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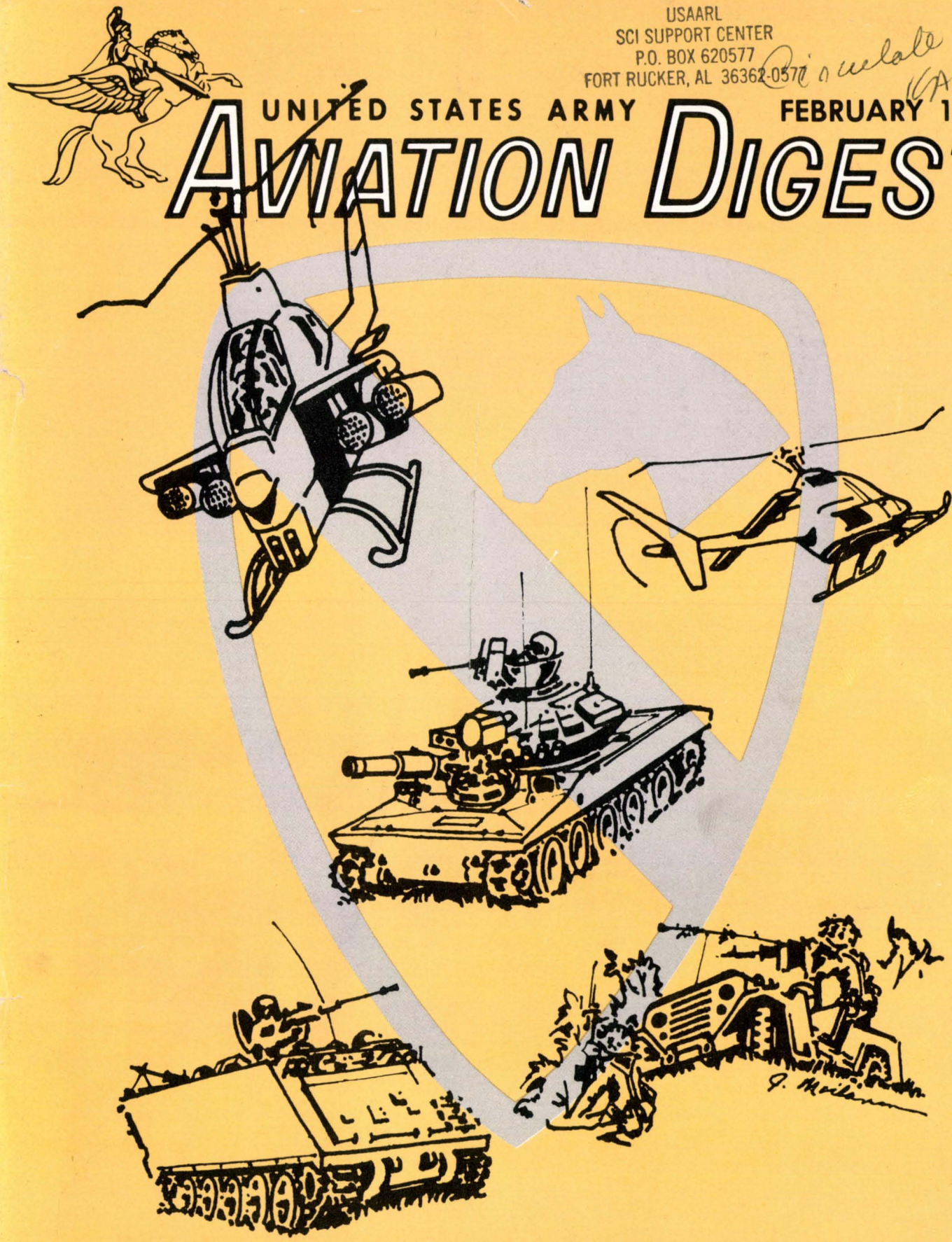
UNITED STATES ARMY FEBRUARY 1977

AVIATION DIGEST



UNITED STATES ARMY AVIATION DIGEST

FEBRUARY 1977 VOLUME 23 NUMBER 2

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A major activity of the
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Inspector General and Auditor General
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ABOUT THE COVER

The cover, by 1LT John H. Moulanen, signifies the close coordination between air and ground in cavalry units. This coordination is so important that air and ground are combined down to the squadron—the smallest combined units in the Army

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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This publication has been approved by The Adjutant General, Headquarters, Department of the Army, 23 December 1975, in accordance with AR 310-1.

Active Army units receive distribution under the pinpoint distribution system as outlined in AR 310-1. Complete DA Form 12-5 and send directly to CDR, AG Publications Center, 2800 Eastern Boulevard, Baltimore, MD 21220. For any change in distribution requirements, initiate a revised DA Form 12-5. Controlled circulation paid at Atlanta, GA.

National Guard and Army Reserve units under pinpoint distribution also should submit DA Form 12-5. Other National Guard units should submit requests through their state adjutant general.

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Air Cav, Ground Cav

The 1st Cavalry Division has come up with an effective means of training the combined air-ground team

Captain Frame J. Bowers III
Armored Cavalry Troop Commander
1st Cavalry Division

COORDINATION between aviation and ground units is nothing new. It was the Army's bread and butter in Vietnam because the ground units could suffer disaster without it. This was particularly true about the coordination between air and ground cavalry units.

Air cavalry immeasurably increased the ground cav's ability to perform its missions of reconnaissance, security and economy of force. This coordination was deemed so important that the air and ground cavalry units were combined in the same squadron—the only combined air/ground, battalion-sized unit in the Army.

Until recently no means of training the combined air/ground teams existed, other than field training exercises (FTXs). These FTXs offered the opportunity for limited coordination between the units but allowed neither to work in a true combat situation. Since many junior leaders have not experienced the trials of combat, this training is a serious shortcoming in the cavalry squadron's preparation for combat. The ground leaders have inadequate appreciation of how much those airborne eyes and weapons can extend their capabilities. At the same time, the aeroscouts have little opportunity to use the ground unit's capabilities (mortars and artillery) for the destruction of targets of opportunity.

In general this has been caused by restrictive requirements. There have been live-fire or firepower demonstrations, but these were carefully planned and meticulously rehearsed operations. Every phase was totally controlled with no freedom of movement allowed either the ground or air unit.

The ground unit had minimum control over the aviation assets and consequently use of them to aid in the accomplishment of the mission was almost nil. The aviation elements could not freely maneuver so they could not completely fulfill their mission. Overall, this type exercise offered little more than a demonstration of the weapons and flight techniques available when putting the aircraft and ground vehicles on the same range.

This condition no longer exists at Ft. Hood, TX. The 1st Squadron, 9th Cavalry, 1st Cavalry Division, has developed and tested an Armored Cavalry Platoon Battle Run for III Corps Headquarters. This exercise is a live-fire zone reconnaissance for an armored cavalry platoon assisted by a mixed team from the air cavalry troop. The exercise is a free maneuver course with no "canned" maneuvers. The platoon leader is free to use his team to accomplish the mission. As the air and ground elements negotiate the course, targets are designated by detonation of TNT blocks near them; the vehicles are then cleared to fire back.

The targets are spread throughout the area and are either stationary silhouettes (figure 1) or popup targets (figure 2) activated by a controller. Each target has a ¼-pound block of TNT to its front which also can be detonated by controllers. The targets can be changed to reflect different scenarios, but the Armored Cavalry Platoon Battle Run pits the platoon against elements of an OPFOR (opposing force) regimental reconnaissance company.

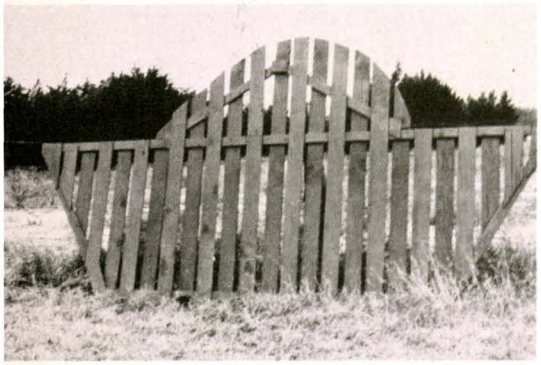
How can aircraft and ground vehicles be mixed on the same terrain without one endangering each other? The Armored Cavalry Platoon Battle Run prevents this through the construction of scenarios which force the aircraft and ground elements to avoid each other's line of fire and also by mounting the chief safety officer controller in an OH-58 Kiowa with a two-net frequency modulated (FM) capability. Using these two devices, the aero team can freely maneuver to the front and flanks of the ground units, reporting information and engaging targets, while the ground platoon can maneuver against threats located for it by the aero scouts.

The course begins with the ground platoon leader and the aero team leader receiving the oral operations order and overlay (figure 3). The aero team is operational control (OPCON) to the troop, and is further assigned by the troop commander to work with the platoon negotiating the course. The reason for this tactical arrangement is twofold. The platoon is the north flank platoon of the squadron, and hence on the

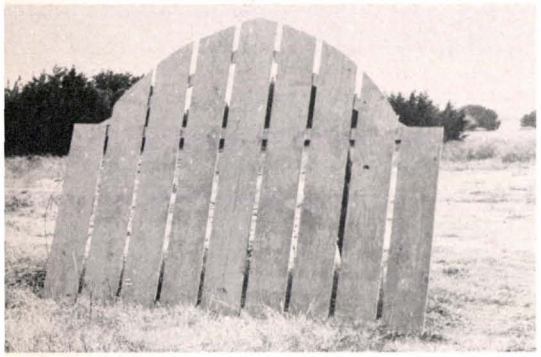
most vulnerable of the squadron's flanks. Dominant terrain (the ridgeline on the north and McBride Point) requires that the platoon have some help in the form of early warning of enemy threats from these areas. The team reports to D Troop headquarters on either an ultra high frequency (UHF) or very high frequency (VHF) net and reports to the ground platoon on the platoon's FM net.

Figure 1
Stationary Silhouettes

Flank of T-62



Frontal of T-62



Flank of Truck

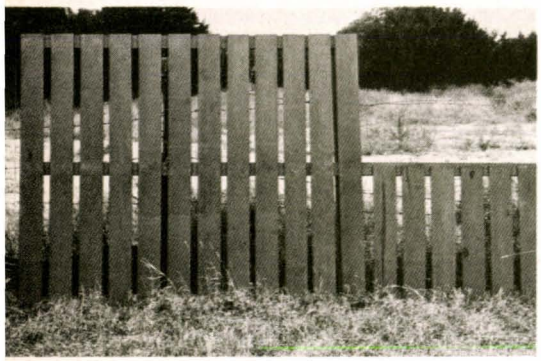
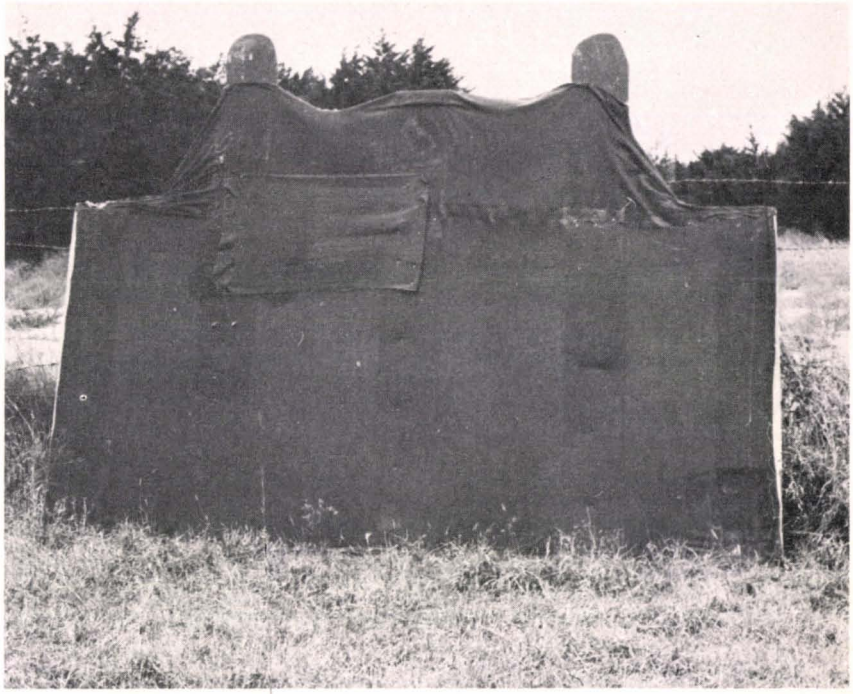


Figure 2
Pop Up Target of BMP 76



After receiving the operations order, the aero scout and its covering AH-1 HueyCobra move out through the area. The ground platoon is in an assembly area awaiting any information the scout reports. In the background, flying at altitude, the chief controller watches the progress of the air cav team. Based upon the relative position of the aircraft, the controller ascertains that (a) the aero scout could reasonably be engaged by one of the targets of the course or (b) the Cobra can engage the target without firing out of the range fan. The Cobra has its weapons set on safe until the aero scout clears the line of fire—just as would be done in combat. The aero scout reports to the platoon leader while withdrawing under the covering fire of the gunship.

Farther down the course, the aero scout has the opportunity to adjust fire from the platoon's 4.2 inch mortar. Unfortunately, an element of unreality enters here, for the mortar must not produce any duds in the maneuver area. This requires the use of variable time fused ammunition which is not the most reliable of rounds and which cannot be fired over the heads of aircraft or the thin-skinned scout jeeps. Consequently, the mortar is located due north of McBride Point and fires at a right angle to the route of advance of the maneuver elements.

The platoon leader, realizing that contact has been made with enemy elements, requests that the aircraft now move to screen the platoon's right flank. From there, the aero scouts are able to report on threats to either the front or flank. This also serves to get the aircraft out of the platoon's line of fire.

At the same time, the platoon leader orders the platoon to move out. The actual organization is up to the leader; it could be either a two- or three-team formation

(figure 4). Behind each team is a safety noncommissioned officer controller mounted in an M113 armored personnel carrier.

These controllers serve the same purpose as the safety officer in the OH-58. They determine whether or not a target can be engaged by their respective teams and if the vehicles are safely positioned to open fire. If both conditions are met, the ground controller calls for detonation of the target's explosives.

At this point the airborne controller again enters the picture. Because of the rolling nature of the terrain and the wide frontage covered by the platoon, it is impossible for one team's controller to maintain contact with another. Consequently, the chief safety officer (CSO) is responsible for maintaining safety clearances between the ground and air teams.

The CSO does not do this by constantly telling the platoon leader to keep the platoon's elements on line. Instead, the pace of the scenario can be changed. One team could be slowed, for example, by detonating more targets to its front than in front of another team. Consequently this team would be required to fight its way forward, while the other teams move more freely. Another team could be prodded forward by having the "troop commander" tell the platoon leader that a gap is opening between the leader's platoon and the platoon to the south, and that contact with the sister element must be maintained. Thus the airborne controller, working over the platoon's command net and the controller's net, coordinates the movement between teams while the ground controller coordinates movement between the elements within the teams. Either the airborne controller or the ground controller can call for detonation of target demolitions.

But back to the platoon on the course. It has now worked its way

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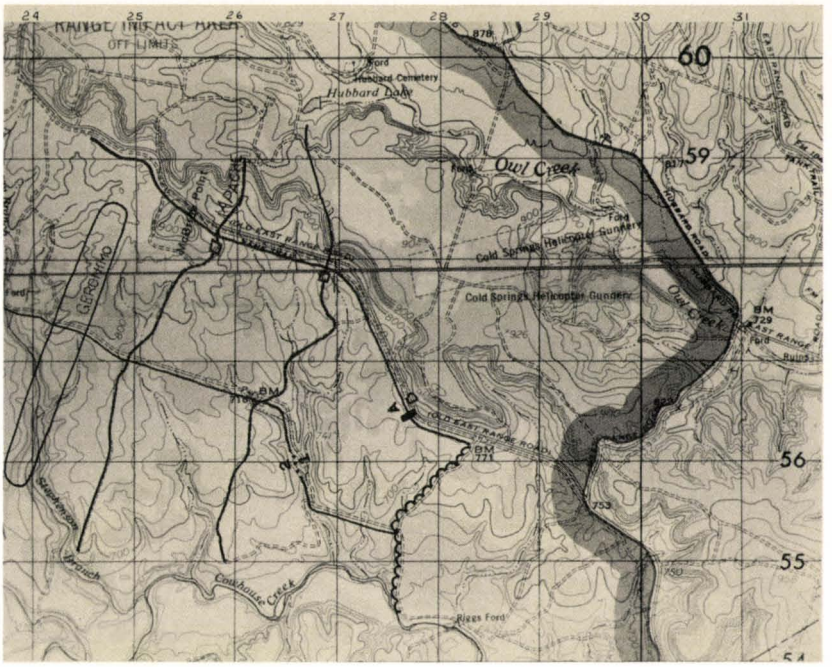

Oral Operations Order For Armored Cavalry Platoon Battle Run

Enemy Situation: Enemy elements broke contact with U.S. forces 3 days ago after suffering heavy casualties. However, intelligence sources indicate that fresh units of unknown identity and strength are now preparing to launch a new offensive. Enemy forces are estimated to be using reconnaissance forces to regain contact for their main force units.

Friendly Situation: The 1st Cavalry Division continues to attack toward the west. At _____ hours 1/9th Cav conducts a reconnaissance in zone from the line of departure (LD) to Phase Line Apache (vicinity NS Grid Line 25) to locate these possible enemy forces. Troop _____ will be in the south, Troop _____ will be in the center and we will be in the north. D Troop will recon throughout the squadron's zone, with particular attention to the squadron's northern flank.

Our troop's mission is to perform a zone reconnaissance from the LD to Phase Line Apache to secure Objective Geronimo no later than _____ hours. We begin at _____ hours.

We'll run it like this: zone rocons by platoon (Plt): _____ Plt in the north, _____ Plt in the center and _____ Plt in the south. Movement will be by platoons from platoon assembly areas vicinity PK 305545, _____, _____, and crossing LD by _____ hours. Artillery fires are available by request through me. However, use your platoon mortars as much as possible.

Plt: _____

Plt: _____

Plt: Maintain contact with _____ Plt. Secure Objective Geronimo from vicinity of EW Grid Line 57 North.

Troop command post (CP) will move behind _____ Plt. Ground surveillance section and troop maintenance (minus) will move with CP.

Pay particular attention to identity and possible personal effects of killed or captured enemy elements—S2 needs all the information they can get. Also, carefully check all roads, fords and bridges in your respective zones. Request permission to bypass enemy elements. We'll be moving fast but deliberately, so D Troop may have to pick up maintaining contact with bypassed elements. *Don't* fire on the enemy unless engaged or unless cleared by me to do so.

Operation Order and Overlay

Figure 3

Night Flying At Noon

CW2 Thomas L. Adkins
Department of
Undergraduate Flight Training
U. S. Army Aviation Center
Fort Rucker, AL

A NIGHT visual system (NVS) is being evaluated at the U.S. Army Aviation Center, Ft. Rucker, AL. The purpose of the evaluation is to determine if a night visual simulation capability can meet portions of the Army's night training requirements. If the night vision system is shown to be feasible, it will be used to extend the training capabilities of the UH-1 flight simulator.

And, it would be helpful if routine night training could be accomplished during the daytime.

The NVS under evaluation is a computer-generated image representing scenes of the "real world." A computer produces a visual image which is displayed on special cathode ray tubes (CRTs). This image is dependent upon the pilot's control inputs and aircraft attitude and motion information derived from the simulator computers. The computer uses this information to produce real-time changes in the visual image and displays this information on the CRTs. The pilot views changes in the visual scene on the CRTs and must relate these changes to aircraft attitude and position and make the appropriate control inputs.

The CRTs are mounted on the simulator cockpit windows; there is one for the pilot, one for the copilot and one for the right window. The present system does not have left side or chin bubble displays.

The night visual system data base was developed based upon the training maneuvers used in the Night Hawk Training Test conducted at the Army Aviation Center (see December 1975 and January 1976 issues of *AVIATION DIGEST* for reports on the Night Hawk Test).

The maneuvers selected for evaluation of student training with the NVS were:

- Night takeoff
- Night approach to an inverted "Y"
- Standard autorotation
- Confined area operations

Four instructor pilots (IPs) from the Night Hawk Test participated in the initial NVS evaluation, using student volunteers from the Initial Entry Rotary Wing Program.

The IPs perceived training students for night flying, i.e., adaption to the night environment, a significant training problem. However, their experiences with the NVS convinced them that the NVS would help the students adapt quickly to actual aircraft night flying conditions.

The IPs found several inherent features of the simulator to be advantageous to training. Originally developed for instrument training with the UH-1 flight simulator (FS), these features also were well suited for use with contact training maneuvers. The two features of greatest interest to the IPs were the freeze or stop action capability and the capability to conduct practice on selected maneuvers or segments of maneuvers by using preset initial conditions.

Students practicing autorotations illustrated the use of preset initial conditions. With each autorotation, the instructors were able to set the simulator at the entry conditions for an autorotation and the students didn't have to fly complete traffic patterns between each autorotation. Another example of the use of preset initial conditions—IPs were able to transfer from the stagefield to a confined area instantly which gave them valuable extra time to practice confined area operations.

The IPs used the simulator freeze in conjunction with the preset initial conditions on many occasions. For example, many students did not remember to retard the throttle as they entered the autorotation. When the IPs observed this error, they froze the simulator, described the error and discussed its importance for a correct autorotation. Then they reset the simulator to the initial conditions of the autorotation and had the students repeat the entry.

These simulator training features saved valuable time and enabled the IPs and students to concentrate on the development of particular night flying skills without interference from intervening flight activities. The students were able to practice a given skill until they had demonstrated minimum proficiency. If these perceived advantages of NVS in combination with the UH1FS are found to contribute to improvements in student training performances and combat readiness flying proficiency maintenance for rated aviators, night flying soon can be taught in the simulator.

Shortly, aviators may be able to call the simulator facility and say, "Please schedule me for 3 hours of night training time at 1200 hours."

The Otter Has A "TWIN"

Major Grady W. Wilson
U. S. Army
Aviation Systems Command
St. Louis, MO

THROUGHOUT THE remote regions of our 50th state, Alaska, a new animal is emerging, wearing the olive drab colors of Army aviation. To you older fixed wing pilots, the sight of these two grand beasts surely will bring back fond memories of the almost extinct predecessors of this aircraft.

As you can probably guess, DeHavilland Aircraft Corp Ltd. has given birth to two shiny olive drab twins, the DH-6 Twin Otter. The proud owners of these newcomers are the 1st and 2nd Scout Battalions of the Alaska Army National Guard.

The new aircraft have the Army designation, UV-18A (Utility-STOL), and will carry the manufacturer's common name of Twin Otter. It is not intended that anyone should think these are newly designed aircraft. Quite the contrary, the first Twin Otter rolled off the assembly line at DeHavilland in the mid-60s and more than 500 now fly the skies of 50 different countries.

To understand the need for these highly versatile beasts, one first must visualize the conditions under which they will operate and the missions they will perform. The Alaskan National Guard Scout Battalions are unique units composed of 29 to 31 village units, divided into 6 companies and a Headquarters and Headquarters Detachment. These village units usually consist of five or more people and are located throughout the 586,412 square miles of the state, from Little Diomede Island (½ mile from the USSR border) on the west to the Canadian border on the east, and from the Arctic Ocean on the north to the Pacific Ocean on the south.

The 1st Scout Battalion is headquartered at Nome with an area of operations covering the state north of the Yukon river, an area of roughly 300,000 square miles (compared to 267,334 square miles in the state of Texas). This region possesses the most severe environment normally encountered by man, often experiencing a chill index of -100 degrees F.

Continued on page 28

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We have run this picture before. It attracted so much attention that we decided to print it again. Now that we have your attention read the article below

ARMY AVIATORS: ATTENTION TO DETAIL

Captain Otha D. Brooks
Harvey J. Schwab
Instrument Qualification Division
U. S. Army Aviation Center
Fort Rucker, AL

ATTENTION TO detail! How many times during their aviation careers have Army aviators heard these advisory words? At least one time if not many. However, we tend to forget or misplace them during times of complacency or when we feel there just isn't time to complete a mission and include detailed procedures during the operation and completion of that mission.

More than 75 percent of aviator-related accidents are contributed to the lack of attention to detail (procedures and regulations). Examples of this are items missed or not handled properly on preflight, faulty runup procedures and the absence of knowledge concerning emergency procedures. These items, if approached in a knowledgeable, detailed manner, would help prevent future accidents—we cannot have any function of safety without attention to detail.

I am an Army aviator. For aviators reading this article, I'm going to tell a story and ask questions which may help keep you flying for the U.S. Army and living a long, happy life. As you read, think about the point I'm trying to make.

Remember the subject—*attention to detail.*

When a patient requires major surgery, when should those on the surgical team start showing "attention to detail"? Should they wait until stitching the incision and try to make sure the patient isn't left with an unsightly scar that can't be covered by a bikini? Or should they start before the incision is made?

* * *

There I was, pilot in command for a ferry mission. I received the ferry briefing from the division aircraft configuration noncommissioned officer but did not receive a ferry packet. I was briefed on recommended routes and applicable rules pertaining to instrument flight rules (IFR), both night and weekend flight per a unit regulation. No other crewmember attended the briefing.

This was a one-ship mission. I chose a copilot who had a maintenance background but had not been in the unit very long. We departed home base in a UH-1 Huey and arrived at our destination the next day. After resting for 2 days, we prepared to ferry a UH-1 back to home base.

We inventoried the aircraft and preflighted it. During a 30-minute test flight, we made a ground and airborne check of the automatic direction finder and VHF omnidirectional range (VOR) equipment. These systems checked out properly.

As pilot, I filed an IFR flight plan and received a weather briefing. I determined my true airspeed to be 84 knots (kts), total distance to facility serving the home base as 129 nautical miles and estimated time enroute as 1½ hours. The weather briefing listed the winds at my desired altitude as 250 degrees at 25 kts. Based on forecast destination weather, an alternate airfield was required but I did not think I "really" needed to file an alternate.

The aircraft logbook had a circle "Red X" condition for an unreliable fuel gauge, restricting the

aircraft to a 2-hour flight. Based on the copilot's experience as a maintenance officer and his observations during the 30-minute test, we listed 2½ hours of fuel onboard the aircraft. The weather briefer advised against departing that day because of the weather system that was moving from west to east. He told us that the weather would worsen within an hour after my estimated time of arrival. I felt we could make it so I elected to go ahead with the flight.

When my copilot and I arrived back at the aircraft it had not been refueled. We flagged down a passing fuel truck and topped off. We departed the airfield at 1504Z, after 10 to 15 minutes ground runup and hovering for departure. Our entire flight was conducted under IFR conditions soon after departure.

After departing we were dropped from radar and advised to contact destination at intersection "A." I reported intersection "A" to destination tower who directed us to intersection "B" and to hold. We reported holding at intersection "B" at 1716Z. Sometime shortly before or just after we reached intersection "B," the winds increased to about 40 kts. We never did become aware of this problem. We thought we had a VOR problem because we did not receive station passage indication in the proper timeframe based on our estimated groundspeed of 60 kts. We hadn't physically made a groundspeed check.

At 1720Z the aircraft was cleared to destination VOR and we were instructed to hold there. I reported departing holding at intersection "B" at 1726Z and asked how long would I have to hold my destination VOR. I was told a few minutes. Shortly after entering holding, the 20-minute fuel warning light came on. I did not believe the warning light with the fuel gauge indicating 420 pounds of fuel—I didn't think this necessary to report.

At 1740Z I told destination we had 20 minutes of fuel left on board and requested a direction-finding (DF) steer to the airfield. We were advised of the terrain elevation in the area and made a DF steer to the airfield, a direction of 320 degrees. We received permission to descend and find a place to land. At 1,400 feet mean sea level the aircraft was still IFR but I occasionally could see treetops directly below us. At 1750Z, the engine quit and I zeroed the airspeed and cushioned the aircraft into the treetops. The aircraft came to rest on its right side, basically intact. We got out and notified authorities.

I never thought this could happen to me!

* * *

Now that this story has your attention, I can begin to explain some of the items which at times are neglected due to the lack of attention to detail. Let's review some of the obvious items which aviators overlook daily.

Look at yourself! Are you ready to function at your maximum ability as a pilot? Have you had enough rest? Have you eaten balanced meals? Are you in good physical shape? Are you emotionally balanced and ready to leave your personal problems outside the cockpit? If you answered no to any of these questions it's time to sit back and reevaluate the importance of your position as an aviator.

Preflight! What is it? A simple definition is anything done to prepare for flight prior to takeoff. Look at the mission. Are you current on all regulations? Are you current in the aircraft? Is your copilot? Do you have proper equipment? Have you planned the route in detail? What about the weather? Fuel? NOTAMs (notice to airmen)? Is your crew briefed? Are they current for the mission? Did you properly file your flight plan? How about the maintenance preflight? Are you familiar with all MWOs (modification work orders)? Do you allow ample time for the aircraft preflight? Are you using the checklist? Do you know all the tolerances? Do you preflight in detail? Do you make one last walk around the aircraft after preflight prior to getting in? Are your passengers briefed? Many of these questions could possibly be answered no. If so, evaluate your actions prior to even getting in the aircraft!

Runup! Do you use the checklist? The call and response method? Take care of all inoperative or out of tolerance items prior to takeoff? Complete every item on the checklist and a detailed pretakeoff check by the checklist prior to flight? Please no negative answers when you're this far!

Inflight! Do you attempt to fly the aircraft in a precision manner to your maximum proficiency? Do you always fly within your capabilities and never exceed them? Do you always fly within the capabilities of the aircraft? Are you constantly on the lookout for other aircraft? Are you thoughts always on your flying while in the cockpit? Do you practice instrument procedures whenever possible? If you have answered no to any of these questions you are looking for an accident or possibly have had one already.

Postflight! If you have managed to land safely is your postflight as complete as your preflight? Have you made all writeups on the 2408-13? Have you closed your flight plan?

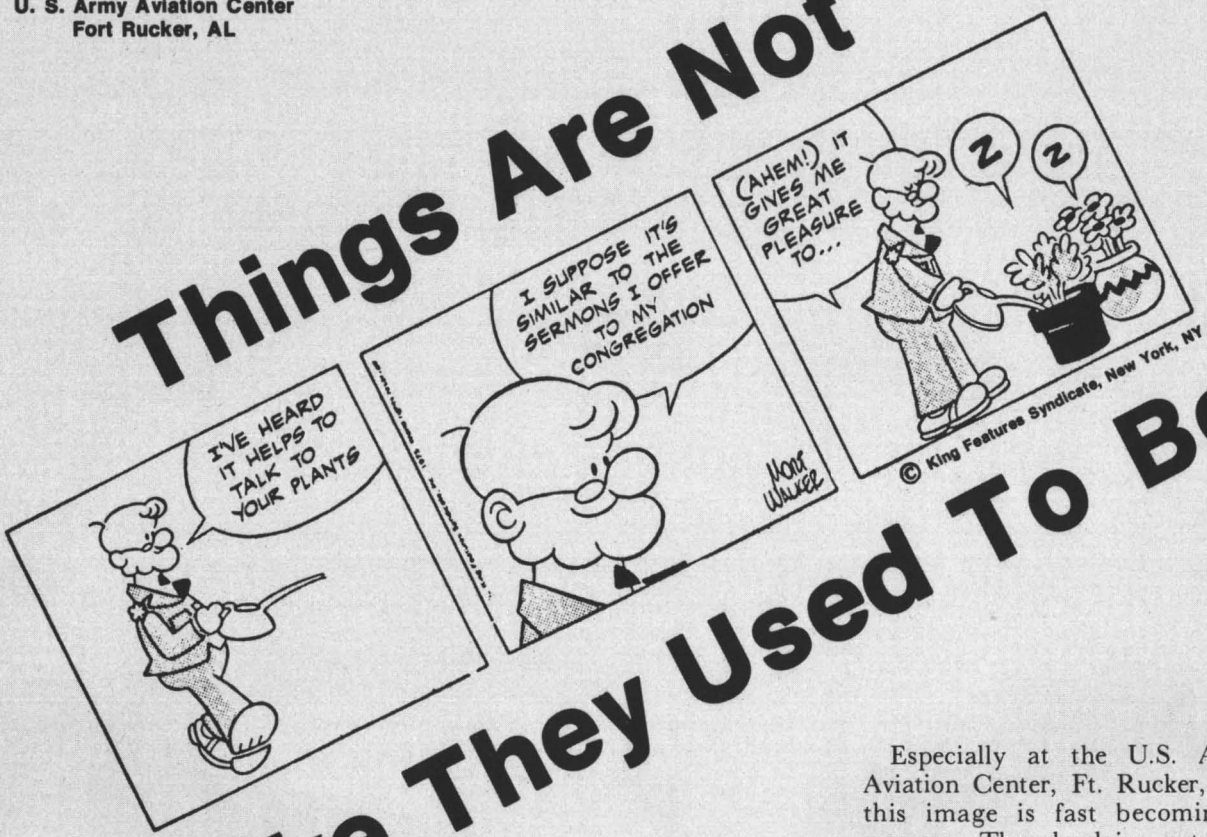
These questions have pointed out the large items missed due to the lack of attention to detail. The purpose of attention to detail is to not only cover the obvious but also to include the minute.

Let us not forget those three words which all of us must heed—*attention to detail*. They are a small but very important part of being a professional aviator.

The image depicting an Army chaplain as an old man interested only in the looks of the chapel, the weekly sermon and problems of Army personnel is fast changing at the Aviation Center. A series of programs have been initiated that will commit the chaplaincy to the total person

Colonel Trevor D. Turner
Center Chaplain
U. S. Army Aviation Center
Fort Rucker, AL

Things Are Not Like They Used To Be



FOR MANY YEARS the image of the Army chaplaincy has been equivalent to the World War II image of Chaplain Stainglass in the comic strip "Beetle Bailey." That image depicted the chaplain as an old man who was interested only in maintaining the appearance of the chapel, preaching a weekly sermon and sitting in the office waiting for the Soldier to come in with some personal problem.

Especially at the U.S. Army Aviation Center, Ft. Rucker, AL, this image is fast becoming a memory. The chaplains not only are interested in the chapel activities corresponding to the local church or synagogue but also are committed to the *total* person — Army aviators and those associated with them.

Various programs have been initiated in an effort to take the influence of the chaplain to the Soldiers where they live and work. Returning to the traditions of early America when the church spearheaded establishment of and involvement in the institutions of higher learning, a chaplain is on the faculty of the Aviation School. The ministry performed by

Chaplain John Brinsfield is teaching in the area of moral leadership, ethics, human relations and communicative arts as well as general military subjects. Armed with a Ph.D. in philosophy and experience as a troop chaplain, his involvement with student aviators and senior officers in the Warrant Officer Career College is to help them to face crucial decision-making responsibilities in future leadership assignments. His warm personality creates a classroom atmosphere which encourages students to seek his counsel on an individual basis over a cup of coffee between class periods.

There are no stained glass windows to dress up the Family Life Enrichment Center which has been established by the Center Chaplain at Ft. Rucker. Instead, there are conference rooms complete with closed circuit TV, a library and testing materials to aid in the improvement of the quality of marriage and family life within the military community. Chaplain Leland Buckner, director of the Family Life Enrichment Center, is imminently qualified having recently come from the American Institute of Family Relations of Los Angeles, where he spent 18 months in graduate training.

Divorce rates and the breakup of family life in the United States continue to rise. Child abuse and neglect are all too prominent and an ever-growing problem with enormous physical, mental and social consequences. The military community does not escape the problems of juvenile delinquency, crimes of violence between members of the same family and other forms of family turmoil.

Moreover, the military family has added stress associated with long periods of separation (husband/father and now wife/mother if she is in the Army) due to overseas or TDY tours and hazardous duty assignments associated with military service. There is an added dimension of stress at the Aviation Center because of the rigorous training involved in aviation. None would deny the effects of physical and mental fatigue upon family life. Long hours of training coupled with hours of study require patience and understanding on the part of the fledgling aviator's family members. Even seasoned aviators must face the impact of just how much their jobs affect family relationships and must make adjustments accordingly.

The programs of the Family Life Enrichment Center are designed to deal with identified issues encountered by both the young Soldier and married personnel. They include premarriage instruction, workshops in communication skills, development seminars, personal growth sessions, marriage encounter retreats, marriage/family counseling, group and individual counseling. The major objective of the Family Life Enrichment Center is to concentrate upon preventive efforts rather than to constantly try to remedy very complicated problems after they arise. Close coordination is maintained with the Army Community Service, community mental health agencies, human resources agencies and others located on or near Ft. Rucker to address the "total" person.

The healing ministry is also another facet of the new image which the chaplaincy portrays at Ft. Rucker. A chaplain is a member of the healing team at the Aeromedical Center and Lyster Army Hospital. He has a combined role of serving as hospital chaplain and serving on the staff of the Alcohol and Drug Abuse Officer to effect a spiritual thrust to the program so vital to men and women whose values have been obscured. The amicable personality of Chaplain Louis Schmit with just the right words of spiritual comfort at the bedside of a frightened patient scheduled for surgery taps a source of strength available to the patient which cannot come from any other source. His training in reality therapy has been an effective tool in reaching the alcohol or drug abuser whose perspectives are topsy-turvey.

Although the core of religious activities are focused on the Sunday and weekday worship activities, there are many other forms of expressing religious devotion. The Center Chaplain has contracted with a nearby retreat center in order to conduct a regular off-post weekend retreat program. Unmarried Soldiers, families and dependent youth have opportunities for indepth study and devotion in a beautiful outdoor setting of the Conecuh National Forest. The idea is to develop a Christian community away from the daily routine in which participants gain a deeper understanding of God and human relationships.

Quarterly prayer breakfasts feature noted Christian leaders in the business and sports world. Religious musical groups — from religious rock to gospel quartets and drama programs — are presented for the young Soldiers at the Recreation Center. A complete religious education program for the three major religious faiths with trained directors of religious education offer everything from Sunday School to summer camps to the best religious library in South Alabama. A chapel visitor greets every newcomer occupying housing on post and introduces the myriad of activities which bring military personnel and their families into an awareness of spiritual resources available to them.

Beetle Bailey would undoubtedly do more than just come to the chaplain to help him get a 3-day pass if he were one of the Soldiers of today's modern Army at Ft. Rucker. The chaplains at this installation are doing their share in helping Army aviators live up to their motto — "Above The Best."

EPMS CORNER

Enlisted Personnel Management System

Specialization in Aviation Maintenance Quality Control

SFC Douglas E. Allen
Aviation Career Advisor
U. S. Army Military Personnel Center
Washington, DC

AFTER SEVERAL years and many complaints from commanders, aviation safety officers, technical inspectors and other aviation personnel, a Narrow Range Technical Inspector (TI) program has been developed. The idea behind replacing general purpose technical inspectors with the specialized inspectors revolved around having experts determine the airworthiness of Army aircraft.

Before the introduction of the Narrow Range Technical Inspector Program, there were two types of inspectors performing all quality control functions in Army aviation maintenance. The airplane technical inspector, MOS 67F, was responsible for inspecting all fixed wing aircraft in the Army inventory while the helicopter technical inspector, MOS 67W, was assigned to inspect all rotary wing aircraft in the Army fleet.

The general purpose TI system did not guarantee that the best available quality control was given to our flight crews. This resulted because some inspectors were not trained on all the different aircraft they were responsible to inspect.

On the other hand, the narrow range technical inspector is a highly qualified technician with several years experience in maintaining a particular type aircraft. The narrow range technical inspector is selected and designated in written orders to perform inspector type duties.

No special training is required for an individual to become a narrow range technical inspector at grade E6. The training received in aviation service schools, correspondence subcourses and on-the-job experience up to that point in the Soldier's career prepares that individual to perform as a narrow range technical inspector.

Under the Enlisted Personnel Management System (EPMS), which is scheduled to be implemented for the aviation maintenance career management field on 1 March 1977, the narrow range technical inspectors are retained. Job descriptions will be published in Change 7 to Army Regulation 611-201. Fixed wing maintenance personnel through grade E6 will be MOS 67G. Helicopter maintenance personnel through grade E6 will have different MOS codes depending upon the category of helicopter maintained — observation/scout utility, attack, medium lift or heavy lift. Also under EPMS, the airplane technical inspector and the helicopter technical inspector will merge into MOS 67W and be retitled quality control supervisors. This provides an outstanding combination of technical expertise in the quality control section. The narrow range technical inspectors will perform inspections on the aircraft their MOS qualifies them to maintain through all phases of maintenance.

On the other hand the quality control supervisor will be responsible for the management functions within the quality control section. These functions will include, but not be limited to, performing nondestructive tests; supervising weight and balance checks on the aircraft; ensuring proper maintenance of aircraft historical and maintenance records; overseeing the spectrometric oil analysis program; ensuring proper compliance with modification work orders and technical bulletins; submission of equipment improvement recommendations; maintaining technical libraries; overseeing the unit calibration program; estimating manhours required to repair damaged aircraft; and providing maintenance assistance and instruction.

OPMS CORNER

Officer Personnel Management System

S-1 Positions
Aviation Career Incentive Act

LTC B. F. Freeman
Chief, Aviation Management Branch
U. S. Army Military Personnel Center
Washington, DC

S-1 Positions: DA message 051814 Nov 1976 announced the designation of S-1 positions as operational flying positions in specified TOEs (tables of organization and equipment). Effective 1 September 1976, S-1 positions for the following TOEs were designated operational flying positions:

01166H
01256H
06726H
07256H
17202H
17206H
17206HV2
17276

Effective 1 November 1976, S-1 positions for the following TOEs were designated operational flying positions:

01252H
07201H
17096H
17196H
17386H
55406H
57056H

TAADS (The Army Authorization Documents System) proponents will cite the above message as authority to document, under the provisions of AR 310-49, the positions specialty code for S-1 positions in units organized under TOEs cited as 15A41 pending publication of consolidated change table 300-62.

Aviation Career Incentive Act: Department of the Army Circular 600-10 announcing the fiscal year 1975 update information and certification of the key elements of data which are required by the Aviation Career Incentive Act of 1974 was scheduled for distribution during January 1977. Distribution was made to company/detachment level. DA Circular 600-10 supersedes DA Circular 600-6 dated 19 January 1976 and validates flying data credit through 30 June 1975. Data published in this circular which is believed to be incorrect may be challenged by submitting appropriate documentation to: MILPERCEN, DAPC-OPP-V, Alexandria, VA 22332.

The Narrow Range Technical Inspector Program under EPMS offers commanders several options not previously available to them. They have the option of selecting the most highly qualified E6 in a particular MOS and designating that individual to perform as an inspector. By rotating the NCOs (noncommissioned officers) from maintenance supervisor to technical inspector, the commander offers the NCO an opportunity to develop as a leader as well as a technician. Additionally, if an inspector is needed on a temporary basis the commander has the option of appointing a member of the unit to perform these duties.

Recent interviews with personnel in MOS 67F and 67W revealed most were not qualified on all models of aircraft. A technical inspector with no experience on CH-47 Chinook helicopters who is assigned to maintain this type aircraft is of little value until a lengthy on-the-job-training program has been completed. This results in additional workload on other assigned inspectors and could pose potential risk to the flight crews.

In this era of sophisticated aircraft and systems what could be more appropriate than specialized inspectors? We owe it to our flight crews and passengers to provide them with safe aircraft.

The *Aircraft Autopsy* In Army Aviation

First Lieutenant Eric L. Mitchell
Maintenance Officer, Analytical Investigation Branch
Directorate for Quality Assurance
Corpus Christie Army Depot, TX

IN ORDER TO help achieve mission accomplishment, Army aviators maintain primary interest in safety, reliability and product improvement. A major factor in accomplishing this is determining the cause for aviation incidents and accidents. This is one of the missions of Corpus Christi Army Depot (CCAD), TX, and the assigned function of the Analytical Investigations Branch, Quality Systems and Management Division of the Directorate for Quality Assurance.

Just as a medical autopsy determines why an organism stops functioning, the Analytical Investigation Branch performs analytical teardown investigations and analysis of aviation material to identify and report malfunctions and failure defects that have caused or may cause aviation accidents. It supports aviation accident boards; the U.S. Army Agency for Aviation Safety (USAAAVS); U.S. Air Force; U.S. Navy; the U.S. Army Aviation Systems Command (AVSCOM); Military Assistance Programs (MAP); overseas commands; National Guard; Army Reserve; and CCAD.

Two mechanics assigned to the Analytical Investigation Branch have a combined experience of more than 60 years in aircraft maintenance

Teardown investigations encompass USAAAVS projects, AVSCOM projects, equipment improvement recommendations (EIR), and ASOAP (Army Spectrometric Oil Analysis Program) exhibits. A USAAAVS project is a direct result of an Army aircraft mishap, whereas an AVSCOM project is a special investigation. An EIR exhibit is a result of a detected failure that may or may not have caused other damage or injury. The purpose of an ASOAP teardown investigation is to verify and correlate or, as the case may be, to deny incipient failures detected by ASOAP. Since an important part of aviation safety is accident prevention, ASOAP is a valuable function. In addition to this, many cross-service projects are received.

Upon receipt of the exhibit—regardless of the type of project—a file is started with all pertinent data enclosed. The project is then assigned to an equipment specialist—the investigator.

After acquiring a mechanic, the exhibit is uncrated and visually inspected for "as received condition."

The eight equipment specialists are highly qualified with many years of aviation experience, high motivation and interest in aircraft safety. The two mechanics assigned here have a combined experience in aircraft maintenance that exceeds 60 years.

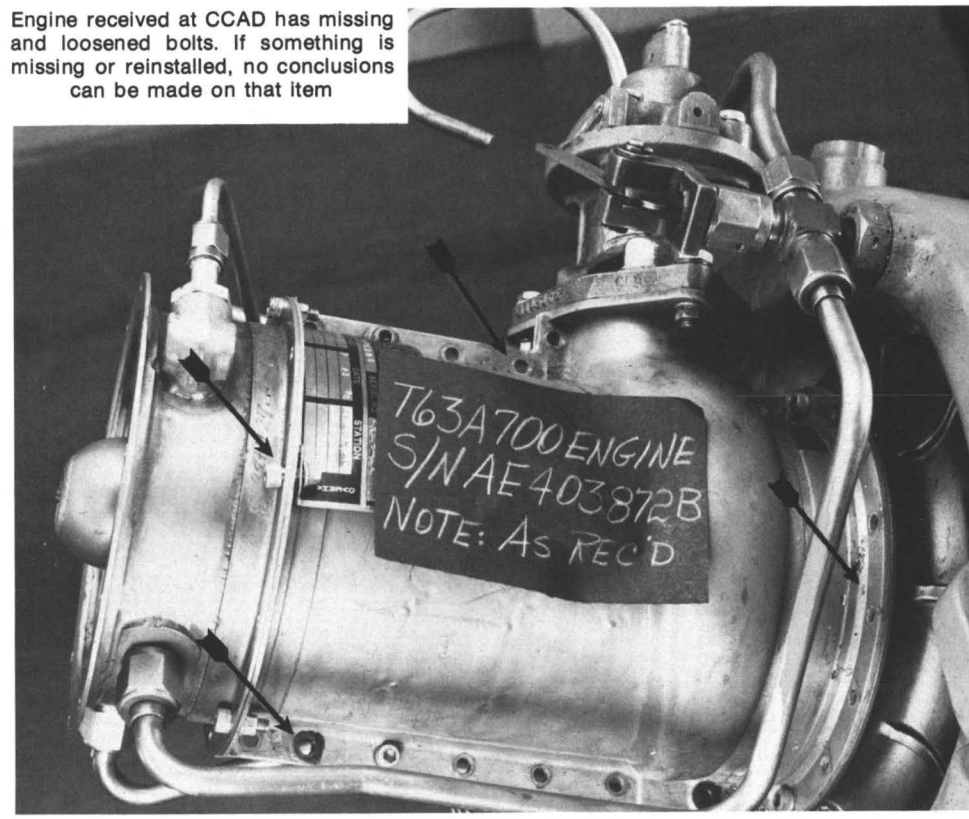
The specialist already has reviewed the history on the exhibit and has a general idea of where to concentrate the investigation. For example, an ASOAP finding of high bronze and iron would most likely be a bearing failure. But still the specialist does not discount any possibility. On an ASOAP or EIR project, the primary concern is with *what* failed and possibly the circumstances surrounding the failure. On any investigation, and primarily USAAAVS and AVSCOM projects, the specialist is highly aware of any discrepancy, even though it may not be directly related to the fault. On the USAAAVS and AVSCOM projects *why* it failed also is a primary concern. This is where support from a skilled and well equipped laboratory plays its role. In order to verify why a part failed, the specialist submits the part to Technical Analysis Division for confirmations. The division has the expertise and laboratory equipment to support CCAD with DOD Spectrometric Oil Analysis Program (SOAP) and chemical, metallurgical, and metrological analyses. They are able to aid the investigator in identifying why a part failed and in submitting recommendations.

During disassembly all discrepancies are well documented by photographs included with any laboratory reports for the final report submitted by this branch. These reports are sent to all parties concerned, along with any recommendations concerning product improvement or maintenance practices.

Every report is reviewed by the branch chief. With the aid of one secretary and one production controller, the branch chief heads a work force of 13 people who can handle any aircraft in the Army inventory as well as similar models from cross-service. If the investigator does not have the knowledge or special tools to do a certain job, that individual knows which shop at CCAD can give technical advice or assistance in disassembly.

But even with all this expertise, the Analytical Investigation Branch at CCAD still needs help from the field. The biggest problem they have is the curiosity of field maintenance personnel. When something is removed and reinstalled in the field prior to receipt, no positive conclusions can be made on that part. If oil samples for ASOAP are not taken properly, it could cost a pilot's life or the branch might receive a perfectly good component for teardown analysis. This inconveniences all parties concerned and tends to devalue a very good ASOAP program. If field maintenance personnel must inspect a part before shipment to CCAD, enclose a statement or include on the form 2407 what was inspected and the findings. Any pertinent background and data will help this branch and, indirectly, all of Army aviation.

Recently the Analytical Investigation Branch instigated a program for keeping a record of recurring faults and malfunctions in hopes of drawing early attention to a problem area. The most important part in solving a problem is identifying the problem. This, then, seems to be the essence of their mission and an important factor in building better and safer aircraft. Hopefully, with help from the field and the expertise at CCAD, they can work toward that end.



Engine received at CCAD has missing and loosened bolts. If something is missing or reinstalled, no conclusions can be made on that item

Who Briefed The Passengers?

CW2 Randall G. McCarson

Instructor Pilot
Department of Undergraduate Flight Training
Fort Rucker, AL

PUT YOURSELF in the position of an Infantry Soldier or some other passenger on a routine mission. The following is a fictitious (and extreme) situation intended to attract your attention (but maybe there are some of you who will not think it's so extreme or fictitious).

You get a signal from your team leader or the crew of the aircraft to go ahead and load up. Now's when you start having problems. First, you don't know how to approach the aircraft. After boarding, you're not sure of which seatbelt is yours nor how to buckle it. Then, the crewchief and pilot are shouting at you over the sharp whine of the engine to put out your cigarette, roll your sleeves down and secure your chin strap. Now, the aircraft is taking off.

You start wondering what should I do *if* we crash? Do I just sit here with my loaded M-16 and hope my head doesn't snap if we roll over? Is there a fire extinguisher? Are there any first aid kits?

Well, the flight is over and we finally land. This must be the door latch; so you pull it and the window falls out in your lap.

After the crewchief pulls the window out of your lap and opens the cargo door, you unbuckle and jump off the aircraft. Now you're stand-

ing just outside the helicopter and your team leader shoves you down on your face and yells, "You dummy, ya wanna get your head cut off by those rotor blades? Stay down!"

After all that confusion, you wonder whether someone could have briefed you before you even boarded the aircraft? The answer is *yes*! Aircraft commanders are responsible for ensuring that proper passenger briefing has been conducted. It is required by AR 95-1. All of the questions that the trooper above asked could have been answered *before* that Soldier boarded the aircraft—had there been a proper briefing.

The unit commander knows it's the responsibility of the aircraft crew to brief the passengers before a flight. But how much time does the crew actually have? About 10 or 15 seconds.

When an airmobile or short lift is projected, the ground unit commander should brief the troops prior to the lift. Here, there is sufficient time to complete a thorough passenger briefing.

The figure is an example of the Passenger Briefing Checklist now being printed by the U.S. Army Agency for Aviation Safety, Ft. Rucker, AL. A passenger briefing will be printed in the aircraft dash 10 for easy reference. *A copy of this and the crash position should be reproduced and sent to the supported units for their briefings prior to an air movement.* Not only will this aid in an expedious pickup and dropoff of troops or passengers, but it also will give you and your crew the professional esteem deserved.

Keep your crew and passengers' safety in mind at all times. We all want to live long enough to see our next paycheck.

Passenger Briefing Checklist

1. **Approach and Departure from the Aircraft:** Passengers should approach and depart the aircraft from an area visible to the pilot. Use extreme caution when under the main rotor blades and avoid the tail rotor at *all* times. Extended radio antennas (back pack and vehicle) must be kept well clear of the rotor system.

2. **Smoking:** Smoking within 50 feet of an aircraft on the ground is prohibited. Smoking may be permitted at the discretion of the aircraft commander, *except* under the following conditions:
   - During all ground operations.
   - Immediately before, during, or after takeoff or landing.
   - An internal load is flammable or combustible.

3. **Emergency Exits and Equipment:**
   - The passenger cargo door windows are jettisonable. Emergency window release handles are at the bottom of the windows, and when pulled, the windows fall inside the aircraft. Four first aid kits are located just behind the pilot's and copilot's seats on the forward support column.
   - A fire extinguisher is located on the floor, either behind the radio console or on the right side of the pilot's seat. Use of the fire extinguisher should be limited to well ventilated areas, since the fumes could be toxic.

4. **Seatbelts:** Each passenger will have and use a lap type seatbelt at all times. Upon departure from the aircraft, secure the seatbelt by connecting the loose ends.

5. **Body Position (For Emergency Landing):** Bend forward at the waist, with feet planted flatly and firmly on the floor. The chest rests firmly on the knees and the position is held by enfolding and locking the arms around and behind the thighs with the hands.

6. **Weapons and Ammunition:**
   - If weapons are to be carried aboard the aircraft, the magazines will not be loaded in the weapon until a few seconds prior to landing.
   - Explosive devices will not be dropped from the aircraft and will be properly secured.

7. **Clothing and Helmets:**
   - Passengers will have their sleeves rolled down, upon boarding the aircraft.
   - Helmets will have the chin strap secured and under the chin and earplugs or ear protection devices will be worn when on the aircraft.

PUBLISH and Serve Safety

The *DIGEST* is reemphasizing through this article the importance of Soldiers in the field contributing information about Army aviation facilities. Data to correct or improve existing procedures will benefit all aviators. *DIGEST* readers may recall the USAASO Sez feature of March 1975 about this subject

Aeronautical Services Office
U.S. Army Air Traffic Control Agency
Fort Huachuca, AZ

FLIGHT INFORMATION Publications (FLIPs) are a primary source of data for transient, cross-country and enroute operations. You Army aviators—in the active Army, the National Guard and the Army Reserves comprise a significant segment of the professional aviation community and constitute a potential editorial staff that any technical publishing house would envy. And to the hundreds of you in the Army aviation support arena, including the many dedicated personnel who have been contributing editors—past and present—our warm thanks.

But now for those in the family who feel that *"It's not my business"; "I'm new to this man's Army"; "In 'Nam I really needed stuff on runway gradients, ammo availability, drop zones and such, but now . . . ."* Of course there are other sundry excuses, but here's a further dissertation on what we've covered.

"It's not my business." Nonsense! Flying safety is *everybody's* business and all those books and charts are to make your flight safer. The handful of U.S. Army Air Traffic Control Activity Aeronautical Services Office (USAATCA ASO) personnel, whose sole business it is, are well occupied just processing information; the actual data must, by and large, be submitted from field sources. YOU!

"I'm new to this man's Army." So were we all—once. If it's tough to understand, or if you can't find your answer in the FLIP, the problem may not be you; maybe the system needs simplifying. As a very smart man said, "There's really no such thing as a stupid question." Through your new eyes, obsolete practices and outmoded procedures can be identified, modernized if practicable, or—as appropriate—eliminated to provide an improved product. The informal and direct door for communication with our office is wide open. Comment cards addressed to USAATCA ASO or the appropriate USAATCA overseas detachment are available at most Army operation offices. Direct phone calls can be placed in many cases to USAATCA ASO or the detachments. Letters, wires, personal visits or any other means are OK too. The location, phone number and wire message address are available inside the front cover of your Enroute Supplement, in the appendix of AR 95-14, and in the DOD FLIP and Chart Catalog. But if you've got a flight case in one hand and a helmet in the other, tell it to your airfield operations people and let them pass it on. Oh yes, CONUS (continental U.S.) aviators have the USAATCA ASO weekly, the Army Aviation Flight Information Bulletin, with the communications data in the Foreword and periodically on the back cover as a direct mail form which can be removed and folded for submitting corrections data.

The USAATCA ASO crew provides a Department of the Army point of contact and liaison with local aeronautical agencies, as well as staff elements concerned with regulatory data, format and content of flight products. Field data on air facilities, communications, navigational aids and airways are processed promptly for dissemination to all concerned. Thanks to those many incoming reports from Army users, the responsible military or civil aviation authorities have been able to correct deficiencies and make things safer for all of us.

So, if you see an error or perceive a better way to put it all together, use the media described above to tell us about it. We'll act on it right now to make it right!

Crash Helmet

Captain Charles T. Woolwine
Department of
Undergraduate Flight Training
U.S. Army Aviation Center
Fort Rucker, AL

or Headset

HAVE YOU EVER had a piece of equipment fail you just when you needed it the most? Chances are pretty good it will happen *to you* in the flying business if you are not aware of a few little important facts! You probably won't be in any condition to DX (direct exchange) it if it does fail you.

A few months back at a quarterly safety meeting, I heard a representative from the Aeromedical Research Center at Ft. Rucker, AL, speak on just that subject. While listening, I found myself mentally picturing the abuses I have been inflicting on my aviation safety-designed equipment. The speaker was talking about several SPH-4 flight helmets that failed their wearers. Most failure information had been determined by the accident investigation board without the benefit of the users' input. One helmet had failed internally because the pilot was in the habit of carrying a flashlight and kneeboard inside it. This caused the shock absorbent materials to deteriorate and lose most of their protective qualities to absorb impact. BINGO!! That's exactly where I have been storing my flashlight and kneeboard.

Another failed internally because the pilot was a model airplane buff. (Good, that one doesn't apply to me.) How? The chemicals used in assemblying the models were often left on the pilot's hands which came in contact with the internal parts of the helmet and caused deterioration. Wow! Here I go again—cleaning solvents and special cleaning chemicals for my motorcycle and sportscar!

By this time I began to get the speaker's point and decided I'd better have my helmet checked. But on the other hand, my old one still worked perfectly. Never had any trouble with the fit or with the earphones and mike. I sure hate to break in a new helmet.

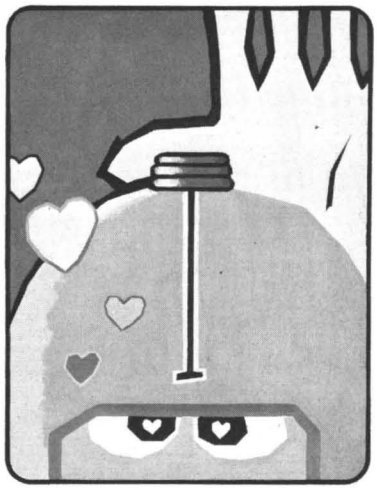
Leaving the helmets for awhile, the speaker started talking about the design features of the Nomex flight suits—how they were made to actually shrink or melt up to 25 percent of their total size in a fire. But if the pilots' suits were altered to fit nice and snug, or the next smaller size was worn for that same reason, the suit would still shrink but the effect would be to void the very protection they were designed to offer.

Now I felt as though the speaker had been following me around and was using me as an example at this meeting. More gory examples of misuse and abuse of flight gear by the very people the equipment was made to protect were given. Are you getting the idea too?

Like myself, most aviators don't knowingly commit this abuse. It was done through insufficient knowledge of facts concerning the proper care and use of our equipment. No one ever bothered to tell me before. But like my own, I would just bet that there are a whole lot of headsets in use today disguised as a crash helmet.

I guess maybe the safest thing for me to do is let out those seams I put in my Nomex and get my SPH-4 over to the inspection shop before I really need them! How about you? Think maybe your equipment has slipped below the safety level?

VIEWS FROM READERS



Sir:

When this fledgling flier first heard those words, "There I was," I was all ears. Surely the words of great wisdom to follow would no doubt enable me some day to run unscratched through that Great Lions' Den in the Sky, beat the Ice Gladiator at his own game or outwit the tricky Night Gremlin.

Throughout my winged times at various parts of this island or occasionally across one pond or another, I have eavesdropped on many "There I was. . ." episodes—occasionally substituted with a "Hey, this ain't no bull. . ."!

One such Death Defying Driver delightedly described his deftness at demoralizing the Demons with a "There I was in my Huey showing the donut dolly how to do a hammerhead stall when the hydraulics suddenly. . ."!

Or how many of us have heard a version of "There I was with 10 minutes of fuel, 2 inches of ice on the wings, the pitot tube iced over, and turbine temperature climbing to the fateful red line, when . . ."!

How about this one heard just last week: "There I was, lead ship in a flight of three at 100 feet, when the whole herd of guernseys headed for the fence and . . . "!

With a little persuasion, nearly every Spellbinding Spieler will gladly supply two or three more tales of personal terrific terror, obviously meant to impress those of us that normally avoid being victims of the Withering Willies.

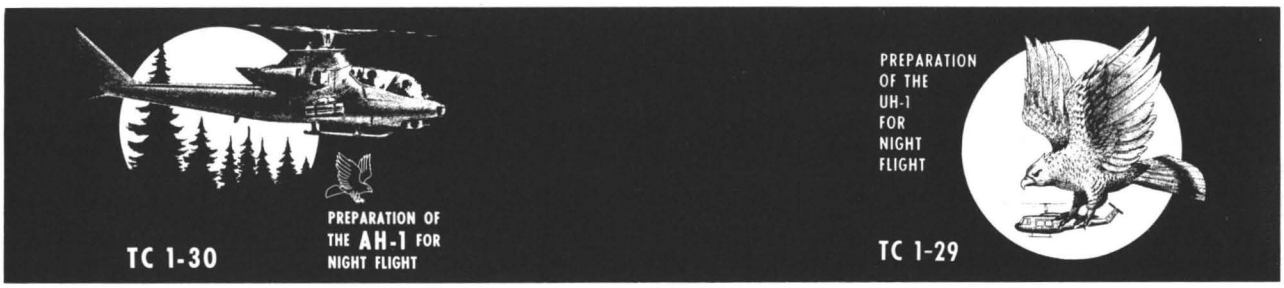
One thing that is bothersome is how the same pilots always manage to get into so many "There I was" acts. Most old pilots I know seldom mention a "There I was . . ." and usually then with regret at being there in the first place.

Perhaps with a large glass of good sense, a heavy shot of planning, a dash of good preflight, and a weather briefing swizzle stick, we can better spend our time propped at the bar telling "There I wasn't" tales.

CPT John D. Balkenhol
USAR Flight Facility
St. Paul, MN 55107

Preparation For Night Flight Series

Since release of TCs 1-29 and 1-30 of the "Preparation for Night Flight" series training circulars, several inquiries have been received stating that these publications do not emphasize the requirement to remove materials placed on the aircraft in preparing it for night flight. Although not brought out in the TCs in the form of a warning or note, the introduction states that the aircraft should be returned to its normal configuration after completion of night flight. Units modifying aircraft for night flight must be aware of this requirement and remove material (e.g., tape, acetate, clip-on filters, etc.) before performing day flight in the aircraft. Future publications in the "Preparation for Night Flight" series will contain a note to this effect at the beginning of Section I.



Sir:

Your magazine makes for interesting reading. I have one question as to the TBO time given to the T63-A700 engine in an article in the October 1976 issue, page 15. It is given as 1,200 hours. The TBO chart in the OH-58A manual (TM 55-1520-228-20) lists the TBO time as 750 hours for the T63-A700 engine. Who is right?

Alexander Botko
94th ARCOM Flt Fac
Ft. Devens Army Airfield
Ft. Devens, MA 01433

The current TBO for the T63-A700 engine is 750 hours as listed in TM 55-1520-228-20. The modified engine (suffix B) has a TBO of 1,000 hours. The erroneous 1,200 hours figure in the article resulted from U. S. Army Aircraft Development Test Activity (USAADTA), Ft. Rucker, AL, having been authorized to fly test engines to 1,200 hours.

Sir:

The 180th Aviation Company (ASH), 11th Aviation Group (Combat), located at Schwaebisch Hall, Germany, stakes its claim to be the first CH-47 company to transition a CH-54 "Flying Crane" company into "Chinooks." Instructor pilots for the "Cranook" transition are CW2 Gordon Ortelli, SIP, 180th Aviation Company; and CW2 Joe Loiselle, the former SIP for the 180th and currently assigned to the USAREUR Safety and Standardization Board. Members of the first "Cranook" graduating class from the 295th Aviation Company (Hvy Hel) are CW3 Leon, CW2 Meyers, CW3 Shakallis and CPT Zeir.

CPT Steven D. Sanford
Assistant S-1
11th Aviation Group (Combat)

INADVERTENT INSTRUMENT METEOROLOGICAL CONDITIONS

The Department of the Army (DA) recently released policy concerning flight procedures that aviators must initiate when they encounter inadvertent instrument meteorological conditions (IMC). A synopsis of the DA message is published below.

A REVIEW OF 42 rotary wing accidents resulting from inadvertent flight into instrument meteorological conditions indicate that the most common reaction by the pilot was an attempt to regain visual meteorological conditions (VMC) without reference to flight instruments. Since inadvertent IMC is an unplanned event most frequently occurring under the least desirable circumstances—low altitude and airspeed and with crew totally unprepared for instrument flight, it is essential that Army aviators be properly trained in inadvertent IMC procedures.

The following are the DA procedures for immediate action under inadvertent IMC:

- Altitude indicator—level aircraft
- Heading indicator—maintain constant heading
- Torquemeter—adjust to climb power
- Airspeed—establish climb airspeed
- IMC/IFR flight recovery procedures—initiate only after transition to instrument reference is complete and aircraft has reached a minimum safe altitude.

Each major Army command is required to develop inadvertent IMC plans to include:

- Training requirements
- Validation of training
- Initial aircraft control procedures for inadvertent IMC/IFR flight
- IMC/IFR flight recovery procedures giving due consideration to factors such as single ship versus formation flight, geographical area (mountains/desert) and aircraft IMC capability. These procedures should, as a minimum, contain the initial altitude and heading for the purpose of providing terrain clearance or radar acquisition; the name and frequency or the facility to be contacted; and the requirement that the transponder be set to emergency (7700). In addition all aircraft should be equipped at all times with the approach and instrument navigation charts appropriate to the local area.

Inadvertent IMC procedures will be reviewed and flight checked during the conduct of all standardization evaluation flights.

ATTITUDE HYPOXIA

Captain John D. Balkenhol
U. S. Army Reserve Flight Facility
St. Paul, MN

MOST OF US within the aviation community know the definition, symptoms and hazards of that malady called hypoxia—that potential threat to all of us that wing our way through the skies. We have been told or know from experience that the problem is caused by a lack of oxygen to the brain and that it increases at higher altitudes. The symptoms are an increased sense of well-being (referred to as euphoria), slowed reactions, impaired thinking ability, increased respiration, unusual fatigue and a dull headache feeling. The main hazard is that our ability to function efficiently and safely is impaired.

Precautionary measures taken to guard against being affected by hypoxia are use of supplemental oxygen; staying within time guidelines for flights above 10,000 feet (daytime) and any flight above 5,000 feet at night; reducing the frequency of our smoking; and possibly sleeping more than usual. The problems associated with this type hypoxia (altitude hypoxia) have been written about and discussed so often, it is rare that anyone has no knowledge of it.

Another malady that has equal or greater potential for mischief is one I prefer to call *"attitude hypoxia."* It is doubtful you will find it described in medical journals and although it may strike any person, an aviator with an advanced case may find it disastrous.

Attitude hypoxia, in simple terms is a lack of sufficient awareness of the fact that we possibly could make a mistake. Or, a situation could present itself from which we might be unable to recover and escape injury or prevent impairment of mission accomplishment.

Susceptibility to *attitude hypoxia* varies from person to person. In addition to a progressive number of years of aviation service without a mishap, alcohol, various drugs, and ignorance of weaknesses of an aircraft or of the weaknesses of the human flying it, decrease the brain's tolerance to hypoxia.

Your body has no built-in alarm system to let you know when *attitude hypoxia* poisoning is taking effect. It is impossible to predict when or where *attitude hypoxia* will occur during a flight career or how it will manifest itself.

A major early symptom of *attitude hypoxia* is an increased sense of euphoria. This progresses to slowed reactions; to mechanical or psychological warning signs; impaired thinking ability to realize a dangerous situation is approaching; or unusual fatigue when confronted with the necessity for a good preflight or weather planning.

The symptoms are slow but progressive, insidious at onset and usually first appear at the 400 to 600 flight-hour level. Early symptoms may appear earlier through contacts with other possibly terminal diseases such as Practice of Unauthorized Maneuvers; Flight With No Sleep; and the dreaded Poor Preflight Plague.

Prevention of the sometimes fatal disease is quite simple—it entails the realization that a disaster may be imminent at any time. A heavy injection of planning and preflight, a tablet or two of sleep taken regularly and constant vigilance at all times normally will ward off most attacks of *attitude hypoxia.*

COMMUNICATIONS CHANNELS

WHEN USING THE AN/ARC-116 remember that some 60 out of the available 3,500 communications channels may give you inferior communications because some of the channels are not usable. While only 17 of the degraded channels are ever present in one of the radio sets, determining the specific channel affected requires extensive testing. So it's best to avoid all the channels that could cause problems and choose one from the remaining 3,440.

If a problem channel is assigned to you for operation, explain the problem and request a different frequency assignment from the local command group.

Below is a list of affected channels, with a rating of poor to unusable assigned for each. An upcoming change will include this information in TM 11-5821-261-20.

Frequency Channels (in MHz) To Be Avoided, Serial Numbers 1 thru 136

Channel	Classification
230.00	poor
230.20	unusable
233.10	very poor
235.15	unusable
236.80	marginal
238.45	marginal
240.00	very poor
241.75	marginal
243.40	unusable
244.70	poor
245.05	marginal
246.40	very poor
250.00	unusable
260.00	very poor
260.15	marginal
270.00	very poor
270.05	very poor
274.65	unusable
280.00	marginal
280.15	marginal
280.20	very poor
285.15	marginal
286.80	unusable
290.00	unusable
290.30	unusable
293.40	marginal
295.05	marginal
300.00	unusable
306.80	poor
310.00	very poor
310.15	marginal
310.20	marginal
320.00	unusable
320.05	unusable
330.00	marginal
330.05	marginal
330.20	marginal
333.40	poor
335.15	unusable
336.80	unusable
337.95	poor
340.00	marginal
343.40	marginal
345.05	marginal
350.00	unusable
360.00	unusable
360.15	marginal
366.20	unusable
366.80	poor
370.00	marginal
370.05	unusable
380.00	marginal
380.20	marginal
385.15	unusable
386.80	unusable
390.00	unusable
390.20	very poor
393.40	marginal
395.05	marginal
395.15	very poor

Frequency Channels (in MHz) To Be Avoided, Serial Numbers 137 And Up

Channel	Classification
230.00	poor
230.20	marginal
233.10	very poor
235.15	poor
236.80	very poor
238.45	poor
240.00	poor
241.75	very poor
243.40	poor
244.70	poor
245.05	poor
246.40	very poor
250.00	very poor
260.00	very poor
260.15	marginal
270.00	very poor
270.05	poor
274.65	unusable
280.00	poor
280.20	very poor
286.80	poor
290.00	very poor
293.40	poor
295.05	very poor
300.00	unusable
306.80	poor
310.00	poor
310.15	poor
310.20	poor
320.00	poor
320.05	poor
330.00	very poor
330.05	poor
330.20	very poor
333.40	poor
335.15	marginal
336.80	very poor
337.95	poor
340.00	poor
343.40	poor
345.05	poor
350.00	marginal
360.00	poor
360.15	poor
366.20	unusable
370.00	poor
390.00	poor

Say Again

TOWER: "Piper 4735C . . . bear to the right."

Aircraft: "4735C roger, have him in sight."

or

Nervous pilot after ATC help through rough turbulence— "Cancel my ILS, I'll go VHF from here."

or

How do you close an airport?
Answer: Shut the approach gate.

OK, OK, enough is enough. Terms can be confusing and misleading. Too often mistaken aviation terms can be dangerous rather than humorous. In light of recent aircraft accidents, the Federal Aviation Administration (FAA) has made a concentrated effort to overcome this problem in communications by publishing as a supplement to the Airman's Information Manual (AIM) Part I and The FAA ATC Manual 7110.65, a glossary of more than 600 terms of interest to pilots and controllers. Further, a description of certain pilot and controller responsibilities has been added to this manual.

Every aviator and controller should make these a large part of his aviation knowledge. In addition there never should be any reluctance on the part of the pilot or controller to clarify the meaning of any clearance or response.

The following selected terms from the new Pilot/Controller Glossary have been included here for two reasons. First, they are fairly new in their usage, or they have been a little vague in the past. Second, it is hoped this short listing will highlight some key areas and whet your professional appetite to check out all terms in the new glossary.

So here are a few—

Additional Services—Advisory information provided by ATC which includes, but is not limited to, the following:

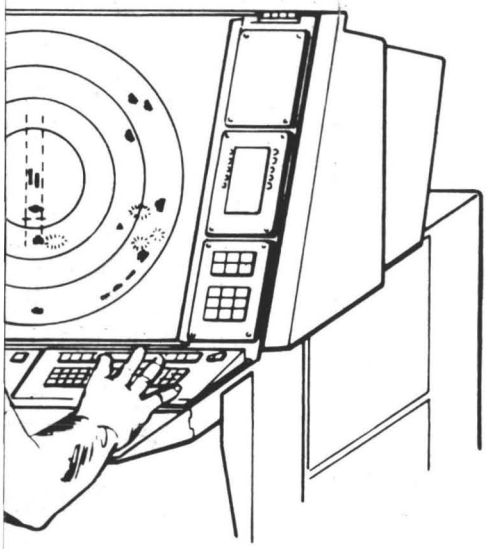
1. Traffic advisories.
2. Vectors, when requested by the pilot, to assist aircraft receiving traffic advisories to avoid observed traffic.
3. Altitude deviation information of 300 feet or more from an assigned altitude as observed on a verified (reading correctly) automatic altitude readout (Mode C).
4. Advisories that traffic is no longer a factor.
5. Weather and chaff information.
6. Weather assistance.
7. Bird activity information.
8. Holding pattern surveillance.

Additional services are provided to the extent possible contingent only upon the controller's capability to fit it into the performance of higher priority duties and on the basis of limitations of the radar, volume of traffic, frequency congestion and controller workload. The controller has complete discretion for determining if he is able to provide or continue to provide a service in a particular case. The controller's reason not to provide a service in a particular case is not subject to question by the pilot and need not be made known to him.

"Mistaking Aviation Terms Can be Dangerous."

All After

Richard G. Harding
Directorate of Training Developments
U.S. Army Aviation Center
Ft. Rucker, AL



Cleared As Filed—Means the aircraft is cleared to proceed in accordance with the route of flight filed in the flight plan. This clearance does not include the altitude, SID or SID Transition. (See Request Full Route Clearance) (Refer to AIM Part I)

Cleared For The Option—ATC authorization for an aircraft to make a touch-and-go, low approach, missed approach, stop and go, or full stop landing at the discretion of the pilot. It normally is used in training so that an instructor can evaluate a student's performance under changing situations. (See Option Approach) (Refer to AIM Part I)

Contact—

1. Establish communication with (followed by the name of the facility and, if applicable, the frequency to be used).

2. A flight condition wherein the pilot ascertains the attitude of his aircraft and navigates by visual reference to the surface. (See Contact Approach, Radar Contact)

Contact Approach—An approach wherein an aircraft on an IFR flight plan, operating clear of clouds with at least 1 mile flight visibility and having received an air traffic control authorization, may deviate from the prescribed instrument approach procedure and proceed to the airport of destination by visual reference to the surface. This approach will be authorized only when requested by the pilot and the reported ground visibility at the destination airport is at least 1 statute mile. (See Visual Approach) (Refer to AIM Part 1)

Cruise—Used in an ATC clearance to authorize a pilot to conduct flight at any altitude from the minimum IFR altitude up to and including the altitude specified in the clearance. The pilot may level off at any intermediary altitude within the block of airspace. Climb/descent within the block is to be made at the discretion of the pilot. However, once the pilot starts descent and reports leaving an altitude in the block he may not return to that altitude without additional ATC clearance. Further, it is approval for the pilot to proceed to and make an approach at destination airport and can be used in conjunction with:

1. An airport clearance limit at locations with a standard/special instrument approach procedure. The FARs require that if an instrument letdown to an airport is necessary the pilot shall make the letdown in accordance with a standard/special instrument approach procedure for that airport, or

2. An airport clearance limit at locations that are within/below/outside controlled airspace and without a standard/special instrument approach procedure. Such a clearance is NOT AUTHORIZATION for the pilot to descend under IFR conditions below the applicable minimum IFR altitude nor does it imply that ATC is exercising control over aircraft in uncontrolled airspace; however, it provides a means for the aircraft to

proceed to destination airport, descend and land in accordance with applicable FARs governing VFR flight operations. Also, this provides search and rescue protection until such time as the IFR flight plan is closed. (See Instrument Approach Procedure)

Direct—Straight line flight between two navigational aids, fixes, points or any combination thereof. When used by pilots in describing off-airway routes, points defining direct route segments become compulsory reporting points unless the aircraft is under radar contact.

Final—Commonly used to mean that an aircraft is on the final approach course or is aligned with a landing area. (See Final Approach Course, Final Approach—IFR, Traffic Pattern, Segments of an Instrument Approach Procedure)

Final Approach-IFR—The flight path of an aircraft which is inbound to an airport on a final instrument approach course, beginning at the final approach fix or point and extending to the airport or the point where a circle to land maneuver or a missed approach is executed. (See Segments of an Instrument Approach Procedure, Final Approach Fix, Final Approach Course, Final Approach Point)

Final Approach Course—A straight line extension of a localizer, a final approach radial/bearing, or a runway centerline, all without regard to distance. (See Final Approach—IFR, Traffic Pattern)

Final Approach Point—The point, within prescribed limits of an instrument approach procedure, where the aircraft is established on the final approach course and final approach descent may be commenced. A final approach point is applicable only in nonprecision approaches where a final approach fix has not been established. In such instances, the point identifies the beginning of the final approach segment of the instrument approach. (See Final Approach Fix, Segments of an Instrument Approach Procedure, Glide Slope Intercept Altitude)

Minimum Safe Altitude (MSA)—

1. The minimum altitudes specified in FAR Part 91 for various aircraft operations.

2. Altitudes depicted on instrument approach charts and identified as minimum sector altitudes or emergency safe altitudes which provide a minimum of 1,000 feet obstacle clearance within a specified distance from the navigation facility upon which an instrument approach procedure is predicated. These altitudes are for EMERGENCY USE ONLY and do not necessarily guarantee NAVAID reception. Minimum sector altitudes are established for all procedures (except localizers without an NDB) within a 25-nautical-mile radius of the navigation facility. Emergency safe altitudes are established for some military procedures within a 100-nautical-mile radius of the navigation facility.

Off-Route Vector—A vector by ATC which takes an aircraft off a previously assigned route. Altitudes assigned by ATC during such vectors provide required obstacle clearance.

Published Route—A route for which an IFR altitude has been established and published; e.g., Federal Airways, Jet Routes, Area Navigation Routes, Specified Direct Routes. (See Published)

Request Full Route Clearance (FRC)—Used by pilots to request that the entire route of flight be read verbatim in an ATC clearance. Such requests should be made to preclude receiving an ATC clearance based on the originally filed flight plan when a filed IFR flight plan has been revised by the pilot, company or operations prior to departure.

Resume Normal Navigation—used by ATC to advise a pilot to resume his own navigational responsibility. It is issued after completion of a radar vector or when radar contact is lost while the aircraft is being radar vectored. (See Radar Contact Lost, Radar Service Terminated)

Straight-In Approach-IFR—An instrument approach wherein final approach is begun without first having executed a procedure turn. Not necessarily completed with a straight-in landing or made to straight-in landing minimums. (See Straight-In Landing, Landing Minimums, Straight-In Approach-VFR)

Straight-In Landing—A landing made on a runway aligned within 30 degrees of the final approach course following completion of an instrument approach. (See Straight-In Approach-IFR)

Unpublished Route—A route for which no minimum altitude is published or charted for pilot use. It may include a direct route between NAVAIDs, a radial, a radar vector, or a final approach course beyond the segments of an instrument approach procedure. (See Route, Published Route)

VFR On Top/VFR Conditions On Top—An authorized IFR altitude issued upon pilot's request in which the aircraft is flown at any appropriate VFR altitude which is at least 1,000 feet above any cloud, smoke, haze or fog layer. (Refer to FAR Part 91)

VFR Over The Top—The operation of an aircraft over-the-top under VFR when it is not being operated on an IFR flight plan. (See VFR On Top)

It should be appreciated that the terms listed here are but a few of those used in aviation. The full glossary should help both pilot and controller to better understand one another. As in so many situations, to function properly we must know the language. This is especially true in air traffic control.

Air Cav, Ground Cav

Continued from page 3

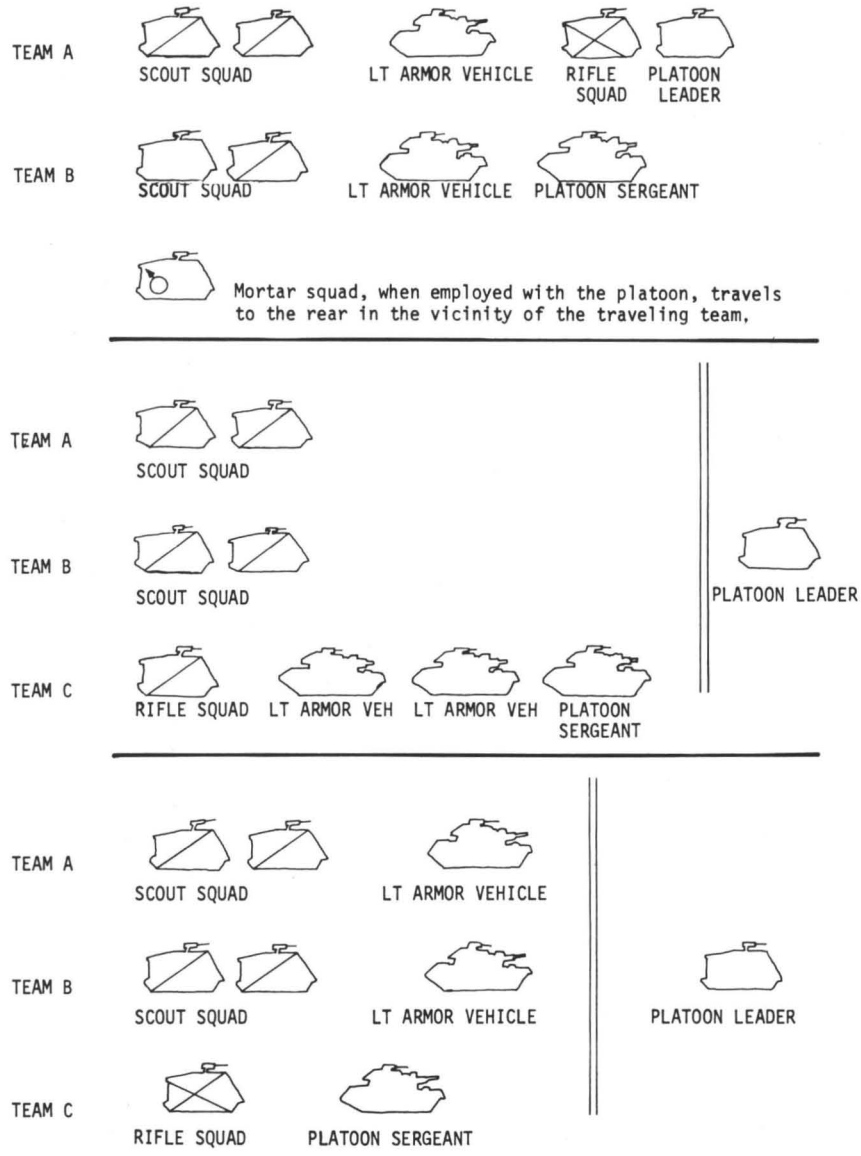
through the terrain and is approaching Phase Line Apache. It has located light elements of the enemy area forces but nothing substantial. The troop commander informs the lieutenant that the platoon is lost and that a large gap is opening in the troop formation. Consequently, the air cav team must move to the platoon's south to cover the gap. About the same time, "enemy" tanks appear in the objective area, signaling the arrival of the unit's main force requirements. The platoon engages these in self defense and then sends the scout forward.

Now the aero scout receives fire from south of the zone. The Cobra fires 2.75 inch rockets or TOW (tube-launched, optically-tracked, wire-guided) antitank missiles to extract the scout; and the aero scout reports as withdrawing. Finally the ground scouts reach the vicinity of the objective, only to discover more tanks. Calling mortar fire to cover this withdrawal, they return to Phase Line Apache and the problem terminates.

What has been accomplished? The platoon with its aero team has experienced the closest thing possible to combat in a training situation. It's free to maneuver as it pleases, facing enemy forces of unknown strength and locations. The enemy appears only by firing on the advancing platoon or, unless detected by sharp-eyed scouts, before it has an opportunity to fire. The stress, confusion and uncertainty are all there—the only thing missing is bullets coming back.

But the platoon also receives invaluable experience in the use and capabilities of its sister units and elements. The platoon leader sees what the aero scouts can do for the platoon and the scouts learn how the employment of the ground element's fire helps accomplish the mission. Additionally, both can see the other's capabilities and limitations in action.

A new dimension to III Corps training has been developed and tested in establishing the Armored Cavalry Platoon Battle Run. The air and ground elements of the cav squadron must work as a team in a stress-filled environment—just as they will in combat. They must face, locate and destroy an enemy of unknown strength and location. Finally, they must report the vital information that their commanders need to defeat the enemy. Hopefully, our platoons will never need the experience gained in this course. But, should the time ever come when the platoons must "fight for real," they will be much better prepared for the stress of combat and the "fog of war"—thanks to the training received at the Armored Cavalry Platoon Battle Run.



Two and Three Team Organization
Figure 4

"TWIN"

Continued from page 6

The 2nd Scout Battalion, based at Bethel, serves an area of some 86,000 square miles containing a total of 16 miles of improved roads. More than 80 percent of the landing strips used by these units are less than 2,000 feet in length and constructed of sand or gravel. During the long harsh winters, most air operations must be conducted on skis, and the summer thaw brings soft ground that requires high flotation gear. The numerous lakes and rivers provide an excellent landing area for float equipped aircraft.

The UV-18s are being used to provide resupply, logistic support, command and control, and administrative support to these isolated village units. They replace the U-1 Otter currently assigned to the battalions; you older pilots will remember the U-1 as "the box the L-20 Beaver (U-6) came in." You also should remember that the U-1 was an extremely reliable workhorse as long as you weren't in a hurry. Its 90-knot cruise left much to be desired when providing support in an area of operations as large as those discussed above.

The retirement of the U-1 from the active Army has created a severe logistics support problem. The combinations of these factors left the Alaskan Guard in the position of needing a replacement aircraft that could perform in a true STOL (short takeoff and landing) role, as a skiplane or floatplane, and operate under the most adverse weather conditions.

Now that we have discussed the need and use of the UV-18s, let's turn our attention to their characteristics and capabilities. The Twin Otter may be described as a twin-engine, high-wing monoplane with fixed landing gear, and excellent STOL characteristics. To those familiar with previous DeHavilland aircraft U-6, U-1, CV-2 Caribou), the strong family resemblance readily is apparent. The basic design was a result of experience gained from more than 400 single engine Otters. The fuselage was lengthened, placing the crew well ahead of the propeller plane, which coupled with tricycle landing gear, affords the pilot an excellent field-of-view not realized in the U-1.

Interior view with the twenty utility seats up and down

The UV-18s extra length increases cabin volume, and provides under-floor tankage space to feed the truboprop engines. The basic airfoil of the Otter wing was re-

tained, but the span was increased to yield a wing loading of the same order as the U-1, at the Twin Otter's higher gross weight. The controls are of Y-yoke configuration and the cockpit layout resembles a cross between the U-1 and CV-2 with the power quadrant mounted overhead.

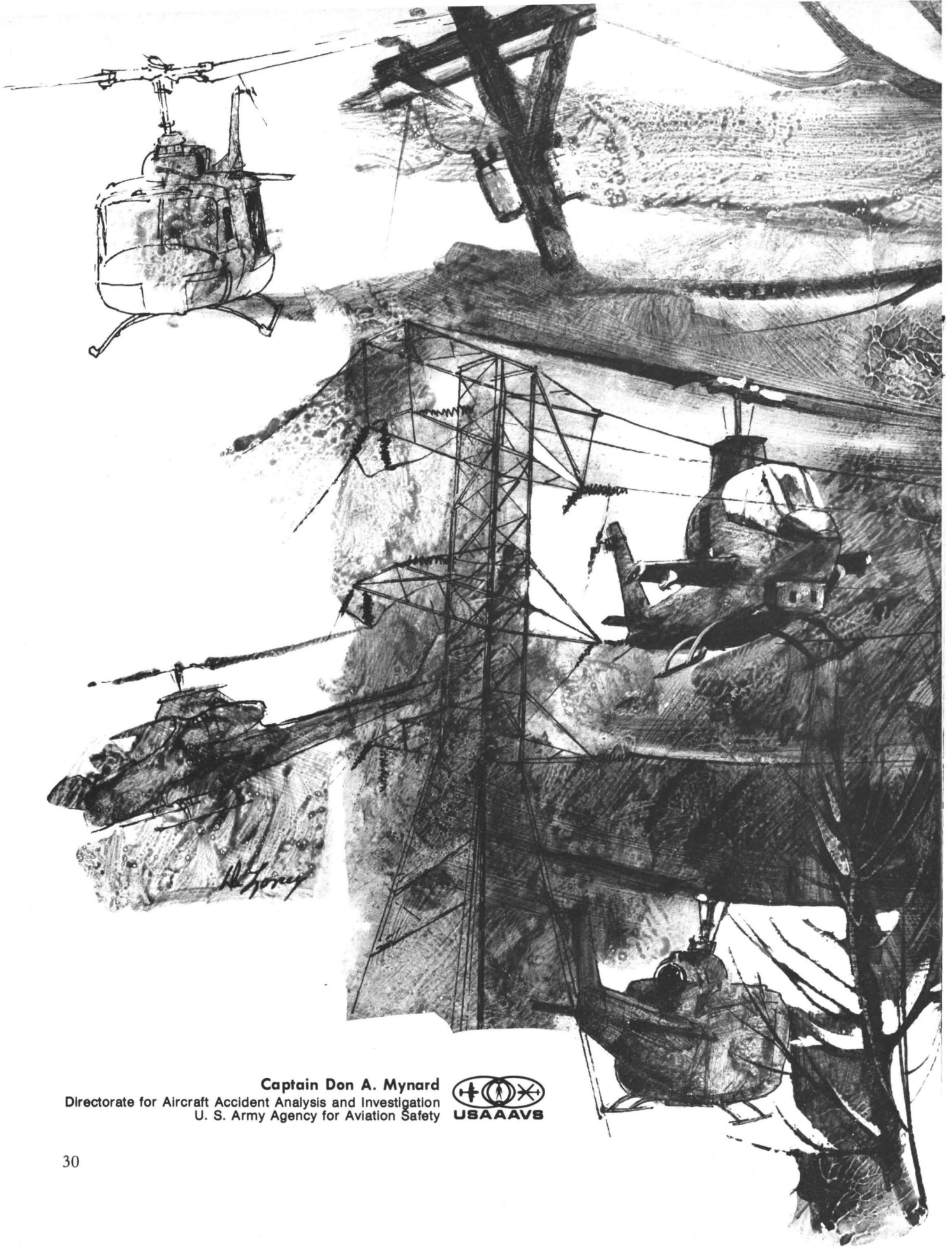
The two aircraft procured for Alaska are of commercial design with certification by the FAA (Federal Aviation Administration). The avionics package selected was the King Silver Crown line and will consist of dual VHF-AM (very high frequency-amplitude modulated) communications/navigation transceivers; dual ADF (automatic direction finder); dual glide slope receivers with marker beacon; DME (distance measuring equipment); and area navigation system (RNAV). Also included will be a radar altimeter; HF-SSB/AM (high frequency-single sideband) transceiver; VHF direction finder; and an emergency locater.

The true worth of these beasts can be seen best from a sampling of their performance data. [*Standard wheel plane configuration*]

Maximum takeoff weight—12,500 pounds
Operational weight empty (crew of 2 at 170 pounds)—7,654 pounds
Crew of 2 and 20 passengers
Engines—2 United Aircraft of Canada PT6A-27 single-stage, free turbine engines
Engine rating (standard day sea level, static) —652 estimated shaft horsepower
Cruise speeds at max cruise power (true airspeed):
Sea level 170 knots
10,000 feet 182 knots
Service ceiling (rate of climb, 100 feet/min):
Both engines at maximum climb power—26,700 feet
One engine at maximum continuous power—11,600 feet
Stall speed (flaps at landing) at maximum landing weight—58 knots
Maximum performance STOL
Takeoff distance to 50 feet—1,200 feet
Landing distance to 50 feet—1,050 feet
Enroute rate of climb at sea level
Both engines at maximum climb—1,600 feet/min
One engine at maximum continuous—340 feet/min
Payload-range
Payload for 100 nautical mile range—4,083 pounds
Payload for 400 nautical mile range—3,003 pounds
Maximum endurance (10,000 feet):
Standard internal fuel—7.05 hours
With long range tanks—9.04 hours

Canadian Air Force version of UV-18A (with floats) and U.S. version with skis

To say these performance figures are impressive would be equivalent to saying Raquel Welch's measurements are adequate. So, it's not difficult to understand why the pilots of the 1st and 2nd Scout Battalions are happy to have the UV-18s. It appears that the Army has successfully obtained a unique aircraft to fill a unique requirement.



Captain Don A. Mynard
Directorate for Aircraft Accident Analysis and Investigation
U. S. Army Agency for Aviation Safety

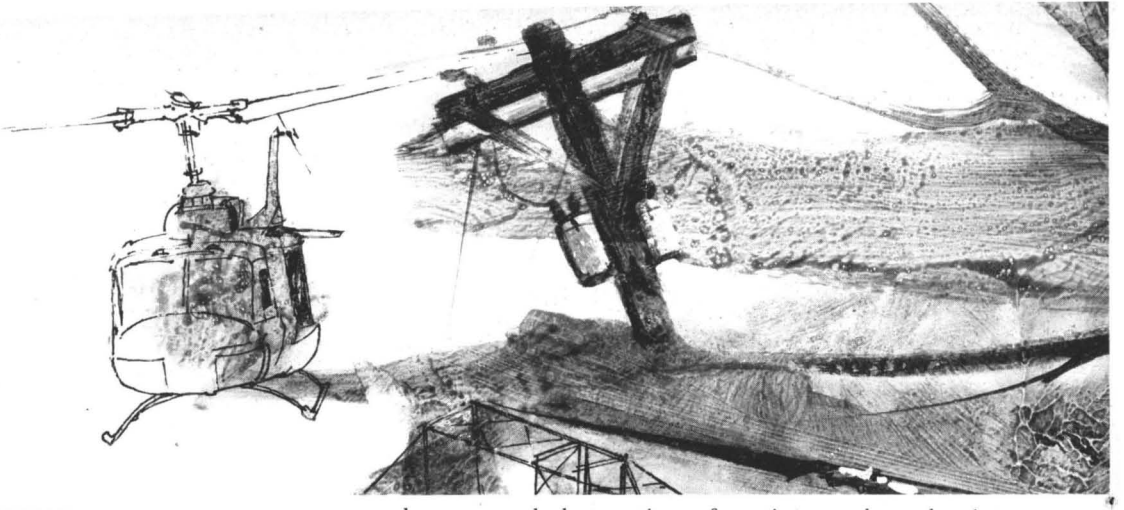
USAAAVS

Although the threat wires pose to Army aircraft in a training environment has never been greater, our chances of virtually eliminating this threat have never been better; and while the outcome depends largely on how we choose to react to this problem, one fact remains clear:

WE CAN STOP WIRE STRIKES

BEGINNING IN FY 1965, when Army pilots were involved in an all-time high of 61 wire strike mishaps, the annual number of such occurrences progressively decreased, settling to a low of 23 in FY 1973. But despite their obvious jubilation over this substantial reduction, aviation safety personnel viewed these statistics with a tinge of skepticism.

Military tactics were rapidly changing. Low-level and contour flying were giving way more and more to nap-of-the-earth (NOE) operations—not only during daylight hours but also at night. In addition, NOE training was slated to be conducted by units all over the globe as well as at formal school sites. Would these individual units be able to exercise the same kind of controls as the formal schools? Could they ensure adequate precautions? Provide ample supervision? Enforce regulations and unit SOPs? And what about the individual aviators? Would some pilots be tempted to try NOE flight on their own—outside the training environment? Could adequate controls be employed to bridle such an adventurous spirit? While only time could supply answers to these and



other questions, safety personnel could not keep from expressing a feeling of deep concern—one they voiced publicly.

But the worst did not materialize. On the contrary, OH-58, UH-1, and AH-1 mishap experience compiled during the period July 1972 through July 1976 shows the number of wire strikes that occurred during this 4-year period averaged slightly more than 17 per year. Considering this time frame includes approximately 4 years of NOE experience, we may be tempted to breathe a sigh of relief. Yet, while safety personnel find encouragement in these statistics, they are careful to avoid adopting any overly optimistic attitude. As a matter of fact, their policy is one of pursuing this safety hazard with renewed emphasis.

We can find evidence of this in the completion of recent studies conducted to determine the feasibility of incorporating wirecutting and wire detecting devices aboard Army aircraft—proposals thought dead long ago. More than 13 years ago, for example, one manufacturer demonstrated an obstacle warning system designed primarily for Army helicopters. This system operated on the laser principle and provided both a video and audio warning of virtually all kinds of obstructions in time for pilots to take evasive action. Various wirecutting devices have similarly been developed and tested.

Why, then, after years of experimentation and at a time when wire strike mishaps are occurring at a reduced frequency are we renewing our interest in this area and reviving old proposals? First of all, NOE has already become a way of life. It is here to stay and just as familiarity tends to breed contempt, some individuals may very well find themselves minimizing the hazards associated with NOE and ignore controls. Secondly, NOE training is on the rise, and increased exposure automatically produces increased risk. In addition, the possibility of renewed hostilities in the future cannot be discounted. In a hostile environment we can expect that manmade devices will be intentionally strung in strategic places to destroy our aircraft. Further, wire strike mishaps not only cause damage and destruction of equipment but also injuries and loss of lives—an area on which we can place no premium.

Our present situation is somewhat similar to that of an individual who accidentally pricks his finger with a rusty pin. After the initial sting subsides, there is no discomfort and he may forget the matter. A day or two later, he will probably notice a slight pain when he handles some object. Again, he may choose to ignore this symptom. However, when the finger begins to swell and throb painfully with every beat of his heart, and he sees a red streak climbing up his arm, you can bet an alarm will sound. Now he must seek medical attention—and do it quickly.

At present, we have pricked our finger, and now have the option of either applying medication or ignoring the sting. If we elect to ignore it, we stand the risk of infection and more serious complications.

The medication available includes not only a safety program with effective controls that we have already been applying but also additonal aids. One of these is a new type of wire detecting device that can be manufactured at a fraction of the cost of the laser type produced 13 years ago. This unit is a relatively simple device that spots wires by detecting current flow through them. And while it would be ineffective in a combat environment, it would be of immense value in a training one. On the other hand, cutting devices would be useful in either environment.

From a tactical standpoint, we have broken through the enemy's defenses and put his troops to route. Now, we can either intensify our attack and beat him into submission or hold our own, granting him freedom to regroup his forces.

Recent studies covering mishap experience of those aircraft most likely to be involved in NOE flight (OH-58, UH-1 and AH-1) show the value of both wirecutting and wire detecting devices.

Following are some of the findings:

Of the 77 wire strikes that occurred during the 4-year period covered by the studies (July 1972-July 1976), 29 could have been prevented had each of the aircraft been equipped with a wirecutter. By mishap classification, wirecutting devices could have

prevented 9 major accidents and 20 incidents.

Of the 31 injuries caused by the 77 wire strikes, nearly one-third (9) would not have occurred.

Of the 13 fatalities, almost one-half (6) could have been prevented.

In addition, the hardware savings that could have been effected by the use of wirecutters approached $1 million.

It is important to note that the effectiveness of wirecutting devices is actually more impressive than the statistics indicate in that 8 of the 77 actual wire strikes produced no damage to aircraft and researchers were unable to evaluate 13 of the others. Therefore, in reality, wirecutting devices could have prevented 29 of 56 mishaps or more than one-half.

The studies also indicate two areas in which wirecutters proved ineffective: those instances in which loss of the main or tail rotor resulted from wire entanglement, and those in which the number and size of wires struck were too numerous and heavy to be cut.

Curiously, wire detecting devices appear to have a slight edge over wirecutting ones. The studies indicate that had detectors been installed aboard the aircraft in question, 34 instead of 29 mishaps could have been prevented.

The studies also revealed one unexpected finding unrelated to cutting or detection devices: the need for more positive communications. Approximately 30 percent of all wire strikes that occurred during a 32-month period within the 4-year time frame covered resulted from failure of the pilots of lead aircraft to inform other pilots flying trail of the presence of wires. In these instances, lead aircraft overflew, or otherwise bypassed, wires which were then struck by a following aircraft. Pilots of aircraft involved in these mishaps invariably assumed no obstruction to be present since the lead aircraft had just flown through the same area.

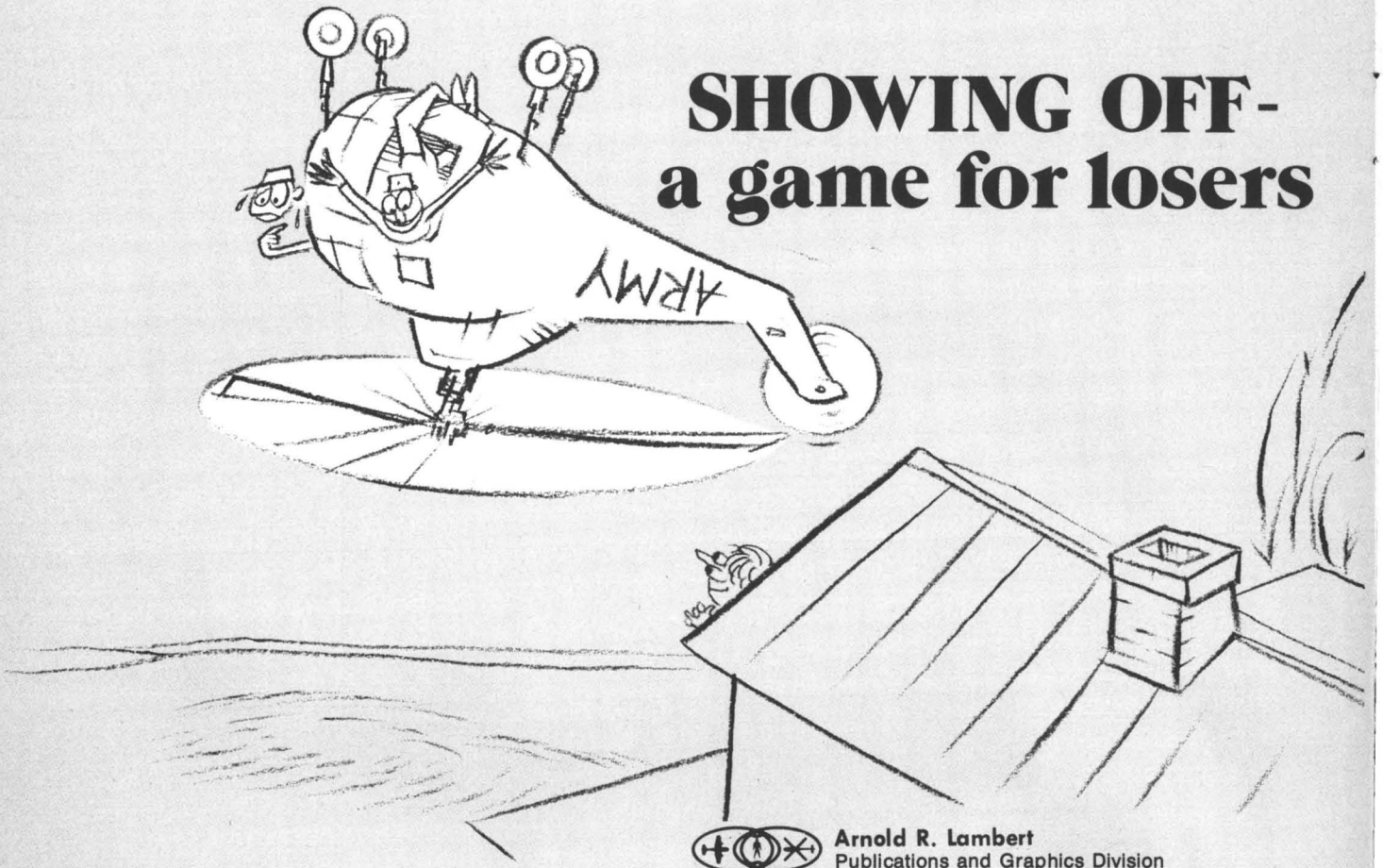
In summation, commanders, safety officers, pilots and all supporting personnel are commended for their efforts to prevent wire strike mishaps. They have successfully reduced the incidences of wire strikes, saved lives, prevented injuries, reduced equipment losses and effected substantial savings in terms of dollars. Congratulations are certainly in order.

As for the future, recommendations are for the Army to examine the feasibility of using wirecutting and detecting devices as protective aids against wire hazards. Meanwhile, we should avoid complacency, continue to emphasize the hazards associated with wires, and maintain the effective supervision and controls presently in force. In addition, the following protective measures should be reviewed and followed:

- Review unit SOPs and directives relative to low-level flying to make certain they reflect the safest procedures possible for the types of missions being flown.
- Provide adequate supervision to ensure pilots adhere to established policies.
- Limit the minimum altitude for required low-level flight training (outside the formal NOE program) to 150 feet above the terrain, or to lower altitudes over prescribed flight courses known to be free of wires.
- When low-level flights are required, provide pilots with current maps that show wire obstacles, and make certain that crews receive thorough briefings.
- Where possible, mark all wires around takeoff and landing points on military reservations and airfields.
- Unless required by missions, avoid low-level flight over areas known to contain wires and over ranges where fine tow wire can pose a potential threat.
- Use all crewmembers in searching for wire obstructions during all low-level flights and ensure maximum coordination between them.
- Keep in mind, the closer to the ground that low-level flight must be conducted, the slower the airspeed should be.

Finally, let's remember that unlike Sisyphus, the legendary king of Corinth condemned to roll a heavy stone up a steep hill in Hades only to have it roll down again as it nears the top, we are not doomed to such a fate. The fact is we *can* whip this problem of wire strikes—and keep it whipped. Right now, the stone is nearing the apex of the hill. A couple of hefty shoves will put it there. And while we may not be able to secure it, we can, at least, stabilize and keep it under constant scrutiny to ensure it doesn't start rolling again. It's up to us.

SHOWING OFF - a game for losers



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SEEKING TO attract attention by conspicuous behavior or, to put it more simply, showing off can get you more trouble than you may bargain for. Everyone has done some showing off at one time or another and most of us stop as we mature. But unfortunately some never mature. When a child realizes he has done something cute, he will try to do it over and over to attract attention. Then the act is no longer cute and he only embarrasses a parent. Later in life he may embarrass himself by showing off, and there is no better cure than a red face and injured dignity.

The fact is, showing off does not always end with embarrassment or just injured dignity. It can be fatal and that is when showing off becomes inexcusable. I was once caught showing off and I am fortunate to be here to tell about it.

When I was in high school, I owned a 1931 Model A Roadster. It was one of a kind in the county and I was the envy of every boy in school. A friend of mine owned a 1941 Plymouth coupe with a paint job that also made it one of a kind. The two of us made up a game to impress the girls, our passengers or anyone else who might be looking. The rules were simple and we played the game often. Here is how it went: Any time we saw each other on a two-lane highway, approaching from opposite directions, we checked the

traffic behind us. If there was no traffic close to us, we would change lanes and pass each other on the wrong side.

We were sure our game was perfectly safe because we always checked the traffic behind us; so what could possibly go wrong? It was great fun to see our passengers brace themselves for the crash or to see a lady at a bus stop throw both hands up to her mouth when she thought she was about to witness a head-on collision. We were told many times that we were crazy and that some day we would have an accident.

What could possibly go wrong? Well, the answer to that question came one Saturday morning when several witnesses were present. I saw my friend turn onto the highway and as usual I checked the traffic behind me. I could see there was nothing behind him, so as we got closer I pulled into the left lane. We were on a collision course and I couldn't understand why he wasn't moving over. I finally realized, when I saw the front end of the car dip as he jammed on the brakes, that he didn't intend to move over. I swerved back to the right side of the road and as I passed, I could see my friend's father driving the car. His mouth was moving and it was obvious what he was saying.

Both my friend and I took a lot of heckling about the incident, especially on the school bus Monday morning. By mutual agreement, Saturday's game was the final game. It was nearly a month before our parents let us drive our cars again. We decided there could be no winner in our game but there could be several losers if something went wrong. Besides, my injured dignity cured me of playing that game. In later years we discussed our irresponsible act and we attributed it to youth and immaturity.

But how do you explain the irresponsible games played by some Army aviators?

After completing his maintenance test flight, the pilot of a UH-1H flew some low-level maneuvers over a river and adjoining farm land. These maneuvers lasted for about 10 minutes and were done at 100 to 110 knots with altitudes ranging from 2 to 75 feet. Several gunruns were made on the local farmers in their fields.

The aircraft was low-leveled across the river at an altitude of approximately 2 feet. Reaching the far side, the pilot started a climb to clear a 25-foot-high levee. During the climb, he dragged the skids through some 15-foot trees between the river and the levee. The aircraft crossed the levee at about 9 feet.

The pilot then flew out over a field, turned left and started a shallow dive toward a farmer standing on the levee. The aircraft was approaching the levee from the right at about a 30-degree angle to the levee at a speed of 100 to 110 knots. The aircraft was very low and closing fast. The pilot tried to break right but the left skid struck the levee. The right skid then hit and both skids were torn from the aircraft. The tail boom struck a lower levee running parallel to the larger one and the aircraft spun and finally came to rest on its left side. Three crewmen were seriously injured and one had minor injuries.

The following pilot errors were considered primary factors in this accident: The pilot failed to use accepted procedures during a test flight. He performed unsupervised, unauthorized, low-level maneuvers, in direct contravention to FM 1-1 and the unit SOP. The pilot lacked the judgment, timing and experience to initiate corrective action soon enough to prevent the crash. The probable reason for this was lack of formal training in terrain flying. The pilot deviated from normal test flight procedures to make "gunruns" and perform low-level flight. The reason for this was possibly his desire to impress the enlisted crewmembers in the aircraft—in other words, to show off.

The pilot appeared to be overconfident in his abilities to handle the aircraft in low altitude, high airspeed flight. The crew may have shared this overconfidence as they did not object to the dangerous flight maneuvers. Two of the crewmen had flown with the pilot before and knew he habitually flew low level and neither of them had reported the fact to his superior or the aviation safety officer. However, he had been reported to the previous maintenance officer for low leveling, but no action was taken.

In this case, more than the pilot's dignity was injured. Luckily, his irresponsible behavior did not kill him and his crew. Perhaps now, his desire to show off, like mine, is gone forever.

TRAGEDY

The actual danger lasted only a few seconds. But the incident—and the lessons learned—are not likely to be forgotten by this medevac crew

CREW CHIEF: The medic and I arrived at the hangar at 0600 hours. I started my daily inspection of the aircraft while he inventoried his equipment. I noticed that the ship had an auxiliary tank installed, but it was empty. The pilots arrived at 0730 to preflight. I asked the aircraft commander if he wanted fuel in the auxiliary tank. He said no. The weather was pretty bad and I didn't fly at all during the day.

Medic: We were notified about the mission around 2230 hours. We were told the patient was an elderly man with a broken neck and internal injuries and that the request was urgent. The crew chief and I rolled the Huey onto the ramp and I checked my medical equipment again. I wanted to be sure I had everything I might need.

Crew chief: After we got the ship on the ramp we came back to the hangar to wait. The weather really looked bad and we didn't think we would go. About 2300 the pilot called and said to put 100 gallons of JP-4 in the auxiliary tank. He said it was going to be a long flight and we would need the extra fuel. In filling the tank, I spilled fuel on the outside of the bladder. I wiped down the bladder and flight deck with towels and water. It was dark, with very little light, and I did the best job I could. I left the cargo doors open to let the fumes out.

Pilot: The patient was at a field site in the woods. At first we thought we would not be able to help. But the site was not too far from an Army airfield with GCA. I arranged for the patient to be moved to the field and called the airfield duty officer. I told him what was going on. He said the airfield was closed after 2200. We couldn't take off until the airfield was operational.

Crew chief: At about 2330 the pilots came out to the airfield and said we had accepted the mission. I told them about the spilled fuel. After checking the auxiliary tank they went through their checklist and cranked.

Pilot: The airfield duty officer at the pickup site had agreed to get someone to man the tower and approach control. He also said it would take about 30 minutes for the radar to warm up.

Medic: Finally we got into the air. I remember thinking that the patient must really be in bad shape to go in these conditions. We were in the clouds right away. After a few minutes we were over a valley and I could see the lights on the ground. Then we were back in the clouds. About 10 miles from the field, we contacted approach control.

Crew chief: We were about 20 minutes out when the pilots said they were going to pump fuel from the auxiliary tank. The medic used his flashlight to check for leaks and said it was OK.

Medic: I was riding in the right jump seat facing

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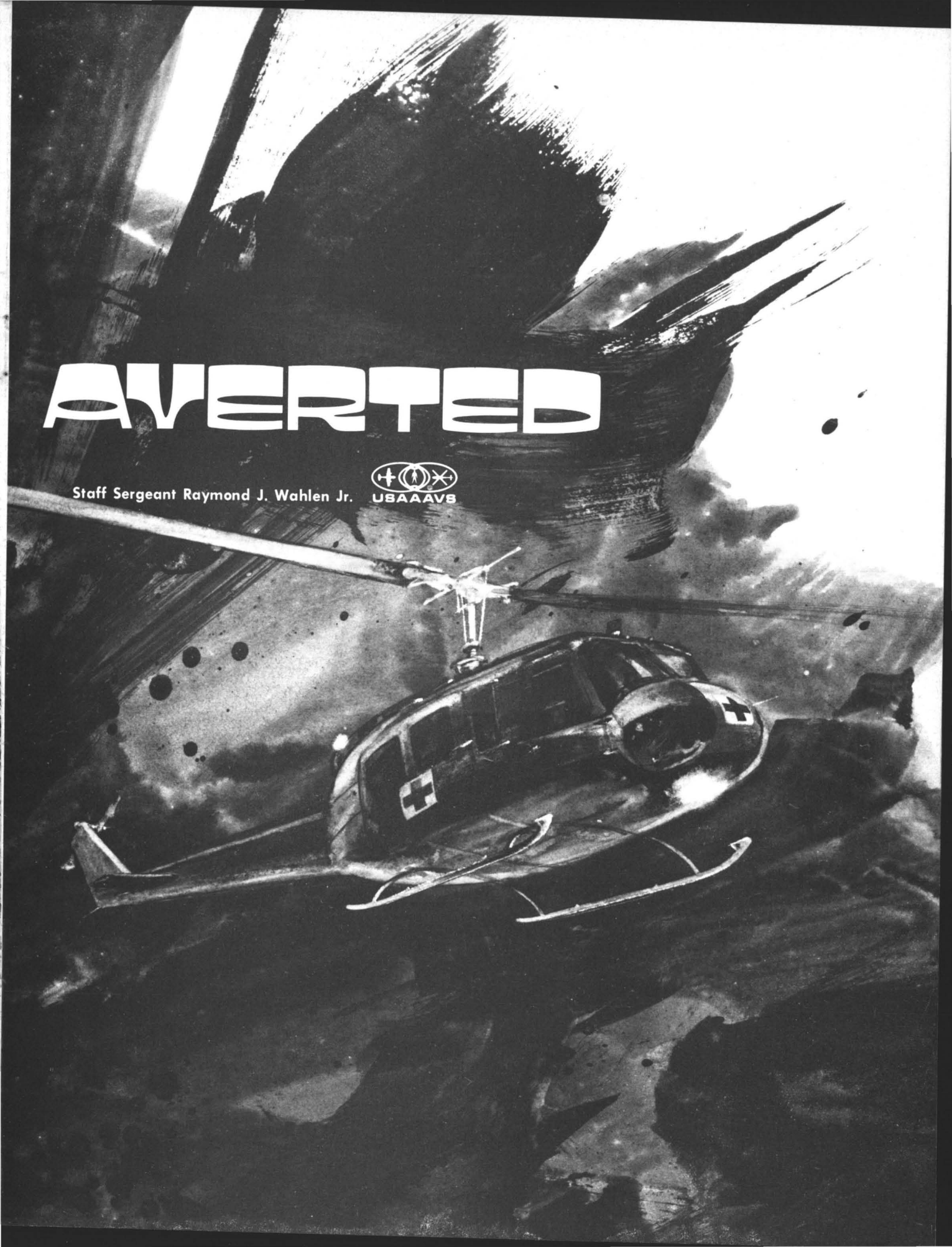
AVERTED
Staff Sergeant Raymond J. Wahlen Jr.
USAAAVS

the auxiliary tank. Just as we were contacting approach control the pilot warned us not to be smoking because he was going to start transferring fuel. I took out my penlight and checked for leaks. I didn't see any. I checked again a minute later and it was still OK.

Crew chief: About 5 minutes after we started transferring fuel I saw a white flash out of the corner of my eye. I didn't pay too much attention to it. I thought it was the medic using his flashlight to check the auxiliary tank again.

Medic: We were about 6 miles from touchdown. I was listening to the GCA controller and looking out the window. Still couldn't see anything but clouds. I noticed a white light reflecting off the surface of the window. It flashed for a second, then went out. At first I didn't think too much about it. I looked at the auxiliary tank and didn't see anything right away. Then it hit me. There are a lot of reflections inside an aircraft at night, especially when you're IFR, but I couldn't remember ever seeing a *white* reflection before. As soon as I realized this I reached for my flashlight to take a real good look. As I was bending over I caught a whiff of burning insulation. A split second later I saw sparks coming out of the bottom of the auxiliary tank. They were shooting around my side of the cargo compartment.

Crew chief: The medic hit me on the chest with the back of his hand. I turned around and he was pointing to the auxiliary tank. I saw the sparks flying all around the tank. I told the pilots we had a fire on board and to shut off the fuel. They did and declared an emergency.

Medic: I grabbed the fire extinguisher. It wouldn't have done any good, but it was my first reaction. I felt a little better with it in my hand. The pilot shut off the fuel and the sparks stopped. Then it dawned on me what could have happened if there had been JP-4 fumes inside the aircraft. I started feeling sick.

Copilot: I noticed the reflection of the sparks just as the crew chief told me to shut off the fuel. I got his warning before any panel lights came on.

Crew chief: After landing I found that the vent hose from the top of the auxiliary tank was shorting out with the pump wiring. I repositioned the vent and told the pilots to give it a try.

Pilot: The airfield duty officer met us when we landed and he just happened to be a qualified maintenance officer. My copilot that night was our unit safety officer. We agreed that the cause of the sparks had been found and corrected. We had transferred enough fuel to make our alternate if necessary and the safety officer made the decision to continue the mission.

* * *

Relocation of the patient to an airfield with GCA capability together with the use of the auxiliary tank made this mission ultimately successful. Without a doubt, the professionalism of the crew chief in cleaning up the fuel he spilled and leaving the cargo doors open so the fumes could dissipate certainly saved the lives of the crew and the patient who probably would have died if the Huey had blown up on approach.

Our unit's previous experience with auxiliary tanks—and that was extensive—had been uneventful. Also, due to a lack of formal training with this equipment, we had only a vague awareness of the potential dangers involved. However, this incident points up the need for some definite safeguards concerning auxiliary tanks.

- Plan flights to avoid the necessity of auxiliary tanks. Use them only in life or death situations. Using auxiliary tanks to extend normal cruising range constitutes an unnecessary risk and should be forbidden.
- Auxiliary tanks should be thoroughly inspected during the pilots' preflight fuel check.
- Installation of auxiliary tanks should be inspected and signed off by a qualified TI. This is not presently required.
- During flight using auxiliary tanks, a crewmember should be stationed in the rear of the aircraft to watch for leaks and any sign of fire. This crewmember should be seated in a jump seat facing the rear of the aircraft. If, for example, an auxiliary tank is to be used on an instrument training flight, a crewmember should be included specifically to observe the auxiliary tank. (Since this incident occurred, the pilot involved has followed this procedure on every flight using an auxiliary tank. On two occasions, crewmembers have spotted leaks and the tanks were shut off before fuel spread over the flight deck.) In the incident with the sparking auxiliary tank, the crew chief's verbal warning was received by the pilot before any warning light came on.
- All units using auxiliary tanks should include in their unit training programs extensive training on the inspection, operation and dangers of this equipment with refresher training conducted periodically.

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The Common Cold

THE COMMON COLD can cause pilot incapacitation during flight which may result in an aircraft accident. A recent human factor mishap serves to remind us that this is just as true for the low, slow flying helicopter aviator as it is for the faster, higher flying fighter pilot. A Preliminary Report of Aircraft Mishap reported that, following cruise flight at 4,000 feet msl in a UH-1H, a student pilot (SP) and instructor pilot (IP) descended to 700 feet msl in an ILS approach. The SP experienced middle ear discomfort and on final, when a missed approach was declared, developed ear pain. The IP took control of the aircraft, landed, and referred the SP to the flight surgeon. The SP was treated for an ear infection.

Two commonly held misconceptions can cause the Army aircrewmember to disregard the common cold as a significant hazard in helicopter flying. First, it is erroneously assumed that the common cold is a minor illness and only a first class "gold brick" would let a cold keep him from flying a low altitude mission. Second, since we fly close to the earth and altitude changes during flight are relatively small, the physiological effects of altitude are minimal.

The common cold is no minor problem in aviation. Swollen lymph tissue and mucous membranes can block sinuses as well as ears. This can cause incapacitating pain and pressure vertigo during descent which may result in loss of control of an aircraft. Additionally, infection of the inner ear by various cold and flu-like viruses can produce severe vertigo which makes straight and level flight impossible.

Let's consider the above human factor mishap and why the SP had difficulty. It is true that at 4,000 feet msl hypoxia is not a problem. However, atmospheric pressure increases more rapidly with altitude change as one approaches the earth's surface. For example, the gradual change in atmospheric pressure at higher altitudes results in a difference of only 84mm Mercury in a 10,000-foot descent from 40,000 to 30,000 feet msl. Compare this to the 237mm Mercury increase in pressure when descending from 10,000 feet msl to sea level. The atmospheric pressure increase is almost three times as much from 10,000 feet msl to sea level as it is from 40,000 to 30,000 feet msl. Another contributing factor is that the flutter valve-like construction of the eustachian tube which ventilates the middle ear makes it more difficult to keep the pressure across the eardrum equalized the faster the pressure increases.

The point to remember is that change in atmospheric pressure, rather than change in altitude, is the important factor. A pressure differential of only 60 to 80mm Mercury across the eardrum causes severe pain; 100-500mm will cause rupture of the eardrum. The increase in pressure experienced by these pilots in descending from 4,000 to 700 feet msl was about 80mm Mercury, more than enough to cause severe, incapacitating pain. A rapid descent from 10,000 feet msl to sea level with a blocked eustachian tube produces enough middle ear pressure to cause temporary deafness, ringing in the ears, pain and vertigo—conditions which have been known to cause fatal aircraft accidents.

Another problem with the common cold is the tendency of individuals to treat themselves with home remedies or medications which do not require a prescription. The cold capsules your wife took to keep her feeling well enough to clean house, prepare your meals and drive the kids to school are forbidden when flying. Most of these medications contain antihistamines and carry a warning that they may cause drowsiness and should not be used while driving a motor vehicle or operating heavy equipment, not to mention flying an aircraft. AR 40-8 prohibits aircrewmembers from flying for 24 hours after taking antihistamines prescribed by a flight surgeon and requires follow-up by him with an examination to ensure ears and sinuses are clear before returning to flying duties. A flight surgeon may treat minor nasal congestion without ear and sinus involvement with nasal sprays and decongestants which do not contain antihistamines, and permit an individual to fly. However, that is the flight surgeon's decision to make, and only after he has made an adequate examination.

Have the sniffles? See your flight surgeon! Don't take a chance on being incapacitated at a critical time during your next flight.

There are certain ingredients which, when mixed together, are almost certain, sooner or later, to produce a

recipe for an accident

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and
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NO ONE IN his right mind likes accidents. No one likes to cause or be involved in them. Yet, accidents continue to occur, and Army aviation is not without its share. Now, accidents don't just happen. They are caused; and if we are to prevent them, we must first identify the causes. Toward this end, we are constantly analyzing our mishap experience. We then publicize our findings in weekly, monthly and quarterly periodicals such as FLIGHT-FAX, the ARMY AVIATION DIGEST and PREVENTER, as well as in more lengthy, detailed studies and reports. We are all familiar with the typical cause factors usually present, especially those associated with some particular individual.

The mechanic who fails to perform a toolbox inventory after completing maintenance work and leaves tools or related items in an aircraft; the pilot who performs a cursory preflight or relegates this responsibility to his crew chief; the crew chief who fails to perform additional engine troubleshooting procedures in clearing a pilot's writeup when initial checks show the engine is performing properly; the tech inspector who fails to visually check completed work because of a heavy workload when he knows the mechanic who performed the work is a capable and conscientious individual. . .all these individuals have inadvertently been responsible for accidents in the past.

Mishaps directly or indirectly resulting from similar causes are familiar to us all. Often, the tendency is to brush them off lightly. *We* don't do these things. *We* always check for tools and related items to prevent FOD. *We* always perform thorough preflight and cockpit checks. *We* always determine the cause of some malfunction and correct it before we clear a writeup. And *we* always inspect the mechanic's work when it must be verified by our signature. But what about those accidents that occur in units whose personnel are immensely safety conscious, thoroughly qualified, and who consistently endeavor to operate in a professional manner? Why do these accidents occur?

While an in-depth study would provide us with much insight as to the causes of such mishaps, it isn't absolutely necessary. By examining but a single accident, we can often find the ingredients which, when mixed together, form a recipe that is almost always certain, sooner or later, to produce mishaps.

One accident from such a recipe occurred recently in the mountainous Northwest. The unit involved had established an enviable safety record, and the personnel were well qualified and dedicated. The accident was not spectacular in nature. As a matter of fact, the cause was about as common as it could be—a cotter pin, or more precisely, the absence of a cotter pin. Yet, investigation of this accident produced 30 distinct findings along with recommendations for implementation. And keep in mind, this unit was safety conscious and operating in a highly efficient manner.

The mission was one of search and rescue. The object of the search was two hikers who were overdue and assumed to be lost. The aircrew was to airlift a search party into the mountainous area and then provide air support in locating the missing hikers.

While the pilot was being briefed by the SAR officer, the aircraft was being preflighted by the copilot. Shortly afterwards, the aircrew and a photographer assigned to provide photographic coverage of the mission departed the airfield. Approximately one hour later, the aircraft was landed at an airfield where members of the ground search party and a guide to direct the pilots were to be picked up. The aircraft was refueled and all personnel received additional briefings relative to the search mission before takeoff.

The flight to the landing zone was uneventful. Members of the search party disembarked, leaving the pilot, copilot, guide and photographer aboard the aircraft. After takeoff, the aircraft was accelerated to approximately 50 knots and held to an altitude of about 20-30 feet above the trees. Since neither intercom system in the cabin section was installed, the guide found it necessary to squat behind the pedestal so that he could give the pilots directions.

When the aircraft reached an altitude of 4,300 feet msl, the pilot reduced airspeed because of limited visibility due to the deteriorating weather. The ceiling was now about 150 feet above the ground and forward visibility was limited to approximately 200 to 250 meters. Almost immediately after the deceleration, the pilot told the copilot that the tail rotor pedals were binding. At that time, the aircraft began a slow spin to the right. Both pilots applied strong pressure to the left pedal but could not budge it. The pilot then stated they were in trouble and immediately retarded the throttle to control the spin.

If we can locate the problem areas *following* an accident, then we can just as readily spot them *before* the mishap occurs.

RECIPE FOR AN ACCIDENT

Although the rate of rotation was reduced, the aircraft continued to spin and descended vertically until the tail rotor struck the ground. Following initial ground contact, the aircraft turned an additional 90 degrees to the right, then impacted in an upright, level attitude, injuring three of the occupants.

Because of impact deformation, both cargo doors were jammed, and exiting was accomplished through the pilots' and left jump doors. Fortunately, no post-crash complications occurred—the engine was still functioning normally and there was no fuel spillage or fire.

After the engine was shut down, radio contact was attempted by means of aircraft and aircrew survival radios. However, because of the remote location and mountainous terrain, no communications were possible. Carrying portable radio gear, one of the pilots began climbing to higher ground, stopping periodically in an effort to make radio contact either with other aircraft in the area or with the members of the ground search party.

As he neared the top of the hill at an elevation of about 5,250 feet, he heard an acknowledgement to his repeated radio calls. Although he was unable to maintain contact, his call was eventually relayed to the SAR officer, and approximately 2½ hours after the crash, the crewmembers and passengers were airlifted to the hospital without incident.

A check of the aircraft verified binding of the pedal controls. Upon removal of the silent chain cover, the cotter pin was noted missing from the tail rotor quill nut which had backed off, eventually scoring and binding against the silent chain cover assembly, locking the controls. A search for the missing pin within the silent chain and the quill assembly covers could not produce it. While it is possible a pin of improper size was used and worked its way loose, the probability exists that no pin was installed. In either instance, the discrepancy was overlooked by the tech inspector (TI).

Two questions arise: Why did the mechanic fail to perform maintenance in a satisfactory manner? And, how could it be that the TI failed to note the discrepancy?

Let's consider the TI first. To begin with, he was the only TI assigned to quality control. As a result, he was working under a constant stress, trying to accomplish all that needed to be done, often spending additional time working on forms after duty hours. In a word, he was "overloaded."

To meet his responsibilities, he was forced to take some shortcuts. For example, he found through evaluation and analysis of each individual mechanic's performance and personal characteristics that some are more reliable than others. Consequently, he tailored his inspection techniques to meet deadlines. If he knew the mechanic was knowledgeable and consistently reliable, the extent of his inspection was less than it would have been if the mechanic was perceived to be unreliable. His failure to note either the absence of the cotter pin or its improper installation during inspection was clearly a human error that resulted from constant and prolonged stress to accomplish all his duties and do so on a timely basis.

What about the mechanic? His maintenance qualifications were highly regarded by supervisory personnel. He was knowledgeable and experienced and always turned out high quality work. Nevertheless, as can sometimes happen, a moment of negligence resulted in his failing to ensure maintenance was properly performed.

Although the series of events that led to the crash were precipitated by maintenance and quality control cause factors, numerous other discrepancies emerged during the course of the investigation.

For example, it could not definitely be determined when an initial inspection was conducted on the aircraft in question. Further, a review of the aircraft records and DA Forms 2404 used in conducting the preventive maintenance periodic (PMP) inspection showed no entry for the removal and replacement of the tail rotor sprocket. While the PMP team chief could not recall whether or not the sprocket was replaced, the TI thought it had been changed during the last PMP. When handed the sprocket that was in-

stalled on the aircraft, he stated it appeared to be a new one. His response to the question as to whether or not removal and replacement of the sprocket should have been written up was: "TM 38-750 states everything is to be itemized. . . "

The PMP DA Forms 2404 showed that two items had been cannibalized from the aircraft in question and installed on other aircraft; yet no record of such action was found in the cannibalization file maintained by the quality control section. In addition, it was found that key personnel were not familiar with the specific procedures for cannibalization. Further, no evidence of written procedures pertaining to cannibalization was found in the unit SOP.

The board also pointed out that during search and rescue missions, it is a common practice to have a knowledgeable guide aboard the aircraft to function as navigator over the rugged terrain. Consequently, aircraft committed to search and rescue operations should provide the guide with some means of communications. This aircraft had none, making it necessary for the guide to squat between the pilots. While the absence of this facility did not contribute to the accident, it may very well have been a factor in the severity of the injuries sustained by the guide.

The communications system common to these search and rescue missions was found to be inadequate. No provision was made for relaying messages that would permit satisfactory progress reporting and flight following. Because of their nature, most SAR missions are conducted over remote, often mountainous, terrain. In addition, aircraft involved must operate within parameters which increase their mishap potential. Consequently, it is imperative that SAR aircraft maintain constant communications with the controlling agency and make frequent position reports.

The radios in use today often do not allow us to communicate when operating in this type of terrain; so the need for another aircraft to function solely as a radio relay becomes apparent. Further, this lack of effective communications and the fact that while operating in bad weather some aircraft may land and remain on the ground for two or more hours, waiting for weather conditions to clear, create a false sense of security at the SAR site. This feeling of "well, he's probably just waiting out the weather" could mean that should an aircraft crash, it might be hours before anyone would become concerned enough to initiate a search. In short, the unit had no definite search and rescue plan for crashed SAR aircraft. This lack of communications could have proved tragic in this mishap had the personnel sustained more serious injuries or had they not crashed in open terrain.

Another communications problem arose when, in transmitting the emergency, the phraseology "Iroquois. . .emergency over" was used instead of the proper "Army 'copter," followed by the last five digits of the tail number. The mountain rescue personnel who picked up this transmission passed it off as having little significance. The term "Iroquois" meant nothing to them. In addition, failure to use the word MAYDAY as a signal of distress contributed to the indifference of the ground party. As it turned out, the only reason the transmission evoked a response was that a member of the ground rescue party happened to mention the call to the SAR officer who immediately initiated rescue operations.

The discrepancies listed are just a few of the 30 uncovered. But from these, we can get a pretty good idea of the ingredients that either alone or in combination can cause accidents and compromise the safety of the occupants. None are new. So, actually, it isn't the ingredients we are really concerned with. Our problem is identifying them—before we inadvertently include them in our "batter." And finding them poses no special problem, but it does take some determined sleuthing. It may even require a complete survey of all areas of our operations. But look at it this way: If we can locate the problem areas *following* an accident, then we can just as readily spot them *before* some mishap occurs.

With the start of another year, let's resolve to locate any of these accident-causing ingredients that may be present in our own operations, and take corrective measures to make this new year the safest one ever.

PILOT ERROR?

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YOU HAVE HEARD the fable "For want of a nail a shoe was lost, and for want of a shoe a horse was lost. . ." It is interesting how little things, seemingly insignificant things, can result in catastrophic consequences—even in aircraft accidents. The final outcome is determined by a series of minor occurrences. Someone does something or fails to do something and creates a chain of events that culminates in the death of a pilot and destruction of an aircraft.

Bob was a good pilot, but he died after an aircraft accident. The cause of the accident was listed as pilot error. Bob ran out of fuel over a heavily wooded area and crashed into trees. Search and rescue found the wreckage three days later, two days too late for Bob.

Was Bob the villain who caused the accident which resulted in his own death? At first glance it appears he simply allowed his fuel supply to be used up before he landed. However, nothing is ever that simple.

Who else could possibly be blamed for this accident? Perhaps Bob could have told us if he had been found sooner. He had almost 24 hours to think about it after the accident.

Let's take a look at the events which led up to the crash, starting the day before. Another pilot had written the aircraft up for a fuel quantity gauge that seemed to occasionally hang up in flight. Maintenance found the wiring plug to be loose on the back of the gauge and tightened it. A test flight revealed no further discrepancy, so the problem was considered solved. No one noticed the frayed wire which was rubbing against the frame of the aircraft.

The test pilot, who was in a hurry to get to an important meeting with the commander, forgot to have the aircraft refueled. He remembered that night, but it was late and he had flown for only 30 minutes, so he decided to wait until the next morning. No one else noticed the aircraft needed fuel.

The next morning Bob was called in early by the operations officer for an urgent mission. The battalion commander wanted an aircraft to pick him up at another installation as soon as possible. The operations officer did not want the colonel to have to wait too long for his ride, so things were jumping when Bob strolled into operations. A quick mission briefing and a reminder not to waste any time was enough to instill a feeling of urgency in Bob. So after a quickie preflight he strapped in, cranked up and was airborne. Assuming the fuel tanks were topped off, he had neglected to check the fuel.

Noticing the fuel gauge was reading slightly low on takeoff, Bob decided that, rather than land just for 200 pounds of fuel, he would make a beeline for his destination and keep a sharp eye on the fuel gauge. He should have had enough fuel to make it VFR.

The beeline Bob had planned to make turned into an erratic sequence of course changes to avoid rainshowers and find ground checkpoints he could recognize in the marginal weather. The fuel seemed to be holding out well on the gauge, so Bob's only real concern was how impatient his passenger would be when he finally arrived to pick him up. Bob thought he could continue along a straight course to the airfield and no longer have to dodge the weather. There was still enough fuel according to the gauge. Now he could call base operations and assure them he would not be much longer.

Bob never made his call. He was too busy trying to control his aircraft in the confusion created when the engine suddenly quit. There was no place to go except into the trees. The aircraft plunged through the leaves and branches of the thick foliage which seemed to swallow it without leaving a trace.

There was no postcrash fire, and Bob, though dazed and injured and trapped by the wreckage, was still alive. After assessing his predicament and coping with his pain, Bob realized he could not free himself without help. Help? Who would be able to help him? He quickly realized that even if search and rescue were launched immediately, he would still have a long wait. The search would be concentrated along a logical straight-line route, but he had had to make a circular route to avoid weather.

Sooner or later someone was bound to fly over him, but how could they see through the dense forest? Bob could see a little sky, but only if he looked straight up. It would not be easy for someone to spot him from the air, and there was no way for him to signal even if someone did fly over.

Bob checked the contents of his survival vest. The bandages were of only minimal use. The ammonia capsules were not necessary. In fact, nothing he had was of any use in effecting his rescue. If only he had a strobe light or pen flares or a survival radio. A survival radio! What an appropriate piece of equipment for a pilot!

Two days after Bob died, his aircraft was accidentally spotted through the trees. Later, the accident investigation board determined the cause to be pilot error. What do you think?

USAAAVS

PEARL'S

Personal Equipment & Rescue/Survival Lowdown

If you have a question about personal equipment or rescue/survival gear, write Pearl, USAAAVS, Ft. Rucker, AL 36362

SPH-4 Helmet Earpad Seals

The earpad seals manufactured by Aqua Aire under DSA-100-76-C-0632 for the SPH-4 helmet are defective. All Aqua Aire earpad seals manufactured under this contract should be frozen and inventory purged. Report of item discrepancy, Standard Form 364, should be completed citing contract DSA-100-76-C-0632 (Aqua Aire) in remarks column. Standard Form 364, along with defective earpad seals, should be returned for credit to Defense Personnel Support Center, S9T Director Clothing/Textiles Stock Control, ATTN: DPSC-T-SKI, 2800 S. 20th St., Philadelphia, PA 19101.

JP-4 Burn Treatment

My troop recently had an incident where a mechanic was blistered after getting JP-4 on his arm. It was brought to my attention by a newly assigned aviator that the instructor pilots at Fort Rucker carry a salve that will aid in reducing that probability of blistering. Can you tell me the stock number for this item?

According to the Aviation Medicine Division, there is no specific salve or cream to prevent skin blisters caused by JP-4. The recommended treatment for JP-4 skin contamination is to immediately wash the area with soap and water. Use a good commercial hand lotion to counteract the drying effects of JP-4. If clothing becomes saturated with fuel, immediately deluge the individual with water before removing clothing. This will prevent most blistering and possible vapor ignition due to buildup of static electricity.

Nomex Uniform

I have been a rotary wing aviator for more than 7 years. I was recently issued another Nomex flight suit (2-piece) and, as usual, I sat for about one-half hour cutting off long, loose, unsightly threads. I then had to take it to the local tailor shop to have the edges of two pockets resewn, one belt loop replaced as it was missing, and one belt loop resewn on one end. Really, when are we going to stop accepting inferior workmanship on these uniforms? Numerous other aviators have similar problems also. It's nothing new—same problems for years. If the military is still purchasing new uniforms, I would like to suggest:

Using velcro, not strings, on the bottoms of pants legs.

Leaving off the thigh pockets as they are seldom used.

Sewing on the shirt sleeve cuff so that when it is fastened it is on the underside of the wrist rather than on the top. When on top, it tends to twist around and is very uncomfortable.

Defective or substandard Nomex should be reported on an EIR directly to Commander, U.S. Army Aviation Systems Command, ATTN: DRSAV-WL, P.O. Box 209, St. Louis, MO 63166, with an information copy to USAAAVS. The EIR is the best possible way to bring about a change in any item of Army equipment. In the last few months, we have been very successful in changing the Nomex flight jacket and getting a better ear cup for the SPH-4. This was accomplished by EIRs from the field.

The drawstrings in the Nomex pants are standard. The velcro we have been using was an addition to the original contracts that has been dropped. The Army has adopted a one-piece tri-service flight uniform and this will be the standard of the future. However, present stocks of the two-piece Nomex uniform will last for several more years.

Helmet Chinstrap

I recently became the proud owner of a new SPH-4 flight helmet. The instruction book with the helmet indicates that the chinstrap should be installed on the second snap from the bottom of the retention assembly. TM 10-8415-206-13 shows the chinstrap fastened to the third snap up, and for years I have been told to fasten it to the bottom snap. The reason given for using the bottom snap was because the top three are used for securing an oxygen mask. What is the correct installation for the chinstrap on the SPH-4 helmet?

Your observation of the obvious differences of the SPH-4 helmet chinstrap location as shown in TM 10-8415-206-13 and the instruction manual for the Gentex SPH-4 helmet is commendable. The U.S. Army Aeromedical Research Laboratory, Fort Rucker, AL, has been advised of your findings, and action is being taken to correct these irregularities.

The proper position to fasten the chinstrap is on the bottom snap or the second from the bottom snap depending on the user's comfort. The upper two snaps are for attaching the oxygen mask only. Fastening the chinstrap to either of the upper two snaps may significantly reduce the retainability of the helmet. It should also be remembered that chinstrap pads should not be used with the SPH-4 helmet. The reason is that compression of the pad allows slack in the retention system and you may lose your helmet in a crash.

ATC action line

UNITED STATES ARMY AIR TRAFFIC CONTROL ACTIVITY

WHAT IS THE amount of obstruction protection provided for airways in a mountainous area? I was under the impression it was 2,000 feet, but recently have been told this is not always correct.

We have detected that confusion may emerge when VFR (visual flight rules) and IFR (instrument flight rules) and policy are not viewed separately and apart from each other. FAR 91.119 related to IFR operations is cited below:

"91.119 MINIMUM ALTITUDES FOR IFR OPERATIONS

(a) Except when necessary for takeoff or landing, or unless otherwise authorized by the Administrator, no person may operate an aircraft under IFR below—

(1) The applicable minimum altitudes prescribed in Parts 95 (New) and 97 (New) of this chapter; or

(2) If no applicable minimum altitude is prescribed in those Parts—

(i) In the case of operations over an area designated as a mountainous area in Part 95 (New), an altitude of 2,000 feet above the highest obstacle within a horizontal distance of five statute miles from the course to be flown; or

(ii) In any other case, an altitude of 1,000 feet above the highest obstacle within a horizontal distance of five statute miles from the course to be flown.

However, if both a MEA [minimum enroute altitude] and a MOCA [minimum obstruction clearance altitude] are prescribed for a particular route or route segment, a person may operate an aircraft below the MEA down to, but not below, the MOCA, when within 25 statute miles of the VOR [VHF omnidirectional range] concerned (based on the pilot's reasonable estimate of that distance).

(b) Climb. Climb to a higher minimum IFR altitude shall begin immediately after passing the point beyond which that minimum altitude applies, except that, when ground obstruction intervenes, the point beyond which the higher minimum altitude applies shall be crossed at or above the applicable MCA [minimum crossing altitude]."

Radar Vector Operations by a radar controller fall within the clause at paragraph (a) " . . . *unless otherwise authorized by the Administrator . . .* "

In airspace where FAA (Federal Aviation Administration) has jurisdiction, obstruction protection is applied as noted below (abstract from an FAA Internal Policy Document).

"OBSTRUCTION CLEARANCE, PRIMARY AREA

a. Nonmountainous Areas. The minimum obstruction clearance over areas NOT designated as mountainous under FAR 95 will be 1,000 feet over the highest obstruction.

b. Mountainous Areas. Owing to the action of Bernoulli effect and of atmospheric eddies, vortices, waves, and other phenomena which occur in conjunction with the disturbed airflow attending the passage of strong winds over mountains, pressure deficiencies manifested as very steep horizontal pressure gradients develop over such regions. Since down-drafts and turbulence are prevalent under these conditions, the hazards to air navigation are multiplied. Except as set forth in these subparagraphs (1) and (2) below, the minimum obstruction clearance over terrain designated in FAR 95 as "mountainous" will be 2,000 feet.

(1) Obstruction clearance may be reduced to not less that 1,500 feet above terrain in the designated mountainous areas of the Eastern United States, the Commonwealth of Puerto Rico, and the land areas of the State of Hawaii; and may be reduced to not less than 1,700 feet above terrain in the designated mountainous areas of the Western United States and the State of Alaska. Consideration must be given to the following points before any altitude providing less than 2,000 feet of terrain clearance is authorized.

(a) Areas characterized by precipitous terrain.

(b) Weather phenomena peculiar to a particular area.

(c) Phenomena conducive to marked pressure differentials.

(d) Type of and distance between navigation facilities.

(e) Availability of weather services throughout the area.

(f) Numerosity and reliability of altimeter resetting points along airways or routes in the area.

(2) Altitudes providing at least 1,000 feet of obstruction clearance over towers and/or other manmade obstructions may be authorized within designated mountainous areas provided such obstructions are NOT located on precipitous terrain where action of Bernoulli effect is known or suspected to exist."

You can readily see that the deviations which result in less than 2,000 feet of protection in mountainous areas are carefully considered and issued for use by the Administrator via the FAR 95 and FAR 97 regulation system. Pilots aren't exposed to these two regulations and don't really need to be. The end result is FAA authorized airspace structure altitudes issued as minimum IFR altitudes and published on approved enroute and terminal area charts.

The rules for VFR operations should be understood by all pilots and are not quoted here. The main thrust is:

Don't fly VFR along an IFR airway 2,000 feet below the MEA or MOCA in designated mountainous area and expect that you are protected. The navigational aid course guidance signal may be distorted or unreliable and you're in reality off course. Altimeter error due to distance from the setting source may create additional height error hazard. Vertical currents may ruin your day (or night). When you fly VFR follow the rules. This includes restrictions imposed by AR 95-1, Tables 4-1 and 4-2. If you fly IFR adhere to the rules, numbers and ATC clearance.

If you fly IFR outside of controlled airspace where numbers are not published, it's your responsibility to maintain the FAR 91.119(a)(2) obstruction clearances. The navigation accuracy responsibility also is yours. This mode of operation is *fraught* with hazards especially in slow aircraft that may drift undetected out of the area of intended flight. IFR or VFR—no in between. Mixing may result in mixing with hard rocks or other destruction by obstructions.

Readers are encouraged to send questions to:
Director
USAATCA Aeronautical Services Office
Cameron Station, Alexandria, VA 22314

OLD WIVES' TALES AND NIGHT VISION

OLD WIVES' TALES are silly stories or superstitions which generally have been credited to gossip or idle talk. Some are true; some only partially true; and some not true at all. There are three "old wives' tales" connected with night vision and like other "old wives' tales" they are not necessarily true or completely wrong.

Wearing dark glasses prior to night flying will help your ability to see at night. This is true, especially under conditions of very bright sun such as found at the beach. The bright light bleaches out the retina which may take 3 days or more to recover. Alcohol, junk foods and physical abuse usually associated with a wild weekend also may contribute to a temporary reduction in night vision effectiveness.

Some people can't see at night as well as others. This is only partially true. Everyone has about the same anatomic equipment and sensitivity to see at night. The light sensitive nerve endings at the back of your eyes consist of cones and rods. Broadly speaking, you see with cones in the daytime and rods at night. And, everyone has the same number of cones and rods and about the same degree of sensitivity.

Effective use of the eyes at night is a technique that must be learned. Most outdoor people do not have trouble seeing at night because they don't depend entirely on artificial light when they are roughing it in the woods. They have learned the technique of seeing in the dark. On the other hand people who have become accustomed to using artificial light at night usually are handicapped when they venture out at night because they have not learned these visual techniques adequately.

There are some diseases that may impair night vision but they are rarely encountered. In addition to harming night vision, these diseases ordinarily affect day vision. Therefore, it is not likely that anyone so affected would be able to pass the annual physical, or the Class I physical to get into the Army aviation program.

Eating carrots (vitamin A) will help your night vision. Not necessarily so! Tests conducted during World War II proved this "old wives' tale" to be false. Individuals were deprived of vitament A in their diets. They suffered all sorts of problems, but the loss of vitamin A did not measurably affect their ability to see at night. If you like carrots, fine, but don't count on carrots alone to make you a night fighter or a night hawk.

Aviation Specialty

AVIATOR MANAGEMENT has been one of our most dynamic activities at the Officer Personnel Management Directorate (OPMD) during the past year. The aviation specialty designation process was an arduous task that involved the review of more than 6,500 aviator records. It necessitated many difficult decisions on the part of your career managers.

With specialty designation for year groups '69 and earlier now accomplished, we are able to direct more attention to the management of the specialty itself. As we look to the future we must be aware that there are external factors which will influence our management options. For example, the Aviation Career Incentive Act of 1974 established utilization criteria that must be closely monitored. Another factor is the reduced initial entry training rate we are experiencing. Even if the Department of the Army is successful in reversing current Department of Defense limitations on flight training, we can anticipate that high utilization of company grade aviators in aviation positions will be the norm in future years. Additionally, PCS (permanent change of station) constraints, Army requirements and professional development needs further complicate this issue.

It is incumbent upon the Army personnel management system to assure that aviators have career recognition consistent with that of other specialty areas and to provide guidance for successful career progression within the aviation program in addition to general career guidance. Specialty management of all aviators gives us the ability to fulfill these responsibilities while addressing the realities of the external influences discussed earlier.

The basic philosophy of the aviation specialty was discussed in an article written by LTC B.H. Freeman which appeared in the October 1976 issue of *AVIATION DIGEST*. We know that there are many questions remaining to be answered; therefore, OPMD is preparing a series of articles concerning the aviation specialty and professional development of aviators. They will appear in "OPMS Corner," beginning with the March issue of *AVIATION DIGEST*. We will address questions such as:

- Should I consider applying for flight training and when?
- What are my company grade and field grade assignment opportunities?
- How about command and assignments at the lieutenant colonel level and beyond?

We are making an effort to advise our aviators honestly of the situation under OPMS, so watch for this corner in the March, April and May editions of the *AVIATION DIGEST*.

Benjamin E. Doty

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Brigadier General, USA
Director of Officer Personnel Management