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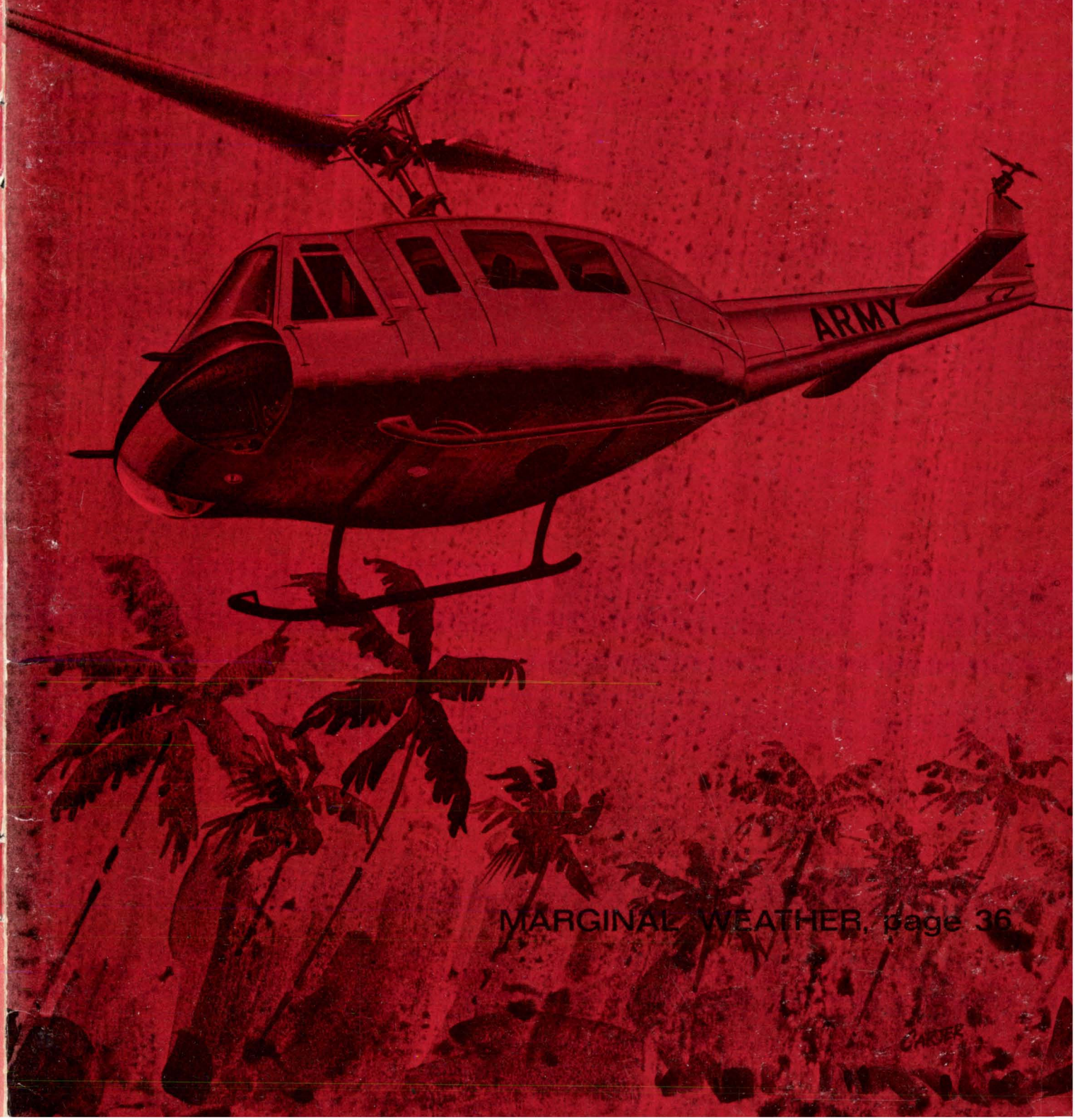
AVIATION DIGEST



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UNITED STATES ARMY AVIATION DIGEST

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

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VIEWS FROM READERS

Sir:

I considered myself pretty lucky that in one year in Vietnam I never took a hit and never had a mechanical failure or malfunction while flying with the 1st Cav in a lift company. But I did go down one time. You guessed it, I ran out of fuel.

On this particular day I was resupplying ROK units on Phu Cat Mountain which is north along the coast above Qui Nhon. After making several sorties I was about ready to go back to my home base just a couple of miles away. At my last stop I found nine ROKs who wanted to get in from their outpost so they could go on leave or rotate. Checking my fuel I found I had about 400 pounds which normally would have been enough to get me to the ROK base and back to my refueling post a short distance away from the ROK camp. About 10 minutes after I took off my 20-minute warning light came on. This offered me no real cause for concern since it was a frequent happening and most of the warning lights came on early in the aircraft we had. People had been known to fly these same ships anywhere from 20-30 minutes on the warning light and still make it in to refuel.

Feeling that I still could make it I continued on until a few minutes later my left fuel boost light came on. Since my right fuel boost light was always on and written up I decided I better stop en route to the ROK camp and refuel. All went normal until the engine slowly quit from fuel starvation about 3,000 meters away from my refueling point. Due to my lack of fuel on board I was able to successfully autorotate the ship to the ground safely with nine ROKs, a gunner and crewchief aboard. The ship came to rest in a rice paddy without any damage. A short time later fuel was brought out and the ship was flown home What was a very embarrassing situation was only laughed off, since the aircraft and occupants received no damage or injury. I learned one very significant lesson though. At the time of flameout I had been on the 20-minute warning light exactly 20 minutes!

Of course the lesson learned was one I should have known already. If you can abide by the light and plan your mission accordingly you will always be safe. However, it is good if possible, to know exactly how long each ship will fly on its 20-minute light if by chance or necessity you find yourself stretching time to get that last sortie of critically needed ammo or supplies to a unit in distress.

Remember the 20-minute light is a calibrated measuring device and like all other instruments is subject to inaccuracies and malfunctions. It should be calibrated at the proper intervals and it should be written up in the -13 when it is not correct.

CPT Paul F. Maxwell
Dept of Rotary Wing Training
Ft. Rucker, Ala. 36360

★★★

Sir:

For any of your readers who have ever had cause to doubt the soundness of "school solutions" I would like to relate the following personal experience.

The question was What do you do when the rubber band breaks, the altimeter starts unwinding and you start an autorotative descent toward Mother Earth? If you are near a nice flat forced landing area there is no problem. But what if you are over high trees? The school solution is: zero the airspeed out over the trees and pull all the pitch remaining in the blades while backing the aircraft into the trees.

My opportunity to test this solution came while I was stationed with the 1st Cavalry Division at An Khe. My crewchief and I were taking "Old 035" (UH-1B) down to the river to get it washed.

On the takeoff I lost 200 rpm but it didn't worry me. Everyone knew 035 was a weak ship. It had 1165 hours on the engine which was scheduled for a change at 1200 hours. Because of the full load of fuel I decided to go the long way to the river. Flying toward the back of Hong Kong Mountain would give me less weight to get in and out of the river bottom.

All was fine for about 10 minutes. Then the rpm bled off and the engine quit. The school solution came to mind. I pulled all the pitch when the trees got to eye level on the windshield. I just backed it in and closed my eyes. I can still hear the wuck, wuck as the blades made contact.

It worked! The crewchief and I jumped out of the aircraft and walked back to the division area.

After reporting the accident we went back to the scene to find "Old 035" neatly tucked into the trees. They were so tall that it took a CH-54 Flying Crane to get her out.

"Old 035" was missing both its doors and the front of the aircraft was crushed where a six-inch log had fallen between my head and the rocket sight.

This is a simple but true story. Flight school recommends exactly what I did: zero the airspeed at treetop level, pull pitch and back into the trees. Keep school solutions in mind. I'm glad I did.

CPT George T. Govignon
Dept of Rotary Wing Tng
Ft. Rucker, Ala. 36360

★★★

Sir:

There appears to be an inconsistency in the November 1968 AVIATION DIGEST. On page 23, an excellent article on behavior standards is accompanied by a photograph of a medical air ambulance and crewman. On pages 61 - 67, another outstanding article on "Dress to Live" with a photograph on page 62 of the injuries to be expected if aviators and air crewmen dress in accordance with the photograph on page 23.

Here is a photo of a medical (?) crewman, armed to the teeth, short sleeved shirt, no flight gloves, jungle boots and personal weapon (not authorized in combat areas).

In as much as the accompanying article deals with behavior, standards, guidance and proper leadership, I would suggest photographs be edited to conform to standards, guidance and leadership as stressed by all safety minded medical air ambulance units.

MAJ Donald G. Murphy
247th Medical Detachment (HA)
Ft. Riley, Kan. 66442

A Plan That Worked

Lieutenant Colonel William L. Stephens

THE FOLLOWING is based on my own 15 years of experience with what I believe to be one of the most significant and well-laid plans affecting Army aviation. Facts have not been verified by me, but I have no reason to believe that our present instrument training is not the result of deliberate planning by some very farsighted, highly devoted individuals.

I present this thought in the hope that those now in training and those doing the training will more aggressively pursue the present instrument programs available in Army aviation and not settle for just passing a check ride so as to graduate into a VFR-only aviator with an unusual instrument ticket.

In 1953 I joined my first aviation unit fresh from flight school and qualified to fly the L-19A (now O-1A) under VFR conditions only. In flight school I had been given an indoctrination of 15 hours hooded flight in the venerable L-5 which consisted of tracking on a low frequency range and attempting an approach in the vicinity of the facility. Instrument flying was not considered one of my best assets, but in no way was I made to feel inadequate because of this lack of training. Of approximately 20 aviators assigned to the division only two had instrument training and they only flew when the division commander chanced, usually on a clear cloudless day, to venture abroad in the division's only L-17.

That fall and winter a shocking thing occurred! We were issued a booklet entitled *Army Aviator's Annual Written Examination*. Those of us without instrument ratings were given VFR only versions and our two instrument-qualified "super aviators" were given IFR versions. The booklet had approximately 100 questions dealing with regulations and other information pertaining to flying.

With the booklet went the normal Army type briefing by an instrument examiner. Basically, he pointed out that this is the first step in a program designed to instrument qualify all Army aviators by 1970. He also explained that this program was being put into effect by the Chief of Staff of the Army. We were told that initially we would be expected to memorize both the questions and the answers. Then, through the years as our knowledge developed, the test would be modified until it reached its final form which would be open book IFR only to present regulatory and procedure changes over the last 12 month period.

For the first time, I and all my fellow aviators were desperately trying to find out what terms such as VAR, VOR, ADF, Approach Control and ATC meant. Many hours were spent discussing the improbability of flying single engine aircraft in actual weather conditions. The general consensus of opinion was that this program was real bad news.

Time passed, and I found that after about three years my development, knowledge wise, had jumped out of all proportion to my own deliberate application. Evaluation would show that about 90 percent of this knowledge had been acquired as a direct or indirect result of this program.

In 1957, I was "selected" to attend instrument school enroute to Europe with an Otter company. Theoretically, we would be one of the Army's first company size aviation units capable of all weather operations. All aviators in the unit were required to be instrument qualified.

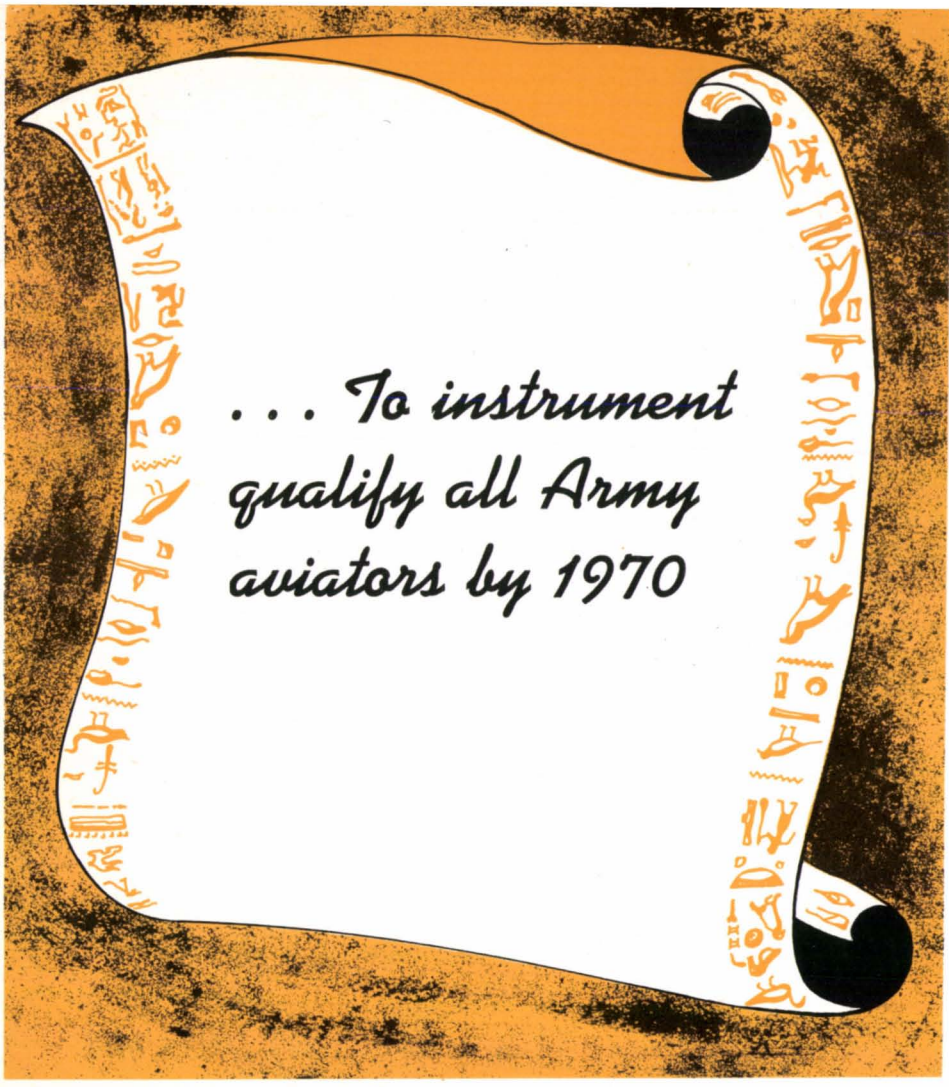
Upon joining the unit, I found that the majority of the aviators were less than enthusiastic about flying in weather. Complaints ranged from single engine aircraft being unsafe for IFR operations to inadequate radio equipment.

Shortly after the company's arrival in Europe, the unit was given a mission requiring all 21 aircraft and 54 aviators to participate in an airlift during instrument conditions. The mission was aborted. Many reasons and excuses were given but a general lack of instrument capability coupled with some lack of enthusiasm was thought to be the cause.

Even with this failure, the very fact that in four years the Army could mass 54 fully qualified instrument aviators in one unit was significant to me. The program appeared to be working.

By 1959, approximately 20 of the original 54 aviators had acquired special instrument tickets and were enthusiastic, devout instrument pilots. This number, I am sure, would closely approximate the total in one unit that Army aviation could boast world-wide when the program started in 1953.

In 1963 I was assigned to Ft.



Rucker and soon learned that my newly acquired prestige of being instrument qualified did not impress anyone. Even the newest fixed wing graduates considered instrument flight as routine. I believed the goal of what now appeared to be a marvelous program had been reached. The annual writ was now no longer cussed and discussed in the same manner. It was merely felt to be routine harrassment by "them." It was even admitted by some that it was doing some good by making all us old pros review our vast knowledge once a year. If nothing else, it certainly put the beginners in their places!

Within my first week at Ft. Rucker, I was chosen to teach instruments in helicopters. I was sure this would be only familiarization so that the helicopter pilot who inadvertently found himself "IFR" could declare an emergency and quickly find a safe place to land.

Again the Army briefing by our new (to us) division commander who stated in part, "All Army aviators are to be instrument rated by 1970."

"Even in helicopters?" says I!

"Yes!" says he!

"Absurd, unsafe, baloney," I thought!

After a tour in Vietnam I again was assigned to Ft. Rucker in 1965 and much to my amazement a program was underway requiring all initial entry helicopter pilots to acquire an instrument rating. It seemed to be taken as a matter of routine by the students. There was still widespread feelings among IPs that it couldn't work but we'll teach it anyway.

Pilots, even instructors, still bad mouth some of the instrument training, but it works. The only comparison I can make is with my own capabilities upon graduation from helicopter school in 1954 to a present graduate. I was both fixed and rotary wing rated; held no instrument ticket and was only qualified in the L-19 and H-13. I was limited to mostly daylight, clear weather operations. If a night mission came up and my route of flight required me to fly away from a full moon into hazy conditions, I was out of business. Night operations in the helicopter were out of the question.

Today's graduates, many dual rated via fixed wing school and turn-around rotary wing qualification, consider all-weather operations in fixed wing routine and marginal day and night operations in helicopters as an acceptable routine practice.

The loud grumbling among the instructors has dissipated to a low whisper. The loud disagreement with the program is gone and those who still disagree usually are for the program but are not entirely in agreement with the training methods.

As an innocent bystander and sometime participant, it appears to me that a marvelous piece of planning has achieved its objective almost two years early and Army aviation is truly coming of age! I only wish that I could look 15 years into the future with such a clear eye and see what program could affect our capabilities as much.

I would also caution the grumbler and non-believer to look to not-so-ancient history and then aggressively join the winning team! Perhaps someone with some wisdom does exist in our "puzzle palace" and just maybe well-laid plans today can have a similar impact on Army aviation.

Utilization of TH-13Ts

Major William H. Gardner

FOR TWO YEARS now the skies of Fort Rucker have been filled with literally hundreds of TH-13Ts. Made by Bell Helicopter Company, the TH-13T is a heavier, more powerful version of its older brother, the OH-13 Sioux. The TH-13T was purchased as an instrument trainer and has been the primary vehicle for instrument flight training for all initial entry helicopter students. Thousands of students have received 50 hours of hooded flight in this aircraft and have been issued tactical instrument tickets.

Anyone who has visited Fort Rucker has seen this aircraft, many have flown it, but it is ventured that few really understand its capabilities and limitations.

The TH-13T's avionics configuration is such that it is quite feasible to use the aircraft for the initial issue of a standard instrument card. The radios and navigation equipment in the box on the next page are found in the TH-13T and can be operated by either crewmember.

A TH-13T can have full ILS, VOR, ADF, and either 1750 or 3500 channel UHF, which meets the criteria for initial issue of a standard ticket.

That you can make the necessary approaches in a TH-13T is only one factor; you can make the same approaches in the link. How stable is the aircraft? Most pilots who have never flown the TH-13T are quick to compare it to the OH-13 or OH-23, but any such comparison is unfair. The TH-13T with its increased weight, 270 bhp 0-435-25 turbocharged engine, and particular hydraulic power system is an extremely stable platform. In fact, if you ask experienced instrument instructor pilots, you will find from the majority that the TH-13T is too stable an aircraft for an instrument trainer. Be that as it may, the TH-13T can hack the job in the terms of reference discussed so far.

There are some definite limitations to this aircraft and some interesting considerations. For example, would you believe an instrument trainer that can't be flown IFR? The reason for this is fourfold. First, the pitot system has no heater, a requirement for actual instrument flight as listed in AR 95-1. Second, there is no backup electrical system in the TH-13T. Before the reader counters by saying there is no backup electrical system in the U-6, remember the attitude instruments in the U-6 are the suction driven type and those in the TH-13T are electrically driven. Third, if you have the 11-channel ARC-45 UHF equipment aboard still found in many TH-13Ts, you don't have the frequen-

cies with which to operate IFR. Fourth, and only mentioned in passing, there is no deicing equipment on the aircraft. If that isn't enough, the -10 itself said it in the first place, "All flight under IFR conditions is strictly prohibited."

Another consideration is the 60-knot airspeed of the TH-13T versus the aircraft the pilots will most often be flying in the field, the 90-knot Huey. When you operate in a mile a minute environment during the formative period of your instrument experience, the transition to faster aircraft is not always easy. The 60-knot cruise and 3 hours and 10 minutes of fuel limits the range of the aircraft, obviously, as a trainer for cross-country instrument techniques.

Its extreme stability has been mentioned as a limiting factor. Another factor often discussed is the loss of servos, which are engine driven, in an actual failure. This is quite true, but accident/incident files indicate that no pilot's emergency was aggravated by the increased stiffness in the controls. Servo-off autorotations are a part of all instructor pilot qualification in the aircraft.

Throttle correlation must also be considered a limiting factor when compared to turbine engine aircraft. During the initial phases of instrument training, it is difficult for the student to properly divide his attention between flight instruments and rpm control. As the student becomes more familiar with the TH-13T, this problem is greatly reduced and becomes almost negligible as a limiting factor to instrument instruction.

No discussion of the TH-13T should be made without mentioning one real safety of flight consideration peculiar to this aircraft. The vision of the instructor pilot to his right from slightly above the horizon to the ground and from his twelve-thirty to three o'clock position is completely blocked by the console and student blind flying visor shield. There is no solution to this problem except a constant awareness on the part of the IP of this restriction and a head that is constantly on a swivel outside the aircraft. He does have some visibility when looking to his right between the student and the shield and out the right door.

No attempt has been made to relate conducting standard ticket instruction in the TH-13T as a part of the training at either the USAAVNS, Fort Rucker, Ala., or USAAVNS Element at Hunter Army Airfield, Ga. Any effort here would encompass many considerations particular to the facilities, training programs and instructor pilot qualifications of both installations.

The purpose in this article has been to clear the air concerning the TH-13T. The aircraft is an excellent helicopter instrument training vehicle, comparable to the U-6 and certainly to the T0-1D for fixed wing. Its only real shortcoming, taken as a separate individual aircraft, is that it is perhaps too stable a platform and does operate at slower airspeeds than its more powerful brethren.

TYPE	DESIGNATION	FUNCTION	RANGE	FREQUENCIES
UHF Command Radio Set	(1) AN/ARC-45 (2) AN/ARC-51X00 (3) AN/ARC-51BX	Transmission of voice signals from helicopter to other aircraft and to ground stations.	Line of sight	(1) Eleven frequencies, 236.6 to 348.6 MHz (2) 1750 channels 0-1 MHz increments, 224.0 to 399.9 MHz (3) 3500 channels .05 MHz increments, 225.0 to 399.9 MHz
Intercommunications	C-1611/AIC	Intercommunications for pilot and crewmember.		
VHF Navigation Receiver	ARC Type 15F	Receives and interprets VOR and localizer signals.	Line of sight	190 channels, 108.00 to 126.90 MHz
Glide Slope and Marker	R-844/ARN-58	Visual and aerial marker beacon reception and glide slope reception.	Local	
Radio Compass	ARC Type 21A	Automatic direction finding.	Up to 100 miles	190 to 1750 KHz
Gyro Magnetic Compass	Sperry SPC-1 System	Heading reference and flight path control.		

Who's In Charge Here?

Dugan's statement indicated that he was the IP. Fenster's statement said he was the aircraft commander. It appeared as though neither knew who was in charge

CW3 John E. Kennebec

THE ACCIDENT board had been gathering evidence for three days. The aircraft had been released to field maintenance where a rotund technical inspector clucked sadly to himself as he listed page after page of parts requiring replacement or repair. The flight crew had been examined by the flight surgeon and duly certified as combat serviceable. All that remained was the paper work; the stack of paper which, by unwritten rule, must exceed the gross weight of the aircraft before being forwarded. The board was hard at work.

The table was heaped with paper. Statements, photographs, weather reports and damage estimates were piled limply in the soggy heat of the Vietnamese springtime.

The board president, a short bespectacled major, tilted his ammo box seat against the wall and surveyed the table with an expression of distaste.

Across the room, the flight surgeon swore softly and with feeling as he tried to erase the remains of a blood-filled mosquito from his freshly typed report.

The rest of the board sat around the table. Each had been chosen carefully and each possessed qualifications which the adjutant had deemed valuable to an aircraft accident investigation board.

CPT Spaht, a starchy young man who sat in the corner paring his nails was a graduate of the safety course at USC and an eager beaver to boot.

A stumpy warrant officer in sweat-stained fatigues, drummed his fingers restlessly on the table. CW2 Quid was an assistant maintenance officer and his work was piling up while he was tied up with the board's proceedings.

WO1 Olson, the last member of the board, was a tall, balding man with a bristly red mustache. He was the youngest man present and by far the most valuable in the opinion of MAJ Baines, the president. He could type 70 words per minute.

The major ground out his cigar in a handy C-ration can and looked owlishly over his glasses. "It looks to me," he said, "as though we have everything we need. We're all agreed on exactly what happened and we've got the sequence of events straight for the report. Now let's see if we can come to some kind of agreement on the cause factors."

Quid was eager to get it over with. He spoke quickly. "Well sir, it seems clear enough to me. We've established they were loaded over max gross. They tried to take off in all that dust, went IFR, ran out of altitude, rpm and ideas. Pilot error all the way."

WO1 Olson sat bolt upright in his chair. "Hey, wait a minute chief! I don't think we ought to do that 'til we eliminate everything else. You proved the engines were running O.K. but there must be other things besides maintenance error or pilot error. You maintenance types are always ready to blame everything on the pilot."

"O.K., cool it," snapped the major. "It's too hot to start any arguments. Doc, do you have anything in that medical report that might have a bearing? Pilot fatigue, low blood sugar, nagging wife, anything like that?"

The flight surgeon looked dolefully at his report and eased his chair around to face the major. "Naw," he drawled, "they were both in good shape, the medical report is completely negative. Lord know they hadn't been drinking!"

MAJ Baines grinned. "If it will make you feel better, doctor, I have it on very good authority that we'll have beer tonight."

"Captain, how about the weather? You talked to the forecaster and got the report. Is there anything that might be a cause factor?"

CPT Spaht referred to his notebook as he spoke. "I don't believe so, sir," he said. The density altitude was high of course, which didn't help, but both pilots knew it and were familiar with the effect on aircraft performance. They were taking off into a light and variable wind on a good VFR day. Even with the overload they should have made it with proper technique. I'm inclined to go along with pilot error, unless you have something I haven't seen." He closed the notebook and carefully returned it to his breast pocket.

"Well, Mr. Quid, that brings us to the aircraft. Is there any possibility of maintenance error or mechanical failure?"

"Sir," said Quid, "we pulled both engines and installed them on another aircraft. I checked them myself. They were putting out rated power and behaving normally. I had a field maintenance inspector check the engine controls, flight controls and rigging. Everything checked O.K. There were a few MWOs outstanding on the bird but nothing that had any bearing on power. All inspections were up to date. We took fuel and oil samples and had them analyzed. They checked out fine. All in all, I'd say these guys tore up a darn good airplane."

MAJ Baines mopped his forehead with an enormous OD handkerchief. "Sounds good to me," he agreed.

"Mr. Olson, you typed up all the statements and records. Have you found any major discrepancies that might give us any insight into the cause of this accident?"

Olson rubbed his mustache thoughtfully. "No, sir, I've read everything and I can't find a thing. I guess it will be pilot error all right but it still seems to me we're missing something."

Quid stood up. "I guess that's it then," he said. "All we need to do now is write up our findings, call

It looks to me like the board has all it needs

it pilot error with density altitude as a contributing factor, and I can get back to the flight line."

"Don't be so danged eager chief!" snapped the major. "We'll just suppose it is pilot error. Now suppose you tell me who the pilot was!"

The maintenance man reached into the closest pile of forms and withdrew a neatly typed copy of the -12. Olson winced visibly as a smudged thumbprint magically appeared on the face of the form.

"According to the record," said Quid, "CW3 Dugan was the IP and CPT Fenster was the pilot. That puts Dugan as pilot in command."

CPT Spaht reached for his notebook with the speed of a striking cobra. "According to this copy of the flight plan," he declared, "Fenster was the aircraft commander and Dugan was the pilot. That makes Fenster the pilot in command!"

"Oh, I don't know about that," said Olson happily, "this copy of the unit flight schedule says that Fenster was the pilot, Dugan the copilot. Dugan's statement says he was the IP. Fenster's statement says he was the aircraft commander. Looks to me as though nobody knew who was in charge!"

There was a moment of deep silence broken only by the scurrying of a small green lizard on the wall behind the flight surgeon.

Quid sat down. "Well," he mumbled, "I really don't see what difference it makes. They would have wrecked the aircraft no matter which one was in charge."

"That's open to question," mused the flight surgeon. "I noticed that Mr. Dugan's statement says that when they lost visual reference, he took over the controls and attempted to reduce pitch to regain rpm. CPT Fenster says that he tried to add pitch to get out of the dust. He didn't even know that Dugan was on the controls. There was certainly some confusion in that cockpit; when both pilots believe they're in command it could certainly contribute to the situation."

"That's true enough," argued Quid, "but they were still overloaded, confused or not!"

"Confusion seems to have had a lot to do with that too," said CPT Spaht. "Neither pilot checked the load; each one thought the other one had done so. It appears that although each thought he was in charge, neither did much about it."

MAJ Baines rocked forward on his ammo box and lit a fresh cigar. "All right, Spotty, we've determined there was confusion and nobody knew who was in charge. Now we've got to determine where the system broke down and make some recommendations to keep it from happening again. Any ideas?"

"Well," said Spaht briskly, "first we'd better interview the unit operations officer to find out exactly what their SOP is on command of aircraft. Then perhaps we should check the other companies to see if they have any better ideas and try to come up with some recommendations based on what we learn."

"Very good," said the major. "Mr. Quid, how do they do it in your company? How do you know who's in command when you go out to fly?"

"If it's a test flight, I'm in charge," said Quid with conviction. "If it's a combat mission, operations usually puts me with an aircraft commander who's more familiar with the situation than I am, so he's in charge.

"Operations has an SOP on the duties of each crewman, qualifications of aircraft commanders, crew standardization and all that stuff right in the pilots' reading file and they review it every month.

"To become an aircraft commander you have to have at least 30 days in country, 50 hours of combat time and pass a check ride with the standardization pilot.

"The company commander just made it last week and he's been here three months."

"Why did it take him so long?" asked the flight surgeon. "Didn't he have the combat time?"

Quid grinned. "Naw," he said, "he couldn't pass the ride. The stan pilot said he couldn't navigate well enough."

"That sounds like a pretty good program," MAJ Baines said with a grin. "I like the idea of having crewman's duties laid out in an SOP. If someone had been specifically assigned to check that load, we might not have all this paperwork to take care of.

"Now let's get cracking on the rest of this investigation." The major stood up and pointed his finger at CPT Spaht. "Captain, you and Olson get over to the company and interview that operations officer.

"Quid, you check the other companies and get me a copy of their SOPs on aircrew duties if they have one. If they don't, find out what their policy is and be prepared to brief us in the morning.

"Doc, you get that report of yours retyped. I'm hanged if I'll turn a bloody mess like that in to the Old Man.

"I'll see you all here at 0700 in the morning." He stomped stiff-leggedly out into the glaring sunshine.

The flight surgeon stared angrily at his bloodstained report. "Now I wonder just what makes that old buzard so mean sometimes," he said plaintively.

Quid stared after the stiffly gaited form of the departing major. "I'm not sure," he said, "but tomorrow I think we better get another chair and get him off that ammo box!"

Master Aircraft Mechanic

. . . he wondered if such a master mechanic could be trained by the Army. Why not? The Army usually managed to accomplish anything it set out to do

CW3 Grant L. Ray

SFC CRUSTY WAS cursing the day he was promoted to shop foreman of his helicopter maintenance detachment, for this was one of those days when everything was going wrong for no apparent reason. He couldn't understand how he could be having so much trouble completing the eleventh PE on those two Hueys.

He had established shop procedures and individual responsibilities based on proved management principles, so the trouble couldn't be there. Supply was doing a great job in getting the parts he needed. He reflected on the men — about par for a helicopter maintenance outfit. They were bright young specialists who were good in their fields, and even though their youthful vigor required a firm hand, the energy was just as evident in their work as in their shenanigans.

Maybe the patron saint of shop foremen was on TDY for a week. How else can you explain the troubles that seemed to concentrate on sections in such a way that it brought his production to a halt faster than a thirsty trooper going to happy hour?

It had started in the sheet metal shop. Out of the five authorized men (he had only four assigned), Doaks had gone on emergency leave and Moore and Benfield caught guard on the same day. That left only Smith. Now how can you buck rivets with one man? Then it was the electrical shop. Giebler had to get sick just as Clampitt was sent to battalion for that special services show. It was just his luck to have a good electrician who also plays a fiddle! Of course he couldn't play that fiddle as good as ole Sergeant Tuck but good enough to be gone when he was needed.

Thinking of Sergeant Tuck brought a smile to his face. Now there was a mechanic! Too bad he's retired. With a few men like him, this job would be so easy that officers could handle it. Tuck could do anything. Hydraulics, sheet metal, electrical, engine work — you name it and he could do it. No, there would never be a holdup for special skills with a few men like him to give continuity to the maintenance program.

SFC Crusty scratched his thinning hair as he wondered if such a master mechanic could be trained by the Army. Why not? The Army usually managed to accomplish anything it set out to do. He wondered how they would go about it if they did.

They would have to spend some time and money on such a program but it would be well worth it. Such a mechanic would save more money every month than it cost to train him. Of course, candidates would have to meet certain requirements, such as having a high school education and be willing to sign up for a six-year hitch before starting school. That'd be no problem — several of his men could meet those requirements now. Naturally, the most important part of this schooling would be at the beginning.

There could be no better foundation than an 18-month civilian aeronautical school that would qualify a mechanic to pass the airframe and powerplant test of the FAA. In fact, the Transportation School at Ft. Eustis did something like that for some instructors back in 1960.

The second part of their schooling would be a modified course at the Transportation School to learn Army records and maintenance management. I sure wish I could have had such a foundation at the start of my maintenance career.

Yes, such a mechanic would really complement the present system. He would even rate a special MOS and a title, such as Master Aircraft Mechanic. With a few years experience as he worked up through the ranks, he would be the finest technical inspector in the business. Then as a senior NCO he could handle any job.

Sergeant Crusty thought, "I probably will never see such a program. Then again, I never thought I would see the day when the Army had as many aviators as it does."

An instructor at the Ordnance Center and School demonstrates disassembly of the XM-27E1 armament subsystem for the OH-6A

Aircraft Armament Repair Course

Sergeant John S. McCormick

TODAY THE helicopter plays a major role in the success of combat missions. However, where there is a machine there is a need for a skilled repairman. With new weapons being designed for utilization on Army helicopters an urgent and continual need exists for highly trained repairmen.

The training site for the aircraft armament repair course is at the U. S. Army Ordnance Center and School at Aberdeen Proving Ground, Md. Among subcourses given in support of the aircraft armament training are those dealing with related MOSs such as fire control instrument repair, small arms repair, field and turret artillery repair.

The first aircraft armament repair course began in April 1963. At that time the course was covered in 15 weeks. As other aircraft armament subsystems became available a need developed to lengthen the course. Accordingly, in October 1967 the course was extended to 26 weeks. At present there are over 150 instructors operating around-the-clock on a tri-shift schedule. Successful completion of the aircraft armament course itself results in the award of MOS 45J20. This MOS is authorized in grades through E-7 in aviation support units throughout the Army.

In order to hold MOS 45J an aircraft armament repairman must be capable of performing all required maintenance operations on the Army's aircraft armament subsystems except complete rebuild. In addition, he is trained to handle, store, and inspect all types of ammunition; load and unload weapons; and troubleshoot the subsystems as required.

The initial training phases at the Ordnance Center and School start directly with the subsystems. As a student advances he also receives a block of instruction on

basic electronics, a particularly important requirement since a majority of the sophisticated weapons systems have electronic components. For this reason student aptitude or prior training in electronics is judged desirable but is not an absolute necessity.

Currently, the minimum prerequisite for attendance is a score of 100 in the general maintenance aptitude area. Within the course students are grouped according to GT scores to afford uniformity in the teaching level required to conduct instruction to specific classes.

Instruction covers the following aircraft armament subsystems authorized for use on Army helicopters:

· The XM-47, consisting of a mine dispenser which can be mounted on each side of utility helicopters and fixed-wing aircraft.

· The XM-3, consisting of 2.75-inch folding fin aerial rockets mounted on each side of the UH-1 series helicopters.

· The M-5, consisting of a 40 mm automatic grenade launcher mounted in the nose of the UH-1 series helicopters.

· The M-16, consisting of two 7.62 mm machineguns and one 2.75-inch rocket launcher to be mounted on each side of utility helicopters.

· The M-21, consisting of one 2.75-inch rocket launcher and one automatic gun (minigun) mounted on each side of utility helicopters.

· The XM-27E1, consisting of one automatic gun (minigun) mounted on the side of the lightweight observation helicopter, OH-6A Cayuse.

· The M-22, consisting of three wire-guided antitank missiles mounted on each side of utility aircraft.

· Also, the entire weapons system of the Army's AH-1G Cobra is taught.

Qualified aircraft armament repairmen are either assigned to units authorized armed aircraft or to maintenance units supporting them. In his job with a unit having armed aircraft the repairman stores and handles ammunition for the armament subsystems in use to include the mating of rockets with warheads. He also is responsible for loading before missions and unloading upon completion of missions. In the areas of maintenance he is responsible for the organizational phase — boresighting daily safety and maintenance checks, and preflight checks.

At support level the repairman must be able to perform all procedures between organizational maintenance and complete rebuild. He may function at the support unit site or as a member of a mobile or airmobile repair team.

Whatever his assignment in the field, he departs the U.S. Army Ordnance Center and School as a graduate of one of the most difficult and demanding courses of instruction taught at the school. He is not only a skilled technician, but also a soldier imbued with the urgency and dedication needed to provide the finest support possible to Army aviation.

An instructor assists students installing the M-134 gun in the M-18 armament subsystem on a HueyCobra trainer

Instruments And Flares

Major Patrick H. Brady

CHARLIE HAS always been a moonlighter; he enjoys the graveyard shift. Finding considerable security in darkness and weather, he wreaks havoc under their protection. As a result Dustoff pilots get a great deal of business under those unhappy conditions.

My first tour as a Dustoff pilot was in that great forced landing area — the delta. Many of us agreed with Charlie on night work. It was pleasant to cuddle up in the soft, quiet darkness, and so much easier to keep away from those hard, loud bullets. However night or night weather missions were not much of a problem in the delta.

Between tours I spoke to many Dustoff pilots who had served time in the central highlands. They were all in agreement about the difficulties of night pickups in mountainous terrain. Night weather pickups in the mountains were practically out of the question. The number of Dustoff crews lost under these conditions clearly indicates the dangers involved. When I heard I was going back, I hustled my derriere to the chapel and prayed for the delta. I was more than a little upset when word came that I was going to I Corps.

I had been in country a short time when a call came in one night from a unit which had suffered considerable casualties. The wounded were located in some 3,000-foot mountains with a ceiling that went down to 200 feet in heavy rain. It was impossible to stay VFR once you left the flat, lighted terrain along the coast; forward visibility was zero. We tried to stay under it and follow the trails and rivers back into the mountains but it was impossible. The searchlight was useless since it reflected off the rain and was blinding. I could see no possible way to stay out of the weather and get to the wounded men.

I recalled some previous pickups we had made in the mountains using flares. I had noticed that the flares silhouetted mountains which were actually in the clouds. I wondered if you could *see in the clouds* using flares. We decided to climb into the clouds, fly instruments to the pickup site, and let down using flares. We went to

4,500 feet and using radar and our FM homer flew IFR to our target. We had no trouble getting over the spot. There was an Air Force ship at 9,000 feet dropping flares which were bright and easy to spot in the clouds; they lit up a considerable area and silhouetted the mountains.

We began our descent circling and following the flares down. Finally we broke out, spotted our ground signal, and made the pickup. We made three more field pickups that night using the same method. It occurred to me after that first time that possibly everything was just right for it to be successful — or we were just lucky. Perhaps on most other occasions the circumstances would not be just so and it wouldn't work. However, since then we have used this technique on many occasions and were successful every time.

Some people have called this an IFR or blind letdown in the mountains; this is not true. *It is an IFR flight to the target and a VFR letdown.* (I have always felt that most of the pilots killed in weather at night were killed by trying to stay under it — trying to fly contact without sufficient visibility.) The clouds are so much softer than the ground and this method keeps you away from those hard obstacles. It is not as complicated as the tactical instrument approach, which I have never seen used in over 20 months in a tactical environment, and just as safe. However, this approach does require some diligence and there are a few points I would like to mention.

PLANNING: Get the altitude of the highest obstacle throughout your flight path, add 1,000 feet, or whatever makes you comfortable, and you have your enroute altitude. Watch those maps, most of them are in meters. Getting over your target is no problem. We've used radar and the FM homer. Decca would be excellent. Any one or combination of the above aids work fine; however, I recommend that you have more than one aid available before you begin. Be sure you have a letdown facility readily accessible and get on radar before you go IFR. Advise the ground people to have sufficient flares for continuous illumination. Of course you consider your fuel and ensure that all navigational aids are sweet. That's about it — you're ready to go.

FLARES: I've found that the flares dropped from another aircraft are the best. Artillery flares are OK if they can get enough altitude. They must be able to reach your altitude or higher to be useful. It is imperative that you have *continuous illumination.* That doesn't mean a few seconds between bursts; it means a lighted flare in the sky at all times. Nothing is more embarrassing than to find yourself in the clouds at 1,500 feet in 3,000-foot mountains and have the lights go out. It's a good idea to note the trajectory of the flares, if they are artillery flares, and keep out of their way.

THE DESCENT: This can be a little tricky. If you follow this cardinal rule you will stay out of trouble: Don't fly where you can't see — don't go down blindly. *Either be on instruments above the obstacles or be VFR as you go below them.* That about covers it. I circle the flares keeping them out my side window where visibility is best. Use a fairly slow airspeed and avoid big power changes. When I see the ground I go for it as quickly as possible. The flares provide excellent visibility under the clouds and if they are near the pickup site, as they should be, you rarely will have difficulty spotting your target. I won't deny that problems can arise on the descent. The biggest danger is to have all the flares burn out during the descent. All you can do (besides cursing the responsible persons) is get on the instruments and climb as steeply as possible. Do not hold your altitude and wait for another flare— *climb at once.* During the descent you must be able to transition quickly from contact to instruments and back again. This point is essential and no pilot should attempt this approach if he is easily disoriented or has difficulty with the IFR contact transition. Close crew coordination is essential and cannot be over stressed. The crew must watch for the breakout and help the pilot avoid hitting flares.

We have found this method effective under many conditions of weather. Our area of operations, like much of Vietnam, is characterized by flat, populated coastal plains with a chain of mountains a short distance inland. Many times there is a combined wall of weather and mountains which sharply separate you from your objective, but often the weather at your target is fairly good. You cannot make it VFR, but you can by using instruments and flares. The method I have described was used exclusively for Dustoffs (in our area) but could be used by other units. Remember, it is not an IFR approach — it is an IFR flight with a VFR letdown. With the proper illumination you *can* see in the clouds.

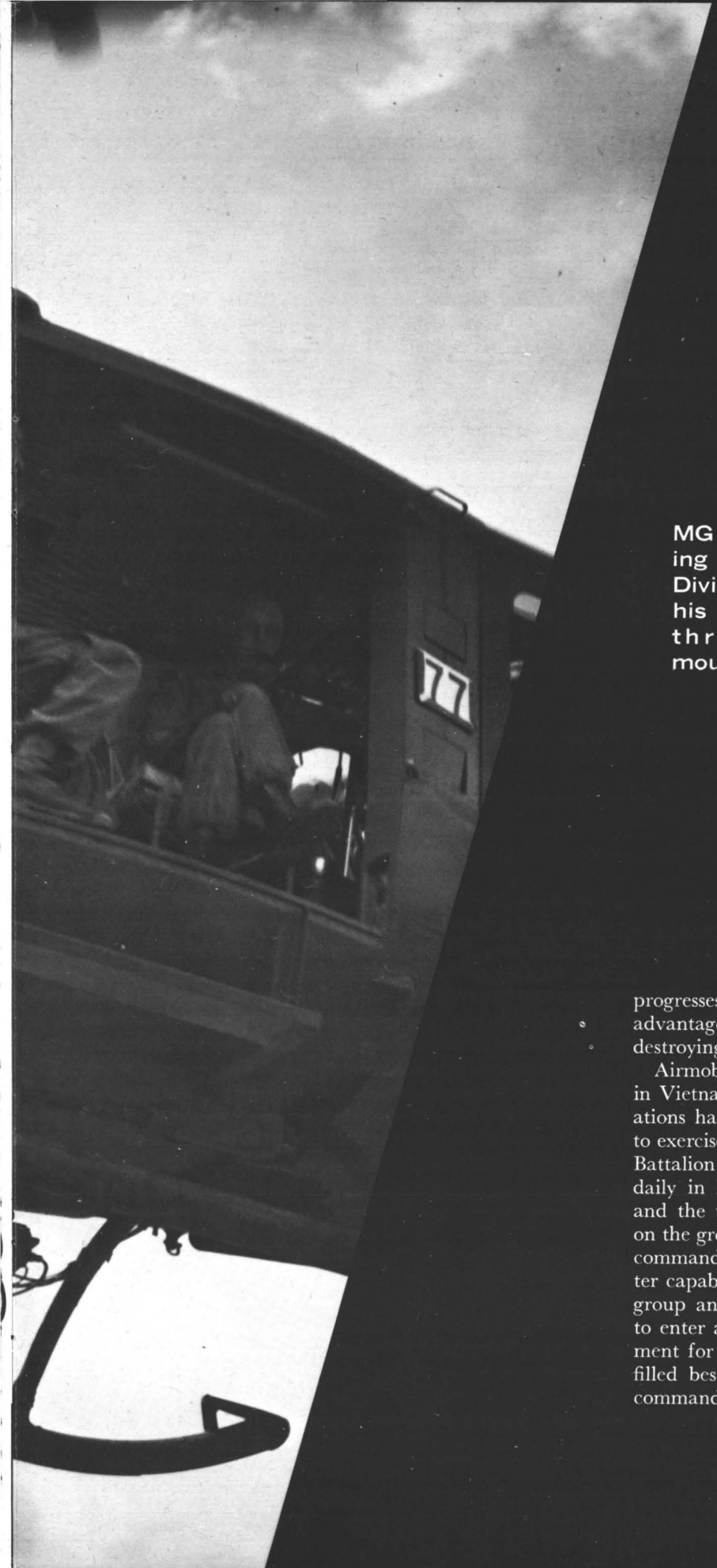
It would be nice if someone invented a device which allowed a pilot to provide, and guide, his own illumination. Something which would give the same visibility as the flares, but which the pilot could direct in front of and below the aircraft. I can think of beaucoup uses for such a machine.

The Heliborne Command Post

Colonel Robert S. Kellar

THE ARRIVAL OF two U. S. Army helicopter companies in Vietnam in December 1961 to transport units of the Army of the Republic of Vietnam initiated the buildup of an unprecedented airmobile capability. The number of helicopters in Vietnam today would have startled even the most ardent proponents of Army aviation 10 years ago.

In the past, the use of helicopters could be justified only when the mission could not be accomplished in any other way or when it was of the highest priority. Today in Vietnam, these versatile aircraft are used routinely for every function of combat. Army helicopters provide a degree of mobility that enables the ground commander to overcome the obstacles of the terrain which would normally favor the insurgent enemy. Almost every operation involves heliborne troops lifted into the battle area to initiate ground combat. These troops are reinforced, resupplied, and their casualties evacuated by helicopters. As the battle



MG William D. Depuy, commanding general of the 1st Infantry Division (facing out) speaks to his troops in battle below him through an AN/ARC-121 mounted in his UH-1D helicopter

progresses, units can be recycled by air into more advantageous positions to facilitate their mission of destroying the enemy.

Airmobile operations have become a way of life in Vietnam. The scale and complexity of these operations have required commanders to take to the air to exercise their command and control responsibilities. Battalion and brigade commanders spend many hours daily in helicopters controlling airmobile operations and the tactical employment of their combat forces on the ground. To properly exercise this control, these commanders must have available to them a helicopter capable of carrying a four- or five-man command group and equipped with adequate communications to enter all of the necessary radio nets. This requirement for a heliborne command post is presently fulfilled best by the UH-1 Iroquois helicopter with a command radio console installed.

(continued)

Heliborne Command Post

The equipment, techniques, and procedures employed in heliborne command posts are constantly being updated and refined as a result of experience gained in Vietnam. Information of this type should be of particular interest to personnel anticipating assignments to tactical units in that theater. This article highlights the evolution of the heliborne command post and the procedures and techniques associated with this means of control which have been successfully employed in Vietnam.

The heliborne command post (HCP) is a fairly recent innovation. During the Korean War, the H-13 (now OH-13) helicopter was used for command visits but the requirement did not exist for the exercise of command and control of ground combat operations from the air. This was rather fortunate perhaps because our helicopter inventory at that time was very limited. The H-19 (now UH-19) helicopter had the prerequisite lift capability for an HCP, but the ground observation from the passenger compartment was quite inadequate, if not impossible at times.

The French use of large-scale airmobile operations during the Algerian revolution generated the requirement for a flying command post. French helicopter units were sent to Algeria in 1956 to provide an improved reaction capability against the rebel forces. In their early airmobile operations, it became obvious that an airborne command and control group was necessary to properly control the various elements of the airmobile task forces. The French field manual on air operations in Algeria describes this concept as follows:

> **The Flying Command Post is formed by the two ground and air commanders in an aircraft equipped with communications capable of providing links with the higher echelons of command, the troops on the ground, the airfields, and the flying aircraft.**

Although the French used both fixed and rotary wing aircraft for these flying command posts, helicopters were preferred because they provided better ground visibility and enabled the ground commander to land when necessary to personally influence the ground action.

By 1960, the growing emphasis on airmobility in the U. S. Army germinated a frustration on the part of the airmobile task force commander — the commander of the ground forces involved in the operation. If he did not fly in the slow-moving H-13, he was relegated to sit in the "box" of the H-19 or the H-34 (now CH-34) helicopter during the air movement portion of the operation and hope that everything was going well. Rudimentary efforts were made to tie him into the aircraft communications system, or his radio operator would stick the flexible antenna of a ground radio out the door of the helicopter. Neither solution worked well. At that time we did not have an adequate aerial vehicle to permit the commander to exercise his command and control functions while airborne.

A suitable vehicle to serve as a platform for the HCP was found in the UH-1 helicopter. In 1960, eight of the first UH-1As were assigned to the 101st Airborne Division for troop testing. The potential of this aircraft as a command post was readily apparent because it provided excellent visibility of the ground from the passenger compartment. At Fort Campbell, Ky., the UH-1 was used in the command post role with ground radios carried in the passenger compartment. Later, "jerry-built" radio packages were fabricated in an attempt to improve

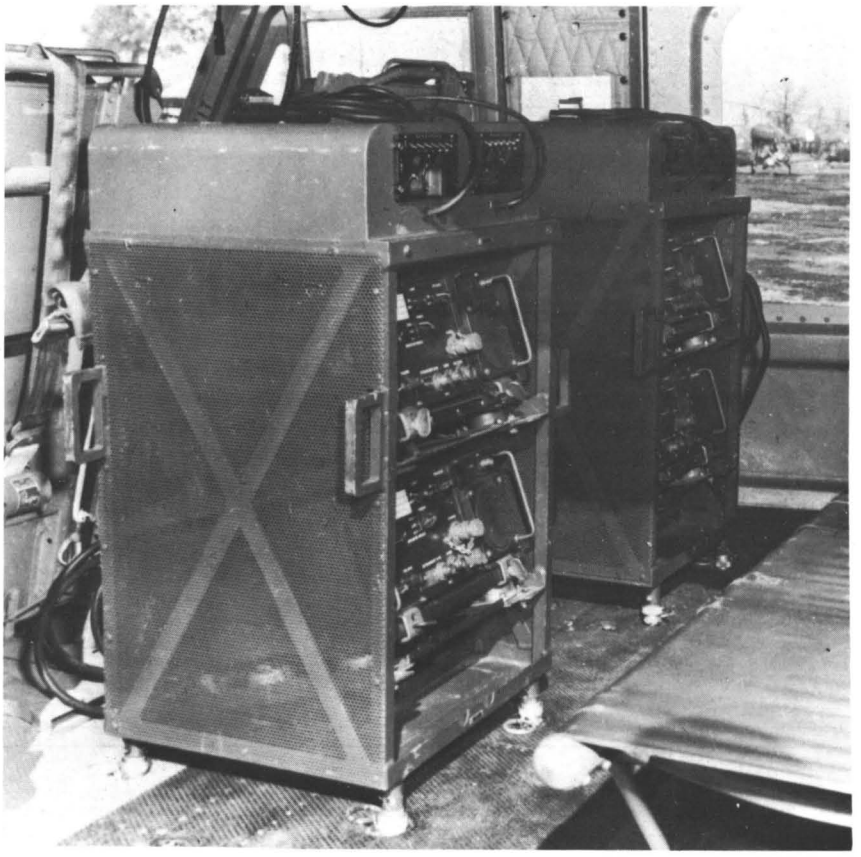
During the Korean War the H-13 helicopter was used extensively for command visits. Here LTG James A. Van Fleet, commander of the 8th Army, arrives at the MLR during a tour of the front

the command communications capability.

As more UH-1 helicopters entered the inventory and were assigned to other tactical units, additional commanders began to use the UH-1 as an HCP. While these commanders could observe the ground action from the UH-1, they did not have sufficient radios to enter all of the required nets and often were frustrated with the intermittent reliability of their available communications.

In 1963, the ever-increasing number of airmobile operations being conducted in the Republic of Vietnam (RVN) created a definite requirement for the use of an HCP. These operations were conducted by units of the Army of the Republic of Vietnam (ARVN), accompanied by their American advisors and supported by U. S. Army helicopter units. The typical command group in the HCP consisted of the ARVN commander, his senior U.S. advisor, the air liaison officer and an artillery advisor. The U. S. Army aviation element commander or his operations officer was considered a member of the command group and occupied the copilot's seat.

To exercise effective command and control of these fast-moving operations, it was essential for the command group to have the ability to enter several radio nets simultaneously. The ARVN commander required a frequency modulated (FM) radio to control his ground units. The senior U. S. advisor needed a second FM set to communicate with the American advisors who were with the ARVN units. An ultra high frequency (UHF) radio was necessary for the air liaison officer to maintain contact with the forward air controller directing the combat support aircraft strikes. In addition, a high frequency single side band (HF SSB) radio was required to enter the corps air support operations net. The aviation lift commander could use the helicopter's organic FM and UHF radios to exercise control of his aircraft.



An experimental console developed by the 11th Air Assault Division in 1965 at Ft. Benning for use in the heliborne command post

To meet this requirement, several versions of consoles containing the necessary radios were constructed and installed in HCPs and their effectiveness in the combat environment evaluated. These early versions of the console provided adequate communications for the command group, but their size and weight were unacceptable. They partially blocked the observation of individuals sitting in the rear center seats and prohibited any lateral movement within the passenger compartment. The added weight was a crucial factor in maximum gross weight and center of gravity considerations for the helicopter. Follow-on consoles were designed and fabricated to eliminate these deficiencies.

Both aircraft-type and ground-type radios have been used in various versions of these radio consoles. Combat Developments Command has recently recommended that the console with ground-type radios be issued for use in HCPs used by ground tactical units. This type console was selected because it contains VRC-type FM radios which ground tactical units use and have the capability to maintain. It can be removed easily from a helicopter that is down for maintenance and readily installed in any replacement UH-1 helicopter. The latest consoles include controls which provide the capability for secure voice operation of the FM radios. Techniques of employing

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the HCP differ considerably between units. The composition of the command group and the equipment configuration of the helicopter vary according to the type of operations being conducted and the resources available.

The typical employment of HCPs can best be illustrated by describing their use during an assault operation by an infantry battalion in the airmobile division. This unit is structured and equipped specifically to exploit the airmobility concept. Each brigade is authorized five UH-1 helicopters for use by the brigade and battalion commanders as HCPs.

In the operation to be described, an infantry battalion, supported by one of the two assault helicopter battalions organic to the division, has the mission of making an initial heliborne assault into an enemy-controlled area. Prior reconnaissance has been performed and a detailed plan prepared to support the operation. The operation order specifies that preparatory fires will be used to support the landing. Tactical air, tube artillery, and helicopters from the division's organic aerial rocket artillery battalion will fire in accordance with a prearranged time schedule.

The infantry battalion command group in the HCP for this operation consists of the commander, the S3, the artillery liaison officer and the air liaison officer. The battalion sergeant major and one or two ground radio operators with PRC-25 radios may accompany the command group if space is available.

In the airmobile division, unlike other units, the ground commander and the helicopter battalion commander normally do not ride in the same helicopter. The helicopter battalion commander has his own HCP which is equipped with one communications central for the use of his command group. This arrangement permits greater flexibility for both commanders by not limiting their individual freedom of movement during the operation.

After the first lift is on the ground, the infantry battalion commander may desire to land in the objective area while the helicopter battalion commander deems it necessary to supervise the refueling activities or the loading of the next lift. Once the battalion lift is completed, the requirement for separate HCPs becomes mandatory. The infantry commander needs his HCP to control the ensuing ground combat operations. The helicopter battalion HCP will be used to coordinate the lift of other infantry battalions into different objective areas.

To insure that the preparatory fires are properly located and adequate, the infantry battalion HCP leaves the pickup zone (PZ) in sufficient time to arrive in the vicinity of the landing zone (LZ) to observe the initial air strikes. The forward air controller (FAC) in a separate aircraft is directing the strikes. The air liaison officer in the HCP maintains contact with

An Army officer coordinates the various elements of a helicopter assault from a heliborne command post aboard a UH-1D

the FAC on one of the four available FM frequencies in the communications central. The artillery liaison officer is tied in with the fire direction center on a second FM frequency. The other two frequencies are set on the brigade and infantry battalion command nets and are used primarily by the battalion commander and the S3. Each member of the command group can monitor all four frequencies but by prior arrangement has primary responsibility for a specific channel. Necessary coordination within the HCP is accomplished over the intercommunications system.

The artillery liaison officer directs the tube artillery to commence firing when the FAC indicates that his aircraft are completing their last firing run. He observes the initial volley and adjusts as necessary to place the fire as desired by the infantry battalion commander.

In the meantime, the troop helicopters have lifted off from the PZ and are enroute. The helicopter battalion HCP accompanies the lift to provide navigational assistance, to supervise suppressive fires along the flight route by the battalion's organic aerial weapons helicopters, and to report any deviation from the air movement plan to the infantry battalion HCP.

The command group in the helicopter battalion HCP includes the

Troops arrive in the LZ as artillery lends fire support

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commander, the S3, the S2 or the flight operations officer and the sergeant major. The battalion commander, occupying one of the pilot's seats, uses the aircraft UHF radio to control his formation. He has the aircraft FM radio on the infantry battalion command net to maintain continuous contact with the infantry battalion commander. The S3 has one set on the helicopter battalion command net. The other FM set is used to monitor the appropriate nets involved in directing the preparatory fires from the infantry HCP. This arrangement provides the helicopter battalion with the latest information regarding the situation in the objective area.

The helicopter battalion commander reports that the formation is approaching the release point (RP), which is three minutes out from the LZ. In the infantry HCP, the artillery liaison officer gives instructions for the tube artillery to fire the last volley, which has been prearranged to include one round of white phosphorus to indicate visually that the preparation is complete. He then alerts the aerial rocket artillery (ARA) platoon which has been orbiting in the vicinity of the RP. The ARA platoon leader receives an "On the way" from the artillery liaison officer and positions his helicopters about one minute in front of the troop ships as the formation approaches the LZ. The ARA platoon leader observes the burst of the white phosphorus round and begins his firing run.

The helicopter battalion commander orders his armed helicopters to begin their suppressive fires when the ARA portion of the preparation is completed. As the troop helicopters approach the LZ, the doorgunners open fire with their machineguns providing additional covering fire until just prior to touchdown. A subsequent report from the ground that the LZ is secure is welcome news to the HCP. A transmission on the intercom is not necessary for the infantry battalion commander to indicate to his staff that he is pleased with the coordination of this operation — a silent nod and a smile express his feelings.

The success of this operation can be attributed to the control which the infantry battalion commander had over all of the elements in the airmobile task force. This degree of control was possible only because he and his staff were in an HCP. If at any time during the operation a modification or a radical change in plans had been required, the necessary details could have been coordinated with all of the elements involved in a matter of seconds.

BG Sidney B. Berry, Jr., in his *Observations of a Brigade Commander,* states that "The brigade commander cannot afford to be without instant access to his helicopter [HCP]." This conviction is typical of Vietnam-experienced brigade and battalion commanders and emphasizes the importance of the continuous availability of this type of control facility. During the crucial phase of an operation, even the routine refueling of the HCP becomes a critical factor. For this reason, forward refueling facilities must be established for the HCP

The 11th Air Assault Division experimented with heliborne command posts during maneuvers at Ft. Benning in 1965

and the refueling of the helicopter planned so that there will not be any interruption in the control of the operation. The commander always must be aware of the time remaining before the aircraft must be refueled.

In the event a replacement helicopter is not available, scheduled maintenance also must be performed so as not to conflict with the commander's anticipated use of the HCP. Usually the crewchief can accomplish all of the scheduled maintenance, except the "periodic inspection," without curtailing the use of the helicopter. This periodic inspection is required every 100 flying hours and takes on the average one or two days to complete.

The size of the command group and the equipment carried in the HCP are limited by the gross weight capability of the helicopter. Personnel that are not essential to the control of the operation should be left on the ground. The extra equipment on the helicopter should be inspected periodically to eliminate the unnecessary items. Many commanders require that the normal operating weight of the HCP be kept sufficiently below the maximum gross weight so that, in an emergency, a medical evacuation may be performed or a subordinate commander taken on a joint reconnaissance.

The crew of the HCP can make a significant contribution to the effectiveness of the operation. When the HCP is on the ground, the aircraft commander will frequently visit the operations tent to keep posted on the activities taking place. In this manner, the crew can anticipate when the HCP will be used and will be knowledgeable of the details of the operation. In quick-reaction type situations, this will expedite the takeoff and the arrival over the crucial point. When the crew knows what the requirements are, the aircraft can be flown in such a manner as to facilitate the observation of the command group.

The HCP is a most effective facility when properly employed. Relatively few are found outside of RVN at the present time. For this reason, the great majority of commanders and staff officers will not have the opportunity to use one until they serve in a tactical unit in Vietnam. There is a requirement for a comprehensive publication on the HCP which should encompass lessons learned so that these personnel can benefit from the experience of others. This will ensure continuing progress in the effective utilization of HCPs not just relearning what others have learned already through experience.

Commanders in Vietnam are adamant in stating their requirements for additional HCPs. Except in the airmobile division, an insufficient number of helicopters and radio consoles are authorized for this purpose. The type of operations conducted in Vietnam dictates HCPs down to maneuver battalion level. These are required not only during the airmobile phase of an operation, but also to control and coordinate ground operations more effectively. An adequate number of UH-1 helicopters and radio consoles should be placed in the organizational structure of our divisions and brigades to satisfy this requirement.

The war in Vietnam has introduced a new dimension in the realm of command and control. The HCP provides the commander with the combined capabilities of an excellent observation post, reliable communications and rapid transportation to any of his units on the battlefield. When their units are engaged with the enemy, commanders rely heavily on the HCP to enable them to observe the action, make better decisions, and personally influence the tide of battle by their timely presence at the crucial place.

Below is a view of a console inside a UH-1D tested as a heliborne command post by the 11th Air Assault Division

When The Dust Is Up

And the RPM is down

Operating in heavy dust with a high gross weight and density altitude is undeniably unsafe, and to place anyone in those conditions is quite unadvisable

WO James N. Post

AMONG THE problems encountered by UH-1C gunship pilots in Vietnam are dust and loss of rpm during takeoff and landing. These problems are particularly hazardous during the dry season since they tend to occur simultaneously.

Weight is always a problem for gunship pilots. It's not unusual to load a gunship with 1,200 pounds of JP-4, a full load of ammunition, fourteen rockets, two M-16s, chest plates for the pilots, and chest, back, and seat plates for the crewchief and gunner. Add a few miscellaneous items such as a tool kit, emergency radio, a PRC-25, a half-gallon Thermos of water, C-rations for the crew, and the pilot's movie camera, and the ship begins to nudge max gross pretty closely.

Old age and dust ingestion will rob any engine of a few precious pounds of torque, despite the efforts of the best maintenance crews. On a hot day at a field like Dalat, at about 4,800 feet MSL, the density altitude can shoot past 6,000 feet while you stand and watch it. Face it, brother, you're likely to lose a few turns trying to get that baby airborne.

Almost any place you go in Vietnam during the dry season, you encounter dust problems on takeoff and landing. Vietnam's dust is fine as talc, and near airstrips where vehicles pass frequently it can get several inches deep. On a hot, still day a loaded gunship trying to hover is pulling every ounce of power it has, kicking up a lot of dust. The heavy dust swirls up around the ship and hangs there, rendering the pilot completely blind. If he's losing rpm at the same time he's likely to be tense, regardless of how experienced he is, and the sudden loss of visibility could cause consternation.

When the pilot attempts to set the helicopter down, the reduction of pitch will permit the rpm to build, requiring a correction in antitorque pedal setting. Without visual reference for this, directional control is difficult, so the nose may swing. If the aircraft has any forward movement, the skidding motion causes lateral forces on the pilot's balance mechanism which will give him an illusion of rolling. An attempt to counter this sensation by rolling the aircraft against it could be disastrous.

Loaded gunships don't have the power to use a max-climb takeoff to clear the dust before gaining airspeed, so the dust problem becomes especially dangerous when coupled with the loss of rpm.

The gun pilot must learn special techniques to cope with this hazard. The best rule is to avoid dusty areas and keep the gross weight down, but combat conditions don't usually permit this to be followed strictly. If the aviator is forced to operate in dust at high gross, the techniques necessary require very close coordination between the pilot and copilot.

Gunships normally don't operate out of confined areas. When they're heaviest — after refueling and arming — they're normally at an airstrip, and have plenty of room for takeoff. In making a takeoff, the aircraft is first hovered to ensure that it will clear the ground and hold a constant rpm. Even though it may lose rpm in doing so, it gives the pilot an indication of how many pounds of torque his ship is capable of pulling and how much rpm he can expect to lose during takeoff. The ship is set down and rpm regained.

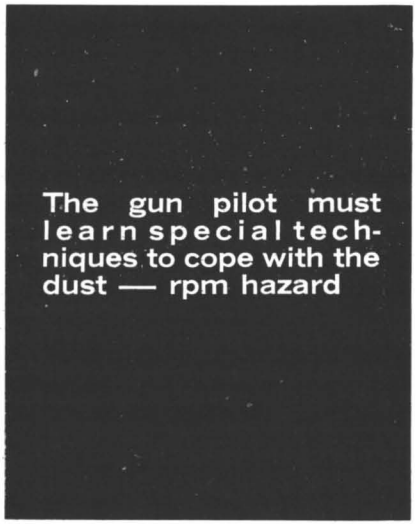
The takeoff is made by applying pitch until the aircraft just breaks ground. Sliding the skids along the ground will aggravate power loss from friction and control difficulty from uneven ground. The helicopter is allowed to move forward,

accelerating slowly and steadily. As it passes through translational lift, it will tend to settle. Power is applied until the power setting determined in the hover check is reached, or until rpm begins to bleed off. This power is held, since any further application of pitch would only cause further loss of rpm without increasing lift. The pilot must be especially smooth and steady on the controls and strive to maintain a constant nose attitude until translational lift is achieved, since any change in the rotor disc attitude robs the aircraft of power. "Jockeying" the cyclic or the pedals will hinder smooth acceleration and aggravate rpm loss.

The addition of dust to this problem makes it doubly hazardous. The necessity for slow acceleration will mean that greater amounts of dust will be blown up. So before taking off the pilot should survey the terrain ahead of him closely looking for anything which might tend to be an obstacle. He should also locate a distant object sticking up above the horizon to use as a directional control reference should dust obscure objects on the ground nearby.

The copilot's duties are particularly critical. He should be on the controls lightly with the pilot and watching the instruments closely. In order that the pilot may keep his head out of the cockpit, the copilot should call off rpm and torque readings to him. Should the pilot lose his visibility completely or rpm bleed to the point demanding an aborted takeoff, the copilot can take the aircraft and set it down by looking through the chin bubble. Even in the dustiest area, the rotorwash will usually keep an area clear up to about five feet in front of the ship. It's a slim margin, but sufficient enough that an alert copilot who knows what he's doing can get the bird down without bending it.

It's hard for the pilot to transition from the headup view to the chin bubble. It takes a fraction of a second for him to move his eyes, another fraction to focus, and yet another to recognize what he sees and act upon it. These fractions could be too much. In addition, if the helicopter is in a slip, the downward motion of the head produces instant vertigo. (If you don't believe that, next time you're under the hood have your stick buddy slip the aircraft, then nod your head up and down quickly a couple of times. It's guaranteed to tumble your gyros.) As the aircraft enters translational lift, the pilot should allow it to rise briefly before assuming a 30 knot attitude. This airspeed should be held until the ship is clear of the dust and all obstacles.


The gun pilot must learn special techniques to cope with the dust — rpm hazard

Landing presents a similar problem and the technique used is similar as well. In theory, the idea is to get the helicopter on the ground with the least application of power. To do this the gunship pilot makes a long, flat approach, keeping his airspeed up planning to lose translational lift as late in the approach as possible. By using a shallow approach, the aircraft is brought to low hovering flight in translational lift. The descent rate is halted primarily by the deceleration of the ship, rather than the application of power. Like the takeoff, the copilot is on the controls and watching out the chin.

The aircraft will lose translational lift in level flight two to three feet above the ground. Power is applied only to prevent rapid settling and to decelerate the aircraft. As this power is pulled in, the dust cloud will begin to form. In the few seconds it takes the dust to become too dense for forward visibility, the pilot makes an approach to the ground with the copilot ready to take over if necessary. Using this technique, the pilot need never pull the dust-creating, high-power settings until the very last seconds of the approach. By that time, the aircraft is low enough and slow enough that the copilot will have a clear view of the ground immediately below the aircraft and a safe landing can be made.

I once heard a student pilot say he thought flight school was made deliberately more difficult than the day-to-day flying of a rated aviator so that tight situations would seem routine when he got his wings. I suspect he has learned by now that flight school training should give the aviator the ability to cope with almost every difficult situation he would ever encounter. Some conditions are simply too dangerous to use regularly in school situations. Operating in heavy dust with a high gross weight and density altitude is undeniably unsafe, and to deliberately place any aviator, student or instructor, in those conditions is quite unadvisable. But the demands of combat flying do not always permit the avoidance of such dangerous situations, so the aviator must be prepared to deal with them. A thorough understanding of the hazards involved and the techniques used to cope with them, and a high sense of discipline toward flying will substantially reduce the chance of mishap.

Observation Techniques

By following a few simple rules, armed helicopter crews can greatly increase the flow of valid intelligence information

CW2 John P. Daum

AS A RECONNAISSANCE vehicle the armed helicopter has opened new vistas in obtaining the tactical information necessary for the proper employment of our forces against the Viet Cong. However, the armed helicopter can be utilized with a much higher degree of accuracy if a current trend observed in many armed helicopter crews is reversed, i.e., a marked failure of many crews to report valid intelligence information because the crews are not observing or are unaware of the importance of salient ground features and/or evidence of personnel movement or localization. The following examples, if actively followed, will provide a basic foundation for obtaining information that otherwise would be lost.

Most of us are well aware of the fire power that can be brought to bear by the armed helicopters. If you are engaged in a reconnaissance in advance of a troop lift and come across any enemy concentration that does not fire at the aircraft, pull out of sight and hearing. Have artillery or air hit the area just prior to the lift. If this is not possible, delay your strike until 3 to 5 minutes before the lift is due. Knowing that armed helicopters normally attack them when they are sighted, the Viet Cong usually assumes that he wasn't spotted. Delaying your strike or arranging for artillery or air generally offers another advantage. It often takes a while to arrange for air or artillery strikes and during the time lapse, the enemy normally begins to move about. Obviously many more casualties can be obtained if the VC are caught in the open.

A further advantage develops when the troops are placed on the ground during or just after the strike. They stand a greater chance of catching the Viet Cong by surprise and should suffer few casual-

ties seizing the objective with the enemy in a state of confusion and probably away from his prepared defensive positions.

Unless you are in direct support of troops on the ground or on a reconnaissance by fire mission, use your fire power for defensive purposes only.

Some good rules of thumb follow and should be adhered to when searching an area for Viet Cong.

• Family shelters, bunkers, etc., are indigenous to Vietnamese villages and homes after years of strife, but should still be considered highly suspect and watched with a wary eye.

• Trenches in or near villages almost always mean present or prior Viet Cong occupation, depending on the age of their construction.

• Old fox holes or trenches as well as new ones can hold insurgents and should be reconned thoroughly. Look for recently used paths, fresh leaves or brush, absence of natives, etc. Don't be misled by fox holes with water standing in them, the Viet Cong often burrow sideways in these holes.

• Normally the Vietnamese farmer does not allow weeds and other alien growth in his rice fields. Check such clumps of vegetation very carefully, they may be camouflaging the Viet Cong.

• Most canals have a slow current depending on the tidal action. Clumps of floating vegetation should travel in the direction of the current, not against it, or from side to side.

• Search from the bases of trees and bushes inward, or on a slant angle. It is usually impossible to see anything when looking straight down into heavy vegetation.

• All haystacks and stacks of rice stalks in fields should be reconned carefully. Haystacks with any type of opening should be approached warily and always treated with suspicion.

• While flying over swamps or mangroves that are under tidal action remember that tracks made in the mud fade with each tide and can be easily distinguished from fresh tracks.

• Any small object located on a tidal flat, especially one that is almost completely covered at high tide, should be examined. The Viet Cong often wear mud colored clothes and hats and crouch down with only the top of the hat above water.

• If a camouflaged house, hut, individual, or anything suspicious is discovered in a swamp or mangrove, it should be immediately marked with smoke as it is often impossible to relocate after losing sight of it.

• Cleared areas along canals in apparently uninhabited sections are often used for loading and unloading supplies. The surrounding area should be carefully searched for camouflaged supply or arms caches.

• The enemy sometimes follows groups of water buffalo or drives them before them. Any number of apparently untended water buffalo that appear to be traveling in a more or less straight line should be considered as harboring or being driven by the Viet Cong.

• A group of water buffalo with young men on every one, or every other one, should be examined very closely.

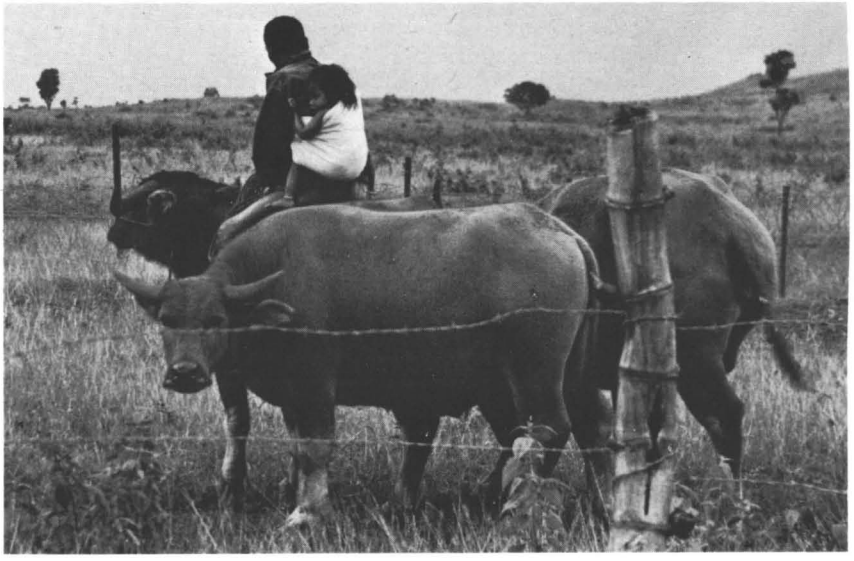
• If you are fired at while flying on a low level recon, break away from the fire remembering that if you climb, you will be in the enemy's sights much longer than if you go down to ground level.

• When smoke is thrown to mark fire, remember that the smoke grenade will travel forward under the influence of the aircraft's speed. Return fire should be directed behind the smoke.

• Do not mistake the many flashes of light from huts and cooking fires at night for gun fire. Muzzle flashes at night appear as orangish-white flashes and once seen should be easily identifiable.

The preceeding examples constitute a base only, but if they are consciously applied while performing reconnaissance missions and constantly added to as your own experience and skill grows, the value of your intelligence reports will increase tenfold and materially aid in the completion of your mission.

A lone farmer and a child on a water buffalo (below) is not a cause for alarm. But, a large number of young men riding buffalo could mean trouble



STRESS

Since each of them is worthy of a separate discussion, the author does not attempt to discuss the multiple stresses affecting Army aviators; i.e. environmental extremes, fatigue, combat. Instead the article is directed primarily at the stresses arising from individual emotional factors and from interpersonal relationships. This type of stress is difficult to define or detect, but can be just as detrimental as the more obvious types of stress.

Major John D. Albright

MOST OF US who are associated with aviation have a good concept of the engineer's meaning of the word "stress." Most of us have also used the term as applied to individual human beings and to their interpersonal relationships.

Contrary to the physical environment where stress can be measured and quantified, "stress" in the human sphere is more evasive. Yes, we know how much shearing force is required to break the average human leg, but how do we determine how much "force" it requires to damage the human psyche? It is only the psychopath who does not feel anxiety and is not subject, in the ordinary sense, to emotional stress. What then constitutes stress for most of us average human beings? A wise man once said, "Stress is all things to all people." Our perception of an event or situation as being stressful is dependent upon our own individual personality make-up, which in turn is dependent upon our heredity and our previous experiences in life, none of which we can willfully change. Often it is not the actual intrinsic threat in a situation to which we react as being stressful; rather, we react to the symbolic meaning which our emotionally biased perception attaches to an event. We all have our own system of emotional values. For example, while the rejection of one of our ideas by a superior may not be threatening to some of us, it may be devastating to others.

Perhaps now we can assume that all of us are subject to emotional stress, that what constitutes stress varies as we as individuals vary, and that stress can cause detrimental effects in our lives. We should now offer some approach on how to deal with stress on a rational basis. Before we do, however, we should remind ourselves of the limitations of reason. We realize that human emotions are not often a result of purely reasonable or rational processes. While emotional responses can be dealt with, to some extent, by the application of logic, we must realize that reason alone may not always be sufficient. In spite of these limitations, reason can often help to overcome a stressful situation and, being readily available, should always be attempted. What then is a reasonable approach to coping with emotional stress?

The first step, of course, is to recognize that emotional stress exists. Most of us are able to do this when we recognize anger, fear, hostility, anxiety or other emotions which exist in us to such a degree as to be unpleasant. Once we recognize that stress exists, we should attempt to identify the source of the stress. Is it a result of a personality clash between ourselves and a superior, subordinate, or family member, or is it a result of the general situation in which we find ourselves?

Once the source of emotional

stress has been identified we should define, almost in a military sense, our alternatives. Are we in a position to alter our environment in such a way as to make it less stressful to us? Often subtle changes in our own value system and method of response to a particular situation (i.e., seeing it in perspective) can change a nearly unacceptable situation into a tolerable or even a rewarding one. Finally, when we have made those alterations within ourselves of which we are capable and we still feel the detrimental effects of a stressful situation, we have two further methods of attack which are often helpful. Frank discussion with a flight surgeon, chaplain or trusted friend often helps us to view situations more objectively when we see our situation as perceived by an unbiased but understanding third party.

The other approach which is almost always helpful is active participation in some recreational activity, preferably of a physical nature. Vigorous physical exercise serves as a non-specific outlet for emotional frustrations and while the effects are temporary it often releases large amounts of tension. This form of assistance is something which is usually readily available to all of us, but seldom utilized to the extent that it should be.

So far we have discussed some things which we as individuals can do to decrease or modify the detractive effects of stress in ourselves, but even a brief discussion of such a topic would not be complete if we did not mention our influence upon this problem in others. In our busy world of sophisticated technology and efficient machines, we can easily forget that technology exists ultimately only to serve man — man does not exist to serve the machine. Machines need only maintenance and lubrication, but man requires more than the simple adjustments of fixing broken bones and repairing torn flesh — man must have meaningful relationships with other human beings if he is to live, in the broadest sense, rather than merely exist.

The stress of some interpersonal relationships can be prevented or reduced if we develop and display genuine respect for our subordinates, peers and superiors — they all have some good qualities. This need not imply formal recognition, although this is occasionally appropriate, but merely the reflection by our every day attitudes, that we do appreciate the individual's contributions and his intrinsic value as a fellow human being. A smile, a "thank you," a willingness to listen, requires so little from us, but means so much to those who must work with us.

In summary, it is evident that emotional stress is present to some degree in all of our lives. It may exist to such an extent as to interfere with our contributions to and our enjoyment of meaningful human relationships. A few simple suggestions have been made which may assist in coping with stress.

Vigorous physical exercise is an outlet for emotional frustrations and often releases large amounts of tension

Your Job . . .

Combat Infantryman Or Aviator? (or both?)

CW2 Irvin W. Hawkins

Many young aviators feel that once they receive their wings their only duty will be flying. But they received basic combat training for the purpose of fighting as infantry when necessary

DURING THE EARLY weeks of January 1968, many intelligence reports were received from higher headquarters stating that the NVA (North Vietnamese Army) would launch attacks against American installations in the Kontum Province. Numerous sightings of enemy movement, staging areas and overnight bivouacs were reported by civilians in the hills to the north and east of Kontum City. Several villages in the immediate area came under heavy attacks by NVA elements almost daily to convince the local populace that the Americans and South Vietnamese soldiers could not protect them. Only one American installation was mortared during this time, however the enemy conducted probing actions around the perimeter of our assault helicopter company, consistently for nearly two weeks.

Each morning at approximately 0200 hours the probes would begin with a burst of automatic weapons fire outside the triple concertina fenced area. Since none of these probes caused injury to personnel or equipment damage, the troops became lax, paid little attention to these probes and were seldom awakened during the night. Because we were protected by infantry and cavalry units on all sides, helicopter maintenance crews worked during the nights without weapons or additional security guards. In general it was felt that if the enemy did launch an attack against our unit, it would consist of mortars only and would not be followed by a ground attack.

Later, due to a heavy troop commitment around Dak To, and southeast of Kontum, most infantry and cavalry units were pulled out and our assault helicopter company was required to provide se-

curity for the airfield. The company, having just arrived from the States three months earlier, was improving its living conditions and constructing a new mess and billeting area on the northern perimeter. The triple concertina fence was expanded to encompass the new billets and to allow for greater observation and fields of fire, with more bunkers incorporated in the defense system. This fence was only partially completed when we received our first attack by NVA forces.

Many young aviators feel that once they receive their wings their only duty will be flying. We must never forget that upon entering the Army we received basic combat infantry training for the purpose of fighting as infantry if the case presents itself. This was the situation on the night an estimated NVA Sapper Company penetrated our defenses through the uncompleted fence and launched a three-pronged attack using highly trained and well organized personnel.

The helicopter maintenance area and vehicle park was hardest hit, catching maintenance personnel by total surprise, unarmed and working at their assigned duties. The enemy, operating in teams of two or three men, moved swiftly through the maintenance area placing satchel charges (a small plastic explosive with firing device) in each helicopter and vehicle. Other members of the team supported the operation with automatic weapons fire.

The exploding satchel charges were mistaken for incoming mortar rounds by soldiers in the billeting area and most of them sought cover in the bunkers between tents. Approximately 30 minutes elapsed before everyone realized what was happening. Then they proceeded to repel the attack and drive the enemy out of the area.

Miraculously only light casualties were sustained by our personnel. However, equipment, helicopter and wheeled vehicles suffered heavy damage. After the attack everyone became more concerned with the physical aspect of security. The attack by the NVA prepared our unit for the TET offensive which would come on 31 Jan 1968.

The entire company began extensive preparation on bunkers, fences and claymore mines. Our unit procured mortars and set up firing pits with illumination rounds

to fire in case of emergency. We learned that the NVA launched their attacks generally between the hours of 2400 and 0300. We never disregarded any intelligence reports no matter how far-fetched they might seem. And we certainly recognized the NVA for the well trained and hard core fighting men they were. With these things in mind we set up a security force that was active 24 hours a day to meet any enemy threat to our perimeter.

The entire unit, spending more time in foxholes than helicopters, was ready to react swiftly to any infiltration, probing action or disturbance around our perimeter. During the TET offensive we got our chance to prove our infantry skills and the hard preparation paid off well.

The enemy used the same intelligence they had gained from our unit on the pre-TET attack, charging from the east, hitting our maintenance area. They must have felt it would be quite simple to overrun our perimeter for they charged with fixed bayonets, satchel charges and B-40 rocket launchers. The estimated battalion size unit hitting our company was stopped cold when we opened fire with intense automatic weapons fire from each foxhole and bunker. The entire city of Kontum was surrounded by an estimated regimental (NVA) size unit, hitting all military installations simultaneously.

We were able to get four gunships airborne, due to the intensive firepower our troops placed on the enemy, and they inflicted heavy casualties on the enemy, throughout the Kontum City area. If we had not been able to get our gunships airborne, to knock out the mortar and rocket firing positions, I feel that our forces would have suffered heavy casualties. Equipment losses for our company were light and the unit did not lose a man during the entire offensive. This can be attributed to the quick reaction by our personnel in a critical situation and the ability to fight as infantry in an emergency.

Although the TET offensive was only one of many campaigns launched against Allied Forces by the NVA and Viet Cong, aviation units throughout Vietnam are shocking the enemy with their ability to withstand and repel attacks with the expertise and professionalism of seasoned infantry units.

The Road Home

When I reached medical aid, the most pressing thought on my mind was, what happens to me now that I'm here

CW2 Jerry A. Temposky

IN THE nine months before coming to Vietnam, my whole existence had been oriented to flying a helicopter in Vietnam, but the thought of being killed or seriously wounded had never been more than casually considered. I had taken the necessary precautionary legal steps but, as in most things, I really felt it couldn't happen to me.

In March 1966, while returning from a routine escort mission, our fire team was instructed to join and provide armed escort cover for a medical evacuation Dustoff ship already enroute to Happy Valley. This area, which is east of An Khe (the 1st Air Cavalry Division's sprawling base camp) had been relatively quiet for some time.

We made contact and shortly thereafter were tailing the Dustoff aircraft. An Air Force 0-1 Bird Dog led the three aircraft to the friendly position, and the American patrol identified itself with a colored smoke grenade. Our fire team established an overhead orbit while the Dustoff ship slowly descended to the column of rising yellow smoke.

Suddenly, as is often the case, I heard three or four sharp cracks. As a reflex, I grabbed the machine-gun sight and began searching for the enemy below. Then I heard the sound of plexiglass breaking and felt the hot burning sensation throughout my right side. I was hit!

As we raced to An Khe, the crewchief placed a tourniquet, made of my web belt and the rotor tiedown, above the wound on my thigh. The trip seemed like

a long one, but 15 minutes later we landed at the 2nd Surgical Hospital. In moments I was on the examining table and preparations were underway to save my leg. An artery had been severed and muscles and nerves heavily damaged. In 10 minutes I was receiving the anesthetic.

My wound was not an uncommon one, and those of many others often happen under similar circumstances. But now that I had reached medical aid, the single most pressing thought on my mind was, what happens to me now that I'm here. Nowhere in the classes and orientations I had received on Vietnam was any information given on what to expect upon becoming a casualty, or what one's family should expect.

This story is normal in that it is a typical example of the road to recovery for Vietnam casualties.

Upon waking from surgery in the intensive care ward, one is, of course, in a somewhat semi-awake state and all sorts of frightening thoughts race through the mind. A quick look is always instinctive to see if a wounded limb is still there. The first reaction I had, and one that other aviators have had, was to realize that I still had my leg and would be able to fly again someday.

The medical evacuation system in Vietnam is arranged so that casualties are always taken to the nearest medical facility having the capability of providing the required care. After three days at the 2nd Surgical Hospital, I was flown to the large 67th Evacuation Hospital in Qui Nhon. Most patients can expect a 3 to 4 week stay. By now, many are able to write a few precious lines home, or can possibly say a few words on a recording tape to be mailed home. For any who are unable to write, the Red Cross workers are on the scene daily and will gladly assist in letting the folks at home know you're O.K.

It only takes a few moments to see the dedication and competence of the doctors, nurses and medical corpsmen. As in all past wars, these people who bathe, feed and care for the injured are a very important morale factor. I and many others feel a deep life-long debt to these people in white.

Soon you are ready to leave Vietnam and begin the long road back home. This now comes under the U. S. Air Force Military Airlift Command Aeromedical Evacuation Service, with headquarters at Scott Air Force Base, Ill. A few patients are flown directly to the United States, with most of the aircraft arriving at Andrews AFB, Md., or Travis AFB, Calif., where an overnight stay is usually in order before moving on to various Army hospitals. But for most, though, it's a C-141 ride to Yokota AFB and then to one of the large hospitals in Japan such as the 106th General Hospital in Yokahama and the U. S. Army Hospital at Camp Zama. Aboard the air evacuation aircraft are good medical facilities. Usually there are two or three registered Air Force nurses and complete medication for every patient on the flight. Meals are served and friendly corpsmen are frequently checking on your condition.

At these hospitals major recuperation takes place. Further surgery is often performed to correct conditions that might have developed since your initial treatment. Once at these hospitals, practically everyone is able to get that important call through to home. At this point many run into morale problems. Since life is centered around your bed, it is important to keep busy. The Red Cross provides library service, and many patients build model airplanes and cars or take part in various game activities.

When the doctors have determined what type of further treatment or therapy a patient needs and that he is in condition to travel, the paperwork begins for sending him back to CONUS. Three main factors are considered in determining the hospital to which you will go: the type of further treatment necessary, available space and home of record. All efforts are made to get everyone as close to home as possible with the other factors considered.

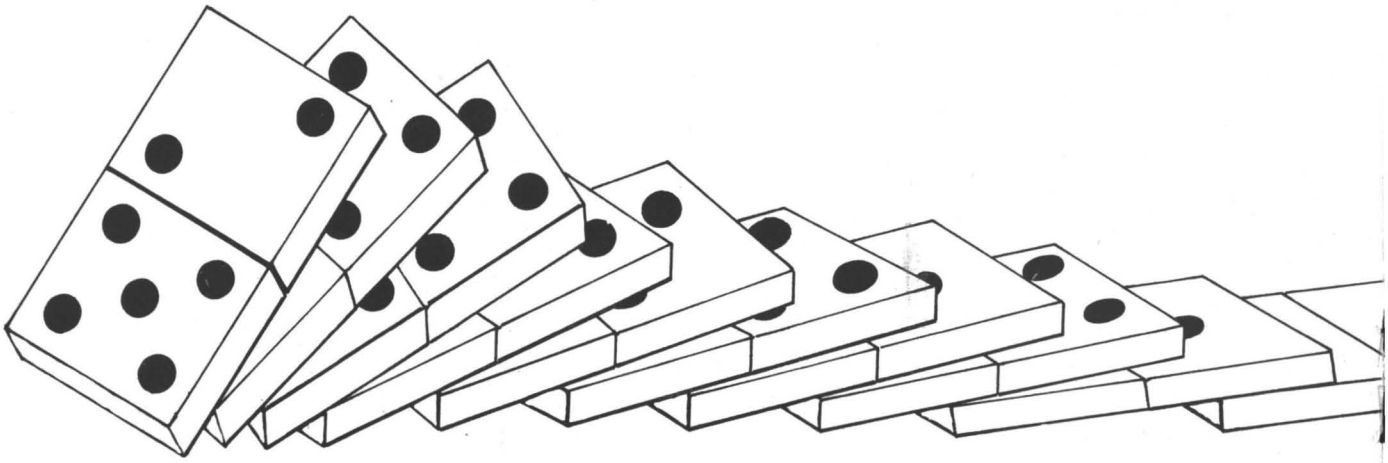
Soon the flight is underway and the huge C-141 Starlifter comes home. The night's rest in the base hospital is difficult for most patients, after sleeping during the flight.

The next day flights take off for all parts of the country with the Military Airlift Command still in charge. In my case destination was Irwin Army Hospital at Fort Riley, Kan. Here, after the minimum time necessary, a convalescent leave is arranged. No matter if one is walking, using crutches or is in a wheel chair, the trip home is now for real.

Many patients on leave gain back so much lost strength or movement in an injured area that further hospitalization is not required and usually additional leave is granted. For others, brief periods in the hospital are mixed with leave time. At this hospital, physical therapy is the single most important item. Weight lifting, exercise, and above all else, determination will speed anyone's permanent exit from the hospital. Now your doctors will complete the usual necessary profile information and the request for orders is placed.

As in my case, many aviators return to Fort Rucker and other flight training areas and work in the various flight training branches until they are able to return to flight status.

My story is not an unusual one, and anyone going to Vietnam can feel confident that the very best of everything will be his if he is injured.



But It Was Only

. . . behind the scenes "little mistakes" began to mesh to crea

Major Duane L

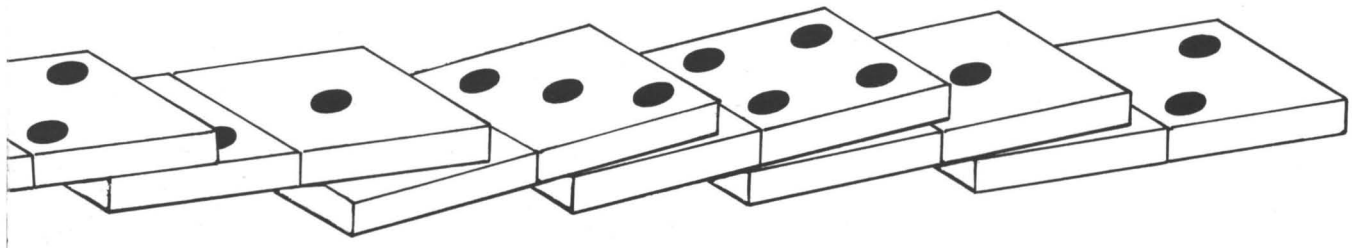
WHEN A LITTLE mistake is made the consequences are usually proportionately small. But what happens then if a number of these small, inconsequential mistakes occur simultaneously or over a short period of time? To answer this question let's reconstruct a night's activities at one of the Department of Tactics' field sites at the U. S. Army Aviation School, Ft. Rucker, Ala.

The afternoon training had been smooth and all preparations had been completed for the night solo training. Flight plans were posted, the support had been emplaced, and a lone student who had failed to solo the previous night had been assigned an IP and a new call sign — Saber 21.

At 1900 hours the first solo aircraft lifted off the TAC site on one of the three navigation routes. Saber 21 had taken off 10 minutes prior to the solo launch and reported to tactical FCC that they were proceeding on the western route at 1851 hours. At 1931 hours the tower reported all solo aircraft had been launched. The operations personnel sat back to wait for the first aircraft to recover and to monitor the calls coming in on the three FCC radios. All was well on this solo night. The operations officer even had the nerve to say it looked like a real dull evening.

Not more than two minutes after that statement was made the atmosphere in the operations tent was altered greatly. A Mayday call from Viper 32 was monitored by the U-6 control aircraft and relayed to FCC. After a quick check with the U-6 it was ascertained that the only problem with Viper 32 was a strange vibration and that he was only a mile out of TAC 36. The operations officer, assuming Viper 32 was still airborne, asked if he could make it to TAC 36. An affirmative answer was relayed through the U-6 and operations initiated a routine SOP incident report and began aircraft recovery.

However, a strange transmission over the FCC frequency brought the operations officer running to the radio. "Be sure you hover it before you try to take off. If it still vibrates, set it down." *An error had been made.* Quickly the operations officer explained to the U-6 that if Viper 32 was on the ground he should stay there. This message was relayed and the U-6 confirmed that the aircraft was



A Little Mistake

te a completely confusing and unbelievable turn of events

Ginter

shutting down with no damage. Well done — it was just a little error and was easily rectified.

The operations team followed a familiar routine to get maintenance to the downed aircraft and write up the report. About this time the FCC operator had to ruin it all by reporting Saber 21 overdue by 20 minutes. Another trip to the radio for the operations officer. Just as he arrived the radio reported loud and clear, "Sheen this is Saber 21, Ranger 6 at 51, estimating Dauphin 6 at 02. Over." That was good. His failure to report was just a small error. He probably was lost and afraid to admit it.

As the operations officer reached for the telephone to file an overdue report with Cairns it rang off the wall. Tower was calling to report that "Flatiron," the crash rescue helicopter, was two miles out and requesting the location of the crash. *What crash?* Cairns had not been informed about the downed aircraft yet, so why would they be looking for a crash? To add spice to the situation the U-6 chose this time to report Viper 36 somewhere between DeFuniak Springs and the Gulf of Mexico, completely lost and low on fuel. Our hero decided to let the U-6 worry about the lost aircraft, have the tower query Flatiron and he would call Cairns to get a straight answer. However, the answers from both Cairns and Flatiron were disturbing. They had a telephone report of a helicopter crash three miles east of Samson. Why, that was right here at the TAC site.

The assistant operations officer, acting quickly, volunteered to fly the remaining support Huey on a search and was quickly airborne. The entire operations team was alive and buzzing trying to sort out a logical answer to this mystery. It couldn't be Viper 32 because he was safe on the ground 12 miles south-southeast of Samson. Who then could it be? No aircraft were overdue on the FCC board, and all had reported their first checkpoint.

The answer walked in the door of the operations tent. A young lieutenant shakily announced to all present that he was the pilot of Viper 31, and he had crashed just one half mile south of the field. The entire group was stunned, but finally went back into action directing the search aircraft to the scene and requesting Flatiron return to TAC-X for the student. The assistant operations officer

quickly located the crash site, but reported he could not remain over it to vector Flatiron. *He was out of fuel.* The student pilot was able to direct Flatiron to the crash to pick up the copilot and both were whisked off to the hospital for a check.

There was no time to relax as the first aircraft were arriving overhead for recovery. Reports had to be made and a second flight launched. The story could end here with only a few minor errors noted and a crashed airplane. Why then the title, "But It Was Only a Little Mistake"?

Let's look at the story again and see what really was happening behind the scenes. As you recall, Saber 21 was a dual aircraft and had taken off approximately 10 minutes early. His initial call was made to FCC by the IP using the call sign "Saber 21." The student's regular call sign was "Viper 31" and he lapsed into using just that on the first two reporting points. This established both Saber 21 and Viper 31 as off the ground and both on the western route. After two errors the student was corrected and began using Saber 21 as his call sign for the rest of his flight.

Viper 31 was actually on the ground and had missed his takeoff time because of maintenance difficulties with his navigation lights. He failed to call operations and inform them of his delay. The tower, not being able to contact 31, called maintenance and ascertained the difficulty. The tower, now informed of the problem, moved 31 to the last position on the launch but failed to inform either operations or FCC of the change.

The FCC operator heard from a Viper 31 in proper sequence so did not take notice that his initial report was the *first LZ on the western route* and not the customary report of "off of TAC-X."

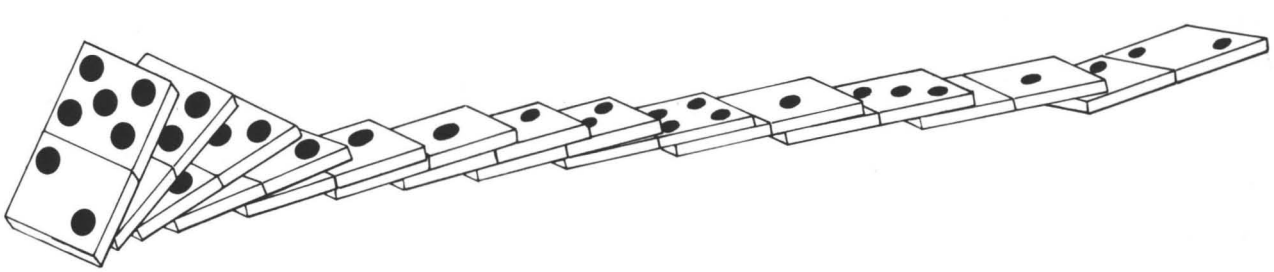
The real Viper 31 took off and had engine failure on climbout. When the pilot finally noticed something was wrong his rotor rpm was already dangerously low. To compensate for this little oversight he slammed the pitch down and moved the cyclic to the rear. The copilot, not to be outdone, called "Mayday" three times — *on intercom.* The pilot's next sensation was that his airspeed was 10-15 knots so he dived the aircraft and started a 180-degree turn toward a light on the ground. These maneuvers had all commenced at 500 feet absolute so the pilot moved the cyclic rapidly to the rear and the collective to the cabin roof as the aircraft smartly met the ground. Although there were several errors involved in these actions, our neophyte pilots must have done something right. They walked away from what appeared to investigators as a nonsurvivable crash.

The pilot was not one to give up when things looked dark. He needed to report to someone. He decided to call his wife and asked her to relay the message of the crash to Ft. Rucker. Being a dutiful wife she called the fire department, which in turn called Cairns, which didn't notify the TAC site, assuming any airfield worth its salt would know when one of the aircraft crashed. Enough for the ill-fated Viper 31.

Why did the assistant operations officer have only 25 minutes of fuel on board at takeoff and have to return prematurely from the search? Earlier in the afternoon this IP had flown the aircraft and parked it on a support parking pad to be refueled. The refueling truck driver was taking a break when he landed and then forgot he hadn't filled that aircraft. In the dark and haste the IP assumed that service had been performed and flew the aircraft without a preflight.

As you can see, the behind the scenes "little mistakes" began to mesh to create a completely confusing and unbelievable train of events. The results were harsh, but not nearly as tragic as they might have been had the crew of Viper 31 been trapped in the aircraft. How many times that night was the statement made, "But sir, it was only a little mistake"? Many of the mistakes were little and taken alone were not worth mentioning, but when sandwiched together the results were greatly amplified and dangerous.

Oh yes, the lost aircraft was shepherded home and the remainder of the night training completed without incident. The operations officer, after closing shop, had driven only a half mile towards home when he noticed his flight helmet slip off the hood of the car into the inky darkness. *But it was only a little mistake.*



Be Professional . . . After Shutdown Too!

Captain Charles V. Lang

TODAY'S "ACTION AGE" of Army aviation is symbolized by what a popular flying magazine recently referred to as "The New Breed" pilot. These imaginative, aggressive, knowledgeable, flight-proficient men have created an image of the Army aviator which is characterized by one word — "PROFESSIONAL" — and professional we are, especially while airborne! Unfortunately our professionalism sometimes terminates with the shut down of our flying machines, creating headaches for others — primarily aircraft maintenance personnel.

Nothing is more maddening and frustrating to an aviator than having something wrong with his aircraft. By the same token, nothing aggravates maintenance personnel more than an inadequate, confusing or erroneous writeup in block 17 of DA Form 2408-13.

Many of us tend to rush away from our aircraft after a flight as though being caught filling out the log book and conducting a post flight inspection were against the law! It is this seemingly unimportant phase of flight that can cause increased maintenance down time, improper repair of an aircraft and potentially dangerous flight conditions.

The comments in block 17 DA Form 2408-13 are often the only guides maintenance personnel have to work from and their importance is often underestimated. Ponder the following examples of actual -13 writeups and comments.

"FLT #1 A/C used excessive amount of oil." This is a common fault concerning O-1 aircraft in Vietnam. If the maintenance officer could not find the pilot who made this entry to determine how much oil the aircraft actually had used in a certain time under specific flight conditions he would be forced to make a time consuming test flight or arbitrarily change an engine, possibly wasting government money. If the entry had been: "FLT #1 A/C burned X quarts of oil in X minute flight at normal cruise," the maintenance officer could have made a decision whether to limit the time the aircraft could be flown or to change the engine.

Another simplified example is: "FLT #1 A/C has severe vibration" vs "FLT #1 A/C has severe 1 to 1 verticle vibration above 60 knots at maximum gross."

Here's a lulu! "FLT #1 Needles split on takeoff." What needles? Which one was high and which was low? What were the flight conditions? How much did they split? Did they rejoin?

Picture the maintenance officer's face who read: "FLT #1 A/C has too much WOP in main rotor blades!"

Other common entries that have turned maintenance heads gray are:

- Engine missing
- A/C lost power
- Brakes weak
- A/C out of rig

Are you guilty of using them?

Common sense is an important factor when making post flight writeups. A professional won't make a writeup until he has analyzed the fault. It's a waste of time as well as embarrassing to find the -13 writeup was actually a faulty pilot . . . i.e.— "FLT #1 pilot's attitude indicator inoperative." Corrective action taken? Maintenance personnel pushed circuit breaker in!

These are only a few of the multitude of actual writeups that maintenance personnel face. 2408-13 entries have long been a major problem area in aviation maintenance but unfortunately no easy solution has been found. Although each of us is taught the proper method of making -13 entries during flight school, it represents only a minute portion of our total instruction and the technique can quickly fade into the land of forgotten knowledge.

Each year Army aviation unveils more complex aircraft and related subsystems which create even more need for aviators to be professional in describing equipment fault to maintenance personnel.

A few points to remember and employ when filling out your -13 that will preclude poor writeups are:

- Write legibly.
- Record all discrepancies.
- Don't rely on others to enter writeups for you.
- Insure writeups are complete and understandable.
- Use correct terminology and nomenclature.
- And most important — take your time and use common sense.

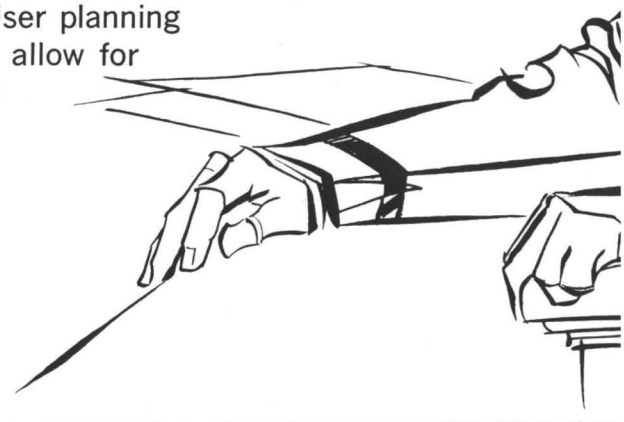
With just a little time and effort we can be professionals with the 2408-13 and make the maintenance job easier too!!!

MARGINAL

THIS LETTER WAS WRITTEN BY THE CHIEF OF STAFF OF A FIELD FORCE

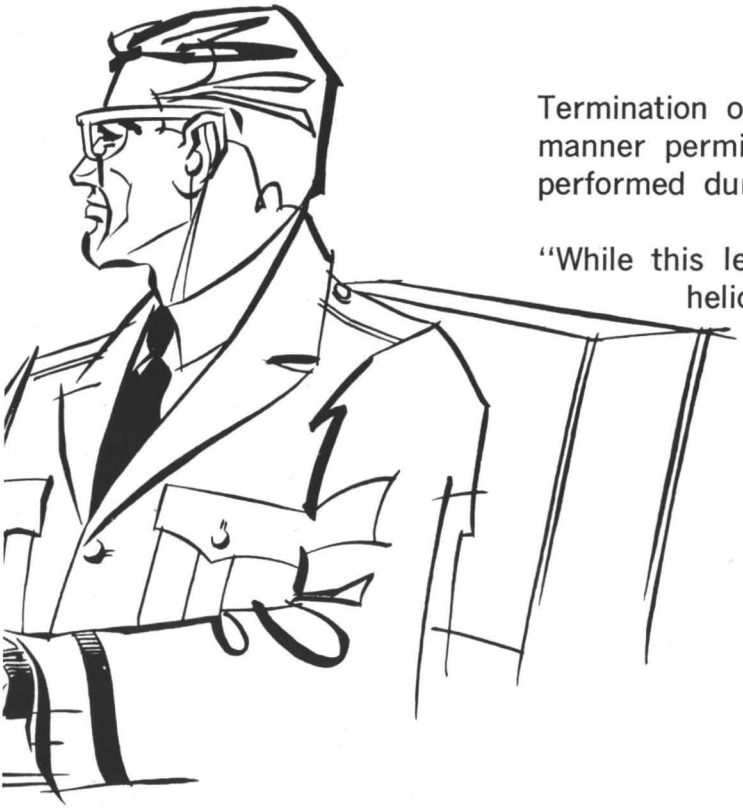
"Helicopter operations at night in this area are considered more hazardous than in other areas of the world. This is due primarily to the adverse weather conditions, rugged terrain and the lack of a full network of navigational aids. During the past two months there have been four aircraft accidents with a total of 14 deaths, all of which occurred at night on routine administrative missions. In all cases, marginal weather was present.

"To reduce the probability of accidents of this nature, scheduling of purely administrative helicopter flights should take maximum advantage of daylight and good weather conditions. User planning should envision start and return times that allow for all travel to be completed during daylight hours, including travel to and from the point of origin of the aircraft.



the following 28 pages prepared by the U. S. Army Board for Aviation Accident Research

WEATHER



Termination of flights at the home base in this manner permits maintenance to be performed during daylight hours.

"While this letter is not intended to restrict night helicopter flights of an emergency or tactical nature, it is the desire of this headquarters that commanders insure adequate review of flight schedules so as to limit night helicopter flights to those approved as mission essential."

MARGINAL WEATHER

ROUTINE PAY MISSION

A UH-1H was on a routine pay mission. The two pilots remained on the ground in the vicinity of two stops while their passengers disbursed payrolls. They departed the last stop at 1755 and filed in the air, estimating their destination at 1845. Their flight plan was acknowledged and they were given an 1825 position report time to an enroute base.

At 1820, the pilot called the enroute base tower for crossing clearance and weather in a pass on the last leg of their flight. He was cleared to cross the pass and told that the weather in the pass was "ragged," but that two helicopters had recently made it.

At approximately 1825, the helicopter crashed into tall trees, traveled about 200 feet, cutting off trees and vegetation in a relatively horizontal plane, before impacting on the slope of a 2,000-foot hill. It burned on impact, killing the crew of four and six passengers.

Analysis: "The pilot and copilot were relatively new aviators, each with under 400 hours total flight time. Both were highly regarded and considered above average officers and highly competent aviators. They displayed no evidence of personal problems and got along well with each other.

"It was discovered, however, that both aviators were up at 0130 the night before and possibly didn't get to bed before 0300. They left on their mission at 0730 and were probably up by 0630. The most sleep they could have had was five hours and it could have been as little as three and one-half hours. At the time of the crash, they had been on duty for 11 continuous hours and had flown an estimated three hours. The pilot had flown every day for 12 days before the accident and the copilot had only three nonflying days in the previous 20. The board believed that the possibility of fatigue certainly existed and that sleep deprivation was present.

"The conduct of the mission up to the point of the last radio contact appeared routine. From the weather report and remarks by the tower operator, it was felt that marginal weather and visibility did exist.

"From the flight path, it was unknown whether the pilots made an attempt at the pass and then were trying to fly through the pass, or whether they were disoriented on their first attempt. However, in light of the weather and visibility conditions existing at the time, as well as the evidence of horizontal impact at the crash site, it is apparent that visual contact with the ground was lost and the aircraft was flown into the hill at cruise airspeed in straight and level flight.

"Both pilots had recently attended a unit safety meeting during which flying in marginal weather conditions was discussed.

"They continued to fly into deteriorating conditions as darkness approached. The possibility of get-home-

itis is plausible and considered probable by the board."

Established cause factors: "Decision to fly into marginal and deteriorating weather, beyond pilot capabilities, as darkness approached.

"Failure to maintain VFR."

Probable or suspected cause factors: "Failure to reduce airspeed during a period of reduced visibility.

"Lack of discipline on the part of the pilots in not assuring themselves sufficient rest the night before the accident.

"Undue emphasis placed on mission accomplishment rather than remaining overnight at another airfield."

Reviewing official: "Add supervisory factors in that adequate rest was not insured for the aviators prior to the next day's missions and positive action was not taken by the tower or GCA controllers to insure that the aircraft crew was completely aware of existing weather and recent weather developments along their flight route. Also, in that information such as 'two helicopters recently made it' should be excluded from weather advisories."

Endorsements: "It is the policy of this unit that an experienced aviator will be assigned with one of lesser experience whenever feasible. In view of the fact that the report fails to reveal any reason for not complying with this policy, a supervisory factor is considered present.

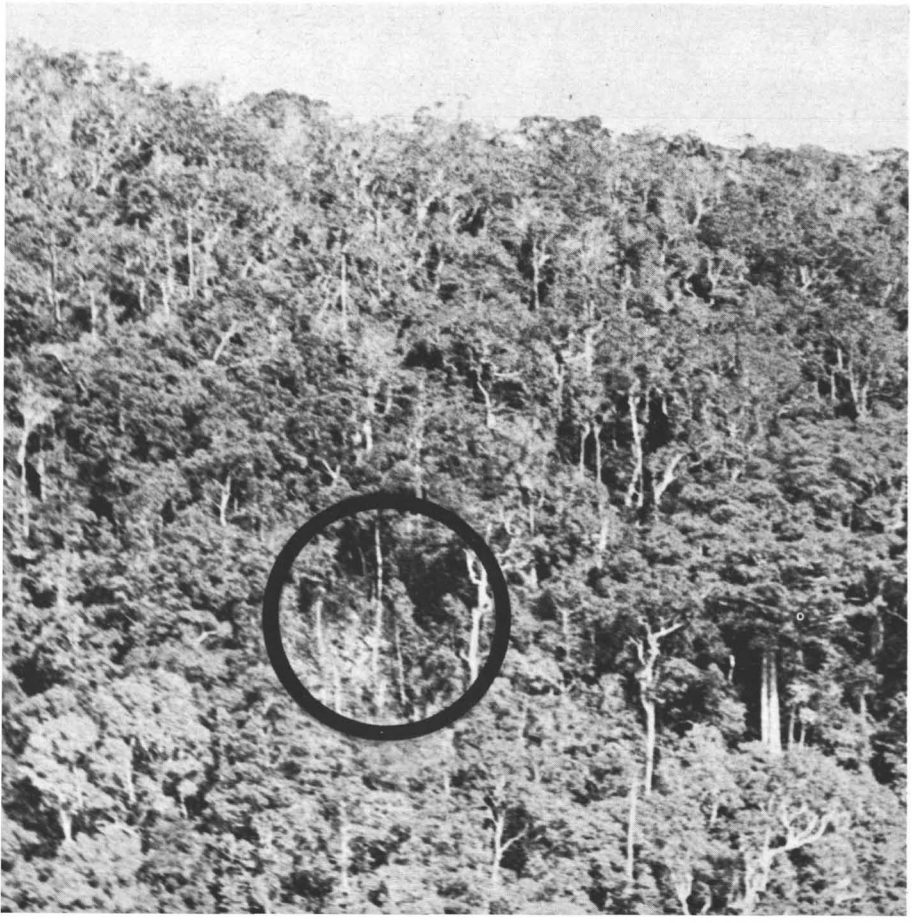
"An additional supervisory cause factor is that the release time for the aircraft was not considered. As a result, the crew attempted to complete the mission through semi-darkness and deteriorating weather conditions."

Recommendations: "That this accident be highly publicized at all levels of aviation command to insure aviator awareness of the cause factors listed.

"That aviators be made aware of the importance of reducing airspeed and maintaining ground contact when flying in marginal weather and conditions of reduced visibility.

"That emphasis be placed on crew rest prior to flight.

"That the dangers of get-home-itis be stressed and that aviators be made aware of units offering overnight facilities in their areas of operation."



Circle shows where helicopter crashed through tall trees into hillside

UH-1B AC: "We departed the airfield at approximately 0757 to make a weather check of a selected area. After flying over the town, we followed the road up the valley to the north. We had not gone very far, when I noticed that the weather was too bad and I told the pilot that I was going to turn around. I had started a left turn when we went into fog. I immediately started a climb on instruments and told the pilot to call the tower and advise them we were IFR and were going to make an instrument approach.

"The tower told him to contact approach control and he began to change frequencies. During this time, I was climbing in a standard left turn and rolled out on the 340 degree radial to the VOR. As I rolled out of my turn with an airspeed of 60 knots, I saw trees and I thought we were breaking out. But the trees were coming up so fast I didn't do anything but fly straight in.

"We hit the tops of the first trees and the top one-third of another tree. It came in the cockpit between the pilot and myself. I came to rest in my seat among some branches. I got out of my seat immediately and ran around the front of the wreckage and found the crewchief in his seat among the tree branches a little ahead of the aircraft. I pulled him uphill, unfastened his seat belt, and left him in the seat with a cushion under his head.

"I couldn't find the pilot for some time, but I could hear him breathing very loudly somewhere under the wreckage. I finally located him under his seat, but I was unable to lift the parts of wreckage off of his seat. I eventually got him out by burrowing under his seat and pulling him out feet first. I wasn't strong enough to get him very far up the hill and I left him on his back with his head on a cushion. I loosened his clothing and got both of them to answer me. I told them I was going to get help and to keep their heads to one side so they wouldn't suffocate. They both answered me and I started out through the woods, after checking the aircraft for any possibility of fire . . ."

Question: "What was your indicated altitude when you started your turn?"

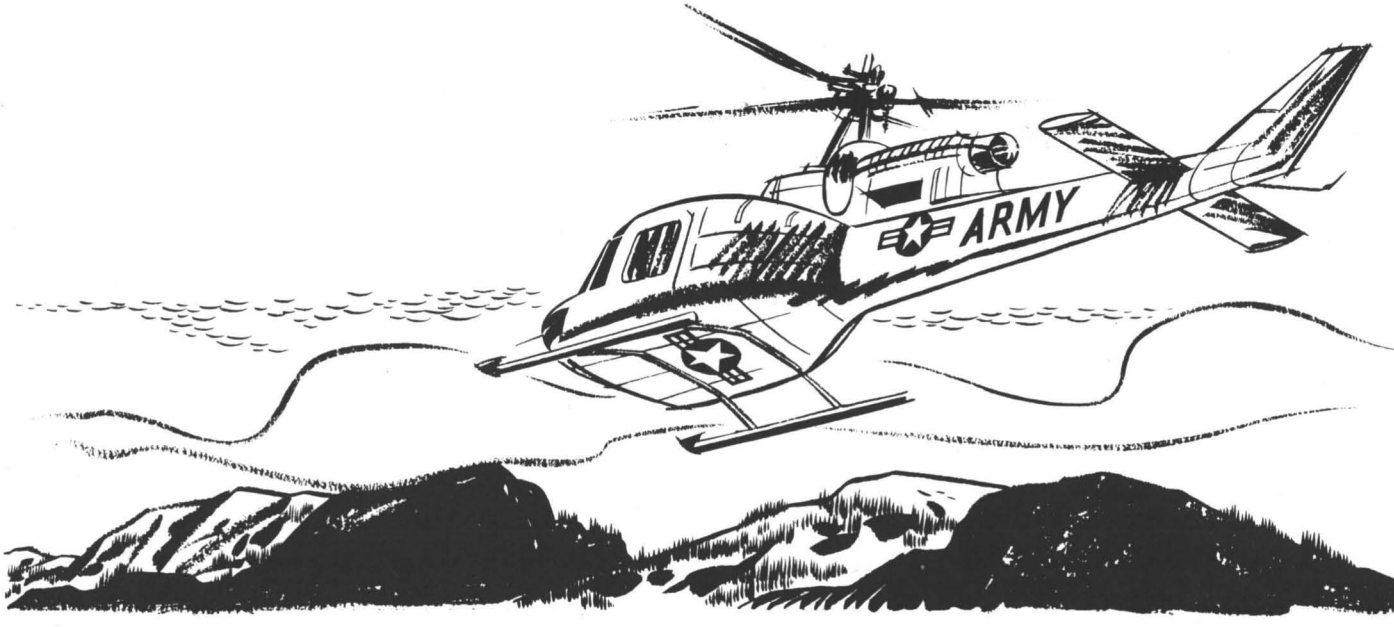
Answer: "My altimeter indicated 1,400 feet."

Question: "Do you also remember what your airspeed was when you started the turn?"

Answer: "It was right around 80 knots."

Analysis: "In interviewing the pilot, he stated that the aircraft was flying normally, the engine was running and all instruments were working properly

NORMAL PROCEDURE, ABNORMAL SITUATION



when contact was made with the trees. The analysis of the fuel showed no discrepancies. The board believes there were no failures in the airframe or components prior to the crash.

"The AC and pilot were well qualified, both in flying the UH-1B type helicopter and in instrument flying. Both were physically fit and had a good night's sleep before the accident . . .

"The crew filed a flight plan and checked the weather. They were unfamiliar with the area, having only flown the route once the previous day. Weather at the departure airfield was marginal and enroute weather was predicted to be very bad, with zero ceiling and zero visibility in the hills.

"Since the crew decided to flight check the weather, additional planning should have been made. They should have planned certain emergency procedures for encountering IFR conditions. No coordination was made with the airfield operations concerning entering IFR conditions, including what altitude they could expect to be cleared to, minimum terrain clearance for the area, or what kind of approach they could expect to receive. The board believes that the crew was deficient in its flight planning because they did not attempt to plan for every possible course of action, knowing that the weather was reported to be below minimums even for a helicopter . . .

". . . The crew did not slow the aircraft below 80 knots in cruise, even though the weather was deteriorating. If they had decreased their speed in proportion to the deterioration of the weather, they would have had more time to make their decision to turn around and the turn itself would have required less airspace, since a decrease in speed increases the time to cover a given distance and decreases the turn radius . . .

"After entering IFR conditions, the decision to continue a normal climbing turn was made. This was a normal procedure in an abnormal situation in which the aircraft was low level and IFR. The board believes that a maximum climb with minimum airspeed should have been made immediately at this point and continued at least until the turn to a reciprocal heading was made and minimum terrain clearance obtained.

"The AC stated that he rolled out of his turn and was inbound to the VOR on a 160 degree heading. The direction of the aircraft as it hit the trees was determined to be 220-degrees. Why did the AC feel he was inbound with a heading of 160 degrees when he actually rolled out on a heading of 220 degrees? From the VOR, the accident occurred exactly on the 340-degree radial. The board estimated the helicopter had been IFR for approximately one to two minutes before it crashed. The crew was extremely

Normal climb lead to tree strikes and crash

busy adjusting themselves to IFR conditions, flying on instruments, locating themselves on the IFR charts and making a radio transmission. The directional needle on the VOR had either been indicating or was centering to an on-course of 160 degrees when the AC noticed it, assumed he had an on course heading, and rolled out of his turn. The rollout was accomplished with a heading of 220 degrees. This was a 60-degree heading difference from what the AC intended . . .

"The AC stated that his altimeter indicated 1,920 feet at initial impact . . . The hill on which the accident occurred was 1,625 feet high and the trees 100 to 125 feet high, bringing the total obstruction height to 1,750 feet. The altimeter reading of 1,920 feet may have given the AC a sense of security. He stated that 2,000 feet would have given him terrain clearance. This is true in the sense that, at 2,000 feet in that particular area, he would not have hit the ground nor any trees. However, a minimum of 1,000 feet above the terrain is required by regulation. Using the hill height of 1,625 feet, the minimum terrain clearance altitude would be 2,625 feet . . .

"This accident was considered to be only partially survivable because of the extended damage within the cabin area . . . The flight surgeon's report revealed that the AC was in the habit of wearing his helmet tight and the other two crewmembers wore their helmets snug . . ."

The two crewmembers who were not wearing their chin straps tight and lost their helmets during the crash sustained concussions and other head injuries. Because of their injuries, they were unable to help themselves and had to be pulled from the wreckage by the AC.

DISORIENTATION IN THE PITCH MODE

UH-1B AC: "At approximately 2230, we departed to deliver a replacement aircraft to an LZ. The ceiling was ragged and dropped down to about 300 feet in some places. I had tuned in the LZ non-directional beacon and, shortly after climbout, was picked up by the LZ GCA.

"We were about 1,800 feet and our flight to the LZ was uneventful, except that we did fly in and out of clouds enroute. I was flying from the left seat and all instruments were operational.

"I experienced slight difficulty maintaining course, but attributed it to my failure to practice more IFR flying.

"GCA vectored us on final, but I drifted off course on my first attempt and the operator vectored me back around for another approach. The second attempt was successful and I caught sight of lights on the ground at the LZ. At about 200 feet, the pilot turned on the landing light and I lost contact with the ground. Light rain reflected light into the cockpit, blinding me.

"GCA called me to break right and re-enter right traffic. Upon turning right, I lost some airspeed, dropping to about 35 knots, still about 300 feet indicated. The pilot was maneuvering the searchlight up rather than down, increasing the blinding effect.

"Airspeed was lost, followed by altitude, and the aircraft banked about 30 degrees to the right. I pulled in power and lowered the nose to regain airspeed. Before I was able to recover, I saw trees rushing up at me. I moved the cyclic to the left and made an attempt to level. Shortly before impact, I increased collective in an attempt to cushion the landing.

"I don't remember anything from the time we were about to hit the trees until I found myself, without my helmet, still strapped in my seat. All of the caution lights were on. I got out of my harness and turned off the battery . . ."

Description: ". . . No aviation weather facility existed at the departure point, but a number of reliable witnesses, including experienced Army aviators, estimated the ceiling at 2,000 feet and visibility at 7 miles, with the visibility dropping to a mile or less in the scattered rainshowers . . .

"The AC reported his position 5 miles north of departure point, heading 330 degrees, at 1,800 feet. The GCA operator reported that the aircraft was in

a blind spot and instructed the AC to turn to 270 degrees and climb. The AC complied and radar contact was established with the aircraft 6 miles southeast of the destination LZ. The operator gave instructions for a turn to a heading of 180 degrees for identification. Identification was positive and instructions were issued for a turn to 270 degrees and a descent to 2,000 feet for base leg.

"After issuing the altimeter setting, lost communications procedure, and requesting landing cockpit check, the GCA operator gave instructions for the first turn on final, a heading of 330 degrees. After intercepting final, a course correction, left to 020 degrees, was given. However, the AC turned right, so the operator instructed him to turn right 180 degrees and roll out on a heading of 230 degrees so the aircraft could be worked back on final.

"With GCA guidance, the aircraft was again worked back on final. The operator commented that the aircraft operator seemed to be making course corrections 'very slowly.' The AC also remarked that he had difficulty maintaining headings. Despite these difficulties, the operator reported the approach seemed good.

"At 1 mile, the GCA operator reported the aircraft was cleared to break left for the POL pad, and to contact the tower on short final to the POL.

"The AC did not have the runway in sight at that time, so the operator brought him down to precision minimums. The AC reported he had the runway in sight and the operator confirmed that he was on course and glide path. The runway was not lighted . . .

"The operator instructed the AC to break right at the runway departure end, enter right traffic, and call the tower on downwind. The AC rogered these instructions, but never contacted the tower.

"The tower operator and GCA personnel stated the weather at this time was 300 to 400 feet overcast, with fog and drizzle, and visibility 1 mile or less at times. The wind was calm.

"The pilot turned the landing lights on and the glare produced from the reflection of visible moisture heightened the AC's difficulties in transitioning from IFR to VFR flight. This was further aggravated by the pilot's manipulation of the searchlight upward, flooding the cockpit with glare.

"Near the departure end of the runway, the AC began his right crosswind turn. His turn away from the lighted area west of the runway to the unlighted area to the east, and the right downwind pattern, led to his disorientation in the pitch mode and the loss of airspeed and altitude which resulted in the crash . . .

"The aircraft struck a tall hardwood tree and the right side in the area of the chin bubble and lower cockpit absorbed most of the impact damage."

Analysis: "This accident was a classic of its kind — spatial disorientation in the pitch mode, brought on by fatigue, during transition from IFR to VFR flight at night, at near airfield minimums . . .

"The AC's flight records revealed he had logged only two hours of IFR/hood time during the previous 12 months, and 166 hours of night time during the same period.

"On the day of the accident, the AC arose about 0700 after a night in which his sleep was frequently interrupted. With little sleep, he had been on duty for approximately 16 hours at the time of the accident. He made two short flights during daylight hours, before the night flight which ended with the accident . . .

"A number of factors which, considered individually, are of no great consequence, served to snowball and cause this accident. They are:

"Fatigue, both chronic and acute, very likely compounded by anxiety over an imminent reassignment and IFR conditions enroute.

"Lack of IFR proficiency.

"Failure of the AC to either set landing and searchlights prior to takeoff, or after takeoff, and failure to brief pilot, a new aviator in the unit, about their use or nonuse.

"Lack of established GCA go-around procedure at the LZ.

"Poor placement of the LZ radar equipment which created cones of blindness, particularly to the east of the runway on GCA downwind because of intervening terrain.

"GCA procedure for transition to VFR on approach breakout at night which called for aviators to break right to a completely unlighted area to the east of the runway, rather than left over the lighted area, when landing to the northwest. This procedure serves to generate disorientation and even vertigo on the part of aviators making the transition. However, the AC could have made a decision to break left over the lighted area and make a safe landing. Traffic procedures notwithstanding, the final responsibility for the safety of the aircraft and crew belongs to the AC.

"Failure of airfield operating personnel to implace and operate runway lights. It is the board's opinion that the AC, on his initial GCA breakout, could have made a safe landing on the runway if only four runway lights had been implaced and illuminated.

"Failure of the AC to apportion crew duties so that the pilot would assume VFR contact at the terminal phase of the approach while the AC remained on instruments."

1000 WEATHER OBSERVATION
Sky condition: Estimated 200 feet overcast.
Visibility: 2 miles with fog.
Wind: 250/06 knots.
Temperature: 73 degrees F.
Dewpoint: 72 degrees F.

Narrative: "The crewchief, only survivor of a UH-1H crash, was interviewed in the hospital the afternoon of the accident. He sustained a compression fracture of the spine and second-degree burns on his face and neck.

"The crewchief reported that the AC was in the left seat and the pilot in the right seat. He said the AC flew most of the time the morning of the accident and was flying at the time of the crash. After completing their first two missions for the morning, they took off at approximately 0930, enroute to their assigned location. The flight was made low level and the crewchief stated that as they came up over a hill, they went into fog or a cloud that looked like it went all the way to the ground.

"At this time, according to the crewchief, the AC started a left turn and nosed the aircraft down. Just before it hit, he said he could see a big tree ahead while the aircraft was still nose down and turning left. At that point, the AC either flared or started a cyclic climb, then the aircraft hit the trees. Its attitude, on initial contact with the first tree, was straight and slightly nose high. It made about four flat revolutions down through the trees, hit the ground and turned on its right side.

"The crewchief, riding on the left side, unbuckled his seat belt and had just stood to jump clear of the aircraft when it exploded and apparently blew him out. He did not remember anything past this point until he awoke in the hospital, except that he heard aircraft flying overhead and was vaguely aware that he was being evacuated.

"Asked if he knew of any mechanical difficulty with the aircraft, the crewchief stated, 'There was no problem with the aircraft. As soon as he turned and nosed it down, I knew we weren't going to make it.' He estimated it was about five seconds from the time of entry into the cloud or fog until impact with the trees."

Analysis: "After considering all the evidence, the board concluded that the aircraft crashed while flying low level, shortly after entering a cloud or fog bank. Although it could not be positively established, the board concluded that the AC failed to use his flight instruments and attempted to maintain visual contact

with the ground after inadvertently entering the cloud or fog bank.

"The board agreed that the AC showed poor judgment in continuing along the flight path, knowing of the deteriorating weather condition, to the point where he was unable to maintain ground contact. He obviously knew about the weather conditions from his previous flights the same morning. On one flight, he found it necessary to climb on top and let down through a hole in the clouds when he reached his destination . . .

"The flight records of both aviators indicated a lack of instrument training since graduating from flight school. The AC had logged only .7 hour of hood during the previous six months and the pilot had logged only 2.0 hours in the same period."

Reviewing official: "Concur with the findings of the accident investigation board . . .

"This accident was discussed at a unit commanders' meeting. Commanders were instructed to remind their personnel that, when on single ship missions, the AC holds the final authority concerning flight into marginal weather. The decision should be made only after carefully considering his and his crew's ability, the urgency of the mission and existing weather conditions. Also, pilots were instructed to take every precaution to prevent inadvertent entry into weather. However, in the event instrument conditions are encountered while flying at low altitudes, the safest maneuver is to make an instrument climb to the minimum safe altitude or on top and contact the nearest approach facility.

"To enable aviators to better cope with marginal weather flight, and to dispel any possibility of fear of flight into weather, a policy was confirmed which requires that all pilots be exposed to at least one actual instrument flight. This training, which includes climbing and descending turns, climbs and descents, one GCA and one ADF approach, is proceeding satisfactorily. Training completion is contingent on operational requirements and availability of qualified IP personnel.

"To insure that all aviators maintain instrument proficiency, the training directive has been changed to include: Units will perform instrument training flights to maintain aviator proficiency. When operational requirements permit, these flights will be conducted under IP/SIP supervision. All aviators will receive, as a minimum, one in-the-clouds training flight under IP supervision. Each aviator will have a minimum of one hour hood training per week. This will include, as a minimum, one GCA, 180 degree climbing, descending, and level turns. This training will be performed when ceilings are 500 feet or above. . . ."

VERTIGO

UH-1D AC: "After the evening meal, I was assigned a mission to take several people from one location to another. At about 1930, we left after making a visual weather check. There was a light rain falling.

"We picked up our passengers, flew them to their destination, dropped them off, flew back and turned south at about 2030. I was flying at about 1,000 feet indicated when we suddenly entered a very heavy rainshower. I lost ground contact and began a slow descent while the pilot called out airspeed and altitude. I experienced vertigo and lost all control of the aircraft at about 500 feet indicated. The pilot said, 'Zero airspeed.'

"We rolled slightly to the right, I corrected to the left, and we then began spinning. We struck the ground and skidded to a stop against an embankment . . ."

The aircraft was a total loss and three crewmembers sustained serious, but nondisabling injuries.

Cause: "Failure of noninstrument rated AC to accurately check inflight weather and allowing his aircraft to enter thunderstorm at night. Contributing factor was that unit operations should have assigned instrument rated AC if mission urgency required immediate accomplishment."

NO INSTRUMENT

AN OV-1B, with a pilot and observer aboard. was on a night surveillance flight.

Report narrative: ". . . At the time of takeoff, the weather was estimated 400 feet broken, 1,000 feet overcast, visibility 4 miles, and fog. The forecast for the duration of the flight was weather improving to 8,000 feet scattered, high overcast, and light and variable winds. At 0141, the pilot filed with radar control and, at approximately 0220, he communicated with an air section. He was apparently on his mission run at the time.

"At approximately 0335, he contacted radar control and requested a heading to his destination airfield. He was given a 255-degree heading for 25 miles. Radar contact was momentarily lost, but he again contacted radar control at approximately 0344 and asked if he was over his destination. Told that he was, he checked out with radar control, contacted the tower, reported he was 5 miles northwest, IFR, and requested weather and landing instructions. The tower advised that the weather was 300 feet overcast, visibility 1½ miles, in fog.

"The tower again contacted the pilot and asked if he had the field in sight. He requested a flare for field location. A flare was fired by the tower, but there was never any indication that it was seen. The tower tried again to establish contact at approximately 0355, but was unable to do so . . .

"At approximately 0354, a guard located at the west perimeter heard a Mohawk go over to his right, heading northwest. He tried to spot the aircraft, but it was apparently in the clouds. Visibility was restricted because of haze. According to the guard, a Mohawk mechanic, the aircraft sounded as if everything was operating properly. Approximately 30 seconds later, he saw an explosion to the northwest.

"The commander of an outpost stated he heard the approach of an aircraft and looked out in time to see it crash. He stated the engines sounded normal until just before impact, when they made a funny noise. Upon closer questioning of the post commander, it appeared the pilot sighted the ground and applied full power for a go-around just prior to impact.

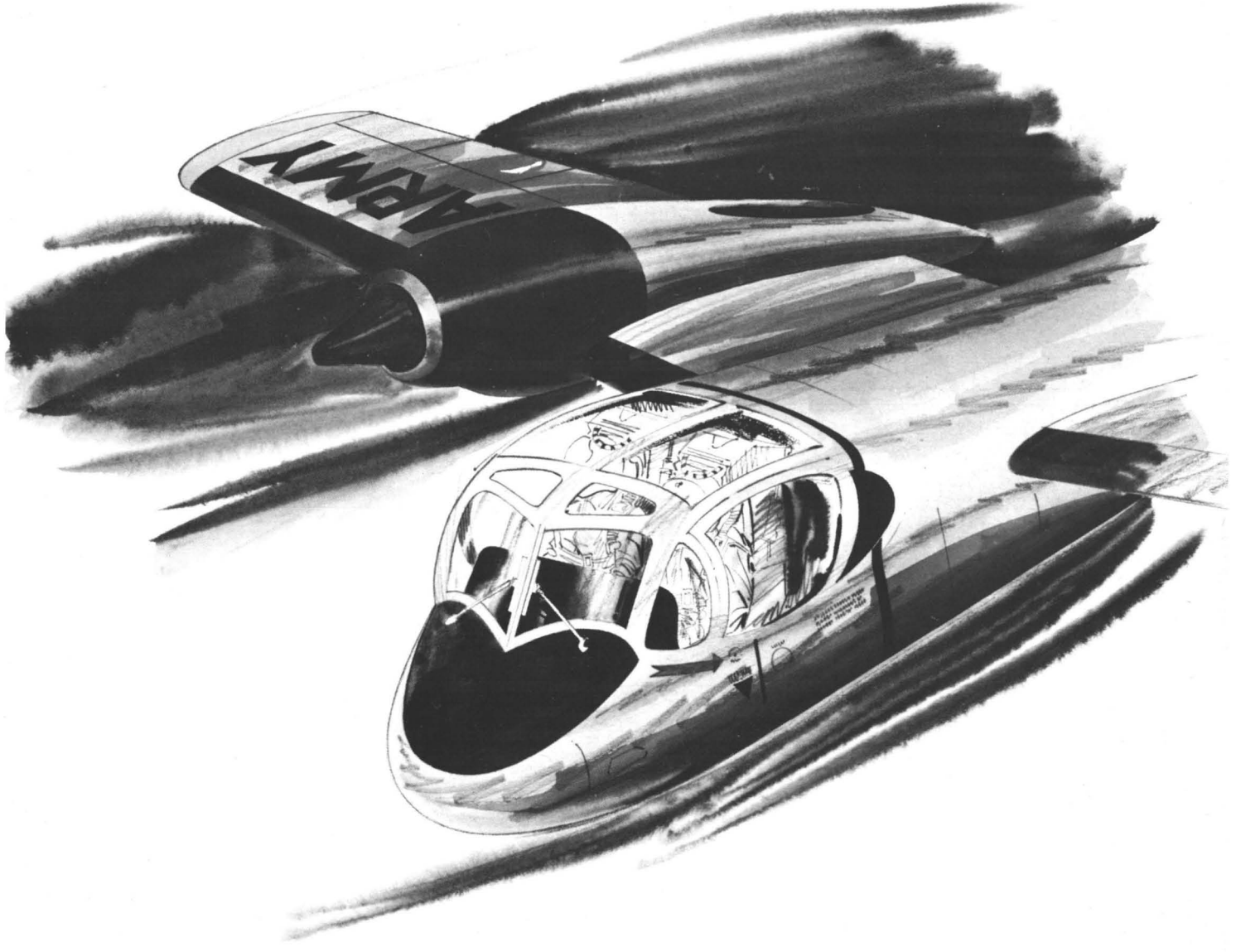
"The left wing struck the ground first, then the left engine, propeller, fuel tank, and gear. The aircraft completely disintegrated and the pilot and observer were killed. It was determined that the aircraft was on a heading of 265 degrees at impact . . .

"There was no evidence that the ejection seats had been fired. The position of the landing gear and flap actuators showed the landing gear and flaps were extended at the time of the accident . . .

"Weather is not considered a cause factor for this accident. The airfield had a nondirectional beacon, but did not have an instrument approach procedure. Two other airfields, one located 13 miles south and one 8 miles east, had approved instrument approach procedures. The pilot elected to make a letdown to his intended destination with a full knowledge of existing weather conditions when suitable alternate airfields were available.

"It is possible the pilot saw the lights of the airfield through the haze or overcast, started his letdown procedures, passed over the airfield lined up with runway 31-13, and started to make a left descending turn, keeping the airfield in visual sight. When he turned his attention back to his instruments, or saw the ground, he apparently realized he was too low and applied power, but was unable to recover in time. . . ."

APPROACH PROCEDURE



VISIBILITY ZERO

REPORT NARRATIVE: "One UH-1D crew and two UH-1C crews were alerted at approximately 2130 for a night reconnaissance mission, scheduled to begin at 2400 . . .

"The commanders of the three aircraft were given flight briefings in operations at 2330. While the briefing was going on, the remaining crewmembers preflighted. Takeoff was made on schedule and the flight proceeded to its assigned area where reconnaissance operations were conducted without incident. A refueling stop was made and at 0130 the flight was again airborne and proceeded to another area where operations were conducted.

"Because of poor weather conditions, the decision was made to return and land. Visibility was restricted to the northwest, the direct route to the flight's destination, so the flight leader decided to fly north to intercept a river, and then fly west along the river to get around the weather. Enroute to the river, the UH-1D was flying at approximately 1,000 to 1,100 feet indicated, followed by the two UH-1Cs which were at 500 to 600 feet in a loose trail formation. The UH-1D entered IFR conditions and its pilot was forced to descend to approximately 600 feet in order to remain VFR.

"As they reached the river, just prior to making a turn to the west, all three aircraft inadvertently flew into IFR conditions."

UH-1D AC: ". . . The weather started to get bad. . . . As I turned west, I went IFR at about 500 feet. The UH-1Cs were lower, at about 300 feet. We ran into severe turbulence almost at once. I called the lead UH-1C and said I was doing a 180-degree turn to the right and called for the second UH-1C to make a 180-degree turn to the left.

"When we came out of the storm, I saw an aircraft at 3 o'clock which I thought was the first UH-1C. I called, but did not get any reply. The other UH-1C pilot called me and said he had lost contact with the first UH-1C.

"I turned, looked back toward the storm, and saw a large fire. I called the other UH-1C and the pilot said, 'Let's go in and see if we can get a better look.' As we approached the storm, he was on my left. We went down to about 200 feet. Then, as suddenly as the first time, we went IFR again. I turned to the right to avoid the UH-1C, called the pilot and he reported that he had done a 180-degree turn and was out of the storm. He said he was going in to land.

"We stayed IFR for about 15 minutes in moderate turbulence. I called the tower and reported the crash, then called the UH-1C pilot. He said he was in the clear and landing. We broke out, flew to the airfiield, and landed."

Analysis: ". . . Investigation of the wreckage distribution revealed that the aircraft made initial contact in a near straight and level attitude, hitting slightly harder on the left skid. Forward momentum carried it through a dike which caused it to nose over and skid forward, shearing landing gear, tail boom, main rotor head, and other minor components. As it came to rest, the cockpit, cabin, and engine ignited and burned. The surviving crewmember stated that he did not notice anything unusual prior to impact. Statements by the crewmembers of the other two aircraft revealed that the night was extremely dark and visibility beneath the clouds was zero due to heavy rain and darkness. . . ."

DOWNWIND IN LIGHT RAIN

A UH-1D was the lead helicopter in a formation of three airlifting a reconnaissance patrol to an LZ in a wooded area.

AC: "We lifted off at 1905 with six troops, 950 pounds of fuel, and a crew of four aboard. Our power check indicated enough power to hover, plus 2 percent . . .

"We approached the LZ to the north. The mission required the approach to be low level. As we approached, we flew through a light rain for 15 seconds and broke out approximately 15 seconds from the LZ, but rain remained on the windshield, causing poor visibility.

"We decelerated into the LZ, staying approximately 10 to 15 feet above the trees. Because of the poor visibility, we missed our touchdown point by 50 meters and came to a hover above 10-foot trees, waiting for the troops to jump from the aircraft. The tail rotor struck an object as the crewchief said to move the tail to the right. We began losing rpm after the tail rotor strike. The troops began to jump from the ship. I moved the tail slightly to the right and felt a hard thump from it. We began to swing sharply right and I bottomed the pitch. We landed facing 180 degrees. One passenger had a broken leg. We were evacuated immediately."

The aircraft was a total loss.

Analysis: "The AC selected an unfavorable LZ for a low level approach. Trees, 10 to 18 feet high, were all around and afforded no true landing area.

"The selected direction of landing was 035 degrees. The wind was from 270 degrees and the approach was made downwind.

"As the result of poor visibility and landing downwind, the AC overflew his touchdown point and tried to salvage the mission by attempting to land in an unsuitable area.

"When he terminated to a hover above the trees, he had a tail rotor strike and started losing rpm. It is believed this loss of rpm was due to insufficient power. The aircraft was below maximum gross weight to hover in ground effect, but above maximum gross weight to hover out of ground effect. This was probably compounded by the fact that, once he realized he had a tail rotor strike, he overcontrolled and lost additional lift and rpm. This caused settling, which resulted in the final tail rotor strike, complete tail rotor failure, and loss of the aircraft."

WEATHER: Scattered rainshowers and thunderstorms, with occasional low ceilings and visibility.

CO of field unit: "At about 1930 one of my men brought in a civilian who was hurt. He had been cutting up a barrel and the axe went through the wood into his leg, causing a 6-inch cut. Our medic said the muscle tissue was all over his leg and the tourniquet was not working to stop the arterial bleeding. He said he needed to be sewn up that night and asked that a helicopter be called.

"The lieutenant called for a helicopter at 1945, requesting a priority routing. Control asked if it could wait until morning and asked us to call the medic. The medic said the man needed to be evacuated that night.

"The lieutenant changed priority to urgent and described the wound. Control said they would get a ship up there as quickly as possible.

"At 2005, the helicopter AC called and said he would be up in about 15 minutes. We removed the patient to the orderly room to await the helicopter.

"At about 2030, I thought I heard the helicopter and said, 'Let's move to the helipad.' While we were still in the orderly room, the lieutenant was talking to the AC and I told the AC I could hear his blades. He said he was hovering over the area, but could see nothing, as the ceiling was 600 feet. The AC said he knew the area and was sure he was right over us. He said he would hover until he got a signal and the lieutenant told him we would put out ground flares and jeep lights.

"At 2035, the lieutenant was in a jeep talking to the AC and the AC said he was going to return to base and wait for the weather to lift. Approximately three minutes later, the lieutenant heard, 'Help me somebody, help me somebody,' on the radio. There was no further communication from the helicopter, although many stations tried . . ."

Following is the transcript of a tape recording of the transmissions between radar control, another station, and the UH-1D. All call signs have been changed and all identification deleted.

Helicopter: Control, this is six eight, over.

Control: Six eight, control, stand by one.

Helicopter: Roger.

Control: Six eight, control, go ahead.

Helicopter: Roger, six eight is in the soup, heading toward the mountain. We're wondering if you can put us over our destination at this time, over.

Control: Six eight, control, squawk three two three ident.

Helicopter: Three two three ident, squawking at this time.

Control: Six eight, squawk standby.

Helicopter: Roger, squawking standby.

Control: Roger, return normal radar contact, suggest you come left heading two three one, two three one for destination.

Helicopter: Roger, understand heading of two three one, over.

Control: That's affirmative, six eight. I show your heading for destination at two three zero for three miles, over.

Helicopter: Understand two three miles, over.

Control: Negative, two three zero heading, two three zero heading for three miles, over.

Helicopter: Roger, two three zero heading at three miles.

Control: Six eight, are you squawking three two three normal?

Helicopter: Roger, six eight squawking two three normal, over.

Control: Roger, I have you over destination now, over.

Helicopter: Roger, we'd like (unfinished).

Helicopter: Control, this is six eight, over.

Control: Six eight, go ahead.

Helicopter: Roger, how do we look on your scope at this time? We're popeye and we're worried about this mountain over here close to destination, over.

Control: Roger, I'm picking up some heavy precip right over your destination and you're right in it, and it's hard to distinguish your target from the precip. I show you about a mile, about a mile and a half southwest of destination.

Helicopter: Roger, what heading should we take at this time, over?

Control: I suggest a heading of zero four zero.

Helicopter: Roger, understand zero four zero, over.

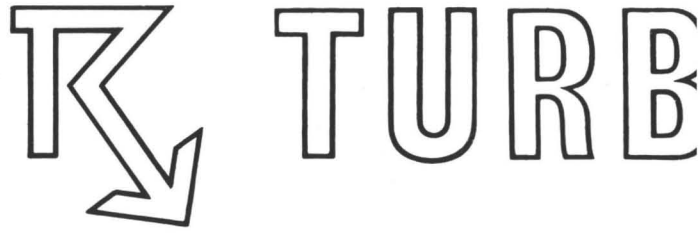
Control: That's affirmative.

Helicopter: Pull this thing up!

Control: Six eight, you calling control?

Helicopter: Roger, six eight is in a bad turn at this time. Ah, six eight is in severe (broken off). Help us, help me . . .

Other station: They're in severe turbulence.



Helicopter: Help me, I'm falling. Help . . .

Other station: They need assistance.

Helicopter: Help me, control, help, somebody help. (Voice in background) "Don't push down."

Other station: Radar control, did you copy his call, over?

Control: Roger, we're sending somebody up there now.

Helicopter: Help.

Other station: He's still up this frequency.

Control: Six eight, control, if you read I suggest a left turn to three six zero heading to avoid the precip in your area, three six zero heading.

Helicopter: That's it, hold it real steady.

Control: Six eight, do you read control, over?

Helicopter: Help us, we're gonna crash, we're gonna crash. We've got zero airspeed. We aren't gonna level off. (Voice in background) "Push down."

Control: Six eight, go north, northbound if possible. Turn northbound. Do you read, over?

Helicopter: Control, help us. We're in a real bad spin out here (Voice in background) "Don't fight me, don't fight me."

Radar controller: ". . . He kept yelling about turbulence and that he was going to crash. I notified the senior director to alert rescue aircraft to proceed to the area. I had no more contact, radar or radio, but still attempted to call him."

Summary: ". . . The transcript revealed that the pilot had difficulty controlling the helicopter under instrument conditions. The severe turbulence encountered probably caused vertigo, which resulted in complete loss of control. After a flight of approximately 25 minutes, the aircraft crashed into the ground, killing all aboard, and totally destroying the helicopter.

"Lessons learned: Instrument flying proficiency must be maintained if safe flight into instrument weather conditions is to be achieved. The consequences of inadequate preparation for instrument flight can be final with absolutely no opportunity for a second chance."

ULENCE

In these accidents and others in which marginal weather and reduced visibility were present, one of the most frequently listed cause factors is: "Failure to reduce airspeed when approaching marginal weather or entering an area of reduced visibility."

Because of its vital importance in the prevention of marginal weather and low visibility accidents, we repeat a lesson taught by Mr. Gerard Bruggink in the Aviation Safety Orientation Course conducted by USABAAR. This lesson is entitled:

AS FAST AS YOU CAN SEE

YOU ARE FLYING your helicopter at treetop level, trying to maintain visual contact while visibility is limited to 1,000 feet. You are on the lookout for obstacles that may loom out of the grayness around you, hoping you'll have enough room to make an evasive turn when necessary. Feeling slightly uneasy, you have reduced your airspeed from 100 to 80 knots.

A practical question at this point is: How much forward distance will you travel from the moment you see an obstacle until you complete the first 90 degrees of an evasive turn? If your total forward travel exceeds the existing forward visibility, you are in trouble. In that case, the accident board would probably blame your demise on: "Flight into low ceiling and visibility conditions without an appropriate reduction in airspeed." (This is a direct quote from one of the many reports on weather accidents.)

There is no reason to doubt that our colleagues who killed themselves under poor visibility conditions slowed down when walking in the dark or driving in the fog. Their failure to use the same protective instinct when flying can be explained only by a lack of understanding of the relationship between safe forward speed and existing visibility, as shown on the figure below.

The figure is based on the assumption that it takes about five seconds to perceive, to make a decision, and to start a corrective maneuver (WADC Technical Report 58-399 — VISION IN MILITARY AVIATION). The forward distance traveled during these five seconds — under no-wind conditions — is a function of TAS and is shown by the straight line on the lower portion of the graph. At 80 knots, the aircraft's forward displacement in five seconds is 676 feet.

Assuming that the evasive maneuver consists of a coordinated turn, it is obvious that the first 90 degrees of this turn will bring the aircraft closer to the obstacle over a distance equal to the radius of the turn. For reference purposes, a bank angle of 30 degrees is used as a standard. At 80 knots, this would produce a turn radius of 984 feet (and a rate of turn of about 8 degrees per second). Therefore, the total displacement of the aircraft towards the obstacle, from the moment of perception until the completion of a 90-degree turn, would be 676 + 984 = 1,660 feet. With a given visibility of 1,000 feet, your problem is simply the lack of 660 feet to maneuver in. In other words, a collision becomes inevitable unless you engage in some last second acrobatics which would probably only increase the spectacularity of your mishap.

What would your chances be if you reduced your speed to 40 knots with the same 1,000-foot visibility? A look at the figure shows that your total forward displacement in that case would be 338 + 246 = 584 feet. This would give you an approximate 400-foot visibility margin (and a 6-second time margin).

Chart 1 shows the theoretical relationship between existing visibility and maximum safe airspeed for various speeds and bank angles. It can easily be seen that the fixed wing pilot who operates in a higher speed region has to give himself a lot more maneuvering room under conditions of poor visibility. For instance, at 180 knots his total displacement towards the obstacle during an evasive maneuver with a 30-degree bank angle is about 1 nautical mile. The implication is that, at 180 knots, he needs at least 1¼ nm visibility. When he reduces his speed to 100 knots, his forward displacement is about 2,300 feet and a visibility of ½ nm would give him a reasonable margin of safety.

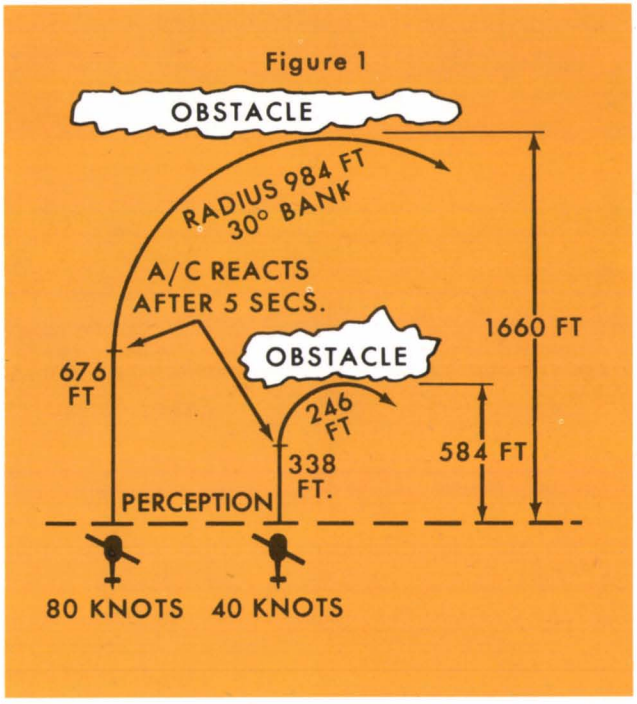
The chart is based on no-wind conditions. It speaks for itself that a headwind works in a pilot's favor and a tailwind against him. It should also be noted that poorly visible obstacles such as high tension lines may increase the existing visibility requirements by a factor of 10 or more. The dotted lines on the chart show the total forward displacement when bank angles of 20 degrees and 40 degrees are used. (Take into consideration the increase in stall speed when you increase the bank angle: at a bank angle of 40 degrees the stall speed increases by about 14 percent, and in a 60-degree bank by 40 percent.)

The only purpose of this discussion is to show that, theoretically at least, existing forward visibility is directly related to maximum safe airspeed as shown in Chart 2.

CHART 2

VISIBILITY	MAX SAFE AIRSPEED
600 ft.	Below 40 knots
1/8 nm	Below 50 knots
1,000 ft.	Below 60 knots
1/4 nm	Below 75 knots
2,000 ft.	Below 90 knots
1/2 nm	Below 115 knots
3/4 nm	Below 150 knots
1 nm	Below 175 knots

To summarize, *the charts don't tell you how to fly your airplane when visibility is poor. They are only a reminder that the smart pilot doesn't fly faster than he can see.*



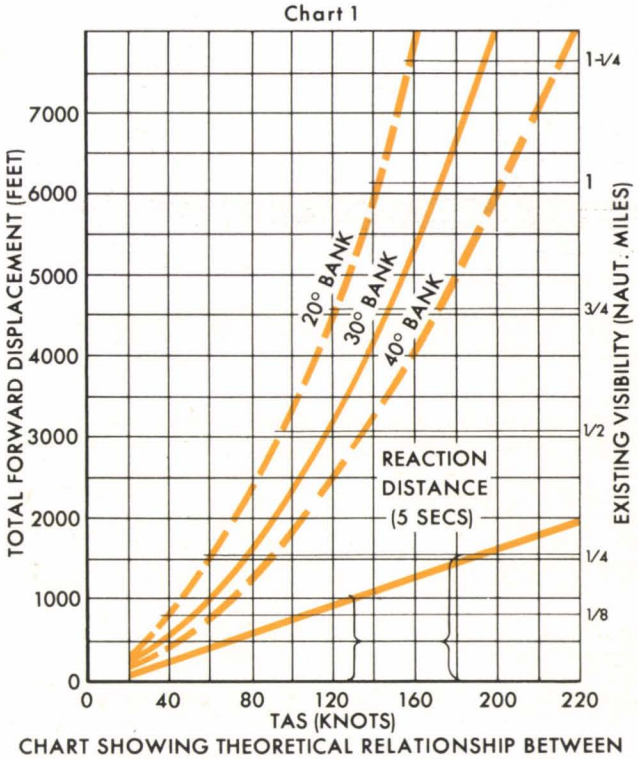


CHART SHOWING THEORETICAL RELATIONSHIP BETWEEN EXISTING VISIBILITY AND MAXIMUM SAFE AIRSPEED

PEARL'S PERSONAL EQUIPMENT AND RESCUE/SURVIVAL LOWDOWN

Words of wisdom about personal equipment are more appreciated and carry greater influence when they come in the form of indorsements from those who command, care for, and provide safety guidance for combat aviation crewmembers. I'm happy to bring you several such indorsements from the safety publications of combat aviation units

From the HAWK MONTHLY SAFETY REPORT:

This month I would like to discuss the wearing of protective equipment. One of the most tragic and useless aspects of some of our accidents is that injured crewmembers often need not have been injured at all. I know you have all heard the stories of how this man or that man would not have lost the use of his hands had he been wearing his gloves, or that this pilot would not have been fatally injured as a result of a blow to the head had his helmet been retained and not come off during the crash sequence. Unfortunately, these stories are true.

It is inconceivable that, in the face of this overwhelming evidence, I still see crewmembers not properly using the equipment they have been provided. The helmet, as an example, must be properly fitted and worn snugly. Your flight surgeon can assist you in getting the proper fit if there is any question in your mind as to just what constitutes "snug." In the case of the newly issued helmet, it should always be adjusted by the flight surgeon to insure that you get off on the right foot and retain your head.

The protective armor should be worn and properly cared for. All too often, we find it has been placed in a puddle of oil or has been thoroughly impregnated with fuel or hydraulic fluid. It would seem unnecessary to mention that this is a dangerous situation, as those fluids burn readily. The benefits of the newly introduced Nomex flight suit can be greatly negated by wearing such a chest protector.

Even more dangerous than the chest protector that has been contaminated by these flammable fluids is the plate which is worn beneath the shoulder harness without a proper carrier. While some ballistic protection may be gained by wearing the protector in this manner, the hazards are great. In the absence of the carrier, there is a significant probability of injury as a result of spalling of the material from which the protector is constructed. When struck, these fragments are not restrained in any manner and they become thousands of tiny flying missiles, each capable of becoming injury producers. In addition to this hazard, the protector which is worn beneath the shoulder harness becomes a serious threat to the throat, neck, and jaw regions during a crash. The person who assumes that his protector is going to remain secured by the shoulder harness is indeed living dangerously.

Countless words have been written and spoken on

If you have a question about personal equipment or rescue / survival gear, write Pearl, U. S. Army Board for Aviation Accident Research, Fort Rucker, Alabama 36360

the subject of fire protection provided by gloves, yet we still find our crewmembers with their gloves in their pockets. Possibly some of us are slow learners, but second and third degree burns and possible lifetime loss of the use of our hands is a high price to pay for such a lesson.

The value of the Nomex flight suit has already been proven. It is often mentioned that the flight suit is excessively hot on the ground and that in some individuals' cases, there is discomfort due to scratchiness of the material. It appears that at this stage, these minor discomforts are the price that must be paid for the protection afforded by existing Nomex suits. Hopefully, improvements will be made, but at this time we can rest assured that the minor discomforts are not nearly so painful nor permanent as the burns that can result by leaving your Nomex suit in your locker.

The equipment that has been provided us for our protection will do the job it is intended to perform. It now remains for us to do our job more professionally by using this equipment properly.

Colonel James C. Smith
Deputy Brigade Commander

From the 12th CAG VIEWPOINT ON SAFETY:

BEAT THE HEAT . . .
NOMEX REALLY WORKS

MAJ Eric Lindstrom
12th CAG Flight Surgeon

"But it scratches!" "It's hot!" "It doesn't fit right!" "Can't get it in our unit!" "No better than fatigues anyway." "Why wear it with all these dificiencies?" "We're wasting our time." Let's examine the facts a little closer. Nomex flight suits were designed for you, the Army aviator, to protect you from being eliminated from the program in a postcrash fire. You have to share the development of the Nomex fiber with the Navy, as the cloth was designed jointly, but the style and the color were made for you. Nomex is presently the best available flame resistant cloth in the Army inventory. Protection against fire is much greater than with the light jungle fatigue. Granted, the fiber will burn if you hold a match to a single strand, but in a flash fire it will not catch fire and burn, flaming, with you inside, like the jungle fatigue will. The weave is porous, and in the breeze of an open helicopter cockpit, the Nomex is pretty comfortable. Try it and see!

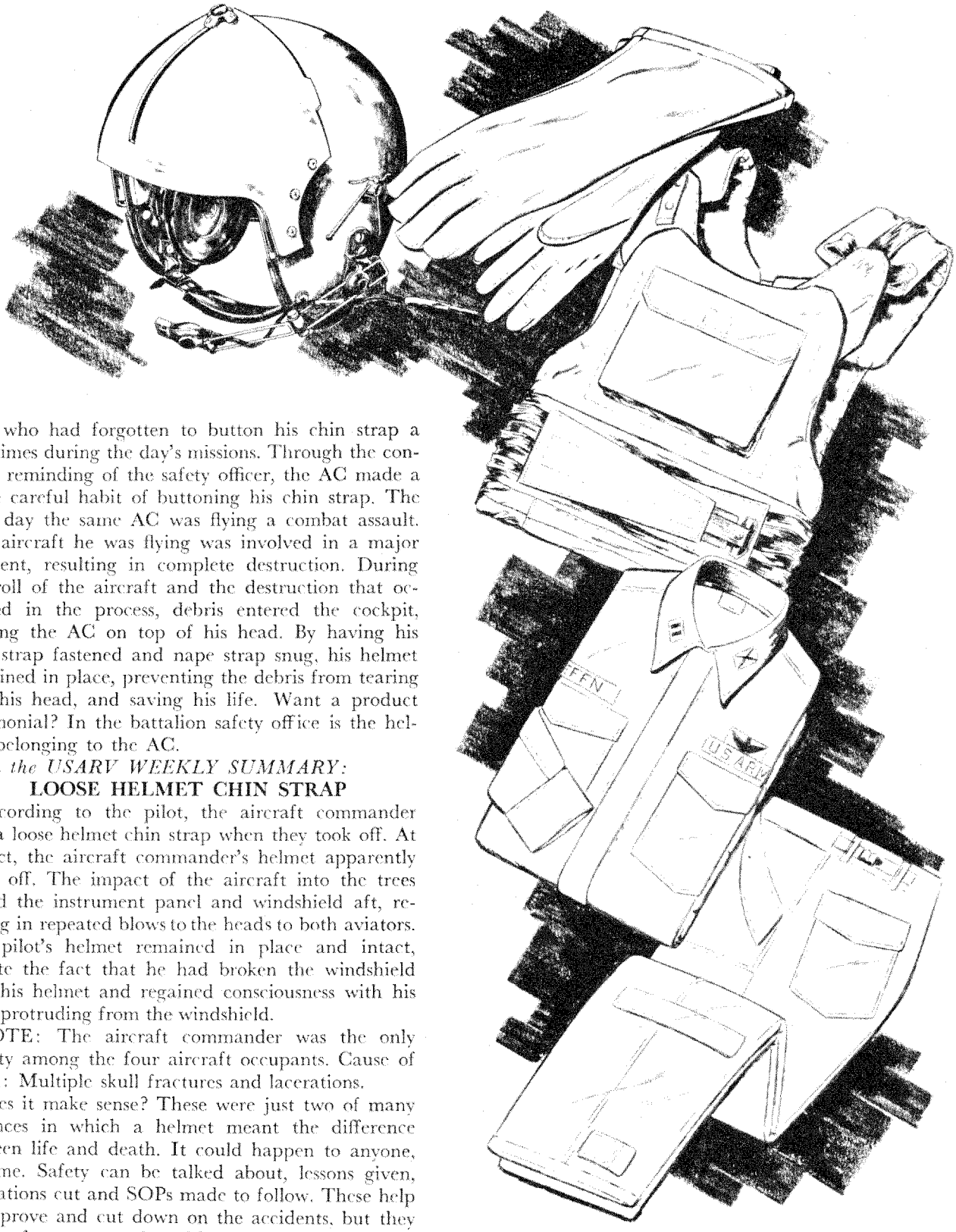
Postcrash fire — couldn't happen to you? Look around. Any accidents with fire lately? Helicopters, I've been told, burn on occasion when crashed, and you just may be in the cockpit on that unfortunate occasion. But, add to the Nomex flight suit (sleeves rolled down of course), the Nomex flight gloves, leather combat boots, a properly worn AFH-1 helmet (often erroneously labeled the APH-6), with visor down, and you have as good postcrash fire protection as anyone does in aviation today. Why be half safe? WEAR NOMEX. We have nothing better!

From the 11th Combat Aviation Battalion NINE'S NOTES:

CAN YOUR HELMET HELP YOU?

In the past, aviators and enlisted crewmembers have been careless about not buttoning the chin straps of their protective flight helmets. There have been a few instances where men have had no chin strap on the helmet, or had a chin strap but did not button it because there was no time, or they forgot. There have been statements like, "I know a man who had his chin strap buttoned and after his ship crashed, he was exiting the aircraft and his helmet caught on something in the ship and nearly choked him to death." Instances in which following a safety precaution has caused injury are certainly the exception rather than the rule.

A safety officer from a unit in the 11th Combat Aviation Battalion was flying with an AC from his



unit who had forgotten to button his chin strap a few times during the day's missions. Through the constant reminding of the safety officer, the AC made a more careful habit of buttoning his chin strap. The next day the same AC was flying a combat assault. The aircraft he was flying was involved in a major accident, resulting in complete destruction. During the roll of the aircraft and the destruction that occurred in the process, debris entered the cockpit, striking the AC on top of his head. By having his chin strap fastened and nape strap snug, his helmet remained in place, preventing the debris from tearing into his head, and saving his life. Want a product testimonial? In the battalion safety office is the helmet belonging to the AC.

From the USARV WEEKLY SUMMARY:

LOOSE HELMET CHIN STRAP

According to the pilot, the aircraft commander had a loose helmet chin strap when they took off. At impact, the aircraft commander's helmet apparently came off. The impact of the aircraft into the trees forced the instrument panel and windshield aft, resulting in repeated blows to the heads to both aviators. The pilot's helmet remained in place and intact, despite the fact that he had broken the windshield with his helmet and regained consciousness with his head protruding from the windshield.

NOTE: The aircraft commander was the only fatality among the four aircraft occupants. Cause of death: Multiple skull fractures and lacerations.

Does it make sense? These were just two of many instances in which a helmet meant the difference between life and death. It could happen to anyone, anytime. Safety can be talked about, lessons given, regulations cut and SOPs made to follow. These help to improve and cut down on the accidents, but they cannot force you or be with you to remind you to be safety conscious. YOU and no one but you can actually perform your safe habits.

YOUR equipment improvement recommendations (EIR's) are important

W. H. Barthel

U. S. Army Board for Aviation Accident Research

A GREAT DEAL OF Monday-morning-quarter backing, complaints and criticism have been levied at The Army Equipment Records System (TAERS) and the part of TAERS probably receiving the major portion of these complaints has been the Equipment Improvement Recommendation forms (EIR's). This is probably due in part to the EIR (DA Form 2407) being used as a check on direct and general support maintenance while, at the same time, it is used as a means with which maintenance activities can communicate directly with the Army Aviation National Maintenance Engineering Point, located at the U.S. Army Aviation Systems Command (AVSCOM). AVSCOM is responsible for in-service engineering support of Army aircraft, including the correction of component deficiencies reported by EIR's.

Complaints and criticism of the EIR system part of TAERS can best be explained by considering the EIR system of reporting as an elastic band, stretched at one end by using activities and at the other by the National Maintenance Engineering Point.

At the using activity end, you frequently hear such complaints as:

"EIR's take too much time to fill out. All the details asked for couldn't possibly be of any value."

"When I submit an EIR, I seldom receive a reply, so why should I waste the time to fill out a form?"

"Why submit an EIR on a component that my maintenance manual says is a condition item? Condition items are throwaway items."

"The replies I get tell me nothing. I don't care if they are establishing a case, I have a problem and I need a solution."

"Some replies say, 'we are looking into your reported discrepancy and we will let you know,' or, 'this is the first deficiency of this type reported, so it is being considered an isolated case.' The same old story of don't-you-call-me, I'll-call-you type of response."

"It's faster for me to get my aircraft back in flight status by throwing away the defective part, requisitioning a new one from supply, and forgetting about the detailed paperwork of deficiency reporting."

At the other end of the band, stretching it just as hard, you frequently hear from the technical and engineering personnel:

"The EIR's received do not provide enough information to make an engineering evaluation of the

problem. How can I provide recommended corrective action when the component deficiency is not even described?"

"Why can't user activities complete EIR's in accordance with the instructions clearly provided in TM 38-750?"

"Why are major field problems predominantly reported by general officer correspondence and not reported as deficiencies by EIR's? It's difficult to respond to a request for corrective action unless some history of past deficiency reporting has been established."

"Why don't using activities provide recommended corrective action or recommended changes to components reported as defective? Such activities have the failed component and are in an excellent position to provide valuable information for developing a solution or fix for a reported problem."

"I'm forced to consider the discrepancy as an isolated case because there is not enough information to make an evaluation of possible causes of failure. The deficiency is not a safety-of-flight problem and I have no past history of this type of failure."

"That unit never tells us about their troubles until they have a problem that they can't resolve by replacing parts. Then we are supposed to provide corrective action overnight."

Such attitudes and criticisms by personnel at both ends of the elastic band can only lead to a passive EIR program from which little constructive information, field failure feedback data, and effective user support can be obtained. Hardware may fail for many reasons. We are all familiar with the *inherent design* types of failure traced back to improper selection of parts, weak structural and mechanical elements, inadequate provisions for lubrication, and many others. However, by the time an aircraft is fielded, most of the *inherent design* types of failure have been eliminated. That's why we have engineering and service tests performed. But we often overlook those elements of design or processing which make for ease of production, overhaul, shipping, maintenance and operational use. These are human considerations that sometimes result in errors and failures that are not inherent to the design.

The term *human error* generally means failure induced by *fabrication* and *maintenance* personnel. The point is that human-induced failures are hard

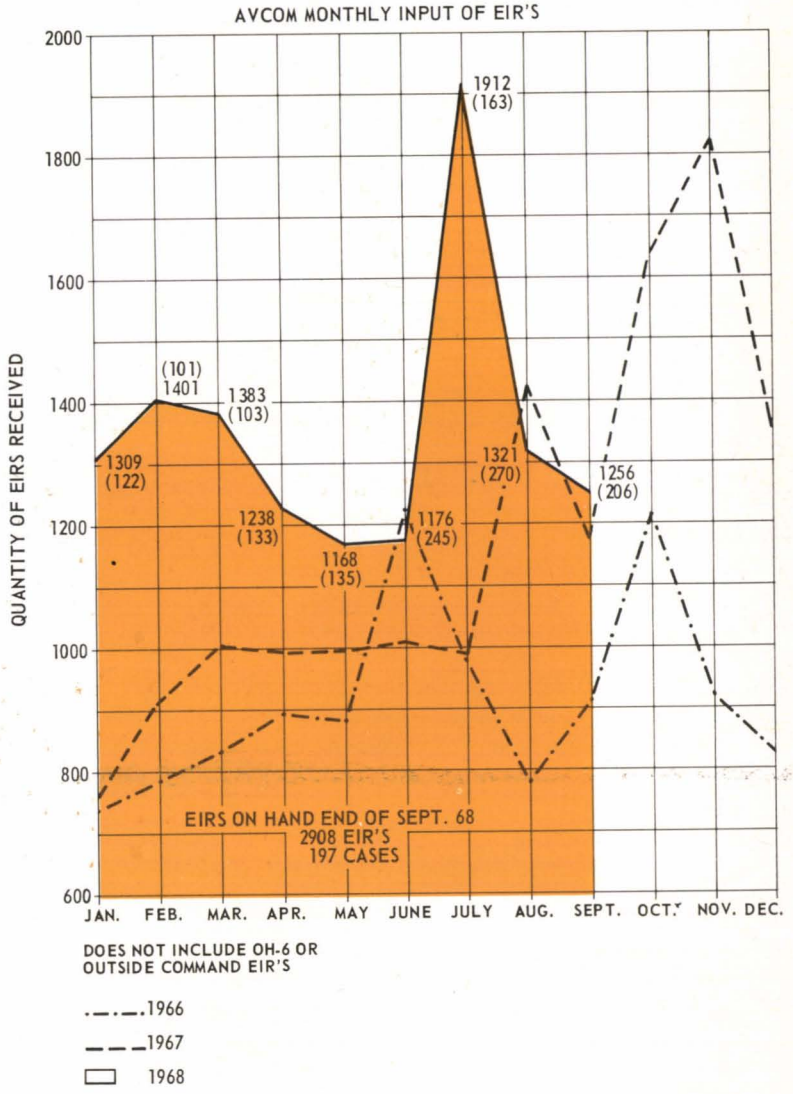
to detect, recur with alarming frequency and are a major problem for which no tests can be developed to substantiate elimination. Knowledge of this type of failure, as well as failures from inherent design deficiencies, after a system becomes operational, can only be obtained by adequate field-failure data feedback.

Significant gains can be achieved by improving field-failure feedback data. At one end, the technical personnel who provide in-service engineering support to users need to know all available information about part failures reported, including information on excessive maintenance believed due to obsolete, confusing or incorrect maintenance instructions. Don't take it for granted that a mechanic with a failed part resting in his hand can't provide valuable information for determining failure causes. A very high percentage of recommendations provided on good EIR's is approved and implemented. These speed up the process of providing replies. Good feedback data will go a long way in improving aircraft systems operational effectiveness.

At the other end, and just as important in improving operational effectiveness, is the type of reply and follow-up action provided by the National Maintenance Engineering Point's technical personnel, as the result of an EIR. Understandable, accurate, timely replies, and recognition of the limitations of field maintenance due to operational environments are most important. This is true no matter how simple the deficiency reported may seem to be.

To assure that each user who submits an EIR is recognized, AVSCOM, within 24 hours of receipt of an EIR, sends an acknowledgement to the using

A very high percentage of recommendations provided on good EIR's is approved and implemented



activity. Indications are that some activities are not getting these acknowledgements, though they are sent as an immediate reply to every EIR received at AVSCOM.

EIR's are first received at AVSCOM by the EIR Control Group, where they are assigned an AVSCOM Control Number and sorted by priorities (Emergency, Urgent and Routine). They are then assigned to the specific system engineering project office responsible for the applicable aircraft and a copy is handcarried to that office. If the EIR is a quality problem, or involves a publication, a copy is forwarded to the AVSCOM Quality Assurance Office or the AVSCOM Directorate of Technical Data, Cataloging and Standardization. In the meantime, the EIR is microfilmed and an acknowledgement prepared and released to the sending activity. The copy of the EIR retained in the EIR Control Center is then used for key punching the EIR information into the automated data bank program.

While all this is going on, the engineer in the specific systems engineering project office is evaluating the EIR, based on its priority and its content to determine:

1. If the EIR contains sufficient information to determine the necessary corrective action.
2. If any previous EIR feedback data showed a similar deficiency and what corrective action was taken.
3. If a case had already been established for the reported problem.
4. If the priority is properly assigned in accordance with TM 38-750. If the priority is not correct, it is changed to the proper designation.
5. If the instructions in the maintenance manuals, as well as past EIR Digest entries, are adequate for the reply. Many EIR's submitted are found to have already been answered by EIR Digest entries. EIR Digests on aircraft systems are available in the field.

If sufficient information and feedback historical data are available to provide a reply, it is prepared and forwarded by the Engineering Project Office to the AVSCOM EIR Control Center. Data from these replies are then entered in the automated EIR data bank program. Replies are then released to the preparing field activity. To insure responsiveness and management control of all EIR's, flasher monthly reports are required on the quantity of open EIR's on hand from all System Engineering Project Offices. These reports are cross checked with the log in the EIR Control Center. The entire processing time for an EIR to be received at the AVSCOM EIR Control Center, logged in, and placed in the system engineering action office is less than two hours.

This does not mean that you are going to get faster answers to EIR's, but an accurate control and time span for responding to EIR's have been established. To provide you with an idea of the EIR intake at AVSCOM and the related support required to be responsive to a total EIR program, the graph was prepared to show the unit intake of EIR's at AVSCOM since January 1967. The numbers in parentheses, starting with January 1968, are the total number of cases established per month. The numbers not in parentheses are the total quantity of emergency, urgent, and routine EIR's received during each month. During calendar year 1966, AVSCOM received and processed 10,964 EIR's. During calendar year 1967, 14,082 EIR's were received and processed. Through September 1968, 12,164 EIR's were received and processed, with only 2,908 EIR's or 197 cases still open. It is estimated that more than 16,000 EIR's will be received and processed during calendar year 1968. The open EIR's and resulting cases at the end of September 1968 were due to various design changes that required an Engineering Change Proposal from component manufacturers. Implementing design changes is a time-consuming process, one of the major causes of delays in responding to user deficiencies reported by EIR's.

The need for obtaining accurate failure data from user activities, including individual analyses of failed parts, cannot be overemphasized. A full description of the physical aspects of the failure is important for tracing possible failure modes or trends. The lack of this information generally results in extensive delays in providing EIR replies.

All reported failures will not necessarily be solved. This fact is not readily understood and accepted by users and customer management. Even when failures of components are fully understood, if they do not affect safety-of-flight, they may not be corrected immediately for such reasons as cost, production, lead time, supply posture of old parts, and maintenance downtime factors. Therefore, it is essential that, prior to any condemnation of the EIR feedback system, all the factors be considered. Remember, it still pays to mine and mill a ton of ore for an ounce of gold — even though all of the gold may not be extracted.

In summary, operational failure data is available today in the field and it can be provided to the technical and material management personnel through the EIR system. Accurate reporting and effective replies can improve the operational effectiveness of Army aircraft and their related systems. To improve, both field activities and inservice engineering support personnel must learn how to better define a component deficiency, how to better report it, to price it, correct it, deliver it, and use it.

Your EIR's *are* important.

From Class 69-2, Army Aviation Safety Course, University of Southern California

THE COURAGE CALLED ?????

HOW MANY TIMES have we heard the words, "Don't try to exceed your aircraft or your own capabilities?" What tempts us to do so, knowing we shouldn't? I have a name for this temptation. But before I give it to you, let me tell you about an experience which had a profound effect on my flying career.

As a newly rated warrant officer, my first assignment was to an airmobile company in the central highlands of Vietnam, an assignment I looked forward to because I would be able to use my newly acquired skills in combat, the ultimate test. I had confidence in my ability, but it was necessary for me to earn the respect of others through the proper use of my skills.

About 10 days after arrival, I had completed my unit checkout and had been assigned to a lift platoon. I had already taken my first hit on a routine supply mission. Although we heard the shots, none of the crew knew we had been hit until a postflight inspection revealed the holes in the tail boom.

I found myself assigned as pilot of a slick for an assault into the region northeast of Dak To, which was to be the staging field. My aircraft commander had also just completed flight school prior to coming to Vietnam, but he had been in country about 45 days. During our briefing, we were told that Charlie was expected to be in the LZ, and that we could expect small arms and automatic weapons fire.

The timetable was followed, and about 20 minutes after liftoff from Dak To, our formation was crossing a high ridge before reaching the LZ. Our ship was in the third "V" of three's, with five "V's" behind us and some Marine CH-34's bringing up the rear.

Our radios silent, we started a gentle descent to the LZ with the AC at the controls. We saw no signs of enemy activity along our flight path which took us down close to the top of a ridge line about 2 minutes out of the LZ.

As we passed directly over the ridge line, it happened! We heard a single shot from below us. The aircraft felt as if it had been hit by a truck. The

collective had actually risen 6 inches before the AC stopped it and got it under control. Eyes fixed on the gauges, I keyed my floor button and shouted, "Throw smoke!" The crewchief beat me to it. Smoke was already billowing. The AC broadcast that we had taken a hit.

Our instruments were all in the green. We were holding our position in the formation. The crewchief and the gunner were checking for holes. Even our six passengers in the rear were looking at themselves, each other, and the floor, seemingly astonished at the lack of a gaping hole — a hole that *should* be there. The jarring effect of that round was tremendous! There must be a hole somewhere!

The AC and I exchanged a glance which, in effect, said, "No damage evident — we go on. But we will watch everything very closely."

Dropping our troops right on schedule, we climbed out. No further action was reported and all was quiet. "Are you sure you were shot at?" the radio crackled. The AC answered, "Affirmative."

Five minutes later, altitude regained, the AC looked at me and muttered, "It must have been a round." Another five minutes later, I caught the flicker of the hydraulic caution light. Just a flicker. I mentioned it, but, as we stared at it, nothing more happened. Was my mind searching for evidence to prove that the ship had been hit? Soon, the whining of the hydraulic pump started, and the light came on again. This time it stayed on.

We performed the proper emergency procedures. Our hydraulics were out! We actually felt better because we now had some tangible evidence of having been hit. Because we dropped out of the formation due to reduced airspeed, we were a few minutes behind the rest of the flight in returning to Dak To. Our hydraulics-off running landing was well executed. We came to a stop about a quarter of the way down the asphalt runway and shut down.

A quick examination showed at least two hydraulic lines in the hellhole ripped open and leaking. One of the company's senior captains came to the ship and told the AC and me that we had done a good job. We were feeling better.

Our battalion commander, a lieutenant colonel, arrived and commented that the ship must be moved so that an O-1 could land. The senior captain told him that ground handling wheels were not available to move it with. The colonel's reply was, "It has to be moved. Fly it off. Have the crew hover it to the side."

Dazed by his remarks, the AC and I just looked at each other. This went against what we had been taught. We both remembered that you don't try to hover a Huey without hydraulics. We said nothing right away. We just stood there. After all, a lieutenant colonel and a captain, both senior aviators, must know more than us. I thought, "Surely, the colonel must know that the ship has no hydraulics — he was on the ground when we landed."

The quiet was deafening. Finally, I ventured, "Sir, we lost our hydraulics."

His answer was, "The ship must be taken off the runway. I'm sure that you and the AC can handle it."

There was the challenge!

Our thoughts went back to the radio query received earlier. "Are you sure you were shot at?" Had we been wrong, we would have been subjected to a certain amount of criticism. We had plenty of time to think this over on the return trip before our hydraulics went out. The colonel's words were, in fact, an order. Did we, a lieutenant and a warrant officer dare to disobey this order, even though we believed it to be wrong?

Our common sense whispered, "No. You can't do it. To attempt would be madness." But ego's answer swelled louder, "You can do it. Show them you can!"

Our crewchief, a gunner, and the senior aviator captain were there. We waved off the crewchief and gunner, strapped in, and started the engine. Together, both of us on the controls, we warily applied collective and started hovering to the side of the runway. I must say the colonel was right. We could and did do it. Our blades at no time came closer than 6 inches from the ground during the ship's wild gyrations as we tried to control it during that short hovering flight.

After shutdown and three chain smoked cigarettes, the maintenance people arrived and had the panels off, investigating the cause of hydraulic failure. Their inspection showed that the single round had entered the hellhole, shearing the bottom bolt of the collective bell crank support. The force of this impact had loosened the two upper bolts which attached it to the frame. From there, metal had gone through hydraulic lines. Another piece went completely through a collective control rod, leaving a gaping hole through about half of its circumference.

The tremendous stress this half-sheared and loose control rod must have been under due to feedback from hovering without hydraulics was more than frightening. We realized how foolish it had been to move the aircraft.

But what did it take for us to make the decision to move that Huey? We really didn't want to do it. Yet, we did. Would we do it again? No. Then what was it? Courage? "Yes, it was courage," I thought, as I looked at the disabled control rod. "Courage — the courage called folly. That was my temptation."

USAASO Sez

The U. S. Army Aeronautical Service Office discusses

New intersection takeoff procedures
Survey teams tailored to help commanders
Incorrectly computing GCA altitudes

ON intersection takeoffs: FAA air traffic controllers now have the authority to initiate intersection takeoffs or to approve them when requested by the pilot. This new procedure was adopted for the purpose of expediting aircraft departures and reducing delays.

The pilot still retains the prerogative to use the full runway length or elect a different intersection for any reason, provided he informs the tower of his intentions. Tower controllers will provide the measured distance between the intersection and the end of the runway on request. Pilots are reminded it is still their responsibility to determine that sufficient runway length is available to permit a safe takeoff under existing conditions.

ON aeronautical services surveys: Are you one of those rare birds who has no problems as an airfield commander, TOE unit commander or aviation staff officer? If so, read no further! These remarks are for those aviation commanders and staff officers who do have problems and need solutions.

USAASO can provide a full spectrum of aeronautical services assistance to Army airfields, other commanders and aviation staff officers, world-wide. If you have equipment problems, equipment experts are available to assist. If you have ATC or airspace problems, ATC and airspace experts are available. Help is yours for the asking. Whatever your needs are, USAASO can tailor a team to investigate your problems and recommend solutions and, in most cases, help you implement the solutions.

ON GCA surveillance approaches: Our field representatives have discovered some radar operator confusion regarding the computation of the recommended altitudes for each mile on final for surveillance radar approaches.

TM 11-2557-29, paragraph 725c and the notes adjacent, specifies what altitudes are to be used and the method for computing the altitudes.

The confusion exists primarily at those airfields which use a precision glide path other than 3 degrees. Some operators are evidently computing the rate of descent for surveillance approaches to make it compatible with their precision glide path angle. THIS IS INCORRECT. Regardless of what precision glide path angle is used, the surveillance altitudes should be computed as stated in the TM and, of course, measured from the end of the runway — not from "touchdown."

UH-1s Return To South Pole

Antarctic Support Detachment Aids Scientific Exploration

THE U. S. ARMY Aviation Detachment (Antarctic Support) from Ft. Eustis, Va., has returned to the south polar region to support six major scientific programs in Ellsworth Land. This is the eighth consecutive year the helicopters have transported scientists in Antarctica.

This year's major project will be a continuation of integrated research by scientists along the coastal areas of West Antarctica. Last year the unit was engaged in similar operations in Marie Byrd Land (see October 1968 AVIATION DIGEST). Included in this year's research will be reconnaissance geology conducted early in the southern hemisphere's summer by Texas Technological College.

University of Wisconsin geologists will make similar studies of the Jones Mountains in Thurston Island in the Eights Coast area later in the summer.

Also scheduled are topographic, botanical and paleomagnetic surveys of Ellsworth Land. A scientist from Chile will make a geological survey of the same area.

The unit departed for "the ice" in mid-October and will return to Ft. Eustis in late February. While on the earth's southern-most continent, it is attached to the Navy's AIR DEVRON SIX.

Members of the Detachment unload one of three UH-1Ds used for scientific exploration in Antarctica. The helicopters are flown in by Navy C-133 Hercules

Don't Distort Your Views On Flight Safety---

FLYING IS A FULLTIME JOB