

# TAC ATTACK

DEPARTMENT OF THE AIR FORCE



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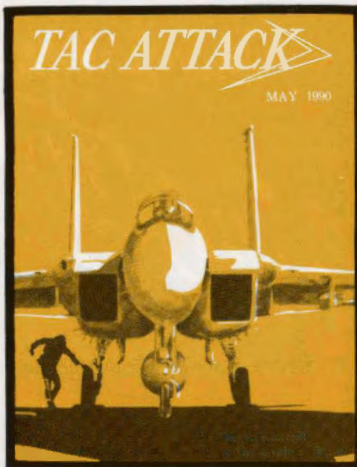
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# OUT OF IN THE

**Lt Col Neely Johnson, USAF (RET)**  
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A quick look at the mishap forecast for fighters will only confirm what you the aircraft drivers already know — that for any jet, there are one or two factors which account for the majority of the ops related Class A mishaps. But just knowing that information won't help you very much. It's not knowledge, but the application of that knowledge which really makes the difference. Unless you use that information to be more aware of the high risk areas and then develop a game plan on how you will avoid or handle the risk better, the knowledge hasn't done anything for you at all. In fact, you may have even falsely accepted the concept that when your number's up — it's up, and the forecast is just saying how many numbers will be handed out. Fortunately, that's not the case. How you apply that knowledge can directly change the outcome of the cards "fate" has dealt you. To help you learn more about when to "hold them" or when to "fold them," *TAC Attack* is launching a new series of articles. They will discuss the major ops factors for each of the weapons systems. If you have some practical thoughts on how we can minimize our losses for your jet, jot them down and send them in to Editor, *TAC Attack*, HQ TAC/SEP, Langley AFB VA 23665-5563.

Our first article in this series deals with the number one ops factor for the F-15 — loss of control. The author is a former Eagle driver with over 450 hrs in the jet. A command pilot with over 4,500 hours in fighters, including 100 missions over North Vietnam in the F-105.

# CONTROL EAGLE



**I**n the August 1988 *Flying Safety* magazine, Major Martin V. Hill of the Norton Inspection and Safety Center summarized the F-15 loss of control (LOC) mishaps. His bottom line — LOC has accounted for 40 percent of the losses in the operational category and almost 20 percent of the fleet lifetime losses for all reasons. **His brief synopsis of LOC mishaps frequently cites the PILOT'S FAILURE TO RECOGNIZE THE OUT-OF-CONTROL MANEUVER HE WAS ATTEMPTING TO RECOVER FROM AND THE RESULTANT FAILURE TO RECOVER DUE TO MISAPPLIED RECOVERY CONTROLS.** More recent loss of control mishaps have tended to be more of the same. This considered, my purpose here is to encourage you to evaluate your capability and predispositions when faced with an F-15 LOC situation.

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## **What is contained here will make sense and be useful to you the Eagle driver.**

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The information herein comes from many sources including the Dash-1, McDonnell Douglas **Product Support Digest** articles, discussions with McDonnell Aircraft pilots, firsthand Eagle experience, and over ten years of close association with Eagle drivers varying from lieutenant to general officer. As a former Eagle driver and now academic instructor of F-15 flight controls and aircraft handling, I have had occasion to reflect often and long as to "How/why it does that." The bot-

tom line, I trust, is that what is contained here will make sense and be useful to you the Eagle driver.

First a generalization. All pilots fly their aircraft to the ragged edge of the envelope, especially when they're maneuvering against another fighter. Think of it, your existence, either offensively or defensively, frequently turns on your ability to coax the very last knot, tenth of a G, or the absolute best turn rate and least turn radius from your jet. Probabilities considered, even though the flight controls are designed for maximum performance maneuvering, it follows that edge of the envelope flying will generate more "surprises," meaning LOC incidents, than flight in the heart of the envelope. But because the Eagle flies so well, most F-15 drivers have never experienced a LOC except in the simulator. In fact, when a LOC incident occurs, it

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**In fact, when a LOC incident occurs, it usually comes as a total shock to the jock.**

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usually comes as a total shock to the jock. One moment he's feeling "I've got it under control, I've seen this a hundred times before, and the jet is just a finely tuned extension of my mind and muscles." An instant later, his subconscious has already detected things are not going as planned. His subconscious mind races through a lifetime of experiences looking for the closest match to the current situation. If this is the pilot's first F-15 LOC, the subconscious may scream "UNKNOWN — DANGER" and a gallon of adrenalin hits his blood stream, his heart races, and his blood pressure rises rapidly. But if the pilot had flown in the F-15 spin program, his subconscious would probably find a match — F-15 Loss of Control, and a much lighter load of adrenalin would hit his blood stream. In this situation, one's **INITIAL** reaction tends to come from the gut rather than be a measured, calculated response. For the spin program pilot, that gut reaction would probably be to smoothly neutralize the controls — the proper response. For a 2,000 hour Phantom pilot, with 90 hours in the Eagle, and no previous F-15 LOC, I would wager his gut feel would be stick forward — the improper response for the Eagle but the correct procedure for old double-ugly (and also the F-5 and F-106). Or even if his gut feel was "controls smoothly neutralize," with a ton of adrenalin the average pilot would probably over ex-



tend his reach. In another instant your conscious mind perceives something is wrong. Then the next instant, although it seems like an eternity to you due to your increased blood pressure, your conscious mind first acknowledges you are out of control. The question then is when faced with this "surprise," what is your predisposition? What would your gut reaction be? Have you even thought about it?

Second, a question. When do you consider the jet out of control? "Well" — you state, "I ask the jet to do something and it did something else." Or, "The world came unglued! The yaw tone was on and I didn't have the faintest flippin' idea what was happening." Or perhaps, "Shoot man, I knew what was happening, but when I put in recovery controls, the jet went wild." Let's review what the Dash-1 has to say.

**"The aircraft is out of control when it does not properly respond to flight control inputs."**

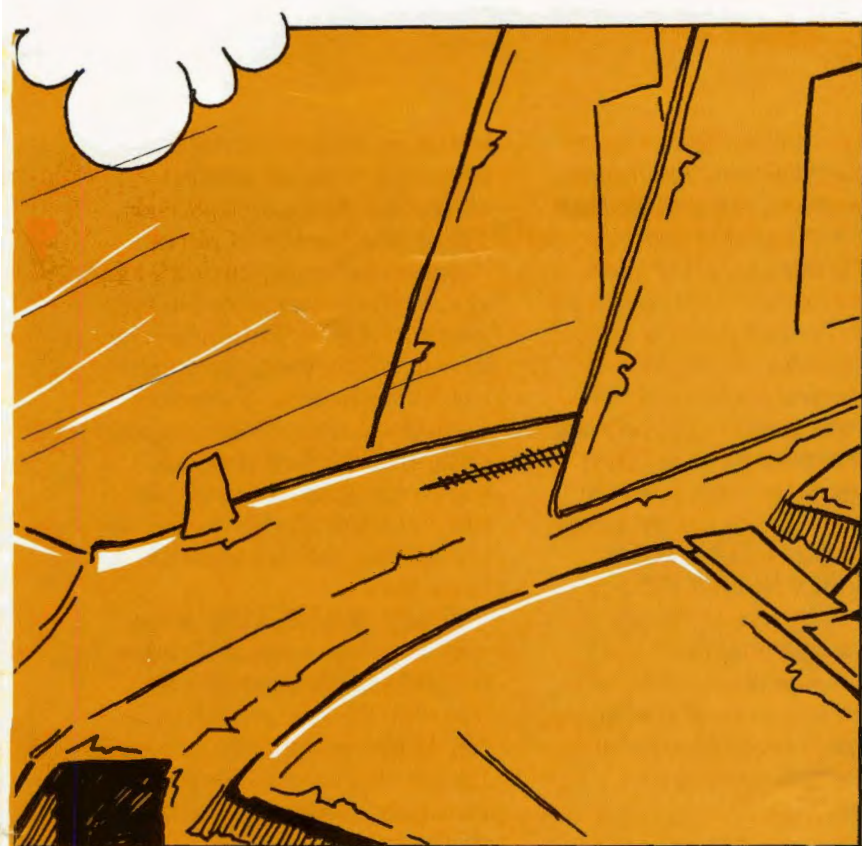
Now I want you to check the Dash-1, page 3-10. Notice it says **OUT-OF-CONTROL RECOVERY, not DEPARTURE RECOVERY.** I realize I'm splitting hairs. The point is **because** the jet flies so well, **because** the jet is so forgiving, **because** the jet so infrequently does something out of character, at times one tends to **force** a maneuver to happen

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**What would your gut reaction be?**

**Have you even thought about it?**

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here. If the jet is still flyable, you will have **flying** airspeed. Conversely, if you do not have flying airspeed and the LOC maneuver is relatively violent, you are probably in a spin. A "real war story" spin video tape showed the airspeed at zero almost immediately after spin initiation. If you are extraordinarily unlucky and manage to "couple-up" multiple effects — inertial, aerodynamic, kinematic — particularly in negative G, you will get the ride of your life and still have flying airspeed. The trend, however, will be rapidly downward. Now to the next step.

**If aircraft is not recovering, an autoroll is possible —**

## **2. Rudder - OPPOSITE ROLL**

Compare the ADI and HSI. If the airspeed was 200 - 300 kts, expect to see the ADI spinning and the HSI oscillating back and forth. "Read - autoroll." If you decide the machine is autorolling, the question is which way? Back to the ADI. This time you need to pay closer attention. I have found that in the simulator in a surprise rolling situation when the pilot looks at the entire ADI, he will invariably misinterpret his roll direction. If you don't believe me, try it on your next CT sim. Conversely, I have found that if the pilot focuses on the miniature aircraft in relation to the moving (rolling) background, he will invar-

## **1. Controls - SMOOTHLY NEUTRALIZE**

Are the controls neutral? Surprisingly enough, frequently they are not. Actual incidents have shown that in an LOC situation the pilot thinks he has centered the stick when, in fact, he has an inadvertent control input. If this happens, the recovery will be delayed; and if they are very far from neutral, the situation could be aggravated seriously. If things don't stabilize fairly quickly into something you can recognize — recovery, autoroll, or spin — you'd better try for a new "neutral" position. Again to the Dash-1:

**"Releasing all stick pressure will result in neutral controls if trimmed near 1G."**

Seems clear to me. You should also read your airspeed along in

when all the time the airplane was screaming . . . "I'm at the edge friend, just stick in some aileron and I'll really show you something." A good while back, you should have started the OUT-OF-CONTROL recovery procedure, but you didn't because nothing weird was happening. The jet just "Wasn't doing what I asked it to." If that's the case, then according to the Dash-1, you were OUT OF CONTROL.

Next, I'd like to look at the details of the OUT-OF-CONTROL RECOVERY procedure. The fine print says do not move the throttles unless in A/B. If in A/B, reduce to MIL. As you do this, read the altimeter. If the numbers aren't large enough, the rest of this discussion is academic. Now to the specific steps:

ably, correctly determine the roll direction. The critical part of all this is, once the correct roll direction is determined, then the correct recovery control can be applied. For a positive-G autoroll, the correct recovery control is rudder opposite the roll. Abrupt application of rudder may cause a pitch over of up to four negative G's once the roll stops. Conversely, if you are spiked into the canopy during a negative-G auto roll, rudder with the roll is the correct solution. The yaw tone should reinforce what you have already determined. Airspeed 200 - 300 kts — intermittent or no yaw tone — probable autoroll.

**If aircraft is still not recovering, an upright spin is most probable —**

### **3. Longitudinal stick - CENTERED**

### **4. Lateral stick - FULL IN DIRECTION OF YAW (TURN NEEDLE)**

### **5. Aircraft recovers (tone ceases) - CONTROLS NEUTRAL**

Back again to the ADI and HSI. This time the ADI is oscillating in pitch and roll and the HSI is spinning. "Read spin." This should be reinforced by low (near zero) airspeed or airspeed reducing very rapidly and a relatively constant yaw tone usually at high rate. The oscillatory spin will obviously not be as stable as the stabilized spin — makes sense. In fact, Jack Krings, the McAir test pilot who ran the original Eagle spin program states: "There is an academic line somewhere between

departures and oscillatory spins." He further indicates "Oscillatory spins (were) defined as spins with pitch oscillations over approximately 10 degrees. These spins were more violent with significant yaw rate hesitations." The turn needle provides the direction for aileron (lateral stick) input. If the turn needle is not sufficiently stable to determine direction, then according to the Dash-1 and the spin program, step 1 of the recovery procedure - **CONTROLS-SMOOTHLY NEUTRALIZE** - will normally recover the jet. From the spin program: "Tests have shown airplane self-recovery in any air-to-air configuration if controls are neutralized when the spin warning tone comes on."

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## **If you decided the machine is autorolling, the question is which way?**

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Discussions with Mr. Gary Jennings, project pilot for McDonnell Aircraft Corporation, provided interesting information. During the F-15 spin program, in spite of additional instrumentation in the cockpit providing spin direction, side slip, yaw rate and control surface position, the time of each recovery was somewhat of a surprise. The name of the game then was correct recovery controls patiently held until the recovery occurred — and it always did. Correct recovery control application is vital because, in some

instances, recovery can be completed only with full aileron/differential-stabilator application. This is why the Dash-1 places emphasis on keeping the stick longitudinally neutral when recovery aileron is applied. **Patience** is no less significant than correct control stick placement. If recovery controls are relaxed, even momentarily, then the recovery clock starts over again. If there is altitude sufficient for only one recovery attempt, then it's a bad day at Black Rock.

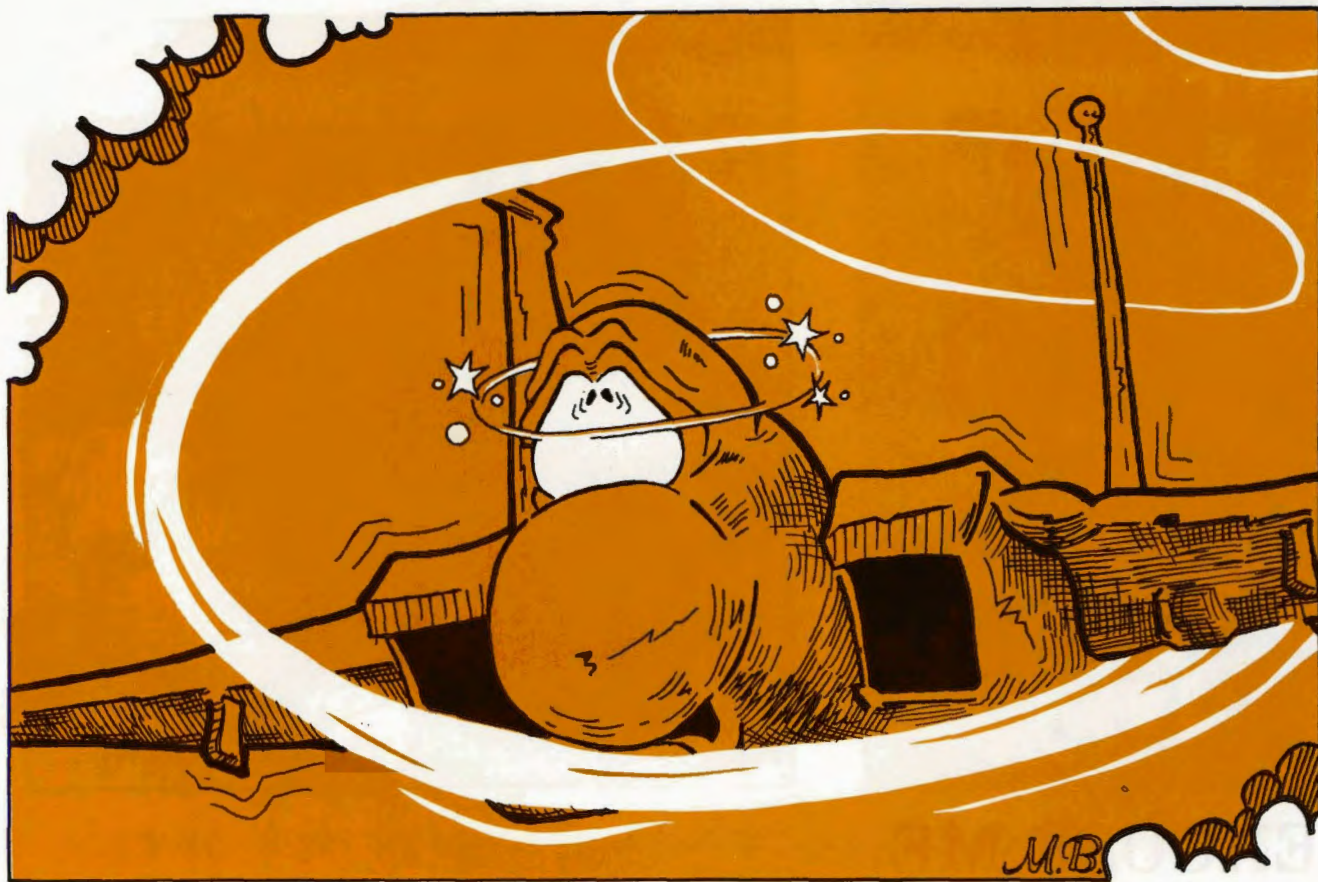
Finally on spins. In the actual spin video tape referenced earlier, the HUD shows airspeed near zero with the spin relatively stable. As the recovery aileron reduces the yaw, the nose pitches progressively more downward. During this process, the airspeed oscillates from zero to 120 KCAS and back to zero several times, then to 120-150 KCAS at the same time the yaw tone stops. The airspeed increased steadily from that point.

### **WARNING**

**If the departure warning tone malfunctions and stops prior to 30 degrees per second, neutralizing controls may result in yaw acceleration and a redeveloped spin. Use other indications of spin recovery in conjunction with the departure warning tone.**

The above paragraphs are intended to clarify the "... other indications of spin recovery. . . ."

It's a good day! You have correctly analyzed the LOC situation and recovered. Now you find yourself extremely nose low with altitude rapidly decreasing. Two additional thoughts. First when the aircraft recovers from a spin, it



will usually do so with some residual side slip present — it has not yet completely doped out which way the pointy-end should go. When this occurs, the aircraft will roll just as it will roll if you apply rudder — roll due to dihedral effect. Most of you have seen this during the recovery from a tail slide. This is not, repeat not, an autoroll. Give the jet time to sort the “liftyies” out and the rolls will subside. Second, the Dash-1, pages A9-16/17, provides the **DIVE RECOVERY - EMERGENCY PULL-OUT procedures**. But remember this, these procedures will put you back in the high AOA regime again and, if lateral imbalance or flight control problems caused your original LOC situation, you may find yourself out of control again with

much less altitude to work the problem. You, my friend, are traveling a narrow road and there is no “school solution” to stay on center line.

**If recovery is not apparent by 10,000 feet AGL —**

## 6. EJECT

An understanding of the way the jet behaves and recovers will hopefully preclude this step.

A final note. You will notice that in no place in this discussion did I make reference to looking outside. It is my opinion that to do so before the situation stabilizes is to court disaster. Major Hill’s article referenced in paragraph one of this discussion is full of examples of some very disoriented folks.

From day one, we have been taught to get on the gauges when our gyros are tumbled. I recommend you use this procedure here too.

So! Having waded through this epistle, what do you know new and different? For starters, I hope you understand a bit more about how the jet behaves in LOC circumstances. Second, if you didn’t stop somewhere during this article and wonder “Would I have thought to look at that particular instrument if I were **OUT OF CONTROL**,” then I have missed the mark. Finally, I hope I’ve convinced you that early application of neutral controls will avoid having to use most of the succeeding **OUT-OF-CONTROL RECOVERY STEPS**. ➤



## WEAPONS WORDS



# EXCUSE ME, YOUR EGO'S IN THE WAY

Major Martha J. M. Kelley  
TAC/SEW

**Y**ou can't do that! I'm telling you. I've a system to cover it. That's why this office is here. . . . mumble . . . mumble . . . mumble. Listen, why don't you back out of this? We'll handle it from here." What happened? Did you walk into someone else's territory? Although they told you they would handle it, it sounds as if you pointed out a gap in their system. But the other person won't talk to you about it. And even though you've pointed out a deficient situation, they may put it on the back burner or ignore it altogether.

This syndrome has been called

by many names. The dog theory (I've anointed this territory) — I'm in charge here, etc. What is really happening is the other person's ego is getting in the way of getting the job done. Unfortunately, this is all too common. As a Safety Officer or NCO, you may even be guilty of playing this game. We waste so much time playing such games and to the detriment of those people who depend upon us to do our job right.

Let's look at some typical situations where the ego game is being played in the workplace. Young sergeant to senior NCO visiting the flight line, "um . . . this is a

no hat area — you need to remove your hat." Senior NCO, "Mind your own business!" Weapons Safety Officer (WSO) to DCM, "Sir, we can't load live on spots E-1 through E-6." DCM, "I've already briefed the wing commander. Come on Captain, tell me what's the probability of a mishap of any magnitude occurring out there. You're interfering with my operation." WSO, "But Sir, I have identified two alternative locations we can legally use." DCM, "Read my lips Captain! Load crew member number one to load crew member number two, "Where's the checklist?" Load crew member number



two, "I don't know and I don't give a \_\_\_\_\_. We're not going to make the next sortie if we don't get all of these things up. You know that!" Well, we all know that these things happen, so what's next.

I say, "Never give up!" Try something different. This is where you may need to become a bit like a politician. Now don't

compromise your integrity, but seriously, the tone of voice you use, the way you present yourself can really make a difference. Always remember, the goal is to achieve the objective (safety consistent with operational requirements), not to win an argument. Keep thinking, how can we work it? How can we get from here to there — accomplishing the mis-

sion while properly limiting the risk? You might even be quiet and listen. Don't simply quote rules and regulations in a way that appears to be a roadblock to the other person. Sit down and look at all the alternatives with them.

**Make safety a positive part of the solution.** And be sure that your own ego isn't one of the ones in the way!



## ANGLE OF ATTACK

# RESPONSE

Dear Colonel Gawelko

This letter is in reply to your open invitation for remarks in the January issue of *TAC Attack*. I read your article in **Angle of Attack** asking, "If we know our airplanes, how to fix them, fly them, and support them, why do we keep having mishaps?" and I wanted to throw my two-cents on the table.

Aside from the mishaps that occur due to sheer misfortune, of which there are very few, a simplified process of elimination may be used to arrived at my answer. If we really do know and fly our machines as well as we think we do (which we do, of course), and our maintenance people provide the excellent support we require,

then a conspicuously consistent factor remains. Defined in **American Heritage** as "a feeling of contentment or satisfaction" and "self-satisfaction or smugness," it doesn't take much assimilation to see a connection between good pilots and complacency. Although we pilots tend to be very critical perfectionists most of the time, the times we slip are when mishaps occur and Lady Luck turns into a real terror. Also, are our maintenance folks driven by the same perfectionism with the aircraft? I've met some who are and some who aren't, just like I've met pilots in both categories.

A diverse range of causes result in complacent attitudes, and I per-

sonally don't think anyone is exempt from being complacent. Those people that retain complacent attitudes don't stick around. Those that fight back with constant aggressiveness set standards, save money and, most importantly, live to "check six" another day. We all agree that flying is a profession and, as professionals, we owe great responsibility to the people who pay for our profession and the government which provides the tools of our trade, be it a wrench or a jet. Sincerely,

**Jeff D. Parker, Lt, USAF  
1401 MAS, Det 3  
Barksdale AFB LA**



# AN ign

**This ignominious adventure began not long ago when an ex-member of our distinguished profession bought himself an aluminum semi-vee, 14-foot boat equipped with a 25-horsepower motor and other related equipment that would enable any inept angler to plane across the water seeking his favorite prey!**

## **Mr. Cal Faile TAC Ground Safety**

**N**ames shall remain anonymous to protect both the innocent and the “not so innocent.” This ignominious adventure began not long ago when an ex-member of our distinguished profession bought himself an aluminum semi-vee, 14-foot boat equipped with a 25-horsepower motor and other related equipment that would enable any inept angler to plane across the water seeking his favorite prey — fish!

Someone once said that “a boat is a hole in the water to throw money into.” Whoever said that must have known our friend, John. He was no exception and could not wait to get the latest lures and gadgetry

“gair-roan-teed” to catch the biggest “lunkers” (bass and whatever) you have ever seen. After investing about \$250 in fishing equipment, he decided it was time to navigate to the far reaches of waterways USA and find the fish of his dreams. Just my luck, he asked me to go along. My mistake was accepting.

Keep in mind that John was very proud of his new boat and fishing gear which were a giant step up from his first “fishing vessel” which was an inner tube and his former fishing gear which was a cane pole. Lack of knowledge of the operation of a motorized vessel did not curb his enthusiasm for the pending trip, and I was not aware of his lack of skills.

I became suspicious, however, when he failed to attach the safety chain from the trailer to the tow vehicle. He claimed he forgot. He maneuvered the car and trailer out of the driveway with what he expressed as great skill. I wondered where the mailman was going to put the mail since the mailbox was on the ground.

The trip to the lake was uneventful, but I couldn't get over the sway of a boat and trailer at 65 mph. At times I felt as if we were already in the water. The fun really began when we arrived at the boat ramp on the nearby lake. You can't believe the number of times we backed towards the water only to have the rear of the trailer go right when John

# ominious ADVENTURE

intended it to go left and vice versa. After sustaining three dents in the bumper and bending the trailer tongue 45 degrees, we decided to line the trailer up by disconnecting the trailer and physically moving it onto the ramp. This worked great until the gravity of the incline overcame our resistance and we both wound up waist deep in the lake. Working very carefully, we were able to disconnect the boat and pull the trailer out. Now the boat started drifting away from us because John "forgot" to secure a bow line to the boat.

Luckily, I was able to swim out to the boat and bring it back in. As I stepped into the boat, I realized I was standing in two feet of water because he "forgot" to put the drain plug in. I really did not care because I was already soaked to the gills. We bailed the water out while people standing around were making sounds like uncontrollable laughter. By the time we got the boat and equipment dried out, the prime morning fishing time had passed us by. We decided to go fishing anyway because nothing else could go wrong — we thought.

We donned our life jackets (I wasn't taking any more chances). After ten or so pulls on the starter rope, John remembered to prime the fuel

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**After sustaining three dents in the bumper and bending the trailer tongue 45 degrees, we decided to line the trailer up by disconnecting the trailer and physically moving it onto the ramp.**

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line and the 25-horse motor roared to life. Away we went, glancing off an adjacent pier, a pylon and another boat that was unfortunate enough to leave with us. The people that were laughing before were now cheering; well we thought it was cheering. What they were actually shouting was inaudible because of the roar of the engine.

The next 3-1/2 hours on the lake were uneventful because we didn't catch any fish. We did catch a couple of minnows we used for bait. The heat of the day finally forced our return.





# AN IGNOMINIOUS ADVENTURE

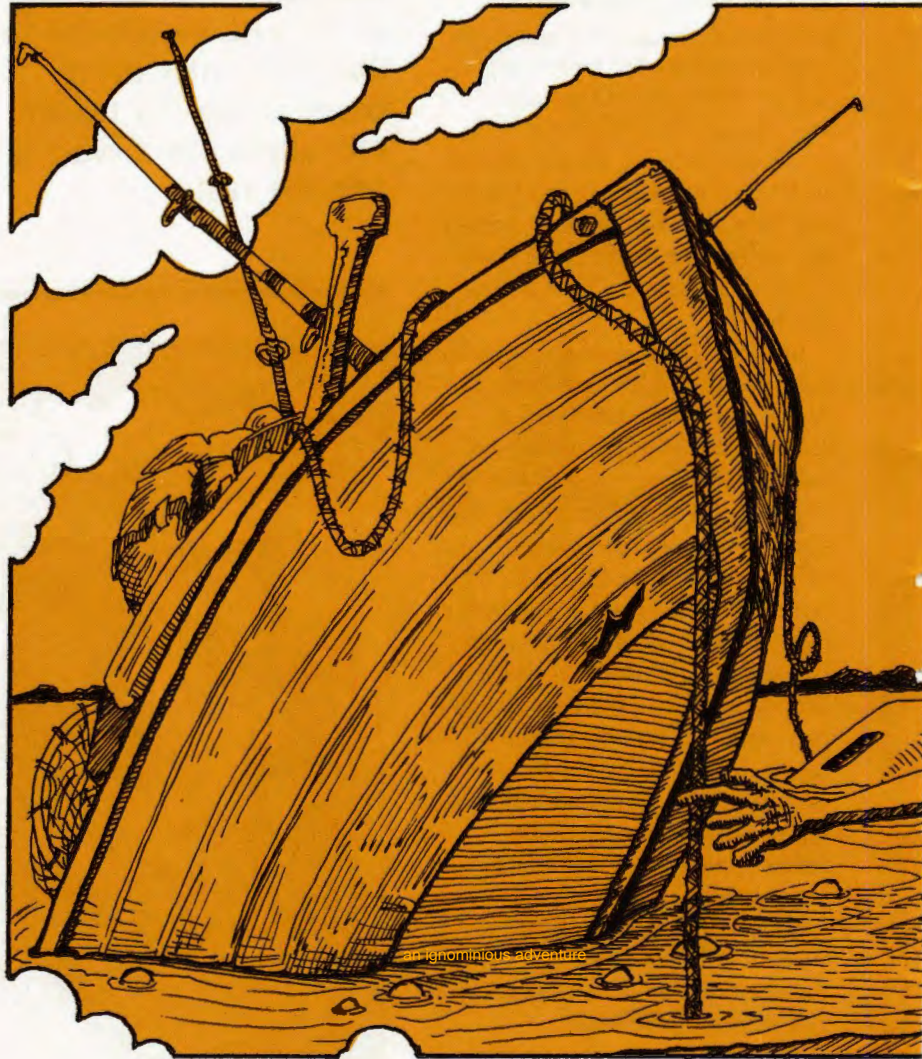
We both had sustained what felt like first degree sunburn because we had left the suntan lotion, food and additional supplies at the boat ramp. Maybe that's what everyone was hollering about.

As we neared the boat ramp, my stomach muscles began to tighten. We were coming in a little fast. As I shouted for John to slow down, he shifted to reverse without any pause, and I almost went over the front of the boat. I found myself staring eye-to-eye with a terrapin. He went one way and I went the other as John shifted into forward gear and nervously gave it all the gas he could muster. I regained my position only to look dead on at the fast approaching menacing pylon that we had struck earlier in the morning. With a loud thump, it disappeared under the water. Almost simultaneously the outboard motor found the pylon, kicking upward with such force it caused John to lose what little control he had left, and we headed straight for the pier. What appeared to be at the last second, John put the motor in reverse and turned the throttle full open. By this time I was in the middle of jumping from the boat to the pier to avoid the collision. However, as my luck would have it, the reversing action set me off balance and I wound up eyeballs deep in the water, arm in arm with my favorite life jacket.

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**John shouted that the boat was sinking and that water was pouring in from a three-inch gash in the front of the boat below the waterline.**

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But this time the water felt good, and at least I was away from the boat. In desperation, John had turned off the motor and was just sitting there looking at me. I felt compelled to have him join me, but I was afraid of what I might do to him in the water. John shouted that the boat was sinking and that water was pouring in from a three-inch gash in the front of the boat below the waterline! I replied that all good captains should go down with their ships. With a change of heart, I took the bow line and pulled him onto the boat ramp. After many tries, we finally got the boat trailered and departed for home.

The trip home was quiet. The last thing I remember saying to John was that the closest he

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**The heat of the day finally forced our return.**

**We both had sustained what felt like first degree sunburn because we had left the suntan lotion, food and additional supplies at the boat ramp.**

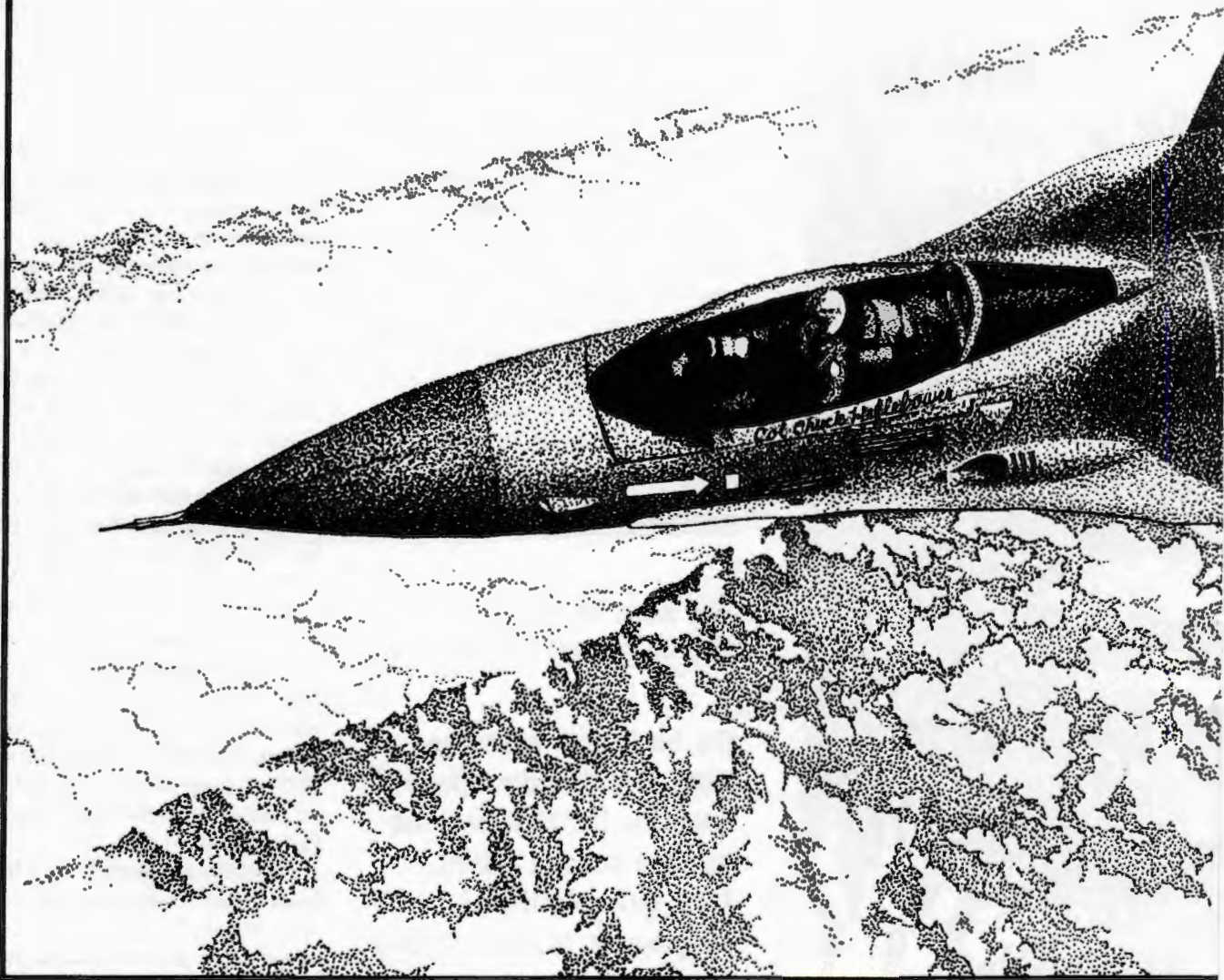
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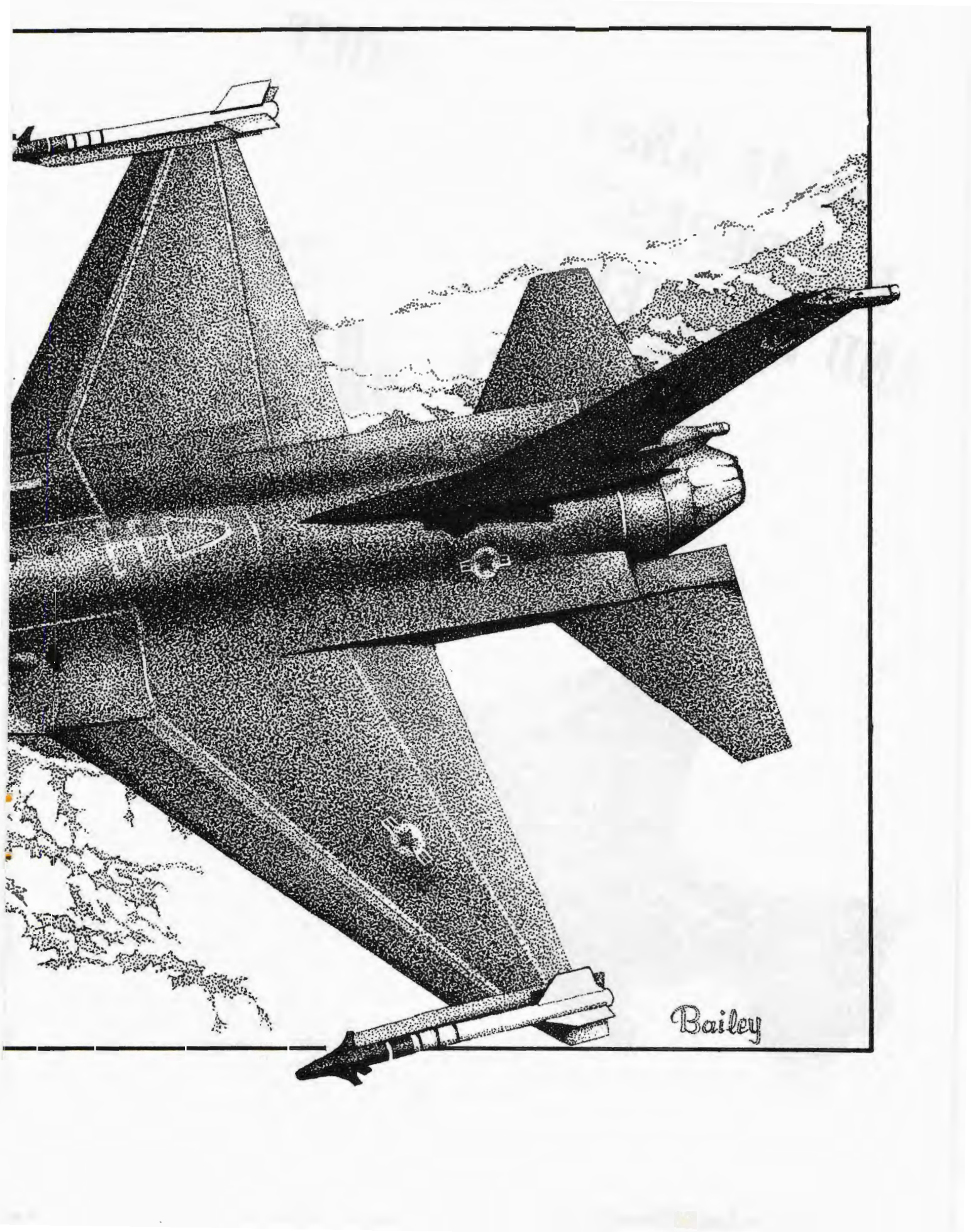
should ever get to a boat is one he could play with in his bathtub. He didn't think that was funny and I wasn't laughing either. Two weeks later after repairs were made, he sold his boat and put the money in the bank. Last time I saw him, he was fishing from the bank of a little creek.

Editor's comment: If John were in your unit, can you think of any suggestions which could have helped him to get successfully underway? Is your base one of the many which rents small powered fishing boats? If so, maybe you could have recommended that he take their rental checkout course which includes safety instruction along with hands on practice. He could even rent a fishing boat a few times to help him determine if he should purchase one or not. In many parts of the U. S. the Coast Guard, Coast Guard Auxiliary, and Power Squadrons offer a safe boating class which offers in-depth information. Or if you knew of someone who loved to fish, maybe you could have gotten them to take John along on one of their Saturday morning trips.

Learning to operate a 14-foot boat doesn't take a degree in Oceanography, but a few hours of practical hands-on instruction sure would have saved John a lot of needless cost and embarrassment. ➤

# F-16 Fighting Falcon





Bailey

# SOME ANSWERS ABOUT F-16 DEPARTURES AND RECOVERIES - part II

Maj James C. Seat  
6516 TS/DOA  
Edwards AFB CA

Last month, Part I of this article answered some questions that we have been getting here at the Test Center. In this final part are some situations you might want to avoid during your next BFM engagement and a few points on departure resistance and recovery effectiveness that may be of interest.

## SITUATIONS TO AVOID

There are basically four

ways to depart:

1. Slow, nose high, no pitch rate
2. Slow, high pitch rate
3. Yaw departure
4. Roll-coupled

The first two ways are the most common as they can occur in slow BFM engagements. The yaw and roll-coupled departures have generally not been a problem, although external stores can increase the chances for these types of departures. In particular, asymmetric stores (left wing heavy is worse) decrease the resistance to yaw departures. A rolling pull that assaults two limiters can lead to a yaw departure. Also, several yaw departures have been attributed to asymmetric LEF extensions. Here's a few situations during BFM that can set you up for a departure:





**SITUATION 1:** You're defensive and a little slow, but it looks like your attacker is heading for a 3/9 overshoot. As he spits outside your turn, you pull up and reverse. Nose high turn reversals are good setups for slow, nose high departures if you're not watching your airspeed before starting the maneuver. Remember, any F-16, regardless of CG or configuration, may depart if you run it out of airspeed.

**SITUATION 2:** You're trying to out zoom your opponent. You roll inverted to watch him. The horn is on, you know you're slow, but the zoom is working, and if you could just "hang" there a second more, you'd have him. You decide it's time to pull down and use max aft stick. You get a fairly good pitch rate at first, but as the AOA exceeds 25 degrees, the nose slows down, and the aircraft rolls right to an upright attitude. This is a good setup for the high pitch rate departure. Recovering on the horn and using smooth aft stick inputs should help you here.

**SITUATION 3:** You're in a vertical scissors, getting slow, but still aggressively rolling the lift vector at a high AOA. This is a good setup for assaulting the roll and AOA limiters simultaneously, causing a yaw departure. This departure is characterized by side forces in the cockpit. Although not a commonly seen departure, avoid the situation by making smooth stick inputs. If you do feel side forces build,

immediately release the controls and the aircraft will probably self-recover.

#### **POINTS OF INTEREST:**

— If you plan to fly with only one missile, Station 9 is the best place to load it for departure resistance.

— An empty back seat moves the CG approximately one percent aft for normal air-to-air loadings and decreases departure resistance. Figure X-1 of the checklist for small tail aircraft shows how a CAT I aircraft can become CAT III unless manually fuel balanced.

— An empty gun moves the CG aft approximately 0.5 percent for normal air-to-air loadings. As with an empty back seat, checklist Figure X-1 for small tail aircraft shows fuel management is required to remain CAT I.

— Big inlet jets with certain stores configurations have exhibited degraded post-departure and recovery characteristics as compared to small inlet aircraft. Deep stalls are generally more oscillatory in roll and yaw, requiring more MPO cycles to recover. During flight testing, the category (CAT I or III) for each stores configuration is usually determined by the demonstrated departure

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**Remember, any F-16, regardless of CG or configuration, may depart if you run it out of airspeed.**

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resistance. In the case of a big inlet jet with a centerline store, the aircraft passed the departure resistance requirements for CAT I, but was very difficult to recover from a deep stall due to violent roll oscillations. Because of the undesirable recovery characteristics, center line store loadings are presently CAT III.

— A modified yaw rate limiter has been tested for big inlet aircraft that greatly improves the post-departure and recovery characteristics. After a departure, the modified limiter commands less differential stab, giving the stab more authority in the pitch axis and a better chance for a self-recovery. If pitch rocking is required, this limiter cuts down on the roll and yaw oscillations, requiring less MPO cycles and allowing a faster recovery. The modified limiter will allow big inlet aircraft with center line stores to operate with CAT I restrictions. The modified limiter also shows potential to improve the post-departure and recovery characteristic of small inlet aircraft and is now being investigated.

Hopefully, this information will help you avoid an out-of-control situation. The bottom line is paying attention to your airspeed, slow speed horn, and making smooth stick inputs should keep you out of trouble. If you do experience a departure, the flight manual procedures will always give you the quickest recovery. And, of course, if recovery is not apparent at 10,000 feet AGL, eject.



# TAC AIRCREW OF DISTINCTION AWARD

**C**aptain David H. Shiver, pilot, and Major Stephen G. Schramm, WSO, 106th Tactical Reconnaissance Squadron, 117th Tactical Reconnaissance Wing, Birmingham ANGB, Alabama, were on a redeployment sortie from Jacksonville ANGB, Florida, after Exercise Federal Keynote. Dixie 61, RF-4C, departed on runway 7 for a quick climb to 11,000 feet MSL. Passing approximately 5,000 feet, the right engine fire light and voice warning came on followed immediately by right engine overheat and left engine fire lights. While retarding the throttle from afterburner, the crew experienced a loud bang and aircraft yaw to the left, followed immediately by a left engine overheat light. Coming out of afterburner, the right engine throttle stuck at 98 percent. The left engine fire/overheat lights went out at idle; the right engine fire/overheat lights remained on. Capt Shiver elected not to jettison the center line tank because of the numerous houses in the area, and he was below maximum gross landing weight. He immediately began a left descending turn, shut down the right engine with the master switch, and declared an emergency with the intentions of taking the approach end BAK-14. Maj Schramm rapidly read checklist procedures. A successful heavy-weight, single engine, approach end arrestment was accomplished.



**Captain David H. Shiver**



**Major Stephen G. Schramm**

**106 TRS, 117 TRW  
Birmingham MAP AL**

Tower advised the crew that no fire was observed during the engagement. Capt Shiver and Maj Schramm made a rapid, but normal ground egress. While checking the aircraft prior to the arrival of the Fire/Crash, Capt Shiver observed smoke coming from the exhaust area of the right engine. Fire/Crash, upon arrival, found a small fire in the right engine Aux Air Door area that self-extinguished.

The post flight inspection revealed that a fuel line had ruptured, spraying fuel into the right engine bay, melting the teflon coating on the throttle cable, causing the right engine throttle to stick at 98 percent. Some excess fuel had entered the left engine

bay through the Aux Air Door Area causing the left engine fire/overheat lights. Capt Shiver's rapid shutdown of the right engine with the master switch prevented additional fuel from entering the engine bay and the fire from spreading. This immediate action prevented possible loss of the aircraft and aircrews.

During the approximate four minutes airborne, Capt Shiver and Maj Schramm's thorough knowledge of aircraft systems and prompt execution of emergency procedures minimized the damage and allowed the recovery of a valuable aircraft and, thus, earned them the TAC Aircrew of Distinction Award.

# Fleagle!

FEW THINGS BEAT A WEEKEND ON TH' WATER TO WORK OUT TH' KINKS BROUGHT ON BY A BUSY WEEK.



NOW IF I COULD GET THESE PERCH TO BITE, MY DAY WOULD BE REALLY COMPLETE.



MAYBE THEY'S BITE'IN A LITTLE BETTER UP TH' RIVER.



PULL, CHUG  
PULL, CHUG, CH



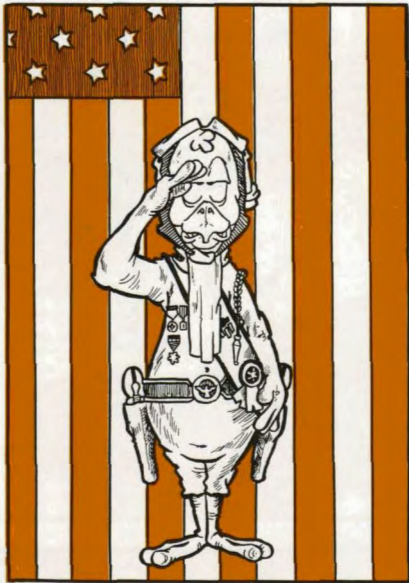
DERN HUNK OF JUNK.



THINK FLEAGLE'S EVER GONNA GET TH' HANG OF DOCKING THAT THING?



HARRISON



# FLEAGLE

## TAC'S OUTSTANDING AIRMEN

**Captain James D. Napoleon, Pilot, and Captain Yves L. Pacheco, Weapons System Officer,** 523d Tactical Fighter Squadron, 27th Tactical Fighter Wing, Cannon AFB, NM, were flying an F-111D aircraft on a low level route. In wings level flight, approximately 500 feet above ground level (AGL), while crossing a ridge line, the crew heard an extremely loud bang accompanied by a violent jolt. The jet pitched down 20 degrees, rolled left to 50 degrees of bank and yawed to the right. The master caution and numerous warning lights illuminated. Aircraft controllability at this time was questionable. A quick scan of the engine instruments showed both engines operating normally. Capt Napoleon regained control by turning all flight control damper switches off. With the dampers off, the aircraft response was marginal. Using both hands, nearly full aft stick and full right roll inputs, he was able to avoid a collision with the ground and climbed to a safe ejection altitude. Once the aircraft was well into the ejection envelope, the pitch

damper was turned on. With a loud clunk, the aircraft returned to normal flight in the pitch axis. The most probable cause for the uncommanded flight inputs and subsequent handling difficulty with dampers off was that the aircraft experienced a partial loss of AC power. The right generator was not allowed to tie into the left AC bus even though the left generator was inoperative. When this occurred, the flight control computers were left without power. By the time the pitch damper was turned back on, the flight computers had returned to normal operation. The same procedure was then used in the roll and yaw axis with positive results. Then the crew performed a damper reset which extinguished all remaining caution lights except for the left generator light. The crew performed a controllability check, confirmed the flight controls were working normally, and accomplished a successful landing. The skill and airmanship demonstrated by Capt Napoleon and Capt Pacheco have earned them a **Fleagle Salute**.

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**Captain Wyatt Stedman, 59th Tactical Fighter Squadron, 33 TFW, Eglin AFB, FL,** was leading and administering a Mission Ready Qualification check ride for his number two man, call sign Jugs 12. Weather at the departure base was 5,000 ft broken, 8,000 ft overcast, five miles visibility with light rain showers and fog.

The F-15s took off in pairs with the second element in 2 NM radar trail. Shortly after takeoff, Jugs flight was directed to turn right after passing 2,600 ft MSL. The wingman was in fingertip formation on the right, inside of the turn. The flight was then instructed to proceed direct to Tyndall AFB and to climb and maintain FL230. The flight entered the weather passing 5,000 ft MSL and rolled out of their right turn heading east. After rolling out, the wingman perceived the flight was still in a right turn and drifted out of position, slightly high and wide on lead. Realizing he was high and perceiving he was drift-

# SALUTES



ing closer to lead, the wingman pulled up to get separation. At this time, the flight was passing approximately 12,000 feet. Jugs 11 then noticed Jugs 12 falling out of position, almost over his aircraft. Jugs 11 unloaded his aircraft and banked left, away from Jugs 12. Capt Stedman transmitted, "Jugs 12, do you have a problem? . . . Jugs 12, you have the lead on the right." The wingman did not acknowledge the lead change and continued to maneuver toward lead. Capt Stedman aggressively maneuvered his aircraft up and to the left of his wingman to avoid a potential collision. Capt Stedman assumed a chase position 500 to 1,000 ft away, while directing his wingman to roll out and pull up from the ensuing unusual attitude. The flight was in the weather with no visible horizon, but with several thousand feet of visibility. Jugs 12 still perceived he was in a right bank, not believing his instruments. Capt Stedman again directed him to roll right and pull up. At this time, Jugs 12 was in approximately 90 degrees of bank and 40 degrees nose low. Jugs 12 glanced at standby ADI when Capt Stedman transmitted, "Jugs 12, roll right 90 degrees and pull up." Hearing this, Jugs 12 then began to recover. Passing 5,000 ft MSL, Jugs 12 broke out of the weather and completed his recovery at approximately 4,500 ft MSL, heading west with Jugs 12

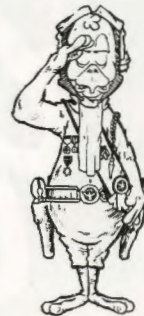
in the lead. During this 180 degree diving turn, Capt Stedman cleared off the Jugs 13 element and coordinated with ATC to clear other traffic from Jugs 12's recovery. After confirming that Jugs 12 had good navigation aids and the pilot was okay, the flight recovered with Jugs 12 in the lead.

Capt Stedman's outstanding situation awareness and flight leadership were directly responsible for the safe recovery of two valuable TAC assets and have earned him a **Fleagle Salute**.

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On 6 October 1989, **Lt Colonel John A. Dennis, Jr.**, an up-grading F-16 pilot, and **Captain Charles L. Moran, Jr.**, an instructor pilot, assigned to the 162d Tactical Fighter Group, Air National Guard, Tucson, Arizona, were flying two F-16A's on a basic flight maneuver (BFM-2) mission. While maneuvering in the area at 28,000 ft and 400 KIAS, Lt Col Dennis felt a vibration in his aircraft. Maneuvering was discontinued and he reported the vibration to the IP, Capt Moran. The engine instruments did not indicate a problem; but when the throttle was moved, Lt Col Dennis detected a slight change in vibra-

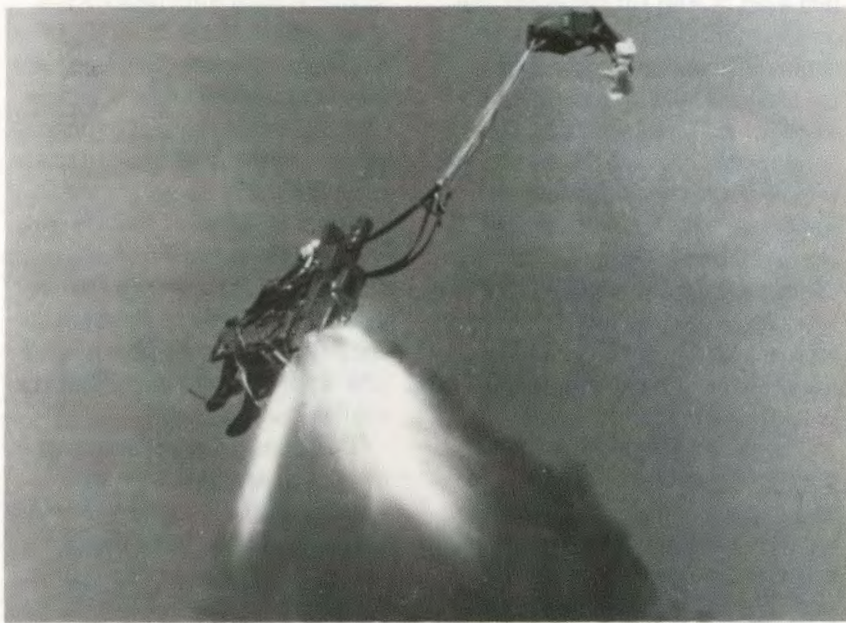
tion. Capt Moran checked the aircraft externally for a cause of the vibration. No cause was apparent, but Capt Moran elected to return to base as a precaution. Power was set at 85% and cruise altitude at 28,000 ft. When the throttle was retarded towards idle during the descent, the vibration increased and the RPM decreased below idle. Capt Moran, in a chase position, observed sparks and debris coming out the tail pipe. He instructed Lt Col Dennis to shut the engine down. Their position at engine shutdown was 20 NM from the field and 25,000 ft altitude. Lt Col Dennis, with assistance from his IP, Capt Moran, maneuvered the aircraft using intermittent speed brakes and S turns to a flameout final and successful landing. The timely decision to RTB combined with superior airmanship and judgment by Lt Col Dennis and Capt Moran prevented the loss of a valuable combat aircraft and earned them a **Fleagle Salute**.





ejection!

# A RIDE FOR THE TWENTY-FIRST CENTURY



**TSgt Larry E. Clucas**  
**HSD/YAG**  
**Wright-Patterson AFB OH**

**T**he Advanced Concept Ejection Seat (ACES II) has been operational for fifteen years. With more than two hundred ejection attempts and no fatalities attributable to the seat design, the ACES II is a proven performer. The ACES II is currently installed in the A-10, F-15, F-16, B-1B and the B-2 aircraft. It is the premier escape system of the Air Force. To enable this system to perform into the next century, several improvements are underway. While all

# A RIDE FOR THE TWENTY-FIRST CENTURY

of these improvements will ultimately enhance the capability of the ACES II, some are more for maintainability than others. This discussion will focus on the improvements that will enhance the operational capability of the ACES II.

The most significant change to the ACES II, in the near term, is the redesign of the Restraint Emergency Release (RER) system. This modification is the result of several mishaps. In several cases, crew members either inadvertently disconnected themselves from the seat prior to ejecting or tried unsuccessfully to use the manual backup parachute deployment system. The redesign of the RER system resolves both of these problems. Time Compliance Technical Order 13A5-56-540, with an estimated release date of May 1990, will lockout the RER handle while the seat is in the ejection launch rails. Additionally, the modification will provide the crew member with an independent ballistic backup parachute deployment system.

For many years, the most signif-

icant obstacle to overcome during the design and qualification of aircrew mounted equipment has been compatibility with the fixed Pitot tubes of the ACES II. These tubes were placed in their present location as a trade off between the clean airflow required for seat sensing and the need to provide clearance between the seat and the aircraft canopy assembly. The Air Force has designed and qualified a set of Flip Up Pitots for use on the ACES II. These pitots will deploy into undisturbed airflow for accurate seat sensing with all known, and projected, aircrew equipment and, ... at the same time, provide the crew member with improved "check six" capability. Production break-in of this modification for new F-16 ACES II seats is projected for April 91. Field retrofit is possible with minimal maintenance impact if funding is made available.

The ACES II's performance is determined by the accuracy of its airspeed and altitude sensors and the ability of the recovery sequencer to process the speed and altitude inputs. The current

sequencer is an analog system operating in one of three modes depending on the airspeed and altitude at the time of ejection. This system while proven reliable in operation has its limitations in terms of fixed performance and rising cost of ownership. The Air Force is in the process of qualifying a new "Advanced Recovery Sequencer" (ARS).

The ARS will provide variable recovery parachute deployment times versus the current fixed deployment timing. Improved sensors mated with a digital processor will enable the seat to adjust the parachute deployment time in response to the speed sensed at the time of ejection. Additionally, the ARS design will determine if a drogue parachute is required in mode II. Sled test qualification of the ARS will commence in April 1990 and, if successful, should be available in mid 1993.

The anticipated reduced cost of ownership coupled with the improved performance will enable the ACES II seat to be the Air Forces' ride for the twenty-first century. ➤



# SECRETARY OF THE AIR FORCE SAFETY AWARD

**T**actical Air Command's safety program in all functional areas — ground, weapons and flight — beat out eight major commands to earn the Secretary of the Air Force Safety Award. The command reduced off-duty fatalities by 41 percent from 1988 and weapons mishaps by 70 percent from 1986. The reduction in weapons mishaps saved \$1.7 million. The command reduced its Class A aircraft mishap rate by 70 percent over the past 10 years with 1989 being the best fiscal year and second-best calendar year recorded in the history of TAC.



## CITATION

### TO ACCOMPANY THE AWARD OF THE SECRETARY OF THE AIR FORCE SAFETY AWARD

The Secretary of the Air Force Safety Award, Category I, for FY89 is presented to the Tactical Air Command for outstanding achievements in mishap prevention.

The Tactical Air Command Class A aircraft mishap rate is the second lowest rate in the Command's history. During the period of this award, 645,000 hours were flown while performing demanding missions. Ground safety accomplishments were also impressive, resulting in all-time record lows for total mishaps and fatalities. Weapons program management resulted in an overall reduction in explosives and missile mishaps.

The achievements of the Tactical Air Command exemplify the high standards established for the Secretary of the Air Force Safety Award and reflect great credit upon the Command and the United States Air Force.

DONALD B. RICE  
Secretary of the Air Force

# Major General Benjamin D. Foulois

## MEMORIAL AWARD

**T**actical Air Command has won the Major General Benjamin D. Foulois Memorial Award for FY 1989. This award is presented each year to the major command with the most effective aircraft mishap prevention program. The honor was established as the Daedalian Flight Safety Award by the Order of the Daedalians, a national fraternity of military pilots founded by World War I aviators. Following the death of General Foulois in 1967, the Daedalians renamed the award to commemorate his contribution to aviation and flight safety.

General Foulois enlisted in the Army in 1898 and graduated from the Army Signal School in 1908. In 1909, he was Orville Wright's passenger on the Army's final acceptance test of the **Wright Flyer**. General Foulois explained that Orville offered him this unique opportunity, not because of his "intellectual and technical ability," but because of his "short stature, light weight, and map-reading experience." In 1910, he became the Army's one-man air force when the War Department ordered him to take the **Wright Flyer** to Texas and teach himself to fly. He earned his wings by a "correspondence course," writing to the Wright Brothers after each crackup asking for their advice on pilot technique.

In 1911, Foulois designed the first airplane radio receiver and carried out the first airplane reconnaissance flights. In 1913, he was assigned to the Signal Corps Aviation School, where in 1916 he commanded the First Aero Squadron at Fort Sill, Oklahoma. In 1917,

Foulois became Chief of the Air Service American Expeditionary Force (AEF), then filled a variety of jobs before he became the Assistant Chief of the Air Corps in 1927. In 1931, the Secretary of War appointed him Chief of the Air Corps, the position he held until he retired in 1935.

General Foulois played a valuable role in American aviation history. As chief of the Air Corps, General Foulois finally convinced the War Department to grant the air arm a semi-independent status, to recognize the legitimacy of strategic bombardment, and to begin to develop aircraft capable of carrying out the mission.



# TAC OUTSTANDING ACHIEVEMENT IN SAFETY AWARD

Sergeant Cynthia A. Rusilko, 33d Component Repair Squadron, 33d Tactical Fighter Wing, Eglin AFB, Florida, has greatly enhanced the squadron and wing safety programs. Her goal has been to support the mission through safety awareness and practices throughout the squadron. The key to her success is safety education which is accomplished in various ways. She oversees the weekly safety briefings conducted in every work center within the squadron. These briefings include seasonal information as well as daily topics, such as seatbelt usage and T.O. compliance. She established a program to prevent "Driving Under the Influence" which was recognized as the best on Eglin AFB. Sgt Rusilko has been instrumental in compiling a designated driver list for extended weekends and holidays, consisting of volunteers from all ranks. One of her most notable efforts towards safety education is during higher headquarters directed safety days. She ensures a productive schedule with detailed briefings, guest

speakers, video presentations, and maximum participation by squadron personnel.

Sergeant Rusilko's outstanding squadron program management has resulted in the lowest personnel mishap rate within the 33 TFW. Her dedicated efforts and programs during the 101 Critical Days of Summer were praised by the wing commander and selected as models for the wing. She was also nominated by the wing commander for the Government Employees Insurance Company (GEICO) Military Members Service Award. This award is to recognize an individual for outstanding contributions to accident prevention. Sgt Rusilko's thorough spot inspections, management of the squadron's safety books, and her genuine concern for squadron personnel complement her solid program. Sgt Rusilko is an outstanding NCO who ensures safety and mission accomplishment co-exist. Her dedication and professionalism have won her the TAC Outstanding Achievement in Safety Award.



**Sergeant Cynthia A. Rusilko**  
**33 CRS, 33 TFW**  
**Eglin AFB FL**



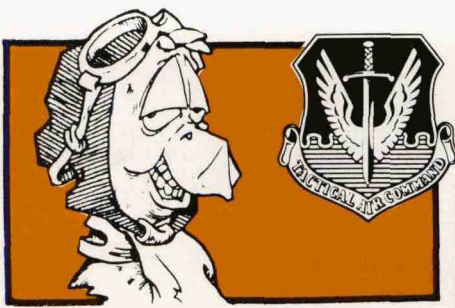
# TAC OUTSTANDING ACHIEVEMENT IN SAFETY AWARD

**W**hen OV-10's arrived at Davis-Monthan, they brought with them the unique safety hazards associated with propeller driven aircraft. A great number of maintenance personnel had never worked around these hazards before. Recognizing the increased potential for a serious mishap, the 23d Consolidated Aircraft Maintenance Squadron commander handpicked Staff Sergeant Timothy T. Pugh and assigned him the task of writing the Flight Line Weapons Maintenance Lesson Plan for weapons loaders in such a manner as to ensure a safe and orderly transition. Sgt Pugh met the challenge head-on. His lesson plans were excellent at emphasizing the importance of accomplishing the mission while limiting exposure to unnecessary risk. Sgt Pugh was also assigned the responsibility to instruct OV-10 cockpit/egress familiarization training. Again, he excelled. He personally developed and produced a video tape demonstrating proper procedures to safely egress the OV-10. The video was of such superb quality that it has been disseminated to OV-10 units worldwide for use as a safety and training tool. Sgt Pugh's influence was felt throughout the entire transition period and directly contributed to accomplishing the mission and maintaining zero mishaps. His aggressive initiatives which effectively balanced risk and training have won him the TAC Outstanding Achievement in Safety Award.



**Staff Sergeant  
Timothy T. Pugh  
23 CAMS, 601 TAIRCW  
Davis-Monthan AFB AZ**





# TAC TALLY

CLASS A MISHAPS
AIRCREW FATALITIES
* IN THE ENVELOPE EJECTIONS
* OUT OF ENVELOPE EJECTIONS

Total		
MAR	THRU MAR	
	FY 90	FY 89
4	12	12
0	6	3
3/0	7/0	9/2
0/0	1/1	0/0

TAC		
MAR	THRU MAR	
	FY 90	FY 89
2	8	8
0	2	1
1/0	5/0	5/0
0/0	1/1	0/0

ANG		
MAR	THRU MAR	
	FY 90	FY 89
0	1	4
0	2	2
0/0	0/0	4/2
0/0	0/0	0/0

AFR		
MAR	THRU MAR	
	FY 90	FY 89
2	3	0
0	2	0
2/0	2/0	0/0
0/0	0/0	0/0

\* (SUCCESSFUL/UNSUCCESSFUL)

## TAC'S TOP 5 thru MAR 1990

1st AF	
CLASS A MISHAP-FREE MONTHS	
50	57 FIS
29	48 FIS
10	325 TTW

9th AF	
CLASS A MISHAP-FREE MONTHS	
58	507 TAIRCW
33	1 TFW
29	4 TFW
25	347 TFW
16	354 TFW

12th AF	
CLASS A MISHAP-FREE MONTHS	
64	37 TTW
30	24 COMPW
27	355 TTW
26	366 TFW
18	388 TFW

ANG	
CLASS A MISHAP-FREE MONTHS	
232	110 TASG
207	138 TFG
189	177 FIG
184	114 TFG
148	155 TRG

AFR	
CLASS A MISHAP-FREE MONTHS	
115	482 TFW
105	924 TFG
93	906 TFG
67	507 TFG
54	917 TFW

DRUs	
CLASS A MISHAP-FREE MONTHS	
162	552 AWACW
32	USAFTAWC
18	28 AD
4	USAFTFWC

## CLASS A MISHAP COMPARISON RATE

(CUMULATIVE RATE BASED ON ACCIDENTS PER 100,000 HOURS FLYING TIME)

	FY 89	1.7	2.7	3.0	3.2	2.6	2.4	2.3	2.9	2.6	2.5	2.6	2.4
TAC	FY 90	1.8	2.8	2.7	3.0	2.4	2.7						
ANG	FY 89	0.0	0.0	1.5	2.3	2.8	3.1	3.2	2.8	3.0	3.6	3.2	3.3
	FY 90	0.0	0.0	1.6	1.3	1.1	0.9						
AFR	FY 89	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	FY 90	20.4	11.2	8.2	5.9	4.8	8.0						
Total	FY 89	1.2	1.8	2.5	2.8	2.5	2.5	2.4	2.7	2.5	2.6	2.6	2.5
	FY 90	2.4	2.5	2.7	2.7	2.2	2.5						
MONTH		OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP

