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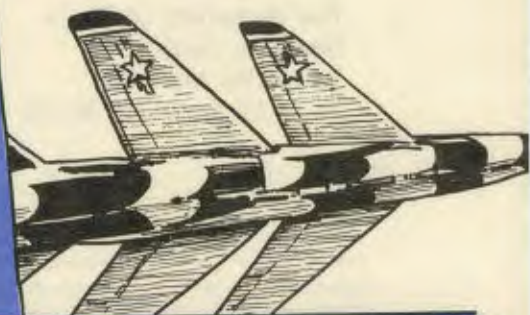
JANUARY 1961

**TAC
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TAC ATTACK

JANUARY 1981

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READINESS IS OUR PROFESSION



TACTICAL AIR COMMAND
GENERAL W. L. CREECH

COMMANDER

LT GENERAL THOMAS H. McMULLEN

VICE COMMANDER

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VOLUME 21 NUMBER 1

Angle of Attack



Readiness is our Profession

"We stand on the shoulders of those who have gone before us." Russel Kirk

When men first began to experiment with aviation, the hazards of flight were unknown. The inherent risks in taking man aloft from his earth-bound environment resulted in many tragic accidents during those early years of experimentation. But, the aviation pioneers soon recognized the hazards and made countless improvements to make flying safer and aircraft more reliable.

The price of their experience was high and stayed high for a long time. Even though loss rates have shown downward trends since the Army Air Corps began keeping records in 1921, losses were still unacceptable. For example, during both WW II and the Korean Conflict, more aircraft were lost to stateside operational and training mishaps than to enemy action.

Since those early days, the Air Force worked hard to reduce the hazards of flying—to reduce our loss of aircrews and aircraft. Just 20 years ago, in 1961, Tactical Air Command experienced 90 major aircraft accidents. Today, our losses are one-third that number and the yearly losses for the entire US Air Force are less than 90 aircraft.

But, we can still improve—we must improve. Today, the loss of an experienced aircrew and one new fighter can equal a number of WW II fighters in terms of firepower and investment. The potential loss of valuable resources demands that we learn and profit from past experiences. Further decreases in our mishap rates will not come easily. Leadership and discipline are the key elements in reducing our losses.

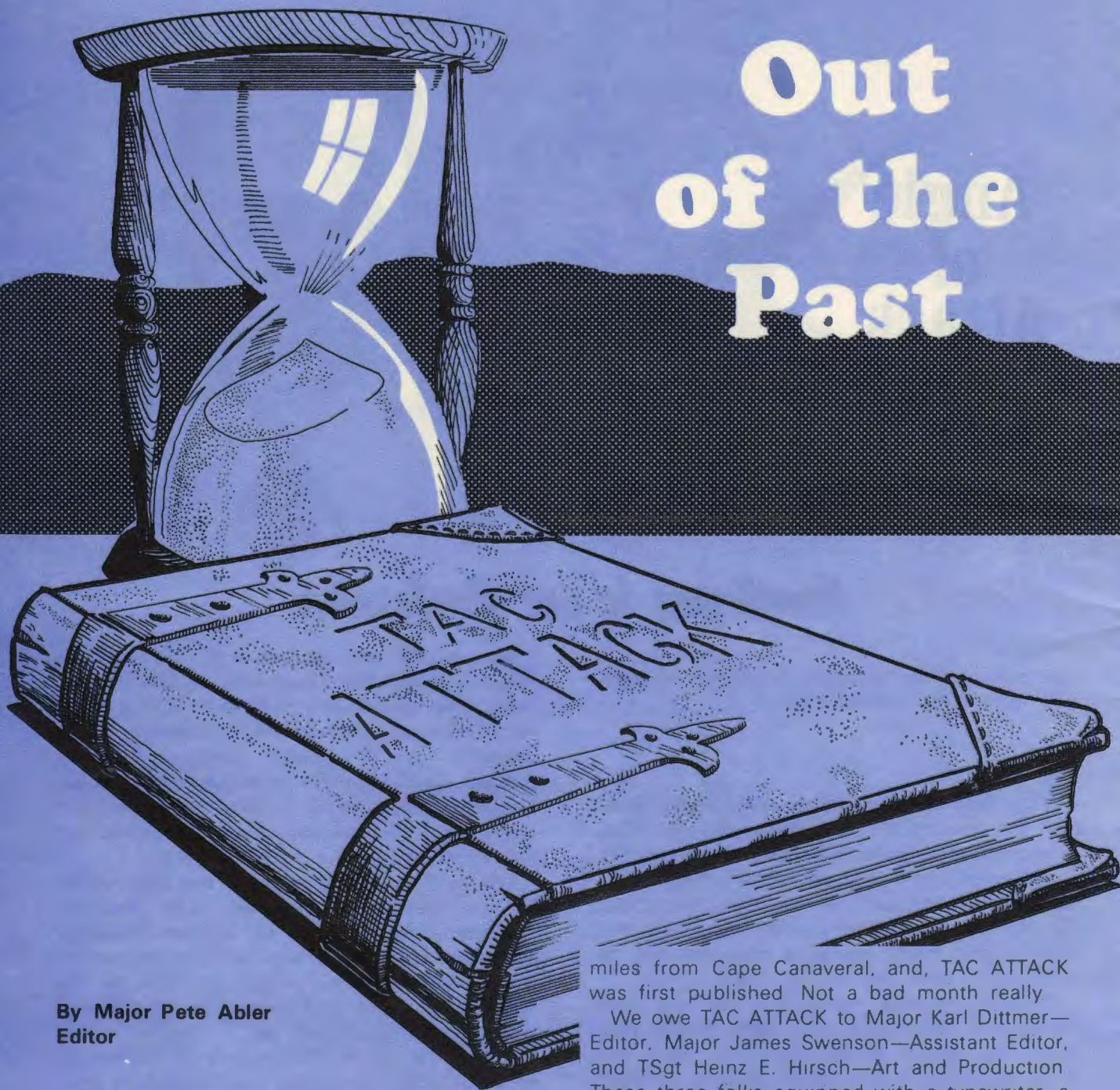
We must remain dedicated to the preservation of our personnel, aircraft, and material resources—the source of our combat capability. The improvements we have made in the past are not the work of a few individuals. They are the result of our direct involvement and the dedicated work of all those before us.

In 1981, as TAC ATTACK begins its third decade of publication, I challenge you to improve upon what others have done in the past. We must increase our efforts and ability to rapidly respond to the requirements of tactical airpower throughout the world. We must live up to TAC's motto, "Readiness is our Profession." ➤

Richard K. Ely

RICHARD K. ELY, Colonel, USAF
Chief of Safety

Out of the Past



By Major Pete Abler
Editor

A number of notable events occurred in January 1961. John F. Kennedy was inaugurated as our 35th President; the Washington Huskies beat Minnesota's Golden Gophers in the Rose Bowl, at age 17, Bobby Fisher clinched his 4th consecutive U.S. Chess Championship; the two survivors of an RB-47 crew shot down in July 1960 were returned by the Soviets; Ham, a 37½ pound chimpanzee was rocketed to a height of 155

miles from Cape Canaveral, and, TAC ATTACK was first published. Not a bad month really.

We owe TAC ATTACK to Major Karl Dittmer—Editor, Major James Swenson—Assistant Editor, and TSgt Heinz E. Hirsch—Art and Production. These three folks equipped with a typewriter, a few desks, and a drawing board formed the nucleus of the magazine. Not only were they the nucleus, they were the entire staff! But they still put out a super magazine.

The difference between the magazines printed 20 years ago and what we publish today is largely a matter of style. The articles, subjects, incidents, and the people involved are strikingly similar. You could almost say that not much has

changed in our business—even if the airplanes are different. On the cover of the first issue was an F-105B, many models of which are still flown by tactical units of the Air National Guard and Air Force Reserve.

There were a lot of other aircraft around in those days. Various TAC units owned F-104s, F-86s, T-33s, Huns, Thuds, Lead Sleds, KB-50s, C-123s, B-57s, F-101s, RF-101s, Herkys, Gooney Birds, Blue Canoes, and just about anything you care to name. It would be several years before the F-110, later to be designated the F-4 Phantom II, would grace the pages of the magazine. Airplanes like the Eagle, Fighting Falcon, and Thunderbolt II were still a glimmer in the imaginations of aerospace engineers.

But, as I said before, the stories remain the same. So, for our 20th anniversary issue, we dug into our archives for articles that could rightfully be judged as the "best" of the past 20 years. The task immediately became difficult because we only had 40 pages in which to print the best—and since we only publish the best to begin with, things were bound to get tight. After much anguish and attempts to eliminate the extra 100 pages of material we had identified, we decided to narrow our focus.

We finally decided to select material which could have been published today—material with lessons that haven't changed from long before the articles were originally printed. I'm not going to pretend the articles are 100% up to date—but I'll guarantee that the lessons are. We tried to get a cross section of all types of articles, so don't expect to be wild about every one.

Our first article "Wring Out The Old" is one of the classic articles. A retirement party is always a good setting for a story examining the bitter-sweet feelings of the retiree—especially one who's been flying for a long time. This one, written by Major Joe Tillman, the magazine's sixth editor, is entertaining and poignant. Incidentally, Major Tillman is now Lt Col Tillman flying C-130s on assistance duty in Zaire.

"The Sink Hole" is an excellent article about landing an airplane—whether it's an F-105, an A-10, or anything in between. There are lessons in this article for all flyers. Since it carries no byline, I'm sure it was written by the editor at that time, Major John Shacklock. He's retired now and was editing an industrial safety publication the last we heard.

TAC Tips have always been a favorite section of the magazine as was Princess Anne. Princess Anne graced our back cover as long as TSgt Hirsch remained with the magazine. Her lessons guided many TAC aircrews in the early years. One of the best is printed here.

In contrast, Fleagle appeared in the center-spread in February 1975. Fleagle first flew into the hearts of TAC ATTACK readers in June 1970, four years after his creator, Stan Hardison, joined the staff. Stan adapted an early cartoon character of his into our beloved, sometime befuddled, bird.

"Daddy's Gonna Take Me For An Airplane Ride" could have been written by just about any TAC aircrew. The situation,—or a similar one where you got caught with your pants down for all the world to see—is only too common. The author, Captain Jack C. Doughty, is now a full colonel, working at the JCS Operations Office in the Pentagon. Incidentally, he was the DO just a few years ago at the same base where this story took place.

In "The Dynamics of Zoom," the reasons why many aircrews don't make it after they've pulled the handle are detailed. This article could well be mandatory reading once a year. The lessons don't change. Neither do those contained in Dr. Chaytor Mason's "Safety Vs Manhood." Anyone who has heard him speak on this and the other areas of aviation psychology know how true his words are.

As a fitting finale to the magazine we have "Three Little Devils at the Gates of Hell." A novel story which could only have been written by a Chaplain—as it was. Unfortunately, I couldn't locate Chaplain Drumheller who retired several years ago.

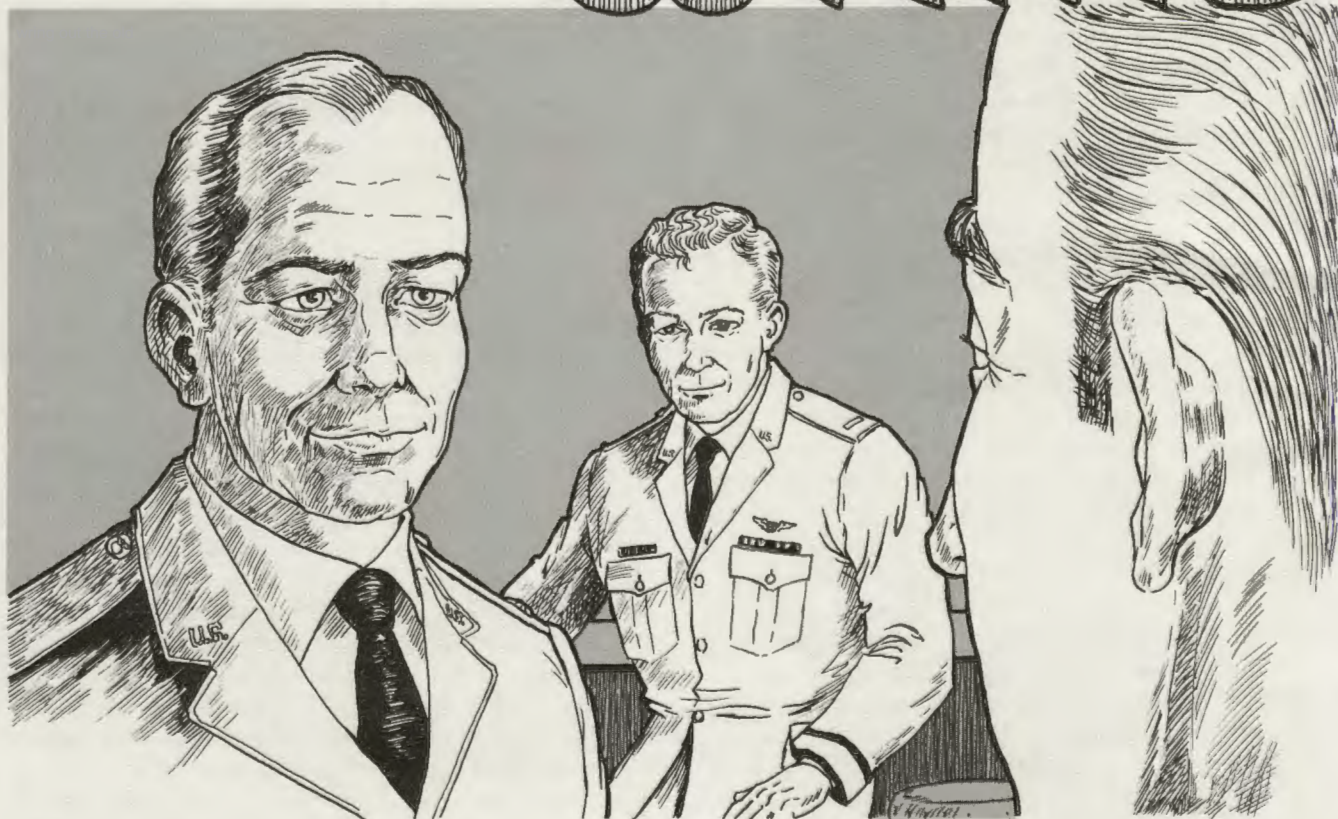
It's probably fitting that in our 20th anniversary issue I can introduce you to our new editor, Major Jim Mackin. Jim came to us from A-10s at Davis-Monthan AFB. Besides the Warthog, Jim has flown the O-2, A-7, and F-4; and also has a degree in Journalism. He and I will share the chair for another month or so until I can make my break to USAFE.

Oh, by the way, on our back cover is the Fleagle which received the most comments of all we've published—but then I'm sure that was what you looked for when you first picked up this issue.

Happy reading!



WRING



The lieutenant sat back and watched the crowd of well-wishers say goodbye to Lt Col Sheaffer. He refilled his mug and debated whether or not he should wait until the crowd cleared or just slip out without bidding the colonel adieu. After all, he thought, "I've only known the guy for six months . . . it seems like I've known him half my life . . . he sure took me under his wing . . . I wonder what my new boss will be like . . . best retirement ceremony I've ever seen . . . what the hell, it's the only retirement ceremony I've ever seen."

By now the crowd around the colonel was down to two guys and they were shaking hands with the retiree and edging towards the door.

"Low and slow, Jim," the last one said as he went out the door.

The lieutenant picked up his mug, and catching Colonel Sheaffer's eye, waved and edged between the empty chairs towards him. The two shook hands.

"Good luck, Colonel Sheaffer . . . we're all going to miss you around here."

"Thanks, Sam. I guess it's time you got a boss who can get some work out of you. It should be against Air Force policy to put two bass fishermen in the same office . . . but I've enjoyed it."

The lieutenant looked around awkwardly. He drained his mug and set it down on an empty table. "Well, keep in touch, Colonel Sheaffer . . ."

OUT THE OLD

Maj Joe Tillman

"Whoa, Sam. You mean to say you'd leave without a final round of 'horses'?"

The lieutenant grinned, "Why not! I enjoy beating feather merchants out of a beer. There's a couple of seats at the bar there . . . and a dice cup."

The two sat down. The colonel won the piddle and took two straight horses. He poured the beer.

"You know, Sam, as much as I look forward to retirement, I'm really going to miss all the people here. I don't think there's a better bunch of guys anywhere."

"Well, you have a lot of friends there in Tennessee, don't you? Besides, ol' bucketmouth will keep you pretty busy. Janet told me you ordered a new bass boat. Hell, you'll probably turn pro on me. I can just hear you the first time we visit . . . 'twenty bucks a day and you supply the beer' . . . and THEN you probably won't show me the trophy-hole."

"C'mon, Sam . . . you know me better than that. I'll give you a military discount—fifteen bucks and all the bait you can eat!" The two looked down at their mugs reflectively.

"You got any parting thoughts for a young lieutenant on his way up, Colonel Sheaffer?"

"It's funny you should ask that, Sam. I was about to offer some advice, but it seems so corny. You really interested?"

"You damn betcha. In fact I'll buy a pitcher as payment."

"Your money's no good here, Sam . . . Barkeep, one more pitcher, please!" The colonel paid for the beer while the lieutenant filled the mugs. "Sam, this is probably the oldest story ever told,

but what the hell, I'll tell it again. I've got no fighter pilot reputation to protect anymore." He paused as the thunder of a departing aircraft flooded the bar.

"It's the fighter pilot mystique, Sam. That's what I want to warn you about. I don't mean the charge you get strapping on a rocket and all that 'high flight' stuff . . . hell, anyone with a hair has got to enjoy that. What I'm talking about is the do-or-die stuff—the press-on-regardless syndrome."

The colonel paused long enough to wave to some friends leaving the casual bar. "Last night, as I was packing, I looked through my old pilot training yearbook—a really odd feeling just before you pack it up . . . Sam, there were five guys in my class who aren't going to retire. Five guys who were damn good sticks, but the odds caught up with them—because they forced their hands . . . but I'd better back up a bit . . . two of them were KIA and I can't include them. Both of them pressed hard, but as far as I'm concerned, that's the time to press—the only time—and they were just doing what they had to do . . ."

"How about the other three?"

"Well, one guy got splashed doing what he shouldn't have. I don't know if you remember the '100 that hit the cable in the Grand Canyon . . . That was Bobby. We were at Nellis together and I knew even then he was going to bust it. I remember we were on the way to the range once and he decided to jump another flight that was on the way back—for a little unscheduled ACM. I made a feeble attempt to talk him out of it, but like a dummy, I stayed with him. Jeez, we tore

Wring out the old

right through that formation . . . they must have thought they were going backwards. All Bob said, as he went through them was, 'Bang, bang, you're dead!' They damn near were, too! I picked a guy out and we raced around a little, but my heart wasn't in it. I could just visualize dropping some of our stores onto Route 66 . . . make a hell of a BDA. To make a long story short, later on that night at the stag bar, one of the guys from the other flight decked Bobby . . . got an Article 15 for it, too. The guy never did tell anyone why he was so teed-off, though. About a week later, Bobby hit the wire."

The lieutenant took out a small package of cigars and offered one to the colonel. After they both fired up, the colonel continued.

"The second guy to buy it was a damn good stick, too, and not as wild as Bob. I got this story second hand from Pete Johnson. Pete was flying with Snuffy and told me what happened . . . I have to assume it's true. The two were comin' back from a round robin . . . this was at Yokota, I think. Snuffy had engine problems . . . also a Hun. Pete dropped back on the wing and looked him over. He told Snuffy he was getting some smoke and sparks. Snuf said he was getting

about 80% RPM and that he'd shoot a flame-out landing into Yokota if high key looked OK. Pete made the calls for him and told Snuffy to get out if things didn't look right. About five miles out, Snuffy had to shut it down. Pete said the bird looked OK so he pressed on. They hit high key about a thousand feet high and Pete told him to fly a wider pattern since there was a pretty strong crosswind into the runway. Snuffy overshot and the turn to final was tight and high. Pete told him to eject—in no uncertain terms. Snuffy touched down hot and long with only about two thousand feet to go, sheared the barrier, went through the airfield perimeter fence and hit a car. He killed six civilians . . . Pete said his last words were, 'No sweat, papa-san, I'll slip it in.' No sweat!"

The colonel stared straight ahead. He turned back to the lieutenant and smiled, "And that, my boy, is what I'm talkin' about . . . no sweat."

How about the third guy?

The colonel puffed his cigar and thought for a few seconds. He took off his glasses and rubbed the bridge of his nose. "Doc Taylor. Fine guy. Circumstances put him in a box, but he could've gotten out. This was only about a year ago . . . Doc was flying F-4s in Europe. He was number two in a 2-ship. On landing, lead took the barrier and tied up the runway. Doc decided to divert into Spang 'cause he was runnin' short of fuel. The weather all over and at Spang was bad. Doc called emergency fuel and was given a GCA straight-in. According to the accident report, he hit minimums and took it around, but knowing Doc, he probably sneaked down a little below that. Anyway, he took it around and flamed out on short final during his second approach. They waited too late to punch out. Their chutes didn't have time to fully deploy. Rumors are he tried to deadstick it in and realized too late he wouldn't make it . . . damn shame . . ."

The two sat in silence for a few minutes as the dull roar of a formation takeoff made the glasses tinkle behind the bar. The colonel, expressionless, stood up and pulled his cap from his belt. The lieutenant followed him out of the bar. They shook hands in the dimly lit hallway.

"Sam, good luck to you. And what I told you back there . . . what the hell do I know anyway . . . see you later."

The lieutenant watched the door close behind the colonel. He turned and went back to the bar.



January 1975



Aircrew of Distinction



Captain Wright W. Matthews

On 9 June 1980, Captain Matthews was flying an air defense practice scramble mission from Tyndall AFB, Florida, in an F-106A. Midway through the mission, he made a pushover maneuver to gain airspeed. As the control stick was moved forward, it rapidly drove to the forward right corner. The flight control dampers were

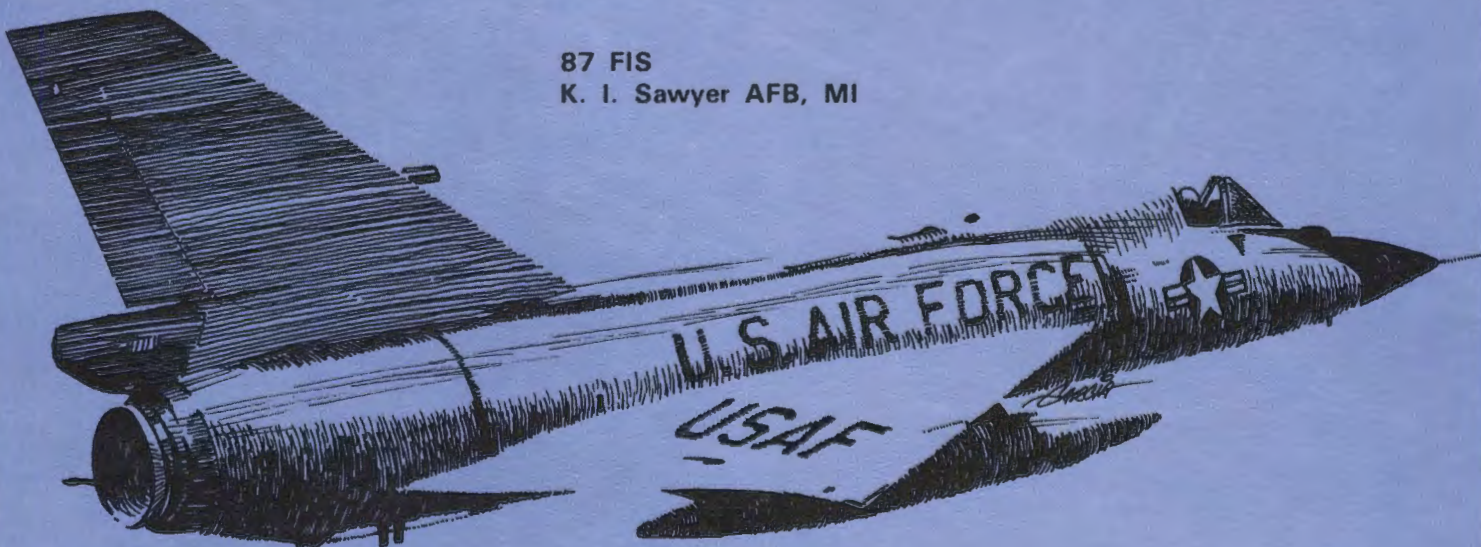
turned to direct manual and the generator and master electrical power switch were turned off to stop any electrical inputs to the flight control actuators. Since these actions produced no effect, he regained aircraft control with brute force. Control stick forces gradually returned to normal.

Captain Matthews then performed a controllability check. A roll to the right with a slight forward stick movement again caused the control stick to drive to the forward right corner. He regained control and configured the aircraft to determine if it could be landed safely. The aircraft slowed to 170 kts with no problems. Power was advanced and as the airspeed increased the nose was lowered; again the control stick drove to the forward right corner. Any forward movement of the control stick caused it to violently position to the forward right corner.

Captain Matthews regained control, trimmed the aircraft for level flight at 190 knots, and flew a straight-in approach using the rudder for runway alignment and power for glide slope. He established shallow descent rate and flew to a power-on touchdown. The drag chute was emergency deployed, the tailhook dropped, and the midfield BAK-12 engaged at 170 knots.

The flying skill and knowledge displayed by Captain Matthews prevented personal injury and loss of an irreplaceable Air Force aircraft. His actions qualify him as the Tactical Air Command Aircrew of Distinction.

87 FIS
K. I. Sawyer AFB, MI



The Sink Hole 10

THE SINK HOLE



It was good to see familiar terrain below him in the let-down even if it was only light patterns on the ground. He knew he could land VFR if he couldn't raise GCA, but he called again for one last try. At last the controller answered!

They exchanged the standard greeting . . . "How do you read?" . . . "Fine, how do you read?"

"Fine." Immediately the GCA operator, in a somewhat concerned voice, started saying he was 500 feet high and five miles from the runway. He eased back the throttle, leaned forward on the stick a bit, and started toward the glide path. Even with speed brakes in, he corrected rapidly. At two miles he was on glide path and stayed on it until just after the controller announced one mile.

As he ducked below glide path he noticed the VASI lights go red-red. He didn't look at them again. When the picture in front of him looked about right, he started back on the stick to flare for a smooth landing. A little correction to the left for wind and . . .

The nose came up abruptly. He released back pressure to break the stall and jammed the throttle all the way forward.

The aircraft touched down hard in the first five feet of the overrun. The left gear was dangling when he came back down on the runway. The drop tank held his wing off for a while, but when he went off the side of the runway the airplane was sliding sideways. The right gear folded outward. Finally all motion stopped.

He felt like crying.

There was no fire.

He unstrapped and got out.

There's a trap out there on final. Many of us who drive high-performance (high wing loading, low aspect ratio . . . call it what you will) airplanes

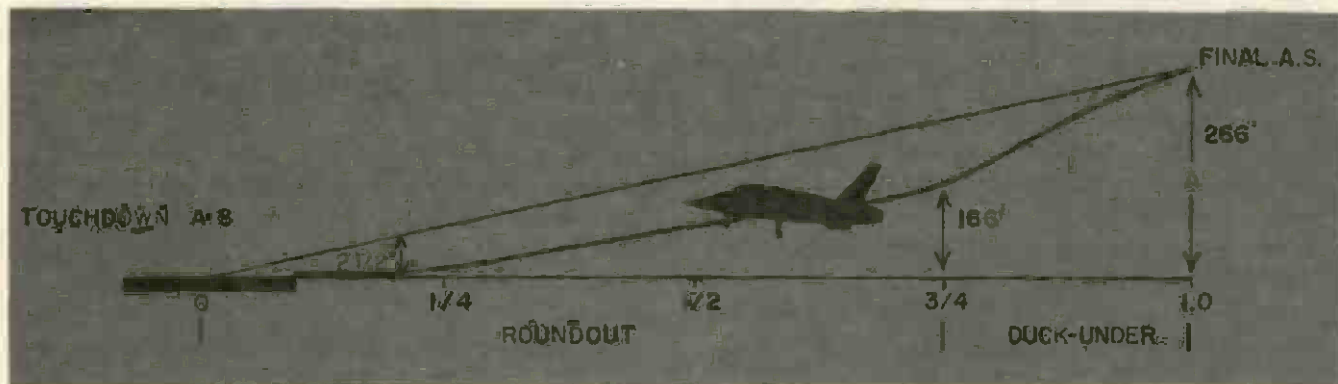
have fallen into it. No, we usually dive into it or let down into it. It's about a half mile out from the threshold.

The trap is where you get into a sink rate you can't recover from. Sometimes you can't recover even tho you recognize it immediately. You might call it a sink hole!

The path to the sink hole is not a straight line. It is not a "glide slope" as we think of it on GCA, ILS, or VASI. It is curved. Two curves. One curve starts at a position on or above "glide path" and descends to a point somewhere below it. Then the curve reverses. The second curve is the flare or round-out that decreases your descent to almost zero as you contact the runway.

You get into trouble right after the transition from one curve to the other . . . when the airplane realizes it doesn't have enough thrust to follow the path your eyeball has planned for it. And that's the other half of it, landing an airplane is still strictly eyeball. All the approach aids in the world will not land the airplane for you. They'll give you a lot of help during the approach to a landing, but you must land the airplane! The only landing aid you'll find in the books, or anywhere else, is what connects the stick to the throttle . . . the pilot!

Most of us dive below the $2\frac{1}{2}$ degree glide path at some point inside the mile-to-touchdown point if we expect to land in the first 1500 feet. After you dive below the glide path, you use the first quarter of the remaining distance to momentarily increase your rate of descent. Then you raise the nose to resume a normal sink rate and attitude. If you hold a normal glide path power setting, this will net you no increase in airspeed. The energy you gain in the dive will be dissipated when you rotate the nose up again.





the Sink Hole

When you reverse the curve and start the final landing arc, you are usually approximating a $1\frac{1}{2}$ to 2 degree slope instead of the $2\frac{1}{2}$ to 3 degree instrument approach slope you left earlier. It's worth noting that the angle of the final approach slope has decreased bit by bit ever since someone invented the term. While WWII Jugs and Spam Cans could handle a slope that was $3\frac{1}{2}$ degrees or steeper with impunity we're finding that the current crop of fighters land best . . . shortest, safest, gentlest . . . out of an approach that is somewhat less than two degrees.

Tests conducted by the RCAF revealed that their F-104s and F-101s which had been landing 1800 to 2500 feet down the runway from a $2\frac{1}{2}$ degree GCA were able to touch down 700 to 1000 feet closer to the approach end from a two degree glide path.

Part of the short, safe, gentle bit you can attribute to the fact that the flatter your approach angle, the less you must rotate your aircraft. Therefore, you fly the pre-flare approach closer to the ground . . . and can judge it more accurately. Also, by requiring less rotation to complete the flare, the flat approach introduces less drag increase at the last moment. You don't stick as much wing up into the wind. Less drag increase means either less power required or less sink . . . however you want to play it.

And drag is what the sink hole is made of. We've heard for years about the back side of the power curve and the area of reverse command.

They're no more than manifestations of drag. Basically it is drag that gets us into trouble on final approach . . . that makes short landings or hard landings. (hard landings are short landings that made it up to the runway).

Let's take the hypothetical case of a '105 (because the figures are right handy) and run thru an approach to see what we're faced with:

ASSUME

aircraft	F-105
gross weight	31,000 lbs
final approach speed	185K
touchdown speed	155K
glide path angle	2 deg
depart glide path	1 mi
wind	calm

As we said, the first 25 percent of the distance to touchdown sees us easing the nose down and increasing our rate of descent momentarily. Then we raise the nose to resume a normal descent rate. We don't lose or gain any airspeed because the energy gained in losing altitude is just equal to what we consume when we rotate the nose down and then up again. The last three-quarters of the trip down final becomes a circular arc as we decrease airspeed from final approach to touchdown speed.

Average speed in the F-105 for the last three-quarters of a mile will be 170K. This will eat up the distance in just under 16 seconds. Since we now have about 160 feet to lose, we'll have to average 10 feet per second . . . or 600 feet per minute.

We started the flare after diving down to a position that looked good to us (185 knots and

160 feet). Right there our total energy was 52,000,000 foot-pounds (kinetic energy plus potential energy). At touchdown, with 155 knots and zero altitude, total energy was 33,000,000 foot-pounds. We lost 19,000,000 foot-pounds somewhere along the line. Why? Because we were not carrying enough power to equal the drag of the airplane . . . we were descending. This unbalanced drag force over the flare distance absorbed 19,000,000 foot-pounds of energy. Put another way, drag exceeds thrust during a normal roundout by an average 4200 lbs.

If we carry more than normal power during flare, we will either land long or touch down hot . . . or both. If we carry less than the thrust required to maintain a 4200 pound drag excess, we will find ourselves with a higher than normal airspeed bleed rate. Uncorrected, that leads to early touchdown . . . or lowspeed instability problems when we hold it off too long trying to reach the pavement.

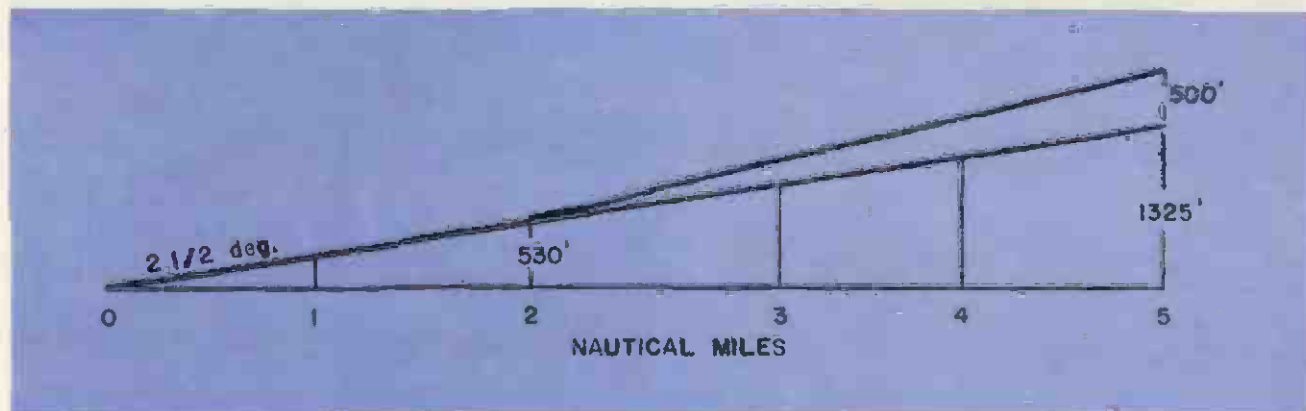
Now let's look at the example from the beginning of this article in the same frame of mind. GCA picked him up at five miles, 250 KIAS, and high, high, high on the glide path . . . like 500 feet. He decided to pull off power, leave the speed brakes in, and nose his 'Chief over to get down to the glide path. He reached glide path two miles from the runway with 185 knots . . . let's say he, too, was at 31,000 pounds gross weight. In that three miles he lost 1295 feet at an average speed of 218 knots. That's a vertical speed of 1600 feet per minute! It's also double the vertical speed he'd have needed on the same slope with speed constant. That's nice, you say . . . but he lost 65 knots in the process! That takes some pretty spectacular throttle chopping . . . with the boards still retracted!

FINAL AS	DEPART GLIDE PATH	AIRCRAFT
100-130K	1/2 NM	T-33, T-39
140-170K	3/4 NM	F-84, F-100
180-210K	1.0 NM	F-101, F-104, F-105

We asked some of the people who can figure these things out what kind of power this guy was carrying. They said about 84 percent after he left the glide path. Test reports and pilot experience say that something more like 88 percent is the minimum average power needed to complete a successful flare and normal touchdown from a 2½ degree approach at his weight.

Okay, that's only four percent less than he was holding, you say . . . not much! Do you know how much thrust he lost between 88 and 84 percent? You get 5400 pounds of thrust at 88 percent and 4300 pounds at 84 percent. This tells us the value of the total drag force acting on the airplane. As we showed earlier, the optimum difference between drag and thrust is 4200 pounds. This changes only when you change configuration or angle of attack.

So what does he get when he leaves his power at 84 percent through the flare? Drag (9600 lbs) minus thrust (4300 lbs) equals 5300 pounds of



the Sink Hole

thrust deficiency. We said a 4200 pound difference is ideal. He's 1100 pounds short in the go department. And it shows up as either a more rapid airspeed loss or, if he tries to hold airspeed, an impressively increased sink rate. Either way the results are the same. Very unfriendly.

How far can this pilot press thru his flare with power four percent low before he's in trouble? He's okay until he uses up the 19,000,000 foot-pounds of energy we figured he would normally use in the flare. Energy available divided by retarding force (drag excess) gives us the distance he will travel before his energy is used up. Plug in the figures . . . 19,000,000 foot-pounds divided by 5300 pounds equals 3580 feet. If he starts to flare at his normal three-quarters of a mile (4560 feet) from the runway, he'll slow to his 155 knot touchdown speed and descend to ground level 980 feet short of the threshold.

And that's where he came down . . . in the first few feet of a 1000-foot overrun!

What's that? He jammed on full power, you say . . . why didn't that stop his sink?

The J-75 takes six seconds to accelerate from idle to 100 percent. It takes about 2½ seconds from 84 percent. If his vertical speed was up to 1000 feet per minute when he decided to shove the throttle, he lost 40 feet in the time it took the engine to wind up to full rpm.

Once he had full power, he held the nose of the aircraft up just short of a stall. Let's say one degree above takeoff angle of attack . . . 12 degrees. How long would it have taken him to kill off his sink?

The downward energy of his 31,000 pound chariot was in the vicinity of 135,000 foot-pounds. The 13,000 pounds of thrust at 100

percent gave him a 2700-pound vertical thrust component at 12 degrees angle of attack. The bird lost another 50 feet of altitude before he leveled it off holding airspeed constant. He couldn't stop the sink in less than 90 feet from the time he advanced the throttle.

That's the story of the sink hole. It's made out of drag. And you can avoid it with thrust. But you must know the hole is there . . . and you must keep the balance between thrust and drag where it's supposed to be. The Dash One for your bird gives you recommended airspeeds for varying weight. And it gives you recommended throttle settings. Know them well!! Also keep in mind that these are often built on the assumption that you'll be on a three-degree glide-path. The throttle setting will give you enough thrust for the energy-exchange during flare. But if you've driven in for some distance on a flatter glide slope, better keep a wary eye on the airspeed meter. Be sure you're carrying enough power to keep you out of the overrun!

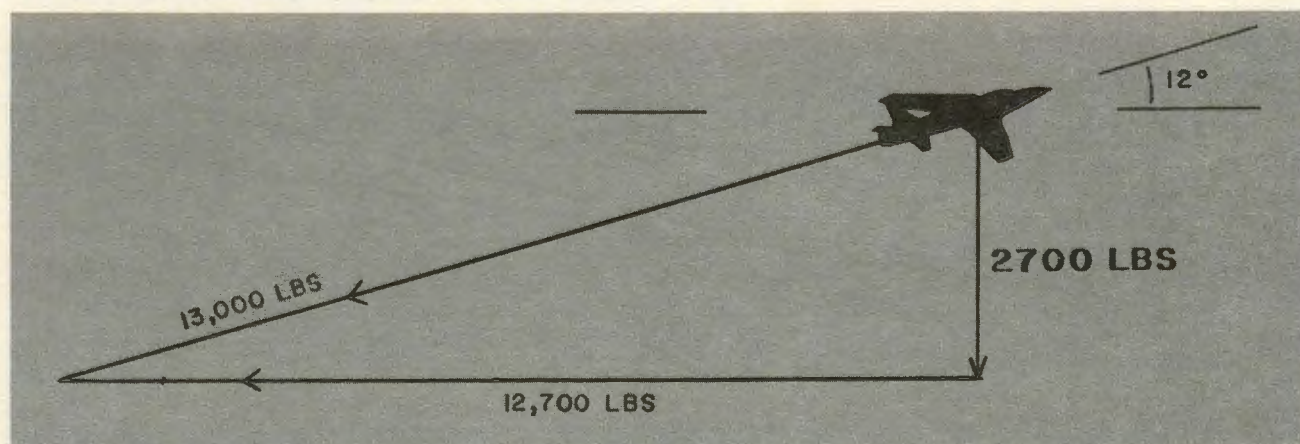
If you're shooting for the first 1000 or 1500 feet from an ILS, GCA or VASI approach, you'll have to "Duck Down." You can get down to the spot you want without touching the throttle if you've the proper power set. If you find yourself high, high, high . . . and pull off some power, be very sure you put it back on and then some to stop the sink you set up!

If you don't, you can be very sure you'll touch down hard or short . . . or both! ➔

References:

Check That Sink, Capt Stanley H. Becker
RCAF Ltr. 450-38CV(SASO), GCA Glideslope Angle
The Landing Phase, D. H. Stuck
And Then There Is Down, Talon Service News

November 1966





TAC SAFETY AWARDS

Crew Chief Safety Award



SSgt Billy J. Tate

Staff Sergeant Billy J. Tate, Jr., 834th Aircraft Generation Squadron, 1st Special Operations Wing, Hurlburt Field, Florida, is the recipient of the Tactical Air Command Crew Chief Safety Award for January 1981. On three separate occasions within a one week period, Sergeant Tate's alert actions prevented potential mishaps. On one occasion he pulled an Army passenger out of the way of a closing air deflector door; on another occasion he had the control tower stop a taxiing aircraft which had an open life raft door. He also observed a large foreign object on the runway during night operations and alerted the tower to its presence. Sergeant Tate's vigilance displays a safety consciousness which well qualifies him for the Crew Chief Safety Award.

Individual Safety Award

Senior Airman Steven M. Wood, 27th Equipment Maintenance Squadron, 27th Tactical Fighter Wing, Cannon Air Force Base, New Mexico, is the recipient of the Tactical Air Command Individual Safety Award for January 1981. Airman Wood recently climbed into the cockpit of a moving A-4 which had broken loose in a windstorm. The A-4 was heading toward another aircraft and Airman Wood was able to brake it to a stop in time to prevent a collision. This alertness is typical of Airman Wood's professionalism as he supports the transient needs of many different types of aircraft. His safety consciousness and outstanding daily performance qualify him for the Individual Safety Award.



SrA Steven M. Wood

TIPS

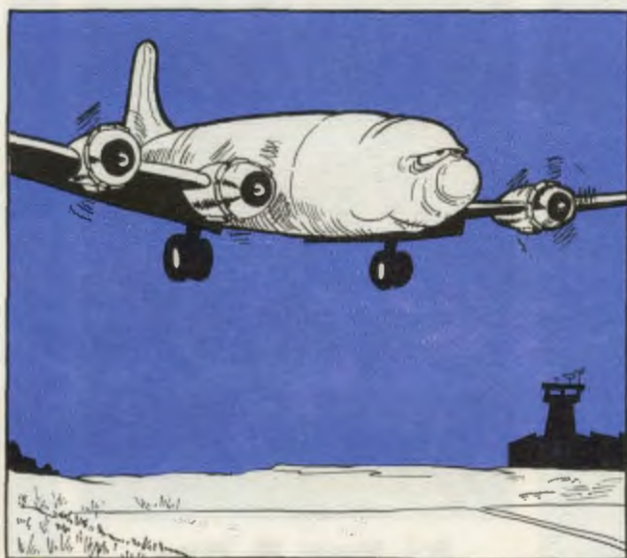
TAC Tips

"The board felt that the pilot's action in failing to order evacuation of the aircraft and in being the first to deplane was not in keeping with accepted practice for aircraft commanders."

January 1972

SPEED VS ALTITUDE

Several years ago the FAA took motion pictures of several hundred scheduled airline landings. All types of transport aircraft were involved. An analysis of the movies revealed two facts, both of which are important in the prevention of overshoot accidents. In computing required runway length for landing it was presumed that the aircraft would cross the runway boundary at an altitude of 50 feet. It was found that the majority of pilots were doing a consistently excellent job. The average altitude at the boundary was 21 feet and very few pilots were higher or lower. This was considered good. Also, in computing required runway length for landing it was presumed that the aircraft would cross the boundary at a certain speed which was a function of the stalling speed of the particular aircraft. Of



...interest items, mishaps with morals, for the TAC aircrewman

course, this speed should vary for gross weight and the FAA correlated the actual weights of the aircraft they photographed. The results showed that in contrast to the high level of skill demonstrated in crossing the runway boundary at consistent and safe altitudes, pilots were very sloppy about speed control. The spread of speeds was terrific even when headwind and turbulence were influencing factors. One in 20 pilots was going at least 20 knots too fast over the boundary and one in seven was going at least 10 knots too fast. Ten knots excess speed is equivalent to being 100 feet too high over the boundary. Most pilots would normally abandon their landing if they crossed the approach end of the runway 200 feet too high, but few realize that they are in the same fix if they cross the approach end of the runway at the proper altitude but going 20 knots too fast. Pilots should not get into the habit of making faster than normal approaches just because they have a lot of runway ahead. Someday they may have to land on a short field and it may be very difficult to break away from the fast approach habit. However, with turbulence and a headwind, it is generally necessary to use a little excess speed and/or power. The point is: pick the touchdown point and fly the proper airspeed all the way down to it or go around and try again.

April 1961

BAD BRAKES, OR BAD BRAKING

The O-2 driver tried two takeoff runs and aborted both times. His acceleration didn't satisfy him and he suspected a dragging brake. Each time he returned the crew chief checked brake assemblies and power plant performance, but found no deficiencies. A test flight crew took over and an hour and a half later decided on a high-speed taxi test after finding no outward evidence of brake malfunction.

After several turns and brake applications they

didn't see or hear any signs of brake drag at ramp speeds. And engine output appeared okay. So, they figured the next step was a higher speed check on the runway. They started at midfield on the 3000-foot strip and tested left and right brakes. No evidence of dragging on that run so they reversed heading and started down the full length of the runway at takeoff power. At about 60 knots, the pilot pulled throttles and stepped on the binders at 50 knots with 1500 feet remaining. Again, they discovered no power or braking problems. Then they decided on one more conclusive check of the O-2's power and braking.

Holding brakes at 2200 RPM on his pusher-pullers, he released and checked engine instruments and acceleration up to about 45 knots. Then he retarded throttles and braked down to a high-speed taxi of 30 knots (winds unknown). Passing midfield, he elected to roll out to the end of the strip. With 800 feet to go he applied brakes to slow down and turned off the runway. By this time there was nothing remaining; he shutdown engines as he rolled off the runway, brake pedals horizontal. A mound of dirt sheared the nose gear; the nacelle and front prop burrowed in the dirt until the tired bird slid to a stop. The crew stepped out unharmed.



The unit wants Dash One amplification on procedures used after heavy braking. Meanwhile, they're requiring a 15-minute cooling off period after each excessive use of brakes, or takeoff abort.

This will avoid future taxi-test-to-destruction efforts by enthusiastic aircrews . . . and provide interim braking guidance until engineers design that perfect aircraft braking system that never heat fades.

August 1970

TAC ATTACK

EXPLOSION

A couple of T-Bird pilots were driving their machine at 41,000 feet one day recently when the occupant of the rear cockpit decided to lower his seat. This casual action triggered a chain of events that they will probably remember for a long time. When the rear seat was lowered it crimped the oxygen hose. The pilot realized what had happened and immediately raised the seat, but this had no effect on the oxygen hose—it remained crimped. He pulled the green apple to activate his bailout bottle and restore oxygen flow to his mask. During his movements in the rear seat he had unknowingly situated the lanyard to his life raft in such a position that it too was activated when he straightened up in the seat. The pilot in the front cockpit heard a loud explosion as the compressed air bottle inflated



the dinghy and another explosion when the dinghy burst from overinflation in the confined area of the ejection seat. The second explosion was accompanied by a billowing cloud of white talcum powder which filled the canopy and both cockpits with what appeared to be smoke. The pilot in the front cockpit immediately stopcocked, figuring that the engine had exploded, or some other failure had occurred that was equally serious. Of course the silence that followed was deafening. The pilots discussed their situation, accomplished an airstart and returned to their homedrome for landing. -5th AF Safety News

April 1961

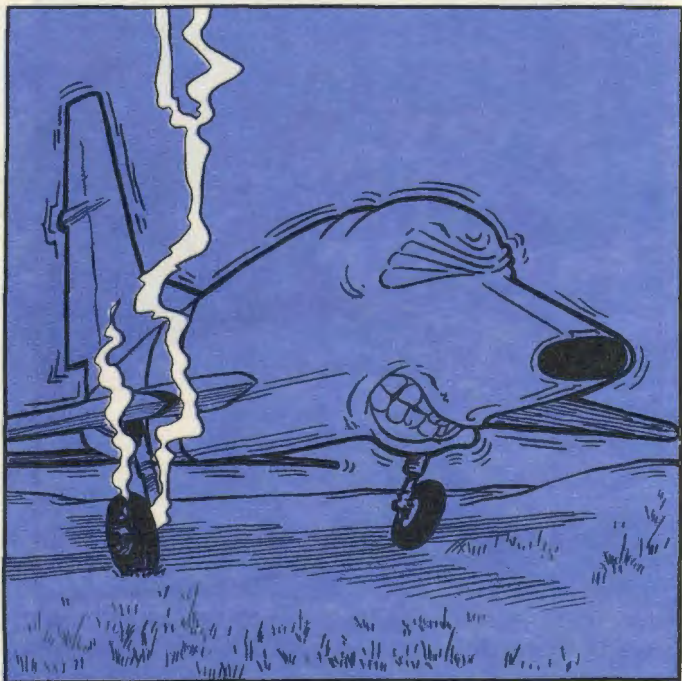
TAC TIPS

TOO PROUD?

Landing at a strange base on a flight away from home, the F-100 pilot found he couldn't get his drag chute to deploy. He cycled the handle three times, but the chute wouldn't come out.

Approaching the far end of the runway, he felt he could turn off without trouble. He thought about the barrier briefly, then dismissed it. He left his speed brakes down, his hook up.

But when he reached the last taxiway, he was still too fast to turn. He crossed the BAK-9 and rolled into the overrun. And his extended speed brakes deflected the MA-1A cable.



When he finally stopped, he was 500 feet into the overrun. And his right brake was on fire. It took the maintenance folks 30 manhours to replace the nose tires and the main gear tires and brakes.

Like many others before him, this troop didn't want to look silly . . . calling for someone to come and raise his hook after he turned into a taxiway. But that would have looked a lot better than sitting in the overrun and calling for fire trucks.

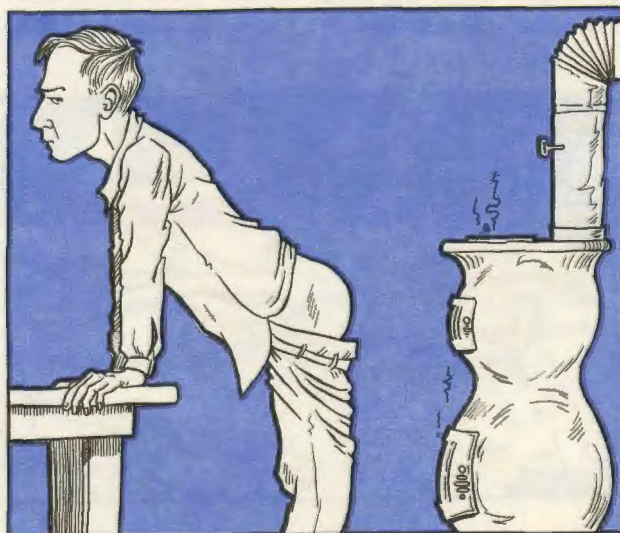
February 1968

DAMP DERRIERE

After a heavy snowfall, early morning ramp temperature dropped to five degrees below zero. Having departed warmer climes two days earlier, our transient Phantom phlyers wore winter underwear, summer flying suits, and jackets.

Transient alert needed help launching airplanes that morning because snow removal created slowdowns. As good TAC types do, the aircrew pitched in and helped ready their birds. A helpful flight medical officer riding one Phantom's back seat helped remove chocks on four birds. Slippery footing on the icy ramp forced him to sit in snow while kicking loose frozen-down chocks. In the process he acquired a wet flight suit and a damp derriere. Also, two frigid nights cold soaked the Phantoms and, subsequently, the phlyers' posteriors.

During a refueling stop about two hours later, our friendly FMO felt a burning irritation. On arrival at home his discomfort aggravated to the point where he preferred to stand rather than sit. Diagnosis was frostbite . . . in an unaccustomed area. Fortunately, it resulted in only a week of "standing operating procedures."



Wearing wet flight suits in subzero temperatures is a known invite to frostbite. And it's also true that bulky winter flying gear in a fighter's crowded cockpit cuts crosscountry comfort considerably. But for your own survival, when you head toward frozen lands from TAC's warm winter resort areas wear your cold weather clothing. And like our minuteman forefathers: Keep your posterior dry!

November 1968



FORMATION COLLISIONS
ACCOUNT FOR
MOST OF OUR
MIDAIRS
AND
ARE CAUSED
BY...



... PILOTS PUTTING TOO
MUCH ATTENTION IN THE
COCKPIT !!



NOT
FLYING AS
BRIEFED !!



OVER-
EXTENDED
WINGMEN !



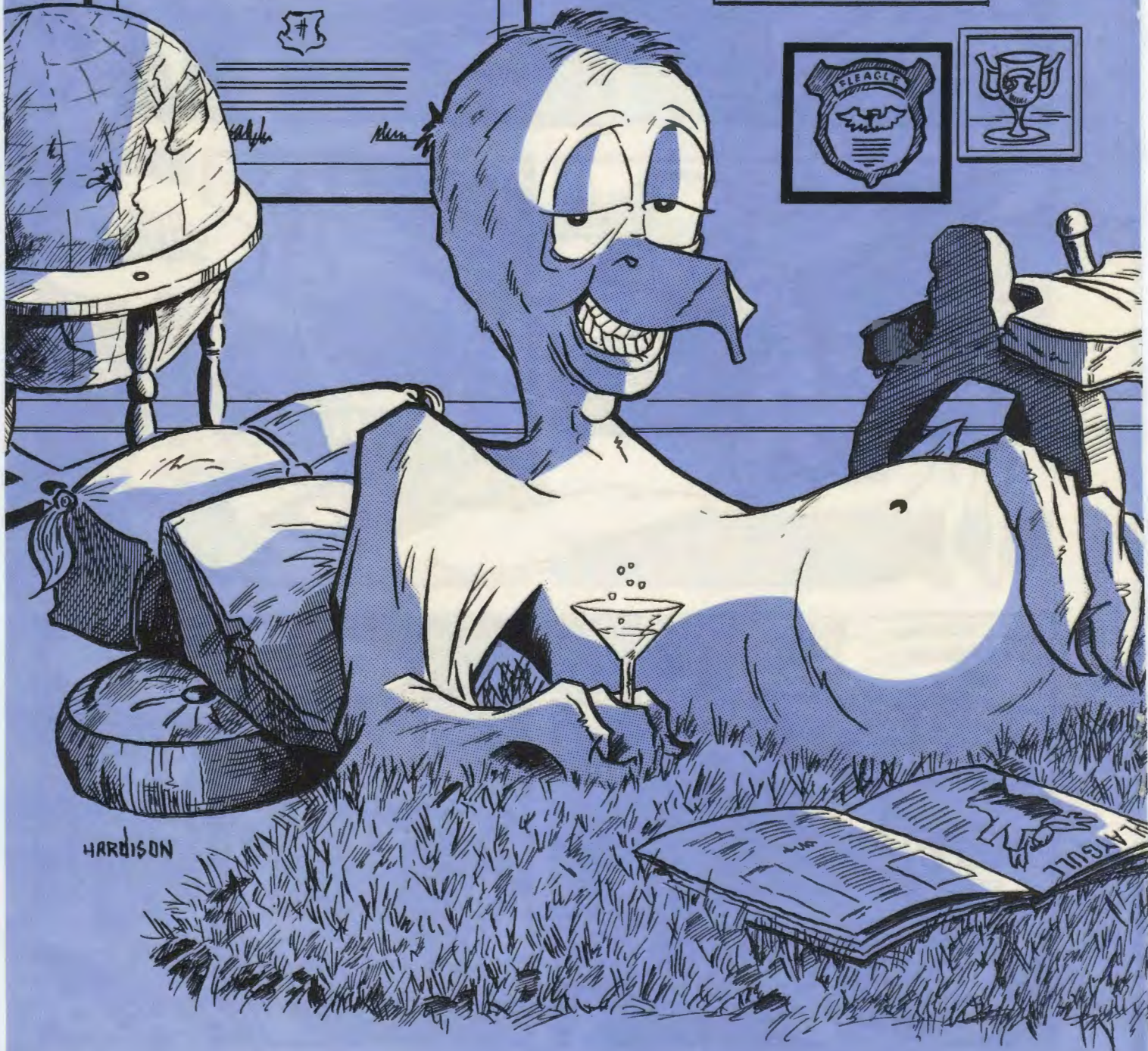
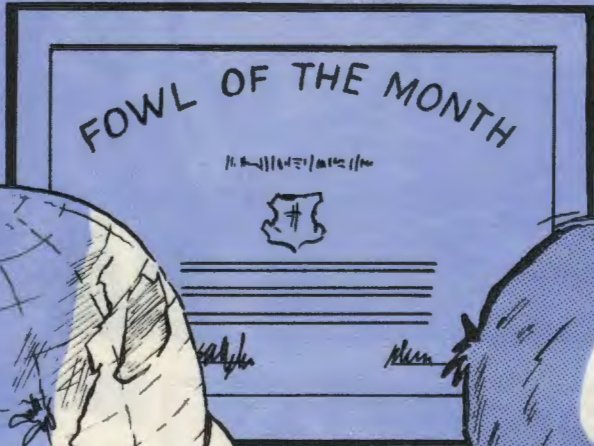
NOT
FOLLOWING
LOST WINGMAN
PROCEDURES
AFTER GETTING
SEPARATED !!



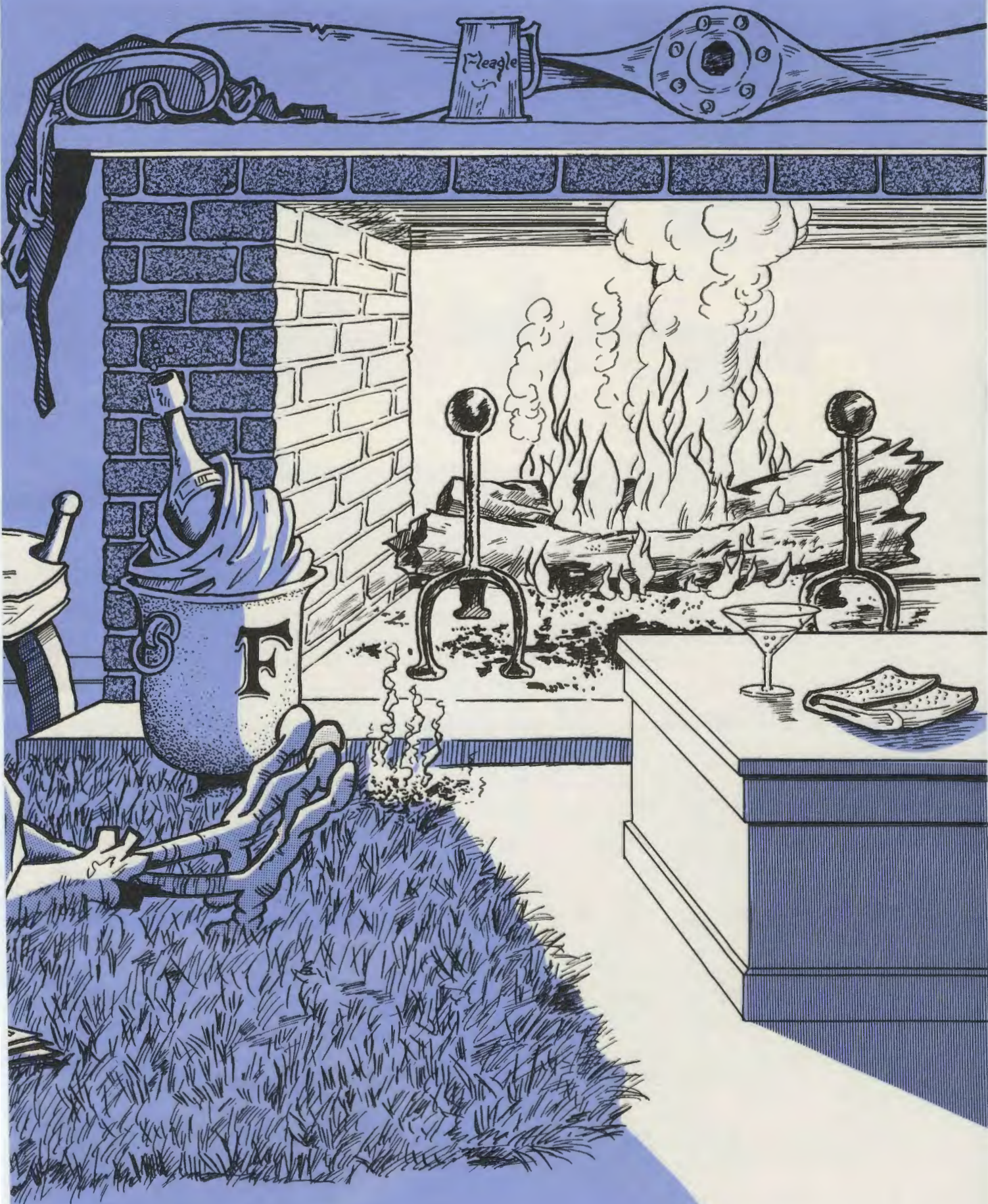
AND NOT BEING
POSITIVE WHEN CHANGING
LEAD !



FIGHTER BIRDS
DO IT
BETTER



HARDISON



Daddy's Gonna Take Me For An Airplane Ride

By Captain Jack C. Doughty
614 TFS, England AFB, LA

I had just stopped in the stag bar for a quick cool one when this lieutenant type eased up beside me. There was something of a whipped puppy look about him as he pushed his empty glass across for a refill.

"Have you ever been embarrassed?" He looked at me.

I turned and shook my head.

"No? I mean really embarrassed!" He was half talking to himself, so I let him go on.

"Isn't it a miserable feeling?" This time he addressed himself to his glass as the bartender slid it toward him.

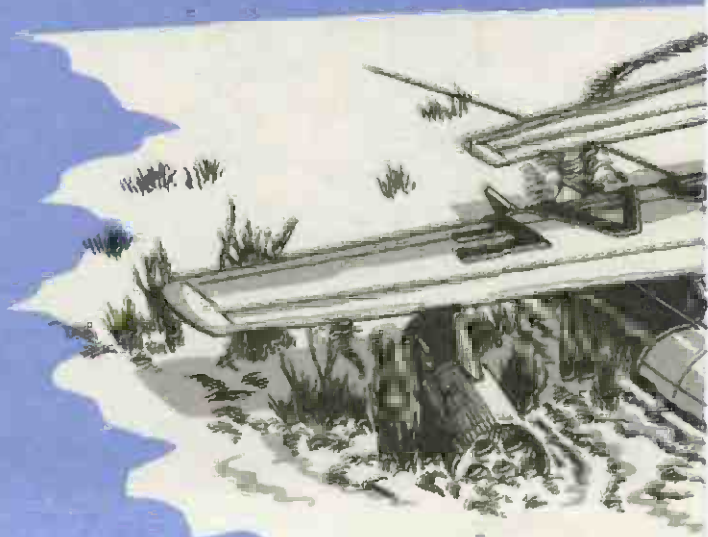
"Let me tell you how I got myself into one of those 'I wish I would have gone in with the airplane' experiences. And I never even got it as far as the runway. I'm over here enjoying an all expense-paid Turkish vacation. The squadron's been here for a month and I'm feeling that I know as much about the local airdrome and the flying area as wingmen are allowed to know."

He saw my attention was wandering and nudged my arm. "Now, today was the blackest of black days. When I arrived at the squadron I saw I was scheduled for a two-ship range mission with one of the senior types. It looked like a fine mission, my first chance to fire rockets."

"The briefing was normal and I remember Lead saying that prior to taking the active, we'll stop to pick up a load of rockets. Right there I should have asked where the arming area is . . . like the heading and all . . . but I didn't. I had that old, 'Daddy is taking me for an airplane ride,' attitude. I figured I'd just tag along and do whatever he did."

This might become an interesting story, I thought, so I ordered two more and settled down to hear him out.

"Then I hit a snag," he continued. "Lead aborts in the chocks. And he gives me the sign to press on alone. This is what I always dreamed of . . . a chance to lead a flight even if I'm the only member. In my most authoritative voice, I called for taxi instructions and waved to my contemporaries as I began my short mission."



"As I approached the runway, I spotted several airmen holding rockets and an ohm meter. Being rather clever," he looked up at me. I shook my head and he continued "I deduced that the arming area must be close at hand. I checked my switches off, opened my canopy all the way, and pulled in facing them."

"When I rolled to a stop, the airman in charge waved his hands to tell me I'm 180 degrees out of phase. I frowned in disgust and began to turn the airplane around."

He paused long enough to take a long swallow from his glass and went on pensively, "I'm not sure why I frowned and shook my head, but I've seen the old heads do it when they make a mistake and I figured it must be the thing to do."

"After I turned the airplane around on the narrow taxiway, the airman gave me a small smile of gratitude. At least I was on the right side now! Then he pointed to the C-130 that was in front of

my rocket tubes. He waved his arms again and I figured he wanted me to make a 360 so the tubes would point into the clear."

I was beginning to lose track of his narrative and wondering what the point of it all would be. But he kept doggedly on.

"Since I was fairly close to the edge of the taxiway, I had planned on a right turn to take the active. But the airman signalled me to make a left turn. It didn't take me very long to realize this had been a mistake. In fact it was sickening . . . that sinking feeling when the right main went off the concrete. It buried itself almost to the rim in the mud."

He was re-living the whole episode now . . . feeling the chagrin. It was almost as if he was punishing himself by telling me his story.

"I was ready to coax that airman into sitting on my lap while I ejected . . . when the whole damn squadron taxied past."

"My flight commander gave me one of those 'wait till I get you alone' looks. And the Ops Officer seemed to be saying, 'I'll make you assistant laundry officer at a spot so remote you'll come here for R&R.' Everyone else was snickering."

He suddenly came back to the present, drained his glass, and pushed away from the bar.

"I think I'll go lock myself in my room . . . maybe I'll never come out . . ."

August 1966



chock talk

tire neglect tragedies

Would you handle TNT as casually as an old tire? Some people have. Of course they don't talk much about it. They're gone. Would you handle an old tire like TNT? A lot of people do. They can tell you about it because they've been around for quite a while.

An inflated tire contains inherent energy which can generate a force as destructive as TNT. The two following stories show how easy it is to trigger a compressed air explosion with tires.



A tire was to be replaced on a century-series fighter wheel. The wheel arrived at the tire shop at the end of the duty day so it was placed on an assembly bench to be the first order of business for the following day.

The next morning, the shop supervisor directed an airman to "change the tire laying on the assembly bench." The airman started the dismantling process by cutting the safety wires. When he had removed three-fourths of the bolts, the rims snapped open like a clam shell. The escaping pressure shot the wheel toward the ceiling

*...incidents and incidentals
with a maintenance slant.*

and knocked the airman to the floor. An unidentified object struck his head causing concussion and laceration above an eye.

His mistake? He had assumed the valve core had been removed. It was SOP that wheels delivered to the shop would not be accepted unless the tires were deflated. It is doubtful that this airman would have dismantled a gun without first checking to see if it was loaded.

An NCO, while on annual leave, was helping a relative landscape a residential construction site. The job called for using a road grader, which they had rented from a construction firm. It was loaded aboard a flatbed truck.

On the way to the site, they stopped to have the grader serviced. The NCO, believing one of the tires to be low on pressure, climbed aboard the flatbed and applied a pressure hose, gauging the tire pressure by eye-balling the slowly vising tread.

He over-pressured the tire. The rim was blown from the wheel with such force that the NCO was thrown bodily from the truck. As he neared the ground, his head struck a concrete block wall, but the resulting concussion was only one of his fatal injuries. The flying rim had broken the sergeant's arm, fractured his jaw, and lacerated his neck from ear to ear.

The NCO's mistake was guessing at the proper pressure instead of determining the manufacturer's recommended pressure and checking it with an accurate gauge.

In these two examples, one tire was large, one was small, one was high pressure, one was low. Both led to disaster. The explanation is simple. Total energy is a combination of pressure and volume.

When handling a wheel mounted tire, think of it as TNT. It's a realistic comparison. An exploding tire on a fighter's main gear can create a force comparable to at least two hand grenades. And an exploding C-130 main gear tire can generate a force equal to about a half pound of TNT, or several grenades.

The next time you change a tire, take a second look . . . it may be loaded!

May 1968

lackadaisical launch

A T-39 maintenance supervisor assigned a routine maintenance check to a five-level staff sergeant and a three-level airman. The men taxied their bird to a run-up area for required fuel burn off. Soon after advancing both throttles to 85 percent, the aircraft moved forward, out of control. They finally came to a stop against another bird. About 100 hours work will put both ships back in shape.

A collateral board was set up to consider the following:

a. Sergeant did not consider fuel burnoff task same as engine run-up so he did not use run-up checklist, chocks, or tiedown bridle.

b. He set parking brakes and advanced both throttles to 85 percent.

c. While monitoring gauges he decided to add additional braking with toe pressure (not knowing this would release parking brakes).

d. When aircraft began to move, the sergeant applied more brake pressure and tried to engage nose wheel steering. He panicked when neither worked and appeared to be failing.

e. The T-39 traveled more than 200 feet, including nearly 100 feet of heavy skid marks which resulted in left tire failure.

f. Immediately before impact with the other aircraft, the airman pulled throttles from 85 percent to off.

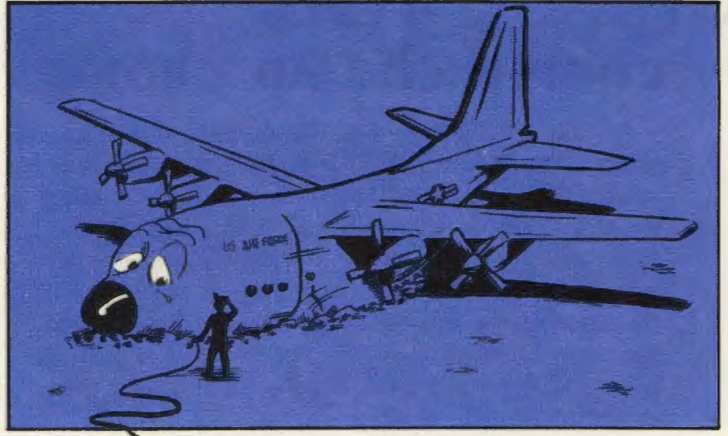
g. When assigning the task, the supervisor knew that it was the sergeant's initial attempt to perform the check without supervision. No briefing was offered.

July 1969

haste can hurt

The other day I was talking to an old friend who was here on TDY. He told me a tale that proves the old saying, "Haste Makes Waste." Now Tom may have stretched this tale a wee bit, but it's still plausible. It certainly could have happened as he told it.

It seems one day a Herky was making a landing on one of the short dirt strips up country and she hit something on the approach that wiped out the main gear. This old bird came to rest right smack in the middle of the strip.



Now, it was essential to get the strip open as quickly as possible. There was plenty of equipment being flown in. The only thing available to move the aircraft belonged to an engineer outfit, so they volunteered to move the bird. They dispatched a crew and a large bulldozer with necessary cable to do the moving job. The head man cleared the area and he and his crew went to work.

The first thing that struck their eyes as a towing point was the nose gear. They hooked on to the nose and pulled it out . . . the nose gear, that is.

Next they went around to the rear and ran a cable through the paratroop doors and out to the dozer. The operator took a little run for it to get it started. Guess what? Yep, that cable cut right through the side structure and out of the cargo door ripping out hydraulic components and wiring as it went.

Defeated, they went again to the nose and ran a cable through the cockpit swinging windows. You can imagine what happened there!

At this point one of the crewmembers suggested they consult the aircraft Dash Two tech order for an anchor point. Sure enough, there it was . . . attached to the 75,000 pound tiedown points in the cargo floor. They used this and successfully removed the old aircraft from the airstrip . . . but not before she was reduced to Class 26 material. All because of HASTE.

Old Tom didn't elaborate on whether anyone was injured during this operation, but the potential was surely there.

"Haste Makes Waste" has been proven down through the ages. And it is still true today. Haste only creates havoc with our aircraft and equipment. In almost every accident, haste is a contributing factor.

September 1967

chock talk

chomp chomp chomp

A T-38 pilot stopped in the chocks and began his shutdown checklist. An additional crew chief approached from the left and removed the pins from the refueling pre-check compartment. He separated them and while still kneeling under the bird, tossed the pitot cover toward the nose of the aircraft. He then tossed the nose gear pin to the crew chief at the nose. The pin took a detour while passing the left engine intake and was ingested. What's next?

May 1971

missing check list

A MSgt, SSgt, and an Airman First were watching as an Airman Second prepared to transfer an AGM-12 missile from a maintenance stand to a missile trailer. While Airman Second positioned the forklift, Airman First fastened the left tie down strap on the missile cradle. MSgt and SSgt were supervising from opposite sides of the forklift.

On the first attempt with the forklift, they found the missile misaligned for proper lowering to the munitions trailer and directed Airman Second to back off and try again. As he backed off, the unfastened right tie down strap caught on the trailer. Before they could stop the forklift, the missile and cradle slipped off the tines of the lift. All three men tried to catch it and managed to slow it down somewhat . . . it landed on the steel-toed safety shoes of Airman First. Neither missile, shoes, nor toes received serious damage.



The report cited supervisory error because MSgt was not using a checklist and missed the caution note that could have prevented the mishap.

June 1966

who done it??

The phyler was on GCA when he saw a utility hydraulic pump lite come on and the left engine oil pressure drop. He shut down the Phantom's left engine and made a successful single engine landing back at home base.

When maintenance investigators got into it, they found the left engine utility pump was broken at the six mounting flange studs on the transfer gear box casing. The hydraulic mounting adapter and gear assembly had disengaged from the scavenge pump, allowing oil to pump overboard. After they pulled the engine, the engine troops discovered that four of the mounting adapter flanges had been broken previously and the broken surfaces were worn smooth. Two of the flanges broke on the last flight.

Suspecting insufficient torque, they checked breakaway torque on two of the mounting nuts and found they broke loose at 125 inch pounds. The engine TO called for 190 to 230 inch pounds.

July 1966

F-4 foreign object

The aircraft had just completed an FCF. Near the end of the landing roll, the pilot attempted to use right rudder—but it wouldn't move! They found a three-eighths universal socket lodged under the rod system bellcrank inside panel 21L. All available records were researched, indicating that no maintenance had been performed in this area by unit personnel.

Checking further they found that the screws on panel 21L had been put on with an air gun. Since the paint was still intact they deduced that this panel had not been removed since the last IRAN (8 months previous) or Pacer Wave (9 months).

That leaves us with the thought that an "undetermined" accident has been looking at us for some time. We have enough problems without incidents such as this. Doesn't everyone count their tools???

February 1971



The Old Sarge knocked the ashes out of the new corn cob pipe and glared at it before shoving it in his pocket. He wondered just how long it would take before it tasted and felt as good as the old one. Even then it wasn't as bad as the expensive metal and briar affair his kids gave him for Christmas. He shuddered; between it and the mild sick-sweet smelling tobacco his wife had given him, he'd just about quit smoking at home. It'd got so that he'd take a walk whenever he wanted to smoke . . . even tho'the new corn cob wasn't as good as the old.

Arriving at the hydraulic shop, he stomped the snow off his feet before going into the heat of the office.

"Hi," a white-haired Master Sergeant said, his pale grey eyes peering over heavy framed glasses perched just below the bridge of his rather large nose. "You slumming again?"

The Old Sarge grinned, shoved some papers to one side and sat on the corner of the Master Sergeant's desk. "George, when are you ever going to clean up this cotton pickin' desk. It looks like a turkey roost."

"Aah, you're a fine one to be talking. With the clutter on yours, you couldn't find the telephone and had to come over here to spoil my whole day."

The Old Sarge snorted, "So! I've a spy in my office. You know why I'm here."

"Trouble, of course."

The Old Sarge nodded. "Nickle Four Deuce, that clunker that we picked up a short while back. You fixed the nose gear uplock assembly and it didn't stay fixed. Drooled some of your nasty fluid all over my clean ramp. We sent it back and if my timing is correct, we should be able to catch your man reassembling it. . . that is if you'll get unglued from that soft chair."

A look of immediate interest flickered thru the pale grey eyes. "Nag, nag, nag. My good clean fluid spilled on your filthy ramp. Your story is enough to make me ill. Where the thunder's my glasses?"

"I haven't the slightest idea," said the Old Sarge.

A short time later, the two were apparently lost in idle conversation, holding half filled coffee mugs by the doorway of the hydraulic shop. After a bit, the Old Sarge nodded his head towards the bench where a young Airman Second was starting to install an O-ring. George glanced at the Airman and walked over to the bench. Very quietly he asked, "Harold, did you check the TO on that before you started?"

"Ah . . . well, I ah, I checked it the last time I installed one."

"You made sure of the part number for the O-ring?"

"Oh yes sir," more brightly, "I compared it with the old ring."

"Oh?" George peered over his glasses again, "Did you check it against the part number listed in the TO?"

"Well, ahh, no sir I didn't."

"I think you'd better . . . and . . . when you're looking it up, read the assembly instructions. I think you'll find that you're supposed to cover the threads with cellophane tape before running the O-ring over them." His voice remained gentle with a note of firmness in it. "If you'd checked the TO last Wednesday, you wouldn't be working on this assembly again. It's the same one. Don't ever trust to memory . . . use the TO, you'll save time in the long run. I see you did use some of the fluid from the system it'll be working in to lubricate the ring before trying to install it. And you did check to make sure it wasn't twisted. But, besides running it over the unprotected threads, which could nick it and make it leak, you had to stretch it quite a bit. That's why I'm certain you have the wrong size ring. Do you understand?"

"Yes sir."

"One thing more, don't call me 'sir'. Save that for officers and decrepit types like my friend here, the Old Sarge."

January 1962

THE DYNAMICS OF

zoom

the dynamics of zoom

As you pull up from the strafing pass, you push your throttle to full military. You feel the engine respond and see RPM passing 95 percent.

Then suddenly the thrust is gone! RPM is decreasing! Exhaust temperature is 300 degrees as RPM winds down past 90 percent. Fuel flow is 200 pounds.

You pull back on the stick, grabbing for altitude. You race through the airstart procedure.

The flameout occurred about 100 feet above the ground. You had 400 knots. That airspeed carries you to 1500 feet above the terrain while you try to restart the engine. As airspeed unwinds past 190 knots you try your third airstart. Finally, you release the stick and concentrate on ejection. The bird noses over slightly, still losing airspeed and building an impressive, but unnoticed, sink rate.

When you eject, the airplane is about 750 feet above the ground.

Your life-saving equipment all works perfectly. You find the handle and squeeze the trigger without delay. The canopy separates immediately. Your lap belt doesn't open prematurely . . . everything is automatic. You separate quickly from the seat. And your parachute inflates promptly . . . without twisting or looping suspension lines over the canopy.

When you look down, you see that you're de-

scending into the exploding fireball that was your airplane.

You wouldn't do that, you say? You wouldn't wait until 750 feet after you had zoomed to 1500 feet? More than one recent ejection went just about the way we've described it here.

None of us really mean to wait until we're down to 750 feet. But many of us could be trapped as the pilot was in our example. His attention was primarily on the altimeter. When he saw he couldn't get much more than 1500 feet, he set about ejecting. And by that time, he had little margin for malfunction.

And he could have broadened that margin considerably if he had ejected at 750 or 1000 feet in his zoom . . . before he ever reached 1500 feet!

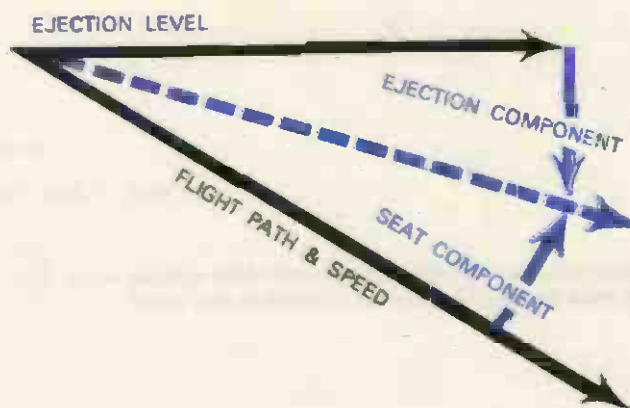
We don't hesitate to zoom from low altitude as soon as we find ourselves in trouble. But too many of us misunderstand the purpose of the maneuver. Let's examine ejection from the zoom and see what exactly is involved.

The ejection seat separates you from the airplane with a predictable trajectory. At any given airspeed, this initial trajectory will be essentially the same in relation to the airplane regardless of your altitude, pitch attitude, or bank.

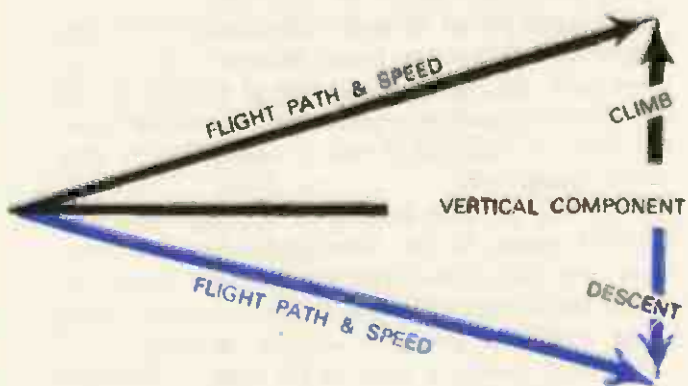
So your movement after ejection in relation to the ground (this is what you're most interested in) will depend on your airplane's direction and speed at the moment you eject. You and your seat are traveling in the same direction and at the same speed as the airplane when you leave it.



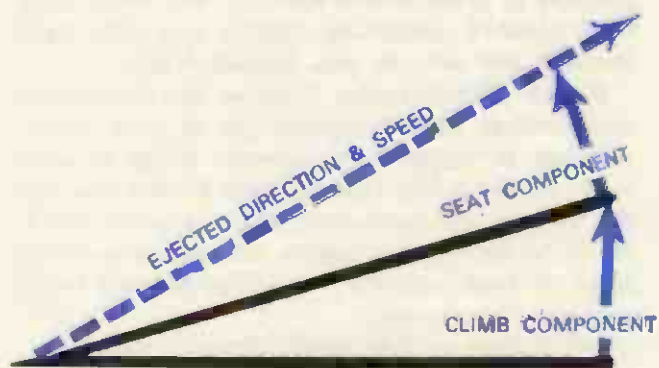
1. In an ejection from a flying airplane, the speed and direction of flight are often more important than the ejection itself.



3. If the initial velocity downward equals or exceeds the initial velocity of the seat, the net effect is like having no ejection seat . . . or even a downward ejection.



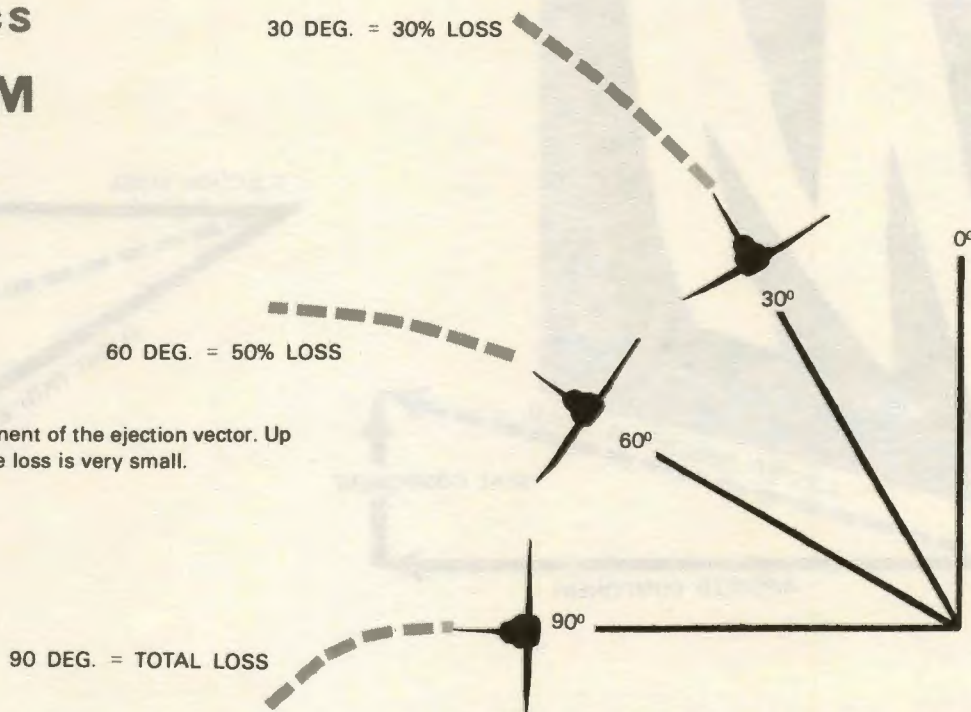
2. If the direction of flight is above or below the horizon, there will be an initial velocity up or down . . . which is added to or subtracted from the initial velocity of the ejection seat.



4. The zoom maneuver provides initial velocity upward. This is added to the initial velocity of the seat, thus increasing the peak height reached by the seat . . . and the total time in trajectory.

the Dynamics of ZOOM

Bank reduces the vertical component of the ejection vector. Up to bank angles of 30 degrees, the loss is very small.



This direction and speed . . . call it a vector . . . is the most important factor in determining the success of your low altitude escape.

If your aircraft vector is level and its speed is above about 120 knots, your seat trajectory will be just about what the manufacturer advertises. The seat will go up x feet, at y feet per minute. You will separate from the seat while you are above your ejection altitude. And if the seat is capable of ground-level ejection, you will have a fully inflated parachute before you fall back through the altitude you ejected from.

If your aircraft vector is below the horizontal, and vertical (down) component of that vector matches or exceeds the upward thrust of your seat . . . the x feet that the seat throws you will not take you above the level at which you ejected. All it can do in this situation is temporarily arrest some of the downward momentum you had when you left the airplane.

But if your aircraft vector at the moment you eject is above the horizon, the vertical (up, this time) component will add to the upward thrust of your seat. Your trajectory will be higher in relation to the ground. And you'll have more time for the parachute to open.

In a very low ejection, a level flight path gives you minimum margin for malfunction or delay.

You can usually increase that margin by gaining altitude. If you have the airspeed to climb 1500 or 2000 feet, you climb. And then you aren't faced with that "very low" ejection any more.

But what about the situation from which you can't climb? Suppose you flame out on GCA final . . . with all the garbage hanging out?

Now you zoom!

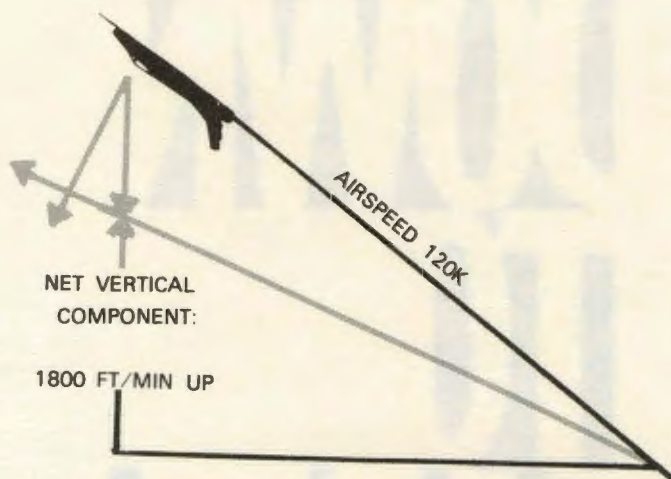
And you don't zoom for altitude!

You zoom for an upward vector and a favorable trajectory. You have been descending on the glide path. Any decrease in rate of descent at the moment you eject is in your favor. If you can level the bird, or establish a rate of climb, you're that much better off.

One way to look at it is to say that you add another factor to the manufacturer's specifications. He guarantees that the seat will come out of the top of the airplane at y feet per minute. You must add your aircraft's vertical velocity.

If you're riding a non-rocket type of ejection seat, it will come out of the airplane at about 3600 feet per minute. Any time that your airplane is descending at a vertical speed greater than that, you'll come out of the top of the fuselage, but you won't go up very far . . . you'll just continue to go down at a lesser rate while you wait for the chute to blossom.

You could eject inverted in a 30-degree climb at 120 knots and still continue climbing. The vertical component of the seat thrust would be 2100 ft/min down. And the vertical component of your aircraft vector would be 3900 ft/min up.



The rocket seats in the T-33 and the F-100 give you a boost of about 5400 feet per minute. Even that's not very impressive when you match it against the descent rates that these birds can generate when the engine quits.

But you can decrease that horrendous down vector if you act before the airspeed's all gone. Think of your airspeed as energy available to maneuver with. The more airspeed you have, the more energy is available to turn the airplane away from its path toward the ground.

Without an engine, that energy dissipates rapidly. You must take advantage of the energy when it can do you the most good. Hold your climb until vertical speed reaches zero (as some of our Dash Ones still recommend), and you'll be going down again before you have time to grab the handle and start the sequence. If you didn't have much energy in the bird when you started, you'd reach the point where you're going down again very quickly.

You may not even be able to establish a climb. But you will seldom be in a situation where you don't have enough energy left in the airplane to decrease your rate of down. Even the heaviest fighters have enough energy on final to zoom to a vector that is more favorable for ejection. Your final approach speed is usually about 130 percent of stall speed for the weight you're carrying. If you zoom off 20 or 25 of that 130, you may not gain any altitude, but you will have rotated your pre-ejection vector upward.

Think about this . . . every final approach you make carries enough energy to rotate the bird to an almost horizontal vector. How else could you

make those grease-job landings? And the same goes for a dead-stick approach . . . if you are carrying sufficient energy with you (this usually runs around 240 knots), you can flare your bird to a horizontal vector before touchdown. So you could do the same thing at a couple of hundred feet, three miles from the runway, when you finally decide the machine just won't make it to the pavement. (Need we say it? . . . you should have made a decision long before this!!)

There's no reason why you shouldn't think about all ejections in this manner. The influence of your aircraft vector is not limited to very low ejections. You flame out on initial and hold your altitude while you try an airstart. Your airplane rapidly decelerates until you can no longer hold your altitude. You're slow and sinking, passing 1000 feet . . . that's not a very healthy vector!

You don't need mathematical formulas to understand this vector business. All you need is an understanding of the forces involved. If you key your thinking to the moving geometry of an ejection situation, you won't be trapped as was the pilot in our first example.

A low altitude ejection is a critical and dynamic situation. You must get maximum performance from your equipment. If you have not restricted your thinking to static ideas of altitude, and planned to use every ounce of energy in your airplane to get you moving UP, you will make the right decision . . .

Roll wings level,
Zoom for an UP vector,
And Boom!

September 1967

DOWN TO EARTH

What Is A Tailgater?

Somewhere between the fume-spouting exhaust pipe of the tractor-trailer and the dainty white puff from the little bug, we find a delightful creature known as the "tailgater."

Tailgaters come in assorted sizes and shapes -- mostly repulsive. You find them everywhere . . . but mostly two feet from your rear bumper. Undertakers love them, the driver in front hates them, policemen tolerate them, empty highways frustrate them, nobody can ignore them, and who knows who protects them.

A tailgater is ignorance with a weapon at his command . . . death with a gleam in its eye . . . stupidity with the power to kill . . . and irresponsibility with a driver's license.

A tailgater has the appetite of Dracula, the energy of a 400-horsepower engine, the curiosity of an inspector of rear bumpers, the lungs of a stuck automobile horn, the enthusiasm of a horseman chasing Lady Godiva, and the shyness of a fullback three yards from the goal line.

No one else is so familiar with the hospital emergency room or so at home in traffic court. When you're stranded on an empty highway, he roars past with a wave. When you don't want him,

he's grinning at you in your rearview mirror.

A tailgater is a fabulous creature. You can keep him out of your back seat, but you can't keep him out of the wreckage of your trunk. You can charge him higher insurance premiums, but you can't charge him with the murder of his victims. You can suspend his license, but you can't suspend his driving.

He's your terror, your shadow, the cause of your cursing, and your constant companion on the road. But when he finally turns off at a tavern, he's a soothing vacant space behind your car, a toothache that's stopped hurting, a feeling of safety in the world.



And when he breaks your neck in a rear-end collision and comes to visit you while you're in traction, he can bring tears to your eyes with those apologetic words: "I don't have any insurance, you know."

November 1969

Did You Hear The One About?

The stalwart troop who arrived at his neighbor's house to find him grunting through a series of exercises with the ingenious invention, the exercise wheel?

Seems like he watched his neighbor go through the paces with the wheel then decided to try it for himself. He proned himself on the floor, reached out and grabbed each handle of the wheel, and started pulling it toward his chest.

Perhaps because of his exuberant desire to demonstrate his agility, his lightning reflexes, and his ability to master the wheel at the first try, the next series of events unfolded.

He swiftly pulled the wheel in a quasi-push-up manner toward his chest. Unfortunately he had misjudged the precise location of his chest and the wheel continued on beyond his center of gravity and struck his groin (OOF). As the exerciser zipped past his C.G. with both hands still firmly attached, his body rotated around the wheel and his chin bounced off the floor a couple of times inflicting another grievous wound.

Result . . . a fractured jaw, a severe pain in the interim, and a shattered ego.

January 1972

Or This One About?

The troop whose motorcycle was on the fritz? He asked a friend of his, who owned a car, to tow him from the base into town (a distance of eleven miles). The friend agreed and they rounded up a four-foot length of chain and attached one end of it to the motorcycle and the other end to the back bumper of the car. . . . Off they went.

They made it out of the parking lot and to the first intersection, approximately a hundred feet down the road from the parking lot. As the brakes were applied in the car the motorcycle driver applied the rear brake and the back tire started to skid. Then he applied the front brake and the cycle started to skid sideways; then the whole thing flipped over and landed on top of the ejected rider.

Result . . . a fractured leg and an eleven-mile trip terminated ten and nine-tenths miles from the destination.

January 1972

Flash

"Yes, sir, it happened while I was working around the house. I forgot that the wife wanted me to light the charcoal. When I went to the patio, I saw that she had already started it. You see, my barbeque is like a 55 gallon drum split in half, and she had put the charcoal in the lid and the electric fire starter was on."

"No, I didn't pour the gas on it then . . ."

"Well, if you'll let me continue, sir . . . I put some briquettes in the other half and poured this gasoline and water solution over it."

"No . . . I've been using it for years, can't understand how . . ."

"Well, the whole bottle burst into flame, and well, . . . I yanked it back and threw it over my shoulder."



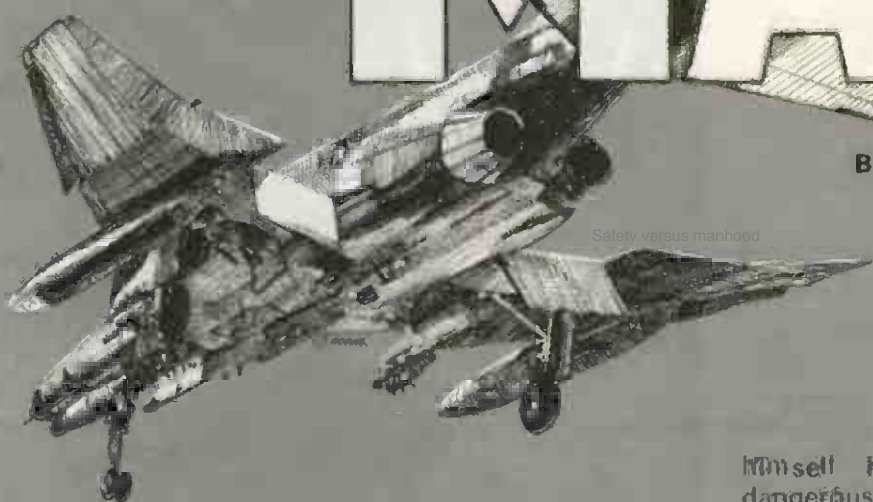
"Yes, sir, that's when I got the burns on my back."

"Yea . . . Yes, sir, it's kinda hard to talk on the phone while lying on my belly."

"OK, sir . . . the Doc says I should be back to work in about a week."

August 1965

Safety VERSUS MANH



Safety versus manhood

By Chaytor D. Mason
Associate Professor of Human Factors
The Safety Center
University of Southern California

In the past 100 years, man has become able to control his environment and manipulate nature more than any previous 10,000 year period in history. But in spite of all his technological advances, man knows little more about himself as a human being than he did 100 years ago. In fact, his knowledge about himself is, in many ways, not greatly advanced over his knowledge 1,000 years ago. His lack of knowledge of

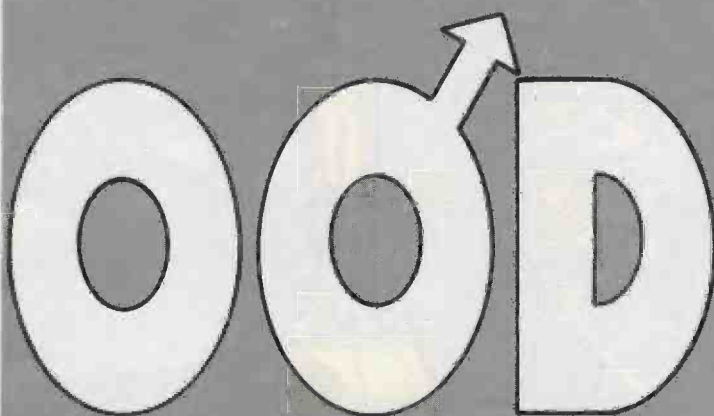
himself has produced some curious and dangerous predicaments.

Many of our concepts of man and his behavior no longer serve us in the world we live today. It has become obvious that mankind cannot survive by teaching children by untested methods passed from generation to generation. It has become obvious that we must subject man and his behavior to the same microscopic examination and exhaustive testing which advanced the knowledge of man's materials.

The subject of this article is one of man's behavior patterns—commonly accepted throughout history without question by millions of men. This concept, still alive today is that manhood and safety are not compatible.

Case Study

A group of 12-13 year old boys are standing at the base of a high voltage power line. They are arguing loudly, daring each other to climb to the top. Secretly, each one is afraid. Finally, one 12-year old breaks from the group, quickly climbs to the top and waves triumphantly to the group below. As he waves, his arm touches the 55,000 volt line. There is a flash, he shudders and falls to the ground—dead!



Case Study

The air is still and calm in this small coastal town. Fog has shrouded the airfield all night. The first flight of the day, Flight 54, a Convair, lets down into the fog. On his third approach, the pilot sights the runway and lands. Each approach was made below company and published minimums, but a successful landing was made.

Five minutes later another Convair, Flight 53, drones over the field. Radio contact is made with the Passenger Agent (who also serves as weather observer). Flight 53 is advised that the weather is well below minimums but that Flight 54 is on the ground and preparing to leave.

Flight 53 makes a VOR approach and pulls up after going 100 feet below the 390 foot minimums. On the second approach, 200 feet below minimums, ground witnesses can see the vague outline of the airplane as it pulls up again.

On the third approach, there is a sudden orange glow in the fog to the east as Flight 53 explodes through the roofs of three beach cottages at an altitude of 30 feet. Forty-one people die.

Case Study

Due to a fuel system failure, an F-4 flames out at 18,000 feet near a desert Air Force Base. The

pilot is told he has too little altitude to make a safe approach, but he responds that he is unable to receive. He continues his approach. On touchdown, the main gear strikes the runway lip, but he makes it.

He receives a commendation for his superb handling of the emergency. In the next year, four more pilots try the same thing. Three fail to make it and six men die. One of the dead pilots was a Lieutenant Colonel, who, although older, was known for trying to keep up with whatever the younger pilots would do.

What is the common problem in all the accidents? The problem is SAFETY VERSUS MANHOOD.

It appears that many of us feel that looking after ourselves is a sign of cowardice. The 12-year old could not say, "It looks dangerous as hell to me. I'm not going to climb up there." The pilot of Flight 54, who landed safely, knew that the pilot of Flight 53 would continue to make lower approaches until he got in, so he took three chances and made it. The co-pilot on Flight 53 died without a word. He could not express his fear to his Captain, for in his mind, he would have seemed less of a man.

The problem of Safety versus Manhood can thus occur at any time, at any age, in any job, in any activity. Safety versus Manhood is one of the reasons why younger people have too many accidents in cars, in boats, in airplanes. It is one of the reasons why accidents are the greatest single cause of death in this age group. It is why younger people show so little caution. There seems to be one thing more important than safety—the proof of manhood.

Until we accept that it is masculine to consider and even plan for our own safety; to plan for all eventualities; to admit the possibility of accident—we men, and leaders of men will laugh and scorn safety practices. It is important for management and training to make sure that the conflict between Manhood and Safety is resolved by coherent safety training. We must define the "Man" as the one who does the job professionally and does it safely. We must make sure there is no difference between safe operating policy and the way aircrews and support people actually perform. We must cut the imaginary lines between manhood and unnecessary risk.

July 1975

Three Little Devils At

By Chaplain (Maj) Clarence E. Drumheller
834 Combat Support Group
Hurlburt Field, Florida



Satan sat at his desk outside the Gates of Hell. After lighting his pipe, he leaned back in his chair and crossed his feet on top of his desk. He was in deep thought.

Although there were wars, riots, and disasters causing considerable mayhem among earth's humans, there was one area which caused him due concern—the U S Air Force's Ground Safety Program. The program, as laid out by the Air

Force, was so effectively designed that Satan's forces were greatly discouraged. Satan knew he had to do something unusual to raise the morale and effectiveness of all his little devils.

Being no simpleton when it comes to creating mischief, Satan, after considerable thought,

The Gates Of Hell

decided to sponsor an Air Force-wide Anti-Safety Contest. Accordingly, he devised an elaborate program of incentive awards which was bound to excite every little devil under his widespread command.

Satan offered his enticing awards in three categories. The lowest category consisted of several three-day passes which would be given to any little devil turning in a creditable piece of anti-safety mischief. This, he thought, would interest all of his clever minions without exception.

To this incentive, he added a second category, offering not only a three-day pass but also an all-expense paid vacation in Hell. Winners of second place could see and enjoy all human suffering and misery which their devilish anti-safety work brought about. What little devil could possibly turn his back on this delight!

Greatest of all awards would be the Grand First Prize—a two-week paid vacation in Hell, automatic promotion, and the coveted "Devil of the Month" award, giving the winner privileges never before offered to any little devil.

Satan decided that this contest was so vital in his efforts to bring down the Air Force ground safety record, that he himself would judge each entry.

Soon after word of the awards had gone out, three little devils appeared at Satan's headquarters outside the Gates of Hell. Each had done his damndest. Each sought the coveted Grand First Prize. Who would be the winner?

Satan leaned back in his chair and puffed his pipe. "Send the first contestant in," he said to his Executive Officer.

The first little red-suiter stood before Satan's flaming red desk, snapped to attention, and gave his fiendish report.

"I've done a magnificent job," he said. "In view of your inspiring contest, I have convinced hundreds of people that they don't need to fasten safety belts, especially when driving short distances. Since most fatal accidents happen a few miles from home, you can see, O Prince of De-



mons, the carnage that's going to result from my work."

Satan took the pipe from his mouth and exhaled a billow of smoke. "That's a pretty good piece of anti-safety business," he said. "The failure to use seat belts is bound to cause many bloody fatalities. You have earned a three-day pass. I'm afraid, however, that it doesn't entitle you to more because really safety-minded people will still fasten their belts, whether for long trips or short ones. We absolutely must come up with something better than that."

With tears of disappointment burning in his eyes the First Little Devil did his about-face and left the office. Satan called for the next contestant.

The Second Little Devil was smiling broadly. The failure of the first fiend to win the Grand First

Three Little Devils at the Gates of HELL

Prize bettered his own chances.

"I've outdone him by a mile of brimstone," said the Second Devil with a superior air, while motioning with his thumb to the door through which the first had passed. "I've really come up with something demonic."

"Spill it," said Satan, clutching his pipe and leaning forward eagerly in his chair. "Don't keep me in suspense all day."

"I've chalked up two atrocious accomplishments, either of which should make me a winner," he said. "First, as you know, alcohol, even in small amounts, impairs judgement, slows reactions, and makes drivers take unnecessary chances. Acting on these facts, I have easily convinced hundreds that drinking in moderation is a lot better than being called a blue-nosed Puritan. Already you can see the mangled bodies, and hear the cries of widows and children resulting from the highway accidents which my abominable scheme has caused."

"Excellent!" said Satan. "This is the kind of heinous thing I want. What else have you accomplished?"

"Secondly, I have spread the word that if one has been drinking, driving is safest late at night

and in the wee hours of the morning. Most police forces reduce their strength during these hours, and there is less traffic on the highways. A really daring driver, I tell them, can open up and see how much his hot rod will do. Wow! You should see all the one-car crashes I've brought about with this satanic plan. So if you'll give me my Grand Prize, I'll rush down to hell and watch'em burn."

"Mmmmmmmmmmm," said Satan, refilling his pipe. "That's a dandy piece of devilment, I must admit. It certainly entitles you to second place, and an all-expense paid vacation in hell where you can watch the people you have sent there writhe and scream. However, I wanted something with a wider influence for the Grand First Prize."

After admitting the Second Devil through the Gates of Hell for his three-day paid vacation in the land of fire and brimstone, Satan called for the third contestant.

Third Little Devil, with creases sharp as razors in his red flannel underwear, squared his shoulders, clicked his heels, threw a smart salute, and reported:

"Sir, how does this strike you? I've taken complete advantage of that natural homo sapiens' characteristic to be lazy, crafty, irresponsible, and resentful of authority. I tell them that safety is only the business of the Commander and the Safety Officer—not theirs. I tell them that safety regulations are just an attempt to regiment them and limit their freedom, and that really smart cookies will ignore them, so long as they don't get caught. Then I teach them to stick together in their safety rebellion, and to cover up for one another in their unsafe practices."

"It's really my work that makes airmen leave their seat belts unfastened. Because of me they throw cigarette butts into waste baskets, and smoke in bed because no one reports them. They are indifferent to safety rules and regulations of all sorts and encourage one another to sneer at them. They fail to report known safety hazards saying it's not their business. I've even taught those with a modicum of interest in their own safety to show a selfish lack of concern for the safety of others."

"My monstrous work, Sir, will spread unsafe practices like wild fire. It will tie up Commanders



everywhere trying to explain the lack of safety on their bases. And to think, it's all because of me. I know how to take advantage of human weakness, selfishness, and irresponsibility. My evil work is bound to have far reaching results."

Before the Third Little Devil could finish his report Satan's red phone rang so loudly that it literally danced on his desk. Satan placed the receiver to his ear. A wild and devilish expression crossed his face. His excited hand emptied the pipe into the trash causing another delightful fire.

Shortly, Satan dropped the receiver on its cradle, walked over to the Third Little Devil, and warmly pumped his hot little hand.

"Congratulations," he said. "That was the operator. He tells me the switchboard is jammed with calls reporting accidents of every description. For this imaginative and effective piece of devilment, you have won the Grand First Prize. You will get your two-weeks paid vacation in hell, where you can watch all the human misery your unsafe

practices have caused."

"Convincing Air Force personnel that safety is somebody else's business has won for you the highest approbation ever achieved by any little devil. I hereby proclaim that you are not only Devil-of-the-Month but 'Devil Forever,' and I am promoting you to the position of Hell's Anti-Safety Officer for life. Now have you anything to say?"

"Yes, Sir," replied Little Devil Forever. "If anybody wises up and discovers that Safety is Everybody's Business, we're through. Therefore, I request permission to forego my pleasant vacation in Hell and return to duty."

"Permission granted," said Satan. "And may carelessness and indifference to safety reign forever."

With a click of his heels and a snappy salute, Little Devil Forever turned and skipped gleefully back to Any Air Base, where he is hard at work right now.

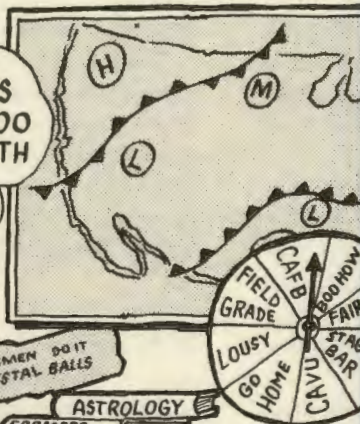
December 1969



FLEAGLE

© Stan Hardison, 1975

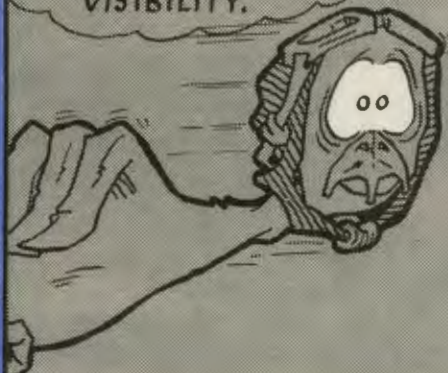
UH ... FLEAGLE, THIS IS METRO... WE'VE GOT 100 OVERCAST WITH HALF MILE VISIBILITY.



WHETHER OFFICE

ROGER METRO, THAT'S NO SWEAT FOR THE ACE OF THE GAUGES.

OOPS! I FORGOT ABOUT SLANT RANGE VISIBILITY.



THERE IT IS.



TAKE OFF TODAY

ON AN AIR FORCE CAREER

WELCOME TO BYRD FIELD

?

HARDISON