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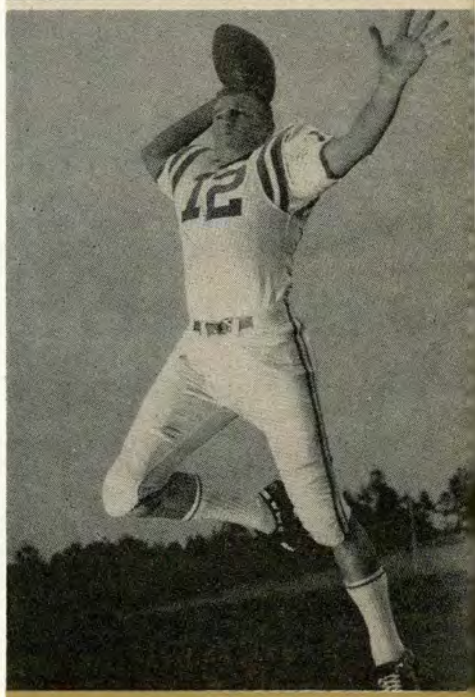
FLYING SAFETY

UNITED STATES AIR FORCE



The Signal Caller

COMMAND AND SUPERVISION

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• **VOLUME 16 NUMBER 1 USAF PERIODICAL 62-1** • **COMMAND AND SUPERVISION** •

THE COVER STORY

Many of you will recognize Cadets Rich Mayo and Charles Moores of the Air Force Academy football team. Mayo is the quarterback who has led the team through a very fine season. On the field each week-end he is the commander, and the responsibility for the success of the team falls largely on his capable shoulders. He shares this task with all of his fine team members and for all of them their football training will come in handy when they assume their added responsibilities as officers in the USAF.

• THE EDITOR'S VIEW •

One of the most fascinating, exciting and exacting professions in the world is that of the diamond cutter. Now there are diamond cutters and diamond cutters, but the one I mean is the man who is entrusted to cut into a large and fabulous stone for the first time. He probably spends only a fraction of a second in actually cleaving a stone. But he might spend months studying the structure of this stone so that he can determine the precise point and force necessary for the stroke of the chisel and mallet. Then the moment comes: either he has done his job correctly and the raw gem becomes a dazzling display in the window of Harry Winston, or he has guessed wrong and the large stone is good only for dust or inferior chips. It's all a matter of preparation.

The point is that this man has reached the payoff. The pilot of an Air Force airplane actually faces this payoff several times each month. Every takeoff might be likened to the stroke of that diamond cutter's mallet. If his preparation is bad, however, the pilot himself is very likely to be dust.

It is inconceivable that pilots continue to fly even though they themselves know that they are not yet qualified to meet the payoff. Yet they do, and their supervisors let them do it. The casual reader might ask, "Why is any Air Force pilot not always ready for the payoff?" For one thing, the pilot is human. He can have off days like anyone else. The diamond cutter would surely not pick up that mallet at any time when he was not feeling completely up to par. Why should the pilot fly at these times? Yet he does!

And then, every pilot must start out with a minimum of experience. While acquiring more of the same he must weigh his experience against the requirements of the mission. If he has doubts about his ability to do the job, he must say so, and the supervisor must help him in reaching his decisions not to fly. But do they?

The older pilots in turn must recognize when they no longer have that "edge" required to do a precise job in the cockpit. Remember, the golf course is not such a bad place to spend those declining years.

What is necessary is that pilots and supervisors weigh the urgency of the mission against the abilities of the particular man to perform it. If in doubt, and the mission allows, delay the payoff until the odds read "diamonds," not "dust."

IN THIS ISSUE

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The Commander and Flight Safety

Maj. Gen. Joseph D. Caldara, Deputy Inspector General for Safety, Hqs USAF

According to General Caldara, both the chiefs and the short feathered Indians must take a real hard look at the role of supervision in flying safety.

Safety is a basic function of command. You commanders have read it, heard it, and sometimes you repeat it. As the commander or the supervisor injects himself into an aircraft or a missile accident prevention program, so the degree of accident prevention effort in a command is affected proportionately.

While safety is a function of command, the commander must have some highly competent safety officer available and responsible directly to him to insure that the horde of little petty details which result in aircraft or missile accidents are bird-dogged, tracked down, and eliminated. It is at the "short-feathered Indian" level that you prevent aircraft accidents, or missile and nuclear accidents, or ground accidents, or whatever kind of accidents. Now that I've inherited all four areas, I have to be interested in all four.

We are starting the aircraft accident prevention program for 1960 with January's topic, "Command and Supervision." Regardless of the the topics for succeeding months, it is this one we want to emphasize for the coming year. Command and supervision is a *must*. It must be *first*, for without it, none of the other topics—maintenance and materiel, man and the flight surgeon, standardization—means a thing. If the commander fails to inject himself and his staff and all his people into the picture, none of these other functional areas is going to operate properly, and you are not going to prevent aircraft accidents.

Here's a bit of history to get this discussion into context. The major aircraft accident rate trend in 1921 was 506 accidents per 100,000 flying hours. However, the period we customarily use as a yardstick for the Air Force today is that between 1947 and 1959. The reason for this is that during that period the Air Force has gone all jet, at least in the fighter business. Now the higher the performance of the aircraft, the higher the requirement on the pilot and crews. This would lead one to believe that the accident rate would almost inevitably be higher. Yet, this is not true. Our jet fighters today have a lower accident rate during their initial use phase than we used to have on our propeller fighters.

In 1947 we were running 44 major accidents per 100,000 hours of flying. For the first half of 1959 we were down to 9.3, and this despite the fact that we're substantially an all-jet air force, and supersonic in the fighter end. This shows that it can be done, *that accidents can be licked!* The rate would be even better than this if every outfit, every unit in every command, was as good as the best unit in every command.

But there is a grim paradox to this reduction in the accident rate from 44 to 9.3. In 1947, about one-third of the aircraft involved in an aircraft accident were destroyed. Today it is just double—69 per cent. If an aircraft is in an accident, the chances are twice as great that it will be destroyed. And with the unit equipment today costing three million dollars a copy, this is no way to spend Air Force money.

If the economic side of these figures doesn't impress you, maybe the human side will. In 1947, 17 per cent of all the pilots involved in aircraft accidents were killed. By 1959, this figure had gone up to 28 per cent. It was actually just about 34 per cent last year, through 1958. In the first half of '59, this figure dropped off dramatically. But even so, this is costing us our trained pilots. You commanders and you trained pilots must face this fact, however, that compared with 1947's figures, double the number of aircraft are being destroyed and double the number of pilots are being killed.

Let's discuss current accident losses and find out where we are right now. We'll take the first half of 1959 and compare it with the first half of 1958. Our major accidents are down 16 per cent, but our aircraft destroyed through June of this year were up 3 per cent, from 261 to 269. Now this is one of the problems that you as a commander

Major General Joseph D. Caldara

face—and that we in headquarters face—in the accident prevention business for the Air Force. All last year, all through 1958, our reduction in aircraft destroyed was very dramatic. But for the entire year we had only been able to save 28 pilots' lives, compared to 1957. Look at our pilot fatalities for 1959. For the first half of the year we were down 53 from the June 1958 level, a reduction of 33 per cent. This is a dramatically successful reduction in fatalities. It may be very definitely tied in with the 36 per cent increase in the number of ejections, up to 156 from 115.

Since the end of June 1959, the number of aircraft destroyed has decreased compared with the corresponding period a year ago. I'm not in a position to tell you as a commander, particularly you senior commanders, what instructions you will give to your crew. But I will say that I think it is more vital to save a pilot's life than it is to save a piece of equipment. Think of it: you would have one devil of a time buying a B-47 or a B-52 or an F-104 pilot. You can buy a bird a lot easier than you can get a pilot, with all his built-in responses and capabilities.

Think of the combat capability we lose here. In the first half of 1959 we were busily engaged in turning out 1444 new pilots. In the same period we killed 110, and another 55 had major injuries. That means 11 per cent, or one in nine, of every one of the graduates from flying school, was going to replace a pilot that was killed. Unhappily, these bright-eyed second lieutenants coming out of flying school don't have the combat capability of the people we're killing in accidents. We have killed fighter group commanders; we've killed a bomb wing commander. These people had combat experience in World War II and Korea. You can't take a new graduate from flying school and give him that combat experience before the next war, so we have simply lost that combat potential.

Now let's look at our aircraft situation. While we were accepting 705, we destroyed 269. Of these, 153 were jet fighters, the equivalent of six squadrons. Six squadrons could help TAC, for instance, on one of those mobile movements overseas. Six squadrons would probably help ADC. And we threw this strength away through accidents in six months. Of the 269 destroyed, 26 were bombers; this is a little better than one and one-half squadrons. The other 90 were miscellaneous types, but we needed them too. In sum, 38 per cent—four in ten—of the aircraft that we accepted went to replace aircraft that were destroyed. What this really means is that the aircraft industry was working at an effective level of 62 per cent, because we were wasting 38 per cent of what they produced.

Since 1950, 3474 pilots have been killed and 7062 aircraft destroyed. That represents a bigger Air Force which we have thrown away through accidents than any other country in the world has, except the Soviet Union. These figures are something that we as commanders have to think about when we consider the problem of aircraft accident prevention and the emphasis that should be placed on it. And when I talk about practicing aircraft accident prevention, the last thing I mean is that we should inhibit the mission thereby. The first thing we've got to do is hack the mission. But then the next thing is to hack the mission as safely as we can.

The multitude of accident cause factors have been exhaustively analyzed elsewhere, so I'm going to skip over most of them and get down first to the pilot. It's interesting to note that pilot-involved factors have been going down steadily from 1954's rate. On the other hand, during the same period materiel causes have gone on a constant increase from 28 to 47 per cent. Now I don't mean to imply that our materiel has suddenly begun to deteriorate in quality, because it hasn't. But I do say that the same degree of reliability in our materiel today, the same capability factor in our maintenance today, will result in more aircraft accidents and more pilots killed if only because of the higher performance of the equipment with which we work. There is a fine line between maintenance and materiel, and we can't define it. For example, the accident which may be attributed to materiel might well have been caused by poor maintenance. I'm going to skip support and get down to supervision.

The techniques of proper supervision, we well know, make a powerful instrument to help the commander carry out his safety responsibilities. Now if 24 per cent of our accidents are attributable to improper supervision—a painfully true figure—then there must be a failure of technique of the supervisory function somewhere along the line. In almost all of the accidents, either the IP or the immediate supervisor has been charged as deficient in his supervision. Yet, inconsistently enough, 93 per cent of the recommendations resulting from these accident investigations require action at a major command level. How can we resolve this apparent contradiction? Perhaps this idea of supervision—the working, day-to-day appli-

Safety is like a seamless web. It doesn't stop anywhere.

Education, training and the judicious application of discipline are the most effective tools the commander has for the prevention of accidents.

cation thereof—could stand a real hard look from both the chiefs and the short-feathered Indians in this flying safety business.

All right, let's give it a real hard look and start with supervision and training. When I'm talking about these things I'm thinking about the commander who interests himself in his unit's training program to the extent that he keeps himself informed of *what* the program is designed to accomplish, *how* its prescribed goals will be reached, and what daily and weekly progress is being made. For example, take a unit's transition program. This is loaded with accident potential. In fact, records show that the accident rate is twice as high during a transition period as it is once a unit becomes familiar with its aircraft. Does the commander keep himself posted on whether his pilots are transitioning on an orderly, planned basis? Does he make himself aware of any weaknesses that are showing up? Does he supervise the supervisors to assure himself that they know their jobs? The good commander doesn't do this on a by-guess-and-by-God basis, you can be sure. He makes it his business to *know*.

Consider this example of the terrible consequences of neglect, when a commander failed to acquaint himself with the competence of his supervisors and the soundness of their program. A 3000-hour pilot was transitioning in a C-130 and had already accumulated 60 hours. The IP was in the cockpit with him when they came in for a smooth landing with No. 1 engine feathered. Then, as he'd been taught, he reversed his props, except that No. 1, of course, was dead. This immediately kicked the plane sideward and it started off across the field. Before the IP could take over the controls the pilot had come out of reverse thrust and into forward thrust again. By this time, a catastrophic accident was inevitable, and 10 people paid for it with their lives.

At no place in the transition program had it been brought out that if you lose an outboard engine on the right side, say, you must never reverse thrust on the left-side outboard engine after landing. Yes, of course, you multi-engine readers know that in the case in question, Nos. 2 and 3 only should have been reversed. You know it, but that pilot didn't know it, and what's worse, his commander didn't know that one of his pilots didn't know it! Did the operations officer, the squadron commander or the group commander ever look at this training program? If they did, they failed to catch a very vital point, and that failure resulted in a very costly aircraft accident in which 10 people died needlessly. I'm not pointing the finger of blame at any one individual in saying these things, but only trying to find causes so that we can eliminate future accidents stemming from the same failures.

Here's a case in point, and it involves a jet example. The chap involved was a rated T-Bird pilot, but in the past three years he had had only three flights for a total of 10½ hours of flying time. He got another checkout and, according to his testimony, it consisted of yakking with another pilot who was almost as well qualified as he. Well, it was hot and the field was 5000 feet above sea level and the pilot was inexperienced in the bird, but by the Grace of God he made a successful takeoff. Because his tanks were siphoning he returned and got them fixed, and taxied out again. But he didn't go back to the end of the runway for his takeoff. Oh no, his three years of experience in the "T", which totaled all of 10½ hours, had taught him that he didn't really have to know what he was doing.

So he started his takeoff roll from the intersection and, sure enough, he just couldn't coax that T-Bird off the ground. Once he had decided to abort, he didn't know what to do, so, as is usually the case, he did the wrong things. He didn't pop out his speed boards, he didn't blow the heavily loaded tips off, and he failed to stopcock the throttle. And the inevitable happened—he plowed right through a fence, killed one civilian and seriously injured another. We don't have to describe the condition of the bird.

It would seem that this man deliberately set out to bust himself, yet no one at the supervisory level either knew or had done anything about it. Now, *this is supervision?* You tell me.

I've given you a couple of examples of supervision, or the lack of it, in operations. Now let's talk about supervision in relation to materiel. Any command concerned with an aircraft, proposed or existing, sends a monitor to mock-up boards, modification reviews, and design engineering inspections. I shall use just mock-up boards to illustrate my point.

Many times while I was still working on the West Coast we had a series of mock-up board meetings which were attended by a series of different officers from the same command. There was absolutely no continuity provided by this method of operation. So we recommended to all commanders that they select one man, just one, and keep him on the mock-up board until the design was finalized or the problem solved. The recommendation was followed for a while, with beneficial results, but I notice a recent slackening along this line. I urgently recommend again to all commanders that you keep the same man on the mock-up board until the issues at hand are resolved.

If the commander's supervision extends to anything it should cover his own internal programs. Yet the command that initiated the engine trend analysis program, which has been so effective in cutting down engine failures, failed to get many of its own units to follow the program. Perhaps some of you don't realize this, but we're having more engine failures and engine failure accidents now

than we did last year or the year before that. When a subordinate commander who is losing aircraft and people through engine failure refuses to adopt a simple thing like engine trend analysis, I just don't know how you're going to get his attention.

I believe you will agree with me that high-level supervision of the maintenance operation is imperative if flight operations are to be conducted safely. Whether it's the line chief initialing the work accomplished or the top commander signing a maintenance efficiency report, each must assure himself that his subordinates have properly performed their duties. This does not imply that the squadron commander must ascertain that safety wiring is installed correctly by personally checking it; it does mean that he must know, or put himself in a position to know, that his maintenance officer is doing a bang-up professional job in running the maintenance function. If he is, then the commander can relax: the safety wiring will be right.

Look at what can happen when the links in the supervision chain of command get weak and rusty. Maintenance changed the ailerons on a C-47 and in the course of hooking up the chain on the pilot's side, they got it backwards. On takeoff, a wing started to drop so the pilot corrected, which, of course, made it drop even more. The predictable happened, naturally, but at least no one was killed. The investigation disclosed that the line chief had a habit of initialing all the maintenance reports without ever looking at or checking the jobs he was responsible for. Of course the pilot must shoulder the bulk of the blame because the checklist requires him to check for free and easy proper aileron movement. But he was an old timer, and a real busy dealer to boot: he was getting a cup of coffee when the copilot was checking the controls. But on the copilot's side the chain was hooked up right, and "old timer" was flying the machine. And that was part of the trouble—the pilot was flying it. If the copilot had tried to take it, the pilot would probably have broken his arm.

The maintenance people did their job wrong; the inspection people did their job wrong; and the pilot did his job wrong. The weak and rusty links in the supervision chain finally sundered. The result was certainly costly; it might have been tragic. And this was supervision at the working level.

Safety as it applies to the flying business is like a seamless web. It doesn't stop anywhere. However, it is diligent supervision that makes safety principles work, else they become just idle concepts and hollow catch phrases. Supervision for safety goes into the servicing of our complex aircraft, the activities of the support area, the handling of missiles and nuclear weapons, in short, into every corner of our world-wide flying operations. There simply isn't time or space to discuss them all. But before closing, I want to discuss discipline.

It is discipline that gives structure and strength to all our efforts; without discipline, our problems are compounded and our best efforts can never succeed. Let me quote from an article by Brigadier General Seth J. McKee, written for SAC's *Combat Crew* magazine. It is titled "Discipline, The Watchword For Safety," and says, in part:

"To accomplish our mission,"—he's talking about the SAC mission—"we must have safety, and to obtain it we must indoctrinate and reindoctrinate our people, old timers and newcomers alike, in the basic philosophy of discipline. The lack of discipline has many manifestations—sloppy preflighting, poor record keeping and flight planning, inadequate crew briefing, incomplete and illegible flight forms, hurried postflight inspections and write-ups, poor communication techniques, improper inflight crew coordination and control, needless and unnecessary weather penetrations, failure to read safety digests and other publications—all are evidence of a poor state of discipline."

And gentlemen, never were words put together better to describe what I'm talking about in discipline. Education, training and the judicious application of discipline are the most effective tools the commander has for the prevention of accidents. Now notice that I did not include directives among those tools. No one can prevent an accident by directive, although many have tried and some are still trying. Years ago when I was a pursuit pilot, we had had four midair collisions in three days at my field. Our commander came out with an order that there would be no more midair collisions at that field. Did this directive prevent any further midair accidents? We had two the next day.

My old commander was just using the wrong methods because the commander is in a position to know more about safety than any person within the organization. At any level the commander sets the pace for aircraft accident prevention, missile, nuclear, or ground safety. Not that he is the safety officer—Heaven forbid! When I bump into a chap who says to me, "Smokey, I'm the Number One fly safe officer in the organization," I get my prayer wheel and start to spin it, because no commander has the time to perform that job.

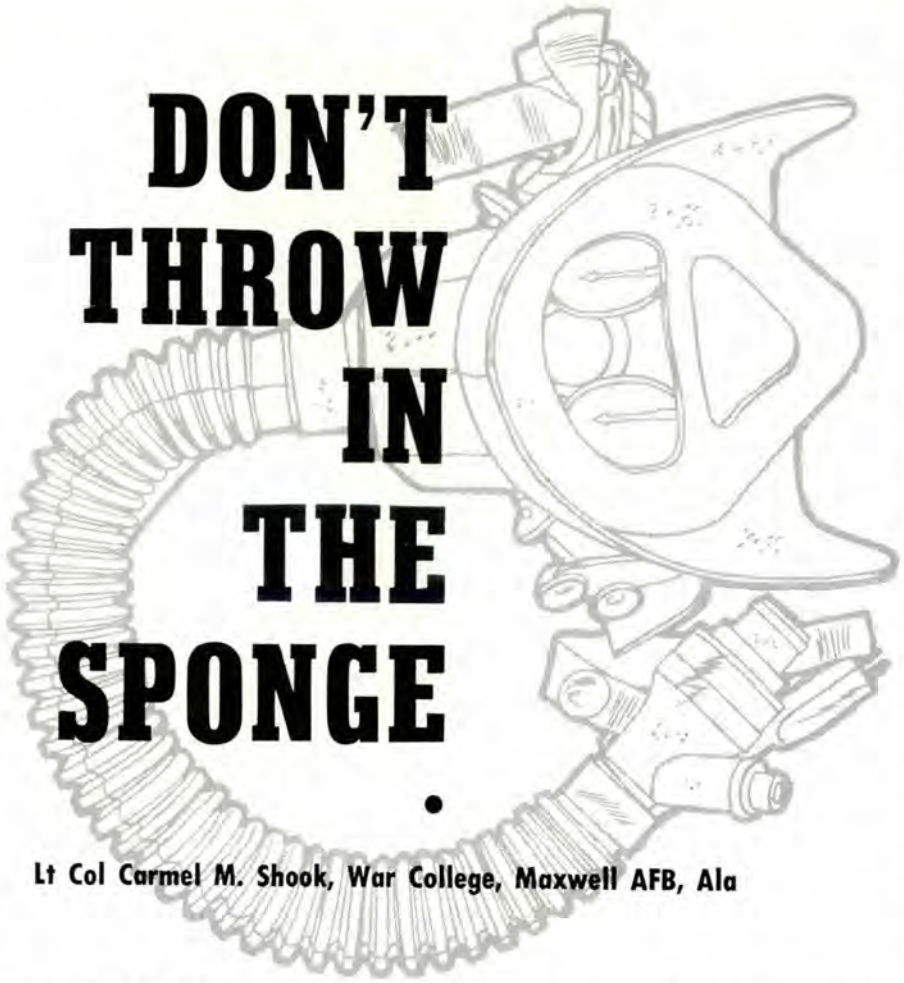
Our accidents rarely result from some great, dramatic catastrophe, but from a series of piddling coincidences that snowball to disastrous proportions. It's a case of getting nibbled to death by ducks. You're not being bitten in half by an alligator and you've got to think in those terms. Take the time to kick the ducks away. That's what flying safety officers should be used for by the commanders. I recommend it strongly.

I think that in 1960 we can see the Air Force-wide accident rate down below 4 per 100,000 hours of flying. I *know* we can see it down below 4, if every commander and every flying safety officer uses his best tactical unit as an example and a standard. If we get everybody to operate as efficiently as the best unit operates, the aircraft accident prevention business is going to be a snap.

And I mean it. ▲

It is discipline that gives structure and strength to all our efforts.

DON'T THROW IN THE SPONGE



Lt Col Carmel M. Shook, War College, Maxwell AFB, Ala

Good old Friday, the favorite day for the students of the War College! The weekend pilots were lined up at the weather office to get the necessary insurance notations on the Form 175. Finally my turn came up and the cheerful Digger-Odell on duty gave me the weather, which wasn't too bad — around 1500-foot broken to overcast with light rain at destination. No strain. Digger said, "You'll be able to top everything at around 33 to 35 thousand."

With this encouragement I proceeded out to the faithful old T-Bird, gave it the once-over, then headed for the wild blue yonder via a VFR-on-top flight plan.

This was one of those old and tired aircraft that loved the dense air of the troposphere—thought I never would get to 30,000 feet. Finally I leveled off just as I reached a sloping front and nightfall set in. As I continued to climb to remain VFR-on-top, I noticed that I didn't feel as good as I usually did in the good ol' Century type that I'd been flying prior to this assignment. I tightened my mask, checked the oxygen blinker, the pressure and all connections. Everything seemed okay. I took several good deep breaths and felt some better, at least for a moment.

I finally got the old T-Bird to 40,000 even though the airspeed would never get above 180 knots. Here I noticed the instruments looked mighty blurred and for some reason I had a terrific headache. This just wasn't right—the most daring thing I had done the night before was to read about 100 pages of the History of World War II.

I rechecked my mask and the oxygen system. Everything seemed normal, at least I thought so. I continued to breathe heavily and even talked to myself to keep my mind on the oxygen system. I still had about 100 miles to go to my destination so decided to try to get a lower altitude, but was unable to raise the Center until I was over my last fix.

After one turn in the holding pattern, the Center answered and the operator seemed completely surprised to hear my voice. I asked for a standard letdown off the fix which allowed for a straight-in letdown off the omni station. For some reason he sent me to the low frequency fix for my letdown. There were thunderstorms all over the area. I was cleared to descend to 25,000 feet en route to the low frequency fix.

As I headed for the low frequency fix I timed myself just in case the thunderstorms attracted the radio compass. They did. But the needle just couldn't figure out which one it liked the best. I knew there was a TVOR on the station but it was off the air.

I switched to channel 14, called for a steer and asked for a DF letdown. By now I had stopped concentrating on long breaths, and things were really hazy. I remembered as I passed through 22,000 I had started my penetration turn, which should have been at 12,000, and I thought how stupid of me, I'd never done anything like this before. I began to feel better and the instruments were clearer now. The letdown and landing were uneventful.

I had a good night's sleep. After carefully checking the oxygen system of the T-Bird and finding everything okay, I proceeded on the second leg of my flight.

I leveled off at 31,000 feet and for about 10 minutes, everything seemed normal. All of a sudden I could feel that same type of a headache coming on. I started the oxygen check as I had done previously, but with one slight change: this time I took my hose to the mask and doubled it up for a blow test. The air whistled right through the exhaust port as if it had no valve. Then I knew that the valve was stuck open. Rather than take my mask off at altitude, I used my glove to seal off the exhaust port and exhaled by force, by pushing my mask away from my face, until I landed.

Upon landing I took my mask off to check it and immediately found the culprit: a piece of sponge rubber from my helmet had become lodged in the body of the exhaust valve and held it partially open. The valve had to be disassembled in order to remove the sticky crumb.

Since this incident I have again found pieces of the foam rubber from the old helmet in the valve of my mask. You can be pretty sure these crumbs are thrown out—way out—prior to flight.

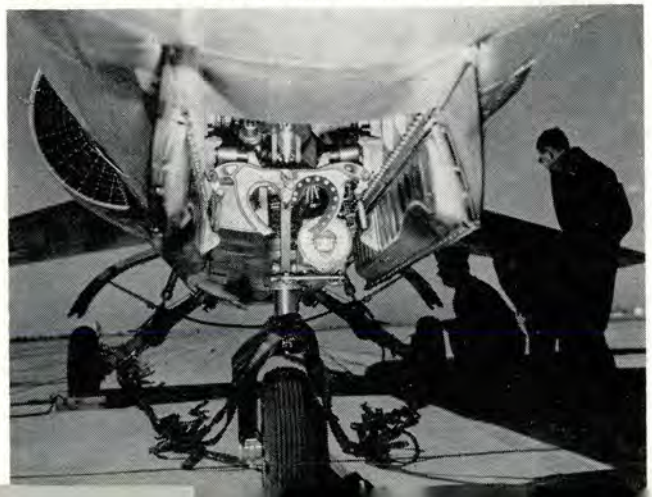
Just wonder how many of our fellow pilots will never read this because they did not see a small crumb? ▲

Above and right. This F-104 was using a barrier for its arrestment. Only one of the main gears caught the arresting cable and it flipped over. The pilot had no canopy, so he crawled out without trouble.

With a nod to the Navy the Air Force is looking for a way to stop errant aircraft. It might soon be in vogue to . . .

"Take the Hook"

Above. To catch the arresting cable before it falls to the runway because of the excessive distance between the nosewheel and the mains, this finger slot is added to the '106 to insure engagement when using barrier. Below, many protrusions invite damage by cable.



In May of 1959, at Edwards AFB, the Air Force began experimenting with the hook and cable method of aircraft arrestment. It had become apparent, as the Century Series fighters phased into the active inventory, that some new system would have to be developed for catching these heavier, faster aircraft when they got in trouble on the runway. The old webbing type barrier system had proved inadequate for the newer jets. Its success rate with the Centuries was sometimes down as low as 40 per cent, although the average was about 50.

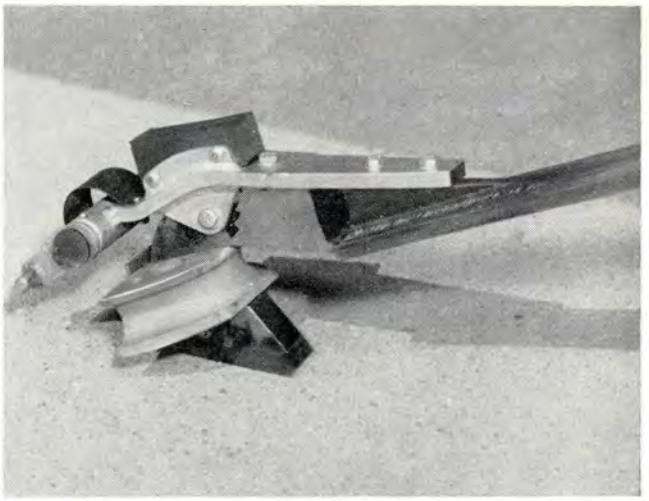
Part of this poor showing was because the barrier system was designed for the earlier jet fighter models whose wheelbase (distance from centerline of nosewheel to centerline of mains) was within the optimum distance of 15 feet. Thus when the nosewheel tripped the nylon rope which flipped the arresting cable up and forward, the main gear had a chance to engage the cable before it could fall back to the runway. With the Centuries, the main gear was so far behind the nosewheel that when the cable was flipped up and forward, it fell back onto the runway long before the main gear had a chance to engage with it.

Even if the engagement was successful, however, there was invariably *some* damage to the aircraft where the cable caught the fairing doors, struts, or other parts. And if just one main gear was caught by the cable, the results were often disastrous. Both of these drawbacks are eliminated by using a tailhook. In addition, propeller aircraft can be caught and saved. This is of course impossible when using the barrier method.

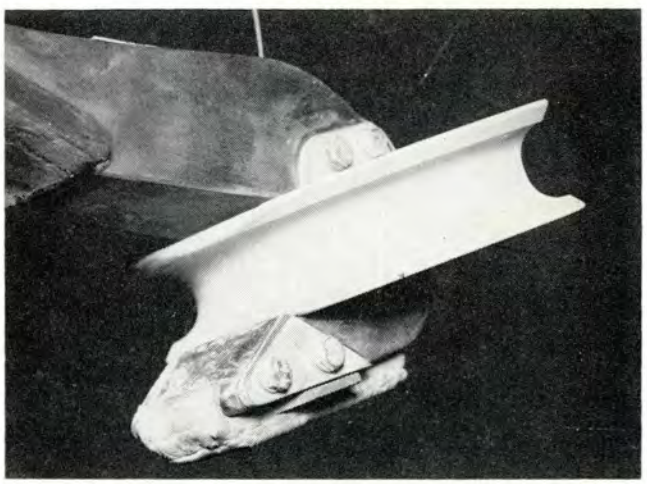
Most important, however, is the engagement success rate. This is now 80 per cent and going higher as hook tech-

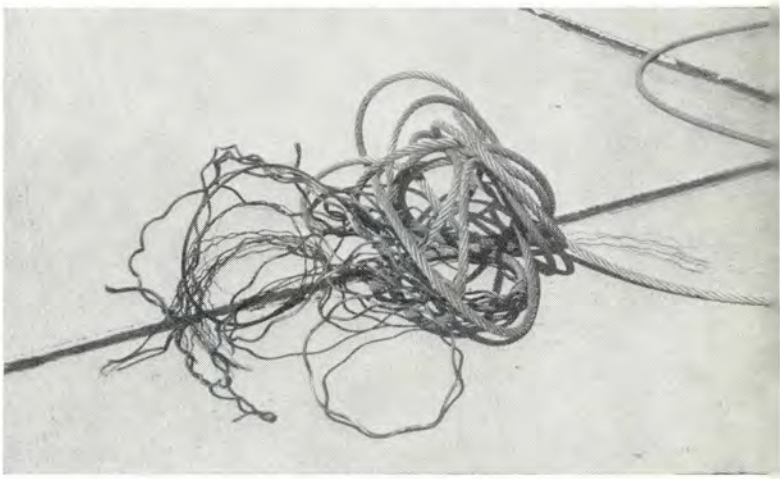
niques and equipment are perfected. Eventually, the Air Force might have all Century fighters equipped with tailhooks. As of now, the F-106 is being furnished with hooks and by February of this year, all '106s at McGuire will be so arrayed. If possible, the Air Force wants an arresting system with a universal capability, for catching bombers and transports, as well as fighters. For example, it is hoped that the B-52 can be fitted with a tailhook. Since the complete tailhook assembly costs only $150 *(approx.)*, and might be the means of saving one of these multi-million-dollar bombers, the development costs of the device are well worthwhile.

The Air Force tailhook is designed to be a one-shot affair. It may never be used during the life of the plane, so it is not a beefed-up device like the Navy's, good for day-to-day use. Even so, if you ever need it, don't be afraid to "take the hook." You'll get stopped—but good! ▲

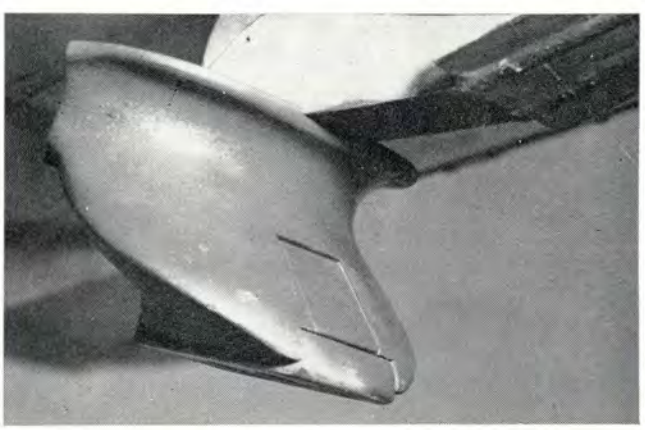


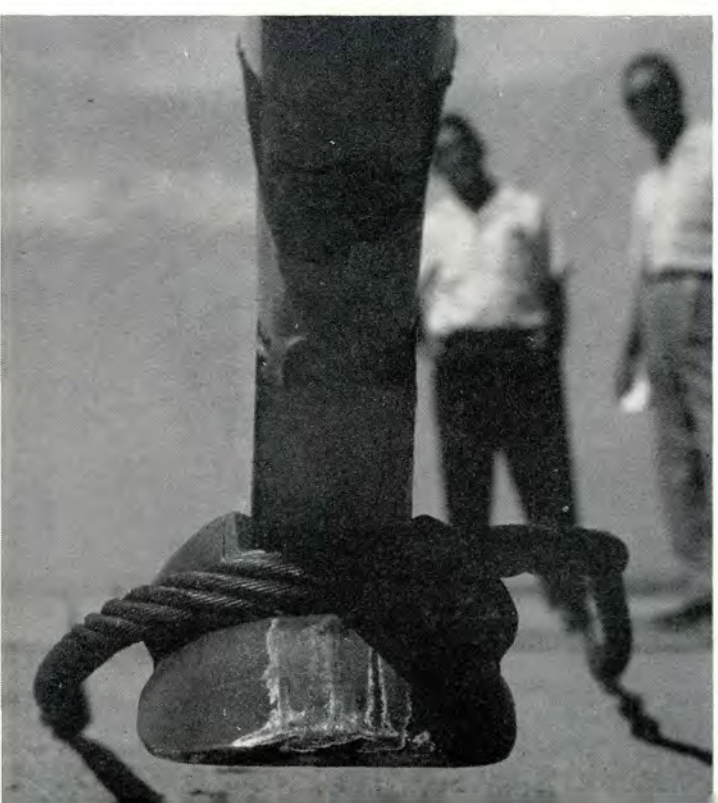
Above right. Prototype hook design showing the arrestor hook shoe which pivots to align itself with the arresting cable. Lower left, close-up of a similar design. If shoe breaks off, however, cable is cut or kinked (lower right) by sharp edges of hook design and aircraft is released.



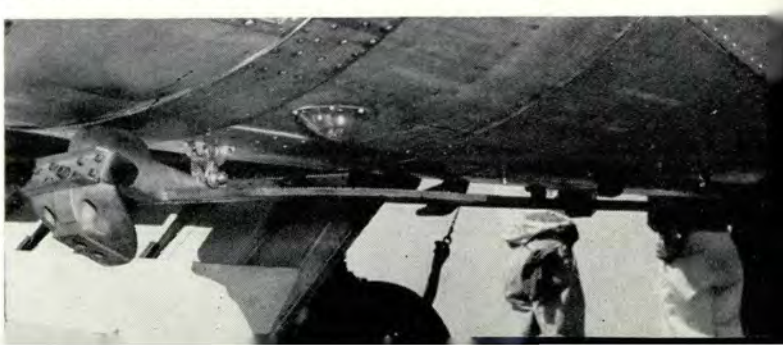


Right, solid Navy-type shoe with stellite foot plate inserted to stop excessive wear when hook is snubbed against runway to prevent skipping over cable. Below, smooth shoe will not cut or kink cable.

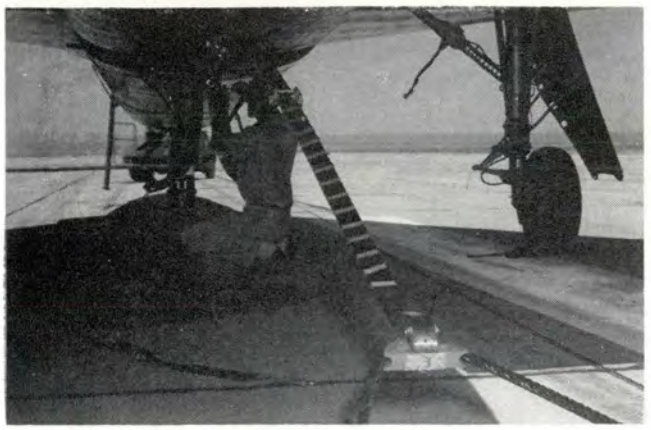




Below. Deployment reliability is insured by use of simple release mechanism. Pilot deploys the hook with a single-pull toggle switch.

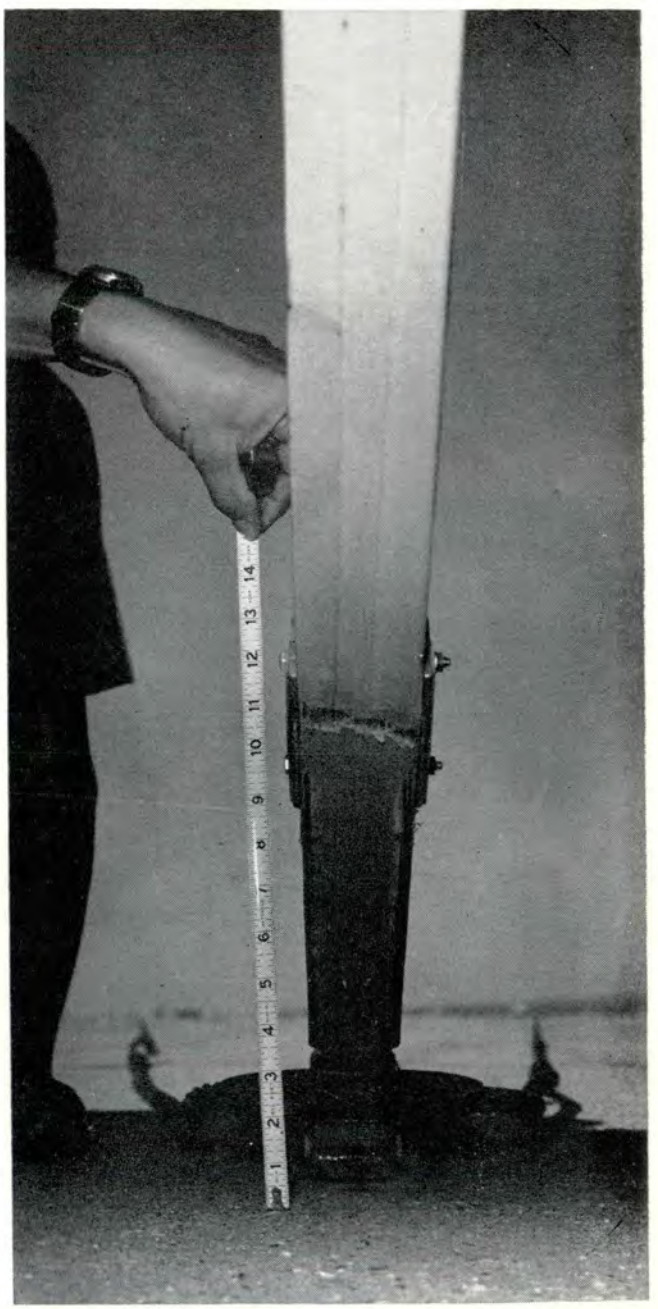


Above, leaf spring hook shank has a downward force component which produces strong snubbing action of the hook against the runway. Below, little danger of missed hook engagement.



Above. The F-84 installation shows a hydraulically operated hook. Below. If arrestor cable is installed permanently above ground, tire casing supports can be used to keep cable 3½-6 inches off runway.

Above. The F-106 makes a perfect catch and yielding elements begin to fly. Below, a prone cable pickup capability is desirable because often the nosewheel flattens the cable and hook passes over, missing completely. Here, the '106 caught cable on rebound for engagement.



Flying Safety begins with
physical facilities and plant from which aircraft must operate.

Built-in Flying Safety

Col. Kenneth W. Schultz, Commander, 3918th Combat Support Group (SAC) Upper Heyford, U. K.

In a remote corner of this SAC base in Upper Heyford, United Kingdom, there lies a scorched and shattered hulk — all that remains of a three-million-dollar B-47 Stratojet bomber—the victim of an accident in 1954. Its chief purpose now is to serve as a training aid for base firefighters. But it has another use: daily it offers mute yet graphic proof of the need for building in safety features, from the ground up, when flying facilities are constructed.

Yes, flying safety can be built into a base—into its taxiways, runways, instrument approaches, traffic patterns, into its day-to-day operations—if you begin early enough. This bomber might have been flying today had the improvements just recently completed at Upper Heyford during a multi-million-dollar overhaul been in existence before the crash that put it out of commission.

A multitude of factors both large and small, tangible and intangible, go into the making of any unit's accident-free flying safety record. Certainly the men who build, maintain, test and fly the aircraft have a lot to do with flying safety. So has the weather—but initially, basically, flying safety begins with the physical facilities and plant from which aircraft must operate. The multiple facets of the problem of building in flying safety are never more apparent to a commander, and never more real, than during a period of construction or reconstruction of facilities at his base. They were driven home to me with full force and relentless urgency during

the past two years of construction here.

In July 1957, RAF Upper Heyford became virtually inactive. Swarms of British contractors and their workmen moved on the 4½-million-dollar overhaul and reconstruction of the runways, taxiways, and flying facilities. The situation proved to be unique in that we ceased tactical operations under the old concept of rotating complete wings on a 90-day TDY basis, and resumed activity some 18 months later under the Reflex concept, with an untried but much rehearsed combat support group organization.

During the interim construction period, each of the factors—weather, men, and physical facilities—had to be considered in the light of their later operational bearing on flying safety. This aspect of our program had to be fitted concurrently into our over-all operational planning. In both cases, problems and difficulties arose which required immediate solution. But the effectiveness of the solutions could only be tested by simulation and dry runs, pending the actual resumption of full operations.

In order to meet our completion date of 1 January 1959, our tremendous construction task naturally became our primary and most immediate concern. Because of the importance of this base in the over-all SAC UK complex, our personnel rose to the challenge, determined not only to meet the deadline, but to make this the finest of all SAC overseas installations.

To insure a phased build-up in the construction program, coupled with simultaneous operational planning and training which would bring ultimate success and leave nothing to chance, a methodical, step-by-step approach was adopted. Under this scheme, staff officers made daily surveys of the build-up of runways, taxiways, AACS facilities, POL *(petroleum, oil and lubricants)* installations, and maintenance facilities. As they noticed areas which were lagging or where improvement was required, the task was assigned to the proper agency and special suspense files were maintained to assure the timely completion of the required work. Checklists were compiled for all portions of the tasks the selected agencies were required to perform. A master commander's checklist which contained

Above left. Construction finished on schedule, the first B-47, piloted by Maj Gen Blanchard lands on new runway. Above. Gen Blanchard, Col Schultz, and British construction officials open the new base. Left. Aircraft on glide path approaches northeast end of runway and overruns. Upper right, safety NCO indicates newly installed traffic lights at runway intersection. Lower right, flight facilities officer briefs new arrival on tower safety precautions.

more than 200 items was closely monitored in order to provide a continuous check on progress.

As I noted earlier, we ceased operations under the old TDY concept and were to resume after construction under the Reflex concept with which few of us were familiar. [*Editor's note: Under the Reflex plan, aircraft and crews—without support personnel or equipment—fly to the Reflex base where all necessary services are provided. After standing alert for a couple of weeks or more, they return to their home stations. The old TDY concept required the movement of all support equipment for an extended period of alert duty away from home plate.*] Consequently, there was only a limited experience factor under Reflex upon which we could call for our planning. To offset this, we called upon the experience of others. Key personnel from this base visited other SAC installations in the United Kingdom which were operating under Reflex, to observe and learn at first hand the duties which we would be required to perform. In this manner, too, we gained a fuller knowledge of all factors and problems involved which would prove invaluable in writing and implementing our own procedures.

This approach was carried even further by sending a team of officers from Upper Heyford to the wing in the ZI which was to deploy here in order that its personnel could be apprised of local situations and factors which might assist them in their planning. Reciprocating, the wing sent a survey team to Upper Heyford to advise us of its needs and insure that planning and work in progress was consonant with its requirements.

What are some of the specific accomplishments which helped us to attain our goal of "built-in" flying safety? Here's one: it was ascertained in checking construction progress that a crossover runway had a 40-to-1 plane gradient at the point of intersection. This was allowable for taxiing but not within established criteria for landing aircraft. That portion of the construction plan was changed accordingly and the runway at this point was completed with an acceptable gradient ratio.

Taxiway shoulders were originally planned to be of pierced steel plank construction, but experience at other U. S. bases in England revealed that this allowed the flint rock soil to blow onto taxiways, causing considerable tire damage and foreign object damage to engines. Since this blowing flint rock might detract from our future capability, engineering contractors were consulted about a possible remedy which would not exceed the cost of the contract. They found a solution: the shoulders were constructed of cement to stabilize the subgrade compacted fill. These shoulders successfully eliminated the hazard potential of the blowing flint rock as evidenced by more than six months of operation with no cut tires or engine loss due to foreign object damage.

Chances of a repetition of the B-47 aircraft accident mentioned early in this article were greatly lessened by the construction of 1000-foot overruns at each end of the two-mile runway. This runway, incidentally, has been designed with sufficient bearing strength to handle the heaviest aircraft in the SAC inventory.

The siting and construction of the GCA area, TVOR *(terminal VHF omnirange)* and DF facility were all completed and tested prior to the opening of the runway. The absence of air traffic was compensated for by enlisting the cooperation of RAF aircraft from nearby British bases in flying practice runs at Upper Heyford while on training missions. This served the double purpose of bringing up the proficiency of communications operators as well as assuring a successful flight check for operations by AACS.

In addition to these Navaids, a new RAPCON center is presently nearing completion. This will be the most modern facility of its kind for servicing air traffic in southern England. Also, new airfield lighting has been installed. This provides an additional measure of safety through improved visibility of the approaches at night or during periods of poor weather. The new high intensity lighting can be seen from much farther away, and to anyone familiar with the heavy fogs and long nights of an English winter, the increased safety resulting from this will be readily apparent.

Coincidental with these physical improvements, traffic patterns were revised both for the safety of crews and for the expeditious handling of aircraft. A happy by-product of this latter move was its marked effect in improving our community relations as it minimized noise and television interference problems.

As our commitment date for the

resumption of operations neared, a prolonged spell of inclement weather threatened to slow construction. While the contractor's agreement allowed him one additional day for each day of rain, he and his workmen shared with our engineers the determination to finish on schedule. When steady rain prevented newly laid asphalt from drying, thus delaying the painting of essential marking stripes, a simple but effective plan was devised. A T-33 was borrowed from another station. As it was towed ahead of the painters, the heat of its jet engine accomplished sufficient drying for the painting to be completed.

A profilometer was used to check the surface variation of the runway, which proved to be not in excess of five eighths of an inch at any point. A Jaguar XK 150 sports car was used to pull a machine for testing the coefficient of friction in braking action at various speeds under both wet and dry conditions. Results indicated the runway surface treatment was superior to that used at any other base in the UK, a potent safety factor in itself. The high quality of this construction work is all the more remarkable because it was completed exactly as scheduled despite the loss of some 40 days because of rain.

Although it was possible to accomplish some flying in administrative aircraft for logistic purposes, the lack of tactical aircraft and a virtual stand-down from our primary mission caused certain problems. Keeping personnel interested and enthusiastic took lots of ingenuity since many were not able to perform fully in their specialties or had to do it on TDY status at other stations. Training to keep technicians at the highest level of efficiency despite operational inactivity was another problem, not unlike trying to keep a football team sharp and smooth without a playing field.

Finally, there were multiple planning problems, notably in the establishment of procedures and methods which might be theoretically correct, but which would remain of uncertain accuracy until actual flying and alert conditions were resumed. To overcome these obstacles and to be ready when SAC's bombers returned to Upper Heyford was our goal and, I proudly add, our achievement.

The number of actions to be taken before and after a tactical aircraft lands at an operational base are many and varied, so it was imperative for us that an orderly sequence of events be worked out in advance of becoming active. Such things as procedures for communications, the follow-me jeep, POL response, base operations, debriefing, filing of flight plans, runway markings, parking plans and so on, all had to be established. Much of this was done before the airfield became operational by simulating landing aircraft with staff cars and running through an actual base reception and debriefing for crewmembers who, for this occasion, were the passengers.

The training of refueling crews was accomplished by having the men tow empty hosecarts onto the hardstands, where they connected the hose to imaginary aircraft in order to get the "feel" and experience of actual refueling. Aircraft and engine maintenance mockups were used to maintain the proficiency of personnel in these areas. Routes for vehicle response to the alert horn were laid out with ground safety and expediency both in mind. Ground safety was a special consideration because the base population includes more than 800 children.

In the event of an accident the actions of the fire department, CBR *(chemical, biological and radiological warfare)* crews, maintenance personnel, and communications for the crash net all had to be worked into a procedure. Unannounced smoke pots were lit at various points on the station periodically. The crash net was then sounded to check that crash procedures were ready and comprehensive enough for any emergency.

Now after six-months-plus of operation, SAC personnel at Upper Heyford can look back with pride in knowing that they had planned well and that the sometimes dismaying days of simulated operation and hard preparation were now paying huge dividends. Upper Heyford IS a safe base—as safe as technical know-how, human skill, and devotion to duty could produce.

We feel it was no accident that this base was awarded the 7th Air Division flying safety award for April after only four months of resumed operations and won it again for the months of June and August. No, these were the end products of our master design.

In other areas, too, the record speaks for itself. Maintenance has the enviable record of the best turnaround or cocking time for its TDY aircraft of any unit in the 7th Air Division, and the on-line commission rate for aircraft at Upper Heyford was likewise the best. Alert reactions have been on a par with SAC's optimum, with steadily increasing traffic count, 485 during the second month of operation. The new alert facility is hailed by crews and visitors as the best they have seen. The satisfaction of Heyford airmen in a job well done is reflected in re-enlistment and extension rates for 1958: 88.6 per cent of eligibles elected to reup or extend for additional service here.

When Major General William Blanchard, 7th Air Division Commander, touched down on the new runway in the first B-47 to land since construction began, it signaled the end of the construction phase; but at the same time it signaled the beginning of an era of operational achievement that will stand with the best in SAC.

Our aim was to build in flying safety. We did that—and with it, we built in efficiency too. ▲

DOWN—

Upper left. YOU are the payoff in the operation just commencing. Retrieve that chute; it may be your home for days. Above, a rudimentary shelter can be put up in minutes with several panels and some shroudlines. Above right, A-Frame tent offers more shelter, takes a bit longer to build. Below, sleeping bag made from chute.

but NOT out!

Above, purify all drinking water. Either: boil for at least 1 minute; use first aid kit purification tablets; add 8 drops of 2½% solution of iodine per quart & wait 10 mins. Rainwater caught directly is generally safe. Right, waterproof matches are invaluable.

You're cold, hungry, thirsty, injured, and alone . . . down in a wild area like Hell's Canyon. What do you do? If you're not absolutely sure, the best thing you could do right now is get a copy of AFM 64-5 entitled SURVIVAL. Your personal equipment section should have one. Read it through, carefully. You will then have taken the first step which may someday help you out of a tough spot. Then, as a big personal favor to your favorite person—YOU—get your chute and take out AFM 64-15 and read it through, carefully. It's a little masterpiece called Survival Uses of the Parachute.

Did you catch the short bit called O-BENTO in the November issue? Better check it, maybe follow its advice. If all else were lost, having a pocket kit like O-Bento might mean the difference between life and death in an emergency.

Then perform a bit of self-administered brainwashing and convince yourself that this warm, comfortable, ever-so-lucky YOU might one day be down in the lonesome timberland with little more than ingenuity, courage, and the will-to-live between the delights of a lifetime and permanent extinction. If it *could* happen to you, get ready for it. So let's review a few things right now—while one of the boys is over cadging a copy of 64-5.

Once you're down, take it easy for a while and get over your shock. Survey the situation; it's probably not as bad as it first appears. Remember, a tremendously efficient Search & Rescue machine is whirring into life to find you. If you are with your plane or can find the wreckage, stay with it; it's a treasurehouse of usable equipment. Moreover, it's a lot easier for the searchers to spot the plane than to see you.

Securing shelter, food, and water are imperative actions on your schedule. Once these are cared for, *prepare your signaling devices for action.* Don't miss chances for identifying yourself to searchers. You may have flares, a radio, chute panels, earth markers, smoke in the daytime, fire at night. Best of all, you *will* have your mirror, a godsend to a downed airman. Learn to use it right.

You may be down, friend, but you're a long way from out. See you at the Club. . . . ▲

DOWN but NOT out (cont.)

Below. Animal food gives the most food value per pound. Anything that creeps, crawls, swims, or flies is a possible source of food. With few exceptions, all animals are edible when freshly killed.

Above, low fire burning all night before a reflector keeps the tent warm without danger of setting it ablaze. Below, each shroudline has 7 to 9 corelines which will make a gill net for catching fish, trapping driven birds or game. Snares & traps also help stock larder.

The airman pictured below has actually been surviving in fine shape for many days now on minimum subsistence rations supplemented by what he could catch or find or kill in the mountains near Stead AFB.

WELL DONE

First Lieutenant
JOHN R. ZARTMAN

302nd Tac Recon Sq, 66th Tac Recon Wg. USAFE ADVON

Lieutenant Zartman was receiving his routine semiannual standardization check flight from the USAFE ADVON Tactical Evaluation Officer for fighter reconnaissance. They both flew RF-84F aircraft. The weather was marginal VFR and the recon target area became obscured by fog. Lt. Zartman requested that the mission be aborted.

At this time, the check pilot told Lt. Zartman that he was feeling weak and sick. The two pilots headed back to base, with Lt. Zartman flying in a chase plane position so that he could closely observe the actions of the other pilot. The erratic movements of the check pilot's aircraft made it obvious that he was hypoxic during this period. He was displaying a serious lackadaisical attitude toward flying the plane. When Lt. Zartman told him to tune in his radio compass, he replied that he did not think it was necessary and anyway, it was too much trouble. Then, through a series of radio transmissions, Lt. Zartman began a steady psychological effort to help the sick pilot regain his perspective and make him re-assume the duty of bringing his aircraft home. It was almost as if he were engaged in gently coercing an intoxicated friend.

Upon reaching the base, Lt. Zartman remained in the chase plane position while the stricken pilot circled the field to use up the extra internal fuel before landing. Three times during this period the check pilot felt sure he was going to lose consciousness. Each time, Lt. Zartman calmly reminded him of some necessary check in order to keep the semi-conscious pilot's mind full of the urgency of flying the aircraft. Finally, under the Lieutenant's close supervision, a safe landing was made. The sick pilot was rushed to the hospital where his condition of weakness and dizziness that had caused hyperventilation was diagnosed as mononeucleosis.

Lt. Zartman's immediate grasp of the situation, his excellent judgment, positive approach and quick application of corrective measures certainly earn him a hearty "Well Done!" ▲

Supervision

DOWN THE LINE

Brigadier General Perry M. Hoisington, II
Commander, 820th Air Division
Plattsburgh Air Force Base, New York

●

The SAC aircraft accident rate in 1949 was a staggering 54 per 100,000 hours flown. By the end of 1958, the rate was down to five. Many people thought this was an irreducible minimum; however, during the latter part of 1959, we were happy to find that the rate had again decreased to slightly over 3. This proves that the rate can be lowered. Our job in lowering the accident rate is similar to the job which faces the professional golfer in lowering his score: it is one thing to shoot par, but it is another problem entirely to shoot down in the 60s. The pro golfer pays a lot of attention to his game, puts in a great deal of practice; this alone makes it possible for him to get the phenomenal scores we see in the major tournaments today. Now, we too are professionals in our game, except that the business we are in is actually much more serious. If we devote the same attention and hard work to our job as the golf pro does to his, we can expect to lower our score as well.

SAC provides each of its air forces with broad policies as well as a great deal of specific guidance in the field of flying safety. This material funnels down through those subordinate air forces to the individual bases which make up the command. Throughout the Strategic Air Command, the policy is well understood that flying safety takes precedence over all other operational requirements. No program receives more emphasis than that of flying safety.

Since a breakdown of all accidents that have occurred within SAC during 1958 reveals a staggering 80 per cent attributed to a combination of pilot and supervisory errors, the most lucrative area for safety improvement is readily apparent. And this is precisely the area where the major safety effort of SAC and SAC's numbered air forces is being made. Having been a member of the Eighth Air Force during the past few years, I can assure you that starting with the Eighth Air Force Commander, Lt. Gen. Walter C. Sweeney, Jr., down through his staff and on down into the field, emphasis has been concentrated in the area of eliminating pilot and supervisory errors.

Units in the field get the guidance and directives required. Safety literature is sound and complete, in good readable form, and understandable to crewmembers. The Commander of the Eighth Air Force and his staff have made a most significant contribution to the safety program by sending out this written material. In addition, they have established an active program of ground and airborne assistance to aircraft in distress. Any base in the Eighth Air Force can get immediate aid in the form of expert technical advice to an aircraft in distress from a multitude of specialists throughout the United States.

A base having an aircraft in trouble immediately contacts the Eighth Air Force command post via the hot line. The hot line is a commercially leased telephone network which interconnects all SAC command posts within the United States as well as certain key overseas installations. Next to the command post telephone is a cardex file listing each aircraft by type and the names and phone numbers of depots, technical representatives, instructor pilots and other specialists for that aircraft.

The senior controller also has a current duty roster of Eighth Air Force Flying Safety Officers maintained on a placard in front of his telephone. One or more of these individuals is immediately available to the command post whenever an inflight emergency develops. The controller places calls for needed specialists and a phone-patch conversation is set up among various experts in different parts of the country. The best possible course of action is established and necessary instructions are then relayed to the pilot experiencing difficulty.

The Eighth Air Force command post was selected as the logical place for these distress calls to be received. The senior controller is familiar with weather and NAVAID status at all possible diversion bases, and can launch a strip alert tanker or chase aircraft if one is needed. As all conversation is recorded, any specialists contacted after the emergency is in progress can be filled in on the situation without omitting a significant detail.

We can measure the effectiveness of this procedure by the number of "saves" we have had utilizing this system. For example, a B-47 drop tank would not feed or drop and the aircraft commander was experiencing aileron power control problems. Lateral control was becoming more difficult as the aircraft became lighter. The specialists, in a phone-patch conversation, agreed that because

During one of the frequently scheduled luncheons, Gen Hoisington gets to know some of his pilots better. During these luncheons Gen Hoisington personally explains his ideas on what is expected of an aircraft commander. Good judgment, realistic training, safety of crew and aircraft are emphasized.

of the slower airspeed required for landing at the lighter weights, there would be a further reduction of lateral control. They advised a landing be made before fuel was burned down to the normal landing gross weight, thus permitting a higher airspeed on final with aileron control available throughout the approach and flare. This was successfully done.

In another case, a C-123 pilot had a control jammed in flight. A quick call to the factory got the manufacturer's technicians who told the crew exactly where to look to find and reseat the cable which had jumped a pulley. The C-123 landed without further problems.

While a great amount of direction and assistance is available to units in the field from Headquarters Strategic Air Command, the numbered air forces and many other agencies of the USAF, there is nonetheless a firm understanding in all SAC tactical organizations that flying safety is a function of command. With this philosophy securely established, the next step is clear. In order for this function to be carried out effectively the Commander must first insure that all officers assigned to flying safety positions are experienced pilots with the perceptive intelligence necessary to ferret out causes, discern potential danger areas, and form logical conclusions based on accurate observation and fact. Understanding of this kind comes only from a wide background and a dedicated application of the principles of safety and accident prevention. Moreover, those selected for flying safety officer positions should be friendly and sincere, able to get along well with people, for they have a lot of selling to do: selling safety and accident prevention. No safety program can be carried out properly unless the flying safety personnel selected are from among the finest officers in the organization. If this type of officer is not available, then the first thing the commander must do is go out and get some individuals who can fill the bill. A mediocre officer assigned to this essential and important duty will produce a mediocre program, regardless of the interest, skill and good intentions of the commander.

Assuming that all officers assigned to flying safety jobs are of the high standard required, the next move of the tactical commander is to insure that his schedule permits frequent contact with these individuals. In short, he must take a leading and most active part in the flying safety program. Personally, I make it a practice to participate daily in projects related specifically to the safety effort. The senior commander in a large tactical organization must utilize the network of talented individuals assigned to flying safety duties to draw all other personnel connected with flying into the program. This includes not only rated personnel but maintenance personnel, supply personnel, tower operators, and all the rest. Everyone must be swept up in the urgency of the safety effort and made to feel that what they contribute is significant to the flying safety program.

During my assignment with the 57th Air Division at Westover Air Force Base, the 99th Bomb Wing, under the very capable leadership of Colonel Dick Lassiter, set an unbroken record of successful B-52 sorties which finally terminated when 1074 missions had been flown without a maintenance cancellation. Establishment of this fine record was possible because the individuals assigned to the maintenance function were so closely aligned with the flying safety program that they maintained aircraft that would roll when scheduled to roll. Sound maintenance is always to be found in the company of an effective flying safety program.

An important practice followed in all units of the Strategic Air Command which contributes significantly to the flying safety program is that of the Wing Commander or the Deputy conducting a clearance review for each sortie. The day before each flight, the crew attends

Supervision Down the Line (cont.)

a pre-mission planning and briefing session. Here, they receive the predicted winds, temperature, and general mission requirements, and so on. With this information, they spend the rest of the day mission planning and carefully checking the aircraft to be sure it is a "goer." At the formal crew briefing, every detail of the mission is covered, the performance data is double checked by another combat ready pilot and the maintenance officer certifies that no safety-of-flight discrepancies exist. Then the squadron ops officer reviews the clearance, again carefully checking each entry. Only then are all clearances ready for the review of the Wing Commander or his Deputy, when either gives the final briefing.

At 1530 each day the Wing Commander conducts his clearance review meeting for the next day's missions. The weather officer, maintenance officer and each squadron ops officer attend this meeting; thus the Commander gets firsthand knowledge of the scheduled missions. He has all the people there who can answer any questions he may have concerning the planned activities.

For example, he makes sure that a crew which may be strong on bombing but weak in refueling is not sent up on a night heavyweight refueling mission without further training and experience. This practice of clearance review by the Commander insures that the entire flying operation is conducted in a professional manner. Without this procedure, the gigantic SAC flying schedule would deteriorate, and the flying safety rate could not be contained.

Prior to making a flight, crewmembers are most diligent in checking the flying safety bulletin board located in each squadron flying safety reading room. On these boards, we have separted operational reports by aircraft systems. This makes for more interesting reading and facilitates checking on specific items without having to leaf through great stacks of reports.

This material is kept up to date and placed in appropriate categories by the squadron Flying Safety Officer. Before this system was adopted, the Operational Hazard Report *(OHR)* files were so voluminous and disorganized that it was practically impossible to find a specific item of concern. Crews felt defeated by the sheer bulk of the file and would rarely take the time to search for a report of current interest. We have learned that not only do the OHR's have to make interesting reading but they must be attractively displayed and easy for the crews to get to. If the crews can be provided with comfortable surroundings in which to study this material, so much the better.

On the day prior to a flight, the crew checks the condition of the aircraft and the maintenance forms of the plane they have been scheduled to fly. This enables the crew to get an early "feel" of the machine and affords them an opportunity to check the status of any maintenance effort which might still be in progress.

It also presents an opportunity to discover items of maintenance which may have been overlooked or are in the process of development. The final preflight on the day the aircraft is scheduled to be flown is thorough and complete. The crew chief assists the flight crew in final inspection. All personal equipment needed for flight is lined up in a standard manner and given a searching check. The aircraft commander reviews emergency procedures with each crewmember. They expect and prepare for the unexpected. They operate on the theory that there is no such thing as a routine mission.

Halfway methods, nonstandard procedures and complacency are unacceptable when flying safety is the goal. Launching a successful sortie represents the ultimate product of the combined efforts of everyone at a USAF installation. There is only one way to do this—the right way. The right way is the safe way. Commanders understand this, maintenance and supply personnel understand this, the crew scheduled to make the flight understand this. If any portion of the equation is missing, a potential accident is nearby.

A most important agency contributing to an effective flying safety program is the Standardization Division. This division is the Taj Mahal of the flying safety program within the tactical organization. The high professional standards required of all crews are established mainly through the efforts of an effective standboard organization. The standboard's function is to make sure that the crews can operate aircraft and equipment safely under all flying conditions and that they are following the flight manual and other prescribed operating procedures correctly. In addition, this division must insure that Instructor Pilots perform their duties in accordance with the highest professional standards.

Each flight crew is required to successfully pass an annual standboard ground and flight check. The crew must also be prepared to receive a "no notice" check at any time. The critiques accompanying these checks are objective. Positive attitudes are developed. If checks are properly conducted, mistakes or flaws in technique discovered by the standboard are seized upon by the crew with a desire for improvement rather than approached with resentment or indifference.

Only the most outstanding personnel available are to be assigned for duty with the Standardization Division. They are relieved from all extra duties, thereby enabling them to concentrate their entire time on checking the proficiency and safe operation of each crewmember.

The Chief of this Division in the 99th Bomb Wing at Westover, Lt. Col. Wynn Moore, is one of the finest, most businesslike officers I have ever met in the Air Force. The entire operation of his activity reflects the ultimate in the professionalism which he represents. Under his direction, individuals accomplish all checks in a standard manner. Crews to be checked are aware of the high degree of proficiency which they will be required to display and take great interest in preparing themselves for a standboard check. Each flight they make represents a step toward this preparation. Colonel Moore's group demands perfection, and the crews know this. In working toward their checks, crews practice and perform according to the book. This represents a major achievement in the flying safety program.

Going hand in hand with the activities of the standboard is the operation of the flight simulator section. In all SAC tactical units, the role of the flight simulator is one of great importance. Operators of this type of equipment are highly trained. Formal schedules are established

to insure that all crews participate. In my units, Wing Commanders keep a daily account of the effectiveness of operation of these trainers. Crews look forward to their accomplishment of a mission in the flight simulator. It is in this type of training that mistakes in procedures and flaws in technique are readily detected and corrected.

Too, the simulator is a good instrument with which to measure the effectiveness of the standboard. If crews perform consistently well in this device, the tactical commander is assured of the effectiveness of his Standardization Division.

During the past few years it has been my fortune to be assigned to bases where the winter months have produced hazards to safe operations. It has always been necessary to have a sound plan for the removal of snow and ice in order that flying schedules might proceed without interruption.

Advance planning and careful indoctrination of personnel are the essential ingredients of success in this enterprise. Operating procedures must be developed outlining the specific responsibilities of the weather, operations and transportation officers, and the installations engineer. Training sessions are conducted to insure that each agency is capable of carrying out its part of the plan. Written examinations are given in order that familiarity with all details may be checked. Snow removal equipment is kept in first class condition, with a stockpile of spare parts on hand.

In any dress rehearsal or actual operation of the snow removal plan, it is essential to establish a control point so that all actions can be fully coordinated. This control point is normally found in the base operations building, where the snow removal plan is displayed in detail on a map of the flight line. Priority areas are clearly defined on the map, with symbols and markings posted to show the location of fire hydrants, drainage structures, refueling pits, and night lighting facilities. Telephone and radio communications nets are available so that all required procedures of the plan can be carried out in smooth fashion. Except for rare occasions, a capable outfit with an adequate snow removal plan can continue safe flying operations despite the winter elements.

The Air Force has gone through a transition from the era when our pilots looked upon themselves as "throttle jockeys" to the present time when we consider our pilots to be aircraft commanders. Unfortunately, this transition has not been made by all personnel concerned. The great number of aircraft accidents involving pilot error which continue to plague us attests to this fact. In almost every incident, failure to exercise the judgment characteristic of a commander is apparent. In far too many cases, the pilot does not understand his role as a commander because he has never had this matter clearly explained to him.

It is essential that the commander of the air division, the wing commander and the squadron commander all know beyond any question of doubt that each aircraft commander in the organization has a thorough understanding and appreciation of what is expected of him in his capacity as a commander. This understanding cannot be attained by scheduling a meeting of all pilots in the theater to "put out the word," nor can the job be done by writing a directive. Only when the senior tactical commanders meet with their pilots in small groups and discuss the subject of the aircraft commanders' grave responsibilities can this necessary understanding be attained.

I follow the practice of scheduling luncheons with groups of from 8 to 12 of our pilots. I initiated this program during my tour with the 57th Air Division at Westover, and I am following through with the same system in my new assignment with the 820th Air Division here at Plattsburgh, with dispersed units at Dow and Griffis. At these luncheon meetings my goal is to make each pilot understand that on the ground or in the air, he is a commander and that at all times I expect him to think and act like one. Good judgment, the common denominator all commanders possess, regardless of rank or size of unit to which assigned, is the keynote of these discussions. At this time I discuss a series of selected accidents which indicate a total absence of the type of thinking I expect from a commander. We all know that it is usually a series of events which build up to an accident, a kind of snowballing effect which places either the aircraft commander or the crew in a position from which there is no return. I emphasize the point that they must not allow themselves to get suckered out into left field. I make it quite clear that they are not to become so fascinated with filling squares on mission assignment boards that it influences their good judgment. The safety of the aircraft and crew should always be the *first* consideration when making any decision. The enthusiastic discussions which follow these luncheons have convinced me that the aircraft commanders appreciate this approach and enjoy the personal attention that goes with it.

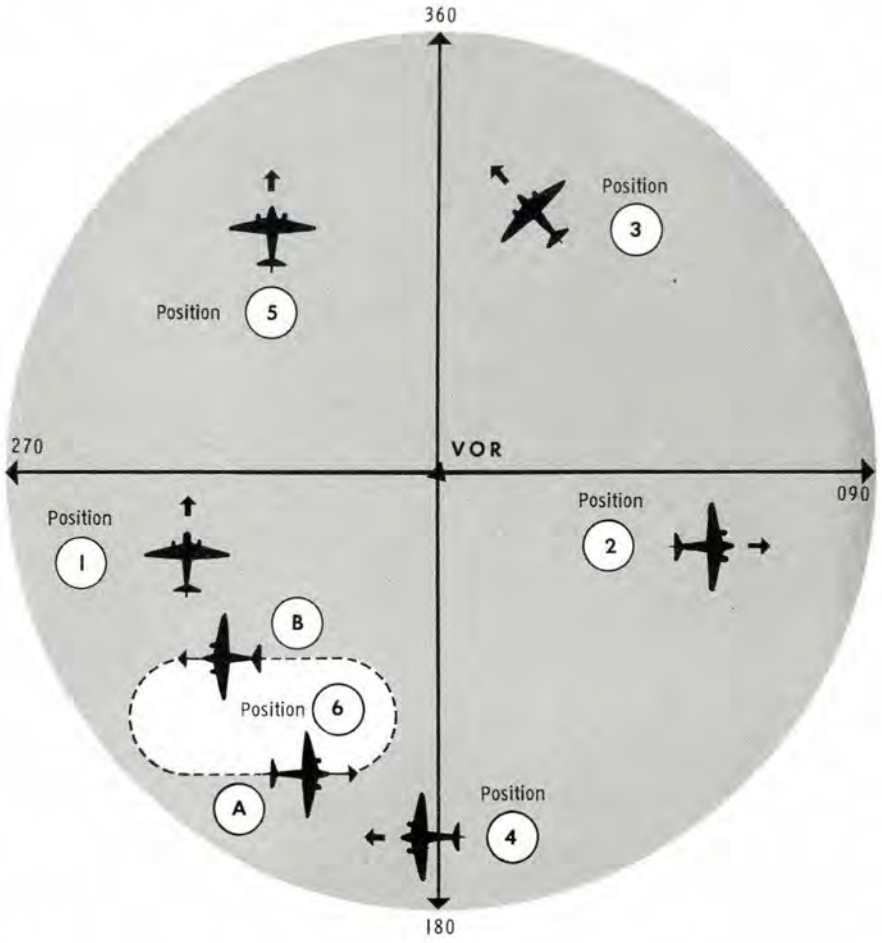
As a tactical commander in the field, I enthusiastically commend the superb job that is being done by the Directorate of Flight and Missile Safety Research in issuing all the directives, procedures, pamphlets, magazines and other printed material required to conduct safe operations. This is probably one of the most professional jobs being accomplished in any business today. Yet, the bulk of our accidents continue to be charged to operator and/or supervisory error. The fault, it is plain, must lie within the tactical organizations themselves, for not selling the product—flying safety.

The top 100 advertisers in our nation last year spent 2¼ billion dollars just to tell us about their products. General Motors alone spent 137½ million dollars telling us about Chevrolets, Olds, Buicks, and Pontiacs. The Coca Cola Company spent 67 million telling us that we still have cokes in the United States and that we ought to drink them. How often do we hear about Gillette Blue Blades, Camel Cigarettes, Ivory Soap, Cheer, Kodak cameras, and that good Gulf that Red Barber reminds us of so frequently? Selling the product is an essential part of any business. The salesman must do his job if the product is to be successful.

Flying safety is a product and it can be sold—that's *our* business. The selling campaign must be sparked by the Tactical Commander with the help of the Flying Safety Officer, who is the vice president in charge of sales. Working together, they must be sure that all personnel in the organization are untiring in their efforts to keep the flying safety program up front where it belongs. If the Tactical Commander and the FSO are on the ball and sell our product, we will not have aircraft accidents. ▲

Think you're a pretty hot ID-249 artist?
Maybe so, maybe not.
Try this test to find out whether or not you're . . .

Vague on VOR?



A/2C James A. Stagner
325th Operations Squadron
McChord AFB, Washington

Not many of you will dispute the fact that a Link Instructor is in a pretty good spot to determine whether or not a pilot completely understands the ID-249 as used in flying Visual Omnirange. A/2C James A. Stagner, Instrument Trainer Instructor, of the 325th Operations Squadron at McChord Air Force Base, has been in his job long enough to observe that several pilots were lacking in proficiency here. His interest and concern prompted him to make up a test to help in the instruction of VOR.

Although it looked deceivingly simple *(and still does)*, more than 30 pilots at McChord didn't find it so easy. The average score was 74 per cent. Only two passed with 100 per cent and one of these men was the officer in charge of the Instrument School.

We've checked the answers closely and they are correct, so if *you* don't get 100 per cent, don't fuss at us. Grab your instrument manual, or better yet, get on over to your Instrument Trainer Section for a little refined instruction. Before you start the quiz, here are a few hints that may help.

• First, there's the Ambiguity Meter *(or To-From)* window — simple —but it is the *first* step in locating yourself on an Omni problem. It tells if the bearing you've selected will take you *to* or *from* the station. It has no connection, however, with the heading the aircraft is flying, so it can not tell you if you are flying *toward* the station or correcting your selected course. The other two parts of the instrument will do that for you.

• Second, you have the DoNut needle. It tells you the heading of your aircraft in relation to the course you have selected. The best way to picture it is to realize that it works off of your Gyro Compass system. With 360 degrees cranked into the course selector window, the DoNut needle is a Gyro Compass. Now, if you turn a heading into your selector window it is the same as turning the compass card to bring that heading to the twelve o'clock *(North)* position. The DoNut is in the same position that your heading needle would be, with the compass card rotated to the selected bearing.

• Third, we have the Vertical needle. With the other two solved, this is the easiest. If the heading of your aircraft will cross your selected bearing, the vertical needle is deflected to the same side as your DoNut needle points. If the aircraft heading will not cross your selected bearing, it will be deflected to the opposite side.

What would the indications be on the 1D-249 if your airplane were in the position shown above? In each case your RMI is *inoperative*, and you must depend entirely upon the 1D-249. Indicate the correct positions for each portion of the instrument listed below for each of the diagrammed situations:

1. Ambiguity Meter (To-From)
2. DoNut Needle ( )
3. Vertical Needle (Rt-Left, Centered)

(See page 29 for answers.) ▲

POSITION ONE

POSITION TWO

POSITION THREE

POSITION FOUR

POSITION FIVE

POSITION SIX-A

POSITION SIX-B

CROSSFEED

LETTERS TO THE EDITOR

From the Army

We have sent you copies of the October DIGEST which contains Dr. Thomas F. Staton's article "Go for Broke." It is an excellent article and will certainly be of interest and benefit to Army Aviators everywhere in reaching a better understanding of the "cause and cure" for aircraft accidents.

Our thanks have been extended to Dr. Staton and now, to you. The staff reads and enjoys your fine publication.

Lt Col Thomas J. Sabiston, CE
Director, U.S. Army Aviation School
Ft. Rucker, Alabama

★ ★ ★

Survival Know-how

I particularly liked the article by Lt. Parsons in the October issue ("Down to the Sea"), and I thought "Familiarity Breeds Content" was good, too. I feel, however, that the methods described in the latter article are superseded and need clarification. We heartily agree with the intent, however, since we have found much of the difficulty experienced with survival items results from the lack of know-how. My comments are in no way an attempt to belittle the article. They are based on present equipment and concepts and are forwarded only as constructive criticism:

"We no longer recommend the use of the Mae West (B-5) life preserver in aircraft equipped with ejection seats. All personnel in aircraft with ejection seats should use the LPU-2/P underarm life preserver. The MA-2 underarm life preserver and the B-5 should be used in cargo type aircraft.

"Individual radios are placed in the survival kit container instead of being placed in the vests in jet type aircraft.

"Loosening the chute harness prior to entry into the water is no longer practiced; nor is it removed after entry into the raft. It can be used in rescue operations and it also provides warmth. All of the survival gear is attached to the harness. For the harness with only one release we recommend cutting the riser without the release.

"For the reason given in the article we do not recommend oral inflation of the life preserver during parachute descent unless a malfunction has occurred.

The latest bailout procedures can be found in Tech Orders 14S2-3-21 and 14S2-2-1. We have found, however, that some tech orders conflict with each other. Perhaps an article on the latest bailout procedures would be beneficial to using personnel?

R. E. Wenrick
Safety & Survival Technician
Warner Robins Air Materiel Area

★ ★ ★

RAF Report

In the September 1959 issue you published an article entitled "Nobody Knows How High I Am." I think you will find, by referring to the manufacturer's literature, that the weight quoted for the Smith's 100,000 ft. altimeter is incorrect.

The output from the electro magnetic pickoff is fed to an external amplifier which uses either valves (tubes to you) or transistors; consequently the total weight of the equipment will depend on which type is used. The total weight of the altimeter and transistor amplifier is therefore only 5.125 lbs. or 8.125 lbs., with the valve amplifier; and both figures are considerably less than the 10.125 lbs. quoted in your article.

Perhaps your readers will be interested to know that this altimeter, known as the Mark 22 series, has been in use for some time in the Royal Air Force.

Flt. Lt. J.F.M. Widmer, RAF
Flight Safety Branch
Hq Middle East Air Force
Episkopi, B.F.P.O. 53

★ ★ ★

Something for Reserves

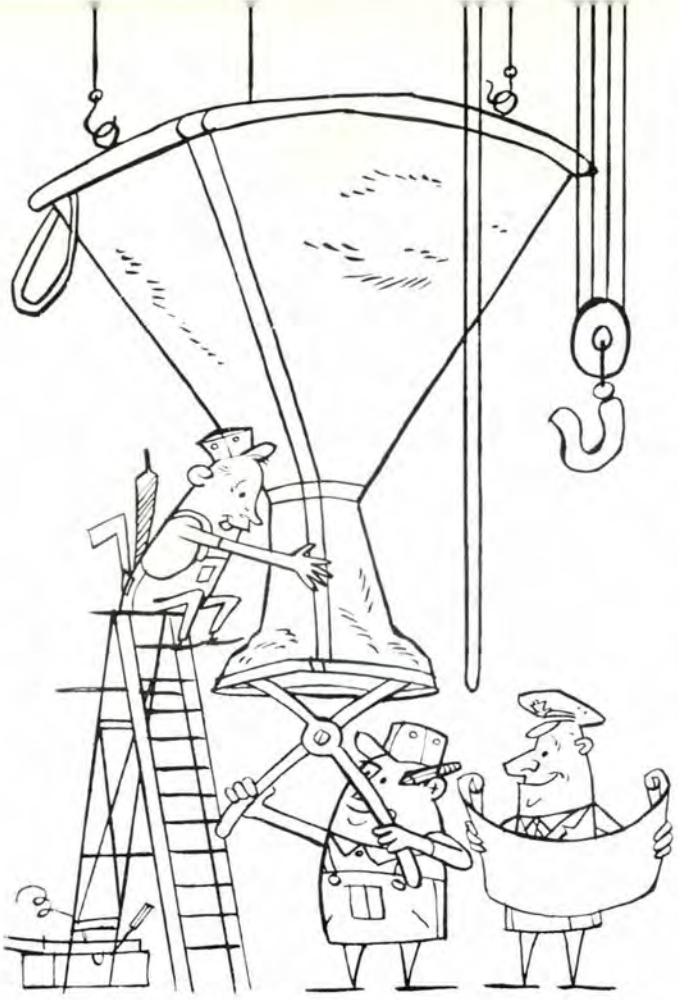
I had the good fortune to attend the 1959 World-Wide FSO Conference in Riverside, and took the opportunity to spend two days at the USC's Flying Safety Officers Course. I certainly learned a great deal. My FSO received something of a jolt on my return. If it was the intention of DFMSR to persuade commanders of the potential usefulness of Flying Safety Officers, then I can say that this aim was certainly realized in my own case.

It is my understanding that quotas are not generally available to Reservists in the FSO Course at USC because of the extensive requirement for these quotas within the active Air Force. I would strongly urge, however, that some effort be made to provide such quotas.

If you consider the total number of aircraft involved in Air Force Reserve troop carrier wings and search and rescue squadrons, you will recognize that this reserve effort represents a very substantial number of people and planes. It may well be that these people (Reservists) are in greater need of expert FSO assistance than those on active duty inasmuch as they do not fly military aircraft as their primary profession. While I think we can take pride in the safety record of the Reservists I think it will be well to try to preserve it by making the kind of information that they put forth at USC available to them. While it may not be possible for budgetary or other reasons to obtain quotas to the regular FSO Course, would it be possible to establish a shorter course, perhaps of three weeks' duration, which would at least cover the preventive phase of the FSO's job?

Col. Campbell Y. Jackson
Hq 514th T C Wg (M) (Res)
Mitchel AFB, New York

Thank you for the kind words, Colonel. A copy of your letter has gone to the officer who oversees the FSO Course. We hope it will be possible to set one up for Reservists.



AACS Analysis Teams — What They Are Doing To . . .

ENLARGE THE SMALL END OF THE FUNNEL

Colonel Frank L. Adams
Commander, Midwestern AACS Region

In his article, "The Small End of the Funnel," (FLYING SAFETY, September 1959) General Doubleday outlined a problem and suggested corrective action by flying units. In order to show continuing emphasis on the problem and what is being done within his own command, we publish this sequel to his article.

Have you ever taken 15 minutes or more to complete a jet penetration and an ILS or GCA approach? Did you ever receive a departure clearance with a restriction to climb to 25,000 feet in a holding pattern? Have you had any trouble locating the end of the runway while making a VOR approach from a facility that is 10 miles or more from the base? If you answer "yes" to any of the above, the activities of AACS Air Traffic Control (ATC) Analysis Teams may interest you. These teams are trying to reduce the number of "yes" answers to these and similar questions.

Normally, an AACS ATC Analysis Team is composed of field grade officers, senior NCOs and a civilian ATC consultant, each possessing a broad aeronautical background and extensive experience in air traffic control. There are five such teams in the ZI and six overseas, each serving a fixed geographical area and sponsored by a corresponding AACS regional headquarters.

These teams work with base operations personnel and flying unit commanders in an effort to develop an efficient air traffic flow system. They analyze controller proficiency, adequacy of operating procedures, air traffic control workshops and tools *(control tower, RAPCON or GCA, communications frequencies and radio navigational aids)*, and the existing air traffic control system.

Upon completion of the analysis the team presents two reports to the base commander. One contains recommendations for immediate improvement of general air traffic control items which, normally, can be accomplished locally or with minimum effort. The other report is a

formal proposal containing recommendations for a complete air traffic control system. This is usually a long range improvement program and may involve reconfiguration of the navigational aids environment and reorganization of the surrounding airspace.

Departure routes are devised that will take aircraft out of the busy terminal area as quickly as possible and permit climbing close to "on course." Other conditions emphasized are:

- "En route penetrations," to allow the pilot to navigate by omni radials to intercept the ILS or GCA glideslope.
- Use of IFF for aircraft identification.
- Expediting departures and arrivals so that each aircraft spends as little time as possible in the terminal area.

An AACS ATC Analysis Team's review of airspace organization may result in recommendations to:

- Remove or relocate a restrictive airways structure.
- Extend the control area in order to provide sufficient controlled airspace for departure and arrival routes.
- Increase the size of existing control zones and establish a requirement for radio communications and control of all VFR traffic within the control zone to secure better protection for high speed jet traffic.
- Permit restricted areas to be used by traffic control during inactive periods. This provides extra airspace for departure/arrival routes and approach procedures.

The matter of NAVAIDS location is of deep concern. When analyzing airspace organization, special attention is given to the navigational aids serving the base, terminal area, and en route system. Just a mile or so difference in the location of a navigational aid can mean the difference between a good air traffic control system or a bad one. Some Air Force bases are "fenced in" by airways to the extent that it is practically impossible to describe efficient departure and arrival routes or en route penetration procedures. Not infrequently, it is found that a well-placed new facility or a more advantageously sited existing one will remove an exceedingly troublesome bottleneck. The resulting increased air traffic flow capability can extend a jet's range many miles.

Maj W. Manby, Chief Flight Facilities Div, and Mr. P. Eisenwinter, ATC Consultant, Midwestern AACS Region discuss rerouting of Victor Airway for better corridor alignment at an ADC Base.

Instrument approach procedures are given a searching analysis. As stated earlier, the Analysis Teams emphasize the use of en route penetrations for recovery of jet aircraft and de-emphasize the use of teardrop penetrations. En route penetrations may be described via VOR or TACAN radials to intercept the ILS localizer course and glideslope or to intercept the GCA glideslope. Such approaches may require an extra frequency change or so en route, but where they can be worked out the result is almost invariably an increase in the traffic handling capacity of the air traffic control system.

Teardrop penetration procedures are, of course, recommended where the en route penetration would be more awkward or inefficient. Analysis Teams may recommend consideration of a wide-angle penetration up to a maximum of 45 degrees if available airspace or obstructions in the area permit. The pilot making his teardrop penetration would be permitted to select any outbound heading within this 45-degree angle which he determines appropriate for his aircraft, considering the wind direction and velocity.

Although few TACAN procedures have been published, they are given careful examination. By 1963, Tactical Air Navigation will be a primary radio navigational aid. TACAN approach procedures and distance measuring equipment procedures are being developed and air traffic control techniques perfected. AACS ATC Analysis Teams have been working on TACAN procedures for several years, but thus far only a few TACAN approach procedures have been published. A more precise procedural control will be possible when the TACAN environment is complete. Our reliance on radar as an air traffic control tool should diminish considerably at that time.

ATC Analysis Teams have come to recognize many limitations regarding the use of radar in air traffic control. Foremost, of course, are the limitations in the equipment itself. While many improvements have been made in radar performance, it still fails to portray all the traffic which may be of concern to the controller and does not tell the controller all he needs to know about the traffic which can be seen. For example, the lack of altitude information on an unidentified target increases the controller's workload enormously.

If a pilot does not see radar traffic which the controller has reported as being "two o'clock, three miles," it is probably because the target is several thousand feet above or below, and not traffic at all in the sense that a collision hazard may exist. But because the controller doesn't have the altitude information, he cites the observed target as traffic. There is little doubt that well over half the radar advisories issued concern targets which are not, in fact, traffic.

In the employment of radar control techniques, excessive use of vectors can cause a pilot to lose track of his position and force him to work an orientation problem or

to request additional assistance when he again starts to navigate for himself.

Procedures which depend upon navigational guidance from the controller through radar vectors are objectionable also because of the excessive voice communications required to provide precise navigational assistance. So much time and attention are required by each aircraft that the total number that can be accommodated in the system is considerably less than need be. ATC Analysis Teams therefore recommend, where possible, the use of procedures which place responsibility for navigation directly on the pilot. Then controllers need only to monitor the aircraft's progress, and thus devote primary attention to providing air traffic separation service with a resulting increase in the number of aircraft the system can accommodate.

Careful and accurate flight planning is, of course, a major element in safe flying operations. At certain bases, on several occasions, ATC Analysis Teams have recommended the use of an experienced, well-qualified Flight Plan Coordinator in base operations. This is visualized as a permanent duty assignment as opposed to the Airdrome Officer concept now used. This specialized officer *(or civilian)* should have a thorough knowledge of ATC techniques, be completely trained in his base's terminal traffic control system, and be familiar with the traffic control system for other Air Force bases within the normal aircraft range of his particlar base. He should help every departing pilot plan his flight, making appropriate recommendations for departure time and route, airways to be followed and en route or teardrop penetration to be used at destination.

The Flight Plan Coordinator would have current knowledge of local and en route weather, air traffic in the area, en route, and at the destination. It would be his responsibility to keep all pertinent information current and immediately at hand and to pave the way for the pilot's entry into the air traffic control system.

No matter what aids progress may bring to assist flying personnel, the pilot still must shoulder his professional responsibilities. AACS ATC Advisory Teams are working for *your* flying safety benefit, but flying safety is a two-way street. You, as a user, can likewise contribute to the effectiveness of the program. When contemplating use of the air traffic control system, you can assist AACS specialists by:

- Requesting the departure route that is best suited to your flight, checking for the most favorable airways to your destination and using the en route penetration provided for you.
- Using VFR Advisory Service and following the traffic pattern recommended at that base for your type of aircraft.
- Giving your AACS controller the practice he needs by requesting practice UHF/DF steers and approaches.
- Working with your GCA unit by practicing precision approaches, surveillance approaches and gyro-out and emergency procedures.

Each GCA controller is required to achieve a minimum of 30 GCA approaches per month, or lose his proficiency. Once controller proficiency is endangered, GCA service must be curtailed. In many cases, IFR operations would be discontinued at those USAF bases which do not have adequate non-radar instrument approach procedures.

We have touched only lightly on many of the problem areas our teams investigate. Improvement as a result of the teams' efforts is noticeable, but it takes time. For example, it took one year to realize airspace action to increase the size of one control area to provide sufficient control airspace for jet penetrations. It took six months to coordinate and publish three en route penetrations for one base. Some USAF base commands are still awaiting results of action which started over a year ago to relocate several radio navigational aids.

Your help is needed. When you discover what you believe is a dangerous or poorly designed approach procedure, an improperly located navigational aid, an ineffective VFR Advisory Service, or anything else that may affect flying safety, by all means do this:

- *Tell AACS about it* through your base or unit operations officer.
- *Tell your* flying safety officer.

Then you will be helping to enlarge the "small end of the funnel."

Left. Since maps and overlays are involved, precision in publication is a must. Team members supervise a draftsman in drawing a detailed map of arrival and departure routes. Right, detailed studies of terrain and adjacent airspace is required. Local area is enlarged to show confliction problems.

ONE WILD IDEA

Major Wallace W. Dawson, Fighter Branch, Directorate of Flight and Missile Safety Research

Every single time an aircraft bashes, the wheels begin to turn, and the inevitable investigation gets underway. If it is a thorough one, it must include a complete exploration of the condition of the whole aircraft and its components just prior to the crash. Wonder how many times investigators have thought, "How nice it would be to have a whole airplane to look at." But then if the airplane was "whole," there wouldn't be an accident investigation in progress.

Invariably, and I do mean invariably, during the course of nearly every aircraft accident investigation, something is uncovered that—while it did not contribute to the particular accident being investigated—could in itself have caused one at some later date. Sometimes the item uncovered might not be a major one. It might be poorly maintained records, an unsatisfactory procedure, poor techniques, nonstandard practices or not going by the book. All right, so maybe these situations would not actually cause an accident by themselves; they still are not as they should be, and if sloppiness in one area is detected, isn't it logical to assume that the disease may have spread? Anyway, the purpose of an investigation is to uncover areas of accident-potential and take corrective action.

So far we have discussed only the activities that occur *after* an accident happens. Suppose, just suppose, that one fine day the FSO decides to pull an accident investigation on an aircraft that hasn't had an accident. Just suppose he "eenie, meenie, miney moes" the list of aircraft serial numbers assigned to the base or flight or what have you. Just suppose he comes up with a bird, chosen at random and actually goes through the motions of an accident investigation, like checking records, systems, components and so on. A lot of trouble, sure. Aircraft accident prevention *is* a lot of trouble. Of course, an FSO with a really vivid imagination could feed in a randomly chosen pilot to this hypothetical investigation. If the FSO should happen to really be in orbit he could even manufacture a "situation" that might involve the tower, GCA, weather, facilities, AIO, mobile, scheduling, briefing, the medics, why go on?

If this FSO were to do this, the odds are pretty good that somewhere along the line he or his assistants would turn up something that needs correction—some area, no matter how small, that can be better—some *thing* that if nipped in the bud *now* will prevent an aircraft accident later on. Happy hunting! ▲

Even C. Z. Chumley has dreams about the future, when, with completely automatic planning, every flight is . . .

JUST AS IT SHOULD BE

Archie D. Caldwell, Operations Analysis Branch, DFMSR

New Years Eve, 1979. Just a few more minutes and it would be 1980 and the tension at the club was growing as 2400 hours drew nearer. C. Z. Chumley, now the oldest active Captain in the Air Arm, U. S. Forces, glowed like an incandescent lamp under the "free form" lampshade he had upon his balding head.

"They just don't make lampshades to fit anymore," Chaunce mumbled between sips of one of those new "isotope martinis." "Why I can remember back at Yuma in the early fifties, we had lampshades that fit. One time ole Hellwege and I were at the club and—."

The chimes from the celestial controlled clock indicated the beginning of the New Year and the shouts of anticipation for it to be a good one made C. Z.'s voice inaudible. All conversation was lost during the minutes that followed. Only by shouting did his wife make the point that it would be this afternoon that the old master had the scheduled courier run to Space Platform 438, then after the audio-video tape messages were dropped off, a circumlunar training flight for the benefit of some new interstellar navigator trainees.

"Come on now, you know how long these runs take and how tired you get even on a routine one like this." Chaunce's better half was forcing him under protest out of the club and on to the sidewalk.

"Milk-run, smilk-run," Chumley blurted. "Even with one hand tied behind me I can get that ole space freighter to escape velocity. Now if they'd just let me get my mits on one of those new photon engine jobs I'd really show 'em a thing or two, maybe even—."

Mrs. C's hand across her spouse's mouth shut off the flow of words. Seizing the opportunity she forced two Purebos tablets *(like Serutan)* down C. Z.'s gullet. Chaunce coughed, then swallowed.

"That, my love, was a very dirty trick, and just when I was beginning to feel like my old self again. Sometimes I think these medics have gone too far in this pill development. And the least you could have done is to have given me only one so I might at least have a slight head in the morning."

A cold stare and a raised eyebrow took the place of words for the reply. A section of the new "conveyor-sidewalk" halted in front of the pair. As they stepped on, Chaunce dialed their home number and the section sped them to their underground housing unit. Chaunce used to like it better in the old "Jag" coming home from the club. The thoughts quickly passed after taking a SLEEP tablet and the equivalent of eight hours of deep sleep were accumulated in half that time, through the efforts of the medic pillmakers.

After breakfast, Chaunce climbed on to the "conveyor-walk," kissed Mrs. C. on the forehead, and dialed the number for the launch pad operations. In front of ops, Chaunce looked at the old crate someone had mounted on a pedestal and chuckled to himself. A plaque on the base read, "X-15 —The First of Many Steps." "Boy, if we had only known then what we know now, we'd have had everything in a bag with the string pulled tight."

Inside ops, C. Z. was joined by Sam, his reg'lar co-helper, the rest of the crew and the navigator trainees.

"What bird we got, Sam? Is everything in readiness? Can't keep those heavenly bodies waiting."

"I think it's old 661 again but will make sure. Might as well get the clearance and other data at the same time too," Sam replied as he moved to a compact electronic data processing machine. He fed in a tape coded: "CHUMLEY, C. Z. 1/1/80 661, CIRCUM, 348, STUTRAIN." The machine made a humming noise for 10 seconds and then stopped. C. Z. opened the top and took out the completed spacecraft forms, weight and balance, flight plan, en route procedures, fuel loading, ETD and ETA, perigee, route asteroid count, automatic flight control tape, and so forth.

"Sort of takes the fun out of flight planning, doesn't it, Sam? No more matching wits with the A.O., no more cheating on the fuel reserve so we could list an alternate, or trying to sneak off in zero-zero with an expired instrument ticket. No poring over charts and data for hours before you could even file. Nope, just no fun at all anymore."

"You're right, Cap'n. But just think how much safer it is now. There hasn't been a spacecraft accident in over three years. Those scientific boys have taken all the guesswork and chances out of this heavier-than-air business. It had to come some day."

"Maybe you're right, Sam, but I sure get nostalgic when I think of the old days. Did I ever tell you about the time I—."

A uniformed guard halted the group short of the space freighter. A portable TV camera sent the faces of the group through a closed circuit to the security office for positive identification. C. Z. gave the ident boys a Barrymore profile. "This tears the hearts out of the secretaries up there. Gad, if the movies had only played their cards right, things would have been different, I'll wager."

Inside the freighter all hands slipped into their pressure suits, took stations and generally prepared for the blastoff. Sam turned on the TV transciever for the countdown.

"Get Huckleberry Hound, Sam," C. Z. chortled. "I'm tired of looking at the same old face for this 4-3-2-1 business."

"T minus five minutes," the face on the screen said.

Chumley inserted a small roll of electronic tape into a box marked "Autopilot" and settled down into his command chair. "Flip the 'Auto' switch 'On' Sam, we're about ready to go."

With the flicking of the switch, the electronic impulses on the tape were starting to be picked up. These contained all necessary data for the flight and return, and as there was a specific tape for each route and destination, all that was needed to make a perfect flight to any location was the appropriate tape. Pilots and crew were aboard only to set the machines in motion, take care of emergencies, deliver communications and run flights for those receiving training in the more advanced fields.

"Thirty seconds," the same old face said.

"Everyone take your anti-G pill. From here on we're just along for the ride. Say, Sam, remember that time last year in that old bipropellent ship when I put the wrong tape into the autopilot, and we ended up on that planet with 50 females to every man? It was a shame the way they destroyed the tape when we got back. Maybe I could splice another one—?"

"Five-Four-Three-Two-One—Fire!"

Old 661 belched flame, shuddered, then rose slowly from the pad. Accelerating rapidly, it started on its flight, controlled through the results of years of scientific research, failures, triumphs and sweat. Just another routine trip which would be free of accident or human error.

"Just as it should be, Sam," Chaunce was yelling above the roar of the engine. "Just as it should be."

★ ★ ★

"What are you yelling about?" C. Z.'s wife was standing by the bed. "You must have been having a nightmare."

"Huh?" Chaunce leaped out of bed and stared through bloodshot eyes. "What day is it?"

"First day of the New Year. Friday. One January. Nineteen Sixty."

"Nineteen *Sixty!* It should be Nineteen Eighty."

"What are you mumbling about?" Chumley's better half almost dropped the coffee pot. "You could have thought almost anything last night. I had to practically blast you out of the club. Better get your things on and some coffee in you. You've got that U-3 courier run to Sacramento this afternoon plus that hop with those trainees this evening. You'd better start to get your things together so you can start planning your flight. You know how long it takes you."

Chaunce piled route charts on the dining room table and while downing his coffee and toast, made heavy black lines indicating his intended flight path. He made some rough estimates on speeds, altitudes and courses, and jammed the whole works into a well-worn briefcase.

"Shouldn't be long, my sweet, just a routine flight for the world's greatest astronaut. Made the run hundreds of times before."

C. Z. planted a kiss that was wide of the mark and hit the "Jag" on the run. In 2 minutes and 04.32 seconds he was in the operations parking lot. Sam was waiting, as always.

"You got everything ready, Sam? We got to make tracks. I hate to miss a wheels-up time."

After frantic minutes of confusion on the ground the U-3 was serenely cruising on top of a solid undercast. Minutes ticked into hours and hours piled up quickly.

"S'funny, no one else is up today. Haven't heard a word over the radio since we passed the Winton-Whittier Marker back a ways. Bird dog says straight ahead but we should be close to on top of the base right now by my calculations. See if you can raise someone on 'Guard', Sam."

"I'll try, Captain. You suppose those 60-knot tailwinds were stronger than forecast? Can't seem to raise anyone and look—that bird dog isn't working!"

"Well these fuel gages *are* working and aren't waiting for anyone. You'd better get someone in a hurry or else—*what?* 60-knot tailwinds??" Chaunce pointed to his computations. All figuring in flight had been on 6 knots but the original figure was 60. There was no doubt. The world's greatest heavier-than-air pilot turned a light green. "I'll bet we've overshot a little, but have no fear. Your old dad will—."

Chaunce's words were cut off as the clouds below parted. A vast expanse of blue spread beneath them.

"One eighty, quick, Sam. Honolulu is expensive this time of year," C. Z. shouted. But there was no need to shout as the engines had suddenly grown quiet.

The pair hadn't spent ten minutes in the raft when a tuna boat out of 'Frisco picked them up. Dirty and smelly as that boat was, it was solid. The only distasteful part was the Skipper who kept shouting, "Hey—A look a'here what-a kind-a fish I catch."

C. Z. and Sam sat on a folded net looking at the sea. It was some time before Sam spoke up. "You know, Captain Chaunce, I guess that the state of the art of building airplanes is just about perfect. It's we humans who are the weak link in the whole chain of things. A misreading of a number, the forgetting to take weather into consideration, the careless act of kicking off a switch in the cockpit. Just plain overestimating our own abilities to do things simply because we've done them before. I guess it will be quite a while before the engineers and the rest of them make a chain without the human link. You know, make everything automatic and all that, but I think it will come someday, don't you? Hey look! Here comes an Air Rescue plane."

"Just as it should be, Sam. Just as it should be," Chaunce yelled! ▲

List

During an inflight emergency in a B-47 aircraft, the navigator successfully ejected at approximately 9000 feet and suffered only minor bruises. He did, however, lose all survival equipment. His MD-1 survival kit, snapped to the parachute harness retaining rings, was lost during ejection or descent.

The navigator stated that, following ejection, he encountered difficulty in freeing himself from the seat but was jerked free upon opening shock of the parachute. During descent he grabbed for the aerial deployment release of his survival kit and discovered the whole thing was missing. He felt for the accessory "V" ring attachments, thinking perhaps they had torn loose. The left "V" ring and complete left hand kit sling strap were still attached, as were the right "V" ring, the kit strap, plus the complete kit harness sling.

It was concluded that the most probable cause of the kit failure was that the left hand sling strap was *improperly* rigged through the attachment buckle, thus permitting it to slip out. Then, the right hand sling strap, which was still attached to the chute, apparently pulled the kit harness sling through the survival kit container cover. This released the kit.

Obviously, this calls for a recommendation or reminder, that all kits be inspected for *proper* rigging of the parachute attachment sling strap through the kit attachment buckle. Inspection on the ground might be easier than at 9000 feet up!

During preflight by an aircrew at one of our B-52 bases, a weather simulator *(ground operating airconditioner)* was attached to the aircraft. The windows, of course, were closed.

The ground crew was instructed to close the navigator hatch in order to check the light indicating "hatch not locked." The cabin was now pressurized. Without making sure it was depressurized before reopening, the pilot ordered the hatch to be reopened. With an explosive force the door opened, injuring the right forearm of a ground crewmember. Fortunately, this was the only injury but it should be a reminder to both ground and aircrew members to watch out for cabin pressure, before opening the hatch.

"Home of The Great White Forest" could very well be part of the USAF roadsign at our South Pole base. Like some of the other stations in Snow White areas, one of the dangerous phenomena encountered in flying operations in polar regions is the "white out" which causes the sky and earth to blend, eliminating the horizon and with it a base upon which to estimate depth perception.

Specialists of the 1710th Aerial Port Squadron have solved the problem by importing 50 pine trees to be planted at the approaches to the ice runways at McMurdo Sound, Antarctica.

Recent information from Headquarters USAF is that paragraph 40B of AF Regulation 60-16 has been deleted. An alternate airfield will be listed on the Form 175 for *all* IFR flight plans.

Some of the older USAF aircraft still are equipped with Marker Beacon Receivers RC 193 or RC 193A. Although no operational complaints have been received, these receivers were declared obsolete by WADC when it was determined that they are not capable of rejecting television broadcasts on Channel 5. Misinterpretation and its resulting confusion due this potential hazard can be completely eliminated if pilots monitor the audio signals as well as the visual, from marker beacon receivers.

Many units are now developing VFR letdown procedures similar to the IFR kind. These procedures are designed to prevent midair collisions near airdromes, and to assure better control of all air traffic. These VFR letdown procedures are rapidly becoming essential, especially at airports with joint civil-military operations.

Tranquilizers—The Aero Medical Section of WADC recently completed a study of the effects of tranquilizing drugs on stress tolerances. Briefly, the tests indicated tranquilizers do reduce stress tolerances and that ". . . if a situation does demand tranquilizers, the airman should be removed from flying status while he is on the drug."

In more detail, here's what they say: "The practice of giving tranquilizing drugs to flying personnel is to be decried; the authors do not mean to condemn the drugs as such, only to condemn the combination of the drug and the flying situation. The dangers are several. The reduction in the capacity to compensate for stress is real and has been shown to extend even to mild-to-moderate reductions in available oxygen. This should be anticipated from the 'autonomic suppressant' group, but is shown also to include the 'central relaxant' group. This latter group, containing the meprobamates (Miltown, Equanil), represents the real danger because of its little-recognized side effects."

A news item, not exactly new but still important, is that Lockheed has produced its last T-Bird for the Air Force.

Since first produced in 1948, we have bought 5,691 of these "trainers." Present inventory shows about 3,066, and these have to last us for a long time. When a T-33 is bashed for good, there won't be a replacement into the inventory. What do you say we all try to fly the bird the way it is supposed to be flown—professionally! If we do, we can have these little ladies around for a long time.

. . CROSSFEED (continued from page 21)

And From PanAm

Let one Airline pilot express appreciation of your fine magazine. Frequently one of your high-calibre articles hits a nail right on the head for us as well as for Air Force personnel.

In a couple of hours I shall be taking off for Sao Paulo, Brazil, where the runway resembles nothing so much as an aircraft carrier with a fatal overrun no matter what runway is in use. Actually the airport is just a truncated mountain top with a two-hundred-foot cliff at the runway ends. The article, "The Long and the Short of It," page 16 of your October 1959 issue, seems to be an excellent one on landing roll, and furnishes me a good refresher for the landing at Sao Paulo. I am sorry that the author of this article from "Approach" is unidentified. One suggestion I should make is that more emphasis be placed on the paragraph headed, "Get her down, boy." This was the main point of the Flight Safety Foundation's "Pilots Safety Exchange Bulletin 56-110," dated November 30, 1956. The point of becoming groundborne as early as possible in a critical landing operation—short of an undershoot—can not be overemphasized.

Again, thank you for production of a very helpful publication to civilian as well as military airmen.

Capt. C. W. Karraker,
Pan American World Airways
Latin-American Division, New York

The kind words are most welcome. Glad you agree that this needs to be said often. We think some of the young pilots will be impressed that an old Pro is never too old to read and learn. Thank you for the boost!

★ ★ ★

Well Done?

Regarding your request for suggestions for story material, I have one—and its negative—which I've felt strongly about for some time now, and since you've asked me, here it is. It's about the "Well Done" award in *Flying Safety Magazine.*

To put it bluntly—and perhaps tactlessly—I think your "Well Done" column has probably been responsible for more deaths and injuries than any other one psychological factor present in the flying environment. Consistently, you feature "feats of flying" that had they been *unsuccessful* would have brought out remarks we hear all too often, like, "Why didn't the so-and-so get out while he still had altitude?" Or, "You'd think that he had enough experience to know he should have gotten out."

We had a young pilot who, on two or three occasions, brought back airplanes from which he should have ejected. While I am the last person to argue with success, the fact remains that this young pilot was made somewhat of a hero on these occasions. Shortly after that third save he flamed out a Super Sabre type, couldn't quite make it to a field, and died in the attempt.

When you glorify the fact that some young officer who, with low flying time combined poor judgment with exceptional skill and luck, has brought one in, you've encouraged all of us—even those of us who know better—to try the same thing.

In short, if you want a concrete suggestion, I recommend that you print no more "Well Dones" which involve dead-sticking Century Series fighters.

Certainly the few aircraft which have been saved this way do not begin to pay for the loss of some very fine officers who have died trying it. Whether or not they are encouraged, too many pilots will continue to attempt to dead-stick Century Series fighters. However, I think that we are at the point of aircraft perfection and limitations that this should no longer be encouraged—perhaps even actively discouraged.

Come to think of it, I should have prefaced my remarks by qualifying myself to speak. I am a current Century Series pilot with more than 2000 hours fighter time and 200 being in the F-100. I've already survived one bailout from the '100 which luckily, was not a situation which gave me a choice. If I had had a choice I might not be here to write this letter because I would have been thinking that "If some 500-hour pilot could do it, so could I."

Lt Col F. D. Henderson
Director of Information Services
Hq APGC, Eglin AFB, Fla.

Col. Henderson's point is well taken and recognized here in DFMSR. For some weeks now the Board of Selection has been instructed to rule out those feats, however skillful, which bring up the question of doubtful judgment. These you will see no more in the "Well Done" pages.

★ ★ ★

Speak Slowly, Please

A cap off to M. T. Deen *(Crossfeed, August 1959)* on surface station people speaking more slowly and distinctly when delivering clearances.

On occasion, exasperated in some dim cockpit I have hollered the thing back at them as fast as *I* could, and then listened with grim satisfaction to the "er—what did you say!" But then everybody loses.

Once in a while we need to remind ourselves, all of us, that we're not up here because they're down there. They're down there because we're up here!

Maj. E. E. Hurst, USAF
Det 220 AFROTC
Purdue University

★ ★ ★

Thank You, Mr. Smith

Your fine magazine provides much information that normally would not be made known to us. These articles, plus a little thought on our part, will go a long way towards the goal of a "zero" accident rate. I find the articles such as "Desk Jockey" *(April 1959)*, and "Beware the Dog Days" *(August 1959)*, do a lot towards making many people think twice about what they are doing.

The knowledge of the mechanics of flying safety is essential to all flying personnel. Although Cadets get to practice good safety habits very little in the air, once the knowledge of these good habits becomes known, they can be practiced to a greater extent when it does become necessary. Please continue those fine articles which are so important to all flying personnel.

C/SSGT Robert E. Smith
50th Sq US Air Force Academy

Answers to 1D-249 test on page 20.

Number	To-From	DoNut Needle	Vertical Needle
1.	From	→	Right
2.	To	↓	Right
3.	To	↘	Right
4.	To	←	Centered
5.	To	←	Right
6a.	To	↑	Left
6b.	To	↓	Left

"Hmmmm . . . now let's see . . . above 29,000 feet odd . . . plus 4000 feet . . . below 28,000 to 24,000 feet . . . 000° to 179° etc. . . . please no violations . . . no violations . . . IFF on at . . . change altimeter setting at 23,580 feet . . . "O" second lanyard off at 5000 feet . . . squawk normal after takeoff . . . go to mode 3 if VFR/VFR on top if radar flight advisory is provided for civil air carrier flights . . . no violations . . . no violations . . . ATC clearance required if VFR when penetrating non-radar etc. . . . do I have my required departure frequencies . . . and how about those discrete frequencies . . . got to make sure I have those . . . please, no violations . . . no violations . . . aircraft is on "A" Row . . . was it 236 or 623 . . . if Abilene VOR is off the air what will be my alternate route structure . . . what was that temperature deviation on my climbout . . . wonder if I wrote down the altimeter setting of my destination . . . Hmmm . . . I wonder if this trip is really necessary!"

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Thank you, Major R. W. Hall and 1st Lt. R. D. Bales, Webb AFB, Texas.

Don't stick someone's neck out...

OPERATIONAL HAZARD REPORT
(Indicate recommendations on reverse)

ANONYMOUS ☐ YES ☐ NO

TO: Flying Safety Officer	**FROM:**
LOCATION OF OCCURRENCE/HAZARD	TIME OF OCCURRENCE: DATE; HOUR; ☐ DAWN ☐ DAY ☐ DARK ☐ DUSK

IF HAZARD OCCURRED WHILE IN AIRCRAFT, COMPLETE THE FOLLOWING:

DEPARTED FROM	DESTINATION	MISSION
ORGANIZATION AIRCRAFT ASSIGNED	AIRCRAFT: TYPE; MODEL; SERIES	
CLEARANCE: ☐ LOCAL ☐ VFR DD 175 ☐ IFR DD 175	COMMUNICATION DIFFICULTIES: ☐ YES ☐ NO	ALTITUDE; WEATHER CONDITIONS

CREW POSITION: ☐ PILOT ☐ CO-PILOT ☐ INSTRUCTOR PILOT ☐ NAVIGATOR ☐ ENGINEER ☐ OTHER (Specify)

PHASE OF FLIGHT: ☐ PRE-FLIGHT ☐ STARTING ☐ RUN-UP ☐ TAXI ☐ TAKE OFF ☐ CLIMB ☐ CRUISE ☐ DESCENT ☐ LANDING ☐ POST FLIGHT

DESCRIPTION OF OPERATIONAL HAZARD

REPORT ALL HAZARDS TO FLIGHT ON AF FORM 457

•

(No Signature Required)

DATE	SIGNATURE OF REPORTING PERSON (Optional)

AF FORM SEP 58 457

GPO 863913