

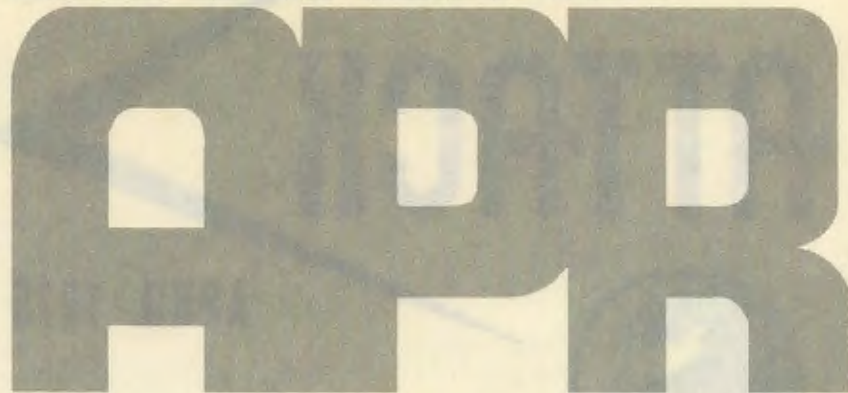
TAC ATTACK

APRIL 1975



"Uncle Willie !"

Willie & Joe
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FOR EFFICIENT TACTICAL AIR POWER



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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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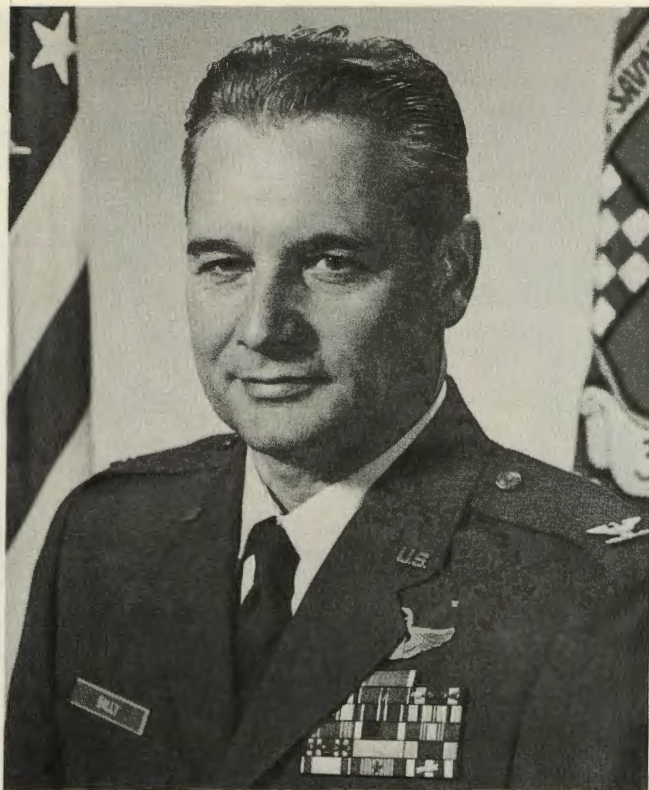
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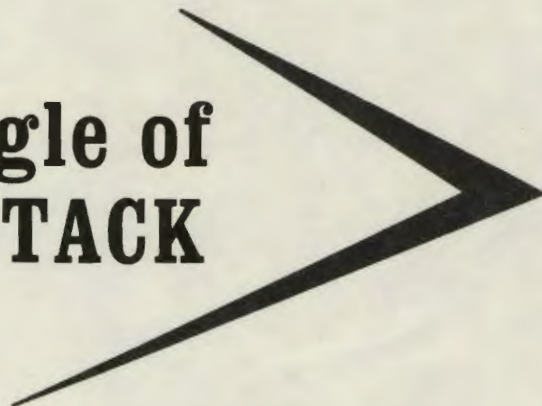
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Angle of ATTACK



PASS THE WORD

Recently, two aircrewmembers died in an accident that might have been prevented. Unfortunately, the problem although known to some, was not surfaced; therefore, no preventive measures were taken.

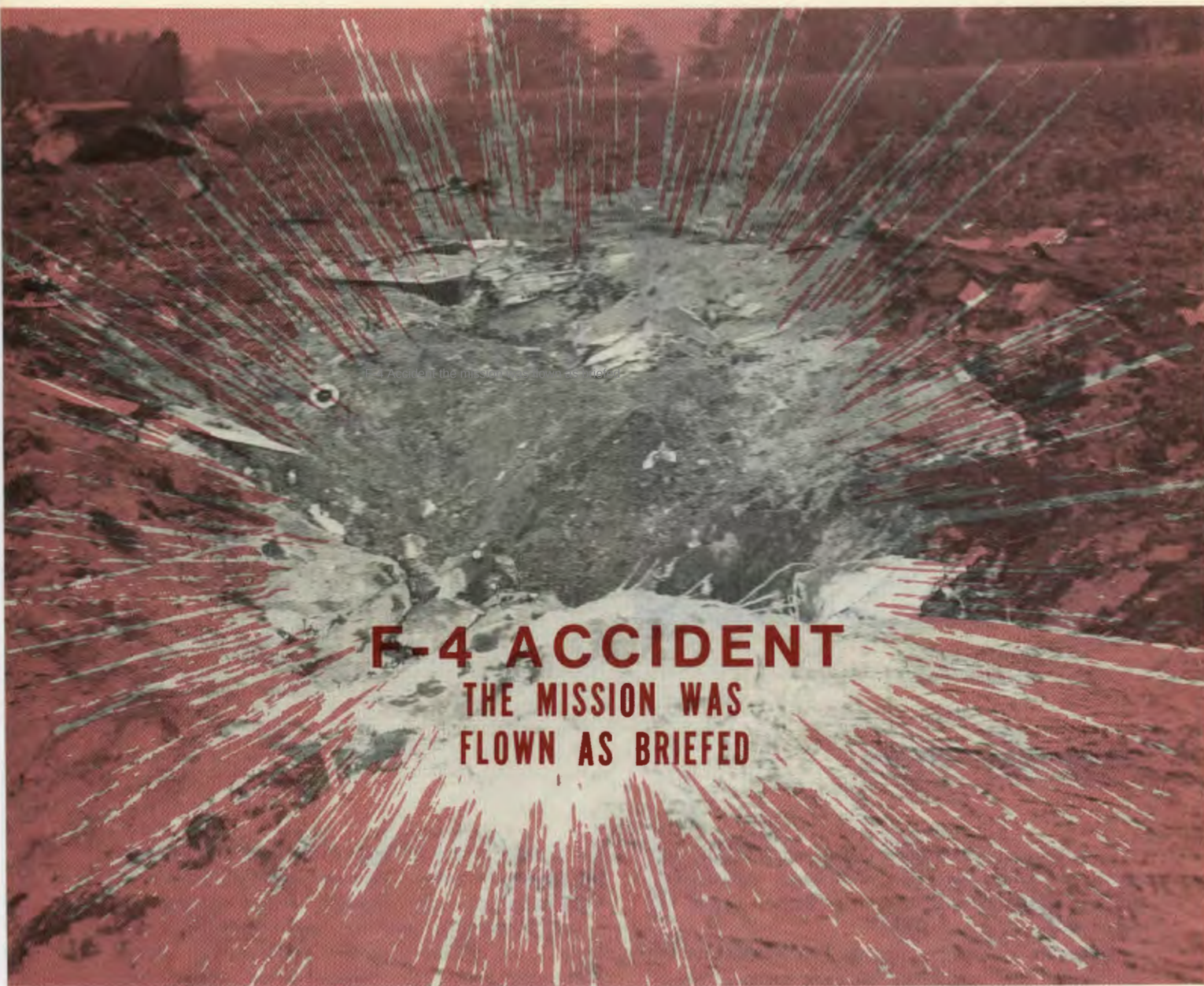
During the accident investigation, the Board found 13 previous instances of aircraft hydraulic pump cavitation after zero or near zero "G" conditions — the accident cause. Two of these 13 occurrences involved the accident aircraft. The tragic part was that no one had submitted an Aircraft Incident Report. Because no one filed an incident report, no trends were noticed, the deficiency was not identified, and no corrective action taken. No one got the word of the accident potential. Result? Two pilots were killed.

AFR 127-4 states an event is classified an aircraft incident even when no damage results when it "constitutes a significant hazard to the crew or aircraft such that a similar occurrence could result in injury or damage." We need this information to prevent accidents... that's the name of the game. To quote the

late General George S. Patton, "Information is like eggs, the fresher, the better." We must have all information in order to see potentially dangerous trends developing.

You're the guys with first hand knowledge of your birds — so if you have an emergency or aircraft malfunction, let your Safety Office know about it... even if you consider it insignificant. Passing the word is a key factor in accident prevention. ➤

William J. Bally, Jr.
WILLIAM J. BALLY, JR., Colonel, USAF
Chief of Safety



F-4 ACCIDENT

THE MISSION WAS FLOWN AS BRIEFED

Monday-morning quarterback... twenty-twenty hindsight... Do you get tired of hearing those two phrases? I do too, but it's really hard not to use them when you're flying a desk in some headquarters and not faced with the pressures of nursing a sick bird back to homeplate. So here we go again...

The following is the sequence of events from a recent accident in another command and some tips on

how it might be prevented from recurring.

Gomer Flight was briefed as a three-ship ACM training mission. The Flight Lead, an FE/IP, was giving a local area checkout to Gomer 03. The briefing covered GCI intercepts, two MIG-Cap ACM engagements, tactical formation and landing. An alternate mission, consisting of two GCI intercepts, two ACM engagements initiated from a "perch" position followed by

tactical formation and landing, was also briefed.

The flight received only two aircraft and was realigned with 03 in the number two position. Shortly before leaving for the aircraft, the flight examiner, Gomer 01, decided to fly two one versus one ORI scenarios rather than the briefed "perch" attacks. The setup, briefed at the duty desk, was as follows:

The adversary (Gomer 01) was to

be at 12,000 feet MSL, 450 KTS. The fighter (Gomer 02) would be at 14,000 feet, 500 KTS with 2,000 feet lateral separation. The two aircraft would be on reciprocal courses. At the abeam point, Gomer 01 would call "HACK," delay five seconds, and initiate a 4-5G AB loop. At the end of the loop, he would start a level 3G turn into the fighter. There was no "canned" maneuver to perform, but grading is based on time to achieve a missile or gun kill. The IP briefed that, from personal experience, the quickest method to achieve a kill would be an immediate one-half-cuban eight begun at the "HACK." He briefed Gomer 02 that he should obtain visual contact with Gomer 01 as he approached the apex of his maneuver and that Gomer 01 should be on the downhill side of the loop. Because of this, Gomer 02 would end up at approximately one mile at zero-one's six o'clock.

Gomer 02, who had not been previously exposed to these maneuvers, was not convinced the recommended attack would work.

The maneuver began as briefed. Neither the pilot nor WSO in Gomer 01 could obtain visual contact with Gomer 02. Number two started a slight left roll as he approached the vertical which negated the initial lateral separation. As his aircraft approached 20 degrees nose high, inverted, Gomer 02 saw 01 and believed he was beginning the downhill portion of his loop. Boresight was selected and Gomer 02 put the defender in his reticle. Gomer 02B called out the slant range as about 6,000 feet. Shortly thereafter, 02 realized the two aircraft were on a collision course. Although evasive action was initiated, the aircraft collided.

OK guys, now you know what happened. We've all been in the position of having our mission changed due to a non-availability of aircraft,

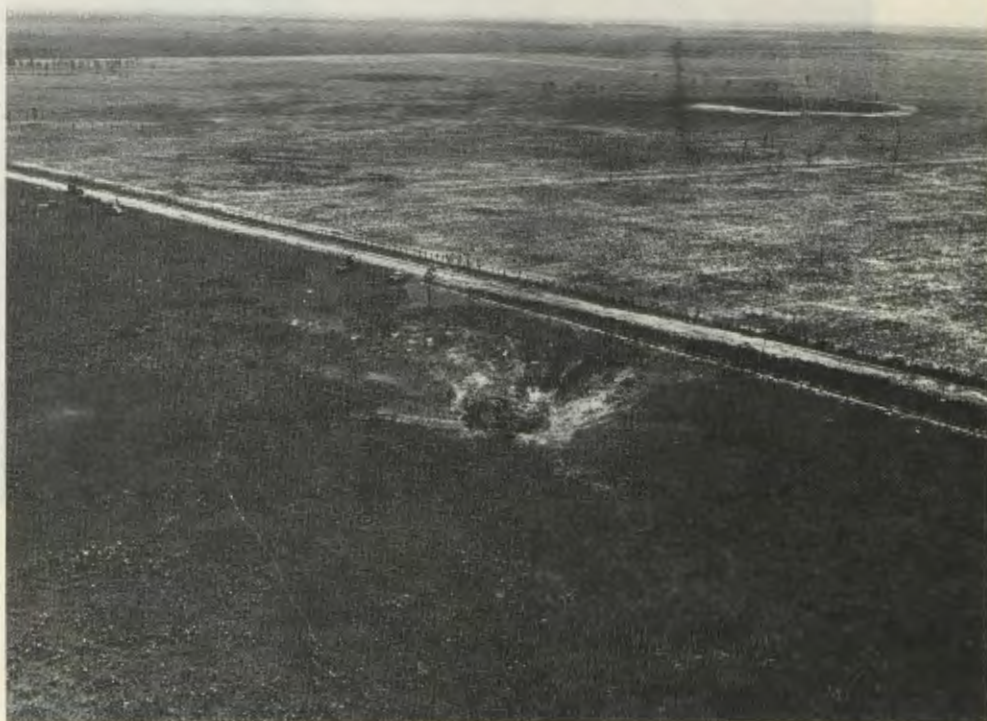
weather, cancelled range times, etc. What have we done about it? Have you ever flown substitute maneuvers that really haven't been adequately briefed? If not, you're either an FNG or have a short memory. I haven't always been sure if everyone knew exactly what they were supposed to do, even though no one in the flight asked any questions or raised any doubts. Maybe they were afraid of being accused of not being able to hack it . . . ever hear that one?

Another question that comes to mind is why Gomer 02 tried the maneuver when he wasn't sure of its consequences. I don't know the answer. But I do know that new guys in a squadron always get a lot of the *"If you can't hack it"* and *"Nobody said it would be easy"* approaches. Elimination of this type of attitude may just bring out a few more questions during or after flight briefings.

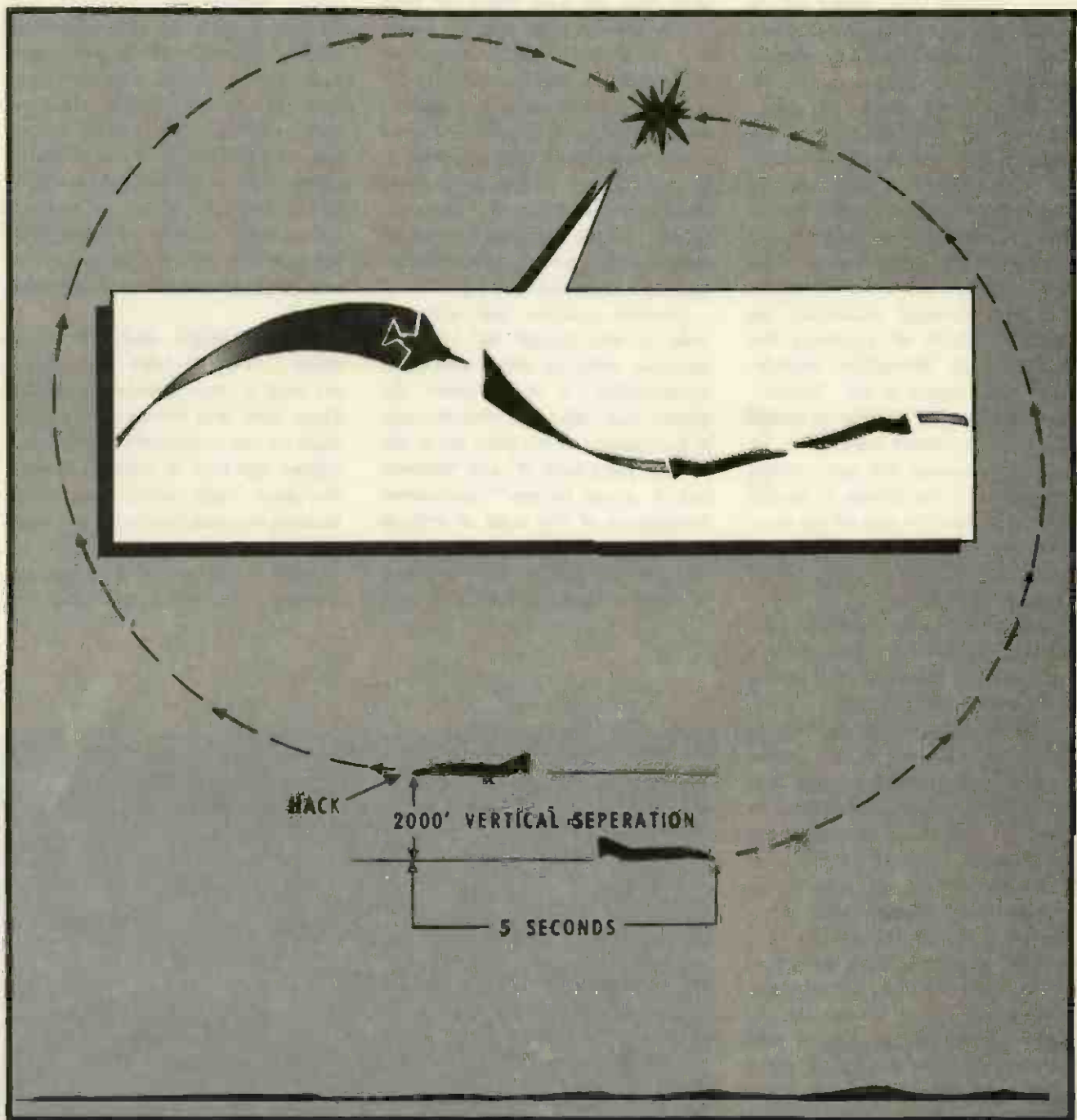
Another factor to look at is time.

We fighter jocks are known for our catlike reflexes and super-sight. But how much time did this pilot really have to recognize his adversary's altitude and projected flightpath and take the necessary evasive action to avoid collision? Let's say a closure rate of 500 KTS, which is pretty conservative in an ACM engagement. 6,000 feet will go by in approximately seven seconds. Not much time to determine the other aircraft's position, direction and take proper evasive action.

IPs and flight leads are supervisors . . . They've been selected on the basis of experience and judgment. Every time they brief a mission they must be sure what needs to be accomplished and how to accomplish it in the safest, most realistic way. ACM training demands flexibility and judgment. We can't have "canned" responses if we are to have realistic training . . . but the margin for error is



F-4 ACCIDENT



small. We must demand the utmost of ourselves and our wingman, both on the ground and in the air, if we are to prevent another accident of this type. Thorough preflight briefings that pro-

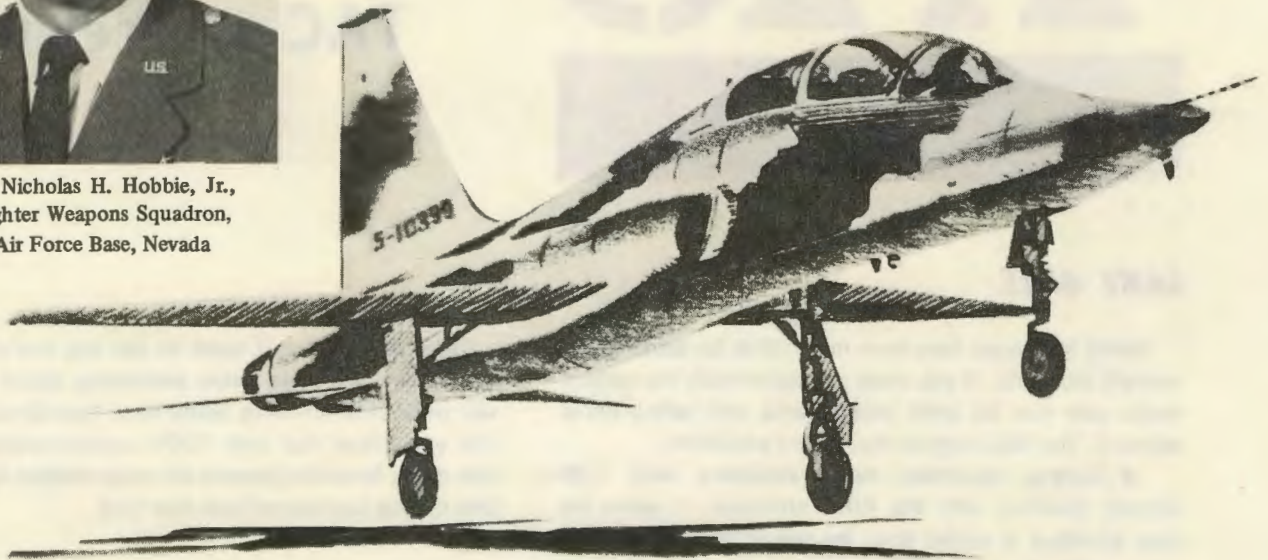
vide complete understanding of all aspects of the flight are necessary so that we are sure everyone knows what they are to do. You wouldn't take a guy "Downtown" if he didn't know

what to do, so why take him on a training mission? The consequences of a mistake made in training can be just as fatal as one made in combat ... and harder to explain.

TACTICAL AIR COMMAND AIRCREWMAN of DISTINCTION



Captain Nicholas H. Hobbie, Jr.,
64th Fighter Weapons Squadron,
Nellis Air Force Base, Nevada



On 6 December 1974, Captain Nicholas H. Hobbie, Jr., was flying as Instructor Pilot in the rear cockpit of a 64th Fighter Weapons Squadron T-38. The sortie was an air combat tactics upgrade mission for the front seater. While initiating an unloaded extension maneuver to gain energy, the front seater's ejection system malfunctioned, opening his lap belt, firing the man-seat separator, and filling the front cockpit with smoke. The pilot was violently thrown against the canopy, the survival kit on which he was sitting was thrust forward against the control stick and held there. The oxygen hose, G-suit and communications cord were pulled loose in the process, preventing intracockpit communications for the remainder of the flight. Observing these events, plus the erratic diving motion of the aircraft, Captain Hobbie took control and attempted to regain level flight. This required the use of both hands, for he was pulling against the combined weight of the front seater and the survival kit which were wedged against the stick in the front cockpit. For all practical purposes, the front seater was immobilized in this position and was unable to talk or render any assistance to Captain Hobbie other than pushing back against the seat kit to give him an additional one half inch of aft stick travel. To compound an already desperate situation, the rear cockpit had been modified with a stress

recorder and contained no flight or engine instruments. With no accurate idea of altitude, airspeed or heading, Captain Hobbie turned toward Nellis AFB using ground references and advised the other two aircraft in the flight of his situation. The GCI site, which had been working with the flight, vectored one of these aircraft to provide assistance; the rejoin was successful. Captain Hobbie performed a controllability check, with his wingman in chase position calling off airspeeds and altitudes over the radio. It was determined that a no-flap approach would have to be made at airspeeds in excess of 200 knots. Aided by his wingman, Captain Hobbie flew a straight-in approach and successfully landed the aircraft. Captain Hobbie's distinctive actions saved both the aircraft and the front seater from certain disaster, since the upgrade student's seat malfunction prohibited a safe ejection. Captain Hobbie's outstanding skill and professional competence in handling this airborne emergency qualifies him for this month's Tactical Air Command Aircrewman of Distinction. ➤

EDITORS NOTE:

Captain Hobbie died in an aircraft accident soon after he so bravely handled this emergency. This award is to be presented posthumously.

TAC TIPS

Early and provident fear is the mother of safety.

—Edmund Burke

interest items,
mishaps
with morals,
for the
TAC aircrewman

LAME AIMS

AIMS altimeters have been responsible for some recent aircraft incidents. If you have a problem with the system, make sure you let both maintenance and safety know about it. The following are two recent problems:

- Another command noted problems with T-39 aircraft modified with the AIMS altimeter. It seems the new altimeter is longer than the one it replaced and the pitot static lines are kinking due to the lack of space behind the instrument panel.

- An AIMS altimeter failed during the first flight after its installation. When the altimeter was switched from standby to reset mode, the stby/reset knob and shaft pulled out of the instrument case. This allowed cabin pressure to enter the altimeter, giving faulty indications. An interesting point... the malfunction will only be apparent when the cockpit is pressurized. If you find stby/reset shaft is missing from the altimeter during preflight, abort the aircraft.

OLD DOG LEARNS NEW TRICK

At FL 380, the SLUF driver noticed engine surges, fuel flow and oil pressure fluctuations. During descent, all fluctuations and surges ceased. At FL 300, the pilot experienced symptoms of hypoxia. Oxygen quantity and pressure were normal and the regulator appeared to work OK. Selecting hot-mike, the jock monitored both the normal and 100% oxygen settings. The sounds on both settings were identical, so the pilot suspected a malfunctioning oxygen system. The Emergency/Mask Test position was selected, an emergency declared, and an uneventful landing accomplished.

They say you can't teach an old dog new tricks. A lot of us jocks think we know everything about flying and will never hear anything really new. How about this one? Did you know that with 100% oxygen selected and on hot-mike, breathing sounds are much sharper and deeper? One ol' dog just learned one new trick.

A HELPING HAND

An A-7D was returning home after depot level maintenance when the pilot experienced radio difficulties; the heading indications also appeared erroneous. While checking this out, the inertial dumped its gyro platform making the primary ADI unusable. As if this wasn't bad enough, our jock was IMC. YGTBSM, right?

The pilot descended to VMC using his standby ADI and mag compass. The radio became operational again and he made contact with the approach control of a nearby military base and asked for a gyro-out GCA. At 200 feet AGL and in the weather, the pilot went missed approach due to large course corrections. While he was coordinating for another approach, the pilot was advised of a Saturn Airways C-130 that could provide a formation led approach at 145 Knots. The A-7 jock joined up with the Herk and the two held hands until the runway was sighted at 200 feet and 1/2 mile on final.

Military aviators sometimes overlook the professional competence of our civilian counterparts. In this case, the professionalism of this Saturn crew saved a fighter jock and his sick bird from possible disaster. Congratulations on a nice save.

CREW REST & CREW DUTY

Ever notice the similarities between aircraft accidents? Recently the Air Force lost three aircraft in two accidents; two different types of aircraft were involved from two commands. The link between them was that the accident investigation boards noted crew rest/duty day violations in both cases.

These violations were not listed as *causes* in either accident, but were findings. The point is that fatigue plays an important part in how a person reacts to stress. Had these crews been adequately rested, they might have acted differently to certain problems that led up to the accident... just one link in the chain of events might have been broken.

AFR 60-1, Chap 7, and its TAC Supplement list crew rest and duty limitations. To help eliminate fatigue, these were formulated to give aircrews adequate periods of rest before flying and to insure that aircrews are not subjected to unreasonable crew duty periods. The responsibility for insuring adequate crew rest ultimately rests with you, the aircrew. But other people can also help — like the schedulers. They must also be alert for crew rest violations. You can help the schedulers by letting them know when your mandatory attendance at various unit functions conflicts with flying duties. Aircrews and schedulers also need the backing of their bosses. Commanders must insist that their crews obtain adequate rest prior to flying, and insure that the crew duty day doesn't overextend the aircrews' capabilities... or violate AFR 60-1.

Crew duty periods for types of aircraft are also explained in the regulation. The point to remember is that the period begins when a crew member reports to work for the performance of official duties or reports for an assigned mission whichever is earlier. Violations of this sort usually occur when flying night sorties and should be closely watched during this period.

Flying is a demanding and fatiguing job. Why strap on a jet when you're already tired? You won't enjoy it and you could be a hazard. Get your crew rest.

SKATING PHANTOM

The runway was wet as the F-4E made its approach. Touchdown was normal. Chute was deployed and the anti-skid system functionally checked. After one cycle, the brakes were released. At approximately 100 knots, the AC applied brakes and felt no response. The paddle switch was depressed and the anti-skid turned off... still no braking action. Emergency brakes were selected at

approximately 80 knots with 2,000 feet of runway remaining. Hard brake application produced no apparent deceleration. With both crew members pressing hard on the binders, the aircraft drifted to the right and came to rest with the nose gear off the right side of the runway at the end.

Investigation revealed that the left anti-skid sensor plug was not locked into place and the right anti-skid sensor plug appeared to be backed off. However, both plugs were still making good electrical contact. If these were malfunctioning, only the anti-skid protection would be lost. 'Wha' happened? REVERTED RUBBER HYDROPLANING. That's where a locked wheel skid on a wet runway lasts long enough to produce temperatures of 400 — 600 degrees F, causing the rubber to revert to its uncured, sticky condition. Mix this with H₂O and you've got a solution that will sustain a skid down to approximately 10 knots. In this incident, both main tires showed heat deformation and the runway had two 700-foot steam cleaned strips leading to where the main gear came to rest. So there was enough braking action to stop wheel rotation, even if there was anti-skid failure.



This is a good example of a tire that suffered reverted rubber skidding — it's not an F-4 roller.

The F-4 Dash One says the cycling of the anti-skid system may not be apparent on a wet runway. A low deceleration may be mistakenly interpreted as brake or anti-skid failure. We Phantom drivers know that with the anti-skid turned off, relatively low brake pressure will cause locked wheels when on a slippery surface.

Some food for thought: A way to prevent a Phantom from ice skating down a wet runway is to put out that anchor on the jet's posterior and snatch up the cable. This will ruin the day for the hydroplaning gremlin and save you from an exciting ride. An ounce of prevention is worth a pound of mire.

DLV7-R17 PHYZ-BIZ



DECOMPRESSION SICKNESS II

LtCol Harold Andersen
Hq TAC Physiological Training
Coordinator



Last month we presented some background information on the cause of decompression sickness. The "bubble theory" was reviewed, and bubbles in the blood-stream and/or the tissue fluids were indicted as the most likely agents. One approach to determine whether or not bubbles do cause symptoms of decompression sickness is to expose either experimental animals or humans to high altitude, await the appearance of symptoms, then X-ray the area to record the presence of bubbles in the painful region. This approach has resulted in photographic records of bubbles in blood vessels and tissues.

The main mechanisms by which bubbles cause pain and disrupt function are by direct mechanical pressure on body tissues, and by blockage of blood vessels. In the former, bubbles arise in the tissue fluids that bathe each cell by diffusion and by coalescence. They tend to grow as altitude increases. As the bubble dimensions increase, they can exert mechanical pressure on the tissue, disrupting the function of the cells, or generating painful sensations.

In the latter, the presence of bubbles in blood vessels can cause a blockade, preventing effective circulation of blood beyond the site of the blockade. The result is a narrow area of stagnant hypoxia. Nerve cells are particularly susceptible to hypoxia, so we shouldn't be too surprised to find that decompression sickness can be responsible for permanent neurological damage.

Painful mechanical pressure by bubbles on structures in muscles and/or in the vicinity of joints is known as "bends" (and an individual who experiences them is said to have "bent" at such and such an altitude). Involvement of the brain and/or spinal cord by either mechanism (direct pressure; stagnant hypoxia) can produce central nervous system (CNS) symptoms.

During 1974, in TAC, there were eight cases of "bends" reported from altitude chamber rides (out of a total of 6,913 aircrews exposed). There were no aircraft incidents in TAC, but 10 bends incidents were reported from other commands. The dull, aching, disconcerting, sometimes disabling muscle and joint pains are serious enough in themselves, but there are other aspects to remember about bends. The pain, as its severity increases,

may cause the crew member's attention to be diverted from his flight requirements. It is important to remember that the bends may appear as only the first symptom of decompression sickness, and be quickly followed by more serious symptoms such as CNS disturbances, chokes, etc. The first symptom of the bends, no matter how minor, requires immediate corrective action.

Immobilize the joint (or area) involved; do not rub, knead, massage, or exercise.

Declare your emergency ASAP — request clearance for an altitude below 18,000 ft.

Immediately set your oxygen regulator at 100%.

Report to a Flight Surgeon ASAP, even if the symptoms disappear during descent; symptoms have been known to return with increased severity hours after their initial disappearance.

Although exercise seems to increase the incidence rate and severity, the pains from bends may also appear in individuals who have been seated and immobile for some time — as in the case of fighter aircrews. The heavier and more vigorous the exercise, the more likely it will precipitate a bends episode. One reason for not exercising the affected joint is that the exercise may worsen the symptoms, perhaps by generating additional bubbles. Another possibility is that the bubble may move to a new position, which may be even more painful than the original location.

Let's review the factors which seem to initiate the appearance of bends.

The basic condition for the appearance of decompression sickness in aircrews is exposure to cabin altitudes of 18,000 feet or higher for long periods of time. If we superimpose this basic condition upon a few other conditions such as a rapid rate of ascent, exercise, obesity and increasing age, we can expect the rate of incidence to increase.

Next issue, we'll discuss these factors in more detail and tie them in to other types of decompression sickness such as CNS disturbances and "the chokes." Until then, keep the bubbles in your beer or coke, not in your blood.

THROW A QUARTER* ON THE GRASS

(or how to avoid killing yourself
with the equipment that's designed
to save your bod)

* Inflation, you know.

By Capt Mike Byers
HQ TAC/DOXBL

In the 1960s, the Air Force started procuring survival kits that would deploy automatically after ejection. The reason that the "bean counters" were persuaded to cough up between \$3,000 and \$6,000 apiece for these jewels is that guys were getting smashed up on parachute landing falls (PLF) with nonautomatic kits. You have to admit, it's a bad situation when you punch out of a fighter, get a good chute and bust both legs when you hit the ground. When your SURVIVAL GEAR causes your injury, that's just unacceptable!¹

OK, so now we've got automatic kits for just about every fighter-type bird in the TAC inventory that uses a "hard" kit (like the F-4, for example); we're working on getting automatic kits for the birds that don't have them yet.² Theoretically at least, we shouldn't be having many problems with PLF injuries caused by the kit. Unfortunately, from looking at accident reports over the last couple of years, you get the idea that a few jocks are still hitting the ground with undeployed kits. About 20 percent of these guys get killed or seriously injured. A few of these accidents are caused by some mechanical failure in the survival kit automatic deployment system: Nobody has ever built a perfect machine or maintained a machine perfectly.³ You can bet, however (and do so every time you fly), that there are a bunch of dedicated guys around the Air Force who spend their time making sure that your gear is going to work correctly. Consequently, the greatest percentage of undeployed kit injuries happen because the crew member didn't have the kit in the automatic mode and/or didn't get a chance to manually deploy it before he hit the ground. Since the whole idea of the automatic kit

1. Medical research has conclusively proven that it is exceptionally difficult to run, fight, swim or otherwise maneuver with two broken legs.

2. F-5/T-38.

3. The wedge is the simplest tool known to man. There are people who can screw up a wedge.

is to get the kit open without any effort on your part, you don't have to be a fox to figure out that flying with the kit in the automatic mode is a pretty good idea.

Aha! you say. What about those trees down there? What's gonna happen when the kit lanyard hangs in one tree, the chute snags in another, and I'm in the middle? That smarts! Well, here comes the tech order stuff, so watch out . . . If you look in T.O. 14D1-2-1,⁴ you will see that some tree landing procedures have been developed. 14D1-2-1 was written by aircrews, life support technicians and experienced jumpers, and it was written so you can understand it; you don't even have to be a fighter pilot. Here's what it says about tree landings:

"TREE LANDING PROCEDURES.

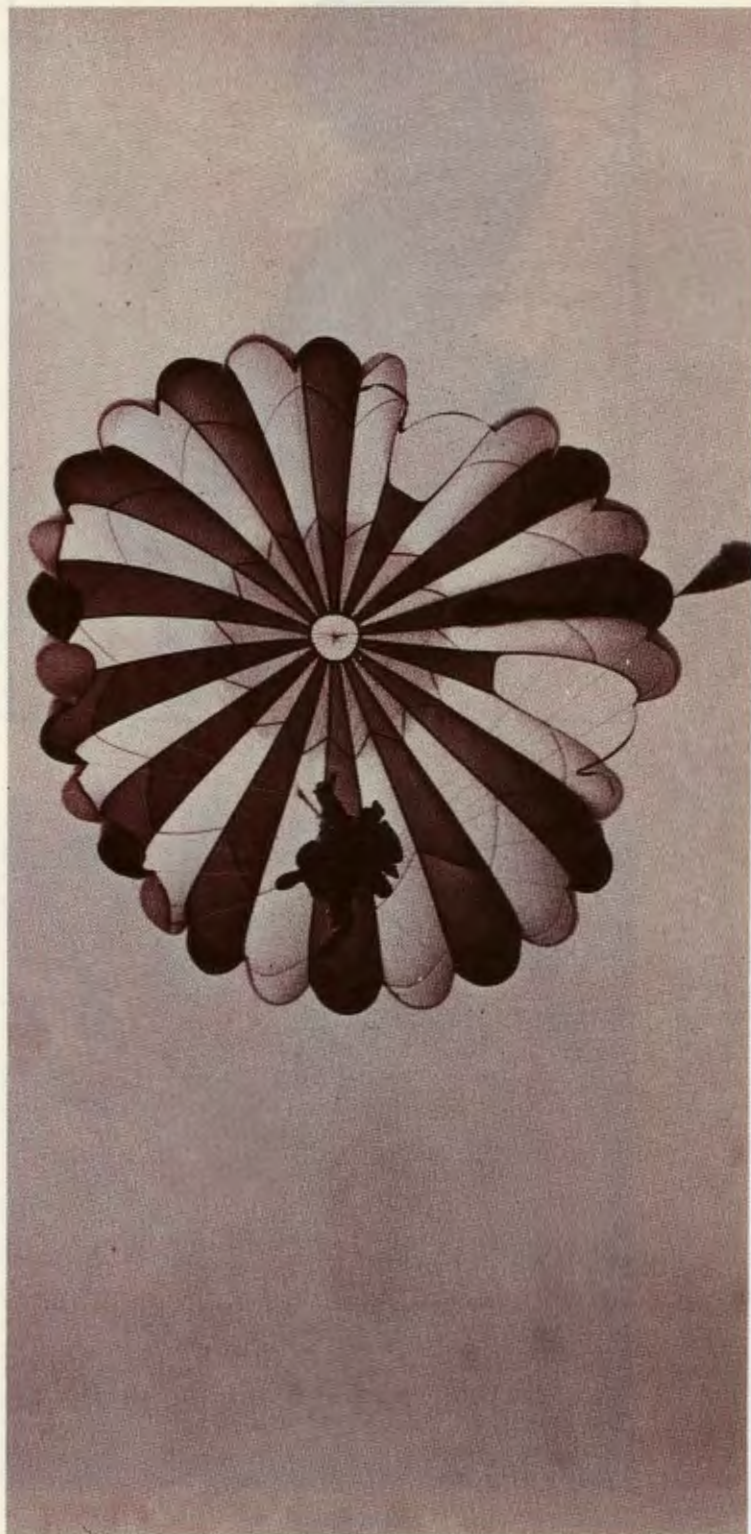
The completion of the following procedures will insure that you are in the proper configuration for a tree landing. These procedures should be accomplished immediately after parachute opening shock.

- a. CHECK CANOPY
- b. VISOR DOWN
- c. DISCARD MASK
- d. DEPLOY SURVIVAL KIT

NOTE: *Immediately prior to tree penetration, jettison the survival kit to preclude possible hang-up. Aircrews who wear the SA-20 parachute with the CNU-7/P container affixed to the harness will not deploy the life raft prior to tree penetration.*

e. PULL FOUR-LINE JETTISON LANYARDS."

There's more info in the TO, but the "NOTE" is what we're interested in. Pickle off the kit before you go into the trees because your chances of getting smashed by an undeployed kit are greater than your chances of getting hurt in a tree hang-up. This is true even if you're unconscious or incapacitated and can't pickle off the kit. The odds are still in your favor if you come down with the kit deployed. Sure, if you're flying all the time over heavily forested areas, you might want to consider leaving the kit in the manual mode. By the statistics, though, you're in better shape if you fly in automatic mode all the time, regardless of tree cover.



4. Check with your friendly Life Support section.



PHOTO 1



PHOTO 2

THROW A QUARTER ON THE GRASS

The good guys at the 354 TFW Life Support Branch sent us some photos that should make the point: Photo 1 illustrates why it's bad news to land on an undeployed "hard" kit. Look at where the kit edge hits your legs on the PLF — the usual injury is to break both legs at the points where the kit catches you. You can make a much softer landing with your gear hanging on that 25-foot lanyard as shown in Photo 2. Photo 3 shows the fittings that allow you to get rid of the kit for tree landings. Note that with the kit deployed, you only have to punch the left airlock fitting to jettison the whole works.



PHOTO 3

If you've got some thoughts, questions, or comments on this article, let us hear from you. Send us a "Fleaglegram." The best life support ideas come from the people who fly with and work on the equipment every day.

Thanks to Lt Col Tompkins, 353TFS for the idea for this article.



site plans

By SMSgt Willie C. Buckholts
HQ TAC/SEW

In daily munitions operations, supervisors and technicians are concerned with explosives storage, operating and administrative support facilities. What does this have to do with "site plans"? The simple answer is "weapons safety." The Air Force has volumes on explosives and related weapons systems. They describe how to store, maintain, and deliver munitions with a maximum of efficiency and safety.

In our business of weapons safety, primary guidance comes from AFM 127-100. The requirement for a site plan can be found throughout this manual; however, the crux of data comes from Chapters 4, 5 and 8. Why are site plans required? When are they submitted and by whom? Who has the responsibility for review and approval? Let's review the above questions and briefly discuss site plans.

Munitions are manufactured with varying degrees of sensitivity and moisture absorbing qualities. It is highly desirable, and in some cases mandatory, that they be stored in structures designed to prevent weather damage and possible chemical reactions due to the breakdown of original compositions. Therefore, prior to the construction of a new explosives facility or modification to

an existing facility, consider the type of structure, materials used in construction, size and use of the structure. These are essential due to the blast, fragmentation and overpressure effects in the event of an explosion. We can't afford to have facilities constructed in a way which would permit an explosion in one facility to cause an explosion in an adjacent facility. In addition, an improperly sited facility would waste the taxpayers' money. A munitions facility is just a lot of concrete and steel if it is not sited and constructed properly. Drawings of structures may be obtained from AFM 88-2 and AFM 88-22.

Next, we must consider where to locate the facility in relation to other facilities, target zones, i.e., inhabited buildings, public highways, etc. The clear zone of the facility is directly related to the sited explosives capacity and is computed from the quan-

tity-distance tables in Chapter 5, AFM 127-100.

When you have justified the need for an explosives facility, the site plan is the next order of business. Site plans are prepared, evaluated and submitted at the local level in accordance with Chapter 8, AFM 127-100 and its TAC supplement. Preparation of site plans cannot be delegated to any one particular office of responsibility. It should be a threefold responsibility. The organization requiring the facility must identify and justify it to the local civil engineers, who must review the requirement, submit designs, and obtain funding. The local weapons safety office acts as an active advisor. They provide the expertise in the preparation of the plan. The civil engineering experts can provide scale maps of the installation and drawings of the facility(s) when not available in AFM 88-2. Once the plan is completed, don't forget to coordinate the package with MA, DE, SE, etc. Keeping all the staff informed prevents time and cost-consuming delays. Make sure all questions have been asked and answered prior to submitting the package for approval.

Now that your site plan package is complete with all supporting attachments and in five copies, you're ready to forward it through command safety channels for review and subsequent approval by the Department of Defense Explosives Safety Board. ➤

TAC			WEAPONS MISHAPS			ANG		
FEB	Thru Feb		EXPLOSIVE	FEB	Thru Feb		EXPLOSIVE	FEB
	1975				1975			
6	8	0	TOTAL	1	1	2		
5	7	0	Personnel	1	1	2		
1	1	1	Materiel	0	0	0		
0	0	1	Other	0	0	0		
0	0	1	MISSILE					
6	10	4	NUCLEAR					

Willie & Joe

by Bill Mauldin



Good stuff is never outdated and Bill Mauldin's stuff is good. If you were lucky (?) enough to see his drawings in the "Stars and Stripes" during the big one, you'll never forget them. If you've never seen his "Willie & Joe" series before, here's your chance to see Pulitzer prize winning humor that transcends all branches of the service, all past wars and the so-called generation gap. Our thanks to Bill for allowing us to run this spread in TAC ATTACK.



"Go ahead, Willie. If ya don't bust it ya'll worry about it all night."



"Just gimme a coupla aspirin. I already got a Purple Heart."



The Prince and the Pauper



"Who started th"



"Aim between the charge wh



"Able Fox Five to Able Fox. I got a target but ya gotta be patient."

"Rumor I wuz playin' poker wit' a beautiful nurse?"



"He's right, Joe, When we ain't fightin' we should act like sojers."



"My son. Five days old. Good-lookin' kid, ain't he?"

'eyes, Joe. Sometimes they
n they're wounded."



SPO Corner

F-111 SHAZAM

by Capt Dan Brown

All aircraft are susceptible to damage from lightning strikes... some more than others. The newest member to join the electrifying group of F-106s, F-104s, R/RF-4s, et al, is the beloved Aardvark. In our 80,000 pound lightning rod, the results have varied from momentary overextension of aircrew eyeball and sphincter muscles to loss of nearly every instrument you fly with... not to mention various holes in radomes, pitot static lines, RHAW antennas, and wing tips. So far, F-111s have been fortunate in sustaining damage limited to the incident category; however, potential for disaster has been demonstrated by other aircraft. Two F-106s were involved in major aircraft accidents because of lightning strikes; one of the aircraft was lost and the pilot killed. RF-4



radomes have been shattered by lightning and other TAC aircraft have also had problems.

So what do you Aardvark jocks need to know? (Even you guys with stationary wings can learn something).

Fixes for the F-111 are coming... they have worked on other aircraft, but are a couple years off... so plan accordingly.

Strikes can occur 30 or more miles from the nearest cloud. Avoiding cumuliform clouds reduces strike probability, but doesn't eliminate it.

Most strikes occur at or near the freezing level ($\pm 5^{\circ}$ C).

If it's your unlucky day, odds are that you will:

- Be in or near clouds.
- Have the pitot tube and radome zapped by a lightning strike.
- Lose part of the CADC system (AVVI, AOA, AMI).
- Lose all or part of the pitot static system from holes in the lines (or have insidious errors).
- Lose the flight control computer or autopilot.
- Have errors in, or damage to, any instrument on the instrument bus due to impulse lead-in on the pitot heat wire.
- Have engine rollback, or false indications of rollback due to impulse effects on tachometers (the experts aren't sure which).

If it's day and VFR at homeplate, you'll probably get it safely on terra firma with little sweat. But if it's night or in weather reserved for company grade jocks, you will have a hairy tale to tell when you get back to the club.

Guest SPO Corner

STANDARD FORMATIONS

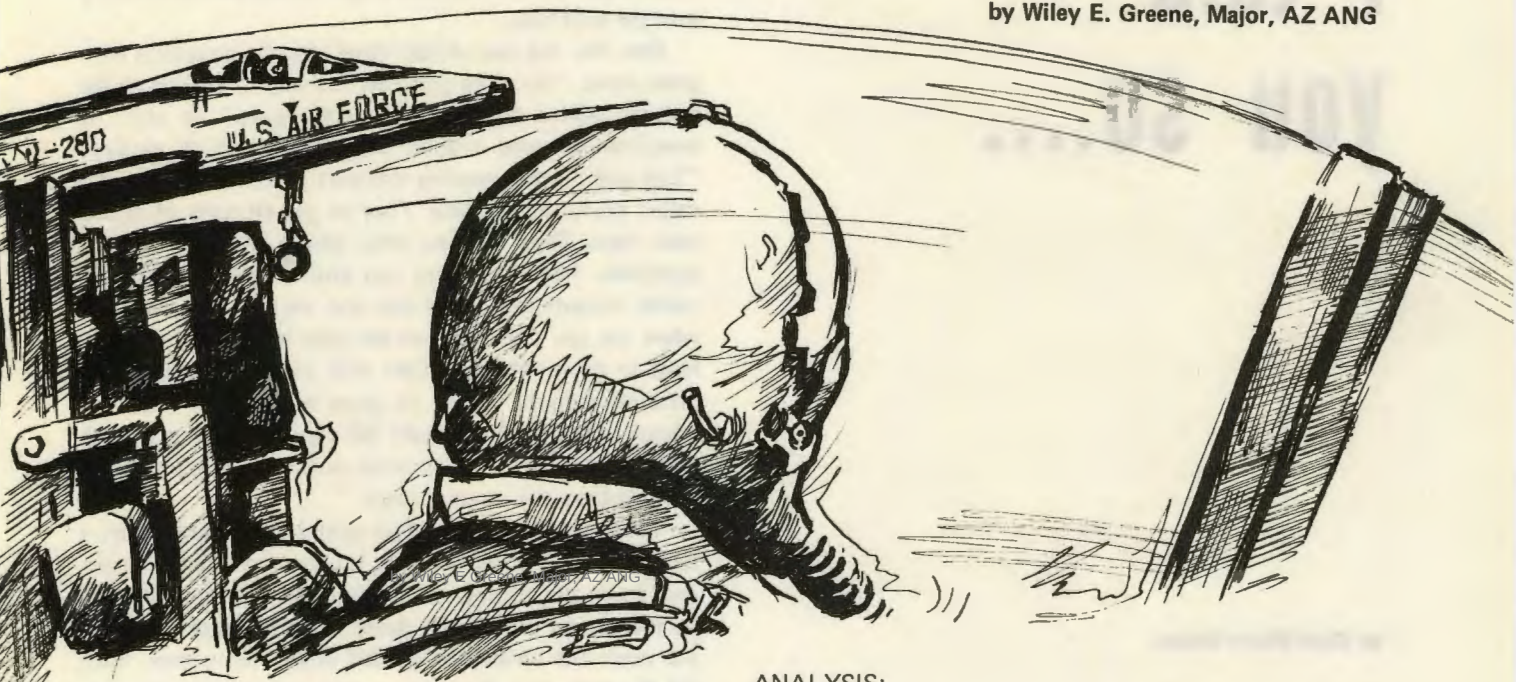
Maj Fred Kempf
HQ TAC/DOVF

FLIP I, General Planning, defines a standard formation as: one in which a proximity of no more than one mile laterally or longitudinally and within 100 feet vertically from the Flight Leader is maintained by each wingman.

If you intend to operate outside those dimensions and you are in the air traffic control environment, the flight lead must request and receive ATC approval. IFR trail formation departures and tactical formations are examples of non-standard formations using FLIP planning guidelines. The controller should be informed as to the positions of wingmen in terms of distance and altitude differential from lead so that he can separate other aircraft from the perimeter of the airspace encompassing the formation. If traffic avoidance vectors are received, lead should request vectors for wingmen to insure their safe clearance around traffic.

EMERGENCY SITUATION TRAINING (F-100)

by Wiley E. Greene, Major, AZ ANG



So far it has been a normal flight. Your TACAN has an affinity for locking on some 40 degrees off of where it belongs; your DME occasionally has a 100-mile error; and you finally got tired of hearing the UHF cycle, so you turned it off. Fortunately you're number four and, except for that BIG BLACK CLOUD that's sitting on top of the only airport within 500 miles, it's no sweat and all you have to do is hang on. Your flight leader splits the flight into elements and your element leader taps his shoulder. You know he isn't patting himself on the back, so you figure he wants you to land on his wing. A little speed brake action, a couple of turns — there's the gear signal, three green, some flaps — we must be on final. Airspeed is high — beginning to see the ground — still some scud — recheck the gear; yup, three green — there's the overrun — Great Gobs of Goose Gravel! Your element leader chopped the throttle and there you are, sliding into the lead. Now what?

OPTIONS:

- a. Open the canopy.
- b. Kick it into burner so that your element leader thinks he's stopped and he slides into the dirt trying to turn off at the first taxiway.
- c. Go around.
- d. Forget about him and make your own landing.

ANALYSIS:

First of all, we don't want to open the canopy. Big, Black Clouds have a nasty way of getting you all wet. So much for Option A. Option B has some merit, but if your element leader was impolite enough to rapidly retard his throttle in the first place, there's a good chance he forgot you exist. Option C might be valid, but consideration must be given to weather — remember . . . no radio and no TACAN. When in doubt — "D."

Once you've started going ahead on a formation landing, it is almost impossible to regain the proper position. You might be able to gain a little advantage by using speed brakes, but there is still a couple of seconds delay in getting the drag that you want. You are much better off if you direct your attention to making your own landing — on your side of the runway. Hopefully, he'll stay on his. DON'T try to look back over your shoulder and fly formation. It doesn't work.

If your leader needed to go to idle in a hurry, there's an awfully good chance that you're fast; and if you are, then here comes a long landing. The best technique is to plan on touching down at your computed touchdown speed even if you are a mite long. Each 10 knots fast is an extra 1,000 feet of landing roll. Eight thousand feet of wet asphalt plus a long landing equals tailhook plus cable. Almost guaranteed. Hopefully, if you use the arresting gear, your fearless leader won't. But that's another situation.

I told you so....

by Capt Marty Steere

During the mid-fifties, an Air National Guard unit based near a large river received word that they were to acquire some new aircraft . . . jets. This caused quite a stir among the pilots in the unit as they were flying P-51 Mustangs. They were fine, sure . . . but real jets! F-84s . . . a real hot mama.

The first big decision was who would go to pick up the first two aircraft. A first lieutenant was chosen because he was the only jock in the unit who had previous jet experience . . . six hours in pilot training. The ops officer went because . . . well, you know.

When they arrived at the depot to accept the F-84s, they were greeted by a beaming second balloon who took them to their aircraft and gave them quickie ground school.

"Nothing to worry about," he grinned. "They're easy to fly. Just to make sure though, I'll even start 'em up for you. Just remember one thing: when you're taking off, let the jet go all the way to the end of the runway before you pull back on the stick. Then it'll take off, no sweat."

With this in mind, the two jocks strapped on the F-84s and left. The jet flew like a dream. But that takeoff was just a little bit hairy. When they arrived at homeplate, they told everyone in the squadron about flying the Fox 84.

Every day you would hear the mighty roar of jets and see them rolling down the runway towards the river. Then, right at the end, they would rotate the nose and fly into the wild blue.

One day the ops officer came into the squadron with great news. "No more going all the way to the end of the runway before pulling back on the pole," he said. As everyone gathered around him, he began to explain. "Last night, I was reading this part of the Dash One. It's called performance data. They've got all sorts of charts back here. They tell you what speeds to fly at for final approach, how long you can cruise. There's even one called 'takeoff roll.' With this one, we can figure out just when we can pull back on the pole to take off. All you have to do is enter the chart with temperature, go up to pressure altitude, across to gross weight, then down to takeoff distance. Easy, huh? We can read the temp from the 'Burpee-Cola' thermometer outside and get pressure altitude from the weather shack."

The ops officer decided he would be the first to try a takeoff using the new system. He lined up facing the river and down the runway he roared. The aircraft was about three-quarters of the way down when he quickly rotated the nose; the aircraft proceeded down the runway, went off the end, into the river . . . still maintaining the same attitude. End of experiment.

At that point, the other pilots in the squadron reverted back to the old technique of going all the way to the departure end of the runway before pulling back on the pole. They weren't going to take any chances on that happening again.

This anecdote is true and maybe it explains the reluctance of some of us to use the T-O-L-D Charts. The guys in that guard unit had the right idea about using the charts. The only problem was they didn't know very much about over-rotation and a thing called power-required and power-available. Now that the Air Force has been in the jet business for some time, we know about those things. We also know that warm weather and high pressure altitudes reduce the effective thrust of our engines. It's getting to be that time of year again, so a simple review of T-O-L-D terms is appropriate.

Critical Field Length: the total runway length required to accelerate with both engines operating to the critical engine failure speed, experience an engine failure, then either continue the takeoff or stop.

Critical Engine Failure Speed: the speed to which an aircraft will accelerate with both engines, experience an engine failure, and permit acceleration to takeoff or deceleration to stop in the same distance.

Minimum Go Speed (Decision Speed): the minimum speed at which an aircraft can experience an

engine failure and still take off under the existing conditions of temperature, pressure altitude, gross weight, and the length of runway available.

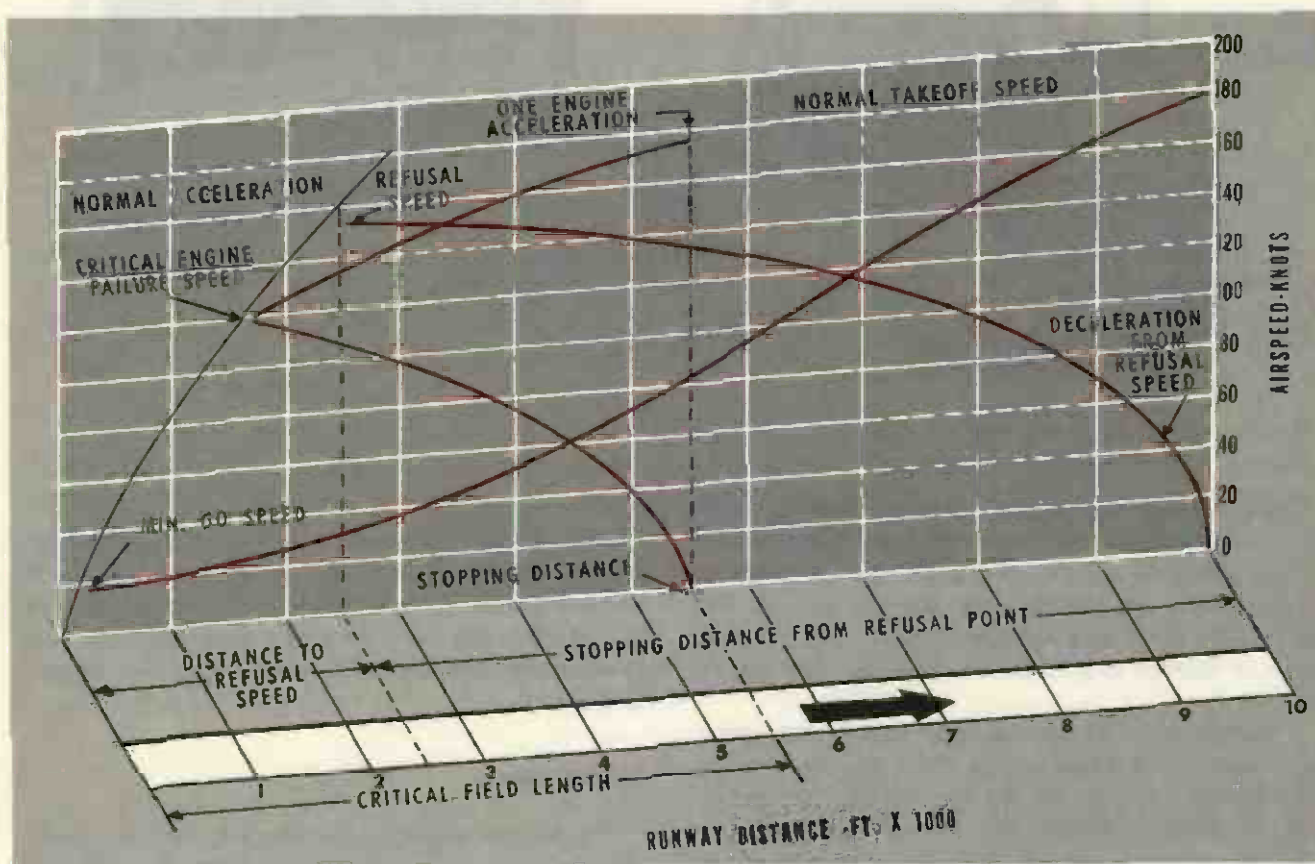
Maximum Abort Speed: the maximum speed at which an abort may be started and the aircraft stopped in the remaining runway.

Velocity During Ground Run: this chart provides two things: (1) takeoff speeds for various gross weights and CG locations; and (2) the relationship KIAS and distance traveled during takeoff ground run and may be used to obtain a line distance in which to check acceleration performance.

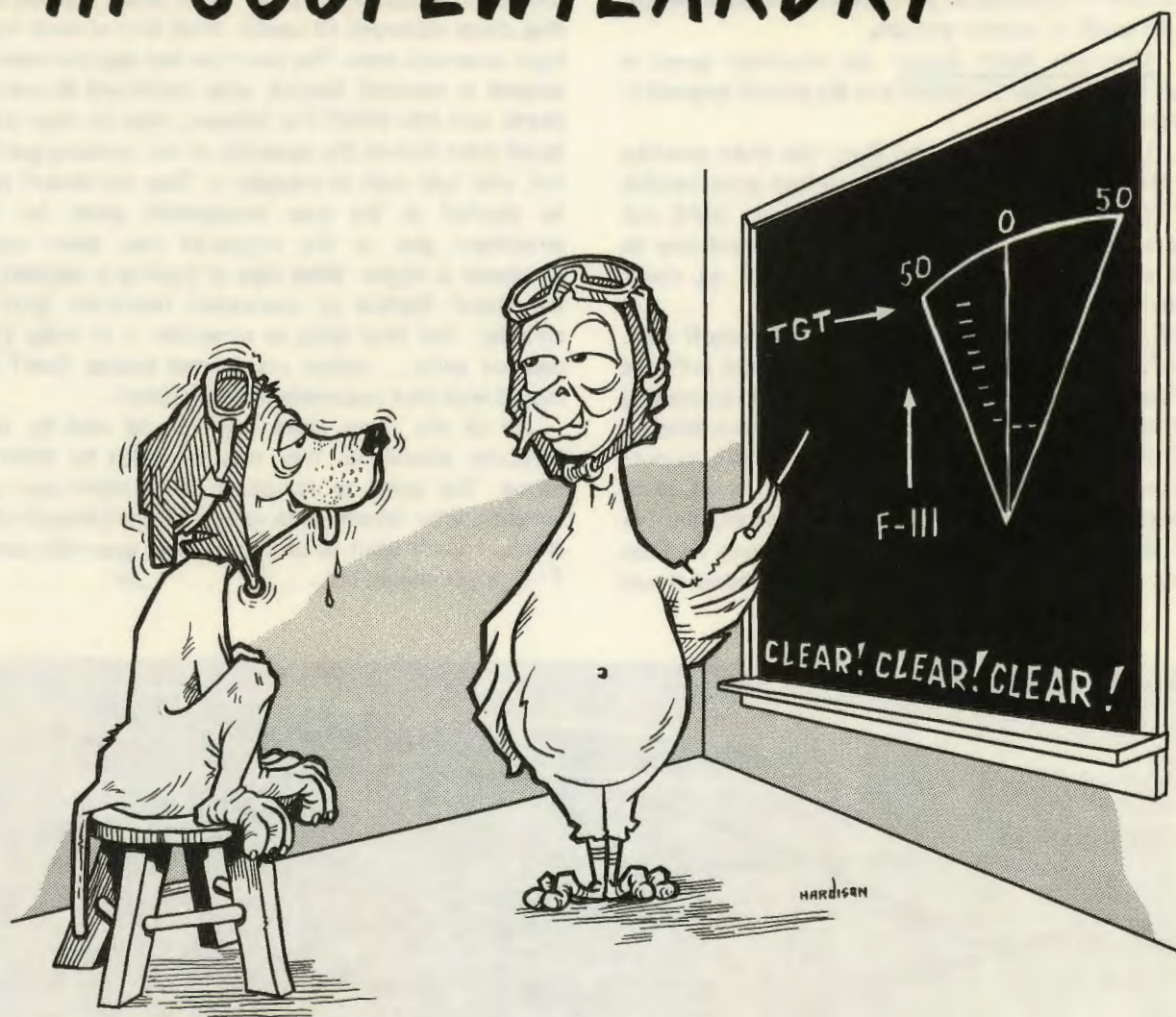
OK, now we've reviewed the terms for takeoff data. The relationship between the terms is illustrated in Figure 1. There are some things to remember when computing your takeoff data. The first is time. How much time do your charts allow for the performance of certain actions? Like making the decision to take off or to abort, or to accomplish the abort procedures. For instance, the F-4 max abort speed chart allows for a 3-second decision period (with both engines operating at the initial thrust

setting) and a 5-second period to accomplish the abort procedure (throttles at IDLE, wheel brake applied, and drag chute deployed (if used)). What isn't allowed for is hook extension time. The Dash One says approximately 5 seconds is required. Second, what conditions do specific charts take into effect? For instance, does the max abort speed chart include the capability of any arresting gear? If not, you may wish to consider it. Then the takeoff may be aborted at the max engagement speed for the arrestment gear or the computed max abort speed, whichever is higher. What type of braking is required by the chart? Normal or maximum? Important facts to consider. The final thing to remember is to make your decision early ... before you release brakes. Don't get caught with your pneumatic knickers down.

All of the terms listed may not be used by your particular aircraft or they may be called by different names. The point to remember is to make sure you compute your takeoff data using your performance data charts. I don't want to be one of those guys who said, "T-O-L-D you so, but ..."



F-111 SCOPEWIZARDRY



Scopewizardry encompasses the accumulated radar air-to-air techniques that have been developed down through the years since WW II. Backseaters with a lot of moxie, flying all weather/night fighters such as the Beaufighter, Black Widow, F-94, F-89, F-101, and F-4, put it all together in principles that have stood the test of time.

The question is "Are we paying attention?" There have been bags full of words written about the "See and Be Seen Concept" and yet we still run airplanes together. So here we go again, one more time. You can't teach old dogs new tricks, probably because they learned them all a long time ago. But how about teaching new dogs old tricks... tricks that aren't being taught anymore, hence

aren't being practiced?

Most F-111 right seaters have never experienced the joy and wonder of air-to-air radar work on a square B scope. Nevertheless, the principles of Scopewizardry hold true whether you are looking at a pie-shaped scope or a square scope. What you see is what you get and seeing is believing.

ELEVATION

Finding the airborne radar target is the most crucial problem. For obvious reasons, in order to "see" the target, the antenna has to be "looking" at it. Radar contacts are lost or never seen due to erroneous antenna

teaching new dogs old tricks

By Maj Fred Kempf
HQ TAC/DOVF

elevation positioning and herein lies the reason for most instances of "no joy."

Where to position the antenna, then? In level flight set the two bar search pattern at zero degrees elevation, unless you are searching specifically for a high or low target. This will give you the optimum look for mid-air collision avoidance. On climbout, set the bottom of the box scan at zero degrees; in descending flight, set the top at zero. This is only a rule of thumb. More precise elevation search patterns for given airspeeds and vertical velocities can be developed on graph paper; unfortunately, these come under the general heading of "useful information seldom referred to."

There is another elevation problem to reckon with. Is the antenna searching at the same elevation displayed on the antenna position indicator? There are at least a couple of ways of checking this out. The first and best method is to slip in behind your formation partner and see if you're painting him on both sweeps. The second method involves your resident mathematician. Have him determine at what range ground returns should begin to paint for a given AGL and zero antenna elevation. If either of these don't check out, you may have an antenna elevation problem.

The final point regarding elevation is this: With the antenna searching level, a distant target will likely paint on both sweeps. As you draw closer, the target may begin to paint on only one sweep, indicating an altitude differential. If you ever get a chance to observe an old RO going into super search at happy hour, watch his lips move. He's probably saying UP-DOWN-UP-DOWN. He knows that the left to right sweep is UP and the right to left sweep is DOWN without having to look at the antenna position indicator or the little green arrows. If you are seeing your target on both sweeps, be prepared to vacate your altitude; someone might have made a mistake.

AZIMUTH

Azimuth interpretation is not as difficult as the elevation problem in that you don't have to manually position the antenna. Let the radar do its thing while you watch the target. Targets do one of two things in azimuth; they either drift or they don't.

A drifting target displays little azimuth movement at longer ranges; however, as you draw closer its rate of drift will increase. If the target doesn't drift, but continues to close at a constant azimuth (be it left, right, or dead

ahead) be prepared to turn smartly to avoid a fender bender.

If a target is being unruly and won't drift the way you would like, you are going to have to "move it." This is accomplished by turning your aircraft which alters the target drift pattern on the scope. If you turn toward the target's direction of flight, you will "heat up" the rate of closure and reduce the angular rate of drift. If you break into the direction the target came from, the angular rate of drift increases smartly and the closure rate "cools down."

If the target is zinging down a constant azimuth on the left and you wish to avoid unpleasanties, break left into the target. Turn right if the target is coming down dead ahead or on the right. It's amazing how strong the inclination is to turn right when the target is approaching from the left in an attempt to get away from the bogey. This temptation can be overcome with practice (lack of practice may remove the temptation forever).

The question arises, "What do you do when the target goes off the side of the scope in azimuth?" If your plan was to avoid the target, you should be home free. If you were attempting to join-up, you have two choices. One is to start looking and guessing. The other is to turn into the target, getting it back on the scope in order to "move it" and thus manage the situation. If you both are generally headed in the same direction and wish to join following an overshoot, develop a procedure whereby you turn 45° — 60° away from the side on which the target disappeared. Fly this heading for a minute or two, reduce speed, and then turn back into the direction of the target until it is reacquired. Because you can't see the target for quite some time, you are operating strictly on procedure and care must be exercised not to reenter a hairy situation (blind overshoots are bad news but a procedural overshoot is better than blind luck).

Working air-to-air azimuth problems can be a painless way to kill two hours in the flight simulator and the air savvy you develop as a result really pays off. Incidentally, do your simulator people keep the air-to-air capability up to speed or is it a low priority item?

RANGE

Range and range rate closure have been touched upon in the discussion of elevation and azimuth. The best thing that can be said for range is to use a realistic range setting

F-III SCOPEWIZARDRY

teaching new dogs old tricks

when looking for or working a target. Not much point in drilling around looking at an 80 mile scope, improving your long range pick-up skills, when it's the pop-up traffic at less than 10 miles that's out to kill you. Try a 30 mile scope for cruise altitude. At low altitudes, a 10 mile range setting is ideal due to the ground clutter problem. As the target closes, keep selecting the shortest range that still contains the return. You can't get an accurate picture working a five mile target on a 30 mile scope because everything is jammed up in the vertex.

Range rate closure speed is difficult to judge at best. If your set provides an overtake readout, a quick lock-on is worth a hundred guesses. In lieu of that capability, the next best bet is practice. Here again, canned situations in the simulator are invaluable for developing a feel for range rate closure.

Radar lock-ons are wonderful if you are short on talent and unable to keep track of the target while in a search mode. What you experience, though, is target fixation to the exclusion of all other activity in the area. It is of little comfort to avoid colliding with the target you are locked on to, only to smash into his unseen wingman who was flying loose route formation.

SIGHTSEERS

There are a number of WSOs who fly around from takeoff to landing with their radar in the ground map mode. They take great pride in tuning, looking at land/water contrast and marvelling at cardinal effect. This type of WSO should be called THE SIGHTSEER.

If you want to give it your best shot and avoid the label of Sightseer, here's what to do. Keep your radar in the air mode except during TFR, rangework, or those few times you need a high altitude radar fix. Use your air mode during climbout, descent, and low level when not required for navigation. You say that the air mode is no good in low level ground clutter? Wrong again. You can pick up bug smashers in the pattern at 3-5 miles, the same range the best interceptors do. Try putting your antenna up just a touch to get rid of some of the ground clutter. Use some side lobe cancellation if available. You may get 20 false alarm targets before you find your bug smasher,

but it's worth it. Nobody said it was going to be easy.

COMMENTARY

We finally come to what to do about your radar contact. The other half of the team needs to be informed. This is called commentary; however, it's a little more dynamic than the term implies. There is a whole shopping list of air defense terminology to describe the facets of Scopewizardry. Terms such as JUDY, PORT, STARBOARD, PIGEONS, ANGELS, etc., are pretty well known throughout TAC; however, we do not need to overly concern ourselves with these. What we need is positive communication with the other guy.

If you find yourself on a collision course, tell the pilot to TURN LEFT or BREAK LEFT NOW, depending on the urgency of the situation, and with all the authority you can muster. Other urgent commands might be DIVE or CLIMB, followed by the imperative NOW.

Routine commentary should give azimuth, elevation, range, and overtake. For example, "Contact-30 right-Level-9 Miles-Closing at 400 knots." This differs from your visual contact in that you have range and estimated range rate closure available. In summing up, it can be simply stated that commentary should be accurate, timely, and authoritative.

By now you are probably thinking that all this is heady stuff for the F-4 types but it really doesn't apply to the Aardvark. Some old-timer probably told you that the F-111 attack radar air mode is an afterthought, ill conceived, and of little value in a fighter bomber. Wrong! The airborne target pick up capability of the F-111 is as good as most other fighter aircraft and that's what it's all about. If you aren't getting a pick-up on your tanker by the time he starts his turn down track, there is something wrong with either your technique, radar air mode, or both. You should consider improving your capability when you get back on the ground.

If you decide that Scopewizardry might be the way to go, it would be good to examine your crosscheck habits. Your scan pattern should take in the flight instruments, performance instruments, navigation aids, radar scope and visual field. You might even want to check six. The length of time you spend on any one item will vary according to flight conditions, but all should be checked each time around. Above all, clear, clear, clear; visually and by radar.

This article raises some questions on F-111 air-to-air radar training. Are we spending too much time on the ground problems of navigation and rangework? Are we turning out WSOs who will give a hundred percent with what's available? Take a look at your mission film and find out how much Scopewizardry you are practicing. It doesn't cost anything... the principles and equipment are on hand, and the payoff could be a mid-air save. ➤



TAC

SAFETY AWARDS

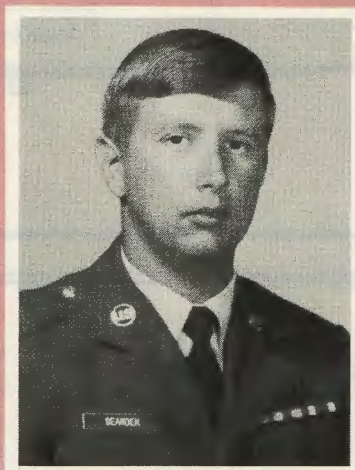
Maintenance Safety Award

Staff Sergeant Steven P. McAuliffe, 27 Tactical Fighter Wing, Cannon Air Force Base, New Mexico, has been selected to receive the Tactical Air Command Maintenance Safety Award for this month. Staff Sergeant McAuliffe will receive a certificate and letter of appreciation from the Vice Commander, Tactical Air Command.



Crew Chief Safety Award

Staff Sergeant James A. Bearden, 1st Organizational Maintenance Squadron, 1st Tactical Fighter Wing, MacDill Air Force Base, Florida, has been selected to receive the Tactical Air Command Crew Chief Award for this month. Staff Sergeant Bearden will receive a certificate and letter of appreciation from the Vice Commander, Tactical Air Command.



CHOCK TALK

...incidents and incidentals

chock talk ... incidents and incidentals

DON'T GET STEPPED ON BY AN EAGLE

The F-15's retractable ladder can prove to be a real head-knocker if you're not careful. One individual has already found this to be painfully true.

There are two ways to extend the Eagle steps: (1) depress the ladder

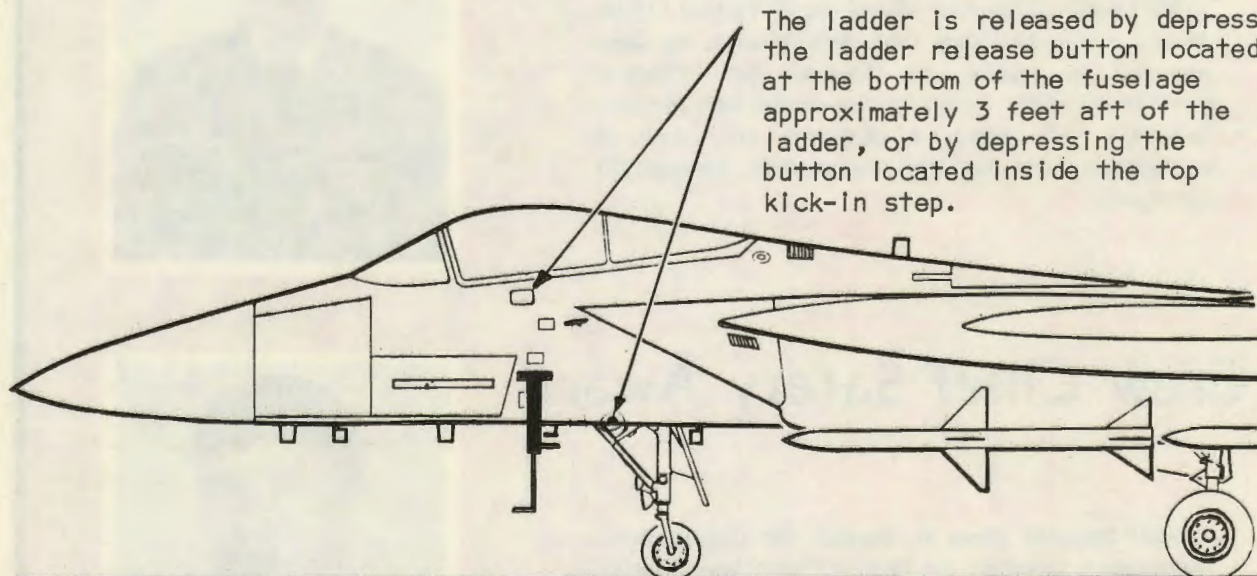
release button located at the bottom of the fuselage approximately three feet aft of the ladder; or (2) depress the button located inside the top kick-in step.

Maintenance personnel and pilots should use caution when lowering the ladder by the lower release button. Stand well clear of the area below the

ladder. When using the button in the top kick-in step, visually clear the area below the ladder before you step on the button.

Whether the Eagle nests at your base or is just passing through, a little caution when using the retracting ladder will save you from a nasty thwack on the head.

COCKPIT ENTRY



The ladder is released by depressing the ladder release button located at the bottom of the fuselage approximately 3 feet aft of the ladder, or by depressing the button located inside the top kick-in step.

PLEASE DON'T FEED THE ANIMALS

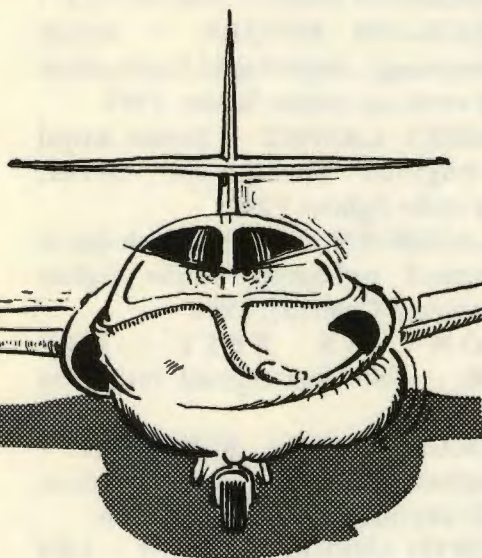
A Tech Sergeant lost his parka hat to a hungry A-37B. He was in the cockpit during an engine ground run trying to locate an oil leak. The right

inlet screen became covered with ice; temperatures were below freezing with a small temperature/dew-point spread. Seeing the ice covered screen, the sergeant decided to lower the intake screen and continue the run. He then told his assistant to climb onto the wing and remove an access

panel in an attempt to spot the leak. When the TSgt leaned over the canopy rail to supervise the Airman, his parka hat and headset were sucked off toward the intake. He grabbed the headset, but one each parka hat was eaten by the Hungry Hummer.

Standard procedure requires the

with a maintenance slant.



A-37 engine inlet screens to be in the up-position during ground runs. Looks like another failure to follow established procedures. Another thing to remember is to properly secure all wearing apparel and loose objects when working near engine inlets. Let's stop feeding the animals.

SPARKS IN THE COCKPIT

Following tech data is a must, yet incidents still occur because of non-compliance. The latest involved an F-4D. During flight, the WSO saw sparks and smoke coming from the area of the right rudder pedal in the rear cockpit. The battery hold-down rod and wing nut were not secured properly IAW 1F-4D-2-13. During flight it came loose and struck the 115 volt AC terminal of the ECM circuit breaker panel... ZAP! Luckily there were no injuries or damage to the aircraft. We might not be so lucky the next time.

10 Commandments for Electricians

I Beware the lightning that lurketh in the undischarged capacitor, lest it cause thee to bounce upon thy buttocks in a most un-technician-like manner.

II Cause thou the switch that supplieth large quantities of juice to be opened and thusly tagged, that thy days in this earthly veil of tears may be long.

III Prove to thyself that all circuits that radiateth and upon which thou worketh are grounded and thusly tagged lest they lift thee to radio frequency potential and causeth thee also to make like a radiator.

IV Tarry not amongst those fools who engageth in intentional shocks for they are surely nonbelievers and are not long for this world.

V Take care that thou useth the proper method when thou takest the measure of a high-voltage circuit lest thou incinerate both thyself and thy meter, for verily, though thou hast no account number and can easily be surveyed, the test meter doth have one and, as a consequence, bringeth much woe unto the supply department.

VI Take care that thou

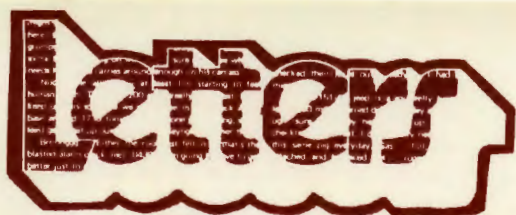
tampereth not with safety devices and interlocks, for this incurreth the wrath of thy supervisor and bringeth the fury of thy safety inspector upon thy head and shoulders.

VII Work thou not on energized equipment, for if thou dost, thy fellow workers will surely buy beers for thy widow and console her in other ways.

VII Service thou not equipment for electrical cooking. It is a slothful process and thou might sizzle in thine own fat for hours upon a hot circuit before thy Maker sees fit to end thy misery.

IX Trifle thou not with radioactive tubes and substances lest thou commence to glow in the dark like a lightning bug and thy wife have no further use for thee except thy wages.

X Thou shalt not make unauthorized modifications to equipment, but causeth thou to be recorded all field changes and authorized modification made by thee, lest thy successor tear his hair and go slowly mad in his attempt to decide what manner of creature hath made a nest in the wiring of such equipment.



TWO PROPS....

Editor:

I read with a great deal of interest, the article "Were Two Props Better Than One," by Bill Holder, which appeared in the February 1975 issue TAC ATTACK.

In response to the author's request, I have checked my "files" and have the following additions to his list of aircraft which utilized the counter-rotating propellers:

A. The list below is comprised of aircraft which were originally designed with the intention of using contra-props:

1. MACCHI-CASTOLDI M.C. 72 — Italian racing float-plane, built too late to compete in the 1931 Schneider Trophy races, but subsequently set the Absolute World Air Speed Record in 1934 at 440 mph.

2. KAWASAKI KI. 64 — Japanese experimental heavy, twin-engined fighter; 1943.

3. MARTIN-BAKER M.B. 5 — British, piston-engined fighter (one built); 1944.

4. CURTISS XP-60C — USAAF single-engined fighter prototype, predecessor to the XP-62; 1943.

5. CURTISS XP-62 — The aircraft you actually have pictured in your article and misidentified as the XP-72; 1943.

6. CURTISS XF14C-2 — USN equivalent of the XP-62; 1944.

7. CURTISS XBTC-2 — Built and flown against the same specification as the Douglas XTB2D which you mentioned in the article; 1945.

8. ARSENAL VB 10 — French twin-engined fighter; 1945.

9. BOEING XF8B-1 — USN single-engined fighter; 1944.

10. NORTHROP XB-35 — USAAF multi-engined, flying wing, heavy bomber (predecessor to the YB-49); 1946.

11. HUGHES XR-11/XF-11 — USAAF twin-engined photo reconnaissance aircraft; 1946.

12. SUPERMARINE SEAFIRE F./F.R.46 and 47 — British Royal Navy equivalents of the

Spitfire F.22 and 24; 1947.

13. SUPERMARINE SEAFANG F.32 — British Royal Navy equivalent of the Supermarine Spitfire single-engined fighter; 1947.

14. AVRO SHACKLETON — British RAF Coastal Command four-engined maritime-reconnaissance aircraft; 1949 to 1973 !

15. WESTLAND WYVERN — British Royal Navy long-range, single-engine (both piston and turboprop versions) carrier fighter; 1949.

16. FAIREY GANNET — British Royal Navy twin-engined turboprop, carrier, anti-submarine strike fighter; 1949.

17. BLACKBURN Y.B.1 — British Royal Navy twin-engined turboprop, carrier fighter (same specification as Gannett); 1950.

18. CONVAIR XP5Y-1/R3Y TRADEWINDS — USN four-engined turboprop flying boat; 1950.

19. DOUGLAS A2D-1 SKYSHARK — USN twin-engined turboprop attack fighter, intended as AD Skyraider replacement; 1950.

20. NORTH AMERICAN XA2J-1 — USN twin-engined turboprop, carrier attack bomber, intended as AJ-2 Savage replacement; 1952.

21. SAUNDERS-ROE PRINCESS — British ten-engined (four are coupled) turboprop commercial flying boat; 1952.

22. CONVAIR XFY-1 — USN single-engined turboprop, vertical-take-off, carrier fighter; 1954. (Still displayed-Norfolk NAS)

23. LOCKHEED XFV-1 — USN single-engined turboprop, VTO, carrier fighter, direct competitor for XFY-1; 1954.

24. TUPOLEV TU-114 CLEAT — Commercial version of the Bear bomber.

25. ANTONOV AN-22 COCK — Soviet transport.

B. The list below is comprised of aircraft which, while not specifically designed for contra-props, did fly with such a propeller installation at one time:

1. SUPERMARINE SPITFIRES Mk.VIII and F.Mk.21

2. HAWKER FURY (second prototype)

3. REPUBLIC P-47B THUNDERBOLT

4. CHANCE VOUGHT XF4U-4 CORSAIR

C. Many aircraft have, in addition, flown as test-beds for engine installations, and some of

these did use contra-rotating propellers. Among the examples of these are the following aircraft (all British):

1. BLACKBURN Y.A.7 and Y.A.8 — Prototypes for the Blackburn Y.B.1 fighter, number 17 on the first list.

2. AVRO LANCASTER and LANCASTRIAN — Both flown with Griffon, piston-engine, contra-prop installations.

3. AVRO LANCASTER and LINCOLN — Both flown with Python, turbo-prop/contra-prop engine installations.

At this point, I would like to make several comments concerning the article itself.

First, as previously mentioned, the picture which you have labelled as the Republic XP-72 is, in fact, the Curtiss XP-62 fighter prototype. I have enclosed two reprints from the William Green book "Warplanes of the Second World War, FIGHTERS," Volume Four. The differences should be obvious, as the XP-72 was a far cleaner aerodynamic design. In addition, the XP-72 reprint will indicate that this fighter was not built "in an attempt to match the F-80A's performance," as was stated in the article. The XP-72 was "... essentially a progressive development of the Thunderbolt... displayed an exceptional performance... but the changing requirements of war demanded long-range escort fighters rather than interceptors, and the order for P-72s was cancelled, further development being abandoned in view of the greater promise offered by new turbojet-driven interceptors such as the Lockheed P-80 Shooting Star."

Second, the reasons why a designer would want to use the contra-rotating propeller principle is really not so obscure. The article correctly noted the drag reducing advantages offered by housing two engines within a single-engine cowl. In addition, however, the original and most obvious reason was to reduce or eliminate the torque problems associated with high-power piston engines. Torque was always a major consideration with single, piston engined fighters, and in the case of the XP-72, the torque came from no less than twenty-eight cylinders, putting-out over 3,000 h.p., applied to a prop of over 13½-foot diameter! Another advantage of contra-pros specifically noted for twin-engined

turboprop aircraft such as the Gannet and Y.B.1 (Numbers 14 and 15 on the first list) is that this design allows one engine/propeller to be shut-down/feathered, providing much greater endurance in cruising flight without any asymmetric power problems.

Third, and last, is the fact that the German Dornier DO 335 PFEIL (ARROW) should not really be included as a representative of the contra-prop principle. Certainly it did have two propellers, in separate locations, driven by separate engines, and rotating in different directions, but then so did the Lockheed P-38 Lightning and North American F-82 Twin Mustang. In other words, the DO 335 is, in reality, simply a twin-engined aircraft of unusual design, as opposed to a contra-prop. That particular design is, by the way, no longer so unusual. It is flown many times each day by great numbers of TAC and civilian pilots. It is precisely the concept of the Cessna Skymaster/O-2.

I hope that all this has provided you with some useful and historical background information on contra-pros.

Major Henry R. Kramer, USAF
CINCLANT HQTRS/J0332
Norfolk, Virginia

Editor:

Reference page 11, Feb 75 TAC ATTACK, you have identified a picture of a single engine fighter as the Republic XP-72, an outgrowth of the P-47. In actuality this is a photo of the Curtiss XP-62.

The XP-62 grew out of the Curtiss XP-60 series. This began with a modified P-40D fuselage, a new laminar flow wing and a Merlin V-1650 engine. Five prototypes were built in varying configurations, the most promising one being powered with the Pratt and Whitney R-2800 radial. The first airplane flew in 1942. Since significant performance increase over existing fighters was not realized, the project was dropped.

The XP-62, which is the photo you published, was a progressive development as a high-altitude fighter. It was much larger and heavier than the P60 — possessing a pressurized cockpit, extensive armor and powered by the Wright R-3350. A

LETTERS

Naval version with folding wings was built as the XF14C-2. The official reason for cancelling these programs was that a concurrent B-29 program required the entire R-3350 production.

The Republic XP-72 was not built as a modification to the P-47, but was intended to be a production follow-on. The airplane, although showing strong "Jug" heritage, was approximately 70% different. It was not built to compete with the P-80A as it was ahead of the P-80's time. In fact, it was built to take advantage of the new P and W R4360 engine which offered a 50% power increase. The performance increase was spectacular, realizing a top speed of 480 MPH at sea level. Two prototypes were built with the first one flying on 2 Feb 1944. This aircraft was fitted with a huge 4-bladed prop that required that all takeoffs and landings be made in a three point attitude. The second prototype was fitted with a Curtiss electric contrarotating 6-bladed prop. Due to the early stage of development of the R-4360 and the consequent problems, this project was dropped also.

References: "The Curtiss Hawks, "Wolverine Press 1972 "Whine from the Jug, Sentry Publications 1974

JAMES P. SCOTT II, Lt Col,
166 TAG
New Castle, DE

Editor:

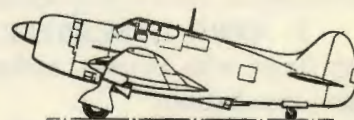
In reference to the Republic XP-72 article on Page 11 of your Feb issue, I believe the photograph actually shows the Curtiss XP-62.

If you will consult Vol 4 (Pages 72 & 184) of Mr. William Green's series of small books entitled "War Planes of the Second World War," (pub. Doubleday & Co, 1964) you will find short but informative articles on both airplanes.

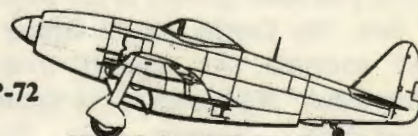
DON MORGAN
Service Engineering Div
San Antonio ALC
Kelly AFB Texas

You're all absolutely right! In fairness to Mr. Holder, I must confess the error was the result of photo "switchology." To clarify the differences in the two aircraft, check below, correctly captioned this time. — ED

CURTISS XP-62



REPUBLIC XP-72



Editor:

In the spring of 1966, I had the good fortune to save a trusty old T-bird from destruction and was awarded the TAC Pilot of Distinction honors. However, I was also awarded a one year tour to "Nam" and never got to see the write-up in TAC ATTACK. Many times as I read your magazine over the years, I threatened to write you a letter to ask where I might get a copy of that issue. I'm not sure which one it was since I have never seen it, but I believe it was about April 1966.

Could you send me a copy of that issue? If not, could you make a copy of the write-up and send it to me? If there is any cost involved, I'll be happy to send you the money.

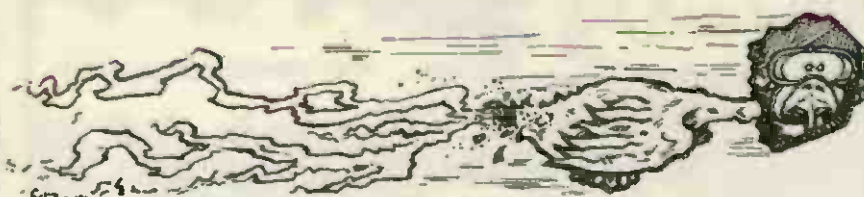
Thanks for your time

Sincerely,

STEPHEN C. MARCINKO, Major, USAF
Woodland Park, Colorado

Your excellent memory's superseded only by the rat-holing instincts of the TAC ATTACK staff. You only missed it by one month — your May 1966 issue is on its way. All of us at TAC Safety would like to pass our belated congratulations to you on your "save." — ED

TAC TALLY



TOTAL ACFT. ACCIDENTS ▶	
MAJOR ACFT. ACCIDENTS ▶	
AIRCREW FATALITIES ▶	
TOTAL EJECTIONS ▶	
SUCCESSFUL EJECTIONS ▶	

TAC		
FEB	Thru Feb	
	1975	1974
1	4	3
1	4	3
1	12	0
1	2	5
0	0	5

ANG		
FEB	Thru Feb	
	1975	1974
0	1	2
0	1	2
0	0	2
0	0	0
0	0	0

AFRES		
FEB	Thru Feb	
	1975	1974
0	0	2
0	0	2
0	0	0
0	0	1
0	0	1



FIGHTER/RECCE WINGS		
ACCIDENT-FREE MONTHS		
83	33 TFW	TAC
50	4 TFW	TAC
35	127 TFW	ANG
32	31 TFW	TAC
30	121 TFW	ANG

OTHER UNITS		
ACCIDENT-FREE MONTHS		
146	130 SOG	ANG
126	2 ADGP	TAC
115	136 ARW	ANG
107	143 SOG	ANG
95	DET 1, D.C.	ANG

MAJOR ACCIDENT COMPARISON RATE 74-75

TAC	74	4.5	5.4									
	75	7.9	5.4									
ANG	74	7.2	6.3									
	75	5.7	2.8									
AFRES	74	0	16.4									
	75	0	0									
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC												

FLEAGLE

FIRE CONFIRMED...EJECT !!



© Stan Hardison, 1975

WOOSH!

LET'S SEE IF I PACKED EVERYTHING IN MY SURVIVAL KIT.

"I THINK I LOVE YOU" IN 42
LANGUAGES, EAGLEBIRD BOBALINK
RECORDS, FOLDING TABLE AND
CHAIRS FOR 8, BICYCLE PUMP,
1 GROSS OF WATER BAGS,
1 COLOR TV, 1 PORTA-POTTI,

3 PAIRS OF NYLONS, 2 QTS OF SEAGULL
SEVEN 80 PROOF, ICE BUCKET AND CORK-
SCREW, ROBE AND SLIPPERS, NITE LITE,
BACK ISSUES OF PLAYGULL, CANDELABRA,
BOTTLE OF NO-SWEAT PILLS...

HARDISON

UH-OH !
I FORGOT 3 THINGS...

MATCHES, FOOD, AND A KNIFE.

