-6 touched down in a crab, bounced, and stalled at the top of the bounce. As a wing started to drop Frozzleforth, belatedly reached up to apply power. He might have saved himself the trouble, for it was at this moment that the fuel-starved engine quit.

The aircraft slammed down on the left gear hard. After what seemed an eternity, the other wheels touched and the crosswind swerved them to the left.

Frozzleforth later stated that he didn't remember exactly when the swerve became a groundloop or, in fact, exactly when they left the runway. But he did remember hitting the ditch. That was just before the right landing gear broke off, the wing crumpled, and his passenger began screaming obscenities at him.

Captain Frozzleforth let his mind wander back to the findings of the accident investigation board. He winced as he remembered some of the words used by the division commander. "Incompetent — willful disregard of regulations — dangerous — nincompoop!"

"Nincompoop? Really, general," he'd thought. "That's a bit severe!"

But Horatio Z. Frozzleforth, III, Captain, United States Army, is not easily daunted. Full of optimism, he went forward to his new assignment as S-4 for the aviation detachment, MAAG, Antarctica.

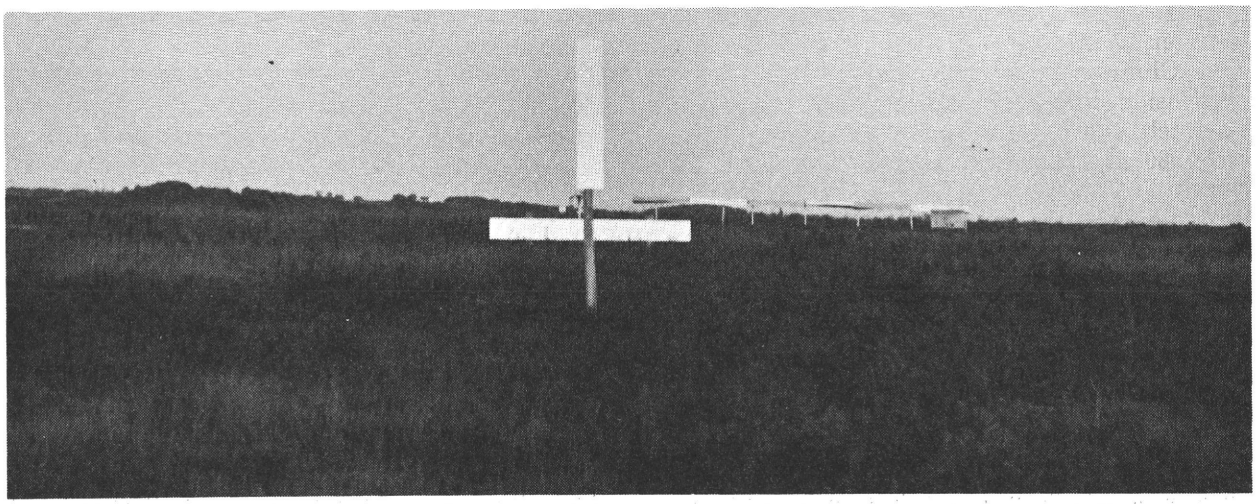
What new adventures await our hero? Will we ever hear of his exploits again? I fear we will.

RED WING

Pierce Wiggin

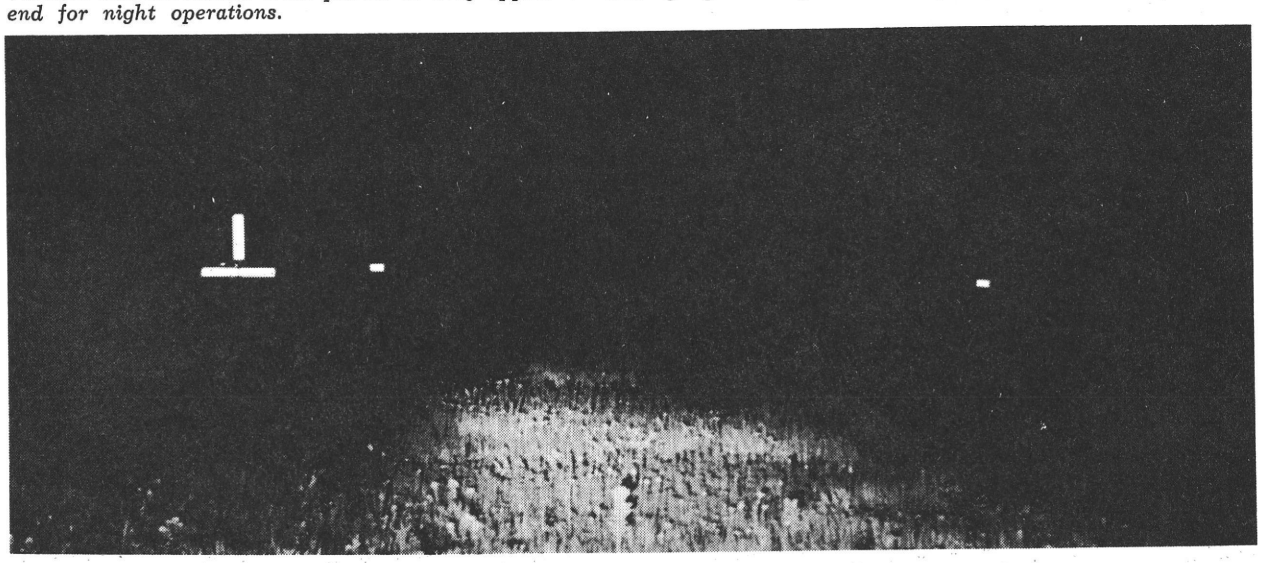
"NECESSITY!" That's the answer Gordon Fisher gave when we asked what prompted his development of the unique night lighting system in use at the Red Wing, Minnesota, Airfield.

Fisher, a World War II bomber pilot and now an Air Force reservist, flies an Aero Commander for the Red Wing Shoe Company. He explained: "We started by flying in and out of the home

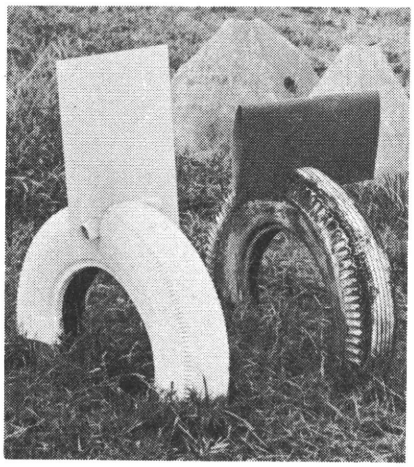


Vertical and horizontal cross panels as they appear in daylight. Red and white panels behind horizontal panel mark runway end for daylight operations.

Vertical and horizontal cross panels as they appear in landing light at night. Small reflectors mark runway end for night operations.



The advantages of reflective lighting for hasty airfields and strips are readily apparent . . .



Discarded tires and reflective sheeting. Blue panel in unpainted tire marks taxiway turnoff.

field only during daylight hours. This wasn't always convenient and we found ourselves coming in at dusk and later. I realized then that we had to have some type of lighting. But the airfield budget wouldn't allow for a conventional system . . ."

Using discarded tires, sheet aluminum, Scotchlite® reflective sheeting, and ingenuity, Fisher soon had the 3,400-foot strip outlined with reflective panels to pick up his landing lights and give him the same night approach picture as a fully lighted runway.

The tires, buried approximately 6 inches in the turf to keep them erect, were used to hold the reflective panels above the level of winter snow. Painted with CODIT® (Mil Spec R-136-89A, 4.3.2.1), a reflective liquid, these tires also reflect light, adding to the approach picture. Mounted in slits cut through the tops of the tires, the reflector panels are easily removed and replaced.

Atop his hangar Fisher mounted a small rotating beacon and four surplus semaphore lights, two red and two green. These were placed parallel to the strip with one green and one red light facing in each direction. To separate the red and green lights, Fisher mounted a 16-foot length of 18-inch board between them and painted it a nonreflective flat black.

He explained that he didn't know what to expect from this arrangement and was pleasantly surprised the first time he lined up with the strip from the air at night and saw a clear white light. With any deviation left or right, the white light quickly changed to red or green, permitting him to line up with the strip from either end.

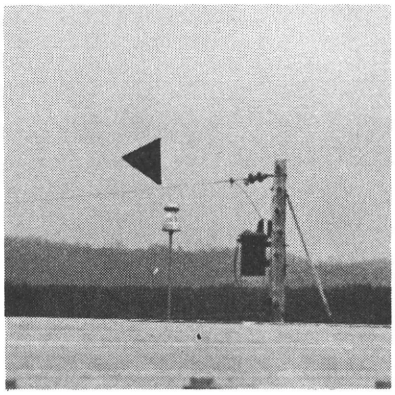
Fisher next experimented with vertical and horizontal reflective panels to establish the correct approach to each end of the strip. These are the first pan-

Runway reflectors as they appear in landing light during night roundout

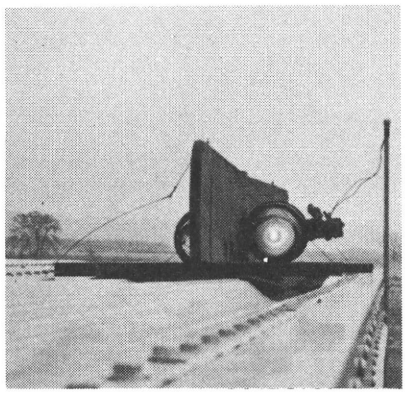
els his landing lights pick up. The approach is controlled by aligning these panels in the shape of a cross, in much the same manner as an ILS approach. If the horizontal panel moves up, it indicates the approach is high; if it moves down, the approach is low. If the vertical panel moves to the left, it indicates the aircraft is to the right of the approach path; if it moves to the right, the aircraft is to the left of the approach path.

This sight picture is maintained until the landing lights pick up the white reflections that outline the strip. The landing is then completed as it would be on any lighted runway. The taxi strip to and from the hangar is outlined by blue wicket type reflectors.

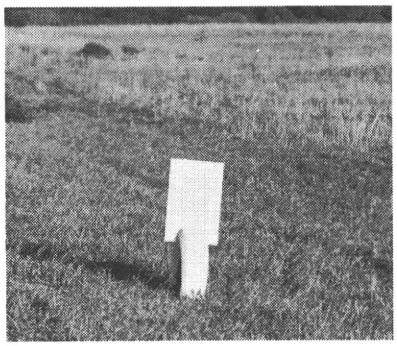
With the rotating beacon for orientation, the semaphore lights for alignment, the reflective cross to guide his approaches, and with strip and taxiway outlined and readily visible in his



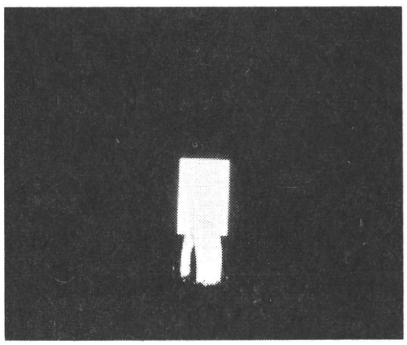
Small rotating beacon mounted on hangar roof



Semaphore lights mounted in pairs of red and green parallel to runway and separated by board give distant alignment

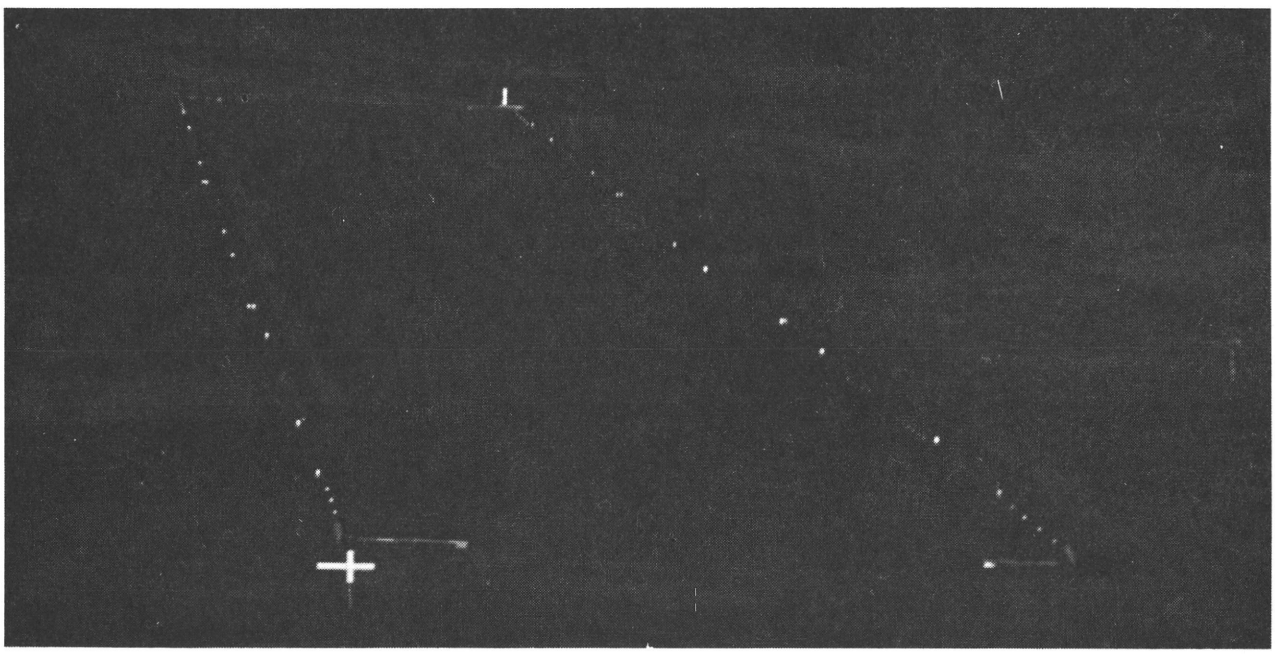


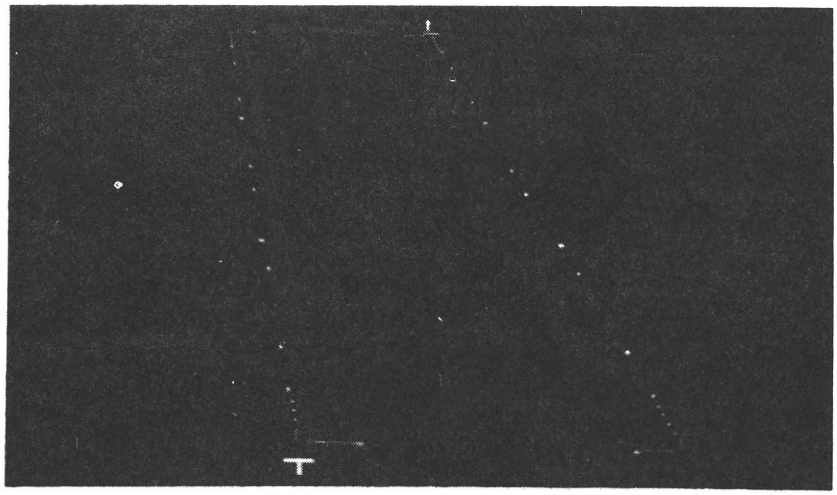
Tire and panel as they appear in daylight



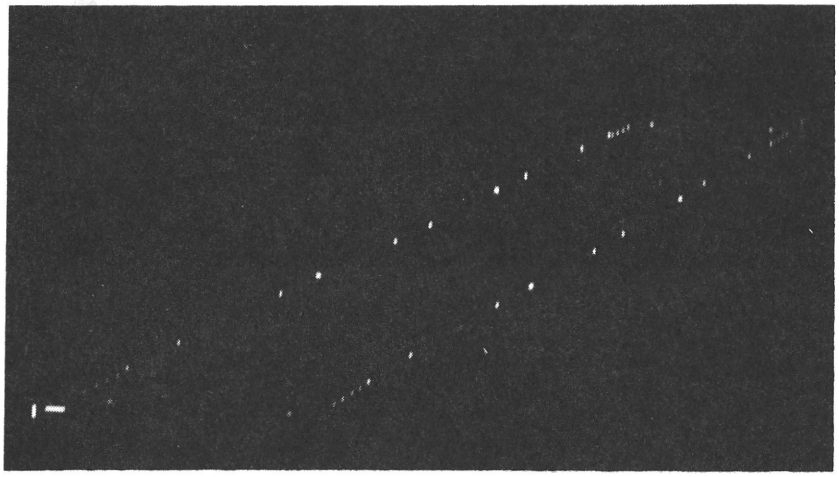
Tire and panel as they appear in landing light at night

Cross and panels reflect landing light during approach. Vertical panel is to right of center, indicating aircraft is left of runway.



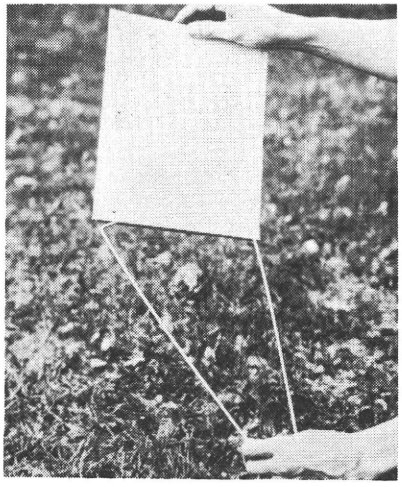


Cross becomes "T" and indicates high approach

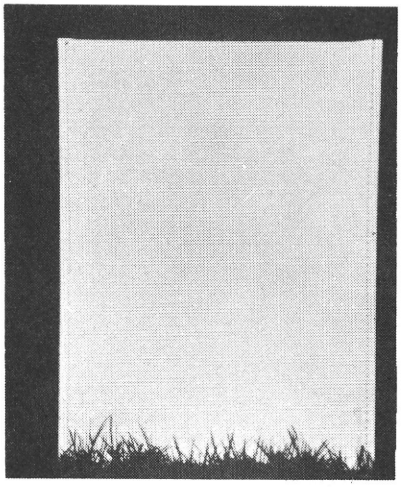


Vertical panel to left of horizontal panel and runway reflectors show far right approach

9" x 12" wicket reflector slips over wire frame for mounting



Wicket reflector mounted in turf as it appears in light at night



landing lights, Fisher had his night lighting system, at a fraction of the cost of conventional lighting. It has been in use for 3 years and he reports it is completely satisfactory.

As a further refinement, Fisher installed a radio controlled switch to turn on the beacon, semaphore lights, hangar lights, and even open the hangar door. This switch is activated from the air by transmitting on a preselected frequency.

The advantages of reflector lighting for hasty airfields and strips are readily apparent:

Economy— Runway and taxi strip wicket type reflectors, designed to slip over wire wickets supplied as part of the reflector units, are available at a unit cost of less than $2.00. These have a reflective area of 9" x 12" and are reflective on both sides. Designated Type B-1, FSN 9905-049-5124, they meet the requirements of Mil Spec R-7264.

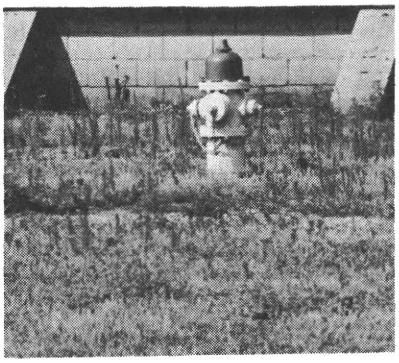
Ease of installation— Aside from the fact that they require no wiring and no power source other than aircraft landing lights, wicket reflectors can be installed or dismantled in a matter of minutes in the same way you install or dismantle croquet wickets.

Ease of transporting— Because of their flat shape and light weight, wicket reflectors can be packed and carried with minimum effort in a very small space.

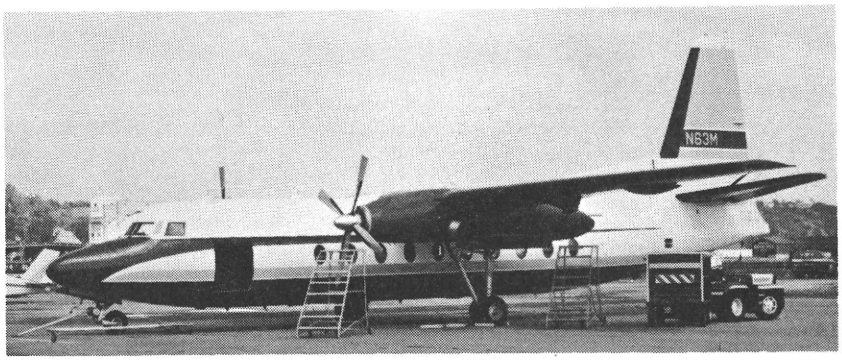
Ease of maintenance— Except for occasional cleaning, wicket reflectors require no maintenance.

Durability— Reflector panels in use at the Red Wing Airfield have been installed for 3 years and show no signs of deterioration.

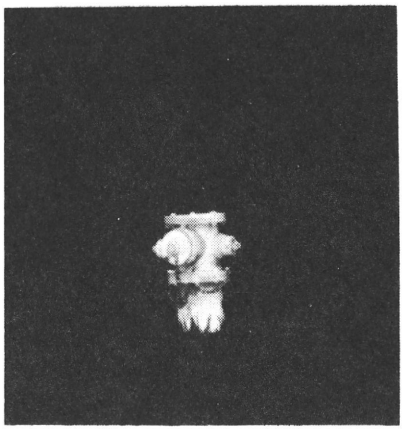
What makes all this possible? Scotchlite® reflective sheeting, a product developed and made by



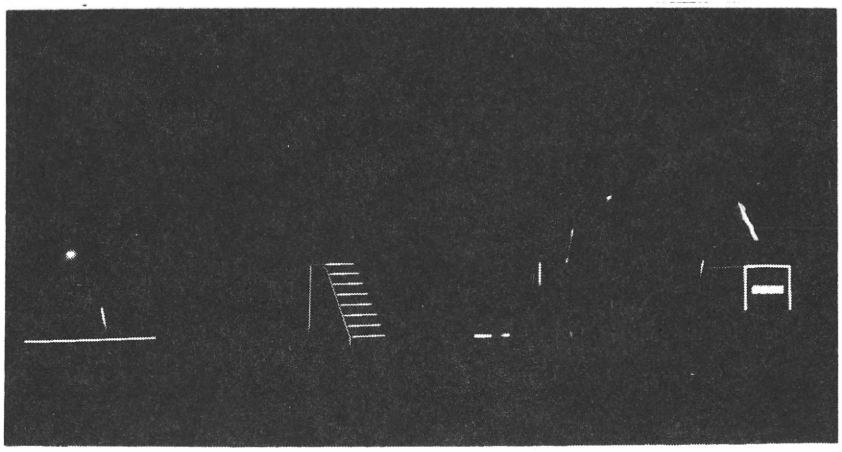
Fire hydrant painted with reflective CODIT® liquid



Airfield equipment marked with reflective sheeting in daylight



Same hydrant photographed in light at night



Outline of equipment is reflected by aircraft landing light

the Minnesota Mining and Manufacturing Company, is made by bonding millions of microscopic glass bead lenses to a plastic base. Each bead is an optically perfect reflex reflector that bounces incoming light back to its source with glareless brilliance. In addition to reflective wickets, this sheeting comes in a variety of colors and is packaged in rolls and sheets. It can be hand cut, die cut, or cut in stacks with a handsaw to any shape.

The brightness values (reflective brilliance) vary with color and cover a range from 15 to 200 times brighter than a white painted surface. Silver is the brightest color.

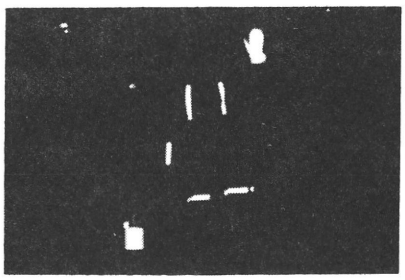
With a pressure sensitive adhesive backing, this sheeting can be pressed in place and bonded by hand. It also comes with a "dry" adhesive which is heat or solvent activated, and is designed for mechanical application in production quantities.

The reflective sheeting described meets the requirements of Mil-R-13689A, 10 January 1956, a coordinated military specification on reflectorized sheeting. It is available on GSA Contract No. GSOOS47778-FSC Group 83 (fabrics, reflective).

Reflective materials have a wide variety of other aviation uses. These were demonstrated recently at an airfield safety seminar conducted by the Minnesota Mining and Manufacturing Company. Included were reflective markings for obstructions, equipment, and personnel, as shown by the accompanying photos.

Man and fire extinguisher in daylight

Man and fire extinguisher at night. Reflective material comes in variety of forms, including sheeting, film, liquid, and even chalk.



Personal Command Letter

The following letter was written by a commander from another service to the aviators in his command. We think it bears repeating to all aviators.

SINCE I BECAME your commander we have had three fatal accidents and two known flight violations. Four of these occurrences have one thing strikingly in common: all the pilots had approximately the same rank and experience that you have.

You are already acquainted, by verbal information or direct association, with our three fatal accidents. One of them was probably caused by the aviator's strong desire to win a competition and by errors of sensory or planning judgment stemming from his limited pilot experience. This aviator had something in common with the other four but he was junior and less experienced.

The causes of our other two fatal accidents will have to be recorded as undetermined. However, in both cases the circumstances indicate that the aviator lost his life while engaged in a flight maneuver that was not a part of his mission, not authorized, and which he had probably been told many times was unwise.

The aviators in these two fatal accidents and in our recent flight violations all had these things in common: all were the same rank, all had a wealth of experience and skill in the aircraft

crash sense

PREPARED BY THE U. S. ARMY BOARD FOR AVIATION ACCIDENT RESEARCH

they were flying, all were on the "downhill" half of their first duty tours, all were graduating from the "nugget" stage, and their commanding officers felt that all were above suspicion of knowingly violating safe flight procedures.

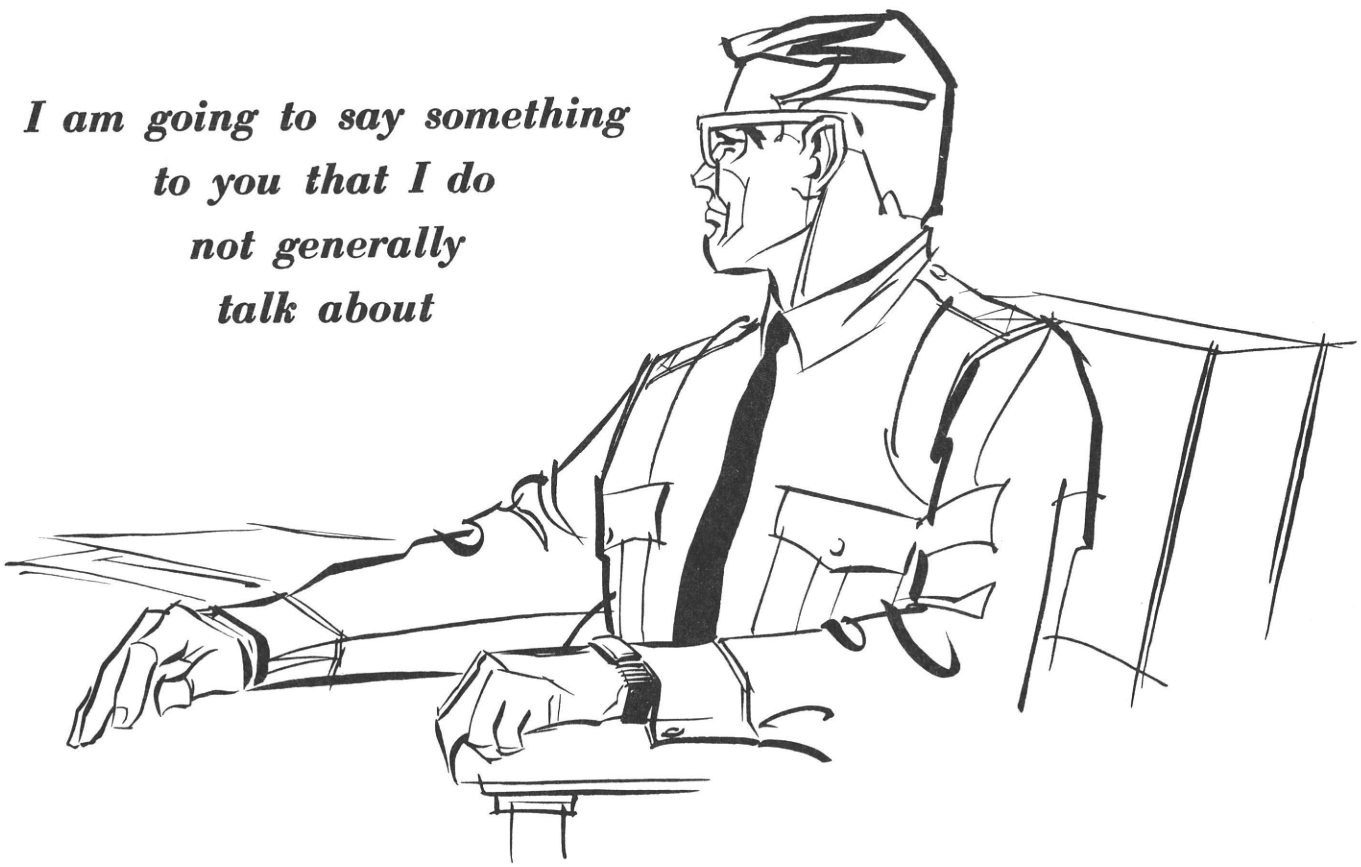
Your rank and experience closely parallels that of these four aviators and that is why I am writing this letter to you. Obviously you are not alone in belonging to this category. The senior aviators in our service are graduates, or survivors, of this stage in every aviator's life. I am asking *you* to survive and to keep a clean flight record while doing so.

I am unable to define the wild emotion or random idea that may have led these four aviators to flirt with *excess* danger. Certainly, all of them knew better through training and indoctrination.

I suspect that they may have fallen prey to that feeling of invulnerability which often results from a high state of proficiency coupled with love of flying and youthful exuberance. How often have you said "That can't happen to me"? If you are sticking to the rules, the odds are very high that "it" *can't* happen to you. If two of our lost pilots did break the rules, they are stark proof that "it" can happen to highly skilled and respected men when they disregard unforgiving aviation axioms.

If these four aviators had been judging someone else, they would have called their four incidents cases of poor judgment. All but one of the four might have been trying to impress others with a little showmanship — a reversion to juvenile thinking. If you want to impress others, all we have to do is show them a day and night of routine operations. Good operations impress anyone.

I am not trying to suppress the "tiger" attitude in you. I am trying to convince you that enough challenge and danger is built into our work to satisfy any normal appetite for thrills. I ask you to join me in the satisfaction the older pilots feel



in fulfilling each mission of each flight safely and effectively and then debriefing the lessons learned — *and* the thrills.

If you have some idea why a trusted pilot would feel an impulsive desire to seek extra thrills, I would like to know about it and discuss it with you. It is the type of urge we must examine and understand if we are to prevent further loss of pilots like yourself.

Ask yourself, also, if you are above taking advice, listening to briefings, or heeding warnings you have heard hundreds of times before. This may be the time in your flying career when some parts of your flying duties are growing stale for you. If you feel this way, talk it over with your CO, your safety officer, your flight surgeon, your wife, or someone else you trust. But don't let a stale attitude kill you.

I am going to say something to you that I do not generally talk about. In addition to the other reactions I feel toward fatal accidents, I feel a certain resentment toward the aviators who caused the accidents. It is not just resentment because I am the boss and they broke my rules. I resent it if they were so good that their COs did not feel the need to caution them every day against taking undue risks. I resent it because they made their unit, fellow aviators, and our service look bad. I resent it because they deprived us of their friendship, and they deprived wives, parents and some tiny babies of a husband, son, and father. I resent it because their accidents, and the grief they brought, did not have to happen. I resent it because they have deprived the nation of skilled fighting men and future leaders.

And, they have made you and the other aviators of your rank and experience suspect in the eyes of their superiors.

This letter is a shot in the dark. I do not know that you are the proper target. I do know that officers of your rank and experience are of the utmost value to this command, to your unit, to the service, and to the United States. Yours is the youth and skill, seasoned by your recent experience, that can accomplish our mission and impart know-how to younger aviators. You bear heavy responsibilities. You know most of your responsibilities well. I want to emphasize that one of your major responsibilities is not just to fly by the rules but to survive by the rules.

I have tried to evoke emotion from you because I believe this is a time for emotion. I fear that fleeting aberrations in normally smooth emotional patterns may have cost us two outstanding young officers. Others may have risked their lives because some stray caprice impaired their normally sound judgment. If you feel any response to these thoughts at all, let your emotions feed your resolve for today and future days. Be a better, safer pilot every day.

When you man your aircraft, you are the commanding officer of that aircraft. Before you man your aircraft, take command of yourself — that you may live to command other aircraft, and other men.

Sincerely,
Your Commander

SURVIVAL KIT HAZARD

An F-104 pilot on a training flight ejected over a desert area and was injured when he reached the ground. Two Army pilots arrived at the site 20 minutes later in a helicopter and landed. No litter or emergency equipment was available and one aviator remained with the injured pilot while the helicopter returned to base for equipment and medical personnel. After the helicopter departed, the injured pilot requested some water and the Army Aviator pulled the handle of the armed survival kit which inflated the raft. As the raft inflated, the metal cover of the seat struck the Army officer in the face. He sustained serious injuries, including a hyphema-detached retina, deep lacerations of the face, adnexal areas of the eye and skull fracture.

BIRD STRIKES

From the CLEVELAND GUARDIAN, Cleland Defense Command, July 1964:

"Lt Harry W. Candler was piloting his Army helicopter at 3,000 feet near the Chardon airport when he spotted a bandit at 3 o'clock.

"Well, not a bandit exactly. It was a chicken hawk.

" 'I saw this tan and white thing flying to my right front,' said the 26-year-old veteran of more than 300 combat missions in Vietnam. 'It was flying alongside the chopper when it swung around and came right at me.'

"Lt Candler tried to swing his craft out of the path of the kamikaze hawk, but too late. The bird smashed through the plastic bubble, sending pieces of the dome flying through the three-place whirlybird.

"The plastic splinters momentarily jammed the controls, dropping the chopper a few hundred feet, but the pilot was able to land safely at the airport.

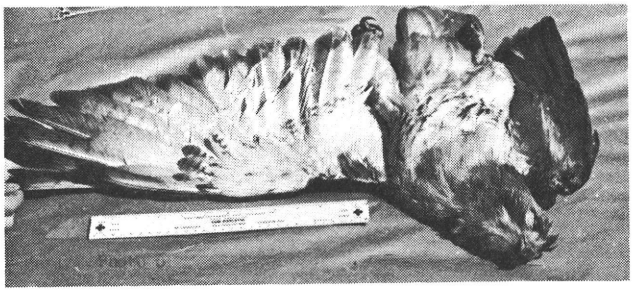
"The hawk, with a 3½ foot wing span, died on the cockpit floor."

* * *

An O-1 aviator took off in a climb to approximately 200 feet when a buzzard collided with the left wing. The aviator continued to climb, flew the traffic pattern, and landed.

Piece of plexiglass (arrow) momentarily jammed cyclic control

Ruler shows size of dead hawk



Bird impaled in leading edge of left wing

CAUSE FACTORS

From the Marine Air Group 26 SAFETY RAISER of 27 August 1964:

"In all of the services, an essential part of each aircraft accident report is the pilot's statement, if available. In this statement, he must include information concerning the cause of the accident and how it might have been avoided. Whenever safety officers gather around the milk bar some of these gems always find their way into the conversation. Here are some of the best we have ever heard and a few go back many years. While we cannot vouch for the veracity of them all, some at least we know are true.

"I consider the primary cause of my accident to be supervisory error — my wife kept me up nearly all night.

"This accident would not have happened if I had overslept as I usually do.

"I consider that I would not have had this accident if I had not been led into making a short, tight pattern by the women sunbathing on a roof below.

"This accident could have been avoided if someone had reminded me to put the wheels down.

"I consider the primary cause of this accident to be design error. If we can have stall-warning devices in the aircraft why not a too-fast-on-final device?

"This accident could have been avoided if my date last night had not been so obstreperous.

"I feel that weather should be a major factor in this accident . . . the warm sun made me sleepy.

"The primary cause of this accident is administrative. I should have never been graduated from flight school.

"I admit that this accident was due to pilot error . . . but there was nothing wrong with my judgment or technique.

"The only materiel failure which occurred was me."

NO GYRO GCA

Early one morning two U-8F aviators departed an Army airfield on a proficiency flight. Forecast weather for the destination area was 1,000 feet broken, 1,500 feet overcast, and visibility 2 miles in light rain and snow.

After takeoff, contact was made with a control center and the VFR flight plan was changed to an IFR plan. The aircraft was cleared to destination at an altitude of 2,500 feet.

Nearing destination, the control center turned the aircraft over to destination approach control and the aircraft was cleared for a series of GCA approaches. Seven approaches were made assisted by the controller on duty at the time the aircraft arrived. After the seventh approach, the controller was relieved and the aircraft made four more GCA approaches guided by his replacement.

The flight plan for return to destination was extended 1 hour and the aircraft made a fifth

approach under the new controller. During this approach, the flight plan extension was approved and the aircraft crew was informed that controller training was in progress, except for the final approach. This message was "rogered" by the aircraft crew. Seven minutes later, at a point approximately 6½ miles from touchdown, the crew asked for a no gyro practice approach. The final controller approved the practice approach and immediately began issuing instructions.

At a point between 4½ and 4 miles from touchdown, the aircraft crew failed to respond to commands given by the final controller and the aircraft started a fast turn to the right. The controller asked if they were having trouble and the crew replied that they were not.

Because of the obvious right turn, the distance away from the centerline, and the nearness of an approaching ridgeline, the controller instructed the crew to continue in a 360° turn to the right and level off to maintain altitude. The aircraft continued in a right turn until it reached the safety limits of the final controller's precision approach radar scope. The controller established that he had lost radar contact and, approximately 13 seconds later, issued missed approach instructions.

The aircraft continued in a right turn and struck high tension wires at a point approximately 4.1 nautical miles from the airfield. It struck the ground a short distance from the powerlines in a level attitude with a high rate of descent and little forward momentum, caught fire and burned, killing both aviators.

Engine analysis indicated that both engines were turning with high power settings when the aircraft struck the powerlines and crashed. In addition to physical evidence, the crew reported no trouble approximately 3 minutes before the accident and *after* the aircraft had entered a rapid turn to the right.

Control analysis indicated that all controls were functioning properly at the time of the accident. The landing gear was down and locked and the flaps were extended, indicating a setting of approximately 15°.

Fuel samples were analyzed and the laboratory report showed no contamination.

A study of the individual flight records revealed that both aviators were experienced, qualified, and current in the U-8F aircraft. Flight physical and health records indicated no recent illnesses that could hamper flying ability.

The aircraft accident investigation board considered that the rapid right turn was caused by one or more of the following:

1. Misinterpretation of the turn needle while transitioning to a no gyro approach.

2. Low airspeed turn with gear and flaps extended, causing the aircraft to fall off to the right.

3. Simulated right engine-out by reduction of power for the no. 2 engine. This consideration was discounted by two members of the board who were well acquainted with the deceased aviators. These members did not feel that the aviators

were the type who would simulate engine-out procedures unless an instructor pilot was aboard.

4. Misinterpretation of the controller's instructions.

The statement of the final controller indicated that he gave the aircraft a 360° turn and level off to maintain altitude because he could tell that it was rapidly approaching the ridge and he felt this was the safest thing to do. However, the board believed that the controller should have issued *climb* instructions instead of *level off* instructions at the same time he issued instructions for the 360° turn.

The board felt that the pilot possibly failed to comply with the 360° right turn instructions because of possible visual contact with the ground about the same time the final controller issued missed approach instructions. It felt that the pilot may have attempted to turn to the runway under VFR conditions, then encountered IFR conditions and attempted at that time to comply with the original instructions.

The board believed that the final controller should have issued missed approach instructions immediately after establishing a definite loss of radar contact. This would have resulted in saving approximately 13 seconds of elapsed time for the pilot to receive missed approach instructions.

After deliberation, the board found the following contributing cause factors:

1. Failure of the crew to comply with the instructions issued by the final controller while on glide path and approximately 4 to 4¼ miles from touchdown.

2. Failure of the controller to issue *climb* instructions rather than *maintain altitude* instructions at the same time he issued instructions to complete a 360° turn to the right.

3. Failure of the crew to execute immediately the missed approach instructions given by the final controller.

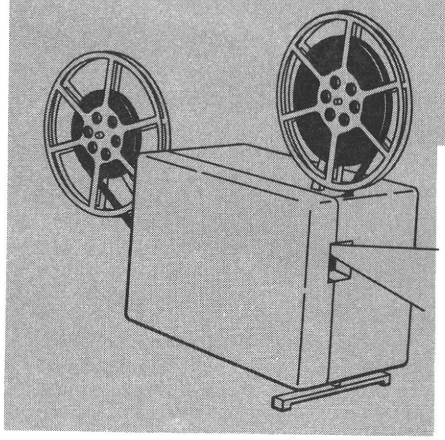
4. The use of excessive transmissions by the final controller before issuing missed approach instructions, delaying the missed approach instructions by approximately 13 seconds.

Recommendations made by the board were:

1. That the Army adopt the transmission break required for Air Force GCA approaches. This break allows the pilot to report any difficulties to the final controller.

2. That a regulation be established to prohibit the practice of no gyro approaches when operating under actual instrument conditions.

3. That all radar approach controllers be made aware of the findings of the board and the importance of issuing concise missed approach instructions *immediately* when an aircraft exceeds the safety zone limits or radar contact is lost.



NOW AT YOUR ARMY FILM LIBRARY

TF 46-3488 "Lessons Learned From Aircraft Accidents – Emotions"

This 16 mm film explains how emotional problems may interfere with efficiency, how to recognize them, and what to do about them to prevent aircraft accidents. The essential and tragic details of two emotionally caused accidents dramatize some of the psychological and physical symptoms of uncontrolled emotions and their potentially hazardous effects on flying. This film is recommended for all Army Aviation personnel.

CLASS E-1

(OPEN CLASS, ANY WEIGHT)

• DISTANCE IN A STRAIGHT LINE: 1,348.8 miles flown by Capt Michael N. Antoniou on 26 September from Edwards AFB, Calif., to Rogers, Ark. (Old record: 1,217.1 miles flown by Bell pilot Elton J. Smith, 17 Sep 52, in Bell 47-D-1 from Hurst, Texas, to Niagara Falls, N.Y.)

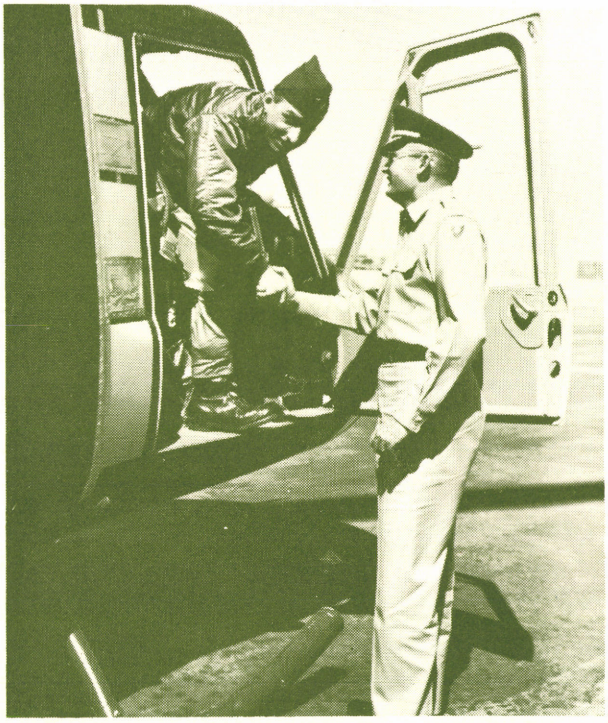
• DISTANCE IN A CLOSED CIRCUIT: 1,614 miles flown by Maj John A. Johnston on 18 September at Edwards AFB. (Old record: 1,531.05 miles claimed by Russian V-8 on 19 Apr 64.)

• 2,000 KILOMETER (1,242.8 MILES) SPEED IN CLOSED CIRCUIT: 139.9 mph flown by CWO Joseph C. Watts on 22 September at Edwards AFB. (Old record: 126.13 mph claimed by Russian V-8 on 19 Apr 64.)

• TIME TO CLIMB TO 3,000 METERS (9,843 FT): 2 minutes, 9.6 seconds flown by CWO Emery E. Nelson on 7 October at Fort Worth, Texas. (Old record: 2 minutes, 17.3 seconds flown in YUH-1D by Army Lt Col Lee Wilhelm at Fort Worth on 14 Apr 62.)

• TIME TO CLIMB TO 6,000 METERS (19,686 FT): 4 minutes, 35.8 seconds flown by CWO Nelson on 7 October at Fort Worth. (Old record: 5 minutes, 47.4 seconds flown in YUH-1D by Maj B. B. Buckner at Fort Worth on 13 Apr 62.)

Maj John A. Johnston climbs from UH-1D and is greeted by his commanding officer, Lt Col Richard J. Kennedy.



• TIME TO CLIMB TO 9,000 METERS (29,529 FT): 9 minutes, 13.7 seconds flown by Capt William L. Welter, Jr., on 7 October at Fort Worth. (Old record: 14 minutes, 30.7 seconds flown in H-43B by Air Force Lt Col F. M. Carney at Bloomfield, Conn., on 24 Oct 61.)

CLASS E-1.d

(3,858 - 6,614 POUNDS)

• 1,000 KILOMETER (621.4 MILES) SPEED IN CLOSED CIRCUIT: 146 mph flown by Major Johnston on 16 September at Edwards AFB. (Old record: 134.9 mph flown in YUH-1D by Maj William F. Gurley on 20 Apr 62 between Hurst and Longview, Texas.)

CLASS E-1.e

(6,614 - 9,921 POUNDS)

• DISTANCE IN A STRAIGHT LINE: 1,348.8 miles flown by Captain Antoniou on 26 September from Edwards AFB to Rogers, Ark. (Old record: none.)

• DISTANCE IN A CLOSED CIRCUIT: 1,242.8 miles flown by CWO Watts on 22 September at Edwards AFB. (Old record: none.)

• 2,000 KILOMETER (1,242.8 MILES) SPEED IN CLOSED CIRCUIT: 139.9 mph flown by CWO Watts on 22 September at Edwards AFB. (Old record: none.)

CWO Emery E. Nelson, left, and Capt William L. Welter, Jr., right, are shown with Bell test pilot Lou Hartwig and UH-1D.

U.S. Army Claims 10 New Rotary Wing Records

A RECORD-SHATTERING performance by a UH-1D helicopter has enabled the Army to claim 10 new world helicopter flight records which include the smashing of two Russian marks and the toppling of the oldest record on the books.

The challenged Russian records are a distance mark of 1,531.05 miles and a speed mark of 126.13 mph — both claimed in the open class. The Army's "Huey" upset the distance mark by flying 1,614.6 miles and the speed record by hitting 139.9 mph.

The oldest helicopter flight record on the books was established in 1952 when a Bell 47-D-1, competing in the open class, was flown 1,217.1 miles in the "distance in a straight line" event. The turbine powered UH-1D topped this by flying 1,348.8 miles.

During a 3-week period ending last October 7, the UH-1D participated in a series of six flights observed by officials of the National Aeronautic Association which is the official U. S. representative of the Federation Aeronautique Internationale (FAI) of Paris, France. The latter is the official certifying body for all world aircraft records and is now reviewing the Army's claim to the 10 new records.

Five Army Aviators of the U. S. Army Aviation Test Activity, Edwards AFB, Calif., took part in the record-breaking flights held at Edwards and at the Bell Helicopter Co., Fort Worth, Texas.

If certified, the claimed records listed below will give the Army 22 of the 26 marks held by the U. S. (Russia holds 14; France 9; and Czechoslovakia, 1.) One Army-held record has been broken by Russia since the FAI certified six records set by an Army OH-23G Raven last year (see DIGEST, July 1964).

Continued on inside back page