AEROSPACE SAFETY

UNITED STATES AIR FORCE

SEPTEMBER 1966

COMMAND CONTROL . . . SEE PAGE TWO

AEROSPACE SAFETY

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AFRP 62-1 VOLUME 22 NUMBER 9

Fallout

FAMILIAR FACE

I thought the face looked familiar as I read the "Well Done" salute to Capt James D. Johnson, 4510th Combat Crew Training Wing, Luke AFB, Ariz. (Inside Back Cover, July issue.)

Then I remembered that this is the same officer (a Lieutenant then) who had bailed out of a stricken B-26 over South Vietnam on February 6, 1963. He spent a few days in the thick jungles before finally reaching a clearing where he was spotted by flying mates who sent a chopper to his rescue. (The story appears in "Air Escape and Evasion," a book edited by Lt Col James F. Sunderman, USAF, and published by Franklin Watts, Inc.) I interviewed (then Lt.) Johnson at Tan Son Nhut Airfield the day he was returned to safety. Colonel Sunderman and I were there on Tdy at the time.

Evidently Captain Johnson has cultivated a good habit—staying calm and doing the right thing when the chips are down.

Congratulations on another fine issue.

MSgt James A. George, USAF
Staff Writer, The AIRMAN Magazine

Thank you for this story.

To The Editor, IPIS Approach

Reference your article on types of procedure turn depiction (May issue AEROSPACE SAFETY), I should like to vote for the holding pattern depiction. During four years of teaching instrument procedures in a Combat Crew Training School, we have weathered many changes in procedures for holding patterns and low altitude procedure turns. Our experience has shown that for a procedure to be easily learned, it should be kept as simple as possible.

The holding pattern type of portrayal helps to keep AFM 51-37 procedure turns as simple as possible. Of the three types of portrayals, it best depicts the basic information needed to perform any of the recommended turns. This includes the depiction of the inbound course, the outbound course, and the maneuvering side.

The barbed type depiction is an adequate presentation, as it also gives a good picture of the inbound course, the outbound course, and the maneuvering side. However, the barbed depiction requires a little closer scrutinization to ascertain these details than does the holding pattern type.

The teardrop depiction is entirely unsatisfactory. This type appears to represent a required, or at least a desired type of procedure turn, instead of just presenting sufficient data to perform any of the recommended procedure turns in AFM 51-37. It cannot be standardized, as recommended teardrop courses differ for aircraft with different pattern speeds. The teardrop depiction does not portray the outbound course or the maneuvering side nearly as well as the other two types. When a type of turn other than the teardrop is to be accomplished, it may require more than just a glance to determine which side is the maneuvering side. The vertical profile on the teardrop depiction may be of little assistance, and, in fact, may be a hazard as presently used. If it calls for a "Right Turn," this de-

continued on page 28

Who's concerned about SAFETY?

Every agency of the United States Government from the executive down through all departments is very concerned about safety. In fact, just about every business is concerned about safety. So are our insurance companies. I think YOU are concerned about safety; I KNOW I am.

Government agencies are so safety conscious that offices have been established to promote safety throughout the individual departments. Industry spends vast sums of money to promote safety. Population centers throughout the country do all they can to make safety a byword. Insurance companies certainly spread the word by giving us lower rates if safety requirements are met.

Why is it so many do so much in the interest of safety?

The answer, basically, is with you and me. Why? Because we are humans—Homo Sapiens—the weakest link in the chain. Our country can design, fabricate, and manufacture just about any item that is required for any particular function. And we can do it so the end product is almost "goof proof." And, right there is the rub. ALMOST "goof proof."

Great strides are being made by the top thinkers in this safety business. They have taken one brainchild, System Safety Engineering, and integrated it into the design phase of new products. The Legislative Branch of our government does much to encourage "built-in" safety in many industrial outputs. The Executive Branch of our government has lent the prestige of that office to a safety program, Project Mission "Safety 70."

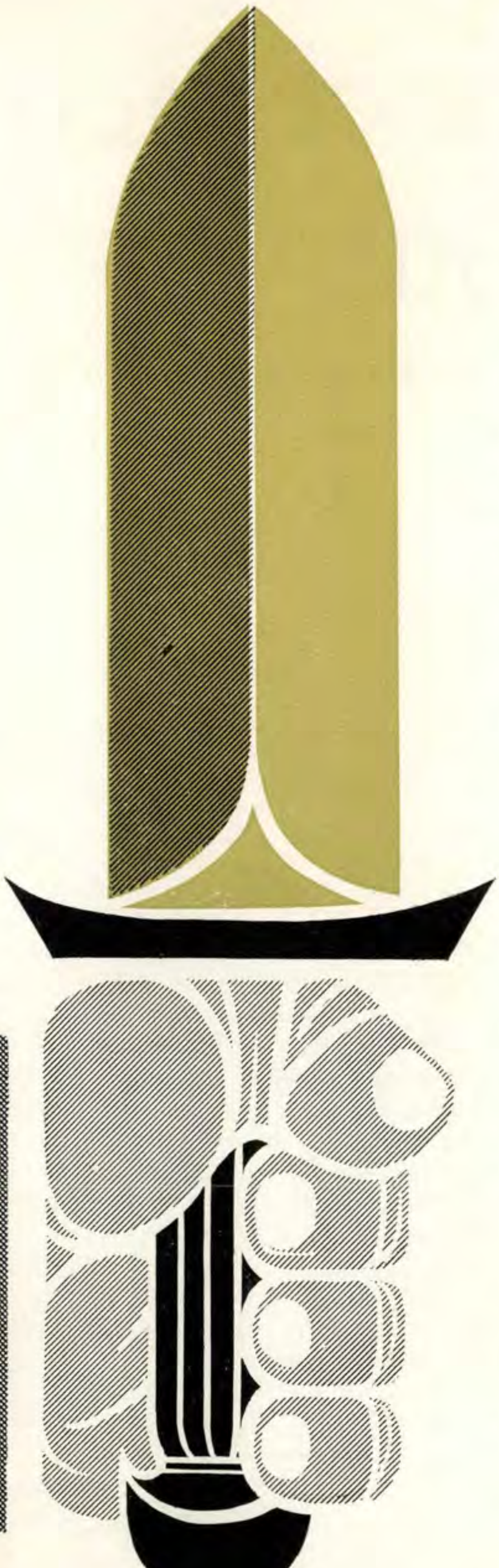
At this point, let's stop and drag out that overworked word, "analyze." If we analyze why all this talent and money is being expended on safety, we immediately get back to the basic problem. You and I. Humans . . . The old adage "To err is human, but to forgive is divine," is a philosophy that points out the weak link in the chain. The humans—you and I.

We have the technology to determine from telemetric data what caused a space-launch failure. We can predict within seconds when a space probe will pass a planet. We can sustain life in earth orbit. We can do things today that 20 years ago were dreams of a visionary few. But, we still can't determine human reaction to a given situation or predict when a human is going to err.

So, all of these people are spending their time and all this money to try and make you and me stop and think. To think SAFETY. To stop doing things that lead to accidents. To believe in safety. To do our job, any job, safely. To look for ways of doing these jobs in a safe manner.

With all the emphasis on Safety, there must be something to it. I am convinced and concerned about safety. How about you? ★

Lt Col C. N. Mozley
Directorate of Aerospace Safety



COMMAND

A recent announcement involving Air Force-wide C-130 accident experience provides an important lesson directly applicable to any flying operation. It is necessary that we examine it closely.

From 1 January 1965 through 1 May 1966, there were 16 C-130 major accidents in the Air Force with eight aircraft destroyed and 35 people killed. This represents 39 per cent of all C-130 major accidents since the aircraft entered USAF inventory in 1955. More significantly, the primary cause of 12 of the 16 accidents was pilot factor. Some of the specific causes listed were immature judgment, poor technique, and lack of professional attitude. In one case, the pilot deliberately violated operating procedures and exceeded design limitations of the aircraft while attempting to perform an exhibition takeoff. He and the five other people aboard were killed. The accident board uncovered a background of similar actions by this pilot.

In another accident, the aircraft commander attempted takeoff with a known engine malfunction. In a third case, seven crewmembers were killed when the pilot attempted a landing with weather below landing minimums. The other accidents have similar stories.

The Air Staff is of course deeply concerned over this drastic increase in accidents. They have recommended a "searching review of aircrew command and control procedures, quality of aircrew training and exact adherence to standards and highest professional attitudes."

This is certainly the right direction for corrective action. Specific actions needed to correct such a problem, however, may not be quite so evident. It is interesting to note the Air Force position that this rash of accidents "cannot be attributed to a decline in aircrew experience but an apparent disregard for well-founded procedures and complacency on the part of aircrews."

This is saying that the aircrews know better but are doing it anyway. The next logical question is, why? The Air Force message outlining the problem

CONTROL

states "inadequate command and control" is one of the cause factors. I will carry this further and opine that most of the cause is inadequate command control.

Both "inadequate" and "misdirected" command control can lead to disaster. If policies and procedures are ill-defined and loosely managed, a confused jumble of operating methods appears. This is fertile ground for accidents. By contrast, sound supervision will always lie at the heart of an efficient and effective organization.

USAFE's position on command control is clear and firm. It has been stated many times through various channels. However, it is important that we continually emphasize the policy because it is the very philosophy by which we operate.

Command control in USAFE involves concise steps and is applicable at all levels of command and supervision. First of all, we must exactly define duties and rules of operation. The rules must be tailored to the needs of our mission. There must be only one set of rules and one standard, as opposed to a set of written rules with empirical procedures.

Second, we must make certain that all our people understand, without confusion, all the rules. Especially must they understand that rules and procedures are dynamic tools of operation. If any rule or procedure is unrealistic, it should be challenged; and if found wanting, changed. We must encourage our people constantly to examine the way we do things to insure it is the best way.

The philosophy is simple. It can be expressed in these objective words: "That all tasks be accomplished in accordance with prescribed standards and that all personnel take pride in ensuring such accomplishment." Commanders and supervisors at all levels must be dedicated to this philosophy and to the three-pronged creed for its pursuance and realization:

- Maintenance of clear procedures,
- Assurance of their understanding,
- Exemplary leadership. ★

Since this article was written, General Bruce K. Holloway, the author, has moved from Commander of USAFE to Air Force Vice Chief of Staff. His command experience, from tactical units to STRIKE Command and Commander of USAFE, lends impact to his remarks on Command Control.

HEADS OR TAILS must we bust 'em?

Maj Richard M. Chubb, M.C., USAF
Medical Officer, Life Sciences Div

The early USAF experience with the F-4C ejection system has been considerably less successful than we had reason to believe it would be. Too many people have been ejecting at unreasonably low altitudes and too many backs have been broken in otherwise successful ejections.

Let us consider the most serious problem first. It makes no sense whatsoever to expect an improved ejection system to do the impossible. Certainly, the F-4C system, because of its positively deployed parachute and a slightly higher boost capability, gives you better low-level capability than some of our other ballistic systems. This small gain in time for chute deployment and altitude of trajectory, in level flight, is definitely not enough to significantly increase your chances of recovering an aircraft you are about to lose. Therefore, you should never allow the relatively small increase in escape capability to sucker you into riding a dying beast to an unreasonably low altitude or into a high sink rate. It appears quite possible that a few of our men have done just this. A grim lesson we have learned is that new escape systems initially have the worst success rates—just because people put them to a more severe test.

The increased low-level capability was put into the system to help the hapless jock who finds himself in dire straits at low altitude, without the capability to gain altitude or improve his ejection chances in any other way. It was not intended to promote lower escapes from high-altitude emergencies. This same principle applies to some of our other aircraft that will soon have rocket boosted seats, positively deployed chutes, and other low-level improvements. If pilots equipped with these systems get overconfident about their ability to escape, some will not live to regret it. If your emergency at altitude is such that you should eject, don't let a good low-level escape system kill you. This is certainly not intended to discourage efforts to recover an aircraft in difficulty. On the other hand, there is no future in staying with a lost cause just because your escape system has an advertised capability to recover you at a lower altitude. You must remember that the slightest delay or malfunction can eliminate the advantage of the better system.

Now for another problem. A compression fracture of the spine is a major injury, although not necessarily disabling. Some persons, in fact, would not have known of their fractures had "routine" x-rays not been taken. Others have definitely been disabled. Few, if any, have lost flight pay because there is a three months' excusal for injuries incurred in an aircraft accident. The vast majority are back to flying well before this three-months has expired.

The fact that most of these compression fractures are relatively benign is no justification for ignoring them. Everyone who ejects should have his spine x-rayed if at all feasible. This is because a relatively minor fracture in one ejection could lead to a severe fracture if another ejection should occur before it is healed. (We have already had one man eject twice from the F-4C). The flight surgeon will ordinarily ask you if your back hurts and this is no time to be stoical — if there is so much as a twinge, tell him.

Now, why do some people fracture their spines while others do not? One Navy study showed that a system similar to that of the F-4C caused compression fractures in over 30 per cent of ejections when the man ejected through the canopy, but in only five per cent when the canopy was jettisoned first. An Air Force study showed that the vast majority of those who fractured their spines were out of position. These two facts are almost certainly related. It is difficult to envision anyone so stoical as to be able to sit erect when he knows he's going through the canopy – you can bet he'll flinch.

It appears highly probable that the primary factor in ejection fractures is forward bending (flexion) of the spine. Anything that causes the head to be forward of the axis of the spine will start this forward flexion. With the onset of high G forces, the neck muscles are unable to hold the head up. In addition, the weight of the head transmitted through these muscles to the bony protuberances on the back of the spine will start flexing the spinal column. In addition, some of the support for the forward wall of the chest is lost, and it tends to sag more easily. The net result is a bowing of the spine that usually results in compression of the forward wall of the vertebrae in about the middle of the back. This area usually ranges from the middle of the chest down, and will be determined by a number of factors not precisely understood and not particularly important to you.

The solution is to sit absolutely erect. If you do this, your chances of receiving a spinal fracture are indeed remote. Those of you who ride the F-4C know that if you put your back against the seat, the headrest holds your head forward. You must, therefore, either use a pad to hold your back forward or consciously come to a brace as you pull the D-ring or face curtain. (A recently developed lumbar pad is being supplied to F-4C crews. It was designed to provide support to the spine both for reducing injuries during ejection and for more comfort during flight.)

There's a lot of scuttlebutt about more fractures with D-ring usage than with face curtains. The fact is that, of 22 survivors of ejection from F-4Cs, 16 used the D-ring and six used the face curtain. Five who used the D-ring received compression fractures and three who used the face curtain got them. These are rather small numbers to support big statements; they are reduced further by the fact that one of the eight fractures very possibly occurred during parachute landing, because the man landed very hard on an undeployed survival kit after initiating ejection with the face curtain. It is obvious that you can and must assume an erect position, no matter which ejection actuation device you use.

In summary, here are some simple rules to follow:

1. Know the capability of your escape system, considering airspeed, altitude, attitude and sink rate.

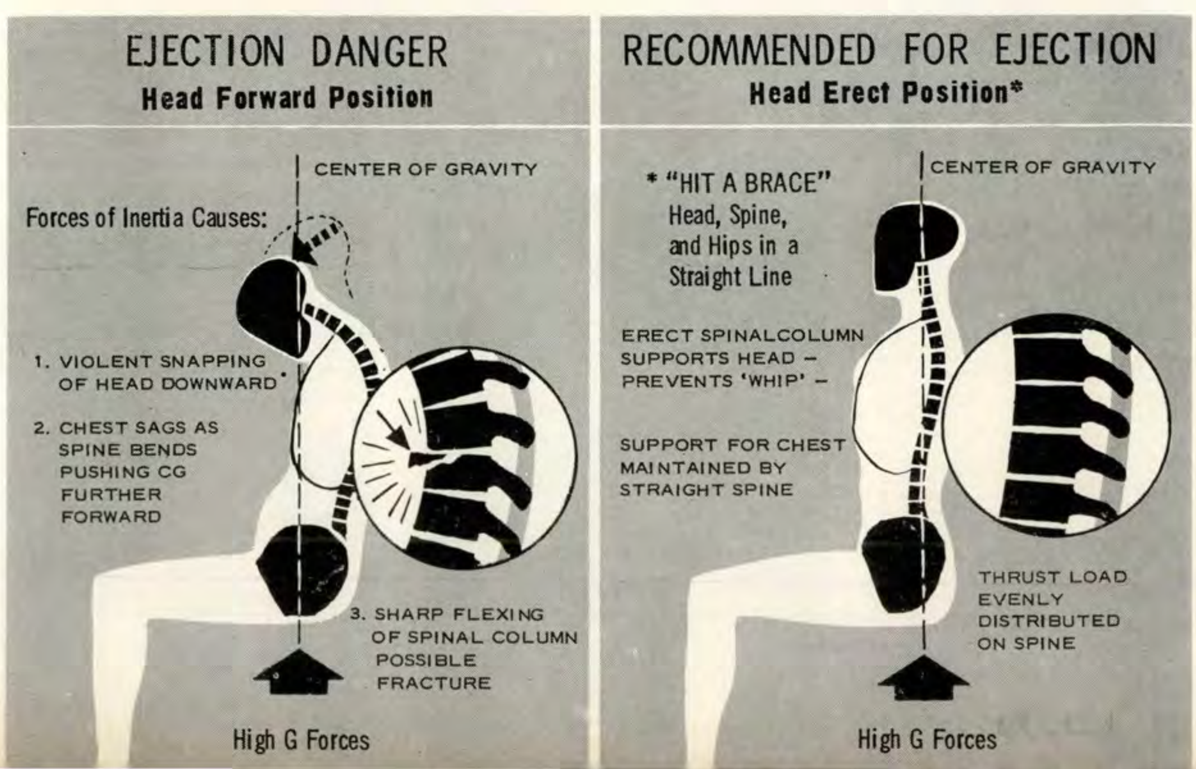
2. Never let a new or improved escape system cause you to delay your ejection by overconfidence in its capabilities.

3. On the other hand, in a very low level emergency, use your escape system any time the bird is hopelessly lost and you are within the limits you've established for yourself in Rule 1.

4. Sit absolutely straight when you eject. This requires practice of your ejection motions with all of the various actuation devices.

5. Release your survival kit before you hit the ground, water or trees. Practice while suspended in a parachute harness will help train you to do this.

6. Get your back x-rayed after an ejection. ★ More on page six



LUMBAR PAD

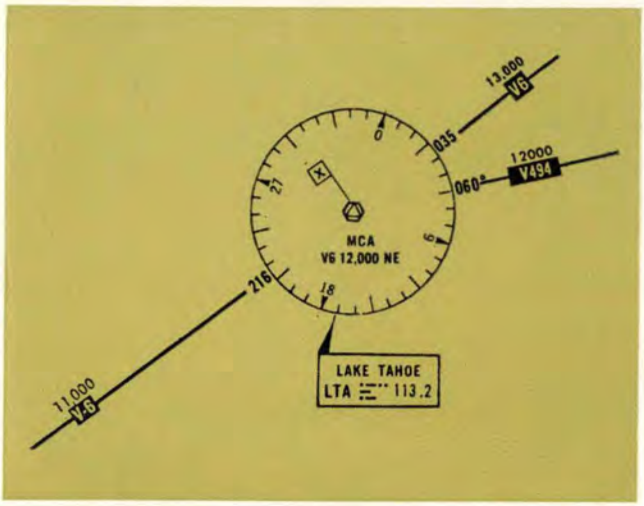
New lumbar pad for F-4C crews, above, and installed, left, should provide more comfort, reduce incident of back aches. In addition, it is expected to reduce the number of back injuries during ejection by providing crewmembers better support of the spine and aiding in proper alignment of the spinal column for ejection.

As lumbar pads become available, F-4C crews are encouraged to get rid of homemade or locally fabricated pads such as those shown at right. In the event of ejection these may cause misalignment of the spine.

THE IPIS APPROACH

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

Q (Refer to diagram) An aircraft is northeast bound on V-6 inbound to the Lake Tahoe VOR at 11,000 feet assigned altitude. In the event of two-way radio failure, when should climb be started?



A (U.S. procedure) Begin climb so as to cross Lake Tahoe at 12,000 feet, then continue climbing to 13,000 feet. What if the ATC clearance was V-6 Lake Tahoe V494 . . .? In that case maintain 11,000 feet until over the Lake Tahoe VOR, then climb to 12,000 feet since the Minimum Crossing Altitude (MCA) at Lake Tahoe applies only to V-6 northeast bound.

Q What is the minimum rate of climb when climbing from one Minimum En Route Altitude (MEA) to another?

A MEAs are established using climb rates, as follows:

Sea level through 5000 feet—150 ft/NM
5000 feet through 10,000 feet—120 ft/NM
10,000 feet and over—100 ft/NM

Therefore, if you are changing MEAs above 10,000 feet and your ground speed is 180 knots, you must climb at least 300 ft/min. Can your aircraft hack this at a typical gross weight? How about with one engine out?

Q Why do some airways designate a MOCA (Minimum Obstruction Clearance Altitude) and others do not? Also, am I authorized IFR flight at the MOCA?

A (U.S. Procedure) An MOCA is shown on En Route Charts directly below the MEA and is identified by an asterisk.

The designation of an MOCA indicates that a higher MEA has been established for that particular airway or segment because of signal reception requirements. When no MOCA is shown on the chart, the MEA and MOCA are considered to be the same.

An aircraft may be cleared below MEA but not below MOCA provided the altitude assigned is at least 500 feet above the floor of controlled airspace along a designated airway, and:

- Nonradar environment—Aircraft is within 22 NM of a VOR, VORTAC or TACAN;
- Radar environment—Aircraft is being radar vectored and has been issued lost communication instructions. ★

Response to The IPIS Approach has been good, as evidenced by the many letters received, two of which are reproduced in the Fallout Section and on page 28. Both the IPIS and AEROSPACE SAFETY encourage letters, for they indicate interest in the feature and, of course, questions help to identify areas of doubt or concern that IPIS can shed some light on.

You may write to either IPIS or AEROSPACE SAFETY. Every attempt will be made to provide the latest info in response to questions. Ed. ★

*Acceleration Time May Be Misleading

Reprinted from GE Jet Service News

Acceleration time for an engine powering a single-engine airplane, unless it is abnormally high, is not a particular problem because there is nothing with which to compare it. The story's different in twin-engine aircraft, however. One engine lagging the other by only a second or two may cause some consternation. Differences in time between uninstalled engines, installed engines on the ground, and engines in aircraft in flight may raise some doubts as to whether the engine is operating satisfactorily.

At the outset, let's emphasize and re-emphasize one important point: *Acceleration time for aircraft-installed J79 engines is not guaranteed.* Acceleration time for uninstalled engines tested according to Military Specifications is a guaranteed item. Certainly, however, installed - engine acceleration time should not be abnormally high.

Among those things which affect acceleration time are compressor inlet temperature and power extraction from the engine. Power extracted includes that necessary to drive airframe accessories through shafting in the accessory-drive section. Air bled from the engine to operate various aircraft systems is also power extraction. You can readily see, therefore, that such variables affecting engine operation make it next to impossible to guarantee acceleration time, except on those engines which are tested according to the guarantee specifications.

Acceleration Time

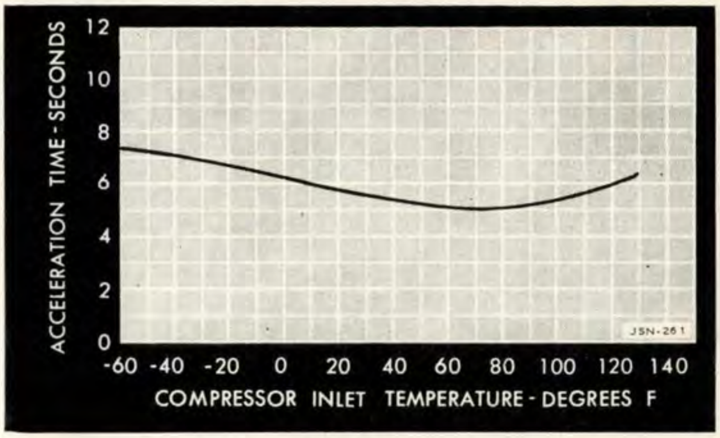


FIGURE 1

Estimated Acceleration Time

For Reference Only- Not Guaranteed

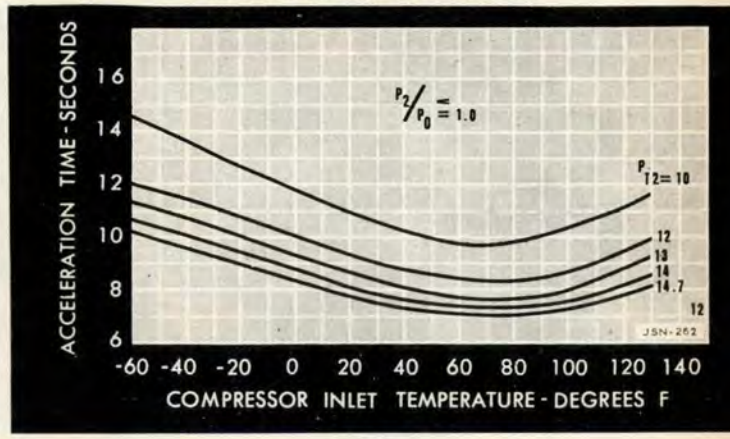


FIGURE 2

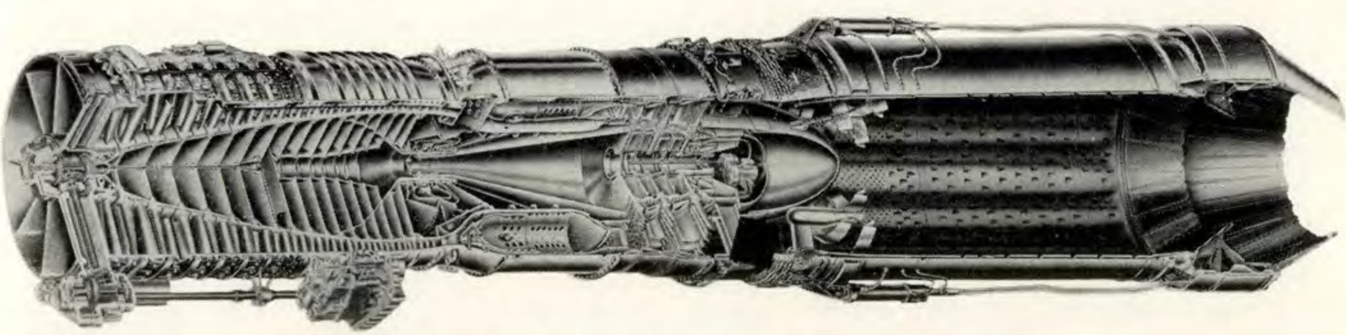
Shown in Figure 1 is a typical guarantee acceleration curve for an uninstalled engine operating under sea-level static conditions with no air being extracted from the compressor bleed ports. Acceleration time varies with compressor inlet temperature.

Changes occur when the engine is installed in an airplane, as you can see in Figure 2. This shows characteristic acceleration times for various pressure altitudes, but again with no compressor bleed. The curves follow the same general pattern as that in the guarantee curve; compressor inlet temperature still affects the acceleration time, but the time for acceleration is greater. If air were being bled, the acceleration characteristics would be changed even more.

Basically, the reason for the differences is simple and may be illustrated by comparing the airplane with the old family bus. A 6-cylinder automobile engine, tuned properly and driving a fan, water pump, and generator will perform quite satisfactorily. Equip that same automobile with an automatic transmission and an air conditioner and you'll note some startling changes, among which will be slower accelerations. It's the same old story of being unable to receive something for nothing.

Since the jet engine is designed to provide for power extraction, the changes are less startling than those in the foregoing example. Nonetheless, some minor changes will occur. Since two engines, side by side, are not identical twins, operating characteristics will vary slightly. So when accelerations in flight are slightly slower than those on the ground, and the time on one engine is a couple of seconds longer than its running mate, keep in mind that such differences are normal. The engines are operating satisfactorily and the power is there, even though it may take a second or two longer to reach its maximum level.

When measuring acceleration time, one must be certain to know when to start and when to end the timing. The time should be counted from the initiation of the throttle burst to the cutback of EGT, not to 100 per cent speed. In the test cell a correction is applied. Acceleration time of an aircraft-installed engine must also be checked during the same operating interval, but remember that even with the correction applied, the result is only an approximation. ★



Acceleration time is affected by compressor inlet temperature and power extraction from the engine. Don't be alarmed if acceleration time of one engine is a little slower than on the other — that's normal.

HOT BRAKES . . . NO BREAK FOR PERSONNEL

Martin P. Casey, SCMCM, Hq AF Systems Command

It is rumored that when General Custer saw all the Indians who attacked him at the Little Big Horn, he realized he hadn't gotten the word. In keeping an ear to the ground, we have been getting recent rumbles that some of our aircraft drivers haven't gotten the word about where to park the bird if they find themselves with either a brake fire, or smoking brakes, after putting it down on the airpatch. The Word, as put out some time back, was to the effect that you don't taxi up to the ramp and toss out the anchor after such an affair — rather, you picked out a predesignated chunk of unoccupied geography and deposited the bird there, whereupon you left the scene. Reason for this longer walk back to Ops was not on account of you liked fresh air and sunshine so much as you didn't care to have a subsequent tire/wheel explosion make holes in other aircraft, and Sam's pretty buildings, and people.

Lest any of the new arrivals think this is pure, improbable fiction, the history book contains all the gory details for how one troop at Kirtland, and another at Edwards found out the hard way that these explosions are sometimes fatal.

To make sure everyone is following the same script, let's run through the scenario once more, and consider two possibilities.

First is the case of an actual brake/wheel fire. Mindful that others might like to use the runway, the pilot, if he is able to drive on his wheels, has maneuvered the bird to a predesignated space, well away from other aircraft or buildings, which is where the fire department meets him. Obviously, if he can't move, he sits. The fire department responds and puts out the fire, using minimum quantities of water spray, CB, or CO_2 then they exit stage left, with all the other members of the cast (Maintenance, Ops, Air Police — the whole package) and the bird is left to cool in center stage all by itself. Again, once the fire is out, everyone leaves, and the aircraft cools itself — no fans, spray or anything else — for at least one-half hour, longer if there are high ambients.

The other possibility is that of a hot or smoking brake. It is possible for new brakes to smoke up pretty good on first application as the high spots burn down, but unless everyone concerned knows for sure that a particular aircraft is making its first landing with new brakes, any hot brake report should also be treated as a potential explosion. Again, the pilot drives to the predesignated hot-brake parking area, leaves the scene, and nobody does anything for at least half an hour.

In the "special conditions" category:

• If the aircraft tires are equipped with fusible plugs, the above problems don't exist. Explosions occur with high pressure tires on high-performance aircraft, usually.

• Most critical time appears to be in the first 15 minutes *after* the fire is extinguished, or the aircraft is parked. This is when the heat build-up occurs, which both increases internal tire pressure, and causes the wheel to fail.

• Keep the area clear for at least one thousand feet. One incident indicated the exploding wheel traveled much farther than this.

• Remember the special procedure of using spiked planks for F-4s and the need of advanced coordination between the F-4 aircraft drivers and the firefighters, since very few firefighters are checked out in taxiing F-4s. If you come up against a sticky situation with other types of aircraft, use the spiked planks there, too – a brake fire, or hot brakes will probably require a tire change anyhow.

It's possible that while your own aircraft operators are doing it by the numbers, perhaps some of your tenants haven't gotten the word about the potential bombs they may have under these circumstances. You Ops types might profitably do some campaigning around the boondocks, before some tenant parks his bomb on your ramp. This has happened; and while there have been no accidents, we don't like the odds against no accidents occurring.

Cue-words for you in directing your cast in this Oscar-winner are "predesignated areas" (by Ops & FlySafe); "put the fire out and everyone leaves"; "clear the area for at least 1000 feet"; "spiked planks for F-4s"; "Props" include marking up predesignated areas on a copy of the map of your airpatch and giving it to the people in the tower; the fire department will furnish the rest as needed. Your rehearsals will occur at your FlySafe meetings; your cast of characters won't require any actual walk-through but only need to remember to listen for directions when it's their turn in the spotlight. You might also show them a copy of the map you give the tower. And the theme of this mighty opus is "Play it cool, Clyde!" ★

Gen Hunter Harris, Pacific Air Forces commander-in-chief, praises Air Force men from the 416th Tactical Fighter Squadron after presenting the Colombian Trophy to Lt Col Richard M. Mischke, of San Antonio, Tex., 416th commander, at the Bien Hoa Air Base. The trophy is given to the Air Force tactical fighter unit having the lowest aircraft accident rate during the preceding year. Pilots of the 416th flew two years without an accident, including more than 4800 hours in combat over North and South Vietnam.

The trophy—a silver cup supported by coiled serpents on a mahogany base—was first awarded by the Republic of Colombia in 1936.

COLOMBIAN TROPHY

The Colombian Trophy is awarded to the 416 Tactical Fighter Squadron, Tan Son Nhut Air Base, Vietnam, as the tactical organization considered to have had the most meritorious achievement in flight safety among the winners of Flying Safety Plaques for 1965. The 416 Tactical Fighter Squadron has compiled more than 16,000 hours in F-100D and F aircraft during the past two years without an accident. The unit maintained constant readiness as a vital part of the strike force in the Far East. The Squadron has participated in several full scale deployments. Unfamiliar terrain and facilities, adverse weather, short notice reaction, and hazards of combat failed to deter this Squadron in the professional accomplishment of its mission. The accomplishments of this Squadron required outstanding professionalism of each pilot and ground crew member, the utmost in training and proficiency, the highest caliber of leadership and supervision, and unsurpassed loyalty. The safety achievement of the 416 Tactical Fighter Squadron perpetuates the highest tradition and standards established for the Colombian Trophy and reflects great credit upon the 416 Tactical Fighter Squadron, Pacific Air Forces, and the United States Air Force.

F-100 ASIP*

AIRCRAFT STRUCTURAL INTEGRITY PROGRAM

The F-100 was produced with a designed service life of 3000 flying hours. At the present time, the fleet average is approximately 2300 hours. The decision to retain the F-100 within the force structure past its original phaseout point created a need for examination of the condition of the F-100 structure.

Airplane Structural Integrity Program (ASIP) requirements were set down by the USAF for the purpose of promoting, evaluating and substantiating the structural integrity, both in static strength and fatigue life, of new airplane systems for an established service life. The first model of the F-100 series, the F-100A, was designed in 1952, long before the ASIP requirement, and although fatigue was an important consideration when the F-100A and subsequent models – F-100C, D, and F were designed, no requirement existed for a specific fatigue life.

To this date, F-100s have been relatively free of major airframe structural fatigue problems. However, Air Force plans for continued usage of the airplane have resulted in this venture to determine the need for, and extent of, structural modification to attain an established service life goal of 5500 flying hours. A contract, monitored by the Sacramento Air Materiel Area, was let to North American Aviation to perform this engineering investigation.

The program consists of the following three phases, the completion of which is intended to provide a trouble-free structural capability for F-100 aircraft through their planned service life:

- A *"Lead-the-Fleet Flying Program"* where flight loads, ground loads and in-service failure data will be collected on a large scale. These data will establish realistic fatigue loading spectra based on current usage for major airplane components, and will be the basis for the fatigue anaylsis and repeat load test programs to locate critical fatigue areas in the airframe.
- A *"Design and Analysis Program"* where critical structural fatigue areas will be identified, specimens tested and modifications developed.
- A *"Full Scale Fatigue Test Program"* where both unmodified and modified major structural components will be tested.

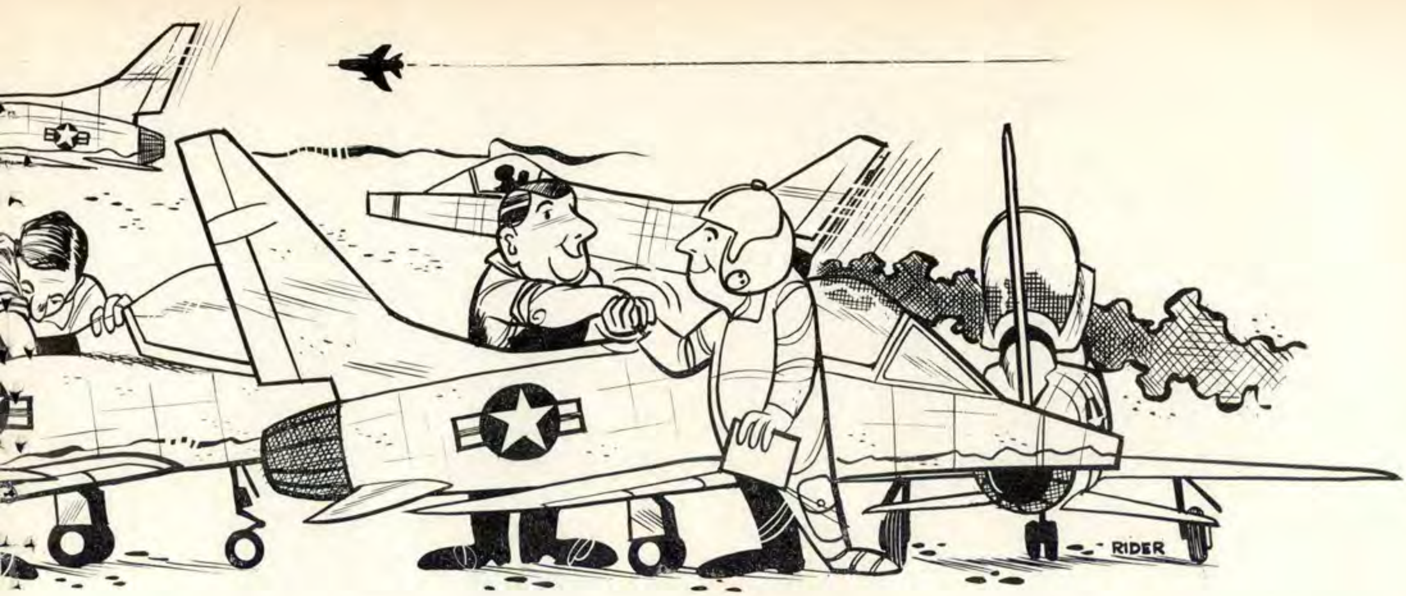
PHASE I

The first phase, "Lead-the-Fleet Flying Program" is fully covered in T.O. 1F-100-9, dated 3 March 1966, changed 7 April 1966. Briefly, this phase involves accelerated flying with two basic objectives:

(1) To collect flight load and ground load data necessary to establish realistic fatigue loading spectra on four major airplane components – wing, fuselage, vertical stabilizer, and landing gear; reduce these spectra to practical laboratory fatigue test loading schedules for use in Phase III of this program and provide flight data to continuously update these load schedules based on current usage of the F-100 fleet.

(2) To collect in-service failure data that will be used to confirm the design, analysis and test results of Phases II and III; and locate further critical fatigue areas in the airframe requiring inspection, modification, and interim repairs to extend the service life of the airplane.

In Phase I, one hundred and twenty-two aircraft will be used to collect the necessary data. Twenty-two of these will be known as "Lead-the-Fleet" airplanes and will be used to develop air loads data and in-service failure data. These aircraft will be flown at a rate twice that of the normal programmed rate. Four of the 22 will be specially instrumented F-100Ds with digital recording systems and will be identified as "Yankee I" and "II" (fully instrumented) and "Yankee III" and "IV" (partially instrumented) airplanes. The other 18 airplanes will be equipped with a 10-level statistical accelerometer



instrumentation system and will be identified as "X-Ray" aircraft. One hundred airplanes, including those flown by *Thunderbirds* F-100 precision demonstration team, will be known as the "Fleet Control Group" and will likewise be equipped with the statistical accelerometer instrumentation system. Identified as "Zulu," these will be used to obtain a comparison of fleet usage to that of the "Lead-the-Fleet" group and will be flown at a normal programmed rate.

Instrumentation for "Yankee III" and "IV," "X-Ray," and "Zulu" airplanes has been installed by T.O. 1F-100-974. Phase I data requirements consist of tapes of recorded data from four "Yankee" airplanes and two forms, 1F-100-9WS-1 and 1F-100-9WS-2, in two parts each. T.O. 1F-100-9 explains how to fill out and use the forms. Inspection areas and requirements are detailed in SMAMA Engineering Report NE 66-301. This report should be used in conjunction with Form 1F-100-9WS-2. A description of Project "Lead-the-Fleet Flying Program" and instructions for the pilot are contained in T.O. IF-100D(I)-1S-24, dated 5 April 1966. This is an operational supplement to the Flight Manual, T.O. 1F-100D(I)-1, dated 15 May 1964, changed 31 July 1965. Other Technical Manuals affected by the F-100 ASIP are as follows: 1F-100D(1)-2-7; 1F-100D(I)-2-10; 1F-100D(I)-4; 1F-100F(I)-2-7; 1F-100F(I)-2-10; 1F-100F(I)-4; 1F-100A-6.

PHASE II

This phase is concerned with airframe fatigue analysis. In Phase II, fatigue tests of small elements representing critical areas of the structure will be made to supplement the analysis. Also included will be designs of modifications to improve the fatigue life of possible critical areas. The analysis is a vital process to determine the correct modification action required when the fatigue life has been demonstrated (by test or in-service failures) as inadequate. The Phase I inspection data on the "Lead-the-Fleet Group" is important to this phase of the program.

PHASE III

The fatigue load spectra derived from Phase I will be used to prepare a laboratory loading schedule to perform full-scale cyclic tests of the wing, fuselage, vertical stabilizer and landing gear. Tests will be made on two complete wings, one complete fuselage and one aft fuselage with vertical stabilizer. As the program proceeds, modifications developed in the Phase II program will be incorporated and tested on some of these major components.

The results of all three phases of the F-100 ASIP will be summarized in a final report in which recommendations will be made to SMAMA on the ability of the structure to attain the usage goals set for F-100 airplanes. Where critical areas are found, design proposals for modifications will be submitted, and repair, maintenance and inspection procedures will be recommended.

Well, that's the ASIP in a nut shell — a short look at a long program that will bring many more successful operational years for the Century birds. The success of a program of this nature, however, depends largely upon two things: the proper completion of the correct forms and the prompt return of the completed forms. This responsibility lies with the pilot, the maintenance officer, the crew chief and the armorer. So don't get caught in short supply. Order a sufficient quantity of -9WS-1s and -2s now, before you need them, from SMAMA (SMNEA / F-100 Aircraft Structural Integrity Program Engineering), McClellan AFB, California, 95652. Send the completed forms, along with pertinent sketches, photographs, samples, etc., to F-100 Project Engineering, North American Aviation, Inc., International Airport, Los Angeles, California, 90009. ★

Rex Riley CROSS COUNTRY NOTES

AFTER COMPLETION of a 100-hour periodic inspection, an O-1E was flown for one hour during delivery to a South Vietnam base. After the flight the pilot wrote up the aircraft for a low vacuum reading. Next day the engine was run up to determine the cause for the low vacuum and it was discovered that both mags showed the maximum allowable drop. This was corrected by adjusting the fuel mixture. When an attempt was made to adjust the throttle linkage, the mechanic found that the throttle cable housing was broken at a point where the solid tubing portion joins the flexible section just aft of the carburetor. Someone had repaired the break by wrapping electrician's tape around the broken area. The throttle cable inside the housing was kinked which caused the throttle to bind and prevented the carburetor throttle plate from reaching the full open position.

Rex has heard his share of tales of the barnstorming days when impoverished pilots held their machines together with spit and bailing wire, and even egg whites. But that was 40 years ago. Whoever made the throttle cable housing fix with tape lacked only one thing—judgment.

DURING A NIGHT FLIGHT the left engine of a C-119 began backfiring severely and the carburetor air temperature went to 50°C. Rich mixture did not help, so the power was reduced to idle and the backfiring stopped. When power was increased and the engine began to backfire again, the engine was feathered. Then the right engine began to run rough and low torque made it difficult to maintain altitude.

At the time these difficulties appeared, the aircraft was on the far side of a metropolitan area from home base, so the pilot decided to land at a civil airport rather than risk flight across the city. The landing was successful.

Cause of the left engine trouble was a broken rocker arm; fouled plugs were suspected as the reason for the right engine acting up.

Here was a crew that acted wisely and didn't succumb to that urge to get back to home plate. If they had, the outcome might have been different and Rex might be telling you about an accident instead of a minor incident.

WHERE TO KEEP IT—We have had a couple of cases of unnecessary hypoxia caused by two things: a poor oxygen system preflight done in haste and a practice of leaving the CRU-8/P or CRU-60/P oxygen connector on the parachute instead of on the mask. Although the personnel involved were conscientious, and closely followed the checklists, they forgot to hook up their mask hoses. If you follow this procedure you eliminate the disconnect warning device that is built into the connector instead of the mask hose. A good PRICE check would have caught this. A recent field trip found that this procedure was causing undue wear, broken male mask hose connector prongs, and permitting dirt and dust to collect in mask hose. The connector should remain on the mask hose end to prevent similar occurrences.

Maj George C. Braue
Life Sciences Division

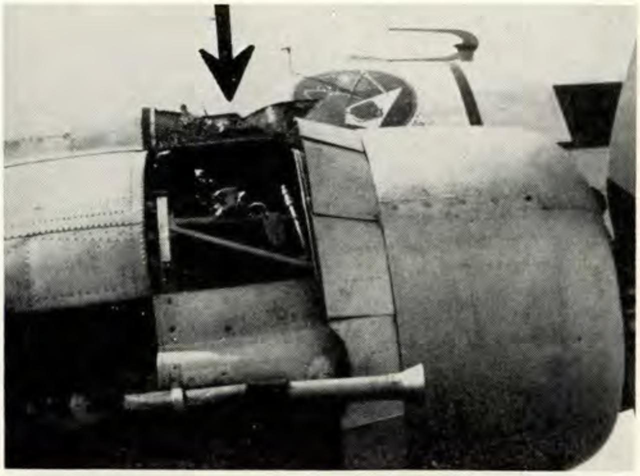
A RECENT LETTER from the Wing Safety Officer at a USAF base told of a foreign naval officer who was fatally injured when he ran into a turning propeller. The transport, owned by his country, was preparing to leave the base and the engines had been started. As the transient crew prepared to direct the aircraft from its parking spot, the officer arrived in a car and made a dash for the airplane.

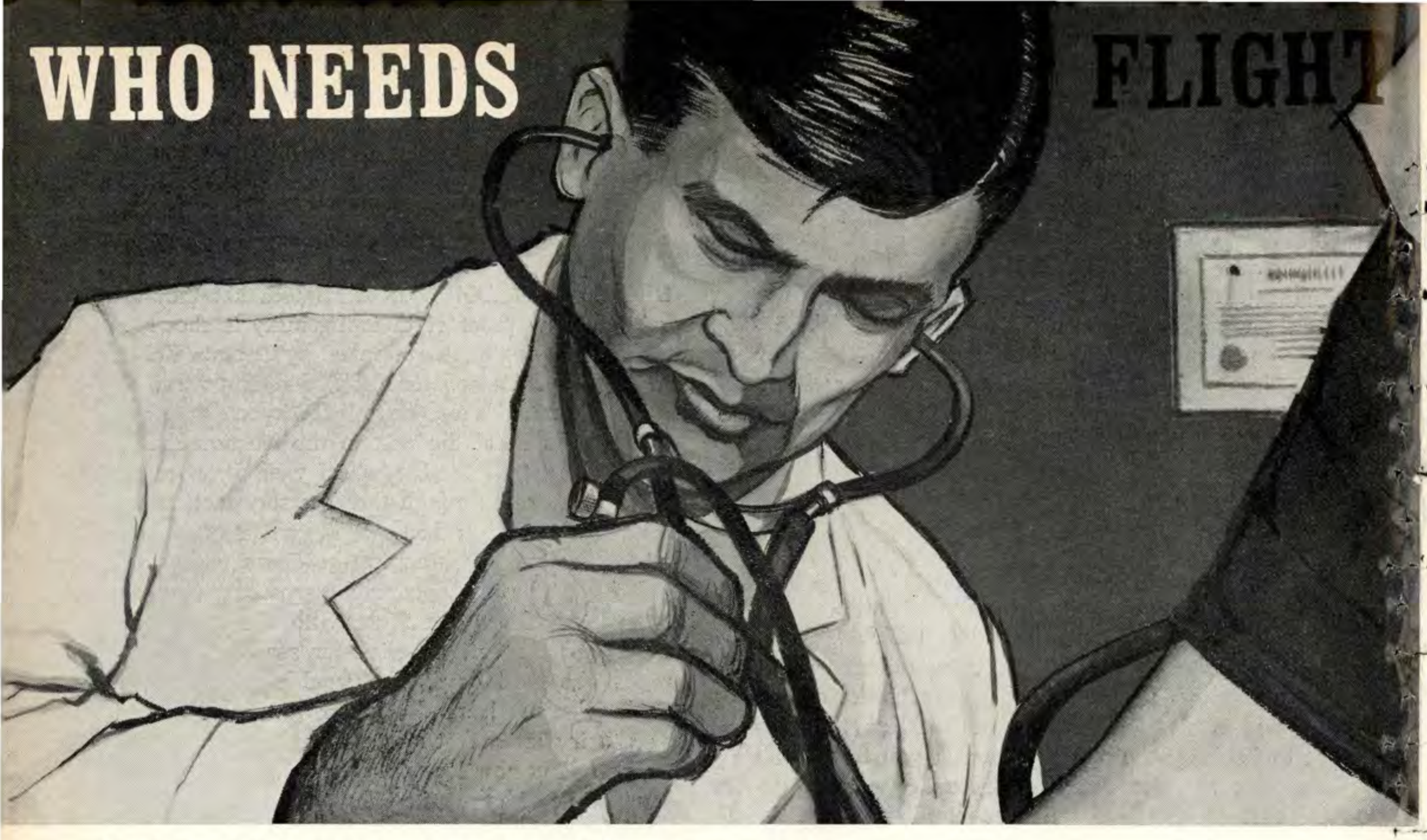
As the man approached from the right front, he was waving at the pilot and did not hear or see the transient alert man who, from his position outboard of the left wing, shouted and started toward the officer as he approached the aircraft. The pilot saw the approaching man and cut all four engines but the officer ran into the Nr 1 propeller.

BIRDS HAVE LONG demonstrated that they are persistent; now proof of their ingenuity is shown in the accompanying photos supplied by Captain Robert E. Maupin of Detachment 4, 2223d Instructor Sq (CONAC), at Chicago-O'Hare Int'l Airport.

In order to build the nest in the location shown, the birds had to enter the wheel well, fly over the oil cooler, entirely through the accessory section and over the carburetor air duct.

According to Capt Maupin, the aircraft (a C-47) had been in phase inspection the previous week but had made at least one flight with the stowaways aboard. The incubation period for sparrow eggs, he says, is about 14 days. The trouble with birds is that they haven't learned to keep their mouths shut. It was their chatter that led to their discovery. Otherwise, no telling how long they would have been able to maintain residence since access to that particular part of the engine cowling is seldom required. ★





Maj Richard M. Chubb, M. C., USAF Medical Officer, Life Sciences Div

Nearing the end of a three-year hitch in the Life Sciences Division here at Norton, I can look back over ten years as a Medical Officer with the Air Force. During this time I have had too much experience with pilots who either wanted to treat themselves, tell the Flight Surgeon how they wanted to be treated, or to see other physicians who would give them what they wanted.

It is certainly understandable that a professional pilot doesn't want to jeopardize his career by telling his Flight Surgeon something that may get him grounded—perhaps for good. On the other hand, it makes no sense at all for a man to deliberately jeopardize his life, the lives of others, and expensive equipment by taking a chance that his illness will not cause an accident.

It was during my first month as a Flight Surgeon that I grounded a pilot with a case of severe tonsillitis and prescribed penicillin shots twice daily. On the second or third day, he was showing signs of improvement and talked me into ungrounding him so that he could take a flight to Tokyo and back. On the surface, there seemed little danger that his tonsillitis or the penicillin shots would cause him to have an accident. He was able to clear his ears, he could see well, he certainly had lost none of his muscular coordination. In short, I felt fairly secure in the belief that I had not made a serious error in ungrounding this pilot.

Then, two things happened. First, the pilot returned and told me in great detail how the soreness in the seat of his pants and in his throat had distracted him throughout his long journey. He admitted that he believed he should not have gone. The second occurred a few days later when I was MOD. That night a patient called to say that he had a penicillin reaction in the form of a rash that had appeared two weeks after his shot of long-acting penicillin. Medication he had gotten at the clinic helped the rash, but he was now complaining of severe pains in the knees and elbows. I didn't believe that these were associated, but there was a chance that the joint pains were a signal of an impending collapse as part of an allergic response to the penicillin. I told him to come in so I could have a look at him. I just happened to be in the reception room when he came through the door and collapsed in my arms from his delayed penicillin reaction. I don't need to draw pictures for any of you pilots about what could happen if you had a pencillin reaction like that in the midst of a long overwater flight in a single seat fighter. An explanation as to why you had taken penicillin would be the least of your worries.

I had another pilot tell me during his routine annual physical that his old ulcer had not bothered him for years. He had collapsed from a hemorrhage from it several years earlier. We'll skip the details and say only that a rather thorough investigation revealed that he was probably involved in a "little white lie." Not only had it bothered him, but he was taking medication for it

SURGEONS? YOU DO

and he was seeing a doctor down town. X-rays taken in a civilian hospital showed the same obstruction at the outlet of his stomach that our x-rays showed. There was no recommendation for waiver for this man who deliberately concealed an extremely serious condition, for which he was taking drugs that had a pronounced effect on his eyes.

On the other hand, there was once a pilot who developed asthma as the result of a very specific and local pollen. It bothered him only on certain days, and by mutual agreement between his Flight Surgeon and Commander, he was permitted to fly on his good days and take medicine on his bad days. This was strictly illegal, according to the letter of the law, and perhaps even the spirit of the law. This man is today an outstanding safety officer and his former Flight Surgeon says he has no regrets over breaking the law, because both he and the man's CO were absolutely sure that this particular pilot could be depended upon to do as he was told and not fly when he shouldn't. The man who conceals his illness cannot give this assurance that he won't have to fly while taking medicine.

Let's consider another aspect of this problem. A pilot had an illness for which he was taking medication that absolutely precluded giving him permission to fly. He dutifully reported to his Flight Surgeon and was properly grounded while TDY far from home. Within 24 hours, he was back with the unused portion of the medicine and the statement that he now was cured. After an apparently safe interval, to allow the medication to wear off, he was allowed to fly home with the rest of his outfit. He had an accident; there is still some suspicion that this was related to his physical status, although this certainly cannot be proven. It is interesting to note that the pilot had taken precautions to obviate disastrous effects should his illness recur in flight, indicating some lack of confidence on his part that he was really cured. This would appear to be a real case of get-home-itis-in-spite-of-gastroenteritis.

Then there was the fighter jock who had a "cold." It wasn't bad enough to keep him from flying, but he took a little anti-histamine and nose drops. We'll never know for certain what caused his death on that dark night. It is definitely known that, on previous occasions when he had experienced an ear-block on descent, he had become extremely dizzy and had been unable to see for several seconds until he cleared his ears. He had taken the nose drops supposedly to preclude just such an ear-block on his last flight. Was it his fault for not telling his Flight Surgeon about his problem, or were his squadron buddies who knew about his condition partly to blame? They all seemed to agree in testimony before the accident investigation board, that his problem could have caused the accident. One of them went so far as to admit that he had similar symptoms when he had an ear-block. There was no evidence that the medical member of the board

Author writes prescriptions for pilot. See your flight surgeon for proper medication. Don't rely on home remedies, off-the-shelf pills.

grounded the second pilot. I trust, however, that he did have a long heart-to-heart talk with that pilot. We'll never really know whether it was the medicine, the illness, or either, but we'll always be suspicious.

We had another fighter jock who went in for unexplained reasons on a dark, dark night. The board had actually finished its deliberations before one of the members discovered from the widow that this fighter pilot had had an unexplained loss of consciousness on at least one occasion shortly before his fatal accident.

That brings to mind some of the cases of heart attacks. Face it, a lot of you men are not as young as you once were — neither am I, for that matter. Some of us are going to have heart attacks and some of these will occur in flight —some already have.

About a year ago, one did. The victim was still conscious and able to conceal severe pain and feeling of ill health from the copilot. He felt so bad that he didn't want to exert himself enough to go back and look out the window at a faulty engine. He sent the copilot back to do that while he flew the airplane. I don't think I need to dwell on how severe the lack of judgment was in this case. We had another who tried to hide his coronary. It was only because those who helped him out of the plane insisted that he went to see the doctor.

I could tell you about one officer who insisted to his dying day that he had not had a coronary, even though his electrocardiograph showed positive evidence of an old, healed myocardial infarction. The autopsy confirmed it, and only then did one of his friends volunteer the information that this man had collapsed on the street, had been carried into a civilian hospital, and had stayed there 30 days on "ordinary leave."

It would be relatively simple to make up a list of drugs you could take and drugs you shouldn't if it were not for one little hooker — many of us react differently to many different drugs. Some of us are extremely sensitive and some of us can tolerate large doses of different drugs. One widely used appetite depressant is a prime example. Some people are greatly stimulated by it and call it a "go" pill; it puts other people to sleep. Some people lose their appetite with it, others eat even more. Some drugs that seem not to affect you much when taken alone are dangerous when other drugs are added. This is due to what we call potentiation — a condition where a combination effect seems to be greater than the additive effect of the two substances. Alcohol and barbiturate are classic examples. Certain tranquilizers probably fall into the same category. To be safe, your reactions to drugs must be thoroughly evaluated. Even more important, it must be determined that the illness for which you take the drugs is not one that will jeopardize the safety of flight.

I do not know which one of the categories mentioned in the first paragraph you fall into, but I'll bet a couple of cool ones that some time in your flying career you'll deliberately deceive your Flight Surgeon and unnecessarily risk your life to make a buck or two. I can understand your feelings, but I cannot condone them. There are many of us around the Air Force who will lean over backwards to help you and keep you flying. In fact, many of us have. You will find that the Surgeon General authorizes the use of some pretty potent drugs, provided they are controlled by the Flight Surgeon and your reaction to these drugs has been carefully tested and evaluated during a period when you are not flying.

I am speaking of the "Go" and "No-Go" pills for crew conditioning. As a final note, I'll add a solemn warning NOT TO USE THESE PILLS ON YOUR OWN. It is definitely known that some pilots have considered all green pills to be "Go" and all red ones to be "No-Go." I feel it is absolutely necessary to point out to you that there's at least one green pill on the market that is definitely "No Go!" Let's not be taking pills unless they have been OK'd by your Flight Surgeon! ★

FAA ADVISORIES

Walter J. Wrentmore
FAA Liaison Officer
Directorate of Aerospace Safety

USE OF RADAR FOR THE PROVISION OF AIR TRAFFIC CONTROL SERVICES. Radar has become a valuable and efficient tool in providing air traffic control services. These services are being provided through two basic radar systems, Primary Radar and the Air Traffic Control Radar Beacon System.

Primary Radar is used to provide service to aircraft not equipped with cooperative radar equipment, i.e., radar beacon or transponder. Coverage is limited by power, antennae design and pulse rate of the ground equipment; aircraft returns vary with distance and size or reflective characteristics of the aircraft. These radar displays are nonselective in that all primary radar returns received are displayed, with no means of identification except through correlation of aircraft position or through maneuvers requested by a controller. Complete dependence on recognizable reflective targets from aircraft limits the usable range. This is particularly true in the high altitude environment with the smaller jet aircraft which normally offer poor radar reflective surfaces. On the other hand, it has the advantage of not requiring special equipment aboard the aircraft and can be utilized within its limitations by any pilot having two-way radio.

The Air Traffic Control Radar Beacon System is a secondary surveillance system which may be operated independently of the primary radar, or in conjunction with it. It requires that the aircraft be transponder equipped and provides certain advantages: usable radar range is greater. Radar reflectivity of the aircraft does not affect the return. By use of selected codes or "ident" feature, more positive radar identification can be made and followed.

The FAA has been working with various combinations of primary radar and radar beacon to develop the best combination to suit the circumstances. The controller's radar display may be adjusted to show the primary radar returns only, certain radar beacon code returns only, or a combination. In the positive control area, air traffic control service is normally provided by the radar beacon system alone. The controller by properly assigning radar beacon codes to aircraft under his jurisdiction and then selecting these codes for display, can see only those returns from aircraft under his control. This eliminates confusion resulting from returns from many aircraft not under his control. Aircraft that are not transponder equipped (or where the transponder has malfunctioned) provide no return on the controller's "radar beacon only display," nor do aircraft transmitting beacon codes other than those selected by the controller. In addition, information on weather is not available through this system. However, primary radar will normally be available for use by the controller to supplement his basic radar beacon picture when he needs it to provide weather data, information regarding chaff drops, and as a standby for failure of his radar beacon system.

Outside of the area positive control environment the desirability of providing radar traffic information and other additional services leads to the use of primary radar as the basic tool, supplemented to varying degrees by the radar beacon system. In terminal areas particularly, the use of radar beacon is often minimal since radar handoffs and stronger reflective targets from the closer-in aircraft minimize the requirement for the identification feature and target reinforcement. At the same time, the beacon returns are often excessively large and the number of aircraft in a smaller area result in target clutter often requiring more selective use of radar beacon. Therefore, in the terminal area, pilots are frequently requested to change their beacon to low power or standby, particularly in congested areas. ATC follows published procedures using information obtained from primary and/or radar beacon systems in areas of radar coverage.

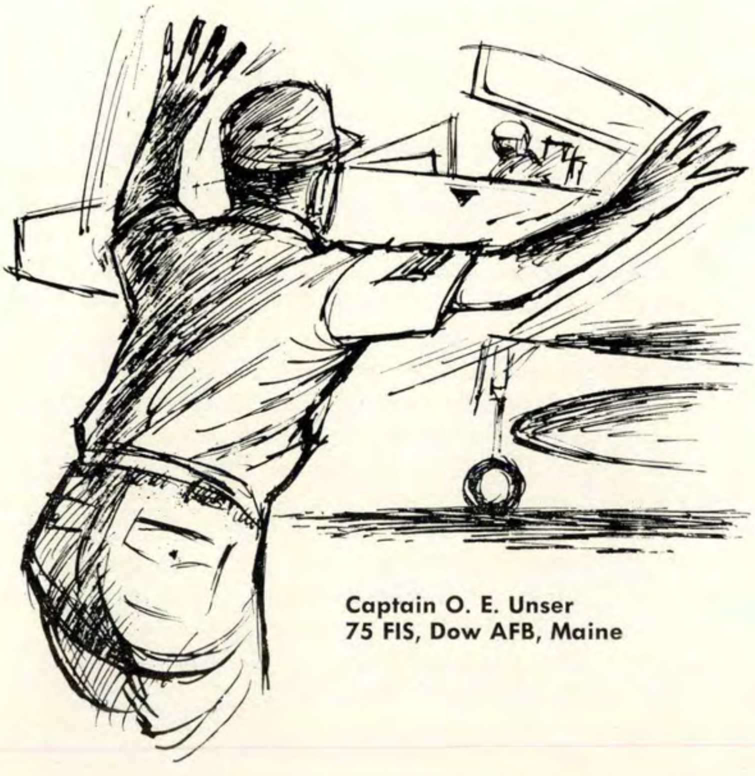
In any case, pilots will be advised when the radar system normally used for provision of ATC service is unusable. However, as a rule, they will not be kept advised as to which source of radar data is being used when both systems are operating normally. ★

Got your signals straight?

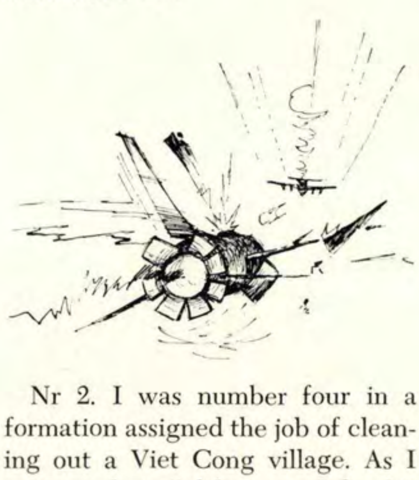
ONE IF BY LAND

The following four tales are unrelated – or are they?

Nr 1. The noise level on the ramp was high. The Sarge couldn't seem to get his message across to me. For a guy who was usually supercalm he sure seemed excited. I read his lips, as he slowly mouthed: ". . . Y.O.U.'R.E. . . O.N. . . . F.I.R.E. . . ! ! !"



Captain O. E. Unser
75 FIS, Dow AFB, Maine



Nr 2. I was number four in a formation assigned the job of cleaning out a Viet Cong village. As I came in low, I felt ground fire hit the bird. I completed my run. Lead was saying, "Four's been hit!!" I tried to tell him I was heading out to sea for possible ejection; – no transmitter.

The headset crackled, "Three, stick with four" — then silence.

The coastline ripped rapidly aft. Three thousand feet—right wing looked bad — better get out!

"Three, this is four, move out, I'm going to eject!" — Nothing.

". . . dammit, move over!" No response.

Speed boards, idle power — three went skidding by. EJECTION!

I saw the right wing fold up; three was clear and okay. I was in a good chute.

Nr 3. The weekend cross-country had been great. No problems with the bird. And that little chick I met last year even remembered! Real swinger — great time.

Now waiting for clearance. Cockpit check almost done. Better check the pitot heat; weatherman says there'll be a 500-foot ceiling on approach. "Hey, Sarge. . . ."

Too noisy, can't seem to make him understand. Oh, well, give him the index-finger-to-the-nose check pitot heat signal. Yep, he's got it; walking toward the front end.

Here comes the clearance—really organized this time—simple, concise. Copied and read back just like in the movies — no sweat!

There's the Sarge — finger on nose and OK sign. Pitot heat is good. Let's crank.

THE NOSE GEAR COLLAPSED! Shut down!

"Sarge, what happened?"

"I don't know, sir, I didn't pull the nose gear pin till you gave me the signal with your finger on your nose."

Nr 4. Engine going, all checks completed, ready to taxi. Pull chocks signal: both fists, thumbs out, rapid movement. Crew chief signals okay. Power up — must be in a hole; more power — *thump!!* It felt like I went over the chocks. Stop, check.

"What happened, chief? I gave you the *pull chocks* signal."

"Well, sir, I was standing a little to the right and I only saw one hand. It looked like you were asking for *electrical power out;* I'd already pulled the power, so I gave you the OK sign. Next thing I knew, you had gone over the chocks!"

Do some of these situations sound familiar? What do they have in common?

From the cockpit of the modern jet fighter it is near-impossible to see the engine(s). At the present time, in your organization how does the man on the ground (usually the crew chief) notify you that "Y.O.U.'R.E. . . . O.N. . . .F.I.R.E! !"

The good book on "Handy Hand-Signals for Aviators and Associates" does not include a signal for this vital communication in its vocabulary. Also missing from the vocabulary is a signal to warn a wingman that you have impending structural failure — that you want to eject. Consider this position. No radio, wingman tight on the right, you can see that the right wing is about to fail, he cannot. How are you going to tell him?

You might consider the idle-speed-boards bit. Is *is* a rather rough way to treat a guy who is only looking after your interests.

The signals mentioned in the above two cases are not included in AFR 60-15. After all, they cannot think of every possible situation. However, in the two cited cases, something must be done. Not only your aircraft is in jeopardy, but also other aircraft in the immediate vicinity. Discuss possible situations with your aircrews. They may offer some pet theories and maybe some "what-I'm-going-to-do's." Pick the best suggestions for your situation. Spread the ideas around; forward them. Then we can all benefit.

Tales Nr 3 and Nr 4 come from a well-known ditty. First verse: unfamiliarity with proper hand signals, use of non-standard signals; improper signaling position or practices. Second verse: same as the first. Etc., etc.

Well, here is your chance to ". . . throw a nickel on the grass . . ." Take an hour to review hand signals in your squadron. If you find a lack of knowledge or a non-standard practice, you have found an accident or incident in the making. It does not take much to correct the situation: a demonstration, a series of photographs (for display in the ground crew lounge and the aircrew briefing room), and a practical test, to be sure the "message" was received.

Another excellent place for your photo series is your checkout folder. When a new man arrives, he immediately jumps on the bandwagon. He will not be the one who, during the investigation following an accident or incident, says: "That is the signal we used at my *last* squadron . . . !" ★

no colonel, it's not a TOY

Capt Donald V. Amodt, USAF

The salmon paid very little attention to the pile of metal that lay in the bottom of the river. Their drive to get up stream to spawn pushed them on.

The Flying Safety Officer from Pine Tree Air Force Base was standing on the bank of the river. He didn't notice the salmon. His attention was focused on the pile of metal at the bottom of the river. A large white star was clearly visible. At times through the rushing water you could detect some letters that looked like U S AIR FORCE.

The FSO didn't have time to think about fish today. He had a fatal aircraft accident to investigate. There were questions that had to be answered, but he would find only part of his answers there in the river.

Let's go back in time two years to a morning when joy was in the air. This started a sequence of events that contributed to this accident.

Lt Boone walked from the hangar out to his helicopter parked in front of Base Operations. He accomplished his preflight with a little more care than usual, because this wasn't just a routine mission. He was flying the Wing Commander out to a remote site for an inspection tour.

He had just completed his preflight when a staff car pulled up beside the helicopter. Col Crockett and one of his deputies got out of the car and boarded the aircraft. After Lt Boone had briefed them on the emergency procedures, he asked Col Crockett if he would like to ride up front in the left seat which is the copilot's seat in a helicopter.

The Colonel had never flown in a helicopter before so he gladly accepted the invitation.

Lt Boone helped the Colonel get strapped in, and then briefed him on the flight procedures as he started the engine and engaged the rotors. To expedite the takeoff, he accomplished the pre-takeoff check as he taxied out to the edge of the ramp. He then called the tower for clearance.

"Pine Tree Tower, Chopper 48. West ramp for a southwest departure."

"Roger, Chopper 48, you are cleared for takeoff; remain clear of the departure zone of runway 23."

"Chopper 48, understand."

Lt Boone brought the aircraft to a hover and slowly transitioned into forward flight.

Col Crockett was impressed by the apparent ease at which the helicopter became airborne and began to fly. He was also seeing the base and the surrounding area as he had never seen it before. He was so taken up with this new experience that he didn't notice the noise and vibration that was annoying his deputy back in the cabin.

The flight was short; only 15 minutes after takeoff they were on the helipad at the site.

As the Colonel climbed out of the cockpit, he asked Lt Boone to pick him up in three hours.

When Col Crockett returned to the helipad, the helicopter was there waiting. On this flight he didn't need an invitation. He climbed into the left seat and strapped in.

After takeoff, Lt Boone asked the Colonel if he would like to take the controls. The Colonel had been waiting for the opportunity and he assumed control of the cyclic and the rudder pedals. He did very well, so well that Lt Boone decided to let him attempt the landing. He called the tower and got clearance for a straight-in running landing on runway 05.

He told the Colonel to hold his airspeed and at about two miles out he reduced the power and started a long, flat, Navy type approach. He was backing up Col Crockett on the controls, and as they came over the end of the runway, he eased back on the cyclic and "greased it on."

The Colonel grinned, "This is just like flying an airplane."

As the Colonel got out in front of Base Operations, he thanked Lt Boone and said he wanted to fly the helicopter again sometime.

He did. In the months that followed, the Colonel occasionally flew the helicopter and developed a certain feel for the shaky beast. He had even managed to struggle through a couple of hovering takeoffs and landings.

Then that fateful day arrived. Col Crockett had requested a helicopter for an 0900 takeoff on Saturday. The mission was to a survival training area 60 miles from the base with four hours ground time at the training area.

Capt Boone volunteered for the flight. Oh yes, Lt Boone had been promoted and had also been made an IP.

He knew this mission was no ordinary inspection tour. This was going to be more of a survey, and

he would get to assist the Colonel. It was going to be a survey to see how well the fish were biting.

When the Colonel arrived at the aircraft Saturday morning, he had two of his deputies with him to assist in the survey. As they boarded the aircraft, he told them that he would ride up front so he could show how well he could fly, as he called it, "his new-found toy."

Col Crockett made the takeoff from the left seat. As he reached 1000 feet, he leveled off and turned on course. After about 30 minutes he picked up the river that flowed through the training area and followed it. He also descended to 300 feet so he could better see the fish in the river.

It was then it happened. The engine quit and in less than ten seconds they had joined the fish.

Seven hours later another helicopter found the wreckage. It looked like a large silver fish. The aircraft was lying on its side under about five feet of water. The crew and passengers were still on board.

The accident investigation will produce some facts about the mishap. A TDR on the engine will reveal failure of the master rod. That was most likely the reason for the autorotation. It can be assumed that the reason for landing in the river was that the aircraft was at too low an altitude at the time of engine failure.

One fact that won't be brought out by the investigation is the control difficulty experienced by the pilot during the autorotation. In the few seconds between engine failure and impact, the pilot had considerable difficulty trying to gain control of the aircraft from the Colonel. He was never successful.

Fortunately, the story as written is not true but the plot is.

Although there is a regulation against it, somewhere in the Air Force today there is a stiff wing pilot getting a "half fast" check out in a helicopter. He may be a lieutenant or a lieutenant general.

The helicopter isn't difficult to fly and that's the big problem. In many respects it flies just like a stiff wing, only it's slower and considerably more maneuverable. Too many stiff wing pilots feel that a helicopter is a simple little machine, good only for chasing jackrabbits and getting into good fishing holes. However, the problems of aerodynamic forces on a helicopter are just as complex as those on a supersonic jet, only different. Without a basic understanding of these differences, it is difficult to attain a proficiency level that is compatible with safety.

Normally these "under the table" checkouts consist mostly of stick time with very little instruction. The pilot learns just enough to control the aircraft. He also learns just enough to be dangerous.

If you become the victim of a fatal aircraft accident, the degree of death is the same whether you were flying a UH-1F or an F-4C. ★

Missilanea

IN THE EVENT missile personnel have to use emergency breathing equipment, how well do these people *really know* the equipment? In an emergency, can they don the equipment as readily and easily as putting on their raincoats? If not, then they are not properly trained.

SAC is currently reviewing all technical orders pertaining to breathing apparatus. One of their objectives is to develop a short, simple checklist to be used under emergency conditions. However, no checklist is a substitute for knowledge when rapid reaction is necessary.

A good parallel is the aircraft pilot who must be able to respond from memory to critical or emergency situations. The pilot's Dash One contains emergency checklists, yet he must memorize certain portions, for in an emergency, *time is critical*. The same should be true of any emergency equipment checklist. It can be a good training aid and supplement to the present technical data. However, in time of a crisis, the user of the equipment will very likely not have time to refer to it.

The old proverb, "He who hesitates is lost," could aptly apply to the individual who is not thoroughly acquainted with his emergency equipment.

Lt Col John R. Cockley
Directorate of Aerospace Safety

TIPSY HOUND-DOG—Two AGM-28 (Hound Dog) forward body adapters were mounted on an Air Log 3010 transport trailer. One adapter was loaded with the forward body of a missile. The empty rear adapter was being removed from the trailer by five personnel. As the empty adapter cleared the trailer rails, the trailer tipped, and the missile body on the forward adapter contacted the floor in a not-so-gentle manner. The pitot static probe was bent, the associated pressure lines were severed, the probe support was sheared from its attaching rivets, and the cannon plug was damaged.

What caused the mishap? Improper positioning of the forward adapter. Tech Order 21-AGM28A-2-2, par 4-21, contains a warning to observe the specified limitations to prevent trailer tip-over and personnel injury. It further requires the limitations be stenciled on trailers used for mounting forward body sections.

All AGM-28 units should insure Air Log 2000 and Air Log 3010 trailers used for forward body section removal have the maximum forward position prominently marked. Air Log 4100B, which is not as critical in positioning requirements, is the preferred trailer for this use.

Captain R. A. Boese
Directorate of Aerospace Safety

WHITE IS BLACK AND YELLOW! There have been several recent occurrences involving the toxic fume indicator showing signs of a leak in the AGM-12 container. This, in itself, could create consternation among the troops, and justly so. None of us are real anxious to go around smelling IRFNA or MAF-1 fumes. Both of these substances are extremely toxic. OOAMA was immediately interested when it was reported that leak indicators in the Bullpup containers showed acid leakage had taken place.

The indicator in the AGM-12 container is white when installed. The left half is susceptible to MAF-1 (fuel); the right half to IRFNA (acid). With an MAF-1 leak, the left half of the indicator will turn black. With an acid leak, the right half of the indicator will turn yellow. Before the container is opened, the indicator should be checked for either MAF-1 or IRFNA leaks. Thus far, 20 container indicators have exhibited acid leaks. These 20 cases involved new aluminum containers in which missiles had not been installed.

OOAMA, the Navy Materiels Laboratory, and the manufacturer of the indicator are all working on this problem. OOAMA has checked some missiles which were in containers having an indicator color change. No acid or fuel leaks, or leak odors, have been found to date. OOAMA will keep us informed on the progress of the solution to this leak indicator problem.

Lt Col H. M. Butler
Directorate of Aerospace Safety

AERO BITS

PRIOR TO TAKEOFF the pilot of an F-100 noticed a low EPR reading. He aborted and returned the aircraft to the ramp for inspection. That was possibly the smartest thing he ever did. When the engine was inspected, a piece of intermediate compressor case approximately 16 inches square adjacent to the dummy bleed valve was missing. Approximately 30 inches of intermediate compressor case cracks were found in the same area and in the area next to the fuel flow transmitter. The engine had flown 626 hours since major overhaul and had no previous history of low EPR.

AFTER FOUR HOURS of flight in a C-124, a passenger asked the flight mechanic for his lunch and was told that the lunches were in the nose compartment. While searching for the lunches, the passenger managed to get hold of the nose entrance hatch emergency release handle. Yep, away went the hatch —fortunately the aircraft was over a desert area.

A flight lunch was involved in another incident, although indirectly. Some sandwich wrappers were drawn through the open pilot's window of a C-119 and went into the left engine. Torque began to fluctuate and RPM surged. The engine was shut down and a single engine emergency landing was made. When the engine was inspected, a sandwich wrapper was found jammed against the left carburetor air intake.

THE PILOT OF AN RF-101 noticed a slight shimmy on the landing roll, then after turning off the runway and jettisoning the drag chute, he saw the gear unsafe light in the handle illuminate and the nose gear safe light go out. Simultaneously the nose gear steering failed. Prudently, he called for gear down locks and a tow. After the down locks were installed the engines were shut down and a cursory inspection of the nose wheel well was made which showed no apparent damage or hydraulic leaks.

During the towing process the tow vehicle had to stop for clearance to cross the runway. As it did so, the nose gear folded aft and the aircraft settled on the strut and tow bar. This resulted in some minor sheet metal damage, and it was found that before the engines were shut down some damage had occurred.

Cause of this incident was faulty maintenance in that the left rear trunion pin (PN 20-45096-3, Fig. 83, Index 28) had been improperly installed. The bolt had not been put through the pin. The aircraft had made six flights since this faulty installation and the pin had gradually worked loose and finally came out completely when the aircraft turned off the runway. During taxi and towing very little force had been exerted toward the pinless trunion, but when the tow vehicle stopped, most of the weight of the aircraft was placed on the trunion. The strut twisted, which broke the lock link assembly and allowed the strut to fold rearward.

PREVENT ICE FORMATION — A pilot reported an increasing exhaust gas temperature which led him to believe that the inlet areas to his engines were icing. Rather than turn on the anti-icing system and take a chance on FOD from large chunks of ice entering the compressor, he elected to let down to a lower altitude. This was effective and his exhaust gas temperature returned to normal in a short time.

During almost any time of the year, icing can be a problem and a definite awareness of possible icing conditions should always be maintained. Staying out of known icing areas is the prime solution, but if it is necessary to pass through such areas, then anti-icing systems should be turned on before ice forms. Anti is prevention, not removal.

Jet Service News
General Electric Company

YOU C-124 TROOPS should beware of an innocent looking local modification of the trash receptacle door on the crew compartment buffet. We're talking about the thin metal ones that open downward and are spring-loaded to the closed position.

A crewmember recently received major injury while placing trash in the receptacle. As he started to withdraw his hand, the spring-loaded door closed on a finger. The natural response was to jerk his hand free and in so doing he cut away the flesh of his middle finger. The Air Force lost the crewmember for 21 days of duty including seven days' hospitalization—not to mention the pain and inconvenience to the individual.

If your birds are equipped with this little finger trap, maybe a chat with the maintenance people is in order.

Lt Col Wallace H. Carter
Directorate of Aerospace Safety

THE RIGHT PLACE AT THE RIGHT TIME! The pilot in the front seat was completing his second ride in the F-4 with an instructor pilot in the rear seat. Approximately 30 minutes after takeoff external wing tanks went dry. Internal wing transfer switch was in the normal position. Fuel readings by the pilot to the instructor were in two figures consisting of tape over counter until the external tanks were transferred, then only one fuel figure was read to the instructor pilot. The instructor assumed that tape and counter were the same since he was unable to view the gage due to the large size of the pilot. After 1 plus 10 of flight, VFR touch and go landings were commenced. Upon completion of the 7th touch and go landing, the throttles were advanced for go-around. Approximately 10 feet in the air, both engines flamed out. Gear and flaps were still extended so a landing was accomplished on the remaining runway. Normal braking was used to stop the aircraft 2000 feet short of the barrier. Tail hook was extended as a precautionary measure.

Investigation revealed that the front seat pilot had left the external fuel transfer switch in the outboard position—as advertised he got no transfer of internal wing fuel into the fuselage tanks. This is one IP who will insist on hearing tape over counter fuel readings whenever he asks for a fuel check. It is recommended that all IPs follow this procedure. The next similar occurrence may not happen at such an opportune location.

Maj Robert F. Brockmann
Directorate of Aerospace Safety

AERO BITS

FOLLOW THROUGH — In golf it's keep your eye on the ball and follow through. When shooting skeet, if you stop your gun when you pull the trigger, odds are that you'll miss. In business following through is often the difference between success and bankruptcy. There's one situation, however, where following through can get you into trouble.

A review of accident files reveals records of some pilots being killed because they wanted to see where their rockets hit the target. They "followed through" to the extent that they couldn't pull up soon enough and crashed into the ground.

Other files indicate aircraft damage caused by the pilot's tracking his missile or rockets when he should be taking evasive action. Our missiles and rockets are the best that money can buy, and they should always perform as expected, but sometimes they don't.

The pilot who is "tracking" his missile when he doesn't have to guide it is begging for trouble. If the missile or rocket malfunctions, he's pretty close to the explosion.

An aircraft was damaged recently, and an excerpt from the report reads as follows: ". . . The launch mode was intended to be a standard 'bomb run' with an escape maneuver immediately following launch. The pilot, however, decided to track the missile and the aircraft sustained minor damage at the inboard leading edge section of a wing flap supposedly from impact with pieces of the motor fin . . ."

This pilot was lucky. He could have caused FOD to the engines, and could have lost the aircraft and his life.

Our scoring systems are the finest allowable by the state of the art. Your hits will be scored, and your near misses will be measured in inches.

Many people in this world have been asked, "In whom do you place your trust?" For my money, one answer to this question by pilots should be, in the scorer.

George W. Williford
OOAMA, Hill AFB, Utah

FALLOUT

continued from inside front cover

scribes the same maneuvering area side as the barb type depiction that calls for a "Left Turn."

The best portrayal would be the one that is the simplest, the easiest to read, and one that is the most familiar to pilots. As entry procedures for holding patterns and procedure turns are almost identical, it seems that they should be portrayed the same.

Capt Dale L. Reynolds
C-130E Stan/Eval Pilot
4442 CCr Tng Wg, Sewart AFB, Tenn

The USAF Instrument Pilot Instructor School is continuing to evaluate pilot reaction to procedure turn depictions in use. This letter is an example of those being received by the IPIS, and typifies outstanding interest and initiative from an Air Force pilot.

To The Editor, IPIS Approach

I very much respect your article "IPIS Approach" published monthly in AEROSPACE SAFETY. As a new pilot I would be very interested in obtaining as many back articles of "IPIS Approach" as possible. If these publications are not easily accessible, I would like to suggest that your school publish annually, in one volume, all the "IPIS Approach" articles from the preceding year. I am sure many pilots, including myself, would be more than willing to pay for any such publication if it were made available. If you find this idea feasible you would be complementing any already valuable service which you provide Air Force pilots.

1st Lt William N. Payne
69 Bomb Sq, Loring AFB, Me.

Copies of all IPIS Approach articles to date are available from the USAF, IPIS, Randolph AFB, Texas 78148.

☆ U. S. GOVERNMENT PRINTING OFFICE 1966 201-220/12

WELL DONE

CAPTAIN ARTHUR D. KERR

961 AEW & CON SQ, OTIS AFB, MASS.

Captain Arthur D. Kerr, an instructor pilot, was flying a local VFR transition upgrading flight in an EC-121H. His student, Captain Paul T. West, was in the left seat, and was performing a practice boost-out landing. On final approach, at less than 100 feet above the ground, they heard a loud snap under the flight deck. Simultaneously, the control wheel deflected fully to the right and the aircraft began to rock laterally. Since the aircraft was not properly aligned with the runway for a landing, Captain Kerr took the controls and throttles and executed a go-around. By using rudder and asymmetrical engine power, he was able to maintain lateral control of the aircraft. He climbed to a safe altitude and trouble-shot the systems. The control column was binding, and aileron control could not be established in either the boost-on or boost-off configuration. The yoke stayed fully displaced to the right. The only aileron control that could be established was to roll the wings to the left. Captain Kerr abandoned the use of aileron control and maintained lateral control by using rudder and asymmetrical power. He then lined up a long final approach, still using rudder and asymmetrical throttles to maintain lateral control, and made a safe landing without further incident. After the flight, inspection revealed that an aileron control cable had worn and snapped in the left wing root, causing the aileron to become inoperative, and the aileron control yoke to bind. Captain Kerr's accurate and timely analysis of the emergency and his skill as a pilot averted what might have been a disaster. WELL DONE! ★

REX RILEY
SAFETY OFFICER
SSGT. Foster
FOD
U.S. AIR FORCE
TAKE ONE F-104 WITH A CLEAN BILL OF HEALTH... A SKILLED PILOT... A ROUTINE MISSION... AND ADD
U.S. AIR FORCE
THE FLIGHT LINE CAN OFFER THINGS EVEN THE OLD STANDBY T-33 CAN'T DIGEST SUCH AS...
A HURRY-UP JOB PUT THIS F-100 IN THE AIR BUT NOT FOR LONG... IT SLOWED REAL FAST CHEWING ON THESE
A FORGOTTEN WRENCH IN THE INTAKE
RUNWAY SCRAPS
MISPLACED PLIERS
RESULT: ONE MAJOR INJURY AND A LOSS OF OVER ONE AND A HALF MILLION DOLLARS
RESULT: TWO MAJOR INJURIES AND COSTING OVER ONE HUNDRED THOUSAND DOLLARS
RESULT: ONE FATALITY WITH A LOSS OF OVER SIX HUNDRED THOUSAND DOLLARS
U.S. AIR FORCE
THESE THREE ACCIDENTS COST A HUMAN LIFE PLUS OVER TWO MILLIONS OF DOLLARS. CHECK YOUR TOOLS... AND REMEMBER KEEP THE FLIGHT LINE CLEAN!
FOREIGN OBJECT DAMAGE CAN BE SOLVED ONLY BY EACH OF US GIVING HIS SUPPORT AND EFFORTS IN CONTROLLING CARELESS DISPOSAL OF ANYTHING THAT CAN BE INGESTED BY A JET ENGINE... FORGOTTEN TOOLS, RAGS, BOLTS, ETC. CAN TURN THE SWEETEST REPAIR JOB IN THE WORLD SOUR. AS A TEAM WE CAN SUPPORT THE FOD PROGRAM AND SOLVE THIS SERIOUS PROBLEM