UNITED STATES ARMY

MARCH 1977

# AVIATION DIGEST

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2 ARTICLE

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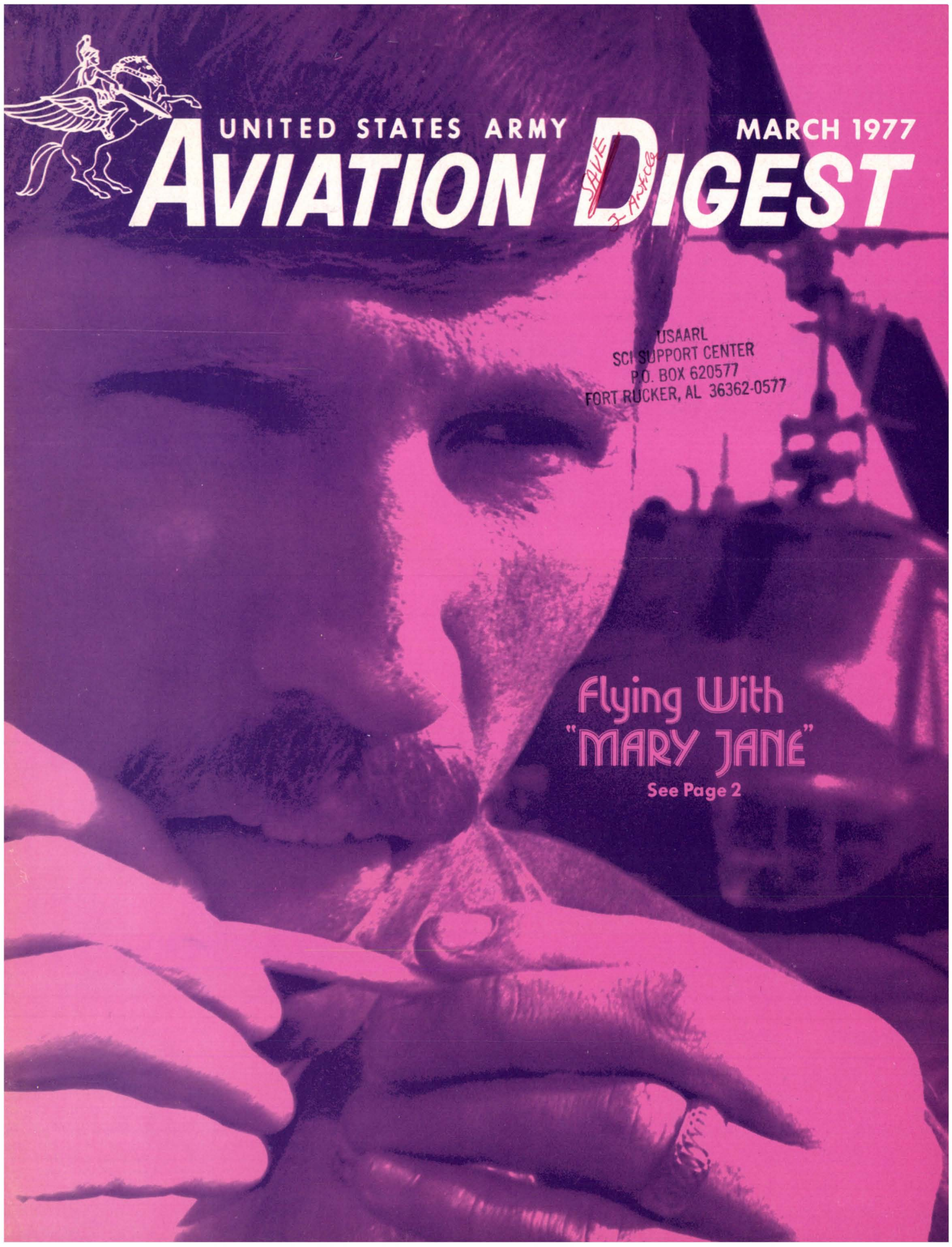

## Flying With "MARY JANE"

See Page 2

# UNITED STATES ARMY AVIATION DIGEST

MARCH 1977 VOLUME 23 NUMBER

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A major activity of the
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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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# The NUTS and BOLTS of

# Managing Enlisted Army Careers

## See

# EPMS

**(Enlisted Personnel Management System)**


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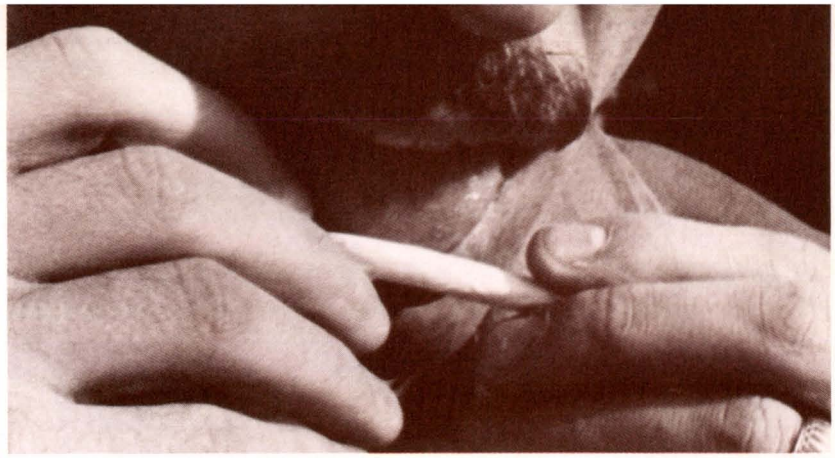
## A REGULAR FEATURE OF THE *U. S. ARMY AVIATION DIGEST*



The effects of marijuana upon human performance is an area of major concern. No place is this concern more critical than in complex man-machine systems, such as those found in aviation, where even the slightest degradation in either flying or maintenance performance can result in catastrophic losses.

USAAAVS

**Lieutenant Colonel**
**David H. Karney, M.D.**
Medical Division
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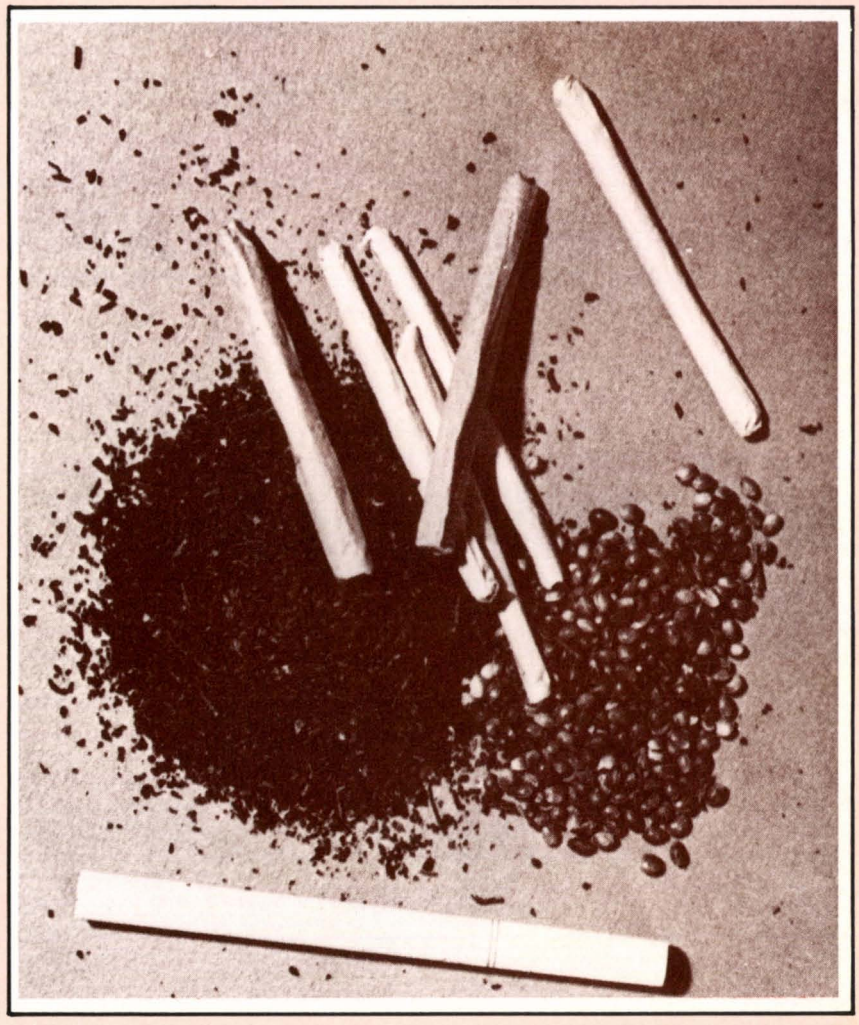


**MANICURED MARIJUANA, CIGARETTES AND SEEDS**

# Flying With "MARY JANE"

HUNDREDS OF THOUSANDS of people—young and old alike—are physically dependent upon drugs—diabetics on insulin, angina victims on nitroglycerin, epileptics on anticonvulsants and high blood pressure victims on diuretics. But their dependency on such drugs is necessary for them to lead a normal, healthy life.

In contrast to these people, there are thousands of others who are dependent on a broad spectrum of drugs which affect them physically and psychologically. These are legal social drugs such as alcohol, tobacco and caffeine; over-the-counter drugs; legally prescribed drugs such as amphetamines, barbiturates and tranquilizers; and illegal "hard" drugs. Somewhere near the middle of this drug spectrum is marijuana (affectionately known by users as pot, tea, grass, weed, or Mary Jane), a growing concern in our society and a potential threat to aviation safety.

When smoked, marijuana quickly enters the bloodstream and within a few seconds (minutes at the most) begins to affect the user's mood and thinking, which lasts for two to four hours.

The psychological effects on the emotions and senses vary widely, depending on what the user expects from the drug, the circumstances under which it is used, and the strength and quantity of the drug. Time is distorted and five minutes may seem like an hour. Space may seem enlarged or otherwise distorted, and sound and colors sometimes seem intensified. Thought frequently becomes dreamlike, and some individuals believe they are thinking better than usual. Recent evidence shows that there is a loss of immediate recall and that it is difficult to think or speak due to disorganization of recent memory.

### Judgment Affected

Like alcohol, marijuana affects judgment and an individual may find it *much harder to make decisions which require logical thinking.* At the same time, he may erroneously believe that his judgment is unimpaired, or even that his mental functioning has been enhanced by the drug. The performance of any complex task which requires good reflexes and clear thinking is impaired, making such tasks as driving or flying particularly dangerous.

Marijuana, like all intoxicating drugs including alcohol, has no place in our aviation environment. While few aviation accidents have been reported in which marijuana usage by maintenance personnel or aircrewmembers was a factor, it is a well-known fact that use of the drug is widespread among servicemen and it would be naive to think the aviation population has not been affected. The absence of documented marijuana-caused accidents is grossly misleading since proof of intoxication is, for all practical purposes, impossible at the present time.

However, there is information available concerning the effects of marijuana on an aviator's flight ability. An informal inquiry conducted by the University of California revealed that social marijuana smoking is not an uncommon practice among civilian-type aviators, some of whom reported that they had even flown while "high" on marijuana. For this reason, the University conducted an experiment to determine the effects of the drug on the aviator's ability to operate aircraft.

The test was conducted in instrument flight simulators using seven professional and three private pilots who had smoked marijuana socially for several years. Before actual testing, the aviators were familiarized with four consecutive 4-minute holding patterns, which included maneuvers encountered in instrument flight; straight and level flight; turns; pitch, roll, and yaw maneuvers; radio navigation, etc. These tasks required coordination as well as short term memory, concentration, and orientation in time

and space. Two flights consisted of a standard holding pattern and two of a modified holding pattern requiring altitude changes. Also, mild turbulence was added so that aviators would be required to continually manipulate the controls to maintain the desired attitude. These flight profiles were carefully chosen to demand a high level of flying skill to correctly complete the sequence.

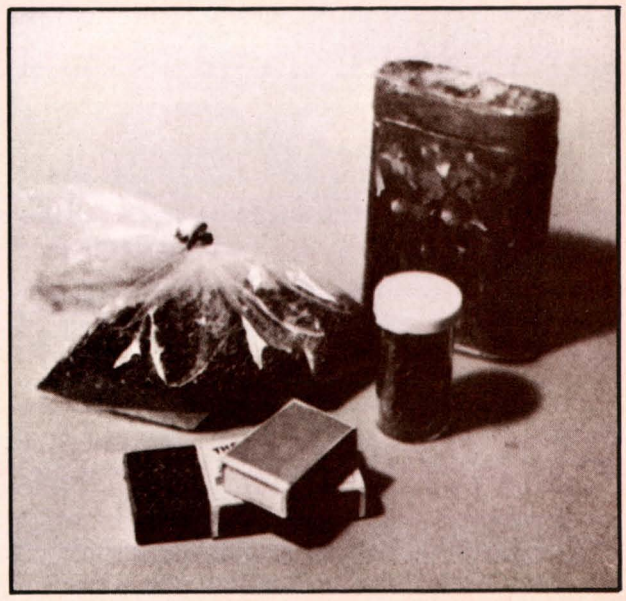
**Flying Skill Degraded**

Once the pilots were proficient in operating the simulator and in performing the holding patterns, two tests were conducted one week apart. Unknown to the pilots they were separated into two groups with each group serving as its own control in two separate tests to validate the results. Before the first test, one group smoked marijuana and the second smoked a placebo (containing no active drug). For the second test, the pattern was reversed. Flying performance of the pilots was then evaluated. In contrast to the placebo, marijuana caused a gross decrement in flying performance with increased prevalence of major and minor errors, altitude and heading deviations, and radio navigation errors. (See table 1.) The effects of the drug persisted for at least 2 hours, generally disappearing within 4 to 6 hours after it was administered.

Several major problems were noted in flying the simulator while under the influence of marijuana—the most significant being its effect on short-term memory and time sense. Aviators often forgot where they were in a given flight sequence or had difficulty recounting how long they had been performing a given maneuver in spite of the presence of written instructions and a stopwatch. Marijuana also appeared to cause alterations in concentration and attention, so that pilots would become preoccupied with one task. As an example, several pilots noted that, following concentration on one particular flying task, they could not tell how long they had been flying or where they were located in the flight sequence. Once they realized this, they would then overcontrol the aircraft in correcting for errors in tasks which they previously had ignored. At times they exhibited a complete loss of orientation with respect to the navigational fix. This loss of orientation occurred when the pilots were either daydreaming, lapsing, or focusing on one certain part of their specified routine.

Although the results noted were quite dramatic in the flight simulator, it is believed that pilot performance in actual flight situations would be even more adversely affected by marijuana. The pilots tested performed a memorized flight sequence and had the in-

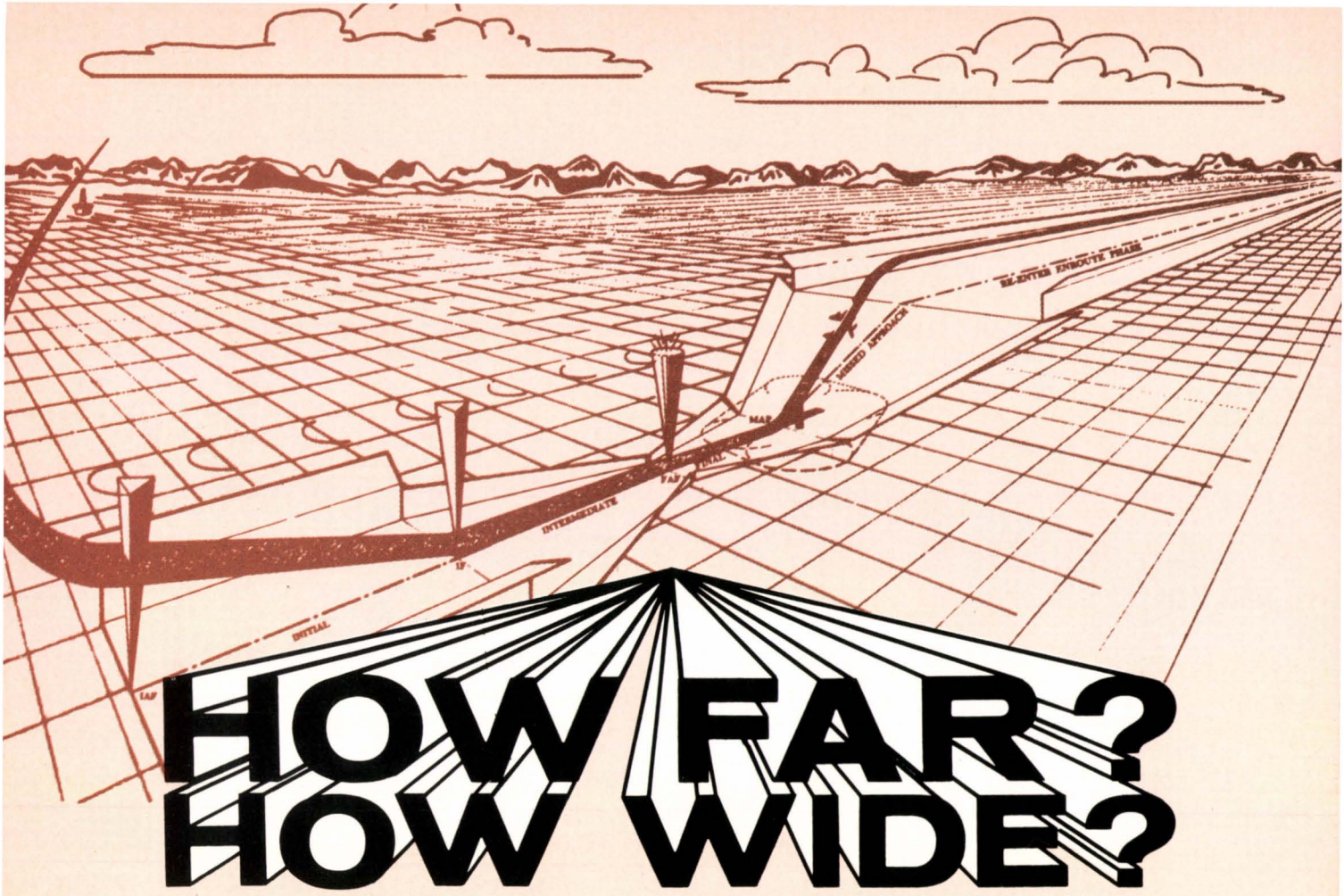
*Continued on page 21*



RETAIL FORMS OF MARIJUANA

TABLE 1.–Average Performance of 10 Pilots 30 Minutes After Smoking Marijuana or Placebo (Values Indicate Total Deviation From Assigned Flight Path During Entire 16-Minute Flight Sequence for Pilot Group).

| | ACTIVE | PLACEBO |
|---|---|---|
| PULSE | 107 | 73 |
| HIGH RATING | 10.5 | 0.5 |
| ALTITUDE (METERS) | 797 | 207 |
| HEADING (DEGREES) | 627 | 332 |
| RADIO NAVIGATION (CDI UNITS) | 100 | 42 |
| MAJOR ERRORS | 2.9 | 0.4 |
| MINOR ERRORS | 4.5 | 0.7 |




# HOW FAR? HOW WIDE?

**Readers should be aware that TERPS distance dimensional units are in nautical miles (6,076 feet) except for visibility factors which are expressed in statute miles and runway visual range (RVR) in feet. Note that the 6,076-foot factor is used to compute the missed approach slope height**

**CW2 Earl G. Kindley**

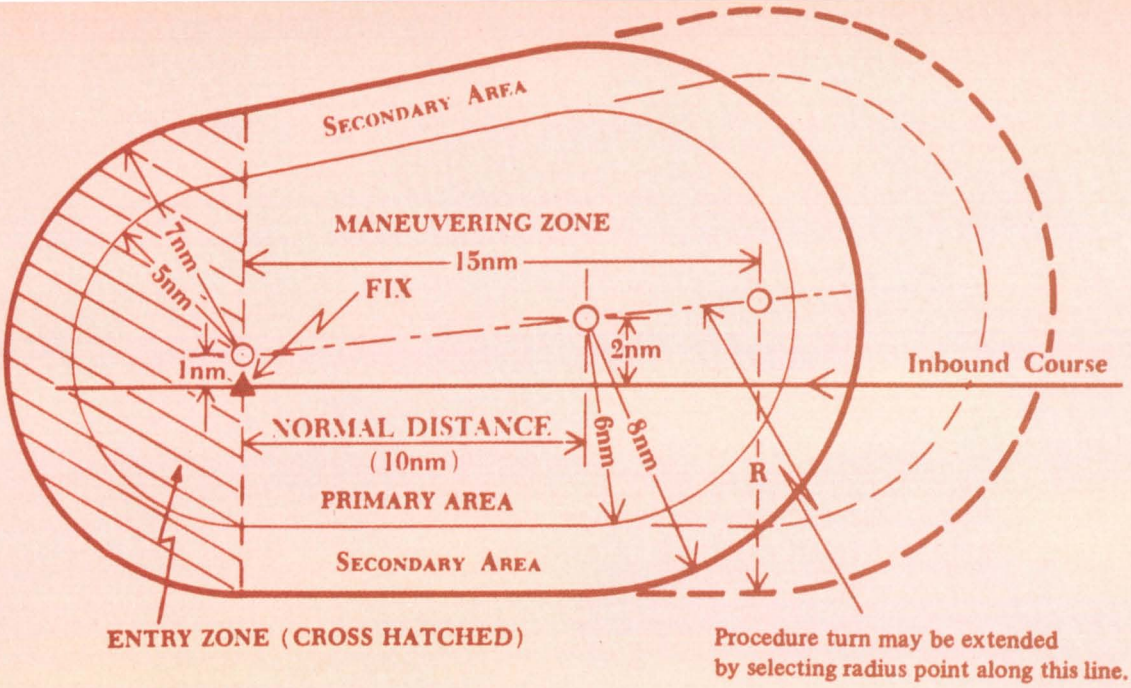
AS AN ARMY aviator you are faced with performing instrument approaches several times a year. I know I've wondered, "Just how safe are these approaches? How large an area of protected airspace do I have in which to maneuver in the event of errors and how high above the obstructions am I?" I began searching for some answers; those I found were both fascinating as well as reassuring. If you've ever wondered about the same things, perhaps this article will provide some interesting answers.

The first place I checked was the *U.S. Standard for Terminal Instrument Procedures,* or "TERPS" (Army TM 95-226). It was from this publication that I drew the wealth of information on this subject.

In order to provide meaningful specific information the discussion here is limited to only one instrument approach system—nonprecision—and to one particular type, a VOR (very high frequency omnidirectional range) with a final approach fix (FAF).

First, it might be helpful to identify the various segments of an instrument approach: they are initial, intermediate, final and missed approach. At times a feeder segment is required, but strictly speaking it is not part of the approach proper. Since some or all of these segments are present to one degree or another in all approaches, they'll be presented in some detail. The segments are discussed in the order in which the aviator would logically encounter them.

When it is necessary to allow an aircraft to proceed from a fix which is part of the enroute structure to the initial approach fix (IAF), a feeder or transition route is designated. These are found on the "enroute facilities" ring of the approach chart; fixes which are not part of the enroute structure also may be designated as feeder route fixes. The latter fixes are shown on the "feeder facilities" ring of the approach plate. Regardless of which fix is present, the following information always is provided: course with magnetic direction and an arrowhead indicating direction to the IAF; distance shown to the nearest one-tenth of a




**Normal Procedure Turn Area (All Aircraft)**

**Figure 1**

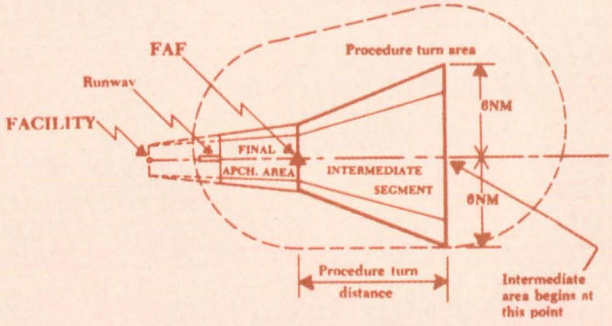
mile; and finally, minimum authorized altitude. Enroute airway obstacle clearance applies to feeder routes. That is, a minimum of 1,000 feet of obstruction clearance is provided within a horizontal distance of 4 nautical miles (NM) either side of the centerline above the highest obstacle within that area. An additional 2-mile secondary area buffer zone (enroute airway criteria) is applied beyond the 4-mile primary area from airway centerline.

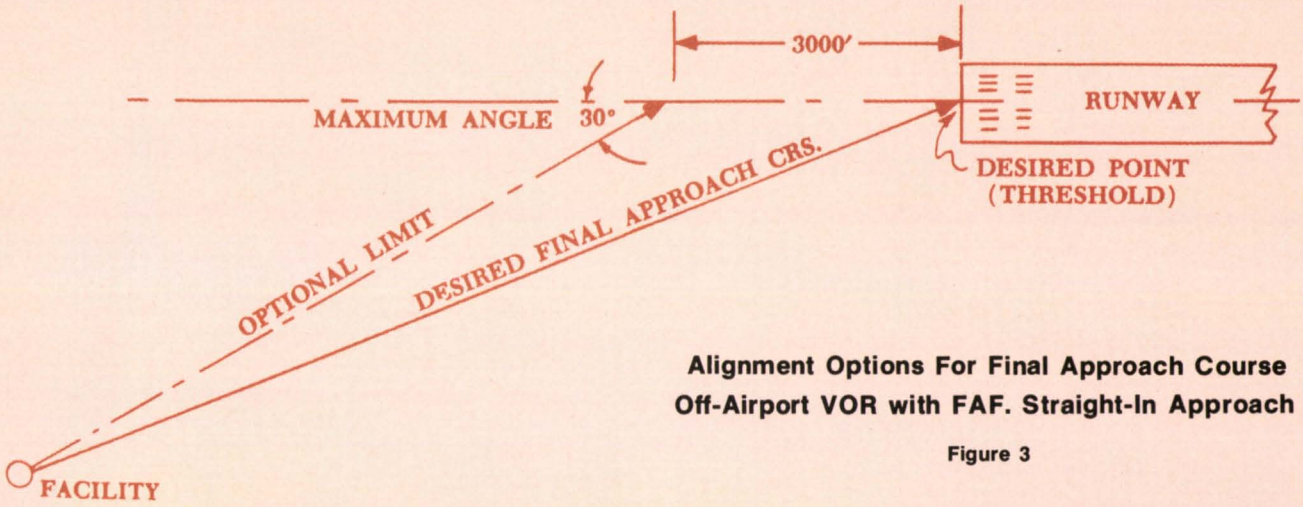
Upon completion of our transition to the IAF, we can say that we've departed the enroute phase of flight and are maneuvering to enter the intermediate segment of the approach. All this takes place in what we earlier defined as the initial approach segment. Normally, the initial segment is 10 NM in length. This may be decreased to 5 miles where only category A aircraft or helicopters only will be operating or expanded to as much as 15 miles for aircraft of category E or as necessary to meet descent gradient criteria if the altitude to lose exceeds standards. Figure 1 shows the construction of the initial approach segment which is based on a procedure turn. Notice the segment is divided into areas and zones. The entry zone is used to determine obstacle clearance prior to the aircraft departing the IAF outbound. The maneuvering zone is the area considered for procedure turn obstacle clearance and this is the point that particularly interests us. Both zones are divided into primary and secondary areas. A minimum of 1,000 feet obstruction clearance is provided anywhere in the primary area. In the secondary area, 500 feet obstacle clearance exists at the inner edge where primary and secondary meet. However, this tapers to zero at the outer edge. So, the farther away from the approach course and primary area you stray, the less you will have in the way of obstruction clearance. By now, it's obvious how procedure turn altitudes are obtained. Assume an obstacle of 1,230 feet in height anywhere in the manuevering primary area. Add 1,000 feet and it yields 2,230. This figure is rounded to the *nearest* 100 feet; therefore, our procedure turn altitude is 2,200 (airport elevation zero).

Upon completion of the procedure turn, the aircraft has entered the intermediate segment. This is the segment which blends the initial and final approach segments; I say blends, because this segment is flexible. The width of the final approach segment varies with the system accuracy for the type of navigational aid that is to provide final approach guidance. The in-

**Figure 2**

**Intermediate Area Within The Procedure Turn Area. FAF is NOT the Facility**





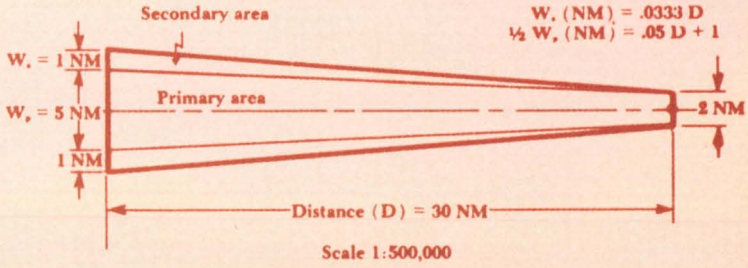

**Alignment Options For Final Approach Course**
**Off-Airport VOR with FAF. Straight-In Approach**

**Figure 3**

termediate segment assumes the width of the final approach segment at the FAF and expands to 6 miles in width either side of the approach course at 15 miles from the FAF. The length of the intermediate area may vary from a minimum of 5 to a maximum of 15 miles (see figure 2). The portion of the intermediate segment considered for obstacle clearance will have the same length as the procedure turn distance. So, logically, only that portion required for procedure turn shall be considered for obstacle clearance. A primary area outside of 10 miles is not considered or used when a procedure turn distance of 10 miles is used. A secondary area extension of 5 miles is considered. Obstruction protection in this area tapers to zero height at the 5 miles point of extension.

Again let's think about obstruction clearance. It would seem reasonable that obstacle clearance would necessarily have to become less the lower one descended in order to facilitate any opportunity to "breakout" under conditions of poor visibilities and ceilings. We do find this to be the case. This intermediate segment also has a primary and secondary area; reference to figure 2 shows how these areas are determined. The primary area provides a minimum of 500 feet obstacle clearance. Five hundred feet is also provided at the inner edge of the secondary area but it tapers to zero at the outer limit. Let's assume that same 1,230-foot obstacle that was in the initial procedure turn area is also in the airspace to be protected for the intermediate segment. This is quite conceivable, since the initial segment overlies the intermediate. To determine low station altitude simply add the required obstruction clearance (ROC) of 500 feet to 1,230. This yields 1,730 or, rounded to the nearest 100 feet, 1,700.

Upon arrival at the FAF, the aviator encounters the final approach segment. It is in this segment that descent to the minimum descent altitude (MDA) is ac-




**Final Approach Trapezoid. VOR with FAF**

**Figure 4**

complished. This segment begins obviously enough at the FAF and ends at the missed approach point. For the sake of brevity and clarity, this discussion is confined to the final approach segment of that same VOR approach with a FAF. Other types are similar, with the dual exceptions of ROCs and segment dimensions.

There are two options for landing—straight-in and circling. A look at the requirements for a straight-in reveals that normally the approach course and landing runway are aligned with no divergence. However, when an angle does exist between the approach course, and the extended runway centerline, that angle cannot be more than 30 degrees (see figure 3). If the final approach course exceeds 30 degrees, only a circling approach is authorized using that navigational aid.

Obstacle clearance for this segment is a portion of a 30-mile trapezoid. It is 1 mile wide either side of the VOR, thus forcing the intermediate segment to be as 2 miles wide; it then expands uniformly to a width of 5 miles at a distance of 30 miles from the VOR. The length of the final approach segment is variable. Five

*Continued on page 26*

# Managing Your Aviation Dollar

*This article describes actual events which occurred in the 71st Aviation Company, 11th Aviation Group (Combat), USAREUR*

**Major George R. Miller Jr.**
**Commander, 71st Aviation Company (Assault Helicopter)**
**11th Aviation Group (Combat), USAREUR**

**Lieutenant Paul A. Dvorsky**
**Unit Supply and Resources Management Officer**
**71st Aviation Company**

WHILE WAITING for the aircraft to be refueled at a small Army airfield 45 miles east of Frankfurt, Germany, LT Aviator decided to visit a friend, LT Blankets, who is the supply officer for a U. S. Army assault helicopter company. Eventually their conversation turned to managing a unit budget.

*LT A:* Our unit commander was really upset today.

*LT B:* Why, what was wrong?

*LT A:* With this quarter finally completed it was disclosed that we overspent our authorized funds. We overspent once before and our higher headquarters made it plain that wasn't acceptable. On top of that, the commander found out yesterday that one of the crewchiefs ordered a 50-cent part and instead got a part costing $200—all because someone used the wrong national stock number (NSN). How has your unit done this year with its budget?

*LT B:* Of the almost $400,000 we were given for fiscal year 1976, we have been able to return more than 16 percent of that to our parent unit.

*LT A:* That's great! But how many aircraft do you have to support with those dollars?

*LT B:* During that time we had 23 UH-1H Hueys and, for the first 8 months, six AH-1G HueyCobras. The Cobras left the unit in February for retrofit to the tube-launched, optically-tracked, wire-guided (TOW) missile configuration and haven't yet been replaced.

*LT A:* How did you manage to support that number of aircraft on less money than you were allocated?

*LT B:* Well, first, take a look at these figures I've just finished working on. In the first quarter the unit was allocated $86,000, of which less than $80,000 was spent; and 7.4 percent was returned (see figure 1).

*LT A:* Our commander would love to be able to do that well, but would never believe your second quarter results.

*LT B:* During that period we weren't able to do as much flying as usual because of adverse weather and only spent 69.5 percent of the $96,369 we were authorized. That was a savings of $29,440 or 30.5 percent. Third quarter funds were reduced to $89,440, of which approximately $80,500 was needed. A balance of nearly $8,000 remained.

*LT A:* It looks like spending started to catch up with you then.

**Figure 1**

| | Quarters | | | |
|---|---|---|---|---|
| | 1st | 2nd | 3rd | 4th |
| Allocated | $86,000 | $96,369 | $89,440 | $127,659 |
| Expenditures | 79,645 | 66,929 | 80,489 | 107,339 |
| Balance | 6,355 | 29,440 | 8,951 | 20,320 |
| | 7.4% | 30.5% | 10.0% | 15.9% |

*LT B:* Not really. We spent a week of that time at a U. S. Army, Europe (USAREUR) training area. We also were making preparations for an upcoming major training exercise which would involve the relocation of half the company, including all aircrews, for a 30-day period.

For the last quarter we were given a budget ceiling of $127,659. At the end of this quarter we had $20,320 remaining, for a balance of approximately 16 percent. These results total an overall savings of more than $65,000 for the four quarters of fiscal year 1976.

*LT A:* Based on what you were given to spend, it appears good; but how did you do by Department of the Army (DA) standards—and have your aircraft been flying, or just sitting on the ground?

*LT B:* We exceeded our flying hour program for the year and were given additional flight time by our aviation group. So you can see the aircraft are being used. We find that the unit was able to "earn," by actually flying the hours of the allocated dollars or in excess of 95 percent of the allocated funds. Of this amount only 88 percent was spent. So you can see that our dollar management efficiency is pretty high.

*LT A:* I still think there's a catch somewhere. What shape are your aircraft in—and are they flyable?

*LT B:* Judge for yourself (figures 2 and 3). Since July 1975, our unit's UH-1H operationally ready (OR) rate has dropped below the DA standard. Incidently, this was directly attributable to a center engine deck separation problem we had with one of our older aircraft. It has been replaced by a newly rebuilt aircraft.

Meanwhile, our AH-1G OR rate has been consistently above the DA standard.

*LT A:* Okay, you've convinced me that your unit is operating within the allocated budget, has an [redacted] program and is maintaining a high aircraft availability rate. My next question is, how have you managed to save money—or is it just an accident?

*LT B:* No, it is definitely not an accident. First of all, the supply officer (in this case myself), was appointed resources management officer and was made the primary overseer of the COLEX (control of logistic expenditure) funding.

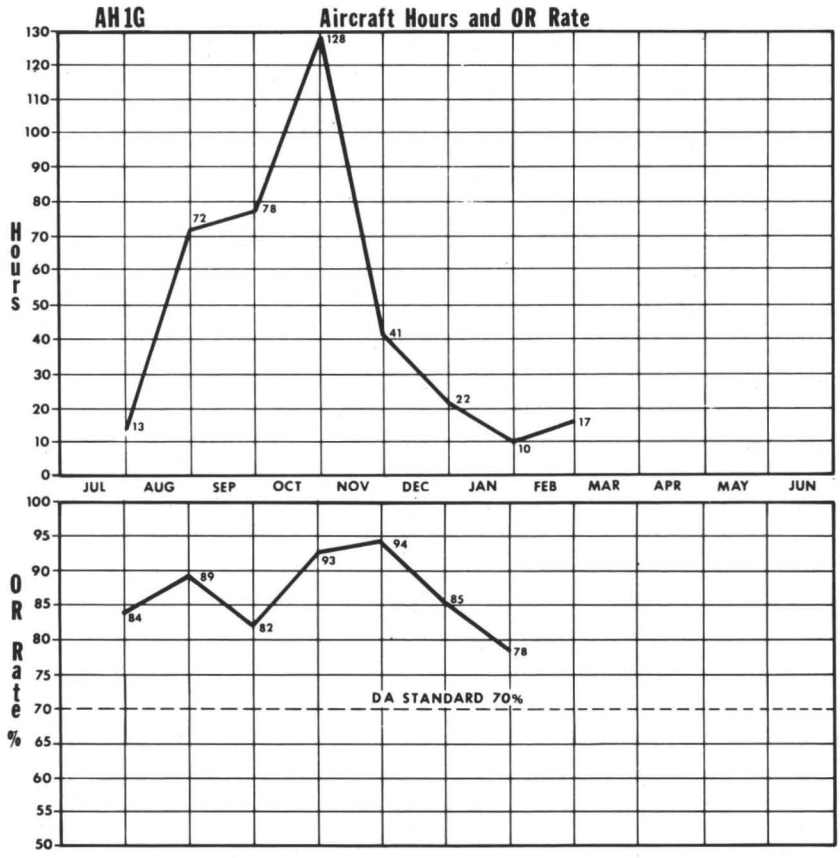
*LT A:* But you can only review the financial status at the end of each month and, at best, have sections adjust their spending accordingly.

*LT B:* Exactly. The real answer lies much deeper, in section maintenance management and supply economy programs. By careful management we were able to save in excess of $60,000. Keep in mind also that the areas of aircraft repair parts and POL (petroleum, oils and lubricants) products are the two most expensive areas as far as expenditures are concerned.

*LT A:* I realize that POL products are almost entirely dependent upon hours flown, but how do you save money in other areas?

*LT B:* Let's begin by looking at the service platoon's procedure for ordering all aircraft repair parts. First, the requestor must put the appropriate information on a parts request form, to include NSN, nomenclature and reference. When this is approved by the supervisor, it is given to the tech supply section, and the NSN and nomenclature are checked for correctness against the microfiche cards. This information, along with the unit price, is then passed on to a maintenance officer for approval or disapproval, no matter how small or inexpensive the part. This

**Figure 2**



process eliminates the ordering of unnecessary parts.

*LT A:* It also would have kept our crewchief from ordering the wrong part. Let's back up a little; I'm not really sure what you mean by the "microfiche cards."

*LT B:* These are 4 by 6 inch cards that have 270 normal sized pages reduced in size upon them. By placing a card in a viewer, the pages are enlarged to normal size or larger for viewing. In this way, our entire library of supply catalogues has been reduced to a deck of cards contained in a small file box.

*LT A:* Is there any advantage other than size?

*LT B:* The biggest advantage is that we receive changes to the deck monthly as opposed to every 6 months, so our information is more up-to-date.

*LT A:* I see. Now, is the microfiche reader a TO&E (table of organization and equipment) item and from whom do you get the flow of cards going?

*LT B:* The reader is an expendable item obtainable through the normal supply system and the cards can be obtained from the DA Pamphlet 310 series like the publications that they are replacing.

Continuing, our motor pool uses a similar system with the prescribed load list clerk ensuring correctness of NSN and nomenclature and adding price. In addition a mechanic will inspect the vehicle to see that the part is in fact needed. The requisition must then be approved by either the motor officer or motor sergeant.

*LT A:* What happens in unit supply, or do they get by on everyone else's merit?

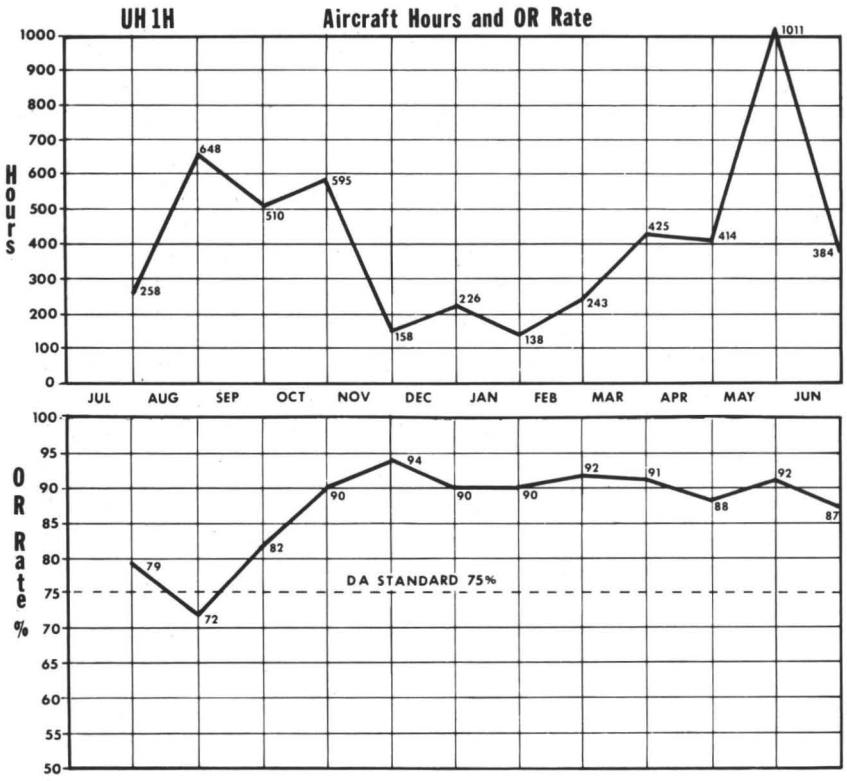
*LT B:* No such luck. Every dollar has got to be managed by responsible and knowledgeable people! As requests for supplies are received the supply clerk will check the NSN and nomenclature for correctness. This again prevents someone from ordering the wrong item which may be of no use and may differ greatly in price. He lists the cost and compares the list of requested supplies against other lists which have been received from the same section with items still due in. This process eliminates duplicating orders. All valid requests are then forwarded to either the property book officer, supply officer or supply sergeant for a final decision. At this point requests also can be evaluated for priority and delayed until a later date if it is deemed necessary due to a temporary shortage of funds.

*LT A:* In all three sections I've noticed only an officer or NCO is authorized to okay the requisition. Isn't it a waste of time to have everyone double-checking the NSN and nomenclature?

*LT B:* You tell me. Wouldn't it be worth it to keep the mechanics from ordering the wrong parts, or anyone else for that matter, who happens to get a little careless? I believe experience shows the extra work to be worthwhile. You just can't let anyone make that parts-ordering determination, or you may end up with a lot of parts that are not really needed and find you have no funds for those that are really necessary. That situation is perhaps what's happening in your unit, LT Aviator.

*LT A:* I guess this all does make a difference. When I get back to my unit I'll be sure to tell them about these money management systems. Then they can decide if we will continue to overspend or if we will begin to operate more efficiently within our budget. Thanks a lot LT Blankets. I think there are a lot of people who will be interested in what you've said about aviation dollar management.

**Figure 3**



# PREPARE TO DITCH

**First one into the pool at recent water survival training exercises at the Newport Naval Base Training Pool was Colonel Russell J. Johnson, aviation support facility commander at Quonset Point, Rhode Island, and aviation officer for the Rhode Island Army National Guard. Not fully evident in the photo is the fact that Colonel Johnson was wearing a complete flight uniform, including combat boots, and that he did not inflate the water wings until he had been in the water for several minutes after jumping off a 15-foot high platform**

*ARMY GUARD helicopter 16536 . . . engine failure 5 miles south of Beavertail Light . . .ditching in the water!*

If that was a real radio message, the pilot and crew of 'copter 16536 would have to know how to ditch a helicopter at sea, get out of it and survive in the water until rescued.

Nobody in his right mind takes that kind of knowledge for granted. That's why, on a recent Saturday, about 50 officers and enlisted men of the Rhode Island Army National Guard's Troop D (Air), 1st Squadron, 26th Cavalry, along with a few pilots and crewmembers from the aviation sections of the 103d Field Artillery Group and the 43d Military Police Brigade, underwent water survival training at the Newport Naval Base.

Training of that type, which is nonexistent in many states, is essential in Rhode Island. "Ocean State" Army aircraft fly over sizeable expanses of water as a matter of routine.

What is water survival training all about? First, attend a class on drownproofing—staying afloat with minimal effort for extended time periods. Now, put on your flight suit and helmet, and your boots—and don't forget the web gear that contains your inflatable waterwings—and come along.

Climb the ladder to a platform about 15 feet above the swimming pool. Keep your body straight, hold your nose and jump feet-first off the platform. Weighted down as you are, you'll find yourself at the bottom of the pool in short order.

Struggle to the surface and swim, kick or splash your way to a point about 10 yards away. Take out your deflated waterwings and, while treading water with your boots on, blow up the bright orange balloons with your own short breath until they are full enough to keep you afloat.

Had enough? But there's more! Make your way to a larger rubber liferaft and scramble aboard with six or seven other people. As soon as you're comfortable, capsize the boat and swim over to the helicopter rescue device dangling in the water, suspended by rope and pulley. Pull one of the seats down, straddle it, get hoisted out of the water, and then it's back down into the drink. Climb out of the pool, weary but wiser.

The water survival training exercise at Newport was put together by First Lieutenant Eric W. Braman, Rifle Platoon Leader with Troop D and full-time operations officer of the aviation support facility at Quonset Point, RI, along with Staff Sergeant Charles E. Wilcox, a technician at the Quonset Point facility. Lieutenant Braman and Sergeant Wilcox made good use of training they received last winter during a week at the Air Force Water Survival School, Homestead Air Force Base, FL. The officer in charge of the Newport training exercise was Captain John L. Enright of Troop D.

Lieutenant Braman noted that Rhode Island has more water survival equipment than most states, thanks to a special effort to obtain it in recent years by the aviation support facility. One problem area: there is no individual military occupational specialty (MOS) in the Army that would place one person in charge of maintaining all of the water survival equipment the state now owns. So, many individuals have had to be specially trained—as an additional duty assignment—to keep the items in good shape.

By the way, the first one into the pool at the Newport water survival exercise, setting an example for everyone else, was Colonel Russell J. Johnson, commander of the aviation support facility and aviation officer for the Rhode Island Army National Guard.

# The 507th Has Its 2,000th MAST Patient

**SSG Don Carr**

**Public Affairs Office**
**Fort Sam Houston, TX**

WITHIN a half hour after receiving a call, a helicopter from the 507th Medical Company (AA) set down on the landing pad serving Otto Keiser Memorial Hospital at Kennedy, TX. A patient there needed to be moved as quickly as possible to the Methodist Hospital in San Antonio, TX, for treatment of cardiovascular problems.

Ordinarily this would be just another mercy mission and rate not much more than a few lines in the records. But this elderly lady was the unit's 2,000th MAST patient since 15 July 1970 when the program was started in the Fort Sam Houston area.

In August 1969 the Secretary of Defense, acting on a suggestion, recommended that military aircraft be used to help civilians involved in highway accidents and other emergencies. From his recommendation came the Military Assistance to Safety and Traffic (MAST) program. Five sites were selected to test the concept. The 507th started its program at one of these sites.

In November 1973 Congress passed the MAST program in an amendment to the Military Procurement Authorization Bill for fiscal year 1974; the President signed the bill shortly afterwards.

Of the 507th's four platoons, only two are stationed at Fort Sam Houston. The other two are at Fort Hood, TX, and Fort Sill, OK. The entire 507th responsibility is for an area in excess of 100,000 square miles.

Probably the most remembered mission performed by the 507th took place in April 1975 when a butane truck exploded at Eagle Pass, TX, located at the border of Mexico. More than 45 people were hurt that night—most of them severely burned. Six helicopters were used to transport victims from Eagle Pass to the burn ward at Brooke Army Medical Center and to other hospitals.

**Above - Preparing to move the 2,000th patient from the helicopter**

**Below - Transferring the patient to a waiting stretcher to take her into the hospital**

# SECRET SOCIETY of TERPS SPECIALISTS

**SFC William L. Loudermilk**
**284th Air Traffic Company**
**Republic of Korea**

**Daniel J. Bradley**
**Department of Academic Training**
**U. S. Army Aviation Center**

HAVE YOU HAD the task of attempting to find qualified specialists within your manpower resources who can design and implement an IFR (instrument flight rules) terminal approach procedure? Did you discover that when you mentioned "TERPS," everyone fell silent and played dumb? The reason is the "Secret Society of TERPS Specialists"—we don't want anyone to know that we "know" something about TERPS (terminal instrument procedures). Yet, the U.S. Army Aviation Center at Fort Rucker, Alabama, has one of the most indepth, comprehensive programs to train senior noncommissioned officers (NCOs) in the air traffic control (ATC) military occupational specialty (MOS) in both fixed wing and rotary wing TERPS procedures. In fiscal year 1974 (FY) the Aviation Center trained 41 NCOs and 55 in FY75. These highly talented NCOs are *somewhere* within your manpower resources and you need only locate them to reap their expertise.

What type of expertise are we referring to? The Aviation Center gives these men 110 hours of intense conference and practical exercise training in all technical aspects of TM 95–226, "U.S. Standard for Terminal Instrument Procedures (TERPS)," together with airspace management. Fixed wing and rotary wing criteria application is covered in great depth. Actual U.S. Army airfields are used for practical exercises, including current criteria and airfield engineering data.

Not only are these NCOs trained in the engineering application, but they also are instructed in the proper function and coordination essential for development of a flyable approach at the minimum cost which satisfies pilots, ATC and command requirements. The application of the engineering data is only one aspect of being a TERPS specialist. These NCOs are taught the value of disassociating themselves from both the ATC concept and the pilot concept and to perform as an interface for both. They learn to establish the best flyable procedures (consistent with the equipment and terrain constraints) that will meet the commander's mission requirements; satisfy the pilot and ATC; and comply with TM 95-226. They know how to provide you with parameters for properly selecting such procedures as straight-in versus circling approaches; final approach fix; intermediate fix; initial approach fix; and feeder fix crossing altitudes to allow selection of the optimum conditions. They are able to consider the best precision approach characteristics.

The Aviation Center trains these NCOs in the precise application of approach minimums—to include adjustment factors for such things as precipitous terrain; induced altimeter error; remote altimeter settings; and excessive length of final approach segments. They can determine if you can or cannot have credit for your approach lights—they can apply the necessary criteria and are able to properly interpret the results.

How about combat situations? Yes, they are trained in the most effective, rapid interface of TERPS criteria to a tactical environment. They know what they can provide you, and can design the most efficient terminal flow for your traffic in the tactical area—if given the opportunity. At the Aviation Center practical exercises are conducted under various degrees of high threat situations, using only basic data input that NCOs would have in the field.

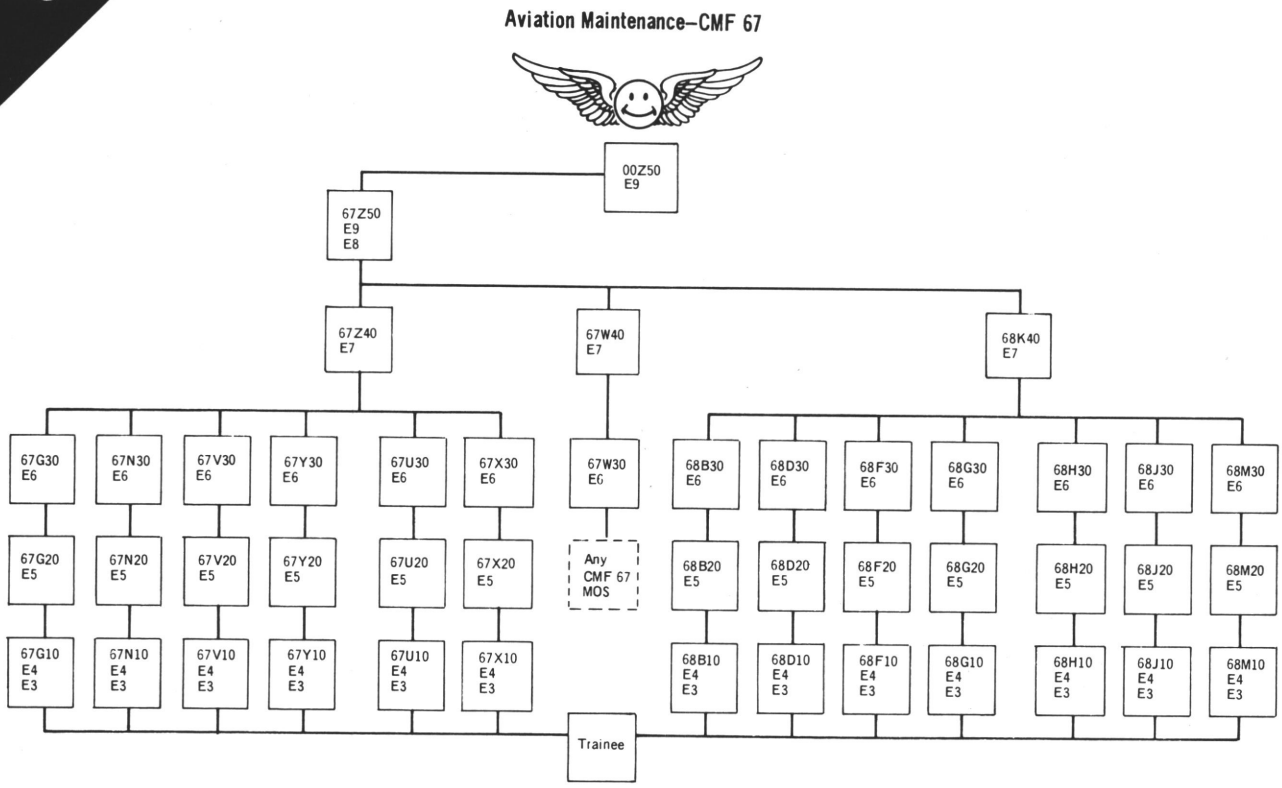
Not only does the Aviation Center ensure that this Army asset is versatile in Army rules and regulations, but it also goes to great lengths to teach them use of FAA (Federal Aviation Administration) documents in airspace and procedural application. This provides them with the ability to coordinate, integrate and procure the most ideal airspace considerations for the Army in lateral relationship to other service elements and the FAA.

The Aviation Center has the only inservice school that can and does teach rotary wing TERPS procedures. These NCOs need this knowledge because 80 percent of Army air traffic consists of rotary wing operations.

Yes, you have "giants" within your resources . . . you need only locate them and then effectively use their talents. If you do this you will discover that your terminal environment from an instrument approach and traffic flow concept will become the envy of all.

EPMS CORNER

# Aviation Maintenance — CMF 67




AVIATION Maintenance Career Management Field under EPMS takes on a few minor changes:

- All fixed wing personnel will consolidate into 67G.
- Fixed wing technical inspector and rotary wing technical inspector will consolidate into Aircraft Maintenance Quality Control Supervisor, MOS 67W.
- Prop and Rotor Repairman, MOS 68E, will be eliminated and those duties transferred to 68B and 68D.
- MOS 35J and 45J consolidate to become 68J.
- MOS 45M becomes 68M.
- All personnel in 68 series MOS become 68K at grade E7 to perform as Component Repair Supervisors.
- All personnel in 67 series MOS at grade E7 with exception of quality control personnel become Aircraft Maintenance Senior Sergeant, MOS 67Z.
- All personnel in grade E5 will convert to sergeant.
- All personnel in grade E6 will become staff sergeants.
- MOS codes 67G, 67N, 67V, 67Y, 67U and 67X will have Technical Inspector positions authorized at grade E6.

BELIEVE IT OR not—the picture captioning this article was not taken in the Vietnam era of the 60s. It is, in fact, a picture taken in 1976, of one of the venerable UH-1M Hueys that make up the first line equipment of attack helicopter companies in the force structure of today's Army National Guard.

The "Mike" models in the attack helicopter companies in the National Guard of Colorado, Utah and Maryland are equipped with the just as venerable M-5, M-21 and M-22 armament systems. In case you may have forgotten, the M-5 is the turret mounted 40 mm grenade launcher system; the M-21 is the minigun and seven-shot, 2.75 inch rocket combination; and the M-22 is the French-designed M22B wire-guided (SS-11) missile system.

Aviation training in the National Guard, or at least that portion belonging to the attack helicopter units, is both unique and challenging to say the least. The challenge to unit training can best be understood by considering the fact that the training demands on an attack company are as current as today's newspaper; and in many cases the ink on doctrinal material is just as wet. However, even with all of the new literature on the attack helicopter employment and tactics, the challenge that has been accepted by the "gun" companies of the Guard is both old and new—the old problem of adopting the new employment concepts and the tactics written for the more heavily armed and faster AH-1 HueyCobra, with its two-man pilot crew, to the less powerful UH-1M, with its four-man officer and enlisted crew. The training challenge for the attack helicopter companies in the Guard can best be summed up as being the application of the new mid to high intensity (high threat) battlefield doctrine to both aircraft and armament systems that were considered marginal at best in the recent "low intensity" involvement in the Republic of Vietnam. (Aviators with memories of such places as Ashau, IaDrang and others hopefully will excuse the last euphemism.)

The uniqueness of the gun company's unit training program is that it must train with equipment on hand and is expected to train on equipment not in the Guard's current inventory for the purpose of enlisted MOS (military occupational specialty) qualification and the eventuality of mobilization. The gun companies have, in effect, twice the training workload with 17 percent of the available training time of their active Army counterparts. Add to these training problems (1) the fact that the aircraft and armament systems have received less attention at Army level because of the obsolescence to the active Army system, and (2) that no service school is offering any enlisted maintenance training on either their aircraft or armament subsystems. These two points most certainly add to the uniqueness of the ongoing unit training of the attack helicopter companies in the National Guard today.

Recognizing the fact that the next military involvement will be a come-as-you-are affair, the majority of the Army's aviation capabilities fully intend to arrive with their muskets functioning, their troops well trained, and with the spirit that the same militia had when it arrived at Concord Bridge 200 years ago. However, the question that must be asked is: Are we giving the Guard enough, when we expect it to show up with esprit de corps and muskets at the next military engagement?

Certainly, the days of flying with a flack jacket in the chin bubble and a 45 between your legs are long gone; however, 10 years after the peak of the conflict in Southeast Asia, it seems that the memories, the war stories, *and unfortunately the equipment* linger on and on and on.

# Minutemen Of Today — Ready! Willing! & Able?

**Lieutenant Colonel Douglas L. Gill**
**State Aviation Officer**
**Colorado Army National Guard**
**Denver, CO**

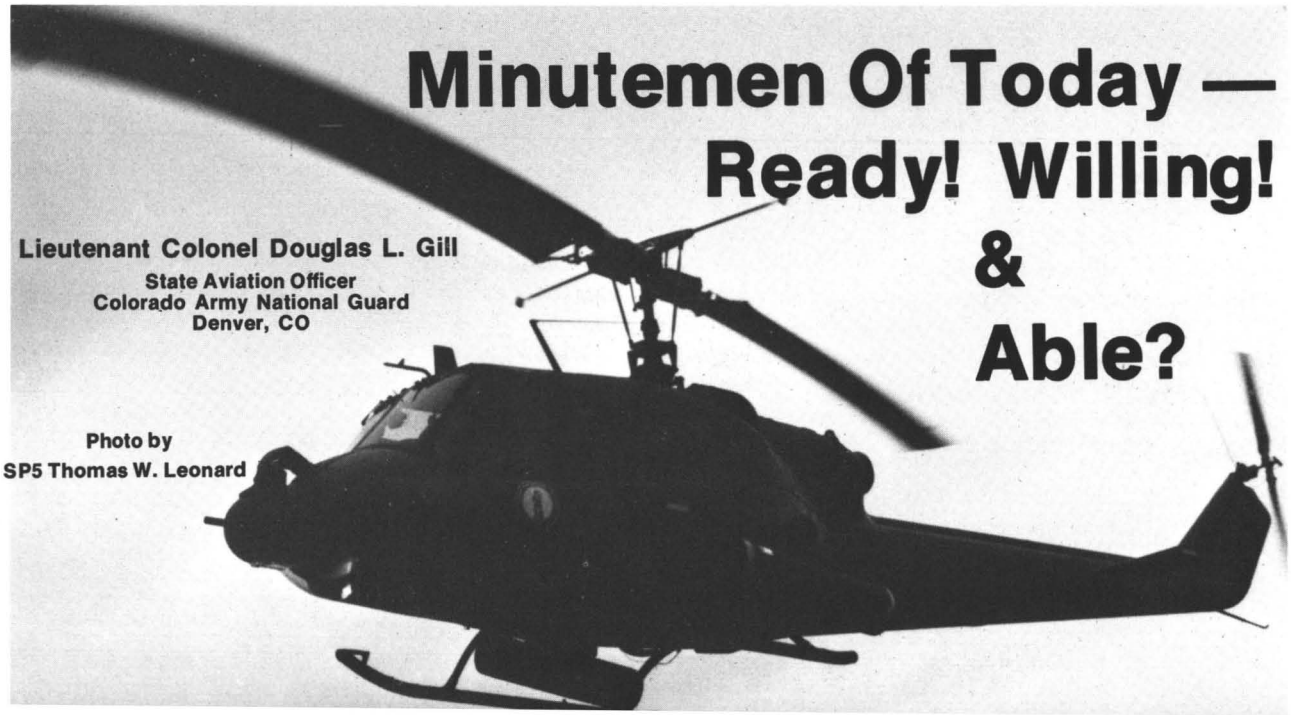


**Photo by SP5 Thomas W. Leonard**

# The Three C's

**CW3 George H. Kennedy**
330th Army Security Agency Company
APO 09012

WHAT ARE THE three Cs equal to? The three Cs are applicable to all fixed and rotary wing flights when we have more than one crewmember assigned. Chapter 11 in the operator's manual covers crew duties, yet in most manuals we will find the statement, "not applicable." The question then is do we need written crew duties, or should these be assigned by the pilot in command?

Before we discuss crew duties, the term should be defined. This created a problem because I could not find a published definition for crew duties. So, here is mine: Flight crew duties are those joint labors, functions and responsibilities required from one or more members of a flight crew during all phases of ground or flight operations. These are specified in the operator's manual, in the standing operating procedure (SOP) or by the pilot in command. Now let's establish a need for more than one crewmember.

Army Regulation (AR) 95-1 establishes the requirement for an instrument rated pilot and copilot for all flights into known or forecasted instrument conditions. The C-12, CH-47 and the CH-54 have been designated crew aircraft requiring both a pilot and copilot for all flights. The United States Army Agency for Aviation Safety at Fort Rucker, Alabama, recommends that all test flights have both a pilot and copilot. AR 95-1 also requires that the commander appoint a pilot in command for all flights. The pilot in command should be the pilot with the most experience, "moxie" and seniority in the model aircraft—regardless of rank. The pilot in command has to know everything that is going on in order to make correct decisions regarding the flight. AR 95-1 added a copilot and created the need for the three Cs. Now let's examine some of the problems created by having more than one crewmember, starting with the ***first C—crew duties.***

A unit's mission will dictate the type of crew duties to be established. The crew duties of a medevac unit and an air assault unit definitely would be different. Most of the problems with crew duties are in unit standardization. Some of these problems are in the area of propeller and landing gear controls, and air/ground communications.

The following incidents are fictitious, and they are presented to amplify problem areas.

**Case 1** — A U-8D aircraft had just departed from the active runway when the entrance door blew open. The pilot requested permission to remain in closed traffic for a full stop landing in order to close the door, and then depart immediately. The pilot made a full stop landing, and the copilot shut the door. For normal landings the unit's SOP stated that the propeller controls should remain at 2,600 revolutions per minute (RPM) until the aircraft had cleared the active or upon reaching a safe taxi speed before the After Landing Check could be completed. The pilot did not request an After Landing Check, but did retract the flaps and set the trim for takeoff. The copilot double checked the door and advised the tower that they were ready for takeoff.

The tower cleared them for takeoff. Neither a Before Takeoff or a Line-Up Check was completed. The pilot noticed that the takeoff roll seemed excessive and that the rate of climb was very poor. The pilot called for an After Takeoff Check. That was when the pilot discovered that the propeller controls were still at 2,600 RPM instead of 3,400 RPM. The pilot again requested closed traffic; however, this time it was to abort the mission and change both engines on the aircraft because of severe overboost.

In the investigation requested by the commander, it was revealed that the pilot normally flew the U-21 aircraft and that it was the unit's policy that the copilot advance the propeller controls full forward on landing. The copilot was busy with the door, and had expected the pilot to advance the propeller controls as stated in the unit's SOP. The SOP was checked and there were different crew duties established on who advanced the

**Figure 1**

**Takeoff Briefing**

1. **Takeoff power, max allowable _____ .**
2. **Distance for takeoff _____ .**
3. **Rotation speed _____ .**
4. **Lift-off speed _____ .**
5. **Departure procedures _____ .**
6. **Single engine procedures:**
   - **A. Before takeoff.**
   - **B. After takeoff.**
7. **Copilot duties:**
   - **A. Monitor engine instruments.**
   - **B. Take care of radios/nav equipment.**
   - **C. Have checklist ready.**

propeller controls full forward after landing in the U-8 and U-21 aircraft. Even though this did not relieve the pilot in command of his responsibility, it certainly helped in creating confusion.

**Case 2** — Today's aircraft are equipped with both very high frequency (VHF) and ultra high frequency (UHF) radios. These aircraft also have intercom controls that allow the pilot and copilot to transmit or receive on VHF or UHF simultaneously without interfering with each other. Air traffic control facilities normally transmit simultaneously on both VHF and UHF. Crew duties normally establish who will operate the radios. The following case will demonstrate what happens when both pilot and copilot operate the radios at the same time.

On an instrument flight rules (IFR) flight through Standiford's Approach Control, I heard the following transmissions on VHF. "Army helicopter 32005, this is Standiford Approach Control, say your request again."

"Roger Standiford, this is Army 005, request radar vectors for a practice instrument landing system [ILS] approach to runway 29; we are level at 4,500 feet and north of West Point."

"Roger Army 005, proceed direct to the outer marker, descend and maintain 2,500 feet."

"Roger Standiford, Army 005 is departing 4,500 for 2,500 feet."

About two minutes later, we heard the following transmissions: "Army 005, what are your intentions after this approach?"

We heard two different answers from Army 005. One was on VHF requesting another approach to runway 29, and the other was on UHF requesting clearance back to Fort Knox, KY.

There was a pause and then Standiford transmitted, "This is Standiford Approach Control, how many Army 005 aircraft am I working with, and say your positions."

We heard two position reports, one on VHF and the other on UHF, giving the same position and altitude.

There was another pause, and then Standiford transmitted, "Army 32005, this is Standiford Approach Control, when you two pilots get your heads together in the cockpit, and you decide what you want, then just one of you call me back on the VHF radio only."

Both of the above cases demonstrate confusion on crew duties in the cockpit. Crew duties must be addressed in the applicable operator's manual or the unit's SOP. Crews must have complete knowledge of these procedures and their responsibilities. Regulations require that the operator's manual be aboard the aircraft for all flights, but most manuals state that Chapter 11 on crew duties is not applicable; therefore, crew duties must be in the unit's SOP. Most unit SOPs, however, would overgross the aircraft if they were carried aboard. There is no justifiable reason why the annex on crew duties could not be carried aboard the aircraft. Each assigned aviator also should be given his personal copy of the annex.

Figure 2

### Approach/Landing Briefing

1. **Type of approach:**
   - **A. Procedures.**
   - **B. DH/MDA.**
2. **Minimum safe sector altitude (emergency altitude).**
3. **Runway in use and surface winds.**
4. **Copilot duties:**
   - **A. Checklist on call.**
   - **B. Tune nav/radios as required.**
   - **C. Monitor approach.**
   - **D. Call 100 feet above DH/MDA.**
   - **E. Monitor engine instruments.**
   - **F. Verify with pilot that gear is down and locked.**

### Emergency Briefing (Single Engine)

1. **Checklist for emergency procedure.**
2. **Fuel remaining right _____ left _____ gallons.**
3. **Fuel in hours:**
   - **A. With crossfeed _____.**
   - **B. Without crossfeed _____.**
4. **Available airfields:**
   - **A. Runway length _____.**
   - **B. Weather _____.**
   - **C. Emergency equipment available.**
5. **Position where gear will be lowered.**

Figure 3

***The second C is for crew coordination,*** which is the ability of two or more members of a flight crew to function harmoniously and efficiently. Every pilot has enjoyed flying with other pilots who were highly polished professionals, but we cannot fly with the same person all the time; therefore, we must establish a standard for crew coordination. Here are two more cases demonstrating problems with crew coordination.

**Case 3** — A T-42 aircraft was on downwind for a night landing. The crew was completing a long 3-hour cross-country flight. The pilot called for the Before Landing Check, and the copilot read the checklist which included the challenge and response of, "Gear—down and checked." The copilot was engrossed with reading the checklist with the aid of a small flashlight, while the pilot was looking at the runway lights and planning the approach. The pilot answered the challenge of "gear" with the command "down." Both pilots were engrossed with their different duties. On short final, the copilot "rogered" the tower's landing clearance. No final landing check was made.

I am sure that the two pilots will never forget the sound of the two

propellers digging into the asphalt, and the sinking feeling as the fuselage slid noisily down the runway. The aircraft slid to a stop and then there was complete silence. Suddenly the crew started to coordinate, "I told you *gear down.*"

"But I thought that *you* had put it down."

**Case 4** — It was a hot day when the crewmembers lined up their U-21 aircraft for an immediate departure from an airfield with a field elevation of 4,000 feet. The pilot applied power for takeoff, glancing just once at the engine instruments. At the same time, the copilot was busy changing frequencies to the departure control. The pilot rotated when flying speed was reached, and retracted the gear after the aircraft became airborne. At this moment, both the pilot and copilot saw that the exhaust gas temperature (EGT) gauge on number one engine was at 820 degrees, and number two engine was at 790 degrees. Failure to coordinate as a crew while expediting the takeoff resulted in both engines being replaced.

Both of the latter cases demonstrated poor crew coordination. These situations could have been prevented by briefings conducted by the pilot prior to takeoff and landing. Currently the only briefings required by regulations are the passenger and certain mission briefings. Many units have excellent passenger briefings as part of their SOPs. A copy of the briefing normally is carried aboard the aircraft, and the crews are well versed on them.

What about incorporating other briefings into a flight such as takeoff, approach/landing, and emergency briefings? Other military services have a standardized briefing based upon the situation and type of aircraft. These briefings are given on every flight even though the crew does not change. Some items must change with the mission and the environment. Figures 1, 2 and 3 indicate the items that could be placed in them.

**Figure 4**

## Crew Duties

1. **Are applicable crew duties written in the operator's manual or in the unit's SOP?**
2. **Are annexes of the SOP on flight standardization procedures carried aboard the aircraft and also disseminated to crewmembers?**
3. **If your unit has more than one type of aircraft in category, are there any conflicting procedures as shown in case number 1?**

## Crew Coordination

1. **Are all pilots adequately trained to operate as crewmembers in an efficient and effective manner?**
2. **Are more experienced pilots being assigned to fly with less experienced pilots?**
3. **Are more experienced pilots assisting the unit standardization instructor in accomplishing his mission?**
4. **Is there a need for flight briefings?**

## Crew Communication

1. **Do pilots use common and safe phraseology?**
2. **Is the standard phraseology printed in the SOP?**

Take a look at your mission and area of operation and see if these briefings could be incorporated to increase flight safety in your unit. Briefings are a form of communication, and this brings us to the ***last of the three Cs, crew communication.*** Crew communication is the ability of a flight crew to internally transmit or receive commands and critical information without confusion. This last fictitious case will demonstrate the hazard of using confusing terminology.

**Case 5** — A U-8F aircraft was on a training flight. The instructor pilot and student were practicing short field approaches. As the aircraft approached the threshold of the runway, it was obvious the aircraft was too high and too slow. The instructor pilot hit the mike button and said, "Apply takeoff power." The student only heard the last part of the transmission, "takeoff power," and complied with the instructions. The aircraft looked like an Otis elevator without brakes coming down. There was major damage to the landing gear and to the wings.

By now it should be obvious what the three Cs are equal to: $C_1 + C_2 + C_3 + P_0$ = Professionalism with zero accidents. You must incorporate all three Cs, and you must employ them in your flight program to maintain a zero accident rate. The above five cases are fictitious, but the increased sophistication of today's aircraft and the need for *published* crew duties are real.

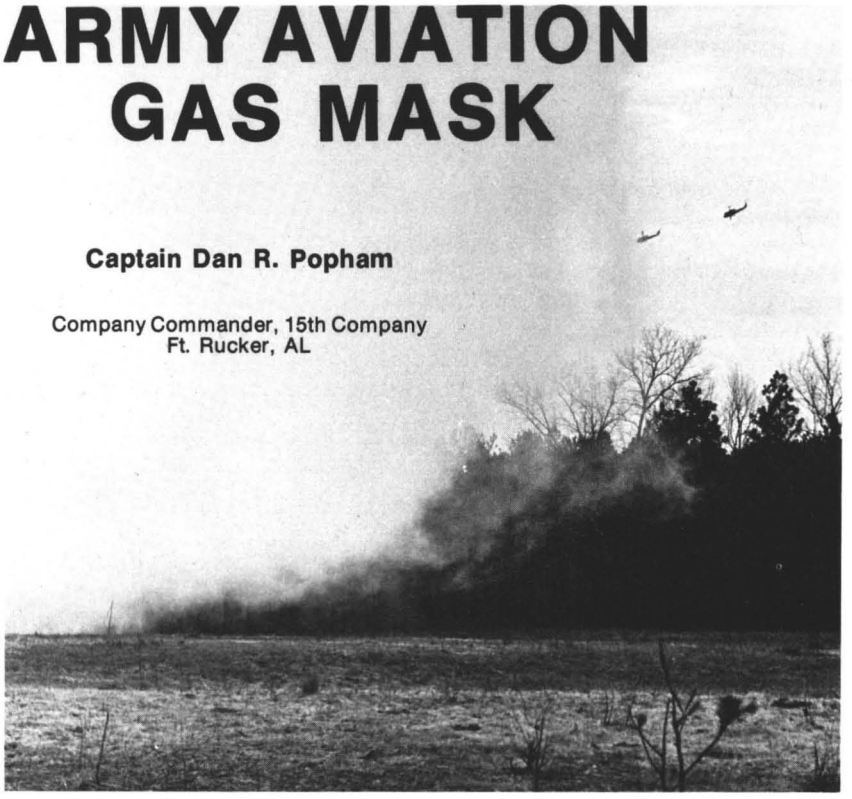
Every unit in the world has unique procedures that are applicable only to that area. If there are procedures that apply to the rest of the world, don't keep it a secret. Send your ideas and recommendations in on a DA Form 2028, or send a letter to the Directorate of Evaluation/Standardization, Fort Rucker, AL 36362.

In closing let me offer figure 4, a short checklist, so that you can give your unit a quick review.

# ARMY AVIATION GAS MASK

**Captain Dan R. Popham**

Company Commander, 15th Company
Ft. Rucker, AL



A LANDING ZONE marked with seemingly harmless "white smoke" could be a hazard to the business of flying. CS, similar to tear gas, a chemical agent, has been *and can be* detrimental in the aviation environment. How many aircraft have crashed because of chemical agents? How many lives have been lost due to chemical agents in aircraft? How many of these losses could have been avoided? What action can one take to minimize these losses?

Most of the above questions and problems could theoretically be avoided or answered by following AR 95–1, which says:

• Either the pilot or copilot will wear a protective mask at all times when fused items filled with incapacitating or toxic chemicals are carried by Army aircraft. Other crewmembers will have a protective mask readily available which has been adjusted and fitted before takeoff.

• When incapacitating or toxic chemicals are carried by an aircraft without arming or fusing systems installed, the pilot and copilot may fly with the mask readily available—unless the possibility exists of accidentally releasing the agent by gunfire or turbulence.

One other statement needs to be added to the regulation—anytime you are in doubt about the toxicity of the environment or there is a possibility of a communication barrier, you should have a pilot or copilot with a mask available. If there is a remote possibility of troops accidentally activating an agent inside or outside the aircraft, the pilot or copilot should have a protective mask on. The ABC-M24 protective gas mask can be used effectively and safely to ensure the survivability of aircraft and aircrewmen but there are some deficiencies that were discovered during a recent flight evaluation of this mask.

A flight evaluation of the M24 protective mask was conducted by the Standardization Section of Advanced Division, Department of Undergraduate Flight Training. The purpose of the flight evaluation was to determine the different modes of flight in which the mask could be successfully employed. The mask was evaluated during both day and night inflight environment, to include NOE (nap-of-the-earth) flight. These comments were developed as a result of this test program.

• Day/NOE Flight:

√ *Inadequate depth perception.* It was difficult to make accurate judgments of altitude while wearing the mask. At times the aviator perceived he was 20 feet AHO (above highest obstacle), when actually he was only 3 feet AHO.

√ *Restrictions of peripheral vision.* The mask restricted the aviator's peripheral vision to such a degree that it became difficult to judge rate of closure and other factors associated with peripheral vision.

√ *Distortion of vision.* Due to the curvature of the mask's lens and the curvature of the pilot's face, many objects both inside and outside the aircraft became distorted. The amount of distortion seems to vary proportionately with the size (curvature) of the pilot's face and the portion of the lens the pilot is looking through.

√ *Nausea and headache.* The aviator experienced minor nausea and headache after flying with the mask on for approximately 40 minutes. This could be caused by the inadequacies in the fitting of the mask, the high "drag" encountered in breathing and the effect of visual distortions combined with normal vestibular stimulation.

√ *Reflection.* When flying into the sun, metallic parts of the mask reflected into the pilot's eyes and could be seen in the lens.

• Night Flight:

√ *Field of view.* Night ap-

proaches were difficult due to the restrictions to the field of view. Also it was difficult to determine height due to inadequate field of view.

√ *Reflections.* A single-source light to mark an obstacle when viewed at approximately 4,000 meters appeared to be two objects due to the curvature of the optical portion of the face piece of the mask. Additionally, all interior lighting in the aircraft produced additional reflections in the optical portion of the face piece of the mask. To reduce the reflections, it was necessary to turn the cockpit lighting to a very low setting which, consequently, made the instruments difficult to read. All problems noted in day/NOE flight are also applicable to the night flight, with the exception of flight into the sun.

This information is presented to remind the reader of the need for a gas mask in the tactical employment of aviation and to alert the user to the hazards of the protective mask we are using today. The drastic change in aviation tactics to NOE and extended night flying requires an improvement in existing life support and protective equipment in order to maintain Army aviation operational effectiveness.

**• While there are still problems to be overcome, the Army is confident that it will have an effective gas mask for Army aviators in the near future.**

-10 CORNER

# AH-1S HueyCobra-10

## Operator's Manual New Nine Chapter Format

**Pat Wall**
**Directorate of Training Developments**
**U. S. Army Aviation Center**
**Fort Rucker, AL**

THE AH-1S HueyCobra operator's manual (TM 55–1520–234–10) appeared 17 November 1976 and became the first helicopter dash 10 in the new nine-chapter format to make its way into the system. With the new format came some changes to the ways some maneuvers are described. For example, the AH-1G operator's manual tells us that the helicopter should be accelerated to 80 KIAS (knots indicated airspeed) for climb during a normal takeoff from a hover. Chapter 8 of the AH-1S manual says "establish climb at the desired rate and airspeed." Similarly, a steep approach for an AH–1G is defined as a 12-degree to 15-degree angle whereas the AH–1S steep approach angle "may vary from that of a normal approach to a vertical descent." Another example is the AH–1S book does not require a 500 feet-per-minute rate of descent for instrument descents as is prescribed for the AH–1G.

These changes have been brought about in an effort to optimize the maneuvers by relying on the information in Chapter 5 (Operating Limits and Restrictions) and Chapter 7 (Performance Data) rather than on rules that were originally established as training exercises. Climb airspeed depends on aircraft weight and density altitude and may vary each time the maneuver is performed. Likewise, approach angles and rates of descent will vary in order to obtain the best aircraft performance for a given mission and environment.

Similar changes were made in other revised helicopter operator's manuals that will be distributed throughout the Army this year.

*Continued from page 4*

**FLYING WITH "MARY JANE"**

structions for the pattern in front of them at all times. In actual flight situations, instructions come sequentially from an air traffic control specialist and must be accurately noted and repeated (i.e., read back) by the pilot.

Unfortunately, there has been little research into the effects of marijuana intoxication on personnel performing specific jobs such as aircraft maintenance, air traffic control, or other support duties. However, the effects of marijuana upon human performance, particularly those tasks requiring a high level of skill, memory, interpretation, awareness, and judgment, have been well documented. Based on this research and on the detrimental effects of marijuana intoxication on the performance of aviators, it is logical to assume that job performance of all aviation-related personnel would be affected.

**Marijuana vs Alcohol**

There is much controversy about the use of marijuana versus the use of alcohol. Note the following opposing statements comparing marijuana and alcohol intoxication.

"Marijuana perhaps more than any other drug is the NOW generation. Not just the hippies or the dropouts or the alienated but the doctors, lawyers, and all kinds of chiefs of tomorrow say marijuana is it. It is better than booze—no hangover. It is a mind drug, not a body drug, while alcohol and nicotine are known to be responsible directly or indirectly for much illness and many deaths. It is a euphoriant in a world that needs joy, not the obliteration of sensation that accompanies alcohol. It is not addicting, whereas hard liquor is. No one dies when they stop using it; some have died when they stopped drinking. It represents and is part of a new attitude toward life while alcohol is regressive."

On the other hand . . .

"Nonsense. Marijuana smoking is frequently the first step toward dropping out of life. It sometimes leads to the use of even more dangerous drugs. It has not been studied enough to say it is harmless. It is a symbol of attitude that will destroy our country and lower everyone's standard of living. Alcohol does present problems but it is the drug of choice in all of the more technologically advanced countries, so it cannot be too bad. Marijuana, on the other hand, is used only in the backwater countries of the world."

Regardless of the pros and cons, we know that alcohol is a dangerous drug physically, psychologically or socially for millions of people whose drinking is out of control, that it is a factor in one-half of all highway accidents, and that it has also been a factor in numerous aircraft accidents. And, based on the limited research presently available, there is no firm evidence that "pot" would be less harmful if used as consistently as alcohol.

Although marijuana is not a narcotic and does not appear to cause physical dependence such as heroin or other hard narcotics, users of marijuana are more frequent abusers of other stronger drugs. This may be sociological, but the relationship does exist.

**Penalties Severe**

The use of marijuana is illegal and the penalties for possession are severe. According to the federal legal controls based on the Controlled Substance Act of 1970, unlawful possession is punishable by up to one year imprisonment and/or fines of up to $5,000. A second offense can be punishable by up to twice the imprisonment and fines of the first offense.

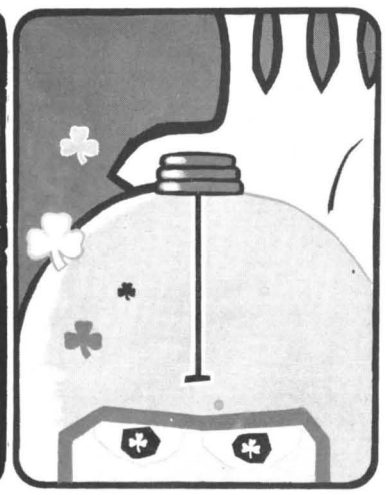
Unlawful distribution of marijuana, or possession with intent to distribute, is punishable by up to 5-year imprisonment and/or fines of up to $15,000 plus 2 years of required special parole. A second offense can be punishable by imprisonment or fines up to twice that of the first offense. State laws vary as to the punishment.

Another aspect of off-post apprehension for marijuana use is that a civil court conviction on a possession charge results in mandatory consideration for discharge under the provisions of Army Regulation 635-206. An "undesirable discharge" can be directed for this off-post offense, no matter what actual jail sentence and/or fine is imposed by the civilian court.

Punishment for possession of marijuana under the Uniform Code of Military Justice is severe. Maximum punishment can result in dishonorable discharge and up to 5 years' imprisonment.

Today, the effects of marijuana upon human performance is an area of major concern. No place is this concern more critical than in complex man-machine systems, such as those found in aviation, where even the slightest degradation in either flying or maintenance performance can result in catastrophic losses.

# VIEWS FROM READERS



Sir:

The following poem was written by me in 1967 after several experiences with "hook attacks." I found it recently and thought I'd pass it on to you for your enjoyment and if you deem it worthy—for publication. I'm sure that many of your Chinook pilot readers will recognize themselves and chuckle with, hopefully, a guilty conscience.

*The Homegrown Cyclone*

*In the future wherever I am*
*As I am recalling Vietnam;*
*I'll not remember the cannons' crack,*
*The rockets' roar nor mortars' whack;*
*But as I sit and as I dwell,*
*I'll remember those moments of hell*
*When the skies of blue were blasted black*
*During the onslought of a hook attack.*
*The assault begins in the pickup zone,*
*When the hook descends with a dreadful drone*
*Moaning the groan of a vicious toad,*
*Ready to pounce on the innocent load.*
*With barbaric blades, he drives the sand,*
*Daring the hookup man to stand;*
*And, if he does, as he touches the block*
*It knocks him flat with an electric shock.*
*If this he survives, he's still mighty rushed,*
*He must leap in a hurry or be brutally crushed.*
*For always at this point, the hook isn't flown*
*It wallows down like a free falling stone.*
*It lumbers away right over the base,*
*Slashing sand in everyone's face,*
*Tearing and tumbling the messhall tent,*
*Leaving the cooks wondering where it went.*
*The stoves in the meantime have been blown out,*
*And all of the food has sand throughout.*
*The coffee is spilled and the grass is on fire,*
*But the schnook refuses to fly any higher.*
*Then as he lurks near the drop-off point*
*A garbled voice yells, "Pop smoke in this damn joint."*
*The men on the ground, madly searching for grenades*
*(Hidden by sand from the last attack of the*
*A grenade is found, the smoke is popped*
*Exactly in the spot they want the load to be dropped,*
*And then they crouch and hide and cower low*
*Protecting themselves from the returning tornado—*
*And the wind once again makes the firebase look looted*
*Men and equipment—even grass is uprooted.*
*Then its over and everyone opens their eyes in dismay*
*The damn load sits a thousand meter away!*
*The Infantrymen stand with sore eyes a 'squint*
*Muttering phrases improper to print;*
*When the pilot through radio starts to cuss—*
*"Remember bluelegs, your only job is to support us!"*

LTC J. L. McDaniel
Infantry

Sir:

The Buffalo Soldiers Historical Society is soliciting information and artifacts concerning Black Army Aviators since the Army Air Forces separated from the Army. The material will be used in the Buffalo Soldiers Historical Museum and in displays sponsored by the Society in libraries and schools around the country. Donations of historical material such as photographs, helmets, orders, newspaper articles, etc., will be tax deductible.

The Museum is located at 345 W. Aspen, Flagstaff, AZ. Hours are 9 to 4 Monday through Friday and 12 to 4 Saturday and Sunday. The Society would like to receive enough material to set up an entire display on Black Army Aviators. Your support and interest will be greatly appreciated.

L. David Nealey
President, Buffalo Soldiers Historical Museum
P. O. Box 937
Flagstaff, AZ 86002

Sir:

I must take issue with a statement made in your September 1976 issue. In the article entitled "Baby Born During MAST Flight" you made the statement that this was the first time, in the United States, a baby was delivered in a military helicopter. I personally was the pilot on a MEDEVAC flight in a Coast Guard HH52A in 1969 when a baby was born aboard the helicopter near Ketchikan, Alaska. I am aware of several other such occurrences aboard Coast Guard helicopters in Alaska and other areas of the United States. Delivering babies aboard Coast Guard helicopters is not a routine mission but does occur on occasion.

I do not mean to take away from the accomplishments of the MAST program or Army aviation. However, when it comes to receiving and assisting civilians, the Coast Guard has been in the business a long time. When the accolades are passed out, the Coast Guard is entitled to its well deserved share.

LT CMDR Robbin F. Krause
Flight Safety Officer
Coast Guard Air Station
Cape May, NJ

Staff Sergeant Steven A. Lewis of Titusville, FL, was one of four Soldiers honored at the first U.S. Army Air Traffic Control Activity (ATCA) awards banquet recently at Ft. Huachuca, AZ.

In addition to having won the Army's top award (see *DIGEST*, September 1976, page 28), Sergeant Lewis learned the week before the awards banquet that he had been named the second best air traffic controller in the world. Gabriel A. Hartl, executive director of the Air Traffic Control Association, revealed Lewis' selection in a letter to the

**Staff Sergeant Steven A. Lewis (left) accepts the plaque symbolizing his selection as the U.S. Army Air Traffic Controller of the Year for 1976 from Brigadier General Kenneth R. Symmes, ACC deputy commander**

ATCA headquarters. Nominees for the association's top award include civilian, military and associated foreign controllers around the world.

**Brigadier General Kenneth R. Symmes, ACC deputy commander (right), presents the plaque proclaiming the Coleman Detachment control tower the U.S. Army Air Traffic Control Facility of the Year for 1976 to Captain Ronnie W. Betts (center) and Sergeant First Class Noel J. Judge**

Also honored at the ATCA banquet were:

• Captain Ronnie W. Betts and Sergeant First Class Noel J. Judge, representing Coleman Detachment's control tower in Germany, the U.S. Army Traffic Control Facility of the Year for 1976;

• Master Sergeant Herbert W. Denmark who won third place in the Air Traffic Control Association's technical writing competition.

Coleman tower took third place in the association's worldwide competition, according to Hartl, while Denmark's award was based on his article, "Early History of the ATC in the U.S. Armed Forces," published in the October-December 1975 issue of *The Journal of Air Traffic Control*. There is no corresponding technical writing award in the all-Army competition.

The 5th Signal Command, a major subordinate element of the U.S. Army Communications Command (ACC), made a clean sweep of the Army awards. The Coleman Detachment, Coleman Army Airfield, Germany, and Sergeant Lewis' unit, Kitzingen Detachment, Germany, are elements of the 5th Signal's 14th Aviation Unit.

**Master Sergeant Herbert W. Denmark (left) accepts a framed letter citing his selection as third place winner in the Air Traffic Control Association technical writing competition from Colonel George A. Rizor, commander, U.S. Army Air Traffic Control Activity**

Sergeant Denmark is an air traffic control specialist with the Headquarters U.S. Army Air Traffic Control Activity, a subordinate element of the ACC. The controller of the year award was presented to Sergeant Lewis by Brigadier General Kenneth R. Symmes, ACC deputy commander. In remarks to some 100 persons attending the affair, Sergeant Lewis said, "I consider my tour in Europe the best and most challenging of my career in the Army. The circumstances, duty performance and dedication which earned me this honor must be seen as a direct reflection of every professional I have had the opportunity to work with."

Lewis, who also received the Meritorious Service Medal for his accomplishments during the last year, added that he had gained much from the ATCA workshop he had attended the preceding 4 days and "will take many ideas back to my unit."

Sergeant Lewis also traveled to Miami Beach to accept the second place George W. Kriske Memorial Award "for individual contributions which have advanced the science of air traffic control and enhanced the professions of the air traffic control system." Sergeant Lewis received the scroll award at the Air Traffic Control Association's 21st annual meeting on 30 September.

Captain Betts and Sergeant Judge also were on hand at the ATCA awards banquet to accept the 1976 Earl F. Ward Memorial Award "for outstanding group achievement and contribution to the enhancement of the profession of air traffic control" on behalf of Coleman Detachment. Captain Betts is commander of the Coleman Detachment and Sergeant Judge is facility chief in the Coleman tower.

Coleman, known as "the busiest U.S. Army airfield in Europe," was cited for its exemplary air traffic control safety record and for noteworthy achievements in promoting positive international relationships.

Joe Whetstone
U.S. Army Communications Command
Office, Chief of Public Affairs
Ft. Huachuca, AZ

Sir:

I have just finished reading "The Army Aviation Story, Part XII," written by Major David H. Price in the August *AVIATION DIGEST*.

I would like to go on record as saying that I considered it an extremely well written and enlightening article; but I also feel a little left out at only being able to enjoy parts X, XI and XII. Having only been in the Army and Army aviation since 1967 I have found it difficult to find the first nine chapters published during the early 1960s.

Is it possible to receive a copy of these parts or even better to reprint parts I through IX in your *DIGEST* so others new in Army aviation will be able to enjoy the whole story?

SSG Samuel A. Richards
U. S. Army Aviation Systems Command
GREECE-LAO

**• Sorry the original magazines are no longer available. However, we are sending a copy of those articles.**

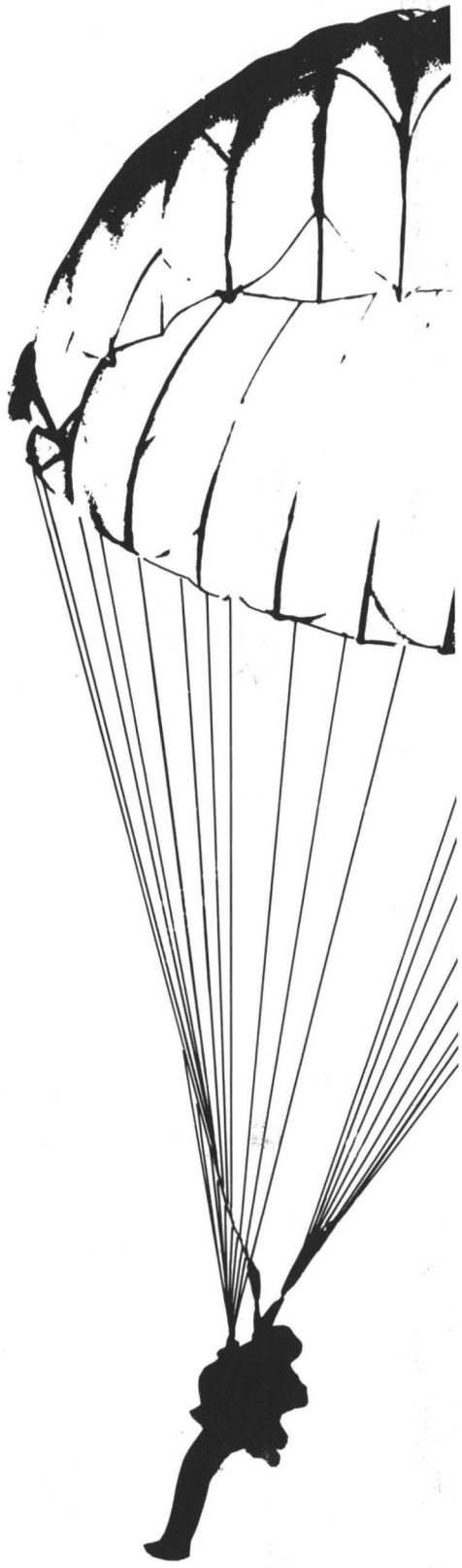
**In regard to SSG Richard's request that the *DIGEST* reprint parts I through IX of the "Army Aviation Story," the *DIGEST* would appreciate it if its readers would let us know how they feel about this. Drop a line to Editor, *U. S. ARMY AVIATION DIGEST*, P.O. Drawer P, Fort Rucker, AL 36362 or call AUTOVON 558-6680.**

**CORRECTION**

**Captain Brendan P. Blackwell's name was inadvertently omitted as coauthor of the November *DIGEST* award winning article, "Army Aircraft Survivability." The *DIGEST* regrets this omission.**

# CHOPPER

**The briefing included direction of flight, jump altitude and air speed, and verbal commands between Pathfinders**



DEW COVERED the dark body of the helicopter as the pilot began the preflight. He inspected the aircraft with full measure of attention to the checklist.

Finishing the preliminaries, the crew boarded and the fire was lighted. As a late morning dawn broke over the horizon the helicopter churned to life and was ready to take to the air.

All checks were made and clearance was received. The crew was on the way to Ft. Bragg's [NC] Sicily Drop Zone.

Winging away from the airfield the trees rushed beneath and soon the drop zone was sighted. The Pathfinders were contacted and the landing was initiated.

Once down, the pilot shut down and climbed out of the olive drab helicopter. His next responsibility would be the briefing of the jumpmaster for this morning's jump.

The briefing entailed a very thorough and informative explanation that encompassed the direction of flight, jump altitude and airspeed, and verbal commands between Pathfinders, pilot and jumpmaster.

The jumpmaster would be given a 1-minute warning, a 10-second standby command would follow and then the command to jump.

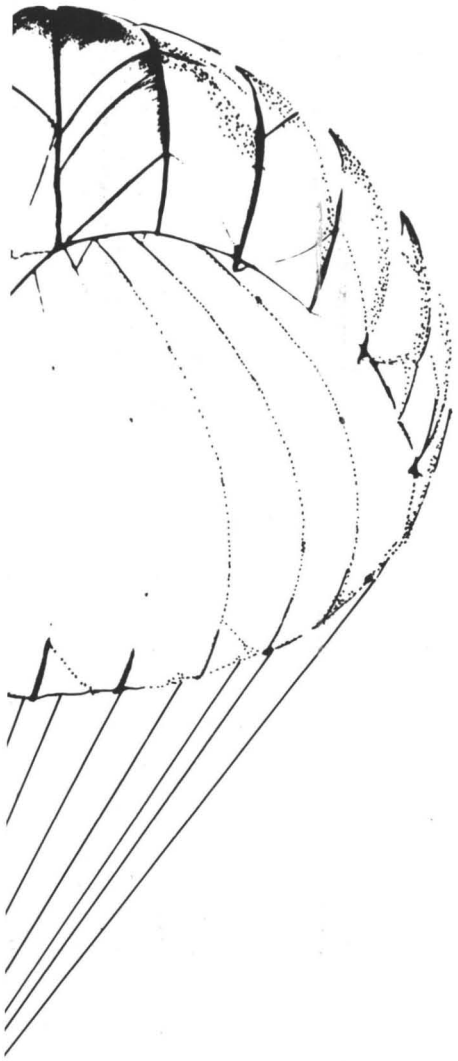
On the command of "Execute! Execute! Execute!" given by the Pathfinders, the pilot would relay the command to the jumpmaster. After the eight men exit the jumpmaster will give the signal, "Eight jumpers clear and away!" and then retrieve the static lines.

Metallic clicks resounded as the fasteners of static lines and seatbelts were secured. Then the jumpmaster called to the four troopers on the right side, "You are number one, I'll point you out; you are number two, I'll tap you out; you are number three. . . ."

He continued the instructions until he informed the eight jumpers of their stick positions and the method of signal to exit. The jumpmaster then fastened his seatbelt, conversed with the pilot and settled in for the takeoff.

The stage was set for a "chopper blast." With a swirl of dust the craft broke ground, paused and then charged into the air. As translational lift shuddered the helicopter, the paratroopers on board felt a twinge of anticipation. They knew there was only one path to the ground. . .via parachute!

The UH-1H continued to climb while the jumpers watched the ob-



# BLAST

**SGT Jon F. Langione**
**82nd Airborne Division**
**Fort Bragg, NC**

jects below appear smaller and smaller. The drop zone smoke seemed to rise at a diagonal as the white billows signified a mild wind. That meant a near straight descent and a good jump.

Then the craft rocked to a straight and level position. Jump altitude had been gained. Only one turn to go and the helicopter would be on the final leg to unload the human cargo.

The jumpmaster started the commands. His voicings were followed by a shuffling of feet and the loosening of seatbelts. With the next to the last command being sounded, the eight men were sitting in the door, awaiting the final, decisive order.

The jumpmaster's arm straightened and the two letter word rang loud. "Go!," he commanded, as he pointed to number one. He then tapped two, three and four. His attention was now turned to the left door and a point signaled number five to exit. A tap was the signal for the remaining three to jump. Each exit was felt by a response in the cyclic and the pilot could feel each of the eight men jump.

The eighth man heaved himself from the helicopter and took an exit body position. He felt the "wind-like" rush of air at his back as he started to count, "One thousand, two thousand" and on to six thousand before he felt the shock of a deploying parachute.

Looking up was a natural reaction to an experienced paratrooper, and above him blossomed a full canopy of nylon. Now the jumper gave his attention to not colliding with other jumpers and wind direction.

He maneuvered by "slipping" and guided into the wind. After a short ascent he judged his height to be 100 feet above the ground and the last man in the stick of eight prepared to land.

A jolt shook him as he contacted terra firma and rolled into a parachute landing fall. He quickly bounced to his feet and collapsed the nylon straining with the wind. The last man to exit then removed the harness and prepared to pack his equipment.

After packing his harness and canopy in the kit bag, he began the trek off the drop zone. As he approached the parachute turn-in point, the helicopter chased skyward once again to make another "chopper blast."

# HOW FAR? HOW WIDE?

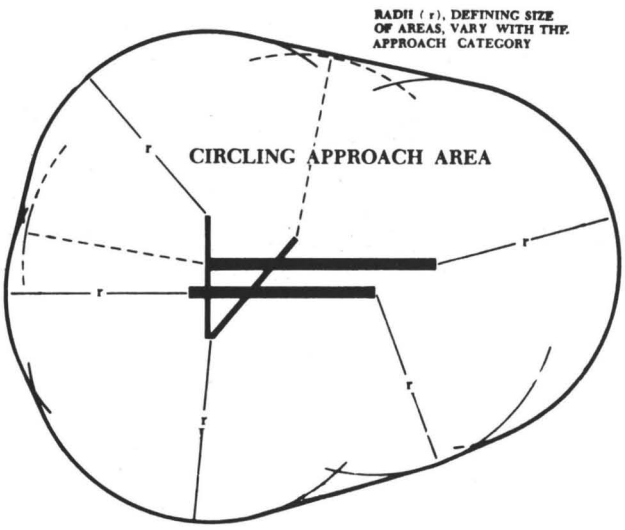
*Continued from page 7*

miles is the most desirable and 10 miles the maximum. Minimum length must provide adequate distance for the aviator to make the descent from FAF to MDA at a reasonable rate of descent and allow for course adjustment when a turn is required. Again, primary and secondary areas exist; figure 4 shows their dimensions. Obstacle clearance is a minimum of 250 feet anywhere in the primary area and 250 feet at the inner edge of the secondary area, tapering to zero at the outer edge.

Well, we know the size and shape of the final approach trapezoid. What about the MDA? Let's take a look to see how that magic number is derived. Bear in mind that it is an MSL (mean sea level) altitude.

**Circling Approach Area Radii**

| Approach Category | Radius (Miles) |
|---|---|
| A | 1.3 |
| B | 1.5 |
| C | 1.7 |
| D | 2.3 |
| E | 4.5 |




**Construction of Circling Approach**

**Figure 5**

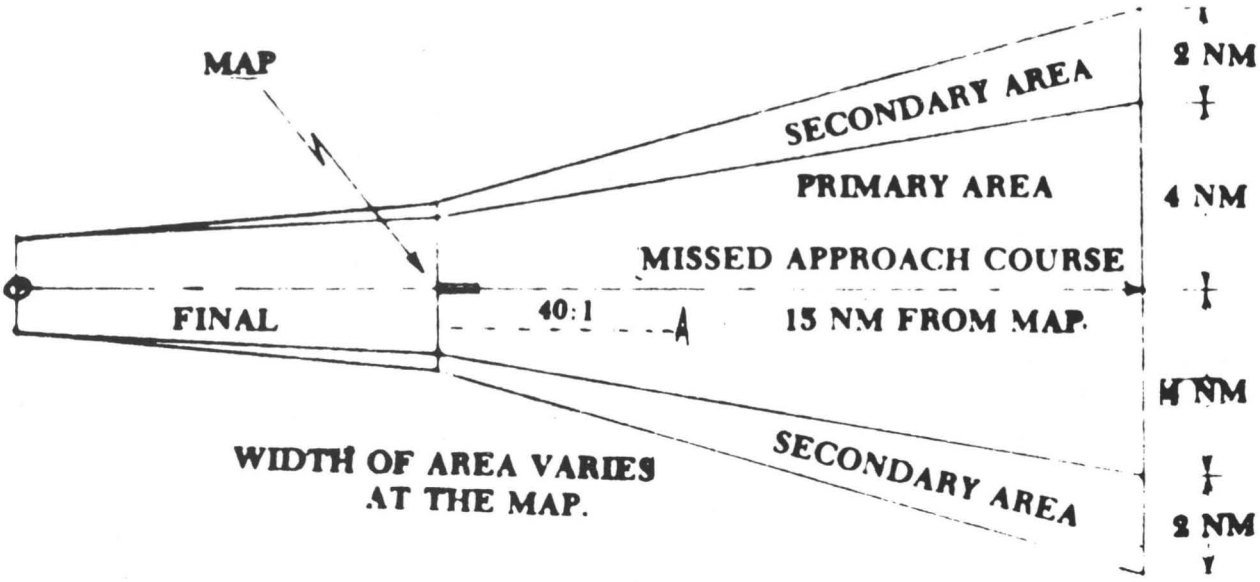
Computation is simple enough. The ROC for the final approach segment is added to the MSL height of the tallest obstruction anywhere in the final approach segment area. In addition, the MDA shall be high enough to ensure that no obstacle in the missed approach area penetrates a 40:1 missed approach surface. We'll discuss the missed approach segment in detail shortly but now let's return to our VOR approach. Suppose there is a 215-foot tower in the final approach segment. To determine the MDA add, in this case, 250 feet to the tower's MSL altitude and obtain 465 feet. Straight-in MDAs are always rounded to the *next higher* 20-foot increment. So, our MDA for this approach would be 480 feet. Simple, huh!

All right, that will land us straight-in, but what if we have a tailwind and must circle. OK, easy enough! Circling landings are much the same with one exception—the circling approach area. This is the area provided for the aircraft to maneuver for landing on a runway which is not aligned with the final approach course or if circling is required for ATC or other reasons. A quick look: Its size varies with the aircraft category. For category A, the limits can be found by scribing an arc, the radius of which is 1.3 miles from the threshold of each usable runway. Join adjacent arcs with tangents and the area thus enclosed is the circling approach area (figure 5).

Obstruction protection of 300 feet is provided in the circling area. In addition the MDA must be established at least 300 feet above the airfield elevation. We said earlier our controlling obstacle was 215 feet tall; by adding the 300 ROC to the MSL height of the tower we obtain 515. This may be rounded to the *nearest* 20-foot increment, providing the resulting figure is not below the straight-in minimum. Our circling MDA is, in this instance, 520 feet. Note that by rounding circling minimums to the nearest 20-foot increment, it is possible to round down.

We now have arrived at the missed approach point (MAP). How about protected airspace during the missed approach maneuver? Very well, let's consider a straight-in missed approach area. It begins at the MAP and its width is equal to that of the final approach area at the MAP. The missed approach area expands to the width of the initial approach segment (8 NM) at a distance of 15 miles from the MAP. This is the area considered for primary obstacle clearance.

A secondary area assumes the width of its opposite




**Straight Missed Approach Area**

**Figure 6**

number for the final approach segment at the missed approach point and expands to a width of 2 miles at a distance of 15 miles (figure 6).

Again, what about obstruction clearance? OK, within the primary area no obstacle may penetrate the missed approach surface. This area forms an inclined plane which ascends 1 foot vertically for each 40 feet horizontally. This equates to approximately 151 feet per mile. In the secondary area, no obstacle may penetrate a 12:1 surface which slopes upward and outward from the missed approach (figure 7). All right, how high above the ground does this obstruction protection surface begin, and how high above it are we? Well, the missed approach surface begins at an altitude determined by subtracting the final approach ROC from the MDA. In our case, 480 minus 250 yields 230 feet. If the number obtained is greater than 200 then it is disregarded, and 200 is used. Thus, the missed approach surface begins at 200 feet above ground level (AGL). Two hundred and eighty additional feet above that sit the aircraft and the aviator, safe and sound.

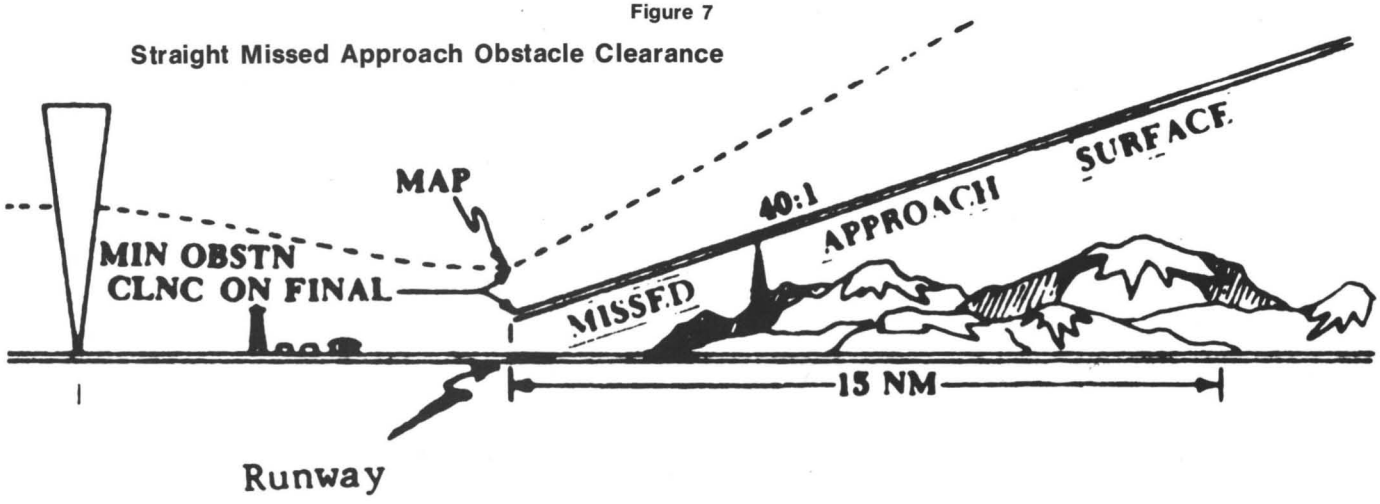
Since by far the great majority of readers are rotary wing aviators, I feel it may be beneficial to take a look at this approach as it would be constructed if it were drawn as a helicopter procedure.

The important basics of safety and good planning still are present. Also present are the same four segments we just discussed. Let us then, using the same approach and same format, briefly talk our way through a helicopter approach.

We will find no change in the feeder segment. In the

**Figure 7**

**Straight Missed Approach Obstacle Clearance**



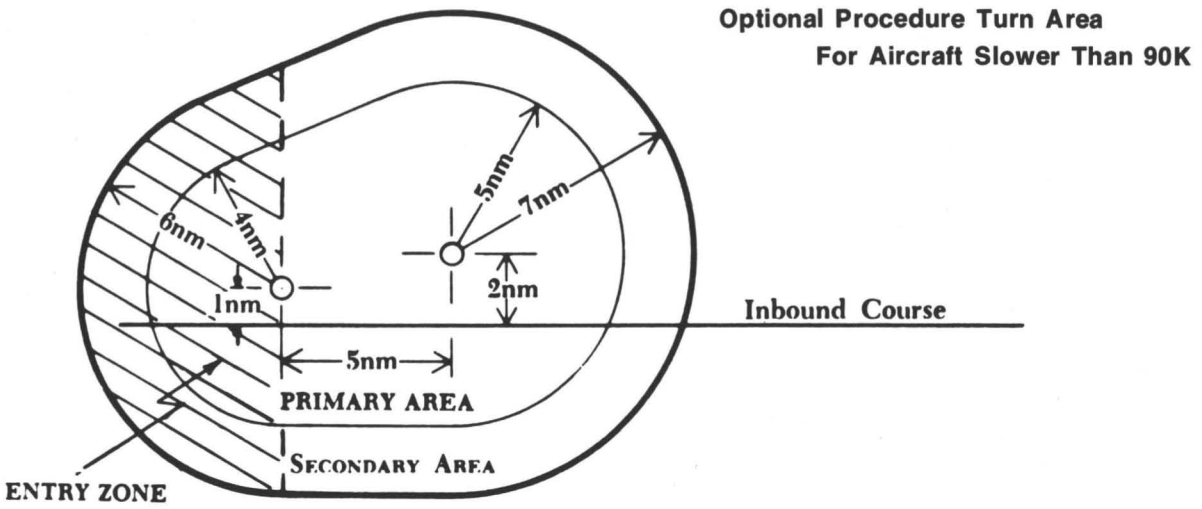



Figure 8

procedure turn segment, we find no changes in ROC or the manner in which minimums are computed. The basic construction is also unchanged, however, the distances are different. A length of *5 miles* from the fix *is used* as opposed to 10, in effect reducing by half the maneuvering outbound distance. Finally, each radii is reduced by 1 mile. The points from which they are drawn remain the same. Compare the two diagrams (see figures 1 and 8).

Upon completion of procedure turn, we again encounter the intermediate approach segment. Again, no changes in ROC or the manner in which minimum altitudes are determined. Construction is exactly as described earlier, with this reminder: The portion of the intermediate segment considered for ROC will always have the same length as that specified for procedure turn. In nearly all helicopter approaches this means an intermediate segment of 5 miles. As you recall, the original length was 15; the extra 10 miles are dropped.

At the VOR we reach the final approach segment. No changes in construction, ROC or dimension are involved. Keep in mind only that portion of the 30-mile trapezoid which falls between the FAF and the MAP shall be considered for required obstacle clearance. Additionally, the final approach course must be aligned to pass through the landing area. No circling approach area is provided.

The missed approach (MA) segment begins at the MAP (by the way, that MAP may not be farther than 2,600 feet from the center of the landing area) and ends—and this is a change—7.5 miles later and, at that point, will have reached airway dimensions. Straight MA segment ROC is amended as follows:

- The MA surface is changed from 40:1 to 20:1.
- The secondary area is changed from 12:1 to 4:1.

Those then are the nut and bolt changes made to satisfy the requirements of a helicopter approach.

I find the major difference to be that of distance. Less airspace is allocated for maneuver and protection. All ROCs (missed approach segment withstanding) are the same, as are the methods used to determine them. Minimums are lower because the airspace to be protected is smaller, and necessarily contains fewer obstructions.

Let me underscore a few points particular to helicopter approaches. They are all based on straight-in criteria. Height above airport does not exist, nor does height above touchdown. Those terms have been replaced by height above landing. The point to which this term refers is the "landing area." It is defined as the portion of the heliport or airport runway used for the landing and departure of helicopters. Helicopter procedures are easily identifiable. The approach plate bears the word "copter," type of facility providing final approach guidance and a numerical identification of the final approach course in three digits. Examples would be: Copter, VOR 090; Copter, PAR 270.

I hope you are now reassured, as I was, to learn that a great deal of prior planning and safety is built into each instrument approach. The examples used were of the most general kind, but they are typical. There are, however, a number of different factors that could affect how an approach procedure is designed. TERPS states nonstandard procedures may be authorized where an *equivalent* level of safety exists. In addition TERPS provides and defines some specific criteria applicable to helicopters; these may be found in chapter II of TM 95-226.

I hope you are interested and encouraged now to dig a little more deeply into this subject. To do so can only make you more knowledgeable, competent and professional.

# ATC action line

UNITED STATES ARMY AIR TRAFFIC CONTROL ACTIVITY

**What's the hot clue on the new standardized domestic pilot report (PIREP) format that was implemented nationwide 1 September 1976 and how does that affect ye Ol' Burley Veteran?**

The new format is designed to improve pilot weather briefing, to make air traffic control more efficient, and to facilitate the use of PIREPs for aviation weather forecast and warnings. The PIREPs are considered of equal importance to observations on the ground or by a satellite in space.

You, the aviator, are a member of this data gathering team, because the reports you send in on the conditions you observe are for your fellow aviators. There is no better source for weather advisories than the PIREPs. The National Weather Service, Federal Aviation Administration (FAA) and Department of Defense (DOD) consider the PIREPs so important they have standardized the format along the lines of the surface weather observation.

This does not mean you have to learn a new procedure for filing PIREPs. National Weather Service, FAA and DOD personnel will receive your PIREP in the usual manner and encode it into the new format. UA (upper air) is the identifier for a PIREP. The PIREPs will be appended to the hourly observations and will follow the UA identifier in the following sequence:

UA/OV-location, time/FL-flight level/TP-type of aircraft/SK-cloud cover/TA-temperature/WV-winds/TB-turbulence/IC-icing/RM-remarks.

The new format will facilitate rapid sorting and display by location, flight levels and weather parameters. It also will greatly aid in the digital air-ground communications and computer voice interfacing. The PIREP is an essential ingredient in the present aviation weather program and will play a major role in the program's future technology.

**Why isn't the General Planning (GP) document issued based on aircraft assigned as the Area Planning (AP) documents are?**

All FLIP (flight information) Planning documents have undergone intensive study, review and alteration in the past few years. The GP was redesigned to contain stable and training information applicable to all military services and to be used for preflight planning services. Certain information contained in the old Section II was deleted from the GP as it was contained in regulations, field manuals, training manuals and training documents. The AP was redesigned to contain information relative to inflight procedures such as terminal control areas (TCAs), preferred routing and International Civil Aviation Organization (ICAO) or local national rules and/or differences for the area of operation. Information that was considered perishable was entered in the various supplements. To specifically answer the question, the GP was designed to be used by aviators during their preflight planning and not as an inflight document. Therefore, GP authorization is based on staff and flight planning requirements, not aircraft assigned.

Readers are encouraged to send questions to:

Director
USAATCA Aeronautical Services Office
Cameron Station, Alexandria, VA 22314

*Static sparking is a dangerous fire potential in refueling operations and even a parked aircraft with its engine off can develop a static charge . . .*

# STATIC ELECTRICITY

STATIC ELECTRICITY is a serious fire and explosive hazard around volatile flammable gasses, highly ignitable fibers and combustible dust.

Recently, an aviator received first- and second-degree burns when his underclothes were ignited by static electricity. He was preflighting a U-8 which had just been refueled and moved into the hangar because of cold weather. The fuel expanded as the temperature increased. When the pilot opened the fuel cap during his inspection, fuel gushed out, soaking his arm and legs. The pilot went immediately to the locker room and removed his Nomex flight suit. Static electricity ignited the fumes as he started to remove his winter underwear.

It was once believed that [redacted] generated by friction betw[redacted] stances. But research has pr[redacted] by contact between two un[redacted] though no friction is prese[redacted] created when flammable [redacted] through a hose, poured, fi[redacted] velocity in any manner. V[redacted] charge by movement and [redacted]

and even a parked aircraft with its engine off can develop a static charge due to the movement of air across its metal surface. And if the air is full of dust, snow, water, or ice, more charge is built up.

Humidity is an important factor in the ability of static electricity to drain from highly charged metal objects. Where high humidity is present, surface resistance is reduced and electrical charges are drained off almost as fast as they form. A high amount of static electricity buildup is generally prevented by 40 to 50 percent humidity in the air. When vehicle tires are dry, they trap charges, but if tires are wet and the road is wet, the static charge will bleed off where the rubber touches the road.

[redacted] reas where static electricity is con[redacted] rd, it would be advisable to replace [redacted] ns or gear drives on ground handl[redacted] d support equipment to eliminate [redacted] of static electricity. It is also ad[redacted] und all metal parts which may ac[redacted] ectrical charge when the construc[redacted] cannot be changed to prevent the [redacted] static electricity.

[redacted] ne is discharged through a hose, a

**Master Sergeant Bill R. Bailey**
Directorate for Aircraft Accident Analysis and Investigation
U.S. Army Agency for Aviation Safety

copper wire should be installed from the pump through the hose to the nozzle, and the nozzle should be kept in contact with the metal receptacle at all times. A separate wire with a male connection should be plugged into a static electricity drain installed near the tank opening. This device should be plugged in before the gasoline is allowed to flow through the hose.

There is a characteristic in fuel called electrostatic susceptibility. This is the degree to which a fuel will take on or build up a charge of static electricity. The amount of the charge that will build up in fuel depends on a number of things—fuel type, amount and kind of impurities in the fuel such as air and water, and rate of fuel flow. JP-4 has more impurities and is more likely to build and hold a static charge than AVGAS. Because of the static charge potential of JP-4, it is more likely to discharge its electricity through a spark than AVGAS.

Static sparking is a serious and dangerous fire potential in refueling operations. It occurs when the attraction between equal but unlike static charges becomes strong enough that the charges from one surface try to find equilibrium and jump the gap to another surface. The two methods to prevent static electricity from sparking during refueling operations are bonding and grounding.

Bonding does not dissipate the static charge, but rather equalizes the charge on two unlike objects. If you have ever watched an aircraft being refueled, you noticed that before removing the fuel cap the person performing the refueling operations plugged in, or should have plugged in, the bonding wire from the fuel nozzle to the aircraft to prevent arcing. When refueling is completed, the nozzle is removed, the gas cap is replaced, and the bonding plug is removed.

Grounding, unlike bonding, is not just an equalizer but a dissipater of static electricity. To ground a piece of equipment, a person simply provides a conductive path into the ground for the static charge. In doing this, the static charge is not left trapped on the piece of equipment and, therefore, the risk of a static spark is eliminated or greatly reduced. The conductive path for eliminating static electricity is made by connecting a conductive cable from the item of equipment to a conductive metal rod driven far enough into the earth to reach the level of permanent ground moisture. The area to which the grounding cable is attached to the item of equipment must be clear of paint, clean and nonoxidized to get an effective ground.

A person's body also conducts electricity and builds up a charge during normal movement and work. Under the right conditions, the human body can build and hold a charge up to several thousand volts. Outer clothing builds a charge not only by absorbing part of the body charge but also by rubbing against the body and underwear. When the charged clothes are removed, the electrical tension or voltage increases to a dangerous point. If the clothes are wet with fuel, the danger is even greater as fuel-soaked clothes can burst into flames as they are removed. Sparks can also be generated by worn footwear. Soles so worn that nails are exposed present a serious danger since fuel spills in refueling areas are common and fuel vapors near the ground ignite easily.

Recent tests by the Air Force indicate that the buildup of static electricity does not differ greatly by uniform type. A blend or synthetic uniform is no more dangerous than a pure cotton uniform. The tests do show that it is possible to exceed 2650 volts when the uniform is removed. Theoretically, 2650 volts can ignite gasoline-air mixtures (vapor). Other variables such as temperature and humidity may affect the static buildup, but regardless of this, the tests indicate there is a potential danger and it differs little with uniforms or mixes of uniforms.

If fuel gets on your clothes, you should leave the refueling area immediately and deluge or thoroughly soak the clothes in water before taking them off. If there is not enough water at the site to soak the clothes thoroughly, ground yourself to a piece of grounded equipment by taking hold of it before you take off the fuel-soaked clothes.

Even though it is difficult to exactly define static electricity, we do know how it behaves, how dangerous it is, and what can be done to control its dangers.

*A Mohawk pilot talks about ejections*

# time to punch out

MK-J5D SEAT

***The MK-J5B seat was replaced by the MK-J5D seat early in 1975. This new seat provides an improved capability. Ejection can now be accomplished safely at speeds from 60 knots ground level when the aircraft is straight and level as opposed to safe ejection with the old seat at speeds from 100 knots ground level, straight and level.***

SITTING AT MY DESK looking at a picture of my two children, I began to reflect on my seven years as an Army pilot with 1,800 total hours and 1,200 hours in the OV-1. I have just finished reviewing another OV-1 accident and it is apparent that Mohawk pilots have a tendency to stay with their airplane too long.

In one case, an OV-1 pilot lost his No. 1 engine and declared an emergency, telling the tower he was unable to maintain altitude. At 4,500 feet and 90 to 95 knots, he jettisoned the drop tanks. However, the IP waited to eject until the aircraft reached 40 feet and 95 knots airspeed and was in a 93-degree left bank. Consequently, he and the pilot who failed to eject were killed.

Another pilot contacted the tower and stated that his OV-1 had lost power and fuel pressure. The pilot stayed with the aircraft for approximately 2,000 feet and was killed when he ejected at 50 feet with 150 to 160 knots of airspeed while the aircraft was in a 12-degree nose-down attitude. The Mohawk crashed before the student observer completed his ejection and he was also killed.

USAAAVS records show that from 1 July 1968 to 1 October 1976 there were 27 OV-1 ejections. Seven occupants were killed and all except one of these fatalities were positively caused by waiting too late to eject.

Since the Mohawk is not a very crashworthy aircraft, the obvious question is why do pilots eject too late?

Is it pride? Could be since I'm sure that most OV-1 pilots feel they can handle just about any emergency and bring the airplane home in the face of insurmountable odds.

Is it fear? What will happen to me if the accident board and collateral board determine that I left an aircraft that I should have been able to save and I ejected too soon? It could also be fear of physical ejection in some cases, or fear of revealing the truth about the sequence of events before the ejection, especially if unauthorized maneuvers were being performed or a violation of ARs was committed.

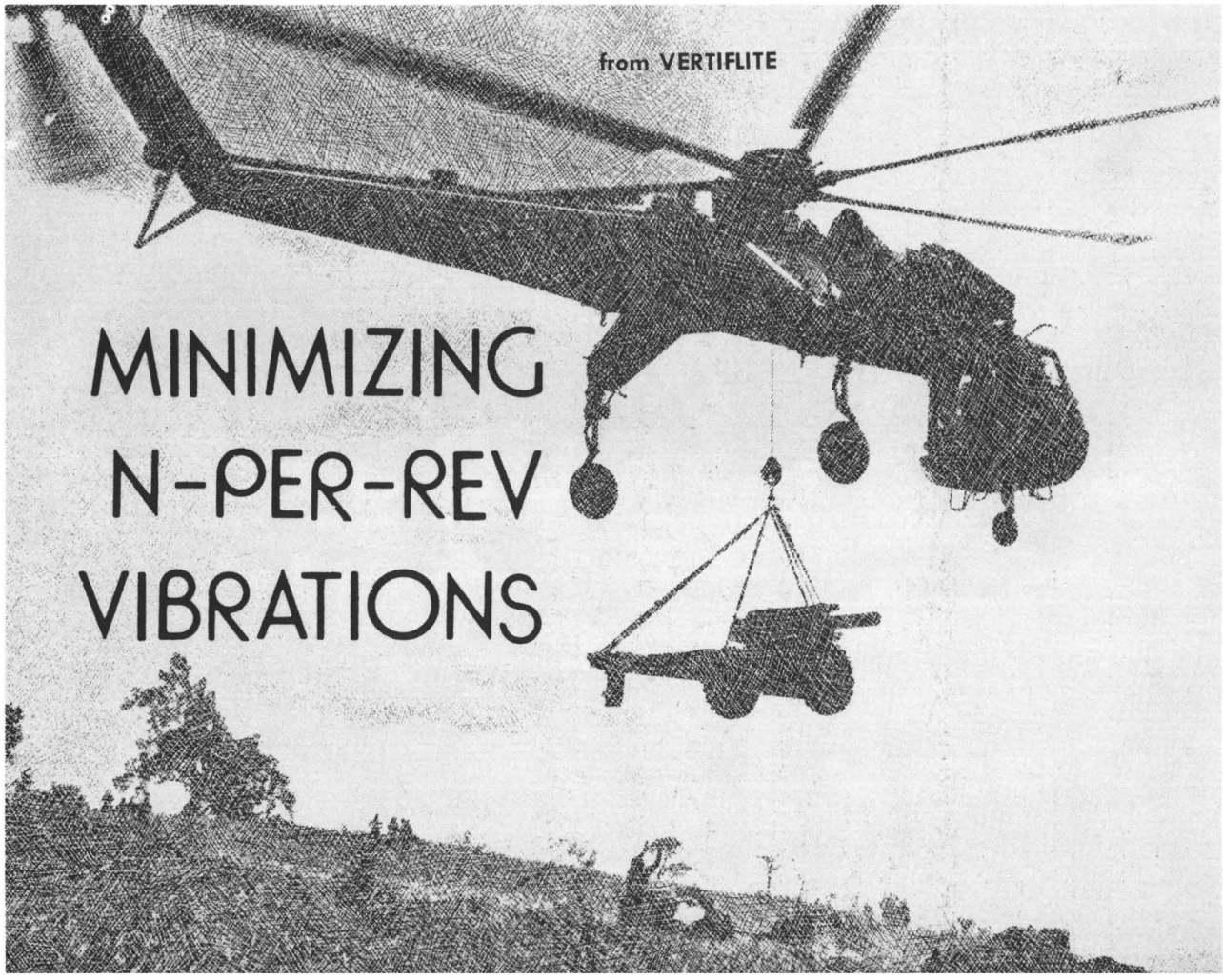
It is obvious there is no logical explanation for a delayed ejection. Many factors present in the successful ejections were also present in the unattempted or delayed ejections. In many cases, a 2-second time interval, 50 feet of altitude or a few degrees of bank would have made the difference between death or life.

The parameters for "your" ejection should be the best preplanned portion of all flights. Know your equipment's capabilities and your capabilities and plan your flight accordingly. If an emergency occurs, which meets your preplanned parameters, don't hesitate—punch out.

**Captain Donald P. Johnston**
Directorate for Aircraft Accident Analysis and Investigation
USAAAVS U.S. Army Agency for Aviation Safety

This article applies to all helicopter types as well as the S-61N and S-58T. The techniques described used on every approach would definitely reduce mean time between failures. In military operations it is not always possible to use this technique due to mission requirements. However, the reduced n-per-rev vibration for any period would help reduce mean time between failure. If this technique is used when the situation does not require a steep approach or an approach that causes n-per-rev vibration, i.e., termination at a large airfield, termination of an instrument approach, termination of contact training flights, the net result will be an overall reduction of mean time between failures and an increase in aircraft availability.

Rene J. van der Harten
KLM Noordzee Helikopters B.V.




# MINIMIZING N-PER-REV VIBRATIONS

**MEDIUM AND heavy helicopters using articulated rotor systems have been found to develop severe n-per-rev vibrations in the transitional stage of the approach that can be prevented only by pilot technique. It was found that if these vibrations (mainly vertical in nature) are allowed to develop, delicate electronics and instruments will be damaged, airframe cracking at main gearbox fuselage attachment points will occur, maintenance and overhaul costs will rise, and passengers will complain of discomfort.**

**Thus from the start of our operations with the S-61N in 1968 the phenomenon was studied. Methods and procedures were developed to decrease these vibrations through understanding of its cause.**

**This article discusses the probable origin of the vibrations as being caused by vortex-blade interaction and vortex recirculation which can occur during transition. In particular these phenomena occur at moderate rates of descent and in flares when adding power, causing a partial vortex ring state. An approach method was developed, accordingly, to prevent vortex recirculation.**

**This recirculation may also explain random settling with power, which accordingly can be prevented by avoiding recirculation of transitional vortices. The approach method as developed should thus also prevent this settling.**

**The National Aerospace Laboratory NLR film, Flow Through the Helicopter Rotor, has been of great value in understanding the basic vortex patterns in the transition. The film was made by Jan M. Drees, now director-Technology for Bell Helicopter Textron, when he was associated with the Laboratory in 1950.**

My company operates S-61N and S-58T helicopters on oil rig and harbor pilot services over the North Sea 24 hours a day. These medium and heavy helicopters, with their articulated rotor systems, require careful handling to prevent heavy vertical n-per-rev vibrations called "shakes" in transition to the hover.

When we started operations with the S-61N in 1968, only roll-on landings from flat approaches and a slight climb during the transition to hover were found to be useful. But these techniques could not always be used for oil rig and harbor pilot services.

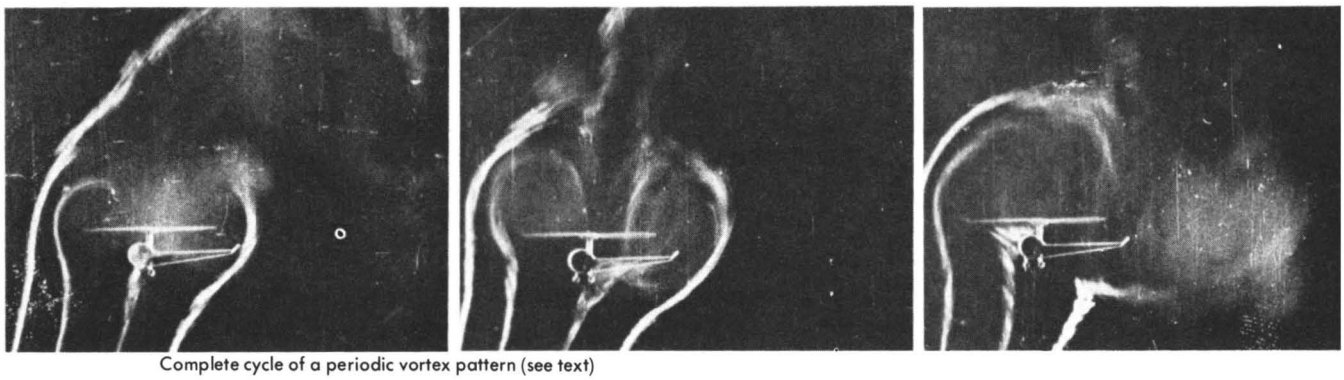
As it was becoming quite clear that vortex ingestion could be assumed (ref. 1 through 5) to be the main cause, an effort was made to understand the flow through the rotor. This led in turn to development of approach procedures and control coordination that solved the problems.

From trying out several factory-recommended procedures it was decided that it was possible to prevent "shakes" and that vortex recirculation was definitely involved. It was clear that sink rates in transition aggrevated the "shakes" and that power was lost in the periodical recirculation of vortices. This was discovered by noting collective decreases necessary to maintain a constant altitude in the hover out of ground effect (OGE) below 20 knots IAS after the vortices subsided.

The basic flow pattern is shown progressively in the figures, from reference 2. They picture one cycle of a periodic vortex pattern at transitional airspeed and a rate of sink of about 500 ft/min. From actual flight tests to obtain the worst vibration conditions it was found that these occur when a flare is executed and/or collective is increased without reducing aft-flapping of the rotor, in the transition, and particularly at low sink rates. The vortices will then be ingested by the rotor and recirculated as in the vortex ring state, with, luckily, the difference that the vortex pattern changes periodically. This can also easily be visualized from the illustrations.

This reingestion may also explain the decrease in power required when the final hover (OGE) is reached, and the periodic change in severity of n-per-rev vibrations. It will not explain why the n-per-rev is mainly vertical in nature, except that vortex ingestion in practice always seems to cause a mainly vertical type of n-per-rev vibration. In fact this implies that steep approaches should not be used in airline transport operations, unless unavoidable. It also explains why experienced pilots avoid steep approaches at altitude when heavy, and in high outside air temperatures.

## MINIMIZING N-PER-REV VIBRATIONS



Complete cycle of a periodic vortex pattern (see text)

Severity of the vortex recirculation was found to be dependent upon:

1. Steepness of the flare attitude in the transition.
2. Adding collective in a flare.
3. Rate of sink.
4. Gross weight (to a lesser extent).
5. Wind conditions.

It is clear that climbing slightly in the transition to the hover will leave the vortices behind and below the rotor if the flare is shallow enough. Basically the same condition occurs, when making a flat approach and adding collective with small increments, when the "shakes" are beginning to appear.

The next discovery was that, when collective has to be added during the transition to prevent the aircraft from settling, the cyclic also has to be brought forward with small increments decreasing aft-flapping and flare attitude. This has been found even more effective than adding collective only, as was done primarily in the beginning.

A good coordination of collective increase with flare angle decrease, preventing a sink rate at the same time, has been found to be so effective that slight sink rates will not cause excessive shakes. The prevention of shakes has cut failure rates of sensitive instruments, e.g., power inlet temperature indicators (digital T-5), in half, and prevented effectively automatic stabilization (AFCS) failures in the transition without soft mountin of the vertical gyros. Also no cracking of tions 245,5 and 295 has occurred in 7,000 flight hours on one aircraft.

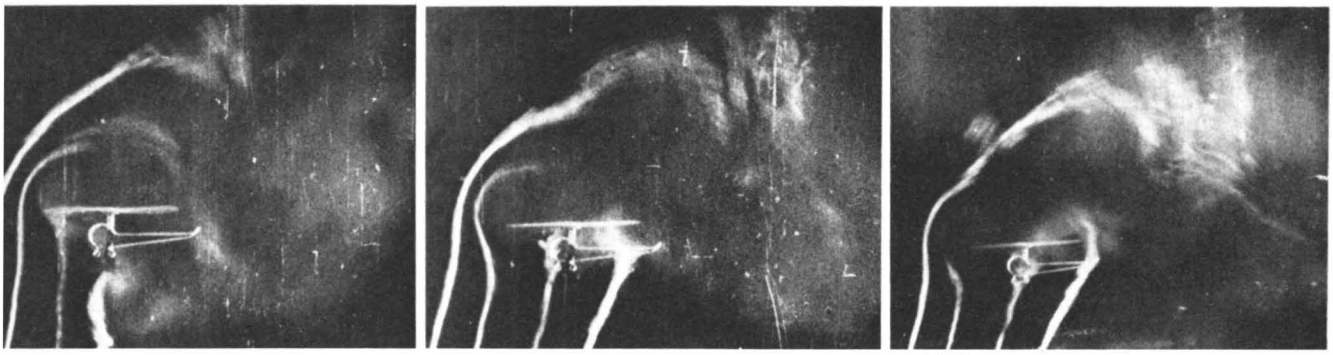
The basic procedure is to choose a landing decision point (LDP) as for the final roundout before landing with a fixed wing aircraft, at approximately 150 feet altitude and 50 knots IAS, at such a distance from the intended hover or landing point and with reference to prevailing wind conditions, that a moderate flare will bring the helicopter over the landing point in the hover or at landing speed. The rate of descent in the approach to LDP may vary between 500 and 1,000 ft/min.

At the LDP the pilot executes a moderate flare, and thus checks his rate of descent, with collective added if necessary, to conduct a flat approach.

When reaching approximately 40 knots IAS some n-per-rev vibrations will appear which cannot be corrected because they are probably induced by the start of the transitional vortices and are not severe. At 50 feet, the pilot should be at 30 knots IAS and have started to add collective, all the time coordinating this with slight forward cyclic movements depending on the steepness of the flare and maintaining as much as possible a constant altitude.

Thus airspeed is then played off at a constant rate at constant altitude. When collective has to be added this should be sufficient to kill the sink rate as far as necessary to keep the shakes at the lowest possible level.

When arriving at 20 knots IAS, collective is added until the remaining slight vortex-blade interference



(All photos courtesy of the NLR)

subsides to the minimum. The pilot then proceeds to land the aircraft.

With wind speeds over 25 knots, normally a run-on landing is executed. However, shakes may appear when settling in for the landing. This can be minimized by choosing the right airspeed for the prevailing wind, of course remaining within the groundspeed limits for the undercarriage.

When a hover has to be made, a gradual descent from the hover in steps may be necessary to obtain the best results. This will prevent recirculation to develop sufficiently to cause heavy vibrations.

The approach method teaches good flight path control, airspeed control, approach planning and coordination of cyclic and collective control. As it conserves power, it is also the best n-1 engine approach in any multi-engine helicopter.

Airframe vibrations were further reduced by reinstallation of the forward battery absorber in our Sikorsky S-61Ns. Most operators of S-61Ns have done this, even after installation of the bifilar absorber (which officially eliminated this requirement).

### Conclusion

1. The possibility of transitional vortex recirculation seems to support, and has indicated, the special approach procedures described herein. In our opinion, further wind tunnel studies of transitional vortex behavior, which could possibly influence future rotor and fuselage designs, are warranted.

2. The approach method basically prevents large power changes during this maneuver and thus is also the best procedure in the case of failure of an engine in multi-engine helicopters, as well as for high-altitude, high-temperature and high-gross-weight operations. It will probably prevent power settling.

3. The prevention of the shakes has definitely improved the availability of the S-61N. Instrument failure rates were reduced to more than half and no cracks have been experienced in fuselage stations 245,5 and 295 in any of our aircraft (7,000 flying hours on one aircraft).

The automatic flight control system, even without soft mounting or relocation of the gyros in the cabin, ceased failing during the transition. As an additional benefit, the passengers are very pleased with the smoothness of the approach and the small changes in attitude necessary for this type of approach.

4. Steep approaches should be left to the military, and commercial operators should try to avoid landing areas where a steep approach is required.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A simple process for aviation materiel supervisors to keep . . .

# PUBS correct and current

DEPARTMENT OF the Army (DA) publications applicable to Army aviation maintenance are extremely important to the aviation maintenance supervisor. Unfortunately, many supervisors do not have a clear understanding of how to locate, obtain, file, post, and destroy the publications. The difference between a correct and current publication and a publication that is not correct and current might mean *the difference between life and death.*

How does an aviation maintenance supervisor find the basic publications he needs to perform his mission? He must use DA Pamphlet 310-4, Military Publications. This pamphlet is an index of technical manuals, technical bulletins, supply manuals (types 7, 8, 9), supply bulletins, and lubrication orders. But before using the index, he must check in a current DA Pamphlet 310-1 (an index of regulations, circulars, pamphlets, posters, general orders, Joint Chiefs of Staff publications, and Department of Defense publications) to make sure the date located on the front page of the 310-4 index is the same as the date listed for the 310-4 index in the current 310-1 listing. If the dates are the same, the 310-4 index is the most current and the correct one to use.

DA Pamphlet 310-4 has four sections. The first section gives instructions on the use of the index. It must be read so the rest of the index may be used. Section II is a list of current publications and changes. The publications are in numerical order. Section III lists ublications that have been replaced by current or tions, and publications that contain out-

dated material that is not accurate for current use. Any publication that is found in this section should be destroyed. Section IV is an alphabetical index of all publications covered by the 310-4 index.

To use DA Pamphlet 310-4 for finding what publications he needs for a piece of equipment, a supervisor refers to section IV and finds the major subject in the alphabetical index. If he cannot find it in section IV, he will refer to section III and it will probably be listed as superseded or rescinded. If the subject was found in section IV, the publication or publications will be listed beside the name of the equipment. The supervisor may turn to section II to find the date, full title, security classification, and changes for the publications. Modification work orders are found in DA Pamphlet 310-7 which covers all of the modification work orders concerning a certain piece of equipment.

After using DA Pamphlet 310-4, a supervisor may realize he does not have all the publications he requires. He must then use DA Pamphlet 310-10, Guide for Publications Supply Personnel. Of course, he must check the date on the front cover with the current date listed for that publication in the 310-1 index to make sure his copy is current. Now, he must have a meeting with the unit publications officer and check his list of required publications against those listed on the publications officer's DA Form 12 series. This series is used to order and receive automatically new and revised publications and changes. If the supervisor's list does not match the publications officer's list, he should make the appropriate changes to the DA Form 12 series. Resupply will then be automatic on new and revised publications and changes. Existing publications not in the unit can be ordered by using the DA Form 17 series. This series is used for a one-time order of existing publications. Using DA Pamphlet 310-10 will assure the aviation maintenance supervisor that he will receive the correct and current publications he needs to perform his mission.

Filing, posting, and destroying is an important part of keeping Army aviation materiel publications current and correct. DA Pamphlet 310-13 explains filing, posting, and destroying publications. The date on the front page must be checked with the 310-1 index to ensure the pamphlet is the most current copy. Filing of publications correctly makes the publications easier to use and update. The publications should be filed in the general area where they will be used. For instance, aviation materiel publications should be filed in the maintenance area where they will be immediately available for reference. All publications should be filed according to instructions outlined in section IV of DA Pamphlet 310-13. The system of filing should be explained to shop personnel so they may find what they need quickly.

Posting is changing a publication as required to add, delete, or modify the information contained in the publication. The most important principle is to get the wrong information deleted or modified and add what is correct and current. When new changes are obtained they must be posted immediately so the old information will not be used by mistake. The procedures are very simple and may be learned by reading sections II and III of DA Pamphlet 310-13. Information that is no longer correct and current must be destroyed locally without security procedures. If the publications are classified they must be destroyed according to Army Regulation 380-5.

The aviation materiel supervisor can assure his publications are correct and current by using the simple process described here. It requires only a few hours of study of a few basic DA pamphlets and military publications indices and a *frequent* review of his publications.

Captain Gibson is a recent graduate of the USAAAVS 10-week Aviation Safety Officer's Course. He is a graduate of the ADA Basic Course, Transportation Corps Advance Course, Aviation Maintenance Officer's Course, and CH-47 Maintenance Test Flight Course. CPT Gibson is qualified in the UH-1, OH-58, and CH-47 aircraft.

# The Role of Command in Aviation Safety

ARMY AVIATION can no longer accept nonprofessionals within its ranks. Fortunately, the caliber of the present-day aviator is superior to any who have passed before him. Why then do we continue to have the same types of accidents which have always plagued Army aviation? Could it be that the command element has failed to progress at the same rate as the modern-day aviator?

To reach a logical answer, we must take a close look at the tasks confronting today's aviation commander. He is a very busy person. He has the personal problems that confronted the aviation commander of old, but his are more complex. He faces the age-old battle of keeping his fighting equipment combat-ready the same as past commanders; but could they envision the complex nature of today's machines of war?

Training is a problem shared by past and present commanders. The requirements for realistic and meaningful training have not changed. But the scope of training has changed and would cause the commander of years past to shake his head in wonder at the diversified nature of today's requirements.

As our present-day commanders are faced with the same problems as our past commanders, how do they improve their performance in today's more complex and demanding environment? There could be many correct answers to this question, but they would all boil down to competent management. Our present-day commander is so pressed for time that unless he efficiently manages his resources and time he becomes a deterrent to the overall safe operation of his unit.

Today's commander can find an abundance of highly trained and qualified personnel to accomplish the unit's mission. He need not know every job better than the man paid to perform that job, but he must ensure that their performance is highly competent. He must be absolutely ruthless in insisting on this type of performance. This is not to say that the commander should not use compassion and understanding in dealing with the personal problems of his men. It does mean, however, that he cannot accept substandard performance

from any of his men, regardless of the cause. He must give all possible assistance and personally check or ensure that other unit members check the performance of substandard individuals to prevent this being the weak link in the unit's safety chain.

Our present-day commander's problems would be minimal if he could obtain maximum and perfect performance from all the men of his unit. Is this possible? Not to the utopian extent. However, proper personnel management and a highly developed understanding of human behavior can maximize his chances of achieving this goal. Commanders should begin by assuring that personnel are trained for their jobs and make every effort to provide opportunities for continuing skill development. This could provide avenues for advancement, as well as provide the type of training needed to develop automatic response capabilities that will be available in times of extreme stress when normal responses are likely to become disordered. Total job familiarity instills confidence and professionalism, qualities commanders look for in their men.

The commander must know his workers and be attuned to complaints, changes in morale, and quality of work. Knowing that a person is having family problems, financial difficulties, or other worries can be useful in deciding to whom he is going to give particularly complex or demanding job assignments. He will know who he can rely on to get the job done safely and professionally.

Modern-day commanders have found they do not have the time to personally supervise every element of their unit's operations. They must rely on the junior leaders. This is a healthy situation and with proper supervision develops the competence and professionalism the commander is looking for.

A common mistake of many commanders is to develop a fixation on one segment of the unit's operations. If there is a sudden improvement in the performance of this section or perhaps a reduction in the accident rate, he assumes that this proves the soundness of his corrective actions. This is not necessarily so. Researchers conducted a study at a large electrical plant to determine whether production was associated with the intensity of illumination. They deliberately changed the lights every few days, then checked the workers' reactions and production rates. To everyone's surprise, production improved whether the illumination was increased or decreased. In the final analysis, they realized that the employees were reacting to management's attention and interest and not to the changes in illumination. Improvement of performance can almost be guaranteed in any section the commander singles out for special attention. But continuing spot checks will be required to ensure that the corrective actions taken are sound and that the improvements are not temporary.

Not only must our present-day commander supervise the numerous and varied daily mechanical tasks that must be accomplished for his unit to operate safely and efficiently, but he must also devote considerable energy to the men of his unit who do the flying.

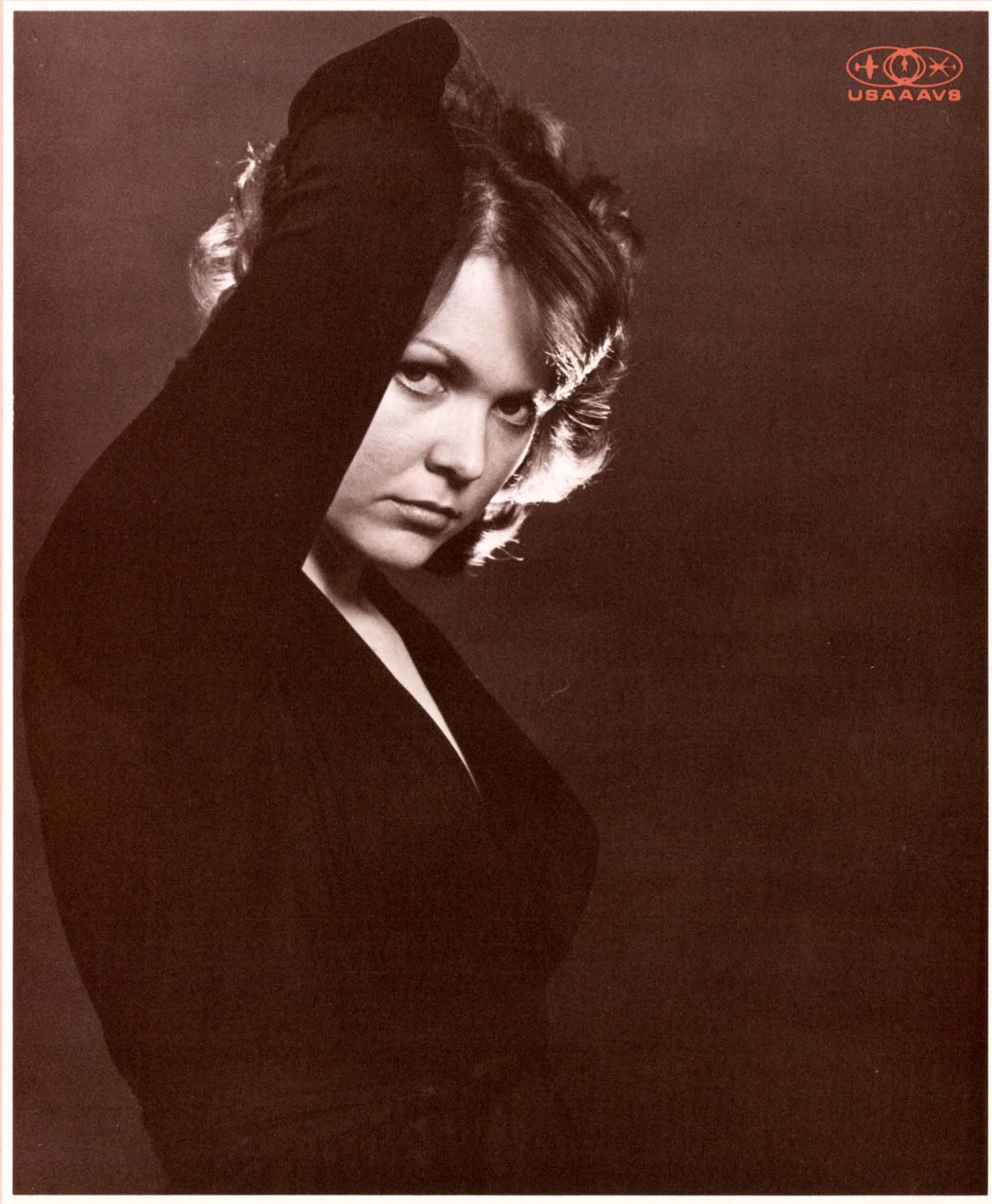
Can he improve on the safety and performance standards established by commanders past? Yes, but only if he is more closely attuned to the needs, desires and personal problems of his aircrews, and only if he can reduce the stress that can so rapidly build to the danger level in our modern military environment.

Our aircrews of today are active, educated military men who act on their own to solve problems that cause stress. They do not usually need professional help in order to cope. The commander's job is to identify the man who is not coping before he comes to his attention through an accident. Every effort must be made to help this man solve his problems so he can devote full attention to his flying duties.

In rare cases it may be necessary to release a man from all duties and give him time off to sort out his affairs. The aircrewmen of today exhibit lots of pride and will hesitate to ask for time off for this reason because of what the commander or the flight surgeon might think. The commander must be close enough to his men so this does not become a problem. He must recognize the symptoms of stress in his men and take positive action before it reaches a dangerous level. If the commander is unsuccessful in his efforts to solve the problems of one of his aircrewmen, he must remove this person from flying duties until a positive change has been achieved. This may be a rough decision, but it must be done.

There is one last thing that our present-day commander must do. He must establish unequivocal discipline within his unit. This should bring about a high degree of self-discipline, but in the absence of self-discipline, applied discipline becomes necessary. The commander cannot be everywhere at once, but he can bring about tremendous improvements in the standards of today's aviation unit by making his presence felt in every segment of the unit's activities. His presence would be the attitude, the climate, and the atmosphere that he has established through his own example and the requirements he has placed on his subordinates and crews.

**Major Danny E. Pope**
Directorate for Aircraft Accident Analysis and Investigation
U.S. Army Agency for Aviation Safety USAAAVS


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*

### Unsuitable Water Purification Tablets

Life support officers and NCOs should check all survival medical kits for the iodine purification tablets manufactured by the Van Brode Milling Company under contract/lot numbers 4723-244, 4723-295 and 4723-302. Tablets with these lot numbers are unsuitable for issue and use and should be destroyed in accordance with paragraph 3-48a, AR 40-61, and paragraph 2-18, AR 735-11.

### Modification of SPH-4 Helmet

*My troop has recently received the AH-1S Cobra. To operate the weapons system in the AH-1S, the SPH-4 helmet has to be modified in accordance with TM 9-1270-212-14. Will the drilling of these holes affect the crash-resistant characteristics of the modified helmet? If the holes decrease the crash-resistant characteristics, is there anything that can be done to minimize the downgrading effect of the helmet modification?*

The U. S. Army Aeromedical Research Laboratory (USAARL), Fort Rucker, AL, advises that careful enlargement of the existing holes in accordance with TM 9-1270-212-14 will not adversely affect the integrity of the helmet.

### Aviation Life Support Equipment

*I recently assumed the duties of life support officer and would appreciate information concerning the following:*

*Survival vest, SRU-21P*

*Fire starter, NSN 9920-00-999-6753, is being received empty in some cases. Is a recharge kit available?*

*Operator's Manual, TM 55-8465-215-10, is hard to obtain.*

*Is there another medical kit available for the Arctic? Many items in our kits are expired and/or unauthorized, i.e., Propoxyphene Hydrochloride (pain killers), Dextroamphetamine Sulfate (stay-awake tablets), and atropine (antidiarrhea tablets). Our local command flight surgeon says to remove these items from the kit.*

*Replacement radio batteries are often received with limited shelf life remaining.*

*Cold weather survival kit, NSN 8465-00-973-1862*

*What is the availability of the Operator's Manual?*

*How do you obtain plastic polyethylene bags for publications?*

*Is there a shelf life for rations?*

The butane lighter fire starter, NSN 9920-00-999-6753, is not refillable. This piece of equipment is subject to leakage if not properly closed. Several Equipment Improvement Recommendations have been submitted to improve/replace the item. In the meantime, you can reorder using the above information. However, we suggest the good old kitchen matches in a waterproof container be added to individual survival vests.

The Operator's Manual, TM 55-8465-215-10, for the SRU-21/P should be available through normal publication procedures. Suggest you verify your last order up through the brigade. In an emergency, you can order up to five TMs by calling St. Louis Publications Center, AUTOVON 698-7339. Give your account number, organization, name and AUTOVON, reasons for order, date required and how many you need.

The tropical survival kit, NSN 6545-00-782-6412, is a medical item and is the only medical kit available for the survival vest. A message went to the field in 1974 directing removal of certain drug items. Since these drugs are now controlled and require certain specified storage or destruction methods, suggest you contact the flight surgeon for assistance.

Replacement batteries for some survival radios are in good supply. According to our information, the depots will ship older batteries first in order to get maximum use. You did not indicate the type of radios your unit has. If they are old type URC-10s or URC-68s, the batteries you order will possibly be very close to replacement date.

Manuals for survival kits should be ordered as mentioned above.

Use TM 55-1680-317-23 & P to order the Bag, Plastic: Polyethylene 8 In. Sq., w/Interlocking Seal Closure, FED PPP-B-0026, Type II, Style 2, NSN 8105-00-837-7755. The 10-inch bag is NSN 8105-00-837-7756.

Information from the U. S. Army Aviation Systems Command, St. Louis, MO, AUTOVON 698-3137, indicates that TM 743-200 shows a 60-month shelf life for survival rations.

OPMS CORNER

Officer Personnel Management System

# Aviation: Should I Enter The Program And, If So, When?

**Major Thomas M. Walker**

Aviation Management Branch
Professional Development Division
Officer Personnel Management Directorate

THE DECISION to make aviation an Officer Personnel Management System (OPMS) specialty and the related policy changes made to support this action have many commissioned officers asking the question, "Should I enter the aviation program and, if so, when?" In hopes of answering these and similar important questions, the following information addresses aviation within OPMS to include the selection criteria for the program.

Under OPMS commissioned officers (excluding the Medical Service Corps) may serve a career in Army aviation in one of two specialties: Aviation—specialty 15; and Aviation Materiel Management—specialty 71. To better comprehend the scope of specialties 15 and 71 and their associated functions/duties, a description of the specialties is essential.

• *Aviation*, designated as an alternate specialty upon graduation from initial entry fight training, is concerned with the employment and support of Army aviation elements in the accomplishment of their mission of augmenting the capability of the Army to conduct prompt and sustained combat operations on land. Army aviation elements participate in the full spectrum of Army missions—combat, combat support and combat service support. Some of the functions performed in this specialty include commanding aviation units and activities, participating in development of doctrine, and serving in principal staff positions (i.e., personnel, intelligence, operations and logistics) at all levels of the Army. Officers in the Aviation specialty serve in a variety of duty positions such as airfield commander, aviation advisor, experimental test pilot and aviation safety officer (not all inclusive).

• *Aviation Materiel Management* is a specialty which encompasses those positions relating to life cycle management of aviation materiel including aircraft engines; airframes; components; accessories; instruments; rotor blades; power trains; or hydraulic, mechnical and electrical fuel systems. Officers in this specialty may perform a variety of functions concerned with research and development; test and evaluation; procurement and production control; inventory control; storage; distribution; maintenance; supply; and transportation. After completion of flight training, specialty 71 officers attend the Aviation Maintenance Officer Course (AMOC) at Fort Eustis, VA. Specialty 71 may be awarded as a primary specialty to officers assigned to the Transportation Corps or an alternate specialty to officers assigned to other branches.

**Selection Criteria:** Officers assigned to a branch other than Judge Advocate General's Corps, Chaplains Corps and Army Medical Department (excluding Medical Service Corps) may apply and, if accepted, attend initial entry flight training. However, quotas for initial entry flight training are allocated to Officer Personnel Management Directorate (OPMD) company grade officer divisions based upon the type specialty experience required to meet company grade aviation requirements—"needs of the Army!" The heaviest aviation requirements are for officers with combat arms specialty experience followed by combat service support and the combat support functions. By percentage, the initial entry flight training quotas are distributed on the following basis: Combat Arms—63 percent; Combat Service Support—18 percent; Combat Support—14 percent; and Medical Service Corps—5 percent. Combat Service Support percentage includes

specialty 71 training.

To qualify for participation in the Aviation program the following prerequisites must be met:

- Be a high school graduate or equivalent; preferably have 2 or more years of college.
- Attain or exceed a composite score of 155 on the Officer Battery Flight Aptitude Selection Test (FAST-OB).
- Have completed no more than 60 months active commissioned service prior to entry into flight training.
- Successfully pass a Class 1/1A Flight Physical (Class II for graduates of Army Reserve Officers' Training Corps (AROTC) Flight Program).
- Have completed branch basic officers course plus 1 year of troop duty. Exceptions to the requirement for a minimum of 1 year troop duty may be granted only for:

√ Transportation Corps officers who have Aviation Materiel Management as a primary specialty, and

√ United States Army Reserve officers who are graduates of the Reserve Officers' Training Corps Flight Training Program and are needed to fill immediate Army requirements.

Detailed instructions regarding application and selection procedures are contained in AR 611-110, "Selection and Training of Army Aviation Officers." It should be noted that age criteria (30 years) is no longer a requirement for selection.

**Aviation Utilization**: Following graduation from initial entry flight training, aviators are assigned to Department of the Army directed operational flying assignments for utilization of their aviation training. Normally these assignments are 3 years in duration and are designed to provide the aviator with a professional foundation in Army aviation. Additionally, aviators are assigned to positions which make maximum utilization of their experience and training. Upon completion of initial utilization, aviators normally are assigned to duties which will increase their expertise in their primary or another alternate specialty.

The Aviation Career Incentive Act (ACIA) of 1974 restricted the flight pay system of the Armed Forces to achieve a more equitable distribution of aviation flying pay. The Act bases entitlement to flying pay on years of officer aviation service in contrast to the previous system of rank and longevity. To be entitled to continuous monthly incentive pay an aviator must perform operational flying duties for 6 of the first 12, and 9 of the first 18 years of aviation service. The 12- and 18-year points are called "gates" and represent a 50 percent utilization goal for aviators. Due to the requirements of the ACIA and the high cost of aviation training, aviators will have a high utilization rate in specialty 15 and 71 positions through the grade of major. Prospective aviators may be assigned to nonaviation positions in their primary specialty or to positions considered as developmental to other specialty areas, depending upon Army requirements. Once designated into the Aviation or Aviation Materiel Management specialty, officers can anticipate assignments in specialty 15 or 71 and their other designated specialty.

**Promotion/Command:** Promotion and command opportunity has long been of major concern to officer aviators. There is a general feeling among some officers that a career in aviation is a dead end street—nothing could be further from the truth. As in previous years Army of the United States (AUS) promotion board results for 1976 show that for grades major through colonel the aviator selection rate favorably compares to the overall selection rate. By grade, the selection rates for 1976 were:

| | Overall Percent | Aviator Percent |
|---|---|---|
| Major | 63.04 | 65.77 |
| Lieutenant Colonel | 61.84 | 60.00 |
| Colonel | 45.90 | 45.58 |

Aviators are eligible for command of both aviation and nonaviation units at the platoon and company level, and may command both. At battalion and brigade level aviators may be considered by Headquarters, Department of the Army Command Selection Boards for command of both aviation and other designated specialty related nonaviation units but, if selected, will command only one. In addition a recent change to command selection procedures permits officers to request in writing that they be considered for command in any specialty in which a recognized degree of proficiency and qualification has been attained. This change—beginning in 1978—will allow commissioned aviators to be considered for command in their branch-related specialty even if they are designated out of that specialty as a result of redesignation action.

As OPMS specialties, Aviation and Aviation Materiel Management provide job opportunity and professional development to support officer utilization from entry level through the grade of colonel. Additionally, there are positions at general officer level which require aviators. An officer who meets the selection criteria should consider service in the Army aviation program. Whatever field of endeavor you may select—aviation or otherwise—your future as an officer rests, as it always has, in your own hands. So potential aviator, take a close look at Army aviation. Look at its missions, career opportunities and, most importantly, how you can contribute to the program. If you meet the selection criteria and aviation represents a personal goal, then submit your application—do it *now!*

# 7th Signal Brigade Helicopters Fight SNOW

**Photos by MSG Scherp**

**Above—Tons of ice and snow burden the branches of the Odenwald Forest creating conditions that threaten thousands of trees. Below—Flying slowly over the treetops, a helicopter from the 7th Signal Brigade knocks off ice and snow with its powerful rotor wash**

**Below—Trees freed of ice and snow appear darker against the other part of the forest**

Three 7th Signal Brigade helicopters helped save thousands of trees from falling over in the Odenwald Forest 35 miles east of Mannheim, Germany.

The helicopters, two UH-1H Hueys and an OH-58 Kiowa, located at Mannheim-Sandhofen, responded to an urgent call for help by the German Forest officials and the mayor of the Odenwald town of Beerfelden.

Unusually heavy snowfall and freezing rain earlier threatened to kill more than 800 acres of valuable spruce trees in the dense forest near the picturesque town.

"The trees could no longer hold the weight of hundreds of pounds of ice and snow and some of them were already toppling over and making others fall, too," said Oberforstrat Werner Volckmann, the regional forest chief, "and there was nothing we could do to save the trees. The damage would be in the millions of marks. I've seen this happen in other areas of Germany."

Normally, the stormy winter weather keeps the snow and ice from loading down the branches of the 35 to 50-year old trees. "But we've had more than 15 inches of snow and frozen rain in the last 3 days and there wasn't even a breeze. The forecast is for even more snow," he added.

Herr Volckmann and the mayor of Beerfelden sent an urgent request for help to the 7th Signal Brigade because they knew the brigade had helicopters.

The aviators responded promptly. Flying over the heaviest hit areas, they used the wind from the blades to shake the snow from the trees. It was a good opportunity to assist the people around Beerfelden.

FOLD

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FOLD

# NAME THAT BIRD
# UH–60A

SUGGESTED NAME
OF AIRCRAFT

YOUR NAME

ADDRESS OR UNIT

COMMENTS

# NAME THAT BIRD

**Have you ever wanted to name an Army aircraft? If you have now is your chance. Read the following and start thinking of names**

THE U. S. ARMY's new UH-60A Utility Tactical Transport Aircraft System (UTTAS) needs a name. The *U. S. ARMY AVIATION DIGEST* is asking its readers for their recommendations.

If you have a name enter it on the preceding page and add a short comment explaining why you think this name would be appropriate. Fold the sheet as indicated; staple and mail. No stamp is necessary. The *DIGEST* will forward your suggestion to the appropriate Department of the Army authority that will decide on a name.

Please enter only one name on the sheet. If you want to submit more than one name, make a copy of the form, fold it into the original and mail it along.

All recommended names must be received no later than 30 April 1977 to be eligible for consideration. All names are not acceptable. AR 70-28, dated 18 June 1976, specifies that Army aircraft should be given the names of American Indian tribes or chiefs or terms. The name should appeal to the imagination without sacrifice of dignity, and should suggest an aggressive spirit and confidence in the capabilities of the aircraft. The name also should suggest mobility, agility, flexibility, firepower and endurance. For brevity, it is suggested the name consist of only one word.

The names given Army aircraft are primarily for use in public releases and other documents as a ready reference but have proven popular among Army personnel.

In the past some Army aircraft, such as the O-1 Bird Dog and OH-23 Raven were not given Indian names. In most cases, such aircraft were given their names before the present policy went into effect. These names have not been changed.

The last aircraft introduced into the Army without an Indian name is the AH-1G HueyCobra. This aircraft, an outgrowth of the UH-1 Iroquois (Huey), was named by its maker before it was purchased by the Army. When the Army started buying the helicopter the name quickly was shortened by common usage to "Cobra," which is descriptive of its impressive fighting ability.

The names of fixed and rotary wing Army aircraft are listed below.

**FIXED WING**

| | |
|---|---|
| O-1 Bird Dog | U-6 Beaver |
| OV-1 Mohawk | U-8 Seminole |
| T-41 Mescalero | U-9 Aero Commander |
| T-42 Cochise[1] | U-21 Ute |
| U-1A Otter | UV-18 Twin Otter |
| | C-12 Huron |

**ROTARY WING**

| | |
|---|---|
| AH-1 HueyCobra[2] | OH-13 Sioux |
| CH-21 Shawnee | OH-23 Raven |
| CH-34 Choctaw | OH-58 Kiowa |
| CH-37 Mojave | TH-55 Osage |
| CH-47 Chinook | UH-1 Iroquois[4] |
| CH-54 Tarhe[3] | UH-19 Chickasaw |
| OH-6 Cayuse | AH-56 Cheyene |

[1]Usually called Baron
[2]Usually called Cobra
[3]Also called Flying Crane
[4]Usually called Huey

## *JUST RELEASED!*

"Report on Mast Bumping," dealing with in-flight breakups—catastrophic accidents caused by mast failure due to mast bumping—is a "must see" film for every pilot and everybody concerned about aviation safety.

Available through audio-visual support centers in April.