

UNITED STATES AIR FORCE • JANUARY 1970

AEROSPACE

SAFETY

THE
MAGAZINE
DEVOTED TO
YOUR INTERESTS
IN FLIGHT



Aerospace SAFETY

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JANUARY 1970

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Perhaps you've already seen page one or the back cover and know that there is going to be a big change for this old book. So beginning with the March issue watch for **Aerospace Safety** to contain both flying and maintenance oriented material.

You'll notice the request that you submit titles for the new combined magazine. We are looking for ideas and there are bound to be a lot of them out there, so how about letting us hear from you? Here's a chance for all of you to write that letter to the editor.

Meanwhile, this issue deals with some of the problems of today. To start off with we have an article about flight leaders. Whether you are the **Lead** or the **led**, the examples given and the discussion of qualities that a good flight leader possesses will be of interest.

The world around us is full of distractions. The trick is not to let these distractions distract one. Now that may sound like a lot of double talk but it isn't really. Read the article "Distraction Factor" beginning on page 8.

Most of the articles this month deal with people. Two, however, concern hardware. You young jocks probably think the F-100 has been around forever. Well, it almost has; in fact, it has become a sort of fighter pilot's Gooney Bird. And what's more, as the article on page 20 points out, with some mods, it may go another 10-20-30?? years. Wanna bet?

Aircrews will be getting new flying suits soon. Made of a fabric that is said to be more fire resistant than the current K-2B suit material, the suits should begin to show up immediately. You'll find the details on page 23. ★

Safety Magazines To Be Combined

Three major Air Force safety magazines are about to become one. Brigadier General B. H. King, director of Aerospace Safety, announced that effective with the March issue, **Aerospace Safety**, **Aerospace Maintenance Safety** and the **USAF Nuclear Safety** magazines will be combined. In announcing the merger, General King said that suggestions for a title for the new monthly magazine are solicited from all Air Force personnel.

Aerospace Safety, aimed primarily at aircrews and operations support personnel, is the granddaddy of Air Force safety publications. It began as a safety pamphlet produced by the Air Transport Command during World War II, and has since been in continuous publication. When the Air Force became a separate service, the magazine took on the title **Flying Safety**. In 1960 the title was changed to **Aerospace Safety** to reflect the expanded Air Force role in missile and space safety.

Aerospace Maintenance Safety, previously **Aircraft Accident and Maintenance Review**, is the Air Force magazine tailored specifically for the technician. It began as a weekly summary of aircraft accidents in 1946 and started publication as a 32-page monthly magazine in 1951.


Nuclear Safety, published quarterly since 1961 by the Directorate of Nuclear Safety at Kirtland AFB, has addressed all aspects of the prevention of nuclear mishaps. Covering the wide range of nuclear materials handling, storage and transportation, this magazine has been distributed to all USAF organizations involved in nuclear operations, as well as many US Army and Navy units and the Atomic Energy Commission.

The new consolidated magazine, to be published by the Directorate of Aerospace Safety under the auspices of The Inspector General, will cover accident prevention information in all areas of Air Force operations. Major emphasis will be in the areas covered by the three previous magazines: aircraft, missile and nuclear operations and maintenance. Also included will be articles oriented toward safe and efficient handling of support equipment and special purpose vehicles.

The name for the new accident prevention magazine should be short (preferably one or two words) and readily identifiable with the Air Force and its mission. The title selected will be the one that best reflects the objectives of the magazine: to promote efficient, accident-free performance by the people engaged in all aspects of Air Force operations.

Due recognition will be accorded to the individual submitting the most appropriate entry.

Suggestions for the name of the new magazine may be submitted on the cut-out coupon from the back cover of this issue, or on plain paper to: The Directorate of Aerospace Safety, AFIAS-E1, Norton AFB, CA 92409, and must be received by 1 Mar 70. ★



ABOUT THE FLIGHT LEADER

You were diverted from your briefed mission this morning to get some trucks the FAC has cornered. When you call him he gives you a quick description of the target and his position. Then he tells you to stand by.


You know the area he describes. You've seen it many times in the nine months you've been in SEA. As you listen to the FAC working another flight, you can visualize the terrain. When the last man in the flight ahead calls off target you are just arriving in the area. You spot him, then the rest of the flight and the FAC in rapid order.

"Okay, Boomer Flight," the FAC calls you as the other flight leaves. "Give me an estimate of your position, you're next."

"I'm over you now," you reply, "orbiting left. I have you in sight."

"Bee-ootiful, Boomer, I've got about five trucks cornered in that





patch of trees off my left wing . . . north of the road . . . against the karst."

Before the FAC marks the trucks he gives you a full description, their elevation, his estimate of the surface wind. When you've rogered that, he goes over defenses in the area . . . moderate automatic weapons fire, escape heading for immediate bailout, and location of the nearest friendlies . . . 15 miles west. You catch your thoughts wandering before he is finished . . . you've worked in this valley many times before. You know the bailout heading and the location of the friendlies.

"Okay, Boomer Lead," the FAC's voice changes. "Let's make passes west to east. Mix them up a little, but go toward that hillside . . . they're tucked in pretty tight against the karst."

Pulling back up for your second

pass, you watch the flight roll in and deliver. They're varying their run-ins enough to keep the gunners off balance, but they're placing the ordnance right where the FAC wants it.

"You're getting ground fire from the top of the hill, Three," the FAC's voice is matter-of-fact. "Four, if you have time, move it 200 meters east to the top of the ridge . . . two guns up there firing now . . . Lead, roll in from your position to cover him . . . north to south . . . north to south . . ."

"Lead's in with guns." You were rolling in when he called. "Move it around, Four; they're tracking you . . ."

As Four releases and starts his pullout, you see something sparkling on his fuselage, aft of the cockpit.

"I . . . I think I'm hit . . ." Four sounds completely surprised. He is jinking as he pulls off over the hill.


The airplane looks intact, no smoke, no fire . . . and he seems to be under control.

You bend your airplane hard toward him as his voice calms down. "Compressor stalls, Lead. No power . . . control's okay, though . . . trying to climb."

Then you see that he is still heading east, toward the bad guys and away from the friendly ground troops.

"Bring it around to the west, Four . . . 180 to the left . . . head west! I'll catch you in the turn. Don't go any farther east!" You see him start the turn, then you ask, "How's the motor, Four? Is it gonna last till we cross the river?"

"Dunno." His answer is brief and curt. He's busy in the cockpit. It doesn't sound good. "How far is the river, Lead? I can't stay with this very long . . . smoke in the cockpit."



Hit on his first pass, Four headed the wrong direction. The friendlies were behind him. If ever he needed a good leader, now was the time.

As you close on him you realize Four doesn't know the area. This is only his ninth or tenth mission. Nothing looks familiar to him yet. In fact, he doesn't really know where he is!

"Lead, I'm going to have to get out . . ."

"Hold on, Four, hold on," you interrupt quickly when he releases the mike button. "Stay with it as long as you can. See that long ridge curving to the north? Beyond that is good guys . . . can you get that far?"

"EGT's pegged . . . getting hotter 'n hell in here . . . but I have control. I can fly the bird."

"Okay, good. It's your show, but stay with it as long as you can . . . get over that ridge." You hear the FAC on guard channel, calling the rescue forces. "The Jollys are on their way, Four."

He crosses the ridge with about 2000 feet to spare. When he ejects, you estimate he is five miles into good guy country. His chute blossoms and then almost immediately disappears into the jungle. Without taking your eyes off the spot where the chute disappeared, you set up an orbit and start to refine your estimate of his position. The FAC is just arriving in the area when you hear Four come up on his radio. He is okay. You begin to relax.

Low fuel forces you to leave before Four is aboard the Jolly, but the situation is under control. On the way home you hear that Four is on the chopper and in good shape. Thank God, you think, he got that bird over the ridge and away from the hostile area.

Without you he probably would have continued heading east until he was forced to eject. Unfamiliar with the area, very busy in the cockpit the entire flight, and then hit on his first pass, Four was close to saturation. Escape to the west, which was automatic reaction to you, required that Four concentrate on the FAC's instructions and then

recall them now that he was in trouble.

Four needed a flight leader. And he had a good one. The system worked as designed, and Four lived to fly another day.

The flight leader's position is one of grave responsibility, not just a position of authority and status. And this responsibility is much broader than merely leading his flight through the air to the target and back.

Unfortunately, not every pilot flying lead in a flight understands this responsibility. Take a recent incident:

Shortly after takeoff, Nr Two in a flight of F-100s found that his afterburner would light every time he moved the throttle to about 87 percent. Flight Lead decided to continue the mission, climbing in burner. After descending in the vicinity of their briefed target, they were diverted. Making another burner climb, and a gradual descent to the second target, they salvaged ordnance and started home. Climbout was in burner again.

Nr Two, who had been doggedly hanging on all this time, found he was down to 2400 pounds of fuel when they were 130 miles from the landing base. At 65 miles he had 1200 pounds and jettisoned tanks and pylons. At 8500 feet, 25 miles from the field, he flamed out, showing 600 pounds in the forward tank. He managed to get the engine relit and flew another 15 miles before the engine flamed out again.

He ejected ten miles from the field.

The accident board found the primary cause was supervisory factor: The flight leader continued the mission when his wingman had a known malfunction which affected safety of flight.

Too frequently, an inexperienced wingman, accustomed to following the direction of his superiors, will

follow his leader into situations he probably would not enter if left to his own judgment.

But a good wingman follows his leader anywhere! And a good wingman doesn't question his leader's judgment.

Now, about the good flight leader . . .

- He has broader, longer experience than his wingman. When problems arise he thinks of more and better alternatives. He chooses the best course of action and reaches a sound decision more rapidly than his wingman.

- He can safely take more imaginative action in a tight situation, because he has a better understanding of the variables involved. He's been there before, knows what's on the other side of the ridge. More at ease than his wingman, in a familiar environment, he observes more and understands more of what is going on around him.

- He can better evaluate all aircraft malfunctions because he knows the machine better than his wingman. Generator failure, TACAN failure, low fuel state, hung ordnance . . . he better understands the impact on mission accomplishment and safe recovery.

- With more knowledge of the mission, he can rapidly evaluate a tactical situation and arrive at an efficient tactical plan. Freed of much of the concentration on switchology and pattern flying that occupies his wingman, he rapidly relates terrain, defenses, weather and target to the mission objective. He plans tactics for the entire flight as the situation develops, or he evaluates and accepts or rejects the plan presented by the FAC, with his wingman's abilities always in mind.

In summary, a good flight leader accepts all the responsibility for successful completion of the mission, keeping in mind his wingman's proficiency, experience and knowledge. ★

the **I.P.I.S.**

approach

By the USAF Instrument Pilot Instructor School, (ATC) Randolph AFB, Texas

NEW HOLDING PROCEDURES

The *Terminal Air Traffic Control Manual*, ATP 7110.8, states: "The most generally used holding patterns are charted on terminal area and approach charts and high and low altitude enroute charts published by U.S. Coast and Geodetic Survey."

Airman's Information Manual, Part I, Departure, states: ". . . and when reaching the clearance limit, begin holding in accordance with the holding pattern depicted on the Coast and Geodetic Survey Chart for the clearance limit . . ." In addition, from the Enroute section: "Pilots are expected to hold in the pattern depicted unless specifically advised otherwise by ATC (Effective October 1, 1969)."

Holding patterns may be depicted on United States Government FLIP Enroute High, Low or Area Charts beginning with the November 1969 issue. Pilot procedures in FLIP are changed to comply with these new air traffic control procedures. The change in procedure requires the pilot to maintain the last assigned altitude and enter the holding pattern depicted on the appropriate chart for the clearance limit. If the clearance limit is enroute, enter the holding pattern shown on the appropriate enroute chart—high, low or area. If the clearance limit is your IAF, enter the pattern depicted at the IAF on the terminal chart. If a pattern is not depicted and holding instructions are not received, hold in a standard pattern on the course on which you approach the fix.

Remember—if a holding pattern is depicted, the controller is required to issue direction of holding and an EAC (expected approach clearance) or EFC (expect further clearance) time, in which case the pilot is expected to enter the depicted pattern. The controller will issue general holding instructions only when a pattern other than the one depicted is to be used.

NOTE: An important point for pilots to remember is that holding procedures upon reaching an initial approach fix (IAF) while experiencing two-way radio communications failure are not changed.

MISSED APPROACH HOLDING PATTERNS

Missed approach holding patterns are being depicted on many Low Altitude Instrument Approach Proce-

dures Charts. There are usually two ways to determine if the depicted holding pattern is a missed approach holding pattern. First, the missed approach holding pattern in the plan view will be shown in 45 per cent of color. The depicted pattern and the associated leg bearings will not be as dark as a normal holding pattern depicted at the initial approach fix (IAF) and used for holding prior to starting the instrument approach. The line width is the same for both the missed approach holding pattern and the normal pattern. Another way to identify a missed approach holding pattern can be found in the missed approach instructions in the profile view. These instructions will include directions to proceed to a fix and hold. The intent of these instructions is for the aircraft to hold in the depicted missed approach holding pattern.

Caution should be exercised to prevent confusing a missed approach holding pattern with a normal holding pattern. One could easily be mistaken for the other under poor lighting conditions. The missed approach holding pattern should be used *only* when executing the missed approach.

USAF IPIS GREETINGS

January 1970 marks the fifth year of continuous monthly IPIS Approach articles. During this time, it has been our privilege to serve as the "sounding board" for many perplexing questions from the field relating to instrument flying techniques and procedures. Continuous revisions to manuals, regulations and documents (e.g., AFM 51-37, JAFM 55-9, TERPs, and FLIP) will prompt many new questions and problems which will require interpretations and answers. Let IPIS be your representative in finding the solutions. We solicit and encourage your interest and participation in the formulation of procedures that will prove to be mutually acceptable to all.

The USAF IPIS hopes that each of you enjoyed a safe and merry Christmas and extends best wishes for a very happy and prosperous 1970.

H. E. ALLSHOUSE, Lt Col, USAF
Commander, USAF IPIS ★

THE WASH OF THE WHIRLEE CHOPPER



Major Pierre Beaucoup and Captain C. Z. Chumley stood watching what had been a proud (venerable, but proud) C-47 slowly being consumed by flames. Firemen were rushing to the scene, but even as they began to pour foam on the burning aircraft, the dejected pair of watchers knew the Goon would never be the same.

The day had started out routinely enough. Pierre, an IP in the C-47, was in the right seat checking out C.Z. as an AC in the left seat. During the takeoff roll everything was satisfactory until trouble in the form of a helicopter appeared up wind from the C-47 and flew along parallel to the runway.

The first indication that they might have a problem came when the C-47 veered slightly to the right, then to the left. Pierre took over and straightened the aircraft. It lifted off at takeoff speed and was flying straight and level when he told Chumley to raise the gear.

Then the helicopter made a right turn and the full effect of its rotor wash was directed toward the Gooney which rolled into a 30 degree right bank and pitched up slightly. Pierre did all he could to correct the roll but the aircraft did not respond. When he lowered the nose in an attempt to regain control, the aircraft settled back to the runway, slid to a grinding stop and began to burn. The pilots and the sergeant mechanic escaped with only minor nicks, bruises and singses, but the airplane. . . .

Later over a cafe au lait in the cafe au lait shoppe, the two aviators discussed the events that preceded the demise of one each Bird, Gooney.

"I 'ave been reading some of ze back issues of ze safety magazines given to me by l'officer de safety," said Pierre, "and I 'ave learned zomesing.

"We were the veectems of zat crazee helicoptaire zat fleu along beside us. My friend, do you know w'at 'oppen to us?"

Chumley replied that he was new to the theater, hadn't flown around helicopters before and, furthermore, if the chopper was in any way responsible, didn't ever want to see another.

Pierre agreed with Chumley, but being a more mature individual, pointed out that living with helicopters operating from the same bases was a way of life in SEA. "But ere is w'at 'oppen," he said. "You are no doubt familiar, mon ami, with w'at is call ze wake turbulence to be found behind feexed weeng aircraft . . ."

Chumley nodded.

"Well, ze helicoptaires, 'ave ze same thing, only eet ees call rotair wash, comprenez-vous? An' eet ees very dangerous at low altitude. You see, helicoptaires are quite maneuverable, w'ich means zat zey do not 'ave to operate within such narrow leemeets as feexed weeng aeroplanes. Zey can land any place and frequently do. We mus' line our aeroplane up weeth ze runway on final and then land on ze runway. Not ze whirlee chopper. He can fly alongside ze runway like zat one today and land any place he weeshes.

"Now, he ees doing zat when along comes a happy fellow een hees aeroplane and . . . voila! We 'ave a somew'at bent machine.

Pecture, if you weel, mon ami, ze rotair wash from each side of ze rotair, flowing back behind zat crazee machine. Les vortices, zey are call. Now zey flow back from a forward moving machine, and zey slowly seenk toward ze surface. As les vortices near the ground—at, say, about one-third ze rotair diameter from ze surface—zey stop

settling and spread laterally. Zat is sideways, mon ami.

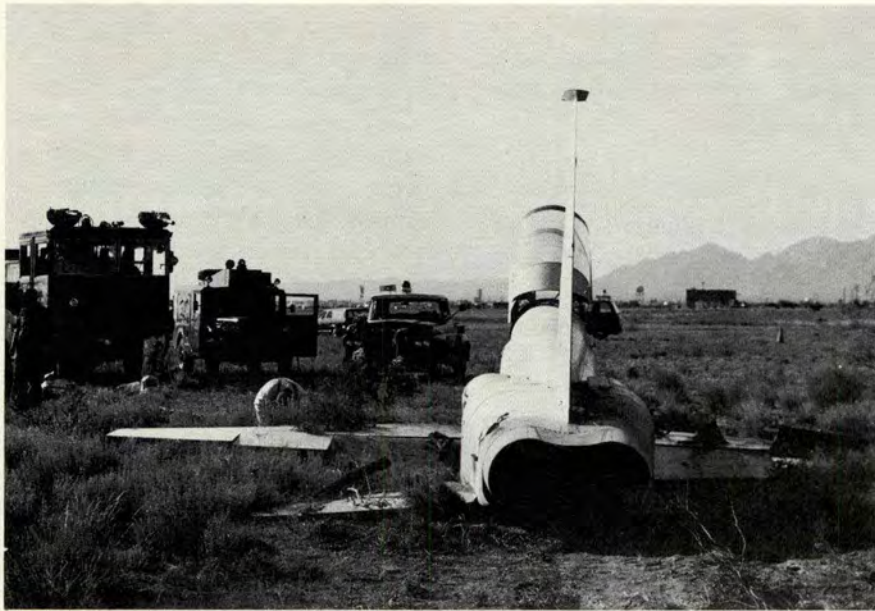
"Weend becomes veree important w'en the whirlee chopper is operating near the runway. As a rotating vortex moves laterally toward a runway, a light weend from ze opposite direction might just offset the lateral speed of the vortex, causing it to remain stationary on the runway. Pairhaps zat ees w'at 'oppen to us."

Chumley ordered another cafe au lait and pondered Pierre's words against a mental picture of the wreckage of the C-47. "I've heard of O-1s and other light planes getting into trouble in rotor wash and wake turbulence," he said, "but I didn't expect any trouble with a bird as big as the Goon."

"Ah, mon ami, zat is w'ere lots of fellows 'ave got into trouble. Zey thought only in terms of light aeroplanes. Well, let me tell you, ze fact ees that aeroplanes of all sizes 'ave been guillotined — C-7s, C-130s, OV-10s, O-2s and O-1s just to mention a few. And zey are mos' vulnerable w'en flying low and slow because at such speed zey may lose control and stall at an altitude from weech they cannot recovair. Comprenez-vous?"

"I think I've got the picture," said C.Z. "From now on I'll keep my distance from choppers. Since the vortices sink, I'll fly at the same altitude or higher than the helicopter when crossing behind it and I'll stay upwind when possible. When landing, if I can't land upwind I'll make sure to give the wash a few minutes to settle down before landing into it."

Pierre smiled and twisted the horns of his moustache. "I believe, mon ami, zat we 'ave learn ze secrets of operating safely—at least reasonably safely — around zose whirlee choppers. Come, eet ees time to go testify before ze accident board." ★



**IT IS NOT ALWAYS APPARENT,
BUT IN MANY ACCIDENTS THERE WAS THE . . .**

DISTRACTION FACTOR

Like quizzes? Why not take a minute — just one — to try this one. Then decide whether you need to read on.

1. It's Saturday morning and you are mowing the lawn when a stunning young lady with the longest legs and shortest mini skirt you ever saw saunters by. You
 - A. Continue mowing and pay no attention.
 - B. Smile in a friendly but reserved manner and continue about your business.
 - C. Stare so hard that you forget what you are doing and drive the mower through a row of your wife's prize petunias.

2. You are driving on the freeway at relatively high speed during a busy part of the day when your eye is caught by an interesting sign off the freeway. You
 - A. Concentrate on driving and ignore the sign.
 - B. Look at the sign for a moment and when you look back find that your car was about to leave the lane you are in.
 - C. Look at the sign too long, your car drifts and your right front fender grazes the car in the next lane.

3. You are at work, on a night formation mission flying on Lead's right wing. Since his NAV equipment is out, he asks for bearing and distance to a fix and you look into the cockpit long enough to get the coordinates from your inertial guidance computer. When you look back
 - A. Lead is right where he was when you turned your head away.



- B. You have moved in a bit and must move back out to avoid hitting Lead.
- C. Lead's wing is right in front of your windscreen and there's no way to avoid a midair.

If you answered A to all of these you are numb, lucky, or superhuman and need read no farther. But if you are a normal man and marked some B's or C's, read on.

Ever since Eve turned Adam's head, men have been victims of what we call *distractions*. Distractions come in all sizes, shapes and descriptions. Some are pleasant, some not. Some are sudden, some come on slowly. Some are soft and subtle while others smack you like a tackle for the Rams.

Some are benign. Some are deadly. There is no way of accurately tabulating the latter because of the finality of the results. We don't really know the magnitude of the problem because we can't positively relate distraction to very many fatal accidents. The best we can do is look at the results of distraction on a pilot when it is known and accounted for.

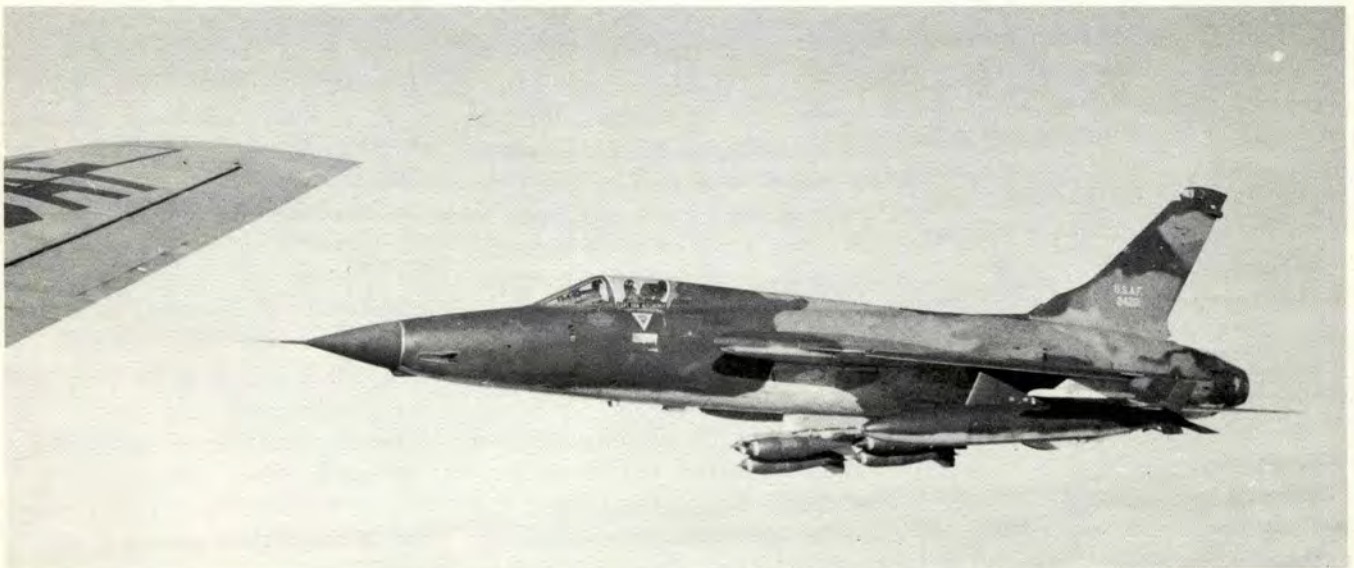
Distractions occur with great frequency, probably to each of us ev-

ery day. Fortunately they don't often occur at a critical moment in a potentially hazardous endeavor. When they do, and no accident results, we usually don't find out about it. So we don't know about those. With this vacuum added to those who can't tell us because they are dead, we are left with relatively few experiences upon which to base judgments and make recommendations.

The "accounted for" events are of value, however, in detecting potential hazards and devising means of prevention.

Anyone is subject to distraction, but the inexperienced are probably more prone. This may be because this person has his hands full doing his job and a distraction may be more than he can cope with: in other words he becomes oversaturated.

An example of this occurred when a student pilot became distracted by a surging engine and other aircraft in the traffic pattern. This young man made a few mistakes—like lowering full flaps instead of half, letting his airspeed and altitude get low, pulling the mixture control to lean (off)—that resulted in a forced landing in which he stalled the aircraft some 15-20 feet off the ground.



a young pilot. Evidence indicated that during a gunnery pass the pilot may have attempted to reposition a gun camera switch and flew into the ground.

A B-52 was destroyed when an instructor pilot diverted his attention while a student IP was performing a very demanding maneuver. For just a few seconds, while the aircraft was nearing the ground on final approach, the instructor concentrated on changing radio channels. When he looked up he saw they were in trouble, but it was too late to prevent the accident. The aircraft hit short of the runway in a nose-low position and the gear was wiped out. After sliding nearly 7000 feet it was destroyed by fire.

While the term diversion may be semantically more exact than distraction in this case, we needn't get too picky because the results could be the same.

Some distractions are desirable. For example, we use lights and sounds to attract a pilot's attention, which in turn distracts him from what he's doing. In this case, it is desirable to call his attention to an abnormal or potentially dangerous situation, such as gear not down prior to landing, a fire warning, a pre-set alarm that tells the pilot that he is at a minimum altitude.

Regardless of whether the distraction is the result of some unforeseen event or a built-in safety device, the effect on the pilot can be the same: it can cause over-concentration on one item to the detriment of the effort as a whole; it can cause an interrupted sequence not to be completed; it can result in confusion and disorientation.

Now all of this sounds pretty bad and one wonders if there is anything that can be done about this problem. Here are some suggestions based on experience, accident in-

vestigation findings, and ideas borrowed from others.

- First, the individual can help himself by knowing his equipment. This is particularly true for younger, less experienced pilots, or for even the old heads who are transitioning into an entirely different kind of aircraft and mission. Knowledge is power (and safety) when something unexpected occurs and the remedy depends on the pilot doing the right thing almost instantaneously. Knowledge also permits the pilot to determine when he has to act immediately and when he has time to take stock and move a bit more leisurely.

- Discipline plays an important role in overcoming the insidious effects of distraction. One must tend to first things first. Discipline depends on knowledge, in this context, and the combination of knowledge and discipline permits the pilot to establish priorities and exercise options. In short, give himself all the maneuvering room possible.

Finally there are mechanical aids — lights, bells, horns, etc. These, of course, are distractions themselves and, unless dealt with intelligently, present their own hazards. Some of the newest systems now appearing are virtually fool-proof. For example, one system that is being considered for a commercial airliner includes a checklist that cannot be advanced to the next step unless a previous step has been accomplished. This may be varied by permitting steps to be taken out of sequence but those missed keep showing up on a lighted panel until they have been accomplished.

Devices like these no doubt will save airplanes and lives. But machines can't do all our thinking, especially when judgment is necessary to determine the next course of action. That is work for a man. ★

DISTRACTION FACTOR . . .

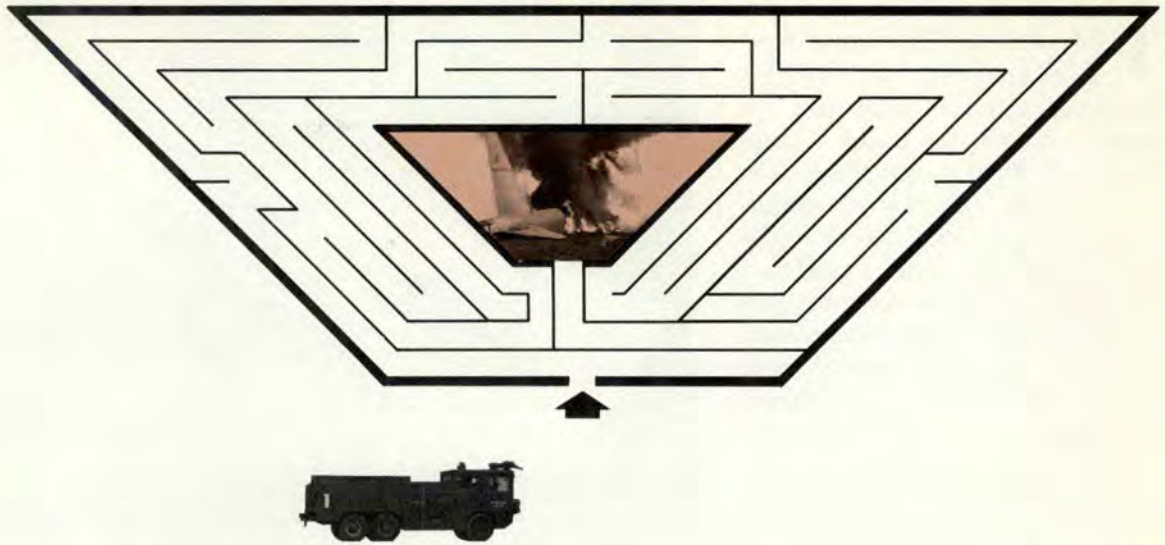
While the primary cause was found to be pilot factor in that the student misinterpreted engine surge as an engine malfunction and cut off the fuel, his actions seem to have been conditioned by inexperience, an abnormal situation and distraction.

A discussion of distraction in relation to aviation usually brings to mind the classic case of the pilot whose attention was diverted during his before-landing check and he forgot the gear. Fortunately that one is rare nowadays, but it still happens. Here's one a bit different.

On a low-level photo-recce mission the pilot was flying at 500 to 800 feet AGL for an oblique photo. Perhaps this one would be better labelled target fixation. Nevertheless, this pilot was looking at the target rather than at his flight path and the aircraft hit the top of a tree. He was real lucky and got back with a scratched bird instead of ending up as a statistic buried in a smoking hole.

Maneuvering flight at low level allows little time for anything but tending to the job at hand. A wandering mind can't hack it. This is where just a momentary lapse can cost one his life.

Although no one knows for sure, it was suspected that such a momentary distraction was fatal to



CAN YOU GET THERE FROM HERE?

Maj David L. Elliott, Directorate of Aerospace Safety

Crash grid maps have been a constant headache for all people concerned. Many hours are spent updating these maps, striving to keep them always accurate and, most important, depicting all access roads to every area on the map. Changing conditions, construction on the airfield, even the change of a parking plan, can cause major changes in the crash response to any given accident. This subject has been stressed to the point that crash map maintenance has become a sore thumb — perhaps because the actual valid requirement is not in sight.

You would think that in this day and age the statement below just couldn't occur: "Crash response was timely up to the point that the trucks reached the large ditch and could proceed no closer to the accident. The pilot was already being removed from the burning aircraft by personnel who were closer to the area. Because of the intensity of the fire and the exploding ordnance it

would not have been feasible to risk lives and equipment in controlling the flames once the pilot had been removed. Two crash rescue crews reacted promptly to the crash alarm. Unfortunately they . . . were not aware of an existing alternate path to the aircraft. Although crash grid maps are carried in all crash trucks, none indicated a large impassable ditch in that area. It was learned that many crash crew personnel were not aware of the ditch. There was no plan to bypass this ditch or other obstacles which might hinder access to accidents within the field boundaries."

The principal lesson is that the crash grid map is a tool. It is a training aid and a road map. It should reflect all changes that could in any way affect response to a crash.

The first step is not to drive down the flight line to check the map, but to establish a plan that will guarantee the map is updated when

changes occur. A Master Crash Grid Map should be maintained by the Fire Marshal or the Fire Chief. Any change of parking plan, any construction or ditch digging should be coordinated by requirement with the man in charge of this Master Grid Map. An operating instruction that requires a dated monthly or weekly check of all access roads should be in existence and working.

An update system for all existing crash grid maps should be in existence to insure that all maps are kept up-to-date. And most important of all, all crash rescue personnel should receive timely instructions on changes in access routes to all areas.

During periods of construction even daily changes may be required. Check your crash grid map maintenance plan. If you don't have a plan—get one. If it doesn't provide for all contingencies, rewrite it. Then check it. If it doesn't work—rewrite it again. ★

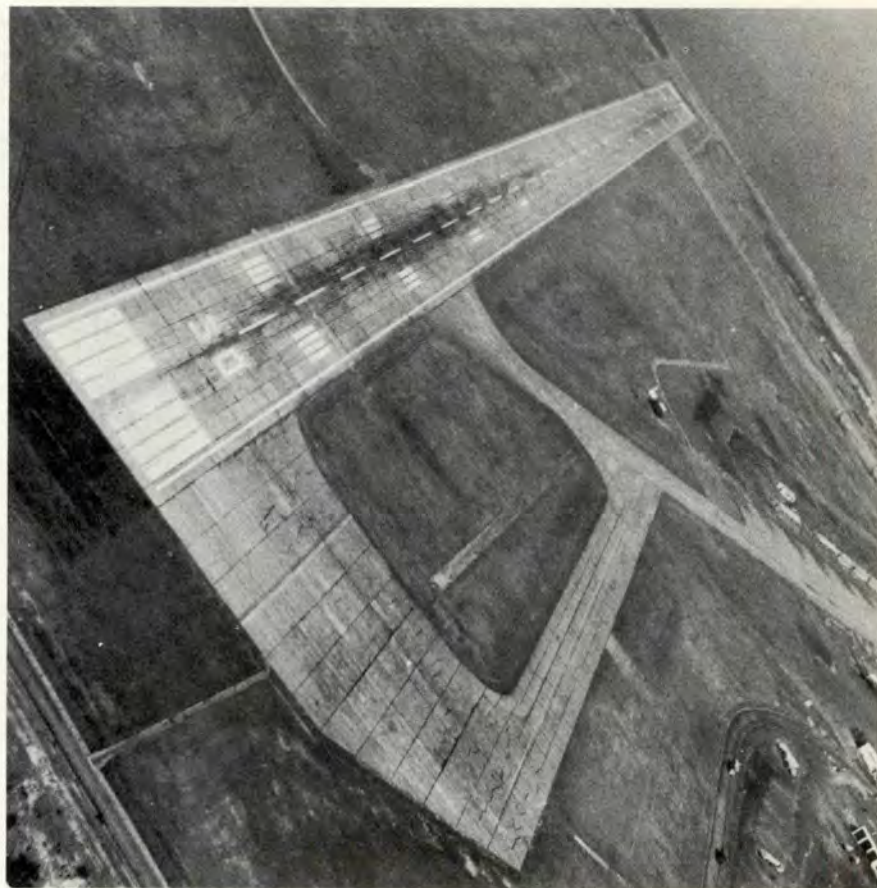
There are many ways to break an airplane. They range from a complicated, and lengthy chain of events, building for months before the accident happens, to the ultra-simple. You would think that the straightforward or easily understood single-acts would generate straightforward and easily understood preventive action. Unfortunately, when a pilot's accident-causing error stems from a lack of experience, the answers aren't all cut and dried.

Take accidents that follow a loss of control in the turn to final. The classic pattern involves an overshoot in the turn to final, approach to a stall, high sink rate, possibly uncontrolled yaw or roll, depending upon the particular airplane's characteristics. Then in rapid sequence follow: go-around instructions from the ground, a final attempt at power and/or control application, delayed ejection and impact short of the runway.

What's the problem? you say. Landing patterns are pretty basic. Anyone who allows himself to be caught by increased stall speed in the turn, or excessive angle of attack on final, just doesn't understand the problem and needs more instruction. Preventive action: training and supervision.

You're right. No argument. But lets add one more—experience. You don't often find an old, experienced head involved in this type of accident. He may get sloppy or careless, and find himself looking trouble right in the face, but he's been there before. He rapidly processes the numerous information inputs of airspeed, angle of bank, crosswind, power, rate of descent—and airplane feel. Without a great amount of conscious thought, he corrects away from the impending stall. He saves the approach if it is within reach, or he admits his error and goes around.

The less experienced pilot, the



THE HARD WAY- EXPERIENCE

new head, doesn't have it quite so easy. He hasn't been there often enough to make his reactions as automatic as they are for the old head. It takes him longer to evaluate and process the information he's receiving. Sometimes it takes him too long, and he finds himself in a situation that is new to him and beyond his capabilities.

• An F-100 pilot returning from

a combat mission entered closed traffic from a practice instrument missed approach. He had encountered a stiff crosswind during the approach, but placed his downwind in a normal, no-wind position. Turning base, he was very close to the runway, and as he progressed around the turn his bank angle increased steadily. When he was about 500 feet above the ground in

a 45-degree bank and obviously overshooting, Mobile told him to go around. He added power but his bank increased rapidly to almost 90 degrees as adverse yaw took over. At about 200 feet, the pilot initiated ejection and the bank began to decrease. Seat separation occurred before the pilot impacted the surface, but his parachute did not have time to deploy. He had less than 300 hours flying time since his graduation from UPT.

• An AT-33 pilot, with 800 hours multi-engine time and about 25 hours in the T-bird, found himself returning with unexpended ordnance after aborting a range mission. He had been briefed on the local hung ordnance pattern but had never flown it. Entering on a 45 to downwind, he turned to parallel the runway when he was almost over it. Realizing his error, he banked sharply away from the runway, then reversed the turn to come around to a base leg. He was still in too close. As his bank increased from 60 degrees to almost 90, and his nose dropped 45 degrees below the horizon, the Mobile controller instructed him to go around. The response was very slow, the aircraft continued in an 80-degree bank with the nose very low. Approximately 100 feet above the ground the airplane came to an almost wings-level attitude and the nose started to come up. Rate of descent continued high; the aircraft impacted almost wings-level. The pilot did not eject.

The low-experience pilot is actually processing more information in this type of situation than a more experienced pilot. He has been taught a specific pattern and is concerned when he is five knots off his airspeed, or fifty feet off altitude. He is not very far removed from a training situation—or he may still be involved in training—where emphasis is placed on doing it right the first time. More of his attention is devoted to flying (or correcting

to) a precise pattern. In correcting his position in relation to the runway, he diverts too much attention from airspeed, power or bank angle. When his attention does come back to these parameters, it may be too late to safely continue the approach. But he tries to save it because he doesn't know it is too late. He hasn't actually been there before, doesn't realize that he's nearing the point of no return.

We haven't yet found the formula for instant experience and each of us has accumulated experience the hard (and sometimes painful) way. Many of us have been pulled out of a tight spot before it closed in around us by another, more savvy pilot—an IP, the guy in Mobile, a flight lead.

The Mobile Controller, when he's on his toes, doing his job, will quickly spot a bad pattern. If he knows the pilot, he will evaluate the pattern in terms of that pilot's experience and ability. In any case,

he will take action before it's too late. A warning, even to an old head, before a go-around is mandatory, can save the day. Certainly, when Mobile knows the pilot is new or inexperienced, he shouldn't hesitate to issue a go-around before the pattern has deteriorated beyond safe recovery.

But there's another angle to this experience thing, and that's recognition. Regardless of your flying time, age, rank or position — as long as you fly, you will continue to encounter situations you have not experienced before. The important thing is to acknowledge that they are new — you haven't been there before. Then proceed with the amount of caution dictated by your knowledge of the situation, its newness or strangeness.

You *can* get there when you haven't been there before. But you'll be assured of a safe arrival if you go at it with deliberate caution the first few times. ★

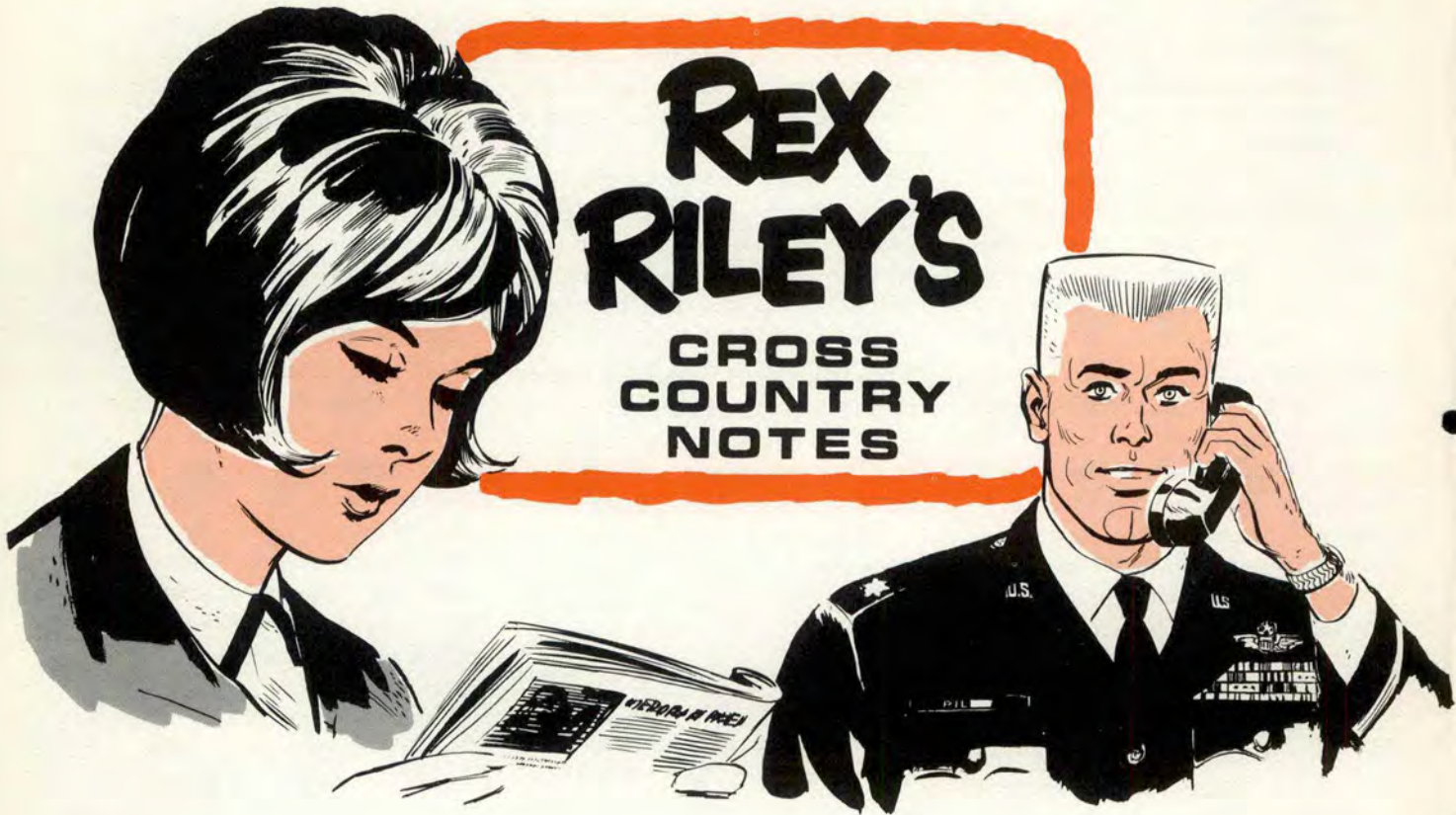
“ARE YOU READY?”

In an article titled “Are You Ready” in the November 1969 issue we made some statements about withdrawal distances from ordnance engulfed in flames as they apply to local base rescue (LBR) helicopters. Our statements, on page 19 of that issue, require some amplification.

We paraphrased an aircraft accident report, saying that withdrawal distances for ground fire fighting equipment are based on blast effect and no data are available for helicopter units to relate these distances to the effects of shrapnel or debris, which caused the accident we were describing. In that one, the entire rotor system of the helicopter was severed by flying debris. However, blast or overpressure from the explosion could have caused disabling damage as readily as the debris.

Information available to us at this time indicates that the withdrawal distances for ground fire fighting equipment, contained in T.O. 11A-1-55, are valid in any direction and apply to airborne helicopters as well, although the T.O. does not specifically mention them.

The accident board recommended that a study be completed to develop standard procedures for HH-43 coverage of accidents involving explosive ordnance. This study is now underway.



REX RILEY'S

CROSS COUNTRY NOTES

CABBAGE PATCH. It has happened again, with the expected results. An O-2 was being fueled but there wasn't quite enough gasoline in the bladder to finish the job. So the hose was attached to another bladder that had been delivered to the refueling spot by forklift and the tanks were topped with an additional 10 to 15 gallons.

Apparently the mission was flown with no problems and the aircraft returned and was refueled. The next day engine failure caused the pilot to make a forced landing in a cabbage patch. The bird was pretty badly dinged and the crew was injured. When the investigators dug into the cause they found that the second bladder contained JP-4. Apparently not enough was introduced during the previous day's fueling and the aircraft engine operated okay. But when it was refueled with more JP-4, that did it.

Such mistakes have cost us lives and aircraft, and will continue to do so until there is some foolproof method to positively prevent them. Until then, people who fuel aircraft must be constantly aware that this possibility exists. Supervisors should make this a frequent item of discussion, and aircrews would do well to make sure they have the proper fuel aboard.

GROUND EGRESS PRACTICE. When one performs a task day after day it seems that it becomes automatic. Such is not always the case when the task is rushed, especially under great stress. This is why frequent practice of ground egress is necessary. Getting out of the bird under normal circumstances is no problem. But in an accident, especially with fire, rapid egress may mean the difference between life and death. The examples to follow reinforce the wisdom of frequent ground egress practice.

When an F-105 went off the runway during takeoff, the gear collapsed and the bird stopped, on fire, about 125 feet off the pavement. The pilot jettisoned the canopy, released the lap belt, parachute chest strap and left leg strap, and tried to stand up. But he forgot



to release the right parachute leg strap and was pulled back into his seat. He then released the strap, but again he forgot—he had not disconnected the oxygen hose from the CRU-60P connector. He pulled it loose and climbed out over the canopy rail.

The other accident involved the pilot of an F-4 making a formation landing. He also found himself off the runway in a burning aircraft with a collapsed nose gear. When the crew scrambled out of the airplane the AC forgot to release the parachute riser-shoulder harness fittings and the survival kit prior to attempting egress. The right sticker clip did not release so he then manually attempted to disconnect the canopy releases and pulled the survival kit handle. As he climbed over the left side, his parachute remained under the left canopy rail attached to the survival kit. There he hung, suspended by his parachute risers, over the left intake in the area which was burning. Firemen came to the rescue and cut him loose before he got singed.

Have *YOU* practiced lately?



SPEAK THE SAME LANGUAGE. There's an old, tired story about the IP who was back-seating it around the busy traffic pattern at a training base: On the go from a touch-and-go, he decided to shoot the next pattern himself to show the student some fine points. Trouble was, he inadvertently punched the mike button when he said, "I've got the airplane." Immediately, the story goes, every student in the pattern released the controls of his aircraft. It took several minutes to sort out the confusion.

That story has been around for a lot longer than I have, and it is usually met with a "you've gotta be kidding" reaction. But check the incident below . . . they still happen!

On landing roll, in a tandem-seat fighter, the student in the front seat found he couldn't pull out the drag chute handle. Getting the gist of the mutterings in the front seat, the IP obligingly offered, "I'll get it," and pulled *his* drag chute handle. The IP then busied himself adjusting his mirror so he could check that the drag bag had deployed. Meanwhile, the student, seeing the bird weathervane after the chute deployed, assumed the IP had taken control of the airplane.

Before they got this one sorted out they:

- Overtook Lead, who had landed in front of them,
- Engaged in a shouting contest about who had control of the bird,
- Each took turns jabbing at the brakes,
- Finally veered away from the other airplane, and
- Taxied to the ramp with Lead's drag chute hanging forlornly from their pitot boom.

There's a lesson here somewhere, about agreeing between the two of you exactly what you're going to say when you take control of the airplane and then both sticking to it.



HELP WANTED. In the reorganization to consolidate three major USAF safety publications in a single monthly magazine, we thought we had all the wrinkles ironed out, all the positions filled with hard-working, experienced people. Then one of them went and got himself promoted out of the job. So we're out beating the bushes.

Starting in April-May '70, the desk of the Assistant Editor will be vacant. We're looking for a major (or captain) to sit at it . . . sometimes. Much of the time he will be chasing around the building (and around the Air Force at large) tracking down material for magazine articles. He will be writing articles, short briefs and accident reviews, as well as editing and re-writing material contributed by others.

He should be a graduate of the USC Flight Safety Officer's course and have experience at wing level or higher in Safety, Operations or Maintenance. Of course, a completed SEA tour is a must. Flying experience in more than one Command or flying mission is desirable, but not required. A degree in engineering or education would help a lot, too.

We're not looking for an accomplished journalist as much as someone with reasonably broad Air Force flying experience who wants to tackle a challenging, sometimes frustrating and always changing and different job.

If you're interested, or know of someone who fits the bill, please write: Directorate of Aerospace Safety (AFIAS-E1), Norton AFB, CA 92409; or call Autovon 876-2633. ★

A BIT OF FLAP



— a pilot learns that communication is more than telephones.

"Well, it's about time!" the Ops Officer roared as Tom walked into the building Monday morning. "I hardly had a chance to get through the door this morning when Colonel Martin was on the phone. He wanted to know what the big flap was between you and the command post Friday night."

Captain Tom Winters stopped momentarily in his tracks. Collecting his thoughts rapidly, his mind racing over the events of the past weekend, he moved toward the counter to face the Ops Officer. He knew there was no point trying to soft-pedal this one. Best to face the facts.

"Yes sir,—ah—bit of a flap on the

phone." Tom couldn't decide where to start his narrative. "I still think I was doing the right thing. We'd pushed pretty hard all day, and with no pressurization, and that icing, I was bushed and I knew the rest of the crew was too. When they wanted us to continue beyond normal crew duty time just to get the bird back home, I told them I was calling crew rest."

"That's not exactly the way I heard it from the DO on the phone just now, Tom. What's all this about RON-ing because of icing enroute . . . and then arguing about a crew-duty extension when they gave it to you?" He paused, then went on. "But I'm sure there are two sides to this thing. Service your coffee mug and come in the office. We'd better sort this out before it gets to the Old Man—we can, can't we?"

"Oh sure, sir," Tom saw this was

his opportunity to be heard. "I guess all the DO has heard is what that major in the command post told him. And that guy just didn't understand that he couldn't know the condition of my crew from his soft seat a few hundred miles away."

"Okay, Tom," the Ops Officer was seated at his desk with his pencil ready. He was going to the DO's office armed with whatever facts Tom could give him. "Give it to me so I can understand your decision. Start as far back as you need to, but give me the details of this exchange with the command post controller."

"Well, you know Friday was the last day of this exercise with the Army. We were on duty at 0450, scheduled for two drop missions

and then the run back here. The local missions went smoothly—as well as you could expect. We were unpressurized and had no cooling on the flight deck. But that wasn't a major problem, certainly, for what we had planned for the day.

"Then, when I landed after the second drop, I got a call from our command post saying we were to divert on the way home to pick up some cargo and passengers. I pressed off and didn't have any difficulty until we approached the divert base. There was pretty sour weather in the area—icing, drizzle—but after flailing around with Approach Control for a while, I got to ILS final and landed. By the time I parked and located the load, it was 1650. We had two hours left of our normal 14-hour crew duty."

The Ops Officer was scribbling on his pad, nodding as Tom went on.

"I guess I made up my mind to RON while I was talking to the

It was a busy day supporting an Army exercise.



weather man. He gave me the same kind of weather all the way home. Freezing precip, icing, all that. And without pressurization, I would have to stay at low altitude, with passengers aboard.

"We had figured about 1 plus 50 to get home. Adding that to the time it would take to load the cargo and secure it, I couldn't make it

in normal crew duty time. That's about what I told the command post. The guy there acted like he sure wanted me to overfly the fourteen hours—like, just a little bit, you know. And I told him I didn't think I should.

"He finally said, 'Okay, if you insist on it, Ill give you a two-hour crew duty extension.' Something like that. I guess his tone of voice carried all the impact, but I made up my mind then and there I wouldn't let him talk me into something I really didn't think we should do."

"Okay, that's fine." The Ops Officer was still nodding in agreement. "Its your decision and you made it."

"So I told him I was RON-ing, and we'd bring the bird back Saturday morning. That was when he told me to hold the line, he was going to call the DO. I guess he didn't exactly say he was directing me to come back right away, but the whole exchange felt like he was really putting the pressure on.

When he came back on the line, he said to go ahead and RON — but to take minimum ground time and be off no later than 0500 in the morning. 'It's 1700 now,' he said. 'That gives you 12



"We were on duty at 0450 . . . two drop missions . . ."

hours—which should be all you need.’

“I didn’t argue. Maybe I should have. Twelve hours would have been okay, but considering the time it would take to taxi the bird to another parking spot, tie down the load . . . and then the business about getting transport to town and a motel. We’d been told there were no quarters available on base.

“The guy in the command post was right on the edge of getting nasty—and I’d had enough of him. So I rogered the 0500 takeoff and hung up. I think he may have still been saying something, but I had my instructions—all I needed from him, anyway.” Tom was showing some of the emotion he had felt Friday as he relived the phone conversation.

The guys on the crew were relieved when I told them we were staying for the night. But when I told them about the takeoff time, I saw their smiles disappear. We went back to the aircraft, taxied to the other side, checked load security so we would be ready to leave in the morning.

“When we got to Billeting, they said they couldn’t give us a vehicle to the motel until two other transient crews were ready to go. We waited another 40 minutes or so. Then it took half an hour to get into town. At eight-fifteen I was back in my room after eating in my goat skin—and I had about seven hours until get-up for the 0500 go.

“Walters and Hawkins had to go to another motel with the rest of the NCOs. They told me they were unable to get to bed until after nine o’clock, and had to get up earlier than we did because the bus was picking them up first. That’s what generated the OHRs they turned in when we got back.”

Tom stopped talking and raised his almost-forgotten coffee mug. The Ops Officer finished writing

and looked across the desk for a long, silent minute.

“I thought you were on the right track there when you turned down the two-hour extension, Tom,” he started slowly. “But then only 12 hours ground time. . . .

“I guess I can see how it happened, though. You couldn’t foresee all the delays. And you didn’t want to push the command post any farther after they gave you the RON you needed.”

The Ops Officer got up and reached for his jacket and hat. The interview was over. Tom went back to the coffee pot to refill. Nothing to do but wait for reaction from the DO.

Colonel Martin watched the Ops Officer and the major from the command post as each one told his version of the story. It didn’t take long for him to see that as each went through his narrative, the other was frequently surprised as the facts came out. The colonel gave them both a chance to finish. Finally they were both silent, expectant, a hint of hostility bridging the distance between their chairs.

“It’s obvious to me,” he started slowly, “but I wonder if either of you caught what I caught as you went through your two very different versions of what happened. You,” he turned to the major, “and your captain,” he nodded to the Ops Officer, “weren’t communicating!”

The colonel leaned back and let that soak in for a minute. “There are a number of points in each story, as you told them here, that obviously you didn’t tell each other on the phone Friday night. For instance,” he faced the major again, “it sounds to me like Captain Winters never knew he was operating on an extended crew duty day or why he was diverted. He was diverted to take part in that flood relief operation in Ohio and we

had authorized a 16-hour crew duty day. He thought he was on a 14-hour day. Obviously, he wasn’t told at the time he was diverted, and didn’t understand the urgency of his mission.”

The major started to speak, but he didn’t.

“But that’s not all.” The DO turned enough to fix his gaze on the Ops Officer. “From what you and I both heard Major Wells say just now, do you think Winters fully explained all of his reasons for insisting on the RON? How about the unpressurized cabin? I don’t think Wells here knew they’d have to fly back through that icing at low altitude with passengers. What about the inoperative flight deck air conditioner and its fatigue effect on the crew during the day? And when we decided on 12 hours’ ground time, we didn’t know the quarters on base were full, or the extent of the delays in getting to and from the motel.

“Of course, no one could forecast all of those delays, but we would have better understood Winters’ situation if he had clued us in on all the problems.”

Both the major and the Ops Officer appeared about to speak, but the colonel cut them off. “A little more communication, and more effort to understand the problems of the guy on the other end of the horn, could have stopped this long before it was big enough for me to get involved.

“Sure, I realize that once the atmosphere of friction was established, there was little likelihood that Winters could get through to us with a complaint about delay getting to and from the motel. But that was the result of non-communication right from the start.

“Okay,” the colonel waved both of them out of the room with the back of his hand, “you two get out of here and let me write something for the CIF about people talking to each other. Or people not talking to each other. Or something.” ★



Pilot Factor

About 35 per cent of the Air Force's major aircraft accidents bear the label *pilot factor*.

This seems to be a fairly high percentage, although we aren't aware of any optimum figure that may have been determined. So for want of anything better, we must assume that of all the major aircraft accidents that occur, approximately one-third of them will be laid on the pilot. Since we're stuck with that figure, distasteful as it may be to aviators, let's look at another side of a many-faceted subject. Some examples will perhaps best serve to get started.

- F-4E — Shortly after the pilot made a left pitch for landing, the aircraft rolled faster than normal and continued to roll after the ailerons were neutralized. The pilot rolled around to straight and level, disengaged the stab aug, retrimmed the rudder and was able to make a straight-in without further trouble. The problem was a malfunctioning yaw amplifier that deflected the rudder five degrees left.

- F-104A — During cruise at FL 310, .85-.87 Mach, the aircraft suddenly decelerated and assumed a nose-down attitude. Engine instruments were checked in the green, flaps, speed brakes and landing gear were in normal position. The pilot applied military power, nose up trim and jettisoned the drag chute. Deceleration ceased immediately but the nose-up trim now caused pitchup which with the existing airspeed actuated the stick shaker. The pilot went to takeoff flaps to increase the stall margin and recovered. All this occurred within about 10 seconds and 5000 feet of altitude was lost.

A precautionary landing was made at a nearby base and the bird checked over. Apparently the drag chute was improperly installed by personnel who were not familiar with the F-104 drag chute installation. Here again a pilot was faced with a serious situation that required a quick reaction and thorough knowledge of his aircraft. We can only speculate on the outcome had this event occurred during

takeoff or in the landing pattern.

- T-33 — Toward the end of a flight the pilot noted a left stick restriction with aileron boost on. Right stick travel was okay. He turned off the aileron boost and lost all left stick travel. Boost on, he still had a little bit. He slowed the bird at altitude to check control and made a 12 nautical mile straight-in. During flare he had the left wing down a bit for crosswind when complete left stick travel was lost. Nevertheless, this pilot made a successful landing. The aileron boost bypass valve had failed.

Each of these was reported not as an accident but as an incident.

Almost without exception Air Force pilots are highly skilled, confident and extremely proud. In a profession that demands the best, they feel they are the best. Part of their pride comes from the knowledge that they have mastered the many skills required to qualify for the position they hold.

Most recognize the possibility that they may someday find themselves in a situation with which they cannot cope. They are also realistic enough to realize that there are occasions wherein the pilot is a contributor to the situation, and these situations occasionally become accidents with the primary cause labeled Pilot Factor.

But pilots also prevent accidents. What if we applied a factor to accidents *prevented*? What do you suppose the pilot factor percentage would be?

Each of the examples given could very well have been an accident except for the actions of the pilot. So wouldn't it be accurate to say that more often than not we can take pride in those words, Pilot Factor? ★

OLD FIGHTER PLANES NEVER DIE

Lt Col Wayne H. Hemm
Directorate of Aerospace Safety

A fighter plane, due to its mission, must endure more stresses and strains than any other type of aircraft. You wouldn't think many pilots could spend most of their Air Force careers associated with one type fighter plane as they can with something like the old Gooney bird. Well, the possibility is becoming more of a reality. The F-100 Super Sabre has been operational since 1954 and is still going strong as one of the major workhorses in SEA.

Granted, due to its age, the F-100 has developed some creaks and groans both internal and external. But it is being given a new life. With modifications that are in progress, and others programmed, it looks like the Super Sabre will never die, but just slowly fade away.

A brief history of the fighter that introduced the Century series reads like this: The YF-100 made its first flights on 25 May 1953 and set a new record by exceeding Mach 1 in level flight. The first F-100A was delivered to the Air Force on 26 October 1953. The last F-100F was delivered 30 September 1959, completing the delivery of 2288 F-100A, C, D and F airplanes. F-100 units



are active in TAC, USAFE, PACAF, ADC, ANG, and in the Nationalist Chinese, Danish, French, and Turkish Air Forces.

Now let's take a look at some of the modifications being accomplished and programmed on the F-100s.

In September 1965, an Airplane Structural Integrity Program (ASIP) was undertaken on the F-100 to determine what was required to increase its service life. Comprehensive fatigue load gathering programs were developed to collect flight load data, ground load data, and in-service failure data. Eventually, a full scale fatigue test of

wings, fuselage, vertical tail and landing gear was undertaken (and is still underway) on unmodified and modified components. Early tests on unmodified components indicated incipient failures in certain components. Before the tests were completed, catastrophic in-flight failures of these components resulted in the loss of three F-100s and two pilots.

Due to the ASIP, an immediate interim fleet modification was completed in January 1968. Other modifications underway as a result of the F-100 ASIP are: (1) replacement of the wing center section lower dual skin which will delete the present 4

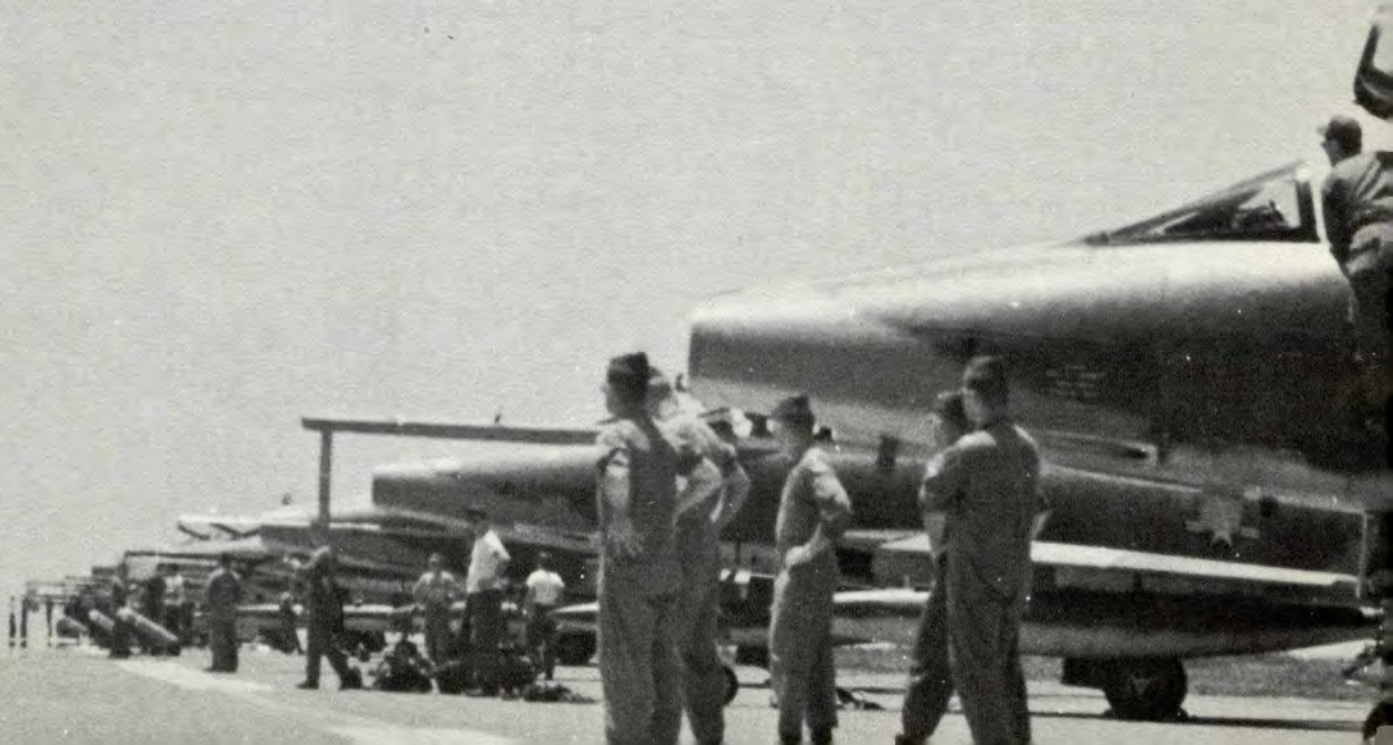
G restriction on the aircraft; (2) replacement of the wing outer panel lower skin which will add active-life airframe hours to the bird; (3) installation of a reinforcing doubler on the fuselage about halfway between the canopy and vertical stabilizer.

Engine and engine-associated mishaps have been the leading single cause factor of accidents in the F-100. Recently, metal fatigue has caused failures of the tenth stage vane and shroud assembly in the J57-21 engine. To correct this problem, a force generation program is being accomplished to replace tenth stage vane and shroud assem-

Still going strong! Move over, Gooney Bird, another old timer is joining your act.



This F-100 wears camouflage suit. Super Sabres carry their share of the load in Southeast Asia.



Thunderbirds flew F-100s for years. Just recently switched to newer F-4s.



F-100 and AIM-9 in action.



Buddy refueling. F-100 proved to be versatile with many capabilities.

blies in all J57 engines. A complete rehab of the J57 engine has been proposed under a project called "PACER RAKE." If implemented, it will greatly increase the life and reliability of the engine.

Many F-100s have been lost due to flight control disconnects. Improper installation of nuts on bolts has resulted in the bolt falling out of flight control linkages and the pilot being forced to eject. Remedial action of changes from one type of nut to another, fleet inspections, and improved inspection procedures did not correct the problem. Finally, action has been taken to minimize, if not eliminate, this problem by installation of self-retaining bolts in the rudder-horizontal stabilizer system, ailerons, and flaps. These bolts will not fall out of the flight control linkages even if the nut does come off.

Tests are being conducted for possible modifications to the F-100 egress system. These would incorporate installation of a single motion ejection system, a dart seat stabilization seat-man separation system and a Stencel forced-deployed parachute.

We in Flight Safety would like to see *both* the aircraft *and* the pilots reach retirement age in good condition. ★



As test bed, F-100 was launched with rocket tied to its tail.

Dropping bombs — just another weapons delivery for this old bird that is getting a new lease on life.



YOUR NEW FLYING SUIT

Lt Col Robert Bonner
Directorate of Aerospace Safety

Next time you are issued a flying suit expect something new. It will look different because it is different and there are a few things you should know about it.

The main feature can't be seen but it's very important. This suit, the CWU-27T, is made of *Nomex* and is more fire-retardant than the K-2B you are now wearing. It won't melt and about 150°F more heat is needed before it will char.

When one reviews injuries received in ground impact *survivable* accidents, it becomes apparent that fire causes more injury, disability, disfigurement, and death than any other single agent. Considerable research has been devoted to producing a fire-retardant suit for Air Force aircrews which is comfortable and still will provide protection

against fire. The result is the *Nomex* suit. The following cases illustrate the need for such a suit.

Case 1: As an F-4D aircraft approached the touchdown point, it began to roll to the right. The pilot was unable to correct the roll and a go-around was unsuccessful. The right wingtip contacted the runway and the aircraft, in a nose-down attitude, veered to the right and departed the runway. The copilot ejected in a left bank ten feet above the ground, at an airspeed of 140 knots. He ejected through a spray of fuel and his clothing and equipment were soaked. Fire erupted and his coveralls burned during the ejection sequence. The K-2B flying

coveralls and gloves provided no protection from the fire. He succumbed 19 days after the accident from third degree burns to 90 per cent of his body. Although the ejection system worked perfectly, the individual died from burns. Had the *Nomex* suit been available, this death would have been prevented, since *Nomex* doesn't burn and does not transmit heat below 900° F.

Case 2: During takeoff roll, the aircraft commander of a B-52D elected to abort the takeoff shortly after S-1. He was unable to stop the aircraft on the runway. As it crossed the perimeter road and drainage ditch, aircraft breakup started and fire ensued. The pilot





New CWU-27T Nomex flying suit designed to provide extra protection to crew in case of fire. It is now in supply as a replacement item.



This suit is more form-fitting than the K-2B which it replaces. It won't be as comfortable in hot weather, but that's a trade-off for increased fire protection.

ordered the crew to abandon the aircraft. He attempted to open his hatch unsuccessfully. Consequently, he escaped out the copilot's hatch. Flames were in the area so he went over the nose and down the left side. He received second degree burns of the left wrist. The crew chief was seated in the IP's seat. He also went out the copilot's escape

hatch but evidently jumped directly into the fire. His flight suit ignited and he had to be forcibly restrained in order to extinguish the flames. He died 48 hours later from complications of the second and third degree burns over 82 per cent of his body. The EWO had no difficulty exiting the aircraft through his own escape hatch. While he was

escaping, a fuel explosion occurred and engulfed him in flames. He died 24 hours later from second and third degree burns received over 92 per cent of his body. These two fatalities might have been prevented if fire-retardant flight suits had been available, since a *Nomex* suit would not have ignited.

The two cases mentioned above



Sage green in color, suit has stood up well in test washings.

clearly demonstrate the need for a fire-resistant suit. There are numerous other examples in accident files to support this idea.

Now let's look at a case where an individual had a fire-retardant suit. As a TF-101F was taking off, oscillation developed shortly after the afterburners were ignited and the aircraft yawed right and left. The

pilot initiated abort procedures. The nose gear sheared, the left main gear collapsed when the aircraft left the runway and fuel from a ruptured drop tank ignited and enveloped the aircraft in flames. The pilot jettisoned the canopy and exited over the right side. When he got outside the fire area, he went to the assistance of the copilot who also was out of the aircraft. The pilot received first and second degree burns (not considered serious) in the face, neck and wrist areas. He was wearing a chemically treated fire-resistant flight suit which he had obtained from the Navy. The lightweight flight jacket was burned and portions melted to the fire-resistant suit. The copilot, who was wearing the standard cotton K-2B flying coveralls, received fatal second and third degree burns over 66 per cent of his body.

Discussion with the medical personnel who took care of both these pilots made one point quite clear. The wearing of the fire-resistant flight suit by the pilot indeed saved his life. His burns were minimal and will not require any extensive hospitalization. Conversations with burn team specialists at the Brooke Army Medical Burn Center clearly demonstrate that individuals wearing fire-resistant suits have much less severe burns and are more likely to be able to continue an active flying career.

Naval aviators are sold on fire-

resistant suits. Since they have worn them, there are several cases where individuals escaped from burning aircraft with minimal burn injuries, where before, in similar circumstances, the individual probably would have been fatally burned.

This doesn't mean, however, that you should dawdle in a fire. The *Nomex* suit is *not* a fire-fighting costume. It is not fireproof, but it is fire resistant and *will* give you additional protection.

As for some other aspects:

The *Nomex* suit was not, like the K-2B, designed to be worn over a Class A uniform. It is more form fitting.

It will probably not be quite as comfortable, primarily because it does not dissipate moisture as effectively as the cotton material in the K-2B.

The suit is washable and tests indicate no problems up to 35 or so washings. It is sage green in color—like the K-2B—so expect some fading with long usage.

At present the suit is intended for year-round wear and there is no plan for a winter version. However, the suit was designed to be worn over the CWU-9 insulated underwear during cold weather.

Deliveries were scheduled to begin in late December with sustained supply expected by 1 May 1970. Procurement of the K-2B has been discontinued and the new suit will be issued on a replacement basis. ★

AEROBITS



FIVE MINUTES IS A LONG TIME . . . when you're preparing to bail out of an airplane. Few aircrew members are afforded that kind of luxury when they have to abandon a stricken bird. Most make their final preparations in a small fraction of that time.

A multi-engine aircraft crew who recently bailed out suspected they would have to jump at least five minutes before they actually left their bird. And with all that none of them took the time to don his flying jacket or gloves. None of them attempted to fasten a survival kit to his harness although kits were available in the airplane.

In addition:

- One crewmember didn't bother to put on his helmet.
- One didn't fasten his chin strap and lost his helmet immediately after he left the airplane.
- Another who failed to fasten his chin strap managed to retain his helmet because his oxygen mask kept his helmet on.

Fortunately the weather was good, winds were light and the crew landed close to civilization. The two without helmets had their landings softened by trees. None of the four was involved in an extended survival

situation. They were all rescued with only superficial injuries.

You may not be so lucky! Your life support equipment does you little good if you don't wear it properly—or if you leave it behind.

And this time of year, it's mighty important!

(Adapted from a SAC bulletin)



ABORT EARLY—AVOID THE CRASH. In a recent ten-month period the Air Force wrote off half-a-dozen flying machines which crashed on take off without doing any flying. The investigations revealed that in nearly every case there was time for the pilot to abort and save the aircraft.

Why didn't they? Maybe because they weren't spring-loaded to the ready position—ready to take positive, planned action. There's a batch of difference between merely memorizing emergency procedures for the Stan/Eval exam and knowing them so well they become second nature. There's very little time for decision-making when you're driving a high speed tricycle. And there's no room at all for guesses.

Your abort actions must be timely and they've got to be right the first time, every time! The margin for error is so small you simply can't afford to bet your life on it—so don't! Be prepared on every takeoff. It's the most critical phase of the flight.

P.S. Fighter pilots, there are two controls in the

cockpit which you should be able to put your finger on like RIGHT NOW—without looking! One lowers the cable catcher. The other operates the instant weight reduction and garbage disposal system.

Major Robert Picht
Directorate of Aerospace Safety



PILOT-TO-FORECASTER SERVICE (PFSV). An event that occurred at Maxwell recently went something like this: "Hey Sarge, how is the weather at Columbus and what does it look like in about three hours?"

"Fine, sir, weather at Columbus AFB is three thousand scattered, ceiling five thousand, vsby above six miles."

"NO! NO! I mean Columbus, *Ohio*."

Fortunately, other than an aggravated forecaster and an upset pilot, there were no other problems.

However, let's suppose this request had been received via Pilot-To-Forecaster radio and the pilot's destination had been Columbus, *Ohio*. If the Columbus AFB weather had been given in place of Columbus, *Ohio* weather, the pilot would have been rather surprised to find three hundred overcast and vsby one mile with rain showers at his time of arrival.

Here are some of the stations that sound similar, particularly over the radio: England and Eglin, Stewart and Sewart, and two of the worst offenders—Robins and Dobbins. A simple solution to Robins and Dobbins is to always say "Warner Robins" instead of just "Robins" alone. Due to the acoustics in most weather shops, radio reception will play tricks even though the stations have dissimilar names. For example, McDill and Maxwell, Barksdale and Maxwell. Eglin even sounds like Maxwell at times. Interruptions, cutouts, and ground station transmissions also play havoc with reception.

Fortunately, the solution to the problem is simple: Speak slowly, enunciate clearly, and if in doubt about being understood, amplify. This will help the forecaster to provide you with better service.

SSgt Billy D. Longgear
Maxwell & Gunter's Safety Bulletin

(Can you think of any confusion-producing names in your area?—Ed.)

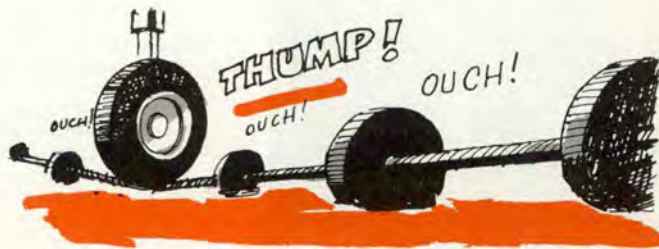


A PARACHUTE CAN SAVE YOU—OR KILL YOU! During an overwater ejection from a crippled (Navy) F-4, the RIO allowed himself to be distracted by a possible leak in his life preserver at the expense of giving thought to ridding himself of his parachute. Convinced that his life preserver had a leak after entering the water, he decided to immediately find his raft before he took the time to release his Koch fittings. Just before he reached the raft in the seat pan, a large wave hit and drove him underwater. When he surfaced he was entangled in the parachute shroud lines.

He released his Koch fittings at that time, but found one leg entangled in the shroud lines that were pulling him under. After a bit of a struggle, he found the knife from his survival vest and cut himself clear of both shroud lines and raft.

It takes one like this to remind us how deadly a water-filled praachute can be. A perfect ejection can be of little value if you are then drowned by the parachute that just saved your life.

(Adapted from USN *Crossfeed*)



ARRESTING GEAR CABLE SUPPORTS. A number of airfields within PACAF are now equipped with polyurethane plastic rails for supporting aircraft arresting gear cables. These rail-type supports are permanently attached to the runway and are in position regardless of whether the cable is extended across the runway.

The polyurethane supports are capable of withstanding high speed roll-overs and will not cause damage to aircraft or tires. However, like the rubber donut, they can and most probably will be damaged beyond repair if touchdown occurs directly on the supports or on the arresting cable. ★

Maj David L. Elliott
Directorate of Aerospace Safety



MAIL CALL



front of a jet engine intake with no significant disturbance resulting from jet intake generated vortices. (Are vortices actually generated in front of jet engine intakes or do we have just a general air movement? Has a smoke film been made?)

It seems possible, however, that at high power settings and with engine intake relatively close to the ground, certain types of material, not already airborne, may be disturbed enough to be sucked into jet engine intakes. Can you identify any film that may show this?

George E. Kammerer
SMAMA (SMITF)
McClellan AFB, Calif.

We suggest an Air Force film SFP 1263, "The Case of the Million Dollar Pliers." Also see the Sep 1962 and Feb 1965 issues of Aerospace Safety. Articles on the subject appear in both of them.

"DON'T KILL THE CROW," OCT. 69 ASM

The author of subject article italicized "in normal sequence with other traffic" which is the fly in the ointment because it puts the monkey on the pilot's back to assess the traffic situation when he's hardly in a position to do so.

The term "minimum fuel" may be meaningful, for example, if a pilot is VFR and number two for landing. But, if he's IFR and about to transition to approach control, how in the world can he assess the traffic ahead of him and the fuel required to get him on the ground?

I would suggest that a term "marginal fuel" be used to clue controllers to inquire what is meant in flying time at, say 5000 feet, and the term "minimum fuel" to denote an emergency situation. Then the crow would be a crow, and a blackbird an entirely different species.

Charles D. Kilpatrick
2578 Air Base Group
Ellington AFB, Texas

It sounds to me as though you're proposing a new name for the same bird, and we're not getting tangled up with another species after all. "Minimum fuel" is supposed to trigger controllers to inquire . . . if they have something other than a no-delay approach in mind for you. And "emergency fuel" means emergency, which seems a lot more direct and meaningful to me than any other word I can think of. Now, about "marginal fuel." Marginal for what . . .?? Ed. ★

FOD

With reference to the FOD article in the August 69 issue, I'd appreciate further information relative to the words: "An engine can pick up objects through vortex generation. McDonnell Douglas Corporation has conducted tests of this phenomenon. They have shown that a jet engine can pick up relatively large objects — bolts, marbles, pieces of sheet metal and small rocks."

Through the years, I have been led to believe that just the opposite is true, i.e., that a jet engine generally will not pick up such objects unless said objects are already in motion from prop or jet wash, winds, etc. It seems I recall movies of nuts, bolts, gravel, cloth, etc., placed on the ramp in

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Presented for
outstanding airmanship
and professional
performance during
a hazardous situation
and for a
significant contribution
to the
United States Air Force
Accident Prevention
Program.

4 Tactical Reconnaissance Squadron, Bergstrom AFB, Texas



Major
Raymond L. Norman

On 13 March 1969, Major Norman was piloting an RF-4C on a low-altitude training mission with a student navigator in the rear seat. While in a level 45-degree-bank turn at 1200 feet and 420 ktas, the aircraft struck a flight of ducks. One duck struck the right quarter panel of the windscreen and continued into the cockpit, glanced off the instrument panel and struck Major Norman on the head and right shoulder. Although stunned and blinded by debris from the bird and windshield that had blown under his visor, Major Norman realized he was at a high angle of bank at very low altitude. Due to high wind noise, communication with the navigator and ground control was extremely marginal.

The birdstrike also rendered the aircraft warning lights inoperative and caused the "Fuel Low Level" light to illuminate. Major Norman correctly analyzed this warning as erroneous and dumped fuel to lighten the aircraft for an immediate landing. By now, he had regained partial vision in both eyes. By shouting into the microphone, he advised Bergstrom tower that he had an emergency and was landing immediately. Although suffering extreme pain in his right arm and severe burning in his eyes, Major Norman safely landed his aircraft. WELL DONE! ★

469 Tactical Fighter Squadron, APO San Francisco 96288



Captain
Michael P. C. Carns

While flying a night strike mission in an F-4E, Captain Carns was unable to release six 500-pound bombs loaded on the right outboard station. Since the hung bombs exceeded the asymmetrical load limit for landing, Captain Carns obtained additional fuel and proceeded to the jettison range where he made two additional unsuccessful attempts to jettison the bombs and the Multiple Ejector Racks. Then he elected to land with the asymmetrical load condition.

Captain Carns flew the F-4E to a smooth touchdown on the 9000-foot runway and subsequently deployed the drag chute. Prior to initiating braking, he noticed a considerable shower of sparks in front of the aircraft's right wing. He immediately determined that both the bombs and the MER had separated and were moving down the runway beneath the aircraft. Captain Carns steered the aircraft to the left side of the runway and selected afterburner on both engines, but made no attempt to get airborne since there was a good possibility that the right wing, flaps, and aileron might have received damage from the skipping bombs and the MER. At approximately the 5000-foot mark, the pilot in the rear seat informed him that the bomb forward of the wing had finally left the right side of the runway. Captain Carns then retarded the throttles to idle, lowered the tail hook, and steered for the center of the BAK-12 barrier and made a successful engagement. By exercising outstanding judgment and ability in the face of multiple hazards, Captain Carns safely recovered a combat aircraft under the most uncommon of circumstances. WELL DONE! ★

The Name Is The Game!!!



Beginning with the March 1970 issue, Aerospace Safety, Aerospace Maintenance Safety, and the USAF Nuclear Safety magazines will be consolidated in a single, comprehensive monthly accident-prevention publication. We want YOUR suggestions for a name for the new magazine. See page 1 for details.

I suggest the title of the new magazine combining Aerospace Safety, Aerospace Maintenance Safety and USAF Nuclear Safety be _____

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YOUR NAME _____
ADDRESS _____