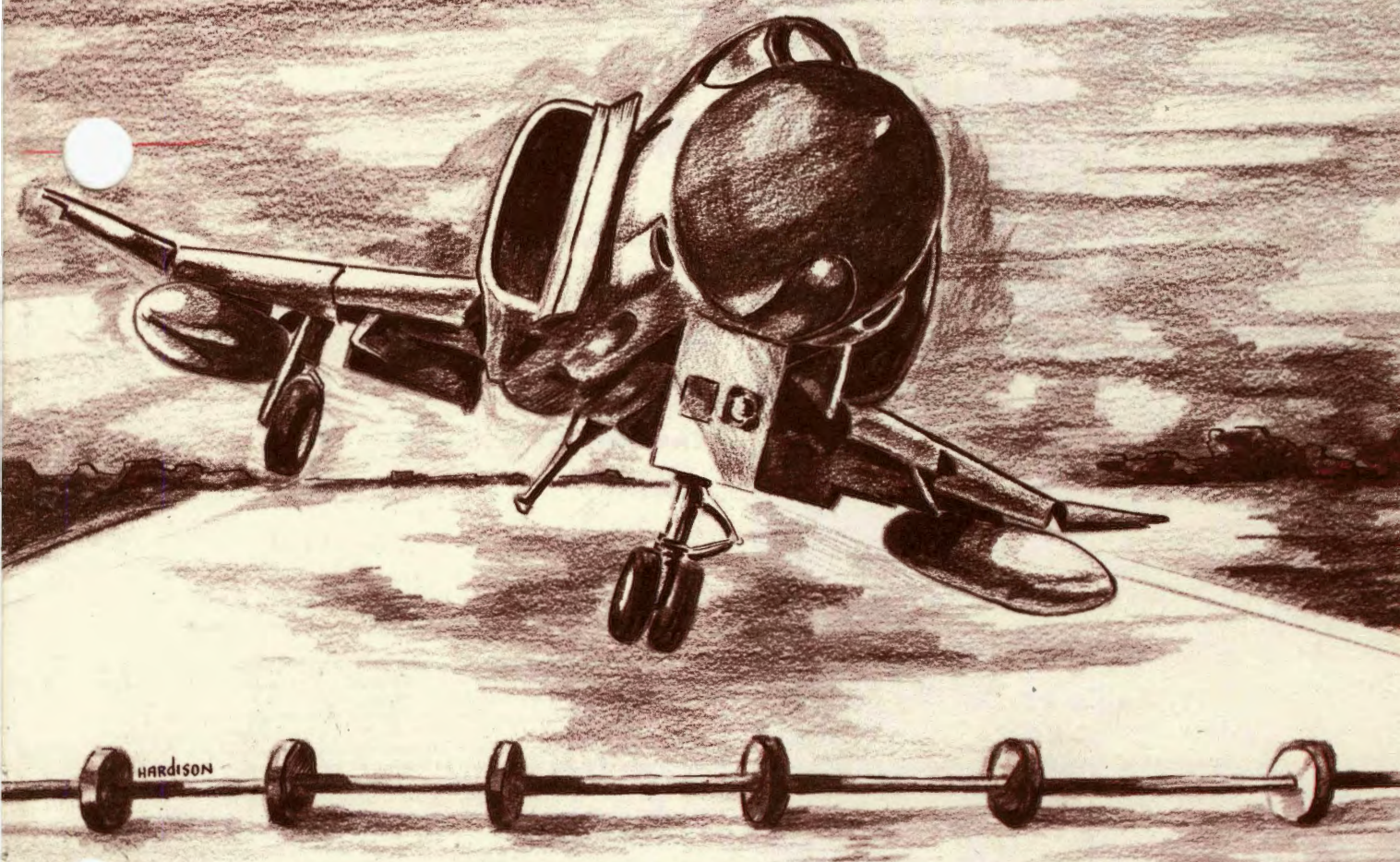
TAC ATTACK

JUNE 1969



With less than three....Page 4

for efficient tactical air power

TAC ATTACK

JUNE 1969
Vol. 9 No. 6

TACTICAL AIR COMMAND

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JAMIE SEZ:

Man with dirty backyard should not try to clean up world.

current interest

departments

TACRP 127-1

Angle of ATTACK

ground egress.....

Rapid escape from the burning wreckage of the aircraft you have just aborted or crashed should be a subject of great concern to all crew members. Yet, each year, we have too many cases where people didn't do it right and were delayed from abandoning their wrecked bird, or trapped at the end of the 25 foot nylon cord that connects them to the lift raft.

Stop here and reflect a minute. Can you mentally picture your movements as you run through the emergency ground egress procedures for your aircraft? If you can't, we may be reading about you at some future date. And there is no reason for it. Our ground egress procedures are simple – perhaps that's the problem. They may be so simple we are not being motivated to practice them. When the chips are down you must, without hesitation, be able to run through the required steps, IN THE CORRECT ORDER. The mishap, by it's nature, may be a traumatic one which could leave you with nothing but habit patterns to operate with. And the only way you can be sure of doing all steps correctly is through training.

If you aren't concerned about yourself, look at it this way. If that fateful day ever comes, that day when you end up in a burning hulk out in the infield, every man within running distance will come to your aid . . . you have no right to jeopardize their lives through your failure to practice ground egress.

R. L. LILES, Colonel, USAF
Chief of Safety

LANDING the F-4

....with less than three....

by Maj Robert G. Dilger
Nellis AFB, Nevada

It was Friday the 13th, and there I was doing it again . . . landing an F-4 with less than three gear. This time I was instructing at the Fighter Weapons School, flying my 17th backseat ACM ride, when we lost utility pressure. We headed for home, set up on base leg, and activated the emergency gear system. Being in the back seat, I didn't have much to do except watch the gear indicators. The nose gear went safe with a clunk, but the main gear didn't budge. On beginning the usual gyrations and emergency procedures for lowering the gear, I got the eerie feeling that I'd been here before.

One year and a day earlier, on my 110th SEA mission over the North, I stopped an 85mm or a 57mm about 100 miles south of Hanoi. Went right between my legs and, luck being with me, it was a dud. Thought to myself, Lord you've taken care of me so far, I'll try and help out for the rest of this run. There was a gaping hole just in front of the windscreen that you could stick your leg through.

Checked my hydraulic gauges and watched them unwind. It was 40 miles to the water, so I headed the other way over the mountains. Lost oil pressure to the left engine and, almost immediately the eyelids went to the trail position. Thrust was also nil. Utility hydraulic pressure zero, hydraulic power control pressure zero on the left engine, but holding steady on the right. That was all I needed.

I threaded my way back over the thickest jungle and the highest mountains I could find, limping badly, but already counting the beers at the club. Set up a long straight-in, actuated the gear emergency extension system – NOTHING!!

Went through the usual gyrations of checking circuit breakers, activating back-seat emergency gear, pulling positive and negative G, but to no avail. Got the foam crew out for an approach-end belly landing. Fuel was pretty low, so I called off the foam and set up on a long, low straight-in. Looked pretty good about a mile out, if I do say so myself – then it happened! A large "clunk" and a violent yaw shook the aircraft. I straightened the bird out with rudder, and asked my wingman what that was all about. He said, "Dilg, I hate to tell you, but your left main just went full down."

After some spicy language, it was determined that the left main was down and locked, and the other two were up. A bounce touch-and-go seemed the answer, so we continued the approach. After we touched down, we limped off on my trusty right engine and started the climb out. By now fuel was critical. The "book" answer was to bail out.

We took it out to the bay and at 11,000 feet, I told my back-seater to get ready. Did I feel sorry for him! It was his first ride with me and this had to happen. Anyway, it looked wet enough, so we wished each other good luck and away he went. I had the mirrors set so that I could see him. That was a mistake. In the middle of fire, brimstone, corruption, and smoke, his body became a blur and shot upward. No way you could live through that I thought.

I reached down between my legs and jettisoned aircraft. The seat slapped me in the derrière (wh... I've kept ample through clever dieting) and away I went. No blackout for me! No such luck. The wind blast was terrific (and I was only 200 KCAS). Away went my mask as I tumbled forward two or three times. I thought to myself, "I'm sure glad they don't expect me to do anything now." Anyway, Martin-Baker did me proud. It worked perfectly. After the gyrations, I felt myself separate from the seat and shortly thereafter found myself suspended below a synthetic cloud. Except for the drogue gun making high-side passes at my head, the rest of the ride was uneventful. Pedro picked us up in short order; wet, but smiling.

And now, a year later I'm staring at gear indicators. We yawed our Phantom and the right main finally went down, but our wingman determined that the left main was still up and locked. We checked circuit breakers, activated back seat emergency gear extension, pulled positive and negative G, but to no avail, so called the foam crew out for an approach-end engagement with two gear.

We set up on a long final with plenty of fuel. My front seat student and I had talked it over at leng... Our plan was to make a long straight-in, on-spee... above, and if anything went wrong we would tak...

around. I stressed the importance of keeping the ...er on so that the BLC would help keep the wing ...

We came down final a little hot and got on-speed just short of the touchdown. Beautiful, I thought – just as we planned! Visibility from the back seat, which is always bad, was now absurd. We touched down about 600-800 feet short of the barrier, the left wing dipped but he brought it back up. I was beginning to think that we had it in the bag when old habit took over. He cut the throttle and deployed the drag chute. This dropped the left wing 'til it scraped. He added power, the left wing came up, and the plane went airborne. Immediately, the power went to idle and the aircraft was back on the runway. The left wing went down, but solid, and we swerved to the left. I threw the power back on and caught it 30 – 40 degrees off the runway heading, got the left wing back up and merrily sped across the infield on one gear, straight for the fire trucks, the ramp area, and the F-111s.

I was afraid to fly because I suspected that stall speed might have changed. Well, the fire trucks were getting mighty close, so I called for ABs and pulled off right over them. Mobile called and said that we still had our drag chute. First time I knew it had been ...ployed, so I called to get rid of it. We got back ... the air and looked things over. We had lost about ... percent of the aileron, but hydraulic pressure and control response were normal. We were all set to try again when we were ordered to bail out.

We started for the bailout area, a dry lake in a mountainous area northwest of the field. With about 900 pounds, we decided to bail out over a valley well short of the intended dry lake. My turn to go first, but I don't think my student was looking in his mirror. We bailed out at 14,500 feet at 200 KCAS. The new rocket seat gave a smooth ride! No blackout, terrific wind blast, oxygen mask came undone, but no tumbling. When things settled down, I soon realized I was strapped tight in the seat. I "cranied" my head around and saw a tiny little stabilizer chute. Checked the ground which seemed mighty close, as I could make out individual cacti.

After about 20 years (actually closer to 20 seconds), I decided that this situation was absurd, so I went manual. Activated both handles (we had rehearsed the ground evacuation procedures so many times that it seemed the thing to do), saw the seat belt apparently in place, so I undid it, jumped clear of the seat, and jerked the parachute out of its nest. Found the D-ring and jerked. Waited expectantly for ... opening shock.

After a while I took a tentative look up, and what I saw scared the hell out of me. My chute was gaily waving in the breeze – a classic streamer. I grabbed the fore and aft lanyards and started spreading them as in a side-straddle-hop exercise. About the fourth or fifth time it opened. I stuffed my heart back down my throat and looked around. I was about 2,000 feet above the ground. The dinghy, survival kit, lanyards, drogue chute, and I were in one awful mess. I unshucked the lanyards, straps, belts, and assorted survival gear, and stripped them off much like a woman getting out of a girdle. The whole caboodle ended up in a tangled mess about 4 feet below me, and I shrewdly deduced that snapped ankles were probable, so I undid the lanyard and dropped the whole works.

There was a 15-knot wind, with stronger gusts, and I was sure moving – backward, naturally. After a while, I got squared away with a right-quartering drift. The spines on the Yucca, Joshua trees, and cacti appeared a mite sharp! I looked straight ahead and prepared for my PLF. PLFs at 6,000 feet elevation are something else. Made one of the few simultaneous three-point PLFs in history – feet, backside, and head thunked into the gravel absolutely together. I released the risers, said, "Thanks Lord, you did it again in spite of me," and pulled cactus needles out of my leg.

A Marine chopper on its way to Las Vegas happened to be passing our way and picked us up – dusty but smiling.

As a result of these two incidents, I drew a number of conclusions, which are presented for your consideration. In reading them, be reminded that this is my own analysis and does not represent any official position. As a matter of fact, a few great fighter jocks, whom I admire, are in disagreement with some of my opinions, so nothing is given as the gospel – merely a point of departure for discussion.

A basic problem is that the procedures do not delineate between landing with or without the availability of a barrier. To me, this is most significant. I've made many a MOREST (equivalent to a BAK 9/BAK 12 system) barrier landing. Until you get about 20 of them under your belt, you are not likely to put the kind of faith in them that I have. The following discussion presupposes a barrier which, of course, is the normal situation on most Air Force stations.

The "book" says to land with 1500 pounds. I believe this is a mistake. Make the final approach with 3000 pounds plus, so that if anything goes wrong (for example, the tail hook jumps the barrier), more attempts can be made.

The book said to fly on-speed. I think the key is to fly a low flat final at something above on-speed, possibly on the order of 16-17 units. The point is, fly a flat power-on approach, as is now suggested in the new check list verbage.

The suggested point of touchdown is 300-500 feet

LANDING the F-4

short of the barrier. On this one, I got into quite a hassle with some fine jocks. Their theory is to touch down 100 feet short of the barrier. You can't miss, so the plan goes.

My counter-argument runs like this: asking a jock to spot her within 100 feet is a bit much. That's a good qualifying landing for a piper cub. Now the old F-4 drivers all know that they can hit a 100-foot spot by making a navy-type controlled crash. I would never recommend this with less than three gear. You don't have a snowball's chance in Hades of keeping that wing up at touchdown, and if the tail hook bounces over, or if you're a few feet long, you'll sure enough do pirouettes through the infield.

Their counter-argument is that the wing can't be held up anyway. This became quite a point of contention. Finally, to prove my position, a demonstration check ride was set up.

In it, I touched down on one gear and flew down the runway on that gear for 5,000 feet. Finally went around because we got bored with the whole business. Aileron, with a goodly bit of rudder, made it a piece of cake.

But back to the case at hand. After touchdown, don't cut the power or use the drag chute. Plan to make a go-around if anything looks amiss. In fact, if necessary, add a little power to keep you going. However, don't overdo a good thing because that boundary layer air will get you airborne in short order. In our situation, that little burst of power put us airborne for 125 feet with lift-off just 24 feet short of the barrier.

To recap my ideas, fly a long flat final at 16-17 units. Don't sweat the touchdown point overly, shoot for a point 300-500 feet short of the barrier, as per the "book." At touchdown, DON'T CUT POWER or POP THE CHUTE. FLY into the barrier. Use aileron and rudder to keep the wing up and to maintain directional control. Try to let the nose down prior to barrier engagement. Be spring-loaded to the go-around mode.

Some other points you may consider: If worst comes to worst, you will swerve in the direction of the "up" gear – very bad place for fire trucks, foam trucks, or ramps. What to do with the trucks is self-explanatory but that ramp can be sticky. If the wind velocity is negligible, consider landing against traffic if by doing so the "up" gear will have a tendency to swerve you away from the ramp. Keep all tanks and pylons, but depressurize the tanks by opening the air refuel receptacle. Foam from the barrier to about 1500 feet down the runway if time permits.

To jump out or not, that is the question. I've talked with a number of pilots who wouldn't consider landing with less than three gear. Their logic goes like this: "The parachute is pretty reliable – like on the order of 90 percent. Why take a chance on a risky landing?" I feel that my chances of grabbing a barrier are close to percent, which then puts me pretty much home free. is especially true if I'm prepared to make two or three passes at the barrier if anything should be amiss. However, in the final analysis, you'll have to make this decision yourself.

If you decide on the barrier, rehearse the ground evacuation procedures. Do not complete any steps ahead of time, as you may have to bail out anyway. Get the canopy only after you're free. It will give you considerable protection if she catches on fire. Use the normal canopy open switch. If you try the manual release you'll have a 3000 pound pneumatic lock fighting against you. It will win! Even if it works, the canopy will only pop open a few inches. You'll be required to lift it the rest of the way and then climb out while holding it open. If you use the emergency jettison handle, you'll lose your protection from the interlock block and after the canopy flies in the air it is ordained to come back down; possibly on your buddy, or firefighters, or the aircraft.

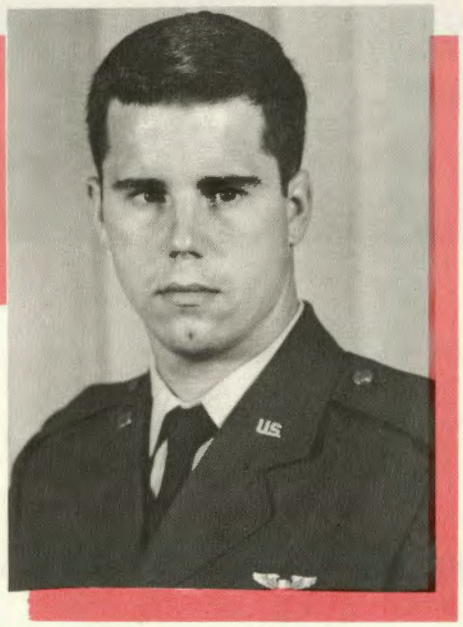
If you decide to bail out, here are some considerations. Bail-out altitude need not be much above aneroid function altitude. Why freefall? In the case of the F-4, the aneroid should work between 11,500 feet and 14,500 feet. I would choose 12,000 feet or below as my controlled bail-out altitude. The system should functi automatically before the manual system could possib actuated. If you should jump from an altitude above aneroid function altitude, it would be necessary to guess as to the proper altitude. There would be a strong temptation to go manual if you found yourself with time to spare. Besides, it gets cold up there! Two hundred KCAS is just fine. Still quite a wind blast but anything less would be too near the stall which might prove critical if problems developed.

Be sure the trim is neutral. If you should have nose-down trim and let go of the stick to pull the handle/curtain, a negative-G condition would lift you off the seat. Would it ever smart when that gap got filled in! Don't wait 'til you are down to 100 pounds of fuel before you decide to go. What would you do if the canopy or seat didn't work after you flamed out? Don't pick a valley that is 6,000 feet high for your landing place. It's nice to take the bird out away from all the earthlings but it can be overdone. The parachute terminal velocity is significantly higher at 6,000 feet than at sea level. I mean you are really moving. The new sky sail is neat but you will waste a great deal of energy trying to steer it. It has a stubborn mind of its own. Might just as well save yourself for things to come later.

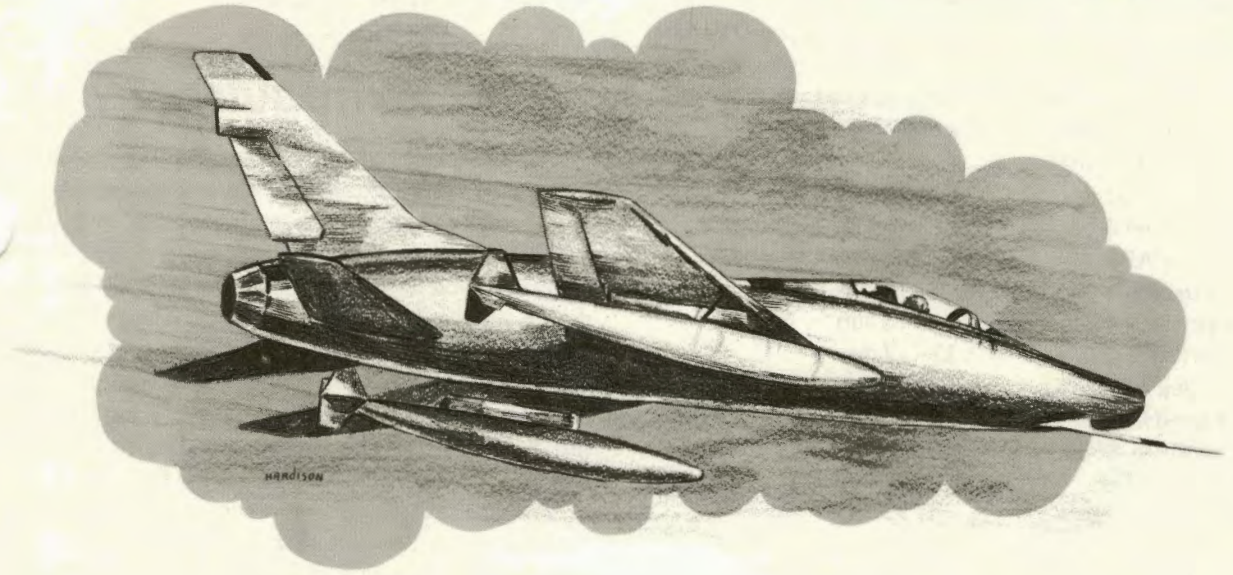
Hopefully, good maintenance and luck will prevent this from happening to you. But if misfortune sh strike, may it only be once.

CTICAL AIR COMMAND

Pilot of Distinction



1st Lt S. H. Morehouse



First Lieutenant Stephen H. Morehouse of the 4510th Combat Crew Training Wing, Luke Air Force Base, Arizona, has been selected as a Tactical Air Command Pilot of Distinction.

Lieutenant Morehouse, an F-100 student pilot, completed a ground attack mission and entered the pattern. After he lowered the gear the right drop tank broke loose and wrapped around the bomb rack with the front half of the tank pointing outward at a 60-degree angle. The F-100 began to yaw and roll but he regained control and initiated a go-around.

Over a clear area he jettisoned stores in an effort to e the tank free. The right outboard pylon failed to jettison because the controls were negated when the tank slammed into the bomb rack. Using full left rudder and partial left aileron Lt Morehouse completed a controllability check with minimum fuel. He established a high right-hand base leg in a precautionary landing pattern, maintaining a 200 knot final approach speed. Just before touchdown the right wing dropped sharply but Lt Morehouse recovered and landed in the center of the runway. Despite the drop tank dragging along the runway, he brought the aircraft to a safe, controlled stop.

Lt Morehouse's demonstration of airmanship during an inflight emergency readily qualifies him as a Tactical Air Command Pilot of Distinction.

CHOCK TALK ...incidents and incidentals

chock talk

more on barriers...

Since publishing the article "Barrier Barriers" (TAC ATTACK, May '69) regarding arresting barrier maintenance training, we have learned that two traveling barrier training teams have been scheduled at twelve TAC bases through a combined effort of TAC/DE, DO, OS, and Air Training Command.

The schedule is:

Homestead AFB	7 - 16 May
MacDill AFB	19 - 29 May
George AFB	3 - 13 Jun
Seymour Johnson AFB	3 - 13 Jun
Nellis AFB	17 - 27 Jun
Langley AFB	17 - 26 Jun
England AFB	8 - 14 Jul
Bergstrom AFB	16 - 23 Jul
Cannon AFB	16 - 25 Jul
Mt Home AFB	4 - 11 Aug
McConnell AFB	13 - 22 Aug
Luke AFB	12 - 22 Aug *

* Tentative pending installation of BAK-12

TAC's Director of Safety has requested that Flight Safety Officers and/or the Chief of Safety at each base sit in with the classes. The letter announcing the training schedule also suggested that a representative of Base Operations attend the classes. These observers are not to be considered a part of the student quota reserved for barrier maintenance personnel.

This may be the last time base commanders will have the benefit of ATC traveling teams. On or about August 6, ATC expects to start a two-week residence barrier course at Sheppard AFB. The base is equipped with an MA-1A, and being installed for training purposes only are a BAK-9, BAK-12, and BAK-13.

When this new "hands-on" training is underway, Arresting Barrier Course No. ZASR 54350-1, commanders may request attendance for their personnel on AF Form 403 through regular CBPO channels.

flying extinguisher?

The C-54 had RON'd and the crew was preparing the bird for departure. After the preflight was completed, the flight engineer and aircraft mechanic boarded occupied the left and right seats respectively. The radio operator stood fire guard. All engines were started and the run-up was completed in the chocks. When ready to taxi, the radio operator pulled the chocks and climbed in. Power was advanced after tower clearance to taxi was received, shortly after brake release a loud noise was heard. It was the number two propeller striking the fire extinguisher that had been used by the fire guard.

The fire extinguisher frame and wheels were thrown to the left and slightly aft approximately 40 feet. The fire agent bottle was torn loose and thrown approximately 120 feet. The aircraft only suffered a dinged number two prop, we lucked out again.

those flip top cans!

Two RF-101s made a normal takeoff using ten seconds, followed by a routine join-up. Normal formation was flown for about fifteen minutes, before beginning in-trail work. While in a descending left turn, number two's nose dome came off and struck the probe doors. Airspeed was 450 and they were at 13,000. After lead checked two over they made a wing approach and landing.

Two possibilities for this incident were explo Improper torquing of the nose dome or material failure.

with a maintenance slant.

the nose locking lugs were the suspects. Material failure could not be proven because the cone was lost. With improper torquing the nose dome usually opens during takeoff or shortly thereafter. The unit involved is retorquing the nose dome prior to each flight.

improper torque

During return to the landing pattern and at 6500 feet, the T-37 crew noted smoke entering the cockpit from [illegible]nd the seats. Engine instruments were checked and [illegible]right engine oil pressure was zero. The right engine was shut down.

The main oil return line was leaking at the "B" nut on the anti-leak valve. The "B" nut had not been properly torqued during installation. It was retorqued, the bird was tested and released for flight.

stray voltage fire...

A fuel leak was discovered in the F-100's left pylon prior to taxi. During removal of the tank a flash fire occurred in the fuel line disconnect area when it was lowered about two inches. An internal explosion in the tank followed moments later. The fire was extinguished by maintenance personnel using a CB fire extinguisher. There were no injuries or aircraft damage.

The aircraft and tank were properly grounded, the battery switch was off, external power had not been applied, and a stray voltage check was made. Additionally, the aircraft grounding system and the grounding points on the ramp checked satisfactorily.

However, when the tank was being lowered the wiring harness remained in the wing receptacle because material [illegible]ure of the adapter allowed the swedged ball cable to [illegible]free and not release the cannon plug disconnect. This tore two fuel quantity probe wires from the male plug and two fuel level control valve wires from the pylon terminal strip.

It is suspected that either the grounding was not as reliable as reported, or a spark occured between the torn wires of the fuel quantity system. It is a capacitor type and may retain sufficient power to cause an arc.

almost right....

The mission called for on-loading and delivering a load of ammunition. The flight engineer and loadmaster arrived at their Herky more than two hours before block time. Aerial port personnel advised the men that to load their plane, it would have to be moved from their parking revetment to the ammo loading revetment.

The loadmaster saw five pallets stacked at stations J and K with four tie-down chains atop the pile. He stowed the chains, noting that the pallets did not move when he walked on them so he assumed the dual-rail locks were in locked position.

An hour later the pilots arrived and the A/C asked both airmen if the ship was ready to move. Both responded affirmative. With engines started and before-taxi checklist completed, the loadmaster sat on the aft cargo compartment ramp observing for the A/C as the big bird backed out of the revetment. When the aircraft cleared the area and started moving forward, the five pallets shifted aft, slid across the cargo ramp and out the door, taking the loadmaster along and pinning him to the pavement. Engines were stopped and an ambulance called.

Doctors expect that after 15-days hospitalized and a lengthy recuperating period, the young man's fractured pelvis may mend without lasting crippling effects. It is also expected that the loadmaster will probably perform each checklist item instead of assume they are complete, even though he was half right. Only one side of the dual-rail system was unlocked.

YOU SPEAK

" FUNNY FRAMES from the FOTO FOLKS "


DICK'S DINER
Ah c'mon Dick, we had duck last night!
Ahhhhhhhhhhhhhh...
TRUCKS KEEP RIGHT
GATE
ATTENTION EARTHLINGS!!! There are many of us-lay down your arms and surrender or we will.....
Oh, Oh...I think I hurt myself!

Tactical Air Command

Unit Achievement Award

Our congratulations to the following units for completing 12 months of accident free flying:

193 Tactical Electronic Warfare Group, ANG, Olmsted State Airport, Pennsylvania 1 January through 31 December 1968

108 Tactical Fighter Group, McGuire Air Force Base, New Jersey
1 January through 31 December 1968

434 Tactical Fighter Squadron, George Air Force Base, California
17 January 1968 through 16 January 1969

4533 Tactical Training Squadron (Test), Eglin Air Force Base, Flori
29 January 1968 through 28 January 1969

37 Tactical Airlift Squadron, Langley Air Force Base, Virginia
19 February 1968 through 18 February 1969

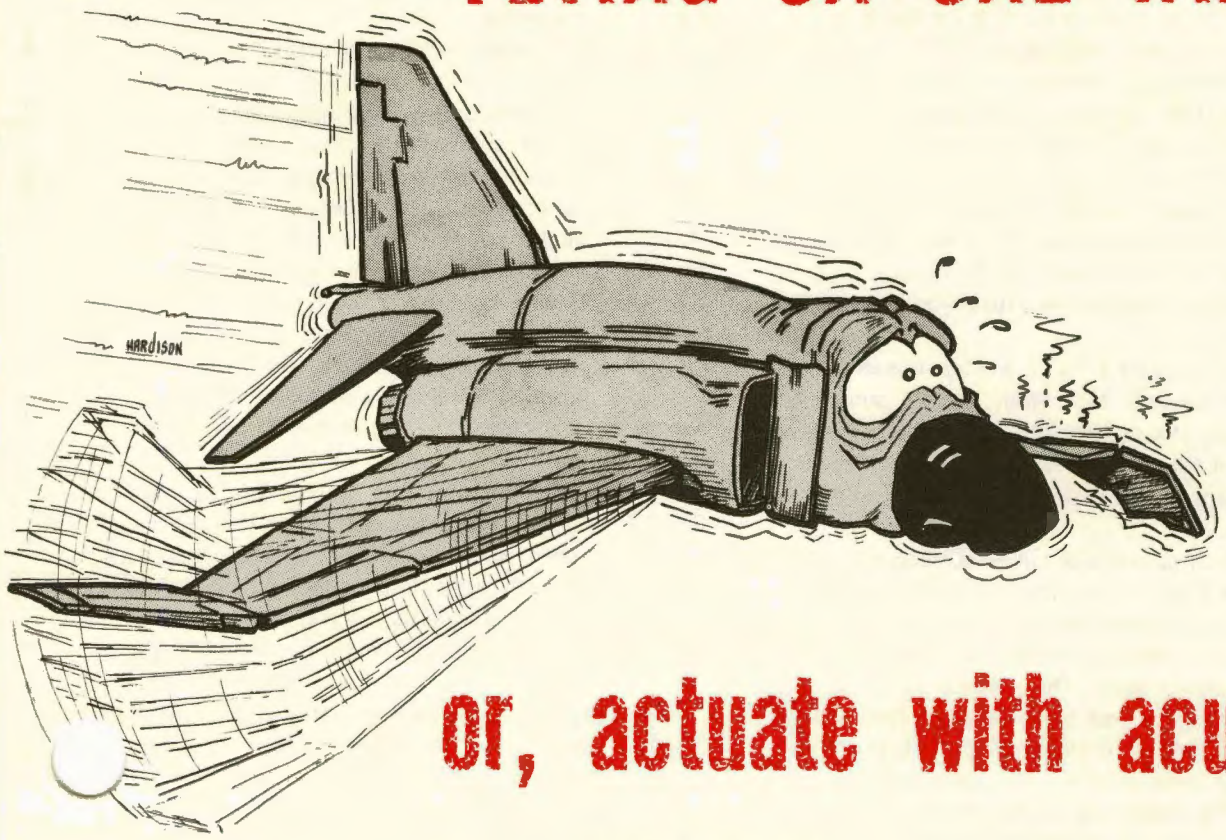
38 Tactical Airlift Squadron, Langley Air Force Base, Virginia
19 February 1968 through 18 February 1969

316 Tactical Airlift Wing, Langley Air Force Base, Virginia
19 February 1968 through 18 February 1969

4535 Combat Crew Training Squadron, George Air Force Base, California
22 February 1968 through 21 February 1969

4409 Combat Crew Training Squadron, Hurlburt Field, Florida
23 February 1968 through 22 February 1969

FLYING ON ONE WING...



or, actuate with acumen

by Maj R. H. Bartlett
Maxwell AFB, Alabama

"Flying on one wing" has referred to many different situations during the history of flight. One usage describes the Friday night flight from "happy hour" to the old homestead. Recently, however, the term has taken on a new meaning as more and more F-4 aircrews are plagued with massive aileron actuator leaks.

When the aileron actuators began cracking it resulted in more than a few aircrews filling an extra square for emergency evacuation and PLFs. This action may have tidied up ground training boards, but it certainly did not help accident rates move in the right direction. The interim fix, TCTO 1F-4-780, has stopped the immediate accident potential of a massive actuator leak, but it also presents us with the new problem of flying with only one controllable wing.

"Old heads" in the F-4 certainly need no introduction to the 780 modification, and the "new guys" can read all about it in the Dash One. However, for our neophytes' benefit, a short layman's explanation of F-4 hydraulics and flight controls is in order. It's basic, but important.

The F-4 has three independent hydraulic systems: primary control one (PC-1), primary control two (PC-2), and utility. The PC-1 pump is mounted on the left engine, and the PC-2 pump operates off the right engine. The utility system has two variable-volume constant pressure pumps, one on each engine. The F-4 flight controls consist of a lateral aileron-spoiler combination, a stabilator, and a rudder. The rudder is the only control surface with some mechanical control authority. The other control surfaces are hydraulically actuated.

Prior to 780, all hydraulic control actuators, except the rudder, were powered by both PC-1 and PC-2. The rudder was powered by the utility system. An aileron actuator failure which caused depletion of both PC systems would rapidly degrade lateral and longitudinal control. The stabilator assumed a position dictated solely by airload, and the aircraft very shortly resembled the proverbial "flying crowbar."

flying on one wing...

The 780 modification replaced one of the PC systems on each wing with utility pressure. With this modification, left wing controls are powered by PC-1 and utility pressure and right wing controls are powered by PC-2 and utility pressure. The stabilator is still powered by PC-1 and PC-2, and the rudder is still powered by the utility system. Therefore, a single lateral actuator failure only depletes one PC system and the utility system. One of the aileron-spoiler combinations and the stabilator continue to be powered by the remaining PC system, and the rudder is capable of functioning with limited mechanical authority.

What should you expect if a PC and utility system fail? How does the aircraft fly? What factors should be considered during the cruise and landing phases? During the remainder of this article, I hope to combine Dash One procedures with a little personal experience, and answer these questions.

Initial notice of an actuator failure can occur in one of two ways: The best is from another flight member. A massive leak is easily detected in normal route formation, and depending on flight conditions an "eagle-eye" can spot it much further away. The actuator is located well within a wingman's normal plane of vision during most formation work, and it is difficult to confuse the leak with any other phenomenon. The fluid streams from beneath the wing, vaporizing several feet behind it. Fluid quantity is not great, so visible leakage won't last long. An early warning gives the aircrew an opportunity to maneuver toward a more advantageous attitude or airspeed.

If the leak is not visually detected, it becomes apparent when the master caution light illuminates. A hydraulic-gauge check will show which systems have failed. It is possible that only one system will indicate failure initially, so continually cross-check the gauges to see if another system is failing. If fluid loss is massive, the gauges will definitely show decreasing systems pressure. Although the rates of pressure decreases may not be equal, the depleting systems will fail in about two minutes.

When a leak is confirmed, take immediate action to establish straight and level flight at a safe ejection altitude within the recommended airspeed range (250-500 knots). This airspeed range is rather broad, so normal cruise airspeed (300-320 knots) is quite comfortable.

For landing, everyone would like a VFR situation on a military runway with lots of concrete and barriers. However, factors other than hydraulic problems may necessitate landing on something less desirable. Whether to fly a long distance to a good military runway or a short distance to a less suitable runway is a stiff decision. I do not make it based only on relative distances. Many factors such as weather, crosswinds, and barrier availability should be considered.

Enroute, the aircraft will handle quite well at 300-320 knots cruise speed. Controls may feel a little sluggish, but the aircraft handles better than expected. Remember a couple of points for the flight home. First, you must think before you move the controls. Rate of attitude change should be slow. Slow, deliberate, control pressure moves the aircraft as much as required and will prevent any over-control tendencies. It will help to plan all banks at around 15 degrees. Second, keep chase aircraft away from you. It is difficult to fly smoothly, and a dented wingtip is really not going to help very much. A good formation position for chase is the route position. If he has to fly any closer than route due to poor visibility, put him in trail.

Prior to landing, jettison asymmetric stores, the 300-320 knot airspeed works quite well. If the allowable jettison airspeed is below 300 knots, keep the aircraft straight and level after jettisoning, allowing time to accelerate back to 300 knots. (If you are getting the idea that I think 300 knots is the magic airspeed, you are right.)

Next step is to get aligned with a runway. Runway length, available barriers, and crosswind must be considered. Again, more than 15-degrees of bank is not worth the risk, particularly when you are close to the ground. A 300 knot entry speed requires about a 15 mile final. This distance allows time to slow down, get the gear down, and set approach speed without being rushed. This distance will also give you some time to become familiar with the degraded control response in landing configuration.

As the aircraft slows to gear speed, the degradation of control effectiveness will be noticeable. The aircraft still responds quite well, but more stick movement is necessary. Greater effectiveness of aileron over the spoiler becomes apparent, so you must keep thinking — do not generate high roll rates. It is a good idea to stabilize airspeed close to 250 knots until gear and hook are down and checked. Then make your crosswind corrections before slowing to approach speed.

I purposely did not mention blowing the flaps one-half down. If the runway is littered with barriers or a stop can be made with emergency braking, don't even consider using flaps. If runway conditions dictate flaps, consider all the possibilities. Altitude is the most important consideration. Be well above minimum safe ejection altitude when you lower flaps. If asymmetric flap extension should occur with the limited control available at 200 knots, it would be an interesting ride. There is

be enough control response at 200 knots to counter initial roll generated by a split flap; however, when the flaps are finally down, it should be easy to right the aircraft. But it takes time and altitude. I had the opportunity to do this at 1500 feet, the next time I will be closer to 10,000.

Remaining commentary is based on a no-flap approach. But if you lower flaps, the situation remains approximately the same, except for approach speed and control effectiveness which are slightly less, and acceleration time slightly greater.

When aligned, establish approach speed. Seventeen units in a no-flap configuration appears to be very fast, but you must remember that control effectiveness decreases with airspeed. Control degradation should not cause any problems if small corrections are used to maintain runway alignment. If a large correction is required, the situation becomes more difficult. So, if a go-around is possible, don't try a large correction at 17 units. If the aircraft is "horsed" close to the ground, your whole day may be ruined.

The only decision left is barrier engagement or an emergency brake stop. Both are well covered in the Dash One, but there are two points concerning approach end engagements that must be emphasized. First, the aircraft must be flown onto the runway at 17 units. Seventeen units is approximately 20 knots above the no-flap approach speed, and the extra 20 knots is enough to fly over the barrier if you aren't careful. The aftermath of aircraft in the air and hook in the barrier is not very pleasant.

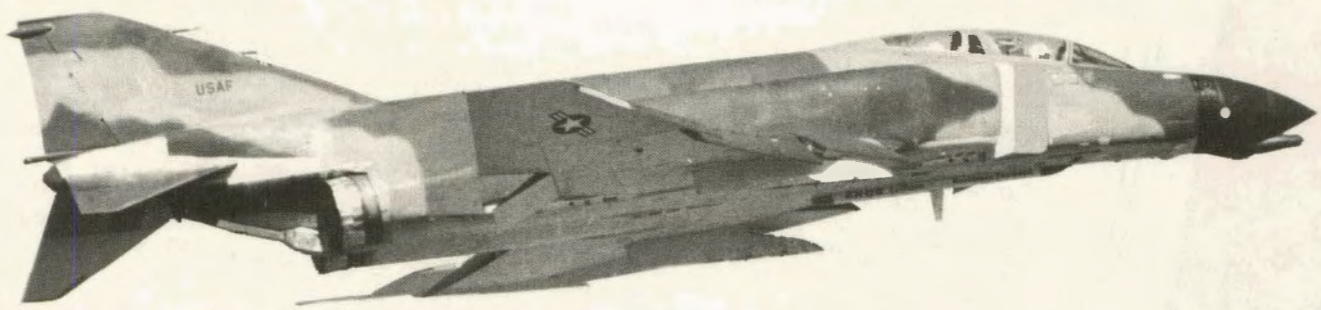
The second caution is to follow the relatively new engagement procedures and move the stick forward after landing. It is rather unnatural, so you must think about it on final and not just trust old habit patterns. If the barrier is hooked — fine! If the barrier is missed — look out!

I do not doubt that the bird could get into the air again, and you could have another go at the approach end barrier. There are so many variables that the decision will have to be made on the spot for individual cases. To me, an emergency brake stop seems to be the lesser of two evils.

All F-4s will soon have the final actuator fix: stainless steel barrels. The new barrels should solve the problems concerning this type of hydraulic failure. However, the F-4 was around a long time before the present problem materialized, and it will be with us for a much longer time. Anyone may someday find himself "flying on one wing."

Limited control caused by a massive failure is not the real problem. The problem occurs when the crew does not use the "good book," does not think before moving the controls, and when they slow down without knowing that the old bird is going to react quite differently as airspeed decreases. If any of you should encounter this problem, follow Lt Col Ray Krasovich's advice in AEROSPACE SAFETY's, "Have Yourself A Plan," March 1969. If your plan is good, and you do not blow a fuse between your brain and the stick, the one wing flying business is "a piece of cake" that you can expand into a great bar story. Cheers . . .

Major Bartlett entered the United States Air Force in 1957 as an Aviation Cadet and received his commission and navigator wings in May 1958. After flying as a radar observer in F-89s and F-101s, he attended pilot training in 1962. Since that time he has flown over 1300 hours in the F-4 with the 8th, 12th, and 4531st Tactical Fighter Wings. The experience gained during two incidents in June 1968 helped to expedite the present TO 1F-4C-1 single-power-control and utility-system-failure emergency procedure as well as this article. Major Bartlett is presently a student at Air Command and Staff College.



Our thanks to Major Smith of the 12th Air Force Safety shop for putting us on to the following address. It was delivered by Dr. Wilson at one of Luke's Flying Safety Meetings. The message is loud and clear and applies across the board.

PSYCHOLOGY OF PANIC

by

Capt S. K. Wilson

I've been asked to talk about the psychology of reacting in a tight situation, but we could also consider this a brief talk on the factors that keep us from panicking, or keep us from blowing our cool. A typical psychologist would probably consider this term the "loss of functional efficiency due to emotional factors."

It seems to me that there are three variables involved in keeping our cool, or if you will, maintaining our functional efficiency without allowing emotional factors to override it.

First, there's stress itself. Stress involves some activities which cause fear, insecurity, frustration, pain, fatigue, any of these things. Some situations will evoke stress in any of us no matter how hard and tough we are. However, a stressful situation has no value that we can quantitate — and how much the stress affects us is a function of oursely Now since we can't control what stress is going to happen to us in the ai at least we can try to control the way that we respond to this stress.

This is where we're brought to the other two variables in how we meet a stressful situation and keep from panicking. These last two variables are personality and environment. Environmental factors are a bit abstract, such as morale, leadership, central support and group identity. Talking about these values is always a little bit embarrassing — sort of like talking about God or love or religion; however, these values have been recognized by military leaders for ages.

Identifying with the group for example. Identifying with the group develops loyalty or belonging, and this allows us to broaden our individual duties to include the squadron. Thus, you are more willing and more able to tolerate personal stress while pursuing your group goals. This all goes by way of saying that all those squadron parties that we go to are fulfillir a purpose, that is, allowing you to identify with the group and thereby developing your loyalty to that group and, presumably, you'll perform better for it. Now, it's been proven over and over again in military situations that a squadron with good morale has a much greater efficiency as a group and as individuals. Presumably then, the individual involved with stress will react more efficiently if his group has good morale.

I think the most important variable involved in maintaining our emotional cool in times of stress is our own personality. If your basic personality is strong and sound and you have a minimum amount of latent anxiety, then your capacity to tolerate stress will naturally be greater. Controlling our personality structure is, of course, not possible. I'm afraid the die is cast in most of our situations, but there are two factors about personality which are malleable in a flying situation.

One is motivation. Obviously, the more motivated we are the more stress we can handle. The other factor, however, is something that's even more concrete and that's training. All the reading, the simulator training, the flying, the education, the skill development, all these things develop in us a sense of action.

Thus, when stress is placed on us in a flying situation, we have something to do. We can plug our little computers into methods of recovery, methods of self-defense, of survival, of escape. Because we're able to overcome this overwhelming anxiety that's produced by not being able to do anything, and even worse, not knowing what to do. So then, I think education eliminates the doubts and anxiety from unknown perils and replaces it with informed expectations and confidence arising from preplanned offensive and defensive measures.

In summary, I think we can see that in running a training program like we do at Luke, teaching new pilots, our new fighter pilots. to fly dangerous machines, a wide variety of factors must be considered in preparing them to meet stress. Probably the type of stress they will meet is beyond our control; also, their individual personality profiles are already set. However, we can and do play a very great part in instilling morale, motivation and good learning patterns in our pilots. If we feel that to the best of our ability our pilots are being taught good patterns of learning, that they are of high motivation and that our squadrons have good morale, then I think we're doing all that is humanly possible to prepare ourselves to react to stress sufficiently.

Amen. *Ed.*

TAC TIPS ...interest items, mishaps

HF and the RF

After refueling, the wingman in a flight of RF-4s experienced radio difficulty. As this problem was being resolved, his leader experienced strong vibrations and an overheat warning light on number two engine. He retarded the throttle with no apparent effect, and the engine was shut down. The vibration and overheat light continued intermittently so the pilot recovered at the nearest suitable airfield, single engine. Troubleshooting on the ground was negative, nothing could be found to account for the in-flight vibrations and overheat light.

It was discovered later that the wingman was transmitting on HF radio during the period when lead had his problems. The proximity of the two aircraft during HF transmissions was presumed to be the problem, subsequent flight tests confirmed the diagnosis.

The Dash One contains this note:

- **It is sometimes possible to encounter flight control pulsations, fuel quantity fluctuations, and occasional warning light illumination when transmitting on certain HF frequencies.**

The unit involved recommended that the "Note" be made a warning and specifically indicate that Fire/Overheat Warning Lights can illuminate along with other problems listed. Sounds like a good idea. The results of HF transmissions in close proximity to another RF-4 could mask a multitude of REAL problems.

MORE on the F-4 YAW STRING

Since answering Capt Murchinson's letter in the April TAC ATTACK, we found more poop on the string. It's located in the McDonnell PRODUCT SUPPORT DIGEST, Volume XV, 3rd Quarter 1968. The article, on page 20 by Gene Schuh, also references the 2nd Quarter 1967 and 1st Quarter 1968 magazines.

CALLING ALL CARS

Here's an outstanding example of improvisation by a couple of Yankee Air Pirates over in SEA. While returning to base after a night combat strike, the B-57's number one engine fuel flow began to fluctuate. The pilot reduced power in an attempt to reduce the fluctuations, but they increased. After two minutes of surging, the engine flamed out. About this time the UHF radio which had been acting up also gave up the ghost. As the pilot turned toward the nearest suitable field, his nav established radio contact on guard using his RT-10 survival radio. After several transmissions, he discovered they could both hear the radio if he held it inside his oxygen mask. A successful night GCA was made using the RT-10!

PHANTOM PHOLLY

A Navy crew headed home in their battle-scarred Phantom. Over the target, PC-1 had been lost. Now with throttles jammed at full military, PC-2 failing, and the stick locked, the pilot decided that their trip would continue via parachute. He pulled the lower handle and his RIO departed on schedule, but he stayed, staring at the canopy which should have been long gone. So he tried the face curtain (both ejection methods use a common lever), nothing happened; he tried the emergency canopy jettison handle, no luck. Next he tried the normal canopy control lever, still nothing. By now his problem became acute. If his ejection system pneumatic lines were shot up, that canopy was gonna hang around. So he pulled the only thing left, the canopy unlock lever. It worked but the canopy didn't go till he pushed the forward edge up into the slipstream.

Fortunately, this whole program began at 15,000 feet, offering sufficient time for all these goin's on. And that's the key to this story. Enough time was consumed so that the pressure in the pilot's ejection system, being held until interlock block removal, had bled off. He had to pull the handle again. But had he tried his manual canopy rem

with morals, for the TAC aircrewman...

immediately, the catapult may have fired, sending him out with arms flailing. Technicians aren't sure just how long it takes the pressure to bleed off, but it's obviously a matter of seconds. Now you know . . . so figure out a plan to whip it. In the meantime, we have people at all levels trying to figure a solution to this modified WW II bailout procedure.

WOULD YOU BELIEVE THAT ?

An F-4 from our sister service was launched from a carrier on a combat mission with the RIO holding a 35 pound (approx) utility hydraulic pump on his lap??? They had insufficient end speed and ejected during launch . . . the RIO was not injured. He was extremely fortunate to get out with only a scratch on his chin. The intent was to fly a combat mission up north, then smartly execute a parts delivery to a disabled squadron mate at a land base. Among other things, it was hard to believe a back-seater would let himself get talked into something like this. It couldn't happen in the Air Force . . . could it????

From the United States Navy CROSSFEED

HOLEY HERKY !

While descending from FL 190 enroute to destination, the aircraft took a lightning strike smack on the radome. The aircraft was in stratus clouds, there was no turbulence, and no hidden cumulus build-ups. The aircraft was in radar and radio contact with a Center who confirmed there was no precip returns between the Herky and destination. The aircraft radar continued to operate, the only damage was a 1/16th-inch hole in the radome.

SUN & SAND

By Capt A. Kent Seale, MC
Langley AFB, Virginia

One of the great summertime activities is laying in sand soaking up lots of sunshine. Just what the doctor ordered for health and happiness according to an old tradition . . . but is it really?

Modern medical doctrine, based on today's scientific research instead of yesterday's theory, says that exposure to sunlight results in more than the immediate effect familiar to most persons, sunburn. But the long term effects, unknown to most, may be disfiguring and even threatening to life.

The reason old theories don't account for today's known hazards is simple. Man has often thought of solar energy simply in the form of heat and light rays. This is very misleading because solar rays undetectable by human senses can cause serious damage to the body.

The term light, when used to denote radiance emitted by the sun, is scientifically defined as electromagnetic energy. These electromagnetic emanations comprise a wide range of wave lengths, extending from the short, higher-intensity X-ray and invisible ultraviolet to the longer, lower-energy and visible infrared rays.

Solar energy on earth ranges from 290 to 1,850 millimicrons. The visible rays extend from 360 to 650 millimicrons. These rays are the good guys. They don't even cause sunburn. The shorter wave length ultraviolet rays, ranging from 320 millimicrons and below, are something else. Fortunately the ozone belt in the atmosphere absorbs all the waves below 290 millimicrons. So the spectrum between 290 and 320 millimicrons is not seen or felt by human senses, but it makes suntan and sunburn.

It is the same part of the spectrum which provides vitamin D. However, don't be misled. You don't have to take the bad to get the good. For your minimal daily requirement of vitamin D, only three square inches of skin need be exposed, or a 15-minute exposure of an eight by twelve inch patch of skin will do the same. But necessity of sunlight exposure for vitamin D is no long

...ty anyhow because food markets are now well ...ed with irradiated yeast, milk, bread, and fish oils. ...of which provide more than the daily requirements.

If you're a sun worshiper who likes to sit poolside for hours on end, you either tan or burn but regardless of which it is, your baking program sets up several reactions in the skin.

First of all, the skin sets up a protective guard. Skin cells called melancytes are stimulated by the ultraviolet radiation and begin producing the pigment melanin to absorb the solar energy. If you tan readily, your skin has many melanin producing cells. With continued solar exposure, this pigment builds up to a "beautiful tan," and the skin increases in thickness as an additional barrier to radiation penetration. More about this later.

If you sunburn readily, you've probably been short-changed genetically, and your skin has a low quantity of melancyte, allowing ultraviolet radiation to penetrate deeper into the skin. Remember, sunburn is not caused by heat from the sun, similar to a burn from a hot object. When ultraviolet rays penetrate basal skin cells, the radiation causes changes in the atomic structure of each cell. With sufficient solar exposure, the molecular changes bring about cell destruction and the body casts them off in the form of blistering and peeling.

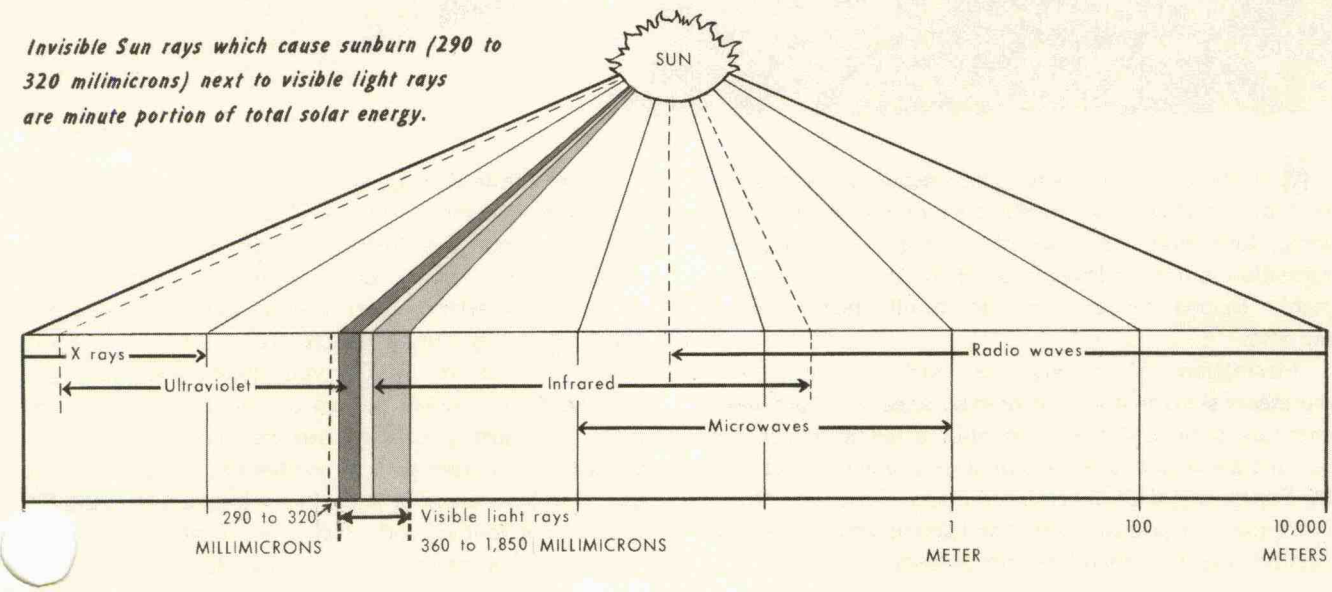
So, it is obvious that persons with skin which can ...ce melanin quickly, simply tan quickly and set up ...uate protection from ultraviolet radiation. Others who burn easily must use restraint, permitting only short solar exposures until the melancyte builds up its pigment melanin defense.

There is more to sunburn than just tolerating redness, tenderness, and blistering during your annual summertime forays. More subtle changes occur over a 10 to 15 year period, usually becoming evident in the third decade of life. The top layer of cells become thickened with scaly patches and may eventually become basal cell cancer. The elastic fibers beneath the skin are also destroyed. Their loss leaves the skin wrinkled and furrowed, creating the picturesque "old sailor's face."

Cellular destruction is even more serious in the eye. The optical system of the eye concentrates solar energy on the retinal surface. Coagulation and swelling of cells results and causes an immediate loss of central vision. The consequent hole, which occurs in the center of your visual field, is cellular destruction and as such is permanent. Children have been known to permanently damage their eyes when playing a game with their friends that might be called, "I'll bet I can look at the sun longer than you."

The intensity of solar energy is increased by reflection from surrounding surfaces. Sunburn radiations may be reflected up to 85 percent by fresh snow, 18 percent by dry sand, and 10 percent by water at an incidence angle of 60 degrees but considerably more at 90 degrees. The amount of solar energy reaching the earth at any one moment varies with humidity, smog, latitude, altitude, time of year, and time of day. A good rule to remember is, the higher the altitude, the clearer the day, and at high noon, more solar energy will penetrate the atmosphere. Consequently, the greater the potential for sunburn.

People need not expose their skin to solar energy for health reasons. Frequent exposure eventually results in an undesirable wrinkled appearance of the skin and possibly cancer. The information in this article should be more than sufficient to warn the "poolside sitters" that too much exposure to sunlight may create severe skin problems in later life.



Invisible Sun rays which cause sunburn (290 to 320 milimicrons) next to visible light rays are minute portion of total solar energy.

Thunderbirds

FORMATION

by Maj Doyle Ruff

Major Doyle Ruff entered the Air Force via the ROTC Commissioning Program in June 1959 after graduation from Florida State University. He completed Flight Training at Laredo AFB in March 1961, and was posted to Moody AFB where he served as a flight instructor until July of 1963. In August of that year he transferred to Randolph AFB, continuing as a flight instructor.

In January of 1965, Major Ruff joined the 1st Air Commando Squadron at Bien Hoa AB where he flew 203 combat missions in the A-1E, 19 of which were "Sandy" missions over North Vietnam. On return to the States in December 1965, he was assigned to the Air Force Academy as Air Officer Commanding, Eighth Squadron, U.S. Air Force Cadet Wing. He joined the Thunderbirds in December 1967.

Major Ruff's decorations include the Silver Star with Oak Leaf Cluster, Distinguished Flying Cross, and Air Medal with seven Oak Leaf Clusters.

Many pilots are fortunate to have assignments in which formation flying is an integral part of the mission. For some, formation is a phase of training; but, ultimately, formation is that undeniable aerial concept which enables highly trained fighter pilots to fulfill their intended purpose.

Formation is synonymous with teamwork. It represents skills that are nurtured by sweat and hard work over long periods of time. Formation often broadcasts the burning desire and great potential of young pilots as they fly side-by-side with experienced pilots. Formation flying is one part of our business that still should be considered a high privilege (and therefore, not abused).

Those pilots with extensive formation experience do not require examples of hairy deeds and exploits, to dramatize and give further realism to the preceding remarks. Those pilots, or pilot aspirants, with limited formation experience need only to know that this is a phase of flying during which you must pay constant attention, and to which you must give your all. Remember, the nickel thrown on the grass could be for more than just your own derrière! The simple reason being that any team with a member not doing his part is bound to lose sooner or later. In our league such losses are often catastrophic, and always unacceptable. Kee mind that our nation's enemies can face few team

dable as a strong flight of four.

TRAIN

Successful formation flying begins with proper training, and the proper training for any individual begins in the Air Training Command. Every second of the formation phase must be used to full advantage and that definitely includes briefings and debriefings. Formation flying in pilot training should be anxiously awaited by student pilots. Instructor pilots should insure that this anticipation does not go unrewarded. Neither student nor instructor can afford to regard this phase lightly. Enjoy it, but always remember you are enjoying a most serious business. It is my opinion that a man who becomes a good formation pilot is then equipped to meet the challenges of all phases of flying.

Formation flying and the training involved with it must be approached with a mixture of caution, respect, and enthusiasm. The barnstorming days are long gone and any pilot who injects such flavor into a formation is more of a daredevil than a VSH wingman or leader. Every formation pilot should want to be regarded as the best. Of the handful of pilots I have tried to emulate, not one was a scatterbrain! And to be the best today requires professionalism. We have no room for the daredevil. If a does not demonstrate discipline as a wingman or r, he certainly does not belong in formation.

Some readers have thus far nodded, "Yes, yes of course." However, these people should ask themselves (quietly, because the answers could prove embarrassing) when the last time was that they flew formation and regarded it merely as a way to get to the range and back. Or, if they remember an occasion when they were airborne and found themselves flying with another aircraft in a way that was not briefed. These pilots could have all the training in the world offered to them and still remain comparatively weak in formation . . . the missing ingredient being discipline. This was aptly stated by Major Tony McPeak in the August 68 TAC ATTACK when he wrote, "Training insures that each man knows what is required of him and how to accomplish it. Air discipline is based on a grim determination to do the job properly." (See "Training and Air Discipline . . . Key to Maximum Performance," by then Captain M. A. McPeak.)

Full time demonstration flying has proven to us that there is no substitute for proper training. That we Thunderbirds truly believe in proper training is borne out by the program outlined for us in USAF Tactical Fighter Weapons Center Manual 60-2. Here is a "walk-before-run" process in which we fly three training ions per day (two diamond missions and one solo ion one day; one diamond mission and two solo missions the next), five days a week, weather permitting.

There is no magic involved in our flying. Instead, the newly assigned demonstration pilot finds himself involved in a lot of hard work and concentration. He begins by flying with the team leader in two-ship formation. These missions involve basic formation maneuvers at lower altitudes. Sustained turns, hard turns, chandelles, lazy eights, rejoins, and other maneuvers are flown. These are eventually followed by simple wing rolls and loops. Only when the leader judges him proficient, does the new demonstration pilot begin to approach air show altitude. He then moves into the three-ship phase of the training program and begins to practice some of the change maneuvers, such as from diamond to arrow-head, or trail. Finally, the four-ship diamond is flown, and the air show sequence is practiced and refined.

During this same time period, the new solo demonstration pilot is trained. His instructor is the lead solo pilot who served the previous year as the new man being trained for this specialty. For the solos too, the training season begins with several missions of only basic wing formation flying. The new solo pilot is introduced to his maneuvers and lower altitudes on a very gradual basis and always under the watchful eye of the lead solo pilot. It is not until five or six weeks elapse that the diamond and solo pilots fly together to practice the entire air show sequence of maneuvers.

All formation pilots in the US Air Force are responsible to certain mission requirements. They, too, have training programs tailored to meet those requirements. It is up to the individual to take full

FORMATION

advantage of his training. The next time you fly to the range, do not be so concerned about the turkey shoot, or how you plan to improve on yesterday's scores, that you forget you are a part of a formation. Use that enroute time and work determinedly on your formation flying. Too many jocks go mission after mission flying half-hearted and mediocre formation, thinking "what the heck, when the going gets tight or down to the nitty-gritty, I can tack on that wing and follow him anywhere." These people are potential weak spots in any formation they fly in. Take full advantage of the formation training offered to you. Our team's sole mission in the air is to fly formation. Yet, we are no different from other pilots in that we too must train properly.

Incidentally, you are never so good, or so far down the road of experience, that you need not concern yourself with continuation training. Reportedly, Confucius once said, "Fighter pilot who considers training no longer necessary will soon be taught lesson from six o'clock position . . . school will then be out!"

BRIEF

Any pilot who is designated to lead is, hopefully, a person who has demonstrated the competency necessary for that position. The leader does not begin his responsibilities for the flight when he signals start engines, or nods release brakes, or approaches the target. His real responsibility to his flight begins with the briefing.

The leader should give a great deal of thought to the mission prior to brief time. At brief time he should sit down and from start-to-finish, leave no doubt in the minds of his flight members that they have been properly briefed on what is expected of them.

To gain such confidence from his wingmen, the leader has to be thorough in his briefing. He should explain his exact intentions and make evident the fact he knows the job better than they. There is nothing wrong with a wingman thinking he can perform as well as his leader. Any good leader wants his men to strive toward that degree of self-confidence; but there is something wrong when the wingmen feel their leader is not up to par.

An excellent rule to follow is: If you do not brief it, do not fly it! Of course, this must be applied within the realm of reality. Otherwise, we lose the flexibility which enables us to rapidly adjust to the unforeseen in flight. However, if in the leader's judgment it is not necessary to deviate from the planned course of action, then the mission should be flown as briefed.

This may sound like an unsatisfactory, iron-clad type of rule to adopt. On the contrary, it is highly satisfactory and logical. The briefing given for a flight is akin habit pattern. The wingmen will go out and follow briefing or pattern. If the leader decides in flight on an unnecessary change to his briefing, and a change which is also unrelated to the mission, he may lead one or all of his wingmen into a jeopardizing situation. Oddly enough, one of our greatest enemies can be that essential pride found in all true fighter pilots. That pride which makes a man stick with his leader no matter what. Like the pride causing some readers, at this time, to think they could never be caught in a similar situation. But, too many good pilots have flown into tight corners because their leader decided to exercise a whim. When you are leading a flight and do not have "six Migs on your _____," consider very carefully any deviations from your briefing.

This is a rule strictly adhered to on our team. We believe it to be a sound and safe practice to fly precisely as briefed. This also helps to get us closer to the perfection we shoot for, but have never reached. Once in a while, when we are in the midst of a particularly good practice mission and everyone is flying exceptionally well, a team member will sometimes ask for a certain maneuver. I have never heard our leader yield to these exhuberant requests if the maneuver was not briefed.

Additionally, the leader should brief thoroughly. Points of confusion or question should be clarified p to termination of the briefing. A good flight leader

his wingmen and will recognize when they do not stand a point. A good flight leader will also remember that the confidence he wishes his wingman to have begins with a complete understanding of the mission. And that all begins with a proper briefing.

EXECUTE

Finally, comes the execution of the formation. This is the time for all the skill, pride, and desire to be demonstrated. This is when the formation pilot proves himself as a valuable asset to his flight. A "grim determination to do the job properly . . . ," as Major McPeak described it.

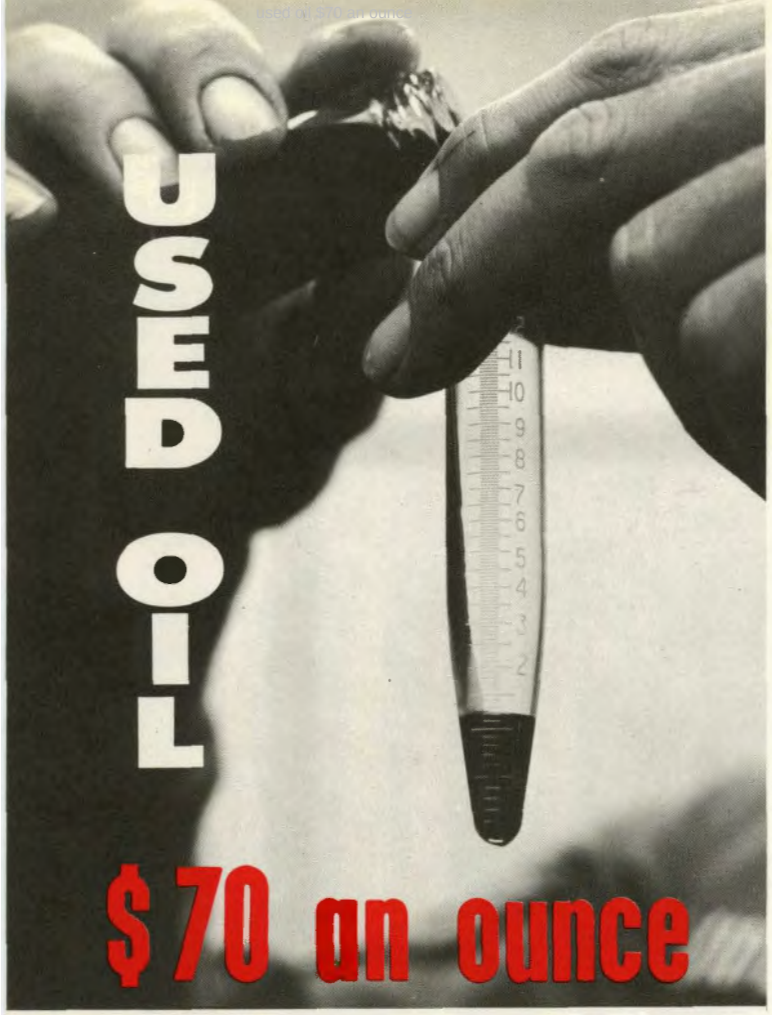
So now the tremendous pride within the fighter pilot may come to the forefront. The desire to "formate" better than anyone else and the pride a pilot has when he knows that he and his flight have done well are the magic combination in proper execution of formation flying.

Another very necessary ingredient is the ability to fly formation without worrying about a mistake made minutes previously. The pilot who overshoots a rejoin coming off the range because he is still thinking of his low scores, is not demonstrating that ability. The safety of the flight and high calibre performance depend upon every member of the formation concentrating on now and at the time thinking ahead.

Concentrating on now and thinking ahead are the only ways we can achieve the success rate necessary to us. For example, if I do not maintain a wings-level position on the leader, but remain cupped (bank into the leader) throughout a wing roll, the time to critique my mistake and think about it is during the debriefing. Right now, I must concentrate on the whifferdill turnaround we are into and be thinking ahead to the upcoming maneuver. If I cannot resist thinking about the mistake, then surely I will not be able to give full attention to the next maneuver and will undoubtedly cause some imperfection in it too. This most certainly applies to the leader as well as the wingmen.

When you and your teammates give proper execution to your formation flying, you have made a significant contribution. Just be sure to do this on an every-flight basis. Many pilots fly formation regularly. The more you fly formation, the more often you should remember that proper execution equals success, with longevity.

The Thunderbirds are merely a representative group of the greatest pilots in the world – you pros! We strive in every possible way to perform in a manner worthy of the privilege of representing you, your skills, and your machines. In working toward this goal, our very lives are treated with the philosophy of proper training, proper planning, and proper execution. This philosophy can keep you in the win column. Some games are played for keeps, so think about it . . .



Last year, 390,617 ounces of engine oil were removed from TAC aircraft. Each ounce was bottled in a sep container and promptly delivered to a laboratory w eventually established its value at $70.08 an ounce.

Ya say that seems a tad high for an ounce of engine oil? Well, you're right. But that $70.08 is not cost. It's profit, or more accurately, savings!

The value of these oil samplings began their afterburner climb about six years ago when TAC tested the Spectrometric Oil Analysis Program (SOAP). SOAP was pioneered by the New York Central Railroad to program diesel locomotive maintenance, and TAC was selected to give this technique a test for USAF after it was recommended at the Third Annual Safety Congress in 1962.

A simple definition of SOAP: a method of detecting excessive wear in the oil wetted areas of an engine by noting a rise in the metallic content of the engine lubrication oil. This makes it possible to predict impending jet engine failure, vital in single engine aircraft, and to schedule engine maintenance before major damage. It prevents operation until engine destruction.

TAC began its program with F-100, F-104, and F-105 aircraft. SOAP soon proved its value with these single engine aircraft because loss of engine usually meant loss of aircraft, and sometimes the crew.

Today, every jet and recip engine in TAC is monit by one of the 20 SOAP labs in the command, 12

All TAC SOAP labs use the Atomic Absorption Spectrophotometer to analyze engine oil samples. It measures amounts of each of ten primary wearmetals (iron, copper, etc) that may be in the oil, giving a direct readout on a small computer. The analyzer works on a principle that atoms of a burning metal absorb light rays of a certain wave length. The machine is equipped with a series of tubes, each emitting light of a wave length absorbed by one metal. The light is projected through a gas fed flame to a photocell. When an oil sample, diluted in a liquid compound, is fed into the flame, the burning wearmetal absorbs a proportionate amount of the light rays. This is detected by the photocell connected to the computer. Noting analysis factors is MSgt Gor Langille, SOAP Chief, Langley

throughout the CONUS, 27 others at USAF operational [illegible]of the world. Because TAC is operating more labs [illegible]ny other command, it seems probable that we see a sizable benefit, or at least one is in the making. To get the total picture, TAC ATTACK called on SAAMA/SAOQT at Kelly AFB, the OPR for SOAP. We ask them, "How's it going?"

"It looks like a pretty good program, but of course you'd expect us to say that so why don't we give you the facts and you draw the conclusions."

"Sounds like a good idea, but we're primarily interested in TAC. Can you be that specific?"

"No sweat, it's all in the computer. We can have it in the mail in the morning."

The facts are near fantastic. But you draw your own conclusions, keeping in mind that dollars can represent only time and material. Aircrew lives are unassessable.

1968 Costs of TAC's SOAP Program

390,617 oil samples analyzed	@ $ 5	$1,953,085
353 TDR verifications of suspect engines	@ 5,000	1,765,000
17 TDRs which proved unnecessary	@ 5,000	85,000
[illegible]al cost of analysis and tear downs		$3,803,085

1968 Savings Resulting Directly From TAC's SOAP Program

301 complete engine overhauls avoided	@ $ 17,950	$ 5,402,950
35 destroyed engines avoided	@ 200,000	7,000,000
17 destroyed airframes avoided	@ 1,031,000	17,527,000
4 pilot training replacements avoided	@ 312,000	1,248,000
Total losses avoided thru SOAP		31,177,950
Total cost of analysis and teardowns		3,803,085
Net annual savings		$27,374,865

These figures tell the story. But with a little arithmetic, they're even more revealing:

Net savings per each analysis	$ 70.08
Net savings for each TDR requested	73,986.12
Return on investment	8.2 to 1
[illegible]Expected return by successful [illegible]ock market investor – 1.3 to 1)	

Diluting oil with methyl isobutyl ketone before analysis is a critical step in SOAP because computer readout is measurement in parts per million, by weight. For example, one part per million means 1000 cc of fluid contains .001 grams of wearmetal. TSgt Donald Widlacki, Langley AFB, dilutes oil.

"All this arithmetic looks pretty fancy," you say. "And," you ask, "how can you prove that which hasn't happened might have happened in the first place?"

This kind of a question is best answered with another. "How does an insurance company actuary determine what his company's losses are going to be when the accidents, which are his costs, have yet to happen?" Answer: history of previous accident rates and costs. SAAMA says their formula has a similar origin.

So for the sake of a few pessimists, cut SAAMAs formula in half and you still get an exceptional return on investment: 4.1 to 1. If you want an Air Force wide picture of SOAP during 1968, apply the formula to: 1,226,368 oil samples analyzed with 1,253 TDR verifications, plus 5 percent for TDRs which proved unnecessary.

Some labs are now equipped to detect fuel and water contamination in their SOAP tests which suggests failing component parts, undetectable during routine maintenance. There have also been engineering and evaluation programs to incorporate an identifying property in various parts of the engine, which when detected by SOAP will pinpoint which part is failing.

Regardless of these new benefits which may come from SOAP, we're already sure of one thing. We've gotta good thing goin!

Operation KOB...

a fowl fantasy!

"Fine-feathered fowl of Bird's Strike Command, I salute you! We've flown the flyways of North America in another migratory invasion with minimum casualties. This year, our semi-annual takeover was virtually uncontested by the wingless wonders we oppose."

Georgi Gander, BSC's Commander, aviated once around the aviary's assemblage and honked on, "In fact, Intelligence's recce robins tell me that bird-discouraging efforts are at a near standstill around the enemy's feeding stations for his aluminum clouds. It's obvious that they're confused and losing their will to resist. Avatrol, that controversial bird-control pill we feared so much, is too hot for airport managers to handle. They're intimidated by our political action committee, Bird Lovers Unite. Their constant chirping, 'Birds mean more than people,' really paid off.

"And our activist group, Front For Feathered Folk, squawked loudly enough to force the feeding of millions of barnstorming birds throughout the nation. To confirm it, camera-carrying cormorants photographed garbage dumps, water holes, and tasty vegetation around many air installations. They're in excellent RON condition. . . for us birds, that is. If any attempts are made to take away our squatters rights, other "fronts" will scream like eagles. Pigeons For Peace are poised to plaster dissenters.

"I've received classified carrier pigeon communications from observation owls all over the country. They all state triumphantly, 'Ninety-five percent of all iron-bird units still react to bird strikes with the classic: Brief all pilots. There's practically no movement to reducing bird populations around their fly fields.' Thanks to you, feathered flyers of the propaganda committee, we've maintained the status quo since our original arch-enemy, Orville, snagged a sandpiper at Kitty Hawk (I hate that name . . . you know how we birds feel about cats!).

"Again, my congratulations, clever comrades. Your propaganda efforts in Operation KOB (Keep On Briefing) produces outstanding results. I know that KOB has been rough at times; we've suffered losses, but they're still "briefing pilots" almost exclusively. So, after every bird strike keep pointing at pilots as the culprit. Whenever possible make him (if you'll pardon the expression) the 'pigeon.'

"Let's face it. What can pilots really do about bird strikes? If he refuses to fly with a bird in the sky, they'll take away his silver wings. He'll be just a cussed kiwi!

"In conclusion comrades, the time will soon be ripe to launch our next big propaganda offensive: Coexistence On Their Concrete!"

CREW CHIEF OF THE MONTH

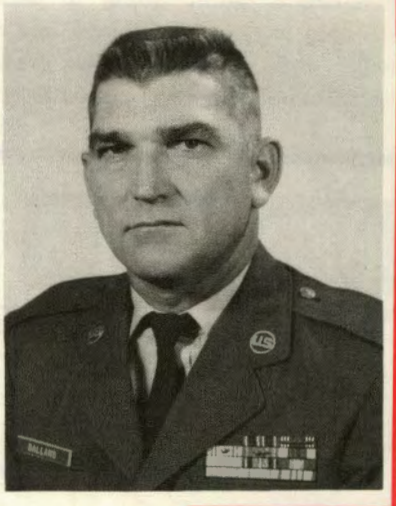
Sergeant Lynn C. Tompkins of the 4537 Fighter Weapons Squadron, Nellis Air Force Base, Nevada, has been selected to receive the TAC Crew Chief Safety Award. Sergeant Tompkins will receive a letter of appreciation from the Commander of Tactical Air Command and an engraved award.

Sgt Tompkins

MAINTENANCE MAN OF THE MONTH

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

TSgt Ballard



Letters to the Editor

As usual we munitions personnel assigned to 9AF enjoyed your April issue of TAC ATTACK, as well as previous issues. Paragraph two of "Munitions Load Crew" (page 9) stated that each crewman must be on orders as a certified loader, and each crew must be on orders as a certified unit. These two statements are not correct in accordance with TACM 136-1, chapter 1, para 1-3, January 1969.

Also, the writing by the photograph (page 10) showing the loading of the AIM-7 Sparrow missile contains erroneous information in the last sentence. A stray voltage check is performed (not functional check as stated) prior to insertion of ejector cartridges (not release cartridges as stated), ref TO 1F-4C-33-1-2.

We wish to express again, we enjoy your magazine.

MSgt Fred Elmore
9AF (DMMA)
Shaw AFB, S.C.

Thanks for the backstop Sergeant. We started the article before the new manual was out and failed to cross-check before going to press. Regarding our reference to functional check and release cartridges, you're right. We promise greater discretion in experto credite when it comes to correct terminology.

Ed.

DISTRIBUTION

As a recent exile from TAC, I have known enjoyed your magazine for many years. Our base is an IRAN facility for F-4s, 105s, and 100s. As a result, we have many fighter jocks sitting around twiddling their thumbs awaiting aircraft delivery. I would greatly appreciate four copies a month of TAC ATTACK so we can feed these eager warriors with brain food prior to their departure.

I would also appreciate copies of October '67, February '69 and other back issues dealing with maneuvering the F-4. Thanks for the help and keep up the good work.

Major John Keating
6214 Air Base Group
APO San Francisco 96340

In addition to the October '67 and February '69 issues, we found articles on maneuvering the F-4 in May and August '67. They're on the way.

We're happy to put you down for four. Thanks for the kind words.

Ed.

SOMETHING FOR EVERYONE

Reference your March '69 cover. Seve. "friends" have made a great effort to bring it to my attention. I enjoyed the issue anyway. Please put us on your mailing list.

1st Lt Richard C. Toothaker
Randolph AFB, Texas

We're glad you enjoyed our mag. We try to have something for everyone in each issue. You're on for one. *Ed.*

PEANUTS

TAC TALLY

AIRCRAFT ACCIDENT RATES

MAJOR ACCIDENT RATE COMPARISON

	TAC		ANG		AFRes	
	1969	1968	1969	1968	1969	1968
JAN	6.8	5.6	28.9	0	0	0
FEB	6.2	7.3	12.8	0	0	0
MAR	6.8	7.1	12.6	0	0	0
APR*	7.2	8.7	14.6	1.9	0	0
MAY		8.0		7.5		0
JUN		8.5		7.4		0
JUL		9.3		6.3		0
AUG		9.4		8.2		2.3
SEP		9.1		7.4		2.0
		9.3		6.7		1.8
NOV		8.6		6.9		1.7
DEC		8.8		7.8		3.2

UNITS

THRU APR	1969 *	1968	THRU APR	1969 *	1968
9 AF	2.7	7.9	12 AF	8.9	6.9
4 TFW	11.8	14.6	23 TFW	17.9	12.2
15 TFW	0	11.9	27 TFW	0	0
33 TFW	12.0	21.0	49 TFW	0	0
113 TFW	0	28.2	479 TFW	11.9	20.0
4531 TFW	0	14.5	474 TFW	22.4	42.7
363 TRW	8.8	0	67 TRW	0	0
			75 TRW	0	0
			123 TRW	39.8	0
64 TAW	0	0	313 TAW	0	0
316 TAW	0	0	516 TAW	0	0
317 TAW	0	0			
464 TAW	0	0			
4442 CCTW	0	0	4453 CCTW	0	13.2
			4510 CCTW	14.7	0
TAC SPECIAL UNITS					
1 SOW	19.6	0	4440 ADG	0	0
4409 SUP SQ	0	0	4500 ABW	11.6	0
4410 CCTW	0	22.4	4525 FWW	13.7	30.6
4416 TSQ	0	0			

* Estimated

The tally is in and it looks as though April was our month for spins. In all there were nine major accidents and three pilot fatalities, making it the worst month so far this year.

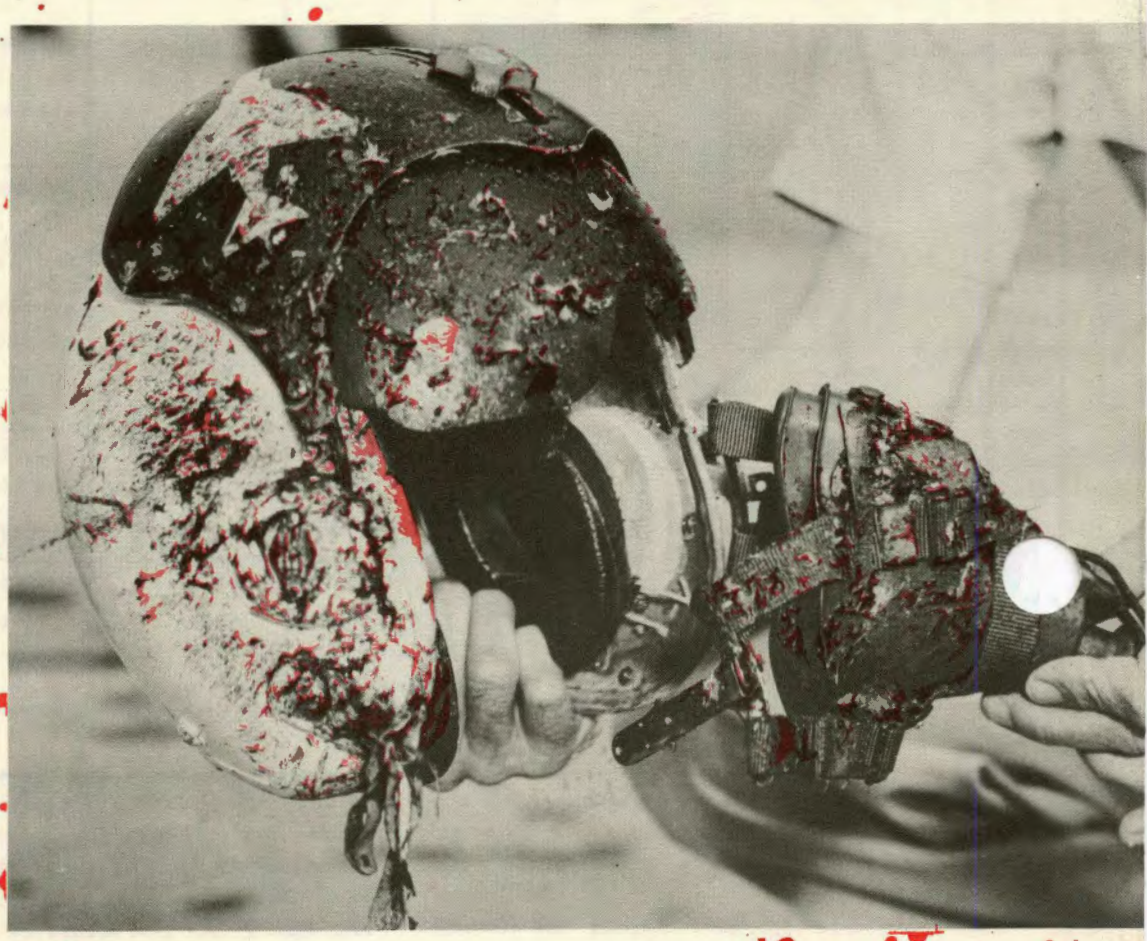
There were three reported F-4 spins, one ofwhich was a major accident. The other two were recovered after some hairy gyrations and came in as incidents. Our accident airplane was an E model, heavy and carrying tanks. The other two were a C and RF. Both birds that recovered did so by using the drag chute as entry into a spin in the opposite direction began after rotation from the previous spin was stopped. Recovery was immediate and positive after chute deployment.

Each of the incidents had a point in common – in each case the crew was misled by a gauge. In one, it was the angle of attack indicator, which later proved to be 5 units low. The other was reading the gas gage. When the crew got back they found that they had been doing rudder reversals at 19 units with 300 gallons in the left external. From the narratives it appears that we would have lost all three birds had two of them not used the drag chute. The "RF" spun clean from 20,000 and recovered at 10,000 feet – the chute was deployed as he entered his third spin. The "F" crew deployed their chute at entry into their second spin and recovered at 6500 feet – they entered the maneuver at 23,000.

Aside from our spin experience, there have been no other major trends. We lost the first F-105 to a split flap after takeoff. Two majors occurred on the runway, both involved blown tires. Another occurred on takeoff due to premature retraction of the gear. In the air we had one loss of control due to vertigo, and one in the traffic pattern break. Another F-105 was lost during AIM-9 tactics practice, and the last accident was an engine failure.

when on low level flights.....

LOWER YOUR VISOR !!!



..... the bird struck the right quarter panel, continued into the cockpit striking the instrument panel, then the pilot. The aircraft was in a left turn at the time of the strike. The pilot attempted to roll out of the turn, reduce air speed and gain altitude but was blinded by debris that blew under his visor. He regained vision in his left eye by rubbing away the bird debris with his left hand.