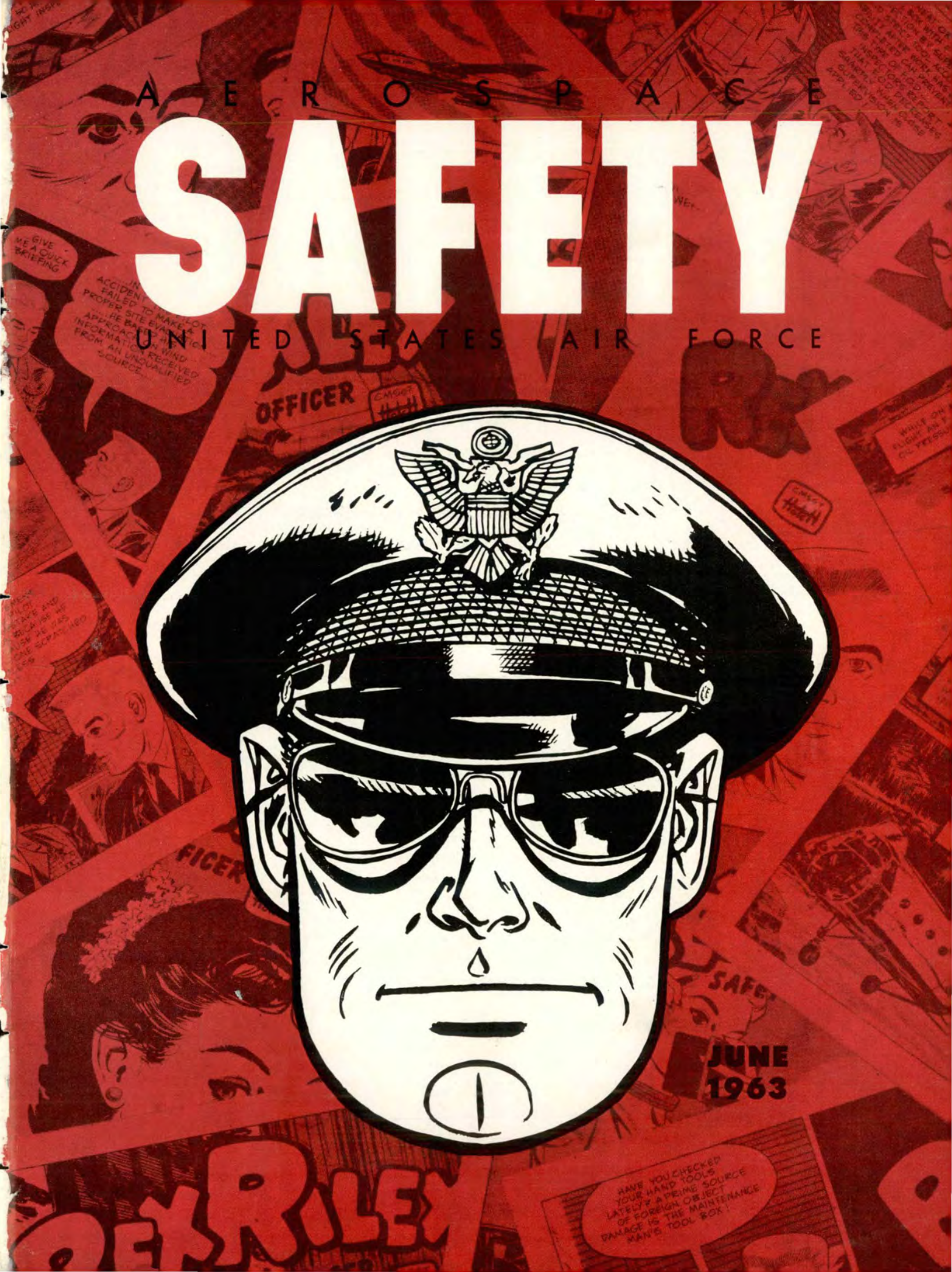
AEROSPACE

SAFETY

UNITED STATES AIR FORCE



JUNE 1963

ATC TOPS IN FLYING SAFETY — The Daedalian Flying Safety Trophy for 1962 was presented by Lt. Gen. William H. Blanchard, left, The Inspector General of the Air Force, to the Air Training Command, represented by Maj. Gen. Henry K. Mooney. The award came at the national convention of the Order of Daedalians May 4, at Kelly AFB, Tex.

ATC Wins Daedalian Trophy

Outstanding improvement in accident prevention has earned the Air Training Command the coveted Daedalian Flying Safety Trophy for 1962. ATC was considered as having the most effective aircraft accident prevention program of all major commands eligible for the award. The command had a 30 per cent reduction in its overall rate and 28 per cent reduction in the pilot training accident rate.

Despite the problems arising from increased activity and conversion to a new supersonic jet trainer, the ATC accident rate was cut from 5.0 per 100,000 flying hours in 1961 to 3.5 in 1962, lowest in the Command's history.

The citation accompanying the award states: "The commendable progress made by the Air Training Command in aircraft accident prevention perpetuates the highest standards and traditions established for the Daedalian Flying Safety Trophy and reflects the highest credit upon the Air Training Command and the United States Air Force." ★

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IN THIS ISSUE

FAREWELL . . .

Our cover this month is dedicated to an outstanding Air Force artist who has hung up his blue suit and put his pens away. On 30 April Chief Master Sergeant Steven A. Hotch, whose familiar signature adorned hundreds of Rex Riley posters, retired.

Behind him Steve left years of service dedicated to the idea that education prevents accidents and that visual presentation is an effective way to remind people of safety. After a short vacation, he will be taking his talents to another medium —television.

Steve enlisted in 1941 and learned the airplane business as a crew chief, flight chief and line chief. That experience, coupled with his talent as an artist, produced an unusual combination which, when directed at safety and accident prevention, helped save many Air Force lives and dollars. Although he did not originate Rex Riley, Steve took over the job of presenting Rex early in that safety officer's career, January 1948, to be exact. He's been doing it ever since.

In 1952 Steve became art editor of this magazine and has held the job, without a break, ever since. Now, more than 120 covers, thousands of illustrations and posters, and many, many cartoons later, he is returning to civilian life where he will become a television art director.

Over the years Steve acquired a host of fans who looked forward to the newest Rex Riley poster. Each poster was carefully researched, much of the material coming from the files of real accidents. Factual information, combined with flight line experience, enabled Steve to maintain the realism and accuracy of his posters and magazine illustrations.

Rex is going to miss Steve Hotch and so will we. — **The Editors.** ★

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Volume Nineteen Number Six — USAF Recurring Publication 62-1

Aircrews operating today's high performance aircraft deserve the best in crash rescue protection. This fictitious article, based on fact, points out the insidious way in which deterioration of a base crash rescue unit can produce tragic results.

INDICTMENT

Too Little...Too Late

THIS IS NOT A PRETTY STORY—no happy thumps on the backs for deserving heroes—no flowery praises for the way they do things at good old Petunia Air Force Base. It is a sickening account of ineptness, carelessness and neglect one would hardly believe possible at a modern base.

Air Force 66666, a jet fighter, was on the runway ready to roll. The pilot, after more than a week away from home, was anxious to get going. His scheduled morning departure had been held up by an order for him to stand by for a small part to be delivered to a base that he otherwise would have passed over. After hours of delay he had finally got into his bird only to have further delays while his clearance was changed three times.

Now, come what may, he was going to bore out of here, and he'd better hurry because the clearance was good for only another minute.

Elsewhere on the base it was a relatively normal day. Routine and habit prevailed. The clear skies and warm spring sunshine had the troops planning weekend activities. In the cool shade of the Fire Station, Chief Firebaugh and the head of Vehicle Maintenance, Major Rollem, were quietly discussing their problems over cold cokes.

The condition of the fire trucks was less than good. The chief had been blaming Major Rollem who, in turn, was condemning Supply for not providing the parts necessary to put the trucks in proper shape.

"I'm sorry, Chief, but until we get the parts we can't give you the best maintenance. Besides, if you'd ever give us one of those trucks for more than eight hours we might be able to get it into pretty good shape. All we can do is perform minor repairs then we have to send the truck back. Our biggest problem, though, is parts. Supply is sitting on its hands and we're not getting action on stuff we ordered months ago."

"I know," the Chief replied. "Tell you what. Next week let's get together and go over and have a talk with those Supply types. Maybe the two of us together can get a little action."

"Good idea, give me a call. Meantime, we'll see what we can do about fixing up the front end on 576."

The Fire Chief wondered just what good they were going to do for old 576. The firemen had dubbed the truck "Old Shaky" because of the way the front end wobbled at any speed over 10 miles an hour. "If we . . ."

His thoughts were interrupted by the roar of the afterburner cutting in on 666 as the jet fighter bore down the runway on takeoff. In the cockpit all seemed normal. Only a slight breeze, all gages in the green, VFR forecast for home base, home for supper.

In Supply headquarters, Col Wearhaus was discussing several matters with his deputy. "Now, are there any hot items we ought to get on right away?"

"Nothing too serious, sir, except maybe automotive parts. Vehicle Maintenance will be over here squawking one of these days, so I pulled the files just to see how bad the situation is. We probably should hit that one because out of 518 items they have requested for fire vehicles we have been able to supply only 133."

"Do they really need the stuff or are they just trying to build up their own private stock pile?"

"I couldn't get too excited, Colonel. When I drove into the shop to get a tire fixed on the pickup I saw most of the stuff we've given them during the past six months stacked along the wall. Most of the boxes and crates hadn't even been opened."

"That figures," the Colonel replied. "Let's hope we don't have a fire right soon, though. Could be some of the crash equipment isn't right up to par, and if anything happens they'll try to pass the buck to us."

In the conference room of Base Headquarters, Captain Trance was just completing a briefing for the senior staff on the results of an inspection that had been completed during the previous week. "To sum up, the base came through in good shape, although the Fire Department got a couple of red marks."

"Just what shape is the Fire Department in?" the Commander asked.

"It doesn't appear to be anything serious, sir. Mostly a matter of housekeeping and a little better maintenance of the equipment."

"Well, we don't want any problems in the event of a fire. Have Chief Firebaugh write a report on what he has done to get things up to snuff."

At their alert station on the flight line, A1C Barnes and A2C Smith were discussing everyday affairs. "Wonder when the Chief is going to start that new training program," Barnes said.

"Aw, that thing will never get off the ground," replied Smith. "It was supposed to get started more than six months ago and I haven't seen anything happen yet."

"Maybe so," Barnes commented, "but last night Sgt Davis told me we didn't do so hot on that inspection last week. Maybe that'll get things stirred up a little. First thing, though, is gettin' these cotton pickin' trucks fixed up. Honest, I don't think we could put out a cigarette in a 10-gallon can."

The attention of the two men was diverted to the runway by 666 taking off. As they watched, the fighter became airborne, then suddenly skidded to the right as though a giant hand had given it a shove. The nose pointed down and the left wing struck the runway. For a moment the aircraft righted itself, then the wing went down again cartwheeling the bird into a crazy half circle. The gear collapsed and, as the fuselage slammed onto the ground, a vicious fountain of flame shot into the air.

Despite heroic efforts by the firemen, AF 66666 ended as a charred pile of wreckage, its pilot dead. The part to be delivered never made it.

Although there were several possibilities, the primary cause of the accident was never determined. While the investigation board was working on the accident, questions began to be asked about the Fire Department's role in the tragedy. Could the pilot have been saved? The two firemen who first arrived at the scene testified that THE PILOT WAS ALIVE WHEN THEY GOT THERE. They had tried desperately to get him out of the cockpit, but they were not equipped for a crash rescue attempt and were driven back by the intense heat.

An investigation shortly after the accident found that the firefighting/rescue operation in connection with this accident was deficient to the point where a rescue, which was possible and which should have been performed, was not made and the pilot died of burns and suffocation.

When this report reached Command Headquarters a team was immediately flown to the base with orders to make a complete survey of its fire protection capability.

The survey report did not make happy reading. In fact, one officer was heard to comment later that the findings read like an indictment at a war crimes trial.

As the result of poor supervision and management by the Fire Chief, the department was considered to be improperly trained, inadequately equipped and not mentally geared for the fast action required in an aircraft crash/fire accident.

The vehicles were in unsatisfactory condition; there was a lack of supervision, guidance and support, and marginal proficiency of personnel as the result of inadequate "live" fire training.

The almost total lack of parts support seriously hampered the efforts of the vehicle maintenance shop to repair or halt further deterioration of assigned O-11A crash trucks. As a result, these vehicles were extremely limited in operating capability and incapable of adequate performance.

There was no evidence that the fiire protection and aircraft crash rescue organization could adequately support flight operations.

The degree of support and assistance available through supply channels was unsatisfactory. Although 518 parts had been ordered by Vehicle Maintenance during the preceding 12 months, only 133 had been received. There was no available stockpile of high mortality parts, nor had an aggressive follow-up action on back ordered requisitions been initiated. Despite these deficiencies logistical assistance had not been requested from higher echelons.

Although the Fire and Aircraft Crash Rescue organization directly supports flight operations and requires continuous interest and support of responsible officers, there was no evidence that such interest and

Frequent "live" fire drills are necessary to maintain proficiency of crash/rescue personnel.

Too Little...Too Late continued

support were provided.

The ten-page Bill of Particulars submitted by the investigators reads like a manual on How Not To Run an Air Base. Items: Fire department SOPs were few and ineffective. Pre-fire planning, directed by USAF for over four years, was still in preparation and not being used. Scrutiny of the correspondence files revealed inadequate follow-up on important matters.

The most charitable thing that can be said of the rescue/firefighting equipment is that it was appalling. The survey team found 43 discrepancies on one O-11A fire truck. Some of these were minor, but included on the list were such major items as: Both turrets out of phase and cannot be elevated or traversed from inside the cab. Broken hydraulic line must be repaired before turrets can be rephased. Pump engine detent handle frozen. Tank suction valve frozen open. All tank and pump drain valves frozen closed. Pump cannot be drained. Clutch slips. Hydraulic reservoir tank leaks. Pump priming (exhaust) rod freezes in open position and cannot be closed except by sharp blows with a hammer directly on the rod, underneath the truck. The entire front end assembly shakes severely when the vehicle is driven over 10 miles an hour.

The above example relates to only one in-service O-11A. The remaining O-11As were in similar condition.

The lack of good parts support, operator neglect and the shop being so pressed for spot repair that overhaul was virtually impossible, contributed to the condition of the trucks.

Supply support was dismal at best. But of the 133 items received, only 16 had been installed. Some of the remaining requisitions were over a year old, but there was no evidence that follow-up action or re-ordering had been accomplished to maintain an active status of critical requisitions. Six items were spot picked for recheck in Base Supply. Of the six reviewed, two had been canceled because of improper identification, one had already been issued, one was on hand, but not issued, and there was no record of the other two.

Training was superficial and considered to be ineffective because of inadequate supervision, the poor condition of the vehicles and extra duty details imposed on the fire fighting force which already had a duty assignment of 72 hours per man per week.

In summation, the conclusion was that the Fire Department was not capable of fulfilling its responsibilities, and that the lack of this capability resulted in a fatality which occurred in an on-base crash/fire.

The list of recommendations was indicative of the many improvements necessary to raise the fire/rescue capability to an acceptable standard.

- Immediate removal of the Fire Chief.
- Immediate implementation of comprehensive pre-fire planning.
- Modification of equipment.
- Publication of SOPs covering all subjects directly influencing the department's operations.
- An immediate inventory of all equipment and tools and requisitioning of items needed to meet TO requirements.
- Acquisition of additional facilities.
- Fabrication of adequate training aids.
- A full alert standby program.
- Discontinuance of extra duty assignments for off duty 24-hour military firefighters.

Action to correct the deficiencies was taken immediately. Realistic training was established; additional staff emphasis was placed on the fire and crash department; additional personnel were authorized and the chief was replaced. An aggressive follow-up action on parts and equipment requisitions was established; an effective preventive maintenance program and improved shop practices were installed.

Drivers and operators of crash fire equipment were trained in the care, operation and maintenance of the equipment; additional equipment was authorized.

You may by now be wondering if such conditions could exist at your base. If you're an aircrewman you may be wondering what your chances are if you find yourself in a blazing aircraft and depending on your rescue team to get you out of the furnace.

If you're a commander you may be asking yourself, "Does *my* firefighting/rescue organization have the capability of handling any and all emergencies? If not, *who* is responsible?" ★

Efficient fire and crash/rescue operation requires well maintained equipment and practice in using the equipment by firemen.

THUNDERSTORMS

PHOTO COURTESY SAN BERNARDINO SUN-TELEGRAM

AIRCRAFT FLIGHT HANDBOOKS contain information on how to fly through thunderstorms. Generally the guidance goes something like this: Prepare the aircraft prior to entering the storm. Establish the specified penetration airspeed. Secure all loose gear. Have all occupants fasten seat belts securely. Turn cockpit lights up bright. Set de-icing and anti-icing equipment. Use radar to pick out "soft" spots. If without radar, pick out light areas. Penetrate at low altitude (approximately 6000 feet) or at high altitude. Try and stay away from the freezing level. In the storm maintain a constant power setting and fly attitude.

Based on Dash One procedures such as above, many successful thunderstorm penetrations have been made in all types of aircraft and even at Mach plus speeds. These have been accomplished by the ignorant, the foolish, the trapped, and, in a few cases, by test pilots on thunderstorm research projects.

Now, in the face of all this, from a safety standpoint one overriding recommendation is to be made concerning thunderstorm flying—DON'T!

If you are going to fly through thunderstorms, no matter what, consult your Dash One. If you don't want to fly through thunderstorms, or aren't sure, read on. Some of the actual experiences to follow make rather exciting reading: For example, the Air Force tanker crew that made a night ditching off the east coast rather than again fly through thunderstorms. They had been in a line of thunderstorms, had been severely battered, encountered engine trouble (thought to have stemmed from hail damaged oil coolers) and chose to make an open sea night ditching rather than again penetrate the coastal storms in order to reach land.

There are several ways of getting into the thunderstorm story. A common one is to go into the three stages concept—building, mature and dissipating. This may not be the best approach. All thunderstorms do not consist of a single cell; often thunderstorms are imbedded in other clouds and frequently they occur at night. In other words, what can be seen may be misleading, and what can't be seen may be dangerous.

Another approach is the probability approach keyed to geographical area and time of year. And a little later on, you'll have a chance to read a briefed account of a T-Bird flight in a tornado in April. And a tornado, insofar as safety definitions are concerned, could be simply defined as an overgrown and absolutely uninhabitable thunderstorm.

Essentially, all that is required for thunderstorm formation is moist, unstable air and lifting action, the degree of severity of the storm being somewhat in direct proportion to the quantities of these ingredients available.

Perhaps a good approach would be to go into the

THUNDERSTORMS continued

weather kitchen, lay out our ingredients, consult the recipe and mix up a thunderstorm. Basic ingredients which will be needed in concocting the thunderstorm include:

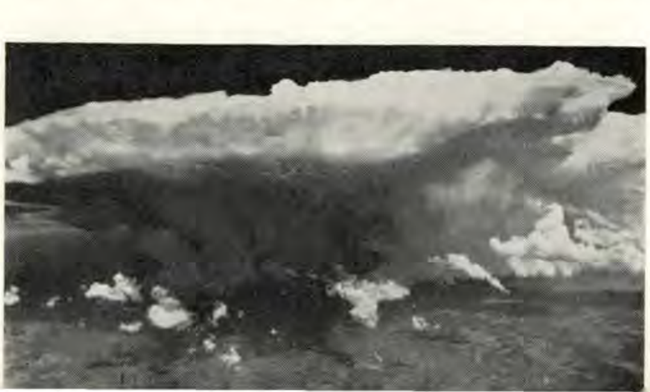
- Vertically unstable atmosphere.
- Horizontal and vertical wind shear.
- Appreciable wind velocities.
- Triggering mechanisms (fronts, squall lines, instability lines, instability areas).

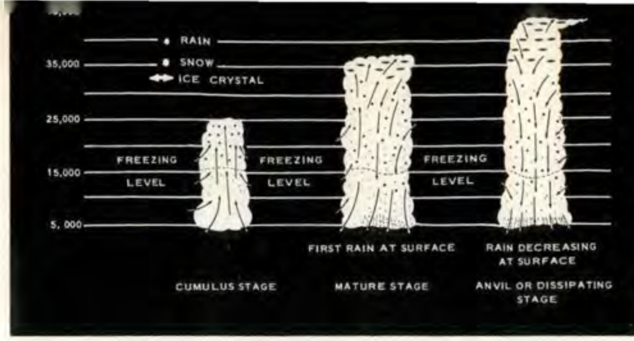
The vertically unstable atmosphere comes in packages with various labels; any one will suffice but a mixture of several will be most effective and is most common. Look for these labels: temperature advection at various levels, moisture advection at various levels, insolation and radiation effects in the surface layers, evaporation and condensation, and convection or turbulent mixtures. Since these labels are hard to interpret by the average pilot the assistance of a trained meteorologist is recommended. He can also, from study of vertically unstable atmosphere, forecast such things as hail size, turbulence levels, surface wind gusts and potential for tornadoes.

The next ingredient, and one that has a most marked effect on the severity of thunderstorms, is wind shear. Consult wind aloft charts and select sections that show greatest shear—primarily changes in speed in the upper levels and changes in both speed and direction at the lower levels. Knowledge of most pronounced shear zones and wind belts is important because this pinpoints the area of strongest vertical motion. Vertical motion is important in development of severe thunderstorms, particularly in development of large hail and tornadoes.

One more ingredient and the recipe is satisfied—triggering mechanism. This actually is the single most important ingredient: the one that releases the energy of the atmosphere which, when mixed with energy from the wind belt and wind shear zone, produces severe thunderstorms. This "baking powder" for the recipe is generally one of two types, persistent or non-persistent. For the novice the persistent is most reliable. This comes in the form of fronts and major troughs associated with strong cold air advection. The non-persistent triggering mechanisms include squall lines, instability lines, instability areas and minor troughs. These are more difficult to forecast and are associated with the most severe thunderstorms.

If the above recipe seems unduly complicated, or assistance in the form of a trained meteorologist is not available, there is a simple recipe that will also work.





All that is needed is unstable air, high moisture content and some means of lifting (mechanical or thermal).

When the ingredients are mixed they form a cell—a thunderstorm being made up of one or more cells. Each cell has a three-stage life cycle commonly defined as cumulus, mature and dissipating (as previously mentioned).

In the cumulus or building stage the most distinguishing feature is updrafts throughout the cell and an absence of rainfall. All moisture is suspended by the updrafts and there will be a slight drop in surface pressure and gently converging surface winds. During this stage the height of the storm increases and it takes on the distinctive, roughly rounded, puffs-of-cotton outline.

The mature stage is reached when, as the storm develops, a large amount of free water is liberated which, in time, exceeds the amount that can be supported by the updraft and the water starts to fall. This falling water soon initiates a vigorous downdraft in part of the area that previously contained an updraft. The air of the downdraft reaches the ground as a cold core in the rain area and spreads over the surface, causing an abrupt change in the wind pattern (gusts) and a sharp drop in temperature. Rain can be extremely heavy and hail is not uncommon. During this stage, strong up and down drafts occur in close proximity with maximum turbulence and heaviest hail. The clouds have a distinctive boiling action and persistent lightning is quite common, though not necessarily so. On occasion the only lightning noted will be the single bolt that strikes the aircraft.

The dissipating stage is the final of the three stages in the life cycle of the storm. During this stage a downdraft prevails throughout the middle and lower regions of the cell. The boiling motion of the clouds subsides, an anvil-shaped head appears and the base takes on a somewhat stratified appearance. During this stage the downdraft cuts off the source for the updraft and the downdraft gradually weakens and finally dies completely. The surface wind and pressure return to normal.

Remember, the life cycle described is for a single thunderstorm cell, and most storms are made up of several cells. As long as favorable conditions exist—unstable air, high moisture content and lifting—storm cycles can be expected to continue.

At the outset of this article accounts of actual experiences during thunderstorm flight were promised. Such examples, picked primarily on the basis of illustrating effect on various aircraft types, follow. It is because of experiences such as these that the only safe thunderstorm flight technique that can be advocated is —DON'T!

F-102

We had two severe weather warning areas to deal with, the first in the immediate area. We planned to climb VFR around this first one, and thread our way through the tops of the second.

We did fine on the climbout, and were in pretty good shape at 42,000 when we approached the second warning area.

About four minutes after I reported passage VFR on top at 42,000, we encountered moderate turbulence, and my engine suffered a compressor stall. I retarded the throttle and lowered the nose, and fought a series of compressor stalls that followed, one after another. In doing so, I realized that I was falling into some pretty rough weather. I managed to recover at 36,000 feet, and so notified the Center. They advised me of commercial traffic at 30,000 in the area, so I called for a left turn of the flight.

About then, one of my wingmen called to say that he too had suffered a compressor stall, and was now flamed out. I told him to do as he saw fit, and to hold whatever altitude he could.

Immediately following this transmission I hit the most severe turbulence I have ever experienced. Its force was such that my aircraft flamed out in an inverted position.

I stopcocked the throttle and switched to emergency AC power, and managed a recovery at about 30,000 feet. Immediately thereafter, my emergency AC power failed. I don't know whether I also lost both hydraulic systems, since I switched my attention to the turn and bank indicator. The turbulence was so severe that I could only hope to "hold on" and ride it out. I couldn't even hold myself in the upright position. Among other things, my head struck the optical gunsight. I developed what seemed to be a left-hand spin, and lost altitude very rapidly. Approaching 10,000 feet, I ejected.

The automatic opening devices worked properly, and I found myself in the middle of a hail storm. My helmet departed in the process, and my face was beaten rather severely by the hail. My descent was both slow and turbulent, taking some 20 minutes to complete.

On two occasions, I oscillated so severely that I found myself above the canopy, which promptly collapsed. When I fell again, the canopy would reopen.

The landing was complicated by high winds and severe oscillations but I sustained very minor injuries.

T-33

I took off and stayed VFR until we'd gone about 10 miles west of Oke City and then climbed up through the overcast, as specified by our IFR clearance, to get on top. At 21,000 feet we were not on top and the radio static was very bad. I tried but could not contact Oklahoma City Radio.

At about 24,000 feet we were suddenly in very, very dark clouds. We had been flying on instruments without cockpit lights, but now they were necessary. This was about 1920 hours, and we were starting to get what we then considered to be thunderstorm turbulence.

The instruments were steady as a rock. We were climbing at about 240 knots and both turn and bank and gyro horizon were as they should be. However, the rate-of-climb pegged itself at 6000 feet per minute, UP! We could feel the tremendous updraft.

I had both my hands on the stick and had my harness and belt tightened up, expecting very shortly to hit a downdraft and then be in the clear.

At this time the airplane suddenly snap-rolled to the right and then continued into a series of very violent snaps, first to the right and then to the left. Next we found ourselves in what appeared to be a crazy twirling-motion maneuver. Incidentally, we definitely were not spinning; a twirling or twisting motion is the only way I can describe it. Strangely enough the instruments were still indicating normal except for the rate of climb and the altimeter. The latter was showing a decided drop in altitude, although the rate of climb was still holding at 6000 feet, UP! I couldn't understand how there could be such a tremendous pressure change so quickly.

"There's a cold front north of El Paso, unstable air moving up from the Gulf. Your destination is in a severe WX area."

Along with the twirling motion, we were still getting those violent snaps that threw us around in the cockpit. This was certainly the strangest maneuver I'd ever been in, and I've flown through many thunderstorms.

The pilot in the rear cockpit asked me if I thought we should blow the canopy and said he thought we had received some structural damage to the aircraft. After a few seconds I answered him and said, "Van, I think you'd better blow the canopy, and if this continues, you get out of the airplane whenever you want to."

Somehow, he was able to reach up against the tremendous G forces and actuate the canopy jettison system. The moment this was done, we lost our helmets and oxygen masks. This was between 20,000 and 25,000 feet.

We were still experiencing this twirling motion; then the plane would suddenly snap and keep snapping. I was fighting the controls and trying to fly the plane when it suddenly flamed out. This was undoubtedly due to the tremendous negative G forces that we were being subjected to.

The airplane was starting to break up and the hail was absolutely terrific in the cockpit. My face was being cut to ribbons. I couldn't see much, since my right eye was closed and the left one was simply a slit. I could just barely make out one or two of the instruments. We were unable to communicate with each other now, but I felt sure that Van was getting out. At about 10,000 feet there was a momentary lull in the turbulence and I sensed that Van was out of the airplane.

I now tried to eject myself but was unable to get my right hand off the stick and over onto the ejection seat handle. The centrifugal forces were so great that I just couldn't move in that cockpit. My left hand was

THUNDERSTORMS continued

still on the throttle, my feet were on the rudder pedals and I could not move them. Finally, I managed to get my right hand into a position where I could reach and catch hold of the seat handle.

I pulled upon the handle and immediately was blown out of the cockpit without ever squeezing the ejection seat trigger, to my knowledge.

As I hit the slipstream, the seat was torn off and I thought then that it had ripped off my parachute, too. I knew that I was tumbling violently and felt sure that I was falling to my death for I just *knew* that the parachute had been carried away with the seat.

The rain and hail sort of brought me to clearer consciousness for a few seconds and a tremendous flash of lightning revealed that my ripcord was hanging by my left side. I reached for the D ring, pulled it and was the most surprised man in the world when I suddenly felt a terrific tug on my shoulders as my parachute opened.

I started floating now, instead of falling, and the chute stopped a lot of the hail from cutting my face and beating into my eyes. However, the turbulence of the air kept me swinging in great arcs of about 180 degrees and the parachute was so wet that it would collapse as I was swung from one side to the other and then would puff and open as I'd hit the bottom of each wild swing. Because of the turbulence, the chute started to twist and twirl, and fight as I would, I couldn't do a thing about it. At this point I firmly believed I'd never come out of this nightmare alive.

Suddenly my feet slammed into the ground, followed immediately by the rest of my body. This, of course, was no controlled landing, and I had the wind knocked out on impact. It felt as though a Missouri mule had just kicked me in the back.

In a couple of moments I got back a bit of wind and tried to stand up. Just as I staggered to my feet, the wind in howling fury snatched the parachute, and for the next minute or two I was dragged first one way and then the other. I didn't have a quick-release harness and probably wouldn't have been able to use it anyway, unless it had been a chest type.

I finally managed to release the chest strap and right leg snap and then was able to slide out of the harness. I stood up and was gratified to find that I could walk, but it was a supreme effort, believe me.

Note that in the above recounted cases the pilots encountered hail. Hail forms in the chimney of the storm above the freezing level. Hailstones vary from pea size to baseball size. Vertical air currents above 150 knots are required to suspend the larger hailstones. Hail encounters have been reported at all levels, from the surface to over 40,000 feet. Heavy hail has been experienced in the clear area outside the storms, most commonly under overhanging clouds and downwind. An effective hail avoidance procedure employed by one airline is to use radar and detour all storms by at least five miles at altitudes below the freezing level and at least 10 miles above the freezing level.

C-118

Shortly after takeoff we felt a downdraft. It pulled me against the seat belt and caused loose bags, hats and papers to be forced against the top of the aircraft. It seemed that we had a momentary electrical failure. The lights dimmed at that particular instant. It was the most tremendous downdraft I have ever felt. It stopped and everyone assumed that we were going to continue on our way. The fellow next to me said, "That was quite a downdraft." I agreed. The next instant—not more than three seconds later—we hit another downdraft. It felt as if we were entering turbulence. My head was forced back against the seat. We were decelerating with forward momentum. Then there was a blank.

The above account is by one of the surviving passengers, a rated pilot, in an accident that took 46 lives. Here again, is further explanation of a thunderstorm characteristic pertinent in this case. Whether thunderstorms are caused by air being heated from below (air mass thunderstorms), or by air being forced up an inclined plane (frontal and orographic thunderstorms), they all have the same general characteristics. These strong updrafts of air, which are the basic cause of the thunderstorm, are offset by downdrafts, both within and outside the thunderstorm cloud. The result is severe turbulence, with the greater portion occurring ahead of the storm in the area known as the "roll cloud." The updrafts of air ahead of the storm and the downdrafts within the storm cause the roll cloud to form at the base of the leading edge. Slightly ahead of this area on the surface, variable and shifting surface winds prevail. In and around the roll cloud is the region of maximum turbulence. The thunderstorm's identifying features may not always be visible because they can be masked by other clouds. Low level clouds may hide the roll cloud, the dark rain area and the base of the actual thunderstorm. Multi-layer shelves of non-violent cumulus and stratus type clouds often

extend for many miles in front of the thunderstorm, hiding its anvil top and base.

F-104

During the climbout the aircraft was struck by lightning. A loud explosion was heard and an extremely bright flash observed. The explosion occurred at the same time that the throttle was moved from afterburner range to military. First thought was that a compressor stall had occurred, but engine instruments disclosed engine operation to be normal. However, three strip panel lights were on: instruments on emergency power, DC monitor bus out and APC out. All Navaids and the UHF radio immediately became inoperative. Subsequent examination disclosed that the nose radome had sustained a one-eighth inch hole on the top side and paint was chipped over a four-inch area. Wires leading to the pitot cannon plug were burned and broken. The pitot heat cannon plug and transducer cannon plug were burned. UHF, ILS, DC power and Nr 3 fuel boost pump circuit breakers were popped. Power supplies for VOR and UHF were burned.

DC-3

At a point in the vicinity of Sutton, West Virginia, at about 0750E, a severe updraft was encountered which brought the nose up to the vertical position in spite of full forward pressure on the yoke. The plane continued on over until it was on its back, at which time the yoke was pulled to full backward position to recover. For the next 20 seconds normal flight was maintained at 3000 feet, but again a severe updraft was encountered and a loop was again made, recovering at 3000 feet. Following this the aircraft was rolled over on its back and a half loop was made, then it was thrown on its left side and at 1500 feet MSL the ground was sighted, only about 200 feet below the aircraft. Some altitude was gained but another loop occurred and the aircraft broke out of the overcast in a vertical dive with an airspeed of around 240 miles per hour. It required strenuous efforts on the part of the crew to avoid striking the ground. Following this, conditions were again normal and the flight continued to Charleston and landed.

KC-135

On a night mission the aircraft was flown into a thunderstorm at 41,200 feet. Control was lost due to severe turbulence, and structural limitations were exceeded. Primary structural failure occurred in the Nr 3 and Nr 4 engine strut attach points. This was followed by inflight disintegration of the aircraft. Primary cause was attributed to the pilot's entering clouds in the vicinity of known, avoidable thunderstorms.

SUGGESTIONS

• Check current and forecast weather with a qualified meteorologist during preflight planning. If thunderstorms are forecast find out if the forecast is for "few" (less than 15 per cent), "scattered" (15 to 45 per cent), "numerous" (more than 45 per cent).

• Flight plan away from storm areas. Don't clear into severe weather warning areas and never take off or climb into a thunderstorm.

• Check all-weather equipment—pitot heaters, carburetor heat, propeller deicers, scoop and wing anti-icers, windshield heat, cockpit lighting, instrument operation, static eliminators (not frayed, worn nor contaminated with grease and oil). See that all cargo and loose equipment are secured.

• Verify that radar is operational.

• En route, use radar, eyeballs and radios to avoid thunderstorms. En route stations broadcast weather at 15 and 45 past each hour, virtually all areas are now within UHF reach of pilot to forecaster service and much of the ZI airspace is under ground radar surveillance.

• Remember that, when all ingredients are present, apparent fair weather cumulus can become thunderstorms in a matter of minutes.

• As a general rule, storms with the fastest growing tops, with the most rapidly changing shapes, are most dangerous. If there is a lot of lightning, a lot of turbulence is also likely, although severe turbulence can be encountered with no lightning noted.

• Circumnavigate. When impossible, make a 180.

• Use radar and avoid storms by at least five miles at altitudes below the freezing level and at least 10 miles at altitudes above the freezing level.

• To avoid hail, stay out of thunderstorms, don't fly close to them, never fly under overhangs, and give widest berth when flying downwind from the storm. Above all, avoid all "figure six" and "hooked finger" radar echoes—possible tornadoes.

• Turbulence is proportional to shear. Use radar to determine areas of greatest shear (iso-echo or use of a fixed low gain setting if not iso-echo equipped). Radar does not see shear per se, but does see moisture accumulations (storms). Radar returns with the sharpest gradient—as seen when gain is switched from normal to the iso-echo or low position—pinpoint the areas of greatest shear (turbulence). Avoid sharp shear areas.

If it becomes necessary to fly through a thunderstorm area (highly unlikely in peacetime operations), avoid the freezing level. Generally, this is an area of most lightning strikes and greatest turbulence. Fly at best penetration speed and with cockpit illumination bright. If not radar equipped, request vectors from ground radar. Such facilities however normally provide steers around only the most pronounced returns—turbulence may still be encountered.

Divert to an alternate if a thunderstorm is over or adjacent to your destination field.

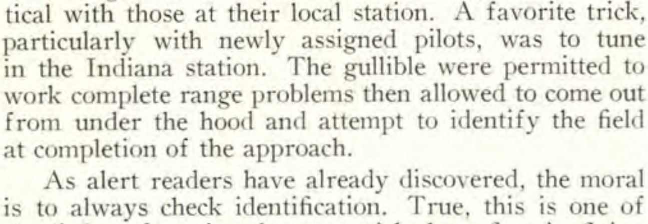
And once more, the one safe thunderstorm flight rule: DON'T! ★

(Source material credits: Aerospace Safety; The Interceptor; The MATS Flyer.)

LITTLE

A FEW YEARS BACK, flight instructors at an Air Force base in Illinois discovered that range legs of a range station in Indiana had headings almost identical with those at their local station. A favorite trick, particularly with newly assigned pilots, was to tune in the Indiana station. The gullible were permitted to work complete range problems then allowed to come out from under the hood and attempt to identify the field at completion of the approach.

As alert readers have already discovered, the moral is to always check identification. True, this is one of the little safety tips that was picked up first in flying school, and one that probably has been remembered by every pilot. Trouble is, there is a difference between remembering and respecting. Let's go to cases.



In the middle '50s, a transport en route to an overseas destination crashed into the side of a mountain peak at approximately 12,000 feet. Destruction was so complete and the crash scene so inaccessible that positive cause could not be pinpointed from the wreckage, or other clues available to investigators. However, another crew reported picking up a homer 10 kcs off from the one that would normally be used, and only through the alert observation and warning of the radar operator was another crash at the same spot averted. Because of the safety of flight implication the frequency spread was increased and call signs changed—after the accident.

Not long after the accident, another transport was inbound to that same base with an IP giving route familiarization checks to three aircraft commanders. On the particular route being flown, in an unpressurized aircraft, it was necessary to skirt the northeast edge of the island. The flight was progressing normally, in clouds, with one of the pilots switching from homer to homer. On one leg, drift correction was absolutely pegged for several minutes. Then, without a word of comment, the aircraft commander, who happened to be standing behind the pilot occupying the engineer's seat at the time, reached forward and switched the radio compass from ANT to COMP position. The needle immediately swung several degrees to the right, indicating that the aircraft had drifted well in toward mountains higher than flight altitude. Respect? Sure, each pilot was an experienced aircraft commander. With this type you can relax . . . it's not necessary to watch each and every move they make, or is it? Is this how accidents happen to well qualified crews?

Late last year another transport aircraft, inbound to a Pacific Island base crashed between procedure turn and the field. This, investigators feel quite confidently, was not a case of facility mistuning, however. At the point of crash the aircraft was exactly where it was supposed to be for this type approach, with one exception: it was 1000 feet too low. Every let down plate in Air Force use shows low station altitude. This is why.

But you know the letdown like the back of your hand, you're tired after nearly 20 hours crew duty time . . . everybody knows this is one of the best pilots in the squadron . . . you're more concerned about Nr 2 because it has cut out a few times in the past hour . . . there can be any number of things like this. But, no single one, nor all collectively for that matter, can offset the finality of a scrambled mess of smoking aluminum a mile or two from the runway.

There's no intent here to point the finger of guilt solely at transport or bomber crews. It stands to reason that these same precepts apply in the case of the fighter pilot, who has as much to do, less time to do it in and nobody to help him. In fact, it was a fighter pilot who, the other day, was pointing out the importance of having the ADF tuned in to a beacon here at mountain-guarded Norton AFB when on a vectored approach. This fellow obviously is not a trusting type—he wants a reference, just in case someone else makes a mistake. As he put it, "I'm not about to get vectored north of the beacon once I'm down below the knobs."

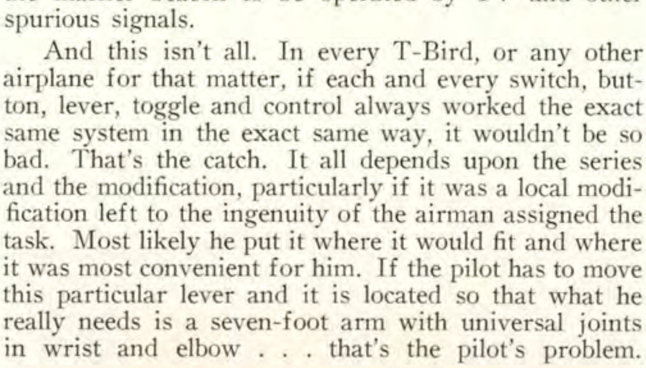
TRIGGERS

How many accidents are caused from this sort of thing, really? Accident files will disclose, as briefly recounted above, that there have been many. Most discouraging of all is the realization that there continue to be accidents, very serious ones, from such well understood causes. Probably those involved know of such common hazards—they've all been publicized time and again. Maybe they just this once forgot for a little while. No one will ever know for sure.

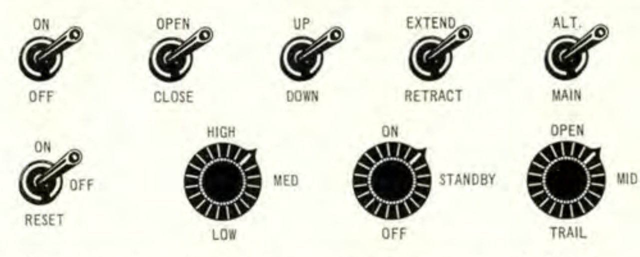
We know, but we don't respect.

Try this. Get out to your airplane a little early next time and once you are seated in the cockpit, take a few moments to dwell on all the handy ways that have been provided to get you into trouble. The radio compass we have already mentioned —OFF, ANT COMP, LOOP are four selectable positions, and the possibility of mistuning and failure to identify. Does the plane you fly have an instrument selector for VOR, ILS and TACAN? How does it affect the Nr 1 and Nr 2 needles and are the copilot's instruments similarly affected? If the UHF happens to be in the ADF position, does the UHF override and the Nr 1 needle point to the UHF station? On some installations, it's possible for the marker beacon to be operated by TV and other spurious signals.

And this isn't all. In every T-Bird, or any other airplane for that matter, if each and every switch, button, lever, toggle and control always worked the exact same system in the exact same way, it wouldn't be so bad. That's the catch. It all depends upon the series and the modification, particularly if it was a local modification left to the ingenuity of the airman assigned the task. Most likely he put it where it would fit and where it was most convenient for him. If the pilot has to move this particular lever and it is located so that what he really needs is a seven-foot arm with universal joints in wrist and elbow . . . that's the pilot's problem.



And, unfortunately, when he runs into such a situation he may just go on living with it until someday it kills him. Remember the vertigo inducing channel selector location for the T-Bird UHF? Is there recourse? Possibly. The Air Force seems to have a limitless supply of paper and an endless number of



administrative types to process the same—might try an OHR or UR. It's better than just telling your buddy, unless he happens to be the Flying Safety Officer.

While you're looking around the cockpit for accident makers, check and see how many switches operate forward or up to the ON position. In some aircraft they've thrown in a few that you push down to turn on. Some years back, a large aircraft was ditched for this very reason. At start of takeoff, the engineer inadvertently set the cowl flap controls in the wide open position. He had been flying another type aircraft in which the cowl flap controls operated in just the opposite direction. Vibration induced from the open cowl flaps on four engines became so great after takeoff that the aircraft commander ditched the plane. And he had a lot more flying time than the average military pilot.

There is no arguing with the fact that equipment is not yet as it should be. It is for this reason that modifications are continually necessary. There is also no arguing with the fact that certain operations are particularly hazardous—another reason for modifications, and safety of flight supplements.

Before we condemn the designer, the mod makers and the other crewmembers, however, we should remember that every day many crews operate like equipment without incident or accident. Of course, they have to work at it; they have to think about what they are doing, and even more important, what they are going to do.

For those who don't, the trap is always waiting, and their inattention, omission or moment of laxness can be one of the little triggers that springs it. ★

IFR WEATHER OR NOT

Lt Col James H. Stanhope, Project Officer, Hq USAF

IN THE SEARCH for ways to eliminate mid-air collisions in the increasingly more crowded airspace, military aviation, with the assistance and cooperation of the Federal Aviation Agency, is undertaking another step to increase safety. Of the many proposals advanced for airspace management, the concept of rigidly controlling each flight movement has received the widest acceptance. Thus, with this brief introduction we arrive at the reason for this article.

The Air Force has recently announced participation in a Department of Defense program featuring mandatory use of IFR flight procedures for certain support flights. It is officially known as the "Program for Increased IFR Operations." It is applicable to military flights throughout the continental U. S. The intended purpose is to reduce the number of VFR near-collision incidents by increasing the use of air traffic control IFR separation service.

The program requires administrative and proficiency cross-country (point-to-point) flights to be conducted in accordance with instrument flight procedures at altitudes or flight levels assigned by air traffic control. Air Force missions coded S-1 through S-4 and S-8 are affected regardless of type aircraft being utilized to perform the mission. The reserve components, performing comparable administrative or proficiency missions, are similarly affected.

MISSION CODES

- S-1 Administrative: Aerial transportation of personnel who are accomplishing executive and administrative functions.
- S-2 Transportation of Personnel.
- S-3 Materiel and Supply Transport.
- S-4 Logistics.
- S-8 Flying proficiency.

Exceptions obviously are necessary in a program of this magnitude in order to assure mission accomplishment when the ATC system is unable to accommodate operations within reasonable limits. Consequently, pilots may proceed VFR (weather permitting) after 20 minutes departure delay, or 15 minutes enroute/terminal area delay. Exceptions are also stipulated to enable avoiding severe weather conditions, to reject ATC reroutings that are not compatible with the mission, and for other reasons of operational necessity, as determined by the pilot. In this category are those reverse-direction SID procedures that consume several hundred taxpayer gallons pointing EAST before setting course WEST. Now, before leaving the matter of exceptions, let's review the bidding. First, the name of the game is improved flight safety; therefore, pilots are expected to remain within the IFR system to the maximum practicable extent. On the other hand, the program is not intended to be blindly applied without exercise of judgment. If, for instance, a short trip of 50 miles is in order, the weather is clear, the IFR departure route is over the quiet loving city in a reverse direction climb, and radar intends to assist you around the multitude of light plane targets they "see"—feel free to pick the best route VFR, and exercise due caution.

Implementation of this IFR program commenced 6 May 1963, with an eight week gradual phase-in period to ease the impact on the ATC system. This phase-in period also will permit the impact to be assessed (and additional increments suspended if need be) as the volume of IFR traffic is increased. Thus, aircraft performing the missions previously mentioned and whose serial numbers end in 0, 1 and 2 became involved in the first week (6 May). Each subsequent week an additional tail number is added so that by 24 June the phase-in will be complete. We might also mention that, as of 1 April, our control towers and base operations facilities have been gathering statistics covering ATC delays and other data needed to evaluate the program's impact. The FAA is cooperating by providing data relevant to approach control activities and other data at locations where they operate military control towers.

The impact of this program on the myriad of Air Force mission activities is cause for debate among the so-called experts. All will agree, however, that serious problems do exist in the air traffic control system today. It therefore appears logical to assume that increased levels of IFR activity will magnify the problems. Consequently, the VFR near-miss hazard might be reduced at the expense of increasing hazards resulting from a lesser flexibility to cope with changing flight conditions, increased fuel reserve problems and the like. At this time, however, we must acknowledge the great volume of satisfactory IFR operations today, and the fact that exceptions from the IFR program have been provided for essential reasons. Nevertheless, flights that previously went VFR may now be forced on airways into weather conditions that pose complications which previously were not a factor in mission accomplishment. The cumulative effect of this increased IFR activity on tactical mission operations has also yet to be fully appreciated. Consequently, and because of real concern for these questions, the Air Force is conducting an extensive program of ATC data collection and evaluation at all of our bases. The Army and Navy are doing likewise.

In conclusion, we believe this program has significant flight safety potential. What the effect will be on our flight activities and mission accomplishment remains to be seen. We will need and expect to hear about it from you. Certainly it is a forerunner of things to come in FAA's continued application of the positive control concept. It deserves our best—in participation—in cooperation—in realistic appraisal. Our cooperation as professional Air Force pilots is absolutely essential for the realization of the program goals. ★

REEL NEWS

Supersonic flight, emergency aircraft procedures and nuclear weapons head the list of subjects covered in recent USAF films available at the Film Library Center. They may be ordered by your local base film library. Bases without such service may order direct from the AF Film Library Center, 8900 South Broadway, St. Louis 25, Missouri. Be sure to give complete titles and serial numbers. Because of the great demand for certain films, it is suggested that alternate showing dates and films be indicated. The films, listed below, are 16mm with sound:

TF 5550 HIGH SPEED FLIGHT, Part 3. Beyond the Speed of Sound. 20 min, color.

Discusses the aerodynamic nature of supersonic flight, including shock waves, airflow, mach line and streamline patterns at supersonic speeds. Also explains changes in drag and lift on straight, sweptback and delta wings with double-wedge or bi-convex surfaces.

•

SFP 624 STAY SAFE, STAY STRONG. 20 min, color. Facts about nuclear weapons.

Explains basic principles of fission and describes the basic operation of nuclear weapons. Describes the field tests that prove the safety of the weapon system.

•

TF 1-5271a DITCHING TECHNIQUES FOR TRANSPORT AIRCRAFT. Communications, Sea Evaluation, Headings and landings. 26 min, color.

Outlines steps to minimize ditching hazards when a forced landing is anticipated at sea. Covers transmission of distress calls, evaluation of sea conditions, landing procedures and obtaining proper headings.

•

TF 1-5271b DITCHING TECHNIQUES FOR TRANSPORT AIRCRAFT. Preparation and Evacuation for Aircrew. 15 min, color.

Shows procedures for evacuation of transport passengers over open sea. Covers inflight checks, precautionary measures before touchdown, and procedures after touchdown.

•

FTA 376a SURVIVAL UNDER RADIATION. Shelter and Travel. 11½ min, B&W, *CONFIDENTIAL* film.*

Demonstrates precautionary measures for travel and finding shelter under radioactive conditions.

•

FTA 376b SURVIVAL UNDER RADIATION. Procurement of Food and Water. 13 min, B&W. FOR OFFICIAL USE ONLY film.*

Shows how to procure food and water under radioactive conditions.

•

FTA 279e SURVIVAL TRAINING. Use of Maps and Compasses. 11 min, B&W.

Shows use of compass and common types of maps in survival.

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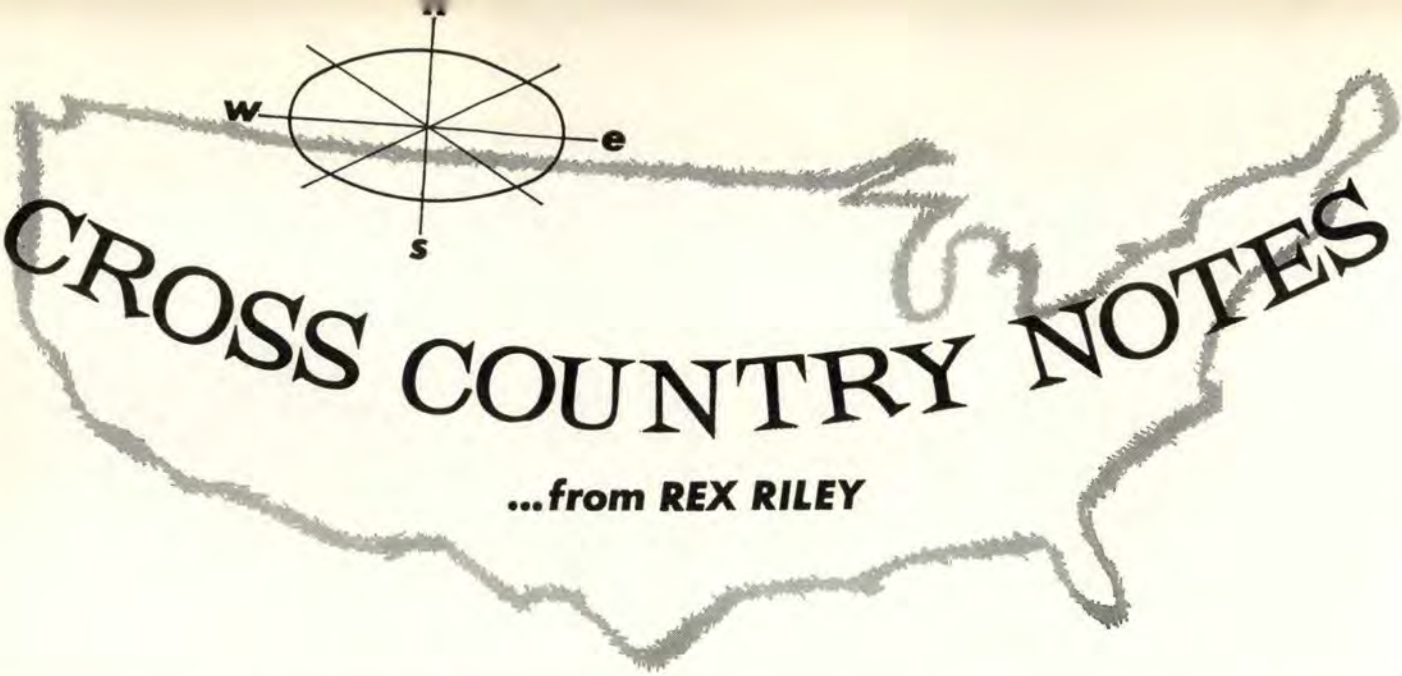
FTA 279f SURVIVAL TRAINING. Route Planning and Selection. 13 min, B&W.

Explains planning of long and short range routes of travel.

(*Essential that films be used together.) ★



CROSS COUNTRY NOTES

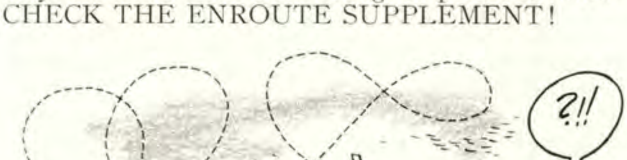
...from REX RILEY

TRANSIENT MAINTENANCE. Now that I am in the transient maintenance business for Aerospace Maintenance Safety, our sister publication, I have become real interested in the subject. That job has caused me to take a good look at the kind of service the troops are getting away from home. Some places furnish top flight service to transients, others have that I-wish-he'd-go-away attitude. A look at the list of bases on the honor roll of Maintenance Safety will tell you which bases will take good care of you when you drop in. Also our back cover of this issue explains how a base qualifies for a recommendation from Rex.

Recently I received a fine type letter from Captain Donald J. Burch, formerly an aircraft maintenance officer at Ent AFB. I used it in the other magazine so won't repeat the letter here. I'd like, however, to comment on what he says about TO 00-20A-1. How many of you know what the book says? Do you know your transient rights and privileges as well as your obligations under this TO? If you don't—and it's surprising how many pilots have never heard of it—I suggest you stop in at Ops and read it over. Also, you might look at Captain Burch's letter in Maintenance Safety (May) and check with your Flying Safety Officer, since I understand the FSO Kit for June and July will contain more info.

FACILITIES AT RESERVE BASES. Some of Rex's friends in the Reserve have suggested that pilots be reminded that facilities at Reserve installations, particularly those located on civilian airfields, are often limited. Should you come whistling in at other than 0800 to 1630, and at any time on Mondays or Tuesdays, in some cases, there will be nobody, but nobody around. Taxiing around on unlighted taxiways and unlighted ramps to parking areas without tiedowns can be both unappreciated and unsafe. Then too, there may not be such exotic items as T-Bird tires, JP-4, light maintenance, local weather service, BOQs, transport and food.

So . . o . . o . . o, these folks who are most interested in maintaining good relations with their extended active duty comrades ask that we again pass the word—CHECK THE ENROUTE SUPPLEMENT!



CROSSCHECK—The pilot of a KC-135 was instructed to hold at best endurance altitude to await an improved landing condition. While at 34,000 feet in the holding pattern, his vertical speed indicator gradually climbed to indicate as much as 1200 feet minimum rate of climb. The aircraft commander used a screwdriver to adjust the instrument to read zero rate of climb. Just prior to descent, the needle was zero. During descent, a comparison of the pilot's instrument with that of the copilot's showed as much as 1500 feet difference in either direction, but prior to level-off it appeared to be reading the same as the copilot's. It functioned normally for about three minutes and then suddenly started to indicate a descent. It increased rapidly to show a 1500-foot minimum rate of descent and at this point the commander instructed the copilot to continue the approach and landing; altitude at this time was 2300 feet, weather 300 and one mile.

It doesn't take much imagination to speculate what the result could have been—had the malfunction occurred near minimums, or if the commander had not cross-checked or didn't have his crewmembers monitoring. . . .

LOW FLYING JETS AND THE FOREST RANGER. One time when I had a few days leave I spent it on a camping trip in the high mountains of California. During my stay I had occasion to chat with the District Ranger and, naturally, we talked about forest fires. When he found out I was in the Air Force he had a lot to say about the jets coming down to low altitudes to take a look, no doubt. This low flying poses a real danger since, during fire-fighting days, there are several types of light airplanes and helicopters in the area. These aircraft are on a common airnet frequency and can coordinate. It so happens the District Ranger uses a helicopter so you can readily understand his concern about the jets coming in at low altitudes. You know anyone who *wouldn't* be concerned—if he were flying the Ranger's job?

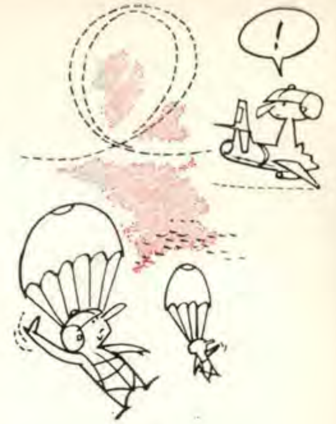
With vacation time just around the corner and fire hazards still prevalent, let's remember we're in the business of accident prevention!

IF THERE'S A WAY, SOMEONE WILL. Guess how it has been discovered that it is possible to lock a man inside a C-133 engine nacelle? Bet you're right! The teletype states: "Maintenance technician inadvertently locked in engine nacelle compartment of C-133 while performing maintenance."

This little episode needs just one more touch, and that is provided in another sentence in the same teletype, which states: "Locally fabricated safety device which prevents hatch from vibrating open during flight also prevents hatch from being opened from inside the nacelle."

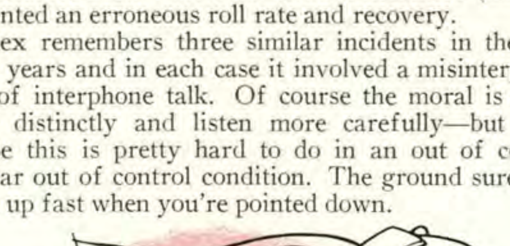
Although specific details are lacking, we assume that "strange knocking sound" effected release before further damage was done. However, with a little imagination we can contemplate the plight of a deep breathing airman riding as an unwilling stowaway in the chilly, rarified air at altitude. The fix: a stencil on all hatches: *Visually check for personnel in tunnel prior to locking hatch.*

SO HELP ME, IT'S TRUE. TIME: This year; PLACE: Over Europe; WHO: Pilot, Instructor Pilot, Navigator; AIRPLANE: RB-66. During a standard instrument departure the pilot turned left to a heading of 235 degrees at airspeed 330 K. Going through 4000 feet, departure control instructed to hold at 4000 feet. After pushing over and getting back down to 4000 the pilot observed the angle of bank had increased to at least 90 degrees and maybe 120 degrees. It's not too certain whether he continued the roll or reversed the roll but the '66 started shuddering. At this point the pilot uttered a few words of dismay or anger or frustration (they aren't printable) and the navigator interpreted these remarks as "Let's 'allez' the heck out of this wounded bird" and smartly ejected. The IP by this time was a little concerned too. He couldn't see the flight instruments, the airplane was rolling and shuddering, so he joined the navigator in a nylon descent. Both made successful openings and landings without injury.



Meanwhile, the pilot, deciding enough was enough, recovered from his most unusual position and climbed to VFR on top. He yelled help and proceeded safely to his home base where the weather was better than his takeoff point. On checking the instruments, the maintenance folks found the attitude indicator (MM-4) presented an erroneous roll rate and recovery.

Rex remembers three similar incidents in the past three years and in each case it involved a misinterpretation of interphone talk. Of course the moral is speak more distinctly and listen more carefully—but then, maybe this is pretty hard to do in an out of control or near out of control condition. The ground sure does come up fast when you're pointed down.



MORE CHARTS. A new chart depicting all low altitude high speed routes has become a part of FLIP Planning Section 1, U.S. The chart is printed on both sides, one side covering the western part of the country, while the reverse side covers the eastern half.

Section 1 still contains the same information as previously except for "USAF Low Level Training Routes (Oil Burners)," which now appear in Section 1A. The new Section 1A, accompanied by the chart, contains the following:

- IFR/VFR Low Altitude High Speed En Route Operations (general descriptive data).
- Low Altitude High Speed Training Routes (Oil Burners—route descriptions).
- Low Altitude High Speed Training Routes (VFR —route descriptions).

The chart is folded to fit a holder provided for insertion after Section 1A. Information provided includes route coordinates, periods of use, altitudes and speeds to be used.

The new Section 1A should provide for safer operations in that flying units and planners may review the chart to adjust routes or altitudes in order to obtain the least number of route conflictions. Pilots can be alerted to be on the lookout for high speed cross traffic whenever route conflicts exist. ★

RELAX

(By an "Old Pro" who asks to remain anonymous)

FOR MORE YEARS than I like to be reminded of, I've heard instructors and "old heads" advise aircrewmen to *relax*. Instructors sometimes get downright colorful in the language they use to get the idea across. Something like "Relax, dammitall, RelaA-A-A——I got it! LEGGO!"

As near as I can tell, everyone agrees with the idea that aircrewmen should be relaxed while working. However, there appears to be a general lack of clearcut instruction as to just how an aircrewman goes about accomplishing this relaxing routine. Usually, he's just "tole" to do it. For example:

Not long ago I was flying with this guy—he being under the hood in the back of a T-Bird. I could feel him back there, sort of snatching around at the controls and in general creating an atmosphere of mild panic throughout the aircraft. Well, now, I spoke up and told him things would probably go a lot better if he would just relax a bit. The clown came back with what I thought was a right classic remark. "You're right. How do I do that?"

I chewed around some on that question and finally told him I'd fly it for awhile and he came out from under the hood for a break. With my usual keen insight into flying problems, I saw right away that my solution wouldn't have done him much good if he had been up there alone in actual weather.

After I got on the ground, I put my feet on the desk and started mulling things over. Figured I'd either have to come up with some advice on "How to relax while flying" or else keep my big, fat, smug mouth shut about telling people to do it. I waited patiently for the problem to solve itself. Nothing happened. Sterner measures were required. I decided to apply my formal problem solving procedure—the sly picking of thoughts from other people's minds. This worked better. I was able to accumulate some pretty good thoughts on the subject.

What is going to be said is aimed primarily at students and those aircrewmen with relatively little experience. It would be nice, though, if you experienced troops would read along with us and monitor the poop. It's good to keep abreast, in touch. Right?

To talk about relaxation, it's convenient to use a term that's almost a nasty word when spoken in the same breath with the word "aircrewman." Let's chat awhile to pave the way for the use of the word I have in mind.

The public image of an aircrewman brings to the mind's eye a man of, among other characteristics, steely eye and iron nerve who doesn't know the meaning of the word fear. Such a reputation is good to enjoy and should be protected, in public. A build-up like that comes in real handy in bars or in the company of ladies. The trouble is, a reputation doesn't do anyone any good when he is airborne in a flying machine. When we talk about flying, we have to call spades by name. For instance:

It just isn't true that aircrewmen are unanimous in their ignorance of the meaning of the word fear. I've heard a lot of mighty hairy-chested tigers use the word as though it had a very familiar taste. Invariably, I've seen the experienced people cast a knowing eye and a small, amused smile when some rare joker, started proclaiming his utter lack of fear of flying. Just to set the record straight, let's see what Webster has to say. Webster says, "Fear: Painful emotion marked by alarm."

Boy, talk about a man hitting the nail on the head! Old Webster must have held an aeronautical rating. We flying personnel not only know the meaning of the word, we live with it. We exhibit the symptoms Webster calls fear more often than we do those associated with the common cold.

With your permission, I'll use the word fear in preference to such words as apprehensive, tense, concerned, confused, and others commonly used to beat about the bush.

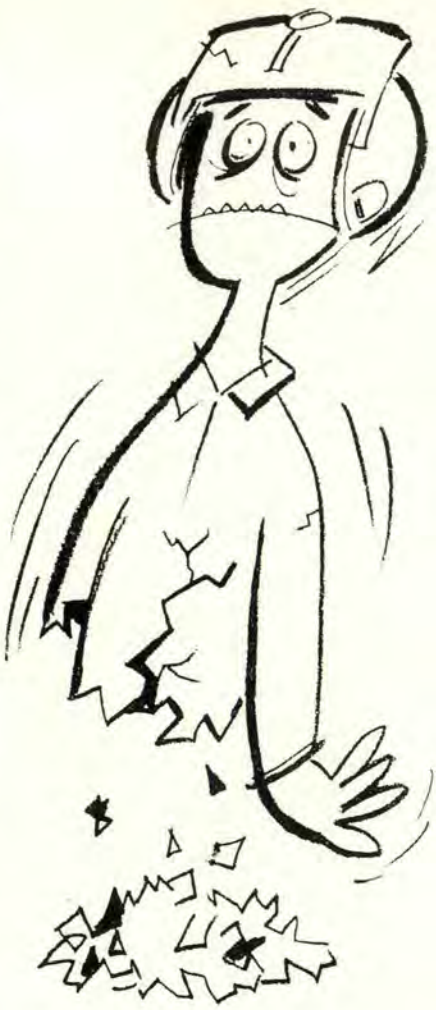
I believe we're ready to talk with each other now. Since I'm writing and you're reading, I'll talk first. I speak like this here! When you are flying, there will be times when you become afraid. You will experience "painful emotion marked by alarm." You might just as well plan on it happening. It's coming, brother—it's part of the game.

All right, now. Just between the two of us, unless someone is reading over your shoulder, we've admitted that aircrewmen sometimes become afraid. We've agreed, I hope, that there is nothing unusual or shameful about it. We ourselves, even as lion-hearted as we are, expect to get scared every now and then. Since we know it's going to happen, we would be smart to plan in advance what we are going to do about it. Can we? Perhaps. Let's give it a bit of a go.

One things is certain. We don't want to give in and panic. If we do, friend, that's all she wrote. What we need to do is to overcome our fear. But how? Well, like the instructors say, the thing to do is relax. But how in hell does a man relax when he's scared?

I talked this thing over with some elderly pilot friends of mine who, I knew, had been frightened several times and had apparently survived unscathed. We were actually trying to see if we could describe a procedure for getting over being frightened.

One fellow said that whenever he was frightened, it made him feel a lot better to think about how funny it would be if, instead of happening to him, it were happening to someone he especially disliked.



Another said he steadied himself with the thoughts that if it weren't for being frightened occasionally, there would be no hazard pay and that he would sure rather put up with being scared every now and then than to take a pay cut.

Someone proposed his method of giving himself a Dutch Uncle talk. Something like this: "Bill, you're frightened."

"Yep, by golly, you're right. I'm scared."

"Well, what do you intend to do about it?"

"The way things look, I expect to go on being scared for awhile yet."

"O.K., if that's the way you want it. But since being scared doesn't require much effort or intelligence, you ought to have some spare time on your hands. How about using it for something constructive—like flying this airplane the way you're supposed to."

The last guy came up with a real gem. He said he was too much of a coward to allow himself the luxury of wallowing around in fear. He went on to explain that whenever he found himself being afraid, the thought that his natural cowardice might let his fear turn into gibbering panic scared the fear right out of him as a matter of instinctive self-preservation. According to him, he considered fear as being downright dangerous and something that he, as a natural born coward, had better not indulge in.

As you may have guessed, the conversations just recorded took place at the Officers' Club bar during Happy Hour. Naturally so. Where else could I bring up such a touchy subject as asking a bunch of pilots what they did about being frightened? I had to catch 'em in a mellow mood, or take a real chance on getting a bust in the nose or being charged with defamation of character. In the harsh light of the following Monday, we put our heads together and concluded as follows: The way to relax, though frightened, is: Expect to be frightened every now and then. Realize that being frightened is normal. Remember that being frightened need not, in itself, keep you from doing everything you could do if you weren't frightened. Realize the only way to save your skin is to overcome your fear—allowing it to develop into panic is nothing short of outright suicide.

So much for the amateur headshrinking, brain-washing, and soul-searching. Are there other things that will help us relax while flying? You better believe. Anything that helps you do your job better will help you relax. Isn't the following statement true? *The relaxed aircrewman is the one who, throughout the mission, is always sure of what he has done, sure of what he is doing now, and sure of what he is going to do later on.*

Notice if you will, how standardized procedures fit into the rosy picture we have drawn of a relaxed aircrewman at work. Our well-relaxed boy knows from past experience that his standard procedures will produce reliable results. He also knows he has made it a point to use them on this flight. He has a good solid grip on things. He can review in his mind the past portions of his mission and reassure himself

that things were done right—period. No doubt about it, no cause for concern. He knows that what he is doing is being done right—another period. Again, no concern. Best of all, he can look ahead to the coming portions of his mission and know that he will be able to reach into his bag of standard procedures and pull out preplanned actions as needed to take care of any situations to come —once again, period; once again, no cause for concern.

Standard procedures are confidence builders—they will do more to help an aircrewman relax than two double martinis and a hot shower. Learn, practice and use standard procedures. Then you, too, can be a relaxed aircrewman and just breeze along with no sweat—secure in the knowledge that you are sure of what you've done, sure of what you're going, and sure of what you're going to do later.

The immediate action items in the Flight Handbook are, of course, similar to standard procedures in that they are also preplanned actions to be taken in the event of foreseeable situations. When you need one of these lifesavers, you need it right now and no second guesses are allowed. Practice your immediate action procedures until you have them down cold. It's silly to carry around any nagging worries as to what you are going to do in case of a foreseeable emergency. For relaxation, there is no substitute for the firm knowledge that you know in advance exactly what is to be done.

Conscientious use of the checklist for non-immediate action procedures will also foster relaxation. It's reassuring to know that you have methodically checked each item off against a printed list and protected yourself from possible lapse of memory.

I can tell you a little flying story you may enjoy. I hope it will point out the advantages of preplanned courses of action and show once again how one small, improper act can develop into a ball of snakes.

Many, many years ago, I was flying a P-39. That's Pee-39, not Tee-39. "P" for pursuit—a "pea shooter." That little monster had an electrically operated normal landing gear system. The emergency gear system was a mechanical crank, chain, and cog-wheel arrangement. The manual crank was located by the right side of the seat and was turned in a vertical plane, aligned fore and aft, to crank the gear down. A lever was provided to select either the electrical or manual gear system. To land, we would lower the gear electrically, switch to manual, give a pull on the crank to make sure it was solid—this told us the gear was full down and locked—and then return the switch to the normal position. The selector switch could be inadvertently placed in a sort of intermediate position that would cause the manual crank handle to whirl around and around when the gear was raised or lowered by the electric system. Please remember this design error.

Well, there I came, in to land on a strip hacked out of solid jungle. Made my usual spectacular peel off the deck, dropped the gear, switched to manual, tugged on the crank, and, so I thought, switched all the way back to the normal system.

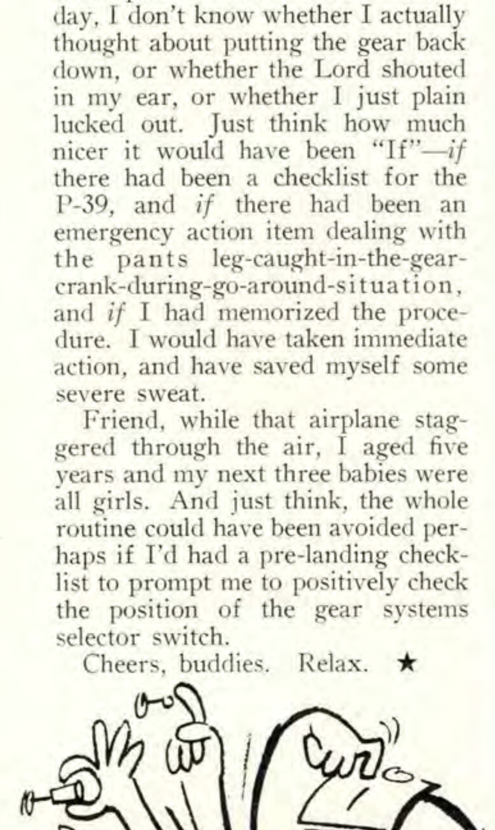
Man, my approach was high, long, hot and downwind. I couldn't have made that strip if I'd had a plow to throw out and drag. I sure kept trying though. Power full back, full left rudder trim and a-slipping and a-skidding.

After waiting until the last possible minute, I gave up and started a go-around. Gear switch to UP, full power, and, since there was torque in those days, stand on the right rudder. Things started happening. The engine roared. The gear started coming up. And because I had left the gear system select lever in the intermediate position, the manual gear crank started whirling around. Due to a shortage of flying suits, I was wearing a set of fatigues, several sizes too long, with the legs rolled up into cuffs—really zoot suit, as we said then. Well, that damned gear crank hooked into the cuff of my pants leg, jerked my foot off the rudder, and pinned my right leg back against the seat.

There I sat. Full power, full left rudder trim, and with my torque leg pinned back against the seat. That P-39 started flying sideways. Now then, the Widow Maker had some unique flying characteristics. Speaking practically, it was either flying or snap rolling—there just wasn't much that you could notice in between. With the power on and full left rudder trim, that airplane gave me one of two choices. It would either slow roll onto its back, or, if I cross-controlled with right aileron, it would stall and snap roll. Neither alternative appealed to me. I pulled the throttle back. She settled in toward the trees. I eased the throttle forward and cross-controlled. She shuddered. Throttle back again. She settled. Throttle forward and right stick. She shuddered. Back . . . forward . . . back. In between throttle adjustments, I was making futile grabs for the rudder trim knob. Things just weren't working out at all. I figured I'd bought the farm and was ready to cut the switches and take the trees—gear up as was recommended in those days—when all at once the light came on. "Put the gear back down." I did just that. The gear started down. The manual crank turned and let go of my torque leg. I mashed the right rudder down and pushed the throttle forward to a position about a foot in front of the airplane. Sweet success! To this day, I don't know whether I actually thought about putting the gear back down, or whether the Lord shouted in my ear, or whether I just plain lucked out. Just think how much nicer it would have been "If"—*if* there had been a checklist for the P-39, and *if* there had been an emergency action item dealing with the pants leg-caught-in-the-gear-crank-during-go-around-situation, and *if* I had memorized the procedure. I would have taken immediate action, and have saved myself some severe sweat.

Friend, while that airplane staggered through the air, I aged five years and my next three babies were all girls. And just think, the whole routine could have been avoided perhaps if I'd had a pre-landing checklist to prompt me to positively check the position of the gear systems selector switch.

Cheers, buddies. Relax. ★



TAX's

ACCIDENTS, INCIDENTS AND ALMOST . .

▶ CONGEALED OIL — During flight, oil pressure on the Gooney's Nr 1 engine continued to drop. When it reached 30 psi the engine was shut down and a precautionary landing made. Lines were bled of congealed oil. No damage.

▶ T-29 TOE STUBBER — Following takeoff, the student pilot applied brakes and the aircraft settled back onto the runway. Runway contact with brakes applied caused the right inboard tire to blow out. Takeoff was continued. Visual check indicated that the right inboard tire was blown and the right outboard tire damaged. The instructor pilot made the subsequent landing with a final approach speed of 103 knots, full flaps, touchdown on left wheel and with right gear held off as long as possible. When the right gear touched down, the outboard tire blew. Both tires shredded badly. The aircraft was stopped on the runway without control difficulty.

▶ SHORT FUSE — On a practice bombing mission an F-105, accompanied in close formation by an F-100 chase plane, was making a low level pass when one or more bombs appeared to detonate instantaneously. Both aircraft were damaged to the extent that all crewmembers had to eject.

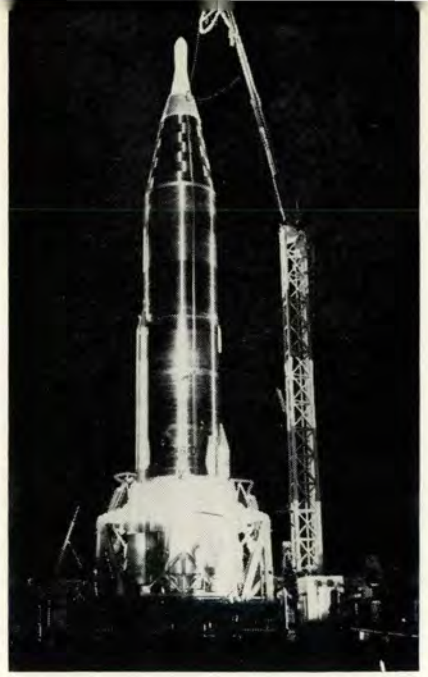
▶ SLICK AS GLASS — First touchdown of the C-47 on the wet grass strip was at the 800-foot point, flaps full. Due to the bump in the ground, aircraft became airborne and again touched down at the 1600-foot point of the 3600-foot strip. Forward pressure was applied to keep the aircraft on the ground, and braking was tried with no apparent effect. The left propeller contacted the ground 185 feet short of the far end of the runway and the right propeller in the overrun beyond. After the aircraft had passed the far end, the copilot pulled back on the yoke and assisted on the brakes. The flight terminated on a small embankment 549 feet north of the runway. The wind, reported to the pilot as east at 10 knots, gusting to 29 knots, was east at 20 knots, gusting to 29 knots. Short field landing techniques, as spelled out in the Dash One, were not used.

▶ ABNORMAL MISSION — At "gear up" the KC-135 mission was no longer normal. The gear didn't retract. The aircraft was climbed to VFR on top and six unsuccessful attempts made to retract the gear. Fuel dumping was started. Nr 4 EPR indicator dropped to 1.2 for about three minutes, then indicated normal. After dumping fuel for about six minutes, Nr 3 oil pressure began to fluctuate between 30 and 40 psi. It held steady for about one minute, then began a steady decrease. The engine was shut down. The pilot turned left (20-degree bank) to stay in the fuel dumping area and noted that when he returned to indicated level flight by his attitude indicator the control column was cocked to the right. The copilot's attitude indicator showed a 10-degree right bank. The "Off" flag failed to appear on the pilot's indicator. A few minutes later the navigator reported his ASN-7 radar inoperative. The pilot made an uneventful penetration, approach and landing, cross checking the copilot's attitude indicator with his other flight instruments. The copilot monitored the aircraft attitude on his instrument to lessen the possibility of parallax error.

The pilot reported that while in a holding pattern on the previous flight, his attitude indicator had given erroneous readings. The copilot made the penetration and approach. Writeups indicated that the gyros had been checked and found to be in good condition, the MD-1 amplifier had been replaced and a ground check was satisfactory.

Findings after the second flight were:

- A corroded right truck leveling switch prevented the gear from retracting.
- Engine failure was due to loss of oil.
- Attitude indicator failure was due to excessive instrument friction.
- A defective flag motor prevented the flag from appearing.
- A faulty control box caused ASN-7 radar failure. ★



MISSILE SAFETY AWARDS

1962

AEROSPACE SAFETY is proud to announce the recipients of Missile Safety Awards for 1962. Winners achieved outstanding safety records in storage, maintenance and operation or development of complex missile systems while maintaining mission capability.

60 Fighter Interceptor Squadron	• Otis AFB, Massachusetts (ADC)
26 Air Defense Missile Squadron	• Otis AFB, Massachusetts (ADC)
6595 Aerospace Test Wing	• Vandenberg AFB, California (AFSC)
Ballistic Systems Division	• Norton AFB, California (AFSC)
498 Tactical Missile Group	• Kadena AB, Okinawa (PACAF)
51 Fighter Interceptor Wing	• Naha AB, Okinawa (PACAF)
576 Strategic Missile Squadron	• Vandenberg AFB, California (SAC)
4135 Strategic Wing REDESIGNATED 39 BOMB WING, EFFECTIVE 1 FEB 63.	• Eglin AFB, Florida (SAC)
31 Tactical Fighter Wing	• Homestead AFB, Florida (TAC)
4520 Combat Crew Training Wing	• Nellis AFB, Nevada (TAC)
7231 Combat Support Group	• Cigli AB, Turkey (USAFE)
124 Fighter Group	• Gowen ANG Base, Boise, Idaho (ANG)

• MISSILANEA

• RED MEANS DANGER The long pointed pitot static probe of the GAM-77 Hound Dog missile is a delicate, precise instrument. The accuracy of its air sampling function is vital to the missile guidance system. If it is damaged or bent, the information it transmits will be erroneous and will destroy the terminal accuracy of an otherwise perfect mission.

In recognition of its fragile nature, a pitot static cover was devised to protect it from the elements and the vagaries of human nature while the missile is earthbound. In addition, a broad red streamer was attached to give a fluttering warning to those oblivious of normal caution.

In spite of these practical measures and unceasing admonitions of GAM-77 Missile Safety Officers, pitot static probe damage incidents occur far too frequently. At times these incidents are bizarre and difficult to believe, yet they happen! The following incident illustrates how an individual can permit his familiarity with everyday tasks to cloud his normal caution:

A munitions maintenance squadron vehicle had been backed into position adjacent to a GAM-77A missile for a scheduled unloading. When the vehicle was no longer required, the driver, oblivious to his surroundings, mounted the cab to the driver's seat and slammed the door—*on the red warning streamer* attached to the pitot static probe cover! When the vehicle moved away, *something had to give.* The pilot static probe was bent and the commander's safety record tarnished.

The primary cause factor in this incident was personnel and supervisory error in that a vehicle was moved in close proximity to a costly missile without proper clearance precautions being taken. The unit took immediate remedial steps; however, habitual awareness would have prevented this incident. *A RED* STREAMER MEANS DANGER.

Lt Col H. M. Hegyessy, Jr.
Missile Safety Division

• A GAM 72 was receiving a scheduled propulsion check following a periodic inspection. When the engine reached 69 per cent rpm, an unusual noise was heard and the engine was shut down. Inspection revealed damage to the compressor section; further inspection revealed a piece of 9/16 drill bit lodged in the engine inlet screen.

Investigation revealed that:

• The supervisor did not review the AFTO 781 prior to the engine run.

• The supervisor did not perform a comprehensive engine inlet inspection.

• The engine had been left in the hanger maintenance area with no covers installed over the engine inlet or exhaust.

An SOI has been written adding the following locally approved safety practices to the GAM 72 engine run checklist:

• A long neck flashlight will be used for all inlet inspections.

• A rubber-tipped dowel will be used to rotate engine to check for foreign objects.

Lt Col Keith Conley, Missile Safety Div.

• GAR-11. The missile was being moved from the checkout area to a storage cell which required use of a rutted and slippery road. The driver towing the MF-9 trailer containing the missile stopped at an intersection then proceeded slowly around a corner. At approximately 5 mph, in a turn, the missile fell from the trailer onto the ice, sustaining damage that required three man-hours to repair.

This mishap occurred because the locking ability of the quick release pin was inadequate as a transit lock on the trailer rail assembly. A modification requiring a different pin was not made, which apparently accounts for this mishap. ★

• GAR-2A. During uploading of an F-102, a crewman passed under the aircraft and caught his belt on the barrier probe safety pin which pulled the pin out. The probe was not locked and it extended, striking the Nr 5 missile. The missile fuselage and rocket motor nozzle were damaged.

This mishap resulted from the barrier probe not being locked, a personnel error. There were, however, several contributing factors:

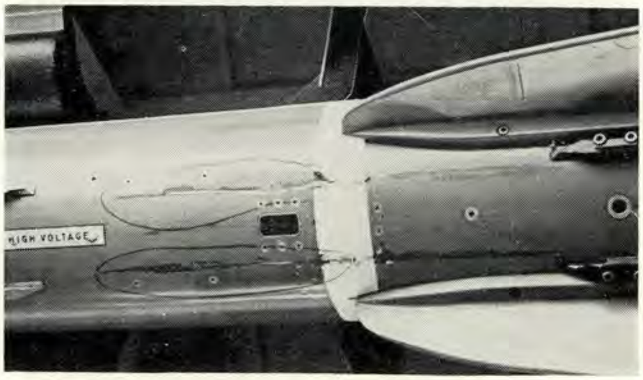
- Failure to follow all the loading steps spelled out in TO 1F-102A-16-2.
- Design deficiency of the safety pin in that it is too easily removed.
- Maintenance error in that the probe latch was burred, the latch spring was weak and insufficient lubrication of the locking mechanism.

Corrective action includes the requirement that loading crews accomplish each step in the applicable loading manual and checklist which requires a physical check that the barrier probe is up and locked and that the safety pin is properly installed.

• GAR-1D. After the Nr 2 rail was inspected, loading of the missile on an F-102 proceeded. As the missile was being positioned on the rail, it snagged on a screw protruding from the rail causing a break in the case and a 12-inch gouge along the top of the missile.

This is another case of personnel error in that there was an improper preflight of the launcher rail before loading. Although recommendations to prevent recurrence included shellacking of screws on the rails to prevent them from vibrating loose, careful inspection during preflight is a "must." ★

GAR damage occurred during loading of missile on rail. The missile was being loaded from the rear and was improperly aligned, causing the case to rub on the aft end of the rail. This can occur on either forward or rear loading launchers, during either loading or downloading, and the only prevention is careful attention on the part of the loading crew.



THE PILOT...THE CONTROLLER...

...AND PRECISION RADAR

Maj Roger B. Condit, Jr., Chanute AFB, Ill.

WHAT'S YOUR DEFINITION of an ideal GCA under instrument weather conditions? How about smooth air, very little wind, stratiform clouds, and a mist just light enough to dampen the runway so that you get that ecstatic "pfoot-pfoot" as the tires lightly kiss the runway. All the way down the final, you were able to set your power and establish your descent, so that the whole approach and landing was accomplished with a "ho-hum" attitude.

If you have experienced this type GCA, no doubt your feeling of elation was shared by the rest of the crew and, before switching to Ground Control, you may have remarked to the controller that that was a darned good run.

For the GCA controller, this was a snap. Because you were able to maintain a constant heading and rate of descent, there were very few transmissions required. Probably, he thought you were a real sharp pilot. You made it easy for him, and the stable air made it easy for you to make it easy for him.

Okay. Now that we have looked at a GCA at Utopia AFB, here's the next obvious question:

What's your definition of a hellacious GCA under instrument weather conditions? Barring emergencies and equipment malfunctions, it would be nearly unanimous that the one single disturbing factor would be turbulence. Moderate to extreme turbulence on GCA final keeps a pilot busier than the mother of the bride with a short suspense. In all honesty, if we were passing out bouquets, the roses would go to the pilot who successfully landed under turbulent air conditions when the ceiling and visibility were 500 and 2, while the lone petunia would be dropped in the lap of the pilot who landed at Utopia AFB under 200 and ½ conditions.

Let's consider precision radar in relation to the pilot and the controller under turbulent air conditions. The more turbulent the air, the more the aircraft is displaced from its intended line of flight. The pilot is continually striving to maintain the assigned heading as well as his descent. His pressure operated flight instruments are erratic and offer little help and, at best, he must average out their readings. This continual displacement of the aircraft requires the controller to give numerous headings and glidepath instructions.

The GCA azimuth and elevation antennas sweep twice each second and if, for example, an aircraft suddenly loses 40 feet, the radar return will reflect this position on the next scan. In other words, the controller gets two looks at your course and glidepath every second. If you've ever complained that a GCA controller had you on the glidepath one moment, and the next moment you were 40 feet below the glidepath, you're right! Because that's where you were! This continuous fight to maintain course and glidepath is compounded as the approach progresses. The pilot has fought the aircraft to bring it to the new heading and just as he feels he has it there, the controller asks him to change it. To say the least, it's a little bit frustrating, and usually the result leads to mixed emotions. The pilot thinks "that was the worst GCA I've ever experienced." He may lament that the controller never did get him on course or glidepath. On the other hand, the controller may think that the pilot was a little rusty since the only time he was on the glidepath was when he went up and down through it.

The truth of the matter is, it "takes two to tango" and the more vigorous the dance, the greater the chance that someone is going to have his toes stomped. In spite of stomped toes, if you landed safely under those conditions, *that* was a good GCA!

The relation between pilot and controller has aspects other than during turbulent air. Take the case of a flight of two "centuries" on GCA final. The controller gives a heading change in order to bring the flight to "on course." In consideration of his wingman, the lead may take this heading change a little more slowly

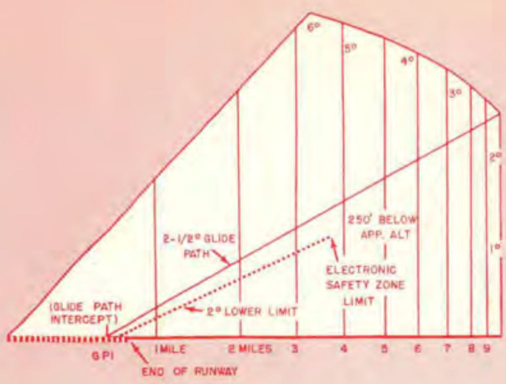


Figure One

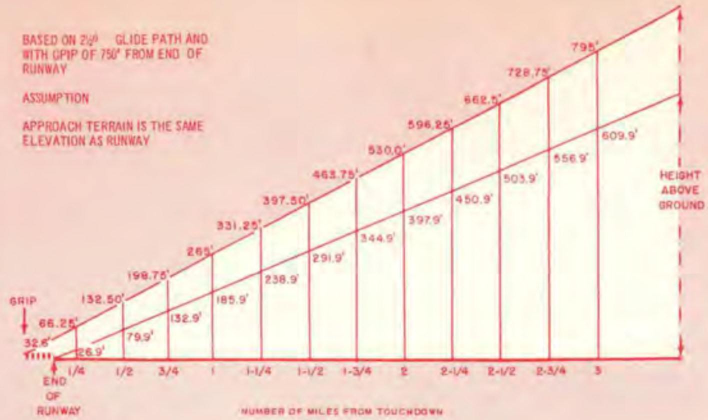


Figure Two

than if he were alone. As a result, the controller believes the heading change was insufficient since the target returns on his scope do not indicate any progress toward alignment to his azimuth course line. Consequently, he gives an additional correction and, if there is a delay in this correction being taken, he will give another correction, and so on until the sum total corrections equal 10 or 15 degrees. The final result is that at or near minimums, a large correction is given in the opposite direction in order for the aircraft to be in a position to land. For safety, this flying technique may be necessary, but it makes for a loused up GCA!

Let's take a look at precision radar for a moment.

Precision radar is designed to accurately and constantly depict the position of an aircraft while making an approach. Every half second the controller can *see* the aircraft as it actually is in relation to the azimuth and glideslope cursors that are electronically displayed on his scope. For facility of operation, both displays are depicted on one scope. Range marks, occurring at one-mile intervals, are spaced in an approximately logarithmic relationship, so that the most critical first mile on the display occupies a greater distance along the sweep than does the less critical second mile. This has the effect of expanding that portion of both sweeps which represents the area in which the aircraft actually contacts the runway (Figure 1).

The elevation display has two references. Besides the glidepath cursor, there is a lower safe limits reference (Figure 1). This lower safe limits reference is established one-half degree below the glideslope, computed from the end of the runway. Anytime a target goes below this reference, the controller must direct the pilot to climb. In order to maintain a frequent check of its accuracy, the lower safe limits and the rest of the precision radar are flight checked each 60-75 days. If you are wondering just how close to the ground you are at your airpatch when on the lower safe limits, wait for a good clear day when the air is smooth, and ask the final controller to bring you down this reference instead of the glidepath. You will have a healthy respect for its purpose and take action should you ever get on it under instrument conditions.

Another aspect of precision radar that is often overlooked is the relationship of vertical distances between the glidepath, lower safe limits and the ground. For illustration purposes, assume a 2½-degree glidepath, touchdown is 750 feet from the end of the runway, and terrain in the approach area is the same elevation as the runway. Then if you'll overlook the fact that vertical distances from the glideslope are measured from a plane extended from the center of the elevation antenna, we'll call all distances as "above the ground."

Figure 2 shows the distances between these references at every ¼ mile for the last three miles of the approach. Note that at 1¼ miles, the glidepath is approximately 331 feet above the ground and there is roughly a 92-foot difference between the glidepath and the lower safe limits. Now, consider that the aircraft is a large bomber and the controller has his blip on the glidepath. Usually this means that the blip is divided equally on the cursor. Therefore, half the height of the aircraft is below the glidepath. At 1¼ miles this doesn't leave a large margin, and an aircraft encountering a shear could drop below the lower safe limits in very short order. Consider this the next time you want to make a GCA when there is turbulent air or a reported wind shear.

If we were to moralize on this article, we'd have to recommend the following:

- Don't let GCA minimums alone be the only safety factor in planning a GCA.
- Dust off the April 1962 issue of Aerospace Safety magazine and read the article entitled "Seeing the Shear."
- Visit your local GCA unit, but don't be satisfied with just watching. If weather and traffic permit, ask to make a precision approach. It's not very difficult.
- Take a look at your local lower safe limits.

With these points in mind, you will become more familiar with the characteristics of precision radar and better understand the controller's role. Remember! A GCA is like a dance, in that someone must lead and someone must follow. Understanding and practice may not get you in the Harvest Moon Ball finals, but they'll help toward creating safe, harmonious relations. ★

GARS
GAMS
AND
ROCKETS

LET'S STOP THAT 1963 TREND!

DURING THE FIRST 70 DAYS of 1963 the Air Force experienced 56 mishaps in the Falcon, Sidewinder, Bullpup and Rocket families. If this trend continues to the end of 1963, the Air Force will have suffered 45 per cent more mishaps with these missiles than occurred in 1962.

By definition (AFM-36-1), the unit Flying Safety Officer in an air launched missile fighter squadron is responsible for missile safety. As the Flying Safety Officer, it is your job to do what you can to reduce this current trend. As a start, let's look at the 1963 mishaps and see what's happened.

In the Falcon family there have been 14 mishaps. Eleven of these occurred during loading/downloading. Two occurred while the missile was being transported, and the other occurred in flight. In 12 of the 14 mishaps personnel error was the primary or contributing cause factor. The other two mishaps involved F-102 snubbing air problems. It is apparent that most of the Falcon mishaps occurred during handling and were caused by carelessness or failure to follow prescribed procedures. The Flying Safety Officer in Falcon outfits can best reduce mishaps by spending more time with the people who actually put their hands on the missile. Emphasis on close supervision and checklist discipline will pay off in this area.

There has been a total of 17 Sidewinder mishaps. Fourteen of these occurred in flight as follows: three failed to launch because the pilot released the trigger too soon; one failed to guide; two failed to detonate; three experienced early bursts after launch; four umbilical connections were sheared and one guidance lens was broken due to internal failure.

On the ground, one mishap occurred during downloading and the other two during maintenance. Eight of the above GAR-8 mishaps were caused by personnel error, i.e., careless handling, malassembly, or releasing the trigger too soon. Eight more were caused by materiel failure, i.e., failure of the fuze, G&C unit or rocket motor, and one was attributed to weather.

As the Flying Safety Officer in a Sidewinder launching squadron, what can you do? First, brief the pilots to hold the trigger down until they see the missile leave the rail. Next, get with the GAR assembly people. Assure yourself that all components of the missile are properly aligned and all screws to assemble the missile are tight. Check the G&C unit and fuze(s) for evidence of moisture or corrosion. Reject any component that shows evidence of damage, moisture or corrosion. When you're satisfied that assembly operations are proper and well supervised, go on down to the flight line and witness several loadings. Determine whether checklist discipline is rigidly enforced. Observe the manner in which missiles are lifted, carried and positioned on the rail. What seems to be the attitude of the loading crew? Are they serious about the business at hand? Do they display true professionalism? If not, spend a few more days on the line until things shape up. Do all the above, and you'll be surprised to discover that those Sidewinder mishaps normally attributed to materiel failure will reduce hand-in-hand with personnel error mishaps.

So far this year the GAM-83 "Bullpup" has been quite active. Many have been fired and handled and as a result, 20 mishaps have occurred, all in flight. Seventeen of the 20 were guidance failures. There were two failures to launch and one early burst. Cause factors: 17 materiel failures, three personnel errors. Here's a case where the Flying Safety Officer might say, "What can I do about the GAM-83? The number of mishaps is directly proportional to the reliability of this bird." Sounds logical, doesn't it—but don't you believe it! You can do a few things. First, check and double check that the missile is properly assembled. Insure no component shows evidence of moisture, corrosion or damage. Be sure all plugs are connected and tight. Do

Lt Col Randall L. Earl, Missile Safety Division

the crystals match those in the aircraft? Are the flares properly installed? Are they the right type? Have the aircraft GAM transmitter, associated cabling, coax connectors and antenna been checked visually, mechanically and electrically? Is the aircraft transmitter checked for proper operation after takeoff and again after launch? Is the missile handled, transported and loaded in a gentle, proper manner? Satisfy all the above and then if the missile fails, see whether the UR section on the base is getting into the act.

Lastly, the rockets: four accidents involving inadvertent launch of 2.75 inch FFARs from F-100 aircraft were reported. All were believed to have occurred as a result of intermittent aircraft system malfunction. With one exception, no specific cause has been determined. In each of the four cases however, (as in previous 2.75 inch FFAR inadvertent firings) the pilot was in the process of activating armament switches or had just completed switching from one position to another when the mishap occurred.

The key to solving and preventing mishaps of this nature is exhaustive, painstaking, investigative effort to pin-point the cause in the aircraft's armament circuitry. The cause is there. It's just a matter of looking, theorizing, probing, testing, checking, thinking, talking, interrogating and looking some more until the guilty culprit is found. Nothing is more frustrating to the investigator than spending days tearing into an aircraft's electrical system and coming up with a blank. Don't despair, you know it's there. Take a little break and start over again. Most of the causes can be pinned down to simple things like loose connections, crossed wires, debris in the aircraft (safety wire, dirt, metal shavings, washers, nuts, bolts, screws, etc., etc., etc.), corroded connectors, bare or chafed wiring and moisture. Of course there are others like faulty switches, chattering relays and worn-out intervalometers. The importance of a thorough investigation cannot be over emphasized. The fault you find and correct may save your life. Plan carefully how you will conduct the circuit-by-circuit investigation before you ever touch the aircraft. By going too far with one theory and not finding the cause you sometimes discover you can't go back. Plan wisely, search diligently. Above all, have patience.

To round out the 56 mishaps there was one MB-1 rocket that suffered a one-fourth inch dent in the heater blanket. This was caused by the tie-down strap latch lock pressing against the rocket. The thing to do here is make sure all straps are adjusted properly so that the latch does not exert excess pressure on the blanket.

So—statistics state the trend is up! Let's bring it down! ★

• BLUE PLATE SPECIAL: SAFETY

The photo at left indicates the popularity of an event that takes place weekly at Carswell AFB. The occasion is the weekly Accident Prevention Luncheon of the 43 Bombardment Wing.

The luncheon, which is optional and informal, is the brainchild of Major Robert F. Erbe, Director of Safety for the Wing. He uses it to pass the word on accident prevention. Programs consist of guest speakers, occasional movies, announcements and lively discussion. Some features that have resulted in seating requirements having to be quadrupled include:

- Attendance is not mandatory.
- Attendees are free to come and go as their schedule permits.
- Lively discussion is encouraged.

The luncheons aren't free, but ten OHRs submitted the previous month or a planned part in the program will get you a lunch on the house. Attendance is not restricted to base personnel; transients are encouraged to attend and to get an oar into the conversation.

Full details of the program appear in the Flying Safety Officers' Kit for June-July.

AERO BITS

CHOCK PROBLEMS. During a recent WESTAF safety survey it was brought to the attention of the team that improper handling of chocks is a serious problem. An OHR has been submitted concerning this problem, which is worldwide and not confined to WESTAF. Specific items are unwarranted delays in chock placement; use of only one main wheel chock; use of wrong type chocks for the aircraft being parked; premature removal of chocks; improper placement allowing aircraft to jump chocks; chock ropes too short. In addition, parking spots are often allowed to become slick with grease and oil, which permits chocks to slide and causes a hazard for personnel working around aircraft.

It was pointed out that several serious accidents could have been averted had proper chock discipline been enforced. Examples: A C-121 jumped its chocks and hit a power unit, causing fire and major damage; damage to two C-135s when chocks were removed prematurely, allowing the aircraft to roll downslope; tail section damage to a C-124 when it rolled backwards after tow bar was disconnected prior to chock placement.

Supervisors and Safety Officers who insist on strict discipline in chock handling might save themselves the work of writing up an accident or incident report.

HYPOXIA? While climbing through 20,000 feet during a night weather refueling mission, the pilot of an F-100 discovered that he had no cabin pressurization. A check of the oxygen system, which was set on normal, revealed nothing amiss, but because of the lack of pressurization, the pilot switched to 100 per cent oxygen. He noted that the blinker was not operating but he continued the mission at altitudes from 25,000 to 28,000 feet. After about an hour he began to experience nausea, light headedness and a pain in the back of his neck. These were similar to what he had experienced during hypoxia demonstrations in the chamber, so he immediately began a descent. The hookup with the tanker was never made.

By the time this pilot had reached 15,000 feet the symptoms had disappeared, however later in the night he awoke with a severe earache. The next morning the ear drum was found to be inflamed. The circumstances of this case point to hypoxia, but the Docs are also suspicious of hyperventilation. The oxygen regulator was faulty and suspected as the cause of this incident.

SUPERVISORY ERROR. After losing one engine while on a cross-country, the crew of a C-123 decided to land at a civilian field. Just prior to turning base, the crew completed the Before Landing checklist and turned onto final at 115 KIAS, 30 in. hg., with 25 degrees of flaps.

On final the pilot in the left seat reduced power to 25 in. to increase the rate of descent. Then flaps were lowered to 45 degrees and power to 20 in. A high sink rate developed and the airspeed dropped below safe minimum single engine control speed. Power was advanced to 30-32 in., and the yoke pulled back in an attempt to reduce the sink rate. This action failed and the aircraft hit extremely hard, about 35 feet short of the runway, bouncing onto the runway. The right main gear collapsed and the aircraft came to rest on the right bottom side of the fuselage. Fortunately there were no injuries to crew or passengers.

Supervisory factor was pegged as the cause since the instructor pilot failed to properly monitor power and airspeed on the approach.

Lt Col James F. Fowler, Transport Sec.

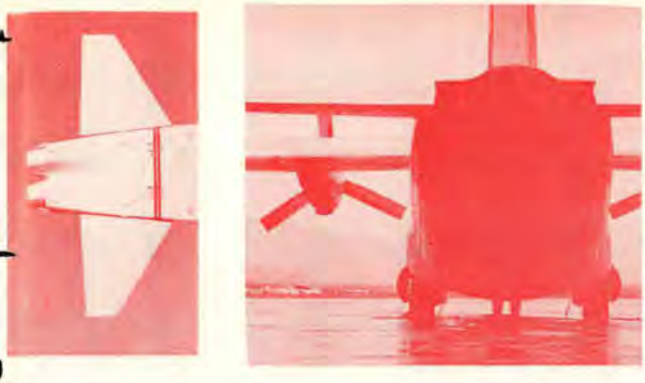
COCKED ATTITUDE—A B-47 landing accident occurred recently in which the copilot ejected at ground level and was killed. Admittedly, the landing appeared to be a somewhat controlled crash but it was quite apparent that he was sitting in a cocked configuration.

A crewmember just happened to be taking movies of takeoffs and landings and was able to film the sequence of events on this accident. By counting the film frames and comparing known ground positions with film speed, the board concluded that the copilot ejected approximately six seconds from the time the right wingtip dragged on the runway. The aircraft came to rest several thousand feet later and received considerable damage but was not destroyed. No other crewmembers were injured.

It is quite apparent as seen by the result of this copilot's ejection sequence, such as canopy separation and ejection seat emerging from the cockpit, that he was either extremely fast in thinking and acting or was fully prepared for the ejection and simply awaiting the opportunity to "pull the cork."

This is certainly not the first case of crewmembers bailing out without an order from the airplane commander. Some years ago a B-47 navigator ejected prematurely while over water and was lost. An entire crew of a B-52 bailed out of an airplane that flew about unmanned for a considerable time before finding the ground and destroying itself.

If crewmembers have so little faith in their aircraft commanders that they "elect to eject" when the slightest thing goes wrong, they should request relief from crew duty and let competent "*men*" handle the job of keeping our Air Force in being. (This in no way



obviates the demand to eject above 2000 feet or, above 10,000 feet for uncontrolled flight, if at all possible when the situation warrants.)

The several cases of crewmembers prematurely ejecting, and thereby causing a chain reaction of confusion resulting in the loss of a first line aircraft, is very strong evidence that a new look at our attitude is required.

Two years ago we added a few bits to Section III of the B-52 Flight Manual: STOP—THINK—COLLECT YOUR WITS. These brief words of wisdom are equally as important in other airplanes. They are certainly more effective in accident prevention than practicing the "Quick Draw McGraw" tactics with ejection seat triggers.

Lt Col D. J. Schmidt, Bomber Section
Bomber-Transport Branch, Flight Safety Division

CAUTION: CHLOROBROMOMETHANE (CB) BEING USED. The CB portable fire extinguisher works on the principle that when this liquid is applied to a fire, dense vapors are formed which smother the fire by exclusion of oxygen. The vapors of CB are moderately narcotic (sleep or stupor producing) and of long duration. The acute toxicity is much less than that of carbon tetrachloride which was one of the reasons for its adoption.

When this agent is applied to a very hot metal surface or open flame, dense vapors and smoke are generated which may produce narcosis or stupor in crewmembers unless precautionary measures are taken. Oxygen masks should be worn if available and when the fire is extinguished, the compartment should be thoroughly ventilated. Prolonged breathing of high concentrations of the vapor must be avoided.

Lt Col John S. Pierce
Life Sciences Group, DTIG

CROSSWIND—During runup, prior to takeoff, a C-47 nosed over, bent one prop and lost the other which went winding off into the boondocks. This was one of those classic I-knew-it-was-going-to-happen accidents and was purely pilot factor in origin.

The aircraft, with full fuel load, four persons in the forward compartment, one aft, otherwise empty, taxied into runup position in a 16-22 knot wind. Instead of parking into the wind, the aircraft was positioned with a right crosswind. Right engine runup was completed and power applied to the left engine. At about 2450 rpm, brakes locked and controls neutral, the tail began to rise. A return to idle and back pressure on the yoke failed to stop the tail and the props struck the ground, one sustaining bent blades, the other leaving the aircraft. Result: an estimated 65 manhours to replace both props and both engines.

We thought this type accident was licked years ago. Obviously this is not the case. Possibly we are getting spoiled by all the three-legged airplanes, since there have been a number of accidents involving conventional gear aircraft, particularly during landing in crosswind. Those who fly these types should take a good look at the Dash One and review the correct procedures.

TRANSPORTING HAZARDOUS CHEMICALS An accident occurred recently when two drums, each containing 83 gallons of hydrogen peroxide, were being shipped on a military aircraft. Although the drums were loaded in a correct upright position, on takeoff one of the drums developed a leak. The peroxide ran across the floor of the aircraft and ignited a nearby corrugated container. The flame and smoke was noticed by the Flight Traffic Specialist who alerted the crew. After unsuccessfully combating the fire with CO_2, the crew smothered the flames with a wet blanket.

This accident pointed up the extremely hazardous properties of this highly reactive chemical and the difficulty of effectively combating fires resulting from spillage. It further raised the question as to whether hydrogen peroxide and like liquid propellants should even be transported in aircraft loaded with miscellaneous cargo. Certainly the stringent safety measures prescribed by AFM 160-39 for the handling, storing and transfer of hydrogen peroxide can hardly be complied with under the conditions that existed.

It is assumed that in this missile age the military necessity of transporting liquid propellants by cargo aircraft will outweigh the risks involved. Thus, the major emphasis must be made in reducing the risk by practicing good preventive explosives safety. In the cited case, preventive safety could have been accomplished by preventing spillage, i.e., proper torquing of the bung plug; in the event of spillage, containment of the spillage by "dyking" in a suitable overflow receptacle; and the presence and use of protective clothing.

In accepting the calculated risk in this type of operation, it is imperative that all aircrew members be thoroughly familiar with the properties of all dangerous materials put aboard their aircraft, their proper handling, first aid factors and measures to be taken in the event of an inflight emergency.

Don Lyon, Ogden Air Materiel Area, Hill AFB, Utah.

TRAGEDY AT

31000

ON FINAL APPROACH the B-52's ILAS power source failed, forcing the pilot to change to GCA. The weather was in the weeds, visibility being limited to one and one-half miles with blowing snow. The aircraft was buffeted by severe turbulence and down drafts on final, and an estimated 15-knot wind was blowing across the runway. (Wind direction and velocity were estimated because the base anemometer malfunctioned while the aircraft was in the pattern.)

The copilot landed the aircraft under circumstances which would have taxed the abilities of a seasoned crew commander. Then he and the radar navigator cut the switches and the crew climbed out of the aircraft.

At a casual glance, the aircraft would have appeared normal, but this was far from the actual circumstance. A closer look would reveal the navigator's hatch cover missing; and when the crew disembarked, it would be noted that the crew commander was not on board.

The navigator's hatch cover had been accidentally jettisoned while the aircraft was orbiting over the North Atlantic at 31,000 feet. During the rapid decompression, the crew commander had fallen from the aircraft leaving the copilot as the only pilot aboard. With the radar operator assisting him with his prelanding checklists, the copilot landed the aircraft.

Let's review the events leading up to this tragedy. The crew was on a routine training mission and, after two successful air refuelings, had established an orbit. Crewmembers were not on oxygen, and all their masks were off. A radar malfunction required inflight maintenance and the navigator, after ascertaining the cause of the malfunction, attempted to find the faulty piece of equipment. He was unable to do so, after an hour's search, and informed the radar operator.

The crew commander, staff navigator, radar operator and the navigator then spent half an hour attempting to locate the faulty equipment. When they failed, assistance was requested via radio from the home base, which advised that the faulty equipment was on the lower left corner of the amplifier rack opposite the food galley.

At this time, the crewmembers were in the following locations: crew commander, standing in the galley; the copilot, in his seat; staff navigator, sitting beside the IP seat; EW officer and the gunner's positions, not reported.

Upon being advised as to the probable location of the malfunctioning equipment, the crew took the following actions: the navigator motioned the crew commander to move so he could enter the galley. The crew commander stepped aft of the navigator's escape hatch. The radar operator started to leave his seat to assist in locating the equipment. The navigator entered the galley, turned and handed the crew commander some object; he then turned back to the amplifier rack. Shortly afterward, explosive decompression occurred due to the navigator's hatch cover being jettisoned from the aircraft because of accidental operation of the emergency hatch release handle.

When decompression occurred, fog filled the crew compartment. The staff navigator and the navigator immediately donned their oxygen masks. The radar operator, who fell or was knocked down in the aisle, saw the crew commander lying in the hatch opening with a refrigerated food container lying on his chest. He reached for the crew commander's shoulder, then began to feel light-headed due to hypoxia. He does not recall anything until he was revived by the navigator. The copilot meanwhile had donned his mask and started an emergency descent to 10,000 feet. He had a lap full of troubles, however, since the automatic pilot had disengaged and he had to hand fly the aircraft. Then his oxygen regulator hose separated from his mask, and he had to reconnect it, only to encounter regulator malfunction. The oxygen pressure prevented him from talking until the aircraft was below 20,000 feet.

After the navigator had got on oxygen, he turned to find the radar operator unconscious in his seat. He retrieved the man's mask from beneath his body and placed it on his face, attempting to revive him. While doing that he saw the crew commander in the hatchway, although he did not know the hatch cover had left the aircraft. As soon as the radar operator had regained consciousness, the navigator turned to the crew commander only to discover that he had disappeared through the hatchway.

The purpose of this summary is to again emphasize the hazards of accidental firing of egress system explosive components. The fact that these devices ordinarily contain only small amounts of explosives is of little consequence. The important thing is the results which occur when they are fired. Every crewmember shares responsibility for eliminating accidents caused by inadvertent operation of egress systems. ★

George Williford, Ogden Air Materiel Area, Hill AFB, Utah

FALLOUT

T-Handle

It is evident that Mr. Charles E. Carroll is well aware of the problems encountered in attaching the zero second delay lanyard to the parachute T-handle. His fine article and pictures explaining the coupler under development and showing a method for "making do" with the present system contain one significant error: the pictures show an attachment using the pilot's right hand. Until the Air Force sees fit to equip its aircraft with right handed throttle quadrants or "formation hold" positions on the auto pilot, the luxury of the attachment as shown will have to be foregone.

For those of us who face the prospect of plunging through the murk with naught but a wingtip and star to guide us, the "ring around the rosy" game with the "free-swiveling" T-handle complete with minuscule orifices doesn't seem to be real good sport.

The reasons for redesign of the parachute D-ring appear to be valid. However, the new T-handle is decidedly not a step in the right direction. As self-appointed spokesman for "Wingmen Anonymous" let me suggest a suitable test for the next parachute opening device that the Aeronautical Systems folks come up with. Have the test subject sit at a desk wearing the test item. Place subject's right hand in the center desk drawer and close firmly on subject's hand. (Be careful closing the drawer; object is to immobilize—not incapacitate subject's hand.) Now open the top left drawer of the desk, remove contents except box of paper clips. Place subject's coffee cup on filing cabinet slightly above eye level; cause subject to stare fixedly at coffee cup while moving paper clips back and forth in the left drawer. On verbal signal "Go" have subject attempt to let go of paper clips and exercise the zero second delay option of the test item within 10 seconds of the "Go" command. Allow the subject 15 ten-second trys in which to complete task.

This test is close to ideal as it realistically simulates the average situation and does not complicate the test environment with such things as turbulence, wingman/lead lack of proficiency or any other occupying but not normal events such as aircraft emergencies.

Thank you for your time and patience in reading and possibly printing this letter. I continue to enjoy your fine magazine.

Capt Jerry Noel Hoblit
8 TFS, APO 123, N.Y. N.Y.

• • •

The article "Zero Second Lanyard" by Charles E. Carroll in the March issue was received with interest by the fighter pilots of my squadron. The proposed design seems to overcome present difficulties in the zero lanyard with the new BA-18 ripcord T-handle.

The article is the first indication I have received that any USAF activity, other than the operational units utilizing this equipment, was aware of the difficulty involved in attaching the zero lanyard. URs from this Wing have been returned with indorsements summarizing that a problem is not recognized, that a sergeant blindfolded sitting in a seat has no difficulty attaching and detaching this lanyard, and that the crews of B-52s have not complained of any difficulty. We are gratified that the Aeronautical Systems Division now recognizes the problem.

Since Mr. Carroll indicated that a possibility existed that AMA might not approve the retrofit action, the pictures in the article might work to our disadvantage; the pictures may be used by AMA to prove that a real problem does not exist, for your pictures make the operation look simple and easy.

The great fallacy of these pictures which might go unnoticed by all but the single seat fighter pilot is the fact that the demonstrator always uses his right hand to hook the lanyard. This right handed system works well in most aircraft and a fighter pilot not in formation can use this system reasonably well by flying left handed momentarily. But—what about the oft neglected man hanging on the wing of another aircraft? This man, if flying in VFR conditions, can move out of formation and use your system or by looking down can use his left hand to hook up the lanyard. However, if the wingman is in actual weather conditions on descent or is flying at night, he cannot move out of formation sufficiently to use his right hand, for flying close formation left handed is extremely hazardous. This pilot can free his left hand from the throttle for periods of one to five seconds and still stay in close formation.

The present lanyard T-handle arrangement makes hookup extremely difficult if not impossible under the above circumstances, especially since the pilot cannot look down during this one- to five-second time period as he attempts to hook up the lanyard with his left hand.

The above consideration may assist in expediting the approval of the retrofit of the T-handle. Although details on the retrofit handle were sketchy, if the lanyard can be placed on and off in a couple of seconds with the left hand without a glance down by the pilot, you have designed a perfect system.

If the handle does not fit all the above criteria, perhaps ASD should take another look at the retrofit. Even though the B-52 pilot is happy with the present equipment, the thousands of single seat fighter pilots have certain requirements that must be considered with each new equipment design which they will ultimately utilize.

Capt Perry M. Smith
615 TFW, England AFB, La.

Life Sciences Group, DTIG, has strongly recommended that a high priority be given to the fix proposed by ASD, and that interim replacement of the T-handle by the old D-ring be considered.

When You Eject

I read with great interest Mr. Shannon's interesting and informative article, "When You Eject," in the November issue. I am sure I speak for all instructors and supervisors here in the USAF Parachute School when I say that we appreciated an authoritative statement in regard to tangible evidence of the parachute technician's work.

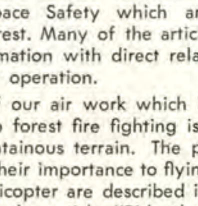
That figure of 1963 lives saved since 1959 by escape systems, even though tempered by the knowledge of too many failures, is a real morale and self-respect builder, especially for our young airmen students attending this course. It may interest you to know that large posters in our shop now proclaim these facts, including suggested remedies for the remaining percentage of fatalities.

Is it possible for us to receive similar information at regular intervals, much in the same manner as in the automatic distribution of AF Technical Orders, thus keeping us informed of the current status of lifesaving figures and parachute effectiveness?

All of us in a supervisory capacity here feel that such information, kept up to date, can be a powerful motivating force, and that our dissemination and publication of it for the benefit of students, instructors and supervisors, official visitors, special course students from all over the Air Force, tours, pilots and aircrews can be of considerable educational value.

MSgt Robert J. Foley
Chanute AFB, Illinois

The information you request is contained in bi-monthly preliminary summaries of USAF ejection experience as part of the Flying Safety Officers' Kit. Copies should be available from your FSO or Flight Surgeon.



From the Forest Service

The Forest Service receives a few issues of Aerospace Safety which are read with much interest. Many of the articles have valuable information with direct relation to Forest Service air operation.

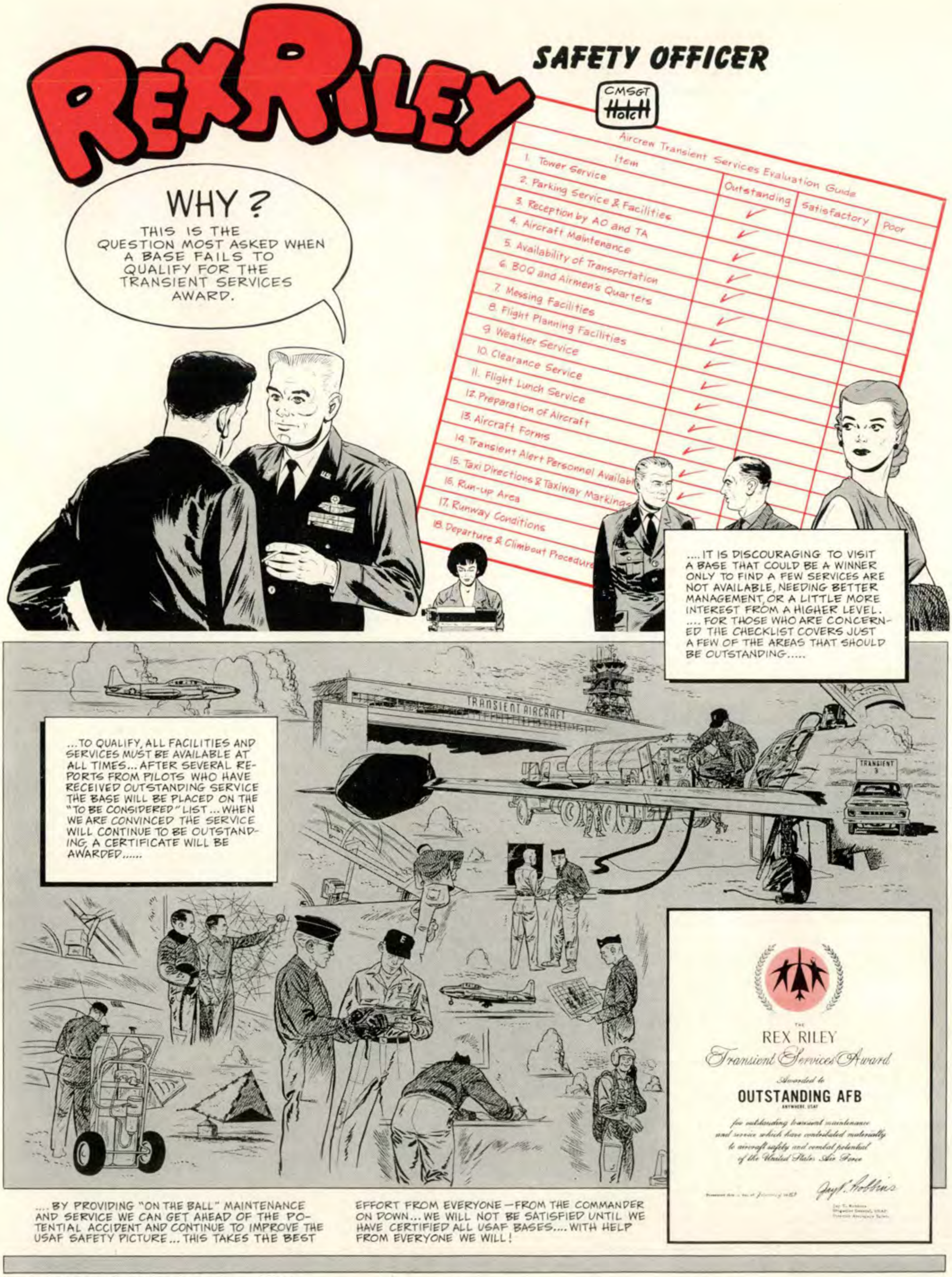
Most of our air work which is primarily in relation to forest fire fighting is done in rugged mountainous terrain. The problems, hazards and their importance to flying such terrain with a helicopter are described in an excellent manner in the article "Ride the Wild Horse" in your March 1963 issue. Most Forest Service helicopter services are obtained from commercial sources. We believe the information in the article is of much value in our work. We plan to make the article required reading for all pilots doing Forest Service helicopter work.

We would like to have several copies of the March issue for information to include in our helicopter pilot training. If you do not have extra copies, may we have your permission to reproduce the article "Ride the Wild Horse?"

Thank you for your cooperation. We consider the Aerospace Safety magazine a valuable publication in our work.

Merle S. Lowden, Director
Division of Fire Control
Forest Service, Washington, D.C.

ASM has received many such requests. Sorry we can't fill them all. However, the full article will be published in the Flying Safety Officers' Kit for June-July. ★



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