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TAC ATTACK

May 1969

MAY 1969



HARDISON

Lightning....Page 4

for efficient tactical air power

TAC ATTACK

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TACTICAL AIR COMMAND

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JAMIE SEZ:

If you treat a man like an irresponsible idiot long enough, he will begin to act like one.

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TACRP 127-1

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

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Angle of ATTACK

weather smarts....

We're back to that time of the year when everyone gets well "weathered" with words, posters and verbal warnings. There is a reason for all this. Our past experience tells us that history will repeat itself. We can expect our flight operations to be disrupted, have a few aircraft beaten soundly by hail, and take a few lightning strikes...sometimes needlessly. And perhaps even buy an accident attributed to low RCR and adverse winds when the first pilot to get caught tries to sneak into a field at the same time as a thunderstorm.

We also know that more problems will turn up during navigational flights than while flying local. There are those among us who have a penchant for rationalizing that a particular cross-country leg is considered important. Don't! Your decision to go must be based on intelligent, thorough, severe-weather preplanning, uncolored by "get-home-itis," or its less publicized partner, "get-there-itis."

On the local scene, have you evaluated your weather watch capability yet? If just the threat of inclement weather is present and we don't fly, our combat crew training would cease at a few bases. Who makes the decision to recall or divert? How does he get his information? From whom? The answers to these questions must be a part of your plan.

It's a time of the year when we have to modify our thinking. We don't subscribe to the "don't go near the water Johnny, you might drown," philosophy. We have a mission—it must be accomplished. It is possible to co-exist with 'Ole Man Weather (giving him his due when necessary) and still accomplish it . . . if we fly smart.



R. L. Liles

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

LIGHTNING

strike

Lightning strike



With this issue we usher in the witching season and it's attendant spastic weather. The phenomenon called "lightning strike" begins to rear it's ugly head along with all manner of changing and violent meterological conditions. In anticipation of the coming attractions, we'll run over our last expensive lightning strike and the lessons learned.

It was the middle of last summer. An RF-4 crew consisting of a pilot and navigator were enroute to their second target on a photo test mission. While circumnavigating a thunderstorm about 190 miles west of home, they took a lightning strike. The pilot estimated that they were two to three miles from the cloud at the time, thunderstorm activity was very light as estimated by weather — three to fifteen percent coverage.

The navigator, in his statement described the strike very well. "About fifty miles from Shaw the first thunderstorms were encountered, however, circumnavigation was no problem. Thunderstorms were seen from then on until the strike, but were isolated. The target area was lined with build-ups to the east except for an area 4-5 miles wide extending about thirty miles. Penetration of the line was made in this area at 22,500 feet. Halfway through, a bolt of lightning was observed on the left. The aircraft jerked to the right indicating a possible strike. I then noticed a split at the outer end of the leading edge flap. I advised the pilot, since he couldn't see it, that metal was beginning to peel back, so speed was reduced and we turned toward Shaw."

Enroute to Shaw, another RF-4 joined up

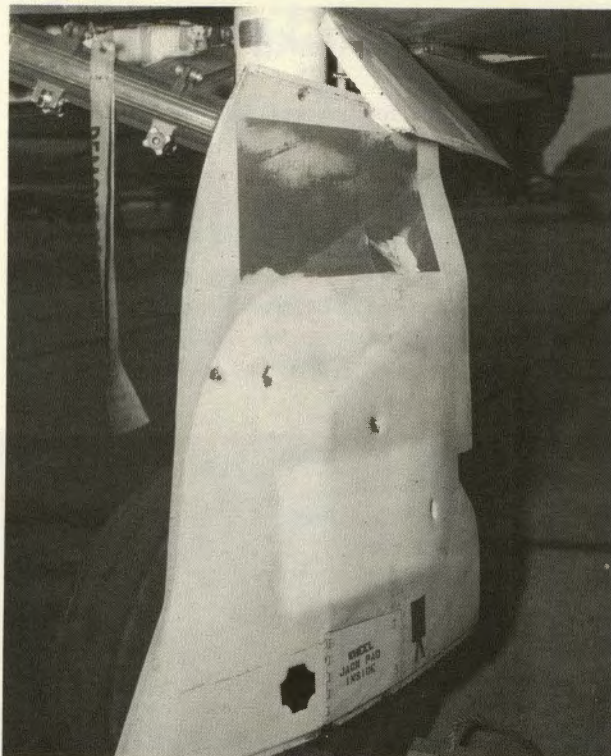
formed the lightning strike. The aircraft lost the left external fuel tank and sustained numerous holes. On the way home a controllability check was run followed by a no-flap landing.

Damage to the aircraft was quite extensive. The lightning strike caused the left external tank to jettison, and then explode while still very close to the aircraft. There was no evidence of forceful separation of the external tank. The damage report included: left center leading edge flap dented and 6-inch hole torn in it; left aileron flap dented and torn; left wing-fold strips torn; left inboard landing gear door dented and punctured; left cartridge starter door punctured; left engine bay door punctured; left wing skin punctured; left pneumatic starter door torn; panel 48 and adjacent skin punctured and torn; skin below ram air turbine punctured and three adjacent ribs cracked; skin aft of panel 47 punctured and torn; right external tank punctured and hole blown in aft end; and casting and hinge adjacent to doors 78 and 138 cracked. Four bolts from the left external tank seam joint were found imbedded in the left gear door and a piece from the seam flange of the left external tank was found imbedded in the left engine starter access door. Including 350 man-hours, all of this came to a hair over nine grand. We were lucky — it only cost us money this time.

The primary cause was, "Weather factor, in that the lightning strike caused the left external fuel tank to jettison and explode." Recommendations by the investigating officer were two: "That the F-4 system support manager initiate an aggressive program to lessen the apparent susceptibility of the F-4 aircraft to lightning strikes or develop a system to rapidly dissipate the electrical charge prior to damaging the aircraft and aircraft systems; and that all rated personnel be briefed on the hazards of summer thunderstorm activity" . . . consider yourself briefed.

With respect to recommendation number one, TAC headquarters requested OOAMA and ASD to make an engineering study to determine if there is a possibility of lessening the susceptibility of the F-4 aircraft to lightning strikes. OOAMA, last September established engineering study number 334E to investigate lightning problems encountered by F/RF-4 aircraft. In February of this year, the project manager reported the study showed that F/RF-4 aircraft were no more susceptible to lightning strikes than any other aircraft.

The unit which experienced this minor accident will be harder to convince though. From 21 March to 18 July last year, they logged 4 lightning strikes — all confirmed to RFs in block numbers -22-MC and -23-MC. Some think that bonding design or bonding installation in these blocks might cause this series airplane to be more susceptible to strikes than other F/RF-4s. In their indorsement to the



Left main gear door. Note bolts from left drop imbedded in skin.

accident report the unit recommended that the Director of Aerospace Safety review lightning strike data on RF-4C aircraft to determine if that model is more susceptible. The final evaluation has not been received to date.

Although we can't attribute loss of a fighter to lightning in our recent experience, the potential is there. Lightning strikes don't get too much attention except by the jocks who sit through one. They have been known to mess up compasses and nav equipment, give crews a mild shock — or as some report, a tingling or numbness following the occurrence. The most hazardous effects fall into three categories; blindness, loss of flight instruments, and aircraft damage as evidenced by this accident narrative.

When flying in clouds at night, you should anticipate a lightning strike — yes, anticipate. Since lightning is no more than electrical energy moving from one charged area to another, a thunderstorm is not a prerequisite for the occurrence. Although blindness is usually temporary, you could lose the bird long enough to end up at someone else's flight level, or in some hairy position. Use your white floodlights.

Loss of flight instruments is a horse of a different color. If you lose them permanently you may get a chance to fly the old "needle and ball." When was the last time you tried it? Granted, it's not required nor are you tested

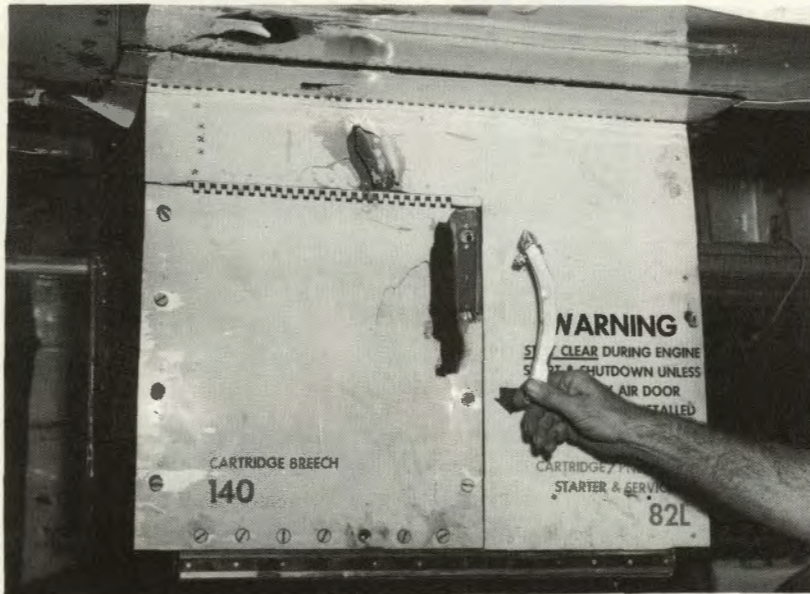
Lightning Strike

on your proficiency in this area. But the system works and is a good temporary crutch to keep you half-way oriented till you either break out or get spit out the side or bottom of whatever you are in. We all know what the result will be if you haven't practiced — right?

The third area, aircraft damage, is beyond your control. But be prepared to cope with anything. A parallel to our minor accident occurred in Japan last year, it involved a flight of two F-4Cs. The strike was from the

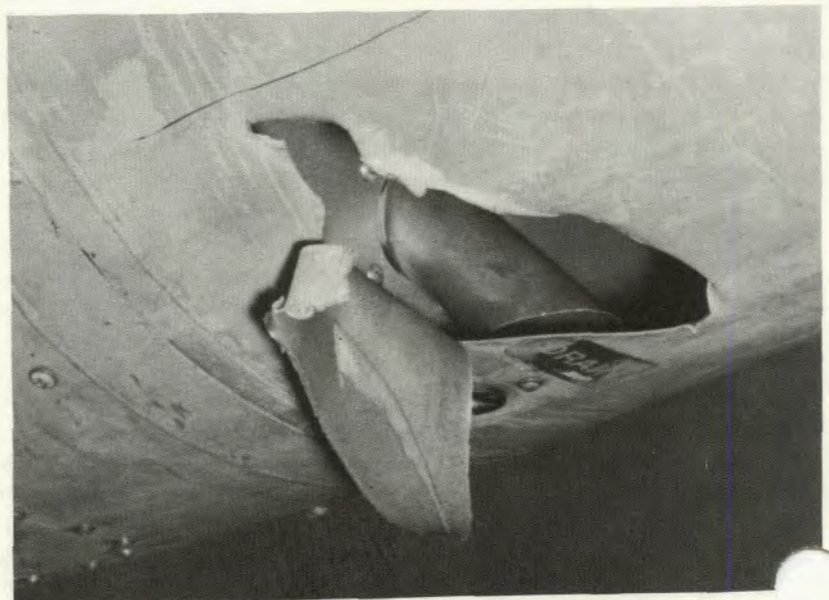
leader's right and passed through his bird to the wing in close formation on the left wing. Number two's drop exploded but part of it stayed on the bird — and made it fly peculiar. Yaw or pitch inputs caused by aircraft damage at night or in turbulence are vertigo inducers of the first water.

So the next time you belly up to the weatherman's counter, press him on the enroute weather. The "standard thunderstorm" briefing will be more valid from now on as summer approaches. He can't tell you exactly where the storms are, or whether you will encounter lightning...but he CAN tell you where it ain't! ➤



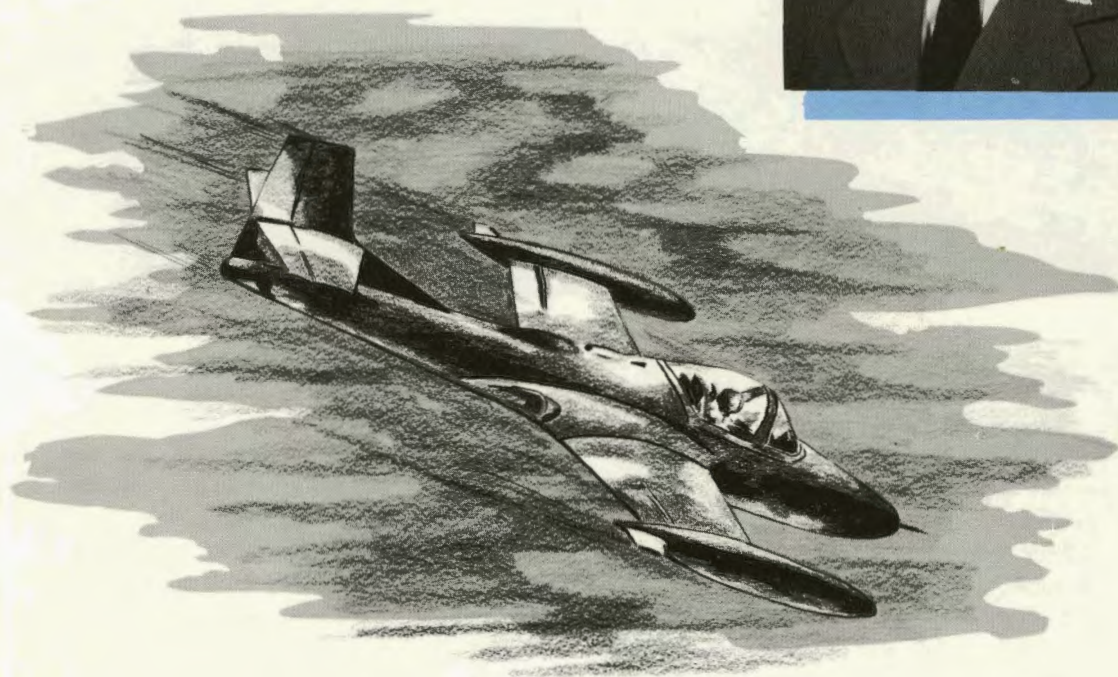
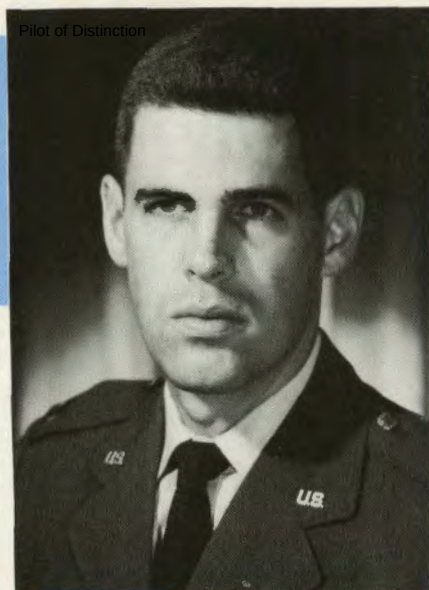
Door 140. Seam flange from left drop tank was found in hole to left.

Damage to right drop.



Pilot of Distinction

Capt McCue



Captain Worth R. McCue of the 4532 Combat Crew Training Squadron, England Air Force Base, Louisiana, has been selected as a Tactical Air Command Pilot of Distinction.

Captain McCue was flying a tactical gunnery mission in an A-37 with a student pilot. During a high-angle strafing pass they felt a sharp explosion in the nose gun compartment. The A-37 rolled and yawed to the right. Captain McCue regained control and recovered from the pass. He shut down the right engine as the rpm decreased through 30 percent and EGT increased to 1,000 degrees. By use of full rudder and considerable aileron he maintained level flight.

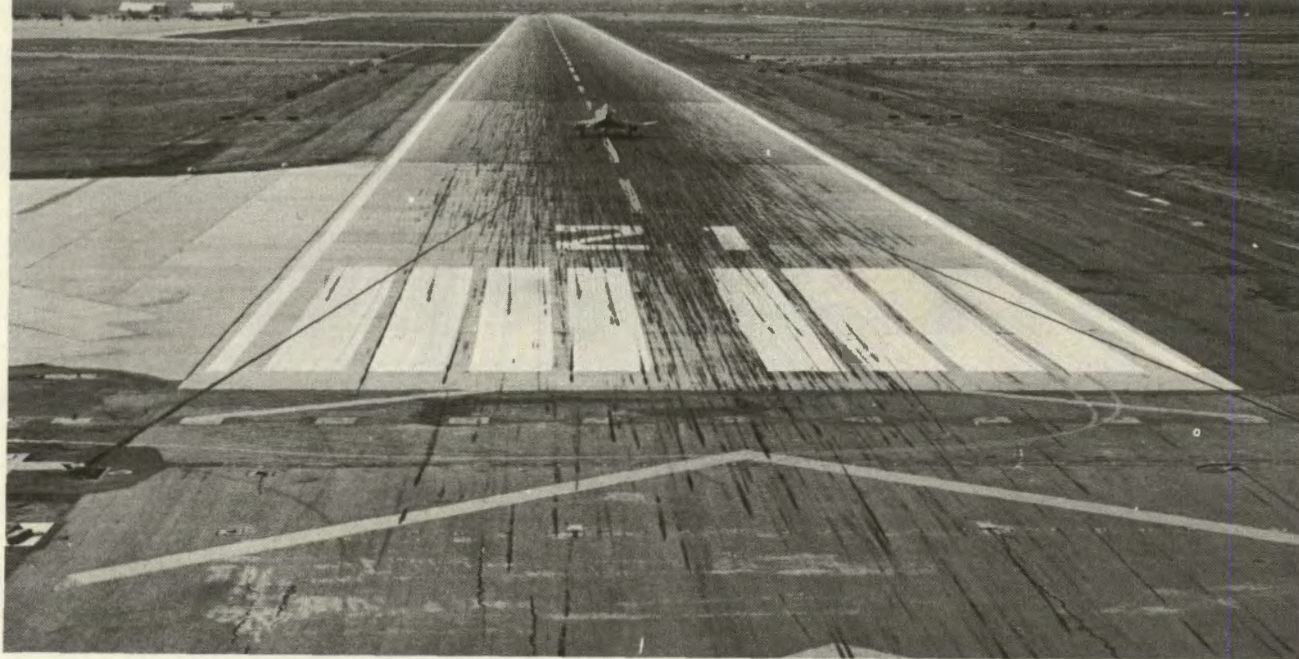
Postflight inspection revealed the gun compartment door

had separated from the nose of the aircraft and wrapped itself around the leading edge of the right wing, acting as an off-center speed brake.

Captain McCue lowered the gear and flaps and found he had sufficient control to land the aircraft. Because of heavy construction equipment on the right side of the main runway he selected a shorter runway for landing. He also elected to land in a three-point attitude at maximum allowable touchdown speed to prevent the right wing from dropping. Captain McCue landed successfully on the short runway, in spite of the control problem.

Captain McCue's professional airmanship during a critical inflight emergency readily qualifies him as a Tactical Air Command Pilot of Distinction.

BARRIER BARRIERS



His bird was sick, so the Phantom pilot chose to set-down at an enroute Air Force base. The tower affirmed an approach end barrier engagement request so he blew down the gear, dropped the hook, and touched-down on centerline with a nose left attitude because of an uncontrollable rudder problem. The crew braced for a quick stop — but it never came! Suspecting he missed the cable, the pilot elected a go-around. Only after he landed on another runway was he aware that he had carried the BAK-9 cable and all 3,000 feet of tape throughout his go-around pattern, tearing at roof tops, TV antennas, power lines, and automobiles, both moving and parked.

At a western TAC base, the Sunday morning silence was broken only by the muffled drone of a downpour, reducing RCR to minimum. Within five minutes the airdrome had a bird in every barrier; some cross-country Phantoms who had to get down in a hurry.

At another TAC base, a BAK-12 sat undisturbed for several months, pulling its silent sentinel duty. Recently, within an hour, it safely stopped two sick birds returning from routine training flights.

Runway barriers are like Blue Cross: straight overhead...until you need'em. And too often, little thought is given to maintenance or performance until the demand is laid on. Then it's too late! Fortunately for both, they are near foolproof when adequately

maintained. But here's where similarity ends. Anybody takes care of one, but specialist knowledge required for the other. That specialist is already scarce in TAC because of SEA demands, and with the many "saves" credited to barriers in the past couple of years, some ops people are suggesting that barrier arrestments become a part of operational training.

In 1968, TAC bases or units had 171 barrier engagements. The majority were on landings because of aircraft system malfunctions. But there is a notable increase in barrier usage during slippery roll-outs, or simply to avoid roll-out incidents on slippery runways. At the present rate, 1969 will record more than 200 barrier contacts. A USAF base near the SEA zone recorded 16 engagements during an eighth month period, all resulting from slippery runways. Three were approach end engagements simply as a preventative measure on 12 to 17 RCR conditions.

Barrier performance and reliability depends on two things. First, knowing the limits of various types determines how they can be used for maximum effectiveness and efficiency. And keeping them mechanically ready to perform is second, though no less important.

Civil engineer people responsible for barrier installations are not too surprised when they encounter the occasional ops or safety officer whose knowledge

ers is limited to "that gadget on the runway to stop plopped birds." This situation exists usually because the officer's previous experience had been with non-fighter units, requiring little or no barrier activity. This may also explain why a young fighter jock, caught with an emergency away from home, attempted an approach-end on an MA-1. If the ops staff is not informed, what can a commander expect of his pilots, traffic controllers, etc. If the safety officer is uninformed, how can a commander feel secure that all precautions are being observed in both ops and maintenance areas.

Barriers are designed to require minimum maintenance even though they must perform on a moments notice, 24-hours a day. This should concern commanders more than a little bit because barrier maintenance is not a specified AFSC. In lieu of this, the Electric Power Production Repairman, AFSC 54350/70 is responsible for barrier maintenance and is the only "barrier specialist" on the UMD. Through no fault of his own, he may or may not be qualified. Training in the 543 field includes a barrier briefing, a no-more-than general introduction. So even though he is a fully qualified 543X0 he possibly has never had "hands on" barrier training.

Because of this, commanders may be falsely assured

MA-1A is the oldest Air Force barrier system in use. It and its modified brothers have saved many birds, and with good maintenance can save many more.



TAC ATTACK

that their barriers are in tip-top shape. The problem may soon be eliminated with the assignment of a Special Experience Identifier (SEI), Code 331, to those 543X0 specialists who have had "hands on" barrier training, which is available from only one source.

The Air Training Command has Mobile Training Teams (MTT) conducting five-day courses in the barrier maintenance field for both military and civilian personnel. ATC conducts the classes at the requesting base and prefers classes of from ten to twelve people. Besides 543X0s, the class may include firemen who daily inspect and perform emergency barrier operations, and ops and safety officers.

Commanders can request the ATC course, 4AST54350, on Air Force Form 403, submitting it through their CBPO. ATC's Technical Training Center at Sheppard AFB advises that the teams are scheduled from three to six months in advance.

Barriers are still thought of as for-emergency-only requirements. But their record for safe performance and our ever increasing high performance flying machines may someday lead to routine barrier engagements. If so, barrier operation and maintenance must also become routine.



Specialists learn the nitty-gritties of maintaining BAK-12 barrier brakes at their own base, from ATC Technical Training Center instructor, Mr. L.E. Schoffit.



CHOCK TALK

...incidents and incidentals

hot airspeed

The O-2's gear retracted on takeoff, but the gear doors wouldn't close. After experimenting a while, the pilot decided the doors wouldn't shut without some maintenance help. On his final approach he lost his airspeed indication. He landed okay on the wing of a buddy O-2 driver.

A microswitch failure kept his gear doors open. That was easy to fix. Losing airspeed readings would've been easy to prevent. His airspeed dropped to "zero" because somebody routed plastic tubing from the pitot boom across a hydraulic power pack. When the power pack overheated, the plastic line melted. The predictable result? No pitot pressure. This unit's checking routing of their plastic tubing during quality control inspections. How about yours?

keep'em flying?

The U-10 student pilot eased back on the throttle for landing, but couldn't reduce power below 16 inches MAP and 2600 rpm. That's too much thrust to quit flying so the puzzled instructor pilot took over on go-around. He couldn't make it work any better so he decided on a "deadstick" landing. He cut mixture over the end of the runway and landed okay power-off.

Maintenance troops found a U-10D throttle control rod in their "A" model. Five inches longer, it had slipped out of a single adel clamp mounted behind the carburetor. In spite of its greater length it's considered a suitable substitute for use in U-10As. The unit made it work by installing a second adel clamp to secure the longer rod. They suggest that all U-10 A/B users check for "D" throttle control rods and do the same. As they see it, there's a right and wrong time to "Keep 'Em Flying."

some sump service!

It looks as though some steely-eyed troop has licked the problem of checking his propeller sump oil level. Just fly till the "OIL REPLENISH" light illuminates, then smartly flick the replenish switch and go on your way. Or that's how it should work!

At any rate, after about three hours of flight, this Provider lit up it's number one propeller oil replenish light to say it was thirsty. The replenish switch was turned and the light went out but would not illuminate u "press-to-test." The bulb was replaced but still would n work.

The crew then discovered that the propeller replenishing circuit breaker was popped. When reset, the warning light came on for about five seconds and the circuit breaker popped again. Since the propeller oil system could not be replenished, the engine was feathered and an uneventful jet assisted landing was made short of their destination.

The oil level in the propeller oil sump was low. THERE WERE NO LEAKS IN THE SYSTEM! The replenish solenoid was the culprit that popped the circuit breaker and prevented transfer of engine oil to the prop sump. But, who failed to service the oil sump during preflight?

lost and FOund

Five seconds after burner lite, this Phantom experienced a sharp explosion. The takeoff was aborted even though all engine instruments were normal. FOD was discovered in number one engine. The damage was caused by the ingestion of a number two apex screwdriver bit blown off the runway by the aircraft which had just tak off. A chip in the ramp in front of number one in

with a maintenance slant.

matched the screwdriver bit.

The owner of the \$40,000 number two apex screwdriver bit may claim his property at the Homestead AFB engine shop. Check your tool kits men.

bundle bungle

It's not fair. The dirty deed falls into the same category of meanness as tying tin cans on cat tails. The drop training bundle didn't break away from the static and pounded the Gooney's left horizontal stabilizer until it imbedded itself in the upper skin. The surprised loadmaster hauled the 15-pound metal bundle back into the cargo compartment. They decided to quit practicing airdrops for the day.

Old Gooney suffered a 4x8-inch triangular tear on the upper stabilizer surface and smaller holes on the lower. How did it happen? Somebody slipped in a bundle with heavier-than-normal tape in the apex tie connecting the bundle to the static line. Normally, bundles are made up by the unit's loadmasters and checked by instructors before dropping. A tatter-tailed Gooney wishes they had done their job.

panels, panels, panels....

No. 1—Prior to takeoff, panel FF-50 was opened by the runway launch team to investigate a suspected hydraulic leak. None was discovered so the mission was flown as programmed. Panel FF-50 was missing after landing. The airlock fastener receptacles were not damaged.

No. 2—Pilot felt a "bump" just after landing away from his base. Aft access panel from baggage pod missing.

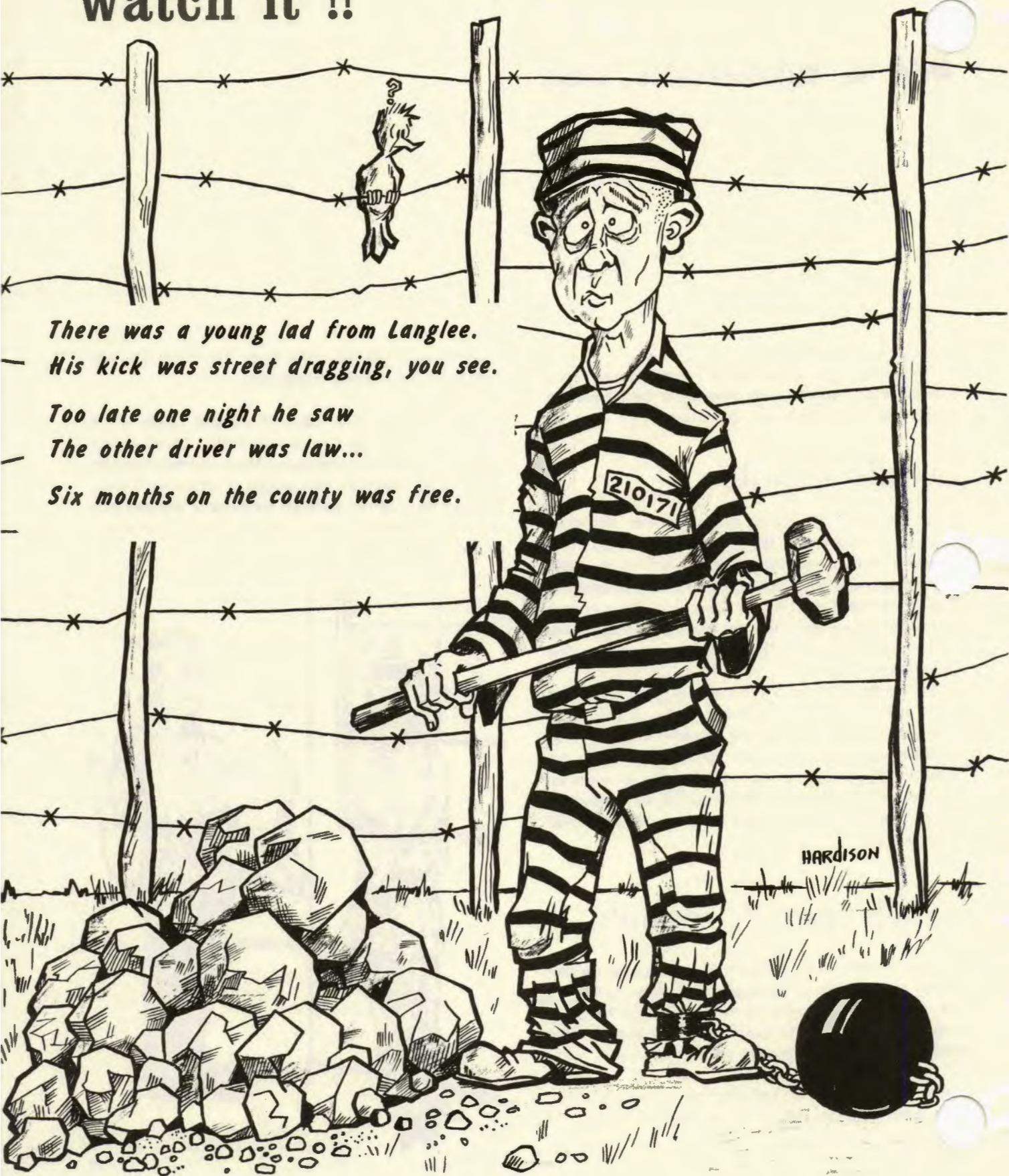
No. 3—Panel R-139 torn off in flight. The R-139 door was improperly secured after engine start.

These are just three cases of insecure panels which constantly clutter up the message traffic. We say clutter because they are so unnecessary. Most of these panels are never found, obviously they landed in unpopulated areas. Let's get on it before someone shows up at the gate with one of our missing pieces of sheet metal... and claims he's been "panelized."



watch it !!

*There was a young lad from Langlee.
His kick was street dragging, you see.
Too late one night he saw
The other driver was law...
Six months on the county was free.*



Accidentally Firing the

PHANTOM DROGUE GUN

**...it's not easy
but
it's happening...**

by Roger Emett
MBA Representative
Eglin AFB, Florida

A drogue gun fired unexpectedly as the mechanic was replacing it during a recent inspection on a MKH7 ejection seat. In this instance, the drogue gun was not loaded so no damage occurred. However, there are cases on record where the drogue gun piston fired through the canopy or caused serious injury to personnel when it fired accidentally on the ground, or in the air.

There have been three cases of inadvertent firing in the Air Force and two recent incidents in the Navy. None of these was caused by a defect in the drogue gun so this suggests that maintenance procedures were at fault.

This article shows how inadvertent firing can be caused and explains how the hazard can be eliminated by using proper cocking procedures.

There are built-in safeguards against inadvertent firing in the basic design of the drogue gun and also in the cocking procedures outlined in TO 13A5-37-3S-1. So whenever there is an accidental firing, there is something wrong in the maintenance area. Someone has to goof because it is impossible to set up a condition where the drogue gun can fire accidentally using the proper procedures.

THE MBA DROGUE GUN

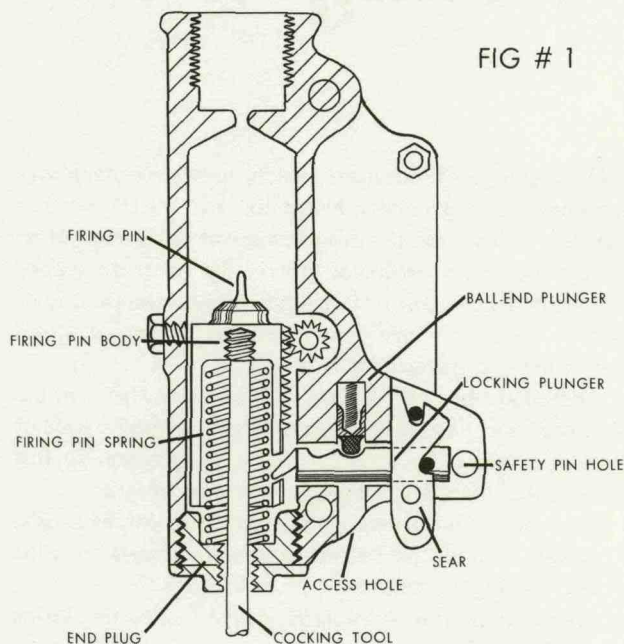
The drogue gun cartridge is percussion fired by a spring loaded firing pin which is released when the trip rod removes the sear from the locking plunger as the seat moves up the rails. When the drogue gun is cocked, the spring is compressed and the firing pin is held in cocked position by the locking plunger engaged in a slot of the firing pin. The locking plunger is spring loaded to the engaged position and must be withdrawn before the firing pin can be released. And the locking plunger cannot disengage when the ground safety pin is installed. This provides adequate protection against accidental firing. The locking plunger of the firing pin would have to break before the drogue gun could fire in these circumstances . . . and this has yet to occur.

—CONTINUED—→

PHANTOM DROGUE GUN

CORRECT ASSEMBLY (Fig 1)

The position of the locking plunger is controlled by a spring loaded ball-end plunger which engages the detents



in the upper surface of the locking plunger. The locking plunger must be in the outboard position to allow the sear to be inserted and it must be pushed fully home to secure the sear before the drogue gun can be cocked. This action compresses the ball-end plunger and allows it to ride from one detent position to the other.

When cocking the drogue gun, the firing pin base rides over the slope on the end of the locking plunger and pushes it outwards until the slot in the firing pin body is opposite the locking plunger. At this stage the spring pressure on the ball-end plunger forces the locking plunger inward to engage the slot in the firing pin. The operator will see the other end of the locking plunger appear momentarily in the ground safety pin hole, then snap back into engagement with a noticeable "click."

Any sand or foreign matter in the locking plunger mechanism will probably result in sluggish operation, and if this is noticed, the component parts should be removed, cleaned, and relubricated before reassembly.

REMOVAL OF THE LOCKING PLUNGER

1. Check the drogue cartridge has been removed.
2. Pull out the sear.

3. Rotate the locking plunger 180 degrees. This compresses the ball-end plunger spring so that the locking plunger may be withdrawn. While removing the locking plunger, place a finger over the access hole for the ball-end plunger to restrain it as the locking plunger is removed.

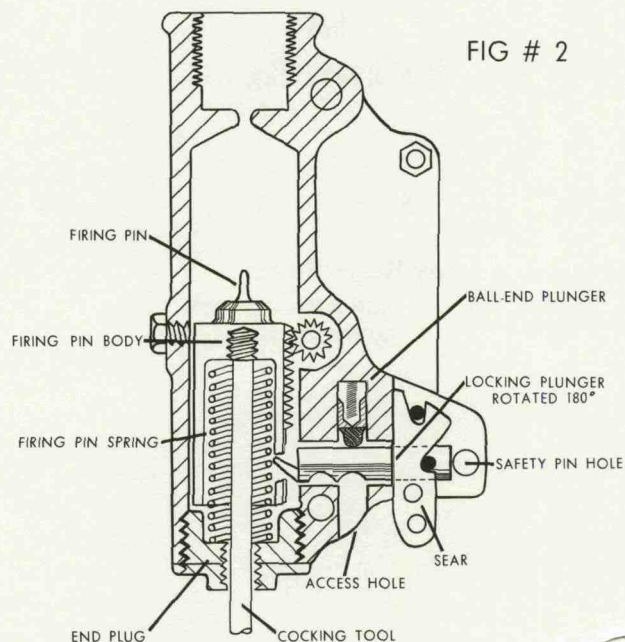
REINSTALLING THE LOCKING PLUNGER

1. Check parts for cleanliness and lubricate with light grease (MIL-G-21164A).
2. With the access hole upward, insert the spring and ball-end plunger.
3. Insert the locking plunger with the detents toward the ball-end plunger and push home. The slope on the end of the locking plunger will compress the spring of the ball-end plunger which will then "click" into the first detent.
4. Insert the sear and, using a ground safety pin or other suitable rod, push the locking plunger fully home into the second detent position. The drogue gun is now ready for cocking.

INCORRECT ASSEMBLY (Fig 2)

It is possible to set the drogue gun in this dangerous condition. And it can fire accidentally if it were jarred by involves incorrect assembly and incorrect cocking procedures — but you have to work at it to get it this way, using either three hands or a bench vise.

It requires the locking plunger to be rotated 180



rees which negates the positive locking action of end plunger. It also requires the drogue gun to be cocked with the locking plunger in the disengaged position initially and then pushed into engagement with the firing pin when the spring is fully compressed. The unit can be cocked in this fashion and may hold for a while but the firing pin will eventually push the locking plunger out of engagement and the drogue gun will fire unexpectedly.

It is not easy to achieve this hazardous condition and it is impossible to attain when the correct cocking procedure is used. The locking plunger can be rotated once it is correctly installed, anytime the sear is removed, but it will snag the ball-end plunger if an attempt is made to insert it incorrectly on assembly.

So it should be obvious that something is wrong.

The sear can be inserted with the locking plunger rotated through 180 degrees and the locking plunger can still be pushed fully home. However, it will then be impossible to cock the drogue gun and again, it should be obvious to the operator that something is wrong. To correct the situation, the sear must be pulled out, the locking plunger rotated 180 degrees into the correct position and the sear reinstalled. The drogue gun can then be cocked.

IR TRIGGER COCKING (Fig 3)

The mating surfaces of both the locking plunger and the firing pin are chamfered to ensure positive

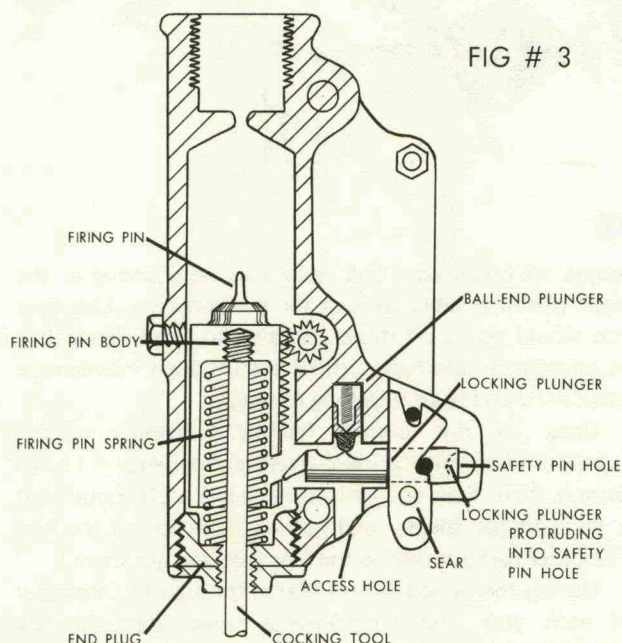


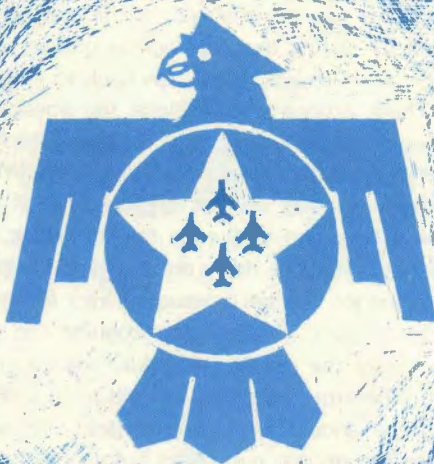
FIG # 3

engagement. This can be checked as the drogue gun is being cocked by noting that the locking plunger appears in the safety pin hole and then snaps back to engage the firing pin. These actions will preclude the possibility of hair trigger cocking. Note that only the tip of the locking plunger is engaged with the lip of the slot in the firing pin and that they can slip out of engagement, if jarred, allowing the drogue gun to fire. In this condition, it will not be possible to install the ground safety pin because the locking plunger will be protruding into the hole for the safety pin. Again, it's easy to recognize and can be avoided by using the proper procedure for cocking the drogue gun. When the firing pin is pulled to its full extent of travel, there should be approximately 1/8 inch of overrun after the drogue gun cocks before the firing pin bottoms out. If this is checked when the mechanism is being cocked, the locking plunger should snap into engagement and thus eliminate the risk of hair trigger cocking.

MBA PROCEDURE FOR COCKING THE DROGUE GUN

1. See that the firing pin is protruding, such as in the uncocked position.
2. Insert the sear and secure it by pushing the locking plunger home.
3. Remove the end plug bolt to allow the cocking tool to be inserted, and screw the cocking tool into the firing pin body.
4. Hold the drogue gun in one hand (not in a vise) and operate the cocking tool with the other.
5. Slowly pull the firing pin to the full extent of its travel.
6. See that the escapement mechanism operates evenly and that no roughness is felt (indicating damage to the gears).
7. See that the locking plunger moves outwards into the hole for the safety pin and snaps back into engagement as the mechanism cocks.
8. Check for approximately 1/8 inch over-run before the firing pin bottoms out.
9. Release the cocking handle and pull again to full travel two or three times to be certain the locking plunger is fully engaged with the firing pin.
10. Insert the drogue gun ground safety pin and check that it cannot be withdrawn without depressing the safety pin release plunger.
11. Remove the cocking tool and reinstall the end plug bolt. Follow the above procedures step by step and it is impossible to obtain an unsafe condition.

So let's have no more incidents of inadvertent firing.



Thunderbirds

Point A to Point B

by Capt Mack Angel

Captain Mack Angel entered the Aviation Cadet Program in 1957 following two years at the University of Arkansas and Fort Smith Junior College where he studied mechanical engineering. Following graduation from flying training in October 1958, he upgraded into the F-100 at Luke and Nellis.

From November 1959 to November 1963, he served with the 417 Tactical Fighter Squadron based at Ramstein, Germany. On his return from Europe he was assigned to Nellis where he upgraded into the F-105. He remained there as an instructor until late 1965.

Captain Angel was transferred to SEA in 1966 and flew 100 combat missions over North Vietnam in the F-105. In December 1966 he was reassigned to the 560 Tactical Fighter Squadron at McConnell as an F-105 instructor pilot. He joined the Thunderbirds in December 1967.

Captain Angel's decorations include the Silver Star, Distinguished Flying Cross with Oak Leaf Cluster, and the Air Medal with ten Oak Leaf Clusters.



Have you ever found yourself on initial approach at a strange airfield, looking forward to a tall, cool one at the O-Club, only to have your thoughts interrupted by, "Attention all aircraft in the Yawdamper local area — Yawdamper closed, aircraft on the runway with a blown tire. Aircraft on initial (that's you) carry it straight through. Expect runway opening in 15 minutes."? All right, now what? Your fuel planning has been perfect and here you are, about to land (you thought) with 2,000 pounds. That's plenty, right? It is if you're sure that the runway will be reopened in 15 minutes. But, what if it isn't? Then where are you going to divert to? Do you have enough fuel to get there? What's the weather? You find yourself with a few problems you hadn't planned on a

couple of hours ago, and wish you were sitting at the flight planning table back at the home drome. This time you would pay a bit more attention to small details like an emergency alternate airfield even though Yawdamper was CAVU and has a nice long runway!

Does all this sound familiar? Possibly you've experienced a similar pride-shattering experience — I have. Once is more than enough! So, let's talk a bit about what it takes to get there — and getting there is half the fun. The other half is enjoying the fact that you got there.

During the period from 1 March through 15 December of each year, the Thunderbirds travel approximately 175,000 miles en route to and from various show sites both in and outside the Continental United States. Shc

Airfields range from 6,500 foot civilian strips with no towers or decent comm/nav facilities, to those we all love — the extra-long-wide SAC beauties. Needless to say, this amount of traveling means a lot of scribbling on AF Form 70's and DD 175's, but what we're concerned with initially is the information required BEFORE we advance to that stage of the flight. The following items are those which we always check BEFORE beginning any serious flight planning:

NOTAMS: Enroute, Destination, and Alternates. It's enough to try a good fighter pilot's patience when you take the time to carefully preplan a mission only to find, when you get ready to file your clearance, that your cross-country destination is closed for some obscure reason. Or, you need to land at an intermediate airfield for fuel, and the runway selected has a trench across it at midfield. A quick check or phone call before deciding where to go could have saved you a lot of time and pencil lead. When checking NOTAMS, be especially conscious of Nav or approach aid status. If the weather is below ASR minimums, and the PAR is out of commission you're out of luck — best to know this ahead of time.

WEATHER: Departure, En Route, Destination, and Alternates. Again, it's bad news when you find, after carefully preplanning a hop, that there is a line of thunderstorms with tops to FL 500 plus halfway along your route of flight, or that the weather at destination is below minimums and forecast to stay that way. It is also nice to know exactly what to expect if you experience an emergency shortly after takeoff and want to recover back at the launch base. A quick check with "Stormy" BEFORE sitting down with computer in hand can prevent a lot of grief and a hurried change in routing or intended landing point. You always check for climb and cruise winds beforehand anyway, don't you?

These two items, NOTAMS and WEATHER, are things which may easily be taken for granted, but which might also mean the difference between that tall, cool one and a cold one.

Once you are ready to begin the mathematical computations (which always works out to plus or minus 30 seconds and 50 pounds, right?) give yourself plenty of time. We always allow at least one hour from the time we walk into Base Operations until brief time. This always gives sufficient time, even in the event of a long line at the weather desk, and we can usually sneak in another cup of coffee while spinning the computer. A real boon to all F-100 pilots is the "quickie" climb/cruise charts in the pilot's checklist, which we've found to be quite accurate. These greatly reduce the time required to come up with the right figures. We find that these charts are not included in the F-4 checklist, but shall soon extract a set from Dash-1 charts. If you are very experienced in your type aircraft, you undoubtedly have your own "fudge-factors." We recommend using them if tried and true. A perfect example of this is the Thunderbird 6 or 8 ship climb schedule. Due to reduced engine trim of the Number 1 aircraft and lower power settings during multiple ship climbs, we enter the charts for a given cruise altitude. We then multiply the given distance by 1.8 — this gives actual climb distance required. Then, by dividing this new distance by seven and adding 1.5, we arrive at the actual time to climb. We add 100 pounds to the fuel taken from the charts, and we're in business. I can't say who devised the formula, and it is weird, but it works! If your system works, use it!

Chart distance $\times 1.8$ = actual climb distance.

New distance $\div 7 + 1.5$ = actual climb time.

Chart fuel + 100 = actual climb fuel.

Besides the normal time/distance/fuel computations annotated on the front of the Form 70, we include all essential landing data for destination, i.e., runway headings, length, elevation, and forecast altimeter setting. Also, frequencies for approach control, radar, tower, and ground control. This provides one complete ready reference form for the route and destination. If a weather alternate is designated, this same information is shown for that alternate.

The reverse side of the Form 70 is used as specified for emergency airfield and takeoff data. Here is where we get back to that emergency alternate mentioned in the opening paragraph. When selecting emergency airfields along your route of flight, do not stop when you reach your destination. Choose an area surrounding the destination airfield — we use a 100 NM radius — and choose one or two suitable landing fields within that area which you can safely reach if forced to divert from a landing approach with a normal landing fuel load. Then you will not be caught in a bind at the last minute.

After completing the Form 70, filling out the DD 175, and receiving a complete weather briefing we're ready to go fly — or are we? Make sure you have, either in your

Point A to Point B

possession or in the aircraft, a complete set of current FLIP publications. We prefer carrying our own, and in that way can always be certain that they are up-to-date. If you are in a squadron which maintains up-to-date publications in the aircraft, great. Then the only problem that arises is when you open the letdown book to the desired approach to X airfield and some thoughtless jock has removed that particular page and placed it on his kneeboard so he could read it a little easier. Another item to check BEFORE leaving the chocks!

We also advocate and practice, preparing a map of the planned route. Even though it is not required for all flights and may not be used, that one time you could have used it in an emergency makes all the cuttin' and pastin' worthwhile. A good map with checkpoints and emergency airfields annotated is much easier to read than an enroute high altitude chart! Assuming that you're going to launch as a flight, the only remaining item to be completed is a thorough flight briefing. In our case, the squadron navigation officer briefs the weather and enroute data. All other pilots copy their Form 70's at that time. If an IFR recovery is planned at destination, the letdown plate is covered in detail, paying special attention to decision heights and minimum safe altitudes. If weather is forecast to be VFR and an arrival demonstration is to be performed, the planned show line and obstructions within a 5NM radius are pointed out. The navigation officer, who is responsible for all aerial refueling preplanning, and coordination, also briefs tanker callsigns, altitudes, etc, if refueling is to be accomplished on the flight. The commander/leader then completes the briefing, covering

all additional items pertaining to the flight. It may be interesting to note that, although our operation is unique, we do follow normal F-100 operating procedures. We use the flight briefing checklist as outlined in 55-100 just as all you jocks wearing the "frontline greens" do. Ours is expanded slightly to include aerial demonstration poop, i.e., wind corrections, bomb-burst crosspoint, etc. Tanker rendezvous and lost wingman procedures are an especially important item, and we cover these in detail. Surprisingly enough our procedures for six or eight ship flights are not really that much different than those you use for four birds.

Okay, now let's go do it! We climb aboard, crank, taxi, and launch. It should be a great trip — we've done everything we can do to make a safe and successful one.

In closing, I'd just like to bring out a few points about the specialized operation of the Thunderbirds. I'm sure there are many of you who visualize us leaping into our red-white-and-blue air machines, launching into the blue, and pressing on regardless. Nothing can be further from the truth! We plan, brief, and fly just like you do. But, we attempt to be precise in everything we do — not just during the aerial demonstration, and it pays off in the end! The old adage that "Practice Makes Perfect" really fits our mission in all respects.

I've tried here to let you in on how we go about getting there, which I said is half the fun. What I've pointed out has been said many times before and will be repeated many more times in the future, but oft times we lose sight of those things which are closest to us. Hopefully, I've reviewed a couple of points which will make your next trip a safer one, and maybe some day soon, we'll cross paths at Yawdamper Airpatch and can have that tall, cool one together! ➔



Tactical Air Command

Unit Achievement Award

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

130 Special Operations Group, West Virginia ANG, Charleston W. Va.
1 December 1967 through 30 November 1968

75 Tactical Reconnaissance Wing, Bergstrom AFB, Texas
1 January through 31 December 1968

4 Tactical Reconnaissance Squadron, Bergstrom AFB, Texas
1 January through 31 December 1968

91 Tactical Reconnaissance Squadron, Bergstrom AFB, Texas
1 January through 31 December 1968

75 Combat Support Group, Bergstrom AFB, Texas
1 January through 31 December 1968

313 Tactical Airlift Wing, Forbes AFB, Kansas
1 January through 31 December 1968

47 Tactical Airlift Squadron, Forbes AFB, Kansas
1 January through 31 December 1968

128 Air Refueling Group, General Mitchell ANG Base, Wisconsin
1 January through 31 December 1968



BEEPER

SNOOPER

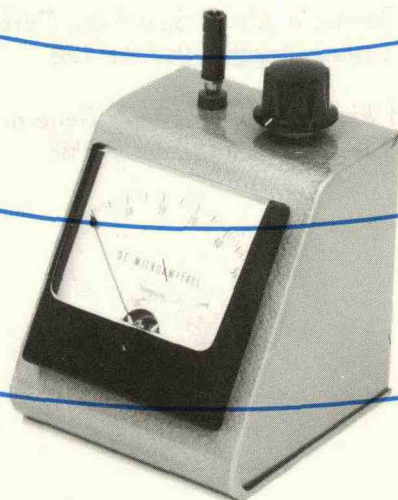
Squawking survival beacons, inadvertently activated, plague almost every unit in TAC at one time or another. To clear the beeper from emergency frequencies often requires a long search through parked aircraft or parachute shops, inspecting many chutes before the culprit is found.

At TAC request the Langley Research Center developed a simple VHF field strength meter to snoop out the beepers. During field testing it was tagged with its only name, though unofficial: "beeper snooper."

The beeper snooper is small, lightweight, requires no power supply as it operates on energy received from the

beacon, and can be assembled at unit level with supply item parts at low cost. It is sensitive within 50 feet of an activated beacon and can be used by inexperienced personnel.

Those now in service are used in one of two ways. support shops place them at selected spots to cover work and storage areas. Because they require no power, they are always "turned on." Each snooper is monitored periodically, and when a meter pointer indicates that a signal is being received, the inspector simply carries it in the direction which shows an increase in signal strength. As he nears the beeping beacon, the pointer will peg on



PARTS LIST

Part	Description	Federal Stock Number
C ₁	0.9-7 pf capacitor or 1.5-15 pf capacitor	5910-928-8300 5910-666-7977
C ₂	6800 pf capacitor	5910-727-9387
R ₁	500000 ohm potentiometer or 500000 ohm potentiometer	5905-822-7660 5905-241-7094
D ₁	1N34A diode	5961-170-4430
J ₁	banana jack, insulated, mounts in 5/16" hole with insulating washer	5935-258-9896
P ₁	banana plug, to mate with J ₁	5935-615-1372
L ₁	4-turns of No. 20 wire, 1/4" dia. x 3/8" long	6145-839-7432
M ₁	0-50 microamperes, 3" meter	6625-535-4594
Antenna	2-ft. No. 14 bus bar wire or 2-ft. No. 14 solid wire	6150-990-8220 6145-681-8372
e	universal meter case, Bud 1936A	6625-814-5621

Figure 2

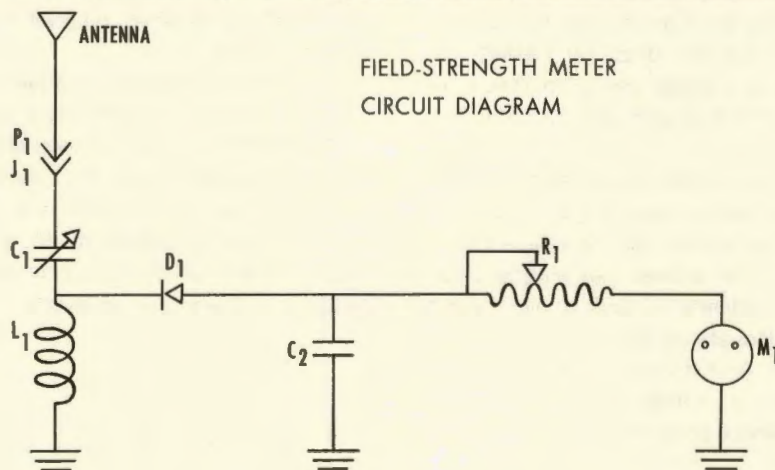


Figure 3

the high side. The signal strength to the meter is then reduced by turning the only moving part, a potentiometer. With this simple method, the snooper will lead directly to a chute with a run-away beacon.

The beeper snooper is used in a similar manner on the flight line. With the potentiometer set for maximum sensitivity, the snooper is held out the window of a cruising flight line vehicle. The meter pointer moves as it an aircraft with a beeping beacon. A quick tour of

the aircraft with the snooper in hand singles out the chute.

The snooper is not expected to become a supply item but units can easily build as many as required for about 30 dollars each. Assemble the parts itemized in Figure 2 according to circuitry shown in Figure 3. When assembled, tune the snooper to the desired frequency by adjusting condenser, C₁. Then you're ready to save a lot of time recovering the next squawking beacon. ➔

TAC *TIPS*

...interest items, mishaps

USE YOUR DELUXE OPTIONS !!

At level off the Provider's number two engine barked one time. The startled pilot retarded Two's throttle to 22 inches MAP and richened the mixture. It didn't help; number two coughed again. After a quick wing scan, the flight engineer reported a sizeable oil leak on the inboard side of the engine. Fully convinced, the pilot punched number two's feather button, but it refused to quit. He followed up by pulling the fire handle, but that didn't feather the prop either. Out of ideas, he moved the mixture to idle cutoff and toggled the prop down to full-decrease rpm; it windmilled around 1200 rpm thru his landing roll.

Investigators identified a cracked cylinder as the source of both noise and oil on number two engine. But that didn't explain the failure to feather, and hauling a lot of extra drag back to base. The answer was simple. They found number two prop's integral oil tank short-serviced on prop oil. Without an adequate oil supply the feathering pump couldn't do its job. And it couldn't get rid of the windmilling prop because a maintenance type (who's supposed to check and service prop oil cans on his Dash Six) didn't do his job.

There's another lesson here because two airplane systems didn't work "as advertised." If the prop oil low-level warning light had done its job, the pilot would've recognized his oil-shortage problem and replenished the prop can with engine oil. Then his feathering pump would've worked normally . . . lots of oil available.

In flight, when a prop needs feathering you want it to

do just that. There are too many times when you can't live with that windmilling prop. That's why the prop oil replenishing system is built in as a "deluxe option." It gives recip pilots an ace-in-the-hole for feathering assistance when the prop's integral oil supply is low or leaking. But pilots flying birds with prop replenishing capability can't depend entirely on the complicated float switch/warning light system telling them about need for prop oil. Especially in an emergency feathering situation. Because people who are supposed to check and fill oil cans don't at all times, oil-level floats stick, and warning bulbs burn out.

So, if your prop fails to drive into streamline position normally, and your feathering pump's giving an electrical load indication: think oil replenishing! Flip on your oil replenishing switch and then punch that feather button again. If prop oil shortage was your feathering-failure problem, you've solved it. If it wasn't, your mixture shutdown and full-decrease rpm options remain. And like good, home-made chicken broth . . . it can't hurt!

MEAN KIDS !!

The Gooney cruised at 9000 feet in heavy layers of clouds. Outside air temperature registered minus 8 degrees Centigrade. Turbulence was light and traces of rime ice coated the bird's leading edges.

Then came the brilliant flash of light, followed by a loud "crack." An ozone odor filled the cockpit, the pilot's windshield cracked, small holes appeared in the Gooney's nose, and compasses disagreed violently with the RMI

with morals, for the TAC aircrewman...

cards. The radios worked okay and a helpful GCA unit nursed them down with a gyro-out approach. They found an 8-inch tear in the tail feathers during a post-flight inspection.

It's an established fact. Thunderstorms breed the meanest kids on the block; Hail, Lightning, and Turbulence. If one of the kids doesn't have enough respect and consideration not to slug a friendly, faithful, loving old lady while crossing the airplanes, how's it going to treat your airplane? Think about it next time you travel down thunderstorm alley. Don't give those tough kids a chance to hit you. Detour about 20 miles . . . who needs them?

BIRD BITES "BIRD DOG"

While making a climbing right turn during a tactical VR mission the FAC heard a loud thump and observed large feathers stuck to the outside air temperature probe. A controllability check was performed at 2500 feet due to partially restricted rudder movement discovered after the birdstrike. Sufficient control was available so the aircraft was recovered with no further problems.

Initial impact was with one tip of the propeller. From this point the bird struck the temperature probe, then at the point where the LF sense antenna is attached above the cockpit. Then it hit the vertical stabilizer, breaking the LF sense antenna loose and bending the bracket up and back so that it interfered with rudder movement.

The primary cause of this incident was pilot factor for failure to clear and properly divide his attention between his ground VR and the immediate airspace. A feather

sample is available at Say, how come da boid won???

CIRCUIT BREAKER SAVE

The flight was normal till 12 miles on GCA final. The Phantom's landing gear was lowered, both mains indicated down and locked, the nose gear stayed up. GCA was discontinued and the crew busied themselves trying to get the nose gear down. Re-cycling didn't work nor did putting the gear handle down while laying on negative G. About this time an instructor pilot got on the horn and suggested the following: 1) With gear handle down, mains down and nose gear up, pull the landing gear circuit breaker on pilot's right console and 2) after approximately 5 seconds, reset circuit breaker.

The pilot accomplished these steps and the nose gear came down. A flyby was made to allow mobile to confirm gear position, followed by a normal landing. Investigation showed that nose gear breakout force was 2900 pounds. It is suspected the nose gear latch roller was binding, stuck or jammed.

The reporting safety officer has recommended further study be made on the validity of the emergency action used. Pulling the circuit breaker "relaxes" pressure in the landing gear system, resetting it reapplies utility system pressure plus a few hundred psi surge which gets the gear down. Here's a caution — this procedure will not work if the emergency gear lowering system has been actuated. We understand that this procedure was first used in 1966 by a unit deployed to Vietnam — wonder if anyone is working on the cause?

ACCIDENTS WE HAVEN'T HAD....for some time



RICOCHET

Our second subject in this series was chosen following a series of incidents in the month of January. Nine aircraft were hit on gunnery ranges during the period 9 thru 28. One, an F-4, received numerous hits in the left intake and lost that engine. It was determined that the range needed cleaning and deep, soil plowing to make the strafe area acceptable for training. This was done. A month later another F-4 on the same range took a hit on the right intake. The projectile was an old 20 mm round which was discovered when the intake panels were removed for repair.

These two incidents are examples of what we face in this area. A ricochet is a random event, dependent on so many variables, we can't name them all — much less discuss them here. But it is in our power to minimize the risk of being hit by a ricochet. We will discuss some of the ways to do this and present some interesting facts which turned up while doing research for this article.

Ricochet incidents for the years 1965 thru 67 were 20, 22, and 21 respectively. Then, in 1968 the number jumped to 31. As of this writing, there have been 11 for 1969. More on these later. Available information concerning type aircraft, date, area of strike, and damage sustained is available from 1967 and will be presented for

information. Chart 1 is a breakdown by month and Chart 2 by aircraft. As you can see, the figures confirm what we

CHART 1
RICOCHETS BY MONTH

	1967	1968	1969	TOTALS
JAN	3	4	9	16
FEB	—	—	2	2
MAR	—	5	—	5
APR	—	2	—	2
MAY	—	2	—	2
JUN	1	6	—	7
JUL	4	2	—	6
AUG	4	5	—	9
SEP	4	3	—	7
OCT	3	2	—	5
NOV	1	—	—	1
DEC	1	—	—	1
TOTALS	21	31	11	63

CHART 2

RICOCHETS BY TYPE AIRCRAFT

	1967	1968	1969	TOTALS
F-4	9	18	6	33
F-100	9	11	2	22
F-105	—	—	2	2
F-104	—	2	—	2
F-84	1	—	1	2
F-5	1	—	—	1
AT-33	1	—	—	1
TOTALS	21	31	11	63

already know. When the weather is good we strafe more . . . and take more hits. Along with that we find that the aircraft that do the most strafing . . . also take more hits.

If we discount the 11 incidents this year we see that 34 of 52, or 65 percent of our strikes occurred in the five month period, June thru October. Using our chart by aircraft we find that the F-100 and F-4 are the big players. Between them, they accounted for 86 percent of our strikes in 1967, 94 percent in 1968, and so far in 1969, 73 percent, for an average of 87 percent in two years and two months. The study began to get interesting when the strikes were broken down further to indicate what parts of our aircraft were taking hits. Chart 3 shows the TAC experience in this area. (Engine figures indicate that an engine was damaged either by a round or debris from a strike, the rest are self-explanatory.) Note that of a

CHART 3

RICOCHETS BY AREA HIT

	1967	1968	1969	TOTALS
Engine	3	5	1	9
Intake	2	2	2	6
Nose Area	1	2	1	4
Canopy	—	4	—	4
Windscreen	2	4	—	6
Other	13	14	7	34
TOTALS	21	31	11	63

total of 63 incidents, 29 or 46 percent were in the area from the canopy/intake forward. Not very good odds.

To carry this line further we broke out data pertaining to the F-4 from the first five categories of Chart 3.

Because of the placement of the F-4 intakes, any of these hits had the potential of being ingested and destroying one or both engines. The data looks like this:

Engine	8
Intake	3
Nose	3
Canopy	0
Windscreen	3
	17

While F-4 aircraft lost engines, you can see that there were nine more chances to eat ricochets . . . and that doesn't count the rounds that just missed!

Our rash of 1969 ricochet incidents also brought on a rash of corrective action. The problem was recognized by the units involved before a trend showed up in the message traffic. Corrective action was prompt and decisive — it ranged from measures to prevent the soil from freezing, to plowing, to just plain cleaning.

Herein lies the key to reducing our ricochet exposure and the area in which our efforts should be concentrated. Since ricochets cannot be prevented, our efforts must be channeled toward stealing the energy from each round at impact. This involves work, a lot of work . . . it requires plowing, discing, hand-picking, use of a Beachcomber if you have one. We're firing larger projectiles than we did training for War II or Korea. All our latest fighters are firing cannon now — on the same ranges we've used since the 30 caliber was in vogue. The point is that our ranges have not improved as our weapons have, so they need more attention — constantly.

No discussion of strafing would be complete without a word about pressing, but what hasn't been said? Here are some words of wisdom that were being passed out at Nellis fifteen years ago by an instructor named Corky Davis . . . "It's stupid to press. Given a properly boresighted gun and sight, a "shooter" can hit from anywhere in range. On the other hand, a "green-bean" couldn't hit the panel if we let him press into 500 feet." The moral of the story is as valid today as it was then. Pressing won't help a man who can't shoot — and a good gunner doesn't need to be inside the foul line to score. Even though that advice is from the F-86 days, it's as valid now as it was then. What's changed other than our gun and the foul line?

We are prepared to accept the risk of an occasional ricochet because air-to-ground strafing is a necessary part of fighter and continuation training. But we are not prepared to accept the added risk due to pressing or strafing on an improperly prepared area. How does your range look today???

watch its **TAIL!**



The "good old days" weren't always what they're cracked up to be. And that includes tanker breakaway procedures in earlier days of air refueling.

Back when tankers and bombers played electronic hide-and-seek in a game called "hide

the B-47," a boomer's, "breakaway, breakaway, breakaway" call meant tanker max power, stick back, and as quick a climb as the old gas-hauler had in her. Then someone discovered it was the too-quick elevators up and accompanying tail squat that put a tanker's posterior in or around

underrunning receiver's canopy . . . be it bomber or fighter. And having that many-motored mother hen sit on you caused too many splitting headaches . . . often fatal.

If still practiced by tanker pilots the old breakaway procedure would've hurt an underrunning Phantom pilot recently. It happened this way. Initial hookup and his early position in the refueling envelope were good. After taking on 6,000 pounds of jet juice, he dropped low in the "package." Trying to return him to the "green" the boomer advised, "Up five." Suffering communications difficulties, the Phantom driver didn't hear the call and moved down instead of up. Now fearing a lower-limit disconnect, possibly nozzle binding, the tanker's super-slide-trombone player sang out, "Disconnect" . . . the command to separate because trouble's brewing fast.

The Phantom phlyer heard the disconnect call and tried; his disconnect light came on, but the boom nozzle seemed welded in the receptacle.

Trying to improve the boom-to-fuselage angle free the binding nozzle, the boomer called, "Back ten." Instead of backing off and down the F-4 moved forward. Afraid of boom tube bending, the boomer retracted the boom hydraulically, yanking the nozzle free. The brute force disconnect damaged the Phantom's receptacle, forcing an air abort.

After disconnect the boom operator saw the forward-moving fighter start filling up his picture window. He transmitted, "Breakaway, breakaway, breakaway" . . . the command for emergency separation. About all the boomer could see was Phantom vertical stabilizer in that instant he sweated his pilot's forthcoming interphone call, "Clear to climb?"

A quick, "Negative, no separation," from the boom operator stopped the tanker's tail-lowering routine in time to avoid inflight modification of the Phantom's fin.

Because tanker pilots now wait for the boomer's "Clear to climb" after a breakaway call before horsing back on the control column, a Phantom phlyer phlys (ouch!) another day . . . after 75 hours of receptacle repair, that and as a result of the boomer's quick action in

getting his flying gas main out of the way before the overrunning receiver turned it into a corkscrew, the rest of the fighter formation unloaded their scheduled fuel and continued the mission.

Aerial refueling has posed problems of tactics and techniques since the days of lowering gas cans by rope. Transferring fuel from bird to bird in close-order drill involved certain hazards then, and it does now. Much of it revolves around individual pilot proficiency and technique. Some receiver pilots hang in the "green" like they're wired; the boomer couldn't shake them off if he tried. Others orbit around the edges of the envelope, daring the signal system, but always getting back in before an automatic disconnect. Some jocks hit the green only while sliding from outer to inner limit, yawing from full left to right azimuth, and yo-yoing between max upper and lower elevation. Obviously, it's not easy and takes practice to approach a club-wielding aerial freighter.

Unfortunately, tanker pilots aren't in the best position to add much in an air refueling emergency. He's at the wrong end of the airplane. Up front's a great place to be during takeoffs and landings (sometimes you wish you weren't), but doesn't help his precision formation flying with a trailing receiver. It would help if he could use some Rube Goldberg setup such as rear-view mirrors, like an earth-bound gas truck. Or, a second set of flight controls extending back to the boom pod. Then he could back and haul his tanker in coordination with the needs of his customers. Flying forward while facing backwards would be tricky, but in time he'd master it.

Meanwhile, he has to depend on the experience and judgment of his boom operator during emergencies. He's a tanker pilot's seeing-eye dog during gas passing because he's the only tanker man in position to see what's going on. Although boomers are outstanding types, you have to consider: he's not a pilot; he's busy flying the boom with one hand, controlling its extension with the other; he's trying to keep his bouncing boom out of your canopy; and he's responding to his pilot's interphone call with a quick, hopefully accurate judgment on,

Watch its tail!

"clear-or-not-clear to climb." It's not an easy job or decision . . . especially at night.

When thinking about a boom operator's responsibilities, and contributions to critical inflight pilot decisions, there's a lesson or two to offload here.

First off, a Caution note in the air refueling procedures manual found its way into that good book through previous sad experiences. It states, "... air refueling will not be accomplished unless interplane communications capability is maintained between tankers and receivers except during an emergency" (our underlining). This near midair began with a temporary breakdown in communication between the boom operator and receiver pilot. If he'd heard the first "up five" call and reacted rightly, the sequence of events wouldn't have degenerated into a breakaway and near midair.

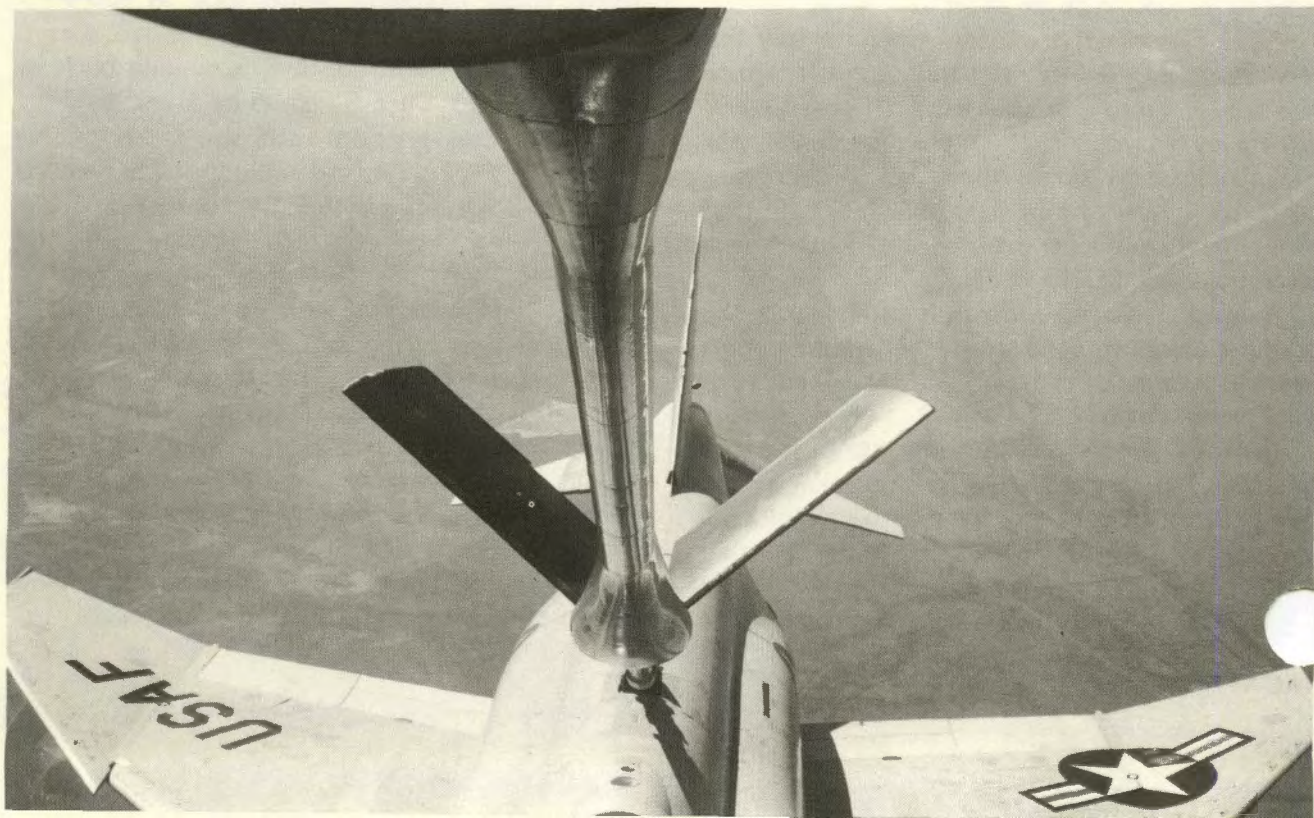
When conversation ceases in the fuel transfer business the success of the operation depends on aircrew types reading air refueling sign language. If all participants aren't fluent, lack of communication can lead to the unhappy smoke signals meaning accident. So, refueling without comm capability adds new hazard to an already demanding, precision maneuver. If you can't talk

to each other it boils down to: How bad do you need the gas?

Secondly, the place to hide in a breakaway call is back and down. Don't advance and increase the boom-to-tanker angle. This is no time to overrun or pushover, lifting your tail feathers to meet the bigger, heavier bottom of a tail-down tanker. That kind of aerial bumps-a-daisy always has a loser . . . normally not the tanker.

Think about it the next time you drive up behind a kerosene karrier . . . especially his terrible tail squat during a breakaway. Also keep in mind that the tanker pilot's way up front trying to maintain a stable platform either with "George" or hand-flying; the boomer is his gas station attendant and advisor in an emergency . . . he flies the boom and clears the tanker to climb during a breakaway. And interphone communication delay between the tanker pilot and his boom operator further delays reaction in an emergency. Now compare this with the fact that the receiver pilot's facing forward and has instant, positive control of his bird.

Add it all up and as always: Fighter pilot carry the big flying load and decision responsibility in air refueling emergencies. But then, he's been shouldering individual responsibility for years. That's why he's a member of the fighter pilot's fraternity! ➤



CREW CHIEF OF THE MONTH

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



SSgt Nix



TSgt Hansley

MAINTENANCE MAN OF THE MONTH

Technical Sergeant Charles Hansley of the 4407th Combat Crew Training Squadron, Hurlburt Field, Florida, has been selected to receive the TAC Maintenance Man Safety Award. Sergeant Hansley will receive a letter of appreciation from the Commander of Tactical Air Command and an engraved award.



Letters to the Editor

THE SEAT'S THE THING

Reference your article "30 Seconds More," of the March 1969 issue of TAC ATTACK.

I realize the articles in this magazine are primarily oriented to inform aircrews and maintenance personnel throughout TAC. However, in the case of Lt Col Slaybaugh's article I feel that civilian companies who manufacture, and Air Force personnel who procure ejection seats should also be made more aware of the fallacy of "Zero-Zero" thinking.

One important conclusion to be drawn from this article and one that was omitted is "The ejection seat of most value to an aircrew member is the one which, from the time of initial aircrew action, places him on the end of a fully deployed parachute in the least amount of time." This statement is true under any low altitude conditions. Inverted flight and high speed vertical dives are not exceptions. The first criteria that TAC should examine on any ejection seat offered for acceptance is the total elapsed time from initial aircrew action to full parachute deployment.

Captain Nicolas J. Ide
15 Tac Ftr Wg, MacDill AFB, Fla.

We concur. You missed one major point however, in addition to the minimum time to deploy, we require above all - reliability. You can be sure that the finest ejection equipment available is mated with our aircraft when the buy is made and that all concerned with the choice of ejection equipment are constantly striving for the day when the "instant" and reliable ejection sequence is a reality. Ed.

"FERRY TALE"

Your Pilot of Distinction for March 1969 must have had that photo made shortly after returning from the cited ferry mission. He looks a tad apprehensive, and he earned the right to that - there's more to the story of that trip.

I caught up with Captain Runco at Hickam after

his airplane had been fixed. I was ferrying a Goon over the same route. We had an HF radio set that wasn't really the best in the world; but it hadn't been a great problem staying in touch with the good people on the ground because of all the commercial and MAC traffic zipping by overhead on the way out from McClellan. Captain Runco and I decided to team up for the rest of the trip. I would take off about 30 minutes earlier than he did on each leg. The Provider, with its superior speed, would pass us at just about mid-point of each island hop. This way, we stayed in UHF range of each other, and it was useful several times in relaying position reports; and it was a little comforting to be pretty well assured that there was someone you could talk to in the event of trouble. That gets to be a four-engine ocean at times when you're looking at it from an old twin-engined recip.

On the leg from Guam to Clark at about ten minutes past equi-time point, Captain Runco lost right engine again. This time it was his HF set didn't work. We were able to contact Guam and the Philippines and soon had the escort 130 on its way from Clark. Within about 15 minutes, using the UHF/DF, we made a rendezvous with the 123 and flew with him until the 130 had a visual on us.

The point of writing this is that I recommend such buddy tactics whenever ferrying twin-engine reciprocals over far reaches of water. I rather missed Captain Runco on the leg into Tan Son Nhut.

Lt Col E. B. Apperson
67 TRW, Mountain Home AFB, Idaho

Thanks for completing Captain Runco's hairy "ferry tale." We're glad it had a happy ending. After back-to-back failures on the same engine over all that water, we'd all look a "tad apprehensive." We'd also be more than concerned about the maintenance provided him after his first failure. Wonder what he said when his right engine quit the second time?

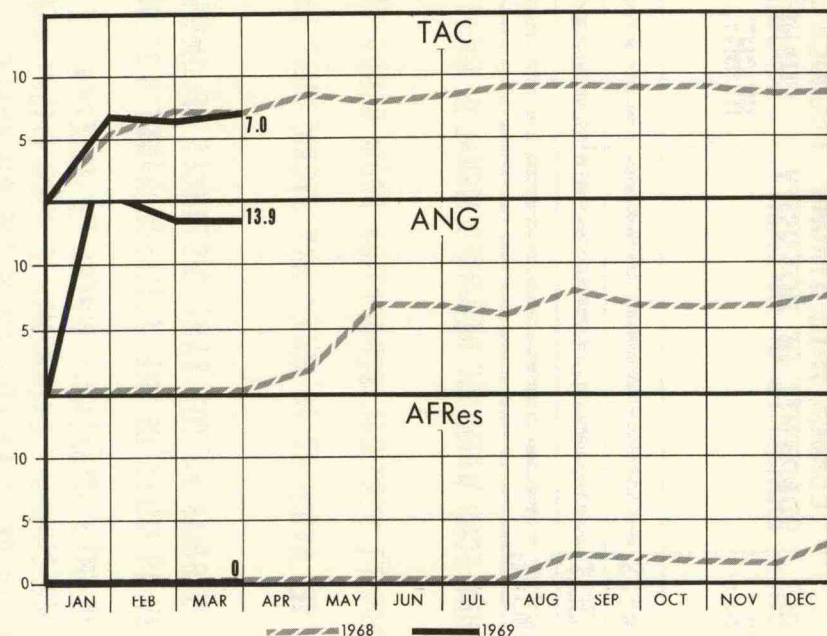
Your buddy system of ocean crossing in unmatched birds sounds outstanding. It's good old Yankee ingenuity and Air Force teamwork at its best!

Ed.

TAC TALLY

MAJOR AIRCRAFT ACCIDENT RATES AS OF 31 MARCH 69 *

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



AIRCRAFT			THRU MAR	
			1969	1968
TYPE	TAC	ANG-AFR		
A-1	0	30.0		
A-26	0	0		
A-37	0	0		
B/RB-57	0	0		
RB-66	0	0		
F/RF-4	1.5	13.1		
F/RF-84	37.4	20.3		
F/RF-101	0	0		
F-5	0	0		
F-86	0	0		
F-100	11.6	5.9		
F-104	68.2	161.0		
F-105	14.6	7.9		
F-111	33.4	52.2		
KC-97	0	20.2		
C-7	0	0		
C-47	0	0		
C-119	0	0		
C-123	0	17.6		
C-130	4.4	0		
T-28	265.3	0		
T-29	0	0		
T-33	7.9	7.9		
T-39	0	0		
O-1	0	0		
O-2	0	0		
OV-10	0	0		
H-21	0	251.3		

* ESTIMATED FLYING HOURS

THRU MAR			THRU MAR		
1969			1968		
9 AF	1.2	8.5	12 AF	7.9	6.4
4 TFW	0	10.1	23 TFW	0	8.3
15 TFW	0	16.1	27 TFW	0	0
33 TFW	0	28.4	49 TFW	0	0
113 TFW	0	44.1	140 TFW	0	0
4531 TFW	0	19.6	479 TFW	8.7	20.0
363 TRW	12.0	0	474 TFW	30.7	57.9
64 TAW	0	0	67 TRW	0	0
316 TAW	0	0	75 TRW	0	0
317 TAW	0	0	123 TRW	34.3	0
464 TAW	0	0	313 TAW	0	0
4442 CCTW	0	0	516 TAW	0	0
			4453 CCTW	0	8.8
			4510 CCTW	18.9	0
SPECIAL UNITS					
1 SOW	28.2	0	4500 ABW	15.8	0
4410 CCTW	0	12.4	4440 ADG	0	0
4409 SUP SQ	0	0	4525 FWW	21.0	0
			4416 TSQ	0	0

FLIGHT PROCEDURES NEAR SEVERE STORMS

AVOIDANCE DISTANCES FOR AIRCRAFT EQUIPPED WITH NARROW BEAM RADAR

Flight	Echo Characteristics			
Altitude (1000s of Ft)	Shape	Intensity	Gradient of Intensity*	Rate of Change
0-20	AVOID BY 10 MILES ECHOES WITH HOOKS, FINGERS, SCALLOPED EDGES, OR OTHER PROTRUSIONS.	AVOID BY 5 MILES ECHOES WITH SHARP EDGES OR STRONG INTENSITIES.	AVOID BY 5 MILES ECHOES WITH STRONG GRADIENTS OF INTENSITY.	AVOID BY 10 MILES ECHOES SHOWING RAPID CHANGES OF SHAPE, HEIGHT, OR INTENSITY.
20-25	←—————	AVOID ALL ECHOES BY 10 MILES	—————→	—————→
25-30	←—————	AVOID ALL ECHOES BY 15 MILES	—————→	—————→
ABOVE 30	←—————	AVOID ALL ECHOES BY 20 MILES	—————→	—————→

* APPLICABLE TO SETS WITH ISO-ECHO. ISO-ECHO PRODUCES A HOLE IN A STRONG ECHO WHEN THE RETURNED SIGNAL IS ABOVE A PRE-SET VALUE.

1. IF FLIGHT IS OVER STORM CLOUDS, ALWAYS MAINTAIN AT LEAST 5000 FT VERTICAL SEPARATION FROM CLOUD TOPS.
2. IF AIRCRAFT IS NOT EQUIPPED WITH RADAR, OR RADAR IS INOPERATIVE, AVOID BY 10 MILES ANY STORM THAT BY VISUAL INSPECTION IS TALL, GROWING RAPIDLY, OR HAS AN ANVIL TOP.
3. IF AIRCRAFT IS EQUIPPED ONLY WITH WIDE BEAM RADAR, AVOID ALL STORMS BY THE SAME DISTANCES RECOMMENDED FOR NARROW BEAM RADAR, EXCEPT THAT STORMS SHOULD BE AVOIDED BY 10 MILES IN THE ALTITUDE RANGE 0-20,000 FT.
4. INTERMITTENTLY MONITOR LONG RANGES ON RADAR TO AVOID GETTING INTO SITUATIONS WHERE NO ALTERNATIVE REMAINS BUT THE PENETRATION OF HAZARDOUS AREAS. AVOID FLYING UNDER A CUMULONIMBUS OVERHANG. IF SUCH FLIGHT CANNOT BE AVOIDED, TILT ANTENNA FULL UP OCCASIONALLY TO DETERMINE IF HAIL FALLS IN OR IS FALLING FROM THE OVERHANG.