UNITED STATES ARMY AVIATION DIGEST

MARCH 1965

TELL ME A WAR STORY—PAGE 2

UNITED STATES ARMY AVIATION DIGEST

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A Wild Ride

CAPT AUGUSTINE T. Ledwidge, Maintenance Officer of the 339th Transportation Company, Republic of Vietnam, recently experienced a freak flight — "a once in a million" — and lived to tell about it.

The 32-year-old Army Aviator was performing a routine ground runup and hovering check on a UH-1B helicopter when a servo cylinder pivot in the rotor control system broke, causing the aircraft to begin a rapid, uncontrolled maximum performance climb.

"It was just like a gas filled balloon being cut loose from its mooring," Captain Ledwidge said, "except that the nose of the ship was pointed down in a tail first ascent. The ship was spinning in uncontrollable 360° right turns. I had no lateral control of the ship, and I could not stop its climb. I feared a loss of power and a sudden and uncontrollable descent."

Also in the helicopter were four maintenance men, Specialists Charles M. Livenspargar, Michael H. Thompson, Roy C. Howie, and PFC David Karaszewski.

"I yelled to the crew for some help to hold down the collective in an effort to stop the rise," Captain Ledwidge continued, "and their reaction was outstanding.

"With utter disregard of the hazards involved, Specialist Howie jumped into the copilot's seat and grabbed the controls. When he was unable to move the collective stick by hand, he stood up and applied the weight of his body by placing one foot on the copilot's collective control while bracing himself against the bulkhead.

"Specialist Thompson crawled on his hands and knees to help me apply pressure on the pilot's control. Considering the open doors, the attitude and violent turning actions of the aircraft, this took a great amount of courage.

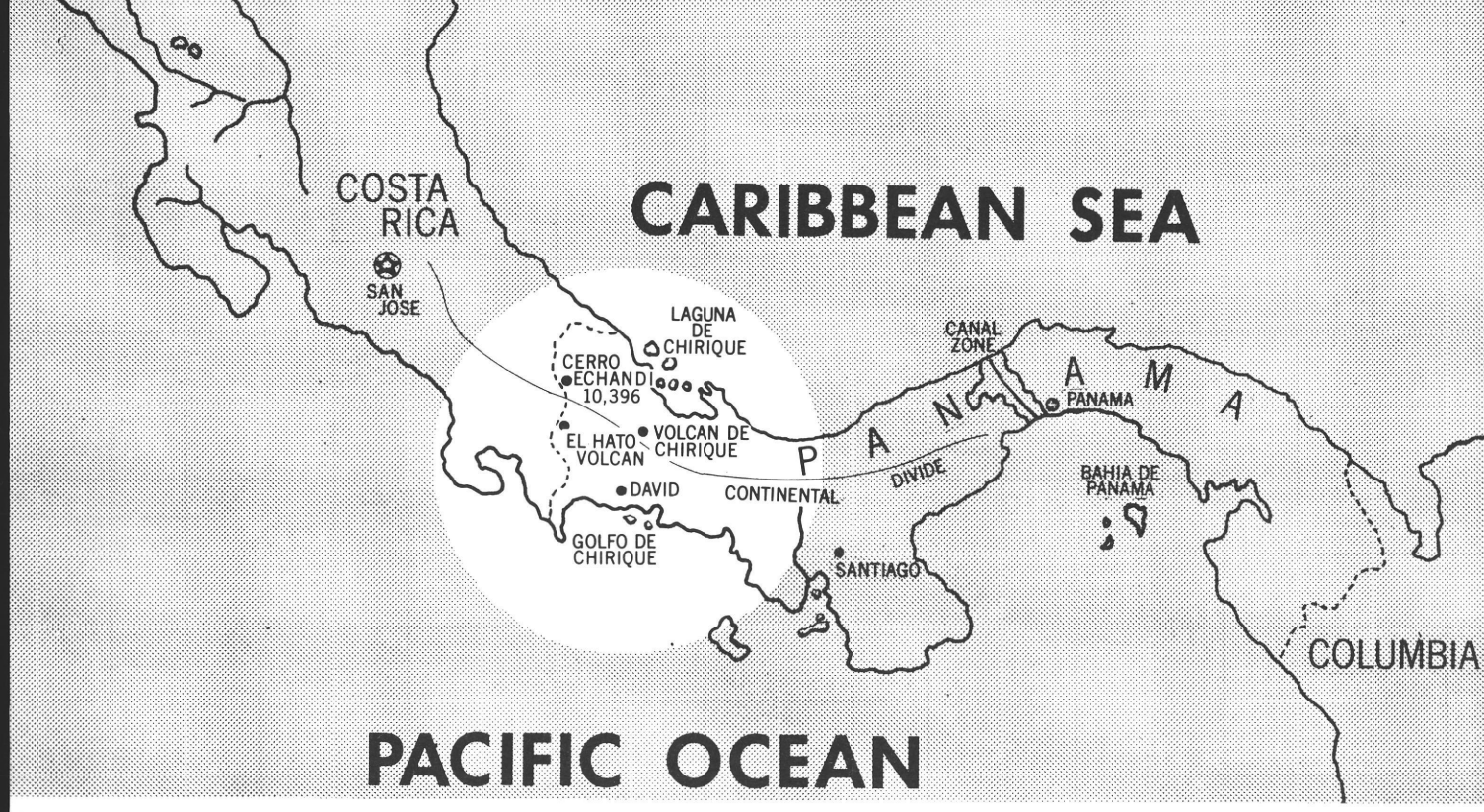
"Once we reached 1,200 feet, we were able to reduce pitch enough to stop the turning and slow climb. The airspeed went to zero and we just hung in the air. With my crew holding the controls, I was able to regain some command of the aircraft and we began our descent.

"We slowly relaxed the pressure on the control and suddenly started a slight climb again. I immediately began to reduce the throttle and was able to make a running landing. It took four men to hold the control while the engine was shut down," the captain concluded.

Captain Ledwidge praised the members of his crew. "Without their calm, quick reaction, we would not be here today," he said.

It was a wild ride!

The men had praise for the captain, too. And to prove the point, they gave him a cigarette lighter the next day, engraved simply, "THANKS FROM YOUR CREW."



Tell Me a War Story

Captain G. E. Kinback, Jr.

WHENEVER a group of Army Aviators get together their conversation inevitably evolves into the aviators' favorite pastime — hangar flying. As they begin to tell their tales of heroic deeds, performed while piloting Army aircraft, these stories eventually take on a can-you-top-this aspect.

If the story teller runs true to form he will garnish the tale with colorful though slightly untrue anecdotes.

I too have such a story. However, it lacks one aspect of the "real" war story: it has been assembled, ungarnished, from a daily log I kept of a two-week assignment in mountainous jungles of northwestern Panama. During this period I was assigned to the 937th Engineer Company (Aviation), a supporting element of the Inter-American Geodetic Survey (IAGS). Another element, the 551st Survey Platoon, had been compiling survey data in Chirique Province for approximately 15 months.

The Chirique Province is divided by the Cordillera (mountain range) de Talamanca. The Talamancas, with peaks up to 12,000 feet, traverse the approximate center of the isthmus, forming the Continental Divide. The Talamancas also form the dividing line between the developed and undeveloped halves of the country.

The current mission of the 551st Survey Platoon was to establish second order survey control from the Continental Divide north to the Caribbean Sea. The survey plan had bogged down because of adverse weather, impassable terrain, and the unwillingness of indigenous labor to serve as equipment bearers and guides. Work was 8 weeks behind schedule.

Helicopter support had been nonexistent because the command had placed a density altitude limitation of 7,000 feet on

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the OH-13. The surveyors of the 551st were on survey points at pressure altitudes between 8,000 and 10,000 feet. On hot days the density altitude could easily exceed 11,000 feet.

During the last week in May 1960 I was summoned by the operations officer and informed I was to take an OH-13 to David (pronounced Dah-veed, capital of the province) to see if I could get the survey moving again. I was told I could overlook the density altitude limitation because of the emergency nature of the situation. Resupply of the survey platoon had become critical.

High density altitude made mandatory exact weight and balance computations

I was selected for the mission because I had some mountain flying experience in Colorado and because of my small stature. At 130 pounds I had a 65-pound safety margin over the average Army Aviator.

At daybreak the following morning I departed the Canal Zone for the 4-hour trip to David. I was accompanied by Captain Tryjankowski (hereafter referred to as "Ski") and his crewchief, Specialist-5 Cunningham, in an O-1, and the OH-13 crewchief, Sergeant Hurley, with me in the Sioux. It was common practice to use a light fixed wing airplane to escort helicopters over thick jungle terrain. Both aircraft were heavily loaded with extra gasoline, mechanic tools, and personal gear.

The base of operations for the 551st Survey Platoon was located on the airfield at David. Ski and I searched for someone who could brief us on the situation.

The radio operator, Private Windfrey, said his last radio contact with the 551st platoon sergeant, Master Sergeant Asselin, and the survey party in the mountains last week indicated that the men had just reached their positions on Cerro Echandi and were clearing lines of sight.

A few mental gymnastics involving time and distance revealed that it had taken Sergeant Asselin and his men 47 days to walk a horizontal distance of slightly less than 20 nautical miles — less than ½ mile a day! During the trek into the mountains it was necessary to cut trails through virgin rain forests with very dense undergrowth.

Despite the fact that the survey party followed the ridgelines, it was impossible for the cover aircraft to keep track of them. The men sometimes went 3 or 4 days without food because the O-1 could not find them to make food drops. Clouds would settle on the higher elevations between 0900 and 1000 hours every day. If the pilot could not find the survey party in the early morning hours, he had to wait until the following day to make his supply drop. Even then, it was difficult to find them in the dense jungle, unless they climbed the highest trees and marked their position with a brightly colored panel.

If the pilot misjudged the top of the ridge by just a foot or two, the package would travel as much as 300 or 400 yards down the side of the ridge. The package had only to fall outside a radius of 100 yards to be completely lost in the dense undergrowth. If the pilot missed the first drop, it might be several days before he could make another.

The weather in the mountains precluded a supply drop for the remainder of the day, so I decided to devote the time on a local area checkout for Ski and on planning for tomorrow. With Ski as pilot and me in the back seat of the O-1 we proceeded to tour as much of the Chirique Province as weather would permit. Heavy thunderstorms were hanging over the Continental Divide and the mountains held a shroud of clouds down to the 5,000-foot level. By the time we had covered the coastal plains and turned toward the mountains, the base of the clouds was already down to 3,000 feet. The most important part of Ski's checkout had to be postponed until the following day. So we returned to David to plan the next day's missions and give

the crewchiefs time to perform their postflight maintenance.

To take advantage of what little flying weather we could get between dawn and the late-morning poor weather, we planned a predawn takeoff. This was to become standard procedure in the days that followed.

The next morning with Ski in the O-1 and me in the OH-13 we climbed through thin fog and broke out on top about 150 feet above the ground. Even though the patch of fog was fairly large around David, only a few small patches were in the valleys along our flight route. We could see Cerro Echandi, 43 nautical miles northwest of David. I planned to accomplish the remainder of Ski's checkout over the radio while he acted as my escort.

We flew past El Hato Volcan. I pointed out the small airstrip to Ski as we went by. We continued climbing and proceeded to Cerro Echandi. I pointed out the prominent landmarks as we passed them. As we approached the peak on Cerro Echandi I could see three men and the theodolite set up over the triangulation station.

I flew low over the peak and dropped a message to Sergeant Asselin, advising him that we would drop food, radio batteries, sand and cement that day and that I would return the following day and land on Echandi. I also advised him to prepare a helicopter landing pad, establish radio contact with David as soon as possible, and be prepared for me to pick him up and return him to David.

I then circled well above the peak so I could watch Ski begin his run for the food drop. The bundles were packed with excelsior to absorb the impact forces and were attached to bomb shackles under the wings. A strong steady wind was blowing across the peak. Ski applied landing flaps. With that strong wind this should have been an easy drop. As he turned into the wind the resulting drop in groundspeed made it appear that the O-1 was floating slowly across the peak. I saw the bundles drop from beneath the wings, hit the ground and come to rest in some small bushes — a successful drop.

I then told Ski to circle the peak while I made another low pass. Sergeant Asselin raised his hand to indicate he understood the message. Ski and I then turned toward El Hato Volcan.

I landed the helicopter near the south end of the strip and shut down the engine. After the OH-13 was refueled and the sand and cement attached to the shackles of the O-1, Ski took off to make the second drop on Echandi while I headed for Cerro Punta in the Sioux.

Cerro Punta is a small village in a valley formed by an extinct volcano. The village is at an altitude of 6,500 feet but several cultivated fields and cleared pastures are in the vicinity at altitudes as high as 9,500 feet. I planned to land in these areas, gradually increasing my landing altitude. If I could land at 9,500 feet with a full fuel load and 150 pounds of cargo (rocks in the cargo slings) I should have no trouble landing on Echandi tomorrow with a reduced fuel load. As I made landings at progressively higher altitudes I noticed very little difference in the handling of the helicopter.

After landing at David we were informed by the radio operator that Sergeant Asselin had just called in. Both of the supply drops had been successful. Although the package burst, they had salvaged enough cement to build three survey markers.

We planned the next day's flights while the crewchiefs performed necessary maintenance on the two aircraft. The future of our helicopter operations in the Chirique Province would depend on the success or failure of tomorrow's missions. For this reason the planning was accomplished in minute detail. Weight and balance computations were accurate to the nearest inch-pound.

The following day the airfield was again shrouded in the typical early-morning fog. Precious time would be wasted waiting for the sun to burn off the fog. We used this time to be sure each member of our closely-knit team knew what was expected of him. Ski was to fly an airdrop

to Picture Point North with Specialist - 5 Cunningham, the O-1 crewchief, assisting in the observer's seat. Ski would escort the helicopter to El Hato, the base camp, and continue to Picture Point North.

I was carrying another airdrop in the helicopter, which I planned to unload at El Hato. I was also carrying extra gasoline for the helicopter. I would remain at El Hato until Ski made the first drop and returned to pick up the second airdrop. We would then proceed to Cerro Echandi together, where Ski was to fly cover until the helicopter was safely on the hilltop. He was then to continue to Picture Point South and make the second drop.

I would wait on Echandi with the engine running until Ski returned to escort the helicopter back to El Hato. This would give me time to discuss the survey situation with Sergeant Asselin while making an on-the-spot inspection. We would then fly back to El Hato, refuel and return to David. With luck and reasonably decent weather, we would complete this morning's mission in a little over 3 hours.

The fog began to break up about 0550 and we were off the ground at 0610 — 30 minutes later than we had originally planned. We climbed up through a large hole in the fog.

I landed the helicopter at El Hato Volcan as Ski continued to Picture Point North. He returned at 0720 and we hooked the second pair of drop bundles on the shackles. As we climbed out toward Cerro Echandi, any doubts I had concerning my ability to land this machine at 10,400 feet were partially obscured by the beauty of this crystal-clear, cool morning. When we topped the lower peaks of the Continental Divide I could look to the north and see the Caribbean coast; by glancing to my left I could see the Pacific coast.

We leveled off at 10,500 feet. I could see a white panel marking the helicopter pad cut out by Sergeant Asselin and his men. As we drew near the peak I saw three figures running toward the pad. They had picked a nice level spot for the pad on the north side. I made a low pass to the north, planning to make a complete circle and land to the north. As I swept over the peak I seemed to have an excessively high groundspeed. A quick check of my airspeed indicator revealed I had only 30 knots of airspeed. I estimated my groundspeed on the low pass and it must have been at least 60 or 70 knots. This meant there was a strong wind blowing across that peak from the south. The wind had been dead calm at the lower elevations! A quick glance at the white flag atop the survey marker confirmed my estimate.

One of the figures on the peak was signaling for me to land to the north. These men had been without helicopter support for so long they had forgotten a helicopter must land *into* the wind. The pad would have been perfect if the wind were out of the north, but was impossible with that strong southerly wind. In addition it was about 60 feet lower than the top of the peak and there would

Pressure altitudes may range from 8,000-10,000 feet, but density altitude could easily exceed 11,000 feet.

When survey teams have time they make helipads like this one in two days. The author landed his Sioux on one less sophisticated.

be strong downdrafts at the pad as the wind came whipping over the peak from the south.

I continued circling the peak looking for another place to land; at the same time I was "feeling out" the convective currents. I found a level spot in a small saddle and turned for landing to the south. As I approached the spot I saw that it was covered with small scrub bushes. But I felt I would be able to set the helicopter down safely, so I continued the approach.

The helicopter handled beautifully all the way to touchdown. I had a little trouble finding a place where the helicopter would "set" without rocking among those tough, 2-foot "trees." After assuring myself that the helicopter was firmly seated I reduced the rpm to idle, locked down the cyclic, and took my first look at the three figures standing outside the radius of the turning rotor blades.

Sergeant Asselin, whom I had known and worked with for months, was barely recognizable. He appeared to have aged 10 years since I last saw him, less than three months ago. All three men had not shaved in at least a month. Their uniforms were so dirty I could not distinguish the chevrons on Asselin's sleeve. Their toes were exposed through the front of their boots and the soles of the boots flapped as they walked. Sergeant Asselin, whom I remembered as a soldier of the "old school," ramrod straight in stature, was bent over like an old man.

As they approached the cockpit there was no mistaking the welcoming smiles beneath the heavy beards. We shook hands as we walked away from the noise of the helicopter. After the sergeant briefed me the men unleashed a barrage of questions: "Would the helicopter stay in the area long enough to finish the job? When are they going to send some new boots? How's the weather in David? Will we fly out by helicopter or will we

"Wings At The Treetops," a new film depicting the latest developments in Army Aviation, is now available to Army units through their respective audio-visual aids communications centers.

The 28-minute film (TV 629) is among 40 being released by "The Big Picture" to over 320 television stations this year. It emphasizes today's versatile aircraft and their capabilities in support of the Army's overall mission.

have to walk back out? How're the steaks in David?" I answered most questions as best as I could but I was very adamant on two answers: Yes, the helicopter would stay until the job was completed, and yes, they would be flown out by helicopter.

While we talked I was able to see first-hand the conditions under which these men had existed during the past 2 months. They said nothing of their hardships except when I asked specific questions. Even then, their answers were the epitome of modesty, indicating that they had simply done their job as best they could.

I asked why they had not requested new boots. Sergeant Asselin told me each man had started out with two pairs of new boots, which were worn out after the first 2 weeks. They had requested new boots by radio and one pair for each man was air-dropped. When that pair wore out and they requested more, the request was turned down. They could not get new boots without first turning in the old ones. The quartermaster in Panama could not understand how a man could wear out three pairs of boots in less than a month. I guess he suspected they were selling them to the natives. They had thrown away their old boots as excess weight after their bearers had deserted them.

Instead of living in the traditional army field tent, they had constructed a shack of small logs and tarpaper. It seems the tents could not withstand the constant high winds and were torn to shreds after 2 or 3 days of flapping in the stiff breeze. The tarpaper had been air-dropped by request, and the shack appeared to be holding up very well.

Sergeant Asselin loaded his personal gear and we climbed aboard the helicopter. We strapped ourselves in; I performed the pretakeoff check and picked up the helicopter to a hover. The OH-13 held a 3-foot hover very nicely. The airspeed indicator fluctuated between 25 and 30 knots, so we had flying speed even before we started moving forward.

The Bird Dog approached from the north and began to circle the peak. I made a routine pinnacle takeoff and turned toward El Hato Volcan, refueled and returned to David.

During the days that followed, many of the missions performed by the two aircraft were not as "routine" as that first and most important, confidence - building mission on Cerro Echandi. Rapidly changing weather, critical high altitude aircraft performance, and unpredictable mountain winds resulted in many marginally safe aircraft operations.

The survey was completed and the last of the surveyors returned to David, exactly 14 days from the time Ski and I departed the Canal Zone. We flew back to unit headquarters that same afternoon.

The men of the 551st survey platoon were packing their equipment to move to another province of Panama, the Darien. The mountains there are not quite as high, but the jungles are heavier and the natives are not quite as friendly. The Darien Indians still display the heads of their late enemies at the entrance of the "bohios." The men of IAGS will continue to perform their missions uncomplainingly as they have in the past. And every mission flown in those jungle covered mountains will be a separate "war story." If I'm not too busy dwelling on my next one I might listen to yours.

Steady . . . Hold It . . .

TESTS OF A new, miniature flash cartridge to illuminate an enemy battlefield at night mark another advance in the Army's surveillance program to find the means of keeping a 24-hour watch on the enemy's movements.

Developed to aid in low-level aerial night photography, the flashlight battery-size cartridge produces enough light on 16 city blocks to get a usable picture with Tri-X film.

The new cartridge is ¼ as light in weight and ¼ the size of previous cartridges. All cartridges of this type have several drawbacks: they are dangerous if not handled carefully. When exploded they send pieces of metal hurling to earth, creating danger for friendly troops. They must be ejected from a special machine which has to work properly for the cartridge to explode at the right time.

In its search for the best answer to night battlefield illumination for low altitude aerial photography, the Army has also tested super size electronic flash equipment. These units are safe, fire accurately, and provide unlimited numbers of flashes during flight, but to date they are much heavier than the new cartridge.

Designed and manufactured at Picatinny Arsenal, the cartridge will be used with an airborne surveillance system consisting of a panoramic camera, a film processor, and an image-scanner. The image - scanner radios the picture information back to a ground station where it is reproduced.

Now It's

Air-Conditioned Face Masks

A LIGHTWEIGHT, nonwoven textile fiber weather mask that the manufacturer claims "not only keeps the nose and mouth warm but also helps warm and humidify inhaled air during colder winter months" has recently appeared on the market.

Such a mask has long been needed by aviators, aviation mechanics, and other military personnel who work outdoors in extreme cold under conditions where the more bulky type masks are impractical. It would be particularly valuable in survival situations to protect the nose and mouth from frostbite and help eliminate premature exhaustion caused by breathing cold air. [FSN 4240-738-6245]

The Minnesota Mining and Manufacturing Company, who developed the mask, says the porous material used allows exhaled air to pass through but stops warmth and moisture. The warmth and moisture is held in a small chamber formed by the mask in front of the nose and mouth. Inhaled air must pass through this chamber and is thus conditioned for more comfortable breathing.

In tests made by the company it was found that inhaled air from temperatures as low as -70° F was brought to a level of +65° F.

The lightweight molded mask is held in place by an elastic band. It can be used numerous times and cleaned by rinsing in clear water. It does not interfere with glasses and goggles and will not hinder voice communications.

A New Look In Commo

Captain John A. Fambrough

FOR SEVERAL years now we have been talking about a "new family" of aircraft for the Army. Chiefs and indians alike have been anxiously awaiting the day that the Army would reduce its aircraft inventory to a highly compatible family of only six or seven aircraft. That day is fast approaching.

Some of the aircraft, specifically the light observation helicopters and the medium cargo helicopter (CH-47A), are in the service and logistical test stage, but will soon be joining more units in the field. Others have been in the field for some time now and are performing admirably.

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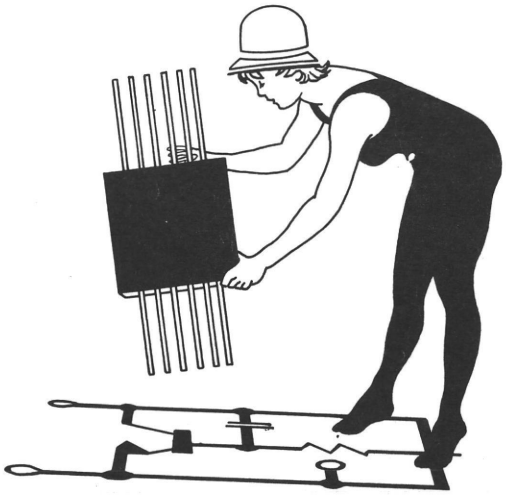
While the new family of aircraft was being developed, quietly, behind the scenes, another new family was being created. This new family provides the new aircraft with the finest communications and navigational equipment Army Aviation has ever known.

Some aviation units have already begun to receive the new equipment, and production and procurement are hard pressed to meet the demand. But the gap will eventually be closed, and we will be using the new equipment in the near future.

So what! We have good radio equipment now. Why all the fuss over a new family of avionics equipment? What does it have over present equipment? We can get from point A to point B without getting lost, and we can talk to the guy on the ground when we want to, so why the big flap? Who needs new radio equipment?

You do, friend! And your commander does, and the Army does!

To the average aviator, avionics is as forbidding as a thick property book; he doesn't want



anything to do with it. "You put 'em in and keep 'em working and I'll use 'em," is his cry. But we should know something about the equipment we use, whether it is an aircraft, a weapon, a vehicle, a first-aid kit, or a radio. To be effective, we must be able to plan for and realize good communications.

One of the biggest problems associated with tactical radio communication has been frequency allocation. Present radio equipment simply does not permit us to use enough of the frequency spectrum.

We all know that our UHF and FM sets are tuneable in increments of one-tenth of a megacycle; that is, 235.1, 235.2, and so on. The critical area has been in FM communications though, where all ground tactical radios are operating in a relatively narrow frequency range. Simply not enough frequencies are available to provide each commander with his needs and desires, especially when it is necessary to tune our radios in such large increments (.1 mc or 100 kc).

To help alleviate this problem, our new family of tactical radios are tuneable to every 50 kc instead of every 100 kc; i.e., 235.1, 235.15, 235.2, etc. In other words, we now have twice the selectivity in a given band that we have with present radios. To provide even more latitude, the portion of the VHF (FM) band we will use has been increased.

Those who are familiar with ground tactical radios know that the old armor, artillery, and infantry frequency range extended from 20 mc to about 55 mc. With the new airborne and ground FM radios, we will operate from 30 to 76 mc, a spread of 46 megacycles, compared with a 35 megacycle span with the old sets. This increase in frequency range and frequency selection provides us with a tremendous increase in frequency availability.

How about the new airborne communications sets? How do they compare in weight, frequency, power output, and maintenance with our present sets? What new set replaces what old set? Since operation of any of the new (or old) communications sets is very simple, our primary areas of interest as aviators and advisors on aviation matters are weight, number of frequencies, power output, compatibility with ground sets, and maintenance. Based on this, let's compare the old family with the new.

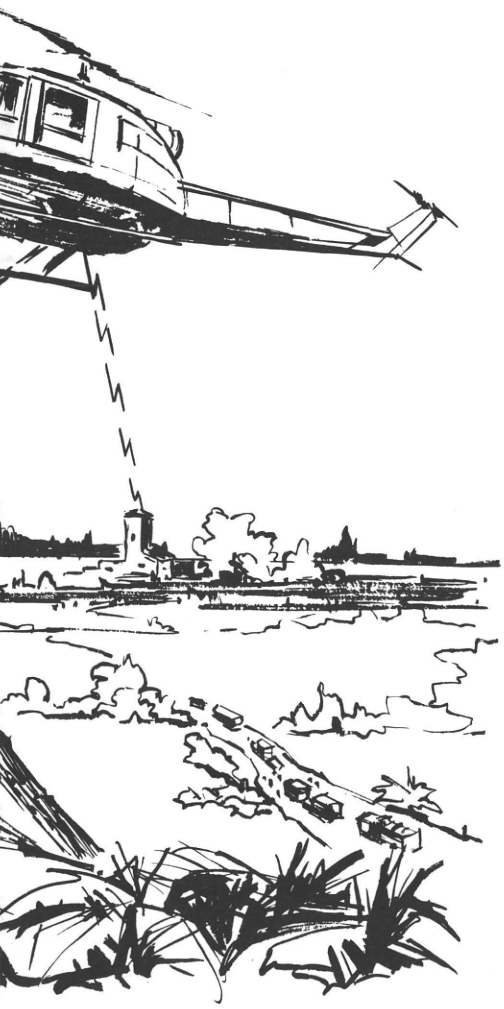
First, let's look at VHF communications. While rarely used by the military in CONUS, VHF is the primary means of communications in many overseas areas. The ARC type 12 VHF radio set is being or has been replaced with the AN/ARC-73 radio set.

The ARC type 12 provides 10 crystal controlled channels and has a power output of 1 to 2 watts. Installed weight varies

with the configuration in which the set is installed, but this set is no featherweight.

The AN/ARC-73 radio set provides 680 transmitting channels and 720 receiving channels with a power of 20 to 25 watts and a weight of only 32 pounds. So we realize a tremendous increase in capability while reducing weight and maintenance. The AN/ARC-73 is partially transistorized, is of modular construction, and is digitally tuned.

Army Aviators are most familiar with the AN/ARC-55 radio set (UHF). This is the communications set installed in most fixed and rotary winged aircraft. The ARC-55 provides 1750 channels, has a power output of 9 to 12 watts, weighs 63 pounds, and is by no means easy to maintain. It is to be replaced by the AN/ARC-51X, which also provides 1750 channels, but weighs only 31 pounds. Power output is 20 watts and the set is partially transistorized. Like all the new sets, the ARC-51X is of modular construction. The ARC-51X has twice the power output at half the weight of the ARC-55.



What is modular construction? Briefly, it is nothing more than construction in which circuits and components are mounted on cards which plug into the radio housing, thus forming a complete set consisting of several cards which may be tested and replaced individually. The result is much simpler, faster, and more economical maintenance.

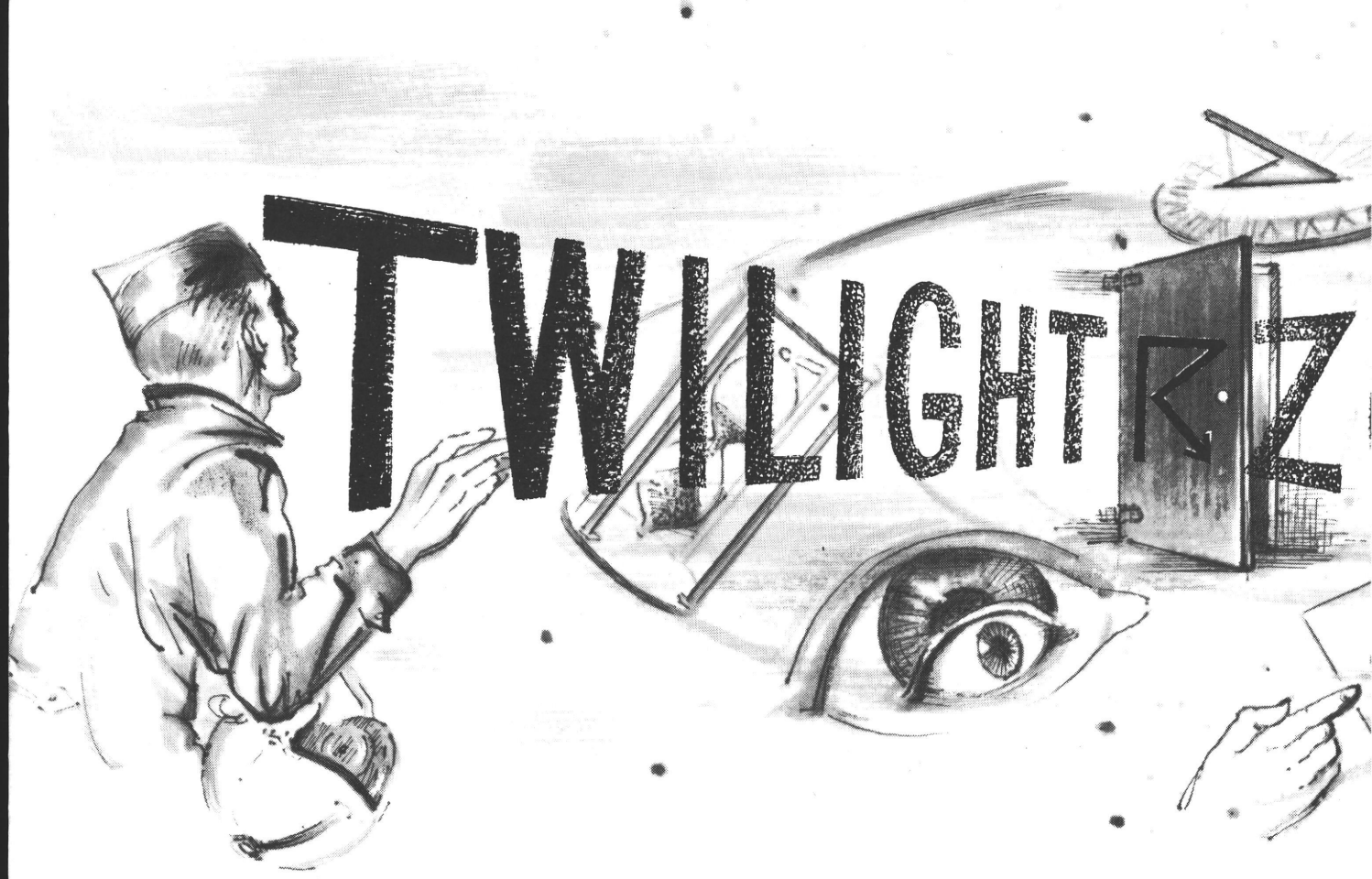
Next, let's compare our present FM set, the AN/ARC-44, with its replacement, the AN/ARC-54. Airborne FM radios are used to net with the ground tactical radio sets (FM), and they provide homing capability as well as communications. The AN/ARC-44 operates in a frequency range of 24 to 51.9 mc for communications, and provides the operator with 280 preset channels. It has a power output of about 8 watts and weighs 49 pounds in an O-1A installation. Weight varies with the type of installation. FM homing on any signal within the range of 24.0 to 49.0 mc is possible when the AN/ARA-31 antenna group is installed in conjunction with the ARC-44.

The new AN/ARC-54 has a frequency range of 30 to 69.9 mc and provides 800 channels. Power output is 10 watts (minimum) and the set weighs 25.5 pounds. The ARC-54 also has a homing capability, and direction (right or left) to the station is presented on a visual indicator similar to an omni deviation indicator.

The AN/ARC-54 can be modified to provide a retransmission capability for increasing the range of ground or other airborne FM equipment. Basically, the retransmission unit consists of two ARC-54 radio sets operating on different frequencies. The unit receives a signal from a ground or airborne set and retransmits it on a different frequency to another ground or airborne set. The characteristics of the retransmission unit are the same as for the single ARC-54, except that the weight is 51 pounds.

All of the sets mentioned are limited in range by line-of-sight restrictions and power output. To provide a long-range communications capability, the Army is procuring a number of AN/ARC-102 high frequency, single side-band radio sets. This set provides 28,000 channels for voice, CW, or data communications in a frequency range of 2 to 30 megacycles. With this set, we can expect reliable communications to at least 100 miles, even when operating at treetop altitudes. The set weighs 50 pounds and is digitally tuned.

That, very briefly, is a look at our new communications sets, a small portion of the basic information that every aviator should be familiar with. Each of us has a responsibility to know our equipment and to be able to advise our commanders on its capabilities and limitations. He expects us to know what aviation can do for him. When he asks you a question on airborne communications, will you be able to give him an answer?



Lieutenant David G. Hendricks

THE TIME IS 2100Z on a gray overcast afternoon in November.

Lieutenant Weatherall has just arrived at Thompson Field, Jackson, Miss., on an O-1A ferry mission. His flight had been conducted under marginal VFR conditions with ceilings ranging from 1,300 feet to 1,500 feet overcast. He hoped to be able to file out as soon as possible and make it on in to Fort Rucker, Ala., that day. It had been a long, frustrating trip due to a slow moving cold front that seemed determined to stay just ahead to block his route of flight. In fact, it had been due only to afternoon lifting that he had been able to get this far.

After arranging for servicing the Bird Dog and checking the weather, Lieutenant Weatherall found that his fears had materialized. Not only was the ceiling forecast to drop below 1,000 feet in about an hour, but also the front was expected to become stationary on a NE-SW line cutting across Evergreen, Ala. Somewhat downhearted, he decided to eat and then keep a running check on the weather for a few hours before deciding to RON.

Lieutenant Weatherall had finished his meal and was staring blankly into his second cup of coffee when a thought began to enter his mind. It occurred to him, "Say, what about those 'elsewhere area' minimums they mentioned back in flight school?" Lieutenant Weatherall didn't realize it at the time, but he was about to enter *the twilight zone.*

Another check on the weather revealed that prevailing local conditions, as well as those for Meridian, Miss., would be 700-800 feet overcast with 3-4 miles visibility, with conditions lowering occasionally to 200 feet overcast ½ mile in light rain and showers. Only slight improvement was expected throughout the next day. Montgomery and Fort Rucker were reporting

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Lt Hendricks is with the Dept of Fixed Wing Training, USAAVNS, Ft Rucker, Ala.

clear and 10 with excellent VFR conditions forecast for the following day.

"Say, could you tell me if I could make a VFR flight using 'elsewhere area' minimums with this weather?" he asked the forecaster.

"That's a little out of my department, but we have a direct line to the tower. Those guys stay pretty well up on stuff like that."

The tower was helpful, but not overly so. "We can give you a VFR controlled departure out of here. Then, if you can stay out of controlled airspace, you'll be o.k. if you have 1 mile and stay clear of clouds. Give us a call when you're ready to go."

This terminated the conversation, leaving many unanswered questions to be pondered over another cup of coffee. Lieutenant Weatherall hadn't carried his Jepp or any regs with him on this trip, but he figured he could look for some "elsewhere areas" on his sectionals.

Entering the coffee shop again, Lieutenant Weatherall noticed another Army Aviator sitting off in a corner, gazing out the window. What appeared to be a well-stuffed Jepp case was on the floor next to him. At least here was the bright prospect of some company and the loan of a Jepp Vol I!

"Am I glad to see another Army Aviator around here! I'm Lieutenant Weatherall, out of Fort Rucker."

The aviator didn't rise or offer a handshake, but merely gave a half salute to the greeting. The name tag on his flight suit offered the only introduction — Captain Filango.

"That your O-1 parked on the ramp?" he asked.

"I'm afraid so. No instruments; it looks like I may be here for a few days. I had been thinking about these 'elsewhere area' minimums, and thought I might borrow your Jepp to look up a few things."

"Sure, have a seat. I used to use special VFR quite a bit and can probably help you out. What do you need to know?"

Lieutenant Weatherall looked a little embarrassed and said, "Just about everything, actually. I've never checked into this thing very deeply."

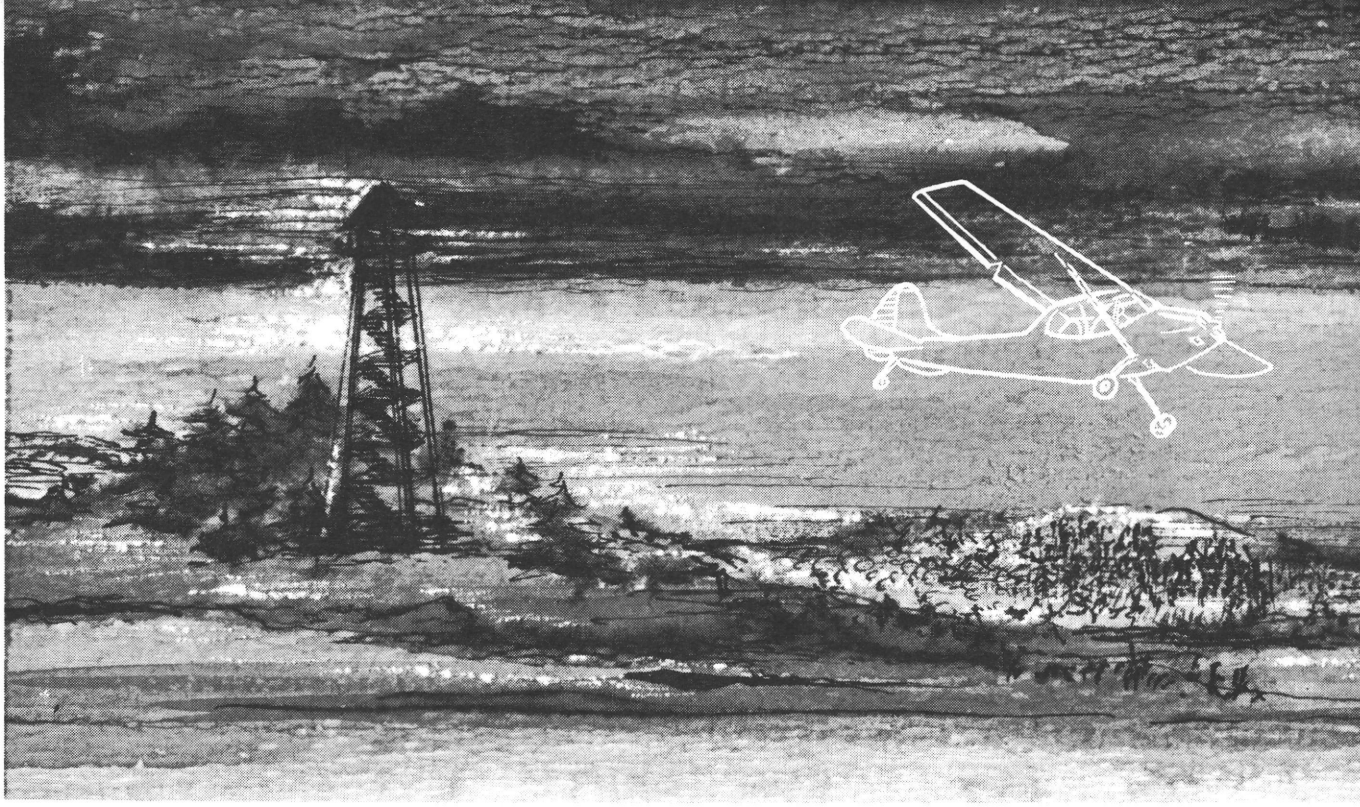
"O.K., let's just start from the top then. AR 95-2 states in Section III that the rules of that section and visual flight rules promulgated by the FAA will govern the operation of aircraft under visual flight conditions. It also states that VFR flights may be cleared when the weather is forecast to permit VFR flights en route. Destination weather must be VFR at the time of departure and forecast to remain VFR or forecast to become VFR at least one hour before arrival and to remain VFR until one hour after arrival. The prevailing weather condition may be used to clear flights VFR when intermittent or occasional below VFR conditions are forecast."

Lieutenant Weatherall settled back in his chair with a look of final resignation. "Guess that washes me out right there. The best they'll give me tonight is 800 feet with not much improvement tomorrow. That won't even get me out under *prevailing* VFR conditions."

"Now that's where you're wrong. You're still thinking of VFR as strictly 1,000 feet and 3 miles or better. Actually, there are three types of VFR: within the continental control area; within a control zone, control area, or transition area; and outside controlled airspace. The latter is probably what you referred to as an 'elsewhere area.'

"To plan a VFR flight with less than 1,000 feet and 3 miles, you are concerned with this uncontrolled airspace. Here, VFR at or below 1,200 feet absolute is clear of clouds and 1 mile visibility. A helicopter may operate with less than 1 mile when flown at a speed that allows the pilot adequate opportunity to see any air traffic or other obstruction in time to avoid a collision. Above 1,200 feet you must have cloud separation of 500 feet below, 2,000 feet horizontally, and 1,000 feet above with 1 mile visibility. This is found in FAR 91.105, Basic VFR Weather Minimums.

"To stay out of control and transition areas, you'll have to



observe the color coding on your sectional maps. The blue and magenta colors indicate the base of the controlled airspace above the surface."

"Ah, sooooo . . ., that's what all those colors on the map are for! I've noticed those, but never paid much attention to them."

"Yeah; well you know. Take your Mobile sectional for instance. The controlled airspace legend is located in the center of the bottom border. Magenta indicates floor 700 feet above the surface, blue indicates floor 1,200 feet above surface, and floors other than 700 feet or 1,200 feet above the surface are indicated by a thin, blue line with the MSL altitude indicated. An example of the latter is a large area based at 3,000 MSL just east of Dothan, Ala. Only the borders of the control areas are colored, with the sharp, smooth side representing the outside edge.

"Airport control zones extend upward from the surface, which precludes penetration without a special VFR clearance. They are indicated on the sectional by dotted lines. Other than restricted areas, this leaves only uncontrolled airspace with no overlying control area. These are indicated by uncolored areas bordered on all sides by the smooth edges of adjacent control areas.

"So you can see that it's not really too difficult to go VFR if you stay low enough and plan on bypassing airport control zones and restricted areas. Even if your destination has a control zone and is IFR for controlled airspace, you might file to some nearby airport that is outside controlled airspace. Then all you would need for a VFR destination would be the same old 'clear of clouds and 1 mile.' From there you might be able to get a special VFR clearance into your desired airport's control zone. This would also involve a change of destination on your flight plan, of course.

"The last and simplest problem is getting a VFR controlled departure. Make the request on your flight plan and then pick it up in the same manner as an IFR clearance. It will be phrased somewhat like this: 'ATC clears R _ _ _ _ _ out of the control zone _____miles SE of Thompson Airport. Maintain special VFR conditions at or below _____ feet while in control zone.' Special VFR weather minimums in a control zone are described in FAR 91.107. The requirements are 1 mile visibility and clear of clouds, except that a helicopter may operate with less than 1 mile. The required special VFR clearance will normally be granted unless a traffic conflict exists.

"The Army Aviator may, however, experience some difficulty in obtaining a clearance from the base operations officer at Air Force and Navy bases. While both services will honor Army criteria for Army Aviators operating at their fields, the clearing officer may not be aware of this due to limited contact with these criteria. This clearing authority for the Air Force may be found in AFR 60-16, para 44c, and for the Navy in OPNAVINST P3710.7B, Feb 1964, para 530C.

"Remembering or recording these references could save a

great deal of time and trouble if this clearance problem should arise. The clearing officer might also require proof of the applicable Army regulations. This would necessitate the pilot's producing AR 95-2, Sec III, FAR 91.105, and FAR 91.107.

"Unless I've overlooked something, that should be all you'll need to know in planning your flight using 'elsewhere area' minimums, as you called them. Of course, you'll have to keep in mind the required minimum safe altitudes. These are found in FAR 91.79. If you're going directly to Fort Rucker, you'll be over uncongested areas most of the way. That would make your required clearance 500 feet from any person, vessel, vehicle, or structure. Anything else you need to know?"

"No, not a thing," was Lieutenant Weatherall's quick reply. "Why now I can file out of here in no time and get home tonight after all!"

"Now just a ..... minute, Lieutenant!" The obliging captain jumped to his feet, leaned forward on the table, and pinned Lieutenant Weatherall to his chair with an icy glare. "Don't you realize that getting out in that stuff at night would be like groping around in the 'Black Hole of Calcutta'? Not only would the low level navigation be bad, but rain, fog, mountains, and unlighted obstacles would simply blend into the darkness. I gave you that information to help you get out in the daytime tomorrow, not to go out and kill yourself in an ink bottle tonight! Now what do you say you just RON tonight?"

After this tirade, Lieutenant Weatherall could only agree. While getting his gear out of the Bird Dog, he failed to notice any other Army aircraft on the ramp. Thinking his new acquaintance might like to share a cab into town he returned to the coffee shop, but could find him nowhere.

"Huh, must have gone on into town on his own. Oh well, wasn't a particularly friendly sort anyway."

The next day's VFR flight was uneventful, although it was made just below a 900-foot overcast until breaking into the clear ahead of the stalled front. The validity of the previous night's warning was more than amply demonstrated. The low level navigation was a challenge in itself, and the sight of a firetower on one of the higher hills with its top buried in the overcast sent a chill up Lieutenant Weatherall's back and neck. "Hate to meet that thing in the dark," he thought.

In relating the events of the flight in a hangar session later, a member of the group commented: "I knew a Captain Filango once. Read where he was killed on a night flight in marginal weather not too long ago. That guy really knew his stuff, but he was a little too bold to suit me. Big, good looking fella, too — light red hair. Oh, well."

As the discussion shifted to other topics, Lieutenant Weatherall was quiet and pensive. The description had fit the captain in the coffee shop to a T. For the first time since that night, our lieutenant began to realize that his flight had taken him to, and through, *the twilight zone.*

LUG

Light Utility Glider

EVALUATION OF Ryan Aeronautical Company's Flex Wing LUG — a light utility glider cargo and logistics system — will be conducted as part of a $280,000 contract awarded by the Army for the Department of Defense's Advanced Research Projects Agency (ARPA).

Evaluation is designed as a further step in development of this unique method of unmanned delivery of high priority cargoes into combat areas. The Army will conduct tests to determine the feasibility of the LUG concept under an air assault type operation.

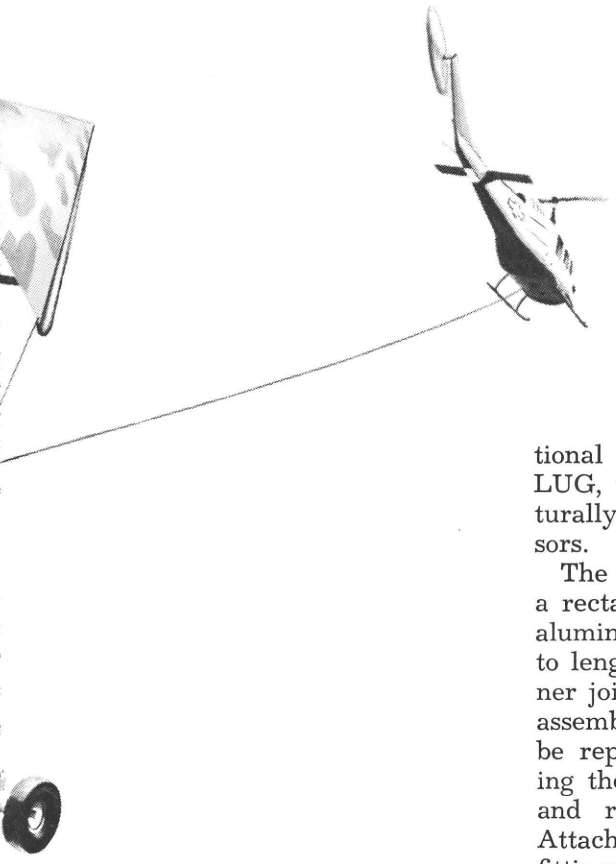
The tow glider concept multiplies several times the carrying capacity of Army helicopters, as successfully demonstrated in previous tests for Army and ARPA in which heavy loads were towed by such aircraft. Ryan's Flex Wing is made of flexible, plastic-coated material attached to an aluminum alloy tubular keel and leading edge members to form an arrow- or V-shaped, kite-like surface.

Suspended beneath the Flex Wing as it is towed is the cargo, which can comprise all types of supplies, weapons and fuel — and even vehicles such as jeeps and other small wheeled carriers. According to the manufacturer, payloads of several thousand pounds can be delivered by the Flex Wing, following release, in a glide to a prescribed area under radio control from the aircraft or the ground.

With the LUG system, the evaluation would be applied to payloads ranging from 1,000 to 1,500 pounds, using either prepackaged or random, odd-shaped cargoes.

A Ryan news release describes LUG as an extremely versatile cargo delivery vehicle of simple design and low cost for use in a highly mobile and dispersed combat environment.

In previous testing programs for the Army, Ryan Flex Wing



LUG systems can deliver large payloads into forward bases of operations where conventional landing strips are nonexistent.

—Ryan News Release

ACG (air cargo glider) systems operated from rough terrain for both towed takeoff and landing, and with both wheel and skid-supported vehicles. Included in these testing programs was successful demonstration of an automatic flare system to reduce landing velocity to preserve cargo, and to minimize landing rollout. Numerous missions were flown with the same glider, with a minimum turn-around time.

Outstanding features of the ACG system included simplicity of construction, ease of maintenance, interchangeability of components, and extensive use of off-the-shelf items. The operational light utility glider, or LUG, will be even more structurally simple than its predecessors.

The LUG control platform is a rectangular structure built of aluminum alloy extrusions cut to length and bolted at the corner joints to form the main box assembly. Damaged sections can be repaired quickly by unbolting these portions and inserting and refastening new sections. Attached to the cargo tie-down fittings are standard off-the-shelf nylon webbing belts with quick release couplings, and hook-ends to support various shaped cargoes.

The tow bridle consists of four lengths of standard aircraft 3/16-inch diameter steel cable. This system generates corrective moments around the aircraft yaw and pitch axes to dampen out tow cable oscillations, and to reduce differential altitude changes between the towed and towing vehicles. Tow cable length is approximately 400 feet.

A roll control rotary actuator, relay control assembly, interconnecting lines and harnesses are contained within the forward platform structure and are reached by removing a section of the floor planking.

The battery box is attached to the platform by four standard quick-disconnect pins. Control actuating devices receive their operating power from two 12-volt lead-acid type storage batteries.

An automatic flare switch hangs suspended under the glider by a 30-foot lanyard assembly. When the switch contacts the ground, the automatic flare circuit is actuated, permitting the wing to rotate in the pitch plane to the flare position.

In tests of earlier air cargo glider systems, satisfactory takeoff and landing performances were demonstrated at gross weights up to 1,800 pounds, with takeoff runs by CH-34 helicopters of approximately 700 feet.

Ryan officials state that the Flex Wing LUG systems now being built will be capable of being towed without control inputs, other than wing trim and the vectored forces induced by the tow cable from takeoff through landings by the UH-1 helicopter. LUG gliders will also be capable of remote control during towed and free flight, and will have an automatic programmed flare maneuver for free flight landings.

The LUG contract is being monitored by the U. S. Army Transportation Research Command, Fort Eustis, Va., an element of the U. S. Army Aviation Materiel Command, St. Louis, Mo.

MID AIR RECOVERY SYSTEM

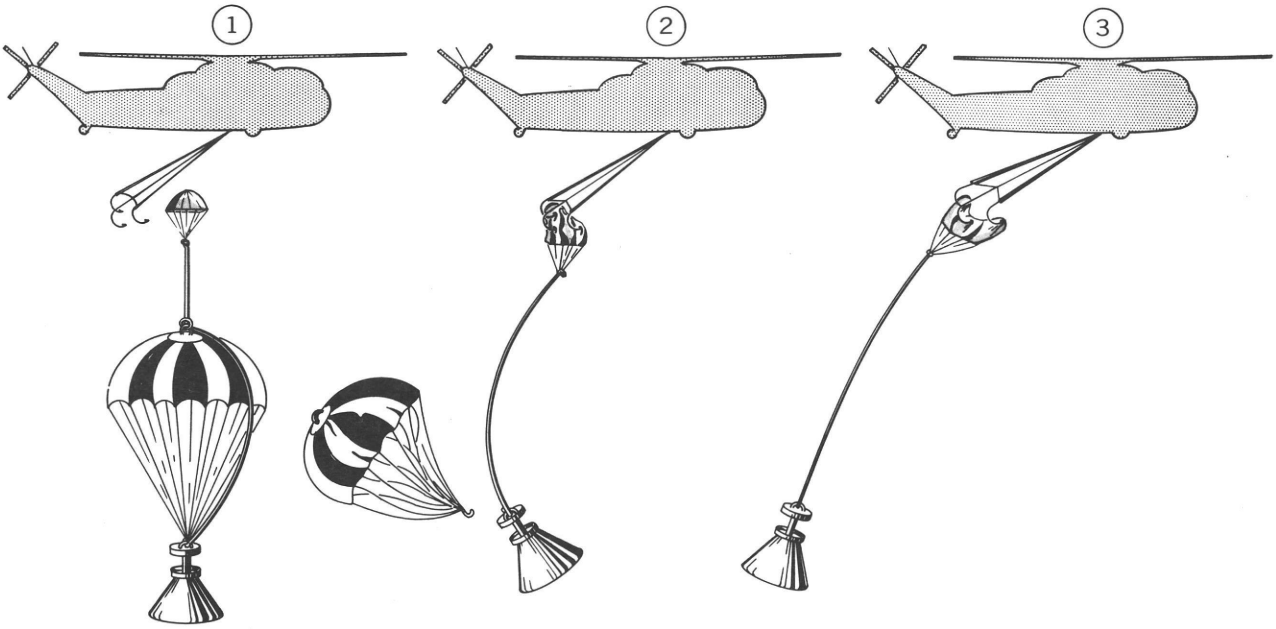
Captain Roland T. Zapata

THE MID-AIR recovery system is not a new idea but the use of helicopters for mid-air pickup is certainly new. The All American Engineering Company first tried it in 1958, using a single pole hookup, and the Air Force completed a short program in the fall of 1961 by catching 800-pound packages. The Army has successfully caught 2,500-pound packages with the CH-37 helicopter.

The need for the mid-air recovery system was generated at White Sands Missile Range by project personnel who wished to have this type of soft recovery (preventing the item from striking the ground).

After completing the first phase of the MARS test program, it became evident that mid-air recovery of parachute-borne objects by helicopter had many possibilities. These uses are not only in the space program for missile, booster and capsule recovery but also in tac-

Figure 1. (1) Initial catch, (2) disconnect and payout, (3) towing and/or winding into aircraft.



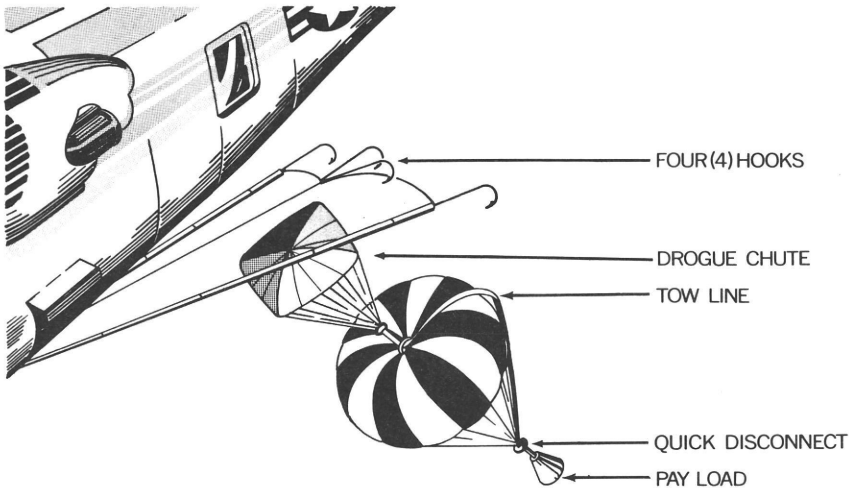


Figure 2

tical situations for pinpoint resupply. It can also put the Army on an equal basis with the Navy and Air Force for recovery services required of the space agencies.

THE MID-AIR RECOVERY SYSTEM

To make a mid-air pickup, a system must be used to reduce the force of the sudden impact created when the catch is made. There must also obviously be a means of reeling in the load after it is caught. (Airspeed at catch varies from 50-60 knots.)

To accomplish these two primary functions of the mid-air pickup, an *energy* absorbing winch which allows for a gradual deceleration of the pickup cable is used. This absorbs the shock and appreciably reduces the g loading on the package and aircraft.

The winch is mounted on a pallet (or platform) which allows for load distribution over the floor of the CH-37 and also furnishes a stable platform on which to attach the rollers, cable cutter, control panel, hydraulic system and the pole actuation mechanism.

The rollers allow the tow-in cable to change directions and therefore place the loading at the c.g. of the helicopter. The poles, which are 25 feet long, are used primarily to establish a rigid object to hold the catch loop and hooks in position. The loop is suspended between the poles (see fig. 1 and 2).

Now let's talk about parachutes. Parachute-borne objects must have a drogue (or target) parachute deployed above the main canopy, and the package must have a rate of descent not to exceed 24 feet per second. Mid-air pickup is not made by hooking into the main canopy but by hooking or catching the drogue parachute. The drogue is attached directly to the package by a drogue line which may run through the apex of the main canopy, or it may be merely tacked at the apex and skirt of the main parachute.

The drogue is attached to the package rather than to the apex of the main canopy to allow the main parachute to either collapse or break away when the catch is made. In phase II, after 1,200 pounds, a system was developed between the drogue and main parachute that allowed a quick disconnect of the main chute as soon as a load was placed on the package. This enabled us to use parachutes up to 82 feet in size.

If the drogue is attached to the apex of the main canopy, the main parachute will paraplane while being reeled in and could possibly fly up into the tail rotor. In the smaller weights, up to 1,200 pounds, the collapsed parachute can be pulled into the the helicopter, leaving only the weight suspended below. Normally the only modification required on the main canopy is the reinforcing of the apex with a cotton material to help reduce the friction burning of the nylon drogue line.

The winch system was designed by All American Engineering Company of Wilmington, Del. The equipment is portable and can be easily installed and removed, using the existing tiedown rings of any CH-37. The complete assembly — fore and aft pallets — is fastened to the floor. The pole attaching arms and the main roller fit into the cargo hatch. After the equipment is installed, the crew prepares for takeoff. Each member has an individual responsibility throughout the operation.

As soon as the helicopter is ready to go, the crew installs the hooks and loop onto the poles. One hook is attached to the end of each pole while the loop assembly has one hook each in the center. As the helicopter takes off, the flight engineer lowers the poles into the catch position.

An Air Force C-123 was used as the drop aircraft and the CH-37 was vectored into position by radar. This same system has been employed in recoveries

Capt Zapata is Special Projects Officer, Aviation Branch, Range Services Division, White Sands Missile Range, N. M.

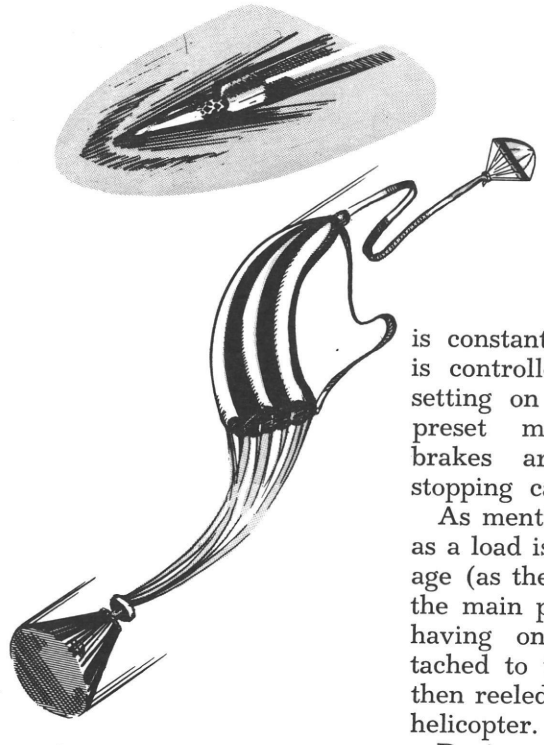


Figure 3

of actual paraborne packages whether missile or aircraft dropped (fig. 3).

The key man at the beginning of the pickup run is the radar operator. He must vector the CH-37 to a point 3 nm from the package when the package is 2,000 feet above the helicopter. At this point the helicopter sets up its approach and moves in for the catch. Either the pilot or copilot can make the catch. If the pilot is making the catch his attention is on the target or drogue parachute and it is up to the copilot to call off airspeed, rate of descent, and power settings.

When contact is made with the drogue chute, the winch cable pays out, accelerates the package to the aircraft speed, and then stops paying out. As soon as the package stops, it dives and swings forward of the helicopter. This is not critical as the package pull on the aircraft is constant. (The cable payout is controlled by a time delay setting on the winch.) At the preset moment, the winch brakes are applied, thereby stopping cable payout.

As mentioned earlier, as soon as a load is applied to the package (as the cable is paying out) the main parachute is released, having only the package attached to the drogue, which is then reeled into the belly of the helicopter.

During our tests the crew members perform the following operations:

- The crewchief loads the cable cutter so it will be ready for use should an emergency arise. (This cuts the tow line or cable and can be triggered by the pilot, copilot or crewchief.)
- The data recording instruments (deleted when not in test phase) and camera are calibrated and turned on before the catch. Normally calibration is made while climbing to altitude. They are turned on when the helicopter is on its final approach to the drogue.

To wrap things up let's go through an actual mission and see what it is like.

Old 997 lumbered across the airfield with the awkward caution of a lady wrestler at a tea party — a little old, a little slow, but her muscles bulging.

This was 0630 of a hot July morning. Twice before that week she had waddled forth, rising with surprising grace toward the distant mountains north and east of Holloman Air Force Base, and glided slowly over the white sands — only to be frustrated, through no fault of her own, both times. This was another day.

Old 997 is a U. S. Army CH-37 and her climates of duty have ranged from extreme cold to extreme heat, with all temperatures in between. In August 1962, she had been outfitted with winch, cables, poles, instruments and hooks. She had taken to the air time after time with this strange package, had ridden the air route north and south in front of the mountains, and had maneuvered her bulk over parachuted packages which grew in size and weight.

The hooks she carried caught the drogue parachute. The line streaked from the winch, halted abruptly, dived towards the sands below, stopped and there slowly coiled again over the power driven reel. Instruments measured the effect on winch and cable. Pilots measured the effect on the helicopter. Army men, caught by the challenge of their experiment, measured the effect on other men.

During this testing, changes were made in equipment and technique. Pilots learned the art (and it is an art) of slowing, descending on the drogue chute, maneuvering hooks into silk at the right place and at the right time, then absorbing the shock of contact to fly a level course as the weight is reeled in.

It sounds — and is — like a game of mid-air angling, but it goes beyond that, both in performance and intent, for angling is a lonely sport; and 997's task needed the combined efforts of a number of people, and her goal was far beyond the immediate task of catching weights

of impromptu design.

Money and time were running out. Her flight on this July morning, nearly a year after her parachute hunts began, was ostensibly the last for old 997 as the leading lady in this particular spectacle.

In the wake of this old lady skipped an O-1A and a U-6A with photographers on board.

Out of the jumble that filled the earphones, voices emerged. King I Radar guided the C-123 carrying the chuted weight so it would drop the target 3 miles ahead of 997, now established on its north-south route.

"Mojave 97," answered King I in clipped monosyllables. The O-1A and U-6A flanked the Mojave, both finding it hard to keep pace with her slow, intent flight.

"Package dropped," the C-123 announced suddenly. The Mojave, now committed, hunted the sky ahead for signs of the drogue and main parachutes. Twice earlier that week the chutes had failed to open.

Old 997 started its stalk, the pilot hoping the drogue wouldn't whip sideways in the air at the last minute. (This had happened using round chutes, but was corrected by using a square 14-foot chute.) The hooks caught.

"Beautiful, beautiful," the U-6 pilot was heard to say. Old 997, her mission accomplished, headed for Holloman.

The CH-37 crew was happy. Pickup had been made at 6,700 feet, lower than the usual zone of 9,000 feet. The CH-37 had made the catch with only a slight jar and nose down, marking the sudden addition of 2,500 pounds.

"A good snatch," said the project chief.

This then was what a typical mission went like. Many more will come.

Why Checkrides?

Lieutenant Michael J. Wolfe

FROM THE DAY HE enters flight school until he's grounded, the Army Aviator will take checkrides. Why? What is the importance of a checkride? It certainly is not as bad as pilots think it is. *And it is not given with the intent of grounding anyone.* Even if you fail a checkride it is by no means the end of the line.

The aviation program is designed to *help* an individual who is having trouble with techniques and procedures. Any program that involves so many people and demands quality as well as efficiency must be continually examined to ensure the best product. Thus, we have the checkride.

Throughout his training the aviator is evaluated to ensure that he is maintaining at least the minimum requirements for his stage of training. At the same time we are striving for improved techniques and equipment to accomplish specific missions.

Since we desire our product to be of "Ole Pro" caliber we cannot reserve our increased knowledge exclusively for future pilots and neglect the ones already rated. This group also needs to know and understand advanced methods and equipment.

The Army Aviator gets some training from manuals, some from knowledgeable individuals, some from on-the-job training, and some from experience. The checkride is used to evaluate progress, weed out undesirable flying habits, and keep aviators professionally sharp.

Of course there are other reasons for checkrides. They will uncover acquired (but undetected) bad flying techniques, a lack of proficiency in instrument flying, an apprehension about confined areas or strip flying. A serious breach of discipline in any of these areas of training could have a tragic result.

Why checkrides? They ensure a quality product. Checkrides are indispensable aids in evaluating progress and efficiency of Army Aviators from flight school to grounding. Checkrides are for your safety.

Murphy Strikes Again

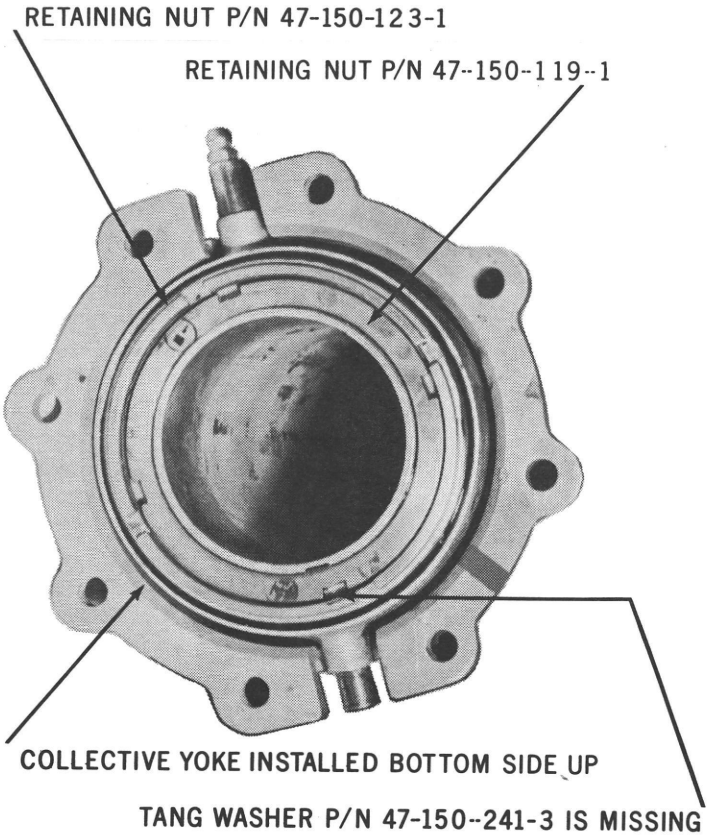
This discrepancy came to light during maintenance being performed by the Aircraft Division, Fort Worth Army Depot. It is an excellent example of how hard an individual must work to install a part wrong and certainly is proof of Murphy's Law.

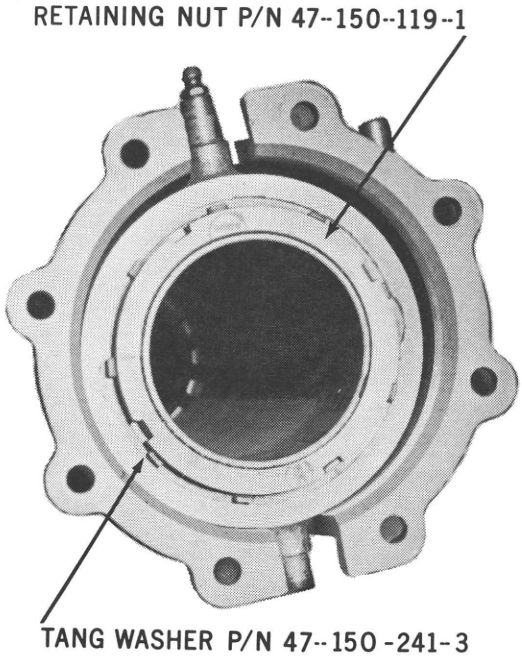
THE COLLECTIVE pitch control on an OH-13G froze in the up position during the override check prior to a maintenance test flight. The aircraft had been test flown the day before and not released for flight due to numerous discrepancies.

Subsequent teardown and inspection revealed that the collective yoke assembly was installed upside down. Additionally, retaining nuts P/N 47-150-119-1 and P/N 47-150-123-1 were installed on the same side of the yoke bearing. The installation of both retaining nuts did not allow enough room to install the tang washer P/N 47-150-241-3 and it was left completely out of the assembly. Since the second nut P/N 47-150-123-1 was installed incorrectly and turned in the same direction as mast rotation, it continued to tighten until it froze the collective yoke.

It was impossible to determine when Murphy's Law was applied, and there is no way to determine the number of hours the aircraft was flown in this condition.

Left: Murphy at work. Right: Murphy foiled.





Today's Supplies Today

Captain John E. Murphy

THE DEAFENING roar of aircraft engines churning in the predawn darkness signals reveille for the officers and men of the 187th Transport Aircraft Company. This "music" is provided by aircraft crewchiefs as they go about the daily aircraft inspection.

As dawn slowly breaks and the surrounding area becomes visible, one notices that this Army unit's "home" is a gently rolling, grassy area encompassed by thick trees. Sixteen aircraft are irregularly positioned under the canopies of large camouflage nets which blend into the adjacent forested area. The grass landing strip measures 1,500 feet in length and is marked with simple ground panels and lanterns. It is characterized with gradual dips and rises.

Aviators of this unit fly the CV-2B Caribou. The unit mission is to provide logistical support to the combat soldier.

A buzz of activity in operations indicates that missions have already arrived from higher headquarters and planning

"Red Cap" service, Army Aviation style

is underway. Captain Tomlinson walks into the tent, having just arrived from the forward division areas. He is commander of the Pathfinder Detachment. Their job is to provide terminal guidance for Army aircraft, but in this instance they support the Caribou company. Closely behind the pathfinder officer are two flight platoon leaders, Captains Dahn and Franklin, who have just finished their "C" ration breakfast. Two other officers in attendance are Captain Paxman, the company maintenance officer, and Captain Evans, the liaison officer from the Quartermaster Air Delivery Company supporting the Caribou. The operations officer, Captain Holloway, turns from the charts to begin his briefing:

"Our initial missions today are cargo deliveries to the 12th Division. Captain Paxman informs me that 15 of our aircraft are flyable and the remaining one will be ready for missions by noon."

As Holloway finishes outlining the mission specifics, he asks the Pathfinder officer to furnish any pertinent details of the delivery sites. In concise terms, Captain Tomlinson begins:

"*Site Whiskey*— This area is 900 feet long, clear and level, but because of heavy rains two days ago it has many deep drainage ditches which makes airlanding impractical. I recommend delivery by the low level extraction technique (LOLEX).*

"*Site X ray*— You can land here. We had Mohawks in yesterday. You have a 1,000-foot strip, with no obstacles on the 090° approach. The 270° end has trees 30-feet high.

"*Site Yankee*— A platoon of Hueys (UH-1s) is here. The area is a patchwork of trees and clearings. The largest open area is about 75 meters square. Airdrop is the solution here, if Captain Evans can have his riggers take care of it.

"*Site Zulu*— I have not been in this area yet. If the Air Delivery Company dropmasters have the cargo rigged for airdrop or LOLEX, we'll have a positive delivery backup in case you can't airland.

"My team will be operational at all sites mentioned, to provide you the necessary navigational assistance."

As the briefing concludes, Captain Evans, the 109th Air

Capt Murphy developed the LOLEX delivery technique with SFC Everett Travis, Airborne Dept, U. S. Army Quartermaster School. He is now serving as an advisor in Vietnam.

*LOLEX, or the low-level extraction technique, is air delivery of cargo from a rear loading type aircraft flying in proximity to the ground (1-10 feet), using an extraction parachute or parachute system to release final restraint on the cargo, extract it from the airplane, and decelerate the cargo's horizontal momentum.

Delivery Company liaison officer, is on the phone contacting his unit to verify receipt of the mission and to pass on specifics which will assist his company in rigging supplies.

Ten minutes after departing "home," the Caribou touch down at LOGBASE and taxi into their loading areas. A group of soldiers wearing red caps, which identify them as parachute riggers, are soon bustling about the cargo compartments, directing the waiting forklifts and 2½-ton trucks into position behind the aircraft, so the essentials of war can be placed into the waiting airplanes. As the red-capped dropmasters lash and load the cargo, the flight platoon leaders complete final coordination with Captain Wilmot, the 109th air delivery officer.

"All supplies for *Whiskey, X-ray* and *Zulu* are rigged for LOLEX. Payloads for aircraft going to Whiskey and Zulu are 6,100 pounds. Each aircraft has a 500-gallon collapsible fuel container of JP-4 and a pallet of ammunition. X ray airplanes are loaded with three 2,000-pound pallets for a 6,000-pound payload. These are 'company type' pallets containing essentials of all supply classes to sustain a rifle company for one day. *Yankee* airplanes are rigged for airdrop. Payload for all these aircraft is 6,000 pounds in six 1,000-pound pallets. These loads will be dropped from 400 feet above the ground.

"While you were en route here, an emergency request came in for POL resupply to four choppers at *Site November*. Aircraft number 406 is already loaded and will have to make a multiple delivery. The first load, a 500-gallon collapsible fuel container of JP-4 goes to the choppers at November using the LOLEX technique. The second delivery is an airdrop of two 1,000-pound pallets from 400 feet at Site Yankee.

"There are two points to remember: (1) LOLEX and airdrop deliveries will be initiated by the copilot's activation of the extraction parachute system. (2) Give your dropmaster the 20-minute, 10-minute, 6-minute red light, and 1-minute warning so he can complete his duties according to our planned sequence."

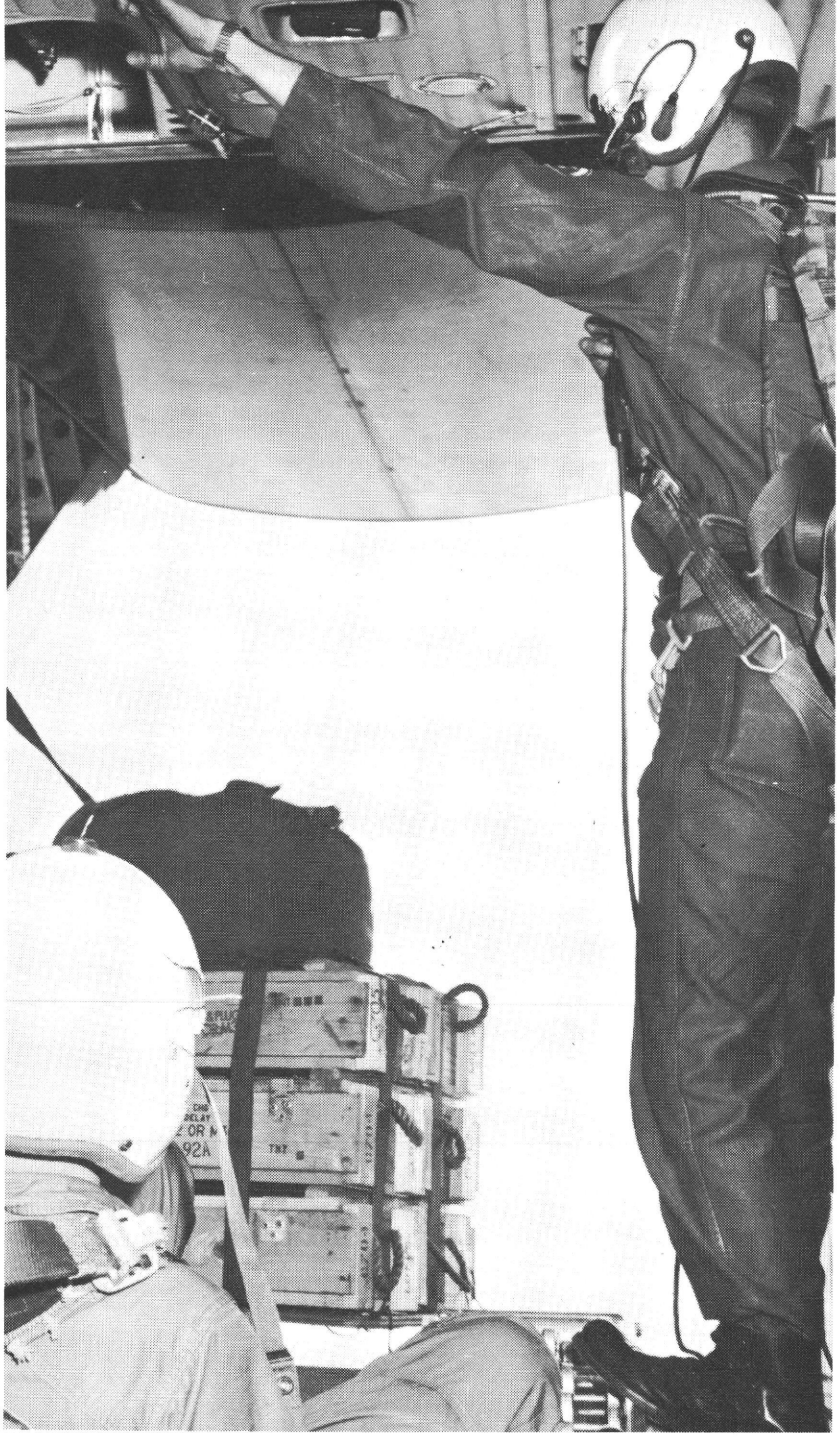
Later, as the Caribou head home after delivering their cargoes, a call from Captain Holloway diverts them to LOGBASE. Captain Wilmot meets the airplanes as they land and has parachutes ready to go aboard. The roller conveyors used for the cargo mission are removed from the floor and stored beneath the troop seats. A few quick words to Captains Dahn and Franklin by Wilmot supplement Holloway's message until the Caribou arrive at the *Site Oscar* marshalling area for a more thorough briefing.

"Headquarters has ordered a parachute assault by a two-company task force from the 1st Brigade. This maneuver is part of a larger effort by the brigade to cut the aggressor salient and relieve pressure on the 3rd Brigade. The assault will take place at *Site January*. Parachute assault was selected because the January area is beyond the range of the division's helicopters and will offer a stealthy and surprising diversion prior to the attack of the 1st Brigade.

"Captain Tomlinson is at Site Oscar with the task force commander and will give you specifics on the drop zone. The actual assault will be a tailgate drop of 26 jumpers from each aircraft. Drop altitude will be 750 feet above the ground. Tomlinson's reconnaissance of the size of the drop zones will determine your drop speed, which may be as slow as 90 knots if the dz is restricted. Dropmasters will fly as static jumpmasters and can assist you and the task force commander in expediting the marshalling phase."

The foregoing discussion has outlined a few missions now

Quarter-ton vehicle delivered by LOLEX system is ready for immediate use.



Properly used the Caribou is a commissary in the sky

routine in Caribou employment. This rugged airplane was purchased for its STOL performance to move troops and equipment about the battle area. Use of its full spectrum of performance enhances the ground commander's tactical operations. Capable of airdrop and the recently developed low level extraction (LOLEX), the Caribou now has a choice in delivery technique which minimizes effects of weather and the condition of terrain, and allows delivery in what would otherwise be marginal conditions.

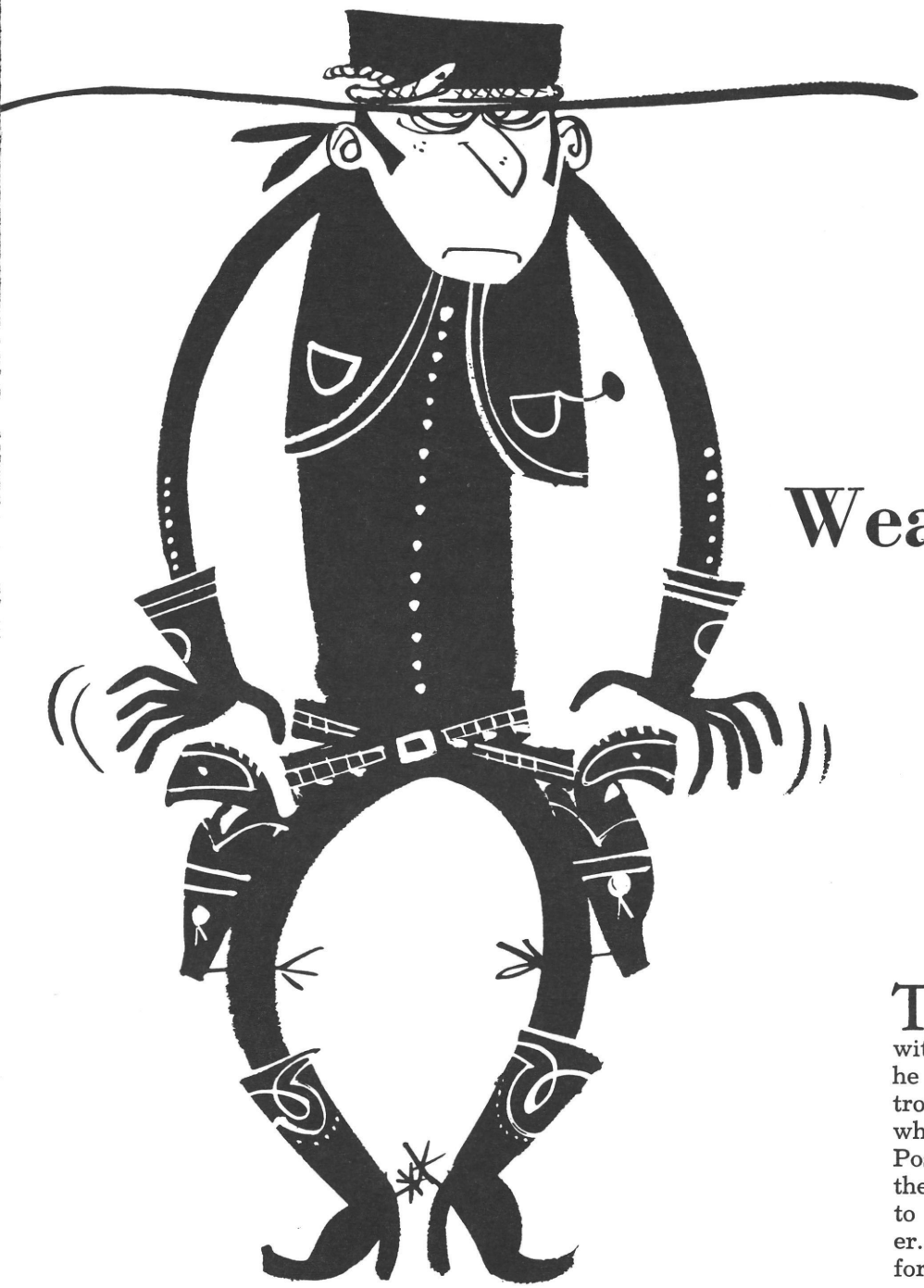
Selecting the method of delivery before takeoff, the Caribou may depart the LOGBASE rigged for airdrop or low level extraction and can use either method if airlanding is impractical. Dependence on airstrips for delivery is minimized. The combat commander aware of the capabilities of this airplane can enjoy an increase in tactical freedom by selecting any open area en route to his objective for receipt of incoming supplies. As with airlanding, the airdrop and low level extraction methods allow for multiple deliveries to several units on a single sortie.

The "Bou," as this aircraft is affectionately known, is characterized by economy of operation and is especially suited for retail delivery of daily consumables to company and battalion sized units. This has the advantage of shortening and minimizing the age old problem of tactical commanders, the "logistical tail."

Where is the battalion commander who would not prefer to have 6,000 pounds of supplies delivered by the Caribou to a point of his choosing, rather than have 10,000 or 27,000 pounds of supplies delivered at an airfield to which he must divert a portion of his unit? The latter situation impedes the tactical freedom of this commander and creates a problem of redistribution. In short the commander's "logistical tail" is lengthened.

If used properly, the Caribou is your commissary in the sky. Providing retail delivery to your command post by airlanding, airdrop, and LOLEX, this plane can respond to your needs and deliver to your unit today's supplies today.

[*For additional information on aerial delivery see "C.O.D. — Cargo on Demand," Nov '64 DIGEST and "Special Air Delivery," June '64 DIGEST.*]



Safety Is A Weak Word!

Major Samuel S. Walker

THE COMPANY commander looked at his bulletin board with contempt. "Here I am," he said, "trying to teach these troops to kill with cold steel while some silly so-and-so from Post Safety tacks signs all over the barracks warning them not to slip on the soap in the shower. How can you condition troops for combat while a bunch of old maid males wring their hands in apprehension about them tripping over their laundry bags?"

Some of our officers use such

Psychological conflict exists in teaching Army Aviators to be cautious while training them in dangerous low-level flight

statements as these to invest their personalities with dash and verve. There is dramatic flair and a touch of the renegade in such pronouncements. They think this is "the thing to do." However this does not mark our company commander as an extremist or professional dissenter. Many observant and sober minded officers are finding subtle conflicts in many of our most vigorously championed programs.

Certainly there is a measure of conflict in the psychological conditioning of troops to be at once efficient killers and as safety conscious as Boy Scouts. So, too, is there conflict in teaching Army Aviators to be cautious pilots while training them in the dangerous tactics of low-level flight. These contradictions are facts that a civilized nation must continually face and resolve. Officers in our Armed Forces must take a realistic view of safety and expediency.

But have those officers with the cavalier attitude really thought through the subject of safety? Have they weighed their attitudes against the ethical, moral and human values involved?

I think many have not. And they must. The professional officer must have a comprehension of the delicate interrelationships of our society. His abilities must go beyond just producing effective soldiers. The officer who sees this as his only job is acutely out of tune with the realities of our social order. He has the tail wagging the dog. This country does not exist so we can have an Army. The Army exists so we can have a country. An occasional restatement of this essential truth is never out of order.

So long as our government is responsive to the will of the people we have the moral responsibility to accomplish our mission with minimum hazard to the lives and well being of our troops. Excesses and arrogant disregard of this dictum have at times roused public opinion against the military to fever pitch. If we do not accept our responsibility solely for its moral overtones, an aroused public opinion will eventually force us to comply with its will. This is one of our better arguments for support of programs which help us do our tasks more safely. We simply have no choice.

But this is only a small part of the argument. The fantastic material waste caused by carelessness, inadequate training, and intemperate decision chafes the taxpayer. National magazines and newspapers carry under banner headlines accounts of military aviation accidents. Recent feature stories take note of aircraft worth more than their weight in gold and cite accident costs that range into ever higher figures.

Editors are questioning the wisdom of investment in such expensive hardware. They wonder editorially if the management of this money is in competent hands. It is our business to prove that it is. Where we are not competent we must become competent. With almost $50 billion going into defense, it becomes increasingly incumbent upon all military officers to develop the management skills to adequately discharge their responsibilities for efficient utilization of this money.

One of the marks of good management in major industrial operations is a strong safety program. Stripped of sentimentalities, it has simply proved to be good business to conserve the people and machines which pro-

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duce. A beneficial side effect is always improved employee-management relations. Employees like to work for organizations that care what happens to them. There is no reason to suppose that the soldiering man is any different.

Another consideration is the tragic waste of talent. We really are not a nation of inexhaustible talent resources. The aviation field is a classic case in point. The dollars and cents worth of an aviator has soared astronomically in recent years. As the complexity of our equipment increases, a progressively smaller percentage of our young people will be able to meet the physical and intellectual standards necessary to operate it. Selection of aircrew trainees becomes more difficult, training more expensive and time consuming.

When a student pilot becomes a finished product he can be assigned to operate a machine costing hundreds of times the worth of a World War II artillery spotter aircraft. The citizens who pay our bills and expect protection from us also expect us to use this pilot and his machine with prudence and profit. This is no place for a swashbuckling and cavalier attitude toward safety. The basic requirement to get the job done demands the conservation of our means to do the job.

Often the argument is advanced that a particular safety precaution would not be observed in combat. This never constitutes a valid excuse for unnecessarily risking valuable lives and equipment when there is time and the wherewithal to avoid it. Further, the potential worth of equipment and crews in actual combat is so great as to warrant more, rather than less, stringent attention to precautions necessary to preserve them. The high unit cost of Army aircraft is only one example.

The concept of a nuclear battlefield has increased the destructive potential of a man-machine combination to a level beyond the comprehension of the World War II soldier. The possibility of short, violent and extensively destructive wars, to be fought with forces in being, further accentuates the worth of the individual soldier and machine. It is more likely today than ever before in history that a soldier and his machine could become the proverbial horseshoe nail which cost a kingdom.

Some officers often offer the trite rebuttal that we are selling safety for safety's sake. This is not an appropriate observation from a mature and reasonable mind. The officer who attempts to carry out a mission assignment which involves exceptional risk of equipment and personnel without first advising the commander accurately and honestly of his estimate of the situation is derelict in his responsibility to his commander. He is usurping the prerogatives and responsibilities of the commander.

Commanders rarely want the mission performed at any cost. They want the mission performed at a cost they can afford to pay. They depend upon staff officers, schooled in the employment of our complicated equipment, to accurately appraise them of the risks and probabilities involved. The bullish concept of the "mission at any cost" ignores our tremendous investment in schools of tactics and grand strategy.

To belly up to an obstacle and overcome it by brute force alone is only occasionally necessary in modern war. Finding and using the easiest and least expensive way is the prime task of commanders. The officer who is constantly stampeded by the immediate requirements of the mission is extravagant and wasteful. The refusal to reason is, unfortunately, often regarded as a

Commanders rarely want the mission performed at any cost

measure of courage and drive. In final analysis it is the least courageous and least effective path to follow.

Injuries to personnel in combat due to careless and negligent disregard of fundamental safety considerations needlessly aggravate the logistic problem of a command. In the case of an Army Aviation mission, it might mean the loss of the only available tool for accomplishing the job. An injured man requires several to care for him; a damaged machine requires many manhours spent in repair which could better be used in maintenance. The probable arrangement of the battle areas into islands of resistance separated by no man's land will probably mean the abandonment of any vehicle or machine damaged in even a most superficial way. Replacement in remote battle areas will often be impossible. These are losses we can effectively reduce with a strong safety program.

Safety is a weak word. It smacks of the luxuries and comforts of peace, but we must take it to war with us. The officer who sees safety as being in conflict with mission has missed the point. Almost any task involves risk, and this is especially true in fighting wars. Commanders who support a strong safety program are certainly as aware of this as those who do not. The solution must always be a compromise. This is in the realm of judgment. The requirement for judgment in the conduct of military operations in war or peace is our primary reason for having officers. And the judgment of a commander who does not support an adequate safety program is seriously subject to question.

Army Testing Kaman UH-2

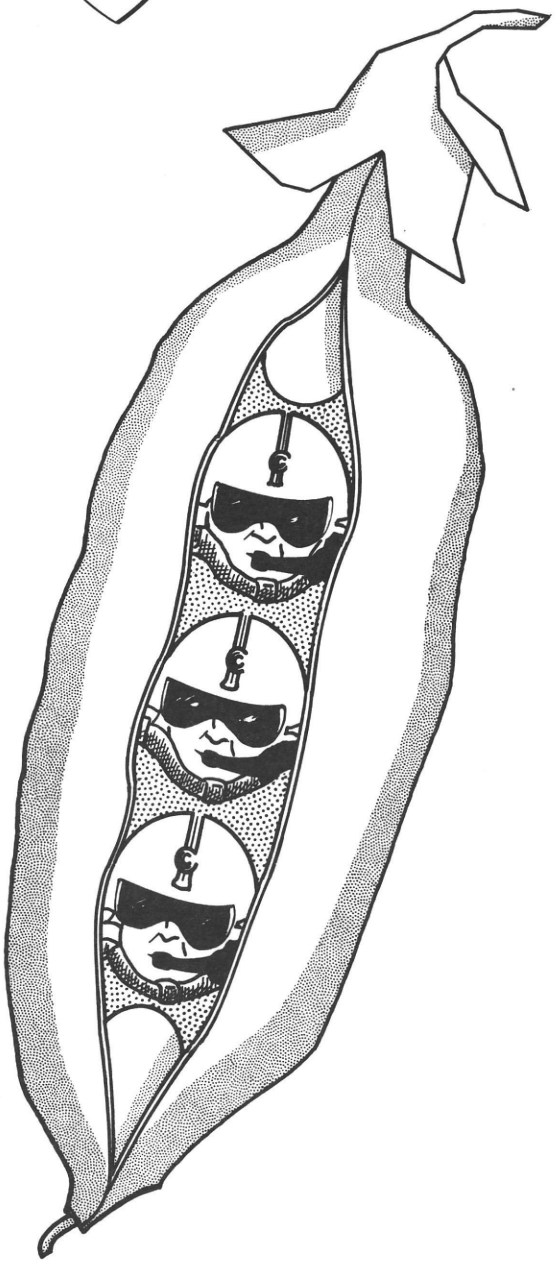
SPORTING A YJ-85 General Electric jet engine, the Army's UH-2 compound research helicopter hit over 200 mph on a test flight conducted by Kaman Aircraft Corporation, Bloomfield, Conn., for the U. S. Army Transportation Research Command.

The UH-2 is involved in one of four separate high performance research helicopter test programs aimed at providing rata for the design of fast, maneuverable, vertical takeoff aircraft for the Army's future needs. Specific data on performance, stability, and stresses on rotors at high speeds is sought.

Based on results of early tests, Kaman and Army engineers believe the augmented UH-2 is capable of hitting over 250 mph. To date its fastest level flight has been over 216 mph.

ANNUAL AWARD
Monthly Winner
CONTEST

Army Aviators may look as much alike as "three peas in a pod," but each has his limitations as a pilot. On every flight as a passenger you rely on the pilot's ability, and on his judgment



You Bet Your Life!

Captain Hubert F. McKenney, Jr.

I DON'T THINK we had better try it, sir. I'm going to head back." (The speaker is a young lieutenant. We will leave him unnamed, and say only that he has been out of flight school for a few months, is of average ability, and is aware of his own capabilities and limitations.)

"Now what the devil is the matter, Lieutenant? I've been in there on days just like this with Lieutenant Blank. Can he fly one of these things better than you can?" (We will leave this speaker completely anonymous. It could be any one of the more influential officers of the unit. At any rate, his word is not taken lightly.)

"No, sir; I don't think so. Perhaps it was not quite as bad as it is today though. I really don't think we ought to try it."

"All right, you've said enough. Let's go back. You can be certain that I'll make sure that I am not stuck with you as a pilot again. When I schedule a flight and spend half a day away from my office I expect to get results. I am going to talk to your boss and make certain I get someone I can depend on next time."

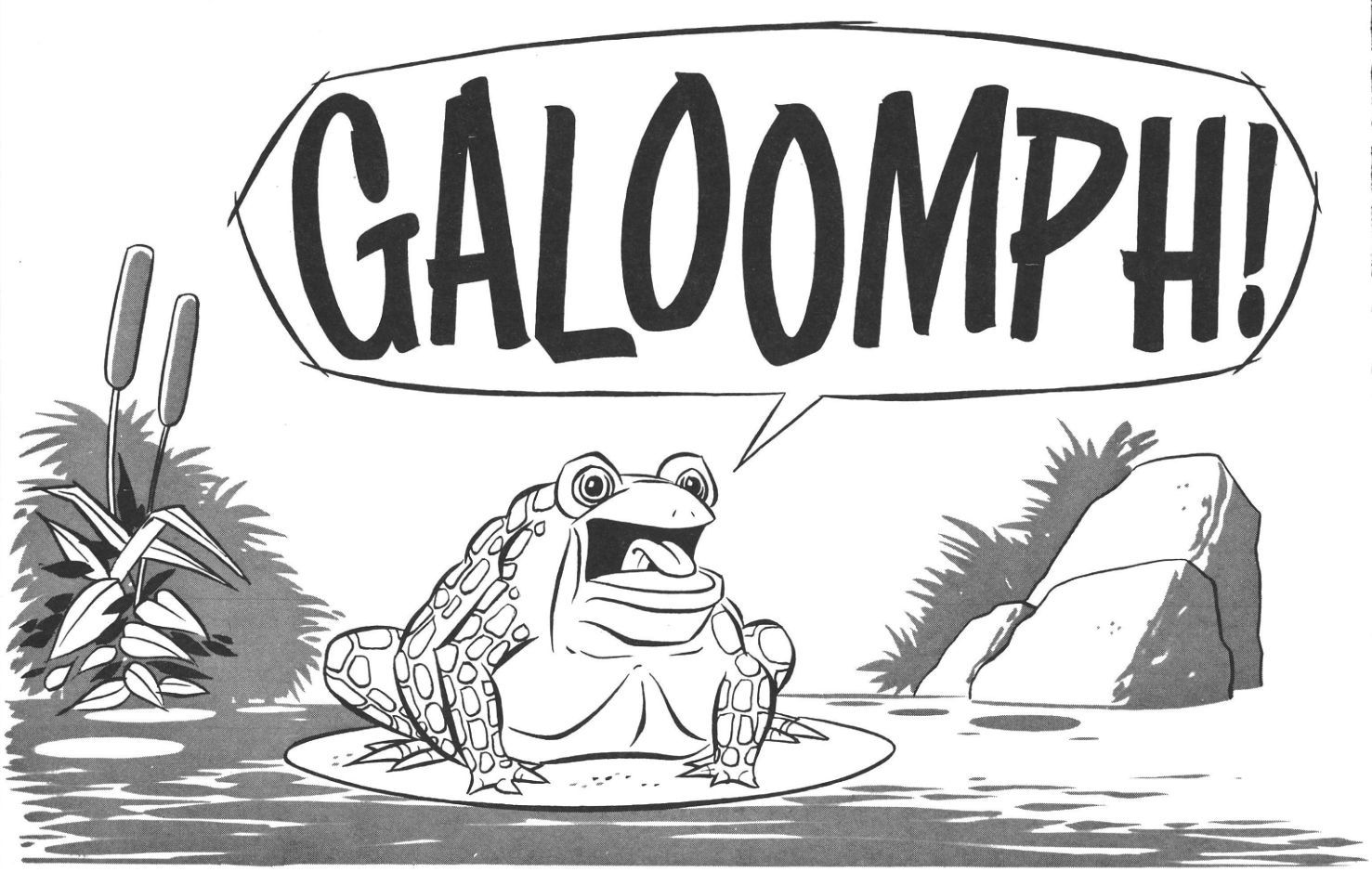
We can stop right here because this is just a story. But put yourself in the shoes of this young aviator, who is not stopped in midair like this story. He still has a handful of airplane to contend

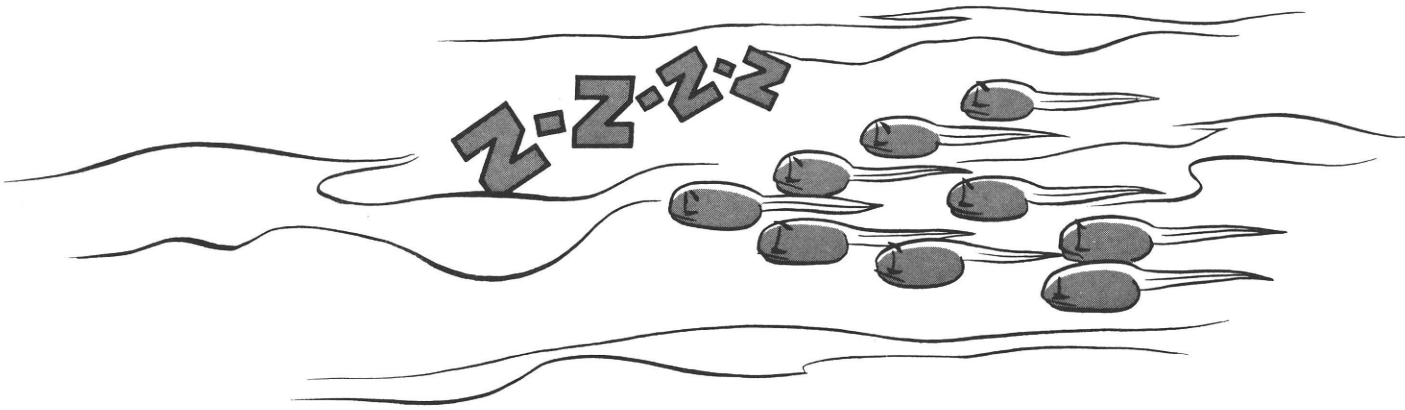
Continued on page 48

Capt McKenney is with the Communications Branch, Special Subjects Division, Dept of Tactics, USAAVNS, Ft Rucker, Ala.

some safety speakers remember when they were a part of the audience . . .

Pierce Wiggin





FINE PRESENTATION, sir! Couldn't have been better!" These or words like them often greet speakers from those who share the head table or platform. How flowery and emphatic depends in large measure on the variance in rank between speaker and greeter. Given with a firm handclasp and admiring smile, such words can inflate egos faster than a millpond bullfrog can swell up and croak, "Galoomph!"

Sometimes the words of praise are earned. There is a law of averages. But all too often the praise heard from the front of the hall is 180° out of phase with what is said in the exits at the rear. "Gad! I thought he'd never finish! How monotonous can you get?"

The same theatre seats, hardly noticed by a volunteer audience which pays to sit through a two-hour movie, become unbearably hard to a captive audience forced to squirm and shift its way through a dull one-hour presentation. Some call this psychology. Others call it murder! Nowhere is this phenomenon more in evidence than during strictly enforced *all-aviators-will-attend* monthly safety meetings.

Though no one has been able to trace the origin of monthly safety meetings, a few graybeards whose grandsons recently finished flight school swear an hour's delay in the first flight at Kitty Hawk was called so that Wilbur and Orville could attend a regularly scheduled monthly aviation safety meeting. Where that speaker dug up his accident statistics is anybody's guess. But it's a sure bet the Wrights were glad to escape to the dunes and get on with their flying.

Many aviators believe, with some justification, that safety meetings originated during the same period as the Chinese water torture. There is often a great deal of similarity to support this belief.

Theatre-going, TV-watching audiences are protected from the droning statistical monotony that infects the average safety meeting. They are protected by critics. Let a Broadway production lay an egg and it's soon lampooned out of existence. They're protected by economy. Hollywood epics go back in the cans when they can't make it at the box office. And TV audiences are protected by multiple channel television sets. No such protection is afforded aviation personnel in safety meetings. Few dare criticize, the admission is free, and there is only one channel.

Some safety speakers remember when they were a part of the audience. Among these, a few have developed a revolutionary new technique for making presentations. Not only do they have something to say, they take the trouble to make what they say ENTERTAINING.

How can safety presentations be made entertaining? Here's how one successful speaker puts it —

"Sex them up! This doesn't mean women in their altogether. It means using a little imagination — pictures, jokes, skits — anything that will keep your audience alert and receptive.

"Keep them short! Too many speakers talk by the clock instead of by what they have to say. They try to stretch 10 minutes into an hour. It's much better to cram 60 minutes of material into a 10-minute talk.

"Be specific! Stick to the point! You may think you're covering a lot of ground when you wander from subject to subject, but all you're really doing is confusing your listeners. No one can effectively cover more than one or two points in a talk and expect the audience to remember what he's said.

"Use aids as aids — not as crutches! Far too many speakers rely on an overabundance of slides to avoid the research and work necessary to produce an interesting talk. I saw one speaker who had so many slides he couldn't recognize some of them when they were flashed on the screen. It may seem impressive to have graphs with many colored lines and mountains of statistics, but it's humanly impossible for anyone to remember what they're supposed to show, especially in a darkened, monotonous, sleepy atmosphere. If you have to use graphs, use simple bar graphs. Better yet, use cartoons!

"Speak their language! If you want your listeners to know what you're talking about, this is self-explanatory. But it means that you must take the trouble to know your audience and gear your talk to a common level of understanding. Simple language is the hallmark of *all* effective speakers. They use it to communicate — not to impress!"

These are some of the ways you can pep up your safety meetings. There are many others. One is described by Gerard Bruggink in "Meet to Learn." You'll find it in this issue.

the purpose of a safety meeting is to develop a desire for flawless task performance

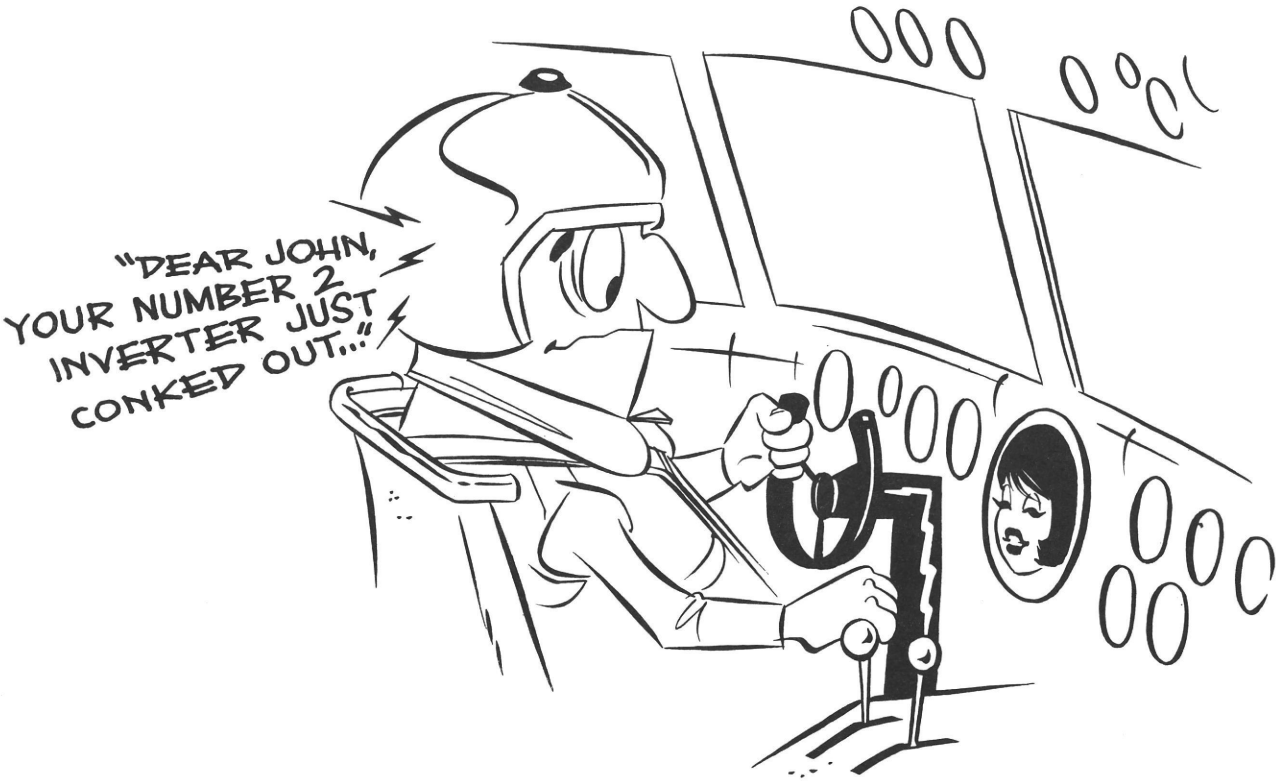
WHAT'S THE BEST way to conduct a safety meeting in my unit?" This stereotyped question always gets a stereotyped answer when a brand-new safety officer visits us for advice: "Don't talk about safety — enforce it!"

For a man who expects to leave us with a briefcase full of canned presentations, this answer is a shock. Of course, we make safety promotion material available, but we try to avoid the impression that accident prevention and the success of safety meetings depend only on handouts and gimmicks.

The true purpose of a safety meeting is to develop or to stimulate a desire for flawless task performance. This can't be done by begging an audience to be safe or by negative appeals to a man's aversion to dying. For those who want to

Meet To Learn

Gerard Bruggink



try the latter method we have a retired bunny, trained to move freely among the audience while distributing posters that show an emotionally undernourished woman gasping, "I'm waiting for your safe return."

If this kind of stuff had any effect, we would be the first to suggest an extra hole in the instrument panel where a pilot could frame a picture of his favorite woman. We could even go further and devise a voice warning system that uses the voice of the pilot's own wife to inform him about current catastrophies: "Dear John, your number two inverter just conked out . . ."

The men who attend our safety meetings are the same as those who fly and maintain our aircraft. They are not paid for being safe but according to their capabilities and the job they are doing. Rather than bore them with wishy-washy generalizations about safety and its blessings, we should show them that our main and legitimate interest is the quality of their work. Job quality starts with job knowledge, and safety meetings are ideally suited to check and increase this knowledge. The following is a suggested method to use safety meetings for this purpose:

The basic idea is to pick at random a person from the audience and have him answer one job-related question in front of the group. Since this program, initially, may reveal an embarrassing lack of knowledge in the selected person, it might be advisable to start with two or three "volunteers" during the first few meetings.

Sadistic as it may sound, the success of this program is guaranteed by man's fear of public exposure! Who likes to admit in front of his colleagues that he does not know what he is supposed to know? When properly handled, this system may even provide some entertainment. Who doesn't enjoy, deep down in the caverns of his ego, the self-inflicted embarrassment of a fellow man?

It speaks for itself that the questions must be practical and pertain to the man's everyday duties. Example: When you question a UH-1B pilot, don't ask him in what direction the N-1 and N-2 turbine wheels turn. Rather, ask him to list the limitations of the L-9 engine and the required writeups in the aircraft book when the limits are exceeded. When you have two or three "contestants" on the podium, let them comment on the first man's answer. And when they are through, let the audience have a go at it. With proper control, the audience should never have a dull moment.

To avoid arguments and filibusters, the emcee should carefully prepare all questions and answers. Pertinent handbooks, SOPs, and so on should be readily available to settle any dispute. If the opinions on a certain subject are strongly divided the discussion should be stopped with the assurance that the matter will be brought to the attention of the policy makers. Such an occurrence in itself is a timely warning of lack of standardization and quality control in training, operations, or procedures.

To make this suggested keep-them-on-their-toes tool really effective, its use should not be limited to the safety officer or the monthly safety meeting. It can be used any time by anyone who sponsors a get-together of flying or ground personnel. A smart CO or operations officer will probably introduce and test this system himself during one of his routine briefings or meetings. There is no better way for a man in a responsible position to establish his authority and, even more important, to find out if everyone knows what he's supposed to know.

This leads us back to our original advice: Don't talk about safety — enforce it. In using this system, you never have to mention the word safety. By forcing your men to maintain their job knowledge, you take a gigantic step towards mission effectiveness and, unavoidably, safety.

What are the first indications that this system is "taking"? When operator's manuals and other handbooks suddenly become collector's items! And don't feel bashful about encouraging grown men to increase their professional knowledge.

A few years ago we had the privilege of attending the survival briefing of a DC-8 crew prior to a trans-Atlantic flight. The crew of nine (including the stewardesses) were assembled under supervision of an equipment specialist around a 10-foot model of their aircraft. All emergency equipment, in miniature form, was handed out to the responsible crew members who, in turn, had to stow this equipment in its proper location in the model. In addition, they were required to answer questions about their specific duties in case of an emergency. This was not a staged performance or a once-a-year shot. This type of briefing is routine before every overwater flight of that organization and we just happened to walk into it.

Let us try some of the medicine that has given commercial aviation its enviable performance record. In the act of swallowing it, we may discover that accidents happen not because people are unsafe, *but because they do a poor job or don't know what they are supposed to know.*

History, Philosophy, Concept, and Results of . . .

zero defects

. . . motivating people to prevent human error type defects by doing their job right the first time

Philip B. Crosby

Manager, Supplier Quality, Martin Company, Orlando, Fla.

I HAVE BEEN ASKED to describe the Zero Defects approach to management, and to tell you something about how this program came into being at Martin. The most significant aspect of the Zero Defects Program is that it creates in your people the attitude of Defects Prevention. The defect that is prevented, that never happens, requires no rework, no scrap, no discrepancy list, no explanations and it cannot be missed by your detection system. It costs nothing to fix.

Zero Defects is a management tool aimed at motivating people to prevent human error type defects by doing their job right the first time.

I do not refer to human error merely in relationship to the assembly worker who puts units together incorrectly, or to the tester who burns out an expensive circuit by applying the wrong voltage. The problems they contribute are significant. But the contributing errors prior to theirs are even more expensive, more difficult to rectify, and even more difficult to detect.

Calculate the cost of design changes to correct drawing errors; evaluate specifications with unattainable requirements; consider the inadequate machine purchased and then resold at a loss; remember the office rearranged five times to reach the proper layout. Everyone contributes, and one thing is sure — the longer the error remains undetected, the more expensive it is to correct.

The fact that it is necessary to discuss an improvement program at all is evidence that our current control techniques of improving job performance have not been uniformly successful. More emphasis must be placed on the individual, the human being, and his innate desire to do a good job. He really does want to do a good job, you know. Consider as an example the executive secretary typing a letter for her boss's signature. Is she satisfied with less than perfection?

People have different ideas of what a good

job is, and for that reason it is proper that we supply them with a standard. But the dignity of the human entity is the primary characteristic that made this country what it is. It is the element that will provide the improvement we seek.

So as we discuss the history and concept of Zero Defects, keep in mind that our basic problem is not with the science of physics, electronics or automation, but rather with the "mind set" of our people that error is inevitable. This mind set was placed there by management people like ourselves as we began to depend upon performance and control by procedure alone at the expense of the craftsmanship of the individual. It is this mind set and its relationship to the total industrial population that we are discussing.

Zero Defects is not complex. It is merely establishing a standard, making the employee aware of the standard, and signifying your personal interest in his performance against that standard.

Let me tell you how the Zero Defects Program started at Martin-Orlando. It was not a sudden inspiration. It was the result of some serious thinking and significant challenges.

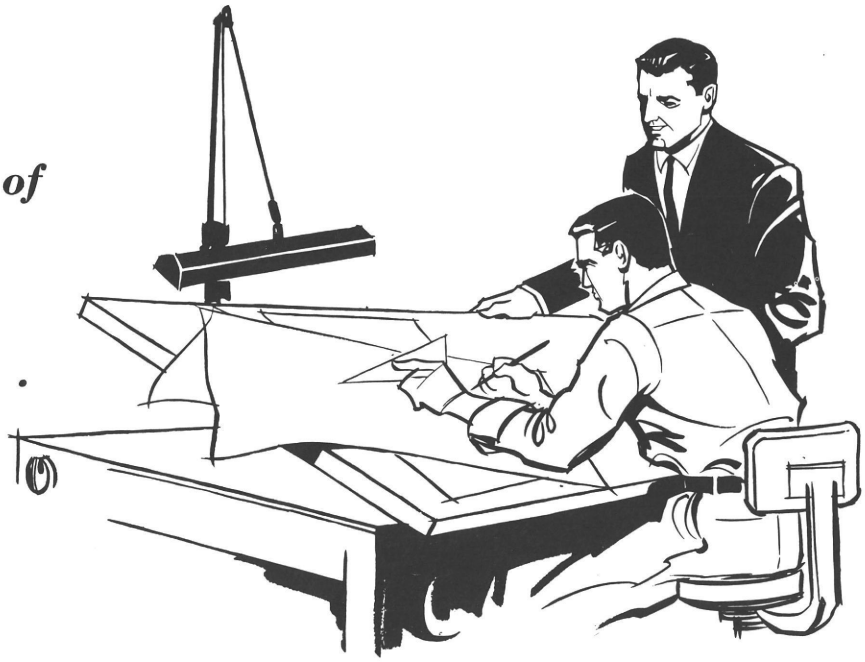
In early 1961, we had established a "Quality Awareness" program in our plant. This was a highly concentrated quality program. It consisted of encouraging people to inspect harder, and detect harder. It was aimed at uncovering all the deficiencies in units before we shipped them. As a part of this program we hung large colorful charts in each work area. The charts provided a monthly measurement of the defect level in each work center.

Much to our amazement, every chart showed a reduction in the defect level in the following reporting period. Generally speaking, this trend toward reduction of defects continued; and though some work areas did better than others, none of the charts ever returned to the original level. The only conclusion we could draw from this was that people would try to improve once they became aware that their performance was being measured and advertised. And it appeared that they liked to be measured.

At this time we were delivering Pershing missiles to the Cape for flight test. The Pershing flight record was outstanding. But we found we had difficulty in detecting every nonconformance before delivery. There were always two or three items found at the Cape.

We increased the intensity of our inspections and tests in the final control points and began to tell the Quality Acceptance and the Manufacturing people that only Zero Defects would do. This seemed to appeal to them and finally on 29 December 1961, a missile was shipped to the Cape that, after being checked from stem to stern, was reported as having no defects at all.

calculate the cost of design changes to correct drawing errors . . .



zero defects

. . . the charts provided a monthly measurement of the defect level . . .

Flushed with this success our Quality people pledged themselves to supply the first complete deliverable Artillery Set to Fort Sill with Zero Defects in hardware and documentation. In addition they would assure that it would be on the air and operating within 10 days after receipt. The total effort on this set at this time was concentrated in our acceptance area so the amount of personnel involved was small, consisting of Quality Acceptance people and Manufacturing support personnel. They had just about two months to do the job, which was a pretty tight schedule for the first total Pershing system.

As we started this task, Mr. G. T. Willey, our Vice President and General Manager, received a call from General Richard Hurst, Army Missile Command, Redstone Arsenal, Ala. Could we possibly deliver this set, even though it was the first, by the middle of February instead of mid-March? Tom Willey recognizes a challenge like this as an opportunity. He is also an "instant planner" so he immediately said "Yes." Our reaction was more like "Oh my Heavens!" I can't recall the exact words. We doubled the intensity of the effort and met the date. Twenty-four hours after arrival at Fort Sill the set was on the air and operating. We had set ourselves a standard.

There was one thing wrong with this accomplishment: we managed it by inspecting and testing every flaw, every nonconformance, every possible discrepancy out of a huge set of sophisticated equipment. It did not seem to be the most economical or purposeful way to accomplish it. There had to be a better way of doing it.

After many sessions with our Quality Managers we finally began to develop what is now the concept of Zero Defects — the concept of the attitude of defect prevention.

Basically it is this:

People are carefully conditioned to believe that to err is human. When they reach an industrial environment, we as management re-enforce that belief. Thus they do not become concerned when the errors they make are within the pattern of acceptability developed for them. It does not bother a man to drill an occasional hole off

center, or to place the wrong dimension on a drawing. "That's what they make erasers for" is a common saying — the "passing grade" complex.

But does this same man react so philosophically when he is shortchanged in cashing his paycheck? Does he have a failure rate that is constant and thus go home in the wrong car now and then or perhaps forget to pay his income tax once in a while?

If his failure rate is not constant then we must be faced with a dual attitude. He has one for himself and one for his work. His own is higher. But no guilt is associated with this dual standard. He is merely doing the type, or level, of work that he thinks we want.

It became apparent to us that we must reverse this attitude or mind set. We established a formal ZD Program. We made the employees aware of the program through a promotional campaign of literature, posters, meetings and other communication media. Then we asked them to sign a pledge stating that they would put forth their maximum effort to perform their job right the first time. In return they received a pin and our congratulations. One of the first persons to sign — in fact he insisted on being first — was the union president.

The reaction of the people was instant. The rework and scrap rates had an immediate and continuing drop. The company suggestion program began to receive more inputs than before — an unexpected windfall. We felt we were on the right track. Others felt that also.

Let me quote to you some excerpts from a speech made by General McNamara of the Defense Supply Agency. He was discussing craftsmanship before the American Society for Quality Control in New York City.

"As an example of positive preventive quality management, one might consider the program called Zero Defects. This is a program which was basically developed, as I remember, by the Martin-Orlando organization in an attempt to exploit that tremendously important national resource — human dignity, or the latent desire to do a good job.

"This program attempts to recognize and heighten the individual workman's interest in his accomplishments, so that he will become more alert and have greater pride of workmanship, both of which result in fewer defects in the final product. This might be in conflict with the 20-year-old quality control concept that everything industry produces has a percentage of defects, but common sense tells us that through cultivation of this admirable quality in human beings, both the manufacturer and the buyer will be far better off.

"There will be still other gains from encouraging pride-in-workmanship, such as improved morale, better labor relations, and the general satisfaction on the part of a workman in a job well done. This program, and others like it, can be an important preventive quality management tool . . . we in the Defense Department and the Defense Supply Agency are going to try hard to encourage the use of this tremendous latent power — human dignity. I know this idea will pay off for us and for you if it is exposed to intelligent, enlightened quality management."

The individual workman's interest is in his accomplishments, even as you and I are interested in our accomplishments.

Zero Defects as a program has three phases. • First, explain to the people what the program is and motivate them to want to participate. • Second, using these motivated people, review your requirements and eliminate or refine those not within the realm of attainment. No matter how highly motivated you might be, for instance, it would be very difficult to deliver a package from Washington to Detroit in 10 minutes and return. That requirement is not attainable in this day. Some day it may be. (There have been reports of salesmen with signed contracts approaching this record.) • Third, with motivated people and attainable requirements, develop processes that are repeatable.

During the two years of Martin's formal program we have learned many things, from our own effort and from the efforts of those who have established similar programs. But the most important thing we have learned is that although you motivate the worker as an individual, by encouraging him to do better, you perform an even more significant achievement by displaying the standards of top management for middle management to see. People can achieve remarkable things when they have a standard that requires them to perform above the normal and be recognized for it. It is essential that we establish our personal standards at a level worthy of their efforts.

Recently I had occasion to read the address of President Johnson delivered at the University of Michigan. In it, he eloquently described what he called the "Great Society."

"The Great Society," he said, "is a place where

zero defects

men are more concerned with the quality of their goals than the quantity of their goods. For a century we labored to settle and subdue a continent. For half a century we called upon unbounded invention and untiring industry to create an order of plenty for all our people. The challenge of the next half-century is whether we have the wisdom to use that wealth to enrich and elevate our national life — and to advance the quality of American civilization."

That is a challenge worthy of our time, our nation, and our separate talents. It is a challenge to do more, do it better, and to do it at the least possible expense. It is above all an opportunity.

We must use the fullest capabilities of our people and the most creative techniques we can develop to support them. Craftsmanship is an attitude. Attitudes are developed by leaders. The challenge of Zero Defects is yours. It's up to you.

" . . . The Office of the Secretary of Defense is vitally interested in this program — and for a very good reason. As custodians of the Nation's security, it is our responsibility to deliver reliable and safe material to our armed forces. Experience has taught us that pride of workmanship, attention to detail, and dogged determination to do one's best, are essential to the fulfillment of that responsibility . . ."

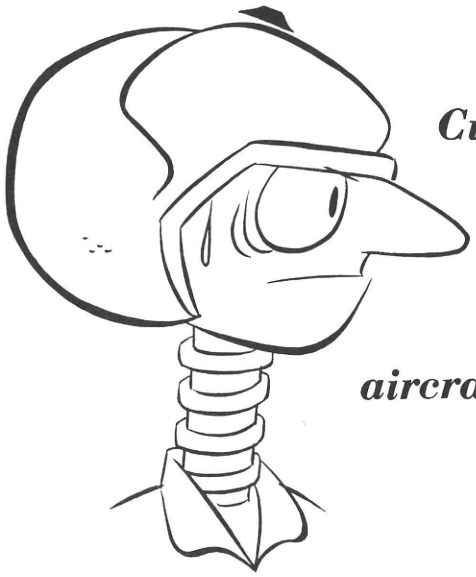
Mr. George E. Fouch
Deputy Assistant Secretary of Defense
(Equipment Maintenance and Readiness)

" . . . For those of us in Government, the really attractive feature of a Zero Defects Program is that it emphasizes the idea of eliminating the problem of quality early — perhaps by avoiding difficulties entirely. We accept preventive medicine as a means to keep people in good health. We practice preventive maintenance as a means to keep our equipment functioning properly. These preventive measures are enforced because they contribute to a more efficient and economical use of those assets represented by our people and our materiel. We can do a great deal to control these measures within the services. But the prevention of defects is a task which we have largely entrusted to our contractors. Through our inspection personnel we can participate in the detection of defects — but this is after the fact. It is a costly undertaking and it often yields costly results in the form of scrap, rework or late deliveries. As contractors, you lose, and as customers, we lose. The adoption of the concept of Zero Defects by our contractors is the key to providing materiel with the degree of reliability for which we can all be justifiably proud . . ."

Brig Gen John A. Goshorn
Director of Procurement
Office of the Assistant Secretary of the Army

crash sense

PREPARED BY THE U. S. ARMY BOARD FOR AVIATION ACCIDENT RESEARCH



Current Share-Its, DA Form 2696, illustrate the wisdom of a command often roared over the intercom of training aircraft: "Keep your head on a swivel."

Share-Its

"High performance aircraft were scheduled for low level bombing and strafing runs in the area I was to fly through from 2110 until 2150. I waited until they were supposed to be out of the area and then proceeded at 2210. I was on final to a tactical landing area when I saw a jet on a collision course. I took evasive action with a sharp climbing left turn and the jet passed under me about 50-100 feet away."

OH-13S Pilot

"We were flying a U-6A on an instrument clearance, assigned to 4,000 feet, holding at a nondirectional beacon. The cloud tops were approximately 7,000 feet and the bottoms varied between 3,300 and 3,500 feet. As we approached the beacon in the holding pattern and in the clouds, we broke out briefly and an orange TO-1D appeared to our left front on a perpendicular course, crossing left to right, and approximately 100 feet below our altitude. The encounter was very brief as we soon re-entered the clouds. I immediately called approach control to verify our instrument clearance and asked if any other aircraft were assigned to hold at our altitude. Approach control confirmed our clearance and replied that we were the only aircraft assigned an instrument clearance in the area. I am convinced that if we had been 100 feet lower we would have had a mid-air collision because there was not enough time to maneuver when I saw the TO-1D."

Training IP

"We were transporting a company size unit to an attack at minimum altitude — flying in groups of two. Three OH-23D aircraft were flying escort, suppressive fire, and observation in the landing zone. Out of the left corner of my eye, I caught sight of a rotating beacon. I glanced left and an OH-23D was on a collision course. I made a right descending turn and the other aircraft made a left turn. It flew to within 10 feet of our rotor blades."

CH-21C Pilot

"We were flying IFR under radar control, cleared for an approach to runway 7. At an altitude of 1,500 feet, we were cleared to descend to 1,000 feet, heading 070. While we were descending and still in the clouds, at approximately 1,200 feet, the final controller said: 'Army — climb immediately to 2,500. Acknowledge!' We started our climb and reported back. The final controller then stated that another aircraft was on a collision course. We saw the aircraft pass from right to left approximately 100 feet below. The other aircraft was later identified as a civilian aircraft with no radio. The weather was IFR."

U-8F Pilot and Copilot

"We were flying at 9,000 feet on an IFR clearance, approximately 10 miles east of a VOR. The weather was scattered to broken clouds with bases approximately 7,000 feet and tops at 15,000 feet. We were flying in and out of the clouds at our assigned altitude of 9,000 feet. At approximately 1732 we saw an aircraft come out of a cloud at approximately our same altitude and heading in the opposite direction. The aircraft, either a Cessna 182 or 205, passed to our left approximately 150 yards and slightly below our altitude (approximately 50 feet). The other aircraft was in level flight attitude and did not deviate from its course. We took evasive action and reported the incident to the watch supervisor at the center."

U-8D Pilot and Copilot

"I was flying at 1,800 feet on a heading of 170° when an F-104 passed on my left approximately 100 feet above on the same heading. While my attention was on this aircraft, another F-104 passed in front from right to left approximately 50 feet below me. I flew into extremely turbulent air created by the passing jet."

OH-13G Pilot

"I had just touched down in a wheel landing when the right brake started chattering. The aircraft veered to the right. I got off the right pedal completely and applied full left brake and the aircraft remained straight. The right brake released as I settled to a 3-point attitude."

O-1A Pilot—Training

"This was a training flight. My student had taken off, turned crosswind, and climbed to 1,000 feet. While still on crosswind, a C-124 was seen on a collision course, flying toward us from our right front at the same altitude. Although we were still in the traffic pattern, we were forced to make a descending left turn of 180° to avoid collision."

CH-21C IP

"We were flying at 200 feet above the terrain on a clear windy day at maximum gross weight (passengers), cruising at 70 knots. I flew between two mountain peaks and encountered a violent updraft. The updraft and a sudden hard gust of wind sent the aircraft into a violent blade stall. It pitched up and to the left at almost a 90° angle without any warning. The copilot got on the controls with me but we were out of control for approximately 30-45 seconds. We regained control approximately 50 feet above the ground.

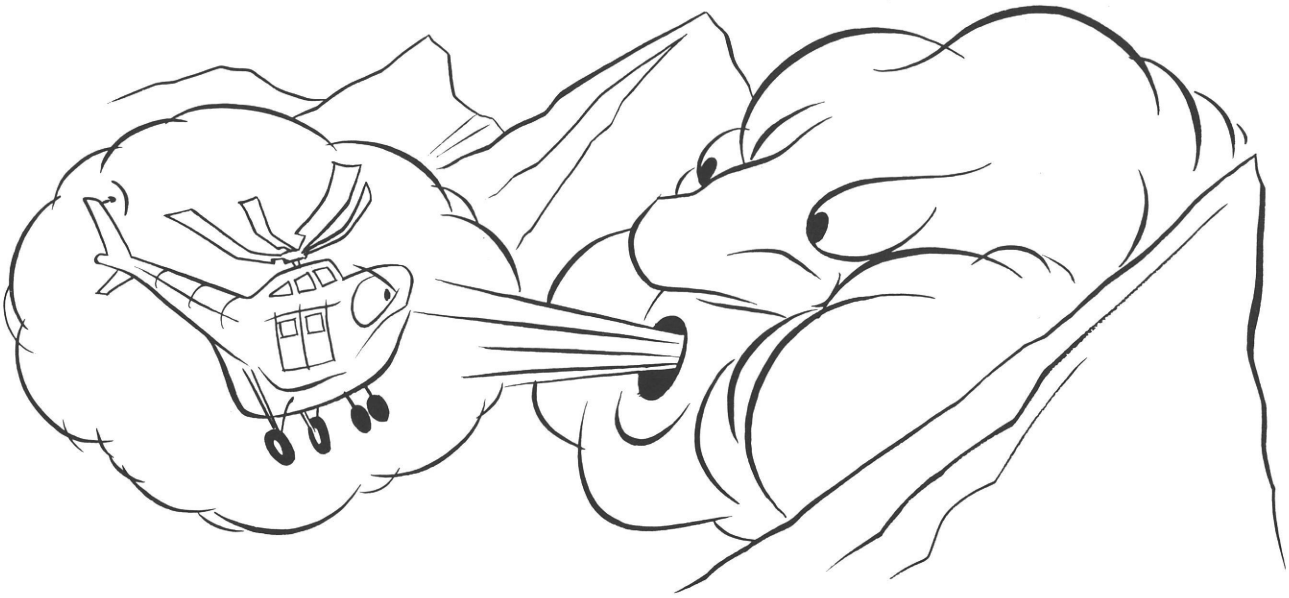
"Moral: High airspeed, high mountains, maximum gross weight, and gusty winds don't mix!"

UH-19D Pilot

"I was landing at an uncontrolled staging field overseas when I noticed a CH-21 turning left downwind from crosswind. Although it appeared we would have adequate spacing, I called the other aircraft. The pilot did not acknowledge. As I neared the roundout point, it disappeared above my left wing and I concentrated on landing. I had just touched down when the helicopter autorotated over my head to a point less than 250 feet in front of me. To make matters worse, I was going about 60 mph in wheel landing attitude and he was on his hind haunches with rear rotor at guillotine height. I reacted with brakes, almost nosing over. Then I came back on the stick to counteract and nearly rotated. Finally, I pressed right brake to start a swerve and all but ground-looped. I missed him and there was no damage but it was as close as I want to come to being cut out of the pattern."

TO-1D Pilot

. . . "High airspeed, high mountains, maximum gross weight, and gusty wind don't mix . . ."



"I made a touch-and-go landing, climbed out on crosswind, and had just started to turn downwind as an O-1 was making its entry into the traffic pattern. It passed approximately 50 feet above me and I don't think the pilot ever saw my aircraft."

U-6A Pilot

"I was inbound to an Army airfield. Approximately 7 miles north of the airfield, I called for landing instructions. I was cleared for a left turn in to runway 20 and told to report base with gear. At approximately 2½ miles northeast on base leg, I reported that I was on base and my gear was down. The tower cleared me to land and advised that a CV-2 was working GCA approximately 7 miles northeast. I did not have the Caribou in sight and reported this to the tower. At approximately ½ mile out on final approach, at an altitude of 150 feet, I saw a CV-2 pass under me at about 100 feet above the ground. No transmissions were received from the tower after I was cleared to land while on base leg."

CH-37B Pilot

"We were flying at approximately 1,000 feet A red and white Bellanca pulled to the left side of us at approximately 200-300 feet. He then moved to the left and made a pass below and to the rear, passing about 100 feet from our aircraft. He then turned and started another pass, but we took evasive action by going to treetop level. He then flew away."

CH-34C Copilot

"We were VFR and engrossed in a discussion and demonstration of the autopilot. As a result, we came extremely close to a UH-1 which was approaching the same VOR at the same altitude from a different heading. We failed to see the UH-1 because we had our heads in the cockpit and the UH-1 pilot failed to see us, probably because we did not have our anticollision light on. We were en route to an area safety meeting."

CV-2B Copilot

"This was an instrument training flight with the pilot flying under the hood. We had just been cleared by approach control to climb to 3,000 feet — cleared to the beacon — cleared to make an ILS approach — report beacon outbound and inbound. No unusual indications were noticed during the climb to altitude or while we were making the procedure turn inbound. We had been flying for approximately 15 minutes and had just descended from 2,500 feet, passing the beacon, when we felt a slight shudder. The master caution light came on, followed immediately by the engine fuel pump light. I took control, entered autorotation, and scanned the instrument panel to see what was wrong. In the meantime, the pilot removed his hood. It was impossible to tell whether the engine was running or not by sound alone. I increased pitch and throttle, determined the engine had failed, and completed the autorotation."

UH-1B IP

"We were IFR on a Victor airway north of an intersection at 5,000 feet. We had just come out of a cloud when a T-37 which was descending from altitude passed about 500 yards in front of us going from northeast to southwest. I reported the incident to the nearest approach control and was told there was no reported traffic in the area."

U-6A IP

"We were VFR en route at 7,500 feet on a heading of 030° magnetic. A civilian aircraft passed us on our left side. When we first spotted it, [the aircraft] was approximately 150 feet off our left rear and closing on an approximate heading of 040-045°. I altered course to 060° to avoid collision and the other aircraft passed us approximately 100 feet away without altering course. My indicated airspeed was 100 knots and I estimate the speed of the other aircraft at 110 knots. I called the nearest radio for an altimeter setting confirmation. The setting given was 30.22 inches. This coincided with my altimeter. The weather was VFR above the haze layer and visibility was approximately 10 miles.

"I don't believe the pilot of the civilian aircraft ever saw us because he did not alter course until well past our aircraft and then he recrossed our flight path on a heading of approximately 360°. A violation was filed and is being processed."

U-10A Pilot

"After our flight, I made an entry in 2408-13 that the pitch was binding in flight. Inspection by maintenance personnel revealed that the cabin heater duct had come loose and fallen into the area of the pitch control lever, causing a bind. An emergency EIR was submitted."

UH-1B IP

"I was VFR en route at 2,500 feet with cruise power when I was overtaken and passed on the left by another Caribou. He passed alongside at the same altitude and close enough to have been flying tight formation. As soon as he cleared our nose, he crossed over to the right side, still remaining at our altitude."

CV-2B Pilot

"I was VFR at night, flying a resupply mission to a forward strip when I saw another aircraft to the right. It appeared to be on a slow collision course and I flashed my wing inspection lights, hoping to attract the pilot's attention. There was no response from the other aircraft and it was necessary for me to turn away and down to avoid collision."

CV-2B Pilot

". . . Upon breaking ground, at approximately 90 knots, and with no runway left to abort on, I found I could get no response from aileron control. With both hands on the stick, I could not move it as much as an inch from either side of center. Aileron trim had no effect at all. When I released the pressure I was holding, the left wing would drop. I flew a very wide pattern and landed without incident . . . . During the preceding days, we had nearly 10 inches of snow. Most of it had melted and we had freezing weather the night before the flight. We found the spring tabs and trim tab frozen solid. The trim tab had frozen with about 3° left trim applied."

OV-1B Pilot

"I was heading east at 1,600 feet when an RB-57 passed below me approximately 100 feet on a collision course. The RB-57 pilot took no evasive action and when I saw him, I had no time to do anything but watch him go under."

OH-13S Pilot

"After takeoff, I was climbing out over a road when I happened to see a kid pick something up from the road. Suspiciously, I turned away

from the little angel. Sure enough, he wound up and fired a nice sized rock at my ship. I was about 50 feet and fortunately he was a bad pitcher. When I reported the incident, I was laughed at."

OH-13E Pilot

"On a VFR flight plan, I contacted approach control for an ILS approach with a full stop landing. The initial radar contact was made after I turned to a heading of 150°. Approach control gave me another turn and stated there was a target at 12 o'clock westbound. I could not see the target. Several minutes later, approach control again warned of a target at 12 o'clock. I looked to the left and saw a Mooney make a steep turn to its right, no more than 200 feet from me, at the same altitude. After closing my flight plan, I reported the near-miss to approach control."

U-8D Pilot

"I was over the VOR at 5,000 feet, VFR en route. As I crossed the VOR, I changed the course selector to my outbound radial, checked the clock, and reached up to change the distribution switch to the transmit position for a position report. At this time, I saw a T-28 aircraft approaching on a head-on collision course. I took violent evasive action to the right. The pilot of the T-28 took no evasive action and cruised serenely by. I estimated we passed within 300 feet of each other, but I was unable to read the other aircraft's number. I was too busy trying to save my life. I reported the incident to the station and was informed there were numerous aircraft in the area practicing instrument approaches."

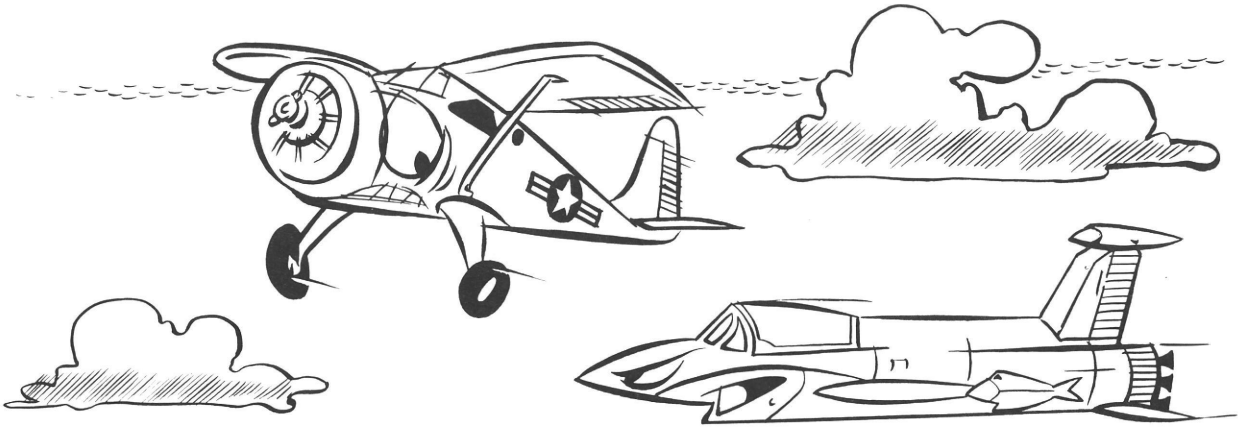
U-6A Pilot

"I descended from 19,000 feet by extending the gear at 120 knots, using full flaps, 2600 rpm, 26″ manifold pressure, and maintaining 120 knots airspeed. During this descent, the gear indicated down and locked. At 10,000 feet, I retracted the gear and flaps and made a normal descent to traffic pattern altitude.

"I lowered the gear on an extended base leg but the nose gear would not give a locked indication although the nose wheel position indicator on the floor showed DOWN. Push-to-test showed the light was not burned out. I retracted the gear and the landing gear position lights were extinguished, but the floor indicator appeared to be stuck between UP and DOWN.

"I lowered the gear again and got the same nose gear unlocked indication. I made a low pass past the tower and they said the nose gear ap-

. . . I was unable to read the other aircraft's number, I was too busy trying to save my life



peared to be down and locked. I tried to get a locked indication by manually extending the gear and this was unsuccessful.

"I made a touch-and-go landing at an airspeed of 110 knots. During the ground roll, I made several attempts to collapse the nose gear by applying forward pressure on the control column. The nose gear appeared to be solid on the runway with no abnormal characteristics other than the unlocked indication. I completed the landing without incident.

"When maintenance personnel inspected the nose gear, they found that both nose gear helical extension springs were broken at the hooked end that attaches to the landing gear lock hook."

U-8D Pilot

A CAN OF PEACHES, THREE COOKIES, AND A NICKEL CAKE

This accident happened during a night maneuver of a field exercise. It started happening the night before when the pilot pulled a tour as Officer of the Day from 2300 to 0100. Just as he got to bed, the unit commander received the following day's missions. The activity generated by the receipt of these missions killed any chance for sleep the pilot had. At 0400 hours, he was called out for the first flight of the day.

Here, in the pilot's words, is how the day's flying went:

". . . I started on my first mission before daylight without any breakfast. The missions kept going on through the morning with only fuel stops. At 1230, after 5:15 hours of flight, I told my section leader that I was too tired to fly and needed a break. Another mission had to go right then, so I was back in the air within 10 minutes. The missions went the same way all afternoon, but I managed to eat a can of peaches, three cookies, and a nickel cake during that time. Just about dark, I was called back from my last mission and landed in a field with the rest of the company. We did not get a briefing, but were told that we were going to move as soon as we got refueled.

"When I hovered out with my section to take off, I tried my landing light and it did not work. I didn't consider this any problem because I have done a great deal of minimum lighted field work, and prefer not to use a landing light. I called the group leader and told him I had no landing light and asked him to make sure that our people had the lights set up on our new field. The group leader passed this on but ground control at the new field failed to say whether they were set up or not. As we flew on to the field, I called the group leader two more times about the light and he relayed my calls to ground control. The last time he called, he was told that they would talk me down.

"I still expected a light as well as being talked down. I followed the second ship of my flight in and saw there were no lights on the ground, but a UH-1 had its beacon on. I guided myself by the UH-1 and continued the approach.

"I got no assistance from the ground until the controller broke into the radio conversation and told me to pull up a little. A short time later, he told me to slow down, that I was coming in too hot. By this time I had landed.

Downslope landing area and damaged OH-23G

"I didn't find that we were landing down a slope until I got out of the aircraft. When I made contact with the ground, my angle of approach compared to the lighted UH-1 indicated that I was still 30-40 feet high."

The OH-23G hit tail low and on the left skid. It bounced forward several feet, hit the ground again and started to roll forward on its nose. The pilot applied full aft cyclic and the main rotor blades struck and severed the tail boom. The aircraft lurched forward, turned slightly left, and came to rest.

This pilot's 759 showed a total 9.1 first pilot flying hours for the day of this accident — all after a night of no sleep, and all on *a can of peaches, three cookies, and a nickel cake.*

The accident investigation board cited the following supervisory cause factors:

No lighting facilities were made available to designate the touchdown area.

The pilot was fatigued from lack of sleep and improper diet and should not have been assigned another mission.

Recommended approach was downslope without the pilot's knowledge.

Miscellaneous contributing factors were listed as:

Excessive transmissions on ground control frequency prevented the pilot from understanding or hearing all transmissions intended for him during the talk-down approach.

Overcast conditions contributed indirectly because of the limited horizon.

The board made these recommendations:

Responsible supervisors should not require aviators to perform beyond individual capacities.

Unit operation personnel should make provisions to keep portable lighting sets available for use at all times.

Unit SOP should be established to include all known field expedients for panel marking and lighting during night operations.

More radio courtesy and discipline should be indoctrinated into all personnel.

Pilots should be instructed not to attempt night landings to unmarked areas except in cases of emergency.

In its letter of transmittal, the Army headquarters said: ". . . this headquarters concurs with the findings and recommendations of the investigation board and emphasizes the major contribution made by the pilot's physical condition, which underlines the desirability of using the guidance in AR 95-17."

You Bet Your Life!

Continued from page 31

with and a lot of things to think over. He knows the winds around this small auxiliary strip are particularly vicious today. This plane isn't responding as well as it might either. His better judgment tells him that the only thing to do is return to the home field and land.

On the other hand his passenger wants to inspect a unit that is bivouacked by that strip, and he wants to do it now. If he doesn't get to do it now, he will be very unhappy; and if a man of his stature says anything to the CO or operations officer, it will carry some weight. Besides, didn't his passenger say that Blank had taken him in on days as bad as this? Our young aviator knows very well that Blank is not a better pilot than he is. What to do? Go or no-go?

"Dipstick tower, this is Army 2346 for landing at Dipstick."

A smart young man, although not a very happy one. He has done his job to the best of his ability, pushed his pride under the seat, and brought his aircraft and passenger back undamaged. What is his reward—the knowledge that one of the more important officers of that division, although he hasn't come right out and said it, thinks he is either incompetent or a coward.

Let's examine another possibility. At 0900 Dipstick Tower hears: "Dipstick tower, this is Army 2346 on downwind for landing at strip 2. We'll be on the ground approximately 1 hour."

At 0910 the crash alarm rings. The unit bivouacked near strip 2 reports that an aircraft attempting to land has crashed and burned. There appear to be no survivors.

The accident board will gather, examine the evidence, wisely shake their heads, and say that this was an obvious case of pilot error. But was it? To some extent, yes. This pilot knew the odds, and 97 percent of the time he wouldn't have tried to land under those circumstances. Why did he try it this time? To put it bluntly, someone had put the needle to him.

Approximately 97 percent of the personnel who ride as passengers in Army aircraft will respect the pilot's judgment. If he says, "No, we can't do it," they accept this as the word of an expert. They respect the letter and the spirit of AR 95-2 which says: "The aviator in command of the aircraft will be directly responsible for its operation and will have final authority as to operation of the aircraft . . . In such matters, passengers, regardless of rank, seniority, or service are subject to the orders of the aircraft commander." This provision was included in the regulation for a purpose. Only the man with his hand on the throttle knows his own capability and that of his aircraft.

Aircraft vary, as do vehicles or any other machinery; some are "hot," some are "dogs." An aircraft that is unsafe is not allowed to fly. However, the aircraft considered airworthy still might not have that extra bit of power required to get out of a tight situation.

Aviators also vary. No two have quite the same capability. The greatest variation, however, is within the individual. Just as most of us have days when we can't quite get a good golf shot, when our coordination is off just a little, the aviator has days when he realizes his coordination is off enough that he can't take any chances. He is the only one who knows his capabilities at any given time.

Respect his judgment! If he feels that he can accomplish the mission, he will make every effort to do so. But if *he* doesn't feel that he can do it, don't try to talk him into it. We all have pride, and if someone chips away at it long enough he can generally get to us. You can do this to your pilot, if you want to. But if you succeed in getting him to act against his better judgment, you have robbed him of one of his greatest assets in the cockpit — confidence. Without confidence he is subject to panic, and panic in an aircraft often leads to disaster.

An aviator is influenced in many ways — most of which have been used quite freely. In addition to the example used in the story, there is the old, "You get paid a small fortune for this; if I am willing to go why aren't you?"

Fortunately, the individuals who resort to such practices are a small minority. They seem to feel that a personal insult has been delivered if they are not able to go where and when they want to. Nothing is further from the truth. The aviator who refuses to take them under hazardous conditions is doing them a great favor. He may even be saving their lives.

If you are a member of this select 3 percent, this article is directed to you. If your pilot tells you he doesn't want to try something that you think he can or should be able to do, go ahead and harass him, if you want to. Remember this, though: the ground is awfully hard, and aviation fuel burns awfully hot. You are betting your life that you are right.

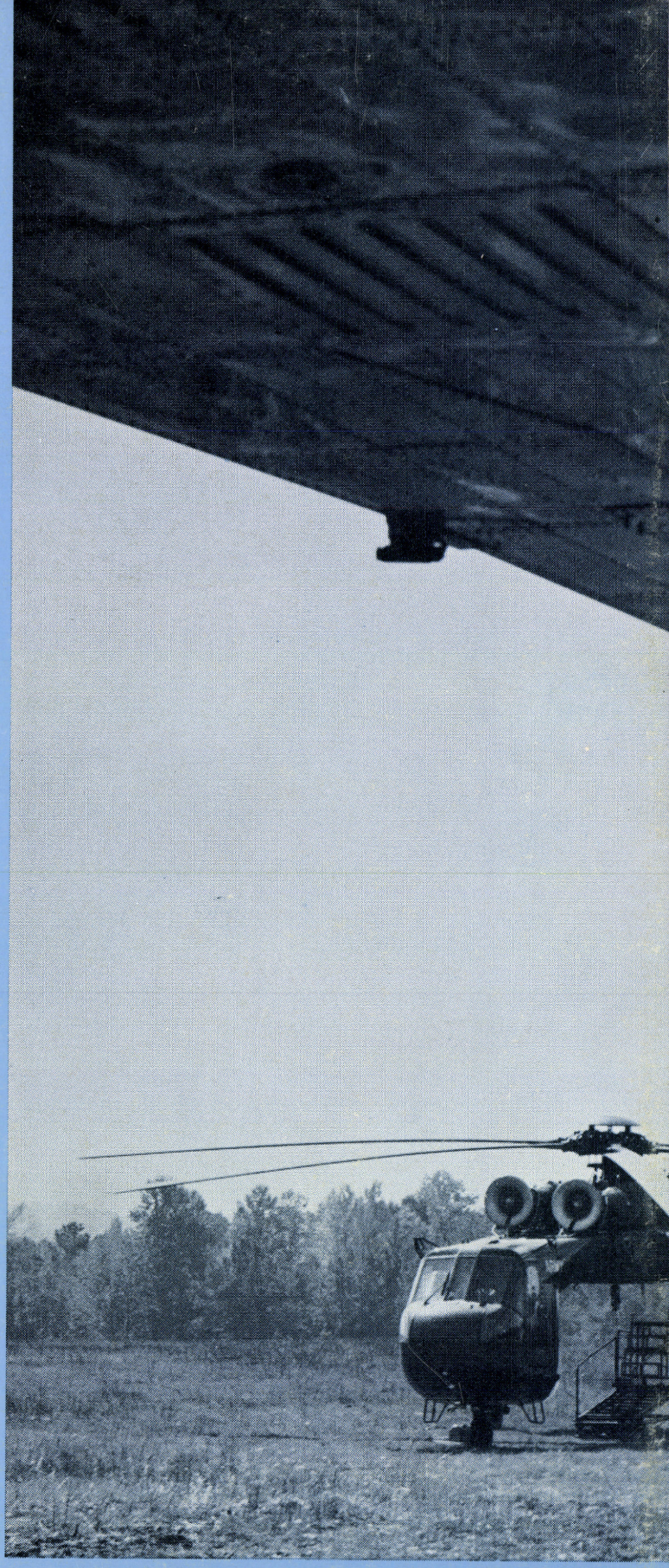
Fasten Your Seat Belts—Turbulence Ahead

IN THIS CASE the turbulence is of the nonmeteorological variety — personnel turbulence, that is. It stems from the existing shortage of Army Aviators, which has been causing some abnormal personnel actions. Considering the extensive impact of the turbulence, it is believed advisable to set forth a few facts as to the whys and wherefores.

The history of Army Aviation has been one of continual shortage of aviators, since the demand for aviators has always exceeded the supply. Corrective actions have been taken, of course, but circumstances have invariably combined to prevent full solution. Primary among these circumstances has been the growth and use of organic aviation throughout the Army. These circumstances are either boons or banes depending upon the point of view. Judged from the standpoint of the Army at large, organic aviation provides tremendous advances in operational capability. When viewed by the individual who has just received notification of a break in stabilized tour with PCS to Vietnam and no delay en route, the complexion of the situation can be somewhat changed.

The aviation personnel situation, in addition to facing the problems inherent in TOE/TD expansion, has recently been presented with the demanding requirements of the air assault tests and support missions in the Republic of Vietnam. These later requirements, in addition to being sizeable, have invariably had an element of urgency which has required emergency fills in most instances.

Taken together, these various requirements for aviators have caused Department of the Army to readjust priorities and personnel procedures in order to support the Army as a whole most effectively. Although every effort is made to avoid adverse personnel impacts, these readjustments do affect Army Aviators in many ways, including "short fuse reassignments," change of stabilized tour lengths, rephasing or deferment of ground duty tours, and repetitive TDY, to mention only the most significant.

The Department of the Army is aware of the aviator shortage and the generally adverse effects of the type actions listed above. Through this awareness, the collective impact of the imbalance among aviator requirements and assets is being reduced daily. However, even the best of personnel planning can only do so much with a limited resource. When this happens, the SEAT BELTS must be tightened and all readied for the pitch and roll. It is a tribute to the caliber of personnel in the aviation program to note the uncomplaining manner in which these hardships have been accepted. There has been a general tightening of the belt and an air of "continue to march" that has been most heartening. Much hangs in the balance these days — air assault testing and Vietnam included — and we know that Army Aviators are equal to the task.

—Prepared by Office of the Executive for Army Aviation, OPD, OPO