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flying

SAFETY JANUARY 1988

SPECIAL ISSUE

Mishap Review and Forecast

THERE I WAS

■ There I was . . . Red Flag in June, my third trip there, and my hair was itching to burn. I'd seen the crash tapes both times before and acknowledged the possibility. But I also came to Nellis bent on having a good time in the hog. Third time's a charmer, right? No complacency on my part. You don't raise hog-drivers on afterburner lifesavers and "gee-whiz" geometry. You use basic tactics at home, refine them at Red Flag, and inhale gun gas whenever you get the chance.

The mission was a two-ship, afternoon go, during the second week. The Navy had arrived in adversary Tomcats, and the skies were usually one war zone after another as we would ingress into Kawich Valley. This particular ride was no exception. But you figure, after the first week, nothing should come as a surprise. You've got the lay of the land down, you know where every little hill and dale is, and even the hair on the back of your neck stands up at the right time when you get near "the box."

I was flying as No. 2, and the target was the industrial complex in the valley. The route jumped from Student Gap, past the farms, across the ridge north of Black Mountain, past Belted Peak, and into the valley. We had just crossed the Black Mountain ridge, the sky was around 12,000 feet overcast, the air was somewhat clear, and we were cruising at 500 feet AGL and doing 275 KIAS.

My lead and I had been trading off lead and wingie all week, and we were pretty well versed on each other's quirks. No one had scoped us yet, and the way looked clear. Coming off the ridge, with lead on the right, and me out about 6,000 feet, I happened to check my 10 o'clock position. What a sight! An F-14 was attempting to chase an OV-10. The Bronco was holding his own, though the Tomcat was clawing to stay in the sky.

Lead called a radar strobe from the 4 o'clock area, and I scanned that area even closer. The airwaves were starting to clutter up with air-to-air chatter and bogie calls, and you could feel the proximity of the bad guys. Just yesterday, we'd been picked on by an F-5, and I had vowed we wouldn't get caught this time. My eyes were peeling apart the sky for anything that moved. And like a good wingman, I was spending a lot of time flying 300 KIAS, 500 feet, looking backwards.

In the transition from the Bronco-Tomcat fight to the possible threat on my right, my eyes momentarily hesitated at 11:30, and I remember thinking, "There's a peak at 12, 2 miles — we're right on the route!" The strobe again, this time closer to 6 o'clock. I started swaying in the saddle to get a real good look at deep 6 o'clock — it helps to clear behind the tails, and you don't have to raise the seat all the way up and cock your head 180 degrees out to scan between the A-10's tails. Still nothing, no glints, no specks moving, nothing. (Meanwhile, we're still doing 5 miles a minute forward.) I glanced back at lead, still at 3 o'clock and no threats in sight.

Then my peripheral vision kicked into high gear — I mean real high gear — and I sensed something mammoth off to my left. My head cranked into overdrive, and my eyes widened to saucers as I saw a mountain pass off my left side — close, very, very close — and I was not above it, or level with it, but rather, looking up at it. I could have been flying fingertip.

I felt frozen as I passed this mountain. I finally started breathing again after what seemed like an eternity. My mind jumped to the thought, "What if you had rocked your jet a little more to the left when checking 6? You'd never have seen it coming!"

Complacency? Me? Never happen. I'm too good at what I do. Period. That would have made a great saying on my headstone. ■

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CONTRIBUTIONS

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SPECIAL ISSUE

1987 was another great year! Our class A mishap rate of 1.51 was the *second lowest* in USAF history. Our fighter/attack Class A mishap rate of 3.01 and Class A operations factor mishap rate of 1.56 were the *lowest* in USAF history.

We converted from calendar year to fiscal year reporting in 1987. The statistics cover 1 Jan to 30 Sep 87. To avoid confusion, our safety action officers have used the term, transition year, or TY 87, in their articles.

In this issue, we take a look at how we did in 1987 in our fighter, attack, and trainer aircraft. Next month, the magazine will be devoted to the heavies.

SPECIAL FEATURES

REGULAR FEATURES

DEPARTMENT OF THE AIR FORCE • THE INSPECTOR GENERAL, OSAF

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A-7

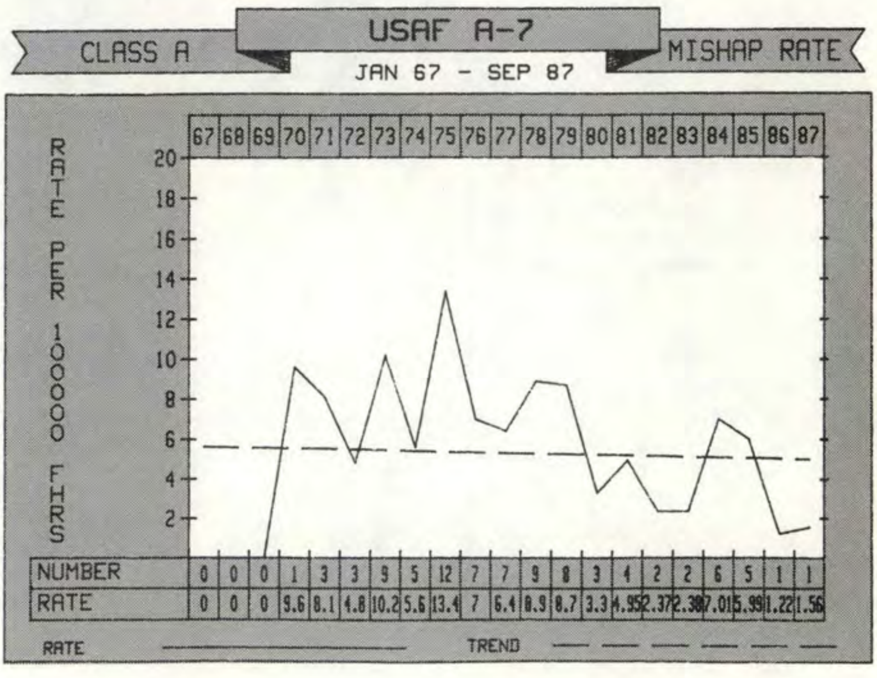
MAJOR LINN L. VAN DER VEEN
Directorate of Aerospace Safety

■ The A-7, an all-weather attack aircraft that has been in the USAF inventory since 1968, is a proven combat performer. It is also in service with the US Navy and the Air Forces of Greece and Portugal. After almost two decades, it is not only one of the most accurate and reliable attack aircraft in the world, but it also continues to develop new capabilities.

The low altitude night attack (LANA) modification will give the A-7 a viable below-the-weather night attack capability, and the YA-7F (previously known as "Strikefighter" or "A-7+") prototype development program has the potential to increase survivability and capability. But we need to ensure these resources, and *you*, are around to meet any threat, whenever it should arise. And the threat for today is any mishap that could cost a pilot, maintainer, or aircraft. So, in hopes of helping you make it successfully through another year, this article will tell you about the recent mishap history and trends, and then discuss some of the future developments.

Recent Mishap History

The USAF has about 375 A-7D and A-7K aircraft in service, mainly with the Air National Guard. This fleet flew almost 67,000 hours in TY 87 and reached the 1.43 million hour mark in 1987. The A-7 has experienced 89 Class A mishaps since 1970, which yields a cumulative destroyed rate of just over 6 aircraft for each 100,000 hours flown. That's 89 aircraft and 36 pilots lost, and while this is a great deal of lost capability, the rate does compare favorably with other USAF fighter/attack aircraft. In fact, the A-7 has one of the



lowest lifetime destroyed rates of any USAF single-engine attack aircraft.

Pilot, maintainer, and aircraft performance have steadily decreased the number of yearly mishaps. The past 2 years have been exceptional in terms of mishaps, with only one aircraft destroyed each year. The TY 87 Class A mishap rate was 1.5. (See figure for a comparison with past A-7 mishap rates.)

Since the mission of the A-7 has remained relatively constant over the years, it's important to examine historical mishap factors that repeat all too regularly. Through the end of TY 87, there have been 52 Class A mishaps caused primarily by operator factors, and two types of mishaps have accounted for three-fourths of these "ops-related" mishaps.

As is expected given the low altitude attack mission of the A-7, *collision with the ground* is the largest single category, with tragic results: 20 destroyed aircraft and 19 fatalities. The TY 87 mishap was also a fatal collision with the ground. The pilot was flying a night mission in a LANA-equipped A-7D. He was attempting a straight ahead pop-up attack when the aircraft hit the ground.

The second most common Class A mishap category is *loss of control*, which has accounted for 18 aircraft and 12 fatalities. The last mishap of this type was in 1981; however, automatic maneuvering flaps and advanced handling training have significantly reduced this problem. This is an example of how the community can attack a "safety" problem that once caused unacceptable losses of valuable combat resources.

Flying the aircraft at its limits and aggressively accomplishing the missions for which it was designed create the potential for one of these statistics on every flight. There's no easy solution, of course, because that's the business we are in, but training the way we plan to fight, following the ROE, knowing the aircraft systems, and knowing individual limits can minimize exposure to these threats.

There have been an additional 37 Class A mishaps caused by material failures, maintenance problems, or design deficiencies. Leading the list of these logistics factors is *TF41 engine failure*, which has resulted in the loss of 21 aircraft and many other close calls.

In recent years, most engine failures were due to second-stage high pressure turbine problems. The fix is a new turbine wheel and blade modification called the High Pressure Turbine Extended Life Program (HELP) that has been installed on all TF41 engines.

FY 88 began with a tragic engine failure that resulted in several civilian casualties. The engine flamed out on a cross-country mission, and the pilot's attempted flameout approach was unsuccessful. The pilot was able to eject, but the aircraft hit an airport hotel with catastrophic results. We also had an extremely close call in TY 87 when an engine quit just after landing due to oil starvation.

There was also another major close call in 1987 when an A-7D LANA jet hit a bird during a night simulated bomb attack. *Bird strikes* were the most common reportable A-7 mishaps in TY 87, and if this bird had hit a few feet inboard, the pilot could have been wearing the feathers or flying a 15-ton glider. Instead, the bird caused over $100,000 damage to a forward looking infrared (FLIR) pod on the right wing.

Which brings up a good point: You may not see the birds at night, but lots of them, especially the big ones, are still flying. I don't know if they have "requirements" also, or just like the smooth air and reduced traffic, but they are there! Plan those LANA and other low-level missions to avoid bird concentrations and migratory routes. Pass on sightings or strike info to the next guy or the SOF.

TY 87 was the first year in the last three without a *gear-up landing*. Maybe we've seen the light, but it's still something that deserves plenty of attention. The hydraulic system design and the absence of any aural gear-up warning have set up many A-7 pilots, so disciplined checklist compliance and a personal habit of checking "gear, flaps, and hydraulics" on short final is a must for *every* approach.

Future Developments

That's a brief rundown of the A-7's history. As I said earlier, though, the A-7 also has a bright future. The LANA mod adds a FLIR pod, a new navigation/weapons computer, a wide-angle field of view HUD, and an automatic terrain-following (ATF) coupler to add night below-the-weather attack to the A-7 mission. The two YA-7F prototypes LTV is building for the USAF will integrate an A-7 airframe with the Pratt and Whitney F100-220 afterburning turbofan and an advanced technology digital avionics suite.

FY 88 Forecast

As with all of our systems, there isn't much separating the mishaps from the close calls. The potential for disaster is inherent in the attack mission, and with even more LANA aircraft and missions coming in FY 88, it will be even harder to have a mishap-free year.

The AFISC computer has predicted the USAF will lose three A-7s this year, and low-level flight, range operations, and engine failures are areas that deserve your special caution. The goal, though, is to make it through the year with *no* more losses, and the A-7 community has the experience, the people, and the motivation to make it happen.

If you would like more details, contact your unit FSO, give us a call at AUTOVON 876-3886, or write AFISC/SEFF, Norton AFB CA 92409-7001. ■

A-10

MAJOR LINN L. VAN DER VEEN
Directorate of Aerospace Safety

■ Six A-10s, at least four pilots — a significant loss for any squadron and quite an investment at around $6 million per aircraft and years of training per pilot. Even one pilot — especially if he's in your wing, your squadron, maybe even your flight — is too much! There are five units that had to live with fatal mishaps last year, and the AFISC computer predicts six more A-10s will be lost in FY 88. *Zero* Class A mishaps is obviously the goal, and the purpose of this article is to give everyone who takes the time to read it a head start on making it until next year's article.

FY 88 Forecast

The AFISC crystal ball compares planned flying hours to the mishap history of the past several years and generates the probable number of aircraft mishaps that will occur if operations are conducted the same way as in the past. The forecast calls for four collision-with-the-ground mishaps, and those are generally fatal. This is what the computer indicates we will lose if something is not changed, and this is not just a problem for some other guy.

This is "up close and personal," and if you can't accept those losses, then it's time to think about how you are going to survive 1988. First, let's take a look at recent history and the mishap trends that developed in TY 87. Then I will analyze that forecast and see where we can make it wrong.

A-10 Mishap History

The seven active A-10 wings, a test wing at Eglin AFB, Florida, five Air National Guard units, and four Air Force Reserve units flew over 170,000 hours in the 9 months ending 30 September 1987 for a Class A rate of 2.9 mishaps per 100,000 flying hours. While this number is good considering the A-10's low altitude mission, and compares favorably to many other fighter/attack systems, it's worse than the 1985 (four Class As and a 1.8 rate) and 1986 results (three mishaps and a 1.4 rate).

Since the first A-10 flight in 1975, units have accumulated almost 1.8 million hours of flying time with a cumulative destroyed aircraft rate of 3.1, the lowest of any fighter/attack aircraft in USAF history. (See figure for A-10 mishap rates.)

As good as the Class A rate appears, the 30 pilots and 56 jets we have lost represent both significant personal tragedies and lost combat capability. We've lost more than two squadrons of jets and almost a squadron of pilots, and that equates to a whole bunch of tanks that will never taste a 30mm API.

The five Class A mishaps in TY 87 were all collision with the ground. While it's no surprise that these form a significant portion of the major mishaps for a ground attack weapon system, it is alarming that since 1983, over one-half of all A-10 Class A mishaps and 80 percent of all fatalities have resulted from flying into the ground. The A-10 already had the highest rate for collision-with-the-ground mishaps, and TY 87 just increased that rate.

■ In one A-10 mishap, the pilot was maneuvering to regain formation position when he initiated a split-S maneuver from 2,000 AGL and 170 KIAS. He started to attempt ejection passing 700 AGL, but the descent rate was too great.

■ The next mishap occurred during a low altitude awareness training mission. The mishap pilot initiated a hard right turn reacting to an attacking aircraft. He impacted the ground after approximately 130 degrees of turn, looking away from his flightpath in the direction of the attacker. There was no attempt to eject.

■ Another fatal collision with the ground occurred on an uncontrolled tactical range. The pilot turned off target following a low-angle bomb pass without initiating a climb. During this maneuver, he probably saw another A-10 operating on an adjacent sector of the range. The aircraft impacted rising terrain in a descending turn. The pilot's head was turned away from the flightpath at impact, probably looking at or for the other aircraft.

■ The fourth Class A happened when a pilot flew into a mountain in IMC. He had gone lost wingman and descended into the mountain, either due to a somatographic illusion (the sensation of climbing while accelerating in level flight) or while attempting to regain visual contact with the rest of the flight.

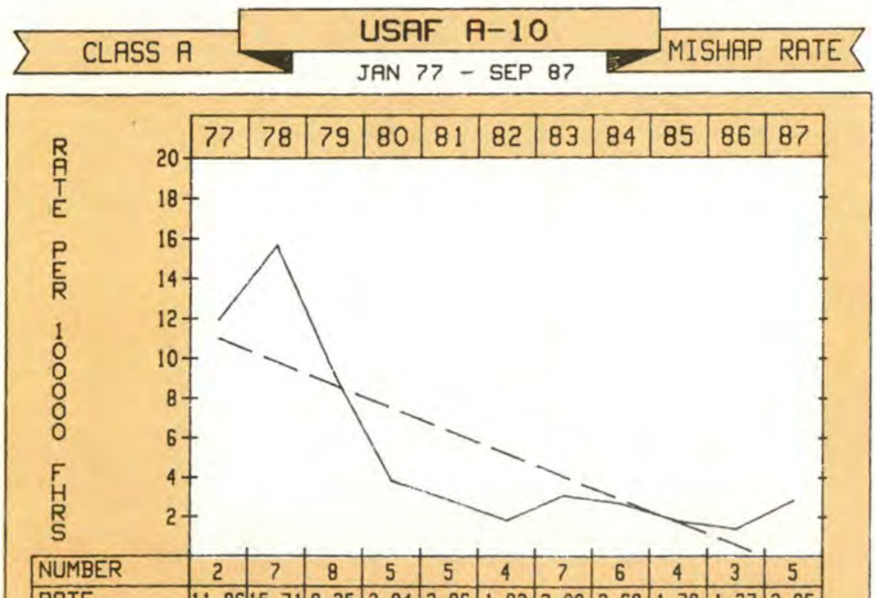
■ In another mishap, the pilot flew into the ground attempting a loop during an unauthorized flyby.

Fighting the Forecast

So how do we make FY 88 mishap-free? As mentioned earlier, over one-half of all Class A mishaps since 1983 were the result of collision with the ground. While we estimate a predictive ground collision avoidance system (GCAS) could have prevented at least 70 percent of all fighter/attack collision-with-the-ground mishaps (and the A-10 will be one of the first to receive a GCAS because of its ground collision rate), we won't see a modified aircraft in the field until FY 90. GCAS will be part of a modification to increase combat capability with a constantly computing aim point and enhanced aircraft stabilization, but it's too far down the road to help this year.

Actually, the solution to collision-with-the-ground mishaps is in *your* hands. Two of the fatalities occurred when the pilots attempted prohibited low altitude maneuvers with insufficient altitude for completion. Two happened with the pilots looking over their shoulder in a turn. All five happened in an environment that had become so comfortable that the pilots were lulled into momentarily forgetting the number one low altitude priority — ground avoidance.

The only solution is to remember these two basics before any flight: First, no matter what the tactics and no matter what any other airplane is doing, nothing is more important than avoiding the ground. Second, the Hog has a bad habit of seeking the dirt, especially in a turn.



All of the TY 87 mishaps were not only the same type, they also fit the recent pattern for A-10 mishaps — flight into the ground (previously discussed), midair collision, or engine failures. In fact, these three categories have resulted in 80 percent of all Class A mishaps since 1983.

Midair Collisions

Our midair collision problem is not just the stray civil aircraft, but also the guy sitting in the briefing room with you! Collisions have historically occurred during cross turns or other maneuvers when attention is focused on a target or another aircraft, and as aircraft roll out of tactical turns concentrating on flight lead.

As with ground collisions, the cause is failure to clear the flightpath. Good communications, disci-

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A-10

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pline, strict adherence to ROE, and anticipation of flightpath conflicts that may result while maneuvering can keep you from debriefing while stuck in a tree.

Engine Failures

Engine failures have been the leading cause of Class A, Class B, and Class C logistics (maintenance, material, or design deficiencies) mishaps. As the pilot, you can't keep this from happening, but you can delay it by minimizing the time spent at "max grunt."

AFLC is doing quite a bit to keep TF34s running, and no, this does not include new engines! Many major parts of the engine hot section are being replaced during the hot section life improvement (HSLI) modifications. HSLI should significantly reduce the number of internal mechanical failures that in the past caused an overtemperature condition or flameout.

The turbine engine monitoring system (TEMS), a computerized system that continuously monitors engine performace, is being added to engines as they undergo the HSLI modification. TEMS provides effective warning of impending failures on the ground, before the engine can fail in flight. These two mods are certain to improve engine reliability and should decrease the number of engine-related mishaps. An unhappy note is that these engine mods will not be completed until approximately 1990, so you may still have plenty of opportunity to log some single-seat, single-engine time.

Other Causes

Since we're talking about system failures, this is a good time to mention some of the other causes for minor, or Class C, mishaps. These are the things that generally result in an air or ground abort, and while nothing else approaches the engine failure rate, there are some other systems to watch out for.

Landing gear, wheel, and tire failures have caused a number of problems in TY 87 as well as in the past. The resulting landing and takeoff surprises include main landing gear tread separations, nosewheel bearing and steering failures, loss of nosewheel steering and normal brakes, and even an occasional gear collapse. These problems are being worked, but solutions are slow to find their way into the field. Be ready for that perfect landing to turn into an exciting ride.

Slat actuator failures are occurring at an increasing rate, but these generally go unnoticed unless the failure results in a hydraulic leak and loss of the right hydraulic system. A new actuator assembly will be retrofitted starting in May 1988.

Modifications

There are many other modifications upcoming; some that are the result of lessons we learned the hard way — broken airplanes. For example, in the next few years, the A-10 will get high flow g-suit valves, an aural warning when the speed brake is extended while single engine, formation strip lighting, a two-action emergency canopy jettison handle to prevent inadvertent actuation while reaching for the emergency brake handle, and a new version of fuel tank foam to prevent the electrostatically caused fuel foam fires that have plagued units operating in cold climates for years.

For the most part, though, we lose "Hogs" and their drivers due to pilot actions. The good news is that you're in control. The jet is not going to put you in very many unrecoverable situations.

The bad news is that the A-10 flies in an unforgiving environment. History shows that if we avoid major "pilot errors," we avoid A-10 mishaps. That computer forecast for six mishaps in FY 88 is a cold, impersonal, numerical analysis, and it doesn't recognize your desire to make this a mishap-free year. Think about that before your next brief, flight, or sim — YOU can make every flight end safely.

This discussion has just skimmed the surface of the TY 87 A-10 safety record and upcoming safety modifications. If you want more details, contact your unit FSO, give us a call at AUTOVON 876-3886, or write AFISC/SEFF, Norton AFB CA 92409-7001. ■

F-4

LT COLONEL HORST K. KRONENWETT, GAF, and MAJOR JEROME L. JOHNSON
Directorate of Aerospace Safety

■ The transitional year (TY) 1987 proved to be a great year for USAF aviation with the second lowest Class A mishap rate of 1.51 mishaps per 100,000 flying hours.

In 24 years, the trusty USAF F/RF-4 Phantom II has accumulated over 9.4 million flying hours. More than 1,430 F-4s remain in the USAF inventory. In TY 87, the F-4 accounted for 8.6 percent of the total USAF flying hours and 23.3 percent of the total fighter/attack flying hours.

The F-4 suffered 8 Class A mishaps which represent 12.5 percent of all USAF mishaps and 27.6 percent of all TAF mishaps.

TY 87 was the third best year for the F-4 with a rate of 3.55 mishaps per 100,000 flying hours (CY 84 was 3.41 and CY 85 was 2.89). Congratulations on your good flying!

Aircraft Lost

Ten F-4s were lost in TY 87 amounting to a lifetime total of 490. Five of the 10 were accounted to operational (ops) causes, 3 to logistics (log), 1 to a bird strike, and 1 to the Navy (non-rate producing).

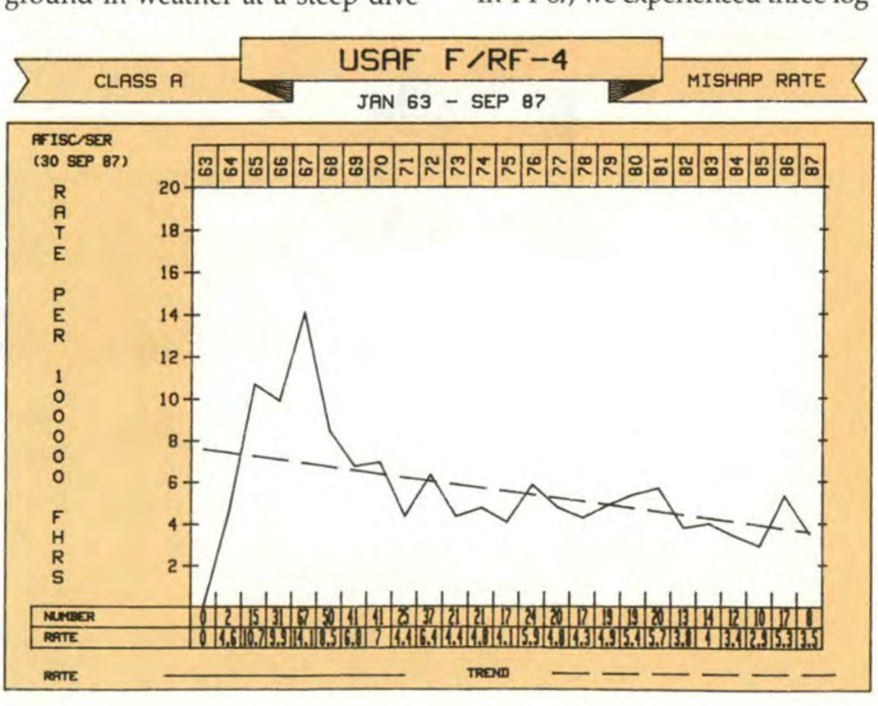
Bad Year For Ejections

In TY 87, we lost 12 F-4 crewmembers. The six ejections outside the envelope were unsuccessful. Four crewmembers were unable to attempt an ejection after a midair and bird strike, and two others were lost when their aircraft impacted the ground in weather at a steep dive angle and no ejection attempt was made. All six ejection attempts within the envelope were successful.

Think for a moment: What are your safe ejection parameters at which *you* pull the handle? If you are unsure, see your flight manual. It's your life!

Log Mishaps

In TY 87, we experienced three log



F-4

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mishaps — one more than was predicted.

■ The pilot did not apply correct bold face procedures when a main tire blew on takeoff roll, resulting in his F-4 departing the runway during takeoff roll. After rolling over the third raised concrete light vault, the right main gear finally collapsed, and the aircraft settled on the right wing tank. After the aircraft slid to a stop, the crew ground egressed, and fire from ignited fuel damaged the aircraft. The blown tire was part of a defective batch of recapped tires and was suspected to have been underinflated.

■ On run-in to the range, an engine fire resulted from failure of a spacer in the 14th compressor stage. Fuel from the damaged No. 4 fuel cell engulfed the engine causing a catastrophic fire. The crew ejected successfully.

■ Bellows failure, combined with a locked stabilator during a pitchout for landing, resulted in an aircraft "locked" into a descending turn. An out-of-envelope ejection, coupled with delayed rescue, resulted in the loss of both crewmembers.

The Log Mishap That Was Prevented

For the last 3 years, the USAF has lost one F-4 annually to engine bay fire fueled by the centerline tank during takeoff. All previous crews failed to jettison the source of fuel for the fire. This year, the trend was broken because the crew jettisoned the external load after an in-flight fire fueled by the centerline tank had erupted during takeoff. The "if necessary" option of the bold face was exercised, and this aircraft was saved. Congratulations!

Ops Mishaps

Loss of control continued to be the largest ops factor, accounting for three aircraft losses in TY 87 costing these crews' lives.

There is a lot to be learned from the four TY 87 ops-related mishaps. First, if you are required to wear glasses — wear them. Second, know the parameters that will prevent you from becoming an out-of-envelope ejection statistic. Third, know how to handle your aircraft (sounds dumb? — so do all three loss-of-control mishaps).

■ Inadequate training, an unexpected maneuver by the defender, and an ROE violation by the attacking IP who was not wearing his prescribed glasses led to a midair during defensive maneuvering. The defending crew survived; the attackers were killed on impact.

■ During a radar trail departure in weather, radar vectoring with no preplanned alternate IFR routing, missed radio transmissions, and possible concern over mountainous terrain may have caused spatial disorientation and led to loss of control. There was no ejection attempt.

■ Falsification of training records to show LOWAT currency and flying a heavyweight F-4 at extremely slow airspeeds while channelizing attention on a potential target contributed to loss of control. The ejection attempt was out of envelope.

■ Another loss of control resulted when during a descending stall, an abrupt attempt to arrest the high descent rate was made. The ejection was attempted out of envelope.

Miscellaneous Mishaps

Aircraft and crew were doomed when a 12-pound-plus vulture pen-

etrated the front quarter panel of the windscreen, instantaneously killing the pilot and incapacitating the EWO. There was no ejection attempt.

Aircraft Loss — Non-Rate Producing

Be prepared! The mission had been successful after finding the aircraft carrier. Who would have thought of an AIM-9 to force the crew that was "alone, unarmed, and unafraid" to eject. The decision to eject from this severely damaged aircraft may have been easier than in other out-of-control situations when the crew believes they are able to recover in time.

Safety Modifications Update

Testing with the high performance centerline tank (HPT) at a CG of 34.1 percent MAC and AOA of 19.2 units showed no significant degradation in aircraft stability control due to rapid fuel movement in the HPT. They did emphasize the known poor flying qualities of the F/RF-4 at aft CGs.

These tests also highlighted the lag between the cockpit AOA indicator and the actual AOA. The indicated AOA and aural tone can lag the true AOA by up to eight units. This lag can persist for up to 7 seconds.

Furthermore, the indicated AOA can momentarily hesitate at an erroneously low value during high rate maneuvering. This could mislead a pilot into believing he had established a lower-than-optimum AOA when, in fact, the aircraft was approaching departure.

To make the F-4 safer, a caution about CG shift in the HPT and a warning about the AOA indicator lag will be included in the flight manual. You also are restricted to maintain 19.2 units AOA for flight with a partially full unmodified HPT. Beginning August 1988, the HPT will be modified with a bulkhead and a relocated fuel cap positioned aft of the aux air doors. The bulkhead and associated plumbing will move the CG forward as fuel is transferred from the HPT.

Single-piece windscreen contractor proposals have been received and evaluated. Anticipate funds for this modification will be made available in FY 88.

Forecast

The Air Force Inspection and Safety Center's analysts are predicting 15 F/RF-4 mishaps for FY 88 — 6 ops, 6 log, 2 undetermined, and 1 miscellaneous. The projected ops mishaps include four loss of control, one midair collision, and one collision with the ground. The log mishaps break down as two fuel system, two engine, one electrical, and one flight control problem. That leaves three miscellaneous mishaps — one bird strike and two unknowns.

It's up to you operators and maintainers to beat these figures.

Bottom Line

Remember pilots and backseaters:

- *Maintain aircraft control* and you avoid loss-of-control situations. Only *you* can prevent aircraft losses in this category.
- *Analyze the situation and take proper action*. Apply proper bold face, general airmanship, timely decision to eject, and *you* can save your life or aircraft.
- *Land as soon as practical*, and please do that safely until in the blocks. Our statistics show that in the past, a major mishap was most likely to happen after an emergency situation had just been handled.

Fly heads up and fly safely! ■

F-5

MAJOR BOB MULVIHILL, CF
Directorate of Aerospace Safety

■ Congratulations — you did it! In 1986, I challenged everyone involved with F-5 operations to prove the F-5 could match the mishap-free year of 1985. You came through the 1987 transition year (TY) with flying colors. The F-5 and the F-106 were the only fighter aircraft able to boast such a record. To be fair to the other weapon systems, we have to admit the F-5 flew a lot less hours than other fighters. The experts also tell us that as a weapon system matures, the mishap rate should stabilize at a low value.

Let's all do our utmost to keep the F-5 rate as low as possible. It can't be done without the concerted effort of everyone who flies, maintains, or otherwise contributes to keeping them flying.

Predictions

Every time we start patting ourselves on the back, we set ourselves up for a big letdown. The F-5 has yet to put 2 perfect years back to back. The AFISC computer predicts we'll lose three F-5s in FY 88, one of which will be to loss of control. The computer could not narrow down the other two. Looking at history, it's easy to see why this is. There is no pattern to indicate one problem area will rear its ugly head sooner than another. Starting with the premise that we are going to avoid all of these predictions, let's look at the past record to see what we have to watch out for.

Operations-Related Mishaps

Loss of control and collision with the ground were the two highest categories. Everyone is crossing their fingers the addition of ballast in TAC's F-5s will eliminate this type of mishap. The aircraft still has to be respected. Don't bet the aircraft can't be put out of control.

Logistics-Related Mishaps

Among logistics-related mishaps, engine-related mishaps made up the largest percentage. Next came landing gear mishaps. If you have a serious mechanical problem with your F-5 in 1988, history says there's a better than 50-50 chance it will involve either the engines or the landing gear.

The solution is obvious: If you have been one of those folks who has been paying attention to detail and keeping the mishap rate low, keep on doing what you did in 1987. If you are one of those folks who has been relying on luck, how about joining the majority who made the zero rate happen. When a mishap occurs, it's normally pretty easy to single out the individual or individuals who were responsible. It's a lot harder to determine who "caused" a zero mishap rate, mainly because it takes the concerted effort of everyone all over the system to make it happen.

Class Cs and HAPs

In the flight safety business, the most important activity is prevention. The more effort we put into prevention, the less time we have to spend on mishap investigation. Class Cs and high accident potential (HAP) incidents normally give an indication how the next major mishap is likely to happen. That's why it's so important for the folks who are close to the action to be on the lookout for hazards. Too often the people who can eliminate an existing problem learn of it only after the Class A mishap. Back in 1986, we lost an F-5E to a landing gear problem that had previously been identified but was never reported through the flight safety net.

So, what do our Class Cs and HAPs tell us? Engine flameouts make up the majority of reports, especially from the aggressor squadrons. The F-5 has the highest flameout rate of any fighter in the Air Force. Fortunately, it also has an excellent relight success rate. But be prepared! With such a high rate, it's only a matter of time before one occurs at a critical time of flight, or two of the little darlin's decide to pack it in at the same time. In 1986, we lost a B model when both engines quit shortly after takeoff.

The other few Class Cs and HAPs have involved canopy losses, landing gear problems, flight control malfunctions, and damage to the vertical stabilator. If we subtract flameouts from the F-5 message traffic we receive at AFISC, it becomes obvious the F-5 is a safe and

reliable aircraft which can sustain a high flying rate with few serious mechanical problems.

In fact, the F-5 lifetime logistics Class A rate is about the same as other fighter aircraft. It's only when we add in the operational mishaps that the F-5 lifetime rate doesn't fare so well. It follows that the F-5 pilots have the greatest influence on the F-5 mishap rate.

Looking at all ejection seat-equipped aircraft, there has been a tendency lately to stay with the aircraft until the eventual ejection takes place outside of the seat envelope. You only have to look at the success rate of "out-of-envelope ejections" to realize what a deadly mistake it is to delay. The most important part of the great safety record of 1987 was the fact no F-5 pilot was killed. Let's keep that record alive through 1988. ■

F-15

MAJOR MARTIN V. HILL
Directorate of Aerospace Safety

■ The first 9 months of 1987 have been good ones for the Eagle community. We flew over 154,000 hours and had a near record low Class A mishap rate of 1.94 per 100,000 hours, surpassed only by 1984's record of 1.71. This is a remarkable achievement, especially considering 1986's tragic high rate of 3.53. Also, for the first time since 1976, we had no Class B mishaps, even though we flew almost 10 times the hours in 1987.

However, impartial rates and numbers do not begin to tell the actual story for this CY to FY transition. The sad truth is that disguised in these optimistic figures is the fact that we lost three aircraft and two close friends this year, none of which can be replaced. Let's briefly look at this mishap experience to see what can be learned from it.

TY 1987 Mishap Experience

■ One mishap and fatality in TY 87 occurred on an operational check flight to test the three external fuel tanks for proper operation. Takeoff through gear retraction was normal; however, at about 300 feet AGL and 280 KIAS, the jet rolled right, then sliced violently left in a rolling departure. The pilot barely recovered, then climbed steeply away from the ground. Shortly thereafter, the aircraft repeated the first maneuver, only this time recovering in a steep, low airspeed dive from which the pilot could not pull out. There was no attempt to jettison the full external tanks, or to eject, prior to impact.

■ Another mishap occurred at the start of a defensive BFM engagement. At the "fights on" call, the pilot started a hard, slightly nose-low defensive turn at 20,000 feet MSL and 400 KIAS, then applied full aft stick as the aircraft slowed. After about 90 degrees of turn, at about 250 to 300 knots and 40 units AOA, the jet abruptly departed controlled flight and then shortly thereafter entered a spin.

After his initial disorientation, the pilot confirmed he was spinning and applied full antispin controls. The aircraft did not recover, and the pilot successfully ejected passing 11,000 feet MSL. The aircraft crashed at sea and was not salvageable.

■ The other mishap also cost a jet and a life. The pilot was the mission leader and one instructor pilot (IP) of a four-ship of Eagles conducting low altitude step down training for the two wingmen. During a two-ship portion of the upgrade mission, the IP and his student were performing low altitude (500 feet AGL) tactical turns. After the completion of a 180-degree turn, and as the IP directed the student to a new formation position to his rear, his aircraft impacted the ground in a slight descent, wings level, at 450 KIAS. There was no attempt to eject, and no mechanical problems were discovered.

Foreign Nation Mishaps

The F-15 is currently flown by

three foreign nations, and they also had a significant mishap experience in 1987.

■ One mishap was a departure from controlled flight during a defensive BFM engagement that progressed into a spin. The aircraft was too low to recover, and ejection was initiated passing 3,000 feet AGL. A malfunction occurred in the egress system prior to the firing of the seat, however, and the pilot was killed.

■ The other mishap appears to be a spatial disorientation incident, most likely of the incapacitating (Type III) kind. The aircraft entered heavy weather while maneuvering at the completion of a 2v1 tactical intercept at medium altitude. The pilot, who was highly experienced, reported on the radio he had vertigo, and then contact was lost. The aircraft crashed at sea, and neither it nor the pilot were recovered.

So, as you can see, even though this has been a good year numbers wise, we have still paid a very high price for our realistic and effective combat training. Also, we are holding true to our propensity for having about twice as many operational losses as we do logistics-caused losses.

Key Issues

This year's mishap experience highlights several key issues for thought.

Pilot-Induced Loss of Control First is the issue of pilot-induced loss of control. It is the leading historical operational loss reason for the F-15, and even though wing fuel imbalance can contribute, it is still an operational error. The Dash 1 discusses stability and control in depth, and Change 6 expands the discussion even more. In addition, MCAIR has summarized several of its Product Support Digest articles, as well as added some new ones, in its F-15 *Maneuvering Characteristics and Performance* handbook that was published 1 June 1987. You should read it, and keep a copy with your Dash 1 and *Eagle Talk*, Volumes 1 and 2.

Technical discussions aside, the primary human issue that comes from these various loss-of-control mishaps is the often almost incapacitating sense of surprise and disorientation that affects the pilot. There are no flight envelope restrictions on non-CFT Eagles, such as there are with the F-4. And despite this freedom to maneuver, there are still relatively few out-of-control incidents, let alone true departures or spins. The flight control system and handling characteristics of the Eagle are superb and light years ahead of any jet fighter that precedes it.

We want our pilots to confidently and aggressively fly the aircraft to its limits. However, remember the jet is not advertised to be departure or spin proof, but rather only resistant, and even then only to varying degrees depending on configuration, AOA, airspeed, etc. Add a wing fuel imbalance or improper flight control application, and you can get into trouble very quickly.

continued

This aircraft will spin, although it is difficult to do even intentionally. It can give you the ride of your life with very little warning if you are careless.

You can do three things to help yourself deal with this situation.

- The first has already been mentioned. Pay attention to what has already been written on the subject. Understand what the Dash 1 means when it talks about autorolls and spin development in Section III. Monitor your wing fuel, and understand why this is so important and how the external stores affect stability.
- Second, you should know what maneuvers put you close to the edge of stability, and be extra vigilant when maneuvering there. Of special interest should be any time you are around 250 KIAS at medium altitude, 40 to 44 units AOA, and in a centerline tank-configured jet. That happens quite often if you think about it, especially during BFM. If you really believe what the Dash 1 says about how the ARI works, no one should be considering negative-g guns jink-outs. Such carelessness could very easily cost us another jet, and it has in the past.
- Lastly, you can mentally prepare yourself before every ride to deal with the confusion and stress if the aircraft departs or spins. There are some HUD videotapes around of spins, but they do not provide the sense of disorientation. Neither can the simulator prepare you for the cockpit forces. Know the procedures; know when you are vulnerable; and be mentally prepared.

It is important not to rush the recovery, and there have been several cases of improper antispin controls being applied. There was also one case where antispin controls were applied when the aircraft was not in a spin, further disorienting the pilot. However, it's also important not to delay, for that can cause the situation to worsen appreciably, especially if altitude is an immediate player or there is a significant imbalance.

Collision With The Ground Collision with the ground continues to cost an Eagle every year and always a pilot, as well. Much command discussion and guidance have been forthcoming, and the issue of F-15 low altitude training is in the front of everyone's mind. A key point that stands out in these mishaps, however, is that it is not our young or inexperienced pilots who are having these mishaps. It's almost invariably an instructor pilot who is both highly qualified and current and giving low altitude training to somebody else.

It is our instructor pilots who are at risk, and not from their students but from their own actions. It has been said for years in the fighter business that the MiG or SAM may miss, but the ground never does — yet we forget. Flying low altitude demands a conscious reprioritization of lookout technique, and the smallest lapses of attention can, and too often do, result in disaster.

Complacency Linked to both of these issues is that of complacency. That word has an evil ring to it, yet complacent means only to be calm or secure in one's environment. Very few pilots are nervous wrecks when they fly or feel they are inadequate to the demands of aviation. They all strive to master their situation so as to successfully accomplish their mission objectives and personal goals. However, when this feeling of competency turns into self-satisfaction, it leads to disaster

because it masks actual dangers or deficiencies.

None of the most recent ground collision mishaps have any of the classic symptoms of either task saturation or channelized attention that are usually associated with human error mishaps. Rather, it is a fatal misprioritization of tasks, due to feeling totally in control, that seems to be evident. As for loss of control, the excellent aircraft handling characteristics and the relatively few out-of-control incidents lead to a feeling it can never happen to a normally operating jet.

FY 87 Improvements

It is important to emphasize what went well in 1987 as well as what did not. In 1986, we lost five aircraft to midair collisions — in the first 9 months of 1987, none. The risk has not gone away, nor have the ROE changed. Our leaders imposed no additional restrictions on effective combat training, even though the pressure was definitely there after the loss of two lives and all that national treasure. Two points come out of this.

▪ First, the ROE do work if enforced and their limitations fully understood. They must never be disregarded or willingly violated, but also, they cannot be blindly trusted to relieve the pilot of his primary responsibility to always clear his flightpath. It is this discipline that allows us to safely conduct realistic and effective air-to-air training that is the envy of other air forces around the world.

However, things were not this way in our Air Force not so long ago, and it has been a long building block process to get where we are today. The same sense of complacency mentioned before can cause tragedy here, as well, if anyone either lowers his own standards or allows others to do so.

▪ The second point is that education and awareness of the risk do make a difference. It has been a panacea in the fighter business to "brief all aircrews" about a problem as corrective action, usually with indifferent results. However, raising the awareness level can be much more effective than changing regulations or restricting training, if the pilots take the issue seriously. We have proven we can train safely and effectively at the same time, and it has often been said that sound tactics are in themselves inherently safe.

FY 88 Forecast

▪ There are five Class A mishaps forecast for FY 88: One logistics and the rest operational, and unfortunately, the first one has already occurred. Of special interest to all pilots is that two ground collision mishaps are expected this year, based on our past experience. If we hold true to the past, we will also have a midair and another pilot-induced loss-of-control mishap. Let's raise the awareness level on these operational issues, and see if we can make this year's forecast a prediction that does *not* come true. ■

F-16

F-16 SAFETY TASK FORCE
Directorate of Aerospace Safety

■ At the end of FY 87, the USAF F-16 fleet had accumulated approximately 1.25 million lifetime flying hours. This includes nearly 240,000 hours flown during transition year (TY) 87. In TY 87, the F-16 achieved a Class A mishap rate of 3.4 mishaps per 100,000 flying hours based on 8 mishaps. This rate is well below the previous F-16 rates and continues the excellent downward trend for F-16 mishap rates as shown in Figure 1.

The lifetime Class A rate is now 6.4 per 100,000 hours with 81 mishaps. The destroyed rate is 5.9 per 100,000 hours with 74 F-16s destroyed. The F-16 continues to be the safest USAF single-engine fighter and, in fact, has a better record than the two-engine F-4 or F-111 at a similar milestone as shown in Figure 2.

The breakdown of the eight TY 87 mishaps shows that six of the mishaps had logistics as the primary factor, and two mishaps were due to operator factor.

The following is a review of TY 87 mishaps.

Logistics-Factor Mishaps

For the first time since 1982, logistics-factor mishaps outnumbered operator-factor mishaps in the F-16. This is a reversal of a USAF fighter trend over the past few years. A breakout of the logistics mishaps shows:

- Two throttle cable failures
- Three F100 engine failures
- One F110 engine failure

Throttle Cable Failures The throttle cable mishaps were quite different. In both cases, however, the engines were stuck at midrange and required engine shutdown to land.

■ In the first mishap, a locking tab washer was installed incorrectly at the depot and a nut backed off. Tech orders were a factor in that several figures depicted the washer installed incorrectly. Local maintenance performed work on this area but did not catch the problem.

In the landing pattern, supervisors decided to delay shutdown, and the engine continued to run until just prior to the departure end arrestment cables. The tail hook was lowered, but the combination of speed above weight-on-wheels and slight forward stick pressure resulted in the hook being held above the cables.

■ In the second throttle cable mishap, the cable actually failed in fatigue due to retaining wedges being improperly installed. Tech orders were a factor in that the figure did not show the wedges from the perspective that maintenance would use while installing the wedges. In the landing pattern, the pilot delayed engine shutdown until low key.

At this point, the EPU failed to run in the hydrazine mode and did not provide electrical power and hydraulic pressure. Although the JFS-assisted windmilling engine provided sufficient pressure to fly the pattern until the flare, the additional demands of landing depleted the hydraulic system, and the aircraft pitched up out of control.

F100 Engine Failures Each mishap was dissimilar from previous F-16 mishaps. This follows a trend from last year of first-time failures, although the results from the operator standpoint were similar to past engine mishaps.

The F100 engine mishaps were due to an assortment of internal mechanical failures. The bottom line for the operators in each case was that the engine could not be recovered following these failures.

Key factors which came to light in

two of the three mishaps were the Joint Oil Analysis Program (JOAP) and the chip detector system. These programs are designed to alert maintenance to any unusual metal wearing and need to be complementary in accomplishing this task. The JOAP will detect traces of metals which are carried by the oil, and the chip detectors will pick up larger pieces of material. Two of the engine failures raised questions about proper maintenance followup actions once the JOAP and chip detector systems find particles.

F110 Engine Failure The engine could not be restarted and the pilot ejected. Following the mishap, flight manual airstart procedures were changed. Additionally, there is evidence the pilot may have inadvertently turned off the JFS while reaching for the switch to transfer to secondary control.

Operations-Factor Mishaps

The real significant F-16 achievement in TY 87 was the fact that there were only two operations-factor mishaps. Since most pilot fatalities have occurred in operations-factor mishaps, it is vital to keep the number low. The mishaps we did have were a collision with the ground, most likely due to spatial disorientation, and a midair.

- The spatial disorientation mishap was a "Type 1" or unrecognized disorientation. The pilot had gotten separated from the flight lead while in fighting wing, and lead was maneuvering to remain clear of clouds. The most likely scenario was that the pilot channelized his attention on efforts to rejoin the flight (looking in the radar or attempting to look outside the cockpit) and entered an attitude from which he could not recover.
- The midair occurred during a low-level, air-to-ground mission and involved two experienced pilots. They had become separated during a reaction to a "bandit" aircraft and were attempting to rejoin their element when the midair occurred. No written guidance existed to cover loss of visual within an element at low altitude, and no procedures had been established to deal with the situation.

A key to many of the operations-factor mishaps over the years has been task prioritization. The emergency procedure admonition to maintain aircraft control might easily be considered the "prime directive." Too often, F-16 pilots have allowed secondary tasks of finding targets on the radar, checking out caution lights, or other cockpit duties to distract their attention while the aircraft entered an attitude from which they could not recover. Temporal distortion also plays a significant role in these mishaps as time passes much faster than the pilot realizes when he is concentrating on one of these secondary tasks.

Outlook for FY 88

It is often said that those who do not learn from history are doomed to repeat it. Although we cannot predict with any precision the exact causes of our future mishaps, we can get an idea of the types of mishaps we might expect and use this information to prepare ourselves to respond to them. Some areas we might look at are:

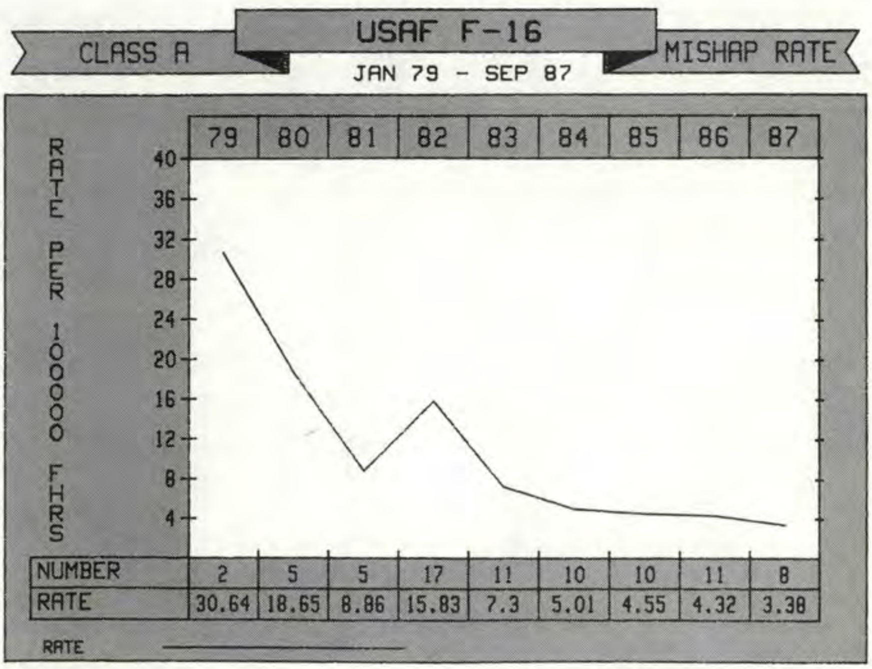
Logistics-Factor Areas

- **Engine** Historically, engine mishaps have constituted 77 percent of F-16 logistics-factor mishaps and 37 percent of all F-16 mishaps. Considering the percentages and the immediate criticality of engine failure during most of our operations, it is logical that the pilot must be well prepared to react.

Altitude at the time of the incident establishes the time available to the pilot to obtain a relight, set up for an SFO, or make his decision to eject. The pilot's understanding of the engine, along with his knowledge and adherence to emergency procedures, will determine if he maximizes the time available and provides himself the best opportu-

continued

Figure 1.



nity for a successful conclusion to his predicament.

The low-altitude environment is the most critical we face due to the relatively short time available for the pilot to react. Recent mishaps have emphasized the need for the pilot to respond quickly and correctly. If the first time a pilot has attempted to zoom the aircraft is after the engine quits, it is unlikely he will do it correctly.

A shallow climb instead of a 30-degree climb can reduce the time available to the pilot by more than a minute. Practicing zooms in a nonemergency environment will allow the pilot to see just what a 30-degree climb looks like. Because of the lean-back seat, it will appear steeper than it is.

Careful reading of the appropriate Dash 1 pages followed by meaningful dialogue during emergency procedure sessions can prepare a pilot to react correctly. Some basic thought patterns can be established which will assist the pilot when the times comes. A subtle shutdown (similar to normal shutdown) may indicate failure of the primary fuel control system and a need to transfer to backup control (BUC) or secondary engine control (SEC).

A failure preceded by loud bangs and engine vibrations (especially at stabilized RPM) could indicate a significant internal engine problem and key the pilot he may need to be ready for a flameout pattern or ejection. Thinking through sample failure scenarios such as this will simplify the pilot's problems when the emergency actually arises.

Engine improvement programs are being conducted continuously in an effort to keep failures to a minimum. The expedited program to replace the fan 2-3 spacers (also known as knife-edge seals) on the F100 engine is now complete. Quality control and inspection procedures have been improved in many areas. Maintenance personnel's understanding of, and strict compliance with, tech order guidance are imperative if the engines in the field are to keep operating correctly.

Recent mishaps have highlighted problems in the tech orders and confusion resulting from insufficient guidance or incorrect figures. Although these are being corrected, the time to identify these problems should not be *after* a mishap.

Quite often, these tech order deficiencies are well known to the individuals performing the work. But rather than submit a change request (AFTO 22), they succumb to human nature and work around the problem. Where we run into trouble is the next guy who is not aware of the problem and, even while doing the best he can to follow the guidance, incorrectly performs the task.

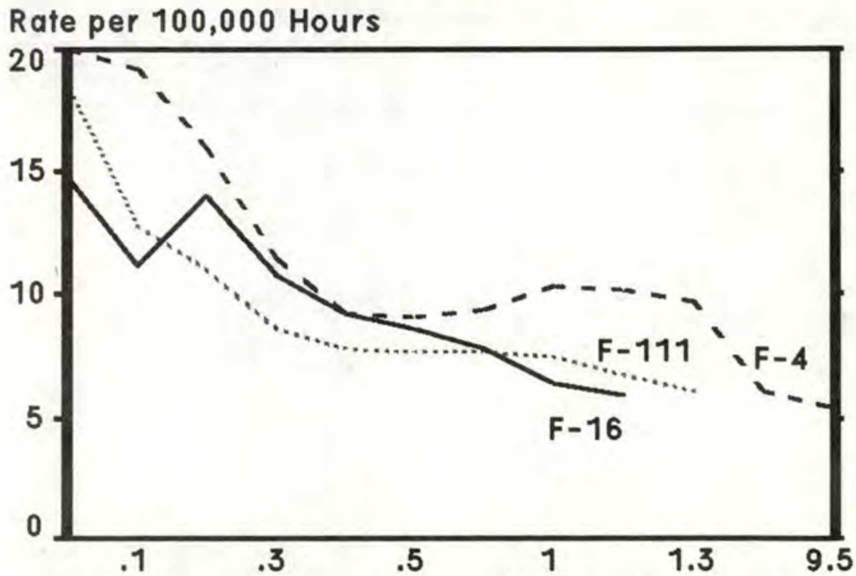
The two throttle cable mishaps this year not only highlighted the tech order problems but also raised issues for the pilot on how to react to a situation where he has too much, rather than too little, thrust. A flameout landing, which presents many problems of its own, is greatly complicated when the pilot must decide when and how to shut down the engine. Although this must remain a decision to be made by the pilot, based on the situation he is actually facing, preplanning of potential emergencies can better prepare the pilot for actual situations.

In most cases of excess thrust, the pilot should have no problem flying to a suitable landing field, although existing fuel and area weather can greatly complicate this. Given a VMC day, it might make sense to orbit at an altitude above high key while burning down fuel or attempting corrective actions such as switching to BUC or SEC. The extra altitude will allow for an orderly return to high key, if the engine quits, rather than a mad scramble to start a flameout approach from a less-than-optimum position.

When the time comes to land, the pilot must determine when "landing is assured." Although the "pucker factor" is much higher in a real situation, keep in mind that your practice patterns start by assuming engine out at high key. Your success to date in completing these practice patterns should, hopefully, give you confidence in your ability to complete the landing from high key with the engine shutdown.

There are good reasons to complete the engine shutdown at high key which directly affect the success of the pattern. Since the engine will most likely need to be shut down with the fuel master switch, this will prevent the need to find and move the switch (and ensure the engine is indeed shutting down)

Figure 2.
F-16 vs F-4 vs F-111
Destroyed Rates



during a more critical phase of the pattern. More importantly, it will provide the pilot an opportunity to determine if the emergency power unit (EPU) has switched to the hydrazine mode and continued running.

If the EPU is not running, there will be insufficient hydraulic pressure to complete the landing, especially during the high demand phase of the flare. Early knowledge of this problem will give the pilot time to attempt to rectify the situation or perhaps fly to a better location for ejection.

■ **Leading Edge Flap (LEF) System** A recent mishap occurred when a missing bolt led to the left LEF failing 90 degrees up. Lack of asymmetry brakes allowed the flap to fully extend. During the landing approach, the mishap pilot lost control when the AOA exceeded 10 degrees. This type of approach is very sensitive to AOA, and Dash 1 guidance must be strictly adhered to if it is to be successful.

■ **Landing Gear, Nose Wheel Steering, Brakes, and Tail Hook** Efforts are underway to reduce nose wheel steering hardovers, with an interim fix out which should result in a free-wheeling nose wheel in the event of failures. Tail hook problems were brought to light during a missed engagement. Speeds above weight-on-wheels speed can result in the hook being too high for a successful engagement. If the pilot is placing any forward pressure on the control stick, the hook can be more than 10 inches in the air.

Operations-Factor Areas

■ **Task Prioritization** We have discussed this earlier, and it remains the single most important factor involved in operations factor mishaps. Collision-with-the-ground mishaps constitute 55 percent of operations factor mishaps and 26 percent of all F-16 mishaps. The single factor involved in each was failure to complete the primary task of flying the aircraft while being distracted by, or concentrating on, other factors.

■ **Human Factors** The pilot brings to the mission a built-in potential for problems simply by being human. Potential areas which can lead to mishaps include judgment, channelized attention, task saturation, overcommitment, pressing, spatial disorientation, and g-induced loss of consciousness. Awareness and recognition of these factors which can affect any one of us can lead to techniques to combat them or to cope with them when necessary.

■ **Loss of Control** The F-16 flight control system is designed to assist the pilot to avoid control problems. It can, however, be defeated by the pilot. While it is true that the F-16 does not "talk" as much to the pilot, situational awareness of aircraft maneuvering can keep the pilot aware of his position within the flight envelope.

TAC has instituted an approach to departure training profile at the RTUs which is aimed at training the pilot to recognize when he is nearing departure situations, and know what steps to take to avoid the departure. A complete understanding of the recovery procedures and proper use of the manual pitch override switch is vital to successful recovery if the pilot does encounter an out-of-control situation.

■ **Midairs** This has become a large concern for both civil and military aviation and is the third leading cause of F-16 operations-factor mishaps. A study conducted at AFISC has shown that our biggest midair threat comes from our own flight members or our opponents in briefed air combat missions.

Rules of engagement (ROE) are important and can provide assistance in many instances. They will not, however, prevent midairs by themselves. Taking positive action to ensure horizontal or vertical separation when visual contact has been lost can be critical in areas where the ROE do not specifically apply.

Summary

The F-16 has established an enviable safety record, becoming the safest USAF single-engine fighter and showing a consistently downward trend in Class A mishap rates. This record has been achieved by a team effort including program managers, contractors, maintainers, and pilots. Each part of the team constitutes a vital link which, if broken, can result in a mishap. Through modification programs, improved inspections, and updated maintenance and operations procedures, we have continued to strengthen the team.

A key to additional success in the future is not only to find better answers after a mishap, but to attempt to anticipate problem areas and solve them before the mishap occurs. At the unit level, that involves maintenance and operations people examining existing procedures and taking action to improve them where required. As the final link in the chain, pilot knowledge of emergency procedures and his ability to quickly and accurately react, combined with his ability to properly prioritize his tasks, can make the difference in our future success. ■

F/FB-111

MAJOR NATHAN T. TITUS
Directorate of Aerospace Safety

■ Pride is something most fighter pilots possess in large measure. Sometimes it's appropriate to brag, and other times it's better to be humble — we don't often know when to do which! In 1987's version of this article, we spent a lot of time boasting about the fact that the Aardvark had gone 26 months without a Class A mishap. Well, gentlemen, we fell off our horse at 28 months. Unfortunately, we fell twice more, losing a total of three aircraft (two fatalities and two injuries) in a 9-month safety year (TY 87). That means our loss rate was 4.7 (per 100,000 flying hours) for TY 87 compared to 0.0 for the 2 years before.

TY 87 Mishap Experience

The three Class As we had were all unique. One involved uncommanded roll inputs from an unlocked spoiler, another was collision with the ground during a toss maneuver, and the other was an engine rollback during a simulated single-engine approach.

What's disturbing about all three is the common thread of operator factor. The first two mishaps will be listed as ops mishaps, while the third will be tallied as a log mishap with ops as a significant contributing factor. These mishaps were preventable. Let's take a look at each and see what we can learn.

■ One mishap occurred on a two-ship cross-country sortie. The mishap crew was flying a wing approach when they noticed a stabilator split. After being checked over visually by lead, they flew on the wing for return to home station.

During a weather penetration on the wing, the mishap crew began to experience greater control difficulty which placed them precariously beneath lead. The aircraft became uncontrollable and the crew ejected. Both crewmembers were seriously injured in the ejection when the forward repositioning cable broke and the capsule landed on its nose.

The decision to fly on the wing with a potentially serious flight control problem was a major factor in this mishap. Preoccupation with flying formation in the weather did not allow the pilot to concentrate on his primary duty of maintaining aircraft control and analyzing the situation. Flight lead should have directed the mishap aircraft to take the lead.

■ Another Class A mishap involved a flight lead upgrade sortie planning a simultaneous toss maneuver on a low-level target. The two WSOs planned the toss maneuver with planning aids and data tables used in the wing for several years. Multiple errors were made in planning and briefing the intended attack. During the actual execution of the toss, the mishap crew flew into overcast weather, came out of the clouds in an extremely nose-low attitude, and impacted the ground.

The maneuver was planned using incorrect data, and the pilots did not verify or check the accuracy of the planning. In addition, the crew flew into the clouds in violation of AFR 60-16, *General Flight Rules*, did not knock it off and transition to instruments, became disoriented, and crashed.

■ The other Class A occurred while flying a combined airborne instrument low approach (AILA) and a simulated single-engine approach for a WSO's initial qualification check. The evaluator briefed to combine the two approaches on their first circuit in the pattern.

During the simulated single engine, the good engine rolled back to 50 percent rpm due to a failure of the PS-4 pressure sensing tube to the main fuel control. The AC advanced both engines to max AB, but the ground came up faster than the engine, and the crew ejected without injury.

Even though the mishap will be listed statistically as a log mishap, both crewmembers failed to properly monitor aircraft performance during the approach.

If there is a common thread to these mishaps from an operator's viewpoint, it might be a lack of "attention to detail" — that extra effort that ensures the flight is thoroughly planned, briefed, and flown. It's easy for any of us to become complacent on occasion. Flying is a repetitive business, and repetition is a trap for complacency. It takes constant vigilance to maintain that sharp edge that makes the difference. Mishaps can and do happen when we let down.

FY 88 Forecast

For FY 88, analysts at the Air Force Inspection and Safety Center predict we will lose two F-111s and no FB-111s. It's hard to predict probable causes for such a statistically small number, but historically, collision with the ground, engine failure, and loss of control head the list. What's particularly interesting is that our mishaps in 1987 support this prediction exactly.

Flying safety is very cyclic with many ups and downs. When I arrived at AFISC in April, I was well aware of our long mishap-free period. When I pulled open a file drawer containing the Class A history of the F-111, its cyclic nature was obvious to me. In 1985 and 1986, we experienced the only Class A mishap-free years we've had since the Aardvark came into the inventory. Let's work toward making 1988 another mishap-free year. It's time to be humble. ■

OV-10

LT COLONEL HORST K. KRONENWETT, GAF
Directorate of Aerospace Safety

■ Congratulations! All of you in the Bronco community have just completed 5 years without a Class A flight mishap.

Your tactical community deserves special recognition from us all. USAF OV-10s have flown over 865,000 hours in 21 years, about 20,000 hours during the past transition year (TY 87). There are 77 OV-10s still in the USAF inventory. The fleet average flight time is 8,900 hours per aircraft, with the highest having accumulated 10,378 hours and the lowest 6,739 hours.

While sister services operating similar type aircraft, and with similar missions, suffered substantial aircraft losses due to out-of-control situations and collisions with the ground, the USAF OV-10 remained mishap free. This achievement is greatly magnified in view of the environmental extremes in which our OV-10 units operate. These extremes range from the polar cold of Alaska to the frying heat and high elevations of the Mojave desert to the salty, hot, humid climate of the southeastern US and Hawaii.

Class C Mishaps

Of particular note are the 18 Class C flight mishaps you reported. These covered the waterfront on engine shutdowns — fire/overheat warning, power loss, engine oil, and propeller blade problems. This shows that you had to master many challenges of considerable Class A potential. All supervisors, maintainers, and fliers of the OV-10 deserve appreciation for this continued excellence in flight safety.

Safety Modifications

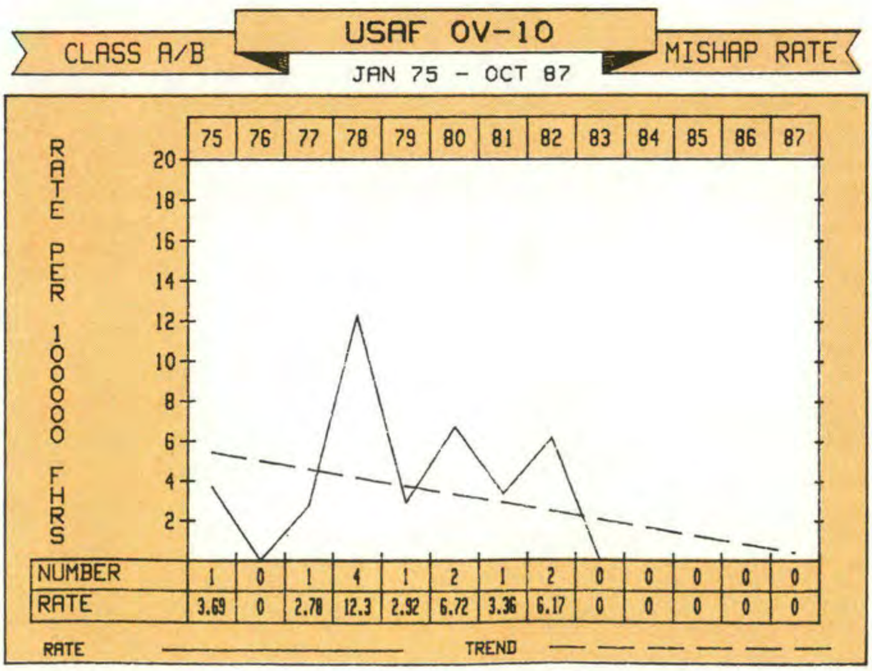
To further enhance flight safety, your OV-10 System Program Manager is planning a refurbishing program to begin in the third quarter of FY 88. It includes paint stripping, corrosion treatment, secure-voice installment, electrical rewiring, and analytical condition inspection. Testing of a fiberglass propeller blade is still being carried on by Air Force Systems Command — still no indication whether they are usable for USAF OV-10s. However, as an immediate result of a TCTO implementing new inspection criteria since October 1986, propeller cracks and tip failures have stopped.

FY 88 Mishap Forecast

The Air Force Inspection and Safety Center's analysts predict Class A losses for the coming year for all weapons systems. The OV-10's forecast for FY 88 is *zero*. You have proved in the past that you can match this challenge. Keep up your good efforts — you are on the right track.

Thank you,

Your proud OV-10 flight safety action officer. ■



OA-37

MAJOR WALLACE W. COATES
Directorate of Aerospace Safety

■ Although the OA-37 is disappearing from the inventory of active units, it will most likely remain in service with the Air National Guard (ANG) for some time to come. There are currently three ANG units and two tactical Air Force units flying OA-37s. In addition, AFSC uses the aircraft for various roles at the Air Force Flight Test Center.

Mishap History

Since becoming operational in 1967, A/OA-37s have flown over 670,000 hours. During this time, there have been 34 Class A mishaps destroying 30 aircraft, resulting in 23 fatalities. Twenty-one of these mishaps were due to operational causes, 10 were logistics related, and 2 were categorized as miscellaneous.

Class A Mishaps

During 1987, there was one OA-37 Class A mishap: The pilot of the mishap aircraft encountered smoke in the cockpit shortly after takeoff. He declared an emergency, turned off the battery and electrical equipment, and initiated a return to the airfield. He then jettisoned the canopy due to considerable smoke. When smoke and fire continued to increase, he ejected successfully.

Other Reports

A review of reportable mishaps in the OA-37 for 1987 shows that engine-related problems, specifically flameouts, account for the majority. J85 flameouts are not unique to the OA-37; it is an issue in several J85-powered aircraft. Airflow interruption to the engine due to poor inlet design is a major factor in the high flameout rate of the OA-37. A redesign of the inlet has been proposed, but has not been funded. So we may have to live with this problem for the near future.

FY 88 Mishap Forecast

The Air Force Inspection and Safety Center's analysts predict one OA-37 Class A mishap for FY 88. It will most likely be a collision with the ground. It is up to you to keep this forecast from coming true.

Meeting the Challenge

Even though the most recent mishap was logistics related and there has been a continuing problem with engine flameouts, the majority of mishaps in the OA-37 have been due to operational causes. Ground collision, both on and off the range, accounts for a significant number of these mishaps. Four of the last five mishaps were related to low-altitude operations. The low-altitude environment is high risk. There is little time to contend with a system failure, and the time margin for recognizing and correcting a pilot error or miscalculation is minimal.

The mission of the OA-37 places it in this high-risk environment for a significant amount of time. Complacency, lack of situational awareness, and recent currency in specific events are all areas that need to be targeted in reducing the risks of low altitude operations.

The safety record of the OA-37 is good. It is consistent with our front line attack aircraft and continues to improve, but there is still plenty of room for additional improvement, particularly in ops-related mishaps. The next time you brief a mission, consider the risks and put added emphasis on how to contend with the real hazards. ■

T-37

MAJOR WALLACE W. COATES
Directorate of Aerospace Safety

■ Safe, reliable, and fun to drive. Sound like a commercial for a foreign import? Well, these same observations hold true for the T-37. The little Cessna has been a stalwart performer for Air Training Command (ATC) since 1957, and with the demise of the T-46, it will continue to be ATC's primary jet trainer at least for the foreseeable future. Safetywise, this has been the best year ever for the Tweet. In fact, no aircraft will ever beat this year's safety record. For the first time in its 31 years of service, there has not been a Class A mishap.

Mishap History

The first T-37 flew in 1956. Since that time, the fleet has acquired nearly 10,000,000 hours of flight time. The average age of the current operational aircraft is 25.3 years. That, incidentally, is older than the average undergraduate pilot training student. During this time, there have been 126 Class A mishaps destroying 123 aircraft and resulting in 73 fatalities. The lifetime Class A mishap rate for the aircraft is only 1.3 mishaps per 100,000 flight hours — a remarkable record considering the mission of a primary jet trainer. In comparison, the T-33, which went into service just 8 years before the T-37, has a lifetime mishap rate of 13.7.

Our 1987 Record

Our unprecedented 1987 safety record did not come by chance. ATC's flight safety officers and flying training supervisors deserve credit and can take a good measure of pride in the record. Maintenance also deserves a big share of the credit. Keeping a 31-year-old aircraft in top operational condition is no easy task. But the lion's share of credit for this year's safety record goes to the instructor pilots. Their skill in operating the aircraft, their ability to teach the necessary skills to our aspiring young aviators, and the sound judgment they've shown in supervising the student pilots are all key factors in this year's spotless safety record. Well done, ATC IPs!

Class C and HAP Reports

As in the past, engine failures and physiological mishaps accounted for the majority of this year's Class C and high accident potential reports. In spite of this, the J69 continues to be a very reliable engine with a relatively low failure rate. On the other hand, the number of physiological mishaps that occur in the T-37 is quite high in comparison to other Air Force aircraft. G-induced loss of

continued

T-37 continued

consciousness (GLOC) accounts for a significant portion of these mishaps. In fact, 80 percent of all USAF GLOCs reported last year occurred in the T-37. Low experience level (students getting their first exposure to jet aircraft), aerobatic flight, no anti-g suit, and an extremely high g-onset rate are all factors. ATC is continuing to stress g-awareness and anti-g straining maneuvers. Students, you need to keep practicing that L1 maneuver.

FY 88 Mishap Forecast

The Air Force Inspection and Safety Center's analysts predict one T-37 Class A mishap for FY 88. It's up to you to prove the analysts wrong.

Dealing with Age

Obviously, the single biggest issue with the T-37 is its age. High-time aircraft are rapidly approaching their structural life limit. To extend aircraft beyond this limit, the system manager at San Antonio Air Logistics Center has initiated a structural life extension program. This program, which entails strengthening of several critical areas, will extend the basic airframe structure well beyond any foreseeable operational life.

Unfortunately, this program applies only to the airframe structure. Other systems such as engines, flight controls, electrical, avionics, etc., are all aging, and there are no plans for updates. Maintaining these systems will become increasingly difficult. Maintenance people will need all the help they can get to keep the Tweet flying into the 1990s.

Keep up the good work, operators. Treat the airplane with the respect its age demands, and you can continue to rely on it. You may have to for some time to come. ■

T-38

MAJOR WALLACE W. COATES
Directorate of Aerospace Safety

■ Do you know which Air Force jet flew more hours than any other in 1987? This same jet, used by four different commands in a multitude of roles, had one of the best safety years in its 27 years of service. Answer: The T-38 Talon. At the end of our transition year 1987, the T-38 had flown nearly 267,000 hours. The only other aircraft in the Air Force inventory to fly more was the C-130. If you count the number of sorties flown, no other aircraft came close to the T-38.

Even though the Talon is getting along in years, it's still the hottest trainer in service and a great aircraft to fly. Thousands of pilots from countries all over the world have earned their wings in this sleek little jet, and you'll be hard-pressed to find one who did not thoroughly enjoy flying the white rocket.

Since its introduction in 1960, the T-38 has acquired nearly 9.5 million flying hours. During this time, there have been 176 Class A mishaps, destroying 170 aircraft resulting in 128 fatalities. The majority (108) of these mishaps were due to operational causes, 56 were logistic related, and the remaining 12 were classified as undetermined or miscellaneous.

Class A and B Mishaps

From a safety aspect, 1987 was an excellent year for the T-38. There were only two Class A mishaps. Both were midair collisions. There was also one Class B mishap — a catastrophic engine failure. A brief review of these mishaps follows.

■ The mishap aircraft were flying a two-ship basic fighter maneuver training mission. One aircraft was flown by a solo student, and one was dual with an instructor and student. Shortly after beginning a high aspect engagement, the solo lost sight. He was directed to continue the engagement by the dual aircraft. As the student in the dual aircraft attempted to lead turn the solo, the aircraft collided. Both the instructor and student in the dual aircraft were killed on impact. The solo student successfully ejected.

■ The mishap aircraft was designated as a radar target in support of an F-15 test mission. Following equipment problems with the F-15, the T-38 was released to fly an alternate mission. After extensive ma-

neuvering and during a VFR descent for recovery, the T-38 collided with a civilian Cessna which was also operating VFR. The pilot and a flight test engineer in the T-38 and both occupants of the Cessna were killed on impact.

- During climbout on departure, the crew of the mishap aircraft heard a bang followed by a yaw, roll, and pitchup. Shortly thereafter, the No. 1 fire light illuminated. The instructor pilot shut down the engine in accordance with the checklist and began an immediate descent for a single engine approach and landing. On short final, a chase ship informed the mishap aircrew of heat damage to the underside of the aircraft and trailing smoke. The crew elected to continue the approach, and they accomplished an uneventful full-stop landing and ground egress.

Other Reports

Reportable mishaps for the year, Class C, and high accident potential reports show a high rate of engine failures and physiological mishaps. Flameouts for various reasons account for the majority of engine problems. Compressor blade failures are rare, but still frequent enough that SA-ALC has directed replacement of the first stage and redesign of second stage blades. In addition, SA-ALC is attempting to reduce the possibility of catastrophic engine failures by removing high-time compressor disks from service.

Most of the physiological mishaps are due to loss of cabin pressure above 18,000 feet. Reports of these mishaps have helped identify problems with the pressurization system. Fixes in work should improve system reliability.

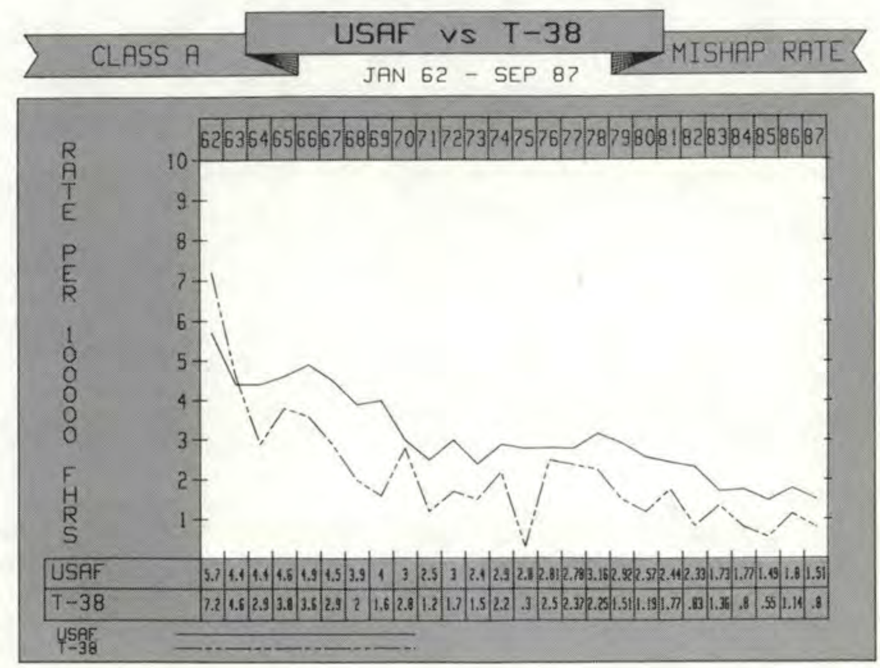
Dealing with Age

Life extension for the Talon is an issue of increasing importance. Pacer Classic, an integral program of airframe, engine, and avionics updates aimed at extending the operational life of the T-38 to the year 2010, is still alive and well. Modifications under this program you may see incorporated in FY 88 are a command ejection system which will allow the instructor pilot to select which seat will initiate sequenced ejection, replacement of the old standby attitude indicator with a new ARU-44 indicator, and a new ARN-147 ILS.

FY 88 Forecast

Based on past experience and trends, our AFISC analysts have predicted four Class A mishaps for the T-38 in FY 88. The figures indicate two of these have a high probability of being midair collisions. It's more difficult to predict what the others will be since several mishap categories indicate probability of occurrence. These mishap types are landing, structural failure, and undetermined. Other lesser probabilities are collision with the ground and bird strike. But now that we know what to watch for (with the possible exception of the undetermined category), it's up to us to guard against these types of mishaps. Nothing would please our analysts more than to be proven wrong.

Since entering the inventory, the T-38 has established a record of safety and reliability that is hard to match (see figure). For the past 25 years, the mishap rate has been decreasing and has continually remained below the USAF average. This record did not come by chance. It took the combined effort of operators and maintainers. As the airframe and systems become older, this effort will have to continue. I'm not by any means implying the aircraft is on its last legs and ready to fall apart. If anything, the T-38 is still one of the most reliable jets flying. I'm just saying, every time you strap in, be prepared and continue to think smart and fly safely. ■



OPS TOPICS

Who Has It?

■ During a range mission, the F-4 pilot noted a Master Caution light and a Check Hydraulics light. The crew performed the Utility Hydraulics Failure checklist and burned down fuel for landing.

When ready for landing, the pilot lowered the gear and flaps with the emergency system and flew a straight-in approach. He touched the Phantom down 1,000 feet prior to the barrier. Shortly thereafter, both main gear tires failed.

The aircraft drifted left and one wheel dug into the runway surface, but the barrier engagement was successful. The aircrew shut down the engines and egressed safely.

The tires blew out because the weapon systems officer (WSO) pulled the emergency brake handle 1 to 2 seconds after touchdown without telling the pilot. The pilot had his feet on the rudder pedals and inadvertently exerted enough pressure to lock the brakes.

The problem was caused by a breakdown in crew coordination. The pilot was planning to go around if the aircraft missed the barrier. He told the SOF but not the WSO. The WSO assumed the pilot wanted the emergency brake system activated, so he did so. But, he didn't tell the pilot.

Proper crew coordination is essential, especially during critical phases of flight. Every crewmember must know what is happening, and no one should activate anything that will affect the operation of the aircraft without prior coordination with the pilot. Keep on talking!

Is This It?

While the F-4 was holding for takeoff, the crew was running the before takeoff checklist. At the point for lowering the canopy, the flight surgeon (FS) in the rear seat said, "I don't believe I know where that is." (Yes, he had received proper training.)

The pilot in the front seat told him, "It's on the left, by your shoulder, hidden under the canopy rail." The FS asked, "Is it the yellow and black one?"

As he asked the question, the FS actuated the handle. The pilot heard a muffled hiss and bang and knew the canopy jettison handle had been pulled. He confirmed that with the FS and then told him not to move anything else and called for help.

The FS had received adequate training and preflight briefing. He suffered a memory lapse on the location of the canopy closing handle. The problem arose when he violated a basic fundamental of aviation: If you don't know what it is, don't move it.

When flying with someone other than a regular crewmember, make sure you impress this lesson upon them. An aircraft cockpit is not the place to experiment with switches and handles to see what they do. This is especially true for those with distinctive markings or red covers.

The Lindbergh Syndrome: Me and My Plane

A flight of two fighters was on an instrument route when the lead aircraft developed mechanical problems and needed to abort the route. The lead aircraft stated, "We need a clearance back to base." . . . The controller issued an IFR clearance. The pilot said, "We are in a left turn and climbing to 17,000."

The use of the word "we" was taken by the controller to mean both aircraft were returning to home station, but only the lead aircraft was returning. The wingman continued on the original IFR clearance and completed the military route through the airspace of two centers. The use of the word "we" meant one thing to the pilot and had a totally different meaning to the controller.

Both the pilot and the controller share the responsibilities. The pilot gave the controller new information and didn't give enough, such as, "Lead returning to station, needs an IFR clearance. Wingman continuing original flight plan." The controller should have requested more information to ensure the entire flight was aborting the route.

The pilot needs to communicate his or her thoughts and ideas to the controller fully so both can work as a team. Know the whole story, not just part of the story. Communicate with each other! ■

Adapted from
ASRS Callback #100

MAINTENANCE MATTERS

F-16: MISSING WHEEL SPACER

■ Following the third sortie on a scheduled surge day, the F-16 crew chief noticed the nose gear tire was worn beyond limits. So he and his assistant changed the tire while a qualified 7-level technician supervised the procedure. After the forms were signed off, it was time for the pilot, who was at the aircraft waiting, to start the engine and taxi out.

While making the final turn on the taxiway prior to taking the runway, the Falcon pilot felt some slight vibrations and then a jolt. When he applied brake pressure to stop the fighter, the nose gear tire separated from the jet, causing the nose strut to impact the taxiway and collapse. The aircraft slid on the nose strut almost 30 feet before coming to a rest. The pilot immediately shut down the engine and performed an emergency ground egress.

If you're a Falcon maintainer, it's probably obvious what happened. The nose wheel outboard bearing spacer was removed during the tire change, but not reinstalled. This allowed the axle nut to fit too far into the wheel hub. As the wheel rotated, it hit against the nut. Gradually, this friction backed the nut off the axle and the wheel fell off.

Several factors contributed to this $150,000 mishap, but probably the most obvious was all three people were motivated to expedite the tire change to prepare the jet for the next sortie. If you recall, the pilot was already at the aircraft.

There have been other F-16 mishaps involving a missing nose wheel spacer, the most serious being the loss of a nose wheel on takeoff roll. Since the aircraft in that mishap had already become airborne, the pilot was forced to burn off fuel and "grease it in" for a 6,000-foot slide down a runway on the nose strut.

F-16 units may want to make this a special interest item at newcomer briefings and weekly roll-calls, while quality assurance folks may want to increase the task evaluations on nose tire changes.

Remember, it's the little things that bite us. So take the extra minute and make sure everything is in place, especially during sortie surges or local exercises.

F-111: PAINT PERIL

Approximately 30 minutes after takeoff, the F-111 crew began to feel a little different. Attributing his condition to not having flown for 3 weeks, the WSO selected 100 percent oxygen and pressed on. But when the pilot's fingers began to tingle and he found himself making small mistakes, it was time to abort the mission. With a concentrated effort, the aircrew was finally able to land the aircraft.

Once on the ground, the crew was immediately taken to the hospital, where they were examined and released.

Investigators determined the cockpit floor had been painted just prior to this physiological mishap flight, and insufficient time was allowed for the dissipation of associated fumes.

Although pride in maintaining aircraft is important, all of us need to pay special attention to the precautions associated with cockpit painting. Correctly allowing sufficient time for paint fumes to dissipate is just as important as knowing the techniques of applying paint. When in doubt, consult TO 1-1-8, *Application of Organic Coatings, Aerospace Equipment*, or your local paint shop for precautionary procedures.

T-38: OPEN STATIC LINE

While climbing out on departure, the T-38 solo student pilot noticed a 150 knot difference in his air speed indicator from that of his wingman. After declaring an emergency, the student accomplished an uneventful straight-in landing with the other aircraft flying chase.

The investigation revealed the mishap was a result of prior maintenance. After an instrument specialist had removed the rear cockpit altimeter, the aircraft status was restricted to "solo only." Still, the specialist not only left the static line unplugged, but also incorrectly documented the altimeter removal action on a red diagonal symbol rather than a red-X in the AFTO Form 781A.

Because of the incorrect condition status, the maintenance action was not reviewed by a 7-level technician.

This unit briefed their instrument specialists on the proper procedures of removing altimeters and properly documenting their work after completion. Immediate supervisors and inspectors should also be especially careful when checking work that has been done by the learner-types. ■

CAPTAIN

David C. Cordon

FIRST LIEUTENANT

Christopher D. Stewart

SERGEANT

Thomas J. Langella

SENIOR AIRMAN

Anthony J. Drake

First Tactical Fighter Wing
Langley Air Force Base, Virginia

■ On 12 December 1986, Captain Cordon and his crew were flying a UH-1 helicopter mission transporting a VIP from Langley AFB to the Pentagon. After 50 minutes of flight, and while 300 feet AGL over a heavily wooded area, the aircraft experienced a sudden catastrophic engine failure.

The entire crew heard the engine compressor stall. Captain Cordon and Lieutenant Stewart noticed the low rotor RPM audio and warning lights. Captain Cordon called "engine failure" and simultaneously lowered the collective to regain enough rotor RPM to make a landing.

Lieutenant Stewart began a forward scan for a landing area and noticed a power line and farmhouses in their flightpath. He called for a left 90-degree turn towards the only available landing area. A turn at this low an altitude during an autorotation is considered so inherently dangerous that it is not even practiced. In this case, the aircraft's limited altitude made the maneuver even more difficult.

Airman Drake, meanwhile, had placed their passenger in the crash position, tightened the passenger's restraints, and opened the side door. Captain Cordon executed a flawless slide-on landing on an estimated 5-degree downslope and came to a stop approximately 30 meters prior to a treeline.

After the helicopter came to rest, Lieutenant Stewart executed emergency shutdown procedures, Airman Drake removed the passenger to a safe location, and all crewmembers egressed the aircraft. Sergeant Langella obtained the fire extinguisher and first-aid kit during his egress and also removed engine shrouds to minimize danger of ground fire. WELL DONE! ■

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UNITED STATES AIR FORCE

Well Done Award

Presented for outstanding airmanship and professional performance during a hazardous situation and for a significant contribution to the United States Air Force Mishap Prevention Program.

TECHNICAL SERGEANT

David F. Murphy

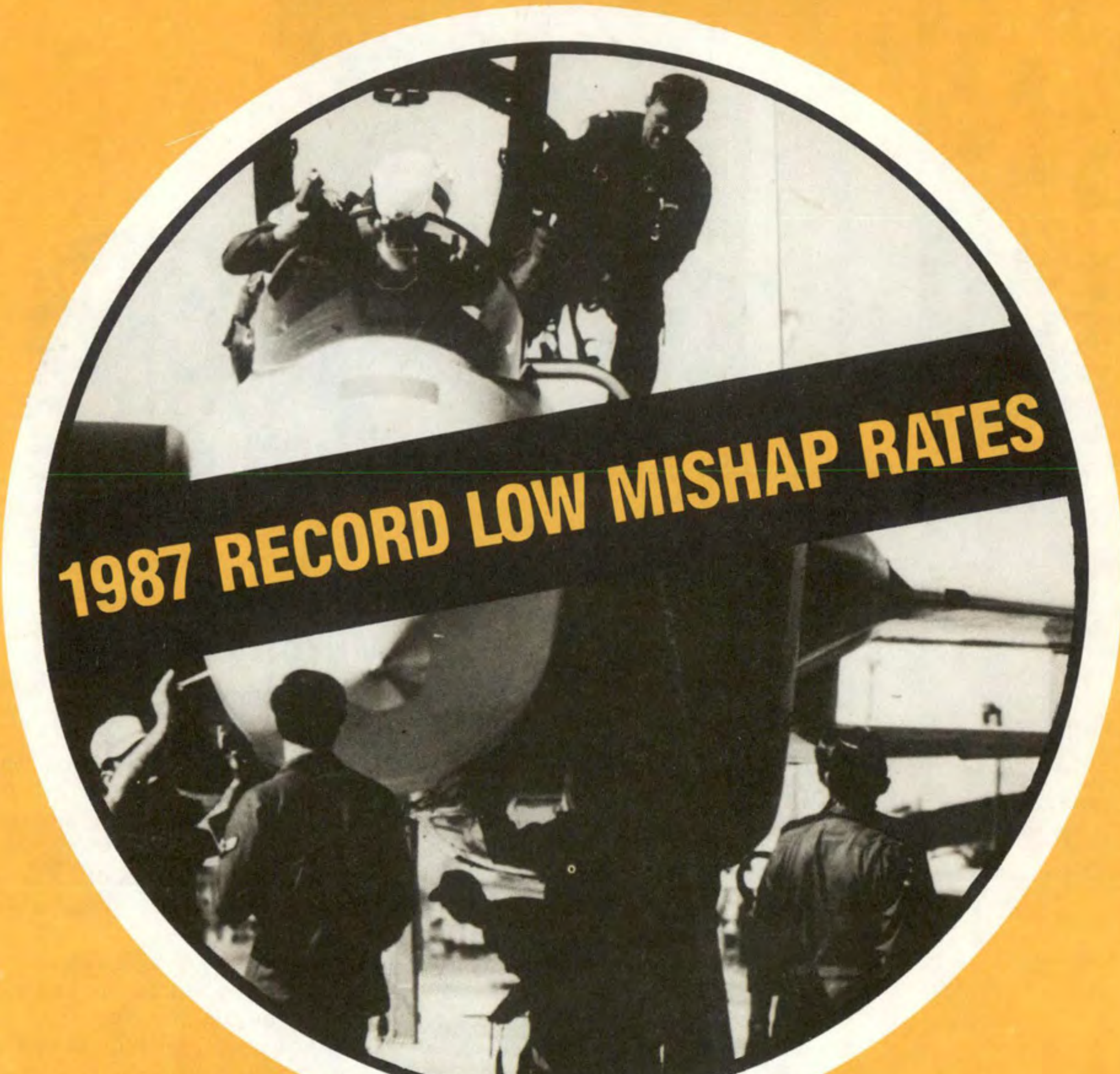
155th Consolidated Aircraft Maintenance Squadron
Lincoln MAP (ANG), Nebraska

■ On 13 December 1986, a transient C-130 aircraft departed the Lincoln ANG base parking ramp and was proceeding to the runway for takeoff. Sergeant Murphy exited the fuel cell repair facility at this time and because of his prior experience on C-130 aircraft, observed the taxiing aircraft with the right-hand main landing gear maintenance door lock installed. Raising the landing gear with this lock installed causes severe damage and possible loss of the door.

Not knowing whether this was a maintenance taxi or a departure for flight, Sergeant Murphy ran to the flightline and verified the aircraft was preparing for flight. He immediately informed the command post to contact the tower to hold the C-130 on the taxiway and inform them of the condition. He then proceeded to the aircraft in the expediter vehicle. Both right-hand engines were shut down, and the aircrew members removed the maintenance door lock. The aircraft then proceeded on with the mission.

Because of Sergeant Murphy's knowledge of the aircraft, keen observation, concern for flight safety, and tenacity in staying with a problem until it was resolved, a potentially critical air abort with major aircraft damage, or worse, did not occur. WELL DONE! ■

Congratulations USAF Fighter/Attack Fliers and Fixers



Overall Class A rate..............3.01

Class A Operations Factor rate...1.56