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UNITED STATES ARMY
JANUARY 1981

AVIATION DIGEST

AN UPDATE BY
BRIGADIER GENERAL KENYON

ARMY AVIATION

JANUARY 1981 • VOLUME 27 • NUMBER 1

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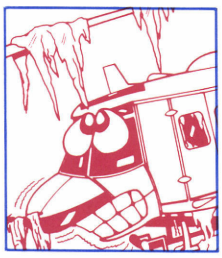

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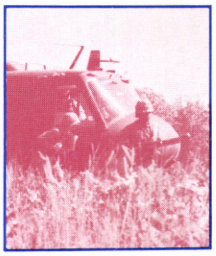
Cover: **This month the** *Aviation Digest* **introduces the first of what will be a quarterly column from Brigadier General Richard D. Kenyon, Army Aviation Officer at Headquarters, DA**



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Richard K. Tierney
Editor

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

The ***Digest*** is an official Department of the Army periodical published monthly under the supervision of the Commanding General, U.S. Army Aviation Center. Views expressed herein are not necessarily those of the Department of the Army nor the U.S. Army Aviation Center. Photos are U.S. Army unless otherwise specified. Use of the masculine pronoun is intended to include both genders unless otherwise stated. Material may be reprinted provided credit is given to the ***Digest*** and to the author, unless otherwise indicated.

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

This publication has been approved by The Adjutant General, Headquarters, Department of the Army, 25 April 1980, in accordance with Army Regulation 310-1.

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

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

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THE START OF A new year is a most appropriate time for each of us in Army Aviation to reaffirm our personal commitment to excellence in service in the days ahead. Our mission and our responsibilities are too great to do otherwise. We must resolve to hone our training and readiness to new levels of efficiency in the eighties so that Army Aviation can lead the way in defense preparedness.

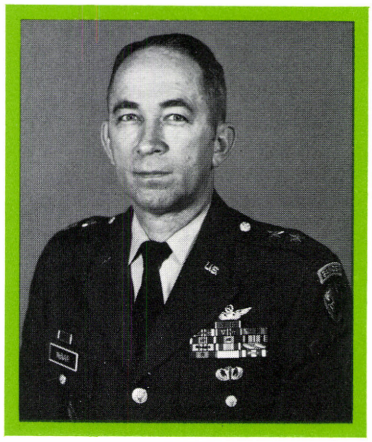
The focal point for all aviation matters at Department of Army level is Brigadier General Richard D. Kenyon, the Army Aviation Officer in the Office of the Deputy Chief of Staff for Operations and Plans, Department of the Army. We enthusiastically welcome him to the front pages of the *Digest* with his "Update," a quarterly article in which he will share pertinent DA level information with *Digest* readers. His initial submission describes the wide range of aviation points of contact throughout the Army staff and some of their more viable recent actions.

One of these key DA staff officers, Lieutenant Colonel (P) E.H. Grayson Jr., of the DA ODCSOPS Training Directorate (Aviation), follows with an enlightening article on "Aviation Training in the 1980s." He very aptly points out that our aviation training and instruction must be oriented "toward perfecting techniques and tactics in order to successfully meet the most sophisticated threat to aviation in history." Further, such an orientation will require greater emphasis on airspace management, night flying and the integration of air and ground units. We here at the Army Aviation Center are especially cognizant that the ideas presented by LTC Grayson must be fundamental to all our training programs, both in the school as well as in our units.

Major Bruce S. Beals, currently a student at the Command and General Staff College, Ft. Leavenworth, describes the important work done by members of the active Army in evaluating Army National Guard and Army Reserve. Evaluation and standardization have long been hallmarks of quality in Army Aviation. Major Beals has played a part in the development of such quality and based on his personal experience with such duty, he explains the objectives of that mission and the methodology used to accomplish it in "Reserve Component Evaluation."

In this "read ahead" each month, I try to highlight some of the magazine's outstanding articles and authors for you; however, "Going Home" describes a type of tragic incident we would rather not report. Yet, it is a familiar story which is too often told too late. It proclaims in no uncertain terms how a series of events and misjudgments can lead to fatal results — fatalities which could possibly have been avoided had that unfortunate chain of errors been broken by any one of a number of responsible personnel. Authored by Colonel Edward E. Waldron II, commander, U.S. Army Safety Center, this article is a must for everyone. It contains unpleasant, but essential lessons for each of us to read and retain.

Finally, while thoughts of good judgment and safety prevail, let me call your attention to this month's special recognition of the retirement of Major General James F. Hamlet, Deputy Inspector General of the Army. Not only is General Hamlet one of our most senior and most respected aviators, he is one who, during his 38 plus years of Army service, has recognized and promoted the inherent requirement for safety as a fundamental ingredient of all Army Aviation operations. He has in turn imparted that philosophy not only to Army aviators everywhere, but especially important, to the ground commanders whom we support. Many of the tremendous improvements in aviation safety in recent years can be attributed in large measure to MG Hamlet. For this and for his faithful service, we are indeed grateful and wish him the very best on the occasion of his retirement from active Federal Service. Godspeed.



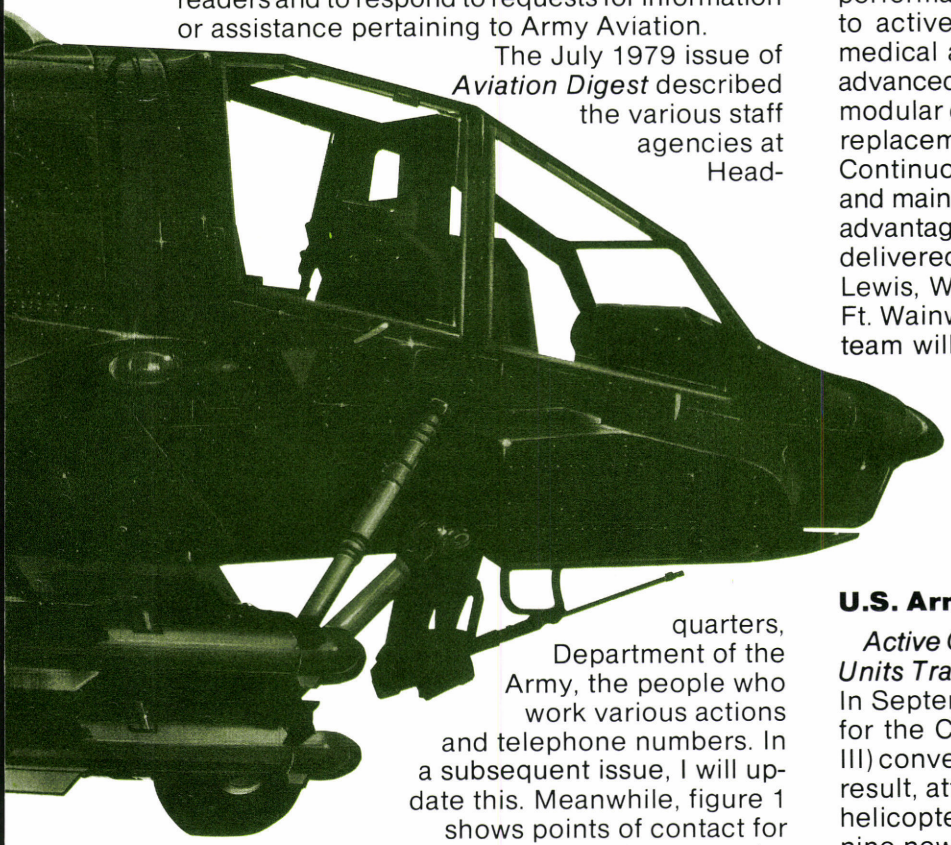
Major General Carl H. McNair Jr.
Commander, U.S. Army Aviation Center
Fort Rucker, AL

ARMY AVIATION UPDATE

Brigadier General Richard D. Kenyon
Army Aviation Officer
ODCSOPS, Headquarters,
Department of the Army

THIS IS THE first of what will be a quarterly forum to provide information to *Aviation Digest* readers and to respond to requests for information or assistance pertaining to Army Aviation.

The July 1979 issue of *Aviation Digest* described the various staff agencies at Headquarters, Department of the Army, the people who work various actions and telephone numbers. In a subsequent issue, I will update this. Meanwhile, figure 1 shows points of contact for some of the subject areas with which you may be concerned.



Below are some news items which will be of interest to you:

Aeromedical

Aeromedical Evacuation High Performance Hoist. The new Western Gear High Performance Hoist provides a marked improvement in hoist performance and has been certified for release to active Army, Reserve and National Guard medical aviation units. This new hoist provides advanced state-of-the-art operational capabilities, modular component design for easy component replacement, and redundant safety features. Continuous duty cycle, increased cable speed and maintenance by unit personnel are additional advantages of the new hoist. The first hoists were delivered to the 34th Medical Detachment, Ft. Lewis, WA, and the 383d Medical Detachment, Ft. Wainwright, AK. The new equipment training team will complete the introduction of the new hoist to active Army medical units on 30 January. The introduction of the new hoist to the National Guard and Reserve will be completed this March. **(DASG-HCO, LTC Tom Scofield)**

U.S. Army National Guard (ARNG)

Active Component and ARNG Attack Helicopter Units Training Together To Improve Readiness. In September 1979, the Aviation Requirements for the Combat Structure of the Army (ARCSA III) conversion was completed in the ARNG. As a result, attack helicopter assets of ARNG assault helicopter companies were redistributed to form nine new attack helicopter units for a total of 12 ARNG attack helicopter companies/troops. ARNG units use the UH-1C/M gunship with the M-22 missile system to train for the attack role. Due to increased emphasis to improve the combat readiness of the Reserve Component and by efforts of the National Guard, the ARNG will integrate 26 AH-1S helicopters into its attack

FIGURE 1

Office	AUTOVON Telephone	Office Symbol
ODCSOPS Aviation Requirements All Aircraft Systems AR 95-1 (less Chapter 6) Flight Simulators Aviation Life Support Equipment Aircraft Survivability Equipment Aviation Awards Avionics Self-Deployment Aviation Night Vision Goggles Ground Support Equipment	227-9666	DAMO-RQD
ODCSPER Officer Management AR 570-1	225-9031	DAPE-MBA
ODCSRDA Aviation Systems		DAMA-WSA
All Aircraft Systems	225-9571	
Avionics	225-1362	
Flight Simulators	225-1362	
Aviation Life Support Equipment	225-1362	
Aircraft Survivability Equipment	225-1362	
ODCSLOG Aviation Logistics	227-0487	DALO-AV
ODCSOPS Aviation Training Training Flying Hour Program Standardization	225-4061	DAMO-TRI-AVN
ODCSOPS Aviation Force Development	225-5568	DAMO-FDF
ODCSOPS Aviation Readiness	227-5730	DAMO-ODR
National Guard Bureau — Army Aviation Division	225-4486 584-2020	NGB-AVN (Pentagon) NGB-AVN (Edgewood Arsenal, MD)
Logistics	584-2027	NGB-AVN-L (Edgewood Arsenal, MD)
Training	584-2215	NGB-AVN-O (Edgewood Arsenal, MD)
Safety	584-4454	NGB-AVN-S (Edgewood Arsenal, MD)
Army Reserve Aviation	225-3662	DAAR-OTR
Aeromedical	227-1469	DASG-HCO-A
Air Traffic Control Matters	284-7796	CDR, Aeronautical Services Office (USAATCA-ASO), Cameron Station, Alexandria, VA

helicopter companies by the end of fiscal year 1981.

Recognizing a requirement to enhance the combat capability and provide for the unique training requirements of ARNG attack helicopter units, U. S. Army Forces Command (FORSCOM) has established a separate partnership-type program. The "Counterpart Program" encompasses aviator, nonaviator crewmember and maintenance personnel. Training is envisioned as progressing from individual to crew, to team, and finally to unit training. Aviator training initially consisted of only refresher/qualification training for individuals previously qualified in the AH-1 aircraft, but it has been expanded to include qualification training. In March 1980 formal "lash-ups" of ARNG and AC units were established (figure 2) and direct coordination between units was authorized.

FIGURE 2

LASH - UPS FOR COUNTERPART PROGRAM FOR ARNG ATTACK HELICOPTER UNITS

ACTIVE COMPONENT UNIT	ARNG UNIT (STATE)
1st Inf Div	ACT 1/238th ACS (MI) ACT 1/194th ACS (IA)
2d Amd Div	D(-) 149th CAB (OK)** ACT 1/124th ACS (TX)**
4th Inf Div (M)	D/40th ID (M)CAB (CO)* D/47th ID (WI) (IL)** AHT 163d ACR (UT)*
7th Inf Div	D (-) 149th CAB (AZ) ACT 1/18th ACS (CA)**
9th Inf Div	AHT 116th ACR (WA) ACT 163d ACR (MT)
24th Inf Div	D/26th ID CAB (FL)* AHT 278th ACR (AR) (TN)** ACT 1/101st ACS (SC) ACT 5/117th ACS (NJ)** ACT 278th ACR (TN)**
82d Abn Div	D/28th ID CAB (NC)** ACT 1/104th ACS (PA)** ACT 1/126th ACS (RI)
101st Abn Div (Air Aslt)	D/38th ID CAB (MO) D/42d ID CAB (NY)** D/150th CAB (MD)* AHT 107th ACR (OH) ACT 107th ACR (OH)
3d ACR	ACT 116th ACR (ID)**

* Indicates unit has received limited issue of AH-1.

** Indicates relationship same as AC/RC partnership program.

As the ARNG inducts the AH-1 helicopter into its inventory, the Counterpart Program for ARNG attack helicopter units can provide an essential catalyst for a smooth and efficient transition of the ARNG to a fully modernized ARNG attack helicopter force by the mid-1980s.

(NGB-AVN, Mr. Ries, AUTOVON 284-2244)

United States Army Reserve (USAR)

USAR aviation is very much alive and is improving. On the positive side of things, aviator strength is gradually increasing, some newer pieces of equipment and aircraft are being issued to USAR aviation units, and the USAR aviation units are involved in realistic training programs which include aircrew training manual (ATM) and Army Training and Evaluation Program (ARTEP) requirements as well as joint readiness exercises and REFORGER.

Also, during a recent Department of the Army Inspector General's inspection of the Office of the Chief, Army Reserve staff, a commendable comment was extended concerning the Individual Ready Reserve (IRR) aviator training program. As with other successful programs, the credit for such laudatory comment rightfully goes to those who help make the program work. In the case of IRR aviator training program, credit goes to the program manager, Major Steven Wallace; Reserve Component Personnel and Administration Center; to all the people in FORSCOM; to those in the Army Research Institute Field Unit at Ft. Rucker, AL; and to many on the DA staff who have supported the testing and development of the program. Expansion of this program over the next few years can be expected.

Brief articles concerning various facets of the USAR aviation program will appear in future issues of *Aviation Digest.* **(DAAR-OTR, LTC Bert Rice)**

In future issues — April, July and October 1981 — I will bring other items to your attention. If you require information on a particular subject, you can contact the responsible staff officer by telephone or by message to Headquarters, Department of the Army, ATTN: (office symbol from figure 1), Washington, DC 20310.

I solicit your comments or questions to the DA staff to assist in identifying the most pertinent subjects and to thereby improve the overall effectiveness of the magazine as a medium of communications within the Army Aviation community.

AVIATION TRAINING IN THE 1980s

Lieutenant Colonel (P) E. H. Grayson Jr.
Training Directorate (Aviation)
Office of Deputy Chief of Staff for Operations and Training
Headquarters, Department of the Army
Washington, DC

DURING THE past year, there has been a major thrust in reorienting the aviation training program. Major Army commands have been challenged to orient aviation training toward perfecting techniques and tactics in order to successfully meet the most sophisticated antiaviation threat in history. Closely tied in with this is a vigorous training effort in the combat and combat support aviation units designed to support the ground commander 24 hours daily, 7 days a week, regardless of the weather, with particular emphasis on providing critical support during adverse weather periods.

In order to meet this challenge, emphasis is being directed toward tactical flight and away from routine Federal Aviation Administration type flying. Recent aircrew training manual revisions have oriented more and more tasks and iterations toward accomplishment of tactical missions, and additional revisions can be expected. The Directorate of Evaluation/Standardization, U. S. Army Aviation Center, Ft. Rucker, AL, has been tasked to examine training in more detail than ever before during unit evaluations and determine whether units have trained to the point whereby assigned tactical missions can be accomplished.

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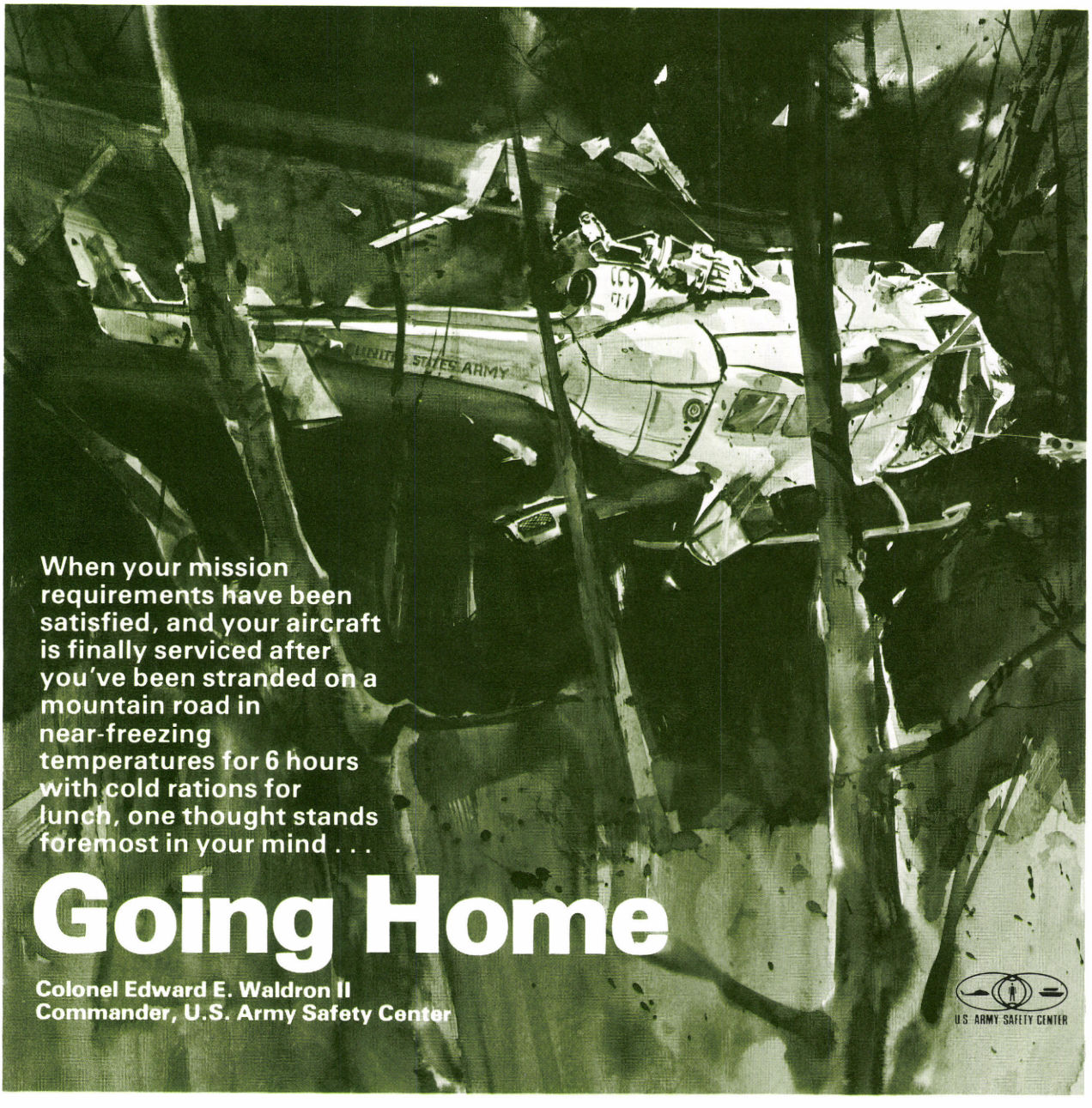


When your mission requirements have been satisfied, and your aircraft is finally serviced after you've been stranded on a mountain road in near-freezing temperatures for 6 hours with cold rations for lunch, one thought stands foremost in your mind . . .

Going Home

Colonel Edward E. Waldron II
Commander, U.S. Army Safety Center

Seven UH-1 helicopters had initially comprised the flight. Now, only four remained in the field, and these sat idle along a mountain road. Eighty pounds of fuel rested in the belly of one aircraft; 110 in another; 170 in the third; and 90 in the fourth. It would be 6 hours before a refueling truck would wind its way up the mountain road to reach and service all four helicopters. Meanwhile, the aircrews munched on cold rations and planned their return flight home as they milled about in the near-freezing weather.

But even on the ground, coordination among the crews was not easy. Two of the aircraft were situated on the mountain at a level above a cloud layer that was rapidly thickening, and two were nestled on the terrain below it. Tired, cold and hungry, the crewmen waited for the fuel that would start them on their way to the warmth and comfort of home, unmindful of the drama that was about to unfold—a drama that began long before their unscheduled landing along the isolated mountain road.

The mission

The seven UH-1 crews were assigned a VFR training mission that required them to conduct a flight to a landing zone where they were to extract troops and transport them to another LZ.

Because some of the pilots in the unit had limited experience in UH-1s, the crews were carefully selected. The

assistant operations officer who was also the senior IP in the unit was assigned as the PIC of one aircraft. The safety officer was PIC of a second aircraft. Another unit IP was the PIC of a third UH-1, with the air mission commander (AMC) assigned as pilot of the seventh Huey. Crews of the other three helicopters consisted of the most qualified of the remaining pilots in the unit. These were paired for maximum safety according to their experience level.

At "oh dark thirty hours" on the morning of the flight, the AMC assigned his senior IP the responsibility for filing the flight plan for the entire flight to include a weather briefing for the mission.

Initially, the mission was planned for a total time of one and one-half hours en route. However, the flight plan filed indicated the time en route to be 2 hours with flight to be conducted at an altitude of 2,000 feet. Weather conditions at this time were forecast as 800 scattered, 2,000 overcast, visibility 6 miles with smoke and haze, with possibility of 800 broken and visibility 3 miles with fog and smoke.

The terrain over which the mission was to be flown was mountainous, and ranged in elevation from 1,200 feet to more than 4,800 feet. Despite the marginal weather reported, no changes were made in the flight plan.

Around 0630, the flight departed the airfield and began the 15-minute trip to the pickup zone. There, the waiting "grunts" boarded the aircraft. The flight then lifted off at approximately 0650 and headed for the assigned LZ. En route, a fuel check indicated all seven helicopters had enough fuel to complete the mission and return to their home base.

The flight arrived at the LZ 30 minutes later, off-loaded the troops, then departed for home. Shortly afterwards, the pilot of Uptight 2 expressed concern to the AMC as to whether enough fuel was available to complete the return flight if they continued on their planned route over low ground. Because of the low ceilings they were beginning to encounter, the AMC felt it best to continue over the planned route. This route afforded relatively flat terrain along a highway on which the aircraft could land should some in-flight problem arise. However, the alternate route over mountainous terrain was the shortest one.

While this discussion was in progress, flight lead informed the AMC that they would not be able to get over the pass that lay ahead and into the next section of low ground because of a heavy cloud cover. Immediately following this transmission, the pilot of Uptight 2 stated that adequate clearance was available to go through a broken layer VFR on top. The pilot of Uptight 3 agreed that this was a good idea after which flight lead stated that they would get on top and try to go direct. This decision was not questioned by the AMC.

However, once the flight was VFR on top, they found the cloud cover was not broken as anticipated, but overcast. The situation now became more complicated. Two of the seven Hueys did not meet requirements for flight under instrument flight rules (IFR). Uptight 4 did not have a VOR, and the copilot aboard Uptight 2 did not have a current instrument rating.

At this point, another complication arose. The pilot of Uptight 2 announced he had a low fuel warning light. As the flight continued, it became obvious that there was no broken cloud layer in the vicinity of the airfield and the decision was made to proceed toward the mountaintops and find a suitable landing site for Uptight 2.

At this time, the pilot of Uptight 3 elected to continue to the VOR and make an instrument approach once clearance was obtained. Two others went with him. Flight lead remained with the flight to help locate a place for the other helicopters to land. Just before they reached the mountains, the pilot of Uptight 4 announced that he also had a low fuel warning light. However, he stated that he had an open area in sight and was descending through a hole in the clouds to land beside a dirt road.

Meanwhile, the pilot of Uptight 2 was on short final to a landing site above the cloud layer while flight lead, who had also reported a low fuel warning light, was making a landing above the cloud layer to a dirt road in the vicinity of Uptight 2.

The pilot of Uptight 7 then proceeded through a hole in the cloud layer and landed near Uptight 4. By this time, his low fuel warning light was also illuminated.

The Hueys had been flying a total of 2 hours when the first low fuel warning light came on and a total of 2 hours and 15 minutes when they landed.

A time for decision

Now, with all helicopters and crews safely on the ground, it was time for additional planning and more decisions. Three aircraft had safely completed the flight back to home station by getting an IFR clearance and making an IMC descent. Of the four remaining on the mountain, two were located at a level above the cloud layer and two were below it. All were intact. All crews were safe. One of the first things that had to be done was to get fuel. The AMC walked to a civilian residence and used the telephone to request a fuel truck to service the four aircraft. In the meantime, radio contact was made with the PIC of the third helicopter, who had landed with two others at their home station, and the locations of the four aircraft which were in the boonies were given to him.

It would be about an hour and 45 minutes before the fuel truck could reach the site of the two helicopters parked on the lower level of the mountain, and it would require another 4 hours for it to reach and refuel the two helicopters on the upper level. Meanwhile, the aircrews waited in near-freezing weather with only cold rations to satisfy their hunger pangs. They also faced the possibility of having to spend the night on the mountain if weather conditions continued to deteriorate.

The weather in the vicinity of the two aircraft situated on the upper level of the mountain was already IMC and was getting progressively worse. Instrument takeoffs would have to be made during departure. Since the copilot of one of these aircraft was not current, and his instrument card was expired, the AMC exchanged places with him. This action paired the individual with an IP aboard one of the helicopters situated on the lower level of the mountain where weather conditions were VFR. In turn, the AMC assumed the duties of copilot aboard the helicopter piloted by the assistant operations officer who was

The accident described here is a classic example of lack of professionalism

also the unit's senior IP.

The assistant operations officer then went to the proposed takeoff area of the second helicopter and determined that a normal ITO would clear all obstacles with no problem. The nearest visible obstruction along the intended flight path was a high ridge that the assistant operations officer estimated to be 2 miles away. After this determination, he returned to his own helicopter and discussed departure plans with the AMC.

The two helicopters located below them had been in radio contact with the flight service station, filed their flight plan, and taken off under VMC for the flight home.

Now it was time for their departure, which would be difficult at best. The weather was obscured and the estimated visibility was 1/16 of a mile. The AMC turned to his IP and asked him what type of flight plan he should file. The response was to file VFR for a flight of two. At 1430 the flight plan was opened and the assistant operations officer informed the PIC of the second aircraft that they were departing.

Instrument takeoffs

During the ITO, the AMC, who was at the controls, narrowly avoided striking a tree that neither pilot had previously noted. Aside from this near tree strike, the takeoff was uneventful. The helicopter remained in the clouds for about 30 to 45 seconds before breaking out. The pilots then continued their climb until the helicopter reached an altitude of approximately 7,500 feet. At this time, the IP informed the pilot of the helicopter still on the ground that the tops were 5,000 feet.

The pilot's response was that he also was going to perform an ITO on a northwesterly heading. When 5 minutes had passed and the second helicopter did not appear, the AMC began a radio search on the frequencies the flight had been using. He never got a response.

Assuming that the PIC of the second aircraft may have had some kind of malfunction that required him to shut it down, they waited. However, after no attempt was made to contact them by means of a survival radio, they descended below the cloud layer and made a quick search of the area but could find no evidence of the helicopter. At 1510, the AMC transmitted the message that one of their helicopters was missing and presumed down.

The search

A hurried ground and air search was made, but no sign of the aircraft could be found. Finally, at 1800 hours, the search was suspended for the night. Military personnel as well as civilian groups familiar with the area were then assembled and organized for the search that would resume the next morning.

At 0530 the next day, ground parties began a search of their assigned areas. At 0800 weather permitted supplementing their efforts with aviation support. At about 1000, a probable impact point was located. At 1020, approximately 21 hours after the aircraft had embarked on its ITO, searchers transmitted the message that they had found the crash site. . . and all crewmembers were dead.

The errors

The events that set the stage for this crash can basically be summarized under two headings—inadequate flight planning and crew and supervisory error.

Four of the seven aircraft had to make precautionary landings because of low fuel. This indicates inadequate flight planning before and during the initial mission.

The hours of waiting in near-freezing temperatures for the fuel truck to arrive and service the helicopters, the availability of only cold rations to eat, and the prospect of having to spend the night on the mountain produced a psychophysiological mood (get-homeitis) that adversely affected the decisions of all personnel involved.

Following are some of the existing conditions that influenced the initial planning:

The AMC had limited aviation experience. Initially, he had planned to fly the mission at 110 knots airspeed for the best fuel range. And most of the flight was planned using straight line routes. However, the AMC failed to update the planning following the current weather forecast before takeoff. Consequently, the reported overcast condition did not permit the shorter straight line route because of the high terrain, and the flight had to be made at an airspeed of 90 knots. This prematurely depleted their fuel supply.

After determining the fuel supply was not sufficient for them to make their destination, the flight attempted to go straight line. When a "sucker hole" in the overcast was noted, the flight proceeded VFR on top. Then, when low fuel warning lights began to come on, the pilots headed for a mountain that protruded through the overcast. If destination weather had been checked before going VFR on top, the AMC would have been aware of the overcast. Had the aircraft remained below the overcast, the pilots could have found a more suitable landing site and departed under VMC after the aircraft were refueled.

Further, following servicing of the aircraft, the AMC allowed his IP and the pilot of the aircraft that crashed to operate their aircraft in violation of AR 95-1. Again, the AMC's judgment was influenced by his limited aviation experience. In addition, the problems encountered earlier in the mission affected his self-confidence. Consequently, he allowed himself to rely heavily on the judgment of his IP who was the assistant operations officer and the senior and most experienced IP in the unit.

The assistant operations officer made the decision that both aircraft would make a takeoff in IMC on a VFR flight plan in violation of AR 95-1. He did not file an IFR flight plan

because he did not believe a clearance would be approved and they would not be able to take off until their positions were VFR. This meant that they might have to remain there overnight if the weather did not clear.

After making the initial decision that both aircraft would make an ITO, he assisted the pilot of the ill-fated helicopter in planning his ITO and indicated confidence in his ability to perform it. In taking these actions, he violated AR 95-1 by failing to insure standard takeoff minimums existed at the time of departure. He used invalid references and misjudged distances in determining minimums by eyeballing it when the actual weather at his location was an indefinite obscuration with less than one-eighth-mile visibility.

The pilot involved in the crash similarly violated provisions of AR 95-1 in attempting an ITO under the existing weather conditions. Undoubtedly his judgment was influenced by a number of factors including peer pressure to make the ITO, confidence of the IP in his ability to accomplish the takeoff, and a desire to get home.

In attempting the ITO, he made a number of judgmental and performance errors. He attempted the ITO from a pinnacle, and he made the takeoff from a hover to keep the tail rotor clear of the small trees around the takeoff site.

Further, he selected a heading of northwest which was the direction to the highest point along a ridge ahead of him. The ridge which had been estimated by the assistant operations officer to be 2 miles away was actually seven-tenths of a mile away, with an intermediate ridge at a lower level approximately three-tenths of a mile away.

During takeoff, he failed to establish a climb. Instead, he allowed the helicopter to descend approximately 300 feet. The Huey then crashed into the intermediate ridge.

Although he was one of the more qualified aviators of the remaining ones available for the initial mission, his flight experience was limited. He had accumulated a total of less than 500 hours of flight prior to this mission. His copilot was even less experienced, having logged less than 200 hours of flight time, less than 15 of which were accumulated after he had completed flight school.

Yet, despite his lack of experience, the PIC attempted the ITO from the left seat of the aircraft, even though the primary flight instruments are located on the right side. Further, he was well aware that he lacked proficiency in ITOs and had difficulty performing instrument flight during flight school.

Professionalism—or the lack of it

A large number of aircraft accidents, particularly accidents such as the one described here, could be prevented by what's commonly called **professionalism.** Every pilot knows this . . . the word professionalism appears with constant regularity in safety pubs . . . you hear the word over and over at safety meetings . . . everyone is urged to demonstrate professionalism in all they do.

But how is professionalism demonstrated in real-world situations? As far as this accident is concerned, a look at what **professionalism is not** is certainly in order. **Professionalism in the cockpit is NOT:**

- **Violating flight regulations.**
- **Filing a VFR flight plan in IMC.**
- **Making ITOs from a hover from the left seat.**
- **Running out of fuel on a scheduled mission.**
- **Failing to assign the most experienced crews to the most critical missions.**
- **Continuing to try to salvage a bad situation caused by bad decisions.**

Once the four helicopters were on the ground, the PIC of the ill-fated helicopter should have been replaced by a pilot more experienced in instrument flight. Replacement crews could easily have been brought to the downed helicopters by the fuel truck. The AMC was probably reluctant to replace the PIC simply because he was the "designated pilot in command." However, it would have been far better to run the risk of hurting the PIC's feelings by replacing him than to let him kill himself. While the PIC was qualified for the first mission—the troop lift—once the helicopters were safely down on the mountain he was not the best qualified for the ITO departure for the flight back home. **It was now a new mission.**

Just as trying to salvage a bad approach almost always ends in a bad landing, the AMC's persistence in trying to undo the results of his bad decisions—beginning with his initial mission planning—ended in a disaster that was both predictable and preventable.

The accident described here is a classic example of lack of professionalism. Simply stated, professionalism is the demonstration of maturity in all aspects of a mission. It is planning and conducting a flight according to established rules and regulations. Professionalism is the most essential safety ingredient. Any job done professionally is inherently safe . . . if there is no professionalism, there is no safety.

Accidents of this nature are especially deplorable because they are preventable, and the preventive measures necessary are simple in nature—insuring that **all** aviation operations are conducted in accordance with appropriate regulations and directives. All aviation crewmembers in positions of responsibility such as platoon leaders, AMCs, IPs, PICs, operations officers, and commanders must constantly remain aware of their responsibility for the safe operation of the aircraft entrusted to them and the safety of personnel under their span of control and influence.

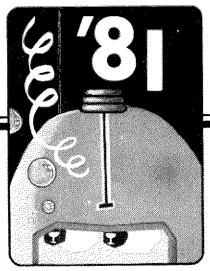
In addition, each individual crewmember has the personal responsibility to resist any temptation to exceed his capabilities or permit others to exceed theirs. Toward this end, unit personnel should be periodically briefed as to how adverse psychophysiological states such as "get-homeitis" and peer pressure can lead to errors in judgment.

What more can be said?

Well . . . put yourself in the shoes of each individual involved, including the dead crew. What **professional decisions** would you have made?

This article is based on a composite of Army aircraft mishap experiences. The errors and events leading to this crash are the same ones causing many actual Army aircraft mishaps, and the lessons learned apply to all aircraft missions.

VIEWS FROM READERS



Editor:

A recent article in the ***Aviation Digest*** noted that the last of the U-6 Beaver utility airplanes in the U. S. Army inventory had been turned in by U. S. Army Berlin to the 70th Transportation Battalion (AVIM) at Coleman Barracks, Federal Republic of Germany. True but, "Phoenix has risen."

Shortly after the turn-in was completed the U. S. Commandant of Berlin requested through military history channels that one of the U-6s be returned to Berlin for loan to the Berlin Transportation Museum. This was approved and about a couple of months ago MAJ Hugh Dimmery, executive officer of the Berlin Army Aviation Detachment, and CW3 Peter Quigley flew the U-6 back to Berlin. It is today with us in a flyable but stored condition.

The Berlin Army Aviation Detachment commanded by the undersigned has five UH-1 helicopters, one U-21A and two UV-20As. We have 8 pilots, 3 commissioned and 5 warrant officers, 11 enlisted and 11 civilians.

MAJ Paul C. Hollowell
Commander
Berlin Army Aviation Detachment
Berlin Brigade (INF)
APO New York 09611

Editor:

The comments of CW2 Roland W. Knoop on the safety of the infantryman presented in his letter to the editor (April 1980 issue of the ***Aviation Digest***) were read with considerable interest. While we do not question CW2 Knoop's interest in the safety of the infantryman who may be a passenger in an aircraft, his comments on the new battledress uniform require clarification.

The material used in the new battledress uniform is a lighter weight variant of the nylon/cotton (NYCO) fabric we have used in our field jacket and field trousers for a number of years. This material was selected after extensive wear testing and lab experimentation to meet a need for protection from the thermal pulse associated with nuclear weapons. The material used in the battledress uniform was selected to meet the overall protection requirements for the combat infantryman which differ from the aviator. While the battledress uniform does not provide flame resistance comparable to Nomex it is far from being the "death trap" CW2 Knoop envisions. The need for a camouflage print in the battledress uniform precludes the use of Nomex since the disruptive pattern is imparted after the material is woven. It is not now within the state-of-the-art to dye or print Nomex cloth after it is woven without seriously degrading the flame protection. Since the requirements for the battledress uniform place far greater emphasis on ability to defeat visual and infrared detection by the enemy than on flame resistance, the NYCO fabric is considered a better choice.

I also should point out that the new battledress uniform is not a permanent press uniform. In fact, it will replace the permanent press utilities which were designed to be essentially a garrison uniform, but were also used for field training. The adoption and issue of the battledress uniform will mean that the uniform the Soldier will train in is the one he will fight in. In this case protection was not traded off for aesthetic benefits.

With respect to our "nylon web" gear, nylon was selected over cotton for four reasons:

- To save weight.
- To reduce the amount of moisture (water) that the items would pick up and retain.
- To reduce drying time if it becomes wet.
- Nylon does not need mildew resistant treatments while the cotton does.

On a final note I would like to mention that all of our combat clothing and equipment items are designed to meet specific requirements which have been identified by the Army's Training and Doctrine Command (TRADOC). During the development, TRADOC represents all Army users by conducting extensive operational tests where the developmental items are assessed under real world conditions. Before any new item of clothing is adopted by the Army, it must successfully pass these operational tests.

I hope the above comments will assure CW2 Knoop and your other readers that the new battledress uniform is the result of much thought, interest and careful evaluation on the part of both the developer and user.

John V.E. Hansen
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Arthur J. Negrette
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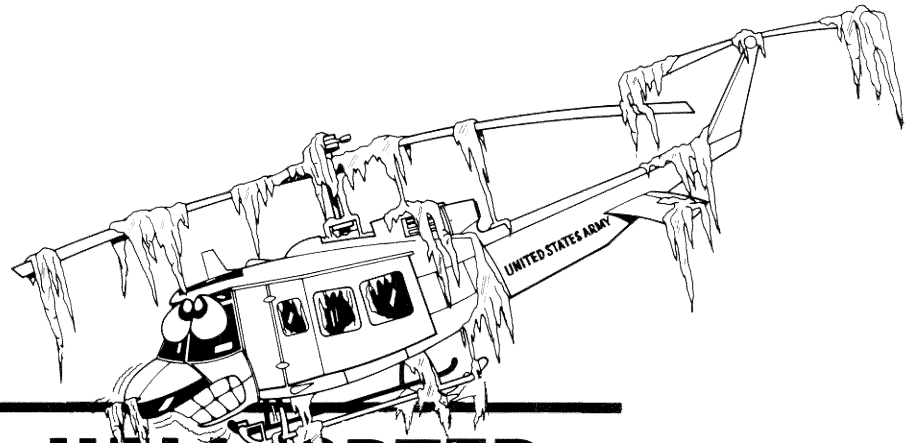

HELICOPTER ICING HAZARDS

This article is a complete update of the one that appeared previously in the October 1977 issue of the *Aviation Digest.* Though there are similarities it offers an expanded discussion on in-flight icing hazards, icing forecasts and engine failure related to in-flight ice

TRADITIONALLY, helicopter operating manuals have addressed the issue of in-flight icing and its effect on helicopter performance by "CAUTIONING" or "WARNING" the pilot to avoid the icing environment. Such restrictions and limitations were at one time acceptable when helicopters were viewed as aircraft operating primarily in visual meteorological conditions (VMC). Since early helicopters lacked the equipment and sophisticated systems normally employed for flight in instrument meteorological conditions, there was little justification for expending time and resources on helicopter icing research and development.

Modern helicopters have expanded the traditional concept of operating only in VMC and today routinely perform a broad range of tasks under instrument flight rules and marginal VMC. It is this expansion of the helicopter's operating envelope that compels a more thorough and comprehensive understanding of the hazards associated with in-flight icing.

HAZARDS OF IN-FLIGHT ICING

The risks associated with flight in subzero precipitation or moisture have been known since the pioneering days of fixed wing flight. Typically, we have characterized icing problems by their effect on lift, drag, weight and thrust. It is readily accepted that in-flight icing reduces thrust and lift and increases drag and weight, all to the detriment of an airplane's performance.

Rotary wing aircraft also suffer from these effects when exposed to icing conditions and, in addition, are susceptible to various complications that are *not common* to fixed wing aircraft. Although many questions remain to be answered regarding helicopter icing and its impact on aircraft performance and mission effectiveness, researchers are beginning to uncover significant insights into this facet of rotary wing development.

The rotor blade icing process on helicopters and its subsequent effect on aircraft performance cannot be analyzed in the straight-forward manner used to explain ice accretion on the leading edges of an airplane's wings. Spanwise elements of a rotor blade, unlike the leading edges of an airplane's wing, move through the air at various airspeeds. Rotor blade icing is made even more complex by the constantly changing angle of attack experienced by the helicopter's main rotor blades in normal forward flight. These obvious and unique characteristics of the helicopter's lifting system,

combined with other not so obvious characteristics such as differing surface temperatures along the blades' spanwise sections and smaller airfoil thicknesses, tend to make helicopter rotor blade icing more complex and extremely hazardous.

A major hazard associated with rotor blade icing is the deterioration of normal autorotational qualities. The adverse effect of main rotor icing on autorotational performance was documented during artificial and natural icing tests conducted by the U.S. Army in the mid-1970s. A major finding was that moderate ice accumulation (about one-half inch) on inboard portions of the UH-1H Huey rotor blade, and similar type aircraft, was sufficient to preclude a safe autorotation in the event of an engine failure. In some cases, as little as one-eighth inch of ice over one-third of the blade span was sufficient to seriously deteriorate autorotational qualities by causing a loss of 22 rotor revolutions per minute (rpm) during autorotation at 70 knots indicated airspeed (KIAS).

Deterioration of normal autorotational rpm results from ice accumulation in greater amounts near the inner portions of the rotor disc which directly affects the blades' efficiency with respect to upward airflows during autorotation.

The reported result is that with about one-half inch of ice on the main rotor blade's inner portion, minimum (safe) rotor rpm *cannot* be maintained during autorotation.

Pilots of rotary wing aircraft should not attempt to judge or estimate main rotor blade ice accumulation by observed buildup on the windshield or other parts of the aircraft, since icing occurs at an accelerated rate on the rotor blade as compared to accumulation on the fuselage. A more reliable method for monitoring the buildup of rotor blade ice on UH-1 type aircraft is to compare power requirements after the formation of in-flight ice to power settings prior to ice detection. Researchers indicate that blade icing of one-half inch or greater on the UH-1 will be accompanied by a 5 to 6 pounds per square inch (PSI) torque increase over the "before" or "no ice" power requirement. More generally, icing tests conducted in the United Kingdom document cases where significant autorotational rpm deterioration occurred with only a 6 percent power increase over the "no ice" power requirement.

Helicopter pilots should remember that even small buildups of ice on the main rotor blades can deteriorate significantly the available autorotational rpm to a level where safe landings cannot be assured. When in-flight icing occurs, most of the damage to autorotational performance is done by the initial ice accumulation, i.e., the first one-fourth inch of ice on the rotor blade. For helicopter pilots, this means that every encounter with icing should trigger an expanded cross-check with careful attention to power settings. If continuous increases in power are required to maintain altitude and airspeed, there is reason to suspect that autorotational rpm has been compromised and the icing environment should be left quickly. If the accumulation of rotor blade icing deteriorates autorotational rpm, then it would seem that the shedding of rotor blade ice would be welcomed. In-flight shedding of rotor ice can and does occur; unfortunately, it is as likely to create a problem as it is to relieve one.

Symmetrical (affecting all rotor blades simultaneously in the same way) shedding of ice in flight can be beneficial by restoring the rotor blades to a more efficient or clean configuration and by reducing the weight of the aircraft. Asymmetrical shedding (affecting less than all of the main rotor blades), however, can create extremely severe vibrations depending on the amount of ice discharged, the type of rotor system and other factors. The severity of these vibrations is documented by experimental test pilots engaged in conducting natural icing studies with helicopters. Their reports identify numerous occasions when in-flight icing tests have been aborted because of main rotor blade icing and subsequent asymmetrical shedding which caused vibrations so severe that it became all but impossible to read the instrument panel.

The severity of vibrations resulting from asymmetrical shedding of rotor ice are generally thought to be a function of the unbalanced weight of the rotor system and therefore may be expected to be greater for two-bladed and three-bladed systems than those rotor systems employing four, five or more main rotor blades. Pilots can expect the vibration levels caused by asymmetrical shedding to decrease with an increase in the number of main rotor blades (for a constant rotor mass) since the imbalance represents a smaller percentage of the rotor mass. Conversely, vibration levels may be expected to be greater when asymmetrical shedding occurs on two- and three-bladed systems.

In short, vibrations resulting from asymmetrical main rotor shedding can be extremely hazardous if drive-train components are subjected to prolonged or severe vibrations. Needless to say, severe vibrations affecting aircraft control will add considerably to the pilot's workload when operating in instrument conditions. Natural icing tests with the S-61 helicopter indicate that vibrations are lessened if forward airspeed is reduced from 110 knots to 60 to 70 knots. Although actions by the pilot to reduce the helicopter's airspeed may mitigate excessive vibrations, one would be wise to remember that such a remedy treats only the symptom and not the illness.

Ice shedding from the main or tail rotor can also produce problems apart from an unbalanced rotor system. Though documentation is less than authoritative, researchers have experienced and expressed a concern for structural or foreign object damage to

the helicopter's fuselage, rotors or engines resulting from rotor blade shedding. This particular hazard appears to be more threatening to large multi-engine aircraft (more than 12,500 pounds) and especially tandem rotor systems.

Asymmetrical shedding of rotor blade ice can be minimized by avoiding static temperatures lower than minus 5 Celsius. Research tests with UH-1 type aircraft suggest that by rapidly varying main rotor speed or entering autorotation, symmetrical shedding may be induced when static temperatures are minus 5 or warmer. *Collective and cyclic inputs were generally ineffective in producing symmetrical shedding and may result in asymmetrical shedding. At temperatures below minus 5 degrees, it is generally not possible for the pilot to induce shedding.*

Pilots and ground personnel should be especially alert when recovering helicopters after flights and suspected icing conditions to ensure that ground personnel stay well clear to preclude an injury by ice which is coming off the rotor blades during shutdown.

The disastrous effects of in-flight icing on helicopter engines has been reported in many military and industry publications. In-flight icing presents a hazard to normal engine performance in two major ways, *ice ingestion* and *air starvation.* Ice ingestion is minimized on many helicopters by the availability of engine anti-icing systems used to prevent the accumulation of ice deposits in the area immediately forward of the compressor section. When these systems are operating normally and environmental conditions do not overtax the capabilities of the system, damage from ice ingestion is reduced considerably.

Even when aircraft are equipped with engine anti-icing systems, there remains a need for caution to ensure normal operation of the engine. Engine anti-icing systems will prevent the build-up of "ingestible ice deposits" only when outside meteorological conditions or aircraft operating conditions (most notably forward airspeed) do not exceed the systems' design capabilities. As an example, when operating normally, the engine air inlet anti-icing system on the HH-3 (S-61) helicopter will maintain the engine inlet surfaces at or above 37.8 degrees (100 degrees Fahrenheit). However, if outside air temperatures are very cold, extremely heavy icing conditions prevail, or the helicopter is maintaining a high forward airspeed, the engine air inlet anti-icing system will be incapable of maintaining a high enough temperature to prevent the buildup of ice in the engine inlet duct and the potential for subsequent ingestion of ice deposits exists. Many HH-3 pilots have experienced an occasion where cruise airspeeds in excess of 100 knots could not be maintained without illuminating the engine inlet anti-ice caution lights — an indication that inlet air surfaces are not being maintained above 37.8 degrees and that the potential for ice ingestion has increased significantly. A common remedy for such conditions is to reduce airspeed to about 70 KIAS which provides the engine air inlet anti-icing system(s) an opportunity to recover from the high airspeed and/or the harsh outside conditions.

Even when the engine air inlet anti-icing system is capable of sufficiently heating the engine inlet surfaces, there is still the threat of random ice ingestion if deposits on rotors, fuselage sections, antennas or windshield surfaces shed and are directed into the engine air intake stream. Shedding ice deposits from the helicopter, often larger than household ice cubes, can be devastating on engine compressor blades if ingested into the helicopter engines.

Perhaps the most insidious and subtle aspect of engine icing is the case where engine anti-icing systems have been activated and fail to perform as expected with ensuing engine failure. Recent research by the U.S. Air Force has discovered that some engine anti-icing systems may be inoperative under in-flight conditions due to the internal failing or malfunctioning of a pressure valve used to channel heated air from the engine tenth-stage compressor over the inlet guide vanes and the struts of the front frames of each engine in the HH-3 helicopter. This pressure valve unit is reportedly used in other types of helicopters configured with engine anti-icing systems.

When a failure or malfunction in the pressure valve system does occur, there is no cockpit annunciator light or instrument to alert the pilot of a failure in the engine anti-icing system, thus creating a false sense of security and no warning that an engine failure may be imminent.

Air starvation of the engine due to accumulation of ice on the engine inlet screens has been reported by the U.S. Navy and others. Several Navy H-46 helicopters have experienced a dual engine flameout because of ice accretion on engine inlet screens, and in one case air starvation of both engines occurred only a few minutes after ice was first noticed forming on the aircraft. Flight in icing conditions with inlet engine screens installed is extremely dangerous and pilots should make every possible effort to *avoid* a combination of *inlet screens and icing conditions.*

METEOROLOGICAL CONDITIONS CONDUCIVE TO ICING

Aviation weather classes have oriented pilots to think of aircraft icing as a function of the following two atmospheric conditions that must prevail simultaneously: free air temperature at or below freezing (0 degrees), and supercooled visible liquid moisture or high humidity Though this explanation provides

some insight into aircraft ice formation, it presents only a meager perspective of the icing environment for helicopter pilots. The inherent limitations of rotary wing aircraft (service ceiling, range, endurance, speed and power availability) and the previously discussed icing hazards require a more comprehensive understanding of in-flight icing conditions and their relationship to helicopter operations.

CLOUD TYPES

Aircraft icing normally occurs in cumuliform (meaning "accumulation" or "heap") clouds or stratiform (meaning "spread-out") clouds. Variations of these two cloud forms dominate the airspace utilized by rotary wing aircraft, i.e., mean sea level (MSL) to 15,000 feet and thus deserve detailed consideration.

Cumuliform Clouds • Clouds of this type are generally noted for their billowy or lumpy appearance, indicating unstable air and strong vertical air currents (updrafts) which are capable of supporting larger than average supercooled liquid moisture drops. These large drops tend not to follow the airstream as it is deflected by the airfoil and upon impact with an aircraft, spread slowly over the aircraft's surfaces before turning to ice. The resulting clear ice, often called "glazed ice," adheres firmly to the aircraft and can create extremely hazardous flight conditions for rotary wing aircraft.

To successfully avoid or minimize the threat of clear ice, some understanding of the principal meteorological variables which affect aircraft icing in cumuliform clouds is necessary. Apart from ambient air temperature, the liquid water content (LWC) and droplet size have the greatest effect on ice deposits and accumulation rates. In general, the average liquid water content within cumuliform clouds increases with altitude to a maximum and then decreases near the clouds' tops. Droplet size is also known to increase within cumuliform type clouds as altitude increases. *The combined effects of increased LWC and larger than average water droplets result in the most intense icing region of a cumulus cloud being the upper half of the cloud.*

Stratiform Clouds • Stratiform clouds appear in horizontal layers and are normally formed when complete layers of stable air rise, are cooled and condensation subsequently occurs.

Droplet size in stratiform clouds normally will be smaller than that found in active cumulus clouds given the stable air of stratiform clouds and lesser cloud depths. Unlike icing in cumulus clouds, vertical icing layers in stratus type clouds are rarely more than 3,000 feet thick. Further, the icing environment in stratus type clouds may extend 25 to 30 miles horizontally while the horizontal extent of an icing encounter in cumulus type clouds is considerably less.

Droplet size may be expected to increase with altitude within stratiform clouds; however, the predominance of stable airflows tends to support or suspend only small water droplets or ice crystals. Consequently, stratus type clouds are far less likely to produce severe icing, and fast buildups of in-flight ice are rarely reported in stratus type clouds.

The existence of predominantly small moisture droplets in stratiform clouds has two important effects on the potential and magnitude of in-flight icing. First, and perhaps most noticeable, is that those small water droplets tend to be deflected within the airstream and thus avoid collecting on the aircraft's surfaces. The second and equally important characteristic of icing in stratiform clouds is that when moisture droplets do impact an aircraft, they freeze instantaneously, trapping large amounts of air between each droplet.

Icing formed by the instantaneous freezing of small supercooled water droplets is categorized as rime ice and described as an opaque granular deposit, appearing white or milky. The opaqueness of rime ice results from trapped air within the deposits which also makes rime ice somewhat brittle and subject to unpredictable shedding after buildup.

Although rime icing in stratiform clouds is often dismissed with little concern by operators of rotary wing aircraft, a potentially hazardous condition can develop because of the extensive horizontal nature of those clouds. The accumulation of substantial rime ice deposits resulting from prolonged flight in them is hazardous, not only because of increased weight and reduced aerodynamic efficiency but also because of the potential for ice shedding after buildup.

FRONTAL SYSTEMS

Research studies indicate that in-flight encounters with icing conditions occur most frequently in the vicinity of frontal zones. In addition to the threat of icing in frontal clouds, frontal systems also create the necessary conditions for in-flight icing "outside of clouds."

Warm Fronts • Warm-front icing may occur both below and above the frontal surface. Figure 1 illustrates how freezing rain or drizzle can be produced by precipitation falling through the front into the subfreezing cold air below and is most often found when the temperature above the frontal inversion is greater than 0 degrees and the temperature below is less than 0 degrees. Where temperatures above the frontal surface are subzero, ice pellets or snow may be noticed below the front and do not normally concern helicopter operators.

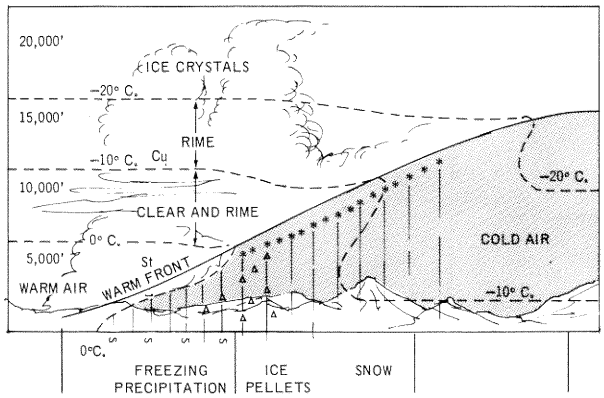

FIGURE 1: Warm Front

Icing in the clouds above the warm front's surface is characteristic of icing found in stratiform and stratocumulus clouds and usually consists of rime or mixed rime and clear ice.

Cold Fronts • Cold-front icing normally occurs in an area preceding and succeeding the front (figure 2),

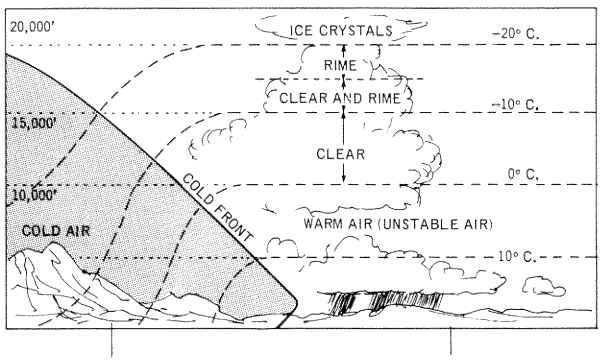

FIGURE 2: Cold Front

and aircraft are likely to encounter the most intensive icing in clouds immediately above the frontal zone. Aircraft penetrating a cold front can expect clear icing to be prevalent in the system's clouds at the lower altitudes (0 to 15,000 feet MSL) and a mix of clear and rime ice at higher altitudes.

Freezing rain or drizzle also may be experienced in a shallow or slow-moving front where the warm air is lifted over the advancing cold front. This condition often produces clouds and precipitation well behind the surface position of the front. Upon falling through a subfreezing cold front, the rain becomes supercooled and freezes on impact with the aircraft.

GEOGRAPHICAL CONSIDERATIONS AFFECTING AIRCRAFT ICING

Aircraft icing is more probable and severe over mountainous or steep terrain than over low or flat elevations. The presence of a mountain range causes strong upward air currents on its windward side which are capable of supporting larger than average water droplets, thereby compounding the icing hazard.

The movement of a frontal system, with its companion turbulence and updrafts across a mountain range, combines the normal frontal lift with the upslope currents of the mountains to create an extremely hazardous environment for rotary wing aircraft. The severest icing occurs above the crest and to the windward side of the ridges. This zone usually extends 4 to 5,000 feet above the mountains and can extend much higher when cumuliform clouds have developed.

As previously noted, the size of water droplets in a cloud is an important factor in determining the type and extent of icing to be encountered. While droplets tend to be larger in cumulus than stratus type clouds, they also will be considerably larger in any clouds that form over open water or in clean air.

ICING FORECASTS

Icing forecasts prepared by the National Weather Service or the USAF Air Weather Service are of little use to helicopter pilots and may be misleading to the uninformed. The methodology and terminology used to characterize and classify the icing environment was developed from in-flight icing tests conducted on DC-4 and DC-6 type aircraft. Thus, such labels as "trace icing," "light icing," "moderate icing" and "heavy icing" which are used to relate the rate of ice accretion on a fixed cylindrical probe on a DC-6 are of little use to the helicopter pilot in ascertaining or predicting the rate of ice accretion on a complex rotor system.

As an example, light icing is defined as an accumulation of one-half inch of ice on a small probe per 40 miles. The rate of accretion is sufficient to create a hazard if flight is prolonged in these conditions but insufficient to require diversionary action. While the prior definition may well be appropriate for a 100,000 pound airplane, there is no assurance that the rotating surfaces of a helicopter will accumulate only one-half inch of ice over 40 miles as an airplane's wings might. Further, while one-half inch of ice on the wing of a large airplane might appropriately be called light icing, there is every reason to believe that one-half inch of ice on the leading edge of most helicopter rotor systems could result in tragic consequences if autorotation became necessary.

Arthur J. Negrette is president and chief executive officer of the Flight Safety Institute, a nonprofit corporation chartered to promote and further flight safety. In addition to consulting and conducting research on helicopter accidents and aviation safety programs, the author flies HH-3 helicopters with the 129th Aerospace Rescue and Recovery Squadron, California Air National Guard. He also served as an Army helicopter pilot in Europe and Vietnam.

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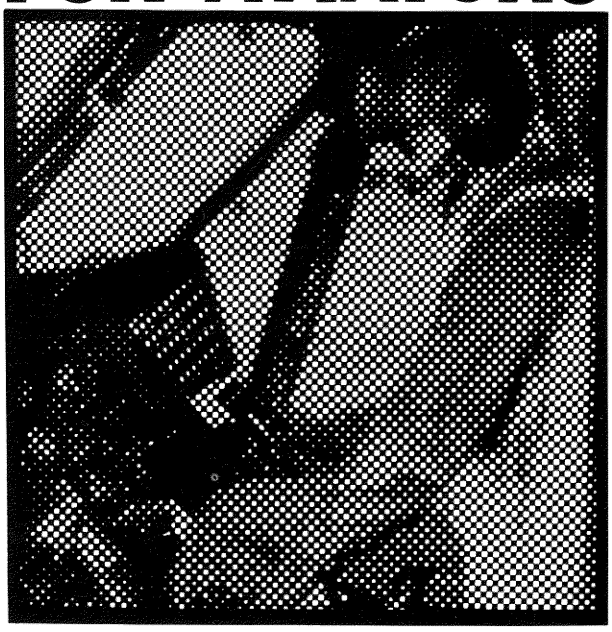
STRESS MANAGEMENT FOR AVIATORS



THE ARMY AND Federal Aviation Administration (FAA) regulations pertaining to the use of chemical substances to reduce tension and anxiety in flight personnel state that these people will be restricted from flying duties after the use of such substances. Specifically, [redacted] restricted from flying for a period of 4 weeks after the use of tranquilizers (e.g., Valium or Librium) and for 24 hours after the use of barbiturates (AR 40-8).

Also, people receiving tranquilizers are considered unqualified for the purposes of the class 1,2 or 3 flight physical examination. The use of illegal tranquilizing drugs (e.g., opium) is, of course, disqualifying from flight status and could preclude retention on active duty.

The purpose of all of these chemical agents — tranquilizers, alcohol and barbiturates — is to induce a relaxed, tension-free psychological and physiological state. Prolonged use of such substances can cause dependence and may lead to a desire for increased amounts. It also may be counterproductive. Rather than decreasing anxiety, prolonged use may cause serious problems in the home and on the job which, for the aviator, could have disastrous results.

Aviators are placed under stresses which are not shared by their land based peers. In addition to the usual stresses of family life, command, finances and interpersonal relationships, aviators must perform complex manipulation of aircraft control elements in three-dimensional space.

Occasionally aviation induced stress has been relieved by "hot dogging," i.e., flying in a manner considered by the participant to be exhilarating and fun, but which in reality is dangerous and unprofessional. Alcohol has been used more commonly to relieve or reduce the level of stress. But, with the increased recognition of the dangers of alcohol consumption, and with the current servicewide effort to de-emphasize alcohol use, many aviators seek alternative means of coping with stress.

A failure to learn to cope with stress in an appropriate manner has predictable outcomes. Stress can cause marital discord, poor working relationships on the job and decreased job proficiency. Individuals differ in their typical mode of response to stress. Some exhibit their anxiety openly: hands shaking, a bobbing foot, nervous twitching or stammers. Others tend to produce physical symptoms as their response to anxiety: nausea, headache, sexual impotence or ulcers. Still others tend to repress or cover up their feelings of anxiety, resentment or anger until they explode in a violent display of verbal or even physical abuse. Finally, some aviators become resigned to their situation and turn their anger and frustration upon themselves, becoming depressed and hopeless — as if stress has caused them to "burn-out" physically and mentally.

Since cumulative medical evidence demonstrates the dangers inherent in using chemical substances to relieve stress, and because of the consequences of reacting in an immature or irrational manner to stress, alternative courses of action must be considered. There are three basic methods of stress management:

- Attempt to reduce stress by dealing with the cause of the stress.
- Attempt to cultivate a personal life style that will make you better able to tolerate the physical aspects of stress.
- Use the therapy techniques which will reduce

the level of perceived stress.

The first step in stress management is to identify its cause and then attempt to resolve the issue or problem which is resulting in stress. Often, if the problem is with another individual, communication directly with that person will resolve the issue. When dealing with others, assertiveness (not to be confused with aggressiveness) is often required to identify the area of disagreement and to define the limits within which you are willing to function. In some cases, the services of a lawyer, marriage counselor, chaplain or financial counselor may be needed. Often, simply admitting you have a problem and discussing it with a relative or friend is enough to put the problem in its proper perspective and to produce ideas which will better equip you to meet the issue or problem. If, despite your best efforts to overcome the cause of the stress, the problem and its resulting anxiety continues at a high level, then the focus must shift from the stressor to the person under stress.

The second step in stress management is to enact changes in your life style so that you are better able to tolerate stress. Since prolonged stress is both mentally and physically exhausting, an afflicted person should sleep 8 to 9 hours a night and eat nutritionally balanced meals — including milk which contains natural sedative properties.

Caffeine, a chemical which produces stimulation, can likewise produce tension and nervousness. Sources of caffeine which should be avoided or reduced in consumption include coffee, tea, colas and some other soft drinks, and chocolate.

Tobacco also has a stimulating effect despite the brief feeling of calm that it initially provides. Physical exercise frequently reduces anxiety, therefore, some form of vigorous exercise should be engaged in three or four times per week. Additionally, dedicate 1 weekend per month and 1 week of annual leave to personal enjoyment. That is, activities which you value and enjoy. If despite your best efforts to modify your life style to a mode more resistant to stress you still find that anxiety continues at a high level, professional help should be considered.

The third step in stress management is seeking the assistance of professionals in the field of mental health. They can teach aviators to use one of the various behavioral methods of stress management and/or can use verbal psychotherapy to overcome stress. Three major techniques in which the goal is a reduction in anxiety are: **relaxation training, self-hypnosis and biofeedback.**

Relaxation training is a method whereby aviators are taught to relax the various muscle groups of the body and later to use visual imagery to induce increased mental and physical relaxation. During the final sessions aviators are taught how to transfer the skills they have learned in the clinic to their jobs or home environments. Since it is a learning process, aviators are expected to practice skill development at home, often using tapes provided by the therapist. Transcendental meditation or other forms of meditation often have a similar effect when practiced consistently.

Auto or self-hypnosis is similar to relaxation training, but it normally can be taught to the aviator in a shorter period of time and the degree of relaxation experienced is typically more profound. As in relaxation training the goal is to develop the relaxation response and home practice is required.

Biofeedback makes use of modern electronic technology to "feed back" to aviators an indication of their current level of tension. Tension may be measured using a thermometer (relaxation causes an increase in blood flow to the extremities), an indicator of muscle tension (relaxation causes muscles in the forehead to become less electrically active) or an indicator of skin moisture (relaxation causes a reduction in the speed of electrical transmission across skin surface). By observing the meter readings on the biofeedback instrument, aviators can learn to reduce their levels of tension. Relaxation training or hypnosis often is used in conjunction with biofeedback training. Again, the goal is to teach aviators to be less responsive to stress.

Verbal psychotherapy usually is used as an adjunct to the above methods. It may be used alone when anxiety appears to be a relatively permanent part of an aviator's personality structure and/or when the anxiety appears to be due less to any obvious external stressor than to an aviator's enduring tendency to interpret life in general to be threatening and stressful. In such cases the therapist's goals are to assist in developing an aviator's coping skills, to assist in placing causes of stress in their proper perspective, and to assist in living in the present rather than the regrettable past or fearsome future.

Each aviator should realize that military aviation has inherent within it an element of stress which would increase in a combat situation. Stress management is of concern not only to medical support personnel but also to the commanders whose units may be affected by stress reactions. All throughout the military, much can be done by the commanders to reduce the causes of stress and to direct unavoidable stress into channels which are beneficial to the unit and to the individual. However, in the final analysis, each aviator is responsible for his or her stress management. Hopefully, this article has assisted the readers in better understanding stress and in deciding on a course of action when stress arises.

REPORTING FINAL

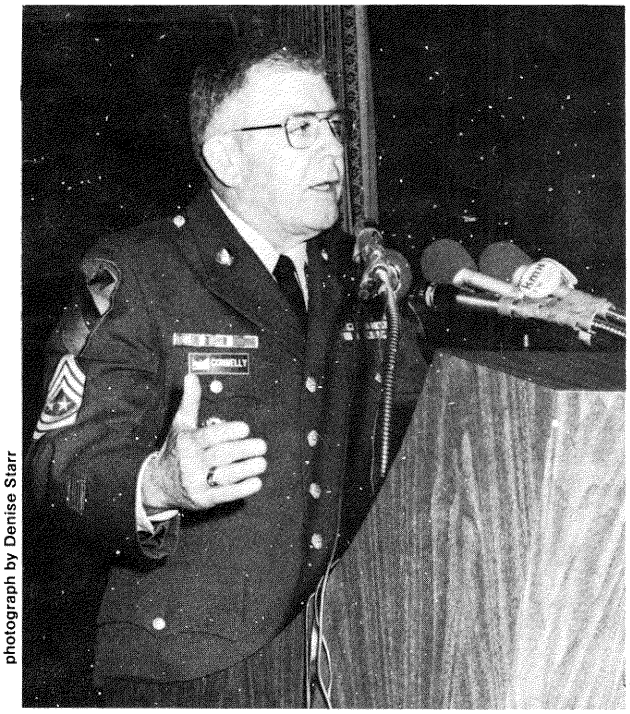
Late News From Army Aviation Activities

FROM FORT RUCKER

Top NCO Speaks. The Sergeant Major of the Army, William A. Connelly, addressed the need for strict integrity in dealing with the Soldier of today when he spoke at a December meeting of the Bogardus S. Cairns Chapter, Association of the U. S. Army.

"The living standards we enjoy as citizens of the United States are also the standards we should hold for the men and women who offer their lives to defend our right to do so," he said.

Integrity, he stressed, must be used in explaining to Soldiers the vital need for training, professionalism and discipline.



photograph by Denise Starr

THE STRICTEST INTEGRITY. The Sergeant Major of the Army, William A. Connelly, speaks to members of the Bogardus S. Cairns Chapter, Association of the U.S. Army, Ft. Rucker, [illegible]apter's December meeting

Graduation Speakers.

• Major General Jack A. Walker, deputy commander, Army Combined Arms Combat Developments Activity, Ft. Leavenworth, KS, told graduates of three flight training classes that the "surest way to peace is through preparation for war."

Speaking about maneuver, General Walker said, ". . .no arm, branch or component is better able to maneuver than Army Aviation. I'm very excited about the potential of aviators," he added, explaining that future plans for the reorganization of the U. S. Army call for greater emphasis on aviation.

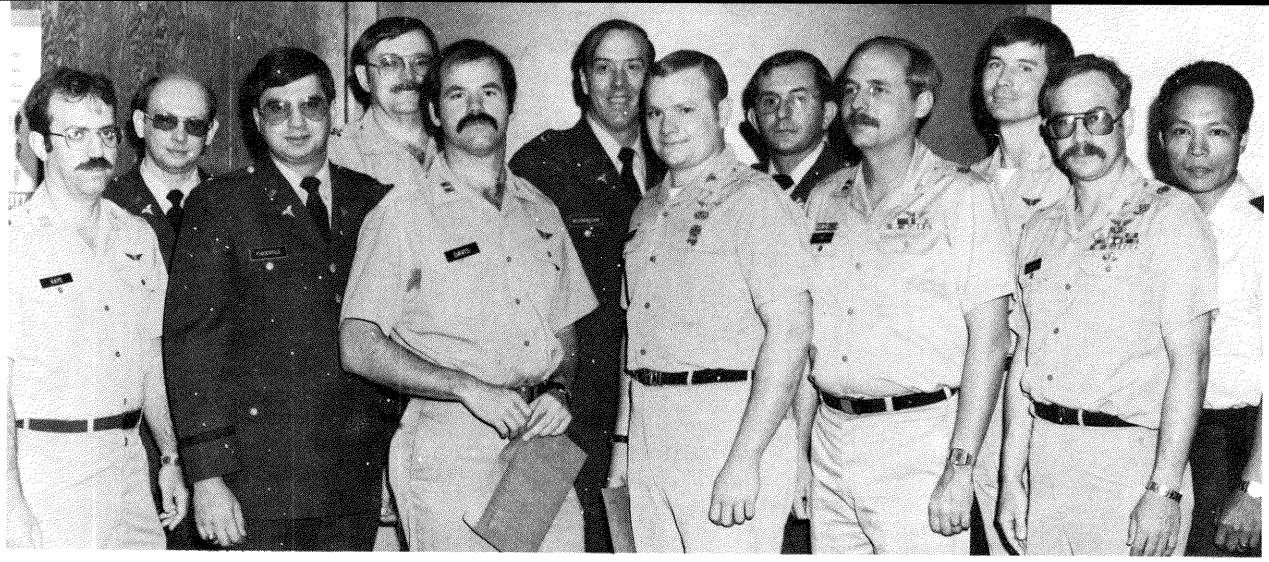
Reminiscing about the beginnings of Army Aviation as a combat threat when he started flying 22 years ago, General Walker reminded the graduates of the sacrifices and time spent by previous Army aviators in the development of armed helicopters. "Don't let that go to waste," he said.

Saying that the Army needs their "youthful enthusiasm," the 23-year veteran added that the aviators should work to improve the service by voicing their opinions. "Challenge your superiors, challenge me," implored General Walker, ". . .ask tough questions and demand answers."

• Major General Emmett H. Walker Jr., director of the Army National Guard, Washington, DC, spoke at the December graduation of two aviator classes.

He reported that the Army National Guard has the "most aviation (capability) under one command in the world," which includes more than 2,500 aircraft and 5,000 aviators.

Desert Training. The problems which faced United States troops during the recent training exercise of the Rapid Deployment Force (RDF) and the steps taken to overcome them were outlined by Major General Jack V. Mackmull, commanding general, 101st Airborne Division (Air Assault), Ft. Campbell, KY, in a speech to members of the Army Aviation Association of America and the American Helicopter Society.



Photograph by SP4 Deb Ellis

NEW FLIGHT SURGEONS. Graduates of the Army Aviation Medicine Basic Class who completed the 10-week flight surgeon program in November at Ft. Rucker, AL, are, from left, Captains James H. Kaye, Harrol L. Cranford and Anthony R. Piacentile; Lieutenant Colonel Charles B. Kennell; Captains William D. Davis III and Lewis H. Westmoreland III; Second Lieutenant William C. Sippo (Distinguished Graduate); Chief Warrant Officer, CW2, James L. Disco; Captains Robert C. Jones and Alfred J. Kirkwood; and Majors David E. Johnson and Ernesto C. Hernando. LT Sippo is a senior medical student and CW2 Disco is a physician's assistant; the others are physicians

About 1,000 members of his command were involved in Operation Bright Star which put American Soldiers and Airmen into desert training with their Egyptian military counterparts. The exercise was designed to give American servicemembers an opportunity to adjust to a desert environment, he said, as well as to be, "...mutually beneficial to Egypt and the United States and to demonstrate to the Free World the ability of the RDF to deploy in the Middle East."

(Editor's Note: Further coverage of this exercise is planned for a future *Army Aviation Digest.)*

(USAAVNC—PAO)

Course Changes. Several changes are being made to the Army Officer/Warrant Officer Air Traffic Control Course (2G-F35), including an increase in the tactical block (equipment/doctrine) from 12 to 43 hours. The course will remain 6 weeks and 4 days in length, with the addition to tactics being offset principally by a reduction in the FAA certification block.

Prerequisites are being altered so that Reserve Component officers/warrant officers may attend, and service obligation is being reduced from 24 to 12 months.

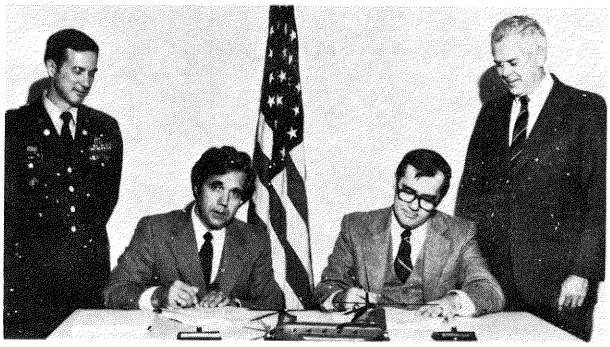
The changes are effective with the class beginning this month. **(ATZQ—TD—CD)**

FROM ST. LOUIS

Safer Fuel Cells. A $2.35 million Black Hawk helicopter composite rear fuselage program, designed to reduce weight and costs, has yielded yet another plus by providing ballistic protection for the aircraft's fuel cells.

In the ballistic testing, the glass fiber and graphite panels filled with rigid foam were hit with 23 and 33 mm high explosive incendiary rounds. There was considerable structure damage, but the panels were completely successful in preventing fuel fires. **(AVRADCOM)**

A Solicitation. The "Reporting Final" portion of the *Aviation Digest* is the readers' forum for sharing news about activities in their part of the Army Aviation community. Please use this address: Editor, *U.S. Army Aviation Digest,* P.O. Drawer P, Ft. Rucker, AL 36362.



CONTRACT SIGNED. Colonel Terry L. Gordy, manager of the Army's CH-47 modernization program, and William P. Jones, director of Boeing Vertol's military helicopter programs (standing, left and right), watch as the initial $103 million modernization program production contract is signed recently in St. Louis, MO, by John Schaible and Doug Casler (left and right), contract officers, respectively, for the Army and Boeing. Nine CH-47A helicopters are covered by this first contract. Army plans call for 436 of its fleet of A, B and C Chinooks to be remanufactured during the next 10 to 12 years to the CH-47D configuration, with initial deliveries scheduled for May 1982. The program's estimated cost is $3.1 billion

ARMY AVIATION LIAISON PILOT RETIRES

Major General James F. Hamlet

THIS MONTH IS the scheduled retirement time for one of Army Aviation's last two liaison pilots on active duty: Major General James F. Hamlet, Deputy The Inspector General, Department of the Army, Washington, DC.

Liaison wings (so named to indicate pilots were qualified in the series of liaison aircraft, i.e., L-4, L-5) were awarded to fixed wing pilots in the beginning days of Army Aviation.

Lieutenant Hamlet

Major General Hamlet became an Army aviator in 1951 when he completed the Army's tactical flight course at Ft. Sill, OK; he has been a stalwart supporter of Army Aviation throughout the ensuing years.

His career began in 1942 when the native of Alliance, OH, was a student at Tuskegee Institute in Alabama and enlisted in the Army. He was commissioned a lieutenant of Infantry in 1944 through Officer's Candidate School.

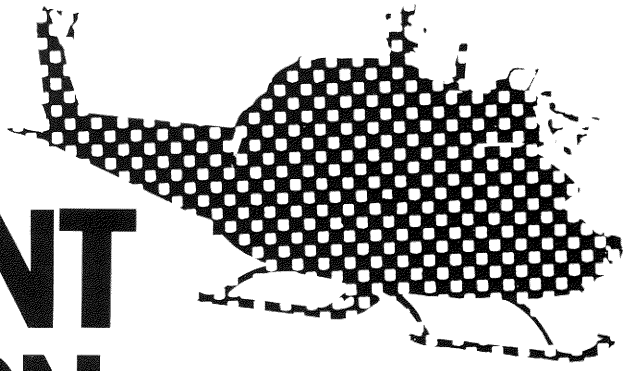
During World War II, he was a unit commander in the 366th and 370th Infantry Regiments in Italy. Since then he has held assignments at all levels of command, including 3 years of combat command time in Vietnam.

His tours include duty as chief, Doctrine and Systems Division, Army Combat Developments Command Combat Arms Group, Ft. Leavenworth, KS; commanding officer, 11th Aviation Group, 1st Cavalry Division, Vietnam; assistant commander, 101st Airborne Division (Airmobile), Vietnam; commanding general, 3d Brigade (Separate), 1st Cavalry Division (Airmobile), Vietnam; and commanding general, 4th Infantry Division (Mechanized), and Ft. Carson, CO.

Major General Hamlet moved to his present position in December 1974.

He has been awarded the Distinguished Service Medal, Legion of Merit with two Oak Leaf Clusters, Distinguished Flying Cross, Soldier's Medal, Bronze Star Medal with Oak Leaf Cluster, 49 awards of the Air Medal, and the Combat Infantryman's Badge. He is a senior aviator and qualified parachutist.

RESERVE COMPONENT EVALUATION



Major Bruce S. Beals
Command and General Staff College
Fort Leavenworth, KS

REINFORCEMENT OF THE ONE-ARMY CONCEPT

RECENTLY, NATIONAL attention has been focused on the state and strength of our Reserve Component forces. Some of our military leaders have indicated that the next conflict will be a *come as you are war*, and the outfit at your side may very well be a National Guard or Army Reserve unit. Obviously, it is to the advantage of the nation, as well as members of the Active and Reserve Components, that the readiness of our RC units be as high as possible and the post-mobilization time required to bring these units to a fully combat ready status be as short as feasible.

One of the primary methods of determining readiness status and training time is through the annual evaluation of RC units conducted during the annual training period. The annual evaluation of RC units is a complex task involving the coordination of many organizations and headquarters throughout the active Army, the Army National Guard and the United States Army Reserve. Members of the active Army are periodically called upon to act as evaluators of RC units during the AT period. This duty can be interesting, challenging, and can provide an excellent learning experience for both the active Army evaluator and the RC unit being observed.

The yearly AT evaluation is designed to achieve several objectives, as outlined in FORSCOM Regulation 350-2:

- Obtain an independent assessment of the training readiness status of RC units.
- Provide training assistance in conjunction with the unit evaluation.
- Determine the effectiveness of unit training programs.
- Give commanders an indepth view of their units' strengths and weaknesses.
- Assist commanders in the preparation of subsequent training programs.

The evaluator is tasked to provide as detailed an evaluation of a unit's training readiness condition as time permits. Considering that the AT period is normally 2 weeks in duration, both the evaluator and the RC unit commander are pressed to make maximum use of the available time. A secondary mission of the evaluator is to provide training assistance to the unit commander. It is imperative that officers and noncommissioned officers who are selected for RC evaluator duty be thoroughly familiar with the most current doctrine, tactics, organization and equipment pertaining to the unit they are observing. The

Major Beals was assigned to the Department of Flight Training, U. S. Army Aviation Center, Fort Rucker, AL, when he wrote this article

GLOSSARY

AT	annual training
ATM	aircrew training manual
CONUS	continental United States
FORSCOM	U.S. Army Forces Command
FTX	field training exercise
MOS	military occupational specialty
NBC	nuclear, biological, chemical
NOE	nap-of-the-earth
RC	Reserve Component
SOP	standing operating procedure
TOW	tube-launched, optically-tracked, wire-guided

unit evaluator is expected to be totally knowledgeable in order to provide an accurate assessment of the organization and to represent the active Army as a source of training assistance. FORSCOM Pamphlet 135-3, "Evaluation Handbook," provides detailed guidance for the unit evaluator.

Regardless of the type unit to be evaluated—from an infantry brigade, to a medical battalion, to a general support aviation company—the evaluator's approach should be concentrated on those tactical, technical and maintenance activities which provide the best opportunity for judging the unit's mission capabilities.

During July and August 1979, I was tasked to serve as a member of the 5th Army Evaluation Team at Ft. Chaffee, AR. The unit to be evaluated was Company B, 149th Aviation Battalion, Oklahoma National Guard. Company B is a combat support aviation unit, based at Lexington, OK, and was scheduled to attent AT in conjunction with the 45th Infantry Brigade, also part of the Oklahoma National Guard. The company began its training at Ft. Chaffee following an air movement of 19 UH-1 Huey aircraft and a road march of ground vehicles from their home facility.

During the 2-week AT period, the unit was required to have a minimum of 88 hours of mission training and to participate in a 4-day/3-night field training exercise. An additional requirement was a 4-mile run/march that had to be completed in 1 hour or less. The first week of AT was devoted primarily to aircrew training manual tasks and Soldier's Manual skills. Unit members conducted tactical troop movements with the 1st Battalion, 180th Infantry, carried external loads, and performed instrument and nap-of-the-earth training. The NOE was performed at Magazine Mountain, the highest point in the state and one of the most beautiful areas in western Arkansas. While the aviators were completing ATM training tasks, the maintenance, service and headquarters personnel were involved with routine maintenance, operation of a rapid refueling point, and logistical and administrative functions.

Following each day's training, the commander received a daily evaluation of his unit's performance for that day. Specific areas of interest included command and staff effectiveness, training management, training performance and maintenance operations. Unit abilities were graded on a scale which varied from "strength" to "weakness" and included provisions for items "not observed" and "not applicable." At the completion of the first week of AT, key unit members, to include the commander, executive officer, platoon leaders, operations officer and first sergeant, attended a critique of the week's training activities. Areas that needed improvement were discussed, with possible courses of corrective action. Items of strength were reviewed to provide the chain of command a complete picture of the unit at the half-way point of their AT period and to prepare them for the FTX and redeployment to their home facility.

One of the most important administrative requirements to be completed during the first week of AT is the FORSCOM Form 1-R, Report of Yearly Training Evaluation of Reserve Components of the Army. The 1-R provides the unit, as well as the U.S. Army Readiness and Mobilization Region and CONUS Army dedicated to supporting the evaluated unit, a complete overview of the unit's training status. Many of the items on the 1-R are similar to categories of information on the unit readiness report. Reported items include personnel strengths, MOS qualifications, weapons status, and other data particular

LEFT: Troops from the 180th Infantry deploy from a UH-1 flown by B Company, 149th Aviation Battalion, Oklahoma National Guard

BELOW: A UH-1 from B Company, 149th Aviation Battalion, performs external load operations at Ft. Chaffee, AR

to each unit. It is the responsibility of the RC unit commander to ensure the accuracy and completion of the unit's portion of the 1-R, while the evaluator must review it and begin work on the evaluator section, which must be completed prior to the end of AT.

Company B began its second week of AT with a tactical movement to a field location. The two airlift platoons made their deployment in conjunction with an air movement of three companies from the 1st Battalion, 180th Infantry, while the headquarters elements established a forward tactical operations site and refueling point. In order to move the entire 180th Infantry, three CH-47 Chinooks from the 136th Aviation Company "Hookmasters," Texas National Guard, were used. The hooks, with their loads of TOW vehicles from the battalion scout platoon, followed close behind the troops on their movement from a pickup zone to a remote landing zone on the Ft. Chaffee reservation.

The unit took maximum advantage of the 4-day/3-night FTX to refine multiship NOE techniques, night formation movements and external load operations. The company also dealt with some basic facts of tactical life, such as camouflage, local tactical security measures, NBC procedures, field sanitation and application of the unit SOP. One of the most important aspects of the FTX, from an evaluator's point of view, is that this is the only opportunity that most RC units have to operate in a field environment during the entire training year. Consequently, those skills that most active Army units perform habitually require concentrated emphasis and meaningful repetition on the part of the RC unit's entire complement.

At this point, the evaluator should be prepared to complete the evaluation portion of the 1-R. Most of the rated items parallel the daily evaluations that the unit commander has received. There is also a section where the evaluator can make specific remarks about the unit's strengths and weaknesses and the overall training status.

The following can be applied by any officer or noncommissioned officer evaluating an RC unit.

KNOW YOUR MISSION. Report deficiencies and noteworthy performances, and provide appropriate guidance without usurping the commander's prerogatives. Do not mistake enthusiasm for competence. Try to remember the last unit evaluator you dealt with, and what you liked and disliked about the evaluation your unit received. RC units are to be judged by active Army standards but be realistic in your evaluation. The RC unit normally has 2 days per month to accomplish the same training tasks that an active unit performs in 30 days.

KNOW YOUR JOB. You must make frequent decisions that affect the unit commander and the chain of command. Be fair and impartial. The unit will remember you longer than the rating they receive.

ESTABLISH COMMUNICATIONS. You must establish a mutual trust to be totally effective. Assure that you inform the unit commander *first* of any shortcoming and of your willingness to assist in making corrections as necessary.

KEEP INFORMED. You must know current regulations, field manuals, technical manuals and other pertinent information unique to your unit. Be totally familiar with the unit's training schedule. Attend those events that you feel are important. Ask the commander if there are any special training items that you should observe.

FIT IN. Always wear the same uniform as the unit and ensure that your appearance is correct.

Duty as an RC unit evaluator can be a most interesting and rewarding 2 weeks. You may come away from the experience with a different perspective on the organization and management of training time and materiel resources. Not only will you meet some fine citizen-Soldiers, but your relationship with fellow evaluators, with their varied backgrounds and experiences, will be the basis for lasting friendships.

Like most assignments, RC evaluation duty is what you make it. It is a potentially useful period of self-study for your own professional development and a time of meaningful training for the National Guard or Army Reserve units that one day might be deployed at your side.

TWIN

SURVEILLANCE IN T

Doug Girard
Public Affairs Office
Aberdeen Proving Ground, MD

IT'S EARLY MORNING in a small Alaskan Eskimo village located on the inland stretches of the Bering Sea. While most of the villagers are heading out to fish the nearby icy waters, five men armed with M-16 rifles begin their task of covering miles of snow and ice, searching for suspicious footprints.

Later in the day their arduous travels take them along sections of coastal shore where they will seek traces left by nonresident visiting boats.

This scene is a frequent occurrence in the state known as America's "Last Frontier."

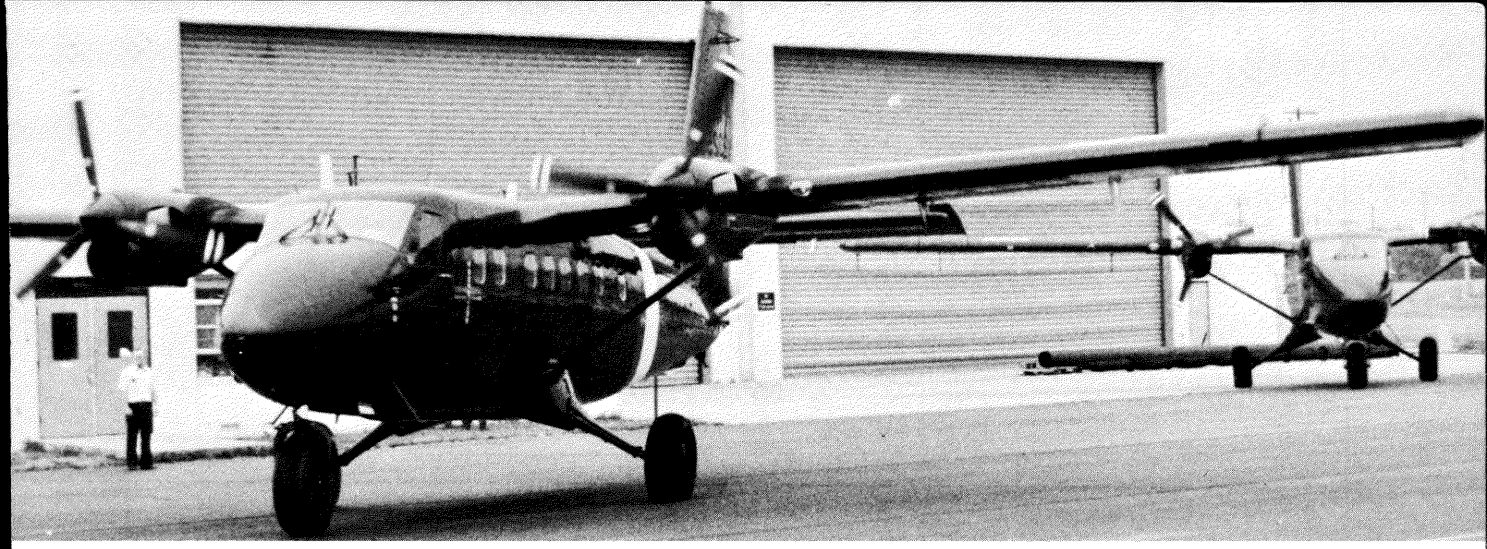
These five Eskimos, along with more than 2,000 others, are members of the Alaska Army National Guard's (ARNG) five Eskimo scout battalions located throughout the state, each responsible for the surveillance of a vast region of land.

Because of the uniqueness of the area and its inhabitants, this is the only place in the world where National Guard units are deployed forward of active Army forces.

To help the scout battalions in their mission of watching and protecting the state, which at the Diomede Islands in the Bering Strait comes within 2½ miles of the Soviet Union, the U.S. Army has purchased two new UV-18A Twin Otter aircraft for the Alaska ARNG. These new planes bring the number of Otters in the Alaska Guard inventory to four, the other two having been in operation for the past 3 years.

These specially built planes are important to the defense mission of the Guard in Alaska because they can move supplies to remote areas in short order, thus cutting the time required to resupply village outposts, sometimes by days.

Since there is a limited road network in Alaska (less than 6,000 miles of state-maintained roads) and some landing strips are poorly maintained due to the rough weather and terrain conditions, the Otters are especially



OTTER

HE LAST FRONTIER

useful with their short takeoff and landing capabilities and oversized tires.

The twin, 680-horsepower turboprop engines are mounted high on the wings so that grass, weeds or saplings won't interfere with the props on landings/take-offs. The planes also can be fitted with floats or skis so they won't be deterred by snow, ice or water.

While the de Havilland Aircraft Company of Canada is the sole manufacturer of the 700-plus Twin Otters flown in more than 80 countries of the world, many of the components, including the engines, all avionics gear and many of the parts which are cast or forged, are exported from American plants.

Though many Otters are in commercial use in the United States, the four assigned to the Alaska Guard are the only ones of their type in the Department of the Army's aircraft inventory.

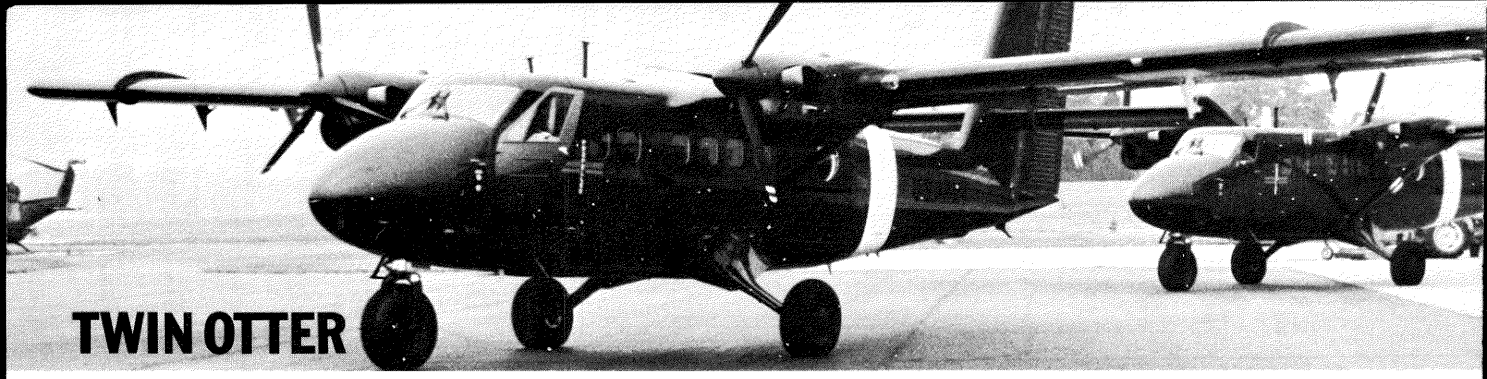
Colonel John J. Stanko (retired), chief of the Army National Guard Bureau's Aviation Division, stationed at the Edgewood Area of Aberdeen Proving Ground (APG), MD, said two more Twin Otters are authorized for the Guard in this fiscal year.

He and his staff at APG manage the entire aviation program for the Army National Guard, which includes 2,523 aircraft and 4,518 pilots.

There are 83 ARNG aviation support facilities in the United States, and four heavy aviation maintenance shops service those 83 installations.

The six crewmembers of the new Twin Otters flew the aircraft to Weide Army Airfield at the Edgewood Area before embarking on their flight to Alaska. That was part of the 16 hours of flight training time in the planes that the U.S. Army Troop Support and Aviation Materiel Readiness Command required the crew to accumulate before its formal acceptance of the craft. COL Stanko also wanted the staff members of the aviation division to get a firsthand view of some of the hardware they would be responsible for managing.

Upon their return to Alaska, the planes quickly began to lose their spanking new appearance because they are "really just a pickup truck in the sky," according to Lieutenant Colonel John Spalding, state aviation



officer of the Alaska Army National Guard. LTC Spalding traveled to Toronto and to the APG for the acceptance ceremony of the aircraft and to conduct a liaison visit to the ARNG Aviation Division.

Major John Elgee, who has flown the Twin Otters extensively in Alaska, listed some of the missions the planes are used for in the 49th state:

- With a 20-passenger capacity, the movement of people is foremost on the list. Troops have been moved to staging areas for drills and others have been airlifted for inoculations and medical treatment. In addition, nine United States senators on fact-finding tours were among the people-moving experiences the planes have undergone.
- In terms of logistical support, the Otters have hauled concrete, lumber, ordnance, safes, dogsleds, dogfood and dried fish.
- Another very important mission is the delivery of the ARNG paychecks, which at certain times of the year represent much of the cash money coming into the Eskimo villages.
- The planes are also available for search and rescue. They are equipped with jump doors which can double as chutes from which supplies can be dropped if landing the aircraft is too hazardous.

The call to arms among the Alaskan Eskimo began during World War II when a well-traveled man by the name of Muktuk Marston organized the Alaska Territorial Guard and made use of more than 3,000 Eskimos from villages on the western coast. Mr. Marston came to Alaska after spending many years in Canada and wound up in the United States military during the war. He was placed on special duty with the governor of Alaska and was assigned the job of recruiting an all-volunteer force to report on unusual sightings, possibly of Japanese troops who then occupied islands in the Aleutian Chain.

After the war, the Eskimo volunteers were disbanded, only to be reinstated in 1949, this time as paid members of the Alaska National Guard.

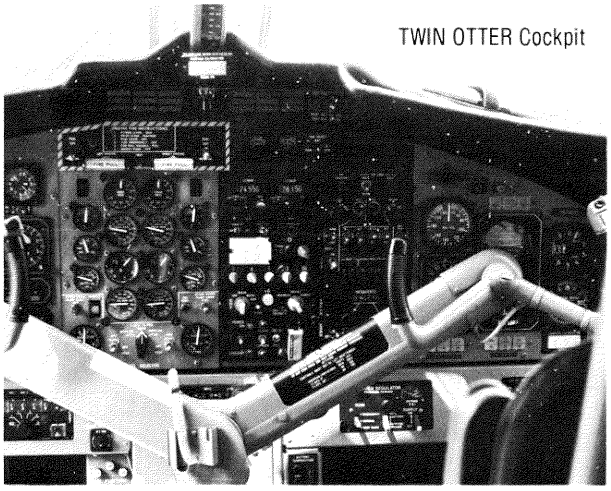
With a total of 78 units in operation today, 17 of them above the Arctic Circle, the Eskimos are a viable defensive force in the largest state in America. To get an idea of just how much ground the scout battalions cover, consider this — the 1st Battalion, headquartered in Nome, comprises 20 units totaling 342 troops who are responsible for surveillance of 110,000 square miles of land, or an area the size of Nevada. With 185 miles of road throughout the entire region, only 20 to 25 of which are maintained year-round, it is no small job.

The 3d Battalion headquarters is in Kotzebue, and is tasked with vigil of 150,000 square miles in northwestern Alaska, or an area roughly the size of Montana. The entire region has only 10 miles of road which are maintained on a year-round basis.

Eskimo Guard members are not required to wear Army footwear and the wearing of other articles of Army issue is not heavily stressed (especially during winter), since the Eskimo's own clothing, such as the sealskin mukluk, is much warmer.

Although the Soviet Union has established military installations on its side of the Bering Strait, it is ironic that the native people of Alaska and those of the northeast regions of the Soviet Union are of the same ethnic origin and speak the same basic language, with only minor dialectal differences.

Still, the Eskimo scout battalions of the rugged Alaskan territories are prepared to fight for the land they originally settled and have occupied for centuries. Army Aviation's Twin Otters are helping to make them combat ready.


TWIN OTTER Cockpit

Betty Goodson
Staff Writer

TRAINING SYMPOSIUM and POLICY COMMITTEE MEETING

FIFTY-TWO ISSUES, ranging from the procurement of "quick inventory toolboxes" to the question whether the Annual Written Examination should be continued, were considered at the U.S. Army Aviation Training Symposium and Policy Committee Meeting held 1 through 5 December, at Ft. Rucker, AL.

Representatives from major Army commands and Department of the Army staff offices attended the joint conference and were welcomed to the Army Aviation Center by its commanding general, Major General Carl H. McNair Jr.

Major General James C. Smith, director of training, Office of the Deputy Chief of Staff for Operations and Plans, Washington, DC, was keynote speaker for the training symposium. Brigadier General Richard D. Kenyon, deputy director of requirements and Army Aviation officer, ODCSOPS, made the opening address for the policy committee.

The importance of aviation training to the Army, and the necessity for the Army's leaders to recognize and determine the direction its aviation force must take if that importance is to be fully realized, was emphasized by MG Smith.

"Our basic philosophy must be that we train today to fight tomorrow's war; anything else is wasting everyone's time. We have to train up to the capabilities of the equipment we have in our hands, and we have to focus our training to support the ground commander 24 hours a day.

"More emphasis must be placed by commanders on individual training. Units can be tactically proficient only when well-trained individuals are available to form the crews, teams, etc., which fight the battles."

Following the two-star general's address, the 70 attendees were briefed on various subjects. Included were the Air Cavalry Attack Brigade Division 86, the Aviation Center training analysis and assistance team, safety, the flight hour program, warrant officer selection and retention, tactical instruments in combat and tactical training.

Those briefings served to introduce the symposium's issues which were then studied by four groups, and their recommended solutions were presented in the closing session.

Most of the topics dealt with in the training symposium flowed into the itinerary of the policy committee meeting which began at noon Wednesday.

In its opening period, BG Kenyon reminded those voting on policy recommendations of their responsibility to help Army Aviation fulfill its round-the-clock support mission through the efficient management of its resources.

"We must work to maintain the people we have in aviation today through reducing the attrition, and we must consider the pay-off of dollars when looking at major programs of product improvement.

"If we executed all the programs we would like in order to effect needed improvements in Army Aviation, it would require $10 billion. We can't do that, of course, so we have to be selective as we consider policy decisions."

The policy committee concluded its work early Friday afternoon. A more in-depth report of coverage given to issues in the joint conference will be presented in a later issue of the *Army Aviation Digest.*

Major Cornelius J. Westerhoff
Commander
Troop D (Air), 1st Squadron, 4th Cavalry
Fort Riley, KS

ELECTRONIC WARFARE

SURE, I KNOW electronic warfare is important; and the next time my unit does some ARTEP preparation we'll play some."

That is pretty much the feeling of most field commanders as they attempt to juggle all the training balls. Some of the poorest electronic warfare (EW) techniques can unquestionably be found in the aviation community. Ever listen to the "chatter" normally found on very high frequency (VHF) bands where the ground or supported commander cannot monitor? Try coming up on 123.45 on VHF just about anywhere in the world and you won't be a stranger long. Unfortunately this is very much an electronics age, and the radio habits we practice on long cross-country formation flights and on our civilian CBs (citizen bands) all contribute to make electronic warfare the same as lost communications. What happens to Army Aviation when our ground-to-air and air-to-air communication vanishes? How will we operate in a forced radio silence environment? The answers to those and many other related questions were the subject of a very extensive electronics warfare test conducted at Ft. Irwin, CA in the early part of 1980.

A joint task force of Army and Air Force electronics experts assembled and operated an impressive array of the type of equipment which U.S. forces might expect to encounter in a major conflict and conducted active electronic interference against Army ground and air maneuvers. The operations against the electronic equivalent of a brigade with an attack helicopter company in support was the culmination of several years of planning and research. In preparation for the test, U. S. Army Forces Command units participating in Gallant Eagle 80 were sent out several weeks early to allow them to operate extensively against the deployed threat.

The participating units were thoroughly monitored and controlled as they planned and executed tactical maneuvers according to predetermined scenarios. Computerized data was collected which accurately revealed the effects of jamming on the decisionmaking process and time delays directly as a result of jamming and communications interference. Rapid and effective feedback to the units allowed them to develop and try procedures to "beat the jammer." Knowing that it was not sufficient to be only concerned with message delivery, units simultaneously concentrated on decreasing the electronic signature of the operation. To further ensure tactical realism, each day's scenario was run fresh with the jammer operators not knowing which frequencies would be used nor what nets would be in operation.

To be beneficial in both testing and training, the threat size and operational concept were designed to be as realistic as possible. Personnel had to be proficient in intercept, identification and jammer operations. The speed and skill of the response by the threat force was in itself an eye opener. With that kind of rapid response, the jamming would frequently begin within the first hour and continue throughout the day. At the conclusion of the day's operation extensive debriefings were conducted of all participating personnel, and discussions followed to determine the results of planned anti-EW procedures and techniques.

After several weeks of testing,

basic countermeasure techniques were found to be successful in eliminating the effects of jamming in air operations. While the mountain of computerized data will continue to be analyzed for months and comprehensive procedures will be developed that will affect future EW publications, these are some of the methods which all aviation units can incorporate into their training.

• **Use The Terrain.** The same techniques which mask you from direct fire will mask you from the jamming signal. No single factor can contribute as much to effective radio communication in a jamming environment as the use of terrain. An added bonus to using the terrain is that it also blocks your transmissions from the interceptors. The terrain must, of course, be substantial. A few trees which keep you from being seen may not be enough to block the jammer's signal. Remember — your radios are line-of-sight and so is the jammer.

• **Use All Your Radios.** The variety of radios in most aircraft gives a unique capability to circumvent jamming signals. By using several radios on a single net it becomes virtually impossible for the net to be identified. For example, during scout/gun operations the scouts would transmit on VHF to the guns who would respond only on ultra high frequency (UHF). This method reduced the traffic on a single frequency by 50 percent, thus making the net much more difficult to identify. If jamming were encountered on a specific frequency or other communications difficulty was encountered, then either station could operate immediately on the other's frequency and radio. Since the purpose of jamming is to delay and confuse, this method is most effective in preventing delays; and when two discrete frequencies are far enough apart they become more resistive to broad-band jamming.

• **Use Your Standing Operating Procedure (SOP).** An SOP is to be used — not to collect dust or to impress the Inspector General. If it is too large or complex it will be ignored. Train by SOP for everything. Nothing is as effective in reducing radio transmissions. If you know what the procedure is, get out of the habit of confirming it on the radio. Remember, reduce that SOP to a manageable size. Eliminate instrument procedures in a tactical SOP. Throw out the details on foot care, etc. Make the SOP work for you.

• **Switch Frequencies.** Again nothing is new here except to emphasize that this takes a lot of training and coordination. The couple of spare frequencies you have printed in your Communications-Electronics Operation Instructions are nice to have, but almost anyone can tell tales of how stations disappeared for hours when the unit switched to an alternate frequency. After a few trial-and-error days the frequency switch technique became highly successful at Ft. Irwin; unfortunately, you won't have a few trial-and-error opportunities at the crucial moment. One unit at Ft. Irwin developed a highly sophisticated, elaborate scheme to switch frequencies frequently. It worked great for that unit, but it also kept any supporting organizations from reaching it on their nets. The Air Force uses a system called "chattermark" where the station switches to a series of predetermined frequencies when a code word is spoken or a high powered tone is heard. Switching frequencies can work and work well; but it, more than any other technique, requires careful planning, detailed instructions and intensive training to make it work to your advantage.

• **Liaison Officer (LO).** It is unlikely that the surest, most dependable and positively secure means of communication will replace the LO. Select and train your LO wisely. Ft. Irwin again proved that the LO is one of the most important positions in the organization. Normally, the LO was the first link — and when all else failed, the last link. The LO is invaluable in getting and delivering the mission and is vital in interpreting the order. There are no questions about it — the attack company and air cavalry troop must be prepared to dedicate an LO and aircraft around-the-clock to this mission.

Remember — The use of jammers by the enemy is intended to delay, confuse and disrupt but is rarely expected to totally destroy communications. If you start receiving electronic interference you can be almost certain that some offensive action will follow — and soon. Jammers expose themselves to our direction finders, and they do not expect to remain in position very long.

The Ft. Irwin tests were designed to determine the effects of jamming on tactical operations. It is important to remember that jamming is only a portion of electronic warfare and certainly not the most dangerous or insidious. Direction finding and interception of our electronic signals is potentially far more lethal. It occurs daily in both Europe and the Far East. Many of the procedures which are effective against jamming are also effective against passive EW.

We must reduce our dependency on our radios. We have to reduce our electronic signature in future operations. Only training and a conscientious effort can do the job. The time to get serious about reducing our communication needs was yesterday.

"For Best Results Be a Ten With The Dash 10"

THE OPERATOR'S MANUAL (Dash 10) Test regularly administered to Army aviators during the hands-on component of the Annual Aviator Proficiency and Readiness Test is an open book examination. In the course of operational flying the aviator also has access to a copy of the dash 10 onboard the aircraft. In these instances, the dash 10 is readily available to resolve questions of procedures, limitations and emergencies. However, when the "blue chips" are down, when flight conditions or emergencies require immediate action, aviators had better have the proper response at their fingertips. Searching the dash 10 for the answer to a dilemma at this point is futile.

If knowing the dash 10 is so essential to the well-being of aviators and to the proper operation of their aircraft, one would think they would be familiar with its contents—especially the WARNINGS, CAUTIONS and NOTES.

However, the information coming across this desk indicates that such may not be the case. Directorate of Evaluation/Standardization evaluation flight checks have discovered too many aviators (including instructor pilots) who are woefully unfamiliar with the essential elements of their dash 10. Furthermore, it appears that oftentimes aircraft accidents have been the result of improper actions by the aviator because of a lack of familiarity or a disregard for the dash 10 and its WARNINGS, CAUTIONS and NOTES.

Typical of this deficiency is noncompliance with paragraph 8-1, Mission Planning, which states:

> Mission planning begins when the mission is assigned and extends to the preflight check of the aircraft. It includes, but is not limited to, checks of operating limits and restrictions; weight and balance and loading; performance; publications; flight plan and crew and passenger briefings. The pilot in command is responsible for compliance.

This deficiency is endemic to the Army Aviation community and is responsible for aircraft accidents with a high degree of regularity.

Another irregularity noted concerns preflight of the UH-1. The CAUTION on page 8-6 of the UH-1 Dash 10 reads: "Do not rotate tail rotor by hand using the tail rotor blades." Yet, we still see aviators doing just that instead of using the main rotor for this purpose.

Our aviators often overlook writeups on DA 2408-13 which involve the UH-1 when operated in rain. Paragraphs 8-44, 3d and 8-74a state than an entry in the 2408-13 is required after a flight has been conducted in rain. The reason for the writeup is that maintenance personnel are required to perform a special inspection after such flight.

A more detailed look at paragraph 8-74, Ice and Rain, of the UH-1 Dash 10 indicates the presence of a

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

WARNING, a CAUTION and a NOTE—plus some very interesting additional information, such as:

- Continuous flight in light icing is not recommended.
- Intentional flight in known moderate icing is prohibited.
- If flight in icing conditions continues the pilot can expect one-per-rotor-revolution vibrations—mild to severe caused by asymmetrical ice shedding.
- If a 5 psi (or greater) torque pressure increase is required above cruise torque setting used prior to icing conditions, it may be impossible to maintain autorotational rotor speed within operational limits, should an engine failure occur.

The UH-1 and AH-1 Dash 10s contain the same WARNING when confronted with indications of an engine failure. The WARNING states:

> Do not close the throttle. Do not respond to the rpm audio and/or warning light illumination without first confirming engine failure by one or more of the other indications.

Too many accidents have occurred when the aviator incorrectly diagnosed an emergency as engine failure rather than a tachometer generator failure or an open circuit to the warning system.

A CAUTION often ignored by aviators flying the OH-58 states:

> When carrying nonrated passengers unfamiliar with the operation of the helicopter, the pilot should evaluate the mission as to the advantages and disadvantages of stowing the copilot's controls or accepting the responsibility of the potential hazard when leaving the controls in place.

Quite a few of our aviators have accepted the potential hazard and are now Army Aviation accident statistics.

An OH-6 WARNING is generally referred to as the "Hughes Tail Spin":

> "Flight involving abrupt right turns should be avoided under downwind, low altitude, low airspeed conditions." It also serves as a reminder of our current problem with the OH-58 and its tail rotor stall characteristic.

It would not be fair to ignore our fixed winged friends, so here are a couple of their more renowned foibles:

The dash 10s of all aircraft with retractable undercarriage contain references to a warning horn. The T-42 Dash 10 NOTE is a typical entry:

> An intermittently sounding horn also located behind the instrument panel is used to indicate landing gear position.

Yet each year several Army aircraft come to a screeching halt on the runway with the undercarriage neatly tucked away in the bosom of the aircraft. In some of these instances after the bird came to rest it was not unusual to hear the intermittent bleating of a Klaxon inside the aircraft.

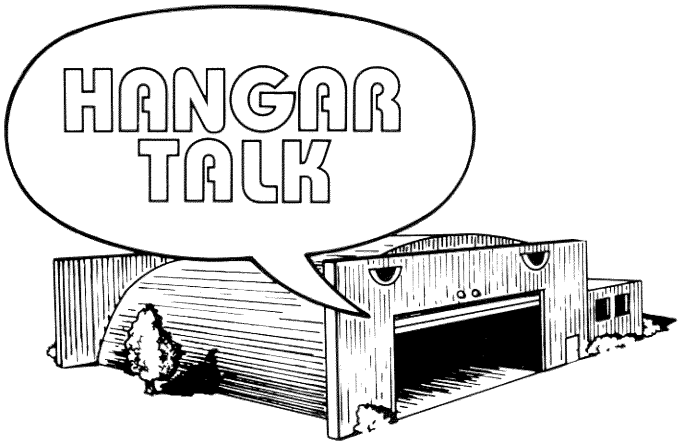
From the U-21 Dash 10 we cite this WARNING:

> Minimum run takeoff and obstacle clearance climb described below are contingency maneuvers and are performed below visual meteorological conditions and power off stall speed. Control of the aircraft will be lost if engine failure occurs at or immediately following liftoff or until best single engine angle of climb speed has been reached.

While mishaps due to disregard of this WARNING have been drastically reduced, they still occur on occasions when undisciplined aviators feel like giving their passengers something extra. Only last year an aviator somehow managed to yank a U-21 off the ground, stall, crash and burn—all in a total distance of 1,200 feet. Somehow everyone onboard survived.

This article has not covered the dash 10s of all aircraft types as such coverage is not deemed necessary to make the point that ignoring the provisions of the dash 10 can have a deleterious effect on the operator. In other words, know your dash 10, fly by the book, and don't be like the former aviator cited in the following poem:

Floorboard Freddie would always say,
"It don't hurt none to fly it this way."
He'd give it the needle to maximum goose,
They never found out what first busted loose.



"Hangar Talk" is the first in a series of quizzes the *Aviation Digest* will be carrying. Each quiz will contain several questions based on a publication applicable to Army Aviation. The answers are at the bottom of the page. Check yourself. If you did not do so well, perhaps you should get out the publication and look it over.

AR 95-1

CW2 Gary Weiland
Directorate of Training Developments
U. S. Army Aviation Center
Fort Rucker, AL

1. When is oxygen mandatory for crews and all other occupants in unpressurized aircraft?
A. Flights above 10,000 feet pressure altitude for more than 30 minutes.
B. Flights above 12,000 feet pressure altitude for more than 1 hour
C. Flights above 14,000 feet pressure altitude for any period of time

2. During overwater flights, all persons aboard single engine Army aircraft will wear life preservers when the aircraft is flown how far from land?
A. Beyond gliding distance of land
B. More than 1 mile from shore
C. Five minutes flying time from the nearest shore

3. Smoking is not permitted within how many feet of an Army aircraft on the ground?
A. 25
B. 50
C. 100

4. Is a clock or watch with continuous seconds indicator required to perform a *day* VFR flight in an Army aircraft?
A. Yes
B. No

5. What are the standard IFR takeoff minimums of rotary wing aviators who have not logged at least 50 hours of military weather instrument time as pilot or instructor pilot?
A. 100 feet ceiling/¼ mile or RVR 1,200 feet visibility
B. 100 feet ceiling/¼ mile or RVR 1,600 feet visibility
C. 200 feet ceiling/½ mile or RVR 2,400 feet visibility

6. Army aircraft must have enough fuel to reach the destination and alternate airfield (if required), and have a remaining fuel reserve (at normal cruise) of:
A. 15 minutes VFR/30 minutes IFR
B. 20 minutes VFR/30 minutes IFR
C. 30 minutes VFR/45 minutes IFR

7. What are the day nontactical VFR weather minimums over flat terrain for aviators flying Army aircraft in uncontrolled airspace?
A. Clear of clouds ceiling/RW: ½ mile FW: 1 mile visibility
B. 300 feet ceiling/RW: ½ mile FW: 1 mile visibility
C. 500 feet ceiling/RW: 1 mile FW: 2 miles visibility

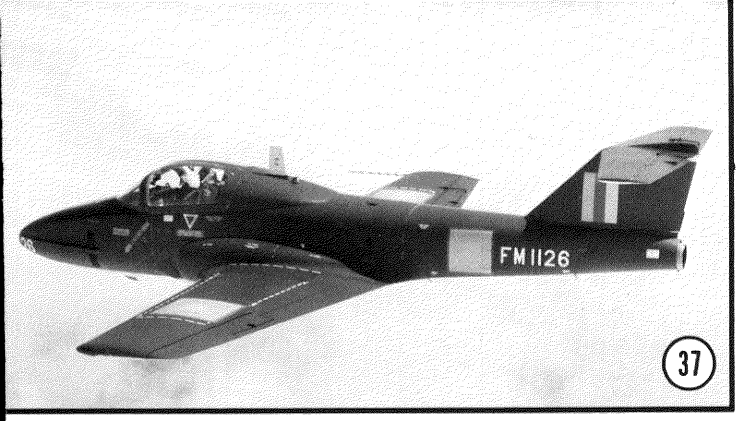
8. May an Army aviator perform operational flight duties as a copilot in his or her assigned primary aircraft after failing either a scheduled or non-scheduled standardization flight evaluation in that aircraft?
A. Yes
B. No

9. Hooded autorotations must be terminated in time for a complete recovery to be made at no lower than what altitude?
A. 200 feet AGL
B. 400 feet AGL
C. 500 feet AGL

10. A "Temporary Landing Area" is defined as a landing area used solely under VFR conditions for less than 30 consecutive days and with no more than how many operations per day?
A. 10
B. 12
C. 25

ANSWERS (AR 95-1)

1. C Para 3-21
2. A Para 3-26b
3. B Para 3-15d (1)
4. A Para 4-17
5. A Para 4-25b (2)
6. B Para 4-2
7. B Table 4-1
8. A Para 6-17a (2)
9. C Para 6-42b (4)
10. A Appendix A



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RECOGNITION QUIZ

DECEMBER ISSUE ANSWERS

37 CL-41G. Canadian mulitrole trainer.

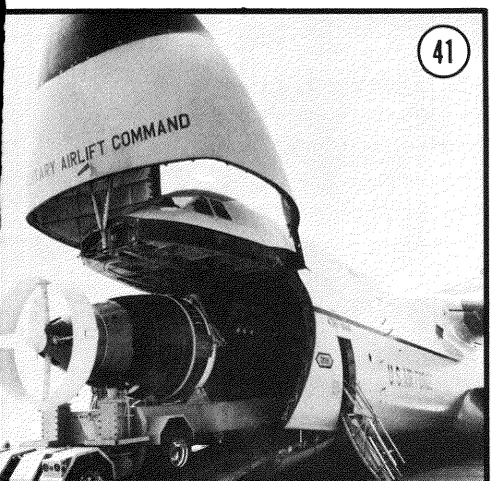
38 T-41 Mescalero. Primary fixed wing trainer, no longer in the active Army's inventory.

39 U-9 Aero Commander. An oldie, originally designated as Army's L-26.

40 Navy's F-111B.

41 C-5A Galaxy. World's largest airplane.

42 A-10 Thunderbolt. Designed specifically for close air support.



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AVIATION TRAINING IN THE 1980s

continued from page 5

Concurrent with this reorientation in aviation training is a revitalization of a coordinated aviation unit-air traffic control unit program which will ensure responsive air traffic management in the combat zone. Of particular note is the recent positive step forward in this area in U.S. Army, Europe. Tying the complete training package together is the fact that more and more combat and combat support aviation units are taking maximum advantage of every opportunity to extensively train in the combined arms environment.

In looking ahead to ensure this challenge can be met, and of greater significance, to enhance battlefield survivability, what are the specific areas in which we must redouble training efforts? It is often difficult to prioritize essentials. However, the list will definitely start with realistic nap-of-the-earth training programs closely followed by a vigorous Night Hawk program, night vision goggle program and tactical instrument training. The bottom line is that if we can't fly in these modes with confidence, then an essential element in accomplishing tactical missions will be lost. Equally as significant is the fact that aviators and air traffic controllers must redouble efforts to ensure Army aircraft can realistically operate beneath coordination attitudes and under tactical instrument meteorological conditions within controlled airspace. Like it or not, we don't do very well in this latter area, and if we don't bite-the-bullet and realistically train — then when the war starts, the system will break down!

How will the training program work? Most readers will agree with the following analysis: The USAAVNC is producing the best trained aviators in history; the air traffic controllers are remarkably proficient in all aspects of their assigned mission; and, our communications equipment is far superior to anything we have ever had in our inventory before. So, why do we continually meet setbacks in keeping the training program on track? There is a major ATTITUDE problem to overcome!

Let's start with NOE training. To even consider flying in this mode, it is absolutely critical for the combat and combat support units to maximize every opportunity to realistically train in the NOE environment. This is the one area aviators must learn to perfect! Helicopters simply cannot survive in any area around the forward edge of the battle area if they are out of an NOE flight envelope.

Next, let's consider night training. Most rotary wing aviators can handle VFR "plain-old-night flying" in a routine manner, although recent USAAVNC DES worldwide evaluations have discovered some units to have totally unacceptable night training programs. The Night Hawk and night vision goggle programs are relatively new training areas (for most aviators) and require not only meticulous planning requirements but also present psychological implications never previously faced. These are not easy training programs and although we find ourselves

GLOSSARY

AGL	above ground level
ARTEPs	Army Training and Evaluation Program
ATC	air traffic control
CRC	control and reporting center
DASC	direct air support center
DES	Directorate of Evaluation/Standardization
FCC	flight coordination center
FM	field manual; frequency modulated
FOC	flight operations center
FTX	field training exercise
IFR	instrument flight rules
IMC	instrument meteorological condition
JAAT	joint air attack team
MTA	major training area
MWO	modification work order
NATO	North Atlantic Treaty Organization
NOE	nap-of-the-earth
REFORGER	Return of Forces to Germany
SOTAS	Standoff Target Acquisition System
USAAVNC	United States Army Aviation Center
USAREUR	United States Army, Europe
VFR	visual flight rules

"We are at that stage in Army Aviation where the tank was between War I and War II. We have done a lot with it, but there is an awful lot more to do. There are a great number of Army people that think Army Aviation is a part-time fighter. Part-time fighter means that you cannot fly as often as you should because of weather. You are hired and paid as a 24-hour-a-day Soldier; your equipment is purchased at the expense of 24-hour-a-day fighters, but you do not fight 24 hours a day; so, you have to do something about that. You have a sacred duty that involves more than just new equipment, new devices and aviation training. It involves the integration of all that in all aspects with the total combined arms team — that is really the challenge. . . ."

Lieutenant General Glenn Otis
DCSOPS, U. S. Army

Opening Remarks, 1979 Aviation Policy Committee

bogged down with MWO problems, disagreements over minimums, off-post training areas, shortage of qualified instructor pilots, map problems, inability to see the wires, and dozens of other reasons why "we can't do it," the programs are moving in the right direction!

The bottom line is that we cannot afford to give any potential enemy an advantage because we don't have the capability to fight and resupply effectively at night. We all must work diligently at overcoming the obstacles facing us by developing concentrated training programs. Then we will be able to support the battle during hours of darkness!

Probably the most controversial training program involves tactical instrument training. Never before has any area precipitated more disagreement or often heated discussions. But, the cold hard facts of battlefield survivability dictate that on occasion Army aircraft will fly 600 feet above the highest terrain obstacle in IMC conditions in order to provide timely support to the ground commander. Why not go NOE? For those of you in the USAREUR and 8th Army environment, think back on those days where it was near zero-zero at the departure field sites, however 500 feet AGL in the major training area! This situation will prevail throughout the battlefield; and to get from the corps rear into the division rear, tactical instrument flight until breakout may be the only way to go. Tactical instrument training ties into a sound air traffic control and airspace management plan, and we need to improve training efforts in both areas. If you think your training programs are really on track, ask yourself the following questions:

- *Has my unit ever trained realistically with the division FCC?*
- *Could the FCC really perform its wartime mission, or was it administratively employed during the FTX?*
- *Did the FCC effectively tie-in to the corps FOC, and could the FOC really accomplish its wartime mission?*
- *Did the supporting ATC unit employ its organic beacons and portable radars during the last major FTX and establish low level IFR air routes?*
- *Did frequency changes and location changes get published in a timely manner?*
- *Was there a workable airspace management plan which allowed Army aircraft to penetrate coordination altitudes, or were all helicopter flights restricted below coordination altitudes?*
- *Could the FCC process an IMC flight plan through the FOC to the DASC or CRC in order for SOTAS to launch/recover inside exercise airspace?*
- *Can your ATC unit manage IFR traffic to and from a field site?*
- *Did pre-FTX planners allow Army aircraft to establish low level IMC routes inside exercise airspace?*
- *Did your pathfinder detachment employ its organic beacons during the FTX in a realistic manner?*
- *Does your unit train in accordance with FM 1-5 guidance on tactical instrument flight?*

If you can answer yes to the above questions, then your unit is one of the few that can accomplish its wartime mission during periods of adverse weather. Let's face it; tactical instrument flight is not easy! Although the helicopter doesn't know it is only 600 feet AGL in the clouds, the crew (and) passengers certainly do. Meticulous planning, concentrated training, to include maximum time in the flight simulator, and positive attitudes are the key. What are the alternatives? We either turn down the mission — or we get shot down!

Beginning with FTX Constant Enforcer, USAREUR took a giant step forward in the tactical instrument training arena. Even with the near insurmountable problems of airspace management with the Bundeswehr Flight Service, frequency

> **"On tomorrow's battlefield, Army aviators will not only face those obstacles posed by the threat and the terrain, but must also be equipped and qualified to operate day and night under marginal weather conditions. When this marginal weather capability is coupled with Army Aviation's mobility and firepower, this element of the combined arms team is recognizably an invaluable asset to the commander in the accomplishment of his mission."**
>
> **Major General James C. Smith**
> **Commander, U.S. Army Aviation Center, 1978**

problems and a host of NATO Air Force participation, each with varying policies, a major break-through occurred. These efforts were expanded during REFORGER 79, and later operations involving the 59th ATC Battalion and the USAREUR combat aviation battalions have resulted in a further giant leap forward in this training area. FM 1-5 (Chapter 22) tells us how to operate under battlefield tactical instrument conditions, and FM 1-60 tells us how airspace management and air traffic control work in a combat zone. The only guidance left is to "dust these manuals off" and start using them.

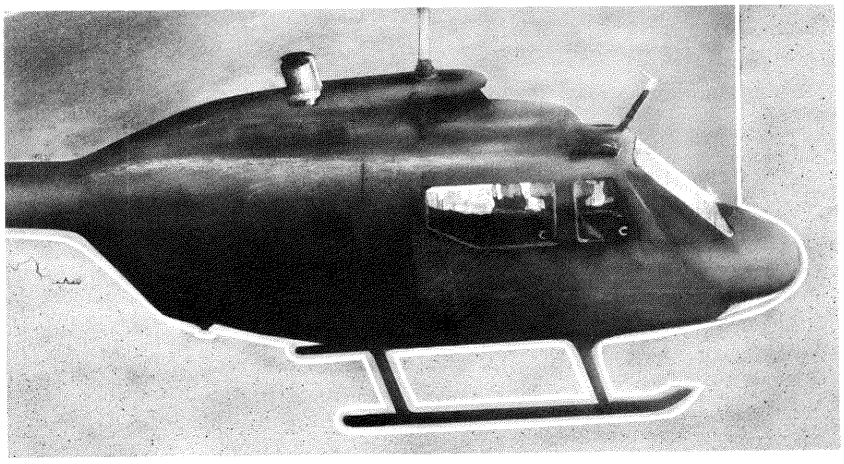
The final training area lies within the combined arms arena. If any Army Aviation training program needs constant attention, it has to center around taking every opportunity to train with ground combat units. Exercises such as Brave Shield, REFORGER, Red Flag, JAAT, ARTEPs, etc. provide golden opportunities for aviation units to train realistically with ground units and jointly perfect those tactics and techniques required on the battlefield. Army Aviation units are members of the combined arms team; and if we are to augment the capability of the ground commander, if we are to provide the commander with the mobility, firepower, reconnaissance and logistical support — then we must train together.

Imagine yourself as a combat aviation battalion commander, during a fast moving REFORGER tactical operation, receiving the following transmission 45 minutes prior to darkness:

> **"Pull together all attack helicopter assets: deploy immediately to the 1st Brigade: contact the commander on Command FM: tuck inside the brigade penetration: and support a hasty river crossing."**

Let me assure you that if you have not trained to accomplish a task such as this, the mission will be a failure. It is not easy to mass critical assets and firepower in time to influence the outcome of the battle, and if aviation units don't train in this mode, the job won't get accomplished. *There is no way that smooth, well-coordinated combined arms operations will succeed unless aviation and ground units train together.* You cannot wait until MTA or FTX time! That's the place where it must work. Pre-MTA coordination, joint command post exercises, local training area operations, etc., are where it gets put together.

The aviation training program during the 1980s will be innovative, dynamic and moving in the right direction. Units in the field are making, and will continue to make, significant strides to achieve realistic combat oriented training programs; and as previously mentioned, the Aviation Center is producing the best trained aviators in history. With this on the plus side, a positive attitude, *can-do* approach, and continued efforts to perfect required tactics and techniques to meet the threat, the challenge of the 1980s will be met!



Officer Personnel Management System

OPMS CORNER

Lieutenant Colonel Joe D. Carothers
Chief, Aviation Plans/Programs Branch
Officer Personnel Management Directorate
U.S. Army Military Personnel Center

AVIATION PERSONNEL UPDATE

OPMS Corner Review

This month marks a change in format for this column in the *Aviation Digest.* Known as "OPMS Corner" in recent years, this feature has generally served as a forum for officer aviators managed by the Military Personnel Center (MILPERCEN). Although still "anchored" by Aviation Plans/Programs Branch in the Officer Personnel Management Directorate, this space will contain articles and information provided by offices responsible for management and support of all **officer** and **enlisted** aviation personnel. This column will be entitled "Aviation Personnel Notes."

Army Officer Named Outstanding Test Pilot

On 12 December 1980 four Army officers were graduated from the Naval Test Pilot School, Patuxent River Naval Air Station, MD. For the second time in 18 months an Army officer was named outstanding student. MAJ Gary T. Downs completed the 11-month course in first place ahead of 27 classmates from other U.S. and allied services. Also graduating were MAJ Michael V. Stratton, MAJ Donald L. Underwood and CPT Arthur R. Marshall. All four are assigned as experimental test pilots at the U.S. Army Aviation Engineering Flight Activity, Edwards Air Force Base, CA.

Warrant Officer Flight Training Regulation Revised

Army Regulation 611-85, now entitled "Aviation Warrant Officer Training" will be issued on 1 February 1981. The new regulation updates policies affecting enlisted applicants, to include aptitude scores, service obligations and interservice transfer of Sailors, Marines, Airmen and Coastguardsmen to attend flight training. An applicant must meet class 1 flight physical standards and active service criteria. Minimum qualifying score on the flight aptitude selection test-warrant officer candidate battery (FAST-WOCB) is 300, or 90 on the revised FAST, with one retest permitted no earlier than 6 months following original testing.

Basic Technical Course Update

The purpose of aviation related Basic Technical Courses (BTC) is to prepare skill level 2 Soldiers in military occupational specialty (MOS) related technical skills required to assume skill level 3 duty positions. The course focuses on training critical tasks listed in the skill level 3 Soldier's Manual for a given MOS to ensure that skills acquired by graduates match job performance requirements. Currently, the following Aviation MOSs have BTCs: 67G, 67N, 67U, 67V, 67Y, 68B, 68D, 68F, 68G, 68J and 68M. The courses vary in length from 5 weeks to 8 weeks and all courses are taught at Ft. Eustis, VA. Branch is attempting to schedule qualified Soldiers TDY en route to their next duty assignment. However, we have found that not enough Soldiers are moving to fill all class quotas.

Immediate commanders can request quotas for qualified Soldiers to attend BTC either TDY and return to parent unit or TDY en route to the next assignment. DA Form 4187 (Personnel Action Request) is used for this purpose and it is routed through the servicing military personnel office (MILPO) for review. A current copy of the Soldier's DA Form 2 and DA Form 2-1 will be attached by the MILPO and the request sent direct to HQDA (MILPERCEN) ATTN: DAPC-EPT-F, 2461 Eisenhower Avenue, Alexandria, VA 22331.

Results of MILPERCEN action on the request for school quotas will be communicated directly to the MILPO—also to the commander who will notify the Soldier. TDY attendance at BTC and return to an overseas station is authorized provided the Soldier will have a minimum of 6 months remaining in the command following course completion. Additional information can be found in AR 351-1, TRADOC Pam 351-10 and DA Pam 351-4.

PEARL'S

Personal Equipment And Rescue/survival Lowdown

Karen Davis **Photographed by Reid Rogers**

Aircrew Chemical Protection

As of late, an increased emphasis has been placed on nuclear, biological and chemical (NBC) protection for the Soldier in the field, and this trend is likely to continue. Since Army aircrews are expected to participate fully in any future combat activities, they also must be prepared to cope with and function in an environment where NBC weapons would be used. The following is excerpted from a recent letter published by Headquarters, U. S. Army Forces Command (FORSCOM) for its subordinate units, and is furnished here for information purposes.

On the modern battlefield, the use of chemical agents isn't only likely, it's expected. Consequently, we must train for this threat. The current aircrew chemical protective ensemble offers sufficient protection from the threat, but it complicates the ability to train safely.

The standard flight uniform includes combat boots, Nomex flight suit and gloves, and the SPH-4 flight helmet.

The chemical protective equipment listed below is worn over the standard flight uniform:

1. Chemical protective overgarment.
2. Chemical protective footwear covers.
3. Chemical protective rubber gloves.
4. M-24 series aircraft protective mask.
5. M-7 protective hood.

The protective ensemble is bulky, uncomfortable, and flammable when exposed to a high intensity flame, but if offers sufficient protection in a chemical environment. Therefore, we must train in it.

While conducting training in the chemical protective ensemble, the following guidance will be adhered to:

1. The Nomex flight suit and flying gloves are necessary components of the ensemble and must be worn under other components.

2. For training, the chemical protective ensemble will be worn only in aircraft with crashworthy fuel systems installed. If flight in an actual chemical environment is anticipated, the chemical protective ensemble

If you have a question about personal equipment or rescue/survival gear, write PEARL, DARCOM, ATTN: DRCPO-ALSE, 4300 Goodfellow Blvd., St. Louis, MO 63120 or call AUTOVON 693-3307 or Commercial 314-263-3307

will be worn on all aircraft, regardless of type of aircraft or fuel system.

3. For training, one pilot should remain unmasked and unsuited to act as a safety pilot. This safety pilot will be the most important part of a safe training program until more data is available on the visual acuity, heat stress, and dexterity problems associated with wearing the ensemble.

4. For the prevention of heat stress, the following guidelines apply when training in a warm or hot environmental condition.

a. Flight training won't be conducted when the aircrew, crew station temperature exceeds 75 on the wet bulb globe temperature index (WBGT).

b. All aircraft crewmembers should receive training in the prevention, recognition, and treatment of heat related injuries.

c. The safety pilot should closely monitor the training pilot, both visually and verbally, and be prepared to take necessary action as required. To prevent dehydration and heat injury, fluids should be taken before and after all flights in the protective ensemble.

It is the FORSCOM goal that all Soldiers be able to effectively operate in the chemical protective ensemble for six continuous hours. This minimum standard must be met if we're to survive on a "dirty battlefield."

XM33 NBC Mask

A new NBC mask has been developed which will replace the M17 and M17A1 field masks, the M24 aircrew mask, the M25A1 tank mask, and the M9A1 special purpose mask. The mask, chemical-biological, multipurpose, XM30 (the aviation version is the XM33), consists of a molded ebstomar facepiece with an inturned peripheral seal and a large flexible lens bonded to the facepiece. A loose assembly is provided for aircraft application where a chest-mounted canister is required. The new mask is designed to provide improved operational capabilities and reduced logistical burden, suitability for wear under a wide range of operational conditions and improved performance and storage conditions. The XM33 will be furnished in small, medium and large sizes. Type classification is expected in July 1982 and a projected initial operational capability in 1983.

Scale Calibration Interval

The scale, dial and beam, national stock number (NSN) 6670-00-255-0239, which is used to weigh the CO^2 cylinders used on floatation equipment in accordance with Technical Manual 55-1680-317-23&P, is now required to be calibrated every 120 days. This calibration interval for the model 10/10E scale, which is manufactured by the Pennsylvania Scale Company, is specified on page I-212 of Technical Bulletin, 43-180-1. (Thanks to CW3 Dave Klindt, U.S. Army Safety and Standardization Board, U.S. Army, Europe, for this info.)

Quality Deficiency Reporting

It is requested that anyone submitting a quality deficiency report (QDR) on the SPH-4 flight helmet or component also furnish a copy to Commander, USAARL, ATTN: SGRD—UAD, Ft. Rucker, AL 36362. This applies to any past QDRs for the retention system and all future QDRs for the complete helmet system. This information will help the Aeromedical Lab identify any QDR trends and help expedite any necessary corrective actions. Point of contact for further information is SFC Gerald Johnson, USAARL, AUTOVON 558-3001.

The ELT Question

We have received a number of inquiries concerning the authorization for and/or availability of emergency locator transmitters (ELTs) for Army aircraft. Since it seems that rumors abound as to who has ELTs and who doesn't, or who is authorized ELTs and who isn't, we think it is necessary to clarify the Army's current position regarding this issue. The fact is that Army Aviation units in Alaska and the Canal Zone have ELTs installed in their aircraft. These ELTs were authorized by Department of the Army (DA) and were procured locally with unit funds from commercial sources. These ELTs are not logistically supportable by the Army. To the best of our knowledge, no other units have been authorized to either procure or install these devices in their aircraft. We in this office feel that there is an Armywide need for ELTs in all Army aircraft due to the lifesaving aspect involved, where the immediate location of a crash is essential to preclude possible death to injured aircrews/passengers which could be caused by loss of blood, shock and/or exposure. Until DA comes out with a definitive position on this overall issue, the only units with ELTs in their aircraft should be those in the two locations mentioned above.

MONTHLY WRITING AWARD

COCKPIT HEAT STRESS IN THE AH-1G COBRA HELICOPTER

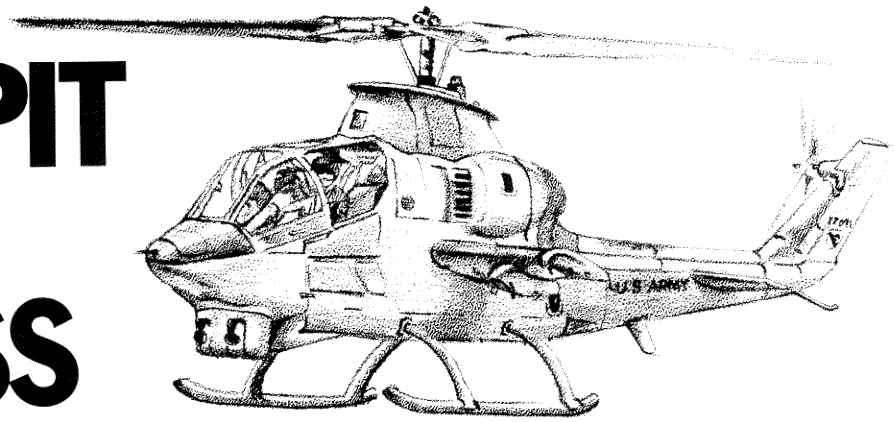


Illustration by SP4 Melvin Slater

The problem of heat stress dealt with in this article also holds true for the AH-1S and TOW Cobra operating under similar conditions of maximum gross weight, high ambient temperature and low relative humidity.

Colonel J.R. Gauld, M.D.
Chief, Preventive Medicine Activity

Lieutenant Colonel H.D. Silsby, M.D.
Flight Surgeon

Captain G. Ramirez
Environmental Science Officer

The authors were assigned to the William Beaumont Army Medical Center, El Paso, TX, when this article was written

COCKPIT HEAT stress has been well documented by multiple Air Force and Army studies. The combination of poor ventilation and the absorption of large amounts of solar radiation passing through the acrylic plastic canopies, which is known as "the greenhouse effect," combines to produce extreme heat loads on crewmembers.

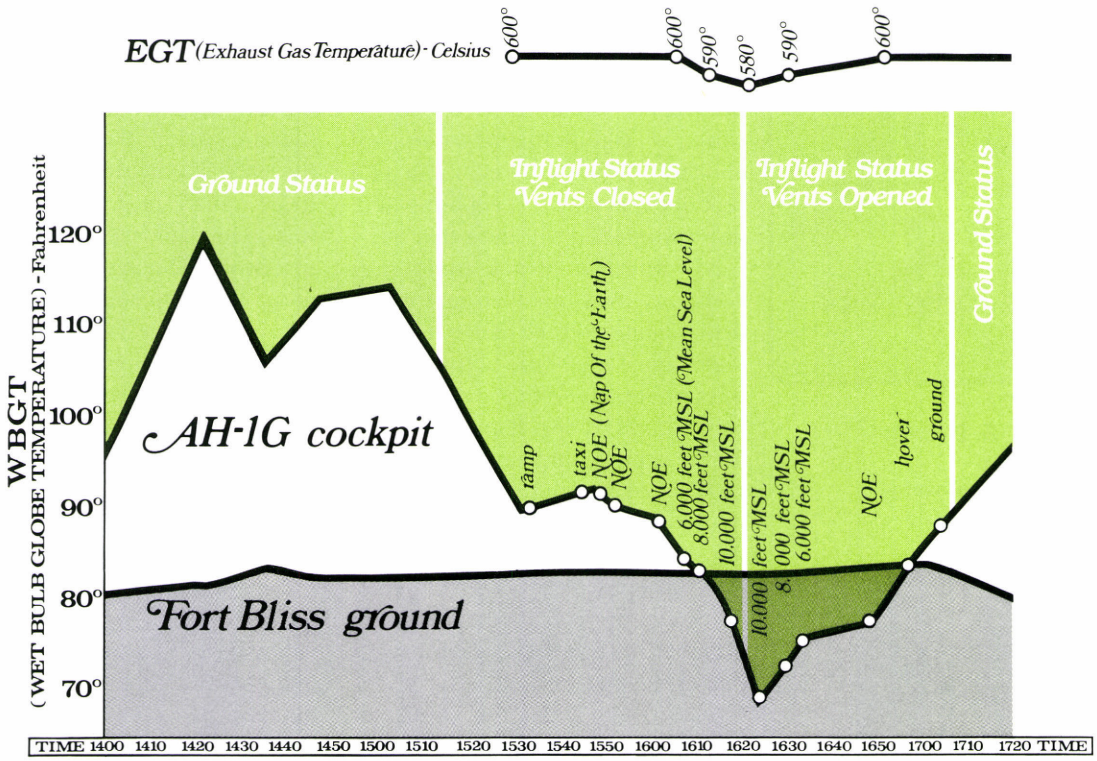
In a study by Breckenridge and Levell in 1970, AH-1G Cobra helicopter crews reported frequent symptoms of moderate heat stress consisting of dizziness, stomach cramps, headaches and prolonged fatigue. They found wet bulb globe temperature (WBGT) indices* on the ground ranged from 75 to 83 degrees Fahrenheit, while cockpit WBGT indices ranged from 90 to 104. As a result of that study, an environmental control system was adapted for the AH-1G.

Problem. AH-1G aircrews, while operating in the summer months in the Ft. Bliss, TX, area, frequently complained of heat stress symptoms and extreme fatigue, especially when flying nap-of-the-earth (NOE). The Ft. Bliss/White Sands Missile Range area is a desert type terrain characterized by low sand dunes and scrub brush with a base of about 4,000 feet mean sea level (MSL). In the summer months, typical afternoon ambient temperatures will range from 95 to 105 degrees Fahrenheit but with a very low relative humidity. Typical afternoon WBGT indices range from 80 to 85 degrees. The factors contributing to the heat stress problem in the AH-1G were:

- Although the helicopter is equipped with an environmental control system, it cannot be activated when the exhaust gas temperature (EGT) reaches 610 degrees Celsius (1,130 degrees Fahrenheit); in actuality, crewmembers cannot activate the system beyond 580 degrees Celsius as the environmental control system itself will add about 30 degrees to the EGT.
- The AH-1G also is equipped with an external ventilation system which cannot be used effectively in the desert environment in NOE flight because a great deal of fine sand and dust will enter the cockpit.
- The already mentioned greenhouse effect of the Cobra's acrylic plastic canopy is a built-in factor.

Material and Methods. To assess this problem, a test of conditions on the ground and in the air was conducted on the AH-1G. Cockpit WBGT indices were monitored and compared with the outside WBGT readings from 1400 hours to 1700 hours. The outside WBGT index was 81 degrees Fahrenheit and steadily

*The WBGT index is computed from readings of (1) a stationary wet bulb thermometer exposed to the sun, (2) a black globe thermometer similarly exposed, and (3) a dry bulb thermometer shielded from the direct rays of the sun. The WBGT index is the best means of evaluating heat stress potential. At a WBGT index of 82 degrees Fahrenheit, discretion is recommended in the planning of heavy exercises for troops.



WBGT Indices Comparison

progressed to 85 degrees during the test period (see figure).

While on the ground with the canopy closed, WBGT levels rapidly increased to a level of 120 degrees in about 20 minutes. It should be noted that the engine was not running and there was no cooling effect from rotor wash. Aviators participating in the on-the-ground test were observed to have an increase in heart rate, up to 120 beats per minute in one person; and both crewmembers experienced an increase in oral body temperature of 1 degree Celsius. At this point, after only 20 minutes of cockpit time, the people were taken from the cockpit to prevent heat injury.

During the inflight test, the cockpit WBGT index started at about 100 degrees Fahrenheit with the engine shut down and the canopy open. After the engine was started, even with the canopy closed, the rotor wash had a cooling effect and the cockpit WBGT index dropped to a level of 90 degrees Fahrenheit. The first part of the flight portion was conducted with the external vents closed and the environmental control system of the aircraft not activated. During the entire period, only at 10,000 feet MSL did the EGT temperature fall below a level of 580 degrees Celsius where the environmental control system could have been activated. During taxi and NOE work, the WBGT cockpit indices ranged from 94 to 96 degrees Fahrenheit. There seemed to be very little difference in WBGT index readings whether the vents were open or closed at slow airspeeds. The sand and dust entering the cockpit during these periods, however, was significant. Test conducted at various flight levels (see figure) revealed very few heat stress problems above 6,000 feet MSL. In fact, at 10,000 feet MSL, the WBGT index dropped to a comfortable 70 degrees Fahrenheit

Discussion and Recommendations. It is evident that AH-1G aircraft operations in a high altitude desert environment are extremely compromised during the heat of the day in summer months. This problem is especially critical in that one of the major modes of tactical operations in this environment for the AH-1G is nap-of-the-earth flight. The combination of heat stress, along with an already stressful mode of operation such as NOE, can combine to produce an extremely hazardous environment for crewmembers. As a result of the testing at Ft. Bliss and the problems associated with heat exhaustion and heat stroke which were revealed, it is recommended that NOE operations and extensive ground and taxi work of the AH-1G be suspended when the outside WBGT index reaches 82 degrees Fahrenheit. It is felt that the AH-1G should be modified to provide a more heat tolerable environment for crews. These modifications might include a more efficient ventilation system, thermally controlled flight suits, a more efficient environmental control system or canopy changes.

"THERE I WAS..."

1LT Wilfred F. Brown
C Troop
1st Squadron, 6th Cavalry
Fort Rucker, AL

PERSONALLY, I'VE never liked "war stories" and cringe when the oft-repeated words, "There I was. . ." signal the beginning of another session. However, due to a recent experience, I feel obligated, nay, compelled to relate this one.

My unit, an attack helicopter company, was involved in a major field training exercise in north central Germany. One of the high visibility missions assigned to the unit was to provide an OH-58A Kiowa and pilot for the express purpose of supporting JAAT (joint air attack team) and related close air support missions. An Air Force FFAC (forward forward air controller) assigned to one of our supported battalions was attached to our scout platoon. As one of the platoon instructor pilots, I was to fly with Bob (fictitious name) in the early portion of the exercise.

An integral part of JAAT training is to familiarize Air Force personnel, who are authorized to fly tactical missions in Army helicopters, with the basics of helicopter flight and includes several flight periods with emphasis on safety and crew coordination. The FFAC I was to fly with had been trained and certified by another unit and, therefore, I was unfamiliar with his strengths and weaknesses.

The day began at 0415 hours for a first light recon and situation update. Bob and I departed the field site at 0530 hours and proceeded eastward to establish contact with the brigade air liaison officer (ALO). Bob received up-to-date sortie information from the ALO. We found we would have A-10s onstation for 30 minutes every 2 hours that would be dedicated to us in addition to nearly continuous sorties by F-4 and FB-111 aircraft.

Bob had brought along several smoke grenades to aid in target acquisition for the fast-movers. Prior to departing we discussed use of the smokes and during the course of the discussion I emphasized that the grenade retaining pin was not to be pulled until Bob's crew door was opened and we were established at a hover. During one of the numerous morning sorties, Bob used a smoke grenade just as we had discussed and its employment resulted in a successful attack on an "orange" target. No problems.

By 1330 hours we were reaching the crew rest limit established by our unit (6 hours) for nap-of-the-earth/contour flight. Bob and I were hovering in the trees at the summit of a hill that rose 500 feet above a valley floor. Bob was trying to bring a flight of two F-4s to bear on a platoon of tanks positioned in a tree line; he was experiencing difficulty vectoring the F-4s to the target due to lack of a good "pop" or initial point from which the pilots could take over visually and begin engagement. Bob decided to use smoke to provide the needed reference. An open, recently plowed field below us seemed to be an ideal spot to place the grenade.

As I began a level descent to the field, I noticed that Bob was holding the smoke grenade in his right hand and had his left index finger in the retaining pin ring. We were one-third down the slope when he pulled the pin and nearly simultaneously released the fusing handle which was evidenced by a loud pop. I shouted for him to open the door and to dump the grenade. He grasped his crew door handle with his left hand and opened it. The smoking grenade was still in his right hand which required him to twist his body to the left to get the grenade through the door. As he twisted to the left, his right thigh forced the cyclic forward. My reaction was to pull

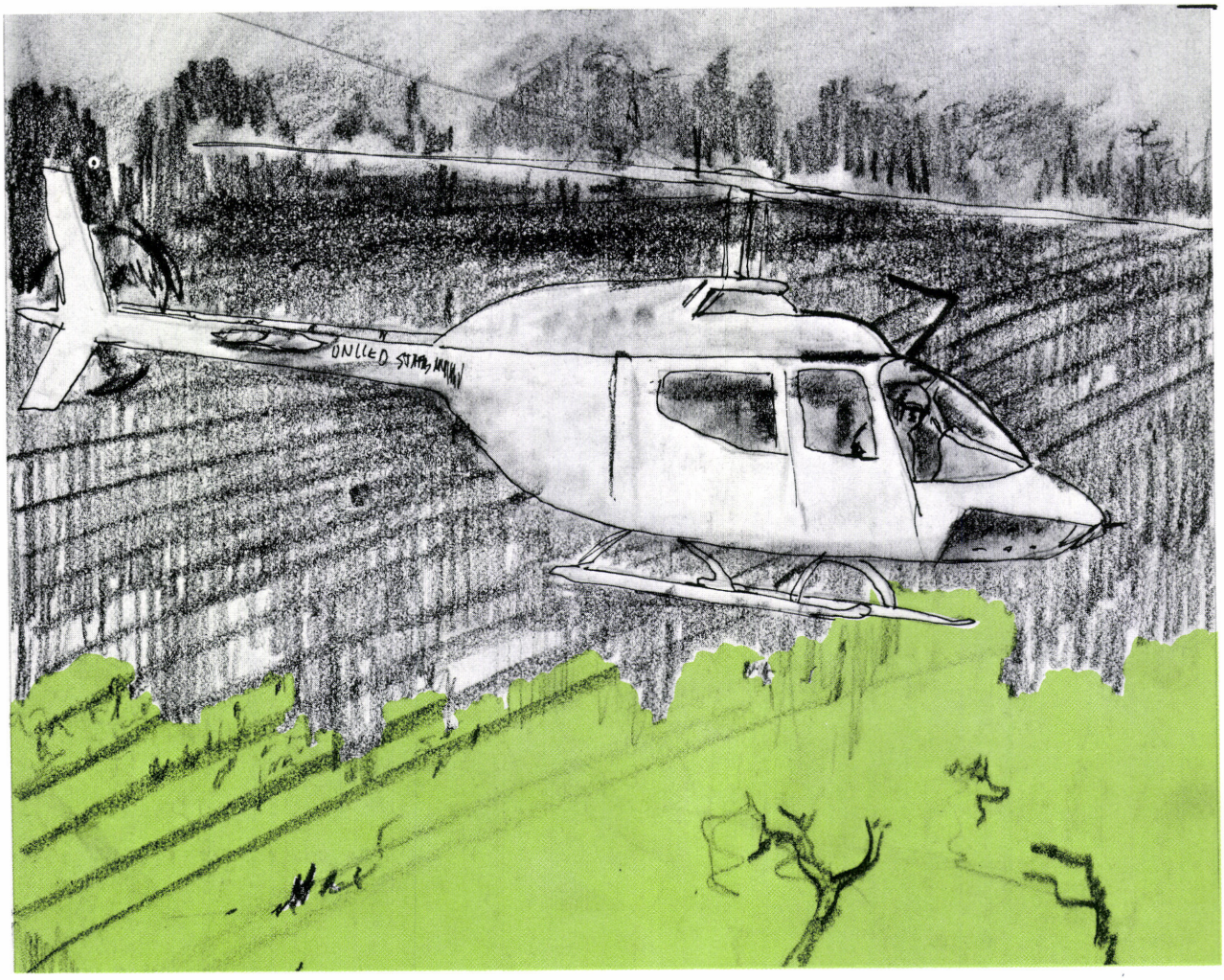
"THERE I WAS..."

aft. This resulted in pinning his thigh between the cyclic and the left seat's bottom frame. Now we were half way down the slope in a 15-degree nose-down attitude. Bob forced the grenade through the door (it fell harmlessly in a ditch), but as he lurched outward to clear the grenade past the skids he thrust down with his left hand to maintain his balance. His hand sought out the nearest convenient grip—the collective pitch control—which he bottomed out.

There I was, 40 knots and increasing, full down pitch, a cockpit half-filled with green smoke and controls that I could not move. Only by shifting my grip on the collective to the control head and taking advantage of the increased leverage and exerting enough rear pressure on the cyclic to bruise Bob's leg was the helicopter leveled and enough collective pitch applied to cushion our 20-knot plus run-on landing to the plowed field. If it weren't for the German farmer's fastidious plowing, this unusual approach would have terminated considerably less successfully than it did.

I learned a valuable lesson the hard way and not without some loss of my feeling of well-being. The operator's manual for the OH-58A cautions against leaving the controls in the left hand station when carrying nonrated passengers. If I had evaluated the necessity of leaving the controls in against the hazards that could occur, and if we had not allowed a training environment, albeit realistic in nearly every sense, to impair sound judgment and safe practices, this whole episode need never have taken place.

In the future I will evaluate each mission carefully to determine whether or not left side controls (cyclic and collective) are needed. I will only use smoke grenades if the crew doors are removed and all involved are thoroughly briefed about their operation and inherent hazards in their misuse. I hope that others benefit from *knowing* this happened and will *not* have the *experience* to learn as I did.



THREAT

Captain Thomas J. McNamara
Ft. Huachuca, AZ

Just as tanks have always been the most effective weapon against tanks, helicopters are the most efficacious means of fighting helicopters. Use of helicopters by both warring sides will inevitably lead to clashes between them. Like tank battles of the past wars, a future war between well-equipped armies, is bound to involve helicopter battles.

COL M. Belov

An Analysis Of The SOVIET HELICOPTER THREAT

In preparing this article, many sources were consulted, including releases from the Soviet press. The reader should understand that the Soviets often release "disinformation" to confuse Western observers. The Soviet tactics discussed in this article may be examples of such disinformation. In the absence of conflicting facts, however, U.S. Soldiers should at least consider the Soviet-stated employment techniques.

Aviation Digest **thanks** ***Military Intelligence*** **for permission to reprint this article**

THE ABOVE QUOTE by one of the most respected aviation authorities in the Soviet Union illustrates the growing Soviet awareness of eventual helicopter combat. The Soviet concern seems well founded. The United States Army, with the bulk of American helicopter assets, now fields about 8,000 helicopters; the Soviet Union, exclusive of Warsaw Pact assets, about 3,460. Sheer numbers, high mobility, battlefield location and combat missions surely dictate eventual encounters.

How will the U.S. crew fare against the Soviets? Each encounter will be different; each encounter will be unpredictable; and many encounters will be characterized by lethal violence. The American crew can increase its longevity in sustained operations by acquiring as much information as possible on the threat. This article will supply some of that information by describing and analyzing the threat and, when appropriate, comparing the threat with its U.S. counterpart. Areas of focus will be personnel, task organization, equipment and tactical employment.

Personnel

Prior to examining the Soviet pilot, one must view twentieth century Soviet society. The Russian people, particularly since the early 1930s, have generously rewarded scientific and technical achievement. A better society through science seems to be a Soviet axiom. To this end, the government has provided excellent aeronautical training for all interested youngsters. A youth attracted to an aviation career may very well initiate his specialized training in his early teens.

As the youth progresses into secondary or technical school he is required to complete military preinduction training. This training, similar to our voluntary junior Reserve Officer Training Corps (ROTC), consists of 140 hours of military training conducted over a period of 1½ to 2 school years.

The course of instruction, given concurrently with regular scholastic or technical courses, is partially comprised of general military subjects. However, as much as 25 percent of the training may be technically oriented. This technical training will be directly related to a military specialty, such as aviation. The program, entitled DOSAAF (The All Union Voluntary Society for Assistance to the Army, Air Force and Navy), provides the Air Force with a pool of politically indoctrinated, scientifically knowledgeable candidates for flight training.

When the aspirant has graduated from secondary school he may apply for formal inservice military flight training. Applicants for flight training are subjected to intensive aptitude, psychological and physiological testing. In addition, they must pass a competitive general subjects written examination with an emphasis on aerodynamics. Of course all candidates must pass a thorough KGB background investigation which closely scrutinizes the political reliability of the applicant and his family. The men finally selected for formal training are considered the best of the generation.

Training the Soviet pilot is expensive and time consuming. Little is written in the current Soviet press relating to actual VVS (Soviet Air Force) initial helicopter training. However, it is known that VVS initial training typically is conducted over a 2- to 3-year period. It includes subjects such as aerodynamics, aircraft construction, maintenance, communication, navigation, gunnery, engineering and tactics.

Although the school is at least twice as long as U.S initial training, the actual flight training is probably similar to that of NATO countries. The first year at the VVS flight academy is devoted to general military subjects, as might be found in the U.S. Army branch officer basic courses. Furthermore, this initial period may contain an advanced aircraft qualification phase (a phase that the U.S. Army considers graduate level training). From this training the new pilot is ready to join his organization and pursue his career as a rated pilot.

Organization

The Soviets have organized their combat rotorcraft into independent helicopter regiments. These regiments usually number two to three per Tactical Air Army (TAA). Currently there are 16 TAAs. Four are located in Eastern Europe. The remaining 12 are located in each of the military districts in the USSR.

The helicopter regiments are designated as either assault or transport. The assault regiment, the most likely to be encountered by U.S. troops, provides forward area services to the Soviet ground units. This assault regiment is usually composed of five squadrons: three attack squadrons and two transport squadrons Eighteen aircraft are found in the attack squadron; 15 aircraft in the transport squadron. One must keep in mind, however, that when dealing with the TAA and its subordinate units no absolute organization exists. The organization is structurally fluid and is tailored to meet specific needs.

All aircraft working in the TAA are VVS assets employed in a direct support role. This integrated role with a subordinate helicopter command relationship is consistent with Soviet doctrine of combined arms operations. This task organization is structured to take full advantage of the helicopter's mobility and speed to achieve the ground commander's objective.

Equipment

To achieve success, the Soviets have not only a viable organizational framework, but an abundance of outstanding helicopters. Two helicopters which U.S. forces are most likely to encounter on the modern battlefield are the Mi-24 attack helicopter (NATO code name: HIND) and the Mi-8 troop transport helicopter (NATO code name: HIP). Both of these craft are excellently engineered, constructed and equipped for their respective roles.

The HIND, introduced in 1971, is generally considered one of the most sophisticated helicopter gunships in the world. Latest reports indicate that it may have a radar directed four barrel 12.7 mm Gatling-type machinegun, a forward looking infrared scanner for target detection, a low-light level TV, eletrothermal deicing devices for main and tail rotor blades, and a bulletproof wind screen.

The HIND combines the firepower of conventional gunships and the lifting capability of modern troop transports. It is expected, however, to be used exclusively in the gunship role.

Augmenting the HIND is the principal assault transport helicopter, the HIP. The backbone of the air assault, the HIP can carry 28 combat equipped troops plus a crew of 3. The HIP can also deliver self-supporting rocket fire for disembarking troops. HIPs are usually escorted to the assault location by HINDS.

The following graphical excerpt from the December 1979 issue of ***Air Force*** magazine further illustrates the characteristics of both the HIND and the HIP.

HIND AND HIP COMPARISON

Manufacturer	Mil	Mil	Mil
Name/Designation	HIP/Mi-8	HIND A/Mi-24	HIND D
Date in Service	1967	1971	
No. of Engines	2	2	
Weight (Kg)			
Empty	7,261	N/A	
Gross	12,000	10,000	
Range (Km)	480	500	
Crew + Pax	3 + 28	4 + 8	
Primary Roles	GP, Assault	Armed Assault	Attack
Armament	4 Bombs or 4 Rocket Pods or Sagger	12.7 mm MG 4 Swatter 128 57 mm Rockets	4 Barrel 23 mm Cannon, 4 Pylons for 57 mm Rockets

Although these systems are formidable, they can be defeated. The HIND, with its fully articulated rotor system, may be less maneuverable than initially believed. Its unique profile and size present an easily recognized, significant target. The onboard antitank guided weapon (ATGW) must be visually tracked to the target. During the time from missile launch to target hit, a maximum of 27 seconds, the helicopter must remain unmasked, unable to use the terrain for concealment. The aircraft is obviously vulnerable to enemy antiaircraft fire during this critical time.

In comparison, the United States has recently introduced two new helicopters, the UH-60 Black Hawk and the AH-64 advanced attack helicopter (AAH). These new helicopters should be a vast improvement over the current systems. As Major General Edward M. Browne states in a recent interview, "The AAH has greater firepower and standoff, has a night and adverse weather capability, is more survivable, more reliable and more maintainable."

A new ATGW system to be mounted on the AAH is probably the most important attack helicopter improvement. The AH-64 will be equipped with a "fire and forget" type missile. This will allow the crew to mask behind protective terrain immediately after firing the missile. The missile will then home onto the target by using laser designation.

With the integration of the UH-60 and AH-64 into the helicopter fleet, the United States should achieve equipment parity on any battlefield. The critical factor at that time will be proper use and employment of forces.

Employment

The Russians closely observed American helicopter tactics and vulnerabilities during the Vietnam era. Soviet air tacticians have efficiently adapted lessons learned to modern battlefield dynamics. The Soviets may now be considered world authorities in effective helicopter employment.

The majority of helicopters observed on the battlefield will most likely be engaged in either of two missions: heliborne assault or antiarmor operations.

The heliborne assault would typically involve the seizure of a specific objective. The objective would usually be a pinpoint target such as a river crossing site or mountain pass. It would be located 20 to 30 miles ahead of an advancing force. The heliborne force may be supported by artillery, attack helicopters or fighter cover. The force could quickly fly to the objective, disembark and secure it in a matter of minutes. A contingent of 20 to 30 HIPs, supplemented with a smaller force of heavy lift helicopters, could move an entire motorized rifle battalion.

The other primary mission would be antiarmor operations. In that arena, the HIND is the undisputed leader in airborne warfare. Wherever opposing NATO/Warsaw Pact tanks gather, HINDs will surely be present. This means that an American crew in support of a NATO task force can clearly expect to encounter HINDs. Due to the substantial threat posed by U.S. helicopters, the American crew should expect engagement by the HIND.

Specifically, the HINDs will be operating in nap-of-the-earth (NOE) flight, deployed in pairs and positioned well forward in the main battle area. When thus deployed, the aircraft also will be within range of supporting ground based air defense systems.

The HIND's weapons systems could attack another helicopter as easily as an armored vehicle. Obviously it is a formidable enemy. However, a Soviet writer describing training in a Turkestan helicopter gunship squadron recently revealed possible tactical weaknesses. The author describes the helicopter's performing diving type firing, as opposed to hover fire. This diving technique, long ago eliminated from U.S. tactics, exposes the aircraft to hostile fire for unnecessarily long periods of time.

The rationale for this technique may be the relative scarcity of antiaircraft weapons in opposing units. The maneuver provides a very lucrative target for opposing helicopter crews. Maneuverability, battlefield

observation and weapons selection change are severely limited in the dive. If the Soviets pursue this diving tactic, the U.S. crew could take advantage of vulnerabilities presented.

In the same article, Major Belyayev mentioned engagement of targets at minimum range. While this might show pilot bravado and increase weapons effectiveness, the advantage of such close maneuvering is doubtful. By maneuvering to minimum range, the Soviet crew exposes themselves to hostile counterfire for a longer period of time. In contrast, U.S. tactics emphasize target engagement at maximum range in order to maximize number of engagements, achieve surprise and increase survivability.

Conclusion

Asher Lee, writing in 1959, stated, "The Soviet defense authorities are readily aware of the importance of tactical mobility in the atomic age. Apart from recent increased emphasis on armored forces, helicopters will assume more and more a large-scale role in achieving this mobility." His words were prophetic. Today the Soviet helicopter force was achieved worldwide recognition as a potent attack threat.

The American airman, however, should not be inordinately alarmed. Soviet and American helicopter pilots are probably comparable. The equipment used by the USSR and U.S. is roughly equivalent. The Soviet and NATO organizations are equally viable. Russian tactical employment, while impressive, displays weaknesses. Collectively, these comparisons indicate that the Soviets can be defeated in the inevitable helicopter to helicopter battle.

Tax tables

Be sure to use the correct tax table when figuring your Federal income tax this year. Remember, accurate taxpayers get their refunds sooner.

A public service message from the Internal Revenue Service.

U.S. Army Communications Command
ATC ACTION LINE

VISUAL APPROACHES

SPECIFIC PARAGRAPHS of the Controllers' Manual, 7110.65B, and the Airman's Information Manual (AIM) appear to give contradictory information on requirements necessary for visual approaches. Paragraph 430d of the Controllers' Manual states that an aircraft must not only have reported the preceding aircraft in sight and be instructed to follow it before being cleared for a visual approach, but also must have the airport in sight. The AIM, paragraph 383a, states the aircraft must have the airport in sight *or* the identified preceding aircraft in sight before the clearance is issued.

Both manuals are correct. The AIM describes the visual approach procedures associated with a radar environment, as prescribed for controllers in 7110.65B, paragraph 796. Paragraph 430 addresses nonradar facilities and nonapproach control towers. In October 1977, the 7110.65 was changed to expand the authority of nonapproach control towers to include clearing more than one aircraft for a visual approach, provided the succeeding aircraft had both the destination airport and the preceding aircraft in sight. The AIM does not address the difference between radar and nonradar visual approach procedures because the operational differences as perceived by the pilot are so insignificant that the additional discussion of controller requirements would add little to a pilot's understanding of the air traffic control system and would probably create more confusion than it would cure. In any case, the 7110.65 procedures are binding on the controllers, while the AIM is directed toward pilots and is strictly advisory in nature.

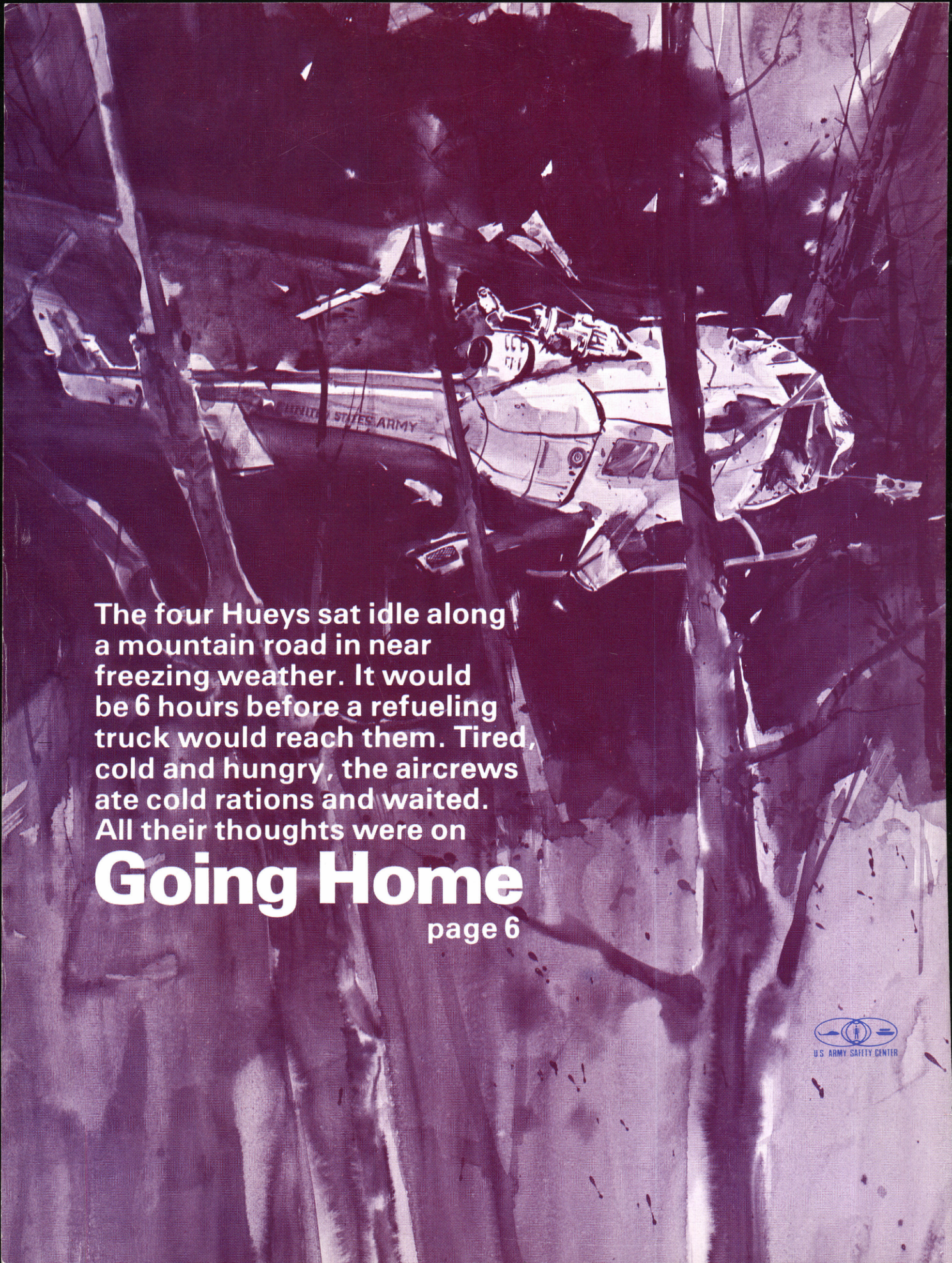
HOW TO GET A SUSPENSION

THE FOLLOWING IS an extract from the Federal Aviation Administration Briefs of 20 October 1980:

"The agency has suspended the airman certificate of a helicopter pilot for operating a chopper near Denver's Mile High Stadium just before the kickoff of the Broncos/Chargers football game. The pilot, who was on an aerial photography mission for a local TV station, reportedly flew as low as 100 feet and passed within 100 feet of the stadium. He also flew below the minimum speed necessary for a safe autorotative landing in the event of engine failure. The pilot can appeal the 180-day suspension to the National Transportation Safety Board."

Readers are encouraged to address matters concerning air traffic control to:

Director
USAATCA Aeronautical Services Office
Cameron Station
Alexandria, VA 22314



The four Hueys sat idle along a mountain road in near freezing weather. It would be 6 hours before a refueling truck would reach them. Tired, cold and hungry, the aircrews ate cold rations and waited. All their thoughts were on

Going Home

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U.S. ARMY SAFETY CENTER