SEPTEMBER 1963

TAC ATTACK

TACTICAL AIR COMMAND

HELPFUL HELO

TAC ATTACK

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Contents

ANY TIME, ANY PLACE 2
OLD TAT 4
BODY IN MOTION 8
LETTERS 10
CHOCK TALK 12
HELPFUL HELO 14
SEG NEWS 1
GRND/EXPLO SAFETY 1
VECTORED IN 20
TAC TIPS 22
UNLATCHED 25
OL' SARGE 26
WELL DONE 27
RECOGNITION 28
TAC TALLY 29

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Detachment 12, of Western Air Rescue Service, practices for the safety of George AFB aircrews.

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Angle of Attack

angle of attack 1

MAKING ALL FUTURES FRUITS OF THE PAST
—Arnold

Colonel James K. Johnson
Chief, Office of Safety

It takes the ATTACK staff almost a month to prepare each issue of this magazine. The TAC printing plant works on it for an added two weeks and then turns the finished magazine over to the distribution section. All told, it isn't unusual to write articles that are to be read two months later. This creates some interesting situations, particularly at this time of year when the temperature is in the mid ninetys and it's time to write about winter hazards.

Fortunately, the safety office is air conditioned and has on record the history of previous winter problems. By turning the thermostat down and drawing heavily on past experience we can generally anticipate future problems. In a sense, this sums up one of the most essential ingredients of any working safety program . . . Using experience to anticipate problems.

Dad notices junior whittling toward his own hand. Experience, usually earned at the expense of several badly cut fingers, has told dad that this isn't safe, so he warns his less experienced son.

The line chief notices a young airman tightening a critical part with a standard wrench. From experience he knows that no one can judge the proper wrench pressure and that the fitting may develop a leak or fail, creating a hazard or causing extra work. He tells him to use a torque wrench.

Over the years, accidents have proven certain courses of action to be unacceptable and dangerous. Regulations are written to keep others from following these courses.

Unfortunately, the prevention cycle does not end there. Junior may forget and whittle toward himself when dad isn't around, the airman may get in a hurry and forget to use a torque wrench on some other critical part or one that's particularly hard to get at. A pilot may violate a regulation because it conflicts with what he wants to do. Junior may not cut his finger, the critical part may not leak or fail and the pilot may "get away" with his violation. But if any of these people continue to deviate, an accident will surely occur.

any Time,

any Place

REPRINTED FROM AIRSCOOP

With all the articles about F-105s, F-4s, missiles and anti-missile missiles, I would like to turn back the hands of time in terms of flying (not the safety involved) and tell about a small group of professional pilots—pilots who are flying the planes of yesterday, in yesterday's flying conditions. Specifically, they are the aircrews flying C-47s, T-28s, B-26s and four fairly modern U-10s in support of the Vietnamese Air Force.

I would hazard a guess that before this article has been completely read, many readers will have remembered when . . . "The PSP (pierced steel planking—for the younger generation) was so slick I thought I'd never get the damn thing stopped." . . . or, "Time's up, start down—well, made it again" . . . or, "Number two feathered, 120 miles out, bearing 226 degrees to home plate." The typical debriefing . . . mission accomplished, nothing unusual happened.

Although, to these aircrews, "unusual" would be landing on an 8,000 foot concrete runway. There is only one in South Viet Nam. The others may be improved rock or clay, a couple with PSP, and always much shorter than one we like. There are a few hazard

flight here, but with all the sorties [illegible] in over a year's operation, [illegible] have been only two accidents (one a minor) attributable to pilot error. One reason for this enviable record of safe flying, in a combat theater, is the continuing emphasis placed on the hazards of our mission and the consequence of not flying safely. One important hazard is the fact that there is no really safe area outside the cities or airports of operation. This does not mean that all these areas are unsafe, just that there could be a group of Viet Cong anywhere you happen to be forced down or induced to bailout. Consequently, this provides a rather unique incentive to make certain that your aircraft is worthy of flight (preflight insp). The short runways of PSP cause one to be a little more critical of takeoff and landing performance. The type of mission, for example, a resupply of an isolated [illegible]st by the gooney bird drivers [illegible]ree-drop rice and ammunition in a 22 foot circle at approximately 50 feet altitude, requires the pilot to exercise the utmost in judgment and flying ability. As usual, mission accomplished, safely.

Another particular hazard of note in this theater is night vertigo. Many times our pilots are

called upon to re-demonstrate the tactics for night fort defense to the Vietnamese who have had only limited night capability. The hazy [illegible]nd ground blend together, ef[illegible]vely eliminating any resemblance of a horizon. Tumbling the gyros is unheard of although it sometimes happens with vacuum instruments. Swinging flares start the ground drifting back and forth and your night vision is completely ruined after a strafing pass under two or three million candle power flares. On the gages or else!

In order to sustain 24 hour operation safely, we do not limit our flying safety to the usual once a month reading of accident briefs in the usual formal atmosphere of a commander's call. Instead, we have a program that daily emphasizes the importance of flying safety, and incorporates more people than just the fly safe officer. For example, a typical day starts with a briefing for all aircrews, not already flying, at 0730.

The essential elements of this briefing cover the missions to be flown by each type aircraft and the crew assignment. This is followed with an intelligence report on the previous day's activities and what we can expect on today's missions. Then the weather picture, covering literally all of Viet Nam, the delta, the mountains, and the costal areas, because each area presents special weather situations. The operations officer usually concludes the briefing with comments on operational policy, airfield status, etc. At least once a week, the close ones are reviewed by the flying safety officer, and he usually manages to find someone on whom he can pin a bone for the week's activities.

In addition to this, there is probably more flying safety cussed and discussed in the tents during the bull session recap of the day's missions. It is this spontaneous discussion that does more to bring about an awareness of what not to, or what to do, in any

specific situation than any formal lecture on flying safety could possibly do. Also, each flight has their own weekly meeting to discuss and evaluate techniques, procedures, new tactics for ordnance delivery and to review emergency procedures.

We have some problem areas, to be sure, but we believe that sensible supervision, individual alertness, and sound judgment has been rewarding from the safety point of view. We believe a con-

stant self-analysis in this respect, and prompt attention to our problems, will help us maintain our current safety record.

I don't know how those U-10s slipped in here, but rumor has it they are being replaced by PT-17s. An over-all well done to the personnel of the 1st Air Commando Group serving in South Viet Nam.

FROM TIME TO TIME some of our fan van fans accuse us of not slanting enough material at them and their trusty machines. Actually the fact that we don't is a sort of left-handed compliment . . . we continually try to pour the water where there's a fire. Oh well, this month we've spotted one . . . so duck or get wet!

First comes this report on a goonie that proved less docile than is generally advertised. An IP demonstrated a power-on stall and warned his student of the aircraft's reaction to a full stall. The student then had a go at the same maneuver, but chickened out before actually inducing a stall. Try again. This time he took it too far the other way. At about 62 knots the old gal stalled - full, in spades. The left wing dropped violently, rolling her almost inverted . . . the IP immediately took control, retarded both throttles as the nose dropped to near vertical. Despite reduced throttle the engines started winding up. He pulled the props to full low and gingerly nursed the aging, but frisky, gal out of the screaming dive, but not before both tachometers hit 4400 rpm. Both engines and props had to be changed.

Obviously, this pair goofed when they bit too far into the partial stall zone. Not being versed in gooney aerobatics and not having tried a full stall in the specific aircraft, we are in no position to evaluate the recovery . . . altho it would also seem that they were too tender with Gs during the early stages of the pullout, which would account for the speed and overspeeding.

No matter, this is one time we'll swing along with the avoid-the-hazard-to-stay-out-of-trouble crowd . . . full stalls are for the more acrobatic type machinery.

Then we have the transition pilot who held the nose of his C-123 up and added full power to the good engine after his instructor hauled an engine off during the approach to a power-off stall.

Hooboy! The bird completed three turns b[illegible] they got it out of the spin and ended up with one horizontal stabilizer that sported a cracked spar.

When we read the brief on this one, our first reaction was to ask "Why . . . why pull an engine at or near stall?"

Then the full report came in and we read the student's comment regarding his reason for using the control he used. He said, "I knew I had a single engine with low airspeed and needed power . . . "

Unfortunately, his reaction is not unique . . . as can be proven by checking thru the accident files on darn near any multi engine bird . . . it is a wrong reaction that is as natural as pulling back on the stick to recover from a stall. From where this tiger sits, there is but one sensible way to attack such problems. However, we do question pulling an engine during a stall series.

The procedure for handling a single engine go around from below single engine control speed should be pre-briefed, demonstrated, and handled as a separate maneuver . . . and no matter how you slice this one, the student's reaction and his comment are proof positive that he was not sufficiently briefed. Admittedly, it takes an awful lot of bri[illegible] to get thru to some students.

ALTHO THE BIRD was of the rusty T-type, the ·ons apply equally to all, so we'll tell you about hortly after the pilot made a normal landing, the right main and nose gear pulled the Arab bit, folded up shop and stole away. The surprised bird did a low curtsy on its chin and one knee, then skidded off the runway. Much to his surprise, the pilot found the gear handle up... and dog-nab it, he'd plunked that critter down and jiggled it too!

So they jacked up the bird, started looking, and found that the gear selector valve camshaft was out of adjustment. This would let the gear handle move to neutral then jar up on touchdown if it wasn't fully locked. The gear uplocks were out of adjustment so the indicators showed safe even tho the downlocks were not engaged.

Thanks to such maintenance, the "T" now stood for TRAP, one each, booby. All that was needed to spring the trap was a pilot who was a little grey on his gear lowerin' habits.

"Aw come now, TAT," some hero is bound to holler, "you can't tell me that putting a T-bird handle down is that complex!"

Frankly friend, we didn't think so either, but apparently we were wrong. This troop left his thumb ~~ the button when he jiggled the handle - which is obvious mistake. He also jiggled it before the r was fully down and locked... and they tell us that this doesn't check things because the gimmick that keeps you from yanking up the gear on the ground will be engaged when the gear is in transit. In short, us T-birders are supposed to jiggle the handle after all three are down and locked.

The main point is this: It pays to know the full story behind each of the many little checks we make while getting our birds ready to leap or come back to roost. Not knowing "why" can make us guilty of just going thru the motions without really checking a thing.

THE TOUCHDOWN was smooth, on the spot and at the right speed . . . some seconds later, the big 105 was bouncing thru the boondocks, off the right side of the runway, leaving a trail of bits and pieces, like the ventral fin, flaps, wing tips, the nose gear strut . . . etc. The bird was a writeoff.

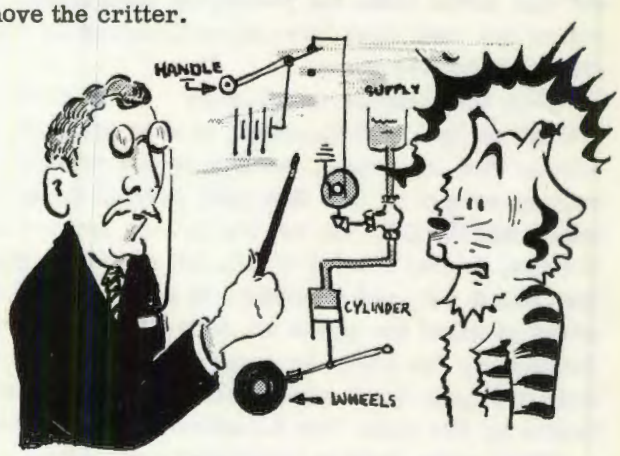
What happened? Well, according to the pilot, and we'll quote him, "The pattern and landing were standard with touchdown just past mobile control. When airspeed decreased thru 160 knots, I reached the chute handle and raised the gear handle in- ad. Immediately, I put it back down and advanced the throttle to full power. When the gear collapsed too far to allow full extension again, I stop-cocked..."

You can say what you wish about this pilot's actions, but respect him for his honesty.

This accident reminds us of the old bug buster with gear and flap switches located conveniently close to each other. It was no accident that the bird frequently ended up on its little tummy after some pilot attempted to retract the flaps. Yes, the 105 drag chute handle is located immediately above the gear handle.

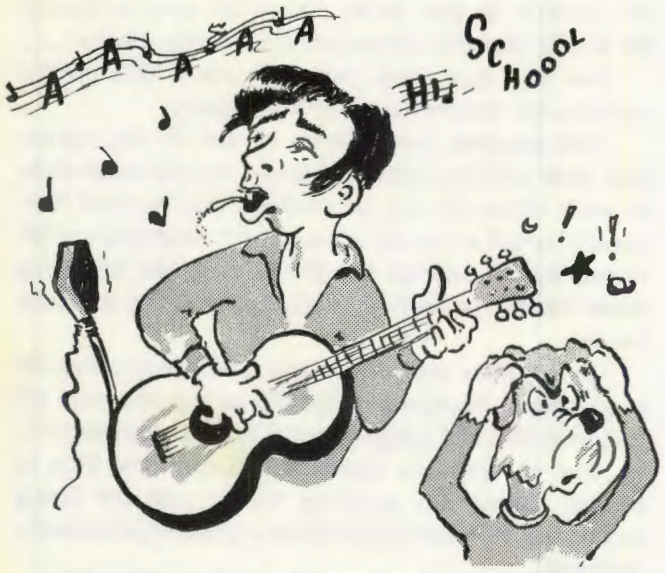
On the other side of the fence, the modern fighter is a complex machine with hardly enough room for all its gimmicks and gadgets, and it is almost impossible to have an optimum layout for all controls. This is reason enough for applying TAT's rule for flying and buying which is: Never trust anyone—particularly yourself.

A shredout of this rule reads: Make sure you have your meathook on the right hootecattle before you move the critter.



AFTER FEEDING IN full military power to terminate a low approach, an F-105 type retracted the alighting gear. Actually, if you want to be technical about it, he put the gear handle to the up position which completed an electrical circuit which repositioned a valve and caused the gear to be retracted.

The big bird promptly sat down on its aft section and slid like an overweight base stealer. To make a long, sad story short and sad, the electrical circuit which caused the gear to be retracted also caused the upper and lower speed brake pedals to extend (the pilot hadn't closed 'em for the go) and the increased drag of retracting gear and fully extended brakes brought the bird down. The report we read blamed the pilot . . . said he used improper clean-up sequence. Could be, but this tiger wonders why he didn't wait a bit before making with the gear bit.



YES SIR, the one thing that has helped put man above the other animals is his ability to communicate. He can write down his horrifying experiences so others can read about 'em and avoid making the mistakes that caused them.

Take the constant speed drive . . . as first installed on the F-100D and F, it used oil from the engine. But a normal, healthy engine produces a certain amount of dirt that gets carried around by the oil and the CSD just flat couldn't eat this dirt and survive. So they started to fail, left and right. When they failed, they had a tendency to split open and out would go all of the engine oil, followed at a discrete distance by the pilot. As a cure, they changed the CSD and gave it a separate oil system. They also beefed up the case. The failures promptly stopped.

When more modern machinery was painstakenly assembled to take over from our fast-aging F-100 fleet, naturally the engineers went to great efforts to consider all . . . ah well, there's always that two percent! So we find our latest, the F-4, with the original CSD system. And it gives trouble. The Navy found this out about a year ago when one of their pilots noticed a generator warning light. He tried to bring the CSD back on the line but couldn't . . . so he followed the procedure that was in use at the time and secured the generator. On final approach he got a fire warning light. Damage was substantial and they revised the flight manual.

Six months and three days later another generator failed in flight, and considerable damage was proof enough that the pilot didn't shut the engine down.

Since, the Navy has reported "numerous in-flight failures." Occasionally, someone doesn't cage the engine and investigators will find the CSD case broken, oil all over the area, bearings burned out, with the CSD case starting to melt . . .

Until we get the latest fix (a gimmick that automatically disconnects the CSD shaft following a failure), a generator warning light calls for single engine operation, so don't try to improve on the dash one procedure!

Those who care here in TAC have pushed for a separate oil system for the F-4 . . . but the Navy doesn't like the 90 pound weight penalty.

THE ACCIDENT SEQUENCE started in late 1957 and ended in June of this year. It was a long and strangely familiar sequence. A young second balloon, fresh out of multi-engine advanced, was dumped into various and sundry non-flying jobs. He got most of his flying in the right seat of bug busters and goonies . . . the only aircraft he was qualified in was the bug buster. He went off active duty in 1959, reverted to active status in the ANG in 1962 and was put into . . . well, here we come to a tangent in our cause factors. The tangent started back during the Cuban crisis when many recalled types remained on active status. Some guard units were hard hit, which was why the 1957 second balloon, now wearing r road tracks, was thundering down the active i office of an RF-84F belonging to one of these uni It was his second transition mission in the bird.

Actually, the unit had done about all they could. They'd checked him out in the T-bird and had let him accumulate 80 hours in it. They had given him ground school and thoroughly briefed him. Now, they were putting him on his own.

As the bird neared the proper liftoff speed, he horsed it into the air in an exaggerated nose-high attitude. His IP in the chase aircraft, some ten seconds behind, twice advised him to lower the nose. The nose stayed up. The IP shouted, "drop tanks," hoping to lighten the bird enough to put it on the right side of the power curve. The tanks went off, but rising terrain and a power line marked the end of the accident sequence.

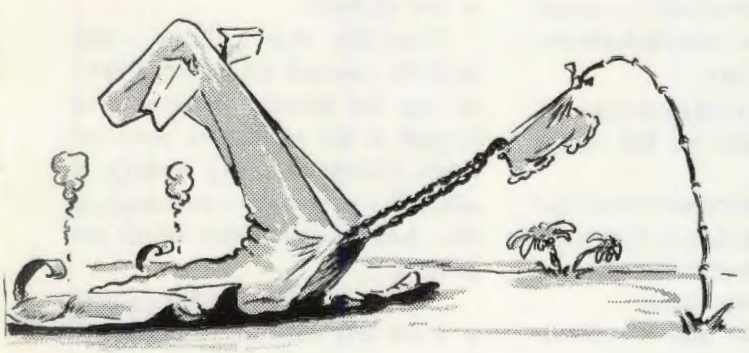
The cockpit of a fighter aircraft is a demanding place to be. Those of us who grew into fighters in easy stages are sometimes prone to underrate this fact. We jumped from the T-6 to F-51s to T-33s to F-86s to F-84s and into the century series. A relatively easy progression. The jump from T-bird to F-84 or century series is a little more abrupt. Not excessively so, provided the pilot is used to things for himself and is competent and confi

TAT has always had trouble swallowing the personnel officer's concept that a pilot is a pilot. We're trying to blame the personnel people for this one. It's just that this accident triggered off this chain of thought. Yeah, the guy might be a pilot to the personnel officer . . . the ops officer ain't sure . . . not 'till he finds out how much background and experience is behind those wings.

Considering the cost of our current equipment and the high price of failure, we should make considerable effort to see that we're using the b e s t we have available.

WE WERE READING an accident brief from another command about a conventional type who got big holes hammered in his machine because he got too close to a thunderstorm. He was at 10,000 feet and flying clear of the clouds about five miles from the storm. He was slugged by three distinct waves of hail lasting about 30 seconds. Nuff said?

A TAC C-123 SMASHED into the ground near an overseas hospital, killing two civilians and sending all four souls on board the C-123 to glory. The pilot attempting to engage a red flag attached to a foot bamboo pole, using a chain that was slung capsule-recovery-style from the rear cargo ramp of his aircraft. No one knows exactly what happened, except that he hit the pole on his first pass, made a second try, hit it again, and then augered.



This was not a controlled experiment, or an approved pick up. Instead, the flag was known as ggie's drawers, and . . . well, you can guess rest.

Once upon a time a pilot's word was accepted and his judgment respected . . . if you yearn for the professional freedom of the good old days, clinch your fists and gnash your teeth with us. Irresponsible acts such as this erode it away, sometimes in huge chunks.

THE VICTIM started his aircraft only to find something wrong with it. He shut down and waited while the wrench and pliers set corrected the trouble. After engaging the starter he noticed, to his ever trustin' horror, that the gear handle was UP. He put it down just as the nose gear folded.

This tattered one has a few hundred well chosen four letter words on the subject of setting booby traps, but the fact remains us pilots have the final responsibility along these lines. The very time you are most tempted to hurry is when it pays most to PROCEED WITH PATIENT CAUTION!

Speaking of booby traps . . . one night an even dozen of TAC's F-101s were scheduled to launch from an enroute base. With six crew chiefs to do the honors, the support was spread thin.

One trusting young pilot asked a crew chief to button a two-by-four foot panel on the left fuselage while he strapped in.

Immediately after takeoff, he noticed a well defined vibration and promptly returned to terror firma. You right . . . the panel was among the missing. So was the crew chief who was asked to button up. At least, no one remembered being asked to do this chore.

Even had there been a volunteer, in the final analysis the pilot would still have picked up the tab for not INSURING that HIS aircraft was fit to fly.

—TAT—

Body in Motion

ONE OF THE most useful things our recent space accomplishments has done is to put the proof of some difficult concepts right before our eyes.

One good example, for us who must be ever-ready to pull an ejection handle, is the orbital proof of Newton's laws of motion. Sir Isaac reached his conclusions regarding gravity, accelerations and ballistic flight paths way back in the early 1700s. He and his colleagues in the physical sciences were able to calculate orbits in terms of centrifugal force versus mass attraction (gravity). They even had the vision to see beyond our atmosphere and state such laws as:

* All bodies, regardless of weight, accelerate at the same rate in free fall.
* A body in motion will remain in motion - at its original speed and in its original direction until acted upon by an outside force.

Isaac Newton and all of his successors in the field of physics were able to accept these hypotheses without even a hope of proof, because they didn't have enough thrust to get beyond the grip of aerodynamic drag. Although they knew it and said it, they never could prove that a feather c snowflake would accelerate travel side by side with massive metal objects in the voids of space.

Today, we have three Americans who have seen "snowflakes" escort them at a steady coasting speed of some 17,500 mph. Today's science teacher can point to objects that were accelerated away from earth five years ago, and are still orbiting steadily at the very same speed provided by the initial boost.

But down here where aerodynamic drag affects everything we do, we still have some trouble accepting other concepts. The concept of the zoom maneuver in the ejection sequence is one of these. Some folks insist on thinking about ejection in terms of altitude - when, in fact, the correct frame of reference is time.

It is certainly true that f fall-per-time equals altitude and that if we try a parach jump from a platform, there is no substitute for altitude. But when we eject from an aircraft which is moving at several hundred feet per second, altitude becomes only one of many important factors - and is, in fact, the least important at low altitude.

Consider this unfair - but strictly correct bit of hard reasoning. No amount of altitude is enough if the parachute does not open. Conversely, any amount of altitude - even zero - is enough, if the chute opens before we hit the ground.

Let's take the questions one at a time and emphasize the variables over which we have control. The first is opening time.

With current standard equipment (that's a laugh) the time from ejection to inflation can be as l as 3 seconds. It cannot be l

because it takes 1 second for lap actuation, .2 seconds for the snapper to separate us and the seat, and 1.8 seconds for the C-9 canopy to inflate (at a speed of 300 knots). This then, is the fastest possible parachute opening for our best equipped aircraft. It assumes the presence of a butt snapper and a zero lanyard hook-up.

For a first summation, we can now say that we need a minimum of about 5 seconds with the one-and-zero lanyard hooked up. If the lanyard is not hooked, we only need 1 second more. Note that please - it's important. It only makes a one second difference if our lanyards are hooked up and the last moment struggle to hook it up might take from 10 seconds to life - so if it isn't hooked, forget it and go! Our modified critical time then, would now be 6 seconds.

It could be much slower. Some ple never separate from the t - and the chute won't open unless we do. This is where we come in. We've got to scramble free of the seat immediately after ejecting. According to the many firsthand reports, the follow-through procedure of reaching for the seat belt is never as fast as the automatic opener, if it works, but we can go for the belt as a back-up, and kick free of the seat the instant we know the belt is open. Then, go for the T-handle (formerly D-ring). If the automatic stuff has worked, it will already be gone - but before we see the empty cable end, the opening shock will hit us.

In an ejection of this sort, the total elapsed time from trigger squeeze to full inflation should average from about 3.7 to 5 seconds, depending on the airspeed the type of parachute canopy se. (All but the older SA 17 seat packs have the C-9 fast-opening canopies.) We say "should average" here because these are the average times achieved in a series of 83 dummy ejection tests conducted at Wright-Patterson a few years ago.

From the time study data of the Wright-Patterson tests, it was determined that the boost of the seat itself will keep us off the ground for from 3.5 to 5 seconds, depending on the type catapult installed. The rocket boosters were the best (over 5 seconds); the M-3 charge next (4.5 seconds); and the M-5 charge - which is standard in T-33s and unmodified F-100s and F-89s provided the least (3.5 seconds).

As a matter of interest, they had 82 percent success in on-the-runway ejections with the C-9 canopies and the two better catapults. The T-33/F-100 gear was found to need 100 feet of altitude for complete success in level flight ejection.

For a time summation: We need about 6 seconds - and the seat itself will provide at least 3.5 seconds in a level flight attitude.

Our final problem therefore, is that of adding a minimum of 3 seconds to what we have - and preferably, some additional time for protection against separation delays. These precious seconds we get from the zoom maneuver - by putting the body in motion in an upward direction.

Everyone can accept the fact that the way to keep a ball or a rock in the air for the longest possible time is to throw it straight up. If we think about it, we can grasp the concept of trajectory too. We all realize that in a distance throwing contest, we seek an optimum trajectory - one that will keep the ball in flight for a long time, but also, one that will cover maximum distance per second while airborne.

In ejection, we want maximum time in the air - hence, the steepest possible climb angle at the moment of launch. If we had 300-350 knots and a clean configuration at the time the red light came on, there is neither a question nor a problem of decision. With that much speed present, we could pull smoothly into a vertical climb - eject as the airspeed bled through 150 knots, and the altimeter wound past, perhaps, 1500 feet - and get a chute inflation going straight up. We could have this, or any part we choose.

But when we're on final approach at 170 knots, gear, boards and flaps extended, and a descent already established - we can't pull much of anything. We can however, milk even this situation for enough to get out safely and hitchhike home.

We recently had a beautiful demonstration in precisely this situation. A Deuce pilot, on GCA final, had a collision at what he thought to be 300-400 feet. He also saw an orange flash, so he assumed the worst - zoomed straight ahead, and ejected successfully. All this IFR! The fact is, he had encountered tree tops at an estimated 50 feet. Would you have believed it possible?

If we understand the concept of the zoom maneuver, we can see why this one and the growing numbers like it have been successful. If we can milk a 10 degree climb angle out of approach speed, the vertical component of our vectors will equal 17 percent of our speed. This vertical speed represents time to us because gravity must decelerate this speed to zero before it can begin pulling us toward the ground.

Exactly what is this worth? Well, in the T-33 at 120 knots, the 10 degree climb will add a hair over 2 seconds to the time it takes us to return to the ejection level. At an approach speed of 180 knots, (300 ft/sec), the net time added is just over 3 seconds. Incidentally, we are speaking of time gained over a level flight ejection.

Any airplane except those using boundary layer control can draw 10 degrees or more of climb angle from normal approach speeds - even with sudden power failure. B.L.C. messes us up because a power failure puts the bird at or near the speed where lift barely equals weight - so we'd be lucky to even break the descent through immediate rotation.

For most of us however, successful ejection is mathematically assured from the moment we pick up the gear passing through GCA minimums. And the difference between mathematical and practical assurance lies with us. If we will establish the best possible launch vector before pulling the trigger - then scramble free of the seat and back up the automatic devices - we can happily add another success to the statistical ledger.

We have one more comment on technique. Do not try to ride the bird to peak altitude in a low speed zoom, because it can top out and start sinking before the nose begins to drop. Point it upward and eject as it decelerates to touchdown speed. At this speed, the flight path is still true. Below touchdown speed, the aircraft itself begins topping out, and will begin falling very shortly. By ejecting here we will likely reach a higher peak than the bird and have the rewarding experience of being second in the race to the ground.

Letters to the Editor

letters to the editor

Dear TAT

Capt Lovrak's article "Short Slides," June '63 TAC ATTACK, appears to be in conflict with an article on enroute radar letdowns in the May Interceptor. The formula used by controllers to determine letdown distance has been thoroughly tested by the 29th Air Division. Also the JAL approach plate, JAL 470 - Enroute Radar/TACAN, for Bunker Hill AFB was developed only after tests in B-58, KC-135 and F-106 simulators. Flight checks prove this data correct. Aircraft flying out of Bunker have the highest performance found in the Air Force.

If you haven't already done so, the ATTACK should publicize the info contained in the Interceptor.

Lt Col John J. Nolan
Air Force Representative

Dear John

We'll answer in reverse. Elsewhere in this issue, read "Vectored In" based on firsthand experience with the system, some info borrowed from the Interceptor article, plus a good deal of scratching around trying to resolve some of the conflicts. Apparently, different centers have different ideas on this subject - probably due to peculiarities of the traffic problems in their area. For instance, the local people use fixes to judge letdown distances, attempting to bring descending traffic over the fixes at specific altitudes.

On the conflicting distance . . . using the letdown rates given by Captain Lovrak, we calculated letdown distances and came up with almost the same numbers, except we consider his distance-to-slow and distance-from-gate-to-airfield to be pessimistic.

However, we have heard several complaints about some approaches being too tight. All were from F-100 people operating with clean, or nearly clean, aircraft. We have no doubts about the validity of these complaints . . . and we published Captain Lovrak's article giving one solution to what is obviously a problem for this select group. We agree that the distance formula (the first two digits plus 10 for subsonic, plus 15 for century series aircraft) is quite adequate for heads-up pilots flying the vast majority of aircraft being used today. They would be tight for the guy who is slow to start his descent or the individualist who fails to use handbook configuration or speeds.

TAT

Dear TAT

As the man behind the scene with regard to one of the "poor impractical, ridiculous" recommendations mentioned in the [illegible] on "Bored Boards," page 22, June issue of TAC Attack, [illegible] compelled to submit a few comments in the spirit of constructive criticism.

As you pointed out, the average pilot could be expected to sit on at least one accident board during his career. Usually, his inexperience makes it difficult for him to second guess the type of recommendations that are desired by higher echelons of command. But, even though he may lack experience, this board member does have one very valuable thing to offer--fresh ideas. They may be good and they may be bad, but a new viewpoint or outlook has solved many problems in the past that has stumped the most experienced safety officer.

Your article implies that a recommendation must pertain directly to a particular accident; I disagree. An accident board that discovers unsafe conditions or practices which could cause a similar accident must make a recommendation to correct that situation even at the risk of ridicule.

You state that some reviewing agencies have closed minds with regard to unconventional recommendations. I was not aware that these people had a mind valve that snapped closed when something unusual or a little different passed across their desk. It is indeed a tragedy if one valid recommendation is discarded as the result of this attitude. My viewpoint is that it should not be necessary to kill someone or lose an aircraft before some part of the system, such as a helmet, can be improved. On some recommendations, the reviewing officer himself might be required to do a little interpolating to find out what the accident board was really getting at in their recommendation. An example of this is the recommendation on radio transmis[illegible]. A small, inexpensive flight recorder might fit the bill [illegible]icely.

The recommendation concerning the nose skid came from Nellis. The Board did not recommend that a nose skid be installed on all F-86's, as you stated in the article, but merely that the feasibility of such an installation be determined. I believe no Wing has the research data to completely substantiate all recommendations before they are made. This is best left to the people who have the information, i.e., TAC and AFIFS.

To me, an accident report is a safety survey in miniature--a chance to give ideas and information to people associated with the flying business that might not otherwise be heard. Perhaps I am an idealist, but as far as I am concerned, accident reports to which I contribute will continue to contain my "grains of gold." If most of these "grains of gold" turn out to be "fool's gold," so be it. If, however, one life is saved or one aircraft conserved, it will have been worth the effort.

Sincerely

CAPT LLEWELLYN KENISON
Assistant Wing FSO
Nellis AFB, Nevada

Dear Lew

Many thanks for your comments on this subject. We're not trying to discourage fresh ideas, just half-baked ones.

As we tried to point out in the article, each base has enough experts running around to prove or disprove the feasibility of almost every recommendation. Too often, the board doesn't use these experts. Our example on giving pilots a device to override all other transmissions during a horrifying event is a case in point. The recommendation is contrary to the basic laws of electronics and no amount of wishful thinking will change that fact. Even if electronically feasible, the device isn't practical since very few pilots would turn it on at a time when they really should be reaching for yellow handles. A recorder is a mule of a different hue—but this board didn't say anything about recorders.

In regard to keeping recommendations pertinent—we hack at this because there are other channels for correcting deficiencies which have no bearing on a specific accident. If they do have a bearing, the recommendation is pertinent . . . provided it cures the problem and isn't like recommending a rubber glove to cure a leaky fountain pen. If on the border line, use judgment . . . but remember, you can just add so much weight to an aircraft and still get it to fly and you can shake loose only so much gold from the bureau of budget, so it pays to make your "grains of gold" genuine.

TAT

chock talk

HOT TIME TALE

During recent years, AFLC has been monitoring several hot section analyzer tests in an attempt to determine the feasibility of using some of this equipment to improve maintenance management and hot section reliability.

Two systems were under study. The time temperature recorder and the aero jet-cal hot section analyzer. To compare them, you must first understand how an engine hot section deteriorates. Significant hot section damage occurs whenever the EGT reaches a certain minimum limit. As the temperature increases, damage also increases at an ever faster rate. To determine the rate of damage, engineers run or ruin the engine under controlled conditions and inspect it to measure the damage. The rate of damage follows a definite curve and is repeatable for engines of a given type.

Now let's have a look-see at the time-temperature recorder. This equipment has a temperature indicator to monitor engine or tail pipe temperature. The indicator is connected to a series of clocks triggered to operate at various temperature levels.

Each clock starts to run once its set temperature has been reached, and continues to record in minutes or seconds as long as the temperature stays above the set level. Once a set time interval has been reached for any given clock, the hot section has supposedly reached its useful life, or needs an inspection. At first, this recorder appeared to have considerable merit . . . however, it has two drawbacks.

Time recording starts at a fixed temperature, and the damage values are taken for that temperature. However, the amount of damage increases at a marked rate for all temperatures above that level, yet temperatures (and damage) between levels are not recorded. As a matter of fact, the damage rate on a P/W engine doubles for each 18 degrees C increase in temperature. Other engines will have a similar curve. Obviously, much valuable information would be left unrecorded with this system. The other fault with this system is that all available information isn't used. A hot section inspection is called for when any single clock runs out. Yet time on other clocks indicates additional damage was recorded. As could be expected, the engineers were not able to get a very good correlation between the time temperature recorder and hot section condition.

The jet-cal hot section analyzer shows much more promise. It has an indicator programmer which continuously monitors EGT and displays it on a digital indicator with an accuracy in the normal operating range of plus or minus one degree centigrade. As an EGT indicator alone, the instrument has an excellent reputation for accuracy and durability. The indicator-programmer drives a hot section factor computer which feeds information into a hot section factor recorder. A warning light comes on whenever max TO temperature is exceeded.

In addition, it will show the maximum engine temperature spread either in flight or on the ground. Simply press a button and a stepping switch will take a reading from each thermocouple. The signals are transmitted to the spread computer which remembers the high and low readings and reads it out in digital form on the indicator programmer.

The hot section factor computer integrates the temperature signal against a predetermined temperature deterioration curve and transmits its output signal to the hot section factor recorder. It does this instantaneously and continuously. Temperature damage to the engine is shown on a digital indicator and is a very reliable indication of the hot section deterioration or condition.

The hot section factor recording system displ

a flag anytime the engine is operated over TO limits. Another flag shows if the engine temperature spread is excessive. These flags can only be lowered by maintenance personnel. Together with the hot section factor reading, they serve to warn of conditions that have affected the safety of the engine . . . in other words, they warn of an excessive overtemperature condition or of a possible hot spot due to clogged fuel spray nozzles, etc.

The hot section factor counter records all instantaneous engine temperature experiences and integrates them against the predetermined hot section factor curve. For a typical engine operating at 600 degrees C, it records 4 counts per minute; at 650 degrees C, 26 counts per minute, and at 700 degrees C, 200 counts per minute. The read-out is a good indication of engine experience and it will accurately signal the time for a hot section inspection or an overhaul . . . even tho the engine has never been overtemped. This is quite important since it takes the guesswork out of telling when the engine hot section needs attention.

The system has been proven by both flight and extensive test cell operations. Engine damage occurs for equal counts on the hot section factor counter and once the acceptable limit of damage is determined for a specific engine, that amount of damage can be carefully predicted by the counter read-out.

This device will prevent many needless inspections and, at the same time, increase engine reliability.

DART GONE

An F-84F pilot lost a dart on his second tow mission for the day. As the dart started to reel out, the jettison chute deployed and pulled the cable from the center of the reel, jamming the reel. The sudden stop caused the cable to break at both ends and off went dart and chute.

The ATO ready switch is used to jettison the dart . . . it was on. Yes, same bird he'd flown on the first mission. No, the armament people didn't turn off the switch when they loaded the dart for the next mission and the pilot didn't check it. Checklist anyone?

WRONG PART

We had a more appropriate title for this one, the editor turned both thumbs down.

Maintenance men repaired the auxiliary air inlet doors on an F-84F, but used AN 520-10G screws and washers, instead of AN 525-10R screws, to reinstall the Tee. During the engine runup, one screwhead broke off and went thru the engine. Damage was beyond base repair. The AN 525 has a minimum tensile strength of 125,000 psi while the AN 520 has a minimum of 55,000 psi. Further, the AN 525 is installed without washers.

DOUBLE JEOPARDY

If T-1 and L-1 leads to the static excitor regulator are reversed on one generator of the F-4, the generator will come on the line and the bus tie-in will parallel if the reverse wired generator is switched 'on' after the other one. The reversed generator will remain on during all electrical loads . . . however, if the good generator fails, the reverse wired one will go off the line and can't be brought back on unless the other generator is brought back on first.

EH, WHAT SAY?

Another command reports that a tug driver was towing an aircraft to the refueling pit with a pilot in the cockpit as brake rider. When the crew chief signaled a stop, the tug driver shouted that his brakes had failed. The pilot didn't hear the warning in time and the aircraft hit a starting unit.

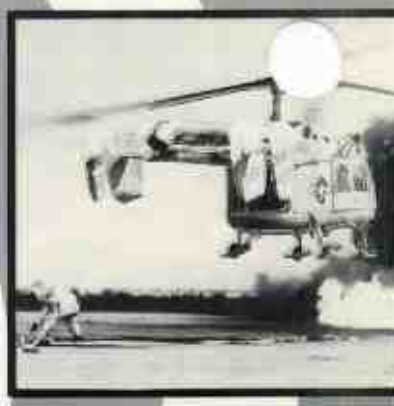
The pilot was wearing his hardhat and an aircraft was taxiing nearby which explains why he didn't hear any warnings. The tug driver was towing a bit too fast, and everything combined to cause the accident. Tug drivers should tow at safe speeds while brake riders should keep the canopy open and leave their ears unobstructed by hardhats, earplugs or sound attenators.

BIG FEET

Our Navy cousins, F-4C type, report two cases where the upper skin supporting flange of the flap ribs cracked near the trailing edge because some big-footed type walked on the flaps. The moveable part of the intake ramp is another sensitive area. The ramps won't schedule properly if walked on. NO STEP means just that!

Delivering off base accident victim to base hospital.

Last minute bri
Joseph E.



Crash-rescue dri

Helpful Helo

ED NOTE

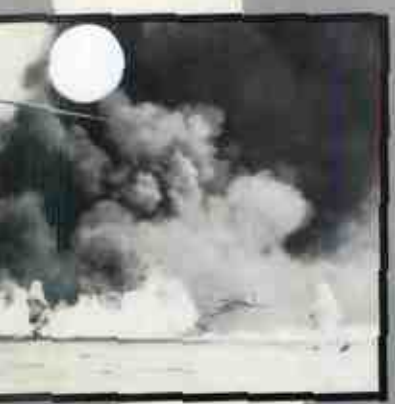
We would like to continue this type of recognition, for behind-the-lines units, but we will need a bit of help. If you know of a real sharp organization, please send us the facts and some action photos. We'll do the rest.

SOME OF THE TROOPS in the field researched the regulations and found no provision for recognizing support units for their contribution to our safety program. They suggested we do something about the situation. The boss agreed and passed the b---, oops, problem to the TAC ATTACK staff.

We decided that, since [illegible] of the support units do not be[illegible]

fing for the rescue team. Capt
O'Connell at the controls.

SSgt Dan Ball delivers young air crash survivors to emergency squad.



keeps crew alert.

to TAC, appreciation in the form of a picture story would be appropriate.

Our first choice for this honor is Detachment 12, Western Air Rescue Service, George AFB, California.

During a three month period this unit flew 300 rescue sorties, made 236 scramble takeoffs with ...nik, executed 25 landings on ...repared, off-base sites and accumulated 560 accident and incident free flying hours. They also upgraded four co-pilots to rescue crew commander status and trained 26 non-rated personnel to full rescue crew member status while standing 25,000 man-hours of three minute alert duty. They also maintained a zero ground accident rate during 5000 man-days exposure.

On one occasion they rescued two little girls (the only survivors) from the scene of a civilian aircraft crash on Big Bear mountain.

Though seldom in the limelight, their support has been effective and their personal effort commendable . . .

Our thanks to an excellent outfit.

SEG NEWS

4450th Standardization Evaluation Gp.

Know your Stdn Evaluators

In October of 1941, Lt Col Richard E. Stanley started his service career in the Horse Cavalry at Fort Riley, Kansas. Going modern, he transferred to the Army Air Corps in 1943, graduating from Navigation School in 1944. During the remainder of WW II, he served as an instructor at Advanced Navigation School and as a crew navigator in B-17's and B-29's. He accepted a regular commission in 1946. Colonel Stanley has spent the last 13 years in the Troop Carrier business as Squadron, Group, Wing or Numbered Air Force Navigator with the 20th TCSq, 64th TCGp, 483rd TCWg, and 18th AF, with overseas tours in Europe, Panama, and Japan. When SEG was organized in 1961, Colonel Stanley came into it from Air Command and Staff College as our C-130 navigator evaluator. Currently, he is our Chief Navigator and Assistant Chief of the Conventional Stdn/Eval Division. His primary aim in life is to insure that all TAC navigators raise their standards, capabilities, professionalism, and prestige to the point where they will have no peers throughout the entire Air Force—this, he is certain, can be accomplished through proper administration of TAC's Stdn/Eval program.

LT COL RICHARD E. STANLEY
Chief Navigator

SOMETHIN' NEW

The old saying about there being nothing new under the sun has been quite apropos to troop carrier for lo these many years, but this old cliche ain't true no mo. There is something new in troop carrier operating procedures! Last month the final report on Phase I of CLOSE LOOK was distributed by Mr. Phi Beta Kappa (Mr. Talley of AO) in limited quantities to the Army and interested Air Force units, both active and Reserve. Those of you fortunate enough to have perused this report will agree that we're on the right road — we're mod

izing . . . we're updating our thinking and consequently our procedures — but stop right there [illegible]vs! Hold it, hold it, HOLD IT! Those procedures in this report are test procedures and are not to be used across the board until they have been completely evaluated, validated, improved, refined, approved and published as standard operating procedures in the 55-series manuals. Along this line, the 314th Troop Carrier Wing of the 839th Air Division has been selected to train their aircrews in these procedures and use them in SWIFT STRIKE III. So, when you see a whole bunch of C-130's screaming along in five second in-trail formation at 300 feet, popping up to drop altitude at the last minute for drop, and then ducking back down to the deck -- they ain't nuts--they're just "CLOSE LOOKIN."

FLIGHT SAFETY

Flying personnel are always coming up with gimmicks designed to promote flying safety but it's a rarity when one of our non-flying brethren demonstrates an active interest and broad insight in the subject. During a recent visit to the 192nd Tac Ftr [illegible] at Richmond, Va., one of our intrepid flight [illegible]iators noticed a maintenance tech sergeant [illegible]dling on the back of a work order sheet. Sneaking a closer glance, our man read the trusty wrench turner's handiwork. It went something like this. . .

F - Flight Planning
L - Loading
I - Inspections
G - Ground Operations
T - Training

S - Storm/Weather Factors
A - Abort Procedures
F - Fuel Management
E - Emergency Procedures
T - Time Calculations
Y - Yardstick of Pilot Ability/Proficiency

The vertical to horizontal matching might be lacking in a few details but the good sergeant's idea of a quick reference check list gets to the heart of Flight Safety, doesn't it?

THE FLIGHT MANUAL SYSTEM

After clearing everything on his new base except [illegible]nce, an aircrew member reports to his duty section in operations. There, after the introductions are over, he is steered to the flight manual control officer who issues him a brand new flight manual plus all current safety supplements. The new aircrew member is now well on his way to becoming a functioning part of the unit. Unusual? No, except how did that copy of the flight manual just happen to be available? It didn't just happen, it was planned by the Air Force and the flight manual control officer. The Air Force established a technical publications system which includes distribution and storage. The flight manual control officer established unit requirements for flight manuals using the procedures in TO 00-5-1, 00-5-2, and AFM 60-2. The information and procedures in these three publications are the basic foundation of the system.

A close examination of the three publications starts with TO 00-5-1, AF Technical Order System. Of immediate interest to the aircrew member, this TO authorizes one copy of the flight manual for each aircrew member. It explains how technical manuals are kept up to date and tells how to correct deficiencies or make recommendations for improvement in TOs. The TO has a lot of additional info that can help aircrew members to better understand the TO system.

Establishing the system is not enough. To be complete, there must be a means for getting TOs to the user. This is where TO 00-5-2 takes over. It explains the automatic distribution procedures, one time requisition procedures, how TO requirements are determined and how TO distribution requirements are established. These are but a few of the areas it covers in detail.

When any system the size of the TO distribution system is put into effect, additional controls for specific areas of the operation are often needed, and this brings us to AFM 60-2. Although this manual is not a part of the TO system, it establishes additional controls specifically for flight manuals. It requires that each unit appoint a flight manual control officer whose primary responsibility is to insure that the procedures in TO 00-5-1 and 00-5-2 are used to establish flight manual requirements and that the manuals are given adequate and timely distribution.

With such detailed procedures and controls, it would seem there is little else to be done. But for any system, no matter how efficient, to work properly it is essential that the procedures be applied properly. Proper application requires that everyone concerned with the system be familiar with it. The aircrew member is certainly concerned with the TO system.

A little time spent reading the TO system will enable him to understand its objectives, procedures and limitations. Only with this understanding can we expect realistic requests and demands on the system and achieve the desired results: flight manuals that are current and available.

SEAC notes

RE-WRITE

The 4450th Stdn/Eval Group's unit evaluation program ground to a temporary halt 1 July. The evaluation stand-down was called to concentrate on a mass re-write of all the individual weapons system procedures and manuals, update master question files, and revise the grading documents. The revised grading documents (60-series manual) will implement numerous changes in the grading system. These changes will give a more valid percentage score and eliminate unequal weighting of some grading areas and items.

The unit evaluation visit schedule is now being resumed and evaluators will be using the new manuals and grading documents as soon as they are published . . . about 1 Oct 63 in most cases.

The new SEG visit schedule anticipates only one annual unit evaluation instead of the semiannual evaluations previously conducted.

THE MINIFON RECORDER

During the month of May, we asked you to report on how well the minifon recorder worked out for conducting S/E checks. Your comments varied from maximum magnificent to unqualified (or unprintable); however, 80% of all units indicated that the recorder was a definite asset.

The mechanical defects reported can, in most cases, be prevented by reading the instruction manual (minifon dash one) thoroughly and by treating the recorder as a delicate instrument, which it is.

The major complaints seem to be on positic the recorder and the jackbox adapter.

We did not attempt to tell you where or how to carry the recorder, simply because we believe a little initiative and common sense will let you do this better yourself. We recommend you select a location in the cockpit and have the local sheet metal shop fabricate a case for the recorder where it can be securely attached and easily removed. The problem of securing the jackbox adapter can be solved by using an elastic strap from a pilot's kneeboard. The wires leading from the jackbox can be taped or braided together so they will best fit your aircraft radio leads. The remote control button can be clamped to either the throttle or the stick in such manner that it will not interfere with movement of these controls.

These suggestions are meant to be just that—suggestions! You are in the best position to solve these problems.

A few tips on the care and feeding of this equipment:

* The battery which comes with the set was not intended for prolonged use—this is why a rechargeable accumulator (battery) was furnished with recorder to the tune of $79.50 per accumulator.

* Read the instructions telling how to recharge the accumulator—you will find it takes about 3 hours for each 1 hour of use.

* After you are all hooked up in the cockpit, operate the recorder while watching the reference numbers; if they are moving, the recorder is working.

* Experiment with various volume settings on the recorder (and the interphone panel on two-seaters) to obtain the best reproduction.

* Finally, if the recorder does not operate properly, have it repaired by the regular crew chief. The Air Force has neither the personnel nor the parts to fix these recorders. Work with your BEMO and contract maintenance office and get it done right.

In summary, we realize that the minifon recorder is not an optimum piece of equipment for this job. However, the cost of designing and manufacturing a limited number of special recorders is prohibitive! TAC has invested a substantial amount of money in these off-the-shelf items, let's make them work.

If you have any specific questions, please address them to SEG-P and we will do our best to satisfy your curiosity.

GRND/EXPL SAFETY

TWO FOR THE MONEY

An airman first at a TAC base out west was stacking MA-2 practice bombs in a transportation pallet on an MHU-12 trailer. He was about ten feet from the trailer, enroute to pick up another, when one of the bombs on the trailer went off. Apparently, it slid off the stack and struck the trailer tail first. Being a modified bomb, it reacted. Fortunately, the case didn't fail, there was no shrapnel and no one was hurt.

The smoke had hardly cleared before an airman first and an airman second detonated another of these bombs while stacking them on a pallet at a TAC base on the east coast. They'd just placed two bombs on the stack when the spotting charge of a bomb in the row underneath let go. It, in turn, set off the charge in another bomb stacked tail-to-tail behind it.

Again, lady luck was with us... both bomb cases stayed in one piece. Everyone hasn't always been this [lu]v. Not long ago an airman lost his leg after one of [the] bombs detonated and the case failed. Let's just say we got off with two free lessons this time, and promptly quit treating these 25 pounders like so much cordwood. Instead, let's treat them like munitions, which is precisely what they are.

SEAT BELTS

Newer cars—for those who can afford them—are coming off the assembly line with seat belt mounting holes. So, if you have a new car and don't have belts, it's a simple chore to install them yourself. (Really, at current BX or discount store prices, you can't afford to be without the belts.)

To install 'em, look for the dimples in the floor covering. Cut or punch out this dimple, pry out the rubber plug you find under it, put a washer over the hole and poke the eyebolt thru the washer and the hole, and tighten away. Put a large screw driver thru the eye of the eyebolt to get it down good and firm. You won't even have to kick the wife under the car to hold the nut since it's already welded in place.

Look for the attachment holes on the floor; however, some cars such as Ford and Chevy II have the inboard ones on the tunnel near the floor, while [Fo]dies, Chevys and Studebakers all have the inboard [on]s further up on the tunnel.

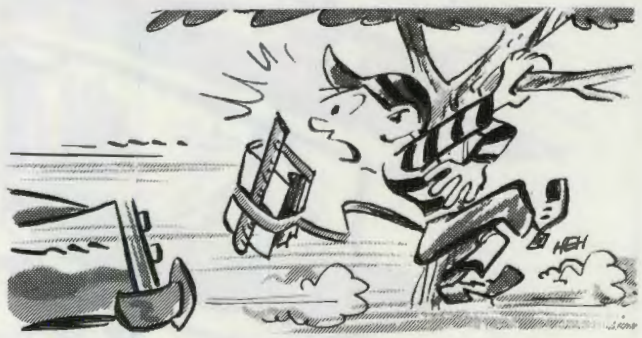
The Buick Special, Caddie, Corvair, Chevy II and Tempest all have their outboard holes located on the side of the sill, while Olds and standard Pontiacs have their outboard holes on the top of the sill.

Older cars have no holes at all... So you'll have to drill them, or have someone drill them. Regardless, make sure you buy belts that pass SAE standards and follow the mounting instructions that come with the belts.

Try to install them so they ride as close as possible to a 45 degree angle, with the belt forming a U around the wearer. Don't anchor belts to the seat itself.

Be careful and don't drill too close to the drive shaft, into brake lines or the fuel line. Make sure anchors are firmly supported . . . and that the floor isn't rusted out at the anchor point.

If you install metal to metal buckles (quick release type), put the buckle on the inside belt.



SEPTEMBER

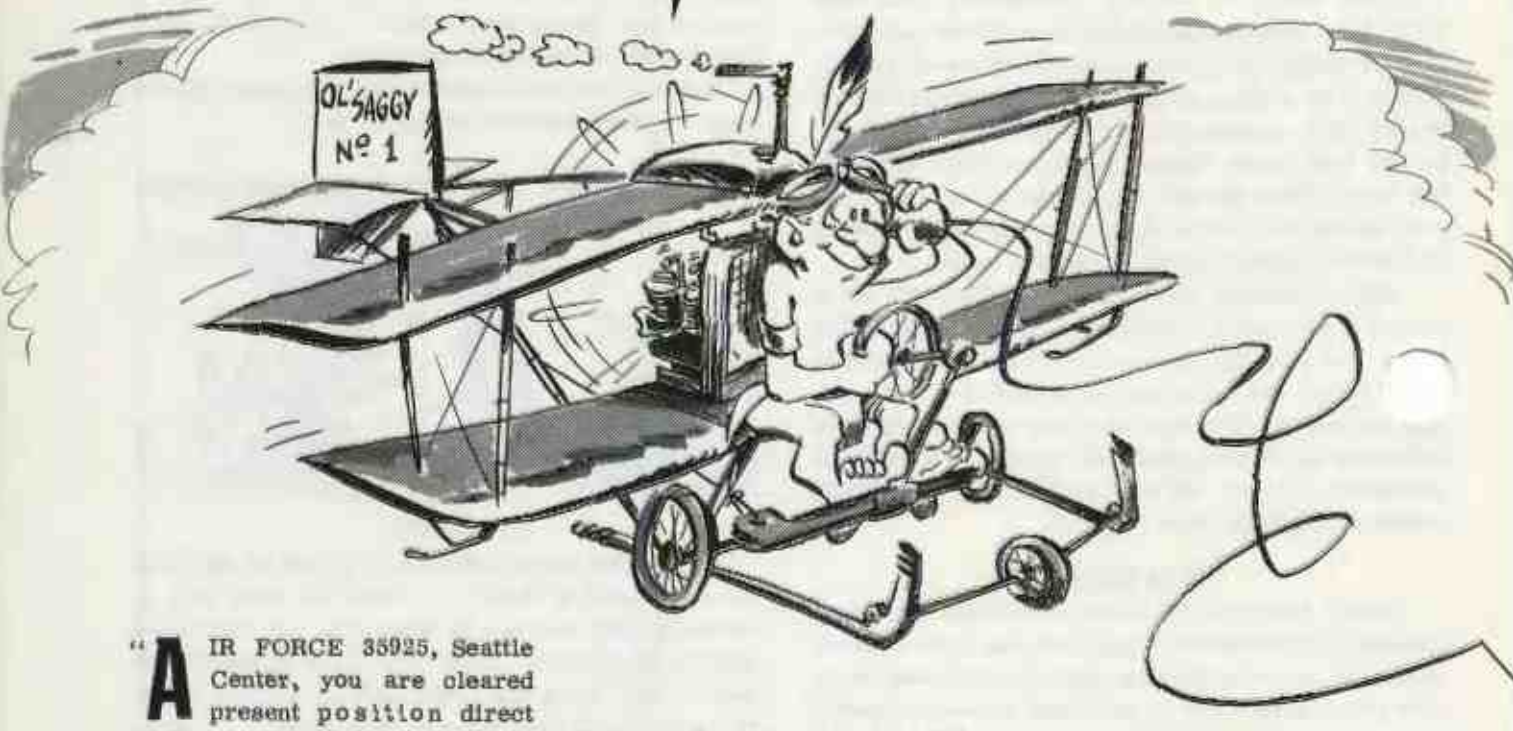
This is the month school starts, and all the little tykes go back to work . . . some of them will be crossing busy streets on their own for the FIRST time in their lives. Each of us must do our best to keep it from being the LAST time any of them cross. So let's take it easy and play it cautious . . . after all, what's a couple of minutes compared to a lifetime?

The people who juggle statistics claim a school bus will be involved in an accident almost every day somewhere in the states . . . in most cases, the school bus driver will not be at fault. That puts it up to the rest of us, don't it?

Believe it or not, despite of all the education programs, some knucklebrains still pass loading or unloading school buses at the risk of killing a child. This law was put on the books for a very good reason - respect it! Also respect school zone signs. You never can tell when a young one will dash out after a ball.

For some months, Air Traffic Control agencies have been streamlining arrival procedures. By using radar, they are able to give traffic on enroute descent onto an ILS or GCA approach, effectively by-passing holding patterns and published letdown procedures. At present, this service varies from center to center, and for different airports within each center. This article will tell you what some of these approaches are like so you'll know what to expect, and appreciate what is expected of you. With that, you're ready to be . . . .

Vectored In



"AIR FORCE 35925, Seattle Center, you are cleared present position direct McChord, descend and maintain two zero thousand. Present McChord weather 500 scattered, 900 overcast, three miles smoke and haze. McChord altimeter, 30.18."

"Rog, altimeter 30.18. Nine two five departing 310 for 20,000 this time."

"Nine two five, we can give you an enroute descent and radar handoff to McChord GCA if you desire."

This was our fourth leg of a rather grueling cross-country. On the previous leg our speed brake refused to extend and the professed professionals had been unable to fix it. We had decided that we could safely press on, making a gear down penetration to compensate. As the IP, I made a quick decision. "Tell them we'll accept, but warn 'em that we don't have any speed brakes."

The controller knew what he was doing. Shortly after we reported at 20,000 he took us down to ten. At ten we slowed and dropped gear. He descended us to 1800 and vectored us onto base. Turning final, the GCA operator gave us a call and took us on in. It was a smooth job from start to finish and, as I recall, we didn't have to change channels when we went from the controller to GCA.

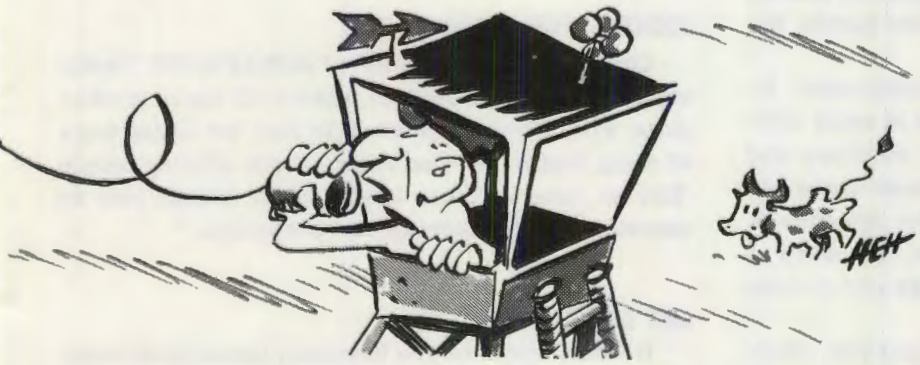
On the way home, another center offered us another enroute letdown and handoff. We took it. My companion was a little getting down to assigned alti

even tho the troops at McChord repaired our speed brakes. ended up close in and high when GCA took over. After some determined instrument flying, he got us onto a proper glide path in time to permit speed to bleed back to normal for a satisfactory approach.

Approaching our next stop we tried another. This time we spent too much time at low altitude grinding to the handoff point. Perhaps the letdown was a little brisker than normal to avoid another last minute rush, or perhaps the controller let us down a bit early.

These enroute penetrations offer distinct advantages to those of us who fly high. If you play your altitude right and don't end up having to tunnel or being handed off hot and high, they'll save you quite a few pounds of fuel.

They'll keep you out of the ng pattern and save time and rt for both you and the controller. If you want one you should ask for it far enough in advance so the controller can fit you in with other traffic.



Most controllers seem to be eager to give these approaches and their techniques should improve with practice. It's up to us to give them that practice.

Some points: Keep the letdown open to the proper approach . I had one controller take me down to 2000 feet some 20 miles out and then announce. "Cleared present position to Blank Omni for standard instrument approach." To be precise, this calls for a normal low altitude letdown. Not having the low altitude plate, I used the low altitude part of the high altitude plate. Two thousand feet was within 100 feet of the correct altitude for crossing low station. Incidentally, controllers are not supposed to play the game that way these days.

The controller usually tells you what to do if you have a radio failure during the letdown. Generally the procedure is to go to the fix at your last assigned altitude or the minimum safe altitude for a 25 mile radius (lower right corner of the approach plate) if it is higher. At the fix, make the published penetration. You can get rid of one-third the difference between your arrival altitude and low station altitude on outbound leg and another third on both the penetration turn and inbound leg if you wish, or use some other similar system.

The optimum distance out for starting an enroute penetration is roughly the first two digits of your flight level plus 10. (If at flight level 330, you'd expect to start at 33+10 or 43 miles out.) This is ideal for a T-33 and most subsonic jobs. About 5 more miles are needed for most century birds.

This distance includes room to decellerate to approach speed. Incidentally, if inbound on 090 and landing is on runway 27, you can start down closer in since this is a maneuvering distance.

The controllers will be using this formula, too, and if you are flying an aircraft that needs more room, advise them. Tell them how much maneuvering distance you need.

If you have limited radio gear, can't make a normal penetration because of some problem, or if you have any other limiting factors, let the controller know early enough that he can plan ahead.

One very important point. You should use the same configuration and airspeed that you normally use for a penetration. Use anything else, and you'll upset the apple cart for yourself.

Be careful when asking for one of these penetrations. If you ask for an ENROUTE PENETRATION you may be asked to hold or work low altitude fixes. This includes intersections. Obviously, you'll need two omnis or TACAN, a fist full of low altitude charts and some help to handle this. It also helps to have an intimate knowledge of the local set-up.

If not equipped for low level work, ask for a JAL ENROUTE PENETRATION. The controller will realize your limitations and direct you accordingly.

Remember, you don't have to make an enroute penetration if you don't want one . . . but use 'em all you can so the controllers can get their practice.

And, if you want the official word on these approaches, check section II of the Flight Planning Document.

TAC TIPS

SINGLE FREQUENCY APPROACH

The problems and hazards caused by changing radio frequencies during let down and approach have been kicked around for a long time. TAC initiated action to get a single frequency approach system and Ops at USAF is pushing for a coordinated FAA-USAF solution to the problem. The ultimate aim is to guarantee that single place aircraft will be able to make SFAs at every USAF base. In a letter to all commands on 8 March 1963, USAF stated "...one goal is single frequency service for all Air Force aircraft with priority in implementation for those facilities regularly serving single pilot aircraft."

This goal is a long way off, but some progress has been made to date. Cannon, Eglin #9, England and Myrtle Beach now have SFA capability and other TAC bases will probably be able to hack it within a year. ACIC will soon include a note in the Flip Planning Document and Enroute Supplement stating that SFAs are available at those bases having the capability.

There is one big problem . . . equipment. To offer SFAs, FAA will have to get a lot of extra UHF transceivers. Naturally, the question of money and who pays for everything is going to cause some delays. AFCS is presently surveying the situation to find out just what is needed and where. The word is out from USAF to get with it, and things are moving in the right direction.

However, don't think for a minute that this whole problem is completely solved. People who are not exposed to the problem cannot possibly understand how serious it is, and we have to keep reminding them. There is no way to simulate the frustration of trying to dial a manual frequency when flying Number 4 in night weather. The pilots of single seat fighter and recce birds have the problem, and they are the only people who can tell anyone else that there is a problem.

To qualify for a SFA all you need do is fly a single place aircraft on an instrument flight plan. T-birds with only one pilot and B-66s are also eligible. Whenever you fly cross country, add the following statement in the remarks section of your 175, "Request Single Frequency Approach at Destination," and damn it all, if you don't get one, write an OHR! When you get back home, tell your FSO about it for his records. We are never going to get the service we need if we don't scream loud and long. The OHR is one of the best ways to get your screams heard.

As a perennial Green 16, I have a personal dislike for manual frequency changes while on [illegible] spastic's wing in night weather. Let's get togeth[illegible] help stamp out multiple frequency approaches . . . [illegible] while at it, let's not let 'em give us too many IFF mode and code changes at low altitude, either.

LOOKING FOR IMPROVEMENT

Col J. A. Wilson, chief of PACAF's ORI Team, suggests that commanders make staff visits to other units with similar missions to hunt for better ways of doing things. He also recommends sending people TDY to observe other units' ORIs. Sounds like an excellent way to improve on "perfection."

LET'S FACE IT

It would surprise you how many times pilots write up a discrepancy on an aircraft when the discrepancy is already listed on the form 781, part B. This is a dead giveaway that they either did not read the part B before going on their flight, or did not remember what they read. A few minutes spent pouring over the forms can eliminate a lot of surprises and, under certain conditions, could keep you from launching an aircraft that is not capable of performing the [illegible] sion.

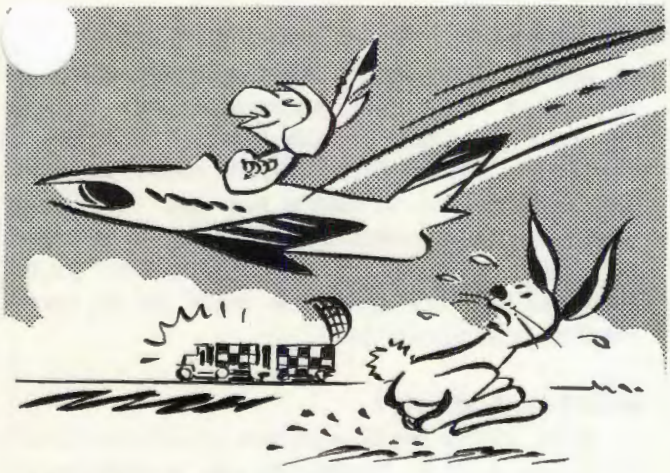
CRASH EDUCATION

General Dunham, deputy for operations at 12th Air Force, sent us a copy of a brochure he distributed to law enforcement and civil firefighting people when he commanded the 831st Air Div. at George AFB.

The pamphlet tells what to do until the Air Force arrives at the scene of an aircraft accident . . . including how to protect the wreckage and how to prevent classified material from being compromised.

The brochure discusses the potential hazards from various pieces of ordnance in a forthright manner, gives fire fighting techniques, and contains rescue instructions for each aircraft assigned to the 831st. Rescue instructions use drawings and photographs (reproduced from the dash one) to illustrate technical points and to describe the proper way to lift an injured aircrewman from an aircraft.

A brochure such as this can do much to remove the mystery most civilians associate with our birds and could easily help save someone's life. As an added attraction, commanders would invite these people to the air base and show them the equipment firsthand, along with a fire fighting demonstration, aircraft ejection seats, and PE displays.



GCA ALL THE WAY

On practice GCAs most pilots ignore the controller during the last few hundred feet of descent. For one reason, the GCA glide slope doesn't jibe with their idea of flare and touchdown. No argument there . . . full credit for the landing, good or bad, goes to the pilot. However, it makes the controller wonder what would happen in a zero, zero emergency.

Next time out, weather and runway permitting, play the game all the way down. It'll be good training for you and the controller. He will also appreciate a technique, i.e., excellent run, too far left and so forth. But, while you're building confidence in yourself and the controller, don't get so engrossed that you forget to recheck your rollers on final approach.

GOOD SHOW

Training Film 5522A, the first of a series of five dealing with personnel error prevention in all fields of safety, should have reached base film libraries by now. It is titled "Man and Safety Communications." The first film covers man-to-man and man-to-machine communications. The movie stresses that accidents are not inevitable, but preventable. Animation serves to hold the viewer's interest as actual mishaps in flight, ground and missile safety are reconstructed.

MEMORY MINDERS

If you live to be 70, your conscious memory will contain about 15 trillion separate things . . . from your serial number to the shape of a bikini. All sorts of memory aids have been popular for centuries, ranging from diets to training courses; however, memory experts suggest you:

* Get interested in what you want to learn, and especially, remember.

* Don't try to learn anything unless you understand the meaning of the material.

* Organize the material logically in your mind.

* Use tricks to memorize lists or a series . . . the P. D. McGripe check is a prime example of this technique.

* To memorize words, look at them, say them aloud and listen to them being said.

* Spread your memorizing over a period of time instead of trying to hack it all at once.

A word of caution: Don't trust your memory around aircraft or missiles . . . use a checklist and be sure!

WEIGHTY PROBLEM

A Coast Guard pilot narrowly missed cropping his chopper after being pitched off the deck of an ice breaker as he prepared to lift off... one of the hazards of boat operation.

He didn't like the way the bird handled and rechecked everything when he returned. The weight and balance had been computed for two persons weighing 180 plus 20 pounds of winter clothing, plus a full load of fuel... then he took another look at his passenger and had him weigh in.

Two fifty two stripped... 275 dressed for flight, enough to put the machine overweight and louse up the weight and balance. His passenger is presently on a diet designed to render some of the surplus.

SNAGGED CHUTE

Right after a normal landing, an F-105 type deployed the drag rag . . . deployed the dra . . . well, tried to deploy the fool thing anyway. The handle worked alright, but the chute didn't cooperate. He got stopped OK and brought the whole works back to the barn for a look-see.

The pilot chute lodged in the sucker door forward of the vertical speed brake door. The pilot had written up the speed brakes for creeping open in flight . . . when a mule was hooked up to the hydraulic system, the maintenance folks found that the boards opened OK, but would not retract.

A new valve cured the trouble . . . but you 105 tigers should keep in mind that a speed brake control malfunction could rob you of a good chute and then plan accordingly.

TENSION TIME

Although TAC pilots are logging a lot of "terror time" (single engines out of sight of land), there is still something about a long over-water flight in a fighter that makes your heart beat a little faster. Recently, a pilot who was starting his first ov[illegible] water deployment had to hold for about 15 mi[illegible] before takeoff and then hit severe jet wash righ[illegible] liftoff. During climb, which was in weather, the pilot felt the symptoms of hypoxia and told his leader. The element returned and landed. Hyperventilation was the probable cause of this pilot's uneasy, queasy feeling, but there is a little more to the story than that. Supervisors must realize that the excitement and anticipation of a long over-water flight are the perfect breeding ground for hyperventilation. Usually, pilots are dressed and equipped differently than normal and the entire atmosphere of the briefing and preflight is somewhat strange. Good planning will let everything progress without delays and undue worries. Me thinks perhaps a little humor to relax the tense ones during briefing might be in order.

PHANTOM PHUN

Asymmetrical burner lights can cause the F-4 to head toward the boondocks even tho you use nose gear steering for takeoff. Waiting a couple of seconds before lighting the burner will help, since the rudder will be more effective at lightoff time.

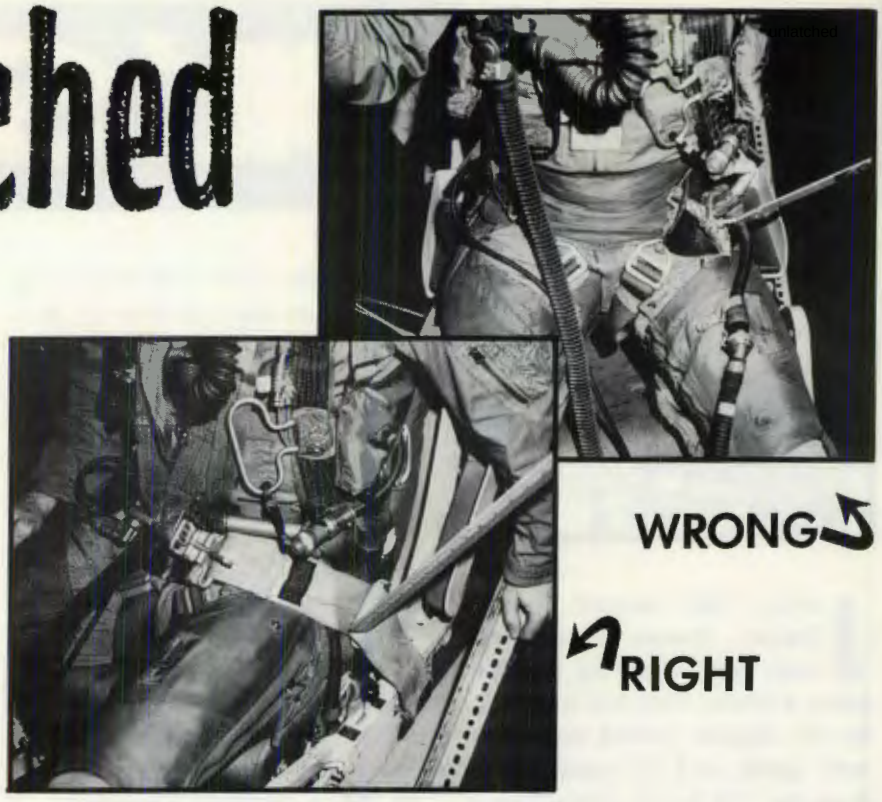
TWO TO ONE

Figures indicate that the two-engine advan[illegible]ge of the F-4 should slow our accident rate. Experts analyzed 123 single engine landings reported by Navy pilots and determined that 47 would have probably resulted in accidents had they been flying single engine aircraft. But, if you're in the habit of putting your trust in one engine, don't get the idea that you can trust two twice as far. Overconfidence can prove fatal.

WRONG TIME, RIGHT?

If an ATC controller advises you of other traffic at eleven o'clock, remember, he is relating the position to your track and not to your heading. He simply can't see the 20 or 30 degrees of drift you might be holding. That much drift can change the o'clock position on your windscreen or canopy as much as an hour. Consequently, if your correction is to the right, you can expect to sight the bogey at ten o'clock. In case you don't see the other aircraft immediately, scan the area about two hours either side of the reported position. Then if you're satisfied it just isn't there, try the other side of the clock... the controller might be left-handed.

unlatched



IN MAY of this year, a TAC F-104 pilot ejected because a gun malfunction wrecked the engine in his bird. The ejection went off OK except he had to deploy his chute manually. His seat belt was unlatched. The board decided that the pilot hadn't latched it firmly, and that it came open during the ejection . . .

Later the same month, another TAC pilot got into trouble while trying to land his F-100C and tried a last-ditch ejection from very low altitude. He was killed, altho the seat went out OK and all initiators fired. Chute deployment had not been initiated because the lap belt was open.

The investigating board was unable to find out why the lap belt opened; however, they reasoned that either the seat armrest or G-suit hose could have snagged the latch when the pilot left the seat or that the pilot unfastened it himself.

In May, an external tank dropped from a TAC F-84F, hitting another aircraft in the formation with catastrophic results. The pilot ejected at very high speed but failed to survive because his chute never opened. Once again, the lap belt was found unlatched, to negate the automatic sequence. The board decided that the lap belt inadvertently opened during ejection due to violent tumbling . . . or that the pilot unlatched it purposely.

Other commands had experienced some similar accidents and safety experts all over the globe started to blame the technique for having pilots attempt to beat the automatic equipment. They reasoned that pilots were getting mixed up and were opening the belt too soon. The beat-the-system technique was originated to keep pilots from hanging onto the seat. It is a positive approach, based on the philosophy that if the pilot is drilled to reach for the lap belt and D-ring he'll have to turn loose of the handgrips.

Ironically, the most probable cause of the open lap belts appears to have been introduced with another cure to the same problem; the butt snapper. This finding came from an F-100D accident that occurred in France during July. The pilot was killed when he tried to eject while turning base leg for a precautionary landing. The lap belt opened during ejection. While checking this, USAFE investigators noticed a peculiar kink in the G-suit hose. The photos accompanying this article show how the kink was induced. The USAFE people made several static ground tests using an F-100 seat and fully equipped pilots, and concluded that the G-suit hose would engage and open the belt latch when the pilot left the seat, whether he routed the hose under his leg or over his leg. THE ONLY SAFE WAY TO ROUTE THE G-SUIT HOSE IS UNDER THE LAP BELT!

Altho there is no positive proof that the G-suit hose was the culprit in all of the open-lap-belt ejections, the probability is high. Until a better cure is in being, play it safe and route all leads under your lap belt, and if you are forced to eject at low altitude, go ahead and try to beat the automatic equipment AFTER YOU'VE PUNCHED OUT of course.

OL' SARGE

ol sarge

JAKE, THE SHORT, stocky Senior Master who rams-rods the transient maintenance section, likes his coffee hot as the hinges, strong enough to etch glass, and in quantity. So does the Old Sarge. Therefore it was only natural the Old Sarge should decide to call on Jake today, of all days. Earlier, right in the middle of the first batch, the coffee maker had given out. The sheet metal shop held no hope for a quick fix since they couldn't find any sound metal to rivet a patch onto. The Old Sarge had mopped up the pool of half-made coffee and stalked out.

He and Jake were just starting a second cup when a farmerish looking major in a worn and faded flying suit stuck his head thru the door and drawled, "Ah beg your pardon, is this the transient maintenance section?"

"Yes Sir," Jake answered, getting to his feet, "What can I do for you, sir?"

"Thought it was, from the sign on the door. Sarge, ah've a problem . . . at least my T-bird has one. On the last three starts the temperature has gone up 'round 800 degrees and stayed there for 15, 18 seconds . . . ah tried to get them to fix it at my last stop but they just cleared the write-up as being within limits." He pointed out the write-up.

"They would," Jake said, looking at the form, "twenty seconds is the max."

"Ah know it," the major said with some heat, "but doggone, that don't make the cotton picker right! If ah was to write it up as being over 20 seconds, all they'd do is crawl up the pipe and look for damage, then release it. Ah'd like to get someone to fix it before ah ruin a perfectly good engine."

Jake looked a question at the Old Sarge, who said, "Makes sense to me, Jake. After all, it'd take some of my money to help buy the major here a new engine."

Jake grinned, "Figgered you'd side with him. Knowing you, it ain't the money that's bothering you. You just can't stand to see a piece of machinery being abused." He reached for the squawk box. "OK, sir, let me have the forms on that bird and I'll hunt you up a new regulator."

The major grinned, - "Sonovagun! Ah finally ran into an outfit that's in the same Air Force as me!"

Well Done

well done

LT COL JAMES E. BEAN

LT CHARLES E. HART

BEST MAINTENANCE RECORDS

The Commander, Tactical Air Command, is awarding monthly certificates of achievement to airmen who maintain outstanding aerospace vehicle records.

JUNE SELECTEES

SSGT MYRON L. WARFEL
363 TRW, Shaw AFB, SC

TSGT TOOMBS W. PIERCE
4411 CCTW, Shaw AFB, SC

MSGT GOLDIE BROCK
4433 ATS, Dobbins AFB, Ga.

JULY SELECTEES

SSGT DON C. DODD
31 TFW, Homestead AFB, Fla.

SSGT RAYMOND L. DAY
516 TCW, Dyess AFB, Tex.

MSGT MORRIS L. COLLINS
4434 ATS, Randolph AFB, Tex.

First Lieutenant Charles E. Hart, a student pilot assigned to the 4526th Combat Crew Training Squadron, Nellis Air Force Base, Nevada, was leading an in-trail formation when the throttle of his F-105 stuck at 103% rpm. He explained the situation to Lt Col James E. Bean, his squadron commander, by UHF radio. Lt Col Bean advised Lt Hart to start a climb toward Edwards AFB, California, for a dry lake landing. He knew the X-15 had launched one hour earlier; therefore, the dry lake at Edwards should be suitable for landing. He also knew a long runway should be used since Lt Hart would have to shutdown the engine prior to landing.

Using tight spirals and high G turns, as previously briefed by Lt Col Bean, Lt Hart maneuvered his aircraft to landing speed and position at Edwards. He then turned the fuel selector off, extended the ram air turbine and touched down at approximately 200 knots. Thru judicious use of the emergency brake system, Lt Hart brought the aircraft to a safe halt.

The exact cause of the stuck throttle is unknown. However, it is believed a cardboard tab in the throttle quadrant may have jammed the throttle. The incident is being investigated.

Expert supervision on the part of Lt Col Bean and the skilled flying of Lt Hart turned a potential accident into an incident and saved a valuable aircraft . . . Well Done!

RECOGNITION

CREW CHIEF OF THE MONTH

Technical Sergeant Barry E. Parmer of the 4520th Combat Crew Training Wing, Nellis Air Force Base, Nevada, has been selected as the Tactical Air Command Crew Chief of the Month. During May, Sgt Parmer's F-105 flew 28 of 31 scheduled and added missions for a total of 40.4 hours. Routine maintenance, a 100 hour post-flight inspection and a quality control in-commission spot check were performed during this period. In addition, during this period Sgt Parmer performed the duties of flight chief, since the assigned flight chief was TDY. He performed both duties outstandingly, without negating the quality of his work in either area. On three separate occasions, pilots have stated in the Form 781 that they considered flying his aircraft a distinct pleasure . . . excellent evidence of his ability and devotion to duty.

MAINTENANCE MAN OF THE MONTH

Technical Sergeant George D. Clinton of the 12th Tactical Fighter Wing, MacDill Air Force Base, Florida, has been selected as the Tactical Air Command Maintenance Man of the Month.

While assigned as Weapons Inspector in the Quality Control Section, Sgt Clinton demonstrated an outstanding ability to determine the true quality of maintenance and operating procedures. He was chiefly responsible for raising the egress systems maintenance from marginal to exceptional. He did this in a minimum of time. His concern for safety prompted him to write an article which vividly portrayed each maintenance man's personal position in the base foreign object damage prevention program. This article was published in the base newspaper. In addition, his suggestion for marking aft section dollies, to prevent the sections being installed on a misaligned dolly, was accepted and employed by the 836th Air Division. His initiative and vast knowledge of ground safety make him an extremely valuable member of the wing maintenance complex.

Pilot of Distinction

First Lieutenant George F. Baker, Jr., of the 401st Tactical Fighter Wing, England AFB, Louisiana, has been selected as the Tactical Air Command Pilot of Distinction.

While on a dart towing mission, the TACAN set in Lt Baker's F-100D failed completely just after he deployed the target. Unable to maintain a positive position in the range area, he decided to return to Channault AFB and land. As he rolled out on his pre-computed heading, the control stick moved swiftly to the full aft position and the aircraft nosed up abruptly. The longitudinal trim system was completely shorted and all emergency procedures failed to correct the difficulty. By pushing forward on the stick with both hands, Lt Baker managed to maintain straight and level flight. In order to adjust power or change radio frequencies, he relieved his left hand by placing his knee against the stick. The dart failed to release over the designated area. To avoid damage to persons and property off the end of the runway, he forced the aircraft down to 200 feet and dragged the dart off. He then climbed to a downwind leg and, using the knee and arm method, lowered gear and flaps. Despite difficulty adjusting power on final, he made a safe landing. Excellent performance and a good show, Lt Baker!

TAC TALLY

A COMPARISON OF TACTICAL AIR COMMAND ORGANIZATIONS

MAJOR ACCIDENT RATE
1 JAN – 31 JUL

TYPE	1963	1962
ALL	12.1	13.0
F-105	43.4	42.4
F-104	37.6	9.6
F-101	24.6	22.2
F-100	12.1	16.6
F-86	0	96.1
F-84	31.2	16.7
B-66	0	0
B-26	11.5	0
T-39	0	0
[illegible]3	0	5.0
T-29	0	26.5
KB-50	0	15.7
C-130	0	0
C-123	3.2	14.1
C-47	0	7.7
U-10	18.7	68.3
T-28	25.3	0

JULY TALLY
GUARD AND RESERVE

UNIT	MAJOR	MINOR
113 TFW	1	
121 TFW	1	

ACCIDENT FREE
(MAJOR & MINOR)

JET			
ACTIVE	MONTHS		ANG
355 TFW	11	7	108 TFW
388 TFW	9	23	102 TFW

CONVENTIONAL			
ACTIVE			RESERVE
314 TCW	48	80	434 TCW
463 TCW	26	31	435 TCW

JULY TALLY
ACTIVE UNITS

UNIT	ACDNTS*	INCDTS
4 TFW	1	1
12 TFW		1
15 TFW	2	
27 TFW		
31 TFW		2
354 TFW		4
355 TFW		6
388 TFW		2
401 TFW		1
474 TFW		
479 TFW		3
TARC		
4510 CCTW		3
4520 CCTW		3
516 TCW		
314 TCW		
463 TCW		
464 TCW		
4505 ARW		
4442 CCTS		
SAWC		
4500 ABW		
4453 CCTS		1
831 CSG		
4435 ATS		
836 AD		2

*MAJOR AND MINOR

In July you managed to reduce the aluminum fallout to within five of perfection. Of the five accidents, the regular forces were charged with two majors and a minor. Both reserve forces accidents were major. One, an F-84F, received extensive fire damage after a hydraulic line ruptured and caused an in-flight fire. The fire developed on final approach and the pilot was able to complete his landing. A reserve forces F-86H was destroyed when an engine flameout, accompanied by mild explosions and severe vibrations, forced the pilot to eject. The aircraft crashed in water and investigators were unable to recover it.

A regular forces pilot was killed after he flew his F-84F into trees during a rocket pass. According to witnesses, this was not a clear-cut case of pulling out too low, and the cause is unknown. An F-105B pilot ejected successfully after a mild explosion and loss of thrust occurred during a night IFR hook-up on a KC-135. A sleeve came off the refueling probe and was ingested by the engine.

A T-33 featured in the minor. The pilot made a nose gear first touchdown from a surveillance approach during a heavy rain shower, the aircraft porpoised and the nose gear collapsed.


There's a Reason for rushing the Season
T-SGT HIRSCH TAC ATTACK 9-63
PRINCESS ANN
NO MATTER WHAT YOUR JOB IS, WINTER WEATHER WILL BRING ON PROBLEMS. PREPARE FOR THEM NOW !
END OF RUNWAY
YOU'VE HAD IT!
YOU PILOTS MAY HAVE A FEW ANXIOUS MOMENTS TRYING TO TAXI ON ICE OR SLUSH — TAXI SLOW AND DON'T FORGET TO RE-CYCLE THE GEAR AFTER TAKEOFF !
DRESS TO SURVIVE SHOULD YOU HAVE TO BAIL OUT AT ANY POINT ALONG YOUR FLIGHT!
SUPPLY AND PERSONAL EQUIPMENT MEN... PILOTS AND MAINTENANCE PEOPLE WILL LOOK TO YOU FOR WINTER APPAREL. GET READY NOW !
P.E.
SIGN HERE!
MR. WEATHER-MAN... DETERIORAT-ING WEATHER WILL TRAP SOMEONE UNLESS THEY ARE WARNED IN TIME.
STAY ALERT !
BASE PERSONNEL, ARE YOU PREPARED TO CLEAR OR MARK A SNOW-COVERED AIRDROME? WILL YOU BE READY TO WARN INBOUND PILOTS OF ADVERSE CONDITIONS WHILE THEY STILL HAVE FUEL TO DIVERT?
RUSH, RUSH! ALWAYS RUSH!
AND MAINTENANCE TYPES... YOU MUST NOT RUSH THRU YOUR JOB BECAUSE OF THE COLD!
YOU WILL BE TEMPTED TO OVERLOOK A FEW HARD-TO-GET-TO ITEMS TO HEAD BACK TO A WARM LINE SHACK!
DON'T!
? ? ?
SHAME, THAT'S FOR DE-ICING AIRCRAFT
100 PROOF BRANCH WATER