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Richard K. Tierney
Editor

The mission of the *U.S. Army Aviation Digest (USPS 415-350)* is to provide information of an operational, functional nature concerning safety and aircraft accident prevention, training, maintenance, operations, research and development, aviation medicine and other related data.

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Articles, photos and items of interest on Army aviation are invited. Direct communication is authorized to: Editor, *U.S. Army Aviation Digest,* P.O. Drawer P, Fort Rucker, AL 36362.

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The Helicopter—Design Frontier, Airborne Visibility

Brigadier General
Samuel G. Cockerham
U.S. Army, Retired

THE HELICOPTER as a tank killer has long been the dream of visionaries in the Army. How close it is coming to being a tank killer may be gleaned from an examination of combat experiences and the basic components in the attack helicopter weapons sytem.

To be successful in battle an Army must be able to move, shoot and communicate better than its adversaries. No Army can hope to be successful without accomplishing these three functions in a superb and unexcelled manner. Any Army which has an advantage in one of these areas of combat power enjoys a relative advantage over its adversary. Implicit in this accomplishment is the need for a fighting force whose equipment enables it to operate in all-weather conditions and at night with zero degradations from daytime performances. If work can

be done at night and during conditions of reduced visibility with equal ease of day performance, in effect, the force strength increases by a factor of two-plus times the current force capability.

Exploiting the third dimension of mobility (defined as the distance from GI boot top height to two helicopter main rotor diameters* is no longer the challenge that it was once thought to be. It is now closer than ever to becoming a reality. With new helicopters on the production line or the final engineering development line—such as the UH-60 Black Hawk, and the AH-64 attack helicopter, the U.S. Army has in the offing two of the most versatile machines that it has ever fielded. These two helicopters will make it possible for commanders to move the mass of their firepower with speeds and consistency impossible in previous conflicts. Notwithstanding, if the tank-threat problem is to be solved, the challenge remains in the area of providing continuous, dependable, day, night, rain, shine, sleet or snow, all-weather visibility for positive mobility and combat engagement purposes.

Considering that tanks employed in mass formations will include air defense with guns greater than 50 calibers, the helicopter must be capable of operating in this mid-intensity combat environment. To kill tanks the helicopter should be capable of continued flight after being hit by guns in this size range. The AH-64 and the UH-60 have been designed with this purpose in mind. Both machines will accept hits anywhere in the area of the upper rotating controls and the main rotor blade ystems. This survivability feature represents a great improvement over the design features of the UH-1 Huey.

A glance at data recorded in Vietnam during Operation Lam Son 719 reveals the capability of the helicopter to accept hits and to survive in a mid-intensity combat environment involving antiaircraft guns. It should be noted that the UH-1, originally developed in the 1950s was designed only to withstand the stresses and strains of normal aeronautical flight conditions. Survivability, as known today, was not a design parameter; however, the survivability of the UH-1 in a mid-intensity combat environment is most impressive as may be noted in figure 1.

It is most significant to note that half of the aircraft were never hit by guns and of those that were hit, two-thirds were repaired at the unit level of maintenance with organic tools and personnel skills. One of the helicopters was hit and repaired on five separate occasions and was still flying on 12 March 1971, the date of this aircraft damage survey. About 9 percent of the helicopters were destroyed on first encounter with hostile fire. Of this percentage some of the aircraft could have been repaired and returned to service if they had been recovered; however, due to the aircraft landing in hostile areas behind enemy lines, recovery of the downed aircraft was not possible. Nonetheless, the Operation Lam Son 719 aircraft experience in combat does indicate that the helicopter can operate and survive in a mid-intensity combat environment.

An indication of the helicopter's effectiveness is apparent in figure 2. On an average day 4,167 sorties were flown involving 1,651 hours with 1.7 helicopters destroyed and 11.2 damaged. Of those listed destroyed, some were recovered and components such as engines, gearboxes, accessories and instruments were recycled to maintenance and supply. It must be noted that Operation Lam Son 719 does represent a mid-intensity combat environment and U.S. Forces were not permitted to operate on the ground in Laos. Thus, normal fire support from U.S. ground troops, artillery, infantry, armor, etc., was not available. The airmobile operations were supported by gunships, close air support and Republic of Vietnam troop units on the ground in Laos.

A more recent example of combat experience in Vietnam involving UH-1 armed helicopters lends

*Commanders have long dreamed of being able to move military units with ease over the battle area unencumbered by conditions of terrain and weather. At the altitude of the GI boot top height, the helicopter has the potential capability of providing the commander with that freedom of movement. For it is at this height above the earth's surface that the helicopter retains its maximum protection through the use of terrain cover and concealment—also known as the nap-of-the-earth. From this altitude to two rotor diameters (about 100 feet) above the earth's surface, the helicopter is in the hover in ground effect (HIGE) distance above the ground. It receives lift assistance from the rotor downwash striking the earth's surface, thus less power is required. At altitudes greater than two rotor diameters, the helicopter becomes exposed to SAMs and antiaircraft guns and partially loses the protection offered at lower altitudes by terrain features. Moreover, the helicopter requires greater power when working at this altitude, hover out of ground effect (HOGE) distance, than it does when it is flying down at the GI boot top height above the ground in the HIGE zone.

an insight into the potential use of armed helicopters with precision guided missiles (PGMs) to kill tanks. Two armed UH-1s first demonstrated in actual combat that enemy tanks could be killed by tube-launched, optically-tracked, wire-guided (TOW) missiles launched from helicopters. The two Hueys equipped with TOW missile launchers and controls arrived in Vietnam on 24 April 1972. Later, on the morning of 26 May they were flown from Pleiku to attack enemy units assaulting the city of Kontum. By noon of that day, nine enemy tanks had been destroyed. By the end of the month, the two helicopters recorded 47 confirmed kills, including 24 enemy tanks—a record unique in the annals of warfare. This event confirmed the saying, "If you can see it, you can kill it."

The AAH airframe is a vast improvement over the UH-1, and thus far superior in all areas of performance. As an example, the AAH is designed to operate worldwide without degradation of performance. This is something that the UH-1 could not do in Vietnam. On hot days, and at high elevations the UH-1 had to be flown at reduced weight in order to hover, take off and land safely during combat missions.

The AAH's primary armament for the antitank mission consists of the Helicopter Launched Fire and Forget (HELLFIRE) missile system having a range greater than that of the primary threat weapon and with practical pinpoint accuracy. The AAH's visionics system offers compatible detection, recognition and identification. The combination of the PGM, mobility and visionics

Figure 1

Operation Lam Son 719
1 February to 12 March 1971

(Data was collected from actual aircraft log books by maintenance personnel during Operation Lam Son 719, February to April 1979.)

- Two combat aviation battalions
- Authorized helicopters 247 UH-1s
- Assigned helicopters.....298
- Destroyed helicopters.....33
- Damaged helicopters.....113
- Total damaged, destroyed, turned-in 146
- Total **not** damaged, destroyed, turned-in.....152

Criteria	Destroyed	Damaged (Repaired in unit)	Damaged (Turned in to maintenance)	Not Damaged
Strike	27	0	0	0
0 Hits	0	0	0	152
1 Hit & repaired	5	70	16	0
2 Hits, repaired	1	17	1	0
3 Hits, repaired	0	4	1	0
4 Hits, repaired	0	3	0	0
5 Hits, repaired	0	1	0	0
Total	33	95	18	152
Percent	11	32	6	51

Helicopters Destroyed/Damaged — Operation Lam Son 719
(35 Combat Days)

Item	Total	Week (Average)	Day (Average)
Helicopters	724		
Sorties	145,842	29,168	4,167
Flight time	57,796	11,559	1,651
Destroyed	60	12	1.7
Damages (combat)	395	79	11.2
		Flying Hours	Sorties
One helicopter destroyed (combat)		963	2,431
One helicopter damaged (combat)		146	369

Figure 2

provides the helicopter with distinct advantages to counter the tank threat. When this capability is compared to the tank's capability, the helicopter is ahead in at least two areas. If the tank has an advantage it lies in its armor protection relative to the modern attack helicopter.

The tank's gun, mobility and armor (better than ever) will not provide the necessary protection against attacking armed helicopters. Only terrain cover and concealment, and restrictions to visibility will stand a chance of providing the tank with the protection it needs against being seen by attacking armed helicopters. Obviously, air defense and other fire support means employed under the combined arms team concept will further enhance the protection of the tank.

The issue is not whether the attack helicopter will replace the tank, or if the tank will be replaced by some other means of engaging combat; no, the issue is, *"Shall the tank continue to be the major threat to the battlefield that it is now?"* Even with the helicopter's mobility and its use of PGMs, it appears safe to state that the tank shall continue to be a major threat to conventional ground forces as long as visibility restrictions prevail in the battle area. Solve the airborne visibility problem and the tank threat problem is solved. *This is the helicopter's design frontier and challenge!*

An examination of the current impediments restricting airborne visibility (and guidance systems) as listed in figure 3 reveals the nature of the challenge. The principal restrictions to visibility and guidance are shown. In addition, both natural and other restrictions to visibility should be included since they impact the effectiveness of the detection and guidance systems. In effect the visibility restrictions become countermeasures which degrade the performance of crews, designators, guidance systems and sensors. Although new improved infrared and microwave sensors are in development, most PGMs will continue to require clear daylight (fairly good weather) to function properly for the remainder of the 20th Century. Unless technology breakthroughs occur, the ability to detect targets and to guide PGMs will remain about where it is today, and even then be subject to favorable weather and visibility conditions.

The need for technology breakthroughs in the visibility area may be obtained by noting the accepted principles of tank employment by the Soviets. Tanks are employed using practical principles governing the use of terrain cover and concealment, and darkness (weather and night) to hide tanks in order to gain surprise. Some of the principles are:

- Tank units conduct night marches or marches when visibility is limited.
- Tank attacks usually are scheduled to begin between midnight and dawn.
- Attack of a strongly defended

Detection/Guidance Techniques	Visibility/Guidance Restrictions
• Laser Designation and Homing	• Fog
• Manual (visual), wire guidance, Infrared tracking and Homing, Laser Homing, Electro Optical Contrast Seekers	• Smoke
• Electro Optical Contrast Seekers	• Camouflage
• Infrared Tracking and Homing	• Flare
• Infrared Tracking and Homing, Electro Optical Contrast Seekers, Laser Designation and Homing	• Arch Light or Laser
• Command Guidance, Beacon Position fixing	• Jamming

Figure 3

city is done normally during darkness or under the cover of smoke.

- They stress the use of camouflage and deception at all times.
- They consider night tank attacks as normal combat operations.
- Darkness and limited visibility are a tank's best defense.

Tanks are employed using supporting arms and services to give protection against air, armor, artillery, antitank guided missiles and observation. When this is considered, one must keep in mind that the Warsaw Pact forces outnumber NATO's (North Atlantic Treaty Organization) about three-to-one in the number of tanks possessed. Moreover, the Warsaw Pact outnumbers NATO three times in artillery pieces; two times in heavy mortars; it has thousands more radar guided surface-to-air missiles; and a third more armored personnel carriers. The Warsaw Pact places great emphasis on the use of heavy equipment such as tanks, mechanized vehicles, carriers and mobile machinery of all types for use in the combat zone. One could quite naturally infer that the tank is the primary threat to the conventional battle area in Central Europe. One could also infer that the key to solving this primary threat remains in the area of airborne visibility. Solve this problem and the tank threat problem is solved.

On 6 May 1976 BG Sam Cockerham became the first military aviator to fly the YAH-64. General Cockerham (right) and Hughes test pilot Raleigh E. Fletcher prepare for a flight at the Hughes' facility near Palomar, CA. General Cockerham, who had more than 20 years command experience during his military career, was the aviation officer responsible to General Creighton Abrams, Commander, U.S. Military Assistance Command, Vietnam, during Operation Lam Son 719 in 1971

The Ultimate Survival Kit

The ULTIMATE piece of survival equipment that you can ever have has already been issued to you—the few kilograms of tissue you carry around under your SPH-4. You can be mechanically equipped like Apollo 11, but if the will and knowledge to survive is missing you cannot last 5 minutes in a post-crash situation. The central nervous system with which you are born is perfectly adapted to keep you alive in a variety of situations, *if* you let it do its job.

There are many possible variations of a post-crash survival situation: You can be alone or part of a large group. You can be in good physical shape or severely injured. You can be in a temperate survival environment or in an arctic or desert climate. Space does not allow going into all the possible situations, so let's concentrate on the one that requires the greatest exercise of the will to survive. Imagine yourself as the sole survivor of a crash in inhospitable weather and terrain.

Our saga begins a few minutes prior to the actual crash. There is usually some sort of warning that disaster is imminent. The engine quits, or the terrain suddenly looms up at you, or you catch a glimpse of wires out of the corner of your eye. Something tells your nervous system that a serious problem is about to occur. At this point the part of your autonomic nervous sytem called the sympathetic nervous system (often referred to as the "fight or flight" system) kicks into action. Heart rate increases, respiration speeds up, the liver releases large amounts of stored glucose for energy into the blood and adrenaline pumps through the body. Blood supply to the muscles and skin areas is increased dramatically, while blood to the internal organs and brain is decreased. The digestive process is stopped almost completely. Hair on the limbs and back of the neck erects, and a tingling sensation is felt all over the body.

BANG! The aircraft impacts the ground and you are thrown forward against your shoulder harness. Everything goes dark. During this period of unconsciousness (it may be a few minutes or several hours) your sympathetic nervous system shuts off and the parasympathetic system comes on. This other half of the autonomic nervous sytem is in charge of maintaining homeostatis (the normal body reaction to its environment). Bodily functions start returning to normal and begin to reorganize after the stress induced changes.

You open your eyes and a scene of unbelievable devastation assaults your senses. Your ears hear the tinkling sounds of metal cooling; your nose picks up the smells of spilled hydraulic fluid, engine oil, fuel and hot metal; your eyes see a twisted control panel—the glassless gauges seem to stare at you like accusing eyes—crushed frame members, and the lifeless bodies of your crewmembers. Again, the sympathetic system comes on, you experience a repeat of the feelings you had just prior to the crash—you have to get out of that aircraft. You feel a compulsion to run, to get away from what you are associating with—the source of your fear—the aircraft.

This is the *first critical point* for survival, the time when you need to begin to use your ultimate survival kit. You need to exit the aircraft,

Captain James W. Voorhees

Individual Ready Reserve
Ft. Worth, TX

but in a careful, controlled manner (injuring yourself while exiting the aircraft will not improve your survival chances). First, quickly check yourself out. Is anything broken? Is there any bleeding? There may not be any pain yet, you could be in shock, and the aches and pains will come later. You carefully leave the aircraft and move through the snow to a distance of 4 to 5 meters from the aircraft. There is no sign of any post-crash fire; you are shocked by the destruction to the aircraft and the place where it impacted. Now you have to go back and check your crew. As you return to the aircraft, you begin to feel fear. It is very quiet; you can see the bodies of your friends in the wreckage. Somehow, they do not look the same. They have an almost waxy stillness to them, something is different—the spark of life has left. It scares you. You are apprehensive about touching them, but you feel compelled to check them out to see if there is anything you can do. You begin to feel guilt and remorse; you were in charge and they are dead—you are still alive.

Second critical point: You are alive and you need to be determined to stay that way. You cannot help your crew by dying. The time for grieving for fallen friends must come later, right now you must survive. So you consciously relax your tensed muscles. You breathe deeply and try to get your parasympathetic back in control; you have to think.

So there you are, knee-deep in snow, leaning against the wreckage of your UH-1 Huey; it's getting to be late afternoon and you are trying to remember what you heard in that safety talk about cold weather

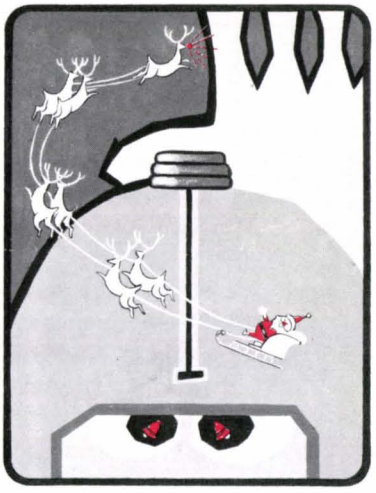
survival. The harder you try, the more apparent it is that you cannot remember what was said. Your mind starts to freewheel, spinning like a flywheel with no load. You will probably freeze to death and nobody will ever find you. It will be dark soon, you were off your proposed route of flight; you will freeze to death; for the first time you begin to feel the cold, your legs begin to tremble, and your teeth are chattering. Your back muscles begin to hurt.

Third critical point: You have to let your brain work for you—all the knowledge you need to survive is there. You just have to let it come out. Again you force yourself to relax. You drag a piece of torn soundproofing out of the aircraft and sit down up against a tree so that you can think. You try to get your memory working by visualizing the briefing room. You see the safety officer standing there, on the chalkboard behind him you see "Cold Weather Survival." It's starting to come back now—get dry, make a shelter, start a fire to keep warm—drain some engine oil to burn with the JP-4, use a rolled up seatbelt in a can of fuel.

You get the survival kits from the aircraft and start building a shelter using the rest of the soundproofing. You place the signal panels on top of the wreckage, and start a fire. Your chances of surviving are now astronomically better than they were an hour ago when you regained consciousness in the wreckage of your aircraft.

If you have the will to survive and are willing to let your ultimate survival kit help you, *you can survive!*

VIEWS FROM READERS



Editor:

2LT Sims' article [September 1979, ***Aviation Digest***] concerning the 6th Cavalry Brigade (Air Combat) initiatives to provide their ECAS Cobras with rocket firing capabilities is great, however her last paragraph contains erroneous information regarding the fielding date of the rocket management system (RMS).

The RMS is installed on the fully modernized Cobra, both new production and conversions, which were to be delivered in November 1979. Retrofit of the 98 ECAS AH-1s will commence in April 1980 and be completed by October 1980.

LTC Joseph U. Moffett
Assistant TRADOC System Manager
Attack Helicopters
Ft. Rucker, AL 36362

Editor:

I have just finished reading the article by MAJ Rudy on "The Tactical Command Post" (*Aviation Digest*, March 1979). Back in 1974 I was assigned to HHT 7/17 Cavalry, 6th Cavalry Bde (AC). The commander, then LTC D. R. Martin, requested that we design and build a forward command post. One that could be set up and used for pilot briefings and a crew rest area.

Using an airmobile tent from an airmobile Conex, I incorporated it into the UH-1H helicopter picture by the use of a zipper along the top outside edges of the soundproofing and soundproofing snaps along the bulkheads. The underneath, to be sure of a total blackout area, I used discarded tent canvas fitted along the forward and rear cross tubes.

We also used a 1.5 kilowatt generator with the exception that we ordered power cords from an aircraft APV. Using two of these cords we could position [redacted] or far enough away from the helicopter to reduce the noise level. Also with the use of sand bags we almost eliminated all of the noise.

Then, as you can see in the pictures, we also used 292 antenna hooked up to our AN/ARC-15 command console. On the command console itself we incorporated longer headset cords so personnel monitoring the radios would not have to sit in the helicopter all the time.

The entire system could be folded and fitted into the UH-1 with minimum time and effort. The command post that we designed took a total of 10 to 15 minutes to set up after the helicopter was shut down, and another 5 to 10 minutes to camouflage the tentage. The camouflaging of the helicopter MAJ Rudy describes is basically a sound idea but if you ever had to leave an area in a hurry the possibility of damage to the helicopter is greatly increased. You would not be leaving if you seriously bent a control tube on the main rotor system or did some severe damage to a main or tail rotor blade.

With the system we designed, the entire system could be unzipped and unsnapped in a matter of 2 to 5 minutes and left there to be retrieved at a later date if possible.

To prevent damage of overheating to components the caution panel and rpm warning circuit breakers are pulled. It also reduces the number of lights that could possibly be seen during night operations.

So as you can see the tactical command post has been proven time and time again by the 7/17th as a highly effective method for forward area operations.

SGT James I. Boley
HHT 7/17 Cav, 6 Cav Bde (AC)
Ft. Hood, TX 76544

Editor:

I feel that I must reply to several areas in the article "A Tactical Command Post For Use in the Command and Control of Forward Aviation Assets," in the March 1979 issue of the *Aviation Digest.*

I, along with the Directorate of Evaluation and Standardization, Ft. Rucker and the U.S. Army Communications Command, agree that the alligator clips are hazardous both to the aircraft and to the battery, but instead of modifying the aircraft with a dedicated receptacle as was suggested in the review comments, use a cable from an aircraft auxiliary power unit. It will fit the external power receptacle on the aircraft; it cannot be installed with reverse polarity; it will give the pilot an indication that he is hooked to an external power source through the master caution panel; and in an emergency the cable can be removed from the aircraft while still energized without damaging the aircraft.

The other point on which I must comment involves disconnecting the battery or the installation of a semiconductor protection device while the auxiliary generator is being used. If it is felt that the battery needs to be isolated all that is necessary is for the battery switch to be turned to the off position. This deenergizes the battery relay and removes the battery from the buss. There are advantages to leaving the battery connected; it will remain fully charged in cold weather and it will supply uninterrupted power for your radios in the case of an auxiliary generator failure. The battery could be destroyed by an overvoltage from the auxiliary generator, but long before the battery was ruined by overcharging the avionics would have been destroyed.

I hope this will be of some benefit to the companies that use the Huey as a mobile command post.

SGT Terry Fogelson
Arizona Army National Guard
5636 East McDowell Road
Phoenix, AZ 85008

Editor:

We would appreciate your mentioning that the Fifteenth Annual Airport Management Seminar will be held at Auburn University, Auburn, AL, from the 5th through the 6th of March 1980. It will be of interest to airport managers and people working with airport managers in the Southeast, East and Middlewest United States.

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Editor:

I am writing in reference to the article, "Tracking and Balancing Helicopter Blades," by Claud C. Ruthven in the August 1979 ***Aviation Digest.*** The Vibrex System has been in use at Corpus Christi Army Depot (CCAD) since 1975 when we borrowed one from the Air Force. The results were so successful that CCAD maintenance supervisors acquired their own. CCAD now has six machines and these are in constant use.

We share the author's enthusiasm for this sytem because of the dramatic savings in manhours and dollars. Resistance initially was encountered from some test pilots who felt that their calibrated seat was more accurate than the Vibrex, however, that has been overcome and the system is now accepted.

G. Albornoz
Quality Inspection Specialist
Corpus Christi Army Depot
Corpus Christi, TX 78419

Editor:

When I was in England last spring, I saw an article in the British press about the Sally-B, the last airworthy B-17 in Europe. This symbol of American WWII air power is in desperate need of parts and maintenance to keep her alive. As the article appealed:

> "A complete overhaul and four new engines are needed . . . if 'Sally-B' is to continue flying as the only memorial to the gallant sacrifice of the 79,000 young Americans who died far from family and home to preserve the freedom of the world."

Being moved by the sad prospect of this Flying Fortress falling into disrepair and being grounded, I volunteered to contact the most appropriate U.S. organizations to help "the Brits" keep *our* plane in the sky. It seems to me that, although the Sally-B is hangared in England, it is an American obligation to keep her airborne.

Anyone wishing more information or desiring to help should contact The B-17 Flying Fortress, USAAF WWII Memorial Flight, c/o Euroworld, 277-279 Chiswick High Road, London W.4 4PU, England.

Thank you very much for your consideration and help.

John Walsh
44 Dietz Rd
Hyde Park, MA 02136

(Do We REALLY Need It?)

Maintenance Test Pilot Standardization

CW4 Joseph A. DeCurtis
128th Aviation Company
APO San Francisco 96538

WHEN I DEPARTED the U.S. Army Transportation Center and School, Ft. Eustis, VA last spring the Maintenance Test Flight Branch was hard at work putting together the beginnings of what eventually will become a standardization program for maintenance test pilots. While on leave I met an old friend whom I consider an excellent maintenance officer. In my excitement I briefly laid out the proposed program to him and his initial reaction caught me by surprise —in fact I was crushed.

"Joe, for crying out loud—all we need is another standardization program! Don't we maintenance officers have enough to do just to keep up with everything we already have to accomplish?"

He proceeded to lecture me about all present birth month requirements, local requirements, plus all the various maintenance functions that the maintenance officer must perform. I could see that in my enthusiasm to relate the idea to him that the words "new," "different" and "change" would make the large vessel in his neck quiver.

It was obvious to me that I had successfully alienated him by making him think that this would be an additional requirement instead of the supplemental requirement that it would be. It would afford the maintenance officer the opportunity to take the type of annual evaluation that would be more realistic.

After I got my friend down from a high hover, I explained to him that this program was not intended to make anyone eat "humble pie," but rather to assist test pilots to perform a valid functional test flight or to recognize those who are doing a super job. It is my belief that most maintenance test pilots would appreciate having an annual evaluation that is practical and pertinent to the mission they carry out daily.

My friend did ask some very good questions, however, and I would like to share some of them with you.

Why do we need a standardization program? What's wrong with the current system?

It's not hard to defend or attack the present system because there is no program to assure that maintenance test pilots are standardized. Currently, maintenance test pilots must be on unit test flight orders. It is recommended that the aviator possessing the most maintenance experience be designated as maintenance test pilot. There is no established system to identify maintenance test flight standards and therefore no requirement for maintenance test pilots to demonstrate this proficiency in accomplishing standardized maintenance test flights. As far as the need for the program, all my friend would have to do is look through his back copies of FLIGHTFAX and compile a list of accidents and mishaps which occurred during test flights that were due to crew error.

The U.S. Army Safety Center (USASC), Ft. Rucker, AL has on file several accidents which occurred during maintenance test flights. Some were caused by unauthorized maneuvers that did not logically check any aircraft system. Some were caused because AR 95-1 and TM 55-1500-328-25 were violated.

Perhaps the saddest incident ever recorded on a maintenance test flight occurred a few years ago and was the subject of a full length article ("The Ox That Gored," *Aviation Digest*, November 1973). Briefly, what happened was a maintenance test pilot (not on orders) proceeded to troubleshoot a UH-1 Huey for excessive vibrations. The flight crew consisted of the maintenance officer,

his pregnant wife, son, a couple of maintenance noncommissioned officers and an OH-58 Kiowa crewchief who came along for the ride. (This was a violation of minimum crew requirement and Army regulations pertaining to civilian passengers.)

After takeoff the pilot climbed to 500 feet, then proceeded to put the aircraft into a steep dive (unusual and unauthorized test flight maneuver to eliminate excessive vibrations) and the aircraft crashed into a reservoir causing several fatalities. This particular individual had a history of executing "phanthom" maneuvers on test flights and had convinced the people in his unit that these "stress" flight maneuvers were normal test flight procedures. And do you know what? Everyone, including the safety officer and airfield commander bought that explanation.

More recently, a test pilot crashed when "showing off" by making gunruns on farmers working their fields. The test pilot's attempt to impress the enlisted crewmembers onboard was a major cause of this unnecessary accident.

I have a notebook filled with similar incidents although not quite as severe as the previous examples. Nonetheless, there are enough of them to demonstrate a need for a program that will assist and educate all of our maintenance personnel.

Before instructor pilots can be put on orders they must be graduates of a DA designated IP course in the category of aircraft in which IP duties are to be performed, or satisfactorily complete an IP equivalency evaluation given by the USAAVNC (reference AR 95-1, paragraph 6-15b). Why don't we proceed in similar fashion with maintenance test pilots?

This would be an excellent long range goal; however, it currently would be unrealistic and extremely difficult to implement. There are a lot of hard working and dedicated maintenance officers who through no fault of their own never had the opportunity to attend any of the phases of the formal maintenance test flight course. It wasn't too many years ago that pilots could not attend the formal test flight course unless they had 1,000 hours total time; 250 of these hours had to be in type aircraft. Also, pilots had to have successfully completed the first portion of the Aviation Maintenance Officers Course. When they completed this, each received a maintenance officer's military occupational specialty.

Would you care to guess what was expected of these graduates when they arrived at their next assignments? You guessed it! They were assigned to maintenance slots and expected to be complete maintenance officers, which included performing maintenance operational checks and test flights. I am not exaggerating that this indeed happened and I'm sure many who are reading this article are saying, "You betcha, that's what happened to me."

So, if these individuals received no formal training, how did they learn to perform a valid test flight?

Some were lucky; someone who knew how to conduct a safe and valid test flight demonstrated the proper procedures.

However, some maintenance officers were never taught how to do a valid check and unfortunately some of the maneuvers that resulted had no reason to be performed.

The validity of the check also is questionable. These maintenance officers used the hit and miss method of parts changing as their time-consuming troubleshooting tool. That's why this innovative program should not be considered just another requirement. If a designated standardization maintenance test pilot can assist someone in performing the proper functional check, then we all benefit. We will have better quality aircraft, less parts changing because of better systems knowledge and troubleshooting, and of course the maintenance officers' nemesis, "down time," should be reduced.

Joe, presently almost all Aviation Maintenance Officers Course students attend the test flight phases. Doesn't that lower the standards of the course?

No way. The course is still a challenge. Just as in any other military school, some do better academically than others. Some excel in their knowledge of aircraft systems and dazzle their instructors with their ability to troubleshoot and eliminate all programed maintenance malfunctions. Others have great difficulty in diagnosing and alleviating those malfunctions.

However, there is one area in which all students can be considered equal regardless of their total flight time or previous maintenance experience. This shared quality is the knowlede that no maintenance flight check exceeds any aircraft limitation plus the "how and why" when performing the check. These areas of importance must all be covered by the maintenance test pilot standardization instructor pilot (SIP).

What would qualify someone to be designated a maintenance test pilot SIP and at what level would they be assigned?

I'd like to use the ambitious program that U.S. Army Europe (USAREUR) is implementing. See the editor's note on page 12. The ultimate goal would be to eventually position a maintenance test pilot SIP at the battalion/squadron level. Those individuals on test flight orders would complete their annual aircrew training manual (ATM) requirements, but the oral and flight portion could also be oriented to the maintenance test pilot.

What exactly would the maintenance test pilot be expected to accomplish?

Surprisingly, not much more than what is already required. The oral portion would still include emergency procedures, limitations, human factors and the other ATM requirements. However, the discussion of the maintenance operational

checks and test flight checks would be included. This is the golden opportunity for the maintenance test pilot SIP to demonstrate how test flight procedures, emergency procedures and aircraft limitations interrelate.

For example: When discussing turbine engine analysis check (TEAC) procedures with an AH-1G Cobra test pilot, the point can be made that a valid TEAC could be performed at 60, 70 or 80 knots—except that a dash 10 limitation would be exceeded if the test pilot is above 70 knots when the rpm drops to 6,400, then to 6,200 rpm. No one should know better than the maintenance officer the importance of accurate range markings and what is required if they are exceeded.

Sometimes our checks don't require us to go to the maximum side of our allowable limits. For example, some aircraft are within limits up to 30 to 35 knots during sideward hovering flight, but for a maintenance test flight that high speed is not required to complete a valid check. A good valid check can be accomplished without ever going more than 5 knots. Emergency procedures and characteristics such as mast bumping can be related to the functional test flight. Not only would the flight portion still include those emergency procedures designated by the SIP it also would include those maintenance operational checks and flight checks with which the test pilot should be familiar.

Finally, maintenance test pilots must have a guide to go by—something to let them know what is expected. A training circular is now being finalized and the draft should be completed soon. The test pilot would be authorized to use the published maintenance test flight manual, TM 55-1500-328-25, and appropriate operational and maintenance manuals.

Who would have the responsibility to monitor this program?

Sorry I was asked that question, I have my own opinion and I'm sure that many will disagree with me. Therefore, let me do a little "tap dance" and say that maintenance test flight course personnel at the Transportation School and Center definitely have the technical expertise and that the U.S. Army Aviation Center, Ft. Rucker, AL has the worldwide experience to augment a successful program. I would recommend a coordinated effort between these Training and Doctrine Command installations. Both have the same goals when it comes to accomplishing safe and valid functional test flights.

Well old friend, I hope that I gave you a better idea of what's in the mill. I'm sure that since there is still a lot of hard work going into establishing this new program that before it is finalized the format may differ slightly from the way I explained it to you. All I can say is standardization of maintenance test pilots . . . it's long overdue!

Editor's note: The following information has been supplied by the U.S. Army Transportation School. A few months ago three SIPs from UASSB* Schwabisch Hall attended the maintenance test pilot course. Using a draft U.S. Army Transportation School (USATSCH) training circular (TC), written by the instructors from the test flight course, the USAREUR SIPs were given the training that would enable them to evaluate maintenance test pilots. Returning to USAREUR with the draft TC, USAREUR began a program following the USATSCH outline. As a major goal USAREUR plans to eventually position a maintenance test pilot SIP at AVIM and other designated units. Maintenance standardization pilot appointment/evaluation at lower maintenance echelon levels will be the responsibility of the AVIM units. The maintenance standardizaton pilots (as they are called in USAREUR) will be graduates of the test flight phase Maintenance Test Pilot Course in USATSCH and whenever possible current instructor pilots in the appropriate aircraft. The maintenance standardization pilots will evaluate unit maintenance test pilots to determine the examinee's ability to safely perform the duties of maintenance test pilot. Those aviators on unit maintenance test flight orders would complete their annual aircrew training manual (ATM) requirements. The maintenance test pilot evaluation may be conducted in conjunction with the annual aviator standardization ride provided all the draft TC mandatory maneuvers for the maintenance test flight evaluation are completed.

***USAREUR Aviation Standardization and Safety Board**

U.S. ARMY

AVIATION STANDARDIZATION

Directorate of Evaluation/Standardization

REPORT TO THE FIELD

DES welcomes your inquiries and requests to focus attention on an area of major importance. Write to us at: Commander, U.S. Army Aviation Center, ATTN: ATZQ-ES, Ft. Rucker, AL 36362; or call us at AUTOVON 558-3504 or commercial 205-255-3504. After duty hours call AUTOVON 558-6487 or commercial 205-255-6487 and leave a message

TC 1-20

Aeromedical Training For Flight Personnel

HOW MANY OF YOU are familiar with the contents of TC 1-20, dated 18 January 1979? Did you know that this document establishes:

- Aeromedical training requirements for flight personnel that will enhance the accomplishment of the Army aviation mission, and
- Aeromedical training requirements that will assist in the conduct of aeromedical health and safety education of flight personnel?

An observation made during recent Flight Standardization Evaluation/Assistance Visits conducted by the Directorate of Evaluation and Standardization is the lack of awareness which exists among many flight personnel of the contents of TC 1-20. This was evidenced by the weak responses in aeromedical factors during the oral examination of flight standardization evaluations (chapter 7, Air Training Manual).

Perhaps one reason for this deficiency is that aviation units may not be conducting periodic aeromedical refresher training. TC 1-20 states that this unit training should be conducted at intervals of 3 years or less and that all aviation-related personnel should be included in the unit aeromedical training program. The goal is to provide aviators with knowledge to recognize the capabilities and limitations of the human body and to reduce hazards associated with the aviation environment. TC 1-20 also states that certain records of training will be annotated following completion of prescribed training. (Refer to page VI, TC 1-20.)

Civilian Employment Opportunities And You

CW2 Paul E. Merchant
Hanchey Division
Department of Flight Training
Fort Rucker, AL

HOW MANY OF YOU have heard a fellow Army aviator say, "I'm just here for the training. As soon as my obligation is up, I'm getting out and going to work for a commercial operator." I dare say almost all of you have listened to (or made) a similar statement. Well, perhaps the grass is greener on the other side of the fence for some; but before you go breaking down the fence, you'd better get all the latest facts on the nutritional value of that civilian pasture.

To determine the nutritional value of grass, one must break it down into its various components and take a very close look at it. This is true in the determination of civilian job opportunities as well, so let me suggest a process of analysis.

A good place to start will be with your *experience.* We all have lots of that, right? For instance, how many flying hours do you have? A careful review of advertisements will show that the operators that will offer a salary of about what a CW2 makes will require between 1,500 and 2,000 flight hours. How did you do? Pass that barrier—good!

Let's examine your Federal Aviation Administration (FAA) ratings. Do you have your commercial helicopter license with an instrument rating? Sure, we all took that competency test in flight school and sent in the form to add the instrument rating. I see we still have a large crowd that has cleared these first two barriers without even working up a sweat—great!

What about your physical? You do have an FAA Class II, don't you? And, of course, they will want to see your radio-telephone operator's card. Once again, I noticed a few folks stumble on those last couple of barriers, but we still have a lot of potential out there.

Oh, I was about to forget; what *kind* of experience have you had? Been into Chicago, Atlanta, Dallas or Denver lately? Have you ever

worked a forest fire? How about setting power poles? —Done any mountain flying? Got any time in Aerospatiale Helicopters (you know, the Gazelle, AS-350, Lama, Alouette II or III)? Any "Ag" work in a Hiller 12E or Bell 47G3b2? Great—I'm glad to hear it!

So far, I have just been checking to see if you could break through the "pasture fence" without any major difficulty. Now let's look closely at the work environment. In the Army we work long days and at least 6 days a week. We have to spend a lot of time away from our families and the pay and work conditions are not the best, and we move a lot—right? Well, as an example, if you are looking for an offshore operator job, you can plan on getting up at dawn and being "available" until dusk on a schedule that could run anywhere from 7 days on and 7 days off, up to 28 days on and 28 days off.

By the way, you will probably be away from home on those "on" days. Vacations? —how does 2 weeks a year sound? And, naturally, pay—well, starting pay should be around $1,200 per month before taxes.

You say you don't like flying time, distance and heading over water? Perhaps a mountain job is more to your liking. The hours for operators in the western states vary from job to job. Maybe 2 months in Idaho on Fire Watch (7 days a week), then back to home base as winter is coming on. What? You wanted a year round job? Gee, I'm sorry. We just don't have any work for you this winter. Come back in the spring, okay?

I hear you. You want to know about the *good* companies. Of course there are good flying positions to be filled in the industry. I know because I have had the pleasure of working for a good company, but sometimes it is a very difficult and distressing process to find that company. "Uncle Sugar" can start looking real good to someone who has had a bad experience as a civilian pilot or has stood a while in the unemployment line, believe me.

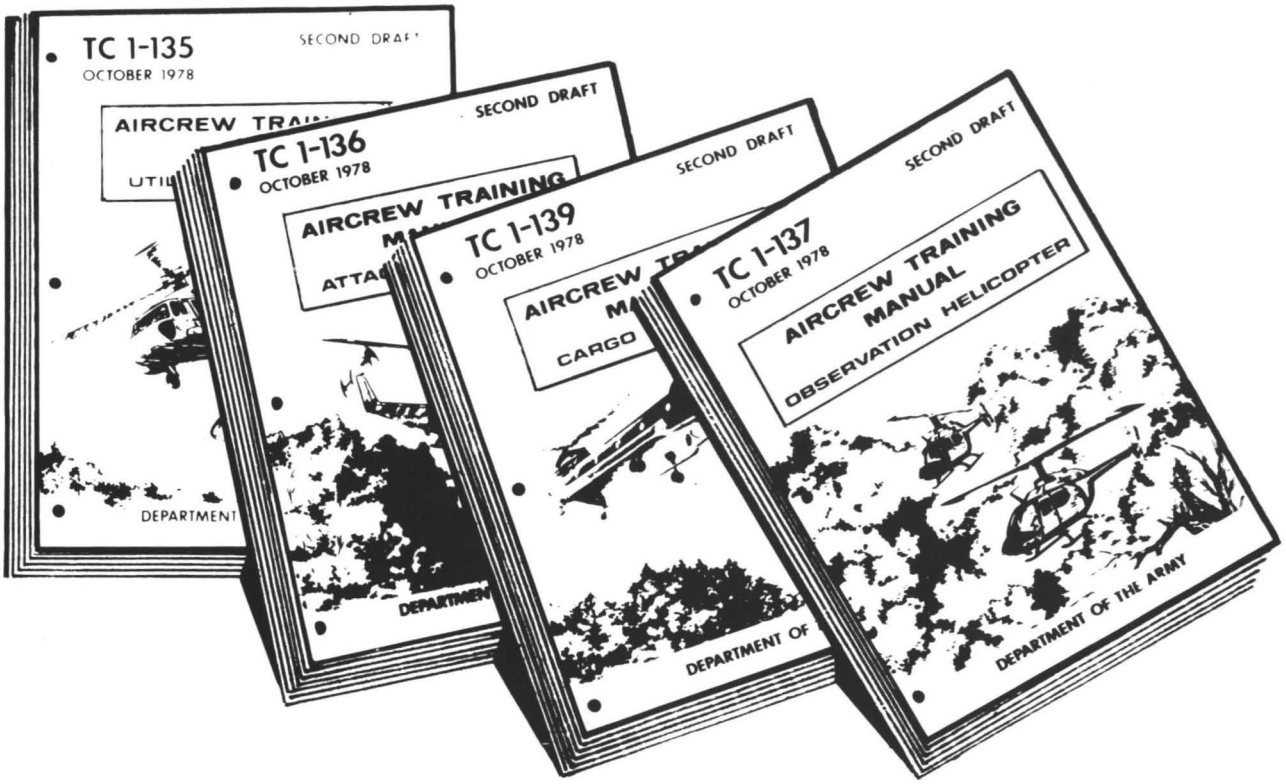
We all know that there are a few weeds in our present pasture, and from our vantage point the civilian pastures look very attractive, and for some, they are; but before you thank "Uncle Sugar" for that $70,000 worth of flight training and pack your bags, be very sure what the nutritional value of your new pasture is. *Compare critically* the pros and cons of both sides.

I have deliberately illustrated some of the (perhaps) negative aspects and barriers to becoming a civilian helicopter pilot because most of you hear the many benefits every day. You can hear a lot of comments like, "There is a pilot shortage now, and you can make $26,000 the first year in many overseas jobs, and as a civilian, your chances of *real* advancement are greater." Or, you could be making your decision on how bad things are in the Army (for example, the talk about retirement benefit losses, the doctor shortage, the condition of the commissary and the post exchange, and so on).

Normally, the decision is yours. The Army needs good professional, experienced pilots. The civilian market also is in need. Consider your future with the same careful, step-by-step approach you would when planning a flight into combat or on instruments.

A lifetime of breaking down fences to reach a better pasture can lead one to the edge of a wasteland with only broken fences to remember. Perhaps with a little fertilizer and grass seed you can find a good future right where you are.

If you do decide to leap the fence and have a go as a civilian, for goodness sakes, do it right. Be prepared financially for a year of job hunting, do some reading or consult with an employment service, and have a resume printed. Know your strengths, objectives and requirements—and good luck.



ATM — A View From The Field

CW3 Robert D. Hill

501st Combat Aviation Battalion
APO New York 09326

SOMETIME in October 1977:

Jim: Hey, Joe, have you heard the latest thing DA has come up with?

Joe: No, what now?

Jim: No more minimums!

Joe: What? You gotta be kidding.

Jim: No, that's right. No more 80 hours a year. No more hood or night requirements. No more big push at the end of the year to get that time. DA has come out with this thing called the ATM. That stands for aircrew training manual. They say it is sort of like an SQT for aviators. The way I understand it, all you have to do is pass an instrument ride and standardization ride each year. If you can do that, you

don't have to do anything else.

Joe: That can't be right, the Army has had minimums for as long as I can remember. Why would they want to change the system now?

Jim: I don't know, but it doesn't sound like a bad system, really. It's pretty simple in that the emphasis is on training in those areas that you are not proficient. If you're up on NOE flying, then you don't need to spend a lot of time in that area. If you are weak on instruments, then you spend more time there. Also, if your job doesn't call for NOE flight then you don't do any at all.

Joe: Well, it might sound like a good idea, but you know as well as I do that no one is going to let us get away without some sort of minimum hour requirement.

Eighteen months later:

Jim: Where are you going, Joe?

Joe: I'm taking a flight down to Stuttgart to drop off some people from division.

Jim: How are you doing on ATM requirements for your 6-month training cycle?

Joe: Pretty good. I need one more scenario 2 and a scenario 3. I will get one on the way down and the other coming back. That will just about bring me up on time, too. You know, this scenario system we came up with sure is working out pretty good. It sure beats the first system we came up with when the first draft of the ATM came out.

The above conversations are fiction based on fact. They are representative of initial and subsequent feelings on the ATM by some aviators in the field. Many aviators found it hard to believe that the Department of the Army would make such a drastic change in policy. I am sure there is a lot of rationale behind this decision, but I will not be discussing it. What I am going to do is describe how our unit has handled the implementation of the ATM from the very beginning to now, and a possible look into the future. The way we handled the initial implementation and subsequent revisions may not have been the best, and I'm sure it's not the only way. Through a trial and error period on the first draft and the publication of the second draft, we feel that we have come up with a very good system that works well for us.

The process all began in October 1977 with a flourish of rumors that DA was doing away with annual combat readiness flying minimums. No one, initially, had any idea what was going to replace them and it was difficult for people to believe that they would suddenly be dropped. Following that were the messages that a briefing team would be traveling throughout USAREUR to explain the ATMs. People still did not know what the ATM was, but they were going to get briefed on the implementation, anyway.

The briefing team arrived and gave us an overview of the ATM program and asked us if we had any questions on the manuals. Well, that was a good question because no one, at that time, had even seen one of the new manuals! I am sure that if the manuals had been available prior to the team arriving we could have solved many of the problems then that came up later.

In November the manuals finally started showing up. The job of reviewing the manuals and establishing an ATM program for our unit was assigned to the battalion standardization section. I imagine that we began like everyone else by reviewing the Commander's Guide. The Commander's Guide provided us with enough general information to get the program off the ground.

First, we developed the list of tasks, by type aircraft, that we felt when completed would accomplish the unit mission. A task list was established for each phase of training moving from refresher (ARL 3) to continuation (ARL 1). The tasks list themselves were relatively easy to come up with, but the means of documenting the training was not. How were we going to know that an aviator had completed the required tasks, and was proficient in them? Determining proficiency was no major problem because aviators are required to complete their instrument and standardization checks annually. Their proficiency would be determined by their passing or failing those two rides. But how were we to know that they had completed the task and how much training they had received in those tasks?

The form that we used was similar to the ATM worksheet shown in the Commander's Guide. This turned out to be five to six sheets for each aircraft, compiling a "laundry list" of tasks. The responsibility for supervising training and maintenance of the task lists was assigned to the aviator's platoon leader or direct supervisor. This individual was to ensure that the aviators were doing the necessary training. Aviators were assigned the responsibility of making the appropriate entries on the task list when they did a particular task. When aviators completed a flight they would update their task list by indicating if they trained in that task and if it was done during the day or night. If the aviator flew with an IP, then the IP would be responsible for indicating if the task was completed satisfactorily (S) or unsatisfactorily (U) and if it was done at night or during the day. This task list provided the

Glossary

ATM	**aircrew training manual**
DA	**Department of the Army**
IFE	**instrument flight examiner**
IFR	**instrument flight rules**
IP	**instructor pilot**
LOI	**letter of instruction**
NOE	**nap-of-the-earth**
SIP	**standardization instructor pilot**
SQT	**skill qualification test**
USAREUR	**U. S. Army, Europe**
VFR	**visual flight rules**

platoon leader or supervisor with a means of determining what training each aviator needed emphasis in, or needed to complete. Armed with this information and training guidance from the commander, platoon leaders established their own training programs.

By this time you might be getting a glimmer of the biggest problem that faced us. How were we going to get aviators to come in after each flight, or even daily, go through their five to six sheets of tasks and make the appropriate entries and do this consistently? Well, you're right, there was not any logical way of doing it. Solution to the problem? None at that time. So we ended up with a program that was hard to manage and was not accepted by the aviators.

We continued to march along through the summer of 1978 trying to make the program work, when lo and behold the second draft of the ATM was forecast to be coming—and, yes, we once again had minimum hour requirements. We also picked up minimum iterations of tasks to complete. By this time we were ready for some improvements in the ATM program.

With the coming of the second draft, we had some leadtime to work with in attempting to establish a new program. We began finding out about the new draft in July 1978. The publications themselves would be arriving prior to October (which was to be the implementation date) along with the new AR 95-1. Well, without the books in hand, it was senseless to do too much preplanning. We knew that there would be minimum hours and tasks but we would not know what they were until the manuals arrived. We delayed any hard planning or major changes until we received the manuals. After an initial review, it was decided that the best way to implement the new program would be to establish a scenario system.

A 5-day working seminar was conducted with a majority of the IP/SIP/IFEs and representatives of the company operations in attendance. The seminar was coordinated by the standardization section. After establishing the basic outline of the new system, the participants were broken up into groups by type aircraft. Each group was tasked with compiling the scenarios for its type aircraft. These scenarios were to be designed so that completion of all scenarios in a "book" would ensure that the aviators would meet the minimum iteration requirements of the appropriate ATM.

The scenario book for each type aircraft has the same basic design in that scenarios 1 to 6 have the same subjects. The additional scenarios are for special missions or requirements. Scenario 1 includes all the common tasks that are completed each time an aircraft is flown. Scenarios 2 to 6 are, respectively, VFR cross-country, IFR cross-country, nonstandard maneuvers, tactical instruments and terrain flight. (See figure 1 for an example of a scenario).

Scenario 7 is a confined areas scenario for utility and observation helicopters and a gunnery scenario for the attack helicopter. Scenario 8 is a miscellaneous scenario for utility and attack helicopters, comprising tasks that may not be logically grouped in the other scenarios. Scenarios 8 and 9, for the observation helicopter, are special mission scenarios and scenario 10 is the miscellaneous scenario. Scenarios 2 and 4 for all aircraft, scenario 3 for utility and scenario 7 for attack helicopters have to be completed at least once at night. The basic subject scenarios in conjunction with scenario 1, are designed to take aviators from preflight to flight to postflight with a logical sequence of tasks to complete.

Aviators are issued scenario books for their primary aircraft and carry them with them whenever they fly. Each flight scheduled is planned around completing one of the sce-

Figure 1

Example of a Scenario

Scenario 8C—Mission w/Cobras—2 hrs—OH-58 (No radio)

1013	Determine necessary weather minimums VOR VFR flight
1014	Prepare and file a VFR/DVFR flight plan
5001	Perform terrain flight mission planning
5002	Perform terrain flight navigation
5003	Perform low level flight
5004	Perform contour flight
5005	Perform NOE flight
5006	Perform masking and unmasking
5007	Perform NOE quick stop/deceleration
5008	Perform Hover OGE
5009	Perform terrain flight take-off
5010	Perform terrain flight approach
5018	Perform FARP procedures
5020	Perform aerial observation
5021	Transmit spot reports
5022	Perform evasive maneuvers
5023	Operate RWR AN/APR-39
5028	Perform techniques of movement
5033	Negotiate wire obstacles
5034	Utilize map for navigation
5035	Perform recognition of hazards to terrain flight
5036	Perform as a crewmember (cockpit teamwork)
6002	Select/Recommend holding area
6003	(S) Select attack helicopter firing positions
6004	(S) Perform target handoff to attack helicopter
6005	(S) Provide security during attack
6016	Perform tactical communications PROC/ECCM
6017	Transmit information using visual signaling techniques

narios whether the flight be for mission support or for training. Scenario 4, which is nonstandard maneuvers, is the only scenario that is pure training and cannot be completed in conjunction with mission support. As a scenario is completed, the pilot makes a note of it on the bottom of the DA Form 2408-12. That information is then transferred to an ATM training worksheet (figure 2). When the aviator has completed the scenario the required number of times in a 6-month training cycle that information is converted to tasks completed and entered on the ATM Master Training Record.

The two major advantages of this scenario system are:

- It gives aviators a definite plan to follow for each flight and for a 6-month training cycle.
- It is accepted by the aviators because of the ease of documenting as compared to the previous program.

Both of these points are important when considering the success of this program. We feel that our program is successful in that it meets the requirements of the ATM, is accepted by the aviators, and is standardized throughout the battalion.

The battalion recently completed an aviation operational readiness safety evaluation by the USAREUR Aviation Safety and Standardization Board during which our ATM program was evaluated. The only deficiency was that we were not using the training worksheet as prescribed by their LOI. Where we list only the scenario number and subject, the LOI calls for listing each and every task.

So, that is where we have been and where we are now. As to the future, we are looking at a couple of things. First, even though the final draft of the ATM has been delayed until sometime in 1980, we are planning our own in-progress review of the ATM and our program, with a view towards refining what we have. Second, we are awaiting the final draft of the ATM with the knowledge that the tasks lists may be shortened by consolidating common tasks into fewer tasks, as we did with our scenario 1. Finally, any person that would like more information on our program can contact the Commander, 501st Combat Aviation Battalion, ATTN: CW3 Hill, APO NY 09326.

ATM TRAINING WORKSHEET
(USAREUR Reg 350-9)

PAGE 1 OF PAGES

NAME | RANK | UNIT

PRIMARY AIRCRAFT OH-58 | ALTERNATE AIRCRAFT

FAC | ARL | DOB

	SCENARIO	FAC 1	FAC 2	S	A	N	DATE
1.	Common Tasks	*	*	1	2		
2. A	VFR Cross-country	*	*	1	2		
B	VFR Cross-country	*	*	1	2		
C	VFR Cross-country	*	*	1	2		
D	Night VFR Cross-country	*	*	1	2	1	
3. A	IFR Cross-country	*	*	1	2		
B	IFR Cross-country	*	*	1	2		
C	IFR Cross-country	*	*	1	2		
D	IFR Cross-country	*	*	1	2		
4. A	Contact Non-standard	*	*	1	2		
B	Night Contact Non-standard	*		1	2	1	
5. A	TAC Instrument	*	*	1	2		
B	TAC Instrument	*	*	1	2		
6. A	Terrain Flight	*		1	2		
B	Terrain Flight	*		1	2		
7. A	Confined Area	*	*	1	2		
B	Confined Area	*	*	1	2		
C	Confined Area	*	*	1	2		
8. A	Mission With Cobras	*		1	2		
B	Mission With Cobras	*		1	2		
C	"No Radio" Mission With Cobras	*		1	2		
9.	Range	*		1	2		
10.	Miscellaneous	*		1	2		

FORM
AE 1 JUL 78 3567

Figure 2

Note: An ATM In-process Review was held in July 1979 with representatives from all MACOMs and Reserve Components. Results of this review are reflected in errata sheets dated August 1979. These errata sheets are available by request from the Training Literature Management Branch, ATTN: ATZQ-T-AT-E, Ft. Rucker, AL 36362. Coordinating drafts were sent to the field on 1 November 1979 for final review. Comments are to be in by 18 January 1980 and the revised manuals will go to the printer in March through June 1980. Based on a normal printing cycle, the ATMs should be in the field by March 1981.

Chief, Training Literature Division
Directorate of Training Developments
Ft. Rucker, AL

EPMS CORNER Enlisted Personnel Management System

The opinions expressed in this article are those of the author and do not necessarily reflect the views of any Department of Defense agency

Promotion Board Changes

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MOST ENLISTED military occupational specialties (MOSs) have established skill qualification test (SQT) booklets/study guides and soon will be testing under the program. Because of this, I strongly urge an enlisted personnel management system review of E5/E6 promotion board requirements since no two boards are conducted the same.

Local boards are conducted in a manner left to the discretion of the individual board members. As a result, various nonstandard business formats are used with the standard promotion grade sheets. Some boards compile the study material/literature into a complete booklet and ask all questions—except world affairs—from this study packet. Prior to the selection process, Soldiers are given the opportunity to review this booklet. When a study packet is not prepared, board members take their questions from whatever references are available. This leaves the Soldier feeling bewildered for not knowing the exact answers to the questions being asked.

More informal boards ask opinionated questions, leaving no room for error; or multiple choice questions, leaving room for guesses. Leading questions are asked or assistance given by board members, especially if they feel the person being questioned is nervous.

Occasionally, a combination of practical application (hands on) and direct questions are asked. Many times the practical application portion includes proficiency with a weapon the Soldier is not issued as a basic weapon, or even required to carry for a particular MOS. An example of this is the M-16 for a 67N crewchief, normally assigned a .38.

Individual units often try to outguess the board members by putting together their own study packet. This does nothing more than confuse Soldiers and leaves them with the impression that their supervisors didn't know what they were talking about. Consequently, Soldiers lose faith in their supervisors.

Under the present system, Soldiers preparing for a promotion board face the added uncertainty of not knowing just how it will be conducted. Although most boards attempt to be fair and take each Soldier's personal record into account, there is little doubt that the personalities and priorities of the board members play a large part in determining the final outcome.

Young, potentially good career Soldiers are subjected to a board whose members don't know them, or what their potential is, yet in a short period of time decide their future. They don't pass if they get nervous, or can't answer the questions the way the board feels they should.

Up to this point Soldiers were recommended by their platoon sergeant/leader and commanding officer for promotion. However, in the prime part of their career they must undergo a board for E5/E6.

In the case of an E4 aspiring to be an E5, many are first termers and potential reenlistment candidates. Rejection by the board leaves the Soldiers with a bad impression of them and the Army, thus discourages reenlistment.

Once the individual is recommended for promotion to E6, the anxiety accompanying the board process is over, with promotions to E7, E8 and E9 based on more objective data. If Soldiers don't make the E5/E6 board, they may very well be lost; and, they must have been good Soldiers for their chain of command to recommend them in the first place.

By continuing to use the standard promotion grade sheets, I believe that the 250 possible points awarded by present boards could be arranged into an accurate proportion. World affairs would be excluded and a current photo used for the appearance portion.

Points would be awarded for military and civilian education, selection as Soldier of the month/quarter/year, attendance at service schools and academics, as well as other criteria. Then by using the unit commander's recommendation/work sheet, a local board could review the Soldiers' records and decide their overall standing, regardless of their MOS.

For the practical application portion, the SQT would be used to determine eligibility, since basic soldiering skills are part of the SQT. This would eliminate cramming to gain proficiency in world affairs and nervousness over inabilities to perform or recite some basic soldiering skill, when these skills have already been tested in the SQT.

The same guidelines that presently exist for the commander's recommendation/work sheet could be applied for those Soldiers not yet tested under the SQT. However, available points for SQT completion would be deducted from the cumulative total.

I fully believe that with just a little effort we can make the system described above, or one similar to it, work. More of the good Soldiers, that we have paid so much to train and motivate towards becoming productive members of the Army, could be retained. I also believe that the all volunteer force can work if we make every possible effort to improve avenues available to us.

NCOLP DOING WELL BUT STILL SHORT!

THIS PAST SPRING the Logistics Branch, Enlisted Personnel Management Directorate, MILPERCEN, initiated a massive publicity campaign to recruit qualified Soldiers into the Noncommissioned Officer Logistics Program (NCOLP). As a result, the program has seen its greatest influx in applications in more than 2 years. Furthermore, approvals into the program outnumber the disapprovals by a 3 to 1 margin.

However, the Army still needs qualified individuals in many logistics program military occupational specialties. So, if you are interested in additional schooling and possibly better assignments, read up on becoming a logistics program member. Information can be found in Chapter 13, AR 614-200 or by writing Commander, MILPERCEN, ATTN: DAPC-EPM-L, 2461 Eisenhower Avenue, Alexandria, VA 22331.

EOD VOLUNTEERS SOUGHT

ARE YOU INTERESTED in a challenging duty assignment? If so the Army is looking for enlisted volunteers in grades E1 through E4 for explosive ordnance disposal (EOD) duties at installations throughout the United States and overseas.

Those selected initially will be attached to an explosive ordnance detachment on the post where they now are stationed, followed by Phase I training at Redstone Arsenal, AL, which lasts for a period of 2 weeks. From there Soldiers will proceed to the United States Naval Explosive Ordnance School at Indianhead, MD, for Phase II of their training. This portion of the course lasts 13 weeks. Upon graduation from Indianhead, Soldiers are awarded MOS 55D10 and the Explosive Ordnance Disposal Badge. And, Soldiers are eligible for $55 per month demolition pay as of the date they report to Redstone Arsenal for Phase I training. Soldiers serving overseas must complete 5/6 of their tours before returning for training and reassignment. However, applications should be submitted at least 8 months prior to date eligible for return from overseas.

To be eligible, volunteers must have 13 months retainability at the expected time of arrival at their unit after completing training, or extend or reenlist to meet this requirement before leaving their old unit.

In addition, Soldiers must meet the mental, medical and security prerequisites for EOD duties outlined in AR 614-200, DA Pamphlet 354-4 and AR 611-201.

Interested Soldiers should forward applications through command channels to: Commander, MILPERCEN, ATTN: DAPC-EPM-L, 2461 Eisenhower Avenue, Alexandria, VA 22331. For additional information call MSG O'Brien at MILPERCEN AUTOVON 221-8016/8017, or contact any Explosive Ordnance Disposal Detachment.

Why Not TACAN?

CW3 Harry P. Arthur
243rd Aviation Company (ASH)
Ft. Lewis, WA

AS WE CONSIDER the present and projected avionics equipment onboard Army aircraft, perhaps one item we're overlooking is the TACAN receiver. It has been suggested that while TACAN is fine for the U-21 Ute or the OV-1 Mohawk, it isn't necessarily appropriate for our tactical helicopters. *Don't be so sure. Take a few minutes and consider some of the applications, both tactical and in the civil ATC environment.*

As our tactical helicopters become more sophisticated with the installation of advanced instrumentation, better avionics, improved stabilization equipment and even rotor blade deicing, they will be operated in more severe weather. In such situations the versatility of the TACAN receiver becomes even more important. Let's consider just a few examples.

Virtually every Naval, Air Force and Marine Corps airfield is served by a TACAN NAVAID. The Marine Corps has even developed COPTER TACAN approaches at many locations. At these airfields radar also usually is available. However, it cannot be used for en route navigation and is generally the sole approach aid for presently equipped Army helicopters. Thus, it is impossible to arrive at some locations in IFR conditions. If it is possible to make a flight under IFR, alternate requirements requiring additional fuel and flight planning must be met.

In addition to its primary use as a military approach aid, TACAN equipment also is compatible with civil VORTAC and DME. Since the civil airspace system primarily is structured around VORTAC stations, the TACAN receiver provides an excellent backup for VOR navigation which is essentially a "dual VOR" capability. This redundancy is simply an added safety feature at no additional cost to the user.

The capability of the TACAN to provide DME information to the pilot from VORTAC and VOR stations with DME is especially important to consider. DME information provides the pilot with a number of valuable benefits. Positive position fixing, intersection identification, holding, and groundspeed and time en route computations are much simplified which greatly reduces the cockpit workload.

In the increasingly crowded ATC environment, the DME function of the TACAN receiver is becoming a virtual necessity. Standard instrument departure procedures, standard terminal arrival routes and controller's instructions often include or require the use of DME. The DME arc procedure is an excellent example of the use of DME to expedite the flow of air traffic, reduce unnecessary vectoring and save valuable aviation fuel.

Additionally, the DME feature of the TACAN receiver combined with the course guidance of the VOR/LOC receiver usually allows the use of lower minimums for VOR approaches or the use of VOR/DME or ILS/DME approaches. For example, of the more than 800 approach procedures depicted in FLIP Low Altitude Instrument Approach Procedures, volumes 1 and 2, almost 200 (25 percent) require the use of TACAN or DME capability. Of the more than 300 airports depicting approach procedures, almost 10 percent are unavailable for IFR use to aircraft not equipped with TACAN. The majority of these airfields, which are VFR only to Army helicopters, are military airfields which provide fuel under interservice agreement, substantially cheaper than at civil fixed base operations. For approaches with both DME and non-DME minimums, the DME minimums average 200 feet lower; some minimums are as much as 1,000 feet lower.

Finally, not only is the TACAN compatible with the present ATC system and military tactical appli-

Glossary

ATC	**air traffic control**
DME	**distance measuring equipment**
FLIP	**flight information publication**
IFR	**instrument flight rules**
ILS	**instrument landing system**
IMC	**instrument meteorological conditions**
LOC	**localizer**
NATO	**North Atlantic Treaty Organization**
NAVAID	**navigational aid**
TACAN	**tactical air navigation**
UHF	**ultra high frequency**
VHF	**very high frequency**
VOR	**VHF omnidirectional range**
VORTAC	**VOR and TACAN station combined**

cations, it also will interface with future developments. Both civil and military microwave landing systems currently are undergoing developmental testing. They will be phased into the civil airspace system and used as tactical military landing aids in the 1980s and beyond. These systems will complement the present ATC system, incorporating DME features like those discussed here.

A TACAN receiver is unquestionably valuable for use within the civil airspace system, but what are the tactical applications? To begin with, TACAN is the primary approach aid for the Navy, Marine Corps, Coast Guard, Air Force and many of NATO counterparts. Many of these aviation assets possess portable or shipboard TACAN transmitters and will use them under tactical conditions at sea and at fixed airfields in relatively secure rear areas. Any consideration of rationalization, standardization and interoperability within NATO, let alone within our own forces, *must* include TACAN.

Certainly the mission of the cargo helicopter includes ship-to-shore cargo transport and movement of troops, fuel, ammunition and miscellaneous cargo from improved rear area airfields to more forward locations within the battle area. TACAN transmitters will be operating within these rear areas and at sea, providing increased all-weather capability and navigation efficiency for TACAN equipped aircraft. Canadian CH-147 Chinook cargo helicopters are equipped with TACAN receivers for precisely the scenario suggested above.

TACAN also provides an air-to-air capability. This feature provides a DME readout between two TACAN equipped aircraft. It can be combined with UHF or VHF direction finding for direction in addition to distance. The possibilities for the use of this capability are limited only by the user's imagination.

Self-separation assistance for formation inadvertent IMC procedures or even limited formation IFR are two examples. Limited tactical instrument applications are practical as is the use of Air Force aircraft to assist in long distance navigation during deployment to areas of operations. The TACAN capability also would be useful for navigation to naval carriers for refueling while self-deploying aircraft to the European theater.

A navigation processor unit is being developed to update inertial navigation systems in fixed wing aircraft by interrogating up to 10 different TACAN stations through the TACAN receiver. The AN/ARN-118 TACAN receiver now used by the Air Force already meets the Army's accuracy requirements for this system and appears to be the present choice for procurement. One might suggest that the same system be evaluated for use on helicopters equipped with doppler or inertial navigation systems. Such systems are being considered now for the cargo helicopters mentioned earlier and will be installed in utility and attack helicopters as well.

Clearly such an updating system is as tactically feasible for helicopters as for fixed wing aircraft, at least within corps and division areas. The installation of the TACAN receiver now allows system growth and follow-on improvements later.

The TACAN receiver is an off-the-shelf proven item of equipment which, through interservice cooperation, can be procured relatively inexpensively. Installation of TACAN receivers in Army helicopters takes us one step closer to true standardization and interoperability. Certainly the benefits of TACAN equipment, both tactically and in the civil airspace system, and its capability for future applications merit serious consideration by Army aviation procurement managers.

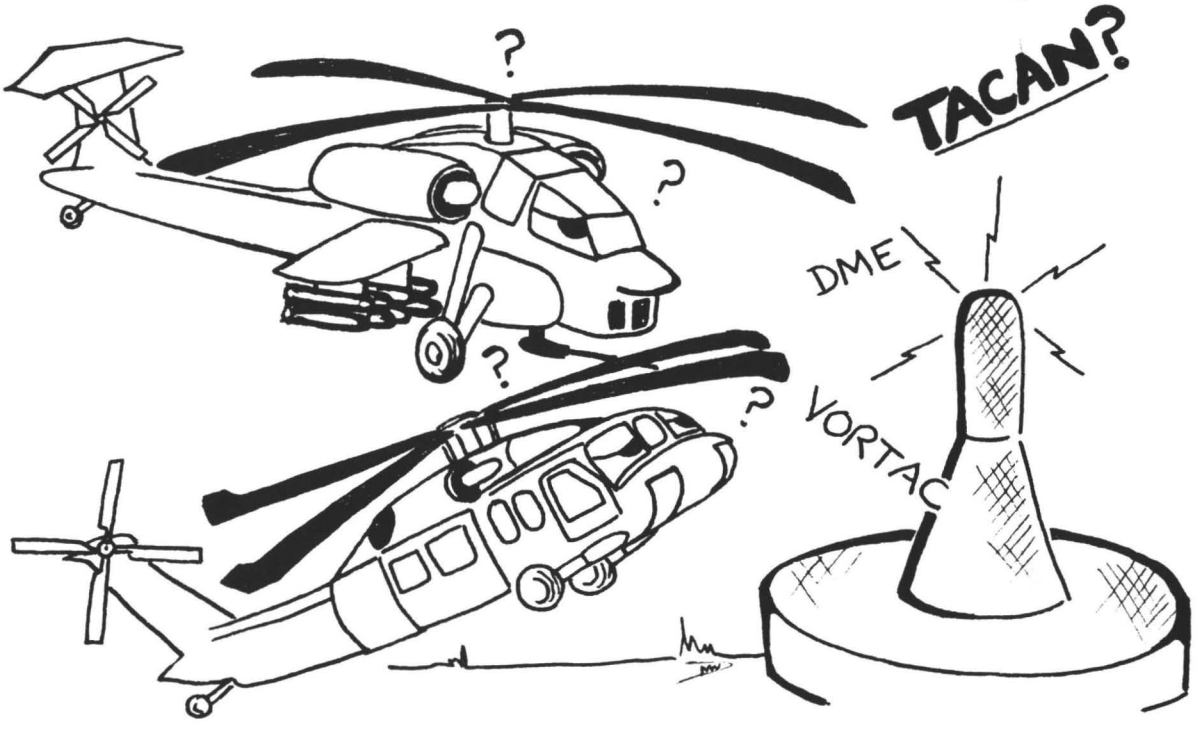
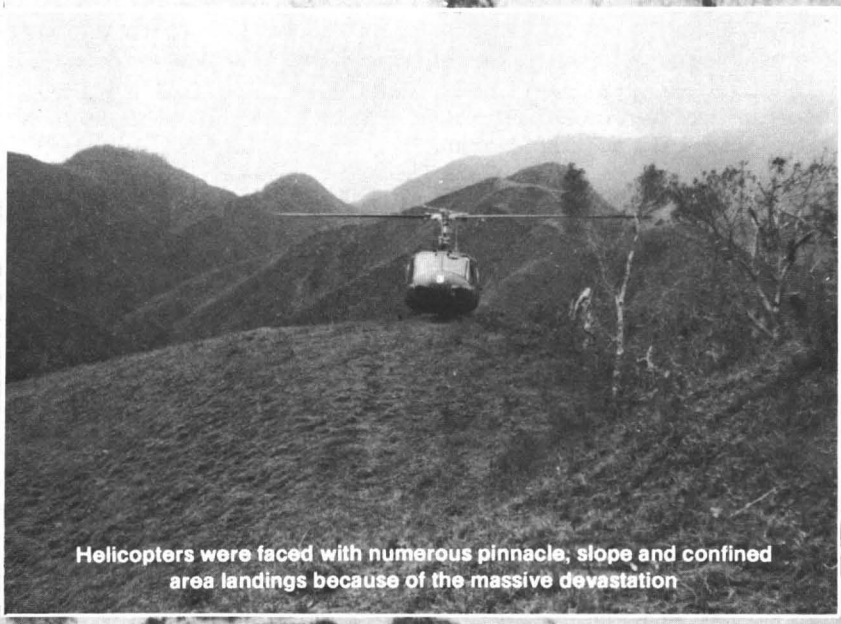


Illustration by David M. Watters



Helicopters were faced with numerous pinnacle, slope and confined area landings because of the massive devastation

HURRICANE COMMANCHEROS

Captain (P) Charles B. Cook

Executive Officer
101st Airborne Division (Air Assault)
Fort Campbell, KY

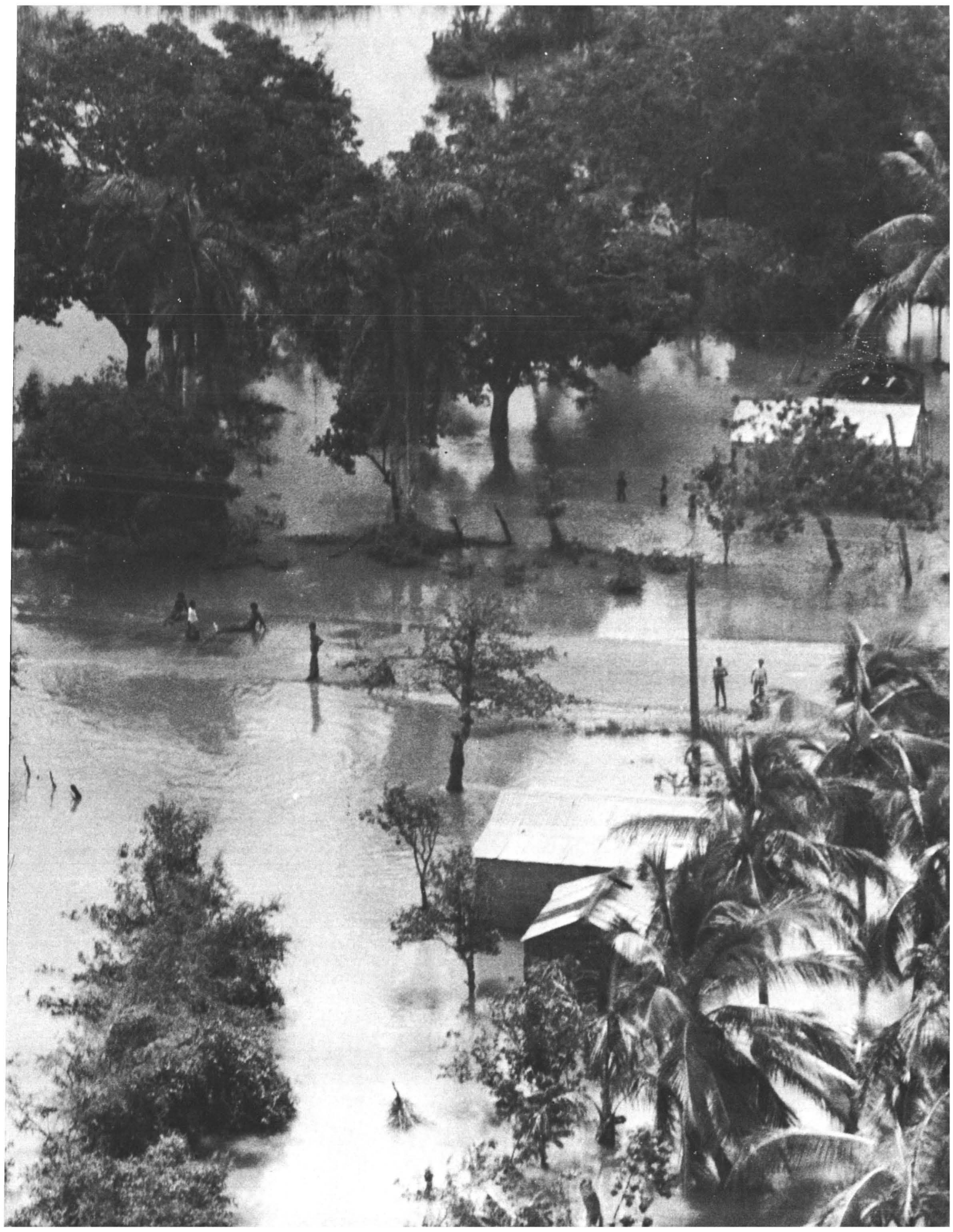
Photos by
CPT C. B. Cook and SP5 R. E. Vaughan

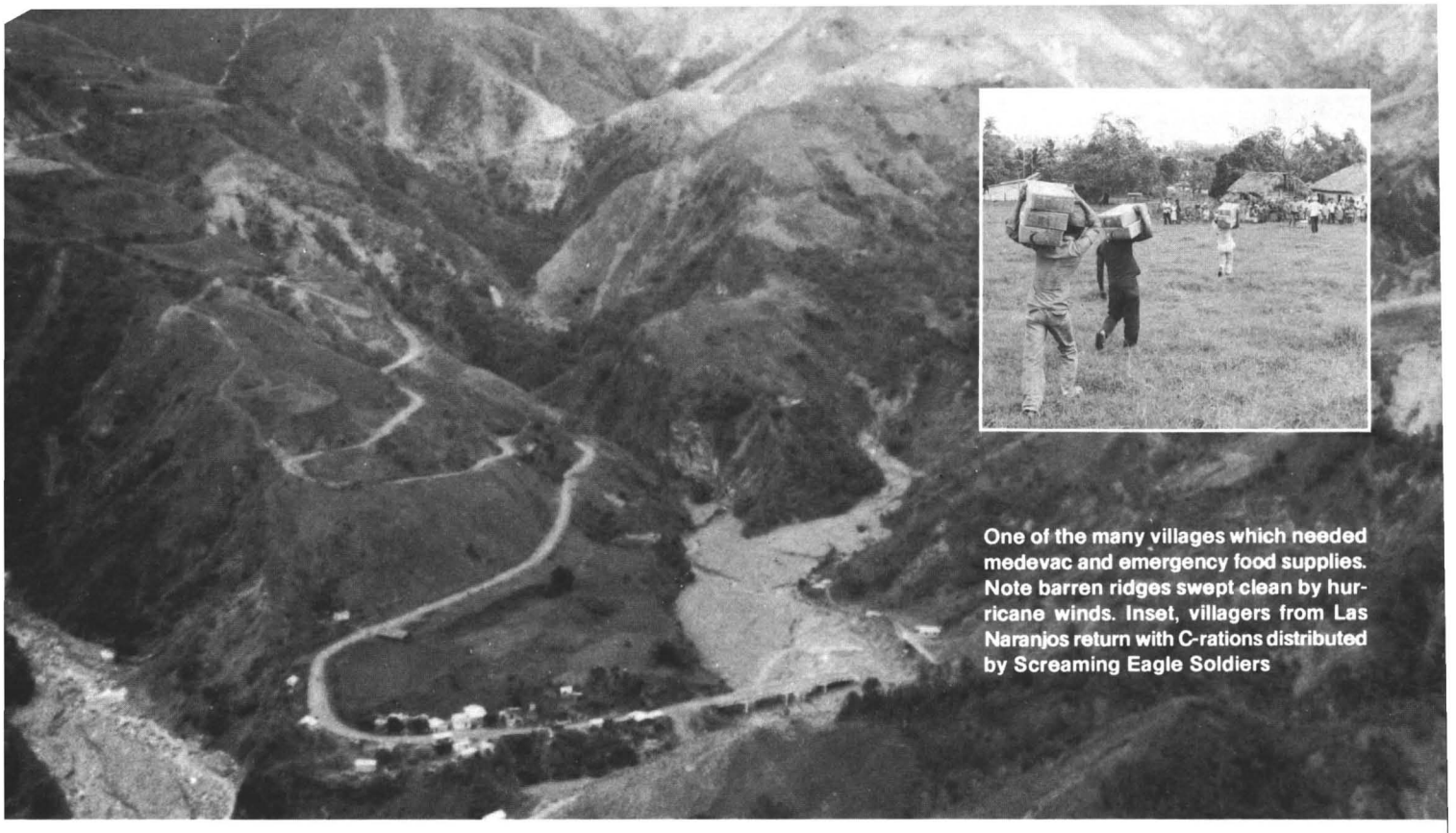
Next Month:
Hurricane/Puerto Rico National Guard

IT WAS A NICE Labor Day with all the prospects of everyone having one last fling before starting school—and the usual alternating cycles of division readiness force and brigade battalion "Gold Cycle" support missions beginning again. As any old campaigner knows this peace can end with a sudden telephone call.

In an ever-expanding alert notification on Sunday, 2 September 1979, the holiday turned into a No-Drill unit recall with real marching orders. A cry for help had gone out from one of our Latin American neighbors, the Dominican Republic.

Hurricane David with its 150-knot winds and 25-foot tidal surge had veered suddenly into the





One of the many villages which needed medevac and emergency food supplies. Note barren ridges swept clean by hurricane winds. Inset, villagers from Las Naranjos return with C-rations distributed by Screaming Eagle Soldiers

unexpecting "under belly" of the Dominican Republic leaving 1,300 dead, an unknown number missing, and more than 100,000 homeless and stranded because of washed-out roads and bridges.

Many people who had been on holiday outings were attempting to return to rural areas from the overcrowded cities when the hurricane struck in an area where the loss of life and human suffering would be maximized—the mountainous areas to the west of the Capitol. In this region, hurricane strength winds compressed through valleys and over ridges, stripping whole mountains bare of vegetation and inhabitants.

From the U.S. Department of State the mission was passed through the Department of Defense eventually to the "Commancheros" of Delta/101st Aviation Battalion, Ft. Campbell, KY. The commancheros marshalled, loaded and deployed themselves via C-5 and C-141 transports in less than 18 hours.

The mission was to set up operations in the Dominican Republic and provide immediate rescue/survey/resupply aviation support to the area stricken by Hurricane David's passage. Amid the readily apparent mass destruction of blown down trees, destroyed homes and factories and capsized ships, the members of D/101 Aviation Battalion quickly set up operations at the Dominican Republic Air Force Base at San Isidro.

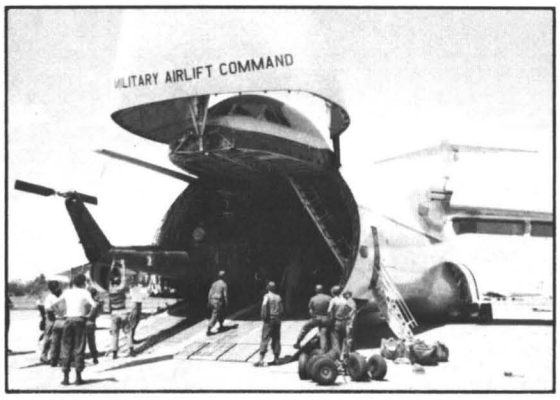
The Commancheros promptly began helicopter operations which eventually resulted in providing the backbone of a U.S. joint service helicopter effort that carried more than 975,000 pounds of food and supplies in a 47-day period to more than 50,000 stranded people.

An attached water team produced in excess of 186,000 gallons of pure drinking water to support the mercy operation.

With the Commanchero operations providing the focal point for the control of U.S. aviation assets, which included U.S. Marine CH-53s and additional UH-1s from the Puerto Rican National Guard, American relief efforts began in earnest 3 days after David struck.

Ducking the blow of Hurricane Frederic only 4 days later, the American aircrews maintained an intense pace of operations not seen since the tactical emergency days of Vietnam. Flying 7 to 8 hours per day, aviators would climb out of the cockpit with posteriors long gone to sleep, satisfied with the knowledge that this was real flying and a job really worthwhile. For saving dozens of injured people, for delivering medical teams and food to those who could not leave their homes without abandoning their

Victims became so unruly C-ration cases had to be dropped from a 10-foot hover



Top left, C-5 dwarfs Dominican P-51s, AT-6s and T-41s at San Isidro AFB, headquarters of the Republic's Air Force. Top right, the C-5s which ferried the UH-1s enabled the Hueys to begin emergency operations immediately on arrival. Above left, personnel of the Dominican Air Force load cases of C-rations onto a Ft. Campbell UH-1 for supply to isolated victims of the hurricane. Above right, SP4 Kevin Gaston of the 101st Avn Bn passes out C-rations at Las Naranjos. The rations were to sustain the people until supply roads were reopened

claim to their property, for a child's smile, was worth it all.

For flying maximum gross weight cargos into the mountainous interior of the country, for working around real contaminated fuel problems, for living with a curfew enforced by armed guards, for establishing forward refueling and resupply bases to extend operational capabilities, for operating in near instrument flying conditions, for recovering an occasional downed aircraft, for running an intelligence net to keep the American Embassy notified of critical areas, and for dealing with surging crowds reminiscent of Vietnam's last days, we all wondered "do you suppose we could get constructive credit for the ARTEP (Army Training and Evaluation Program) everyone else was taking back home?"

It became obvious to all that our sudden arrival was the first major U.S. presence since the 82nd Airborne and Marines were there in 1965. At that time there were many "Gringo go home" slogans; however, the widely publicized efforts of the U.S. helicopters rapidly won the hearts of the populace. A wave and a smile always were freely given as we passed through the oldest city in the New World, Santo Domingo and 101st Airborne stickers were hotter than a Mickey Mantle baseball card as we passed on our way through town to do our daily coordination with the Military Assistance Advisory Groups and Embassy.

Stickers depicting the famous 101st Division Screaming Eagle soon were seen on everything from privately owned vehicles to shoe shine boys' boxes.

During the disaster relief operations conducted in the wake of both hurricanes, there was an armada of help, an inter-American effort from several nations. Aircraft from Venezuela, Mexico, Columbia, as well as a steady flow from the U.S., brought in a variety of food stuffs and building materials. The Dominican Republic Civil Defense coordinated the distribution of this aid, initially by helicopter and then by roads as the Dominicans were able to reopen them and bypass washed-out bridges.

Acts of generosity, including the sacrifice of U.S. and Dominican lives in a CH-53 crash during the intial emergency phase, were not unnoticed by the Dominican Republic and its people. One newspaper described it as, "A moving example of the extremes of heroism, noble spirit and solidarity that men of different nations can achieve in hours of crisis."

Many homes were opened up to the members of the Task Force; lasting friendships were built. At the conclusion of the operation, one of our Dominican friends, CPT Victorio, summed it up best with his toast at a farewell party, "You arrived under orders as Soldiers, you lived here and worked here as friends, but you leave as Brothers and Sons of Our Land."

SEASON'S BEST

HURRICANE EAGLE SAVE

Story and photos by
SP5 Ralph E. Vaughn
101st Airborne Division (Air Assault)
Fort Campbell, KY

IN THE WAKE of Hurricane David, 59 "Screaming Eagle" Soldiers were deployed from Ft. Campbell, KY on Labor Day to the Dominican Republic to aid disaster victims.

The main component of Task Force Eagle Save, Company D, 101st Aviation Battalion, 101st Airborne Division (Air Assault) set up a base of operations at San Isidro Air Force Base, 8 miles from Santo Domingo.

Eagle Save's main mission was to assist the Dominican government in making a damage assessment survey with four UH-1 Huey helicopters.

Prior to Eagle Save's arrival the exact extent of damage to the Caribbean island was unknown. Officials knew little about how many lives were lost or where food and medical supplies were needed most.

After 3 days of flying damage survey missions, the government was furnished enough information to reflect the state of the Country and the condition and needs of the people.

With the needs known, the 101st Soldiers began using the choppers to deliver food and medical supplies to the storm-ravaged and hungry villagers.

Medical supplies ranged from penicillin to aspirins, and the main food items delivered were corn meal, baby food, condensed milk, beverages and the ever-present Army C-rations. According to one pilot, the villagers mobbed his aircraft after he had dropped off several cases of C-rations because he still had more cases on board . . . they wanted them.

The delivery of supplies was limited, for a short time, to a 100 statute maximum, the flying range of Army Hueys. This situation was relieved, however, when four CH-53 Sea Stallions arrived. Three were from the New River Marine Air Station, NC and the other was from the Coast Guard Station at Borinquen, Puerto Rico.

Because of their greater range and load capabilities, the Sea Stallions were used to survey portions of the island not visited since the onslaught of the hurricane.

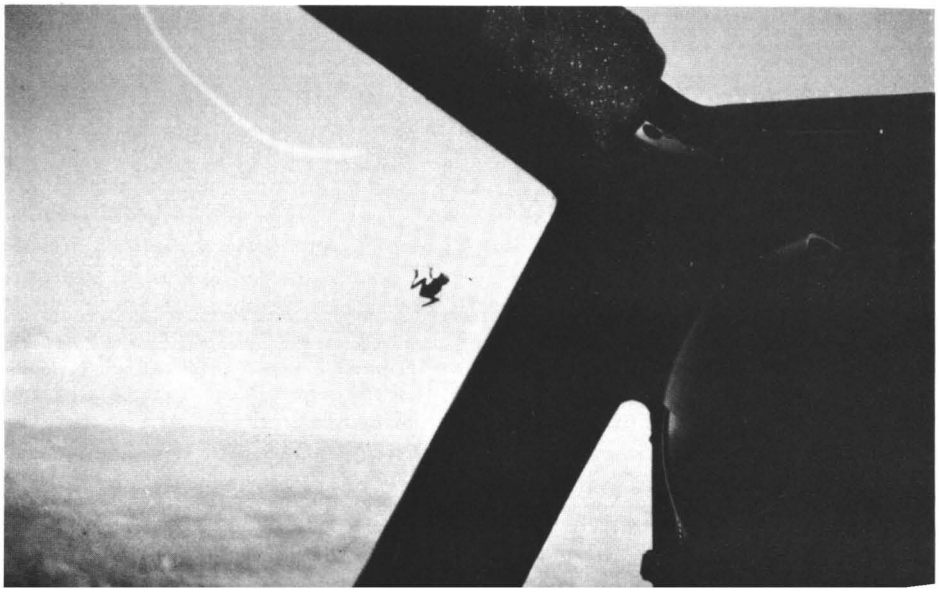
Although hampered by bad weather from then Tropical Storm Frederic, the helicopters of Task Force Eagle Save were airborne as often as possible.

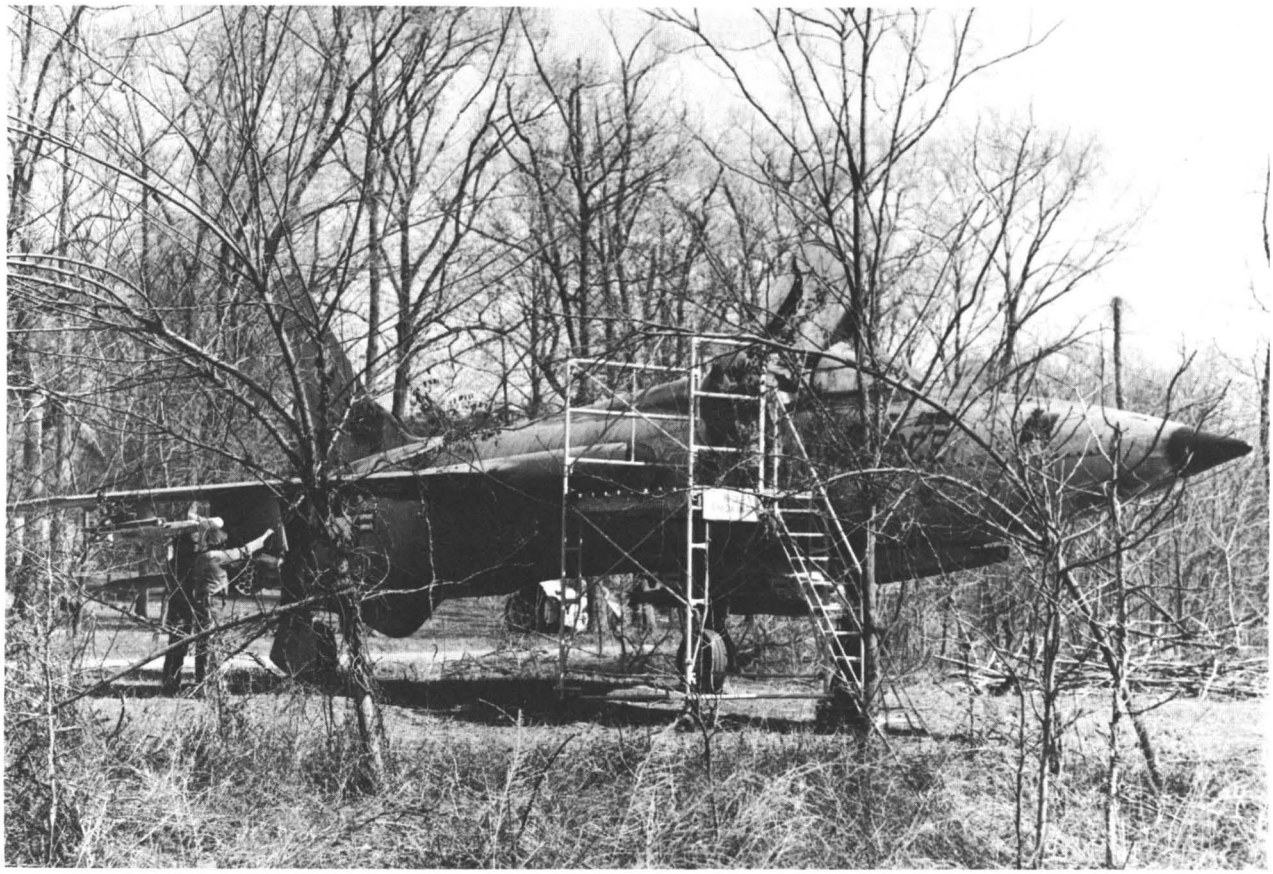
Sometimes the weather forced them to make deliveries of food supplies to places which had not been scheduled until later because they were not able to make it to the designated town.

The pilots and crews of the helicopters discovered some villages entirely wiped out, splinters lying where buildings used to stand.

Some of the hill people had taken shelter in caves without food or fresh water. Still, they had been able to find the time and strength to construct a small chapel and to pray for the souls of those who had perished.

Left, SFC Walter D. Smith, of Task Force Eagle Save, inspects rotor system of a Huey. Flying mercy missions didn't eliminate needed maintenance. Above, frogs pinging around the cockpit in cruise flight got to be too much





Crew checks armament and armament systems of F-105B

Bandit Airfield

Captain Carol King, USAF

Naval Ordnance Station
Indianhead, MD

Photos by PH1 Thomas Dougherty

ONE OF THE MOST unusual airfields in military service has plenty of planes, but no runway. The tower is a collection of mobile homes, Conex containers and a prefab building underneath a cedar tree. While there have been a few landings, by boat or tractor-trailer, there never has been a successful takeoff.

There are, however, several "augered-in" wrecks to be seen. It is not a normal flightline operation, of course; it is a training ground.

In the area are schooled the explosive ordnance disposal (EOD) technicians who respond to real crashes all over the world. Here they learn to deal with all sorts of bombs, dispensers and missiles, both on and off aircraft. They learn the finer points of safing armed

SGT Marshall Dutton and SGT Doug Donnelly carefully explore side-mounted dispenser of Marine Cobra

Left: Students examine cockpit of F-4B

Below left: (L-R) SGT Marshall Dutton and SGT Doug Donnelly safing the ejection seat of F-4D
Below: (L-R) SGT Dutton and BM1 Henry Coleman check rocket pods on UH-1 Huey

aircraft guns, ejection seats, bomb racks and all the assorted explosive hazards that airplanes possess. They learn to "render safe" an aircraft—any aircraft—not only when it is in one piece, but also after it has been scattered over acres of countryside. For this purpose the Bandit Airfield is admirably suited.

Its aircraft have been obtained from a variety of sources and include crash residue and old test models. They range in condition from externally complete to almost unrecognizable. Their commonality is that they represent hazards with which the EOD technician must be familiar. It is this person's job to clear an accident site of explosive dangers before other personnel are exposed to the hazards. That is not the entire EOD job, of course; personnel of all services are trained together to handle explosive, chemical and nuclear ordnance of any source or description.

The DOD sanctioned Explosive Ordnance Disposal School at Indianhead, MD is a Navy managed, jointly staffed organization which conducts all U.S. and some foreign EOD training. The Bandit Airfield (or, more specifically, the Air Ordnance Practical Area) is one of several practical training areas, each dealing with a specific grouping of ordnance or hazardous material. The hardware requirements of this particular area give it an especially fascinating appearance.

Situated high on the banks of the Potomac River in southern Maryland, the area is a cleanup crew's nightmare. The first thing

Above: BM1 Henry Coleman (front) and AMN Michael McCollum survey remains of A-1E
Above left: BM1 Coleman and SGT Doug Donnelly safe MK 82 bombs loaded on A-4C
Left: BM1 Coleman examines AIM 9 missile, part of F-4D crash

to strike the eye is an F-4B, which appears to have landed with its nose gear up and armed missiles under its belly, at the end of a short gravel road. Nearby is an F-100C, its nose also buried in the dirt and its fuselage-mounted gun installed. Looking further, among scattered inert items from World War I bombs to laser-guided missiles, an old Navy A-4C can be seen, much the worse for wear. It has good company in one of the first F-105B models, whose wings are weighted down with a ferocious collection of bombs.

A UH-1 helicopter sits serenely by the central building complex of house trailers and Butler buildings, its 40 mm grenade launcher filled with lethal looking dummy rounds. Other aircraft lie under tall pines and overgrown apple trees. There are the cockpit and wings of an A-1E that, inconceivably, once flew. An F-4D that now lies upside down with its wings torn off was assembled from two crashes in Turkey and Thailand.

A Marine Cobra gunship that once was used to test an ejection seat mechanism now shades the deer, and supports dispensers and the EOD students whose lives may someday depend on what they learn from these old, junked, "worthless" aircraft.

The Bandit Airfield is an unusual assortment of "has-beens" that continues to serve a very real mission. They help to ensure that EOD technicians of all services will be able to accomplish their dangerous duties safely, efficiently and to the benefit of us all.

"Tell it like it is" PRAMs

ONE FRIDAY MORNING last May at Marshall AAF, Fort Riley, maintenance test pilot W01 Dan Shank was running up an OH-58A. With the engine idling at 63% N1, he turned the battery switch on. The battery exploded! The aircraft was immediately shut down.

Investigation revealed that the wrong size screw had been used on a terminal link inside the battery case. This left a gap which created electrical arcing. All OH-58s at Fort Riley were grounded for a one-time inspection. Three more were found with the same problem. Major (then Captain) Ray Schaefer, aviation safety officer, 1st Aviation Battalion, called the Army Safety Center, then dispatched a detailed Preliminary Report of Aircraft Mishap (PRAM).

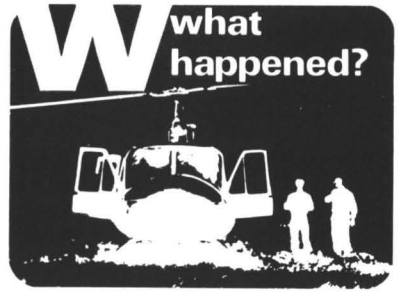
Part of the problem was two screws of different lengths with the same National Stock Number. The Safety Center's LOH system manager coordinated with Communications-Electronics Readiness Command (CERCOM) and Troop Support and Aviation Materiel Readiness Command (TSARCOM) to find a solution. The result was an OH-58 safety-of-flight message, a FLIGHTFAX article, a recommended change to AR 385-40 to improve identification of failed parts, and recommendations to better identify all parts by part number.

One well-written PRAM had started actions which eliminated an aviation hazard with catastrophic potential.

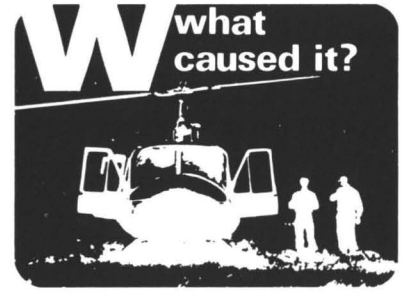
There are other cases in which one PRAM has led to the identification of and solution to a worldwide problem. But sometimes it takes more than one to establish a trend or define the magnitude of a problem. The point is that the PRAM is one of the most important tools available for identifying and solving aviation problems before they kill somebody.

Most PRAMs report precautionary landings (this classification includes aborted takeoffs and interrupted missions) caused by materiel problems. Most accidents are caused by human error. Doesn't quite track, does it? There are several reasons. One is that a unit just doesn't have the people to conduct a detailed investigation of every precautionary landing.

When an oil pressure light comes on, you don't ask the pilot how much sleep he had the night before. It he had been more alert, though, he might have caught that chafing line on preflight. Another reason might be that the commander or safety officer just doesn't want to put his "dirty laundry" out for everyone to see. "I mean, after all, we just can't tell battalion, division, and the whole world that the hydraulic line failed because a fitting was overtorqued by an improperly trained and unsupervised OJT crew chief!" Sound familiar?



Although these things don't appear in PRAMs, they are often revealed in accident reports. To paraphrase a TV commercial, you can write it now, or we can write it later. When you read in FLIGHTFAX that the destruction of another unit's aircraft and the loss of a crew was



caused by the same problem you identified and solved in your unit but didn't report, nothing will help that sick feeling in the pit of your stomach. (An article entitled "Don't Embarrass the Command" reprinted from APPROACH in the April 1978 AVIATION DIGEST deals with this problem and is worth printing again. See page 34.)

Since most PRAMs are reports of precautionary landings, let's look at them for a minute. Precautionary landings increased from 72.8 to 205.1 per 100,000 flying hours from CY 71 to CY 78. During that same period the accident rate decreased substantially. That doesn't necessarily prove that precautionary landings prevent accidents, but there have been a lot of precautionary landings that were inches or seconds away from being major accidents.

AR 385-40 tells you how to prepare a PRAM but leaves a lot of latitude as to how you describe what happened, what caused it to happen, and what can be done to

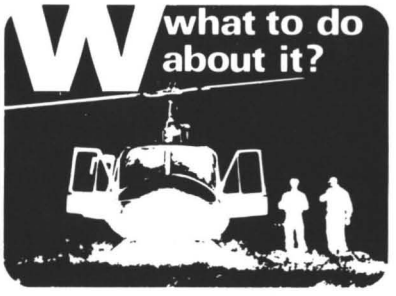
U.S. ARMY SAFETY CENTER
Major John W. Lowe, Directorate for Aviation Systems Management, and Emil Spezia, Directorate for Investigation, Analysis and Research, U. S. Army Safety Center

keep it from happening again. These three items of information—the 3Ws as we call them—are what we at the Safety Center need to get something done about a problem. Most units are doing a good job of telling us what happened, but the last two Ws (what caused it and what to do about it) are usually lacking.

Take this one for instance: "During demonstration of straight-in autorotation with aircraft having high gross weight, AH-1S IP did not use sufficient deceleration to slow aircraft's forward speed, followed by insufficient pitch application to minimize the already fast rate of descent and forward speed, causing a hard landing." OK, we know what happened, but why did it happen? Did the IP lack recent experience in the aircraft? Was he not properly trained? Does the aircraft design make depth and speed perception difficult in autorotations? Did the sloping runway give him misleading visual cues? What can be done about it, either at unit level or Army-wide? Do maneuver guides or IP training need some changes? Do aircraft configuration restrictions for autorotations need to be changed?

As you can see, this PRAM leaves a lot of questions unanswered. Now, here's what we would like to get. "During demonstration of straight-in autorotation, AH-1S IP did not use sufficient deceleration to slow aircraft's forward speed and aircraft landed hard. IP did not allow for high gross weight of aircraft (9,000 pounds) and failed to use sufficient pitch application to reduce high rate of descent and forward speed *because* he was inexperienced (50 hours IP duty) and had not performed this task during the previous 5 weeks. As a result, IP inaccurately estimated his rate of closure and did not take proper corrective action in time to prevent hard landing. Unit IP training will be upgraded to ensure IPs are familiar with the flight characteristics of the unit's aircraft in all weight configurations and flight modes. IP performance, qualifications, and selection will also be closely monitored."

This information could then be broken out by the Safety Center in the same 3W mishap reporting format we use for accident reports. This format allows quick identification of *what* happened, *what* caused it, and *what* to do about it. This mishap experience is then combined with worldwide experience and used to identify inadequacies and improvements needed in aircraft, materiel, regulations, field manuals, management, and unit and school training. Lessons learned are disseminated Army-wide.



Inadequacies are rank ordered in terms of risk to determine which ones require immediate corrective actions.

In writing PRAMs, it's important to think them through in these terms: What happened—the task error or materiel failure or malfunction; what caused it—the system inadequacies which allowed the error, failure, or malfunction; what to do about it—the corrective actions needed to prevent repeat occurrences. These terms are defined in more detail below. This may take a few minutes longer during PRAM preparation, but it should save some time in the long run by answering all the questions about the mishap before they are asked.

Our job at the Safety Center is to help you save lives, increase your aircraft availability, and help improve your unit's readiness. To do this, we need your help in identifying problems and corrective actions. Units that submit "tell it like it is" PRAMs using the 3W approach considering man, machine, and environment are contributing much to the worldwide aviation safety effort.

Definitions of the 3Ws

What happened. A task error is performance which deviated from that required by the operational situation and caused/contributed to the accident.

A materiel failure/malfunction is materiel that ceases to operate entirely, operates but not as designed or intended, or operates as designed but performance is below operational requirements.

What caused it to happen. A system inadequacy is an element of the Army system that did not operate as designed or intended and caused/allowed/contributed to the task error, materiel failure, or environmental factor.

What to do about it. Corrective actions are actions required to correct or reduce the operational impact of a system inadequacy.

U.S. ARMY SAFETY CENTER **from APPROACH**
Richard P. Shipman

Don't Embarrass The Command

LT BOB McCLEAN, Safety Officer of VA-71, was disturbed. He had the Pri-Fly watch and had just observed his good friend and roommate, LT Clay Felts, bolter twice even though his hook had been in the landing area. Clay had an excellent reputation as a carrier pilot, and in fact, stood well up on the squadron landing efficiency board. Therefore, after the second bolter, LT McClean requested the binoculars to look over Clay's aircraft. LT Felts was just too smooth a pilot to induce two consecutive hook-skip bolters.

As requested by Pri-Fly, LT Felts took his A-7 up the port side of the ship, tower high. Bob trained his "eyes" on the *Corsair* for a close inspection. His discovery was not good.

"Boss, 404's hook point is on backwards! I think we'd better bingo him to the beach. We've got a maintenance det there that can put it back on the right way."

"How in the hell can you install a hook point backwards?" thundered the air boss. "What were the pilot and plane captain looking at during their preflight? The Old Man's gonna be made as hell that we gotta bingo that bird. You know how he feels about diverts."

With a final diatribe, the air boss picked up the conspicuous red phone that connected him directly with the captain of the ship.

"Yes, sir, we're going to have to bingo him. Yes, sir, I know you don't want to bingo any aircraft, but the only other choice is the barricade."

"I don't understand how it happened either, Captain. OK, I'll pass the word to bingo him right away. Yes, sir, I'll have the squadron skipper meet with us in your cabin at 2200."

The red phone was returned to its resting point awaiting the next crisis.

When the Raspberry net reported 404 safely ashore, LT McClean went below deck to the readyroom, upset and unhappy. He was very upset that maintenance had installed the hook point incorrectly and just as disturbed that nobody in the safety review chain had caught the error. The collateral duty inspector missed it, the plane captain missed it, the pilot missed it, and nobody else in the flight noticed anything unusual. Lots of people had an opportunity to catch this dangerous error, but

nobody did. Bad business. The squadron's excellent safety record could easily be cut short by slip-ups like this.

Beyond this, LT McClean was unhappy because the squadron had really fallen on its sword. He had a lot of pride in the squadron—as did most members of "The Demons"—and the professional reputation of the squadron meant a lot to everyone in VA-71. Besides, they were well in the running for the "Battle E" award. This kind of publicity they didn't need.

Knowing this, LT McClean tried to phrase the first draft of the required incident report to minimize the embarrassment to his command. But every way he tried, it still looked bad. "Well," he reasoned, "not much choice but to pull a Howard Cosell and 'tell it like it is.' As the old Murphy's Law goes, 'If an aircraft part can be installed incorrectly, someone will install it that way.' If a Sierra Hotel maintenance department like ours can do it, chances are excellent that someone else will, too. Maybe this report will spare them the same problem."

The safety officer soon realized that he needed more information before he could write a complete report. He left the readyroom and proceeded to his stateroom to look for LT Felts. There he ran into Clay, who had just returned from the beach with his aircraft fixed. Since it was close to chow time, they decided to talk over dinner. After going through the line in the dirty shirt wardroom, the two pilots found a relatively clean place to sit down, and Bob started talking.

"How'd you miss that hook point, Clay? Wasn't it obvious on your preflight?"

"Not really. The aircraft was spotted tail-over-water, so I couldn't preflight the tailpipe area or look into the hook well."

"I can see that, but I wonder why the plane captain didn't catch it when you dropped the hook after taxiing out of your spot?"

"Well, to be perfectly honest, the air boss wanted me to expedite launch since the catapults were being starved, so I didn't stop for the hook check. I wanted to impress the boss with our squadron's can-do spirit."

The jello and cookie for dessert didn't appeal to Bob, so he left Clay to finish dinner while he went down to maintenance to investigate. He found the maintenance control chief in the maintenance admin office.

"Chief, how'd that hook point get put on backwards, and why wasn't it caught by the CDI?" Bob asked.

"Well, sir, it shouldn't have happened. But Brown was assigned the job—he's a new man, you know. It looked like such an easy job that he couldn't screw it up, so Phillips, his supervisor, went to chow. He'd been working for 9 straight hours and needed some food and a break badly.

"Right about this time, Ops called, saying we had an add-on hop that would make the squadron look good if we would cover it. Well, the only comer we had was 404, so we started hustling to get the paperwork in.

"Then, to top it all off, hangar deck started screaming to get the bird topside so it could be spotted. I guess somewhere in between, the CDI never got done. It's bad business, but it happens sometimes when you operate like we've been."

Later that evening, with all the facts in his head, LT McClean finished his rough draft of the incident report. "Same old story," he thought. "Operational commitments, rush for launching, add-ons to make the squadron look good, overworked and undermanned maintenance department, breakdown in communications—all the factors were present in this incident that have been identified time and time again as causes of accidents. Well, we were lucky this time; no accident. At least it will make a good incident report and maybe spare some other squadron the problems I'm going through now—or even more important—prevent an accident."

With the rough completed and routed, Bob went to the readyroom to catch the evening movie already in progress. His entrance went largely unnoticed, as most of the squadron was captivated by an Indian western movie, known in readyroom circles as a "max ordnance flick." The junior ensign was posted at the blackboard, logging the body count as bad guy after bad guy fell victim to the blazing .45 of the hero. Bob settled into his "Rocket 8" readyroom chair and was soon joining in with groans and boos.

The readyroom went silent momentarily as the black-hatted villain lined up the hero in the crosshairs of the telescopic sight of his high-powered rifle. Lo and behold, he shoots and misses, prompting the hero to leap from his horse, draw his .45, and, while suspended in midair, gun down the villain 500 yards away. The ensign logged one more dead while a hail of ballcaps, pens, NATOPS Manuals, and other fixtures of the readyroom not nailed down bombarded the screen in protest. When the dust settled, the phone was ringing, belatedly answered by the hatless duty officer.

"Yes, sir, he's right here. I'll send him down."

"Bob, the CO wants to see you in his room right away."

Bob exited with the body count at 48 and proceeded to the CO's room on the second deck. He knocked upon arrival.

"Come in, Bob."

"Hello, skipper. You wanted to see me? I'll bet it's about the incident report. Is something not clear?"

"Not really, Bob. It's a good report with the facts pretty much straightforward. But, you know, I don't think we should send it out."

"Do we have a choice, skipper? OPNAVINST 3750.6 says it's a requirement. Even more important, it might save somebody else from doing the same thing and having an accident."

The skipper contemplated the overhead momentarily before he replied.

"Let's be realistic, Bob. If we publish this, we'll embarrass the command. We'd be hanging out our dirty laundry for the entire fleet to see. And you know how much everyone wants that 'E.' "

"But, skipper, this report might save someone else from making the same mistake and maybe even getting hurt. It's our professional responsibility."

"Oh, I think you're exaggerating. It was really a fluke incident that wouldn't happen again in 100 years. It won't do anybody any good—and it will just make us look bad. We'd be putting ourselves on report.

"No, I appreciate your good work, but let's just leave this incident report here in the squadron. You work up a procedure so it can't happen to us again, and let it lie at that."

Bob was tempted to argue further, but he had found early in his military career that you can press your opinions only so far with seniors, and then you have to desist. He felt he had reached that point. Besides, if Bob were to be truly honest with himself, he would admit a measure of relief at not sending out the report. After all, it reflected poorly on him as safety officer.

Walking back to the ready-room, Bob could not help but think how ironic the whole situation was. "If only we weren't so good, maybe we wouldn't have to be so afraid of ever looking bad. Even great squadrons have people who make mistakes. After all, that's what a squadron is—humans—and humans err. What do 'they' expect? Why can't we be mature enough to 'fess up' to our errors so that others can learn?"

There were so many conflicting thoughts going on in his mind that Bob could not enjoy the rest of the movie, even though the body count stood at 76. Frustrated and upset, he returned to his room.

It was but 5 weeks later that LT McClean was reading the message board and ran across a preliminary accident report on an opposite-coast A-7 squadron. The message read, "On normal night recovery, aircraft engaged No. 4 wire. After 15 feet of wire pullout, hook disengaged from wire. Aircraft continued over the angle and impacted the water inverted. No ejection was observed. Alpha damage, Lima injury."

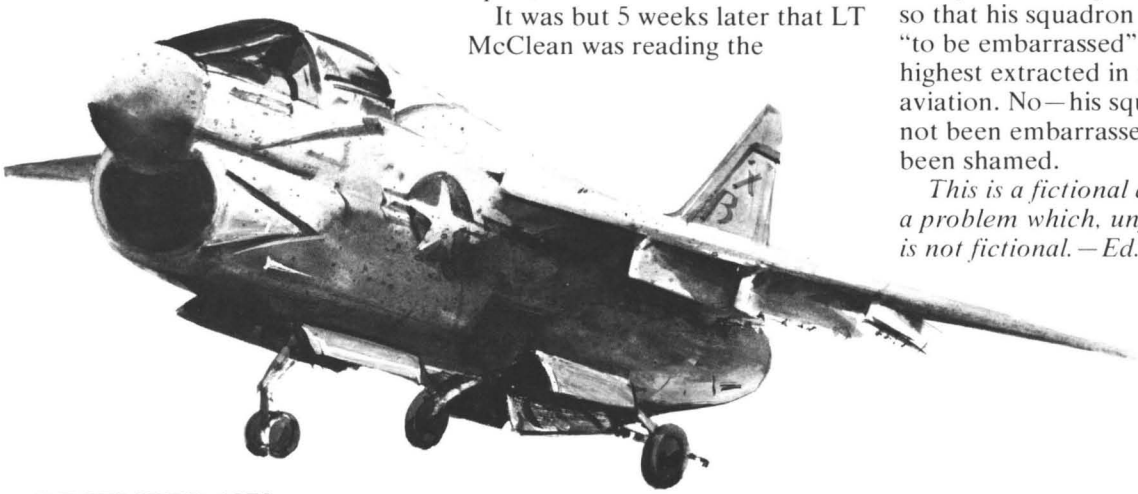
Bob could feel a knot tightening in his stomach and a cold tingle come over his entire body. Was the hook point installed backwards? Nah, probably a fatigue failure of the hook point or shaft, or a failure in the crossdeck pendant. But a nagging doubt kept after him.

One month later, the complete investigation summary was on the message board. The aircraft wreckage had been salvaged, and there in the conclusions, loud and clear, came the statement Bob didn't want to read.

"The hook point was found installed backwards on the hook shaft. There was enough protrusion from the back side of the hook point to engage the wire momentarily. When the hook finally slid off the wire, the aircraft had decelerated to a point where it could not regain flying speed."

LT McClean's legs were shaky and he felt lightheaded and dizzy as he walked back to his room. The price that squadron had paid so that his squadron didn't have "to be embarrassed" was the highest extracted in naval aviation. No—his squadron had not been embarrassed; it had been shamed.

This is a fictional article about a problem which, unfortunately, is not fictional.—Ed.



Reporting Final

Late News From Army Aviation Activities

FROM FORT RUCKER

Aviation Warrant Officer Training In Service (Interim Change to AR 611-85). Department of the Army Message 191500Z (Oct 79) states: The Army is increasing its training rate of warrant officer aviators from the present 465 output to 808 in FY 81. Consequently, there is a need for more applicants to meet increased requirements. In recognition of this, effective immediately the FAST score requirement has been lowered temporarily from 300 to 270. Previously tested personnel, with scores of 270 to 299, are eligible to apply. Request all commanders give this program their full support to encourage outstanding enlisted members who have the potential to become warrant officer aviators to apply. The time is now for those who want to enter this exciting, rewarding career field. **(USAAVNC)**

Simulated Reforger. The Army's annual Reforger exercise (Return of Forces to Germany) is its most important and most expensive training maneuver. The 46th Engineer Battalion (Combat Heavy Equipment) at the Aviation Center, Ft. Rucker, AL and the 34th Engineer Battalion (Combat Heavy), Ft. Riley, KS, have devised a simulated Reforger exercise which tests its units under similar circumstances and saves the Army a bundle. Recently, they swapped B Companies for a week of field training under Reforger conditions. Using a single C-141 aircraft, Company B of the 34th Engineer Battalion flew to Eglin Air Force Base, FL, to begin the exercise while Ft. Rucker's Company B boarded the aircraft and flew to Kansas for its training.

The concept behind the real Reforger is to preposition materiel (e.g., vehicles and tools) in various locations throughout Germany. The equipment, known as POMCUS (prepositioning of materiel configured in unit sets), is then issued to the arriving unit.

This enables short-notice movement of troops into Europe carrying only assigned weapons and personal field gear. Once they receive their equipment, they convoy to a field site and conduct an exercise or fight a war.

Because of the cost in moving troops to Europe for a 2-month exercise, many stateside Soldiers have not undergone this type of needed training. Simulated Reforger training between Kansas and Alabama accomplishes many of the same objectives. This simulated Reforger exercise is designed to familiarize Soldiers with procedures of going to an unknown location, drawing equipment and vehicles, moving into a field location and assuming a combat engineer mission.

Hurricane Frederic. Six helicopter pilots and two crewchiefs from the U.S. Army Aviation Center at Ft. Rucker have been recommended for the Army's Humanitarian Service Medal for their efforts during the disaster relief operation in Mobile, AL, following Hurricane Frederic. The pilots, assigned to the Department of Flight Training, are CPT Ronald Kaetzel; 1LTs David Ball, James Pierce, Charles Sizemore and Richard Tannich; and CWO Richard Risher. The crewchiefs, assigned to the Aircraft Logistic Management Division, are SFC Harold Shonk and SSG Oscar Gransberry.

Three UH-1 Hueys were sent from Ft. Rucker to Mobile to assist federal coordinating officer, Arthur Doyle, at the disaster relief center headquarters.

Ft. Rucker's 46th Engineer Battalion hand-receipted batteries, field generators and vehicles to Alabama National Guard in Mobile to assist in the cleanup operation.

The Ft. Rucker Soldiers flew personnel from the main relief center to isolated Dauphin Island and the Gulf Shore resort area for damage assessments. The helicopters also moved necessary supplies and personnel among the temporary disaster relief centers in the Mobile area. **(USAAVNC-PAO)**

FROM FORT CAMPBELL

Farmer Rescued. Cool thinking on the part of an injured Hopkinsville, KY farmer recently brought two alert Ft. Campbell helicopter pilots to his rescue and perhaps to save his life.

"On occasion I've griped a little about the helicopter noise when I've been out working in the fields. But that was the sweetest sound I've ever heard when the helicopter came over the treetops," said Luke McCarty whose right ankle was broken when his tractor turned over. Mr. McCarty decided his only chance for rescue was to start a fire and hope to attract a helicopter from nearby Ft. Campbell. His thinking paid off when the smoke was spotted by Warrant Officers James Edgington and Mark Greenwald of Company C, 158th Aviation Battalion.

"We were finishing our fuel load and had been up for almost one hour and a half and were headed back to Campbell Army Airfield to refuel," explained WO Edgington."The fire appeared to be only a minor brush fire so we initiated our return to Campbell

New Radar. LTC John D. McCurdy, Campbell Army Airfield commander, explains a part of the many operating functions of the new ARACC to MG John N. Brandenburg, 101st Airborne Division (Air Assault) commander. (U.S. Army photo by Billy Nixon.)

Army Airfield. Just as we were getting ready to leave, Mark noticed someone in the field waving a shirt." The 158th aviators relayed a call for help through Eagle Control to the 326th Air Ambulance Platoon, then stayed with Mr. McCarty.

The 326th rescue helicopter was piloted by Captain Roderick A. McLeod with First Lieutenant John Van Buskirk as copilot. Also aboard were the crewchief PFC Ralph Bruner; medic PFC Victor G. Chevrette; and PVT Stephen Waits, an aircraft mechanic. They provided Mr. McCarty necessary first aid and flew him to Jennie Stuart Hospital.

New Radar. A new Army radar approach control center (ARACC) was put into use officially at Ft. Campbell, KY during a ribbon cutting ceremony held recently at Campbell Army Airfield. MG John N. Brandenburg, post and division commander; COL Daniel Leonard, 7th Signal Command deputy commander; and U.S. Air Force COL Curtis C. Love, 1839th Engineering Installation Group, communications commander, cut the ribbon opening the new center.

"It's the newest radar in the Army," said LTC John D. McCurdy, Campbell Army Airfield commander. "It is equivalent to radar used at Atlanta and Memphis airports." The new radar equipment is Federal Aviation Administration tested and has proven to be the most qualitative and reliable air traffic control (ATC) equipment available. It can be modified easily to interface with the FAA radar system. "The ARACC is capable of providing long-range (165 to 200 miles) and coverage at much lower altitudes than the tactical equipment previously used," LTC McCurdy continued.

Equipped with four scopes, the controller's display is much larger and can filter out most clutter found on older ATC radar scopes. The scopes will allow Campbell Army Airfield to give radar approaches in the training areas and provide coverage of the civilian community, handling more targets and traffic at the same time. **(101ST DIV PAO)**

FROM ITALY

Firearms Ban. If you have orders to Italy, don't plan to bring personal firearms. Privately owned firearms cannot be shipped to Italy by military or civilian personnel or their dependents, according to a recent joint military services ban on firearms shipment.

Police enforcement agencies in the Southern European Task Force (SETAF) area formerly registered firearms imported by people under military orders. However, stricter enforcement of a 1975 law prohibits this activity. American officials are trying to establish workable procedures to comply with this law, but there are no means presently available to legally import firearms to Italy. Heavy fines and stiff prison sentences face violators of this law. Personnel with firearms in transit to Italy should contact the provost marshal's office as soon as they arrive. The SETAF provost marshal warns that illegally imported and unregistered firearms are subject to confiscation and destruction. **(SETAF-PAO)**

FROM ST. LOUIS

Project Manager's Award to Col (P) Hesson. Secretary of the Army recently selected COL (P) James M. Hesson for the Army's Project Management Award. Assistant Secretary of the Army for Research, Development and Acquisition, Dr. Percy Pierre, made the presentation last October at the project manager's conference in Orlando, FL. COL Hesson is the project manager for CH-47 modernization located with AVRADCOM in St. Louis, MO. The research and development project, featured in the September 1979 issue of *Aviation Digest*, is in its fourth year.

COL Hesson was chosen from more than 70 project managers in the Army and commended for directing the program in order for its goal to be achieved 4 months ahead of schedule (within cost). COL Hesson will be promoted to BG in the near future, and COL Terry L. Gordy will become project manager for the CH-47 modernization.

(AVRADCOM)

FROM CONNECTICUT

Cobra Fiberglas Rotor Blades. Kaman Aerospace Corporation has been awarded a letter contract for a multiyear procurement program by the U.S. Army for production of 1,696 Fiberglas rotor blades for the AH-1 Cobra. The first year's procurement (400) has an anticipated value of $8,750,000. Several years ago the Army decided it was necessary to procure a new blade that would improve the Cobra's survivability in a hostile environment. After an industry-wide design competition, Kaman was chosen (1975) to design the improved AH-1 rotor blades. Kaman then developed, tested and qualified the blades to Army specifications and went into limited production in its Bloomfield plant. **(KAMAN CORP)**

PEARL'S

Personal Equipment & Rescue/Survival Lowdown

If you have a question about personal equipment or rescue/survival gear, write PEARL, DARCOM, ATTN: DRCPO-ALSE, 4300 Goodfellow Blvd., St. Louis MO 63120

Shake Your Bootie

You may requisition the cold weather mukluk boot, NSN 8430-00-269-0098, and still have to shake your booties to help keep your feet warm. The mukluk is being furnished without the felt insert bootie type sock. Without this felt insert you won't have much luck with your mukluk in keeping the coldness away from your feet. The felt insert is available from S9T by the following NSNs at a cost of $5.72 each:

NSN 8415-00-177-7992	extra small
NSN 8415-00-177-7993	small
NSN 8415-00-177-7994	medium
NSN 8305-01-057-3503	large

Many individuals in extreme cold climates wear first the regular cushion sole sock, and then the sock men's winter wool/cotton over the regular cushion sole sock. Then your feet with both of these socks are placed inside the felt insert, and then you put on the mukluk. The following NSNs are for the sock men's winter wool/cotton:

NSN 8440-00-261-4897	Size 9
NSN 8440-00-153-6717	Size 10
NSN 8440-00-153-6718	Size 11
NSN 8440-00-153-6719	Size 12
NSN 8440-00-153-6720	Size 13
NSN 8440-00-153-6721	Size 14

Air Force/Navy Publication

The aviation life support equipment (ALSE) bulletin and the ALSE pamphlet list a number of Air Force and Navy publications on ALSE used by Army aircrewmembers. The Air Force and Navy publications listed in the pamphlets will provide valuable assistance in the use and maintenance of ALSE. Army Regulation 310-70 outlines the procedure for you to obtain the service publications you need.

Life Support Equipment Training

There is no established military occupational specialty (MOS) in the Army for aviation life support equipment; however, many items used by aircrewmembers are critical and require inspection and testing. Some units visit the nearest Air Force or Navy facility for assistance in having ALSE properly inspected. And, there are schools that personnel can attend prior to establishment of an Army MOS.

The Army ALSE MOS is at Department of the Army Military Personnel Center for final approval. However, we are not forecasting the approval date. Once we have established an MOS, the Army will have its own ALSE training schools. But in the meantime, the Air Force and Navy have excellent ALSE schools Army personnel may attend.

The following information should be of help to you in getting into one of the Air Force or Navy schools. However, you must coordinate your training request through your local command or unit training office.

• **C3ABR92230-000 (Aircrew Life Support Specialist):** Location—Chanute AFB, IL; length—5 weeks, 4 days.

Purpose—Inspection and maintenance of aircrew life support equipment such as emergency parachutes, torso harnesses, life rafts, life preservers, survival kits, helmets, oxygen masks. Issues, fits and adjusts aircrew life support equipment. Trains personnel in instructional techniques and methods of conducting aircrew life support equipment training.

• **C3AZR92250-004 (Aircrew Life Support Equipment):** Location—Chanute AFB, IL; length—4 weeks.

Purpose—Specialty oriented administrative and supervisor functions such as: evaluation of personnel performance, suggestion program and maintenance of publication files. Requirements and procedures for operation, use, inspection and maintenance of life support equipment such as: parachutes, parachute/torso harness assembly, life rafts, life preservers, survival kits, helmets and oxygen masks. Advanced training and techniques of conducting training for aircrews and life support personnel.

Prerequisites (Army aviation)—Must not be color blind. At least 2 years duty after completion of training. Will be assigned as ALSE supervisor and provide training on ALSE to aircrew personnel. Must be graduate of basic ALSE course 3ABR92230-000 and have a minimum of 12 months experience in the field of ALSE. Must be grade E5 or higher or Department of the Army (DA) civilian responsible for management/directing ALSE program.

• **Aircrew Survival Equipment (Basic LSE C-602-2010 class A-1):** Location—NATTC, Lakehurst, NJ; length—70 days (convenes weekly).

Purpose—To prepare aircrewmembers with the basic knowledge and skills required to perform job related tasks within the scope of ALSE and covers aviation life support equipment fundamentals, parachute rigging, packing and maintenance, oxygen and

Debbie Fuentes

Photo by Tom Greene

carbon dioxide equipment and systems, inflatable equipment, rigid seat survival kits, rescue kits and devices, pilot's personal and aircrew survival equipment, operation of sewing machines, and basic fabric/repair work.

Prerequisites (Army aviation)—Must not be color blind. At least 2 years duty after completion of training. Will be assigned or used as primary ALSE specialist and provide training on ALSE to aircrew personnel or DA civilian responsible for management/directing ALSE program.

Special Information—All instruction is self-paced and is oriented to those tasks to which the student will be assigned. Satisfactory completion of this course is required before entry into aircraft survival equipment school course C-602-2011.

• **Aircrew Survival Equipment (Advanced LSE C-602-2011 class C-1):** Location—NAATC, Lakehurst, NJ; length—63 days (convenes every 4 weeks).

Purpose—To provide aircrew survival equipment personnel with the knowledge and skills necessary to perform and supervise the maintenance of and conduct training in aviation life support equipment and systems. The course is self-paced individualized modular instruction. All trainees receive introduction to basic teaching procedures, aviation maintenance, materiel management procedures, use of sewing machine and fabric repair techniques.

Prerequisites (Army aviation)—Must not be color blind. At least 2 years duty after completion of training. Will be assigned or used as senior primary ALSE specialist/supervisor and provide training on ALSE to aircrew personnel or DA civilian responsible for management/directing ALSE program.

If you have a question on the Air Force training you may call Chanute AFB, IL, Mr. Stanford Fornof at AUTOVON 862-3034. Questions on Navy training at Lakehurst, NJ can be answered by calling Chief Long or Chief Kenny at AUTOVON 624-2687 or 2288.

Protective Armor

Assembled body armor (front and back plate w/carrier) is now available in all sizes. Army activities authorized this armor may submit funded MILSTRIP requisitions to S9T.

NSN	SIZE
8470-00-935-3192	Short
8470-00-935-3193	Regular
8470-00-935-3194	Long

If you have a question on this armor you may call (S9T) Mrs. Jerry Lyles at AUTOVON 444-2537.

Black Or White

If you have a need for the cold weather boots black, or cold weather boots white, the following information may be of assistance:

Continental United States depot stocks of subject boots, size 15N, 15R, 15W and 15XW are exhausted. No further procurement will be made.

The following sizes of the cold weather and extreme cold weather boots have been deleted from the current specification MIL-B-41816E, dated 5 Oct 1978 as amended.

SIZE	NSN (BLACK BOOT)	NSN (WHITE BOOT)
15N	8430-00-823-7079	8430-00-823-6923
15R	8430-00-823-7081	8430-00-823-6924
15W	8430-00-823-7082	8430-00-823-6925
15XW	8430-00-823-7083	8430-00-823-6926

Submit requisitions for the above sizes to the Defense Orthopedic Footwear Clinic, 666 Summer Street, Bastore, MA 02210. The routing identifier is S1T. AR 32-4, Section VI, Part B outlines requisitioning instructions. *Do not* requisition the above NSNs from S9T.

If you have a question on the above boots or any other boot worn by Army aircrewmembers, you may call (S9T) Ms. Maria Valente at AUTOVON 444-2535.

MONTHLY WRITING AWARD

the HIND MYTHS & FACTS

Captain Carl E. Daschke

Threat Branch
Directorate of Combat Developments
Fort Rucker, AL

THE THREAT

OF THE TACTICAL combat equipment items fielded by the Soviet military recently, few have created as much interest, discussion—*and led to as many misconceptions* within the Army's aviation community as has the Mi-24 HIND assault helicopter.

Discussions concerning the HIND invariably surface misconceptions concerning its size, possible missions and flight capabilities. Many of the misunderstandings are the result of attempts to compare Soviet with U.S. concepts of rotary wing aviation in terms of missions, armament and tactics.

Common examples of misconceptions concerning the HIND-A and its product improved follow-on, the HIND-D, are:

- The HIND, because of its size, is incapable of hovering or firing its weapons from a hover.
- The HIND is huge when compared to U.S. aircraft. It's often compared, in size, with an armed CH-47 Chinook.
- Soviet rotary wing technology is incapable of producing a rotary wing aircraft stable enough to allow it to engage in nap-of-the-earth flight modes.
- Soviet rotary wing technology is extremely rudimentary and tends to be far behind U.S. technology in terms of armaments and avionics.

The truth of the matter is that the Soviets have the capability to produce and field a modern, highly technical and advanced assault helicopter. The deployment of the HIND, which exhibits many of the advanced capabilities of the U.S. advanced attack helicopter (AAH), preceded the U.S. AAH production and employment by several years. Consequently, the ability of Soviet technology to produce a helicopter with capabilities equal to (and in some instances exceeding) corresponding U.S. systems and capabilities signaled the closure of another weapons technology gap.

Since the HIND's introduction, four versions have been identified. Initially, the HIND-B prototype was produced, followed by the HIND-A. The HIND-A was selected for production and subsequent deployment to the tactical forces. A follow-on version of the HIND-A, but without armament (HIND-C), was produced to be used as a training aircraft.

During the spring of 1977 the HIND-D, a product improved variant of the HIND-A, was identified with the forward forces. The deployment of the HIND-D follows the evolutionary development of HIND series aircraft with additional emphasis being placed on armament and fire control. The HIND-D is expected to possess a greater offensive capacity by incorporating more sophisticated fire control, target acquisition and improved weapon systems. The HIND-D is considered by some observers to be the most versatile and advanced helicopter in service anywhere in the world.

In an effort to clarify some of the myths surrounding the HIND, and more accurately evaluate its offensive potential, it is necessary to recognize the most

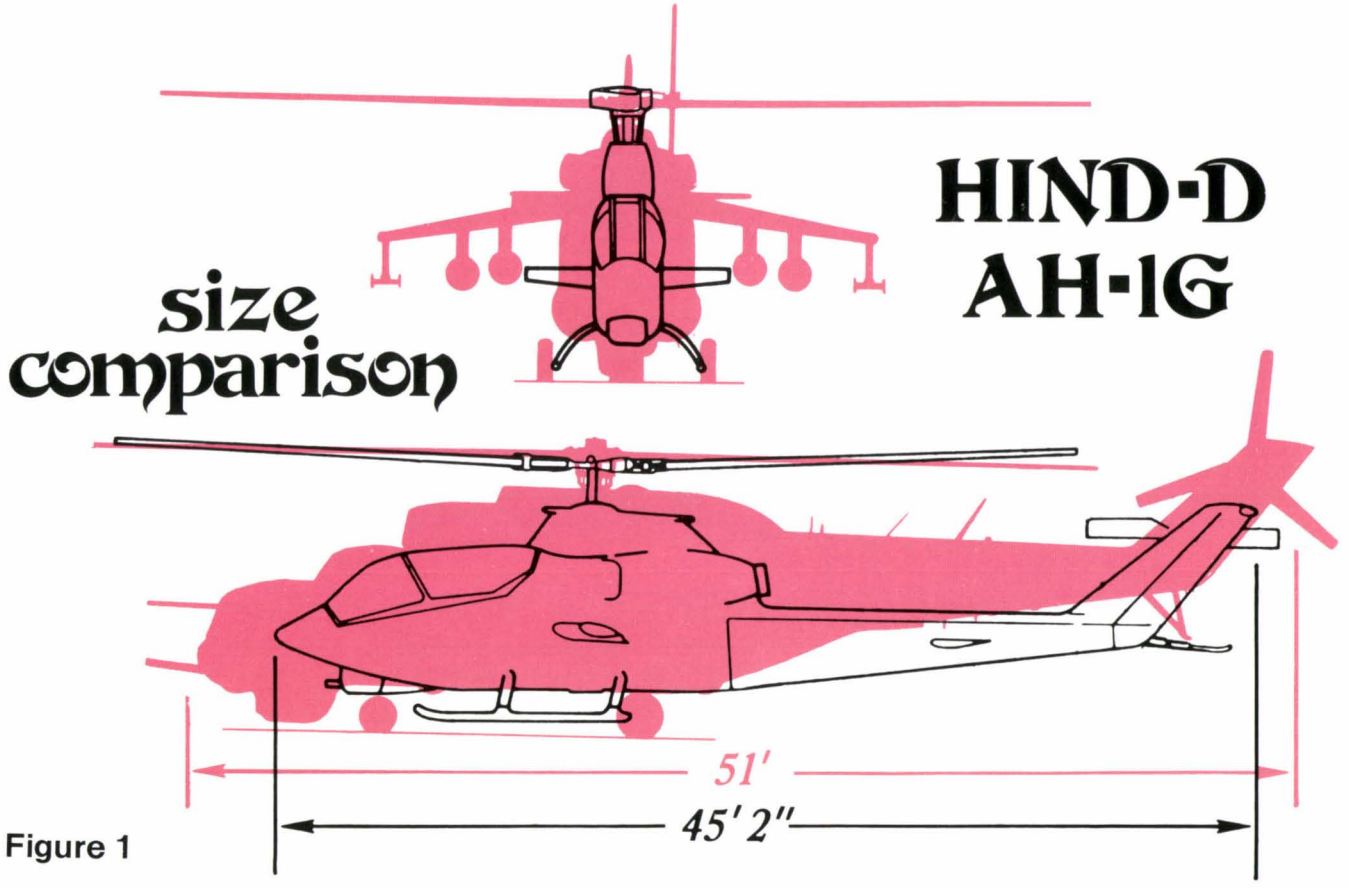


Figure 1

significant difference between the HIND and its present U.S. counterpart, the AH-1S Cobra. The HIND was developed as an offensive weapon with the ability to operate and survive ahead of the attacking forces to which it is attached. The aircraft's onboard weapons, coupled with its ability to carry an additional basic load of ammunition or eight combat troops, tends to support the HIND's potential for independent combat operations. The armament package developed for the HIND allows the aircraft to employ a variety of different weapons in support of its actions:

- 128—57 millimeter (mm) free flight aerial rockets (FFARs).
- 4—antitank guided missiles (ATGMs).
- General purpose bombs.
- 12.7 mm Gatling gun.

The weapons package, cargo hauling and flight characteristics allows the HIND to be extremely versatile and could be expected to perform many more types of missions than comparable U.S. helicopters. It is believed, however, that the HIND will be predominantly employed in the combat roles discussed below.

Close Air Fire Support: The variety of weapons found on the HIND allows it to provide close air fire support for the attacking forces. The lack of dedicated close air support (CAS) from high performance aircraft has long been a point of concern among attacking ground force commanders. The HIND could be called upon easily to fill the CAS gap by attacking an enemy force with its rockets, bombs and Gatling gun fire. The ability of the aircraft to loiter in the vicinity of the battle area until sufficient numbers of targets become available further increases the HIND's CAS threat to our defending forces.

Combat Air Assault: In the early stages of a conflict the primary mission of the HIND could easily center around its ability to transport forces and then remain with those forces to provide close air support. Combat air assault (CAA) missions will be conducted in an effort to insert forces within our rear areas. These forces would have the mission of disrupting our communications, logistics, and command and control facilities. Particular emphasis would be placed on those logistical areas where our special weapons are maintained. In addition, CAA could be used to facilitate the securing of river crossing areas to be used by the attackers, and fortified positions. In the performance of CAA missions, we can reasonably expect the HIND to be employed with the Mi-8 HIP E and F which have a larger troop lift capability. The HIND's

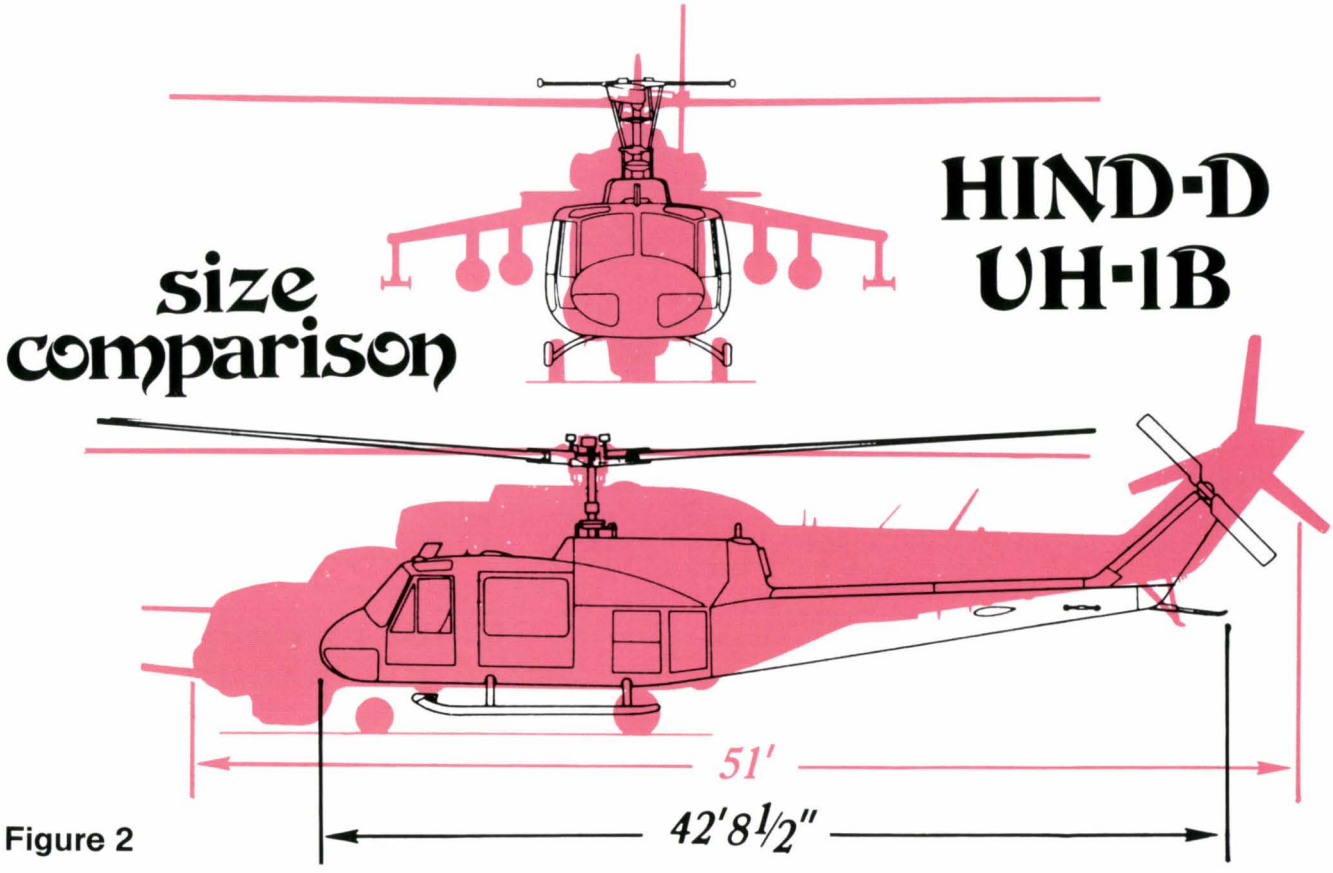


Figure 2

ability to carry a full complement of weapons, with an additional basic load of ammunition inside the cargo area, will prove to be invaluable in supporting the combat air assault role.

Antitank Fires: The HIND is capable of employing its ATGMs (AT-2 SWATTER or advanced systems) much in the same manner as our antitank aircraft. Considering the range limitations associated with the AT-2 SWATTER, the aircraft would probably realize its greatest antitank success by engaging armor from a defensive position. However, the offensive potential, especially against our tanks acquired while they are repositioning between defensive battle positions, cannot be discounted or overlooked.

Air-to-Air Interdiction: The possibility of our helicopters being engaged by the HIND is a subject of increasing concern and debate within the aviation community. This concern is undoubtedly justified, with the postulated air-to-air mission based upon several undeniable factors.

The HIND is equipped with weapons which originally were developed for air-to-air use, or are capable of being employed in an air-air role. Most notable are the 57 mm FFAR and the 12.7 mm Gatling gun.

The HIND, if employed in the missions we project for it, will spend a great deal of its time operating behind our forward edge of the battle area. It would then be reasonable to conclude that our most timely response to these intrusions would be our own attack helicopter; therefore, the HIND appears to be armed to counter our perceived aviation threat to the accomplishment of the HIND's mission.

Assuming that our antitank aircraft are at least as successful in killing Soviet tanks as we hope them to be, it is not unrealistic to believe that the Soviets would consider the HIND as a viable weapon to be employed against our antitank aircraft. As stated earlier, the HIND-D incorporates sophisticated navigational, target acquisition/fire control and weapon systems. The advanced technology associated with the HIND is made possible by the use of a "continuing technology" process employed in the manufacture and design of each succeeding version of the HIND. Another practice, allowing the designer to provide equipment which is more sophisticated than what we generally would include on our helicopters, is the use of common aircraft systems. This commonality stresses the use of standardized parts, assemblies and subsystems throughout aircraft production when and wherever possible.

Therefore, it is possible to find several types of aircraft equipped with similar avionics, navigational devices and armament. The reason behind the use of common items is that the design bureaus for arma-

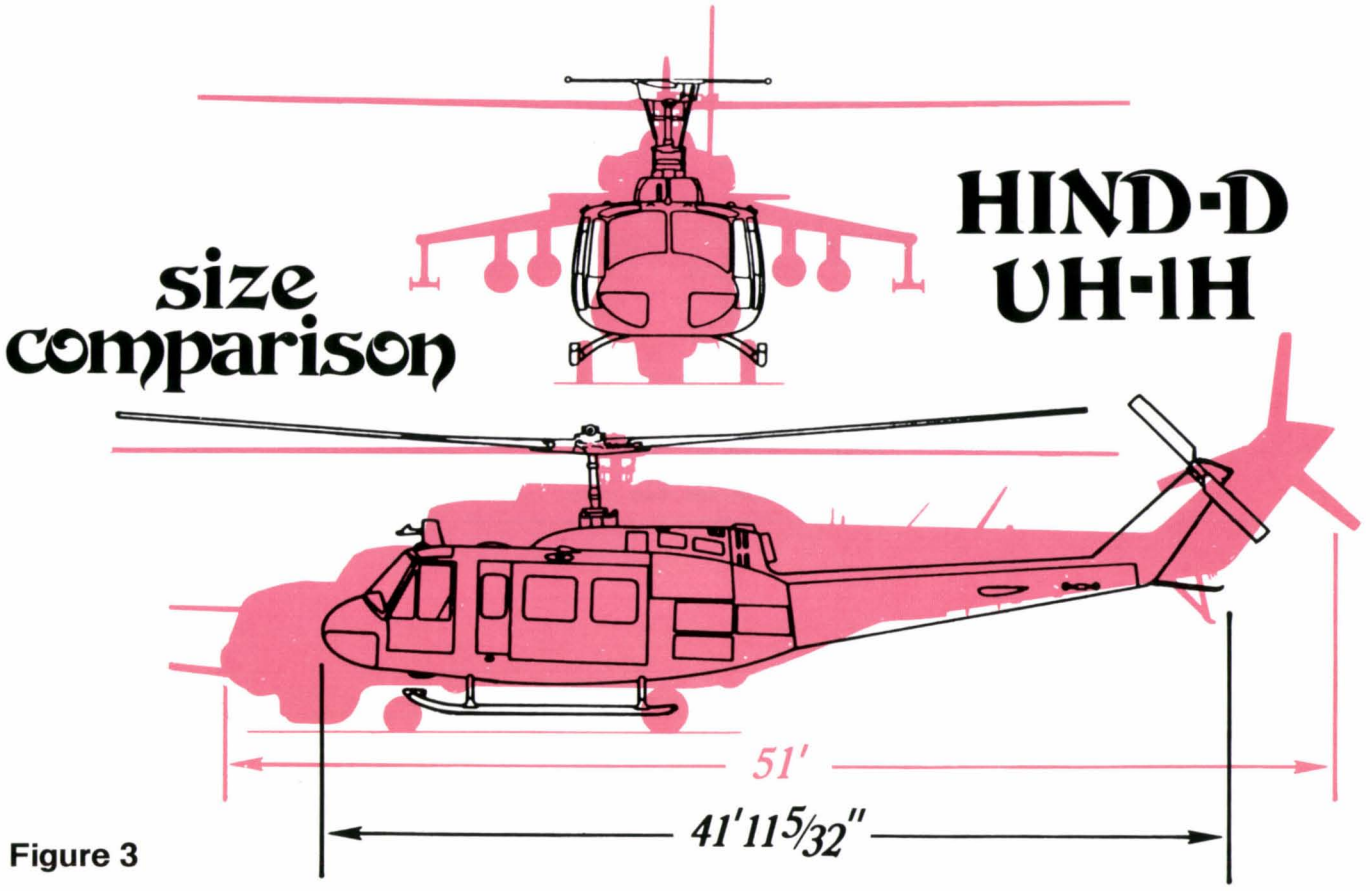


Figure 3

ments and avionics are responsible for developing all related systems for the Soviet aircraft fleet. Under this concept it is far less complicated and less expensive to design one type of subsystem which can be used on several aircraft; thus, the navigational systems, bomb racks or rocket pods tend to be standard throughout the Soviet Air Force.

Much has been said concerning the size of the HIND in comparison to our fielded helicopters. Obviously the HIND is larger than its U.S. counterpart. A smaller version of the HIND would undoubtedly reduce the aircraft's versatility, and reduce the aircraft to a carbon copy of our antitank helicopter. Although larger than U.S. antitank helicopters, it is not as large and cumbersome as some "experts" would have you believe. With the help of the illustrators at the Aviation Center at Ft. Rucker, AL, we have prepared scaled comparisons of the HIND versus our AH-1G (figure 1), UH-1B (figure 2) and UH-1H (figure 3) helicopters.

The illustration comparing the HIND with the AH-1G provides some distortion in that it compares the aircraft in a landed position. In flight the HIND's tricycle landing gear would be raised into the fuselage. Therefore, in flight, the height of the two aircraft would be similar, more closely resembling the Cobra's. Another important consideration when comparing the aircraft is that the HIND most probably will be observed from a frontal or at least quartering position, with the observer's vision being obscured by fog, haze or smoke. The obscuration of the aircraft would make immediate positive identification more difficult. This fact will no doubt cause some real problems for our ground forces, especially in the air defense units attempting to identify aircraft.

The HIND's larger size will no doubt restrict it from operating in the very extremes of terrain flight. This will, however, be of minimal concern to the Soviet aviation officer. The HIND appears to have been provided with the technology, power and armament to enable it to successfully complete its myriad of combat missions. I feel that, although the aircraft undoubtedly will have some vulnerabilities, the HIND can be expected to represent a rather significant threat to both Army tactical aviation and our ground forces. Based on the HIND's versatility, we can expect increasing numbers of HIND aircraft to be deployed in the forward areas.

Questions or comments concerning this article should be directed to the author by writing to the Threat Branch, Directorate of Combat Developments, ATTN: ATZQ-D-CT, U.S. Army Aviation Center, Ft. Rucker, AL 36362; or call AUTOVON 558-4709/5671, or commercial 205-255-4709/5671.

The Case Of The Wayward Bolt

THIS IS THE story of a bolt that fell out of a jetliner.

But it's not the story you're thinking about.

This bolt came from a DC-8, not a DC-10. And our story has a happy ending, thanks to the initiative and perseverance of an FAA [Federal Aviation Administration] accident-prevention specialist who takes his job title seriously.

The story begins on a Sunday morning early this year with a Cessna 172 carrying a flight instructor and a student on an instrument training flight. Suddenly, with the aircraft at 7,500 feet in the Bohemia holding pattern over Long Island, NY, a small metal object crashed through the windshield, tore a chunk out of the sunvisor and just missed the flight instructor's head.

It wasn't until the following evening that officials at the flight school decided that the incident should be reported. They called the Farmingdale General Aviation District Office (GADO) and told accident-prevention specialist Robert C. Heckman what had happened. He immediately suggested that they search the aircraft. In the rear seat of the Cessna, they found a heavy 2-inch bolt with some torn pieces of metal jutting from it.

Bob Heckman drove over and picked up the bolt. He knew it hadn't come from the 172. It had to have come from some other plane. At 11:30 p.m., he was at the New York Air Route Traffic Control Center at Islip, checking the records of incoming flights. He came up with a list of 20 air carrier aircraft on their way to JFK Airport at the time of the incident.

The next day, he made the rounds of maintenance personnel, trying to identify the part and to narrow down the field of aircraft from which it had come. By a process of elimination and deduction, he finally settled on the most likely prospect: a Madrid-chartered Avianca DC-8. It had been in the area at the time the 172 was struck and was descending to JFK from 10,000 feet.

He called the carrier to find out where the DC-8 was. It was at JFK, about to take off for Madrid with a full load of passengers. No maintenance had been done on the plane, he was told, nor had it flown since its arrival at JFK the afternoon of the incident.

The aircraft was scheduled for a 6:00 departure. Bob Heckman reached the plane at 5:30 p.m. The passengers had not yet embarked. Heckman boarded the plane, produced the bolt, and told the captain the story.

The captain was not impressed. "Are you telling me that a piece of my airplane landed in another airplane . . . in the air?" He repeated the story to his copilot and engineer in rapid Spanish. They laughed uproariously.

"I'm telling you," Heckman said doggedly, "that it is possible. All I want you to do is wait until I can check out this part in your maintenance manual."

The captain shrugged. "All right, I'll wait," he agreed.

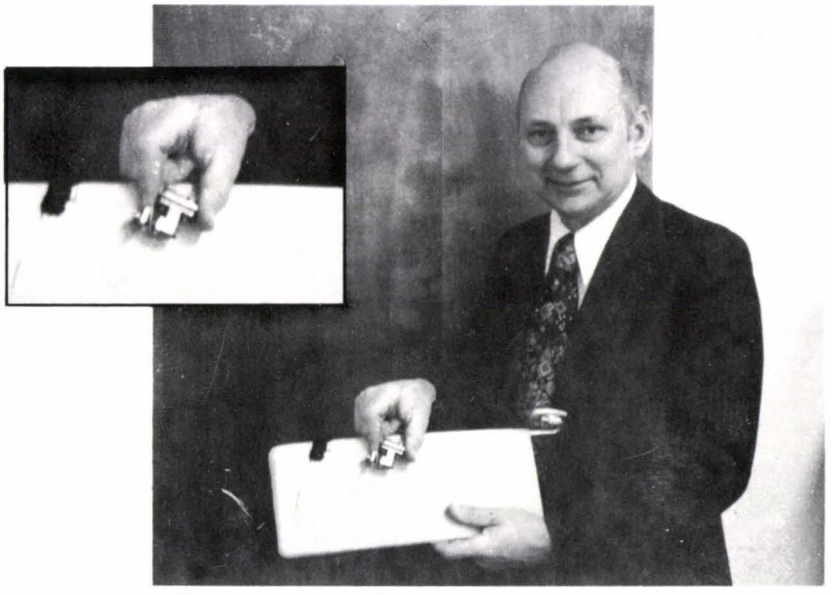
The inspector sprinted over to the hangar and there, with the help of a maintenance mechanic, went over the DC-8 manual. Positive identification was made. The part was a jet thrust reverser stop from a DC-8. He and the mechanic raced back to the plane. By this time, the passengers had boarded, and the crew was getting ready to close up and roll.

"This is definitely a part from a DC-8," Heckman told the captain. "And it's most likely that it comes from your plane."

"Are you grounding my airplane?" the captain demanded to know.

Bob considered all the international complications that might ensue from such a course of action. "No," he said finally. "I'm telling you that this part that I have in my

We read and hear a lot these days about how people just don't care anymore about the quality of their work. But here's a story about some people who do care, and about one man in particular—an accident prevention specialist—whose perseverance most likely prevented a tragedy. We may not always get the same opportunity Bob Heckman did—but then, Bob made his opportunity. The *Aviation Digest* thanks *FAA World* for permission to reprint Irv Moss' article from its August 1979 issue



Bob Heckman of the Farmingdale, NY, GADO and the runaway thrust-reverser stop from a Spanish DC-8

hand is probably from your aircraft. If you want to take off without an inspection of your engines to see if this part is missing from one of them, then that's your responsibility."

The captain conferred in Spanish with his crew, and then turned to the mechanic. "Will it take long?"

"No, sir!" said the mechanic and he bounded off the plane. Soon, he returned. "Come outside," he said. "I want to show you something."

He led them to the number one engine. By this time, it had grown dark. He pointed a flashlight inside the engine. "See? This is the rear jet thrust reverser stop. See inside, there's another one."

He led them to the number two engine. "See this?" he asked, pointing his flashlight. "This is the rear one. Now look here. The front one is missing!"

The captain muttered darkly in Spanish, shaking his head in disbelief.

While the repair was being made, the captain and the crew kept pumping Bob Heckman's hand in profuse gratitude. The part was replaced in short order, and the aircraft departed for Madrid.

As an interesting sidelight, it should be noted that because of JFK's long runways, reverse thrust had not been necessary when the DC-8 landed there. The Madrid runway, however, is much shorter, and reverse thrust is necessary. What might have happened to the aircraft and its passengers without reverse thrust capability in its number two engine is, of course, speculative; but the super-detective work of Bob Heckman has given literal meaning to the title "accident prevention specialist." **By Irv Moss**

ATC ACTION LINE

UNITED STATES ARMY COMMUNICATIONS COMMAND

Military Training Routes on Sectional Aeronautical Charts

THERE IS A change in progress for NOAA-NOS 1:500,000, Sectional Aeronautical Charts, or Sectionals as they are commonly known. Military training routes (MTRs) are being added to the Sectionals.

As you will recall, military training routes define airspace where certain designated military aircraft can operate below 10,000 feet at speeds above 250 knots indicated airspeed to accomplish their national defense training mission. MTRs are defined completely in the Department of Defense Flight Information Publications (FLIP) AP/1B and depicted on AP/1B charts. However, neither of these FLIP products are intended for Army in-cockpit use and are normally available only in the flight planning room. The FLIP instrument flight rules (IFR) Enroute Low Altitude Charts depict all IFR MTRs (IRs) but only depict visual flight rules (VFR)/MTRs (VRs) at or above 1,500 feet above ground level. This leaves a lot of lower altitude VRs not showing up on the FLIP Enroute Charts. This low level VR omission is especially important to Army helicopter pilots since they frequently operate in this low level airspace under VFR conditions. An unexpected close encounter with a jet doing mach .98 can ruin a helicopter pilot's whole day.

Over the next few months all MTRs will begin to be depicted on Sectionals. While this is a big improvement we are not yet home free. Sectionals are not published on the same schedule at which routes may be altered (enroute 56-day cycle). Notice to airmen (NOTAMs) and FLIP still must be consulted for changes that may occur after the publication cut-off date listed on each Sectional (6 months).

Federal Aviation Administration flight service stations (FSS) within 100 nautical miles of an MTR are notified when an MTR is activated and will pass that information along to pilots on request. Also, pilots of aircraft using a VR route are requested to monitor 255.4 MHz if practical.

Readers are encouraged to send questions to:

Director
USAATCA Aeronautical Services Office
Cameron Station
Alexandria, VA 22314

Points to remember on MTRs:

- *See and avoid* is the separation system.
- Sectional MTR information may be NOTAMD.
- Flight service stations monitor active MTRs.
- Getting to your destination without rotor blades is considered difficult.

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Army Aviation Annual Written Examination

CPT Frank Ellis
Training Analysis & Design Division
Directorate of Training Developments
Fort Rucker, AL

THE 1980 ARMY Aviation Annual Written Examination (AAAWE) was shipped from Ft. Rucker, AL, the week of 19 November 1979. The new exam follows the basic format of the 1979 version with the following changes.

The 1980 exams, as a result of analysis of answer sheets received, place greater emphasis on equipment recognition and the interrelationship between weight and balance and performance charts. New regulations included are AR 40-501 and AR 600-107, both related to aviator medical requirements. Newly incorporated Field Manuals are FM 1-2 and FM 1-51. Training Circulars 1-13 and 1-20 also have been added to the referenced material.

Units that requested Federal Aviation Administration versions of the exam will receive a new Reference Data Booklet (RDB), Volumn I. The corresponding en route low altitude chart (L-9 and -10 dated 19 April 1979) has been mailed separately. This new flight information publication (FLIP) material will remain in use for the next five annual exams.

Units requesting International Civil Aviation Organization (ICAO) exam versions will receive a small change to supplement the current RDB, Vol III. The ICAO FLIP material is expected to remain in the field through 1984.

One major change in procedure being initiated this year is that the 1979 material can be signed out for use as a study guide. Aviators interested in studying for the 1980 exam should request the study material from the unit AAAWE test control officer (TCO) after receiving their examination notification.

Another major change is that the individual aviator must ensure that the Individual Flight Record, DA Form 759, is properly annotated in accordance with AR 95-1, figure 7-3, to show completion of the annual written exam. Since the TCO will forward answer sheets to Ft. Rucker on the last workday of each month, aviators must confirm their records with the unit flight operations prior to that date.

We welcome your suggestions for improving the annual writ. Just call us or write your questions or recommendations for changes or additions in your own words and mail them. (It would help if you include a reference by title, paragraph and page.) Either give them to your TCO to be forwarded with your answer sheets, or mail them to: Commander, USAAVNC, ATTN: ATZQ-TD-TAD-TD (AAAWE), Ft. Rucker, AL 36362; or call us at AUTOVON 558-6989, 6876; Commercial 205-255-6989 or 6876.

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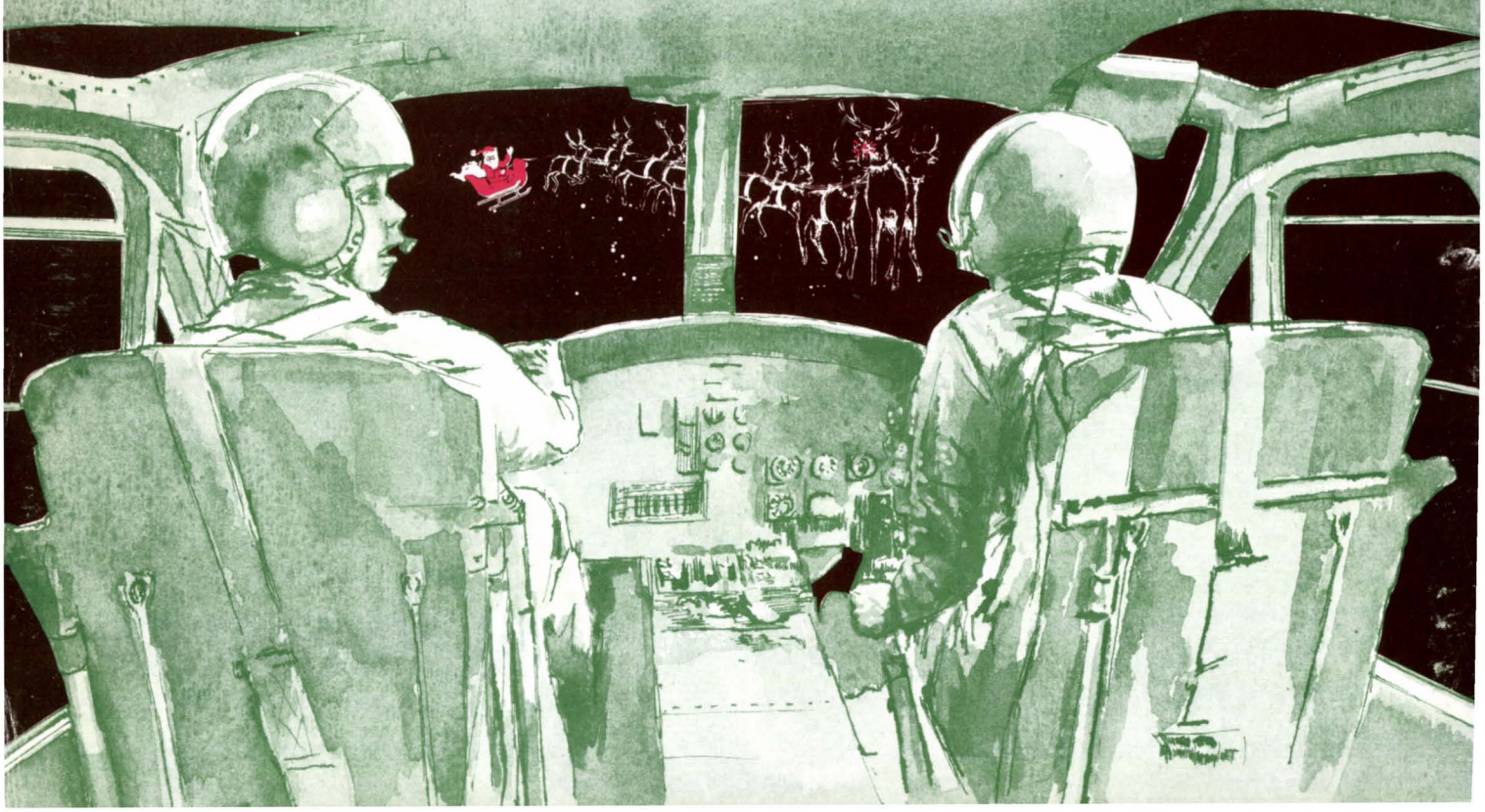
The only requirement for it to be carried with your name is that it be functionally related to safety, tactics, maintenance, flight or some other aspect of aviation. Mail captions and your name to Editor, *U.S. Army Aviation Digest*, P.O. Drawer P, Ft. Rucker, AL 36362.