

TAC ATTACK

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SPINS....Page 8

for efficient tactical air power

TAC ATTACK

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TACTICAL AIR COMMAND

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Articles, accident briefs, and associated material in this magazine are non-directive in nature. All suggestions and recommendations are intended to remain within the scope of existing directives. Information used to brief accidents and incidents does not identify the persons, places, or units involved and may not be construed as incriminating under Article 31 of the Uniform Code of Military Justice. Names, dates, and places used in conjunction with accident stories are fictitious. Air Force units are encouraged to republish the material contained herein; however, contents are not for public release. Written permission must be obtained from HQ TAC before material may be republished by other than Department of Defense organizations.

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our worst enemies

The most common causes of our operator error accidents revolve around four simple human frailties: pride, fear, haste, and complacency.

Pride is listed first because it is most often a factor. Take, for example, our annual loss due to landing accidents. In almost every case the pilot had an obviously bad approach, yet continued on to a major accident because pride overruled his better judgment.

Emerson wrote, "Fear always springs from ignorance." And fear is something all of us have known at one time or another. However, thorough training provides timely responses to critical situations. It is fear born of incomplete training and understanding that causes a man to panic after a crash landing; take off his gloves, and receive severe burns while releasing survival equipment an item at a time instead of pulling the quick release handle. It is fear that causes a pilot to blindly lock his brakes during a heavy weight aborted takeoff, lose control and come to grief in the overrun. Adequate preplanning and proper training should have led him to use brakes yet steer for a centerline hookup with the overrun barrier.

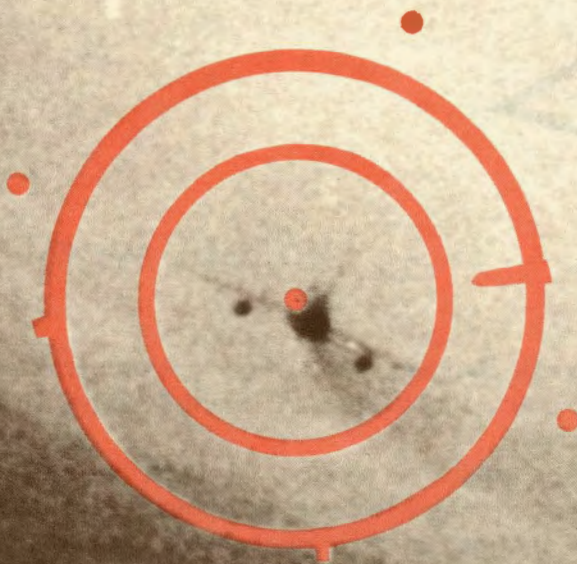
I'm sure most fighter pilots have heard of the pilot who, being late for a range mission, rushed out of operations, made a hasty preflight, jumped in the cockpit and attempted to start his engine-less aircraft. And it is haste that causes premature gear retraction on takeoff, leading to a crash at the airfield boundary.

The record shows only too clearly that thousands of hours in the air do not make a pilot accident-proof. On the contrary, experience appears to breed complacency. We see this frequently when an Instructor Pilot lets a student go too far and land short of the runway or crash while practicing a simulated single engine approach.

Pride in our profession is absolutely necessary but it should be the pride of competent performance. Fear is something we can recognize and train against. And haste is usually born of some form of fear. Complacency sets in when we allow experience gained from hours of safe flying to make us careless. And then we become our own worst enemies.

R. L. LILES, Colonel, USAF

Chief of Safety



Let's Keep It Like It Is

by **Colonel Daniel James, Jr.**
Vice Commander
33rd TFW, Eglin AFB, Fla.

For many years, during the infancy of the fighter pilot business, jocks would choose sides, name an "I dare you to meet me place" and with no more of a briefing than a few hastily placed bets, dash off into the blue to engage in the ancient art of dogfighting - alias ACT, ACM. The results of these lusty encounters were a few aircraft and bodies scattered across the

countryside and, of those who survived, some pretty hot fighter jocks who in turn littered the mountains, valleys and oceans of Europe and the South Pacific with enemy aircraft blasted unceremoniously from the sky.

Now we all agree that this wasn't the smartest way to get there. The increased cost and complexity of the modern-day fighter, not to mention the inestimable value of the fighter pilot's life, make the old method of spawning a fighter pilot highly impractical.

In the past, one method of preventing accidents has been to eliminate whatever it was the pilot was doing when the accident occurred. I think we had better watch it or we are going

not ourselves "preventive safetied" right out of practice of aerial warfare. Okay, now before I say "who better watch what," keep listening.

You will remember, if you have been around through a couple of wars, that for a long time ACM was stricken completely from the training syllabus for several reasons. One of these was a misplaced idea that we would not fight classic air battles in the classic way in future wars. Another and very important reason was the increase in accidents attributable to ACM training. The loss rate was deemed unacceptable.

Somehow the MIG jocks over the North did not get the word that there were to be no more nose-to-nose, air-to-air hassles like the ones we had in the Great Hate. So they kept on trying to sneak up behind us to gain that old six o'clock advantage.

The result was — you guessed it — same old classic air battles necessitating our development and practice of sound air-to-air tactics to survive. The people who sell and influence decisions on such things sold some very-hard-to-convince people that there was a definite requirement to practice and perfect our techniques of aerial combat in our own friendly skies before engaging in a game of "grabbies" with some glory hunting MIG jock over the Hanoi Hilton. So we got the program back again.

And what's happening? With alarming frequency we see the accident rate attributable to

ACM, climbing toward that unacceptable point again. (And now I tell you "What you better watch.") Much too often we find the cause for the accident located squarely underneath the big hard hat — the fighter jock himself who wasn't flying smart.

ACM within the guidelines that have been established is not a dangerous phase. But like other facets of the fighter pilot trade, it calls for the utmost in application of professional skills that have been already mastered by the jock before he reaches ACM. We are often too quick to cuss the bosses when they say "Okay, you can't do that one anymore." "There go our formation takeoffs." "There goes our ACM." "KEERIST!" Keerist, indeed! We blew it ourselves.

Our leaders have no desire to cure the disease by killing the patient. But they can't run blind against statistics or turn a deaf ear to the charges of wastefulness from the people who foot the bills, or make the laws, or question their control. It is up to us, the individual fighter jocks, to be constantly bright eyed and bushy tailed; to train to the limit, yet practice strict air discipline in accordance with the spirit and intent of existing regulations and directives.

We do not have to fly scared, just FLY SMART. Let's keep our out-of-the-combat-zone losses through pilot error (the worst kind) to nil. This is the best way home and this is the *only* way we can KEEP IT LIKE IT IS! ➔

Colonel Daniel (Chappie) James, Jr., actually needs no introduction within TAC. A native of Pensacola, Florida, he was educated at Tuskegee Institute, Alabama, and became an aviation cadet in January 1943. Since receiving his commission he has had an almost continuing series of fighter assignments which include combat in WW II, Korea, and North Vietnam. In the typical pattern of the career officer, Colonel James is also a graduate of the Air Command and Staff College at Maxwell and has served a Pentagon tour. He's a fighter pilot's fighter pilot and TAC ATTACK is pleased to present his guest editorial.



de Havilland 4



Flight Leaders

The first completely American-built combat plane to fight in World War I, the de Havilland 4 (DH-4), arrived in France in May of 1918. Four hundred and ninety-eight more reached combat air squadrons of the American Expeditionary Force before the Armistice. Considered by many as the finest day bomber of the war, the versatile DH-4 doubled as a reconnaissance type. On occasion, it filled the role of a fighter bomber. Manufactured in the U.S. under British patent license, and powered by America's outstanding contribution to aeronautics in the war — the Liberty Engine — the DH-4 supported a major share of the A.E.F.'s aerial bombing effort. Production totaled 3431 airframes up to war's end, with about 2100 shipped to A.E.F. and Allied units. The DH-4 continued as a primary weapon system in America's air arm late into the post war period.

Actually, both tactical and long-range strategic bombers were latecomers in the war. Fighter planes were born early in the conflict to combat highly successful recce airplanes pinpointing front strengths and weaknesses. They had to be chopped and denied access to battlefield intelligence. So the airplane's mission widened quickly and advanced from reconnaissance, to fighting, to bombing . . . with a few variations along the way. In fact, nuisance levels of aerial bombing in the form of hand-dropped grenades and finned metal darts preceded serious air-to-air combat between fighters and recce types. However, building of really effective bombers such as the DH-4 had to wait for advances in aircraft design and power plant improvement. They weren't long in arriving.

Increases in horsepower and greater reliability of water-cooled in-line and "V" engines, such as the Hispano-Suiza and Liberty series, spawned a new generation of bigger birds carrying larger loads, over longer distances, at higher airspeeds and altitudes. With its V-12 Liberty at full blower, DH-4s pegged their airspeed at 124 mph, often outrunning intercepting German fighters. Forced into a stern chase, enemy pilots faced the ring-mounted twin Lewis guns of DH-4 observers. Surprisingly, DH-4 squadrons of the A.E.F. scored 59 aerial victories while losing 33 aircraft

to enemy fighters. Aircrews of the pictured 11th Bomb Squadron, easily recognized by its famous comic-strip-character insignia, "Jiggs," logged 13 of the DH-4's combat kills.

The Liberty engine series reflected American mass-production thinking and technology. Until design of the inline 4 and 6, V-8 and V-12 of the four engines in the Liberty series, Americans manufacturing European power plants were faced with handmade engines, non-interchangeable parts, and metric measurements used on all technical drawings. For the first time in World War I, the Liberty aircraft engine series gave the Allies a standardized power plant with interchangeable parts, all mass-produced. All four engines of the series used standard-size steel cylinders, heavy-duty aluminum pistons, crankshafts, and crankcases. The only parts not standardized were those affected by the number of cylinders.

By the time mass production began on the Liberty, combat demands for higher horsepower dictated almost exclusive manufacture of the V-12. Cylinders of five-inch bore, with their seven-inch stroke pistons were set at a 45-degree included angle. At 1800 rpm the early twin-ignition V-12 cranked out 400 hp, later beefed-up versions reached the 450 to 500 hp range. Fully equipped for flight the power plant weighed about 900 pounds, achieving the long-hoped-for lightness with high horsepower output needed for combat success.

The pictured fighter escorts, Nieuport Scouts, were hard pressed at times to fill their air cover mission. Their 120 hp Le Rhone rotary engines gave them a then-slow top speed of 110 mph. When throttles hit the firewall in a hassle, fighter pilots depended on their air combat maneuver training to protect the high-tailing de Havillands.

With advances in air-warfare technology, chivalry among airmen as practiced at the war's beginning died . . . at least the "friendly enemy approach" between fighter pilots no longer applied to bomber and recce crews on either side. World War I aircrews found that survival in combat depended on superior equipment, training, maintenance, tactical doctrine and air discipline. It still does. ➔

ANATOMY of a



SPIN

by Maj John P. O'Gorman
and
Lt Col John M. Lowery

The information presented here was gathered from a variety of sources; USAF's Aero Space Research Pilot School, NASA's Langley Research Center, Lockheed, North American Rockwell, and McDonnell Douglas. Our hope is that pilots may find some bit of information which will help keep them from encountering an accidental spin. Ed.

The Korean War introduced jet fighter versus jet fighter to aerial combat. During that conflict it wasn't uncommon for an Air Force pilot to be credited with a Mig kill not because he actually shot a Mig down, but because the Mig snapped and spun-in while they were maneuvering. Significantly, in North Vietnam, our fighters have been forced into offensive and defensive combat with late model Migs. Again, cases have been reported of enemy aircraft spinning. We may never know how many of our aircraft snapped out of control and were "lost" in combat. But history shows this happens in every war and to both sides alike.

Fighter pilots have had spin, loss of control,

and post-stall gyration problems since World War I. The reason is that fighter pilots must necessarily maneuver their aircraft throughout the entire spectrum of its designed performance envelope. To be aerodynamically competitive in combat, a fighter must have flight controls capable of a wide range of inputs at both high and low speeds. In other words, control surfaces must be both sizeable and have large deflection angles. This usually means they are capable of being maneuvered into a spin.

In the early days of jet fighters and trainers we discovered that large elevator deflections could cause a wing to reach an angle of attack that blanketed the tail—causing pitch and yaw instability. This was true with the T-33, which also had a sometimes asymmetrical wing root stall.

After a considerable number of loss of control or tumbling accidents, Lockheed's Tony LeVier discovered the T-33 had too much elevator throw or "up" travel. So they restricted the up-elevator angle from 38 degrees to 22 degrees (+0, -10°) recambered the wedge stall fillets and instal-

sharp edge stall strips. This, according to Mr. [redacted], made the T-33 a new aircraft. (Air Force [redacted]s were later modified to 26 degree up elevator.)

Meanwhile, fighter pilots had become quite wary of spins. As a result, usable information and pilot experience with this maneuver has become quite rare.

From 1 January 1966 to 15 November 1968, thirty-two TAC aircraft have been lost to some form of spin. Many of our accidents today are no doubt due in part to a lack of understanding. This discussion is intended to increase pilot knowledge of the various spin modes.

First of all, a stall always precedes a spin. Therefore, stall warning is also spin warning, unless of course, you abruptly apply controls and go directly into an out-of-control condition.

All of our TAC fighters are recoverable from normally encountered spin modes by sole use of aerodynamic controls. Only exception to this statement is that on rare occasions the F-4, F-100, and F-104 have a seldom encountered flat spin mode, from which there is no known recovery outside of a spin chute or retro rockets. In TAC our chief concern centers on the upright and inverted spin.

First, let's clarify some spin terms:

1. "Incipient phase" is the transient motion between stall and a fully developed spin. For example, in the T-33, this stage in its extreme, may begin as a tumble. In other aircraft it may be labeled the "Thing," post-stall gyration, or out of control condition. The point is that the gyration leads to a steady state spin.

2. "Steady-state phase" is that portion of a spin from the commencement of a predictable pattern of motion (balancing of aerodynamic and inertia moments) until application of recovery controls.

3. "Recovery phase" covers that period of a spin from the moment recovery controls are applied until level flight is attained.

UPRIGHT SPIN

Most modern U.S. fighters are fuselage loaded. This means aircraft weight is distributed primarily in the fuselage. Therefore, inertia moments

about the fuselage predominate over inertial moments about the wing. As a result, spins entered from a one-G condition all exhibit basically the same characteristics throughout the incipient and steady state phases. To amplify, this means the T-33, F-84, F-100, F-4, F-105, and F-104 all spin with similar characteristics. (The F-104 spin must be entered from pitchup and the F-4 has two identified upright oscillating modes.)

Upon application of pro-spin controls the gyrations go something like this: the nose pitches up and over in the direction of intended spin, then drops sharply below the horizon. Frequently, spin rotation will appear to pause, as if stopped. Then the nose pitches downward 50 to 60 degrees and completes the first half turn. (Fuselage loaded aircraft have a strong nose down pitching moment in a spin.) Yaw and rotation rate then build rapidly and the nose whips back up toward the horizon. Here again, the aircraft may tend to hesitate as it reaches a level condition.

In heavier aircraft, F-105s, and F-4s, the nose generally swings above the horizon during the first few rotations. In an F-100, nose rotation is usually about level with the horizon. A T-33 may vary from 10 degrees below to 10 degrees above depending on C.G. of the individual bird. Generally though it's 10 degrees below.

In all subject aircraft, nose oscillations are lower to the horizon and rotation rate accelerates with each succeeding turn until a steady state spin develops. Number of turns required to reach steady state rotation varies with each aircraft and depends on G loading at spin entry.

A steady state spin results from a balancing of aerodynamic and inertial moments and forces. Using a full stall, one G entry, a T-33 requires about three to four turns to reach steady state.

A two G entry, at say 160 knots, requires five turns or more. NASA wind tunnel data indicates an F-4 can reach steady state in as little as two turns.

A steady state spin is characterized by stabilization of airspeed — with roll, yaw, and pitch rate oscillations becoming fairly constant in amplitude. In the T-33, airspeed will peg at about 145 knots, having built up from a low of 80 to 110 knots and increasing 10 or more knots with

anatomy of a spin

each turn. For century series aircraft, rotation rate will be fast . . . in the neighborhood of one turn every four seconds, maybe faster depending on fuel weight, C.G., and type aircraft. The F-4 completes one turn in 5 to 6 seconds in a normal upright spin . . . 3.5 seconds in a flat spin.

Many pilots are unaware that an aircraft can go almost directly into a steady state spin without prolonged pitching and oscillating motions characteristic of an incipient stage. This is why you sometimes hear reports of an aircraft that appeared to be in a nose low spin but was not oscillating in the usually expected (extreme) manner. Here's what happens.

When you find yourself at low airspeeds, frequently lower than stall speed, say from a near vertical ACM maneuver, or from a yo-yo off the dart, **any sudden control input, especially aileron**, can cause you to fall almost directly into a nose low, steady-state spin . . . because you have no remaining energy and very low G.

This can be easily demonstrated in a T-33 using a Zero G, low airspeed entry. The incipient stage will be mild and short.

Conversely, a high G entry at a relatively high airspeed will cause the aircraft to remain in an incipient stage spin for a longer period. Entry will be violent — a snaproll — and oscillations may be confusing and uncomfortable.

SPIN RECOVERY

Engineers use a mathematical formula for calculating control inputs necessary to recover any given aircraft from a spin. If this inertial formula, $\frac{(I_x - I_y)}{mb^2}$, which figures moments of inertia about the longitudinal and lateral axis, results in a negative sign, the aircraft is considered fuselage loaded. Spin recovery controls are: (1) control stick aft, (2) rudder **against**, and (3) aileron **with** spin rotation.

If the inertial formula results in a positive algebraic value, then anti-spin controls are (1) stick forward, (2) rudder against, and (3) aileron **against** . . . which in most aircraft may be optional. The T-37 uses it in incipient stage only.

This should help clarify why spin recovery in the wing loaded T-37 is almost opposite to century series birds. The F-104 as mentioned before, is an exception because of its high tail. (See "The Thing," June 68 TAC ATTACK.)

There are aircraft which have a neutral or zero inertia. However, they are predominately general aviation aircraft. Their recovery is neutral stick and opposite rudder.

The T-33 is a borderline case. With full tip tanks the inertial formula produces a positive value indicating the aircraft is wing loaded. Recovery controls then are similar to the T-37.

With tips empty, a T-bird's moment of inertia becomes a negative value, making it fuselage loaded and becoming more so as wing fuel is consumed. Spin rotation and recovery controls then become quite similar to our heavier fighters.

You may wonder why aileron-with recoveries are not recommended in the T-33 Dash One. The reason is that rudder alone provides enough force to stop the spin. Therefore, aileron is unnecessary. In addition, any hesitation to neutralize aileron during spin recovery can lead to excessive yaw angles with the possibility of secondary spin. While this is not dangerous, it is uncomfortable. The full aft stick requirement keeps the spin rotation rate slow, and reduces possibility of an inverted spin (because of the innate nose down pitch).

One word about neutral or hand-off recoveries. This technique can be effectively used during incipient stage spins in most all our aircraft. The idea is to pause and determine direction of yaw or spin. Recovery will usually be prompt. However, upon releasing or neutralizing controls (unloading angle of attack) you may find that rotation rate sometimes increases momentarily. This is a temporary thing and results from a change in aerodynamic moments due to streamlining of flight control surfaces. When the spin does break you may end up doing rolls. But some opposite rudder, or in a T-bird aileron, will stop this.

Spin recovery is critical in all aircraft. Like most aerobatic maneuvers, it's best done by feel. Release recovery controls too soon and the spin will resume. Release too late, and you've got a full blown secondary in the opposite direction.

When you approach a stall in the T-

airframe buffet increases significantly. After you and exceed a wing's maximum coefficient of lift, the buffet diminishes. During spin recovery you'll notice a distinct **build** in buffet which reaches maximum intensity just before the spin is broken. This may be a useful clue to help you recognize when to release recovery controls. However, visual reference to the ground is the best aid in judging when a spin is broken.

Recent NASA wind tunnel studies have uncovered some significant facts of interest to F-4 pilots.

To be effective as an anti-spin device, drag chute deployment must be at almost the instant loss of control occurs. This is, of course, done in conjunction with an attempt to unload to 10 units angle of attack. Deployment at a later time will accelerate spin rotation.

As mentioned before an F-4 reaches steady-state spin conditions very fast... about two turns. Drag chute deployment in the steady state phase will cause an increase in pitching moment which is balanced by an increase in spin rotation rate.

This occurs because a spinning aircraft is really like a large gyroscope. In a steady-state spin, rotation moments have an established pattern and become balanced. Drag chute deployment disturbs the rotating "gyroscope" in pitch. And the aircraft reacts gyroscope-like... the applied (drag chute) force reacts 90 degrees to the applied direction thus producing an increase in yaw or spin rotation rate.

NASA found that to be effective as an anti-spin device in the F-4, a drag chute canopy must be 70 feet from the aircraft attach point in order to avoid disturbed effects of the aircraft wake.

INVERTED SPIN

This is perhaps the most thrilling of the recoverable spin modes. It is also more confusing and difficult to master because **roll rate is both faster and opposite to yaw rate**. These factors combine to make it extremely disorienting even to pilots experienced in inverted spins. According to Navy test pilot Commander D. Z. Skalla, writing in COCKPIT magazine, "This maneuver is

guaranteed to erase all doubts about the value of the turn needle in determining spin direction and leaves considerable doubt about pure eyeball cues..." The turn needle, in any spin, becomes a yaw direction indicator and **always** indicates spin (yaw) direction. The ball, of course, is useless.

An inverted spin is relatively easy to encounter. However, many aircraft won't enter an inverted spin using a conventional, inverted entry. Therefore, a yaw-roll-pitch-coupled, entry is required.

To illustrate, let's take an actual case where an F-100 pilot attempted to perform a 150 knot aileron roll. With the aircraft pointed about 20 degrees above the horizon he applied full left aileron. As he rolled he began adding forward stick to hold the nose up... producing negative G. The large deflection of aileron caused a left roll as planned; however, the nose yawed right because the down right aileron produced a strong right (adverse) yaw. As he reached an inverted position more forward stick was required to hold the nose above the horizon.

Now, one roll is not necessarily hazardous. But he let the aircraft continue to roll a second time. The roll, pitch, and yaw inertial forces continued to build while airspeed dropped off. At the inverted point, almost full forward stick was required to hold the nose up. Aware of the dangers of adverse yaw at low speed the pilot attempted to stop his left aileron roll (right adverse yaw) with right rudder. At that moment he completed all the requirements for a yaw-roll-pitch-coupled entry into an inverted spin... yawing right and rolling left. Because of his low airspeed (energy) he fell quickly into a steady-state inverted spin.

On the other hand, a pilot can very easily enter an inverted spin by not holding enough aft stick when initiating recovery from an upright spin.

In a recent TAC accident an F-100 pilot snapped out of control (upright), held neutral or slightly forward stick and hit trim-for-takeoff in an effort to unload angle of attack. When the aircraft did not recover he continued to hold forward stick. This coupled with the F-100's innate nose down pitch caused the aircraft to enter an inverted spin. In fact, recovered wreckage showed

anatomy of a spin

the trim had been run full nose down.

"Unloading" is a valid recovery procedure only in the incipient spin stage. If recovery is not immediate, then aft stick and anti-spin controls are an absolute must. Aft stick normally slows down the rotation rate and prevents an extreme nose down pitch.

This nose down pitch of fuselage loaded aircraft, coupled with neutral or forward elevator control, also presents the possibility of airframe overstress due to negative G.

Recovery techniques for inverted spins may vary for different aircraft, but full rudder opposite direction of yaw is always the first step. Many of our century fighters are known to have a marginally effective rudder in an upright spin. Anti-spin aileron is therefore required to help stop spin rotation. Loss of rudder effectiveness in an upright spin is caused by partial airflow masking in the wake of the horizontal tail or slab. (See Figure 1.)

An inverted spin is different. Rudder is much more effective in stopping rotation because airflow is clean and undisturbed. (See Figure 2.)

In some T-tail aircraft (F-104), this may not hold true.

Despite increased rudder effectiveness, some aircraft may still require anti-spin aileron for recovery; but as we said before, inverted spins are different. NASA spin tunnel experience has shown that for inverted spins in fuselage loaded aircraft, aileron effect is reversed. Therefore, if anti-spin aileron is required, you must place aileron *against* direction of yaw. Again, for emphasis, this means with a turn needle deflection full left, you must use full right stick to get help from anti-spin aileron.

Perhaps this would be easier to understand if explained in terms of wing tilt relative to the ground. A NASA report explains, "If the rolling moment is such that the inner wing is tilted down (relative to the spin axis), it is considered an aileron-with setting... in an inverted spin rotating to the pilot's left, the inner wing would be the left wing; moving this wing down relative to the ground would be brought about by moving the stick laterally to the pilot's right."

Unless your Dash One specifies, best policy is ailerons neutral.



An inverted spin results from forward stick (attempting to unload angle of attack) in a steady state upright spin.

Figure 1

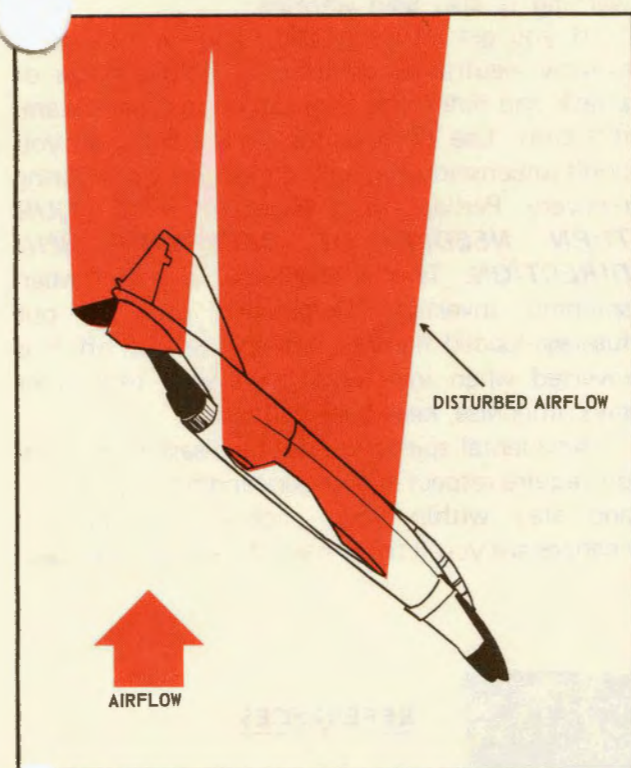
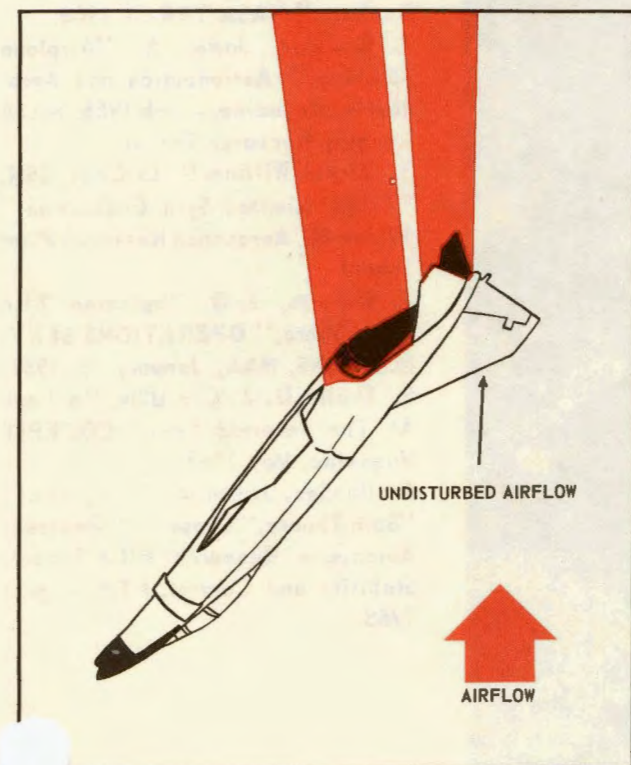


Figure 2



FLAT SPIN

This is the most hazardous condition a pilot is likely to encounter because it's an unrecoverable spin mode, unless you are rigged with an anti-spin chute. When fully developed flat spins are characterized by an apparent lack of pitch and roll oscillations. This mode consists almost entirely of yaw about the spin (vertical) axis. At entry you may experience yaw, accompanied by some pitch and roll oscillations; however, as the spin develops yaw increases and pitch-roll oscillations stop. Rotation rate may then become exceedingly fast and confusing.

Navy tests have shown that an F-4 may oscillate in the same manner for both a recoverable upright and non-recoverable flat spin during the incipient stage. A pilot would therefore be unable to tell which type spin he was entering until he reached the steady-state phase.

Usual prerequisites for getting into a flat spin appear to involve high angles of attack, very low air speeds (often lower than stall) accompanied by sudden large deflections of aileron and rudder. It stands to reason then that to avoid flat spins you must avoid sudden control inputs at low speed. Instead, just hold controls neutral and let the nose fall thru to build airspeed. Then use your controls as needed.

CONCLUSIONS

Experience has shown three very common and consistent pilot errors in spin recovery:

(1) Moving aileron *against* the spin. This is an almost universal reaction of pilots with whom we have flown. Stick opposite to roll is a natural pilot reaction due to both centrifugal force and ingrained habit patterns.

(2) Failure to recognize when a spin is broken and holding recovery controls, then entering a secondary spin in the opposite direction.

(3) High speed stalls during pullout. This often results in a secondary spin and is invariably accompanied by some unconscious aileron movement... which gives direction to the ensuing secondary stall and helps precipitate a secondary spin.

anatomy of a spin

Pilots frequently tend to look for rapid response from anti-spin control inputs. Accident reports indicate that if recovery isn't immediate a pilot usually selects a different flight control setting. In a well developed spin it's not unusual to hold recovery controls thru two or more complete turns before any recovery effect is noticed. If you have selected proper anti-spin controls the spin will stop. However, you must remember you are applying a relatively weak aerodynamic force to a gyroscope. The reaction is necessarily slow.

Most all of our fighters are recoverable from erect and inverted spins. In fact, the F-100 won't spin without pro-spin aileron (except flat spin).

Your turn needle tells you spin direction



Spins are always preceded by a stall, so stall warning is also spin warning.

If you get into a gyration you can't identify, quickly neutralize controls to unload angle of attack and determine yaw direction. Chances are, it'll stop. Use both hands on the stick, so you don't unconsciously apply opposite aileron during recovery. Perhaps most important: **USE YOUR TURN NEEDLE TO DETERMINE SPIN DIRECTION.** This is absolutely essential when spinning inverted. Remember too, in our fuselage-loaded fighters, anti-spin aileron effect is reversed when inverted. Unless your tech order says otherwise, keep ailerons neutral.

Accidental spins need not be disastrous. They do require respect and understanding. Fly smooth and stay within your proficiency level, and chances are you'll never have the experience. 

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5. Skalla, D. Z. Cdr, USN, "A Look At The Inverted Spin," *COCKPIT Magazine*, May 1968.
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MAINTENANCE MAN OF THE MONTH

Technical Sergeant John L. Schroff of Detachment 1, 831 Air Division, Edwards Air Force Base, California has been selected to receive the TAC Maintenance Man Safety Award. Sergeant Schroff will receive a letter of appreciation from the Commander of Tactical Air Command and an engraved award.



TSgt Schroff



SSgt Wheeler

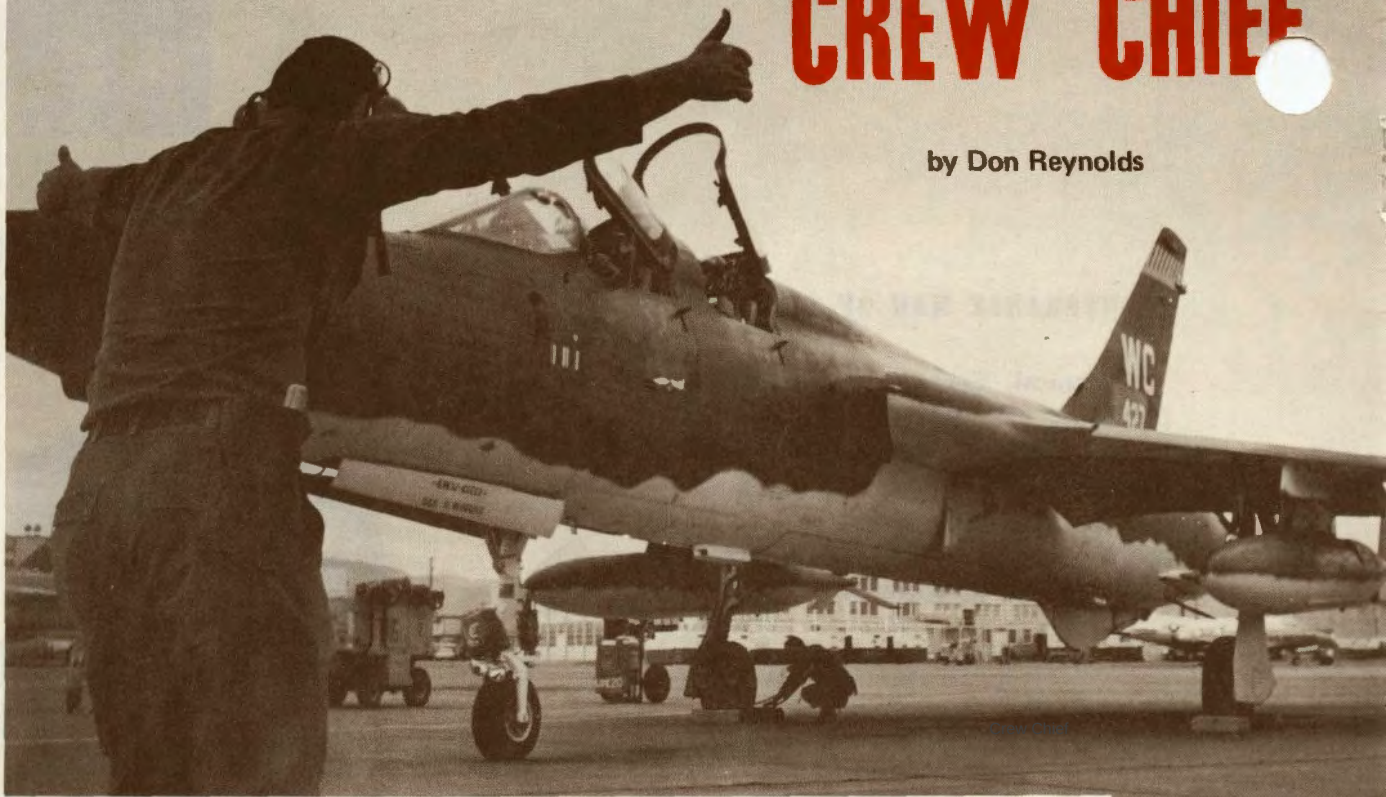
CREW CHIEF OF THE MONTH

Staff Sergeant Ervin L. Wheeler of the 524 Tactical Fighter Squadron, Cannon Air Force Base, New Mexico, has been selected to receive the TAC Crew Chief Safety Award. Sergeant Wheeler will receive a letter of appreciation from the Commander of Tactical Air Command and an engraved award.



CREW CHIEF

by Don Reynolds



Keeping an aircraft ready for successful missions and safe return of its crew is the responsibility of one man — the crew chief. He has plenty of help from systems specialists, supervisors, and even the aircrews, but he's the one person who says, "She's ready to fly." And when a pilot pulls the gear off the runway, it's done with complete dependence and trust in his crew chief's performance.

Awareness of this particular bond between aircrew and crew chief is one of the first impressions felt by a new man on the flight line. Getting assigned to a bird soon becomes his most important goal. Most crew chiefs will not tell you this in so many words, because few are the kind to air their hopes for all men to hear. One of these men is Sgt. William P. Citty, Jr., with the 4537th Fighter Weapons Squadron at Nellis AFB.

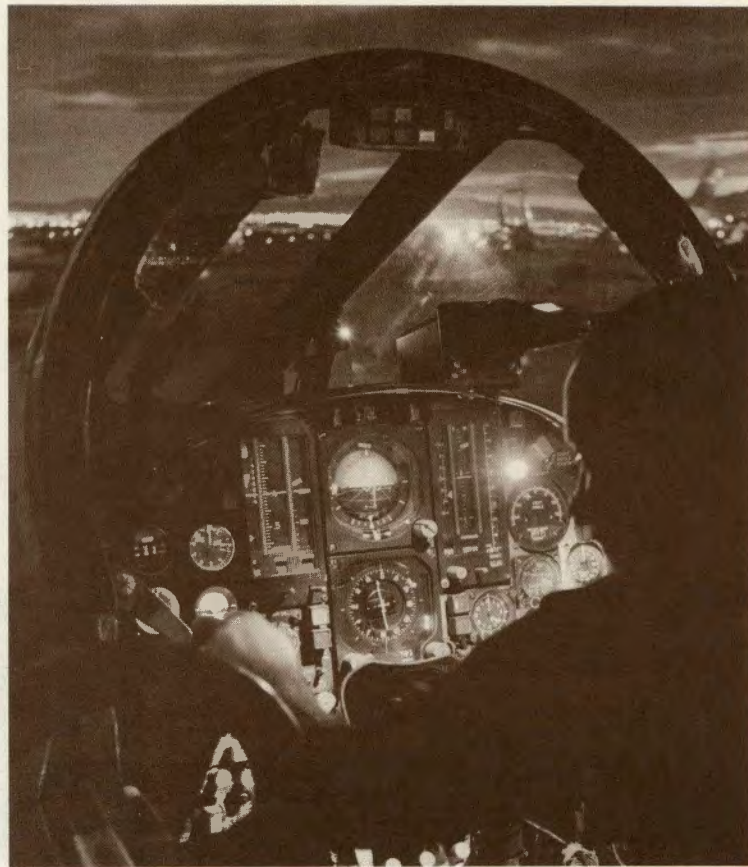
"I wanted to be a fighter crew chief since my early teens. In fact, by the time I reached high school, my hopes had resolved into simply believing that it would happen: like summertime — you know it's going to come."

During Sgt Citty's little more than two years service, he has graduated from three Jet Mechanic Courses at Sheppard AFB, has completed a tour in Korea, and is now keeping his F-105F ready for two to three Wild Weasel training missions a day.

During a recent month, his aircraft flew 38 sorties, was maintained at a 93 percent OR rate, and did not miss one sortie because of abort or non-delivery. The 22-year old airman was named TAC's December Crew Chief of the Month. Along with this outstanding performance, he is aiming for a BA degree by attending Nevada Southern University.

In this article, Sgt Citty tells about his aircraft, his mission, and his profession.





Crew Chief Sgt William City, Jr., inspects, during preflight (above), a maze of electrical and hydraulic connections in the forward engine bay, and makes a checklist stop (left) at the arresting gear precharge pressure gauge.

Lights of Las Vegas glitter on the Nellis AFB skyline as Sgt City sets up his cockpit (above) for ground tests. Below: City and other chiefs await return of their F-105s.

"The best pilot in the world isn't worth a damn without a good bird. That's why I like my job — somebody's really dependin' on me. I've been schooled, drilled, and sometimes cussed, but I've got my own bird. And it's worth it. Keeping her flying is a lot like driving drag races when I was a kid. I soon learned that winning required a top performance car. That's why I replaced her transmission 19 times. My Thud's the same way, and she can put-out 100 percent every day with the right kind of care — like prompt, thorough checklist inspections and service, oiled with a few drops of worry. You usually don't hear this kind of chatter from chiefs, I know, but I'm not the least bit ashamed — and most others aren't either if you ask 'em."

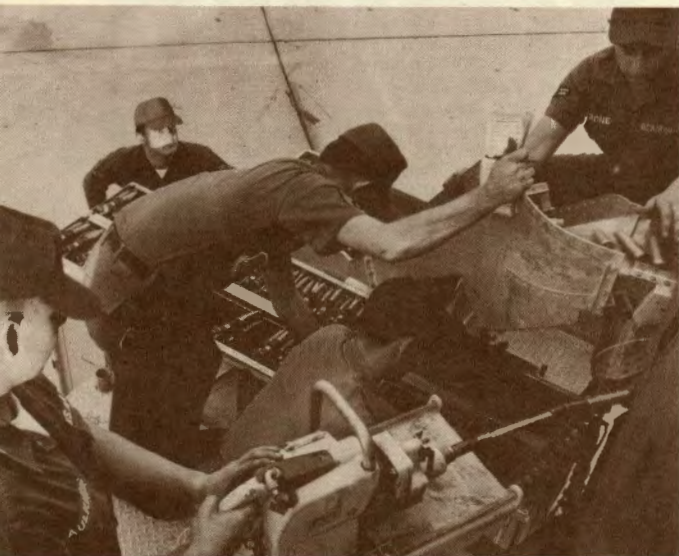
"Thud chiefs work by the same TOs, part numbers and checklists but you'll never convince me that all our aircraft are just alike. Being a little corny about it, each has its own characteristics — like women, some "walk" with a special gait, others may "giggle" instead of laugh. And mine, right now she is popping a few rivets regardless of how often they're replaced. Yeah, it's frustrating, but I'll find out why. Not just because it's my job, I want to know. Maybe that's why they say chiefs are born and not made. Like chiefs sitting on the ramp waiting for their bird to return, looks to outsiders like a real piece of cake. You'll never convince me that, even during a ramp bullsession, some chief isn't thinking about those more than 65,000 parts he keeps glued together for the sole purpose of keeping a crew alive to do their job."



CREW CHIEF

Launching their Thud on a Wild-Weasel range mission (right), Sgt Citty and his assistant clear the crew for a cartridge start. Below: Citty watches as an armament crew loads his F-105's Vulcan with 20mm ammo. An Arkansas Razorback, the pride of his home state, is the only personal marking on the crew chief's supersonic fighter.

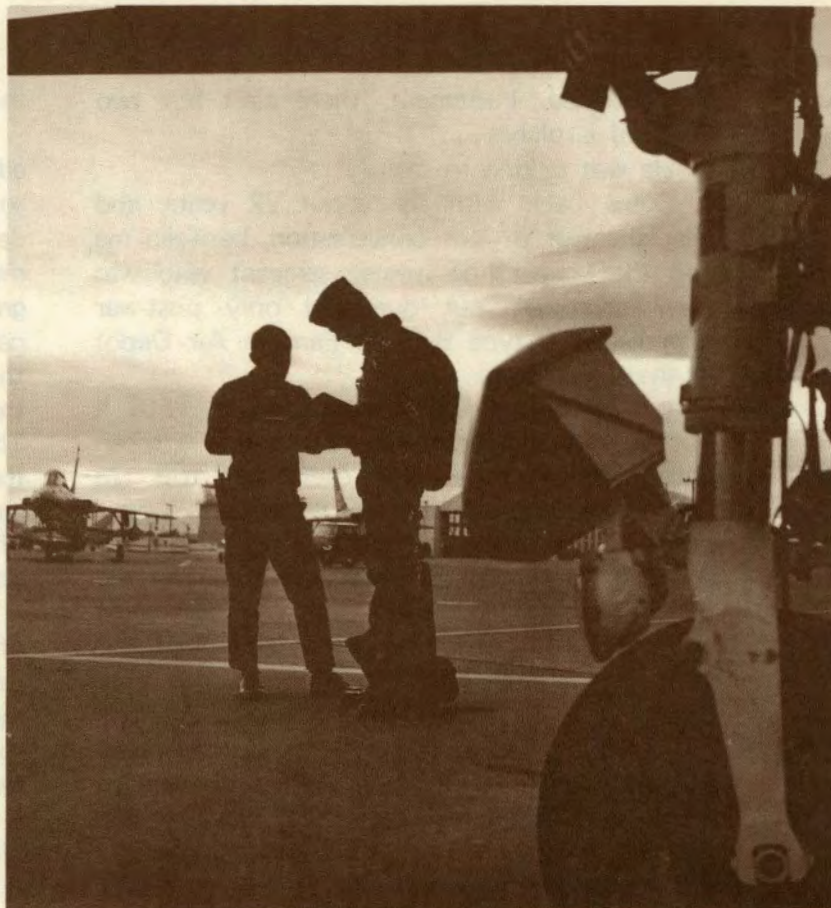
"When I was a 'Ned New Guy' on the line, launching was the most thrilling moment! And it still is, but it's different now. Here, most of my pilots were flying airplanes long before I was driving a car. That puts me in a bind, because with all that experience in the cockpit, the probability of a realistic alibi is slim if something goes wrong in the air. So now, when my aircrew is headed for the taxi strip, no matter what I'm doing, that check list rolls through my mind with the clickety-click of a torque wrench. Don't get me wrong. She doesn't fly unless I'm sure... I learned that the hard way. But it still goes clickety-click. That's probably why I like to be around when specialists are working. Sure, they know more about their job than I do, but I still like to be there. Once when I was an assistant, my chief said I was wasting time standing around watching. Maybe he was right, but I still like to be there. When someone was working in the guts of our bird, I always felt better after she was all buttoned up. And I still do. I don't ever want to have my razorback dug from some muddy hole in the ground 500 miles from home."



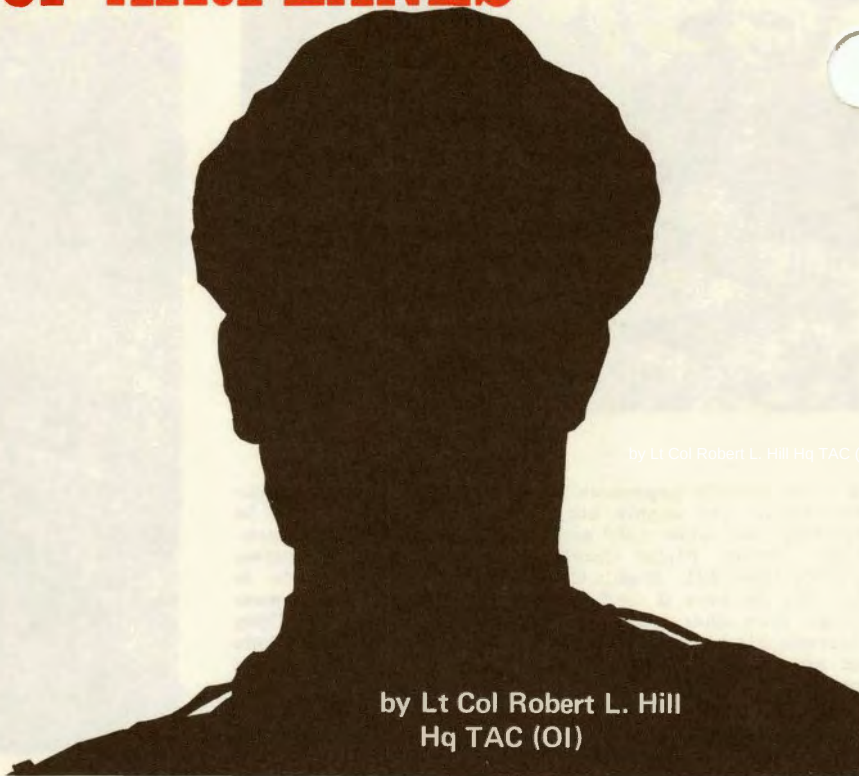


A Crew Chief's paperwork not only supports maintenance scheduling and supply but, at command level, helps in spotting fleet wide 'soft' areas that may require R&D attention. Above: Flight Chief, TSgt Gary Bailey reviews City's Form 391. Right: City keeps a full set of tools in his kit. He says it isn't always easy because some wear longer than others. Below: At the end of a mission, City debriefs his pilot Maj James O'Neil, noting any variations in aircraft performance which can be adjusted before its next flight.

Getting the Crew Chief of the Month citation is an ego builder of course, but at the same time, a little embarrassing because all those pretty sounding words boil down to just doing the job that was assigned in the first place. And besides that, every chief has plenty of help if he really wants it. Like me, I'm still a young fella with lots to learn so I walk around with open eyes and ears. I hope I never change in that respect 'cause I'll dry up. TSgt Bailey proves that to me every time he shows me a change in the TO... and I haven't seen a TO change yet that wasn't intended as an improvement. This doesn't mean my own ideas can't be used and I like to think that chiefs are capable of suggesting improvements. It just takes a little time and paperwork to get them in the TOs, that is if they're good enough. The hardest part is to keep from using a good idea until it's approved. Before then it's called improvising, which can turn out good and sometimes bad. Like when I was draggin', I remember times when the engine needed rod bearings but the bank was broke. I won races with bearings cut from my leather belt. A great idea. Not a scratch on the bearing races either. But trying to get two races out of one belt was asking for a piston smack against the head. The same thing goes for procedures. I'll bet there isn't a chief in the world who hasn't varied the checklist order...the easiest way I know to tie a guy's memory in knots while watching his bird on takeoff roll. On this job I learn from people and I depend on people. And in the process, I learned not to depend on some. As a chief, I hope I can always hold the trust that my pilots have given me. Like when a pilot said to me as I was strapping him in the seat, "Is she ready to fly?" and I said, "As good as she'll ever be." He stared at me and said, "Maybe you'd like to ride in the back seat in case she needs you." I didn't have to say 'no'...I hope I never do." ➤



two kinds of AIRPLANES



by Lt Col Robert L. Hill Hq TAC (OI)

by Lt Col Robert L. Hill
Hq TAC (OI)

"You see, Lootenant, there ain't but two kinds of airplanes..."

He was talking to me...

Come back with me about '22 years, and hear the rest of this conversation, between me and the brown-shoe master sergeant who was crew chief on our one and only post-war administrative type B-17 at Panama Air Depot in the Canal Zone.

I had steamed into the hangar with a pocket full of borrowed gold and a kitchen pass for a scheduled overnight trip to Guatemala City, (which in those days was a pretty good place to RON). As I threw my B-4 bag up through the hatch, I shot my best official-aircrew-member-look at the old sarge and asked, "Where's the pilot? Why isn't this crate ready to go?" He looked me over carefully, making note of my new wings and my gleaming brass bars, and then resignedly hoisted himself to his feet, shifted his wad of Kentucky Twist to the other cheek, and replied, "He was here a while back, sir, but he left... we ain't goin' nowheres anyway 'cause

this here airplane's out of commission."

Well, I wasn't about to give up such an educational trip so easily. "What's broke? Is it something we can get along without?" I demanded. Sergeant Williams pondered a moment and then, in a tone which expressed great sorrow for my abysmal ignorance, patiently explained: "You see, Lootenant, there ain't but two kinds of airplanes... them that's in and them that's out of commission. Them that's in commission, you fly, and them that's out of commission, you don't. This here airplane happens to be one of them that's out of commission, and you oughta be darned glad you got a pilot that knows which is which."

It was some years later that the full impact of Master Sergeant Williams' homespun wisdom penetrated the walls around my thinking muscle. He had, in his own inimitable way, spelled out for me one of the most basic secrets of survival in this flying business. Think it over. I pass it along to you as I got it from him... for free.

TACTICAL AIR COMMAND

**PILOTS
OF
DISTINCTION**



Major Richard M. Desing and Major Otis L. Bonner, Jr., of the 478th Tactical Fighter Squadron, Homestead Air Force Base, Florida, have been selected as Tactical Air Command Pilots of Distinction.

They landed their F-4D after completing an ACM mission, and while taxiing to the ramp shut down the right engine. Shortly thereafter, the left engine auto accelerated. Instantly, both pilots brought the throttle to idle and the engine flamed out. The aircraft stopped between a row of B-52s and fully loaded KC-135s. Smoke was coming from beneath the aircraft. Radio failure, caused engine flameout, prevented crash crews from



Maj Desing



Maj Bonner

being alerted. Major Desing and Major Bonner evacuated the aircraft and saw two to three feet of flame coming from the left auxiliary air door near the main fuel manifold. Major Desing signaled his wingman to alert the crash crew. They then ran to the sides of the taxiway, grabbed fire extinguishers, and put out the fire. The crash crew arrived and prevented the fire from restarting.

The rapid evaluation and coordinated action of both pilots during this emergency readily qualify Major Desing and Major Bonner as Tactical Air Command Pilots of Distinction.

CHOCK TALK

chock talk

cavitating pumps

An RF-4C pilot placed the gear handle down. The gear extension cycle began but seemed unusually slow — in fact the nose gear and left main wouldn't lock down. A check of the telights showed several warning lights illuminated, "check hydraulic gauges," "left and right aux airdors," and "speed brake out." When he checked gauges the pilot noticed utility hydraulic pressure reading 700 psi and falling.

Thanks to the emergency extension system all gear were locked down. And a successful approach-end barrier engagement followed.

Subsequent maintenance investigation showed that both hydraulic pumps had been damaged in a manner which indicated prolonged operation dry — or while cavitating. Looks like a case of improper purging after system maintenance. Or could it be poor system servicing?

supervisory inspections

While preflighting the ejection seat, an F-4 pilot discovered the canopy initiator disconnected. A records check showed that egress personnel had recently completed some seat maintenance. An oversight such as this could be labeled "human error" and forgotten. However, our maintenance system is designed to catch just this sort of thing.

The maintenance action involved was cleared by an authorized seven-level supervisor. By his signature he certified that the seat and canopy ejection systems were properly installed and

....incidents and incidentals

ready to perform their lifesaving function.

This supervisor's failure to catch a gross error could have cost a pilot his life. Too often there is a tendency to get careless and rationalize, "Aw, I know old Joe does good work" — then sign off the work as inspected... from the office or maintenance truck.

In this case no one was hurt... and the egress maintenance crew "rebriefed." From here it appears everyone concerned was lucky.

careless conscience

Sometimes disciplinary action seems to be the only way. An inspector signed off red-X items after mechanics had completed work on an F-100 flight control system.

The plane completed two missions. On the third, during takeoff the pilot added back pressure for rotation but received no response. The IP took control, pulled the stick back, but the nose wheel stayed glued to the runway. Abort procedures ended with a successful barrier engagement at about 130 knots.

Inspectors could not locate the castillated nut and cotter-key which is supposed to hold the control rod to the horizontal stabilizer actuator control bungee. To make a bad situation worse, the 781A did not note that this nut had been removed during the flight control maintenance, two flights previous.

Had the linkage separated during a critical portion of the previous flights, maintenance personnel and the sign-off inspector may have

with a maintenance slant.

more on their conscience. More, that is, than an upcoming disciplinary session requiring answers about leftover parts and short-sighted inspections.

high priced junk

The pilot pushed his F-4 over the top of a more than 70-degree climb to check the AFCS cutout. At about 10 units angle of attack, he heard a thump and both outboard wing tanks disarmed.

Trouble shooters found the electrical circuits OK. However, there was a slight burn on the screw ends holding wire terminals to the wing station jettison switch. And aluminum drill shavings lay under the pilot's left console . . . junk, which cost two wing tanks.

During the zero-to-negative G maneuver, the shavings floated against the terminals closing the circuit. A couple of minutes with a vacuum cleaner probably would have saved the tanks. Good housekeeping is the key, but one electrical shop also sprays a layer of insulation (clear varnish or shellac) on exposed, switch terminals under consoles.

aileron trim solution

A TAC unit flying F-4Ds has been experiencing aileron trim problems traceable to broken wires in the aileron feel trim actuator cannon plug. The wires break while connecting the plug because of its tight fit near the centerline stores cannon plug. Working space in this area is inefficient, and a pending TCTO may result in repositioning one of the plugs. In the meantime,

the unit requires an entry on the 781A when work is done in this area. Before the supervisor signs off, it is mandatory that he not only check the trim actuator cannon plug but must also perform a trim check. Sure, it's more work, but their birds are not making as many unstable emergency landings.

paper maintenance

Two 37MM bursts near the cockpit area forced an F-4D into uncontrollable flight. The SEA aircrew bounced between forces of from 8 positive Gs to 3.5 negative Gs until the AC ordered the pilot to eject. As the rear seater left the aircraft, the AC pulled the lower handle. His canopy released just after the rear seater catapulted out. But the AC's seat stayed with the pitching Phantom. As he pulled the handle two or three more times to its full extension, the bird flipped over on its back where the pilot regained control and flew home.

Ground tests proved that had the cable been pulled one more time, it may have fired the catapult gun, leading some to believe that battle damage may have caused delay in canopy jettison with corresponding lag in removal of the interlock block. Nevertheless, they also found excessive clearance between the firing link trip lever and the sequence actuator clevis pin — it was .007 of an inch, or .027 greater than the maximum .050. Investigation proved that TCTO IF-4-816, in which this adjustment is required, had not been complied with even though aircraft forms certified it had been done prior to the aircraft's arrival in SEA. Paper maintenance!

TACTICAL AIR COMMAND AIRCREW ACHIEVEMENT AWARD

Major Solomon Harp, III, and 1st Lieutenant Roland J. McDonald, Jr., of the 16th Tactical Fighter Squadron, Eglin Air Force Base, Florida, have been selected to receive the Tactical Air Command Aircrew Achievement Award.

Major Harp and Lt McDonald were Number Two in a flight of three F-4Es. After a low level navigation leg they began the gunnery portion of the mission. On their third rocket pass using pop-up tactics, the aircraft passed 7500 feet MSL and yawed sharply to the left. The "Off" flags appeared on the ADI and the gyro tumbled. Major Harp began an immediate dive recovery. A quick check of the instruments disclosed a double-engine flameout with both tachometers at 35-40 percent. He initiated an air start of the right engine. Light-off was immediate and the throttle was brought forward from idle to military power. With return of electrical power Lt McDonald alerted the range officer and flight leader of their emergency. Major Harp then made a successful air start of the left engine while Lt McDonald maintained radio contact with the tower. They aborted the remainder of the mission and made a successful landing without placing either throttle near the idle stop.

The immediate corrective action and professional teamwork demonstrated by Major Harp and Lieutenant McDonald merit their selection for the Tactical Air Command Aircrew Achievement Award.



Maj Harp



1st Lt McDonald

TACTICAL AIR COMMAND

UNIT ACHIEVEMENT AWARD



39 Tactical Airlift Squadron, Lockbourne AFB, Ohio
 61 Tactical Airlift Squadron, Sewart AFB, Tenn.
 182 Tactical Fighter Group, Peoria, Ill.
 188 Tactical Reconnaissance Group, Fort Smith, Ark.
 317 Tactical Airlift Wing, Lockbourne AFB, Ohio
 430 Tactical Fighter Squadron, Homestead AFB, Fla.
 431 Tactical Fighter Squadron, George AFB, Calif.
 430 Tactical Fighter Squadron, Homestead AFB, Fla.
 522 Tactical Fighter Squadron, Cannon AFB, N. M.
 777 Tactical Airlift Squadron, Pope AFB, N. C.
 778 Tactical Airlift Squadron, Pope AFB, N. C.
 910 Tactical Airlift Group, Vienna, Ohio
 4432 Air Transport Squadron, Chanute AFB, Ill.
 4433 Air Transport Squadron, Dobbins AFB, Ga.
 4434 Air Transport Squadron, Randolph AFB, Texas
 4435 Air Transport Squadron, Hamilton AFB, Ca

a 2nd look at a....

ZERO / ZERO EJECTION

by Don Reynolds

Pre-takeoff checks completed, an F-4 aircrew closed their canopies, ready to move toward the runway at a SEA airbase. As the AC applied power, violent over-pressurization of the cockpit caused him to stop his Phantom, and the rear seater called for him to dump pressure. The AC reached for the dump valve. But before pulling the knob he heard a loud explosion and, a few seconds later, saw his pilot and the rear ejection seat strike the ground about 200 feet ahead at eleven o'clock. The pilot rode the seat to his death. Why?

This accident was triggered by the victim's own error. But failure of the life support system to perform within its design zero/zero limits was due to errors of others.

The accident was setup initially by the utility ground crew who failed to reset the cabin pressure regulator valve. It was left in the "ground test only" position and is not a part of, nor accessible for, preflight inspection.

This oversight set the trap for the rear seater who used an unauthorized procedure to relieve cockpit pressure. As he called to his AC to actuate the pressure relief valve, he also moved the canopy control selector to "open." With the canopy unlocked, overpressure forced it up, shearing the canopy shear pin. The canopy raised several inches above the stationary aircraft.

It fell back, slightly right of center, causing the actuator rod attachment bracket to strike and dislodge the interlock block. Then the cam roller struck the rear of the banana links, firing the ejection seat through the canopy.

The power reel retraction mechanism, firing out of sequence, failed due to excessive Gs. The pilot's neck was broken during canopy penetration. For the rear seater, this was the end. But for those of us still flying, the fact that the seat landed with the pilot still attached and chute neatly stowed, could give rise to a credibility gap, upgrading the whole egress system. No sweat! Worked as advertised, but was foiled with

generous portions of human error.

The drogue gun fired on schedule. The time-release mechanism released the scissors shackle and unlocked seat restraints. The 22-inch controller drogue extracted the 5-foot main drogue — but it didn't deploy. Investigators found that the controller drogue shrouds and connection line were misrigged and tangled with shrouds of the 5-foot drogue.

And even though the controller drogue pulls more than the maximum rotation pressure (5 to 15 pounds) required to open the scissor shackle, it remained closed, blocking extraction of the pilot's personnel chute. Investigators found that it required more than 60 pounds of pull to rotate open because someone had coated it with more-than-ample spray paint for anti-corrosion protection.

This fumbling of correct procedures led to a wing-wide inspection of all aircraft egress systems. The front seat main drogue of the ill-fated Phantom was found to have the same tangled misrigging. And more than that, inspectors could not open the 5-foot canopy until they removed a long strip of wide adhesive tape. It was the type wrapped around drogue line ferrules prior to TO 13A5-32-501, and should have been removed prior to completing the modification. It evidently had been dropped inside the drogue when the seats were upgraded to H-7. Nevertheless, this error should have been discovered on subsequent drogue chute repacks if TO 13A5-32-3 had been followed.

Other discrepancies found were: four scissors mechanisms required more than maximum pivot pressure; four drogue chutes with anti-squid lines wrapped around several shroud lines; and on all aircraft, the parachute withdrawal and arming lines were routed incorrectly.

Along with a touch of hurried thoughtlessness in the cockpit, this accident had ample help from supervisors, inspectors, and specialists. ➔

TAC TIPS

...interest items, mishaps with mechanics,

cold nose

After leveloff the Herky's extra crewmember checked out the driftmeter, scanning the terrain below. Looking forward, he was surprised to see the nose gear staring back, hanging in the breeze. The crew checked gear indicators; they showed all wheels up and locked. Deciding to try again some other day, the pilot returned to base. When they lowered all gear for landing the nose gear didn't move. But, all gear indicators cycled from up through "barber pole" to down and locked. Landing was routine.

Maintenance inspectors found a bad micro switch on the nose gear uplock. Replacement cured the Herky's rare cold nose complaint.

gauge gazers

The C-119 pilot orbited the paradrop initial point and noted unbalanced fuel quantities. Tanks selected for right engine operation showed fuel amounts decreasing rapidly. Fuel flow and fuel pressure checked within limits so he changed fuel tanks to verify fuel quantity gauge operation. They checked out okay. Right wing fuel decreasing rapidly, he feathered number two engine and landed at an alternate.

Fuel system specialist found two rear engine studs stripped. These secure the fuel pump diaphragm cover to the pump body. This allowed the diaphragm cover to hang about one-fourth inch from the pump body. The gap permitted fuel to be pumped overboard at about 8000 pounds per hour. The boxcar crew is convinced that it pays to be a "gauge gazer."

emergency gear trap

Utility hydraulic pressure went to zero immediately after takeoff. The F-4D pilot noted gear and flaps only partially retracted, radar out, both auxiliary air door malfunction lights, and speed brakes partially extended. He dumped fuel, extended gear and half flaps with the emergency system, and made a successful landing with an approach end barrier engagement.

Investigators suspect the emergency landing gear system had been inadvertently actuated and reset prior to the mission. This caused air landing gear down lines to be routed to the utility reservoir and forced hydraulic fluid overboard — causing the utility failure.

Experience has shown that inadvertent pull and reset by ground crew will not introduce air into the lines, unless committed while on jacks with gear cycling. So, pilots, if you think it may have happened, write it up. Today's doubt will be proved during tomorrow's flight.

t-39 toe trippers

An Air Force T-39 made a routine GCA approach and touchdown at a Navy air base. Both main gear doors were damaged when the plane passed over the mid-field barrier at an estimated speed of 25-40 knots. Maximum height for AF arresting gear pendants is three inches; for the Navy, tolerance is from two to five inches. At AF bases, the T-39 gear door ground clearance of six and one-eighth inches allows a good three-inch gap or clearance between gear doors and pendants. At Navy and Marine bases, clear

the TAC aircrewman.

may be only an inch. Recommendations have been made to either standardize on a three-inch pendant height, or modify gear doors so they retract after gear is down and locked. But until action is taken, T-39 supervisors and pilots best beware if their mission calls for landing over a Navy barrier... or be prepared for gear door repairs.

barrier plate ramps

At some bases a ramp has been placed in front of MA-1A anchor plates to prevent aircraft tails from tearing out the plates and sending them hurtling down the runway at high velocity. These ramps were recently responsible for a tail hook bouncing over a BAK-9 cable, thus preventing a successful hook-up. Current thinking is that the high-velocity plates are more dangerous than the chance of an unsuccessful barrier engagement. Therefore the ramps stay, as does the chance of hook bounce.

F-4 crews should be aware of this possibility and if the hook misses — take it around and try again.

no margin for an emergency

The pilot of a jet fighter was not thinking about an emergency situation at his destination, when filling out the flight clearance for his cross-country navigational training flight to a civil airport... *neither had the operations officer, nor the commander concerned.*

The pilot arrived safely. But when he started off for his return trip, the control stick froze

at rotation speed. An abort was initiated but the aircraft ran out of runway and burned. The arresting system installed at the end of the runway was not compatible with the aircraft. It was for tailhook-equipped aircraft, but the aircraft had no tailhook.

The Air Force has provided jet fighter and some jet trainer aircraft with a distinct safety feature — the opportunity to takeoff and land toward an aircraft arresting system in the event of an emergency. Though the systems are located primarily at Air Force bases, some civil airports, especially the joint use type, have arresting systems installed.

In line with the barrier regulation, AFR 55-42, commanders and their operations officers should carefully review the mission requirement when scheduling aircraft on cross-country flights. Unless the mission dictates otherwise, it is wiser and safer to insure that barrier capable aircraft land at destinations with appropriate arresting systems.

From TIG BRIEF 21, 1968

hot seat

Recently, a Martin-Baker MK H7 seat rocket initiator cable was found crushed and frayed. The cable, damaged in the area immediately forward of the cable dispenser housing, appeared to have been crushed by lowering the seat onto an obstruction beneath the seat bucket.

To avoid inadvertent firing of the rocket motor and possible injury, all personnel should be aware of the dangers involved when objects are placed under or around the seat structure.

Maybe this should be another before-strapping-in preflight item.

a screech-job



by Lt Col Carl E. Pearson

You've heard these pilot laments thru the years we've enjoyed retractable landing gear: "I didn't know my wheels were up until I tried to taxi off the runway." Or, "I congratulated myself on the smoothest landing of my career. Couldn't feel the wheels touch. Then I heard and felt the tick-tick-ticking of props slicing grooves in the runway."

How do pilots, high-time and low-time, in single or multiplace birds, forget something as basic as "gear down" before landing? With a checklist reminder? And especially pilots supported by a copilot (even better, an IP) and a flight engineer?

Here's one way, unfortunately, a too frequent way. The Provider IP had his copilot in the left seat on their ninth airlift sortie of the day. They were lined up on a long final into an uncontrolled

forward airstrip. About 20 miles out they received weather, field condition, and security info. They finished their descent checklist about 10 miles out, but held up on starting the jets.

At four miles the pilot called, "Start jets" and asked for the Before Landing Checklist. He set landing flaps himself and drove down final. One jet engine started very slowly. That delay, plus stowing a loose navigator's seat occupied the flight engineer thru touchdown.

Distracted by necessary radio calls, briefing his copilot on terrain obstructions, and concern about a crosswind complicating the landing on the short, narrow runway, the busy and tired IP ran the checklist items quickly. Meanwhile, he monitored his student's approach and flare. Later, he didn't recall lowering the gear.

It would've been a good landing with gear down. A maintenance recovery team jacked up the bruised-bottom bird, lowered the gear normally, inspected and cleared it for a one-time flight home. However, a different crew this trip.

Forgetting the gear usually involves breaking flight-manual established checklist patterns when your span of attention and control is saturated — and you're distracted. Fatigue contributes to setting the stage. For example, delay your jet start, accomplish it late and out

sequence, and you're even later starting the Before Landing Checklist, waiting for a last-minute decision on landing or go-around. Add to this upgrading a copilot during a combat airlift mission into a hazardous, minimum-facility strip on the day's ninth sortie. Tired, tense, and already behind the checklist power curve, you hurry. Then miss some responses while crew coordination collapses – if it ever existed. The earlier checklist hangup starts the sequence of events leading to landing gear-up.

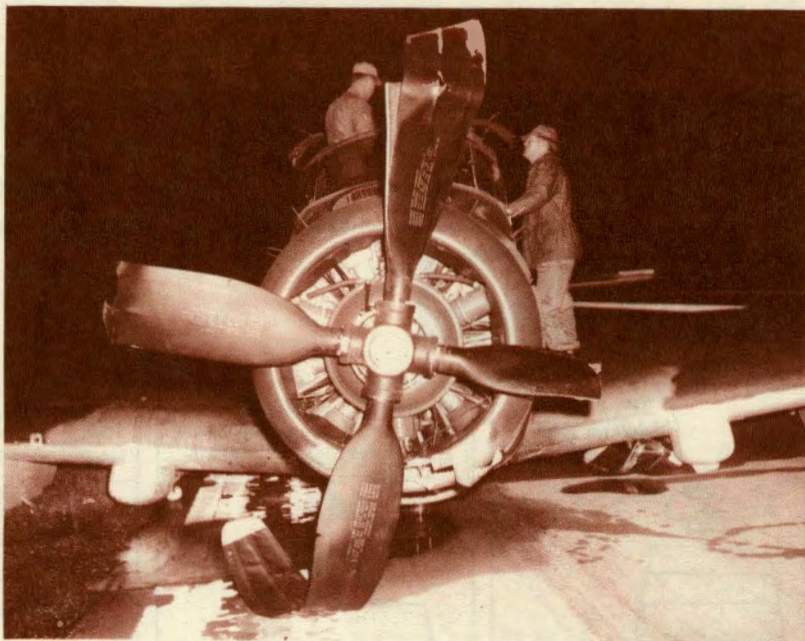
When you reach that most hazardous phase of flight, close-in on final, it boils down to which stimuli score in the fierce competition for your attention and reaction. Normally, at this stage you've completed your cockpit checklist chores – or should have. Except for onspeed readings you're concentrating on things outside of the cockpit that demand your close attention: Lining up, missing an overrun or runway lip, clearing a raised barrier, flaring on time, touchdown, reversing, rollout, and reindeer on the runway. Close-in, you're responding to outside influences and have to. Anything less

results in collision with the ground or, at best, a controlled crash. You can't grease them in flying instruments to ground contact; that's sometime in the future.

Because landing still requires visual reference, you've got to get your head out of the cockpit in sufficient time. That's why checklists are subdivided into phases of flight. Accomplished in proper sequence at the right time and place they ready you for your next flight event, thereby ruling out memory lapses and emotional reactions to critical inflight problems. Checklists are a rational and proven system of aircrew and airplane management. They avoid the possibility of three crewmen each mounting a horse and galloping off in all directions.

Logical lifesavers, checklists serve as a unifying device, coordinating what would otherwise be separate actions of an aircrew. Complete them at the time and place called for in the flight manual. That way you and your bird will be ready for a wheels-down grease job. And you'll avoid the most embarrassing pilot accident in the books – a screech-job.

Interrupted checklist – A SCREECH JOB



LETTERS to the EDITOR

"The 8th Tactical Fighter Wing Reunion will be held January 31 - February 1, 1969, at the Sheraton-Park Hotel, Washington, D.C. For reservations or further information contact Major James D. Covington, 4315 Majestic Lane, Fairfax, Virginia, 22030."

Dear Editor:

Reference your article "Chuckling Chock Incidents," the TO as quoted could lead some of us to believe that all wheel chocks used on the flight line require reflectorization. This "bright" idea could develop into an extremely costly program.

Para 2-15, TO 35-1-3, 10 June 1968 requires reflectorization of wheel chocks applicable to specific aircraft. I believe clarification is warranted in one of your forthcoming issues.

Thanks for a fine magazine.

TSgt Thomas Clavin
1st SOW, England AFB La

You've got a sharp eye for TOs Sarge. We were caught in the middle of a TO change by quoting the 15 Dec 67 order which simply states, "Wheel chocks used on the flight line will be painted with yellow reflective paint color 7211." By publishing time, the TO was changed specifying minimum markings for various aircraft chocks. It also includes an interesting note, "In the event conditions warrant, reflectorizing of the whole wheel chock may be accomplished at the discretion of the using authority."

Ed.

Dear Editor:

The item titled "Hazardous Lag" regarding F-4 altimeter lag may be misleading to many of our F-4 units. The aircraft model types were omitted. Altimeter lag is applicable only to the F-4E and RF-4C. A fix is being engineered to correct this deficiency as soon as possible.

Paragraph 4 of the item indicates that replacement of the CADC fixed the problem. In fact, it did not. It appeared so because the chase aircraft on this FCF was another F-4E where previous chase aircraft were F-4Ds. Subsequent flights comparing the F-4E altimeter against an F-4D again verified the existence of the lag in the F-4E aircraft.

Request your readers be informed of the facts in order that they don't start looking for problems that do not exist. For further reference we refer them to 15 Tac Ftr Wg message (C) P261659Z Sep 68 which was addressed to all F/RF-4 units worldwide.

Lt Col Jack Robinson
Hq TAC (DMMA2), Langley AFB, Va.

Dear Editor:

I noted a small error in the October 68 issue of TAC ATTACK, in the "How High is Up?" article. It states that errors can "be minimized using the procedure for altimeter corrections as outlined in AFM 51-37." A recent change to 51-37 deletes the referenced correction procedure. You fly the aircraft at the current altimeter setting as long as the error is less than ± 75 feet.

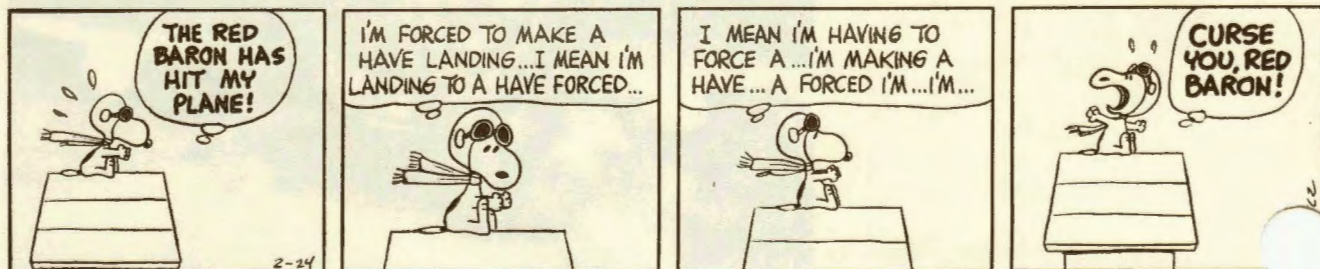
It is a simple matter for maintenance to adjust the altimeter to within ± 5 feet of proper altitude. I believe the ± 75 feet is a carry over from the old days and it should be changed.

David E. Raley, Major, USAF
Chief of Safety, Williams AFB Ariz.

Many thanks Dave for catching our error. We'll refer your suggestion to our flight safety types for consideration. Ed.

PEANUTS

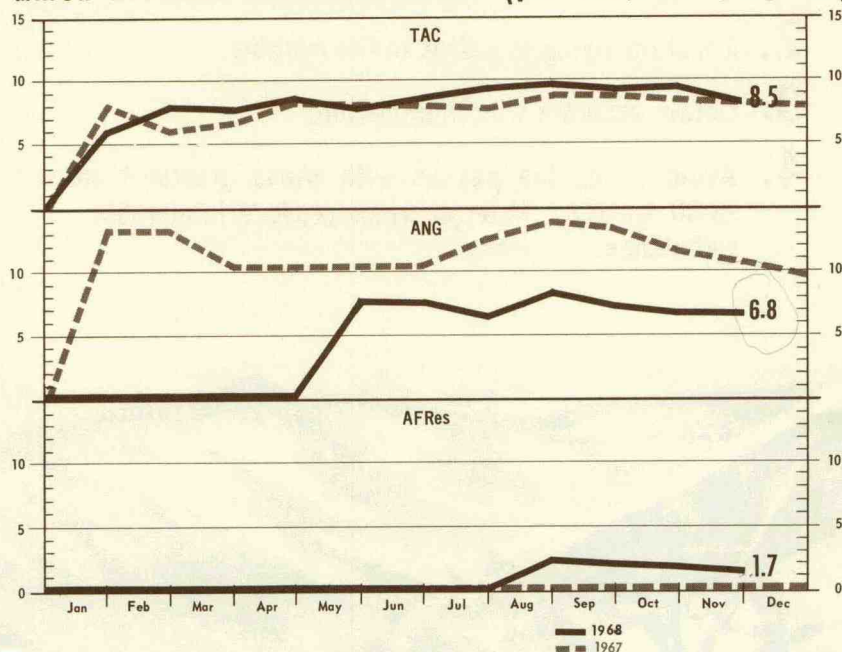
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TAC TALLY

MAJOR AIRCRAFT ACCIDENT RATES AS OF 30 Nov 1968*

MAJOR ACCIDENT RATE COMPARISON (per 100,000 flying hrs)



UNITS

THRU NOV 1968			THRU NOV 1967		
9 AF	5.7	6.7	12 AF	10.0	9.3
4 TFW	8.8	5.2	23 TFW	25.3	12.4
15 TFW	8.6	20.8	123 TRW	12.2	11.6
33 TFW	7.2	8.0	27 TFW	7.8	10.1
113 TFW	18.5	12.4	140 TFW	5.0	16.8
4531 TFW	14.6	0	479 TFW	9.8	8.3
363 TRW	5.4	8.2	474 TFW	32.6	0
64 TAW	3.3	0	67 TRW	8.5	10.2
316 TAW	0	0	75 TRW	0	18.4
317 TAW	0	4.4	313 TAW	0	0
464 TAW	0	2.4	516 TAW	0	0
4442 CCTW	0	6.2	4453 CCTW	13.4	6.1
			4510 CCTW	5.0	8.9
SPECIAL UNITS					
1 SOW	5.5	5.2	4500 ABW	0	0
4410 CCTW	15.4	10.7	4440 ADG	0	0
4409 SUP SQ	0	0	4525 FWW	28.1	18.7
			4416 TSQ	42.2	0

AIRCRAFT	THRU NOV	
	1968	1967
TYPE	TAC	ANG-AFR
A-1	52.0	25.0
A-37	23.8	0
RB-66	0	0
F/RF-84	0	6.0
F-86	14.9	28.4
F-111	38.8	0
F-100	10.4	0
F/RF-101	16.1	0
F-5	14.5	18.4
F-105	26.9	0
F-104	9.5	77.2
F/RF-4	10.3	11.6
C-47	0	0
KC-97	0	0
C-119	0	1.7
C-123	12.8	4.5
C-130	0.6	0.5
T-29	0	0
T-33	2.1	9.1
T-39	0	0
C-7	0	22.4
O-1	7.3	11.0
O-2	7.6	0
OY-10	0	0
RB-57	0	28.5

* ESTIMATED FLYING HOURS

MOUNTAIN FLYING TIPS FOR RECIPS

1. Always file a flight plan. It may mean the difference in life or death.
2. Mountain flying is safest in the morning.
3. Obtain accurate wind information.
4. Avoid flying the passes with winds greater than 25-30 knots. Stronger winds produce intolerable turbulence.

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5. Fly the ridges. Stay out of canyons. Ridges provide updrafts; canyons downdrafts.
 6. If you must fly in a canyon, fly along one side, not in the middle so you'll have room to make a 180 degree turn to get out.
 7. Approach passes and ridges at 45 degree angles. Then if you can't get over, a 90 degree turn will get you out of trouble.
 8. In a downdraft don't try to climb out. Maintain airspeed and fly thru it or turn out of it.