

FLY SAFETY

TAC ATTACK

APRIL 1969



....Page 16

for efficient tactical air power

TAC ATTACK

APRIL 1969
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TACTICAL AIR COMMAND

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The reason that more people die of worry than
of work is that more people worry.

Robert Frost

current interest

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TACRP 127-F

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


everything in its place....

An alarming upward trend of foreign object damage has cost the Air Force thousands of dollars during the past two months. Luckily, FOD has not caused a death or aircraft accident . . . so far. We're walking on thin ice in this area and if something isn't done to curtail our exposure rate, our luck is due to run out.

What is really alarming is that some of these occurrences are so gross, they are almost unbelievable! The fact that all of these instances have not occurred in the Tactical Air Command does not make us immune in the future. Foreign objects have ruined tires and engines, jammed flight controls, blocked throttle controls. Here is a partial list of the Air Force experience since the beginning of the year:

- O-1___ Could not retard throttle in flight – one-half inch open end wrench stuck in carburetor, jamming flapper valve.
- F-101__ Engine destroyed – ingested ratchet handle and socket during ground run.
- F-100__ Throttle jammed in flight – screw lodged in throttle quadrant.
- F-4 ___ Three engines destroyed – one ingested a bolt, two unknown. Suspect fasteners from aircraft panels.

Foreign object damage generally occurs for only one reason – sloppy work! When a wrench, a drilled out rivet, or a screw turns up in flight and creates a hazardous situation, how else do you explain it? These items each have a proper place, be it a tool box or the trash can. When they turn up on the flight line, uncontrolled, they are dangerous – potential accident causes waiting to strike.



R. L. Liles

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



The Flight Leader

by Maj Joe Moore

We have been asked to write a series of short articles for TAC ATTACK, relating them to the demanding tasks of being well-rounded, safety conscious fighter pilots. In the following months, therefore, you may expect to see a brief epistle from each one of us. Since we do most things by the numbers, it falls to me to lead our series off. Logically, perhaps, "lead" is the operative word.

As in most operations of all kinds, leadership is a primary key to success, if not THE key. This applies equally well to executive leadership of a large corporation, foreman guidance on a construction job, flight line NCOIC supervision on the ramp, or flight lead in the air. This article must necessarily be limited to the latter.

Contrary to the views held by some, no one becomes a flight leader automatically, or overnight. It is definitely a "walk-before-run" process and demands that a pilot be a good follower (i.e., wingman) first. The job of being a VSH fighter pilot requires certain intangible qualities such as a different personal philosophy than usually expressed by other than fighter pilots, maximum aggressiveness — tempered by "smart" and "judgment," determined self-reliance, and strong discipline. You may consider that a few virtues have been omitted, but in my evaluation, these factors are all inclusive.

Thunderbirds

Thunderbirds

The Flight Leader by Maj Joe Moore



For example: Strong self-discipline encompasses courage in that courage is most often measured in terms of ability to control fear. In one word, I like to call it "heart." Many people call themselves fighter pilots because they can "drive" a hot pursuit around the sky, but a real fighter pilot demonstrates the things I am talking about.

While a rare few fighter pilots may be born, most are developed and trained. Some never cut it! The same is true of flight leaders, and some of them never cut it! How many of you have flown behind a squadron commander that has been a fighter pilot (and a good one) for empty-

...; yet, he unnecessarily led you over one of the heaviest AAA concentrations in you-know-where? Or the flight commander with years of experience and thousands of hours, but he took you through the same flak three times while hunting for the target? That is the pay-off: be it good or bad.

What, then, makes an effective and efficient flight leader? We could probably fill this entire issue with requirements. To my mind, there are a few broad statements that seem to cover it pretty well.

First, as previously mentioned, a good flight leader must have demonstrated that he is a good follower. Invariably, a pilot learns more about good and bad lead techniques while on the wing, than when actually leading.

Second, he must be a skillful, smooth, and safe pilot.

Third, a flight leader must be a hard taskmaster, demanding of perfection, but capable of teaching his wingmen how to achieve it.

Fourth, he must be an exceptional detail planner. While many planning tasks can be delegated to flight members, the leader must exercise thoroughness and accuracy. These, in turn, insure safe accomplishment.

Fifth and last, a successful flight leader must be flexible, able to think ahead of the present, and quick to make safe decisions in the air.

In the demonstration mission, the task of being flight leader is not unlike combat, except the spectators do not shoot — yet! But, then the task of being a flight leader anywhere should be like that. During an air show, the difference between a "1+" and a "2-" (our grading on a scale of 1+ to 5-) often results from the leader's performance. Show centering, timing, altitudes, maneuver accomplishment, and a multitude of other considerations are his responsibility.

During training, practice, and even official demonstrations, he must be quick to criticize the smallest error, but with advice and encouragement of instructional value. This is continuous. To achieve the optimum in precision and perfection, briefings and debriefings must be laboriously detailed, painfully thorough and ruthlessly critical, but objectivity and team spirit are never lost.

Each demonstration pilot is a specialist in his position. Positions are not exchanged, and spare pilots are not used. Each one becomes intimately knowledgeable of the peculiarities in technique and procedures that the leader uses. Though radio transmissions are used to assist in anticipation of maneuvers, each one is performed the same way — every time. The leader can do almost anything with the diamond, and the wingmen will always be there; but, the more skillfully and the smoother he flies, the easier the task of the



the flight leader

wingmen. The safer he is, the more confidence the wingmen have in him.

Planning is one of the most significant factors affecting the success of a demonstration. Aerial photographs and large scale topographical charts are used to survey the show site and plan the safest and most impressive show line. Very similar to target study! Once the ground planning is accomplished, the leader surveys the show site from a light aircraft or helicopter. He checks the show line, obstructions in the area, proximity to densely populated areas, references for aligning on the show line and the bomb-burst cross-point, and other features pertinent to a safe, successful demonstration. Briefings are, as mentioned, complete. Peculiarities of the show site are discussed and obstructions pointed out.

Flexibility, thinking ahead, and decisions in the air are factors that make or break an air show and increase the safety of the performance. The whifferrill turn is the key phase of every maneuver sequence. Airspeed and altitude parameters are determined by the whifferrill. If it is not planned and performed properly, the following maneuver may be poor, or the flight may not even have satisfied the airspeed requirements for the maneuver. For example: 380 KIAS is the absolute minimum for entering a diamond loop, 400 KIAS is minimum

desirable. On a cool day at low elevation, leader may elect to continue a loop at 380. On a hot day at high elevation, the leader may elect to abort a loop at 400 KIAS. While the diamond can top a loop at surprisingly low airspeed, the formation may not be the most precise, or the loop pattern may be poor. It very, very seldom happens that maneuver parameters are not satisfied, but the flight leader must always be prepared to make the right decision.

One additional factor that comes to mind, as this article is closed, is that of confidence. Wingmen must be inspired by and have confidence in their leader. A leader can only earn this by performance. On the backside of a loop, if the leader says, "We aren't going to make it," the whole formation starts to bobble. All he may have meant was that he had drifted off the show line and was not going to get back to it. His choice of words and tone of voice must inspire confidence.

So, where are we emerging from this rambling? Summarizing — you must have "heart;" you must learn to be the best "follower" around to earn a shot at leading a flight; and you must devote every thought and action to making it easy, safe, and productive for your wingmen when you are a flight leader. Never assume it is your right to lead by virtue of rank, hours, or years in the business. In combat, you may have a difficult time finding people that want to fly on your wing. ➔

Major Joe Moore began his Air Force career as an Aviation Cadet in 1955, graduating in June 1956 at Bryan AFB. Subsequent assignments included instructing in the T-33 at Laredo AFB and F-86 fighter-gunnery at Williams AFB, followed by three and a half years with the 81st TFW in England flying the F-101. In July 1963, he joined the 4453rd CCTS at MacDill and became one of the initial group of Air Force F-4 instructor pilots.

He earned his Bachelor's Degree at the University of Omaha in March 1965, under the Bootstrap program. Later in the year, while TDY from the 4453rd CCTW at Davis-Monthan, he completed fighter tactics training at the USAF

Fighter Weapons School. Then, while temporarily attached to the Fighter Weapons School, Major Moore was sent to SEA as a part of the F-4 Tactics Team. During their thirty day tour, he flew 21 combat hours with 6 missions over the North.

Major Moore attended Air Command and Staff College at Maxwell AFB from August 1966 to June 1967. A month later, he was back in SEA flying F-4s with the 8th TFW at Ubon. He flew 135 combat missions, 100 over North Vietnam. His decorations include the Silver Star and the Distinguished Flying Cross with two Oak Leaf Clusters. He joined the Thunderbirds in May 1968.

UNIT SAFETY AWARDS



1968 TAC GROUND SAFETY AWARD:

Category 1

516 Tactical Airlift Wing, Dyess AFB, Texas

Category 2

USAF Tactical Air Warfare Center, Eglin AFB, Florida

1968 TAC TRAFFIC SAFETY AWARD:

Category 1

516 Tactical Airlift Wing, Dyess AFB, Texas

Category 2

USAF Tactical Air Warfare Center, Eglin AFB, Florida

SEMI-ANNUAL TAC DRIVE SAFE AWARD:

Category 1

4442 Combat Crew Training Wing, Sewart AFB, Tennessee

Category 2

USAF Tactical Air Warfare Center, Eglin AFB, Florida

1968 TAC EXPLOSIVES SAFETY AWARD:

27 Tactical Fighter Wing, Cannon AFB, New Mexico

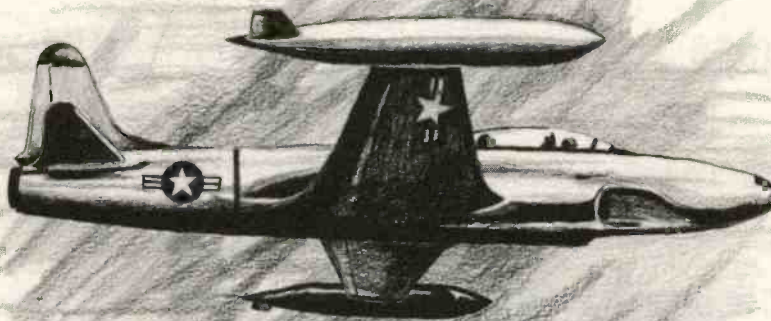
Note: Units with more than 1000 assigned military personnel compete for category 1 awards. Those with 1000 or less compete in category 2.

TACTICAL AIR COMMAND

Pilot of Distinction



Maj J. L. Graber



Major Jack L. Graber of the 23d Tactical Fighter Wing, McConnell Air Force Base, Kansas, has been selected as a Tactical Air Command Pilot of Distinction.

Major Graber was flying in-trail formation in the rear seat of a T-33. A sudden, extremely heavy engine vibration required him to retard the throttle to a mid-range setting in order to reduce the vibration. This, and subsequent throttle changes, failed to stop the vibration. Suddenly, the engine flamed out. An airstart using the gang-start system was successful, but maximum throttle position produced only 55 percent. As engine

vibrations continued Major Graber realized he could not reach his base in a partial-power glide. He moved the starting fuel switch to manual and engine rpm increased to 78 percent. Engine vibrations increased, accompanied by grinding noises and oil pressure dropped to two psi. However, the additional rpm provided the needed thrust to reach his base. Gear and flaps were lowered normally and he made a successful landing.

Major Graber's skillful performance during this critical inflight emergency readily qualifies him as Tactical Air Command Pilot of Distinction.

MUNITIONS



LOAD CREW

by Don Reynolds

Ordnance delivery on target at the right time is totally pilot responsibility. Right? You bet your sweet pippin it's not! Though he spends a lot of time and talent getting to a target, risking enemy fire, adverse weather, and endurance of his man-made flying machine, he fail if his armament system esn't perform. His

TAC ATTACK

responsibility is shared with a group of flight line technicians called Munitions Load Crews.

The importance of this little talked-about group is appreciated more when you know that: (1) each crewman must be on orders as a certified loader based on his own expertise and proficiency, which is re-evaluated every six months; (2) that each crew must be on orders as a certified unit, in which temporary substitutes to that unit may be made only

with equally certified men; and, (3) failure of a man or crew to adhere to severely controlled procedures can result in injury to many people, not to mention failure of a combat mission.

If a mistake is committed, the crew will be decertified and returned to training status. Then they must demonstrate their qualifications and be recertified by doing all required loading techniques within a limited time and before a certifying official.

A load crew cannot rest on

LOAD CREW

Key to safe munitions loading is the loadcrew chief who is center of all communications, coordinates timing of each task, according to checklist which is marked off by item as loading progresses. Right: Loadcrew of 33 TFW, Eglin AFB, begin proficiency test. Chief, Sgt Robert Rigsby, calls checklist item to cockpit No. 2 man, A2C Wayne Farmer, for voltage check by No. 3 man, A1C Robert Godwin at pylon. No. 4 man, Ken Culbertson prepares M-117s for loading. Load also includes CBU-2s and AIM-7s.



Weapon must be secured and safety pinned before hoist is lowered, or chief's arm is jeopardized. Brakes remain locked on MJ-1 and driver's hands off steering wheel until signal from chief. During all loading operations, location and task of each member must be known to the chief.

Loading AIM-7 Sparrows calls for needle threading precision. After installing fins, crew raises 400 pound missile, guiding forward wings and aft fins into one of the F-4s four missile cavities. Loading also includes function check before inserting release cartridges.



TER mounted M-117s are torqued secure as the third bomb rolls toward the pylon. After pylon is loaded, No. 2 man rigs arming wires and installs nose and tail fuzes.

Fuze mishandling is hazardous and can cause dud delivery.



Torquing sway braces tight is not good enough. Properly calibrated tool assures even pressure on all braces; prevents hangups and inadvertent release.



One of the last procedures is inserting ejection cartridges. Again, torque is vital. Cartridge caps must be fitted tight enough to make good electrical contact. Right: Body position is critical while torquing ejection rack cartridges. Standing offset from cartridge caps prevents serious injury should the explosive inadvertently fire.

its laurels. Moisture in a release circuit can blow an otherwise excellent job of loading. It's their job to detect such a hazard. Failure to stand in the right place while torquing an ejection cartridge can mean serious injury if it inadvertently fires. A checklist error by one man may endanger the welfare of many others. Unlike some other line occupations, the hazards of careless work can endanger himself as directly as the aircrews who depend on his performance. And they do.

For instance. An incorrectly

timed or rigged fuze could mean a dud on target or destruction of one of our own planes. An inaccurately torqued ejector cartridge cap could result in hung ordnance, or worse, inability to jettison stores if aerial combat is imminent. The same thing can happen because of poorly torqued sway braces on MERs, TERs, and stores. This problem is most severe on takeoff when a pilot tries to jettison stores because of a flight problem. If the stores release from one wing but hang up on the other, the imbalance at this

critical point in flight is a direct route to disaster.

Patience and endurance are important qualities for safe performance by load crews, and must be added to their primary quality of thoroughness. Hours are sometimes long, day or night. The ramp may be sun-scorched, rain-soaked, or blanketed with near blizzard snows. All of this they must accept with patience and endurance. For one quality they cannot tolerate is negligence for any reason. Their life, and others, depend on it. ➤

TAC TIPS

...interest items, mishaps

FLYING BRASS

Number two was flying chase high and inside while a student was sharpening his eye on a dart. At about 1700 feet, the student hosed off a string. Chase immediately dropped down and behind him in anticipation of the coming break to resume the perch position for another pass. As two got in trail, his student fired again. As the chase pilot pulled up to avoid collision with the shooter's brass, he observed a single shell casing pass beneath his aircraft. It struck the in-flight refueling probe light housing for a two man-hour repair job. Ve - thy Int-a-thes-ting. We'd like to pass this on to you applicable F-4 types also.

TACAN

Subj: Erroneous TACAN DME Information.

All TAC pilots will be advised to use caution when using DME information within 25 nautical miles of the TACAN station. A condition in certain TACAN facilities may produce DME errors in increments or multiples of three miles after an unlock is experienced. On some TACANS, DME error may be induced following unlocks caused by signal blanking in turns or by manipulation of the aircraft function switch from transmit/receive to receive and back to T/R position, which might permit the aircraft receiver to accept spurious signals which it normally

rejects. The errors may occur inbound to or outbound from the station and may indicate closer to or farther from this station than the actual position of the aircraft. Pilots experiencing this error should consider the facility unreliable and immediately report the problem to the nearest air traffic control agency for use in technical investigation and correction of the condition. Action is being taken to identify and eliminate the causative factors.

HYPOXIA

At FL 310, the T-33 cabin was 20,000 feet. After 30 minutes the pilot began to have trouble holding his heading and altitude. He selected 100 percent oxygen and noticed he was feeling similar to the hypoxia sensation observed in the altitude chamber during his last ride. He immediately began a descent and selected 45M on the regulator, no pressure flow was noted. Passing 14,000 feet he considered actuating his bail-out bottle but did not do so because he felt better.

The aircraft oxygen system did not begin to supply oxygen for more than five minutes after level off at 3,000 feet. After landing, the oxygen system checked out satisfactory.

The part of this incident that is odd, is that the pilot landed with his bail-out bottle full. By the time you realize you are hypoxic, your judgment is impaired to a degree. We are all conditioned to descend, why not to pull the green handle??

with morals, for the TAC aircrewman...

DOORGONE!!

The C-119 dropped its emergency bail-out hatch on takeoff. It fell out about 2000 feet down the runway. Unaware of its loss, the crew charged on. The tower types advised them about the hatch drop and they returned to claim it. All the while protesting that both pilot and flight engineer had checked hatch installation for security on walkaround.

What's your guess? Ours too!

GOOD SHOW

While slowing to final airspeed in the GCA pattern, aircraft pitch control became

oversensitive and the F-100 began to porpoise moderately. A missed approach was made and the pilot climbed to 10,000 feet for a controllability check. At 300 knots, the aircraft was more controllable but unstable in pitch and could not be trimmed for straight and level flight. As airspeed was decreased to below 200 knots, pitch control became increasingly difficult, with oscillations at 170 knots approximately twice as severe as at 200 knots. The pilot was able to dampen the spurious pitch inputs by bracing his arm on his knee. A 200 knot final was flown to touchdown at 170 knots using a flat approach.

An improperly locked jam nut allowed the mach gradient changer to disconnect from the gradient changer linkage rod end.





INDIVIDUAL

We are proud to present the Tactical Air Command Individual Safety Award winners on these pages. The contribution to our mission made by these five men will never be known...we have no way of counting accidents that have been prevented. Selection for the highest Tactical Air Command Award in their individual field is our way of recognizing outstanding efforts in behalf of accident prevention. I wish to add my congratulations to the many they have already received.

R. L. LILES, Colonel, USAF
Chief of Safety
Tactical Air Command



Outstanding Flight Safety Officer (Second Half 1968)

Major James M. Fuller
4510 Combat Crew Training Wing,
Luke Air Force Base, Arizona.

Outstanding Nuclear Safety Officer

First Lieutenant Danny R. Sheppard
474 Tactical Fighter Wing,
Nellis Air Force Base, Nevada.



Safety Awards for **1968**



Outstanding Missile Safety Officer

Second Lieutenant John P. Delaney III
4510 Combat Crew Training Wing,
Luke Air Force Base, Arizona.

Outstanding Contributor to Missile Safety

Master Sergeant Phillip O. Carroll
27 Tactical Fighter Wing,
Cannon Air Force Base, New Mexico.



Outstanding Ground Safety Man of the Year

Master Sergeant William D. Tyrl
850 Field Maintenance Squadron,
1st Special Operations Wing,
England Air Force Base, Louisiana.



ON THE H-7...

On the H-7

Ejection seat conversion in the Phantom, from H-5 to H-7, is complete in TAC. Like most egress systems, a successful ejection in the new model depends on two things: the user's knowledge of the system; and how well he uses it. Every aircrewman worth his salt has read the Dash One so there's no need to repeat it. But several ejection experiences point out important facts not included in the basic instructions.

The improved H-7 ejection seat eliminates some faults of the old model, offers an expanded working envelope, and reduces possibility of back injuries. It also offers several new "faults." But the seat gives the user a new edge on survival, and the several "fault" remedies now in the works will be money in the bank.

The big improvement over the old system is the addition of the rocket pack. It propels the seat to about three times the height of the almost-overpowering ballistic charge of the H-5.



rocket makes possible a lower ballistic charge on the seat gun (185 Gs per second vs 266 on the F-5) reducing probability of cracked vertebrae frequently encountered in the old seat.

The H-7 also includes a different style personnel parachute called the skysail, a 29.7-foot slotted canopy. It provides greater shock absorption on high speed openings eliminating need for the G-limiter, which sometimes prevented immediate chute openings vital at low altitudes, and provides for a lower rate of descent. All well and good, except sequence time saved by discarding the G-limiter is nullified by the slower opening skysail. So this fault is being corrected. According to OAMA, the skysail will be replaced soon (May or June) with a 28-foot flat canopy, called C-9. Its rate of descent is within one-half-foot per second of the skysail but opens a full second sooner. On zero-zero tests, it opened at 186-foot altitude compared to 83 feet on the skysail. This 100-foot leeway is mighty welcome to the guy unlucky enough to punch out on the deck with some sink rate.

The H-7 conversion includes an automatic ejection sequencing system. The Dash One gives simplified operation procedures; however, aircrews who have ejected, report seemingly unexpected

delays in the system. Actually, with adrenalin flowing like a fountain, a second seems like hours, so be prepared for the following sequence timing after initiating the dual ejection system from either cockpit with either lower handle or face curtain:

	FRONT SEAT	REAR SEAT
Shoulder harness reel retracts	immediate	immediate
Canopy blows off	.75 sec	.20 sec
Seat catapult fires	1.15 sec	.30 sec
Drogue gun fires	1.90 sec	1.05 sec
Time release activates main canopy	3.40 sec	2.55 sec
Full chute canopy (skysail @ 350 kts)	5.2 sec	4.35 sec
Full chute canopy (skysail @ 50 kts)	6.65 sec	5.80 sec

The front-seater can manually reduce the .40-second delay between canopy blow and seat catapult firing by holding tension on either ejection handle until after the canopy blows.

Using the lower ejection handle vs face curtain to eject has been debated since the Phantom first flew. In early years, the face curtain was named primary, as it still is in the Navy. More recent statistics show, however, that Air Force crews prefer the lower handle, and the Navy uses it about 30 percent of the time. It's still aircrew choice however, and there seems to be a general acceptance that Air Force crews prefer the quick access of the lower handle. But like most choices, there's a trade off of credits and liabilities.

For the last minute decision, demanding now-or-never action, valuable split seconds are saved with the lower handle. Along with this technique, experience records injured spines from poor posture, broken and bruised left arms from flailing, and occasional loss of masks and helmets. But if ground contact is not a split-second possibility, a lot can be said for the face curtain. Sure it seems clumsy, but the same can be said by surgeons who must tie minute knots with gloves on. Training makes the difference, and using the face curtain is not so formidable that its benefits should be ignored. TAC life support types strongly recommend practicing both methods to proficiency during seat training periods.

Proper face curtain use assures better posture, both arms anchored equally, and assurance that wind blast will not take your mask and head protection. You already know that it's not as



It's the easiest thing in the world, on entering the cockpit to place toe of your flight boot atop the lower ejection handle. Bent guards and sprung D-rings are almost common and no one seems to notice . . . except the guy who all of a sudden has to use it. That's when he loses valuable seconds jerking free.

on the H-7....



This is a no-no . . . if you want to make a clean man-seat separation after ejection. Oxygen and communication leads should be placed on seat back of buttocks, in front of lumbar pad. When placed as shown, lines may hang up on seat bracket behind pad. On separation, occupant will be twisted violently, sustain arm and neck injuries, and lose oxygen mask.

easily done as stated in the Dash One. If you pull with equal force on both handles, most men of average height will find themselves leaning forward to get the low-stowed curtain over their headgear. Admittedly, this is clumsy and creates poor posture.

So the next time you're in the training seat, try it this way a few times. Grasp both handles as before. Your elbows will take a natural and safe position within your shoulder width area. Now, instead of applying equal force, jerk one handle, left or right, with a slight shoulder twist in the opposite direction, leaning a little forward to assure the curtain does not hang up on your headgear. This motion takes a split-second and you can feel the handle stow clip break loose from its stowed position. Now apply a double action force that completes the sequence. Holding the pulled handle firmly, snap your head and shoulders back against the seat. As you do this it will be natural to equalize forces on both handles.

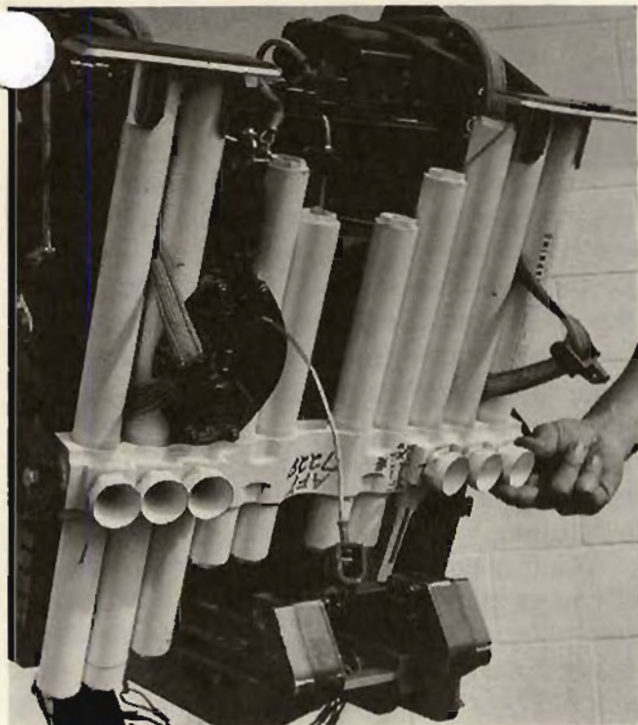


This is the only correct procedure for removing face curtain and ejection gun safety pins, though some aircrewmen have been known to remove them personally before entering cockpit. The Dash One is explicit. For aircrew safety, chief will pull pins only after occupant is strapped in, seat adjusted to proper height.

letting the lever forces of your upper arms draw your elbows down toward your waist, pulling the face curtain taut over helmet and mask. Your back is straight and both arms and hands are anchored

Like any new technique, the first few times seem clumsy. With a little practice, you will feel confident in choosing the advantages of the face curtain when time permits.

Many F-4 jocks have transitioned from another bird, one that uses arm rests or similarly located handles to be pulled up for ejection. There's a similar handle in the Phantom too. But don't let your old habits trap you into pulling it to eject. It's for ground egress only! Those who have inadvertently pulled this "emergency harness release lever" aren't around to explain what happened. Evidence shows that on realizing their error, they pulled the lower ejection handle next. Without assistance of leg garters, seat belts, a talley reel straps, they exited their Phantom w



Heart of the H-7 is rocket motor, mounted on seat bucket bottom. Rocket nozzles direct propellant for stable escape. Damaging the thin-walled nozzles by lowering seat on gear extended under seat, or setting seat on nozzles during removal maintenance, could cause erratic flight during ejection.

all the grace of a nude gull in a hurricane.

Murphy's law says it will happen again. So establishing an alternate may someday save an already dreary situation. The hardware manufacturer was queried about using the face curtain under these circumstances. Their answer: Even with good posture and firm grip on the curtain handles, it's probable that the aircrewman, without seat belt and leg garters, would slip out of his seat feet first before it cleared the aircraft. This is an assumption based on engineering data.

The only alternative seems to be a little old fashioned . . . going over the side. Evidently this problem wasn't high on the designer's priority list because the location of the plane's control surfaces strains the odds for a successful manual bailout. But when it's the only alternative, it's vital. So a mental run-through is worthwhile. But don't forget one important thing if you get caught in this fix. Either pull the survival kit



Installing canopy jury struts without inserting locking pin sets up a great booby trap. Upper: Strut can easily teeter forward against banana links. If canopy is closed from ground, or pressure drains off letting it lower, firing mechanism is inevitably damaged. And if Murphy has failed to insert safety pin, the seat gun will fire, though interlock remains in position. Below: Simply inserting jury strut pin may save crew chief embarrassment, and pilots life.

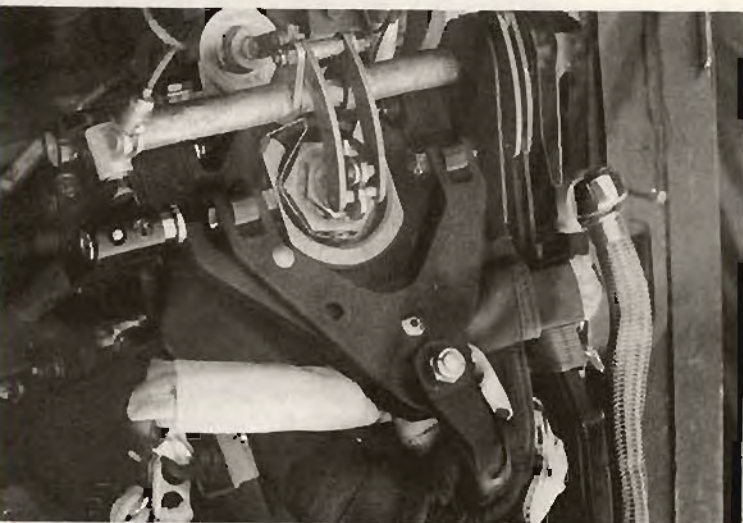


on the H-7....



Face curtain initiated ejection may take a couple of seconds longer, but it's the safest way to go. Posture is good, arms and hands anchored to prevent flailing, and helmet and mask are guarded from wind blast.

Scissors shackle will not function if sprayed with heavy coating of paint or preservatives. Shackle connects drogue canopy to seat until man-seat separation when it releases drogue to extract personnel parachute.



emergency release handle, exiting without survival gear, or be prepared to get free from the stronger sticker clips on the H-7. During egress training, you've experienced the tug required to overcome the clips on H-5 training seat. These trainer seats, by the way, hopefully will be replaced soon with the modern version. But the point here is, the H-7 clips need about 65 pounds of force to break free, more than twice the present training devices. So it's recommended that you waddle out of the seat, breaking one side loose, then the other, before starting Dash One manual bailout procedures.

Another problem is what to do if the canopies fail to go after ejection is initiated. If the failure results from a leak in the emergency pneumatic system, the canopy emergency jettison handle will not help. So the next best is to select canopy open (normal system). If this does not work use the canopy manual unlock handle, physically pushing the canopy up into the slip stream if cabin pressure does not force it open. The sc charge will fire as soon as the interlock is removed by the jettisoning canopy. Flailing arms will result unless quickly restrained.

Thigh garters will soon be installed. These work in conjunction with the standard leg garter as noted in the Dash One and TO 13A5-32-502. The thigh garter goes just above the knee, while the leg garter is fastened above the boot, or generally understood as mid-calf. The important point is, fasten the garter below the thickest portion of the calf to prevent it from sliding toward the knee on retraction.

R&D is continuing on the H-7. A hard look is being given toward improving the shoulder strap retraction system, and in April or May a new automatically deployed survival kit will replace the present seat kit.

Just like the Phantom, the H-7 seat performs within its designed envelope. High sink rates and less than level attitudes at low altitude are not within that envelope. So pressing, even for ejection, can be fatal. Those who made the decision to "punch out" before leaving the envelope can tell you all about it. ➤

Spring, Summer, & THUNDERSTORMS

Maj JAMES T. BAILEY
5th Weather Wing
Langley AFB, Virginia

Winter to summer atmospheric change means one thing: Thunderstorms! Experts say that over the earth about 1,800 thunderstorms, with 100 cloud to ground lightning strokes every second, are waiting for unwary pilots at any one time. And since we've been short on our share during the winter months, logic says our time is coming.

Four factors associated with thunderstorms and of extreme interest to aircrews are turbulence, icing, hail, and lightning. We will first review the development of thunderstorms, and then deal individually with the associated hazards and their possible damaging effects.

The Glossary of Meteorology defines a thunderstorm as "a local storm invariably produced by cumulonimbus clouds and always accompanied by thunder and lightning." The thunderstorm represents atmospheric convection at its strongest.

An average of forty-five thousand thunderstorms occur each day. Every storm, in order to reach full maturity, must satisfy certain meteorological requirements within the atmosphere. First, there must be an unstable situation which means, in very general terms, controlling weather parameters are upset easily. The next condition which must be met is a method for lifting the unstable air. This lifting action can be accomplished by a number of different means such as heat from the sun, upslope motion from frontal action, wind effect on mountains, or converging streams of air flowing from different directions, resulting in vertical motion.

Now that we have the primary ingredients for thunderstorm development, let's follow one through its life cycle. Moist, unstable air when

lifted from a cumulus cloud serves as a basis for the storm. From this point on, the major activity progresses in an upward direction. When air is unstable, an increase in lifting increases action and speeds up the thunderstorm development. The cloud feeds itself, attracting moisture from the surrounding atmosphere as vertical currents accelerate. In this state, updrafts extend from near the ground to above the top of the cloud, with the greatest push occurring in the top of the cloud. Vertical velocities even in these early stages may be as high as 3000 feet per minute.

When there is enough moisture, precipitation usually starts 10 or 15 minutes after the top of the cloud passes through freezing level. The freezing level is a significant altitude for summer flying and crew members should be aware of its meaning and alert to its height. When moisture starts down as precipitation, it brings air with it, forming a downdraft in the center of what has just become a mature thunderstorm. In this stage updrafts remain around the outside edge of the storm. As the downdraft approaches the surface, it is deflected outward, causing extremely high surface winds. The highest surface wind will normally be in "front" of the storm or in its path, with gust velocities being the sum of downdraft velocity and forward speed of the storm over the ground.

Turbulence

Early in a mature thunderstorm, shortly after downdraft and heavy precipitation first starts, surrounding updrafts tend to increase and reach a climax. From this point in time the storm's fury begins to abate. It is during this stage that the thunderstorm tends to become stratified at

thunderstorms....

different levels and develops the well known anvil top. Maximum drafts occur at fourteen to twenty thousand feet and often reach as high as 4500 feet per minute. Updrafts and downdrafts pass each other at these speeds causing tremendous shear, up to 100 mph, resulting in considerable turbulence in and near the storm.

In addition to shear, which is experienced between strong up and down flow of air, there is also a gust factor to be considered. In contrast to the drafts which are relatively constant in velocity, gusts are small scale variations in vertical wind flow over small distances. Shear between the drafts and gusts create an eddy effect which is responsible for the turbulence encountered when penetrating a thunderstorm. The degree of turbulence affecting aircraft is directly proportional to airspeed. The accepted method to minimize effect of this turbulence is to reduce airspeed as much as practical in accordance with the appropriate flight manual.

Icing

Icing is always a factor to be considered by aircraft flying in thunderstorms and can be anticipated when air temperature at flight altitude is at or below freezing point. Clear ice is most common in lower levels of cumuliform clouds as opposed to predominantly rime type found in higher levels. In areas of numerous thunderstorms, icing problems may be excessive due to prolonged exposure to below freezing conditions. The effect of icing caused by thunderstorms does not differ from that caused by other means and should be treated in the same manner.

Hail

Hail damage is regarded as one of the worst hazards of thunderstorm flying. This phenomena usually occurs during mature stages of thunderstorms when the updrafts are at high intensity. Formation of hail requires large quantities of liquid water and strong updrafts to delay the fall, keeping the hail nucleus in

suspension long enough for it to acquire a thin coating of ice. The altitudes which afford the conditions for occurrence of hail are between 10,000 and 15,000 feet. At this time, we have no information to indicate a direct relationship between hail occurrence and color of the cloud. Nor does shape or intensity of the radar echo show existence of hail.

Lightning

During an Air Force sponsored "Thunderstorm Project," 22 percent of the aircraft that penetrated thunderstorms were struck by lightning. In general, the damage was limited to small punctures in the skin of aircraft and was considered minor. Aircrews in all-metal aircraft are safe from effect of lightning discharges. However, brilliant light from lightning discharges may be temporarily blinding. Lightning strikes have been known to produce severe errors which may permanently affect magnetic compasses.

Lightning will magnetize metals, render compasses unreliable, actuate electrical circuits inadvertently, induce deafening static in headsets and temporarily blind crew members during night missions. Predominantly, strikes occur below 20,000 feet and are most likely to occur in the 5,000 to 10,000 foot level. Strike probability almost certainly coincides with altitude range of the cumulonimbus cloud which is commonly found between 3,000 and 30,000 feet, occasionally higher.

The life cycle of a single cell is 20 to 90 minutes, however, under certain conditions a series of systems will form in lines or clusters, in which there can be several storms in various states of development. What may look like one storm may in fact be numerous cells, thus extending the maturity span within the area for a period of hours. During the period of time that an area is under the influence of thunderstorms, terminal conditions may lower to a point below operational minimums. Obscured ceilings and heavy rainfall will reduce low slant range visibilities and increase difficulties encountered in executing approach and landing procedures. In addition, strong gusty surface winds with gra



MEAN ANNUAL THUNDERSTORM
FREQUENCY BY DAYS.



MEAN ANNUAL HAIL FREQUENCY
BY DAYS.

variability in direction are usually present and add to existing landing hazards caused by reduced visibilities. Finally, heavy rainfall creates another hazard, when accumulation of surface water on the runway causes poor braking action and tends to create a possible hydroplaning situation.

Several bases of this command are located within an area of high thunderstorm frequency. The geographical area in the CONUS with the maximum frequency of thunderstorms lies in central Florida and their number decreases to the north and west. However, thunderstorm activity is quite prevalent over all of southeastern U. S., the Mississippi Valley, and the central plains region throughout most of the summer months.

With these facts in mind, it is presumable that most of us will encounter some thunderstorm activity during the coming months. Keeping the following few simple rules in mind and remembering what we have reviewed in this article may assist you in staying out of trouble:

1. Never fly in IFR conditions within the immediate vicinity of thunderstorm cells if at all possible.

2. If your aircraft is equipped with radar, USE IT! Clear all principal storm echoes by at least twenty miles. Remember, being radar echo-free does NOT mean clear air. A twenty mile safe zone has been recommended by many flying units when circumnavigating a storm. There are documented cases of aircraft being lost or severely damaged when flying at a distance of ten miles from the nearest echo.

3. Pay attention to severe weather warnings and advisories. If in your weather briefing there is no mention of them, ask the briefer just to make sure.

4. When your destination lies within an area of thunderstorms or the potential for thunderstorms exists select a good alternate. Remember, the best landing procedure to use during a thunderstorm is to proceed to your alternate.

5. Regardless of what stories have been passed on through the years, there is no 100 percent sure, safe altitude to penetrate a thunderstorm. The best penetration technique is to go around them; if that's not possible, turn around and go back to where you started.

CHOCK TALK

...incidents and incidentals

Dip...Stick??

During climb above FL 200, the T-39 master caution light flickered occasionally. During level-off at 350, the oil pressure light illuminated and the oil pressure dropped. The right engine was stop-cocked and a single engine landing made without further incident.

While investigating this incident, the unit involved found a considerable number of dip sticks marked with only an "add 4 quarts" line, or nothing. To a transient alert crew not familiar with the T-39, it could appear that one would add four quarts of oil to the system when the oil level drops to that line. There is an oil dip stick available (PN 548743) that indicates: Full, add 1 qt, add 2 qt, add 3 qt, and add 4 qt. The unit involved is attempting to have all their engines equipped with the marked dip stick. Sounds like a great idea.

Communicate!!

During night maintenance an F-101 engine dome had been removed to facilitate repair of a hydraulic leak. An inspector checking the installation called to the mechanic, questioning the fit, then satisfied himself that it was okay. Unknown to him, the mechanic, thinking that a socket and ratchet handle would be needed, placed them inboard of the intake turn vane. The inspector signed off the FOD inspection, the engine was started, and immediately ingested the tools.

Only a Few Inches

The F-4 crew had completed engine start and were accomplishing the "Before Taxiing" checklist items. The ground crew had serviced PC-1 after engine start and didn't move the hydraulic servicing unit. The crew chief looked at the cart and thought it was clear. He then cleared the A/C to lower the flaps. Yup, the flap struck the servicing unit . . . for 17 manhours. The crew chief was only a few inches off.

Loose Bolt

When flaps were raised on takeoff, BLC and flashing-wheels light illuminated. Airspeed was decreased and the gear was lowered, putting the lights out. The A/C was unable to lower the flaps by using normal procedures, the flap circuit breaker was popped and would not reset. The warning lights test switch was depressed and all lights were normal. When changing to tower frequency, the A/C noticed that the comm and nav command lights were inoperative. The warning lights test switch was depressed again. The entire panel was out. An emergency was declared, the flaps were blown down, and the bird was recovered.

90 manhours to repair doesn't tell the whole story in this one. Check this list of damage: wiring on TE flap actuator burned by hot BLC air, TE selector valve and flap relay shorted out, sheet metal damage to left TE flap selector valve for 1/2 to full-down shorted, a

with a maintenance slant.

with a maintenance slant

all left TE swivels and lines damaged by heat.

The left trailing edge BLC valve was disconnected. The BLC valve linkage bolt was recovered and showed no signs of failure or stripping. This was the seventh flight since last BLC maintenance.

Screwy FCF

An F-100 test pilot from another command ressed to the negative G portion of his flight rolled inverted to check for debris in the cockpit. Shortly, he noted some foreign objects floating around. He caught a few, stowed them in his pocket and rolled upright for a while. He then rolled inverted again to retrieve particles he

hadn't caught on the first go. After getting these, he rolled upright to continue the FCF.

He attempted to add power but the throttle would not move. After retarding it slightly, he again tried to advance it but it would not budge. He had 75 percent, 11,000 feet, and 260 knots. Distance from home was 85 nautical and a quick calculation showed he could not make it from his present position. Some quick trouble-shooting revealed a hex screw jammed between the throttle shaft and the inboard wall of the quadrant running guide. He couldn't get his hand down far enough into the slit to move the screw, nor was the dinghy knife blade long enough. He finally used his hunting knife to move the screw forward enough to get 85 percent. At that point, he gave up and went home. Another "whodunit" added to our FOD files. We lucked out again.





BATTLING THE BIRDSTRIKE PROBLEM

by Lt Col T. J. Slaybaugh
Hq TAC (OS)

THE ACCIDENT

Last Spring a TAC fighter was on run-in for a LAAD weapons delivery, speed .75 Mach, altitude 350AGL, when a bird smashed through the windscreen. Control was lost due to wind blast and flying debris. At between 300 and 500 feet and at 505 knots, both pilots ejected. Both suffered injuries. The aircraft was destroyed, as was one Golden Eagle.

THE INCIDENT

A month later an RF-4 at 500 feet and 420 knots had the windscreen shattered and both side panels broken out by a birdstrike. The front seater, due to wind and noise, was unable to maintain control. This time, however, the IP in the back seat was able to take over and bring the plane back.

These weren't all, just TAC's most spectacular aircraft-bird collisions of 1968. All told, 79 were reported with 59 (75%) causing aircraft damage. Most of TAC's birdstrikes occurred at low altitude, with severity of aircraft damage generally in proportion to aircraft speed. But there is more to the problem than just low flying birds and fast flying aircraft. In February a report

was received of an aircraft-snow goose collision at 25,000 feet.

And, in addition to the hazard, there is cost—several millions of dollars each year, mostly for overhaul of bird-burger-making machines, otherwise known as jet engines.

Reestablishing the problem isn't difficult, finding an effective solution is. Rehashing some pilot-slanted ornithology probably offers the most hope for bird avoidance in the immediate future.

THE PILOT CAN:

- Slow down when low. An RAF study group determined that the breaking point between the accident-incident category came at just under 300 knots. One researcher calculated that at 600 knots, a bird-strike by a two-pound bird is equivalent to a 72,000-pound force.

- Fly with the visor down. Fortunately, in the incident described earlier, the pilot was flying with his visor down; fortunate because very little imagination is required to guesstimate what the jagged canopy pieces that scratched the visor would have done to unprotected eyes.

- Steer clear. There's truth as well as poetry in the "birds of a feather" rhyme, and the more strikes, the more risk. Birds, particularly in flock can often be spotted and avoided.

- Learn, and respect, local hazards. TAC's entomologist has prepared a report on bird problems at TAC bases. This report should be available through base civil engineers and safety offices.

- Check warning notices. Bird hazards, particularly movements of migratory birds, are sometimes published.

- Respond to radioed sightings. Tower and range controllers often report observed bird activity, especially in aircraft flight path areas. Radar operators may be able to detect bird movements, particularly of large birds in flocks.

- Provide PIREPs on bird hazards.

- Fly low level routes during non-migratory seasons, to the maximum extent mission requirements permit.

- Flight plan proficiency flights into bases of least birdstrike potential.

BIRD CONTROL

Despite the noise and confusion, airports provide a sanctuary-like fascination for birds. Half of all birdstrikes are at 1000 feet or less, and half occur over, on, or within one mile of an airport. Efforts at bird control measures vary from complete failure, to almost absolute success. A measure may work well at one base, fair at another, and not at all at a third.

TEMPORARY RELIEF

Recorded distress calls played over loudspeakers may frighten birds away, or they may attract the curious. At one TAC base \$370 amber-beam flashing lights were installed to scare sparrows and pigeons from a hangar. They were completely ineffective. Several years ago researchers burned tires and fired guns and set off blasts to shoo the birds away from an island airport. About the only noticeable effect was feathers ruffling from blasts, provided the bird was close enough. Stuffed owls may have some effect, or they may serve as resting places. As a general rule, scare devices are most effective if used in variety and sporadically. Once the freshness or unexpected aspect wears off, most birds aren't much impressed.

One scare method, spectacularly successful in some cases, is the use of falcons. At one airfield where falcons were used to keep seagulls away, the smart gulls learned to spot the falconer's car and would disappear long before the falcon was turned loose. Lesser Bustards — duck-sized migratory birds in Spain — became a very serious problem. A landing KC-135 suffered 35 strikes at Torrejon. Reportedly, a falcon program now underway has practically eliminated the hazard.

But there are many problems in the use of falcons. A trained falconer is needed. Falcons are extremely hard to come by. Most are obtained on expeditions into the Alps or Greenland. With the increased use of insecticides the falcon population is declining. Bird lovers aren't appreciative of cannibalistic-minded falcons. Some falcons get shot by hunters and some just plain take off. There's a report of one lost when he failed to pull out from a high speed pursuit dive after a duck that had landed in a water tank.

Shotguns, acetylene cannons, and twin-shot type shot shells are frequently used, and often quite successfully, especially if at irregular intervals.

Temporary relief can also be achieved by driving a vehicle down the runway.

Combinations of scare devices are usually most effective, like when someone rides shotgun on the vehicle, or if it is equipped with loudspeakers to broadcast distress cries.

PERMANENT CONTROL

TAC's entomologist offers the five following probabilities as to why birds are seen on or over air bases:

1. In search of food or water
2. Roosting
3. Resting or loafing
4. Nesting
5. Passing by

He says that when a potential bird problem exists, the following steps should be taken:

1. Identify the species and the attraction.
2. Ascertain if the problem is temporary, persistent, or recurring.
3. Decide which measures give promise of being most practical, and institute same.

birdstrike...

Following are some control measures to consider:

Eliminate dumps, drainage ditches, and ponds. (Gulls apparently like dumps even better than airfields. A case is on report telling of gulls being buried alive rather than move from in front of a garbage-covering bulldozer.)

Remove potential roosting and nesting sites—tall weeds, reeds, brush, poles with holes and decorative cover.

Don't landscape with berry and seed producing shrubs.

Keep grass near runways cut at the length least attractive to birds.

Use herbicides and weedkillers to eliminate broadleaf seed plants and weeds.

Obtain consultive assistance from the Regional Office of Sport Fisheries and Wildlife, or the TAC entomologist in the Civil Engineering office.

WHAT'S AHEAD

A great deal of effort is underway, both in

North America and Europe, to learn more about bird movements and then make use of this information in flight planning. For example:

Weather and bird migration data being correlated to better predict migration periods.

A study to determine if microwaves, sent ahead of an aircraft, can disorient birds and clear the flight path of feathered FOD.

Time-lapse photography of radar scopes to determine bird concentrations, with aircraft operations restricted or halted on the basis of bird intensity.

A study on the effect of wing beat modulation patterns on radar echoes.

Tracking transmitter equipped whistling swans.

Tracking migrating birds with helicopters.

Use of mechanical hawks.

... But, until that distant day when some exotic breakthrough solves the problem, we who fly should be confirmed and concerned bird watchers... these flying feather dusters can really "clean your clock." ➤



Birds picked up from the runway following a KC-97 birdstrike on take-off.

CREW CHIEF OF THE MONTH

Technical Sergeant Thomas D. Price of the 4510 Combat Crew Training Wing, Luke Air Force Base, Arizona, has been selected to receive the TAC Crew Chief Safety Award. Sergeant Price will receive a letter of appreciation from the Commander of Tactical Air Command and an engraved award.



TSgt Price



SSgt Hambrick

MAINTENANCE MAN OF THE MONTH

Staff Sergeant Raymond L. Hambrick of the 4th Tactical Fighter Wing, Seymour Johnson Air Force Base, North Carolina, has been selected to receive the TAC Maintenance Man Safety Award. Sergeant Hambrick will receive a letter of appreciation from the Commander of Tactical Air Command and an engraved award.



Letters to the Editor

Letters to the Editor

THUNDERBIRD OPENINGS

Applications are being accepted until 31 August 1969 for two demonstration pilots, a narrator, and a materiel officer to fill projected vacancies in the ranks of the USAF Thunderbirds.

Selections will be made by 15 October with a reporting date not later than 15 December for a 26-month tour. The narrator will be selected for a 36-month tour.

Applicants for demonstration pilots and narrator must have 1,000 hours jet aircraft time. Jet fighter or jet trainer aircraft experience is mandatory. These applicants must have a completed SEA tour and less than 10 years active commissioned service as of 31 December 1969. One selectee will perform the duties of narrator for one year, then fly as a demonstration pilot for two years. It is desired that he have public speaking experience.

Applicants for materiel officer (previously termed "maintenance" officer) must have less than 12 years active commissioned service as of 31 December 1969. They must also have a completed SEA tour and carry a full qualified AFSC F4344. In addition, they must be on FSC-1Y and be current in jet fighter aircraft.

All applications should be forwarded to MAJCOM and a separate information copy sent to USAF Air Demonstration Squadron "Thunderbirds," Nellis Air Force Base, Nevada 89110. They should be prepared in accordance with Air Force Manual 36-11J, Chapter 45.

YOUTHFUL READER

I very much enjoy reading TAC ATTACK so it is not easy to get except by going to a TAC base, which there are none of around here. So I am writing to you. Please send me issues from Jan '68 to the present. I've been reading as many as I could get since the 67th TRW took over Mountain Home where my brother was stationed.

Alex Van Luik
5704 Rock Creek Road
Agoura, California

Your magazines are on the way, Alex. We're always willing to go along with a prospective lighter-pilot.

Ed.

A PIECE OF STRING

Sometime during the first half of 1966, your magazine published an article about yaw strings for the F-4. The article was written by a lieutenant who had been appointed "String Officer" at one of the F-4 bases located in the southeastern portion of the United States.

If possible, I would like you to send me a copy of that article since my squadron is very interested in studying the yaw string concept.

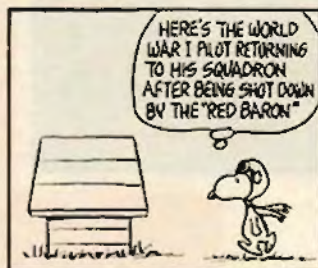
Capt A. H. Murchison
523 Tac Ftr Sqdn
APO SF 96274

The March '68 TAC ATTACK is on the way. Hope Lt Riemer's article is what you are after.

Ed.

PEANUTS

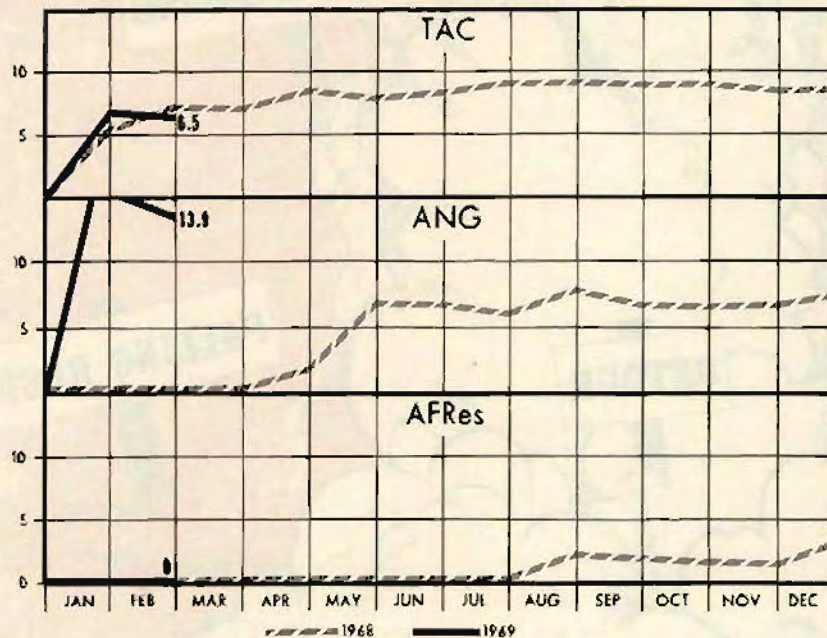
Courtesy of Daily Press, Newport News, Va.
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TAC TALLY

MAJOR AIRCRAFT ACCIDENT RATES
AS OF 28 FEB 69

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

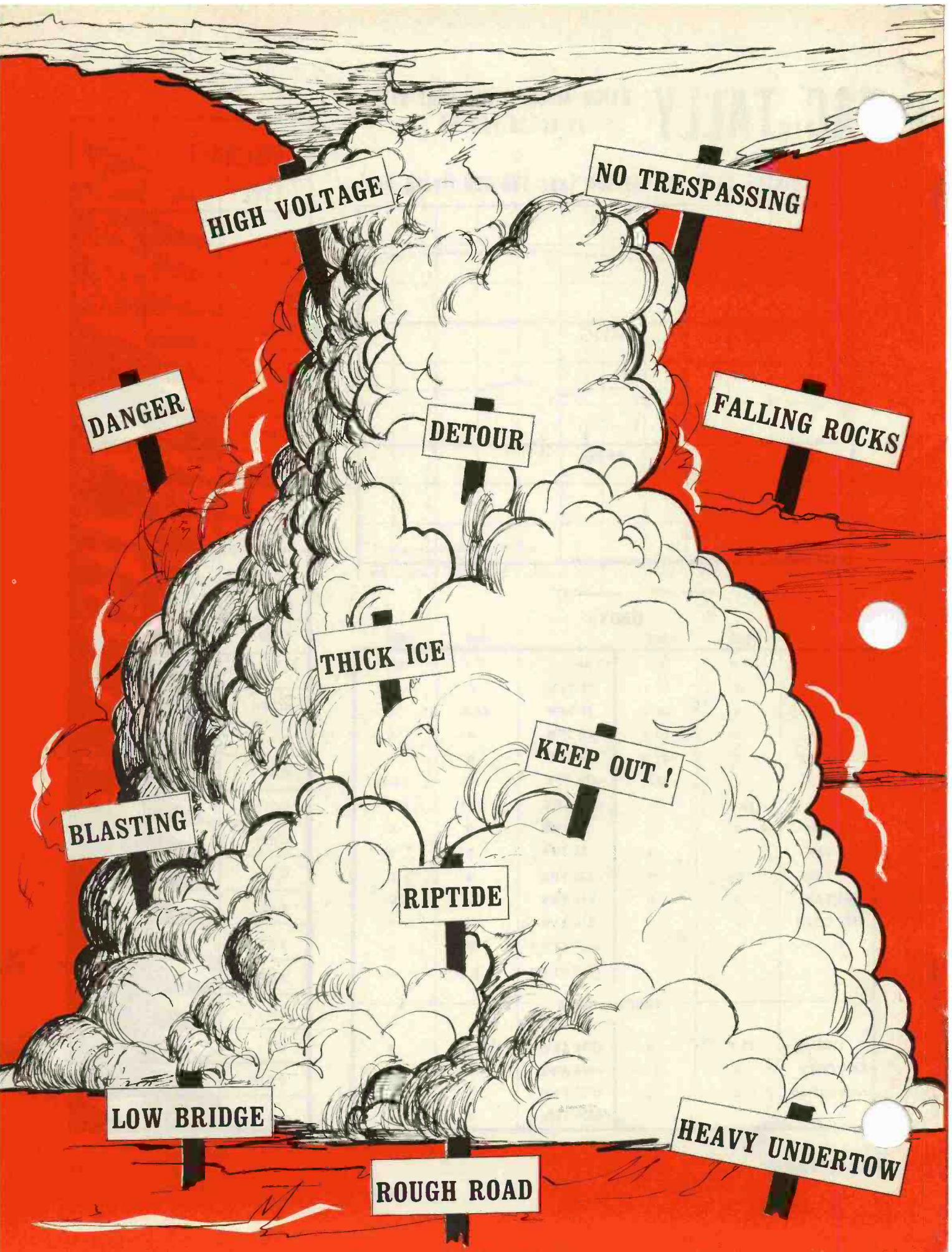


UNITS

	1969	1968		1969	1968
9 AF	1.8	10.3	12 AF	5.1	5.8
4 TFW	0	17.1	23 TFW	0	0
15 TFW	0	25.3	27 TFW	55.9	0
33 TFW	0	20.7	49 TFW	0	0
113 TFW	0	41.5	140 TFW	0	0
4531 TFW	0	32.4	479 TFW	0	29.9
363 TRW	18.6	0	474 TFW	21.1	58.7
64 TAW	0	0	67 TRW	0	0
316 TAW	0	0	75 TRW	0	0
317 TAW	0	0	123 TRW	0	0
464 TAW	0	0	313 TAW	0	0
4442 CCTW	0	0	516 TAW	0	0
			4453 CCTW	0	0
			4510 CCTW	9.9	0
SPECIAL UNITS					
1 SOW	29.7	0	4500 ABW	23.6	0
4410 CCTW	0	9.6	4440 ADG	0	0
4409 SUP SQ	0	0	4525 FWW	0	0
			4416 TSQ	0	0

AIRCRAFT TYPE	1969 / 1968	
	TAC	ANG-AFR
A-1	0	0
A-26	0	0
A-37	0	0
B/RB-57	0	0
RB-66	0	0
F/RF-4	15.6	0
F/RF-84	0	11.5
F/RF-101	59.5	0
F-5	0	0
F-86	0	0
F-100	17.5	0
F-104	35.1	246.3
F-105	0	0
F-111	23.0	0
KC-97	0	37.5
C-7	0	0
C-47	0	0
C-119	0	0
C-123	0	28.5
C-130	6.4	0
T-29	0	0
T-33	11.5	0
T-39	0	12.1
O-1	0	0
O-2	0	0
OV-10	0	0
U-3	0	0

* ESTIMATED FLYING HOURS



HIGH VOLTAGE

NO TRESPASSING

DANGER

DETOUR

FALLING ROCKS

THICK ICE

KEEP OUT !

BLASTING

RIPTIDE

LOW BRIDGE

ROUGH ROAD

HEAVY UNDERTOW