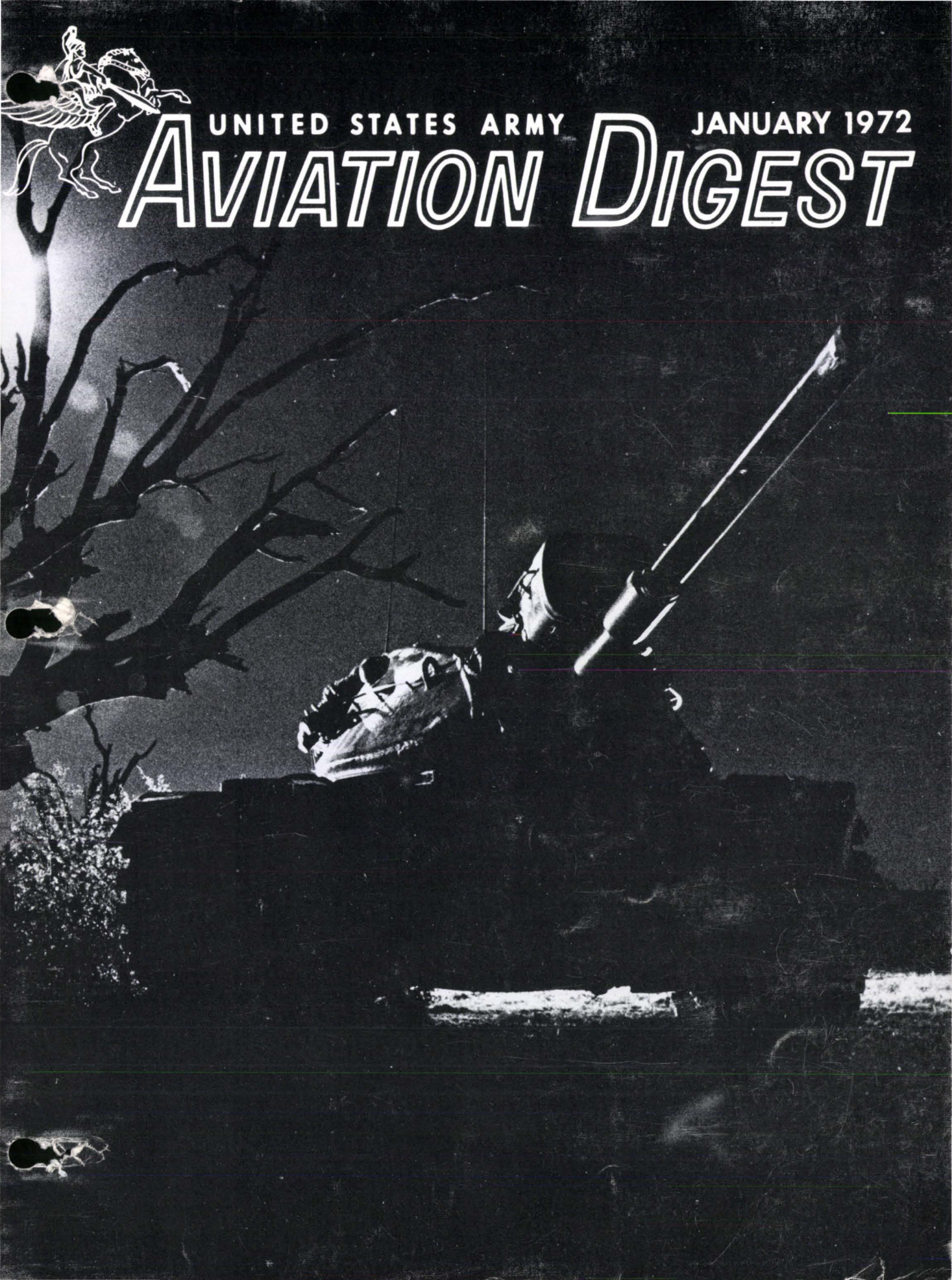
UNITED STATES ARMY

JANUARY 1972

AVIATION DIGEST



UNITED STATES ARMY AVIATION DIGEST

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ABOUT THE COVER

A flare from an Army aircraft flushes out a tank during day-night maneuvers of air combat cavalry brigade tests at Ft. Hood, TX. A related story on helicopter employment in conventional warfare appears on page 6. Photograph by CPT Tom Greene

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

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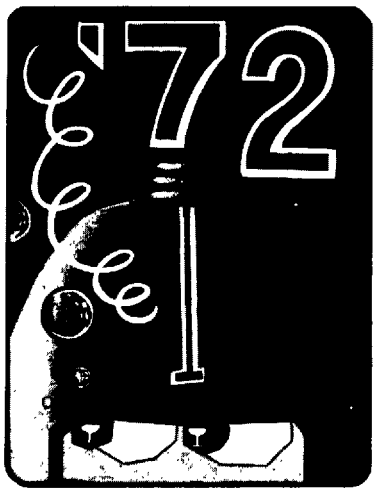
VIEWS FROM READERS



Getting out soon? Consider Reserve Component aviation. Write the DIGEST for a list of units in your state

Sir:

As you remember, I gave the DIGEST first crack at my RVN negatives while I was at Rucker '69 to '70 because I know most aviators use "instamatic slides" and only a few of us specialize in black and white 35 mm.

You have used several of my shots since without any credit, but how about pages 31 and 33 of the November 1971 issue? I'm just as proud of those two shots. How about a mention in the December issue?

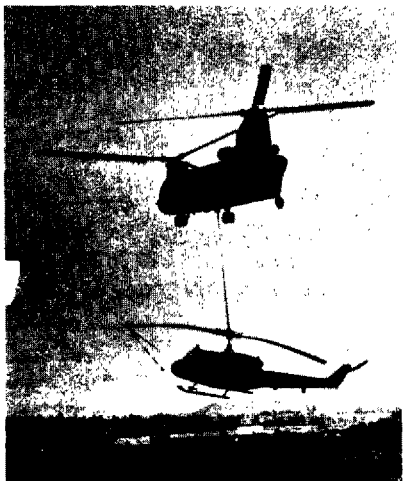
CW4 Don Joyce
Newport News, VA. 23601

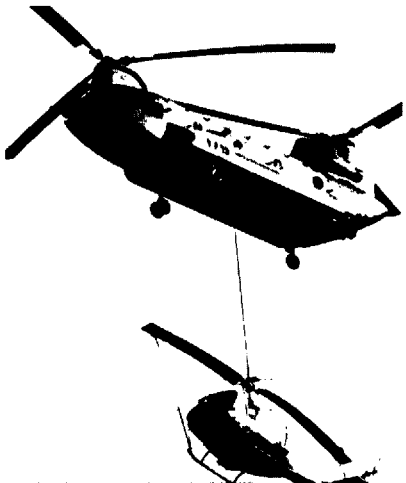
• The DIGEST would like to apologize for not crediting CW4 Joyce for the photos on pages 31 and 33 of the November issue. The DIGEST is interested in obtaining good photographs depicting Army aviation and invites readers to send copies of their photos or negatives to:

Editor
U. S. ARMY AVIATION DIGEST
P. O. Box J
USAAVNS
Ft. Rucker, AL 36360

Please be sure to write the photographer's name and address on the back of the photographs so that proper credit may be given when published.

Photographs by CW4 Don Joyce





The DIGEST thanks CW2 Peter J. Smith, aviation safety officer, 165th Aviation Group (Combat) for the following:

The skies over the Republic of Vietnam are no longer darkened by huge swarms of helicopters and fixed wing aircraft as they were a few years ago. This is a matter of great significance. No longer can an aviator transmit a Mayday and have instant response from dozens of aircraft. Not so long ago if you were forced to autorotate you could normally expect to spend only a few minutes on the ground, provided of course you were able to get off a distress call.

But this has all changed. As the number of troops, pilots and aircraft being withdrawn increases, your chance for an instantaneous rescue decreases. This accents the importance of flight following. If we don't tell someone where we are going plus how and when we will get there they won't even know where to start looking for us if we turn up missing.

A big item in safe flying in Vietnam, and one that can never be emphasized enough, is *knowing your position at all times*. Waiting until the engine quits is much too late to try and figure out where you are. You'll need two heads and four hands just to keep the aircraft under control, warn the passengers, turn the

Continued on page 17

Not By Reputation

Counting on reputations can backfire . . . just as it did for Wild Bill Hickok when he met Wesley Harding (right). In fact, counting on reputations can prove fatal. It did for Custer . . . and it can for you if you misjudge the reputation of your aircraft, yourself or the enemy

Bob Kuenstler
Department of the Army Civilian

THE MOTION PICTURE about General George Patton came as a surprise to me. I did not know that the general was "one of us." By that I mean I always have had recollections of previous lives, but did not know that General Patton shared that awareness.

I recall some of my earlier lives more clearly than parts of this one. When people ask me how it feels to have this awareness, I want to ask them how it feels not to have it. When they say "Do you believe in reincarnation?" I want to say that it is not a question of belief—it is one of knowledge. Either you know it or you don't. It's that simple.

Usually when one is gifted with this awareness he also is gifted with the knowledge to keep his mouth shut. I have only half the gift, and thus I'm writing this. But I have a purpose.

I wish to make a point of safety, and if I do perhaps my folly will be justified. I want to explain how it is that men are susceptible to a certain kind of accident. It all has to do with reputations, and if I may take the liberty of a little nostalgia I think I can make my point better than if I stated it briefly.

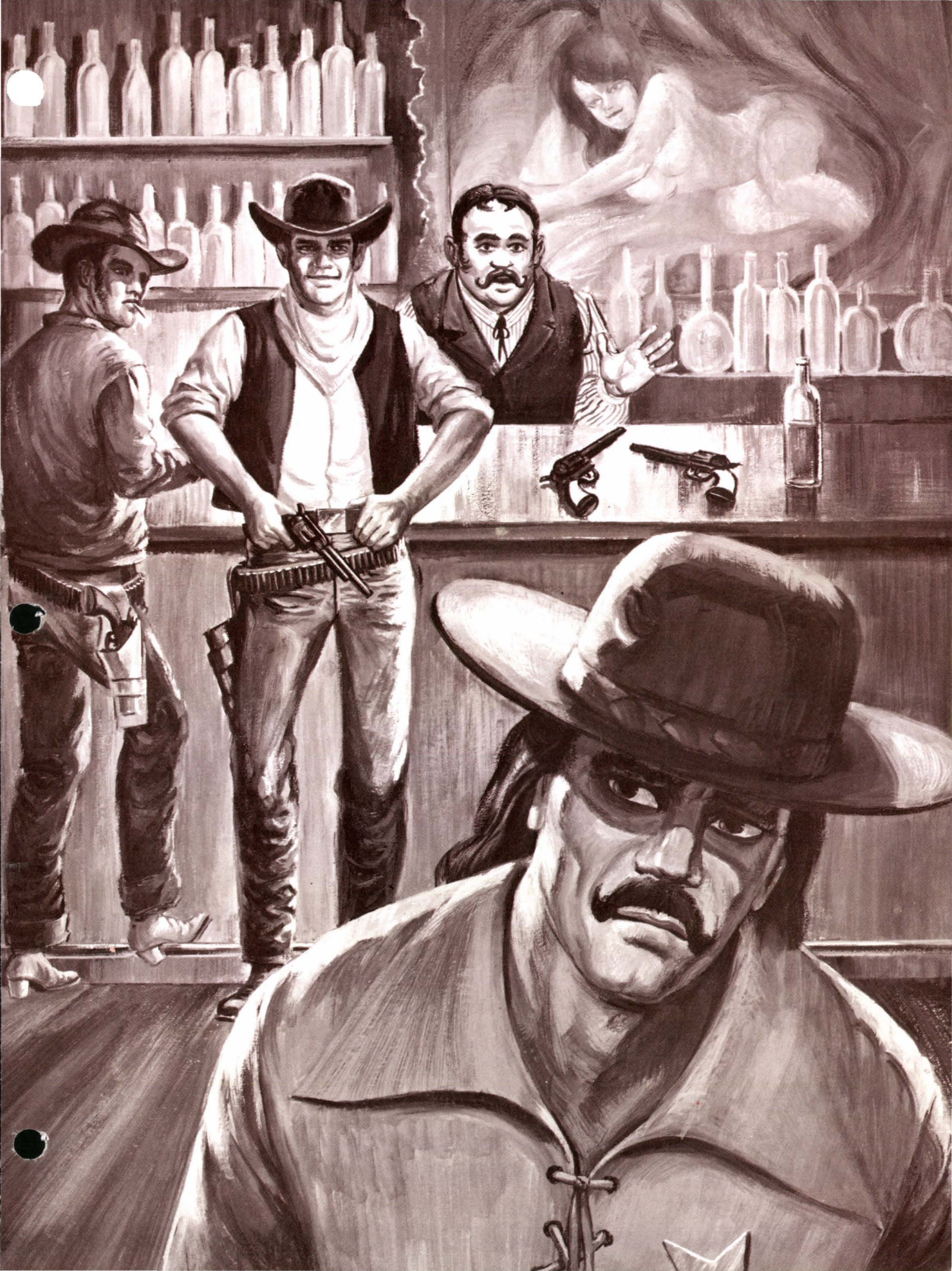
In all my observations of people in the several lives I recall, men have lived partly by their deeds in the present and partly by their deeds in the past—by their reputations. It's nice to have done things so well in the past that you can coast along on your reputation. Bill Hickok, the famous marshal of Abilene, did this.

I remember I'd driven the trail up to Abilene with a herd of steers from Beeville, TX. Our outfit had been joined by a youngster named Wesley Harding. I'm not sure where Wes had spent his life up 'til that time, because he'd never heard of Hickok.

You see, Hickok had had his belly full of drovers shooting up the saloons there in Abilene. It had become his custom to send a party of men out to meet us and to collect our sidearms before we entered town. Wes told them that if Hickok wanted his gun he'd have to come get it in person. Well, we all knew the reputation of Hickok, and we expected to see him ride out and meet us as soon as he got Wes's message. But to our surprise he never showed up, and Wes rode right into town wearing his gun. As if that weren't enough, he was still wearing it that night when we were in the Silver Dollar.

Hickok owned, or had interest in, most of the saloons there in Abilene at the time and the Silver Dollar was the nicest. It had a fulltime piano player and fiddler, and there was a little stage built over on one side where some of the better looking girls would dance and sing. It wasn't a good show, but out there and under the circumstances it couldn't have been more enjoyable if it had been what they now have in Las Vegas.

We were all havin' a good time, and it was right after a couple of the saloon girls had finished singin' a new song called "Buffalo Gal" that Hickok walked in. There was a hush went over the room because everyone knew Hickok and his reputation. That is to say, everyone except Wes Harding knew it. Wes was leaning on the bar and concentrating his attention on the stage. But the next entertainment was to com



The rabbit didn't have to hang around to protect a reputation

from Hickok and Harding, and everyone knew it except the chief performer Wes Harding himself! Well, the whole thing was over before it began. Hickok walked up and said, "Cowboy, we've got a rule in this town—no guns to be worn by anyone. . . ."

Wes just looked around and said, "Okay, marshal." With that he reached down and picked his gun out of its holster as though to hand it to the marshal. But suddenly, to everyone's surprise, Wes was holding the gun leveled at Hickok's chest, as though to hold him at bay. "I'll take your guns, marshal," he breathed in a barely audible voice as he carefully removed one, then the other of Hickok's pearl-handled revolvers from their holsters and placed them on the bar. He then ordered Hickok out of the building and Hickok left.

Harding finished his drink and then ordered the music to continue. It did but the atmosphere was a bit strained until Harding, not willing to push a good thing too far, vanished out the back into the alley before Hickok had time to return.

Hickok enjoyed a good reputation, but here was a case where he was not known by it. He had foolishly relied upon it, and suffered a little embarrassment as a result.

Now I'm not saying that the whole idea of reputations is bad. Sometimes a reputation can serve a good purpose. Like during the Civil War. I was in an infantry outfit then. We were moving through the woods one day when a rabbit jumped up and ran away. The fellow next to me said, "*If I didn't have anymore reputation to uphold than he has I'd be running too.*" It was no joke. His desire for reputation kept him there to do a job that had to be done. It was a good thing.

When it comes to talking about reputations, no discourse would be complete without the mention of George Armstrong Custer. I was with Custer, you know. Oh, yes, I know you'll think I'm like the proverbial old-timer who claims he was with all the greats—Roosevelt at San Juan Hill, etc. But, I really was with Custer as a Department of the Army civilian scout. Whether or not there is any connection between my being a DAC in that life and in this one I can't say.

I knew Custer well; he was a fine man. He was hell for gettin' the job done and he was all duty, you can be assured of that. There was just something about him that you couldn't help but like and admire. His men, except for the few who were envious and hated him for that reason, would have followed him right into hell and been glad for the opportunity to do so. In fact, that's what we did that day at the Little Bighorn.

The Little Bighorn really wasn't as big a mistake as history recorded it. A mistake, yes—just not quite like it's been remembered. You might say it was a calculated risk, and not such a bad calculation at that. You see, Custer had run the same risk with good results at least twice before.

Once at the Battle of the Washita Custer split up his command into four units, surrounded a village at night and attacked and wiped it out at daybreak—only to discover that the village he attacked was the end of a long line of villages and great hordes of hostiles were all over the area. His supply wagons were several miles back down the trail, and he was afraid they'd be discovered and cap-

The Indians were confused when Custer mounted up the regiment and held a parade in front of them

tured. If they had been we'd never have gotten out alive. So what did Custer do? He mounted up his regiment and with the band playing conducted a dress parade up and down the line of villages. This diverted and confused the Indians so that his wagons were able to arrive unnoticed. The remaining hostile chiefs came in to surrender and to promise to return to the reservations. In his attack on that one village Custer had established a reputation by which he defeated almost an entire Indian nation. Thus, the savages too had established a reputation with him. Custer thought them to be an easily confused lot, unable to regroup and fight effectively after an initial setback.

It was a misguided opinion, yet further confirmed one day on a scouting expedition. We had camped alongside a fairly wide river and everything seemed peaceful as night came. All night there wasn't so much as an attack by a hungry mosquito.

But dawn of the next morning brought a surprise. The opposite bank was lined with hostiles. They were elevated above our position and began firing at us. We took cover and began firing back. Our best sharpshooters took heavy toll of their ranks, but we also lost eight to direct hits from the savages' rifles. Soon both sides were under cover and the sniping took a slower pace. They began crossing the stream on both sides of our position.

You'd think Custer would have ordered an immediate withdrawal, seeing their superior numbers and willingness to fight. But not so. When news of their crossing came to Custer he was delighted and said he hoped they'd all cross over. He split the command into five separate units and placed each in a separate position as dictated by the contour of the terrain. He could pass visual signals to each unit from his central position. Our

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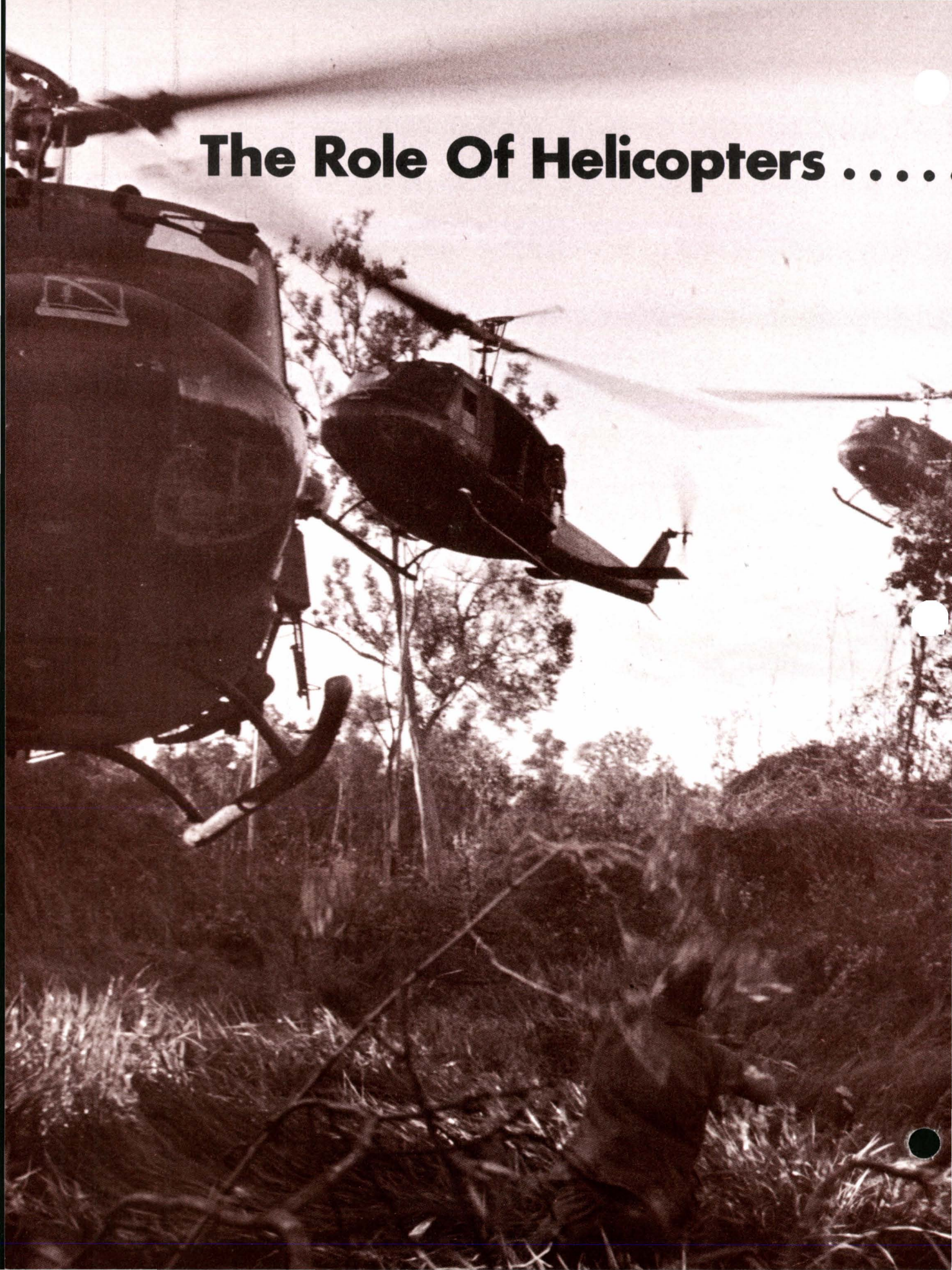
The Role Of Helicopters . . . . .



. . . In Conventional Warfare

Colonel DeLyle G. Redmond

IT IS DIFFICULT for many to recall that just a few years ago airmobility was not universally accepted, even within the U. S. Army. It was not until the tests conducted with the 11th Air Assault Division [later designated the 1st Cavalry Division (Airmobile)] at Ft. Benning, Ga., during 1963 and 1964 that airmobility gained a glimmer of respectability. And, it was not until its later baptism of fire in the Republic of Vietnam that the airmobility concept was proven.

Similarly, today there are many antagonists who recognize the desirability of employing helicopters in an environment such as the Republic of Vietnam, but maintain that they will have only limited use in mid- to high-intensity warfare. The arguments on both sides are endless and, in the final analysis, regardless of convictions all beliefs are unsupported by facts because such a war using helicopters has not been fought. But, of course, this does not justify waiting for a war to start before developing a helicopter force capable of operating effectively in mid- to high-intensity warfare conditions.

Each new advancement in warfare has seen its share of controversy and has been initiated with a certain degree of skepticism. Indeed, many critics prophesied that helicopters could not survive in Vietnam. Placing weapons on such an unlikely, unstable platform as a helicopter in the late 1950s and early 1960s was greeted with something less than wild enthusiam and universal acceptance. But, the Army has been successful in this endeavor and continues to look to helicopters to satisfy its ever increasing tactical mobility requirements. What must be determined is the extent of use envisioned for helicopters so that appropriate organizations can be structured, equipment can be developed and training programs initiated. Prior to determining future requirements it must be clearly established just what helicopters will be expected to accomplish in any future warfare.

Operations

Helicopter operations will be primarily defensive in nature. Large-scale penetrations over heavily defended areas will be unlikely. This does not mean that helicopters will be employed only in a defensive role. On the contrary helicopters will be used to exploit success and bring the battle to the enemy whenever possible; however, helicopters will be used to inflict maximum delay on enemy forces, particularly in the initial stages of a future war.

Defensive action must place heavy reliance on front line "trip-wire" units inflicting significant damage to delay the enemy until troops can be withdrawn or reinforced by airmobile assault or more conventional ground means. Main and airmobile reserve forces also must be capable of swift movement to any area of the battlefield. All forces must have the means available to them to stop the enemy in advance. In all instances heavy reliance must be placed on helicopter units armed with air-to-ground missiles.

In defeating a conventional army success hinges in the ability to stop enemy armor—the vanguard of the assault. Of primary importance, therefore, is the employment of helicopters in a tank-killer role. Attack helicopters must be capable of decisively engaging and defeating enemy armor. They must have an all-weather day and night capability and be available in sufficient numbers to blunt an enemy offensive. Used with the U. S. Army/U. S. Air Force combined arms striking force, attack helicopters can significantly contribute to the outcome of any battle.

Attack helicopters also must be capable of employing various weapons systems to accomplish other missions. Included in this role are the specific tasks of preparatory fire, suppressive fires, counterpreparation, diversionary and fires against targets

of opportunity. Many targets may be better suited for engagement with rockets of machine guns than with air-to-ground missiles. Helicopters must have the capability for complete interchangeability and selectivity of weapons so that commanders can engage targets with appropriate armament with the least possible delay.

The success attained by using aviation is attributable in no small degree to responsiveness to the desires of the ground commander. He must have helicopters able to accomplish a variety of tasks and no single helicopter can satisfy all of his requirements. Therefore, there is a definite need for specialized types of helicopters. For instance, a large helicopter cannot possibly function as an observation helicopter. The very nature of the mission calls for a small, fast, highly maneuverable aircraft. Similarly, because of such diverse factors as the enemy situation, configuration of terrain, speed of flight, distance to objective or any number of reasons, a small transport helicopter capable of carrying a squad of infantry would be preferred over a large transport helicopter. At other times the reverse will be true.

Likewise, to anticipate making a multipurpose attack helicopter with a "button-on" armament system double as a transport is fallacious thinking. An attack helicopter must be designed and built for specific purposes and its configuration is not compatible with that of a transport. This does not mean that the Army should have a great number of different types of helicopters (which greatly increases any organization's problems) but there must be enough observation, attack, medium and heavy transport helicopters to attain the flexibility required by the ground commander.

Because of the probable nature of any future battlefield, helicopter units must be employed from dispersed locations and be capable of operating from field positions for prolonged periods. They now have a limited capability for operating from field locations but must concentrate their forces around a large rather immobile, ground oriented logistical tail. To be effective these units must be self-sufficient and capable of maintaining aircraft in the field under all-weather conditions.

While the situation and terrain will dictate the degree of dispersion required it is important that helicopter forces be able to be massed at any given time so that the commander can concentrate decisive forces and helicopter firepower sufficient to stop armor at his discretion.

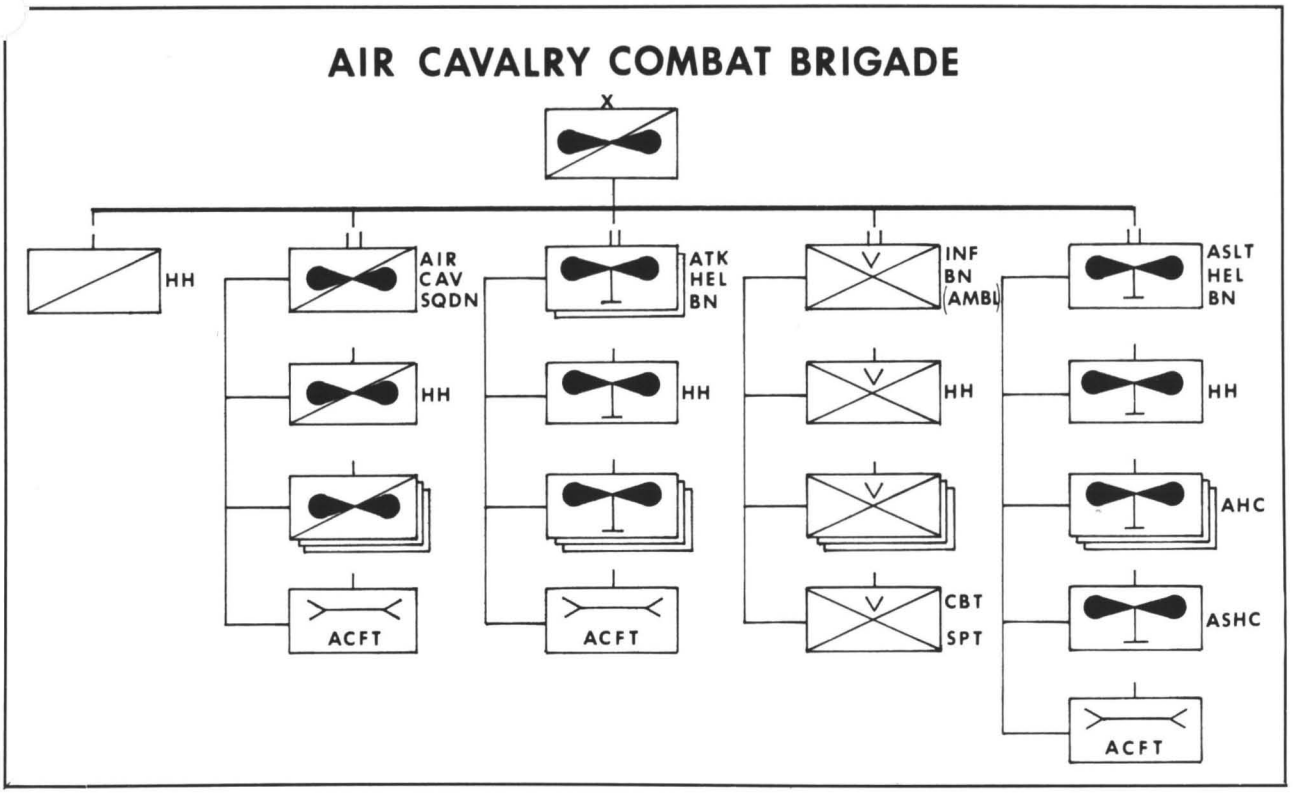
Organization

Future airmobile organizations should be formed on the building block concept. Each organizational part of "team" can operate independently, or any number of teams may be joined to form a larger unit. Centralized control is required to provide overall direction and supervision of the teams. This concept will necessitate only minor revision of present day forces. There will still be a requirement for divisional, nondivisional and air cavalry helicopter units.

In mechanized or armor divisions more emphasis will be placed on the use of attack helicopters than on troop transports. These divisions must be given sufficient transports to airlift a company size unit to provide a degree of flexibility to the commander. Medium and heavy helicopters also must be available to satisfy part of the division's tremendous logistical support requirements. Both air and ground vehicles will be used to provide a responsive means of supplying fast moving mechanized or armor striking forces.

Infantry divisions will be airmobile oriented. The airmobile division as we know it today is an excellent starting point to satisfy this requirement. In this type unit air cavalry, infantry, artillery, attack helicopter, troop transport and medium helicopter units are all combined to provide a force capable of rapid movement and decisive action. One such organization proposed for a

A fireteam of AH-1G departs a staging area during ACCB tests of techniques and helicopter tactics being explored at Project MASSTER



igade size unit is an air cavalry combat brigade (figure 1). This unit employs the elements essential to an airmobile force of the future.

The Army commander must have a general support aviation command. He will then be able to shift his helicopter assets to mass forces and provide support as required. All helicopter organizations must not be organic to division or separate units. All heavy helicopter and the majority of medium helicopter support should be provided by a separate aviation command. This command is also necessary to provide overall aviation expertise and support to the theater commander.

Air cavalry is currently reconnaissance and surveillance oriented and has only a limited troop-carrying and firepower capability. Merely finding the enemy in a future war will not be as important as having the immediate capability of destroying him. Hunter-killer helicopter teams capable of stopping enemy armor should consist of attack helicopters. Little is to be gained by using helicopters in an "observation only" capacity and then having to call on other helicopters to destroy a target. The longer the period of time between sighting and engagement, the more likely the target will either disappear or the helicopters will themselves be exposed and taken under fire.

The basic element of future helicopter units will be teams consisting of various numbers and combinations of types of helicopters. Teams will be essentially platoon size organizations of eight to ten helicopters. Each will use helicopters for resupply and be capable of independent operations.

Helicopter companies will consist of three to five teams. Administrative and other support requirements will be provided by the parent company headquarters.

The dispersion of forces will create local security problems since large numbers of troops cannot be committed to satisfy this requirement, helicopter teams must rely on mobility rather than numbers. They must select areas providing the most security and move frequently. Of course, it is impractical to anticipate that all helicopter units will be completely mobile, and this creates a requirement for a base area. This area need not be elaborate but it must contain the necessary manpower, communications, parts and supplies to sustain the teams. It will require a degree of security but locating it with other elements reduces the overall requirement.

Training

No longer will the Army aviator fly number five or number

Continued on page 35

Charlie and Danny's Write-In

Dear Danny: In the U-21 manual, TM 55-1510-209-10/1, I note the presence of two fuel tables which don't agree. The information contained in the moment columns in the table on page 12-9 (figure 12-2, sheet 5) differ from the one shown on page 12-10. Obviously one table is incorrect, so which chart should be used?

SP6 W. W. B.

Danny's answer: Those in the know advise that both charts are correct but apply to different configurations of the airplane. When the manual was printed a minor notation was inadvertently omitted explaining that the chart on page 12-9 is to be used only in connection with U-21A and RU-21A. The chart on page 12-10 is to be used with U-21A configuration II (U-21G) aircraft only. In addition it is not necessary to calculate fuel usage by using the instructions on page 12-9, merely use the combined fuel table shown on page 12-10. Proper notations to this effect will appear in a change that is now being prepared for distribution.

Dear Danny: Change 5 to TM 55-1520-227-10 (CH-47B and C) changed the normal operating rpm to 235 for the CH-47C with L-7C engines and MWOs 55-1520-227-50/15 or 55-1520-227-50/16 applied. The change stated this increase in normal operating rpm was necessitated because the minimum tuning range of the tuning vibration absorber is 233. The question arises in chapter 4, page 4-2, paragraph 4-6 where it states, "On the CH-47C with T 55-L-7C engines, set rpm at 230 at all gross weights." This page is marked change 1. Was this an oversight or was it intended to be this way?

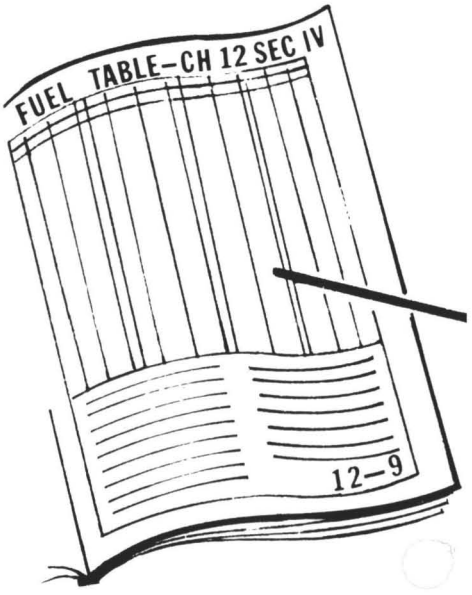
CW2 Bell

Danny's answer: Change 4, dated 22 Oct 70, removed page 4-2 of TM 55-1520-227-10 and replaced it with a new page 4-2 and a page 4-2A. However, that portion to which you refer remains unchanged. By the time this comes out in print we should have been successful in having it changed to include a note or reference concerning those helicopters modified by the above stated MWOs. Please refer again to the WARNING on page 1 of change 5 and the last two sentences of paragraph 2 which read, "Again, these instructions apply only to helicopters modified by the above MWOs. Instructions for the unmodified CH-47C with T 55-L-7C engines remain unchanged."

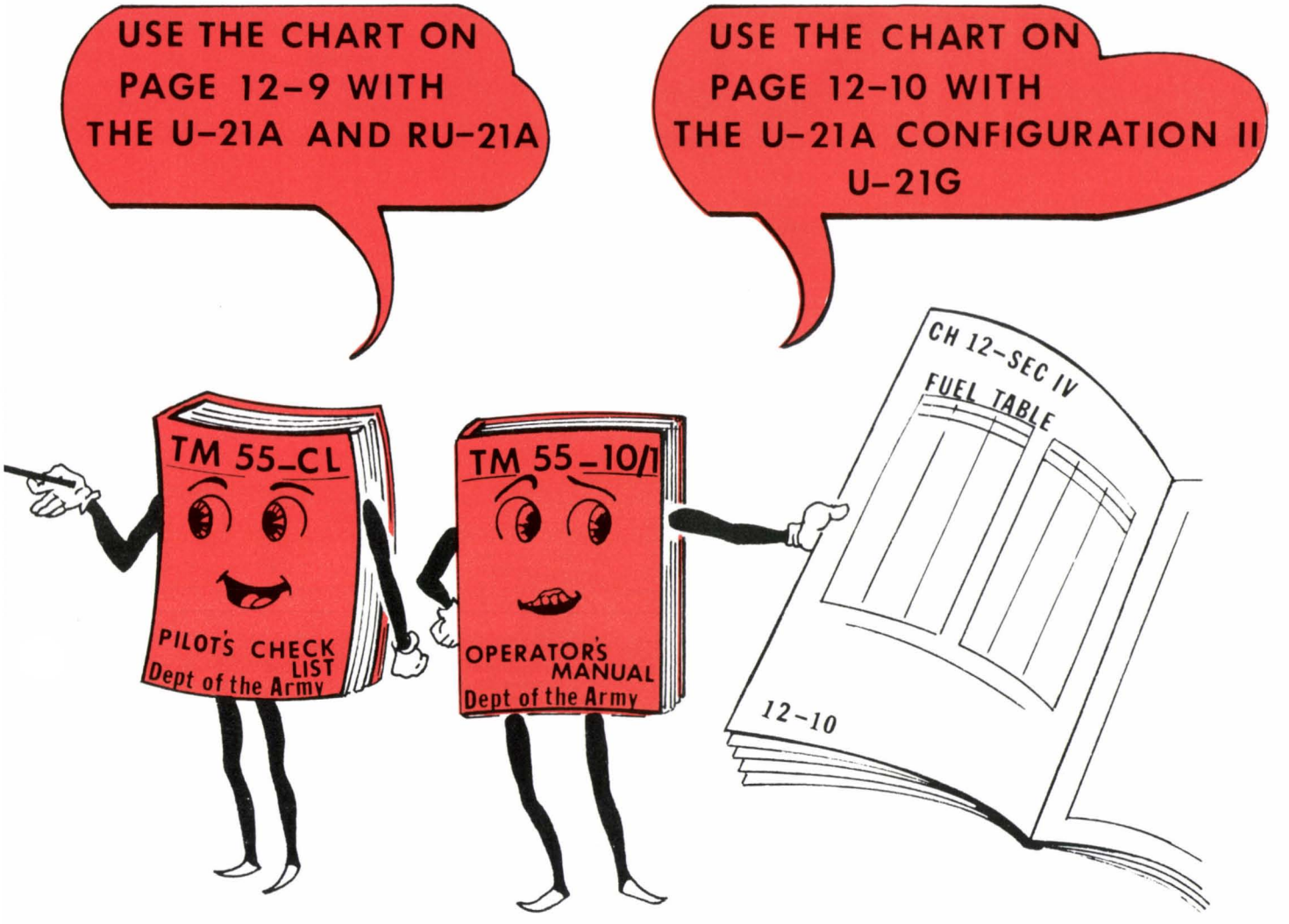
Dear Danny: In TM 55-1520-219-10 and TM 55-1520-210-10, a discrepancy appears in refenence to the maximum engine oil pressure. Both the B and D models indicate 25 psi minimum oil pressure at flight idle. They both give 60 to 80 psi for continuous operation. The B model dash 10 has 80 psi for maximum oil pressure and the D model dash 10 has 90 psi for maximum engine oil pressure. Please give the reason for the difference.

CW2 Smith

Danny's answer: Someone goofed; the maximum oil pressure for both the B and D model UH-1 is 80 psi. This will be corrected in an early change to TM 55-1520-210-10. Your interest and alertness is appreciated; keep up the good work.



Dear Danny: We have been having a discussion on the emergency procedure for transmission chip detector and loss of transmission oil pressure on the CH-47 aircraft (reference TM 55-1520-227-10; chapter 4 Emergency Procedures). It states that after a loss of oil pressure or when a chip detect



ATTENTION—ALL AVIATION OFFICERS!
Charlie and Danny has a limited supply of U. S. Army Aviation School T-42 checklists. A limited number of checklists will be sent to aviation officers upon request

light illuminates to make a landing as soon as practicable using minimum power. This sounds a little ambiguous. Does it mean to make a landing with minimum power such as an autorotative landing? Our thinking on this is to make a landing with minimum power *reduction* and to keep power applied until touchdown. Most transmission seizures occur when torque applied to a transmission with a loss of pressure or a chip light on is reduced and then reapplied.

CW2 J. T. M.

Danny's answer: Thanks for the question. It does get you to thinking, what is minimum power. I had one fellow say, "Minimum power? Autorotate!" Don't get sucked in, friend, best thing to do is to keep power applied to the driver train. We have recommended that paragraph 4-70 be retained as is with one change. Change last sentence to read, "Should the caution light illuminate during flight, land as soon as practicable using power."

Proximity Warning Devices Verses Midair Collisions

Captain Lee W. Jurney

WHEN MAN FIRST began to fly he had the sky pretty much to himself. But that was changed by two world wars which spawned many technological advances in all phases of aviation. Aviators are now confronted with virtually the same potential for colliding as are automobiles.

The Federal Aviation Administration (FAA), general aviation and the military have all been hard at work trying to prevent midair collisions. The use of electronic devices seemed a logical solution, but problems ranging from prohibitive costs to excessive weight kept cropping up. So measures such as the redesign of airways, control zones and procedures were studied and met with limited success. But the midair collision problem continued to become more critical and Army aviation felt the impact.

Between January 1966 and March 1968 16 lives were lost and 13 aircraft were destroyed in midair collisions at one post alone. It is conceivable that most if not all of these midairs could have been avoided with a workable warning device which would have alerted pilots that other aircraft were nearby. The Army quickly went to work on the midair collision problem. In November 1967 the U. S. Army Electronics Command, Ft. Monmouth, N. J., published a request in the FEDERAL REGISTER for proposals from commercial industry to provide a device for testing and evaluation at no cost to the government. Five companies expressed interest in the program and promised to produce a device and supply engineering support for an evaluation prior to May 1968.

Competition was soon narrowed to two companies and the final evaluation was conducted by the U. S. Army Aviation Test Board at Ft. Rucker. The evaluation concept required that the proximity warning device would be a transponder-type system which maintains continual contact with other systems that are within range +300 feet of altitude and within 1,000, 2,000 or 3,000 feet horizontally as determined by a selector in the cockpit. The system transmits its

altitude to all other proximity warning device systems within range by sending out a series of pulses. If the data processing indicates that the altitude requirement of +300 feet has been met, then a reply signal is generated and transmitted back to the system that was doing the interrogation. The proximity warning device then determines the length of time that had elapsed between the transmission of the altitude data and the receipt of the reply. If the range is equal to or less than the range set on the range selector switch, then an alarm occurs, an audio alarm signal will come on, and also a light that indicates the relative position of the intruding aircraft.

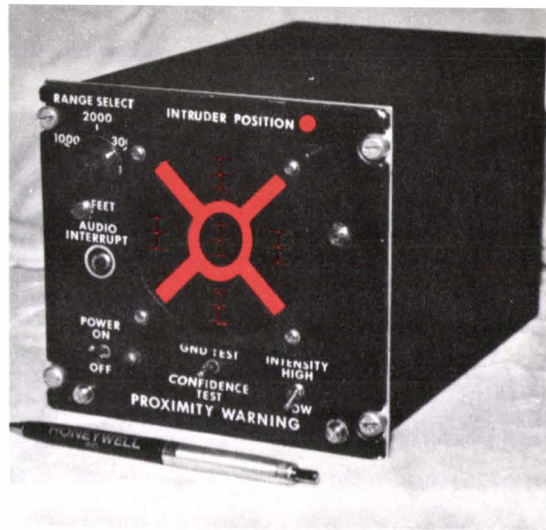
As a result of the comparative evaluation the Army began negotiations with Honeywell Aerospace Division, Minneapolis, Minn., for the purchase of 222 proximity warning devices. The contract for the devices plus necessary support and test equipment was signed on 30 June 1969. Delivery of the systems began that December and marked the beginning of a series of operational evaluations of the Honeywell YG1054 proximity warning devices. The first was conducted within Ft. Rucker's basic helicopter instrument training area by scheduling TH-13Ts equipped with the device in adjacent training areas. The report was highly complimentary of the system—based on more than 200 contractor instructor pilot evaluations and 400 flight hours. After the completion of the operational users' evaluation, a complete profile with preplanned intrusions (intentional midair courses) was flown with 100 percent per reliable results.

Acting upon the favorable reports of the evaluations and recommendations made by the users, a more advanced system was brought to Ft. Rucker under contract for evaluation. The device was basically the same as the original with an azimuth capability added. The result of the 30-day evaluation of the azimuth device mounted on a UH-1D helicopter was not as favorable as that of the original device; however, with additional engineering research and testing it could be an effective aid in the prevention of midair collisions.

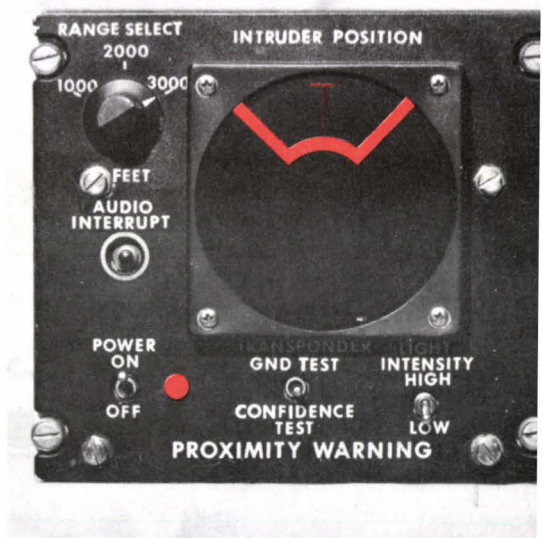
In July 1970 the final shipment of 222 devices arrived at Ft. Rucker for installation. An additional 63 devices were needed to completely equip the TH-13T fleet and make the system effective within that particular portion of training. A contract for the 63 devices was signed in December 1970 and shipments began in May 1971. These proximity warning devices were designed for the TH-13T and the Ft. Rucker environment and have been performing satisfactorily in that capacity. This has not, however, restricted research into more advanced systems for higher performance aircraft or different environmental situations. These include xenon lights, radar, laser beams and even atomic clocks. But the devices alone will not solve the midair collision problem. They can only aid the pilot in preventing midairs. The final responsibility rests with the entire crew of each and every aircraft.

EDITOR'S NOTE

At the time of this writing the post that experienced the midairs has recorded only one midair collision since the first proximity warning devices arrived in December of 1969. That midair was between two fixed wing aircraft which were not equipped with the PWD (no fatalities, and only minor damage).

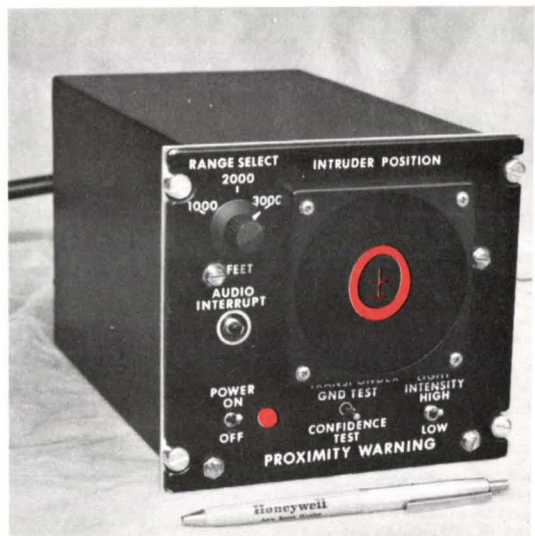


PWD with all azimuth lights operating



PWD azimuth forward above warning

PWD azimuth center quadrant warning



Provided by the Society of U. S. Army Flight Surgeons

Major Nicholas E. Barreca, M. D.

Aeromedic

FLYING FATIGUE

Aviation has fatigue-producing stresses. Commanders, flight surgeons and air crewmen must recognize and control these if they are to be averted

MILITARY AIR CREWMEN are familiar with skill fatigue. They have experienced the tired, haggard weariness resulting from long, vigilant and diligent labors in a basically stressful aviation and military environment. They have recognized the deterioration in performance or efficiency associated with varying states of fatigue. And, they can testify that the familiar "head-bobbing" often experienced during a long uninteresting auto trip on today's superhighways is nothing compared to the multiple stresses of concentration and boredom encountered simultaneously in the aviation environment.

How can one recognize potentially disabling skill fatigue and prevent it from occurring? Can it be measured? In a sophisticated laboratory the physical and chemical effects of stress can be measured when baseline or control observations are made for comparison. Under operational conditions this is not practical and most likely impossible to accomplish for any length of time. Thus, there is no simple measurement such as a single symptom, sign or test that will lend itself to use and interpretation in the field. Instead, one must learn to recognize fatigue effects while they are developing. And, most importantly, one must recognize those stresses which commonly result in fatigue so that they may be minimized or modified in advance.

The aviation environment has many fatigue-producing stresses which may operate alone or in combination. Each must be recognized and controlled if skill fatigue is to be averted. Pilots and crews must cope with some or all of the altitude stresses: hypoxia, decompression sickness, gas expansion and hyperventilation.

There also are the less aviation-oriented, yet prominent, physical stresses: acceleration, noise, vibration and temperature extremes. Speed also imposes the stress of workload as well as the pressure of split-second timing. In addition, there are the confinement and constraints of cockpit design which from a human factors standpoint can impose stresses.

The unpredictability of weather and instrument missions, the limitations of night operations and differing aircraft characteristics also place degrees of stress upon each air crewman regardless of his training and experience.

Our day-to-day medical status is a potential stress in itself and determines our ability to handle other stressful factors. Organic or physical conditions, especially the common ones, exert their influence. Then there are the psychological or emotional stresses which become intertwined with one's level of responsibility, competence and experience. Further, there are a variety of self-imposed stresses, those we may bring upon ourselves: poor eating habits and overweight, smoking, drugs, alcoholic overindulgence, overexertion, a lack of physical activity and off-duty activities including social obligations and moonlighting.

Other conditions determine or influence our response to aviation stresses. These too can frequently be controlled or modified. There are the stresses of aviation mission scheduling: work-rest cycles and circadian or diurnal rhythms. Ideally, work-rest ratios should correspond to 8 hours on and 16 hours off, an arrangement to which most working people have become accustomed. Circadian rhythm has to do with our biological clock. The timing of sleeping, eating, digestion and elimination generally follow a 24-hour pattern. If upset by dislocation across several time zones, our basic body processes become unsynchronized . . . and fatigue results.

Lastly, there are the organizational stresses. Leadership, administration and maintenance will have a positive or negative influence on an individual's ability to cope with stress and often determine whether or not significant fatigue will result and interfere with performance.

All of the factors outlined above can be categorized into two types of fatigue, each of which can be characterized differently. *Acute skill fatigue* is temporary and ordinarily relieved by a night's sleep. *Chronic skill fatigue* is more serious and incapacitating and generally is not simply relieved by short periods of rest.

The characteristics of acute skill fatigue have been observed and studied. Most of us have recognized some of them ourselves or in a fellow air crewman:

- Tired air crewmen are increasingly willing to accept lower standards of accuracy and performance (**"I'm 200 feet off my altitude! So what? Is this Times Square or something?"**).
- Fatigue causes errors in timing or loss of ability to keep apace of sequenced events. (**"Prelanding check? But, I've already landed!"**).
- With fatigue there is a loss of control smoothness and poor coordination of flight controls (**"Sorry 'bout that! Guess there's too little friction on the cyclic. What was that about the needle and ball?"**).

• Tired air crewmen develop diminished ranges of attention. They become more forgetful with a tendency to be easily distracted. Thus, they require a larger stimulus to produce a given response (**"What was that about aircraft . . . my area? Damn that cigarette is out again . . . boy, that Chinook is a large aircraft, hard left!"**).

• Fatigued air crewmen fail to integrate instruments as a unit. Their panel crosschecks are inconsistent and more attention is paid to individual components or instruments (**"No sweat on the altitude . . . good ole altimeter only down a notch!"**).

• Fatigued air crewmen tend to neglect secondary tasks and peripheral instruments (**"What's that, Doc? What chip detector light?"**).

• Fatigued air crewmen tend to be unaware of errors and error accumulation (**"How did I manage to miss those checkpoints?"**).

• With fatigue air crewmen tend to split complicated tasks into component parts (**"First I pull in power, then a little left pedal, then some forward cyclic pressure . . ."**).

• With fatigue there is a growing inability to interpret kinesthetic sensations of motion, weight and position correctly (**"I didn't realize you could roll an LOH!"**).

• A state of irritability and lack of patience builds up as fatigue increases (**"Roger, tower, wheels down and locked for the second time . . . stay awake will you!"**).

• Fatigued air crewmen project their mistakes on the equipment, aircraft or environmental conditions (**"Damn bird, if it had wings I wouldn't have had a compressor stall!"**).

• Air crewmen become less capable of evaluating their own compromise or unreliability when fatigued. They cannot appraise their own disability (**"Postage stamp LZ . . . watch me lick it!"**).

• Fatigued air crewmen make many mistakes performing simple, well-learned tasks, particularly toward the end of a mission and most commonly in the landing sequence (**"Field in sight. No sweat! Simple straight-in approach behind that C-141."**).

Recognizing the signs of acute fatigue is important. When an air crewman recognizes them, usually in another individual, he can at least recommend that he cool it for awhile. It is more important though to prevent, or at least minimize, acute skill fatigue. Here are some ways of accomplishing this.

There must be a limitation on daily flying and working hours. AR 95-1 states that crew duty (beginning 2 hours before takeoff) will not exceed 12 hours (14 hours with an augmented crew). This is a start in the right direction.

Commanders must avoid piling stressful missions on top of one another. Missions must be spread out and fairly divided among all unit members. They also must be undertaken within the capacity of the unit's ability to perform them.

Every reasonable attempt should be made to lighten or limit the burden placed upon air crewmen. The copilot is one means of accomplishing this for the aviator. This has been effectively used in Army aviation. Cockpit design with the use of supporting electronics and instruments are another means. Then, there are "luxuries" such as environmental control and protective devices.

Finally, all air crewmen must be given the opportunity for adequate rest and **natural sleep.** AR 95-1 states that a crew re minimum of 12 hours prior to the start of crew duties is advisable. Often air crews experience restless sleep due to the effects of alcohol or well-intentioned sleep medication. (This subject was discussed in a previous Aeromedic, AVIATION DIGEST May 1970.) Natural sleep, if it can be initiated, is the best deterent to acute skill fatigue.

While acute skill fatigue is our most common enemy, chronic skill fatigue becomes a not uncommon intruder, particularly during combat operations. Many of the stresses responsible for acute skill fatigue contribute to chronic skill fatigue. Usually chronic skill fatigue results when there has been inadequate resolution of acute skill fatigue. Invariably the individual air crewman does not recognize chronic skill fatigue readily so it is important for other air crewmen to recognize its characteris tics:

• *Slowed reaction time.* ("Sir, it was almost as if he was preoccupied. We were the last ship in the formation. He knew the LZ was tight, yet he reacted late and sluggishly in decelerating the ship. That was too close for comfort. This wasn't the first time. For the last few weeks I've had to alert him to bogies that I'm sure he saw . . . it's as if he was operating on a different time scale.")

• *Poor judgment.* ("I don't know what has gotten into him. He's always been so careful and exacting. Yesterday we were loaded to max gross . . . winds and DA were high. Just after takeoff we took fire and hits. He elects a 180 right back to the base . . . we take more fire . . . and really tear up the landing. Last few days he didn't seem to

Continued on page 2

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VIEWS FROM READERS

necessary switches to the correct positions, find a suitable forced landing area, establish an autorotational glide and get off a Mayday. There is no time to figure and pinpoint your location. And it's awfully, awfully hard to locate one small OD painted helicopter on the ground under the best conditions—even when its general location is known.

Another matter of vital importance to your welfare is your survival equipment. Having a survival radio *on your person* greatly enhances your chances to be rescued. And of course smoke grenades, flares, strobe lights, etc., all improve your chances to make it back.

We all have been well schooled in the proper procedures and are provided with the tools and means to fly safely in a ombat environment. But we must *use* .he assets at our disposal.

Sir:

The word safety comes up more and more every day in Army aviation. But what does the word really mean to us as Army aviators? The Webster's Dictionary defines it as: being safe from undergoing or causing hurt or loss; a device on a military apparatus (as a mine or missile) that prevents it from being fired accidentally; a football play; a member of a defensive backfield in football in the deepest position; and, last and perhaps most important to us as aviators, to protect against failure, breakage or accident.

The first step is being safe from undergoing or causing hurt or loss. To me this phase following your dash 10 checklist as described in AR 95-1 ensures you of a prelight which will prevent you from undergoing or causing hurt to yourself as well as to your crew. How embarrassing it would be if you didn't check your fuel and 15 minutes after you take off you have fuel starvation. Filling out the -12 correctly will help prevent the loss of flight time and pay. Plus, the -13 is very important because it lets you know if anything is wrong with the aircraft. If you find anything wrong with the aircraft write it in the book; it lets the next guy who flies the aircraft know what is rong also. How would you like it if the crew before you did not write up binding in the pedals and the antitorque push-pull tubes jammed on you in flight? If there's anything wrong with the aircraft, no matter how little or big, write it in the book; it covers you and helps the next guy. The biggest help would be to fly the aircraft the way it's designed to be flown. Most commanders want live pilots, not dead showoffs.

The next phase touches equipment as devices on a military apparatus (mines or missiles) that prevents them from being fired accidentally. Here the meaning of safety is very important. Think of all the explosives that are carried on Army aircraft. Imagine that you're the aircraft commander of a slick or cargo plane and your load was 500 pounds of explosives such as hand grenades, smoke grenades, WP, etc. Would you check to see if there were any loose grenades and make sure that the firing pins are secured and wouldn't come loose? Keeping loose rounds of ammunition in a container will prevent them from getting lodged in your controls. It's hard enough to fly an aircraft with good controls, but it's even harder when you have something stuck in them.

...but feed your ideas to the AVIATION DIGEST

Another important area is the device on a piece of equipment to reduce hazard; this meaning of safety has a great importance to us. If we ensure that all safeties are fastened and secured, they will function more effectively. By being in a hurry and skipping over your preflight you might not notice a broken safety wire on the damper arm of the main rotor blades, or a missing cotter pin in the rudder trim. When carrying cargo make sure it's fastened down and secured; I'd hate to make a turn and have the cargo shift. The most important piece of equipment in any flying job is you. Wearing your flight suit, gloves, helmet and boots properly will help to protect you from a flash fire, cuts and any unnecessary injuries. Keeping yourself physically and mentally fit will help too.

Let's face it, safety and flying go along like bread and butter. If you fly safely you have a better chance of making it to your destination than flying unsafely. Filing a flight plan is a good policy. It lets people know where you are going, plus which route you are taking. Like in football it's no fun making two points for the other team. Morale is higher if you make a touchdown for your own side, particularly if it's safe and sound.

Much like the member of a defensive backfield in football in the deepest position, you're the guy your crew depends on to get them back safely and in one piece. Don't take unnecessary chances; one mistake could end your crew's lives and yours.

Perhaps the most important phase of safety is Webster's last definition: to protect against failure, breakage or accident. No one can prevent all things from going wrong with your aircraft, but knowing your emergency procedures as written in your aircraft's dash 10 will allow you to get the aircraft on the ground safely and intact. Doing your job as efficiently and safely as possible will help you to a long and safe flying career which means following all the rules established for Army aviators. If you have any better suggestions submit them so we all can benefit. Rules were made to keep you safe and if you follow the established procedures you'll have a better than average chance of collecting your retirement. A primary basic is to ensure that you and your aircraft are capable of performing the mission. Don't let your ego of pride substitute for safety because your ego doesn't give the engine more power when you need it. My best advice is safety first above anything else for a long flying career.

CWO Earl K. Bauch
DSIT, Systems Engineering
Ft. Rucker, AL 36360

Why USAASO Sez?

Colonel George Rogers

COL Rogers was director of the U. S. Army Aeronautical Services Office (USAASO) when he wrote this article. The article contains information of the services that are available through USAASO

IN TODAY'S Army there are few soldiers—from private to general officer—who have not flown in military aircraft. For many, flights taken were in and out of the fire bases and tactical landing sites in the Republic of Vietnam. For others, the logistic support or administrative flight is more familiar. Almost all flew to and from Vietnam on contract aircraft. Flying in the military, as in the civilian community, has become a way of life and, like most other commonplace experiences, little attention is given to the systems supporting that way of life.

One of the more important of those systems supporting air travel, be it around the world by commercial air or a 10-minute helicopter flight into a tactical landing zone, is the air traffic control system. In some form or another air traffic control is involved in just about every flight made, and yet surprisingly little is known about the system even by aviators themselves, much less the passengers.

What is air traffic control? The ingredients of an ATC system can best be depicted schematically, as shown in the accompanying chart.

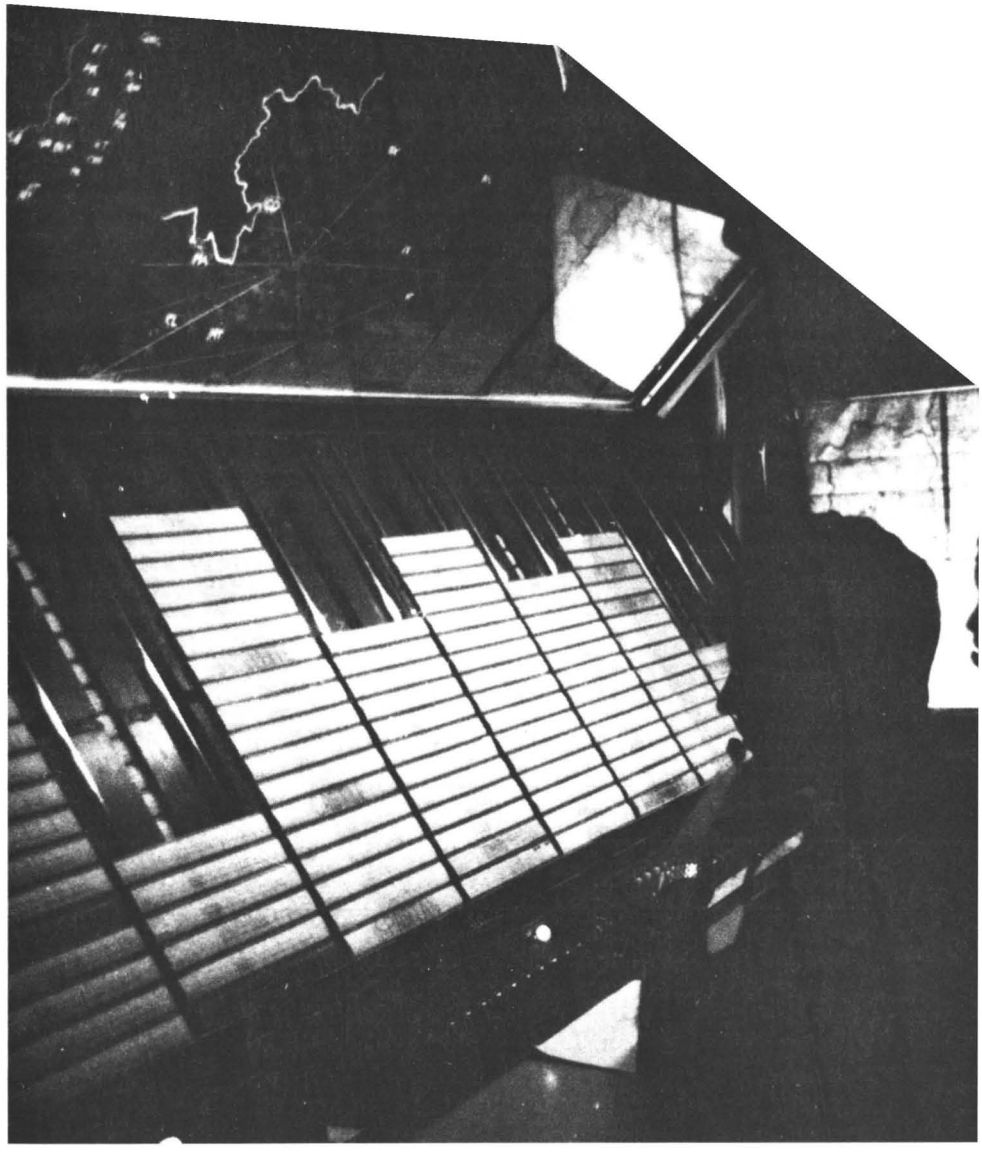
On a national level the Federal Aviation Administration (FAA) is charged with development and operation of the entire system. However, by Federal law and because they are major users the military departments are actively involved in both the developmental and operational phases. A major effort is routinely expended by all interested parties in keeping this system—which is so vital for safe and efficient air traffic—current with the changing needs of the users.

For the U. S. Army, responsibility for the air traffic control system is vested in the U. S. Army Aeronautical Services Office (USAASO), a little known organization located at Cameron Station, Alexandria, Va. USAASO is a class II activity under the Assistant Chief of Staff for Force Development and operates within the parameters of AR 95-23 as the Department of the Army Executive Agency on—

- Airspace and air traffic regulation, control and procedures.
- Related ground support facilities and procedures.
- Flight information.

Very little public notice has been given to the Army's participation in the national program and one may ask the question as to just how this involvement is consummated. The Army's involvement is accomplished primarily by cooperative agreement and by the timely exchange of information. Frequent formal and informal consultations between action officers of the FAA and members of the Department of the Army and other military services result in discussions and submission of proposals and comments on major issues. Through this media the Army assists in shaping national policies and plans of the FAA for the growth and development of the national aviation system.

The Department of Defens



In a darkened room at the busy Tan Son Nhut, RVN, airport Army air traffic controllers of Capital Center flight follow hundreds of aircraft daily

and the Department of the Army's management of this cooperative effort is formally accomplished through an established advisory committee on Federal aviation which, in turn, is supported by working groups. The assistant Chief of Staff for Force Development is the Department of Army's principal member of this committee and the Director of Army Aviation serves as the alternate member. USAASO is the Army's executive agency on airspace, air traffic regulation, rules, procedures, related ground support facilities and systems, and on flight information. The director of this activity serves as the principal Army member of the working group of the DOD advisory committee on Federal aviation.

With this background an inquiring but cursory look at the USAASO and its assigned mission should generate provocative questions about this relationship.

To fulfill the mission relative to airspace, air traffic regulation, control and procedures USAASO conducts daily liaison and coordination with the FAA. Additionally, organic resident offices are located at eight FAA regional headquarters.

The Department of the Army has about 200 separately designated areas of special use airspace located throughout the Continental United States. Of these, 114 are classified as restricted airspace and range in size from 2 square miles to over 1200 square miles. Additionally, the Army has 41 controlled firing areas. Associated with Army flight facilities are the control zones and transition areas to protect the instrument approaches and departure procedures as well as air traffic in the terminal areas. As a major user of airspace the Army has a continuing requirement to justify retention, revision or establishment of new areas to support the Army's mission.

In the utilization of navigable airspace, consideration must be given to our nation's philosophy of the public's right of freedom of transit, and to ensuring the safety and efficiency of flight for private and commercial as well as military aircraft. From a partisan point of view, consideration must be given to specific requirements of each military installation and protection of its operational interests relative to special use airspace which may be hazardous to flights of nonparticipating aircraft. Additionally, the Army will continue to have requirements wherein the coordination of national airspace is necessary. Examples are construction proposals by the military establishment when the proposed structure will penetrate

the navigable airspace and, conversely, when like structures are proposed by civil agencies which may be in the vicinity of military installations. Each such construction proposal must be negotiated and approved by the FAA.

During fiscal year 1971 over 11,000 Federal airspace proposals and studies were reviewed and processed by USAASO. Of these, 2,000 actions related to the structure or restructure of existing or programed airways; approximately 1,000 actions were proposals for new civil airport facilities; and the remaining 8,000 related to the structure of towers, buildings or like facilities that would penetrate the navigable airspace. Even though only a small percentage of the stated proposals have a direct impact on Army operations, each must nevertheless be reviewed to safeguard military interests.

Air traffic control encompasses actions pertaining to the development of Army policy and criteria for instrument flight procedures. This includes the review, approval and publication of actions on each standard instrument flight approach procedure and standard instrument departure for all Army airfields having approved terminal facilities.

At both the tactical and nontactical Army airfields the ground controlled approach radar is the Army's primary instrument weather landing system. Nondirectional beacons and terminal VHF omni ranges also provide for approaches to Army airfields. Air-ground communications equipment plays a major role in the control of terminal and enroute traffic. Altogether there are over 50 separate major items of equipment used in the Army air traffic control system.

The operators of this equipment are the ATC tower operators (MOS 93H), the ATC ground control approach (GCA) specialists (MOS 93J), the ATC enroute specialists (MOS 93K), and the air traffic control chiefs (MOS 93L). Training for these specialists is conducted at the U. S. Army Aviation School, Ft. Rucker, Ala., and currently there are about 2,500 on the Army's rolls. Maintaining this sophisticated equipment in the enlisted fields are the radar repairmen (MOS 26D) trained at Ft. Monmouth, N. J., and the avionics communication equipment repairmen (MOS 35L) the avionics navigation equipment repairmen (MOS 35M), and the avionics equipment supervisors (MOS 35P) trained at Ft. Gordon, Ga. About 1,100 of these repairmen are required to maintain the Army's worldwide equipment inventory. USAASO's involvement and responsibilities in this area encompass the establishment of policies and criteria on the requirements for, and the installation, operation and certification of, air traffic control facilities. Worldwide engineering assistance on design and installation of ground support facilities is provided by organic technicians who currently are stationed worldwide.

When service and support requirements exceed the capabilities provided in the areas of operation cited, technical assistance is augmented by technicians from the home office on a TDY basis. USAASO technicians are exceptionally qualified to perform these functions and have extensive background and experience in the field of ground avionics. Augmentation of organic capabilities in technical assistance is provided by a current contract budgeted for and managed by USAASO. Another source of technical assistance comes from a national agreement with the FAA. Upon request, and on a reimbursable basis, the FAA provides onsite technical engineering aid. Looking to the future, extensive study and research by the Combat Developments Command and the Office, Chief of Research and Development in concepts and hardware are a continuous effort to meet Army requirements in air traffic regulation and control.

USAASO determines and validates Army requirements for flight information and coordinates with other services and other governmental and international agencies for publication in appropriate flight information media. Action officers are deeply involved in the acquisition, validation and editing of over 200 operational items of information or informational change each week in the 43 separate flight information documents in which the Army provides input. Distribution control of these documents is a perplexing task of USAASO's. To effectively carry out a worldwide flight information program for over 1,300 subscribers, USAASO has three aeronautical services detachments. The detachment located in Hawaii assumes responsibility for the entire Pacific area. The detachment at Heidelberg is responsible for the European, Mediterranean and Near East areas of operation, while a detachment in the Canal Zone handles the Central and South American areas. Responsibility for the North American area is handled by the home office.

The enlisted specialist at the unit and installation level responsible for the overall coordination of flight information data is the flight operations coordinator (MOS 71P). About 1,900 of these specialists are coordinating the traffic created by over 26,000 Army aviators flying more tha

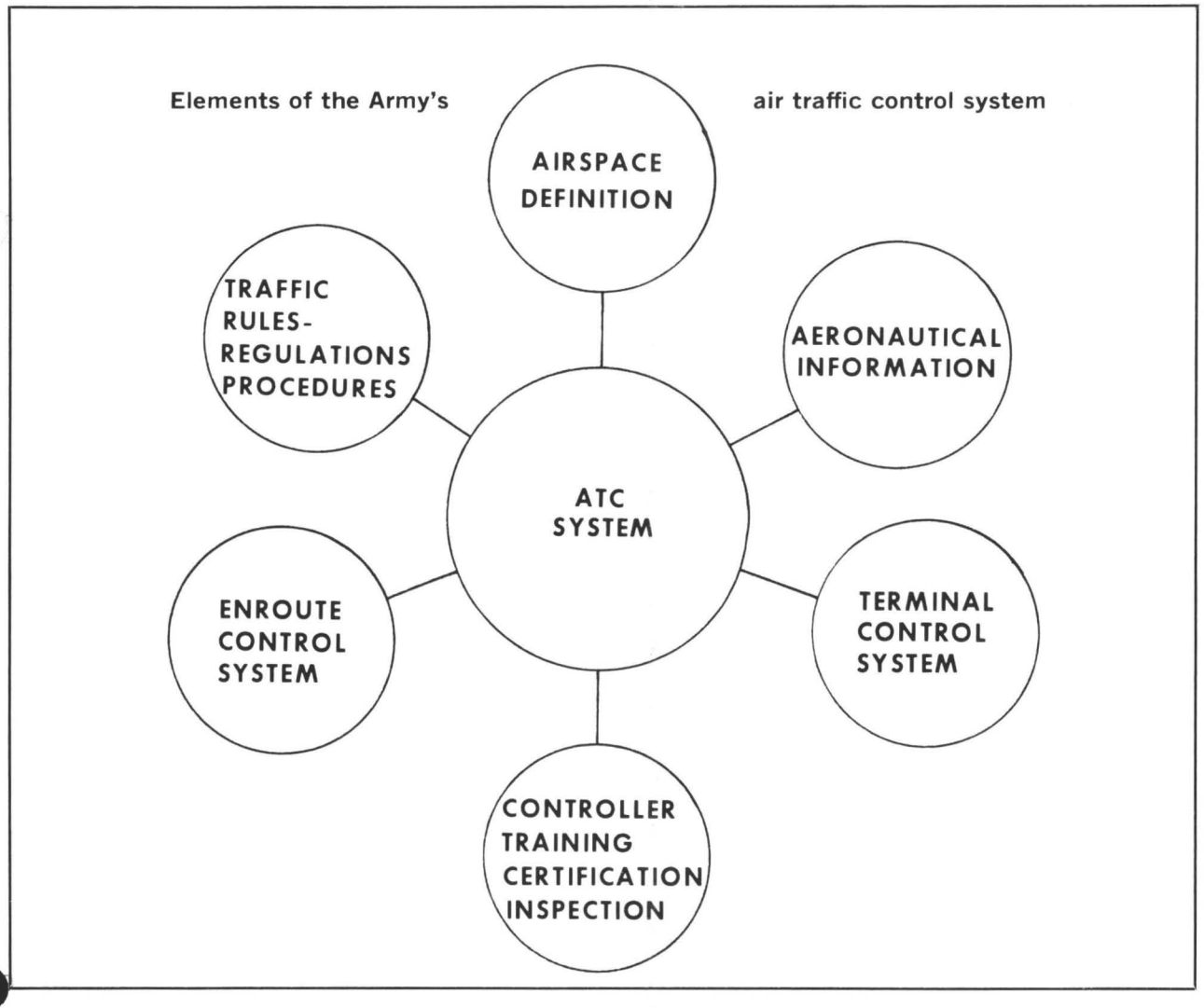
12,000 aircraft for a total of 6.1 million flight hours in fiscal year 1971. These flights are conducted from over 500 airfields and heliports employing approximately 800 fixed and tactical ATC and NAVID facilities in the worldwide Army aviation program.

Another time-consuming task is the necessary routine liaison and representation on various Department of the Army, Department of Defense, national and international committees. Currently membership is provided on 26 formally established committees, working groups and/or working parties.

The most recent addition to the tasks assigned to this office is its designation as the Department of the Army point of contact for the following ATC equipment, systems and staff actions:

AN/TRN-30—Nondirectional beacon
AN/TSQ-71—GCA
AN/TSQ-70—Control tower
AN/TSQ-( )—Control tower
Landing systems
AN/GRC-171—UHF Transceiver
AN/GRR-23—VHF receiver
AN/GRR-24—UHF receiver
AN/GRT-21—VHF transmitter
AN/GRT-22—UHF transmitter
AN/TSC-61—Flight coordination center
FAA coordination
DA point of contact at PANAG (ECOM position and navigation group)
AN/GRN-6—Nondirectional beacon
AN/FPN-40—GCA
TB 95-1 implementation
Korean ATC update
Joint ATC actions
Radar target simulators
AN/APM-305 transponder test set

From a standpoint of policy which has Army-wide impact,

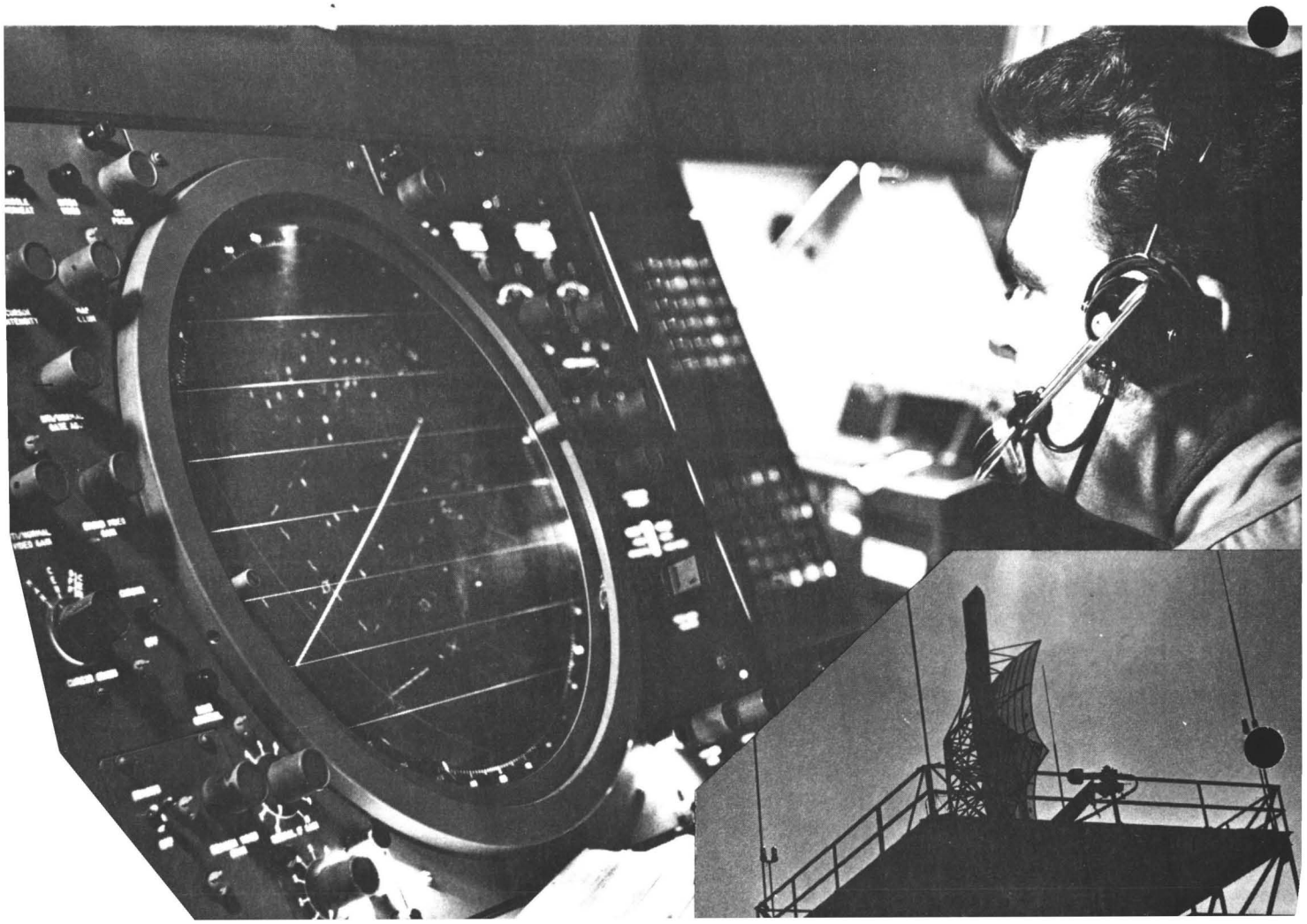


Whether in the visual (above) or the radar air traffic control environment (below), USAASO provides service to Army units throughout the world

USAASO's proponency for 12 Army regulations is one of its more important tasks. Of equal importance is the participation with other services and the FAA in the development of joint and federal regulations pertaining to air traffic control. Additionally, USAASO has primary responsibility for input into certain technical manuals, technical bulletins and army subject schedules pertaining to ATC.

USAASO is first and foremost a service activity and is in the business of selling service. It can assist installation commanders or individual unit commanders by providing direct support wherein onsite technical assistance in the operation and maintenance of ATC equipment is provided. Also, it can afford assistance where and if desired to improve overall ATC management of aviation facilities either by tailoring a team of specialist for a specific requirement or by providing a full team of specialists to conduct a survey of facilities to identify weaknesses in ATC personnel or equipment performance.

Personnel assigned to USAASO represent the entire Army aviation family referred to throughout this article as they coordinate ATC actions at top levels of command and as they participate in the business of the 26 separate committees and working groups on which they serve. AR 95-23 authorizes individuals, worldwide, to communicate directly with this USAASO in matters related to its functions. To increase the efficiency and effectiveness of the Army's air traffic control system, the efforts, the ideas and the suggestions of each interested person are earnestly solicited.



Aeromedic

Continued from page 16

care what we flew over or at what altitude. . . .")

• *Irritability.* ("Now look here, Sonny-boy, I flew the Burma Road when you were impressing your parents with your ability to hold your head up. You *don't give me* lessons in flying. What's more, don't chatter while I fly! . . . and chief, you and the gunny stop shifting your weight around back there!")

• *Poor appetite.* ("Doc, I don't feel sick . . . I just don't wanna eat. The food doesn't taste as good anymore . . . I don't know why. Besides, I . . . don't feel much like . . . doin' anything!")

• *Weight loss.* ("Yeh, I've lost a little weight. You'd lose weight too . . . if . . . oh, I don't know.")

• *Sleeplessness and indulgence in alcohol.* ("Doc, he just tosses and turns all night. Keeps me awake, too! But that doesn't worry me as much as the booze. He doesn't usually drink much . . . only socially. Lately though he's on a liquid diet till 0200 hours.")

Many might say the individual is depressed . . . not acting like himself. Often the flight surgeon must be called upon for the treatment of this type of fatigue. However, chronic skill fatigue can be prevented. If acute skill fatigue is dealt with often chronic skill fatigue will be avoided. The following measures will often minimize the likelihood that chronic fatigue will become prevalent:

• *Ensure adequate training.* With good leadership the men of a unit will be prepared, disciplined and trained to undertake a given mission. This will maximize their performance in the face of known stress and inevitable fatigue. Without training, discipline, leadership and a sense of esprit de corps a unit and its members are ill-prepared to confront even the simplest stresses of the aviation and military environment.

• *Limit flying hours.* AR 95-1 recommends that commanders consider the following . . . for fixed wing aircraft, 30 hours/7 day period and 100 hours/30 day period . . . for rotary wing aircraft, 25 hours/7 day period and 90 hours/30 day period. In the combat environment this was necessarily extended but only under close and continued command and medical supervision.

• *Have provisions for regular leave and R&R.* This measure must be carefully utilized. It must be applied before serious fatigue is apparent. Once the depressed fatigue state is established . . . as with combat fatigue . . . taking the individual away from it all, frequently reinforces his state of disability.

• *Improve working conditions.* One needs no practice in the miserable. Groveling in the mud for the sake of tradition traditionally results in discomfort, dissidence, disease and sometimes disaster. Every effort must be made to maximize man's effectiveness by avoiding unnecessary stresses.

• *Establish set and limited tours of duty.* The prospect of ultimate relief enables one to tolerate more stress. This has been one of the reasons for the decrease in psychiatric casualties in Southeast Asia.

• *Encourage good physical conditioning through beneficial forms of recreation.* Physical conditioning not only prepares one for the enduring tasks at hand but improves mental outlook. It increases the likelihood that sleep will be natural and protective.

• *Minimize the self-imposed stresses.* While largely an individual task, great strides can be made by a commander by setting the example and discouraging conditions which would enable the easy development of bad habits.

• *Recognize accomplishments through awards and decorations.* Man, while intelligent, is basically vainglorious and proud. Without recognition of his accomplishments he soon loses his motivation.

The administrative provisions (AR 95-1) for flying hour limitations are somewhat arbitrary. They can be misleading and easily result in a false sense of security. Each individual differs in his tolerance to stress and the extent to which he will become fatigued. Because of the multiple complex stresses involved in aviation and the fact that it's human nature not to realize when you're too tired for efficiency and safety, flight surgeons and commanders must keep an eye on pilots and other air crewmen for signs of fatigue. To accomplish this *commanders and flight surgeons* must have an intimate knowledge of their men. This only can be achieved by frequent participation in their duties and missions and close surveillance of their responses to stress. Commanders must recognize the safe limits of human performance and the uniqueness of individual capacity. Flight surgeons must be alert for the subtle reflections of compromised performance and marginal reserves. Air crewmen must be aware of their individual capabilities and avoid overextending themselves at the expense of safety, efficiency or the compromise of future mission accomplishment.

Maintenance

Preservation Of Fuel Control: The fuel control should not be left unpreserved (T-53 series engines) for a period longer than 48 hours. Moisture present in JP-4 fuel will corrode internal parts of the fuel control, causing serious damage. (Reference TM 55-1520-210-20, page 5-116)

Component Disassembly: When removing or dissassembling components exercise care to prevent dirt or other foreign matter from entering the engine. Caps, plugs or temporary covers should be used to close all exposed openings.

Installation Of Aircraft Nickel Cadmium Battery: Installation of the particular aircraft nickel cadmium battery will differ from aircraft system to aircraft system. For installation procedures of each different aircraft nickel cadmium battery refer to the manual covering the aircraft. Also, observe the following:

- Battery positioning and security.
- Ventilation of gases.
- Voltage regulation.

Note: For a battery to be used for the first time, *be sure* that the battery has been prepared for service by higher category of maintenance personnel as annotated on the battery service record card.

Transmission Wafer Oil Filter Seal: Many problem areas are peculiar to a specific series aircraft. One that has been experienced several times was failure of the UH-1 series helicopter transmission wafer oil filter seal. Frequently this problem occurs when a transmission is changed or disconnected to facilitate transmission mount changes. In each case excessive maintenance manhours were required for trouble-shooting. On each occasion the problem occurred as soon as the engine started and the transmission was turning. Excessive oil pressure blew the transmission oil wafer filter seal. The problem was often due to an unserviceable quick disconnect in the transmission to oil cooler pressure line, or just a good case of improperly installed quick disconnect. The quick disconnect is located in the forward transmission well and is extremely difficult to install and/or to detect improper installation.

Oxygen (Gaseous) Servicing: Caution: Only qualified personnel shall be authorized to operate equipment for servicing of an aircraft oxygen system. Oxygen servicing requires the utmost precautionary measures due to the highly explosive and flammable capabilities of oxygen.

a. Prior to servicing an aircraft oxygen system, personnel shall familiarize themselves with the system, precautions and instructions for handling gaseous oxygen, operation of servicing equipment and potential hazards involved.

b. Aircraft shall not be serviced with oxygen when any of the following conditions prevail:

(1) Aircraft electrical switches are on.

(2) Ground-powered equipment is operating within 50 feet of the servicing area.

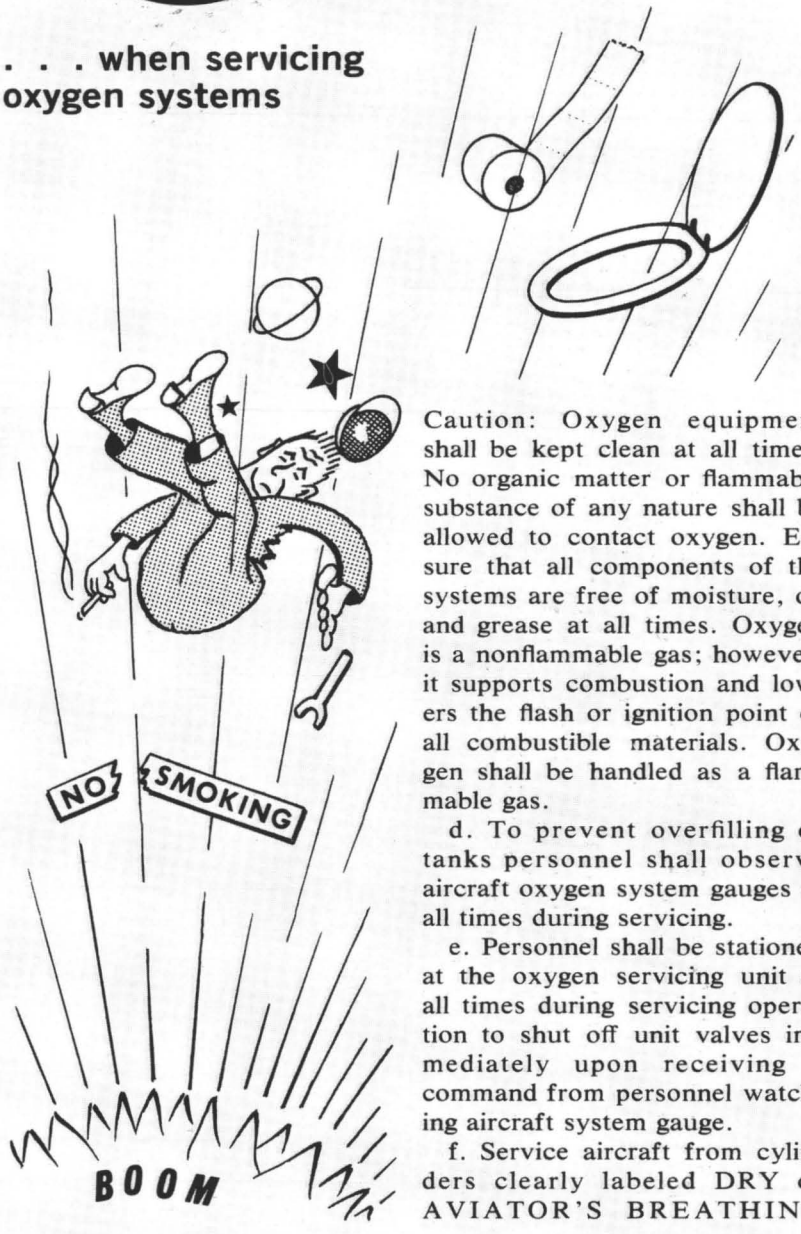
(3) Aircraft is being serviced with fuel, oil or anti-icing fluids.

(4) Any combustible materials, fluids, etc., are evident around oxygen servicing equipment.

c. When an aircraft is being serviced with oxygen within 50 feet of an area where smoking is permitted, *NO SMOKING* signs shall be placed at a 50-foot radius around the servicing area.

Matters...

. . . when servicing oxygen systems



Caution: Oxygen equipment shall be kept clean at all times. No organic matter or flammable substance of any nature shall be allowed to contact oxygen. Ensure that all components of the systems are free of moisture, oil and grease at all times. Oxygen is a nonflammable gas; however, it supports combustion and lowers the flash or ignition point of all combustible materials. Oxygen shall be handled as a flammable gas.

d. To prevent overfilling of tanks personnel shall observe aircraft oxygen system gauges at all times during servicing.

e. Personnel shall be stationed at the oxygen servicing unit at all times during servicing operation to shut off unit valves immediately upon receiving a command from personnel watching aircraft system gauge.

f. Service aircraft from cylinders clearly labeled DRY or AVIATOR'S BREATHING OXYGEN. Other oxygen may have moisture which could cause flow stoppage at temperatures below freezing.

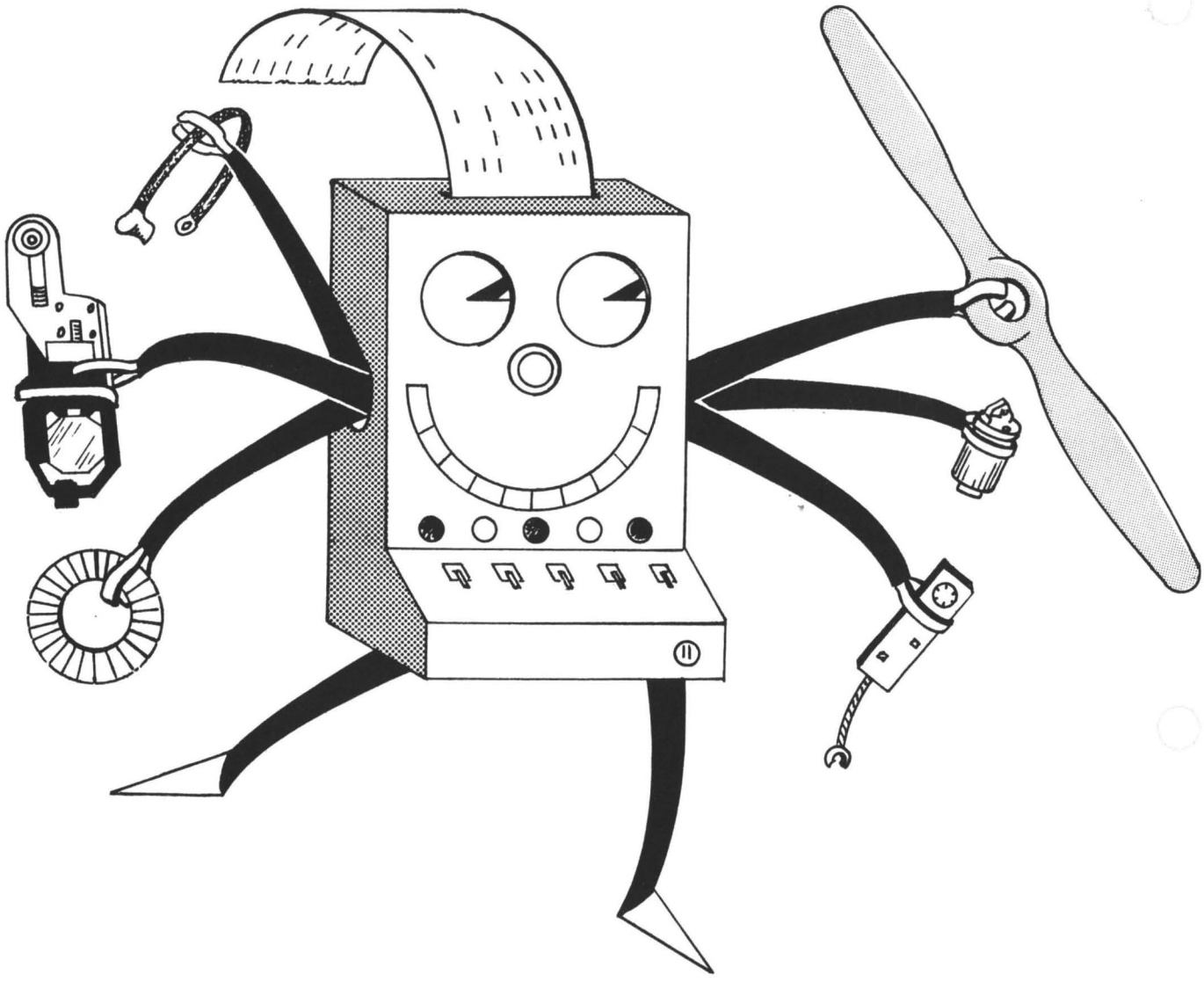
g. Always use a pressure-reducing device when servicing low pressure oxygen system from high pressure bottles.

h. Fill oxygen system slowly to prevent explosion resulting from heat generated by filling too fast.

i. An aircraft oxygen system not equipped with shutoff devices at cylinders shall be completely discharged of all pressure prior to removing components. All electrical power shall be turned off during oxygen discharge operations.

j. Refer to applicable aircraft maintenance manual for additional information and maintenance procedures. (Reference TM 55-1500-204-25/1, page 1-16)

We received a maintenance question on calibration of the J2 or AN/ASN-43 gyro magnetic compass. Our research finds that the calibration procedures for the J2 compass are found in TM 11-6605-200-35 and the AN/ASN-43 is in TM 11-6605-202-35.



Computer Assisted Maintenance Management

Major Harold L. Jones

Although computers are now being used more and more at the direct support activity level in the aviation support structure, their value in providing assistance to maintenance is often being overlooked

UIC	ACFT TYPE	SERIAL NUMBER	NEXT PE	TOTAL AIR/F HOURS	HOURS PE DUE	HOURS TO PE DUE	AVG DAYS TO PE	ENG TYPE	ENG SERIAL NUMBER	NEW OR O/H	ENG HOURS	HOURS HE DUE	HOURS TO HE DUE	AVG DAYS TO HE	HOURS TBO DUE
56	UH-1D	65-9565	25	3912.3	3913	0	0	L-11	LE10979	0	656	4006	93	41.5	4883
56	UH-1D	65-10050	27	3574.6	3577	2	.9	L-11	LE10071	0	10	3742	167	74.5	4754
56	UH-1D	65-9708	25	4392.1	4401	8	3.6	L-11	LE10818	0	860	4701	308	137.5	5131
56	UH-1D	66-17078	32	3108.1	3207	98	43.8	L-11	LE10663	0	907	3303	194	86.6	3399
BANK TIME - 1254															

Figure 1

THE VALUE OF computers to supply operations is widely known. Computers which have been specifically developed to aid in maintaining stock record ledgers and to complete functions which otherwise would be tedious, time consuming and very much subject to human error are now found at direct support supply activity level in the aviation support structure.

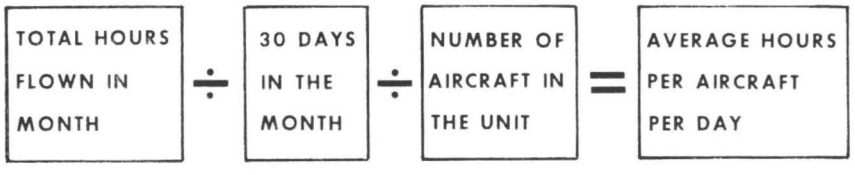
Although computers are increasingly being used in the supply field, their value in providing assistance to maintenance has been largely overlooked. In the Aircraft Maintenance Brigade, Hunter Army Airfield, Ga., maintenance management information systems are being developed which, hopefully, will provide a beginning in rectifying this oversight. Even though the data presentations now in use are aimed specifically at Hunter's problems and are primarily for staff and support planning purposes, the principles involved have wide application. Hunter's systems could very possibly be adapted for use in many other areas.

The only known widespread use of computers in maintenance management involves the compilation and presentation of data for the DA Form 1352, the Aircraft Inventory, Status and Flying Time Report. Hunter is no different from other large fleets in this respect in that data for this report is accumulated on a daily basis in some cases and checked and consolidated at the end of the month, printed by computer and then distributed.

Working with the 1352 data, however, and with a minimal amount of additional input data Hunter has developed a different data presentation felt to be much more useful at this lower level of management. As shown in the solid circles in figure 1, this presentation called the *Scheduled Maintenance Projection* uses seven bits of information already submitted for 1352 report purposes. The bits of information shown in the broken circles only four are required to be separately submitted by the units owning the aircraft; the computer does the rest. It subtracts the "Total Airframe Hours" from "Hours PE (periodic inspection) Due" and arrives at "Hours to PE Due." It then completes the same computation to arrive at a figure for "Hours to HE (hot end inspection) Due."

Then in a slightly more complex computation the computer

Figure 2



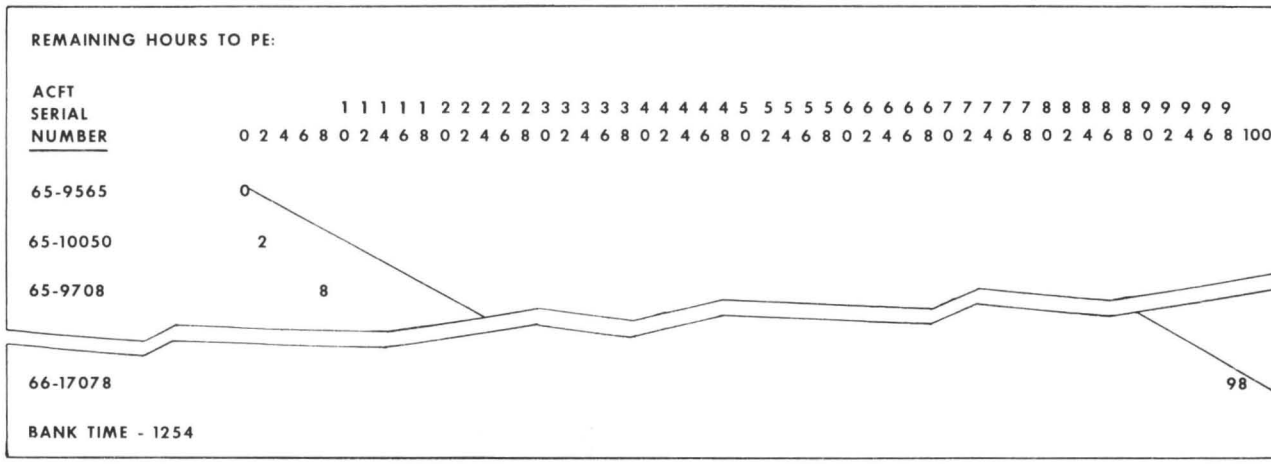


Figure 3

recalls the total number of hours flown by this particular unit in the previous month and, after dividing the total by 30 days in the month to arrive at the average unit daily flying hours, the computer again divides—this time by the number of aircraft in the unit—to arrive at the average number of flying hours per day per aircraft (figure 2).

This factor, which normally ranges from 2.0 to 2.4 hours per day at Hunter, is then divided into the number of "Hours to PE Due" and into "Hours to HE Due" to arrive at "Average Days to PE" and "Average Days to HE."

After the data is accumulated for each of a given unit's aircraft, it is sorted and put into sequence in relation to the "Hours to PE Due" with the aircraft which is closest to PE being first and the aircraft farthest from PE being last. Then the data is printed.

This presentation results in a depiction of every unit in relation to its scheduled maintenance workload for the coming month. It has the potential with skillful use to make it possible to identify peak workloads a week or two in advance of their occurrence. Conversely, the Scheduled Maintenance Projection can identify a unit with a relatively light scheduled maintenance workload a week or two in advance of that situation. This information can then be used in scheduling especially heavy flying commitments or to allow the unit to pull early or deferred maintenance.

As an additional computation the presentation shows the "Bank Time" for the unit. This

Working with engine workload projection sheet, engine shop's platoon leader coordinates parts requirements with his supply supervisor

figure results simply from the addition of the number of hours remaining to PE for each of the unit's aircraft. Under optimum scheduling conditions "Bank Time" would be the number of aircraft in the unit multiplied by 50 hours each. For example, in a unit with 20 aircraft one aircraft should be 5 hours from PE, another 95; the second closest to PE should be 10 hours out and the second farthest 90 hours; each aircraft set should average to 50 hours. Optimum "Bank Time" for this unit would be 20 x 50 or 1,000 hours. The actual "Bank Time" figure might be 750 hours, indicating a heavier than average maintenance load, or it might be 1,250 hours, indicating a light workload. By printing out the "Bank Time" figure for each unit the user of the data presentation is provided with a "quick and dirty" indicator of the unit's scheduled maintenance workload.

Use of the data presented in the Scheduled Maintenance Projection led quickly to the development of a spinoff presentation of extracted information. This spinoff, seen in figure 3, is entitled *Table of Remaining Flying Hours Before Periodic Inspection.* Its use and purpose is relatively apparent. Once again it sequences a unit's aircraft in relation to their next scheduled PE and prints them in that sequence, showing the number of hours remaining to that PE. By drawing a line diagonally from the "0 Hours Remaining" point for the first aircraft to the "100 Hours Remaining" point for the last aircraft, an optimum scheduling line is established. It is then very easy to identify workload peaks and valleys. Efforts should then be made to alleviate the problems represented by either of these two conditions.

The third computerized maintenance management information system presentation in use at Hunter Army Airfield by the Aircraft Maintenance Brigade is one that is particularly useful locally due to a unique organizational factor. At Hunter all turbine engine maintenance, except for normal first-line troubleshooting, is performed by one engine shop. This shop performs all hot end inspections and all engine changes for the entire Hunter Cobra and Huey fleet. This centralization has greatly contributed to quality standards and it has streamlined and much simplified the management of the high value, supply critical engines and their components.

The data shown in figure 4 is selected, sorted and printed solely from data depicted in the Scheduled Maintenance Projection (figure 1). Figure 4, *Hours Left Before Hot End Inspection,* is a printout listing every turbine engine at Hunter in relation to its next hot end inspection. On the day the report is printed the aircraft shown at the top of the listing is the closest aircraft (and engine) to hot end inspection; the aircraft (and engine) farthest from hot end appears last. This report enabled the centralized engine shop to realistically, and with an increased degree of accuracy, project its requirements for engines and hot end components.

All three of the maintenance management information presentations developed thus far by the Aircraft Maintenance Brigade are in various stages of their evolution. They are by no means the ultimate in management information systems and even these still have "bugs." Nevertheless, they represent an advancement in the state-of-the-art of maintenance management. Given the proper, skillful and aggressive use of these relatively simple systems and intelligent, intensive and innovative thinking by maintenance managers, our "art" *will* advance as it *must* to meet the changing, growing demand for Army aviation.

Figure 4

UIC	ACFT TYPE	SERIAL NUMBER	ENGINE TYPE	ENGINE SERIAL	NEW O/H	HOURS HE DUE	HOURS FLOWN	HOURS REMAIN	AV DAYS REMAIN
63	UH-1D	64-13723	L-11	LE10969	0	4482	4481.1	1	0
39	TH-1G	66-15286	L-13B	LE21302	N	2291	2287.9	3	1.4
68	UH-1D	65-9665	L-11	LE09499	0	3505	3498.9	6	3.0
63	UH-1D	64-13511	L-11D	LE12791	0	4321	4297.5	23	11.5

INSTRUMENT CORNER

Q. Recently while planning an IFR flight I found the "B" model Huey dispatched to me had no transponder. FLIP Section II states that the absence of a suffix in the aircraft designation box on a DD Form 175 indicates there is no Transponder/TACAN equipment onboard the aircraft. Should I have entered UH-1E as the aircraft designation or should I have omitted the "B" to avoid possible confusion?

A. Aircraft model designations should not be used on DD Form 175. In this case controllers could have mistaken that "B" as indicating a transponder with 64 code capability and DME equipment was onboard your aircraft. Unnecessary radio transmissions which may arise to verify your status could cause some confusion. Reference: FLIP Section II, dated 16 Sep 71, page II-53, USAASO.

MILITARY FLIGHT PLAN		AIRCRAFT UNIT OF ASSIGNMENT 361 AWC	
TYPE OF FLIGHT PLAN ☑ IFR ☐ DVFR ☐ VFR ☐ FVFR	RADIO CALL R14789	AIRCRAFT DESIGNATION/ TD CODE UH-1	ES
INITIAL CRUISING ALTITUDE 3000	POINT OF DEPARTURE PKU	NAME AND NUMBER	STANDAR

IFR	VFR	ROUTE OF FLIGHT

Q. I am dual rated with a standard instrument rating in both helicopter and fixed wing aircraft. If I were to fail an annual instrument checkride in a fixed wing aircraft, could the examiner revoke both my fixed wing and helicopter instrument ratings?

A. Yes, the examiner reports the results of the examination with his recommendations as to the award or revocation of instrument ratings to the awarding authority. AR 95-63 states: "In the case of an applicant who does not successfully complete the required examination, the awarding authority will invalidate *any* instrument rating currently held by the individual. The applicant must successfully complete a reexamination within a 60 day period from the date of initial failure." Reference: AR 95-63, page 2-2, paragraph 2-5c.(2), dated 13 May 1969, and ACSFOR/AV.

Q. At what point prior to departure should the anticollision light be turned on while operating helicopters?

A. AR 95-1, paragraph 4-5c, dated 12 Sep 69, states: "Aircraft lighting. (1) In flight the anticollision light (Grimes light) will be ON when airborne, except while operating under actual instrument conditions when the light may induce vertigo. During darkness the navigation lights will be on STEADY unless the Grimes light is inoperative, in which case the navigation lights will be on FLASH. (2) Ground. The Grimes light will be OFF during all ground operations, and ON when entering the active runway for takeoff."

The catch for helicopters is: Flying time starts when it lifts off the ground. Therefore, the anticollision light should be turned ON prior to hovering flight. Changes to dash 10s and checklists are currently in the mill to reflect this. NOTE: The Study Guide and Reference Data Booklet for the 1972 annual writ should be arriving in your units soon. The study guide is in programed text form and contains questions similar to those which will be used on the annual writ. Emphasis should be placed on where information can be found rather than on memorizing figures and rules.

Q. Why does the Army use only 70 feet (.07) as allowable error in the Kollsman window of the altimeter, and where does the K factor enter the picture? The other uniformed services and the FAA state that the allowable tolerance is 75 feet (.075) in the Kollsman window.

A. The fact that we march to the beat of a different drummer is not so critical as you suppose. The difference between .07 and .075, expecially when you try to read it (5 feet) on an altimeter, is minute. Consider it as an extra 5-foot margin of safety.

The application of the K factor to altimeter settings is explained in TM 1-215. By continually adjusting the Kollsman window to the current altimeter setting the aviator compensates for the nonstandard surface pressure, and the altimeter reads the field elevation when landing as well as displays the indicated altitude above mean sea level in flight.

Concerning both your questions, stick to the guidelines that TM 1-215 gives you. The agency which has proponency for TM 1-215 will be reviewing it shortly, and the proposal to standardize altimeter error and K factor should be on the agenda.

The Crew Chief

Captain Edwin S. Carpenter

ANOTHER EARLY morning takeoff for an all day ash and trash mission. Certainly don't look forward to this mission. Maybe I'm over 140 hours now and won't fly for a few days? No luck there, I'm only at the 100-hour level. Well, another week and I should have a few days off.

Aircraft number 350. Who is the crew chief? Specialist 4 Smith. He's a pretty good crew chief; ships always look good—shouldn't be any problem on preflight. I'll see if I can find him and let him know what we will be doing tomorrow. Also, tell him to have some C's aboard because we probably won't get a break for chow. He's not in his tent, but if I don't see him tonight he'll be there in the morning; the platoon sergeant will get the word around as to who is flying at what time.

Sound familiar? Thoughts like the above undoubtedly went through your mind many times in the Republic of Vietnam. But, did you ever stop to think about the plight of the person whom you have saddled with most of the responsibility for the coming day's mission, or just where he might have been when you couldn't find him in his tent? Let's consider the crew chief for a moment and discuss his situation.

Your day begins about 0500 hours for an 0600 takeoff. You get up, dress, eat breakfast and arrive at the flight line about 0530. There you find the crew chief busy readying the UH-1 Huey for its takeoff. He has probably been with his bird for 45 minutes to an hour ensuring that everything is prepared. Your first question concerns the C-rations and the next the condition of the aircraft. You dump your equipment in the cockpit and begin your version of the preflight. The crew chief dutifully follows you around the aircraft and answers your many questions.

Finally, you are airborne with the crew chief keeping you clear of everything imaginable. He is in and out of his aircraft a hundred times and does the bulk of the loading and unloading. He is continually buffeted by the wind as you attempt to keep that little ball centered, and possibly drenched should a thunderstorm wander near your flight path. Should you be called upon to carry troops he ensures that everyone uses seat belts and keeps their weapons unloaded—not to mention keeping their heads out of the rotor blades. He finishes the flying day tired, dirty and quite possibly scared, depending on the level of proficiency of you and your copilot.

After completion of the mission you might postflight and maybe even give a slight word of praise to the chief about his performance or his aircraft's performance. You then head for the mess hall, the bar and finally collapse into bed after a hard day in the cockpit.

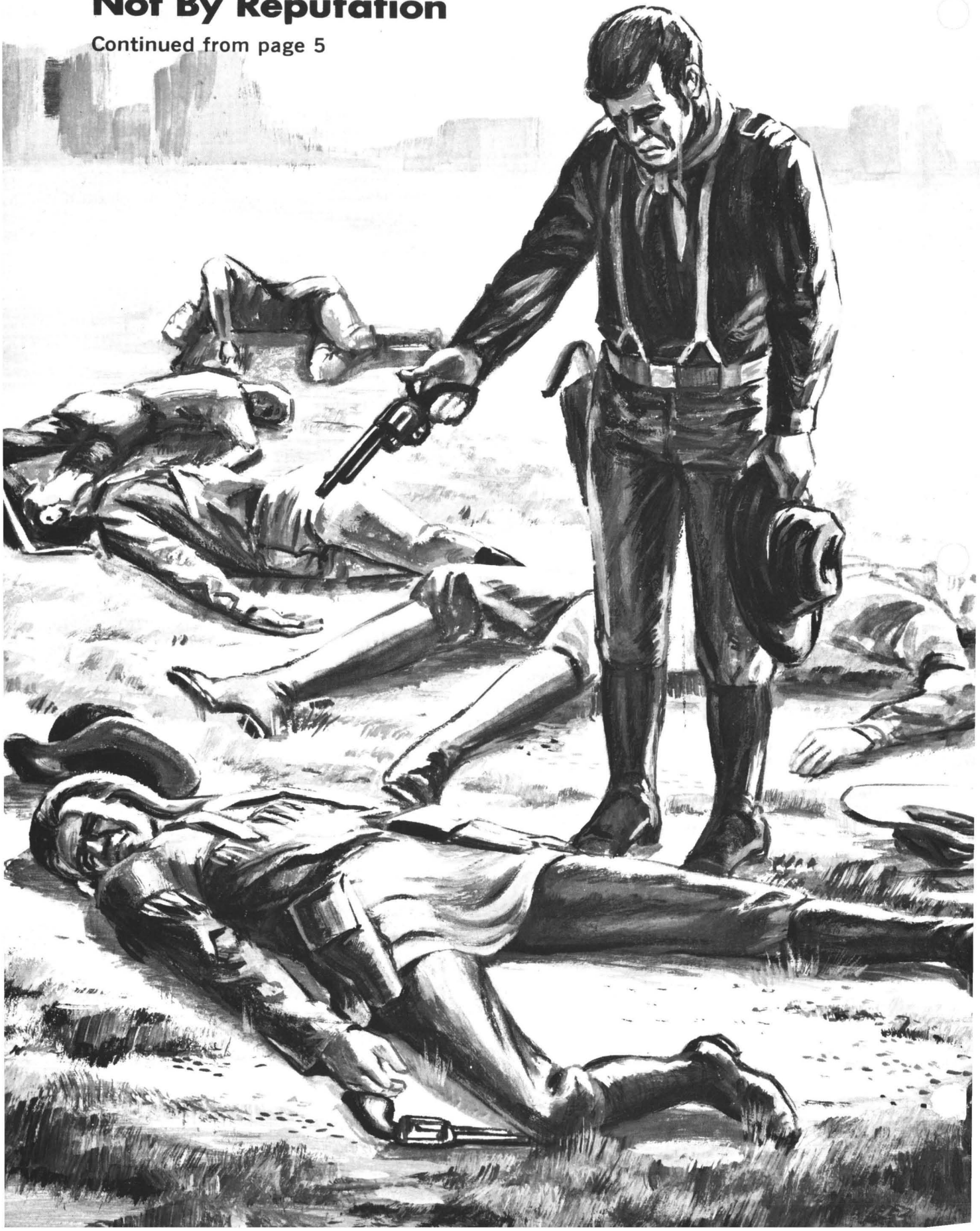
The crew chief secures his aircraft and then follows you to the mess hall. After chow his nightly routine varies greatly from the relaxing routine which you follow. If the crew chief is lucky he only has the normal duties of a daily inspection and a cleanup job. If he is unlucky he also has an intermediate inspection and/or a maintenance problem. He finally completes his day about 4 hours later and then opens a can of beer if he doesn't have guard duty.

Why does the crew chief continue to work in a position as described above? It certainly isn't the flight pay. A captain will receive more than twice the pay; even a second lieutenant or WO1 will receive better than one and one-half times the pay. The living conditions are better than the infantry's but not as good as many enlisted men have. And, you certainly couldn't consider his job any safer than many positions when reading the weekly accident summary. He is probably in aviation because he enjoys flying and receives satisfaction from knowing that his bird flies mainly because of the job he has done and only slightly because of the skills of the pilot.

The next time you receive your daily flying mission stop a minute and think about the crew chief. Remember what his day has been like and inquire if he may need some help to ready the aircraft for tomorrow's flight. He may need a runup following an intermediate inspection and it will save him time and steps if you come to the flight line instead of him scouring the company area finding someone qualified. Take a minute to chat with him and ask him how things are going. You'll undoubtedly find a wealth of knowledge about your aircraft and be rewarded by a better performing crew chief.

Not By Reputation

Continued from page 5



morning report carried 237 men before the loss taken by the snipers. We waited.

Soon mounted warriors could be seen moving freely on both high banks of the river. On a distant bank, well out of rifle range, I could see the outline of their women and children come to see our finish and to pillage our remains. We were surrounded. Their blood-curdling signal cries back and forth between their various positions were enough to chill the soul of any man. But do you think that bothered Custer? Not a bit. *He knew these Indians by reputation.* He knew each one was depending upon others to do the real fighting—the dying. Well, he just waited until they were all in their positions. Then one by one he signaled for a charge by the several units.

The shock of a charge under the circumstances and of new charges from new directions, along with the presence of their women and children, completely devastated the Indians. About the time the third unit began its charge the whole thing disintegrated into a rout. They left their positions and began to run in all directions.

We counted 47 bodies when it was all over. But the only reason it wasn't more was that we couldn't catch them. We had their number. *Theirs was a lousy reputation.*

Next spring at the Little Bighorn things were different. Anyone who wasn't there can never know how close we really came to a victory that day. It was just a matter of misreading a few reputations.

The Indians, to begin with, had a reputation for being poorly armed. But that day most of them had Winchester repeaters with an unlimited supply of ammunition.

The Indians also had a reputation for being poorly organized. But that day they were accompanied by Sitting Bull, Crazy Horse, Gall and several other battle-wise chiefs.

Of course everybody knows the general way things happened that day. We were following the trail of a village that seemed to be about 1,200 Indians. What we didn't know was that they had joined the whole Sioux nation at a point across the Little Bighorn. Custer, knowing Indians by their reputation, was concerned mostly with whether or not they could get away. He ordered Major Marcus A. Reno to charge the village before he had seen it.

Major Reno, a good leader but without experience, went in as directed. But he was so shocked by the size of the village when he saw it that he stopped his charge and fought dismounted. This was the first of our mistakes.

Not By Reputation

The Indians thought we knew of their overwhelming superiority of numbers and that for this reason we would not attack. Their religion forbade entering battle without warpaint and prayer, and since they weren't expecting an attack they had not made these preparations. There were only a few who had prepared themselves—wishfully or for scouting and raiding of nearby villages of the Crows, who were friendly and loyal to the United States Government. Only these met Major Reno's first attack. Had he known it and continued his charge it would have been like Sam Houston when he caught the whole Mexican Army asleep at San Jacinto. Huge armies have a reputation for being caught napping. Major Reno never considered this.

Custer took his detachment a short distance downstream and got his first view of the encampment from a ford of the Little Bighorn. He signaled an advance and we began what was to develop into our charge into the village. Major Reno had drawn the main fighting force to his position, but there were a few braves continually attacking our column. I guess the general thought Major Reno had successfully attacked the village. We made no attempt to reinforce him or to stay in communication distance.

We continued toward the village expecting little resistance on the way; however, upon recircling the top of a small hill we were directly confronted with what seemed to be thousands of painted warriors. Our column was stretched out for about a mile. We had no chance to fall back and regroup as they were all around us in a matter of minutes.

Contrary to popular belief, Custer was killed about midway through the battle. He was standing in the middle of a small group of soldiers that had rallied around him when a bullet struck him in the left side of his chest.

At this point I realized that we were finished. I looked at Custer and realized that in death he was safe. A plan began to form in my mind. Indians didn't mutilate the bodies of suicide victims, and great numbers of our men had stood up and openly shot themselves in an effort to save their bodies from desecration. I figured there'd be a lot of bodies untouched for this reason.

To make Custer's death look like suicide I fired my revolver into his left temple at close range. Then I smeared horse blood and dirt all over my head to give the impression that it was badly mutilated, and to give question as to the cause of my death. I figured that such a dirty scalp wouldn't be desirable to any Indian under the circumstances.

I lay quietly. Slowly the firing stopped. I held my breath. I could hear the Indians rummaging around. Several walked by my position and scalped bodies nearby. Custer's and mine remained untouched. Then all was silent. But it was still daylight; when darkness came I would run for it.

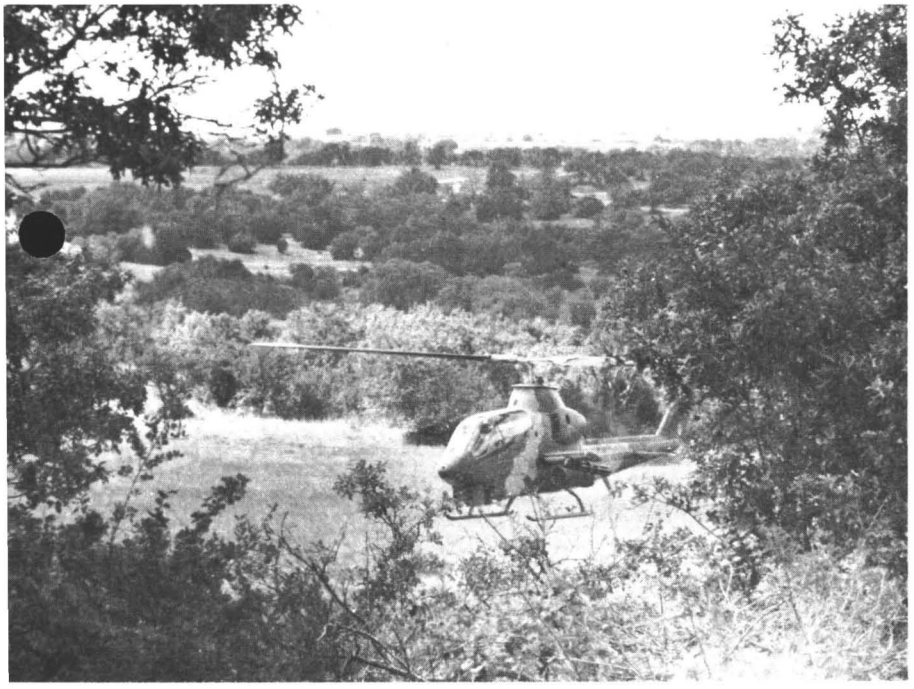
I waited about 30 minutes and heard noises. I could tell that the squaws had come to strip the bodies. Most of the braves had taken scalps and souvenirs and withdrawn to the camp about a mile away. I had survived their pillaging, but now the women and children. Could I survive theirs?

Suddenly I was being dumped from my clothing like potatoes from a sack. I came up off that ground like an uncovered quail. For a long moment I stood there staring at the astonished squaws. It looked as though I could walk away and leave them standing there in shock. The thought of freedom was just beginning to enter my mind when a young buck from somewhere nearby decided to try a newly acquired rifle with my head as a target. I never knew what hit me. It had been a rather full life anyway. I was glad to end it there.

But getting back to the subject of reputations and the purpose of this tale, *airplane drivers had better be careful about reputations.* Sometimes if you believe in a reputation it's a good thing, sometimes it's not. Like airplanes themselves, for example. Airplanes have a reputation for turning on people and killing them for little things that on previous occasions they've been perfectly content to tolerate. *You'd better believe that reputation and remember they have it.*

Weather is another thing; it too has a reputation for killing people when they least expect it. You'd better remember its reputation every time you deal with it, which is every time you fly.

On the other hand, you'd better not count on your own reputation. Just because you've survived 10,000 hours does not mean there is a single rule changed in honor of that reputation. Just get too slow on final one time and all your previous final approaches count for nothing. Kick a little rudder in a final turn under just the right conditions . . . fly into weather you shouldn't . . . leave your gust locks in place . . . you'll see. You'll be just like Hickok or Custer—either embarrassed or dead. Nature doesn't know you by reputation, only by what you're doing right now.



In the conventional environment the helicopter pilot will have to learn to use natural terrain features as hills, trees and nap-of-the-earth flying techniques to survive against such weapons as the Soviet ZSU-23-4 self-propelled antiaircraft gun (left) which carries an onboard radar

Continued from page 9

eight in a flight of ten aircraft playing follow-the-leader and letting someone else do the thinking. Each aviator will have to be even more of a leader than he is today, capable of making timely decisions and accomplishing the tasks at hand with little assistance or supervision.

Increased emphasis must be placed on improvement of basic leadership skills such as map reading, troop leading procedures and adjustment of supporting fires. The Army aviator will be called upon to develop an even greater understanding of air and ground tactics. He must possess *all* of the traits required of ground combat leaders if he is to operate effectively.

The aviator must be trained not only in the type of environment in which he will fight, but he also must be thoroughly knowledgeable of the enemy. He must be taught anticipated enemy tactics and methods to cope with them and be familiar with the enemy's equipment—particularly tanks. He also must be trained in air-to-air tactics and methods of detection of high performance aircraft.

Likewise, the ground commander must be given extensive airmobile training to properly utilize this powerful airmobile striking force.

Because of the perseverance and perceptiveness of the proponents of Army aviation, helicopters are now operating with unqualified success in Vietnam. But, we must prepare for the future now as we enter the 1970s. We must carefully ascertain and pursue the goals of Army aviation. Only then can Army aviation guarantee that it will continue to support the ground commander and live up to its motto as being "Above the Best"—in *all environments.*

CW3 Norman F. Cates
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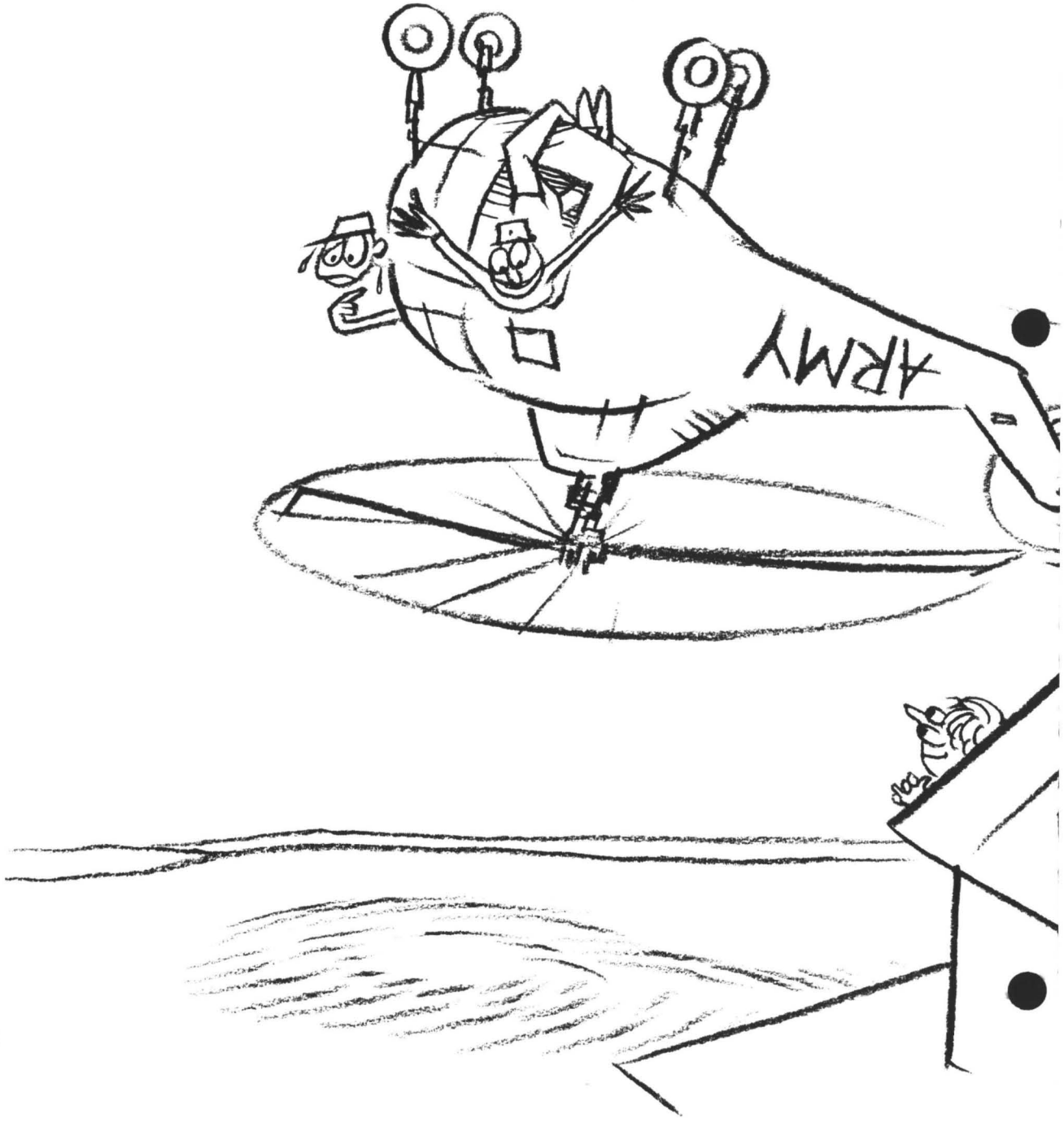
USAAAVS

Thrill Addicts and You



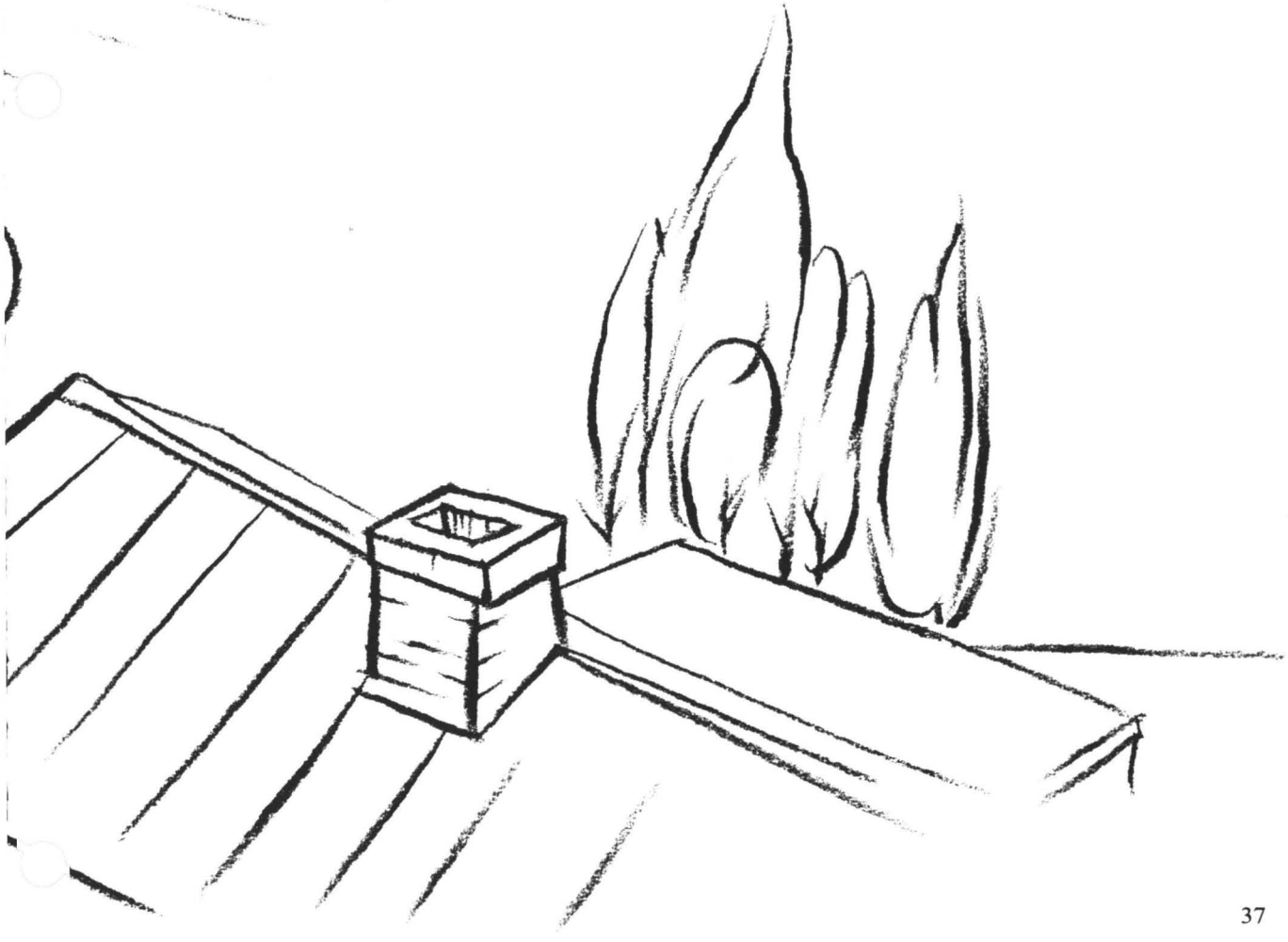
I BELIEVE man will someday fly without the aid of machines. At first thought, this may seem impossible—the idea that we may break the chain of gravity which binds us to the ground. But it's really not that far out. Researchers now tell us the capacity of the human brain is far greater than had been believed. They say the greatest exertion placed on it only uses about 10 percent of the power available. So we have a vast, relatively untapped source of power.

Remember that scientists once said man would not survive an automobile ride. The thinking was that the wind blowing in his face at speeds up to 15 miles per hour would create pressure greater than his lung's ability to exhale and he would not be able to breathe. Further, it was believed that speeds higher than 25 miles per hour would interfere with the blood circulation to the brain, causing a loss of consciousness.

We now know the human body is amazingly flexible. It adapts to change quickly and is extremely durable when properly maintained. The only thing that stops man from flying is the key to unlock that 90 percent of his brain capacity which may well contain the secret of flight. Until that great day, we'll have to be content with machines that fly. Since we are limited to machines, we should make every effort to ensure we are safe.

There are two factors that affect our safety. First, there is the machine. It has been designed to be as safe as possible and still fly. But we should always keep in mind that it was designed and built by man—using only 10 percent of his brain power. So we can't expect too much from it. It will do what we tell it to do and no more. So the primary responsibility for safety in the sky lies with the second factor—the manipulator of the machine.

What is different about the pilot that makes him responsible? It's his ability to react to visual and emotional stimuli, plus his ability to integrate all stimuli and determine an unprogrammed course of action. In other words, it's his ability to think and to react. This brings us to what I believe to be the essence of flying safety. What does the pilot think of aircraft and flying? Does he think of an aircraft



THRILL ADDICTS

as a machine designed to carry him from place to place without ground restrictions? Or does he consider it a toy? True, there are aircraft designed and built for fun, but we can't use them in our business. We should not think of flying only for fun. While it's not pure drudgery and is fun, it is not *for* fun.

We should teach our new aviators to think of aircraft as means to an end—a group of systems tied together by airframes—a challenge to be mastered. Have you ever noticed how many pilots are small in stature? At first this was necessary because of weight and size restrictions. But modern aircraft lift hundreds of men and still the challenge of flying appeals to men of small stature. Why? Because even the largest machines can be mastered by anyone who has the determination. Flying is viewed first as a challenge and later as an accomplishment bringing much personal satisfaction. Very few men, large or small, fly solely as a means of earning a living. The sense of challenge, the sense of accomplishment and the sheer fun of flying make pilots, as a group, very happy in their work.

On the other hand, some pilots are so happy they shouldn't be allowed to fly. The exhilaration of flying is like a drug to them. The thrills which came naturally and sustained them through their student pilot days become diluted and are no longer enough. Like the drug addict, their dose must be constantly increased. You have read about this type many times in the Weekly Summary. Their accounts usually go like this: "Pilot, performing aerobatic flight over girl friend's home, entered a spin from approximately 300 feet and was unable to recover prior to impact." Or: "Pilot was seen flying along highway about 2 feet above the surface, turning away from oncoming traffic at the last moment. After running two cars off the road, as he was turning away from the third the aircraft struck the top strand of a barbed wire fence, flipped inverted and crashed."

You may have one or more thrill addicts in your unit. If so, your life is in danger. Why? Because they may overstress an aircraft to the point where it fails structurally while you're flying it. How can you recognize a thrill addict? First, you can observe him when you fly with him. Does he ignore the checklist? Does he horse the aircraft around? Is he casual about tower instructions? Does he fly outside the normal flight envelope? Are you glad when the flight is over? If the answer to any of these questions is yes, you may have an addict. Another way to identify him is by his flying stories. They usually start like this, "There I was flying across a cow pasture at 3 inches when I dragged the skid/wheel through a pile of . . ." You know the rest of the story. His inborn flying skill saved the aircraft and his life. His story usually ends with, "It was close! I nearly bought it that time!"

Having located a thrill addict, what do you do about it? First, recognize the fact he may have the flying ability he claims. If so, he's worth saving. Talk to him. Try to make him see that his actions endanger himself and others. Without naming names, discuss his flying habits at your unit safety meetings. Try to develop a consensus of opinion from the other pilots that his type of flying is not bravery, but stupidity. Get him laughed at. Bring the maintenance officer in to discuss stress factors involved in abrupt control movements such as pop up and stop-to-stop roll maneuvers. If all this fails and you still feel he should be saved, name him to the unit commander for counseling. Let the unit commander impress on him the importance of following the rules and advise him about administrative actions which may be taken against him if he continues.

When all other efforts have failed, the unit commander should recommend a flying evaluation board (FEB). Contrary to popular belief, an FEB does not automatically mean that he will never fly again. The board evaluates him objectively, going into his psychological motivation, medical history, and personal ambitions, and interviewing other pilots who know him. The board may return him to full flying status and the fact that he was called before it may shock him out of his bad habits. In cases where a man will not admit the dangers of his bad flying habits and will continue to endanger us all, we are better off without him.

We have always paid lip service to the word *professionalism*. Unfortunately, we have not always used professional judgment in our attitudes toward our fellow pilots. We have been protective of individuals to the detriment of their groups. We have tolerated and coddled men who returned our kindness by placing our lives in jeopardy. Man may someday fly on his own and we will have no way to stop him. We have a way now and I think we should use it. What do you think? Your comments on this article will be welcomed by: CO, USAAAVS, ATTN: E&P Department, Fort Rucker, Alabama 36360.

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HELICOPTER TERRAIN COLLISIONS

THE 836 ARMY helicopter collisions with terrain obstacles which occurred during calendar year 1969 resulted in 177 fatalities, 299 injuries and involved 2,020 individuals, at a dollar loss of $55½ million. Crew error mishaps involved several categories. Most notable of these were 433 tree strikes in Vietnam. Tree strikes occurred during the following phases of flight: hovering—244, landing—239, inflight—160, and a surprisingly low number—40—during autorotations.

UH-1 and AH-1G helicopters were most frequently involved, accounting for 611 mishaps. Most mishaps occurred in Vietnam during daylight hours on combat missions. Prevention of helicopter terrain collisions requires competent training; enforced flight discipline; adequate planning; management of facilities, including selection and preparation of landing and pickup zones, revetment placement, etc.; and ground handling of helicopters in confined areas.

Corrective actions taken by commands and units to which these helicopters were assigned consisted mainly of:

1. Daily and monthly safety meetings and briefings, discussing particulars of each mishap.

2. Primary flight training manuals reviewed and revised as necessary.

3. Flight standardization boards monitoring checkrides and transition training to preclude operational problems concerning aircraft flight characteristics and emergency procedures.

4. Emphasis placed on compliance with training

procedures, effects of high density altitude and weather conditions.

5. Reviewing of aviator proficiency requirements, aviator flight briefings and supervision techniques.

6. Conducting training classes and supplementing local SOPs as necessary.

Initially confined to utility/attack helicopters, the research for this material revealed a far greater magnitude of terrain collisions than had been previously thought. Because of this, research was expanded to include all Army helicopters.

As the title implies, this article is broad in scope and includes collision with trees, stumps, revetments, parked aircraft, wires and other terrain obstacles. Logically suspected of being a leading cause for terrain collisions, research revealed crew errors far exceeded expectations. Of the 836 terrain collision mishaps studied, crew errors were involved in 764, or 91 percent of the mishaps. Four crew error mishaps were due to faulty internal communications between crew members during LZ landings.

Tree strike mishaps were due in part to ground commanders not properly preparing LZs. However, this does not relieve aircraft commanders of the responsibility for conducting safe flights and accomplishing missions. In some cases, commanders accepted these as necessary losses for mission accomplishment. Also, the majority of tree strikes resulted in only incident damage which did not affect the accident rate. It was found that similar accidents were repeated in the same organizations. This indicates that corrective actions taken were ineffective.

Crew error terrain collisions can only be prevented by the concerted efforts of all Army aviators. While commanders can place emphasis on this subject, they cannot fly every mission. Some of the agents that help induce crew error are:

- Complacency
- Fatigue
- Poor pilot technique
- Mission requirements
- Environment
- Supervision

While there are other means of inducing crew error, these six appeared most frequently in the 836 mishaps studied. Because of this, it is appropriate to examine each independently.

Complacency—a feeling of content and satisfaction, especially self-satisfaction and smugness. These conditions can be produced in long and repeated missions, usually following the same routes in the same type helicopter. A complacent condition develops in most cases with the crewmen being completely unaware that they are victims of this condition. Consequently, they are not as alert to flying the mission as the mission dictates, resulting in mishaps.

Fatigue—the condition of being very tired as a result of physical or mental exertion, weariness or exhaustion. This condition most certainly exists in RVN, and perhaps in other areas as well. It is closely associated with complacency and renders a crew almost incapable of properly performing its mission. There have been times when fatigue has approached such a level that a normal 8 hours of sleep would not restore the individual to his top level of performance. Dog-tired flight crews are poor substitutes for safe flight operations and most probably result in more mishaps than realized.

Technique—the manual or bodily skills necessary to accomplish some end or result, the technique of a pianist or a pilot. Poor pilot technique appears in many ways, from sloppy or unplanned flight maneuvers to placing an aircraft in a condition from which it exceeds designed aerodynamic limits. Examples of this are steep gunruns with late recoveries and major flight control input in an effort to pull out of a dive, resulting in a combination of high sink rate and weight that exceeds the lift capability of the rotor system. On steep climbing turns, a major flight control input will bleed off rpm to the extent that forces of the rotor system are no longer effective. This results in mishaps.

Mission requirements—that which is required; a requisite; the act of requiring; a demand. It is well known that most missions are planned at high staff levels and in some cases controlled by tacti-

TABLE 1
CONSOLIDATION OF WORLDWIDE MISHAPS

	NUMBER	PERCENT
Mishaps	836	
Major accidents or aircraft losses	278	33
Personnel involved	2,020	
Injuries	299	15
Fatalities	177	9
Crew error mishaps	764	91
Cost of mishaps	$55,689,788	

cal ground commanders and passed on to operational aviation units for execution. These operations create many problems for lower level operational aviation commanders. In many cases, there is only time for rapid attempts to execute requirements, without time to properly and safely plan missions at the lower level, prior to attempting execution. Results are tree strikes, revetment strikes, striking parked aircraft, etc. It would behoove major commanders to look into this area.

TABLE 2
UTILITY/ATTACK HELICOPTERS
TERRAIN COLLISION MISHAPS—1 Jan-31 Dec 1969

MISHAP CLASSIFICATION	UH-1	AH-1G	TOTAL
Major accidents	149	31	180
Minor accidents	9	3	12
Incidents	396	23	419
TOTAL	**554**	**57**	**611**
MISHAP LOCATION			
CONUS	34	3	37
Europe	1	0	1
RVN	515	54	569
Other	4	0	4
TYPE OBJECT AIRCRAFT STRUCK			
Tree	326	11	337
Terrain	99	28	127
Revetment	42	18	60
Stump	63	0	63
Wire	24	0	24
Other	0	0	0
PHASE OF OPERATION IN WHICH MISHAP OCCURRED			
Inflight	79	18	97
Hover	169	15	184
Landing	196	8	204
Takeoff	98	10	108
Autorotation	12	6	18
MISSIONS FLOWN			
Training	32	8	40
Service	30	3	33
Test	16	1	17
Combat	476	45	521
PERSONNEL			
Involved	1539	91	1630
Injuries	186	17	203
Fatalities	148	4	152
PERIOD OF DAY			
Daylight	486	44	530
Night	48	10	58
Dusk	17	2	19
Dawn	3	1	4
MISHAP CAUSE FACTOR			
Operation (Crew error)	499	48	547
Command supervision	20	7	27
Facilities	30	2	32
Unknown	5	0	5
MISHAP COST*			
Major accidents	$26.7M	$6.1M	$32.8M
Minor accidents	100,000	49,000	149,000
Incidents	10M	99,000	10.1M
TOTAL	**$36.8M**	**$6.2M**	
GRAND TOTAL			**$43M**

*Figures have been rounded off to nearest $1,000.

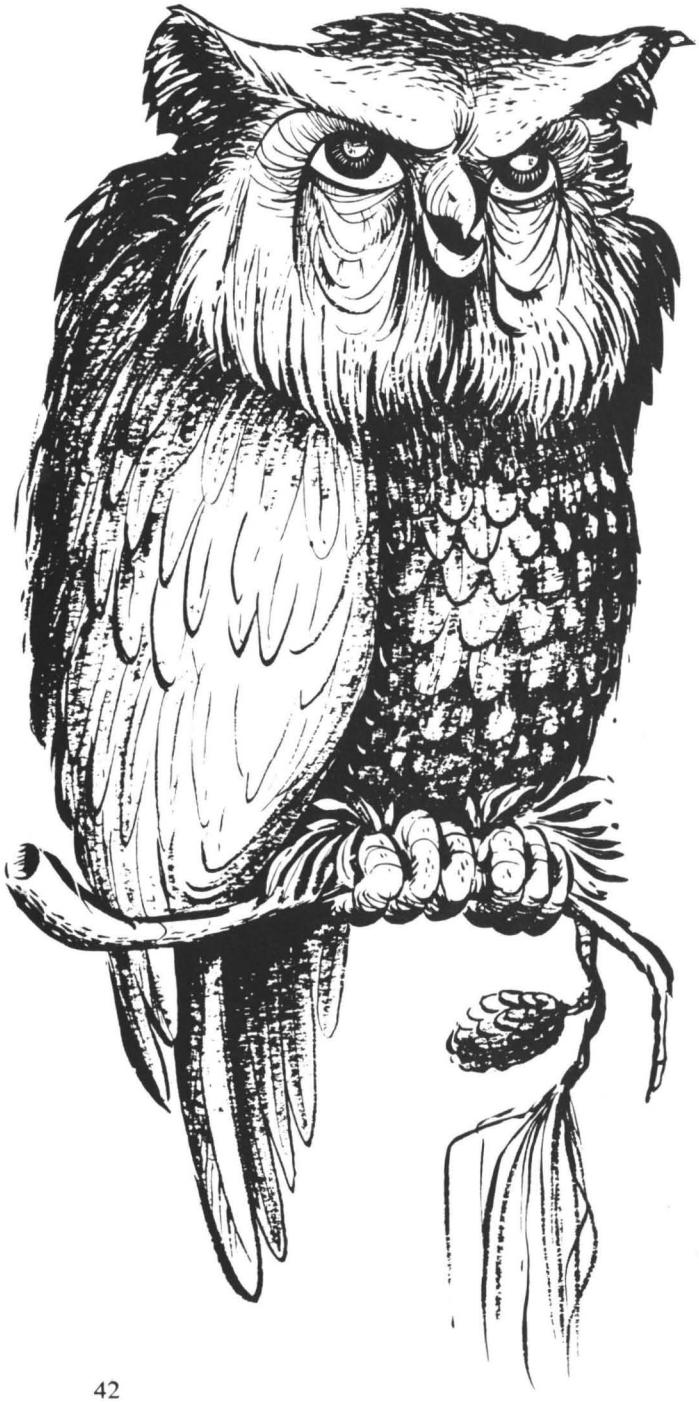
Environment—the aggregate of external circumstances, conditions and things that affect the existence and development of an individual, organism or group. The environment in which missions are flown is extremely important. In some cases, mission requirements in RVN placed crews at altitudes best described as the grey area. Any type of emergency requires immediate application of appropriate procedures to prevent a mishap or catastrophe. These type missions tax the alertness and professionalism of crews, and such things as complacency, fatigue or poor pilot technique cannot exist if mishaps are to be prevented. It is obvious that this environment must be accepted to accomplish the mission. It is also obvious this type mission requirement is not going to change if the job is to be accomplished. This shifts the burden to aviation unit commanders to ensure that mission assignments go to the best qualified crews available.

Supervision—the act of supervision; superintendance; the authority to supervise. Thirty-two mishaps which occurred during this period were attributed to command supervision. These included selection of unqualified crews for missions; poor preparation of LZs; poor POL facilities; failure to conduct adequate briefings; etc. Once again, it is the commander who is responsible, and it is he who must initiate the correct action necessary to prevent mishaps in this area.

As stated below, these six agents were by no means the only cause factors for all the mishaps studied. But they were the most predominate. All can be corrected by the concerted efforts of all Army aviators.

Based on analyses of these 836 terrain collision mishaps, the following recommendations are made:

1. Unit training in collision avoidance, including full crew coordination and assigned responsibilities for each crew member.
2. Enforced flight discipline to prevent low level flying when it is unnecessary for mission accomplishment.
3. Improved planning and preparation of landing and pickup zones.
4. Improved planning in the placement and construction of revetments and other obstacles which might prove hazardous in and around heliports and airfields.
5. A requirement to ground handle helicopters in confined areas.
6. Removal of unwarranted obstacles in areas of frequent operation.



Comments from the wise old owl . . .

STRICTLY

MEN HAVE learned a great deal by watching and imitating animals and who knows when it all started? Maybe with Noah and the collection he had aboard the ark during those rainy days. Regardless of when it started, men are still learning from us.

I recall a legend passed down through my family from the beginning of time. It concerns a man who was frolicking through the woods when he stumbled on a furry little creature gnawing a tree. The man watched the animal for a time, then made a very vigorous attempt to sink his choppers into a similar tree. Unable to dent it, he sat there with nothing in his mouth but throbbing incisors and tried to think of some choice words. While he was doing this, the animal gnawed through the tree, but failed to yell, "TIMBER!" The man was clobbered on the noggin when it fell. He learned several things that day. He learned the taste of the tree was not the least appealing. He learned that when a tree is severed, it falls. He learned that it's painful when you bite a tree or one hits you on the head. And he learned that beavers don't yell, "TIMBER!"

The next day, this man detoured around the area of his painful experience into an area where a burrowing animal was at work. He approached this new endeavor with more caution, but the results were similar—fingernails torn to the quick

Arnold R. Lambert

FOR ~~THE BIRDS~~ MEN

and a hole in the ground that served no useful purpose except to add to his painfully gained knowledge. Imagine the surprise this man must have had during his first attempt to imitate a fish and his rude awakening when he tried to breathe under water. This legend is told to all owls before they leave the nest to teach them it's much better to follow their instincts and parental guidance than to imitate other animals, including man.

Unlike the rest of us, men have an inquisitive nature and a determination to successfully imitate animals. This induced creative thinking. Where men were lacking in natural ability, they put their intelligence to work and developed machines which enabled them to accomplish similar but greater tasks than animals in a fraction of the time. Their machines now enable them to gnaw through a giant tree in a matter of minutes; to burrow and blast through an entire mountain of solid rock; and to circle the earth under water, via the polar ice cap.

We birds have been the most difficult animals for men to imitate. You've seen people doing imitations of bird sounds and hunters luring ducks into shotgun range by imitating them with a duck call. This type of imitation is relatively safe. But when men's imitation of birds extended to flying, that's when danger reared its head.

Long before that December morning in 1903 when Orville and Wilbur Wright successfully imitated powered flight, men were trying to fly. Every type of contraption imaginable was built in back yards and garages. They included everything from large bat-like wings strapped to arms to engine-driven wings that flapped. Some of these men were ridiculed for their disappointing failures. They were, nevertheless, aviation pioneers. At least they were learning how it couldn't be done.

After the Wright brothers' success, men continued to improve their machines because they were determined to outdo birds. Before his death in 1936, General Billy Mitchell, a pioneer in military aviation, predicted men would soon be flying faster than the speed of sound, from coast to coast and overseas in a matter of hours. This is fact now and, with the development of more complex aircraft, men have surpassed our capabilities in many respects, including speed, distance and altitude. But there's one area where men have not surpassed us—SAFETY! I'll grant you, birds don't complete every flight safely. If you were to read one of our accident reports, it would probably read: Four members of migration flight 201 were ingested into a monster flying machine.

Ever see an eagle dive for a rodent and crash because he didn't pull out soon enough? Ever see a humming bird hover into another humming bird or bump its tail against its nest and fall to the ground? Ever see a crow fall out of the air be-

cause of starvation? Men do all these and more. Ever see a bird land on a wire or in a tree? Sure, they do it all the time—safely! Men do it too, often with disastrous results.

During the 15-month period from 1 January 1970 through 31 March 1971, 543 Army aircraft were involved in hover and taxi mishaps, accounting for damages of $26,000,000. These figures are bad enough, but you must also consider the losses of life, injuries and time.

Ever hear a golfer say his golf balls must have wood centers because they keep slicing into the trees? Well, some men's rotor blades must also have wood centers because they keep slicing into trees. There were 148 mishaps caused by rotor blades hitting trees. Main rotors accounted for 115 of these. Sixteen more helicopters settled into trees for about the same number of reasons. We flit around and settle into trees constantly, both day and night. Thanks to our superior engineering, instincts and training, we do it without scratching a tail feather. If men are going to continue this kind of flying, they need to study us and learn our ways much better than they have in the past.

Rotor blades accounted for 54 mishaps involving other objects. Tail rotors in 30 of these hit such objects as stumps, trucks, fences, rope, water, dikes, boxes, buildings, the ground and a pin flag on a golf course. Main rotor strikes with other objects included a hat, dump truck, windsock, sandbags, guard tower, water tower, engineer stake, light pole, vent pipe and radio antenna. Can you imagine what the owl population would be if we pulled stunts like that?

If there's any place a bird feels secure, it's in the nest. Not so with flying men. There were 29 mishaps involving rotor blades or other parts of helicopters hitting parking revetments. Some fixed wing types taxied too close and hit revetments, too, but they're not included.

Here's one we never do that's always costly—hovering too close in parking areas. Three UH-1Hs were damaged in one mishap when one hovered into another that was parked and the third was damaged by flying debris. For a while, this was the record number damaged in a single mishap for those 15 months. But it didn't last long. Two days later, a UH-1H hovered between two revetments, meshed main rotor blades with another UH-1H, caused major damage to both, and flying debris damaged an OH-58A and an AH-1G. Dollar damages to these seven aircraft amounted to $670,000.

Twenty-seven mishaps involved skid contacts with the ground or other objects such as stumps, dirt mounds, grounding wires and psp. One helicopter skid hooked an automobile bumper hidden under snow and flipped it into the fuselage.

Records show 74 hard landings for the 15 months. One main cause was slow reactions by IPs during training flights. Others included turbulence and rotorwash. Some were even passenger induced!

Eight helicopters were damaged or destroyed when pilots went IFR in dust. One helicopter had a hole in its belly from a 105 artillery tube. No, the 105 wasn't fired. The pilot hovered down on top of it. Here are some others:

- Rotorwash picked up piece of psp that broke chin bubble.
- Rotorwash picked up quart oil can that broke chin bubble.
- Rotorwash picked up ammo can that damaged main rotor.
- Rotorwash picked up piece of sheet metal that damaged main rotor.
- Rotorwash caused dead tree to fall into main rotor.
- Loaded M-79 discharged through windshield.
- Loaded M-16 jammed control pedals.
- Slingload hit fuselage.
- Parachute lines in rotor and mast.
- Cargo hook whiplashed and hit underside.
- Minigun malfunctioned and damaged main rotor.

We owls have been in the flying business since our ancestors crawled out of the sea and we've developed a reputation for wisdom. Now I'll be the first to congratulate you and laud you for your terrific flying achievements. But, fellows, when it comes to safety, some of you have a long way to go. I say *some* of you because I've watched most Army aviators fly year after year without damaging their machines. I've noticed that these are the men who are most serious about their chosen profession, the ones who know their machines inside-out, the ones who go by the rules, the ones who keep themselves in top physical condition and the ones who are constantly alert to all flying hazards.

You've bested us in every aspect but one. Why not go all the way and best us in safety, as well?

RESOLUTION TIME

Gene Berta

IT'S TIME FOR human beans, to borrow Pogo's word, to make New Year's resolutions, isn't it? I ask, because I'm not sure of anything much these days, except that people in general and aviation folks in particular can always use improvement. While we're at the business of resolving to quit smoking and spending more than we make, let's also resolve to quit making the same mistakes this year that caused accidents, incidents, forced landings and precautionary landings last year. Here are some suggestions:

I, John Doe, aviator, do hereby resolve:

- Not to hit trees, but to survey my operating areas carefully and fly accordingly.
- Not to fall through during practice autorotations, but to land softly (as opposed to hard-ly).
- Not to run out of gas, but to make sure I have enough fuel on board for my missions.
- Not to hit wires or other aircraft flying near me, but to look where I'm going.
- Not to leave objects lying around in aircraft that can blow out windows and doors, but to avoid loose object damages.
- Not to leave fuel caps loose during preflights, but to keep all fuel inside tanks where it belongs.
- Not to start helicopters with rotors tied down, but to check the rotors every time before I start.
- Not to fly into weather, but to try to live until next year this time.

I, Richard Doe, mechanic, do hereby resolve:

- To use the right amount of torque on fittings to avoid leaks and untimely landings.
- To find loose wires and lines to preclude false indications and consternation in cockpits.
- To watch where I'm going as I taxi around the flight line so I won't hit other aircraft or hangars.
- To clean and secure chip detector cannon plugs so precautionary landings will not have been for nothing.
- To put all my pliers, screwdrivers, hardware, etc., back in my tool chest after each job so engines won't burp them up in flight.
- To inspect and replace any latches that show signs of wear so doors and hatches won't pop open in flight.
- To be extra cautious with hydraulic lines to avoid chafing and bending which result in leaks that cause hydraulic failure and can spoil a crew's whole day.
- To watch for moving props and rotors on the flight line so I will be around to make resolutions next year.

GESTALT, AWARENESS, and THE ASI

AN AIR SAFETY investigator's first interest must be and is always the protection of life. Additionally, his findings have a direct bearing on financial interests. Failure of ASIs to do the best job of which they are capable could be catastrophic in this day of the Airbus and the 747.

Since interviews with people constitute a major portion of any air safety investigation, an ASI must develop his sensitivity to both the response of an individual to a question and to his own reaction to that response. Lack of personal awareness can cripple his work and performs a disservice to those he is committed to serve. Those of us who are ASIs cannot afford to waste one moment with our faculties developed to less than full awareness.

With these thoughts in mind, let's look at the way the Gestalt concept can give an ASI better results for his time. We'll briefly examine the original Gestalt idea, its developments and its direct application to air safety investigations through an increase in the personal awareness of ASIs to all situations. Any ASI who becomes a student of Gestalt principles and applies them daily will make himself more effective in air safety work and in life in general.

The notion that the whole is more than the sum of its parts forms the foundation of the Gestalt concept. For example, 96 notes do not make a tune, and aircraft are more than just their total of thousands of miscellaneous parts. An aircraft designer's *concept* of the arrangement of the parts makes one aircraft more effective than another. The Gestalt concept, stated briefly, is that the *idea* of the arrangement makes the parts meaningful. It follows that an ASI's concept of possible arrangements of a safety situation can illuminate potential failures and reconstruct failure situations.

The ink blots shown in figure 1 demonstrate visually the basic Gestalt concept. The dispersion of parts has meaning only in our mental completion of the picture. An ASI encounters this type of presentation daily in his work as he locates the *parts* of an accident and studies their arrangement. Through the sensitivity he has developed toward this kind of problem, he is able to perceive the meaning of the arrangement of parts and reconstruct the form.

In recent years, some Gestalt thinkers developed the notion that perception is entirely an internal phenomenon and they developed around this idea a new area of psychology known as Transactional Analysis. Eric Berne pointed out in *Games People Play* that the premise of transactional analysis is the existence of relationships between mental states, as opposed to the existence of relationships between people. Each individual is a composite personality derived from three basic mental states: parent, adult and child.

Let's look momentarily at our own mental development. It has been proven by neurosurgical as well as psychological methods that our brain records every verbal and tactical stimuli we receive. Any recall of these recordings has associated with it the feelings we had as the stimuli were originally received. For example, the reaction of a teenage Cessna pilot to the word *ejection* will be entirely different from that of a Navy Phantom pilot. That an excessively adverse feel

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Data Center
USAAAVS

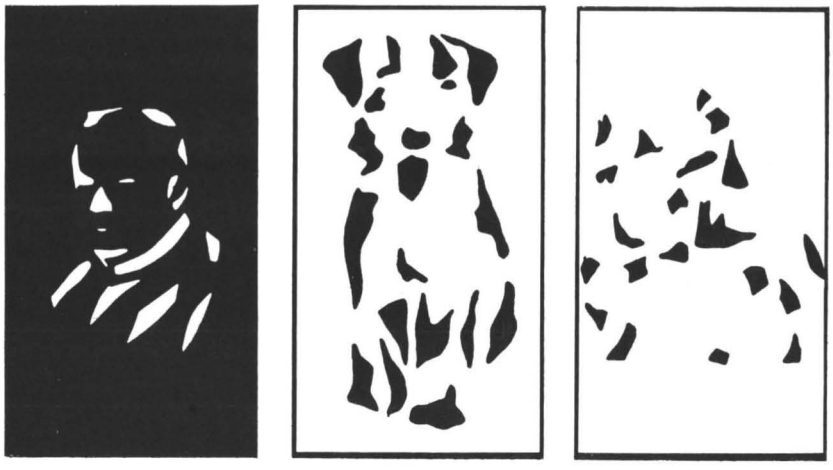

FIGURE 1
The dispersion of parts in the ink blots illustrated has meaning only in our mental completion of the picture

ing associated with a brain recording will prevent its recall is evidenced by our everyday mental blocks. But it's important to remember that our brain, or data bank, continually records information from different sources and updates and revises these data in a manner that reflects our maturity.

In the first five years of our lives, most incoming information is recorded straight and used unquestioningly. This data base forms a portion of every personality that we call the *parent*. It is characterized by do's and don'ts; prides and prejudices; embarrassment and shock; and all information recorded at an earlier date. Concurrently with the building of the *parent* data set, the *child* is developed in each of our personalities. *Child* is characterized by "I can't," "I want," and superlatives such as "bigger," "biggest," "greater," "greatest," as well as tears, endless creativity and imagination. *Adult* development begins with the onset of locomotion in the infant. It is characterized by logical decisions that use all the data sources available at the time. We observe the onset of *adult* actions when a child decides he had rather be in another place, ceases to cry and begins to crawl there. We can recognize reaction characteristics in everyone with whom we come in contact.

Identification of these characteristics is a vital part of transactional analysis. In ASI work, a transaction occurs when the ASI says or does something to a witness or a member of an investigation board and this individual does or says something in return. An examination of this exchange, or transaction, is a transactional analysis.

In any transaction, each person is speaking from either the *parent*, *adult* or *child* (PAC). In the business of accident investigations, our problem is most often to get people to answer from their *adult* so they will readily give direct answers to direct questions. Consider the following excerpt from an ASI interview with an instructor pilot who had just allowed a student to apply too much aft cyclic and damage a tail boom.

" . . . The tower notified us that our tail was hanging down, so we shut the aircraft down. We have had lots of trouble with morale in the outfit since our new CO arrived. He is just an egomaniac. He pretended to be drunk one night and urinated on my leg in the club parking lot. But he wasn't drunk because I had been with him all evening and he hadn't had a drink."

As interesting as it might be, this answer did nothing to solve the problem of the damaged tail boom. The IP was desperate for an audience for his personal problems and, when asked a question, he replied from his *child* stance. How often has an ASI asked, "What did you see, in your own words?"—only to hear, "It was awful, just like the paper said. First I heard this noise that sounded like sputtering and backfiring, then I saw all these people running. By the time I got there,

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Adapted from a paper presented by the author at the second annual International Convention of the Society of Air Safety Investigators, 26 October 1971, Los Angeles, California. The convention topic was "Physiological and Psychological Aspects of Air Safety Investigation." Mr. Holmes is an air safety specialist in the Data Center of USAAAVS.

they had the fire out." The *adult* answer would have been, "Nothing."

This type of exchange underscores the value of the Gestalt concept when applied to air safety investigations. Aware of the fact that people do communicate from the mental stance of *adult*, *parent* or *child*, an ASI, for best results, will try to maneuver the person he is questioning into his *adult* stance. For an ASI to get people to reply with *adult* answers, he must know the characteristics of complementary and crossed transactions and be able to recognize them quickly. He must know how to guide people into an *adult* stance. He must strengthen his own *adult* stance.

The complementary transaction involves a response that is appropriate, effective and follows the natural order of healthy human relationships. The following examples from different parts of the PAC may help ASIs to recognize complementary transactions.

Parent-parent complementary transaction:

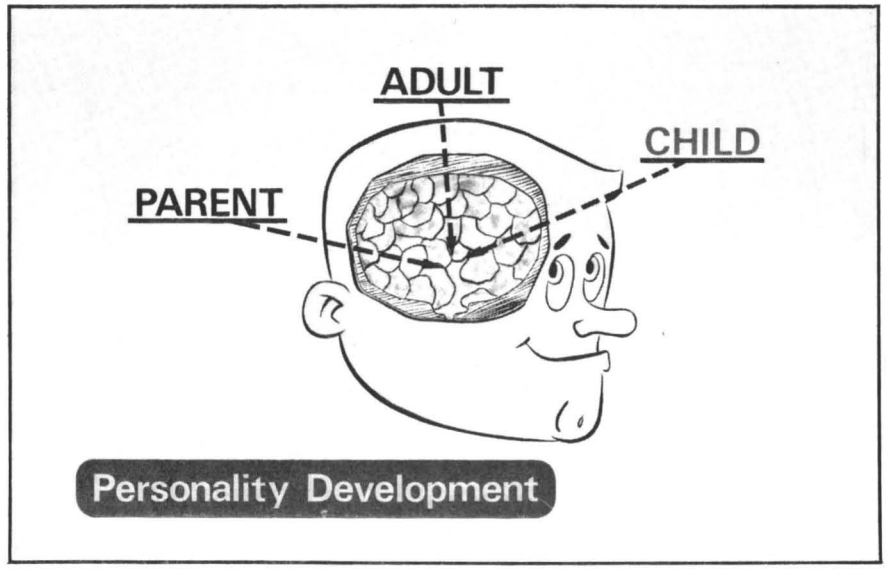
First civil servant: "Looks like we're not gonna get that pay raise."

Second civil servant: "We should get one every time industry does."

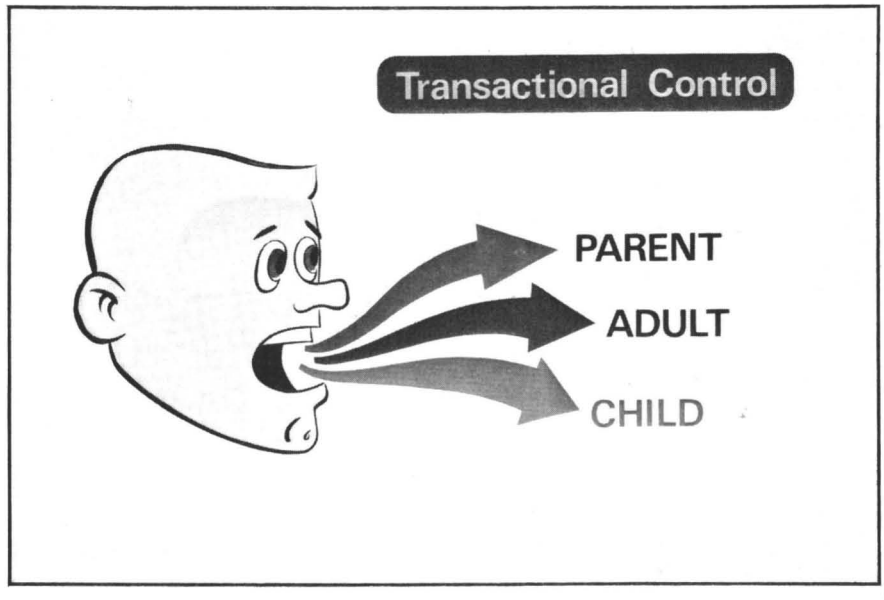
First civil servant: "We ought to have a lobby like theirs."

Child-child complementary transaction:

First aviator: "I wish I could get my hands



The brain, our private data bank, continually receives and records information from different sources, thus forming the different parts of every personality called "parent," "child" and "adult"



Aware of the fact that people communicate from the mental stance of "parent," "adult" and "child," the ASI will try to maneuver the witness into his "adult"

on the people who built this hunk of junk."

Second aviator: "I wish I had the money they made off the government."

Parent-child complementary transaction:

First engineer: "Those idiots at the office always change the specs every time I get them just about completed."

Second engineer: "I wish they'd quit picking on us, but they know jobs are scarce and we can't quit."

Adult-adult complementary transaction:

First ASI: 'Do you know why they used this particular extrusion on the landing gear?"

Second ASI: "No, but I think Tom does and I'll give him a ring."

FIGURE 2
In these ink blots, one figure-ground relationship is readily apparent, but a second look may reveal another

Complementary transactions cannot be taken out of context because, quite often, the participant's secondary message (the way he says it) says more than the words he uses. For instance, a man speaks to a girl at the bar, "I'm new in town and I'd like someone to show me around." The girl replies, "I've lived here quite awhile and I could spare the time."

In every transaction with a secondary meaning, there is a lack of candidness and honesty. It is a less efficient way of getting the message across than the use of candid questions and answers.

The crossed transaction is characterized by the cessation of any meaningful communication about the original issue. It is essential that an ASI recognize this immediately.

First ASI: "Do you have the sample bottles?"

Second ASI: "I thought you were smart enough to take care of that."

Here we see an *adult-adult* question with a *parent-child* answer. The answer leaves us wondering whether we have bottles or not. In this case, an *adult* inquiry is answered by a person in the *parent* role who answers down to the questioner's *child*. At this point, the original questioner must ask again for his information, and time and energy are wasted. Further, the questioner's *child* may have been activated, and the original question may be obscured until the *parent-child* conflict is settled.

When an ASI seeks to establish the role in which the other person is speaking, the following characteristics will help him to recognize the *parent*, *adult* or *child*. These must be taken in context. The *parent* will have physical clues, such as

Verbal Cues... PARENT	ADULT	CHILD
· always	· why	· bigger
· never	· what	· biggest
· stupid	· where	· I wish
· ridiculous	· when	· I don't care

Certain verbal cues help to establish the role in which an individual is speaking

a furrowed brow, pursed lips, pointing index finger, horrified look, hands on hips, etc. His oral cues are words such as "always," "never," "stupid," "ridiculous," "ought to," "should," "absurd," "How many times have I told you," "Now, what," etc. The *adult* may also choose to use these words after he does, in fact, decide that it "always" happens that way.

Child cues are pouting, shrugging shoulders, downcast eyes, teasing, squirming, phrases like "I wish," "I don't care," the superlatives mentioned earlier, etc.

Adult clues are basically a vocabulary of "why," "what," "where," "when," "who," "how," "how much," "in what way," "probably," "possibly," "I think," "I see" and "It's my opinion . . ." The job of an ASI is greatly simplified when he deals with people who use an *adult* vocabulary.

In order to get others to respond from their *adult* stance, we first develop the *adult* in ourselves so we can be easily recognized as people who make reasonable and fair decisions. We couch our questions in the *adult* vocabulary to increase the probability of *adult* responses. We recognize crossed transaction responses and resist reacting to them from either our *parent* or our *child*. We become familiar enough with our material to isolate the issues at hand and be sure the answer given is not about another issue. We assume at the outset that there may not be a right or wrong answer. We realize that ideas we propose have to be defended. If the idea will not stand without the force of personality behind it, it is not worth much. Last, we look at all alternatives from the "why not" standpoint.

Staying in our own *adult* position is the result of continual effort to refrain from having our *child* or *parent* hooked, to refuse to take the bait when our ideas are received by "Impossible," "Absolutely not," "No way" or "That was a stupid thing to do." We can strengthen our *adult* stance in several ways. We learn to recognize our *child*, its vulnerabilities, fears and the principle methods of expressing these feelings. We also become familiar with our *parent* and its admonitions, injunctions, fixed positions and the principle ways of expressing these. We need to be sensitive to the *child* in others, talk to that *child* and appreciate its need to be creative. Last, and perhaps most importantly, we should practice counting to ten.

The Gestalt concept not only supplies us with the tools for transactional analysis, but also provides us an aid to be used in "telling it like i is"—awareness training. An ASI's *job* is to tell it as it is. Before he can do this, he must be able to *see it as it is.*

The two additional blots in figure 2 point up our capability to see an alternative. One figure-ground relationship is readily apparent. But when we look at the blots again, we can see another relationship. The earlier set of blots demonstrates our ability to complete the incomplete situation, and both sets involve sensitivity to situations. It is the degree to which we are *sensitive* that we are *aware.*

An ASI's sensitivity to his own reactions can be increased by careful study of *Gestalt Therapy* by Perls, Hefferline, and Goodman. This book provides a very detailed evolution from which an ASI can attain increased effectiveness. Several experiments are described that can be related to air safety investigation. For example, the examination of eating habits is related to our work in that both eating and safety involve acquisition, assimilation and use. How an individual approaches his meals is very likely the way in which he approaches daily problems. In addition, the direction of our attention to functions of which we have been unaware may very well expand our awareness of situations.

Another experiment helps us to understand ourselves through the revelation of muscle behavior in different situations. A tense muscle in a listening situation—your boss telling you about a mistake you have made—is a physical indication of what your subconscious would like to be doing. Most likely your thigh muscles are telling you by their tenseness that you would like to run. As we enhance our ability to recognize these internal resistances and tensions, this recognition, in turn, helps us to see alternatives that may be present in a situation.

In conclusion, this article has barely touched the surface of the usefulness of Gestalt ideas to the conscientious ASI. If he will closely read both *Games People Play* and *Gestalt Therapy* and apply what he reads to his work, he can not only find more parts of the whole that may illuminate potential failures, but also become aware of more possible arrangements of these parts for reconstruction of failure situations. Examination of ourselves, using the Gestalt concept, equips us to meet each new occasion with more effective use of our faculties. The self-assurance that comes from knowledge of our personal effectiveness makes our investigations much more successful.

Watch it, guys, these are no-noes!

Loose or unfastened chin straps
Indifferent preflights
Fuel uncertainty
Equipment that won't work

Indulgence the night before
Survival gear left behind

Forgotten emergency procedures
Unfitted helmets
Nylon undergarments and socks

Remember—LIFE *IS* FUN! Dress and fly to live!

Wanda (PEARL) McLemore

LAOS PRESENTED itself as a challenge to the Easy Riders, accustomed as they were to all that kind of thing. But things got hot, more than reasonably hot, and riding wasn't always so easy. Troops unaccustomed to hot combat assaults or extractions must be thoroughly and professionally trained during cold assaults and extractions. In every airmobile movement, they must either get on or off their helicopters, precisely and quickly, at the proper time. The proper time is when troop compartment crewmen, on orders of aircraft commanders, signal them to do so.

Precisely and quickly means less than 15 seconds. Particularly in the conduct of deliberate or hasty extractions, troops must be so trained and directed that they will recognize the load limits established by each aircraft commander. To this end, standard loads and/or standard visual signals, understood by all troops and readily given by crewmen, are established. Such training is a responsibility of both aviation and ground unit commanders. It is integrated at every opportunity. Troops so trained stay out of the blades.

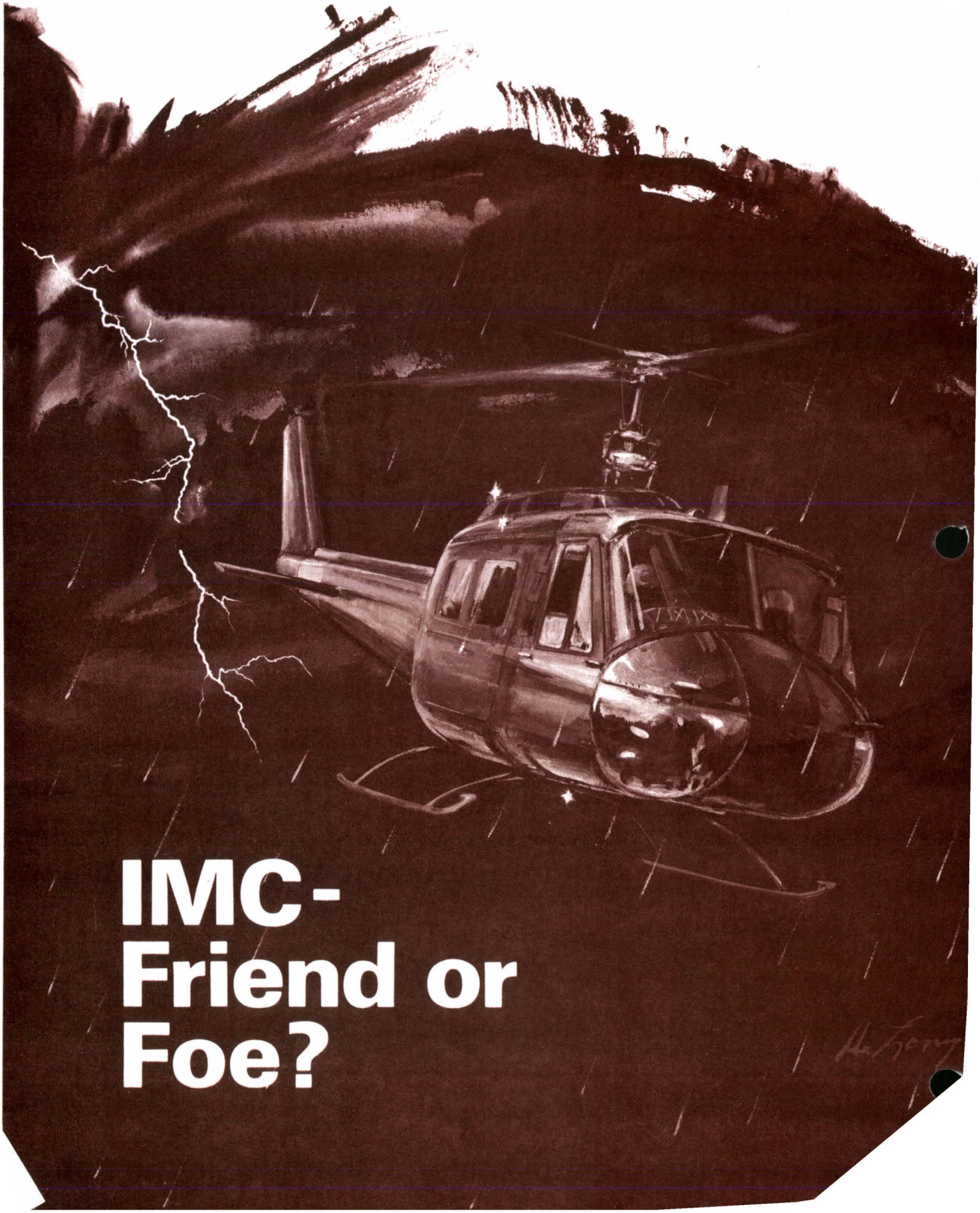
It's hot and dusty. Bullets are beginning to eat tree trunks and bush tops, both 60's are steadily rapping, mortar rounds are whoomping and cracking, the smokey cordite smell is sticking in the nose and the sweat has that JP4 diluted feel down on short final. It's "Stand them up, line them up, knock them down and right on." Listen to the whirring, clicking, whining, rushing, pat-pat-pat and lovely roaring sound. It's a bite in the gut that feels all the way up to the armpits.

An assault or extraction builds to a key phase as the first chopper nears touchdown. Indirect supporting fires have now shifted, clearing the airspace, and Army helicopters provide immediate direct aerial fires. Alternate, close-in areas—suitable for use by trooplift helicopters—provide flexibility to continue the critical phase under optimum conditions and limited risk. Teamwork, training, sound maintenance and planning are the primary ingredients which enable the success of such operations.

Comes a time when it's all gone. We're going to sit back and readjust; going to lock our fingers together behind our heads and sorta lean back; going to reflect. Right away comes a happy, faraway feeling. Comes a touching twinge of regret, thinking about the ones who won't be coming back. Wondering what more could have been done. Meeting folks the way they used to be. Knowing things and watching things grow—kids and birds, water and sky. Somewhere far off is a humming pat-pat-pat.

SLICKS AND THINGS

Major Robert L. Clewell
Data Center, USAAAVS



IMC-Friend or Foe?

CW3 John L. Coleman

Aircraft Accident Analysis & Investigation Dept.
USAAAVS

When was the last time you found yourself totally unprepared in IMC? Can you recall how many new gray hairs you had after it was over?

THE TIME IS 2030 and it's pitch dark. The crew chief is busily loading some supplies on a UH-1 and the pilot is supervising the seating of his passengers. This is the last mission of the day and everyone is becoming weary. Both the crew chief and the pilot are thinking of a good meal and a hot bath and then maybe a cold beer at the club. Finally, everything is ready and the pilot climbs into the left seat, pausing briefly to look up into the black sky.

For a moment the thought occurs that he should have checked the weather. Oh well, the weather had been pretty good all day. It should be okay now. Besides, it's only a 30-minute flight to home base. As he calls clear to the crew chief and begins to crank the engine, he notices the empty right seat where the crew chief is going to sit. For a moment he feels alone and wishes he had another pilot aboard. But the thought quickly passes as N_1 reaches 40% and normal starting procedures demand his attention.

Soon everything is set and the pilot makes a last minute crosscheck of the instrument panel, calling out the pretakeoff checks, then calls the tower for clearance. He notices the left attitude indicator is a little cockeyed, but it's been that way all afternoon and the tower operator is telling him he is cleared for takeoff.

The helicopter becomes airborne and soon they are cruising at 2,500 feet, with only 20 minutes remaining to home base. The pilot notices some rain showers and haze ahead of him as bolts of lightning occasionally light up the sky. No problem, he thinks. I'll just fly on through and get this bird home. A few drops of rain on the windshield and the pilot begins to scan his instruments, but suddenly nothing can be seen outside the cockpit. He corrects for a right bank shown on the attitude indicator. Wait a minute! Didn't it show a right bank on the ground? Must correct back and use the needle and ball. Too far to look over at the right attitude indicator. The beacon is on and the reflection off the clouds is very disturbing. Must get it off! Ball is too far out of trim! Too much correction with the cyclic—the helicopter is in a 20-degree bank to the left! How did it get there so fast? Air speed is building too fast—100 knots indicated! Must slow it down! The decision comes quickly to make a 180-degree turn and get out of the weather.

It has only been a minute or two since the first drop of rain hit the windshield. Watch the air speed—nose is too low—110 knots! Rate of turn is too fast—must slow down! Everything is becoming mixed up and all the instruments are going crazy. The pilot realizes he is losing control but, because he is so disoriented, there is nothing he can do. The Huey crashes and burns, killing the six people aboard. Total elapsed time from takeoff: *15 minutes!*

This pilot was experienced, with over 1,000 hours of flight time, of which 500 hours were logged as AC in UH-1s. Why did this tragedy happen? Investigation revealed the pilot had let his rotary wing tactical instrument card expire and was not proficient in instrument flying. The weather analysis prior to the mission was inadequate. A forecast had been made, warning of severe and continuous thunderstorms in the area. Haze had also been forecast, with a visibility of

one-fourth mile in the vicinity of the storms. Additionally, the pilot attempted instrument flight from the left seat, with the left attitude indicator inoperative, while a crew chief occupied the right seat.

It's evident this pilot used bad judgment in attempting a flight into weather. But it's possible the accident could have been averted if the pilot had maintained proficiency flying instruments and had been in the right seat. It was suspected the pilot had not performed an instrument flight since flight school.

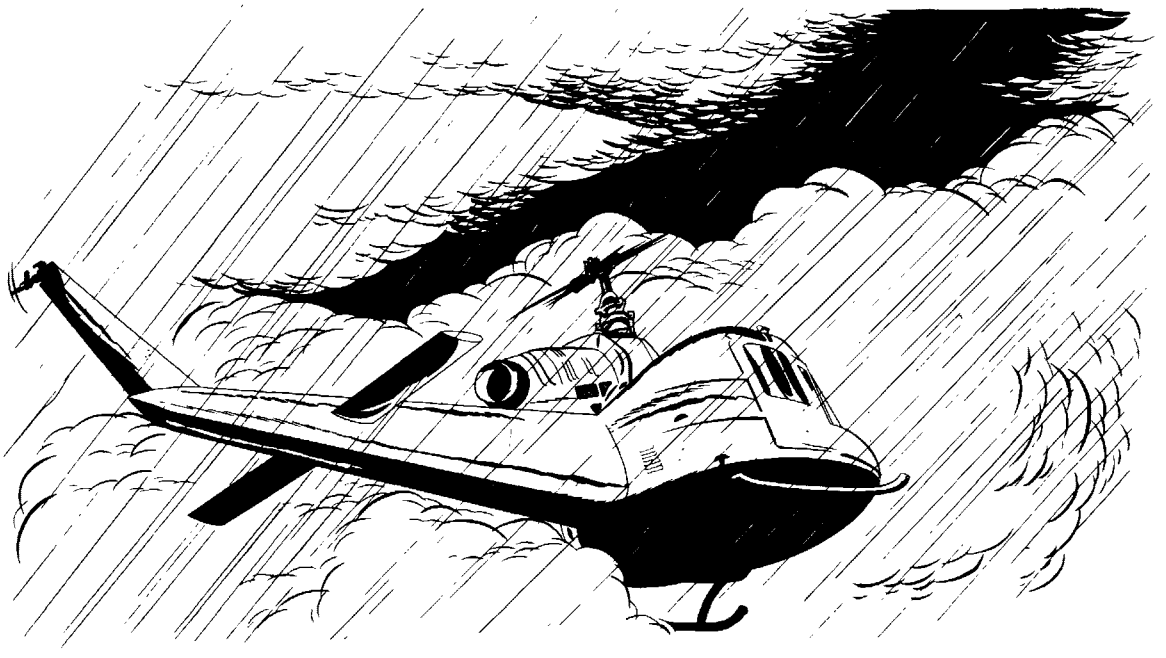
This accident is only one of 77 rotary wing mishaps that occurred during fiscal years 1970 and 1971 which were definitely related to instrument meteorological conditions (IMC). Of the 77, 59 were classified as total losses and eight as major accidents. While dollar costs for these accidents were very high, the number of people involved is staggering—172 killed and 87 injured.

While there are no *typical* accidents, there are many similarities when the 77 mishaps are considered by phases of flight. Cause factors repeat themselves often and include command supervision, crew training and proficiency, inoperative instruments, material failure/malfunction, inadequate weather analysis, wrong procedures, violations of flight discipline and SOPs, unauthorized flights, poor planning, improper emergency techniques and poor weather briefings. There are a few more that include variations of these, but these are the most important.

There were 10 mishaps which occurred during takeoff and climb into IMC. As soon as the aircraft entered the clouds, spatial disorientation occurred and the crews lost control. This was true even when instrument takeoffs (ITOs) were attempted. When was the last time you made an ITO? Was it good enough to ensure a successful takeoff in adverse conditions?

It was determined that 27 mishaps involved aircraft in cruise flight. The term *cruise flight* is construed to mean normal flight attitude, with an altitude of 500 feet agl or above. In most of these cases, the aircraft entered clouds in straight and level attitudes. Spatial disorientation was experienced by the pilots and very shortly after this, the crashes occurred, In some instances, pilots attempted 180-degree turns and spatial disorientation occurred even more rapidly. To make matters worse, in some cases, IMC conditions were entered with inoperative attitude and/or heading indicators. Do you remember your partial panel training? How long did it take you to become disoriented? If you were flying on a full pane

. . . an interesting fact about these mishaps is that there were 35 during daylight hours. This means that it isn't simply a matter of flying into weather which cannot be seen because of darkness



under actual instrument conditions and an important instrument failed, could you get to the next base safely?

What about those times when a VFR flight is planned and conditions remain VFR during the flight, right up to arrival at your destination? All of a sudden the field is socked in and you have to attempt an instrument approach. It will be said that this is poor planning and shouldn't happen. But there were 17 cases of this type and some of the aviators involved were highly experienced. Again, the circumstances are similar in that approaches were attempted and spatial disorientation occurred either during the approach or while attempting go-arounds. How often do you practice instrument approaches, to include several full stops and go-arounds? Are some of these approaches without the benefit of GCA? There are many tactical situations, simulated or real, where only an ADF or similar approach is possible. When this happens, there's no one to talk you down.

There are those who will say, "I'll just apply the old follow-the-roads low level method if I get into trouble." There were 17 crews who attempted this procedure because they were forced to fly low level while trying to stay out of the clouds. Each ended up as an accident statistic, either because they eventually entered IMC and lost control, or because visibility was reduced and the aircraft struck wires, trees or terrain and crashed.

There were six cases in which helicopters struck some object while hovering after successful approaches or prior to takeoffs because of reduced visibility due to weather. Do you remember hovering in reduced visibility and drifting without realizing it? How many times have you almost run into an object while hovering because you were distracted momentarily, even in clear weather?

Weather had been forecast in 57 of the 77 mishaps. In 13 other cases, it was suspected a forecast was made. The weather was not forecast in the remaining seven mishaps. From these figures, we can easily see that the weather involved wasn't totally unexpected. In most instances there was plenty of time for planning an instrument flight, even while airborne. There was also time to make decisions about whether to even attempt such flights.

Another interesting fact about these mishaps is that there were 35 during daylight hours and 39 during the hours of darkness. Three occurred at risk. This means that it isn't simply a matter of flying into weather which cannot be seen because of darkness. The crews were not prepared for instrument flight, no matter what time of day or night.

Next we come to the instrument qualifications of the crews. Of the 77 aircraft involved, 63 crews had instrument training of some type, 12 crews were classified as training unknown and two crews had no training at all. Of the 63 crews with training, 59 had rotary wing tactical instrument cards and four had rotary wing standard instrument cards. There are some who will immediately say that most of the mishaps were caused by the TAC card. I do not believe it makes any difference what kind of card is issued. We all have the capability to learn to fly instruments safely and with assurance. It is for the individual to realize his own weaknesses and try to correct them by seeking training on his own initiative. An aviator does not have to be a fully qualified instrument pilot before he can learn enough to get himself out of a tight situation.

When was the last time you found yourself totally unprepared in IMC? Can you recall how many new gray hairs you had after it was over? Many of us can think of at least one experience where we stumbled down through the clouds, finally landed, got down on our hands and knees and kissed good ole Mother Earth. Usually, after this type of harrowing ordeal, we quickly proceed to learn more about instrument flying and brush up on our proficiency, vowing never again to get caught in a similar situation.

One problem, basic to human nature, arises. Our minds automatically try to erase bad memories. If extra care and effort is not taken to remember what we experienced, some of us will find ourselves going through the same nightmare all over again. This occurs because our subconscious minds have caused us to forget how scared we were the first time and we relax our effort to maintain instrument flying proficiency. If we allow this to happen, weather will continue to take its toll among us.

I do not believe that an aviator has to crash just because he flies into IMC. With training and proficiency, instrument flights can be performed safely, without panic and fear. Basic instrument flying can be practiced to some extent in every aircraft on almost every flight of any duration. If you remember this and practice, no one will benefit more than you when the weather suddenly closes in. Wouldn't it be better to greet IMC as an old friend next time, rather than as a foe who will kill you?

Rating Orders

Upon audit of the flight record of one of our aviators, it was discovered that a copy of his original aeronautical rating orders was not in his records as required by AR 95-64. Request you furnish this office a copy of these orders to be placed in his record. His identification is attached.—CPT

USAAAVS receives only DA Forms 759 and 759-1. We do not receive any other flight records. Copies of rating orders may be obtained from The Adjutant General, ATTN: AGPS-S, Washington, D.C.

Broken Wing Award

We would appreciate it very much if you could provide us with any available background information concerning the Broken Wing Award.—CPT, ASO

The idea for the Broken Wing Award was conceived by the U.S. Army Aviation Center Safety Office in conjunction with the Director of Rotary Wing Training at the U.S. Army Aviation School, Fort Rucker, Alabama. The award was originally established as the Commandant's Broken Wing Safety Award by USAAVNC Regulation Number 385-14, dated 22 June 1967, to recognize aviators of the USAAVNC, USAAVNS and Fort Rucker tenant activities who demonstrated exceptional skill in recovering Army aircraft from in-flight emergencies, other than those which were self-induced.

Due to the expressed interest of the Director of Army Aviation to initiate this award on a worldwide basis, the United States Army Agency for Aviation Safety (USAAAVS) conducted a staff study in April 1968 to determine a means to best implement the award worldwide. The conclusions and recommendations of the staff study for worldwide implementation were accepted. The award was established and the criteria were incorporated in AR 385-10 during September 1968, with USAAAVS designated the proponent agency.

Chapter 7, AR 385-10, dated 17 February 1970, outlines the criteria and information required for nominations of individuals for the award.

AVIATION ACCIDENT PREVENTION FORUM

an interchange of ideas between readers and USAAAVS on subjects of aviation accident prevention

Publications

Over the past several months, we have received many inquiries about how to obtain aviation ARs and blank forms, especially those in the 2397 series. We dispatched our Girl Friday to the library to do the necessary research, and this is what she came up with. We hope it will be helpful.

AR 310-2, August 1971, is the bible for distribution and requisition of DA publications and blank forms. According to this regulation, an organization in the field should be able to get the publications and blank forms it needs if the procedure described in the following paragraphs is followed.

In order to get publications to the people who need them, the U.S. Army Adjutant General Publication Centers (USAAGPCs) distribute and resupply publications directly

Readers are invited to participate in this forum. Send your ideas, comments and recommendations to USAAAVS, Fort Rucker, Alabama 36360

organizations and units, using the pinpoint distribution method. A commander of a brigade, group, regiment, battalion, company, battery or comparable command may establish an account for the publications required by his headquarters at either or both of the USAAGPCs listed below:

USAAGPC
1655 Woodson Road
St. Louis, MO. 63114

Some types of publications stocked: All technical and supply publications such as technical manuals, technical bulletins, lubrication orders, supply bulletins and supply catalogues.

USAAGPC
2800 Eastern Boulevard
Baltimore, MD. 21220

Some types of publications stocked: Army regulations; DA circulars, general orders, pamphlets and posters; certificates for awards and decorations; doctrinal, training, organization and miscellaneous publications.

To establish an account with a USAAGPC, a commander submits a "Request for Establishment of a Publications Account" (DA Form 12), either prior to, or along with a pinpoint subscription form. The subscription form is used to establish the organization's publication needs at the USAAGPC. When a commander submits these completed forms, he has "subscribed" to the publications he needs for his headquarters. The USAAGPC will then assign that unit an account number. The submission process made easier because the subscription forms are preaddressed to the appropriate USAAGPC. Two pinpoint subscription forms, "Requirements for Army Aviation and Army Avionic Configuration Publications" (DA Form No. 12-31) and "Requirements for Army Avionics Publications" (DA Form No. 12-36), will be of interest to many aviation subscribers.

A word of warning: The next higher headquarters must approve requests for accounts from companies, batteries and detachments.

A commander's responsibilities are not limited to establishing the account and submitting the initial requisition. He must ensure that both the type and number of publications subscribed for are actually needed. In this regard, a commander should request only those publications applicable to his headquarters. He should review his subscription forms at least twice a year to confirm that his unit is receiving needed publications, but is not getting unnecessary ones. The same subscription form (DA Form 12 series) is used to submit changes. The "change" box should be checked and changes indicated in those blocks on the form for which additions, deletions or changes are required. Instructions are found on the back of the form.

For the convenience of the subscriber, USAAGPC allows "write-in" subscriptions for new publications not listed on subscription forms. New issues are announced either in a DA circular or in a USAAGPC letter and may be ordered by the "write-in" method.

In any correspondence with a USAAGPC regarding an account, the account number assigned the organization by that particular USAAGPC must be referenced. And a last suggestion concerning publications: If the designation of an organization is changed, a change showing the new designation and referencing the account number should be submitted to the USAAGPCs as soon as possbile.

Bulk quantities of blank forms, including the 2397 series, are provided to the publications centers in overseas commands and to installation publication stockrooms in CONUS for initial distribution to using units. However, some overseas commands, organizations and activities that are not satellited on a command with a publication center receive blank forms directly from USAAGPC, as do CONUS installations and off-post activities which neither operate stockrooms nor are satellited on organizations with stockrooms. These groups order blank forms directly from USAAGPC by means of DA Forms in the 12 series which provide USAAGPC the necessary data to compute the types and quantities needed.

By and large, most using units requisition blank forms from installation publication stockrooms or from overseas command publication centers, as appropriate. DA Forms 17 and 17-1 are used. Units are allowed to keep 60-day supplies on hand.

THE CRACK IN OUR MIRROR

Ted Kontos

Only through a critical self-analysis can we obtain facts for improving the Army aviation safety program

NARCISSUS, we are told, caught a glimpse of his reflection in a pool of water and, thereafter, spent most of his time admiring himself. Although basking in self-admiration is neither desirable nor beneficial, a periodic self-analysis can provide important information for improvement.

The key to optimum safety lies in the professional qualities of individuals. The degree of safety depends on the degree of professionalism exhibited by each member of the aviation team. Aircraft can be no better than the effort expended by the crew chiefs. Remote airstrips and landing zones can be no safer than their selection and upkeep. The reliability of an engine can be no greater than the quality of workmanship it received during overhaul. Professionalism, then, is a highly personal matter required for top performance. Broadly speaking, professional performance is a product of personnel selection, training, application and supervision. These areas may appear simple. In reality, they are extremely complex.

PERSONNEL: Personnel should be carefully selected for training in any given field. They should meet or surpass established qualification criteria, whether they are to be trained as jeep drivers or aviators. Each must be physically capable of performing his intended job, have the ability to learn, have an interest in the skill he is to be taught and be mature and emotionally stable.

Seldom do we encounter difficulties with the first two requirements. It is a relatively simple matter to examine an individual for physical defects and test his capacity for learning. It is even easier to determine a person's area of interest. But in choosing someone for training in a particular field, we are often prompted to base our selection solely on need. If we need mechanics, for example, we assign a given number of qualified inductees to maintenance schools for training, with little regard to their prior experience in other fields, or their indicated areas of interest.

In most instances, a malassigned individual will conform, complete the prescribed course of training and perform satisfactorily. Although acceptable, he is not totally satisfactory. While he performs quality maintenance, he does so primarily because of personal pride and a sense of duty and responsibility. When he has fulfilled his service obligation, chances are he will accept his discharge and leave the service. Yet, if such individuals were assigned to their field of interest, many would be encouraged to continue a military career.

In some instances, a malassigned individual may be reluctant to conform as expected and perform in a lackadaisical manner. Although he will not deliberately create hazards, his negative attitude will adversely influence others. This individual cannot be trusted to do quality work, without constant supervision. Unless his attitude changes, he will never become professional.

In more remote instances, a malassigned individual may become antagonistic and create problems for his instructors and supervisors. He will generally find himself either transferred from one unit to another, or relegated to menial tasks where he can do no harm. His attitude, coupled with his lack of knowledge and interest, can be hazardous. Should his performance inadvertently cause a mishap, he will look you in the eye and say, "I didn't want this job. You forced me into it! I didn't make the mistake intentionally, so don't blame me!"

THE CRACK IN OUR MIRROR

What about maturity and emotional stability? Although not synonymous, they are closely related and can be considered jointly. A deficiency in either is a blow to professionalism and safety, particularly when it involves aviators. A young pilot recently flew into wires during an unauthorized low level flight, in violation of regulations and his unit SOP. Although he was able to land safely, his aircraft sustained major damage. After admitting he had knowingly violated published directives, he was asked if he intended to violate these same regulations in the future. His reply indicated an immature regard toward the need for rules and regulations and the likelihood he would continue to ignore them. How would you like to fly regularly with this man? How would you like to command a unit composed of aviators whose attitudes were similar to his? While it's admittedly difficult to spot emotional instability and a lack of maturity, signs indicating these characteristics usually appear during training and first assignments.

TRAINING: If any area can be singled out as the most influential in developing professional characteristics, it is probably training. The quality of training an individual receives and the practical experience he acquires during training will form the foundation he will build upon during his entire career. If his subject matter knowledge is incomplete, or if he is permitted to form bad habits during training, he will be severely handicapped. With adequate facilities and equipment available, it is the instructor who plays the most significant role in developing professionals. Instructors, while accepting the major portion of credit, must also accept the major share of the responsibility.

A flight instructor, for example, must be qualified in his aircraft, be experienced as an aviator, be knowledgeable in his subject matter and related areas, be an astute observer and be well versed in methods of instructing. And this is not enough. He must also be truly professional and set an example for his students to follow. He must be able to instill them with a sense of responsibility—a need to follow procedures and abide by regulations and SOPs; a thirst for knowledge and experience; and a desire to maintain peak physical and emotional health. He must instill pride in performance.

An OV-1 pilot and observer were on a cross-country flight. After a refueling stop, during which they took a short break, the pilot, without conducting a preflight, took off. One engine stopped and the airplane crashed, killing both occupants. Investigation determined the cause of engine stoppage to be fuel contamination. This occurred during servicing from a tanker contaminated with water. Further investigation revealed the pilot had experienced many difficulties during training, particularly in the area of emergency procedures. He had amassed numerous pink slips (failing grades). He had been assigned to several different instructors and recycled through the program, barely managing to squeeze by his check flights.

Would the contaminated fuel have been revealed by a preflight? Would a more proficient pilot have been able to cope with the resulting emergency? These questions are speculative. The point is that weaknesses discovered during training, unless positively corrected, are apt to appear in later performance.

SUPERVISION: The period immediately following graduation is probably the most important in an aviator's life. During flight training, an aviator learns technical subjects and displays proficiency in performance. But he still lacks experience. The type of experience and how he gets it may well determine the degree of professionalism he will attain. How is he to develop desired characteristics while gaining meaningful experience? The answer is supervision. Without it, the entire aviation program, from start to finish, would fall flat on its face.

Supervision is of two types—direct and indirect. Most of us are familiar with the benefits of direct supervision. It is the one positive means to ensure an individual is doing his job properly and following stipulated procedures. Aviators find more of this type of supervision during flight training where they are constantly monitored. It is both excellent and necessary, but limited in practice. There just aren't enough supervisors to directly supervise every job or flight. Consequently, though direct supervision offers the advantage of assuring actions are correctly performed, it is too restricted in scope to be effective throughout the operational aviation environment. Indirect supervision is what we must depend on for producing and maintaining professional characteristics.

At one installation, two new and inexperienced aviators were assigned a flight to an unprepared field strip. They failed to make a reconnaissance. The airplane veered off the strip after landing and struck trees. Although both pilots managed to escape unharmed, the airplane caught fire and burned. In another instance, the newest and least experienced aviator in a unit, assigned a test flight in marginal weather, crashed. More recently, an aviator with less than 50 hours in type was assigned a UH-1H test flight. The battery was stowed in the aft position and, during hover, the aft skid hung on psp. Control was lost, and the helicopter rolled inverted.

How are ACs selected in your unit? In one, a pilot was expected to prove his ability by flying under a bridge. After one prospective AC failed the test, this practice was stopped. Are ACs often selected solely on the basis of rank, with little regard for experience? Do missions always come first, with little regard to need or evaluation of importance? Are all mishaps properly reported? Are accidents thoroughly investigated? Unfortunately, evidence suggests that deficiencies exist in each of these areas. Similarly, there is strong evidence that unit SOPs are not always followed.

What about aviators who have records of multiple mishaps involving pilot errors? Are they given additional training and evaluation? What about yourself? Do you always brief passengers before each flight? Do you wait until check flight time to concern yourself with proficiency, then forget it until time for the next one? What do you do about problems? Do you solve them or pass them off to someone else?

When a fixed wing test pilot attempted a power-on stall, the airplane snapped inverted and went into a flat spin. After a loss of 7,000 feet, the pilot managed to regain control and landed. Maintenance personnel worked diligently to find the cause and the wings, as well as individual flight control surfaces, were replaced. On a subsequent test flight, the same thing occurred. This time the empennage section was replaced and additional shims were installed on one side. Apparently this cured the problem and the airplane was returned to service. When the unit was requested to transfer some of its airplanes, this was the first to be reassigned. The question is this: If, at some future date, the empennage is damaged and replaced, with shims installed by-the-book, what might happen if an unsuspecting pilot attempts a power-on stall?

The only answer to problems such as these lies in the area of supervison—the key to professional performance. Despite many improvements in recent years, there is a mishap crack in our mirror of performance. Shall we allow it to progress or shall we seal it with better selection, training and supervision?

USAASO Sez

The U. S. Army Aeronautical Services Office discusses

New year, new equipment

Landing fees

New Year's resolutions

CREAK-K-K . . . CRACK-K-K . . . POP-P-P!!! You have probably noticed that our control tower radio equipment is sporting a long, white beard and making creaking/cracking sounds. There will be a new, different sound coming from the towers when the new generation control tower radios start rolling off the assembly lines. Yes, sir! The Army has put its money on the line for some new tower radio gear and we should see first delivery some time in July 1972. The items involved are single channel transmitters and receivers in the VHF and UHF bands. Transmitter AN/GRT-21 and receiver AN/GRR-23 cover the VHF band; transmitter AN/GRT-22 and receiver AN/GRR-24 are UHF. The radios provide for 50 kilohertz channel spacing and include many state-of-the-art improvements. Be on the lookout for communication without exasperation!!

Landing Fees: "Who, me? This is a military aircraft and I'm on official business and on an authorized flight mission and I didn't know your field . . . "

Yes, it can happen. There are certain airfields, privately owned and operated, that were constructed without Federal funds. They can legally charge a landing fee to all visiting aircraft—even those with the stars and bars. Out-of-pocket cash to pay this fee can be downright embarrassing, especially if you hadn't planned for it. Sure, you'll be reimbursed eventually, but why not check your FLIP *before* filing. See page 3, FLIP IFR Supplement, Aerodrome Classification Section, regarding use of private (PVT) fields and those with no classfication. Also, see AR 95-1 for guidance and, if in doubt, a call to the airport manager should usually provide essential information on landing—fee or free—as the case may be.

New Year's Resolutions for Airfield Operations Officers:

- Keep controllers at top proficiency.
- Make certain that controller physicals are current.
- Be sure that controllers are properly rated.
- Be sure that an ATC facility training program is established and used.
- Make sure a semiannual testing program has been established.
- Review TDA to determine that controllers in sufficient numbers and grades are authorized.
- Use an ATC facility checklist throughout the year.
- Maintain control of vehicular traffic on the airfield.
- Eliminate excessive downtime on your navaids.
- Keep noncontroller personnel out of your ATC facilities.

Unit Rotary Wing Instrument Training

COMMANDERS in the field, to include National Guard and Reserve units, can and should take the initiative to update personnel instrument ratings within their organizations as rapidly as possible. This is particularly true now that aircraft for this purpose are becoming available. To assist aviation unit commanders in updating their personnel, the U. S. Army Aviation School's Department of Nonresident Instruction at Ft. Rucker, Ala., has compiled two packages designed to assist in preparing tactical ticket holders and noninstrument rated personnel for a standard instrument rating.

The commander's packet contains all the information needed to conduct the program at unit level; i.e., flight syllabus programed texts, recommended grading system, the instrument instructor and maneuver guide, and a catalog of correspondence courses available from the aviation school. Individual packets are available and enable each student to proceed at his own pace. Leading military and civilian educators consider programed texts to be more beneficial than computerized instruction primarily because of their economy and convenience.

The Department of Standards and Instructor Training at the aviation school recommends that this program be conducted at brigade or group level to ensure the control needed to conduct the program.

Request for these packets should be addressed to:

Commandant
U. S. Army Aviation School
ATTN: ATSAV-NRI
Fort Rucker, Alabama 36360

Due to the large number of programed texts involved, commanders are urged to determine their needs and order judiciously. One commander's packet is suggested for each battalion, separate company or equivalent size unit. Student packets should be ordered on a one per student basis only. As a further guide each student packet weighs a little more than 18 pounds.

THE U.S. ARMY BOARD FOR

USABAAR

AVIATION ACCIDENT RESEARCH

USABAAR, the U. S. Army Board for Aviation Accident Research, Fort Rucker, Alabama, a Class II activity of the Office of the Assistant Chief of Staff for Force Development, has been renamed . . .

USAAAVS

U.S. ARMY AGENCY FOR AVIATION SAFETY

This change was brought about by the agency's expanded activities and responsibilities in Army aviation safety. These activities and responsibilities will be described in future issues of the ARMY AVIATION DIGEST. The correct pronunciation of the acronym USAAAVS is "*you saves.*" Correspondence should be addressed to:

CO
USAAAVS
Fort Rucker, Alabama 36360