TAC ATTACK

FEBRUARY 1968

ZERO ACCIDENT YEAR . . . page 4

for efficient tactical air power

TAC ATTACK

FEBRUARY 1968

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Angle of ATTACK

It's a real privilege to congratulate the officers and men of our Air Force Reserve for completing 1967 without a major accident. Anytime a unit has an outstanding safety record it is noteworthy. But in this case the pilots, mechanics, support personnel and supervisors are Reservists. Their safety record is the culmination of exceptional skill, dedication, and above all professionalism, in their approach to their duties.

The commanders and supervisors set the tone and example in this accident free year. It is obvious that they put a lot of thought, hard work, and top level supervision into the conduct of their mission. Their varied and demanding operation required constant attention to detail in order to run safely and according to plan.

The Reserve flying and training requirements were as stringent as those of our regular airlift squadrons. Their inspections and surveys had to meet the same rigid standards we require of our active units. They were even tasked with some combat crew training. They met the challenge of these difficult tasks, and they did it in an outstanding manner.

Thanks to their efforts TAC's airlift potential has been greatly enhanced. Their assistance has been a major factor in helping meet our worldwide tactical airlift commitments.

It is indeed a pleasure for me to salute our dedicated Reservists. They have again proved themselves an invaluable member of TAC's aerospace team.

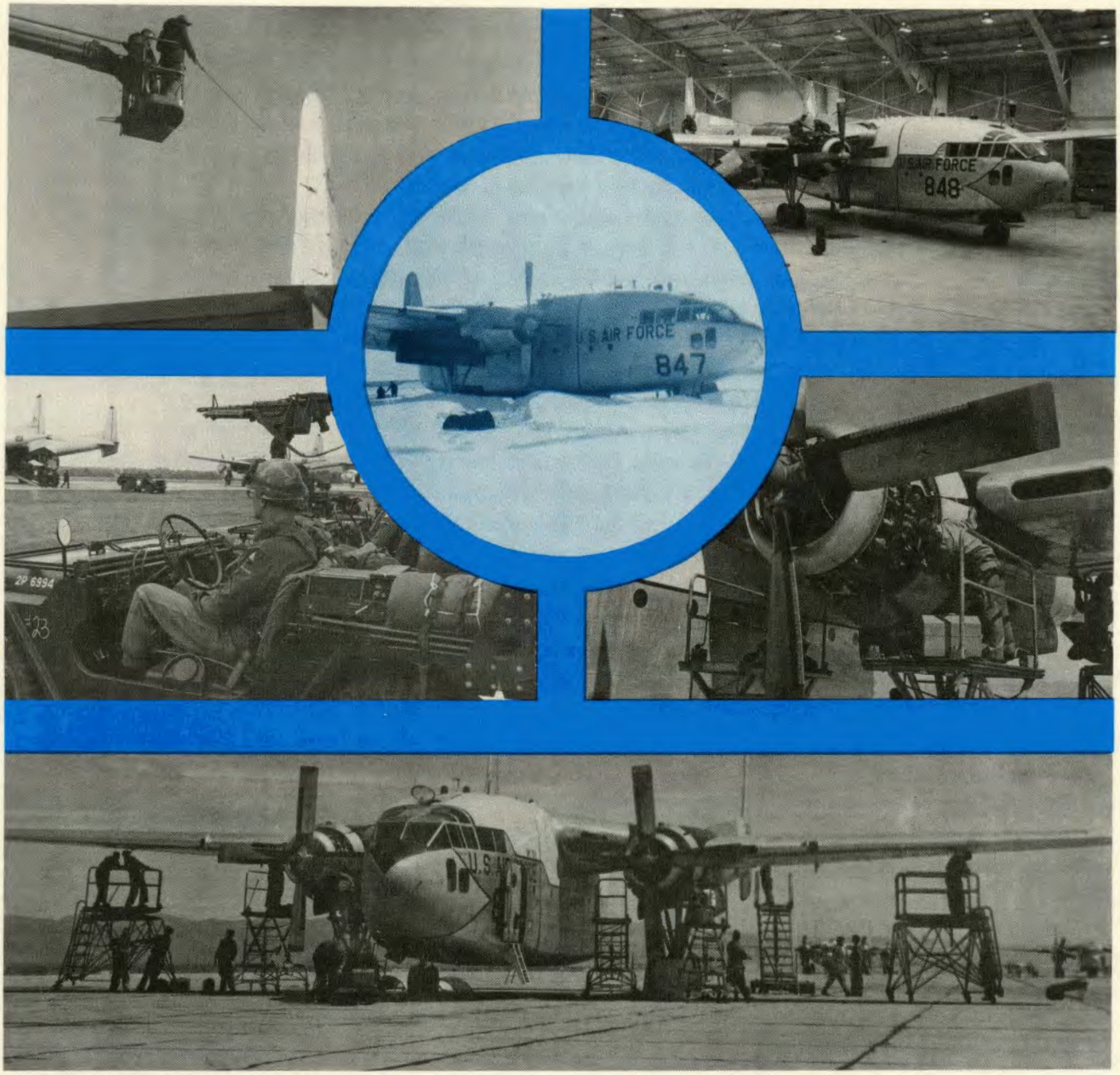
Keep up the good work!

H. B. Smith

H. B. SMITH, Colonel, USAF
Chief of Safety

THE MAGIC ZERO

TAC's AF Reserves Flew A NO-ACCIDENT YEAR



Reservists in TAC's C-119 fleet flew accident-free during 1967 while completing the heaviest flying schedule in their history. Thousands of missions were flown to support regular force operations. The part-timers carried hundreds of tons of cargo, thousands of passengers, and dropped nearly 110,000 Army paratroop trainees.

An accident-free year of flying has been accomplished by one of the Air Force's oldest fleets. All 21 squadrons of C-119G Flying Boxcars, now flown by Air Force Reserve aircrews, scored a zero accident rate during 1967. This is an unparalleled flying record for the twin-boomed bird since it took to the air in 1947.

Contributing to this outstanding record are seven reserve tactical airlift squadrons which have an accident-free history for their nearly ten years of C-119 flying. They have racked an impressive score of more than 285,000 hours flying time without either a major or minor aircraft accident.

FLAGPOLE FLYING DIMINISHES

Annual flying time for a C-119 aircrew member averages about 200 hours. However, the days limited to flying the flagpole and cross-country hops to accomplish training requirements are long gone. Today's reservist missions have been integrated with regular force requirements providing thousands of hours of productive airlift.

Reservist missions are flown each week in direct support of Air Force and Army commands, carrying cargo or personnel throughout the United States, Canada, and Caribbean. Though these cargo hauling flights are not tactical missions, aircrews log up to 30 percent of their annual proficiency training. Added to this are actual paradrop missions for Army, Army Reserve, and National Guard forces.

Paradrop operations are conducted on a continuing basis at Army paratroop training centers. At least three aircrews are assigned to these centers each week of the year, and an increase is expected.

Tactical airlift reserve units have responded continually to natural disasters, usually on short notice. Communities struck by flood and hurricanes have received their first assistance from C-119s loaded with emergency gear and supplies.

The Flying Boxcars dropped more than 800 tons of hay to snowbound herds last December after a crippling blizzard struck several Western states.

The reserve fleet's combat capability was demonstrated in 1962 when 24 squadrons were mobilized on a no-notice call during the Cuban crisis. In less than 48 hours after recall to active duty, C-119s of several squadrons were deployed and loaded with Army weapons and personnel.

PART-TIMERS PRODUCE

Reservist's flagpole flying diminished several years ago. Since then, the C-119 fleet has recorded some striking figures in the accomplishments column.

The following statistics reflect productive operations only, and omit flights conducted exclusively for training:

FISCAL YEAR	1963 thru 1966	1967
Missions	41,937	13,218
Hours Flown	196,787	45,113
Tons Hauled	36,013	10,237
Pax Hauled	152,683	66,467
Troops Dropped	429,743	109,517

There were 42 tactical airlift groups in the Reserve Forces in 1963. Some of these units have transitioned into C-124s with reassignment from TAC to MAC, leaving 21 reserve groups in TAC. Although the number of groups decreased, the amount of productive airlift per unit increased.

During this same period, the accident rate varied from a high of 6.3 to a low of 1.2. In the past year, reservist C-119 operations included a variety of missions.

There were substantial increases of overwater flights, arctic operations, aircrew training for several active force commands and allied air forces.

MAGIC ZERO

Also, new techniques and equipment were developed for increased paradrop effectiveness. More about this later.

WEEKEND WARRIOR?

An informal handle has long marked the reservists. And there are many C-119 drivers who cringe at the sound of "weekend warrior." For they know that there was a time when it was true. But times have changed.

Today, they are holding down two professions. Reservist aircrews average about 55 duty days each year and they must satisfy their civilian employers, not only for the welfare of their families, but to gain favorable promotional positions. They are also expected to fulfill their military obligations: maintain flying proficiency, keep current with methods and procedures, and always be ready to stand an ORI evaluated on the same basis as regular forces.

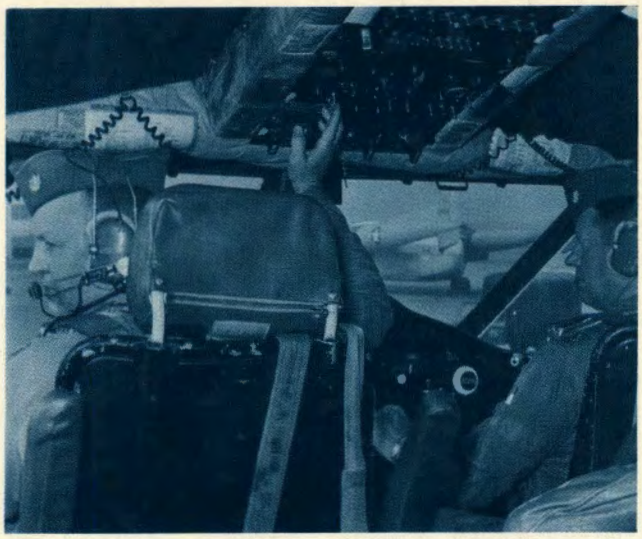
These busy men are susceptible to peculiar hazards. And reserve commanders are well aware of the problems, which they admit require constant surveillance and supervision.

First of all, a reserve pilot has a maximum of four days per month for relaxation. And over a year's time, this max time is usually eroded by several volunteer flights for directed airlift missions.

Example: Major X is a packaging engineer for a large firm in the Midwest. His obligations are the same as others who have two teenagers, a cub scout, and an urban home. He lives about 2 1/2 hours driving time from his assigned reserve unit.

At least twice a month, he packs his flight gear, tooth brush and Dash-One. At the end of a day at his civilian job, he begins the 2 1/2 hour trip through rush-hour traffic hoping to make a 2000 hour briefing. The flight may be the start of a cross-country cargo trip or, if he's lucky, a 2 1/2 hour night, tactical mission.

From the time he leaves his office until he boards his C-119, he is expected to complete the transition from packaging engineer to aircraft commander, fully informed, alert at the controls, and motivated to act and respond by the book. This demanding schedule can be a set-up for an accident waiting to happen.



Reserve aircrews of TAC's C-119 fleet flew more than 90,000 hours in 1967. Crewmen average about 200 hours flying during their 55 duty days served per year.

Commanders know it. Brig. Gen. Donald J. Campbell, Commander, 302nd TAW at Clinton County AFB, said it this way: "Command control and supervision is the beginning of a no-accident record. But its application must avoid the scare technique in favor of presenting realities of the problems to every aircrew member, mechanic, and loadmaster. We must accept the responsibility of being our brother's keeper. This is the motivation which makes the system work."

WELL CREASED HATS

Experience is an asset of the reserve forces. All pilots, navigators, and most flight engineers learned their profession during four or more years of active duty with regular forces. Ten to 15 years of flying time per man is not unusual. And their original experience was in various aircraft: fighters, bombers, cargo carriers, both jet and recip.

Today's average reservist has logged about 3,000 flying hours. And it's not unusual to meet an aircraft commander with 5,000 hours, of which more than 2,000 hours were logged in reserve C-119s. He knows his Dash-One. He knows the operating envelope of his bird.

Reserve maintenance also benefits from experience. Col. Alfred Verhulst, Commander, 434th TAW, Bakalar AFB, has said, "The Dollar-Nineteen gets exceptionally good service because many technicians and supervisors have been working on the same aircraft for nearly ten years."

The C-119 is a predictable bird, though this was not always true during its early years. Bugs have been eliminated from the R3350-89-B engines. Most of the power plants have gone through their fourth overhaul at the depot. Long experience with the engine has given time to strengthen its weak points.

The average of 4,400 hours per airframe and control systems has given reservists ample experience in coping with the aircraft's inherent responses.

Time has also brought about developments to increase the effectiveness of the C-119. Reservists were not satisfied with the accuracy and performance of the sluggish and unpredictable gravity and chute extraction paradrop systems.

MISSION METHODS MODERNIZED

About four years ago, the 433rd TAW at Kelly AFB was authorized by TAC to develop a new paradrop system proposed by reservists. The motorized system was tagged "Alamo Slingshot." It ejected a maximum of six A-22 containers each weighing up to 2,000 pounds, on one pass over a drop zone. And the Slingshot system has an offloading time of a short, predictable 4 1/2 seconds. It is now used fleetwide.

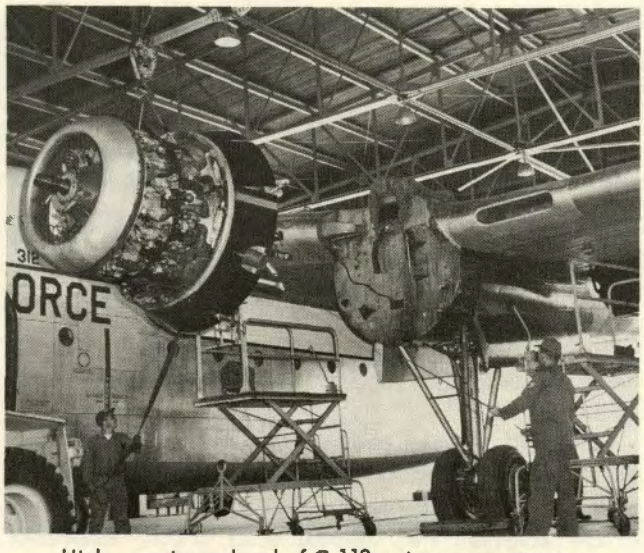
Less than two years ago, the 434th TAW told TAC that they had a way to make the Slingshot system more effective. TAC said go.

After three months of development and testing, the Indiana reservists had a system they called SPADS, which on one pass over the DZ, could paradrop up to 16 A-22 containers, or 52 A-21 containers, or three J-1 platforms, or any combination of the three. The ejection time remained at 4 1/2 seconds.

SPADS permits a single pass drop of up to 22,000 pounds, based on current C-119 wingload limits, for short tactical missions. And no-cost parachute modifications allow drops at up to 50 percent lower than normal altitude, greatly improving accuracy.

Part of the accuracy is shown by the 47.2 yard CEA (circular error average) of all 844 test drops. And the ground pattern of a max load was held to 50 by 200 yards.

MAGIC ZERO



High experience level of C-119 maintenance men contributed to setting the Reserve's zero-accident rate.

Some units have developed procedures for combating specific hazards, especially aircrews operating from civilian airdromes. Take the 928th Tactical Airlift Group at Chicago's O'Hare International Airport, long known as the busiest facility in the world.

The 928th's home runways handle more than 650,000 takeoffs and landings per year, and their airspace is shared with seven other civilian and military airports within a 30 mile radius. Col. R. E. George, Commander, said his aircrew response to this environment has caused his men to be branded "swivel necks" by personnel of sister units. Scanning is SOP for every 928th crew member, including the loadmaster who covers the rear quadrants from the rear door windows.

DEFENSIVE FLYING REDUCES ACCIDENTS

Reservists work in a broad environment of civilian employment and Air Force flying. Some believe this has a positive effect toward accident-free flying. This multi-environmental situation stimulates "defensive flying" according to Operations Officer, Maj. Walter Ruf. He explained it this way:

When a reservist arrives at the flight line, he has been away from the cockpit for 10 to 12 days. He has little doubt about his ability to perform, considering his many years of current status and the 3,000 to 5,000 hours he has logged.

But during the 10 to 12 days of no flying, the reserve driver has heard little or no hanger talk; he has not seen the latest operations and safety briefs; his interest in weather has been limited to the condition of his lawn; and the vocabulary of common aircrew phrases has a strange, though temporary, sound. Reorientation is accomplished through programmed procedures.

Each action is deliberate. The pilot plans his flight in complete detail. He follows checklists without deviation. Every pilot knows that a methodical approach sidelines complacency. His attitude is defensive. He knows that a missed briefing or procedure is an invitation for an accident.

TAC monitors the C-119 fleet's Standardization and Evaluation program. However, command and control of the reserve units on inactive status is the responsibility of CAC (Continental Air Command) headquartered at Robins AFB. Reservists conduct training operations in accord with TAC criteria. They are subject to TAC ORIs. And the C-119 units become wholly TAC elements when mobilized.

Reservists believe that their bird, though in the well used category, can contribute to TAC's mission. They are proving this fact with every hour of airlift support given to regular forces. They also know that if their equipment is ever needed on a full-time basis, they can deliver.

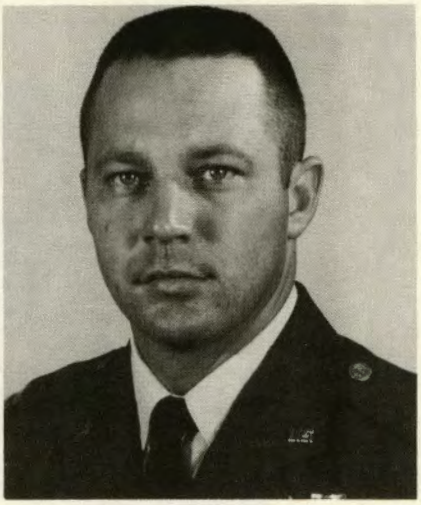
One group commander said it this way, "Who can argue with success?"

Seven Air Force Reserve tactical airlift groups have flown without an accident in their C-119s since they received the aircraft almost ten years ago. These units have tallied a total of more than 285,000 Flying Boxcar hours. They are:

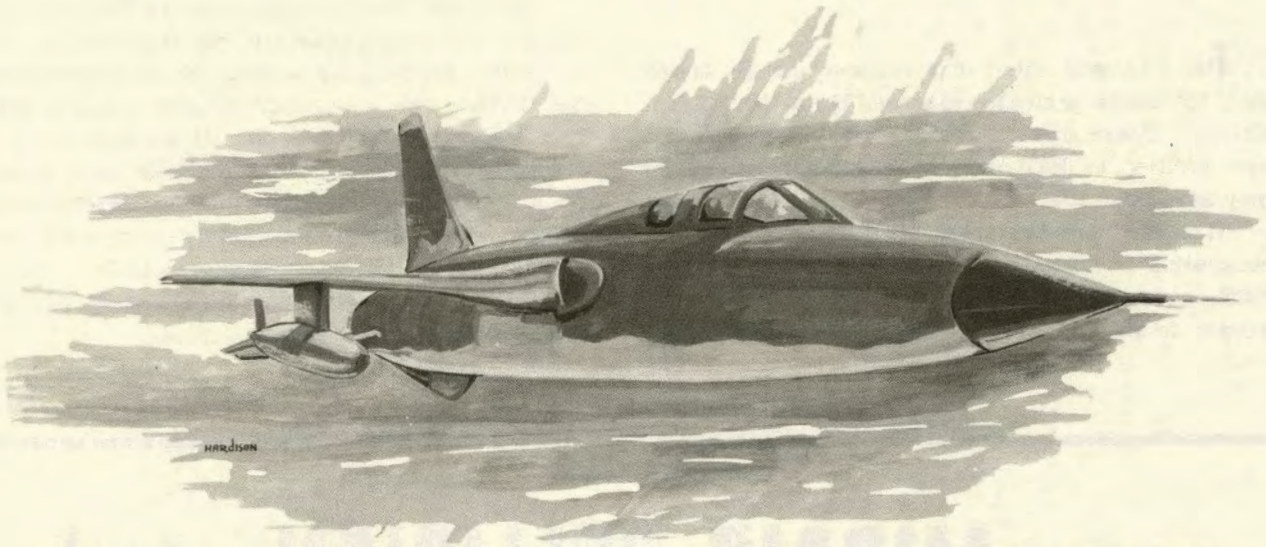
906th TAG Clinton County AFB, Ohio
910th TAG Youngstown MAP, Ohio
913th TAG Willow Grove AFRes Fac., Pa.
924th TAG Ellington AFB, Texas
928th TAG O'Hare IAP, Illinois
931st TAG Bakalar AFB, Indiana
934th TAG Minneapolis-St Paul IAP, Minn.

TACTICAL AIR COMMAND

PILOT OF DISTINCTION



Captain Douglas G. Lauck

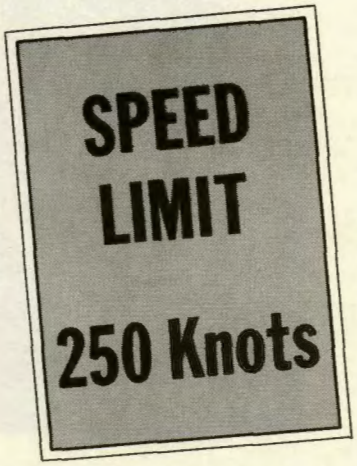


Captain Douglas G. Lauck of the 562nd Tactical Fighter Squadron, McConnell Air Force Base, Kansas, has been selected as a Tactical Air Command Pilot of Distinction.

Shortly after takeoff in an F-105F on a night proficiency flight, Captain Lauck found his doppler navigation system malfunctioning. He also found the intercom and Tacan were failing. When he tried to notify Air Traffic Control of his difficulties, he found his radio dead. This was followed shortly by failure of the utility hydraulic system and then complete electrical failure.

With darkness approaching, Captain Lauck dead-reckoned his position to be near a large city and started an immediate descent through the 8000-foot-thick cloud layer using only altimeter, airspeed, and magnetic compass. He located the city and an airport and started an approach for landing. Normal wheel brakes, anti-skid, leading and trailing edge flaps, speed brakes, afterburner, and thrust decay were not available to him because of the system failures. His drop tanks were half full, but he could not jettison them. He touched down at 235 knots, stopcocked the throttle, used aerodynamic braking, and delayed his drag chute until he was below 200 knots. With careful use of the emergency brakes, he was able to turn off the runway 1000 feet from the end and stop on a taxiway.

Captain Lauck's skilled airmanship, professional knowledge, and calm reactions during severe stress, readily qualify him as a Tactical Air Command Pilot of Distinction.



The FAA has ruled that you may not fly faster than 250 knots indicated airspeed below 10,000 feet altitude. There are no aerial police to enforce this new addition to FAR part 91. But this requirement may save your life.

At most of our busy population centers air traffic congestion has become a perplexing problem. The VFR, or see-and-be-seen, philosphy is becoming harder to live by (pun intended). Many of the light plane owners who fly in these areas can't afford the equipment necessary to make each flight under instrument flight rules... one of the proposed temporary remedies. So with the mix getting to near critical proportions, the 250 knot speed limit has been placed on all of us. It's purpose...SAFETY.

Our guidelines in TAC are to comply with this FAR. It will shortly appear in our own AFR 60-16. We may exceed 250 knots however, when the assigned mission requires it or when the aircraft Dash One specifies a higher speed to assure safe operation. TAC high speed, low altitude operations on approved routes and in air combat tactics areas are exempt from the speed restriction. If you fly a bird which requires more than 250 knots for safe flight then your lowest optimum airspeed becomes your airspeed limit.

There are further exceptions to the rule. Let's say for illustration your aircraft requires 300 knots on initial approach for landing. Maybe your base also has T-33s. The commander is authorized to establish standard airspeeds for all aircraft using the airdrome. In this case the T-33 could be required to fly a 300 knot initial approach. Established traffic pattern airspeeds for the various airdromes can be found in the Flip Enroute Supplement.

So don't get caught with your speed up. Above all ... keep your eyes out!

near MIDAIR COLLISION study

The Federal Aviation Administration recently published an advisory circular (ACOO-23) establishing a study program on the frequency and cause factors of near midair collisions. The Air Force has thrown its full support behind the program.

In an effort to encourage participation the FAA has offered immunity to pilots who report near midairs. This includes Air Force pilots. The data they accumulate will not be available outside the FAA except in the overall conclusions of the study.

However, USAF cautions that it "cannot extend the same degree of immunity to its own pilots." Information concerning a flying violation obtained outside the FAA, even though it may be involved in the FAA study, will be processed in accordance with AFRegs. This, they say, is necessary so that corrective action can be taken when needed.

TAC's part in this worthy program is to be handled through safety channels. Since the FAA data will not provide feedback to the military services, military pilots must also report via the OHR. This may appear a little time consuming. But remember, both the OHR and FAA study are for everyone's benefit.

We can't take corrective action if we don't know the problem.

WHUMP!!

BANG!!

CRUMP!!

...speak english, guys

Two horrible examples of how an unexpected situation can get downright dangerous when the people involved don't use language the others can understand.

While the pilot was expediting his VFR approach to land, he sighted a large thunderbumper partially covering the airfield. His radio request to approach control was, "May I have the numbers?"

He received DME and a change in altitude and vector instructions. Some airline pilots use the term "numbers" to request the existing weather. Without receiving the weather info he wanted, the pilot went ahead and landed. He lost forward visibility in the rainshower, drifted off the side of the runway... CRUMP!!

A flight of fighter types was making a VFR night formation landing. They were advised of "company traffic" in "same type equipment" landing ahead of them. They acknowledged and replied, "Military assumes responsibility for separation of aircraft." Tower rogered the MARSA with clearance to land. The flight leader requested the jet trainer on the runway to expedite clearing the runway.

The tower operator used the term "company traffic" to indicate an aircraft belonging to the same organization. When he said, "same type equipment," he meant another jet aircraft. But the flight leader interpreted it to mean a jet fighter (versus a jet trainer). The term MARSA is for use at altitude during air refueling. It generally has no application in the traffic pattern in fighter operations.

When he was requested to expedite, the jet trainer pilot started heavy braking in an attempt to clear the runway ASAP. The landing pilots assumed he would expedite to the end and clear... they attempted to pass the trainer on either side... BANG!!

Sounds like a Chinese fire drill, doesn't it? Look, as long as we all fly Air Force aircraft, we should all speak the same language. Even ICAO says we have to speak English.

C'mon, guys...

from a 9th AF Safety Alert Letter

BOLD FACE procedures ...

They're doing something to make the bold face procedures in the Dash One easier to learn and easier to remember! Had you noticed?

Had you noticed that there's a move underway to standardize the terminology in emergency procedures for all aircraft? And to condense some of the lengthy procedures? And to downgrade some of the existing emergency procedures to non-critical status?

It started without a lot of fanfare a couple of years ago. And it's been progressing steadily since then. The changes resulted from a study of the bold face emergency procedures in jet fighter and trainer aircraft conducted by the Stan/Eval Division of Systems Command at Eglin AFB. TAC has accepted the recommendations of the Eglin study and our flight manuals are beginning to reflect this new approach to emergency procedures.

The F-100 was first. During flight manual review last year some of the terminology was changed and the number of CRITICAL procedures was reduced from 27 to 25. This year, we hope to see it go further toward complete compliance with the new concepts.

Last year's review of the F-105 manual brought most of the emergency procedures in line with the new ideas. And conferences on the F-4, F-5, and F-111, brought about changes in those manuals. The F-104 manual involved coordination with the foreign countries who use that airplane, and the next revision to the F-104 book will show the changes.

We haven't ignored the older airplanes. During the review of the F-86 and F-84 handbooks, TAC recommended they be changed to line up with the birds in the active force. The Prime Depot for each aircraft agreed and the changes will soon be in the field.

Although the Eglin study was conducted on jet fighters alone, the recommendations make so much sense that the concept is being extended to all Air Force aircraft.

To grasp the significance of this new approach, you must fully understand the special meaning we attach to CRITICAL procedures. Most flight manuals define them something like this:

CRITICAL

THOSE STEPS WHICH MUST BE PERFORMED IMMEDIATELY WITHOUT REFERENCE TO WRITTEN CHECKLISTS. THESE CRITICAL STEPS SHOULD BE COMMITTED TO MEMORY.

It makes sense that in a critical emergency you must make an immediate, conditioned response. It also makes sense that we should reserve the bold face format for truly CRITICAL emergencies. You would normally follow these critical items with non-critical steps in the same procedure.

This new approach to emergency procedures involves four major factors.

- The term CRITICAL is often misused. Many bold face procedures didn't meet our definition of a CRITICAL emergency.
- The unlearning-and-relearning problem has always complicated transition into a new bird. It has troubled those who fly more than one airplane.
- Similar emergencies in different aircraft have often received widely varied treatment. Some manuals cover a given situation with a bold face procedure. In others it may not even appear as an emergency procedure.

AIRCRAFT TYPE	TOTAL NUMBER OF CRITICAL PROCEDURES REQUIRED		TOTAL NUMBER OF CRITICAL INDIVIDUAL STEPS REQUIRED	
	PRESENT	PROPOSED	PRESENT	PROPOSED
T-33	14	11	45	30
T-38	10	9	22	24
F-4	11	12	32	33
F-5	9	10	20	27
F-100	16	12	47	34
F-101A	12	10	32	28
F-101B	16	10	50	28
F-102	27	13	57	37
F-104	20	13	47	39
F-105	16	13	38	39
F-106	24	12	71	35

easier to memorize

• Finally, many bold face procedures were either misleading or actually incorrect. The procedure for complete hydraulic failure in one twin-jet fighter used to read like this:

1. DECREASE AIRSPEED
2. ATTAIN LEVEL FLIGHT
3. EJECT

Step #1 assumed the failure would occur at high airspeed. But there was no reason why the hydraulic systems would quit at high speed instead of low. If they both fail at low airspeed, the pilot who tries to comply with the first step, will find himself in a rapidly compounding problem. Having lost all control surfaces except manual rudder, when he slows the airplane he will soon find the bird out of control and spinning.

Because he has no control left but a little rudder, he'll have an awful lot of trouble complying with Step #2. If the hydraulic failure occurred when his nose was low, he could only raise it by increasing power and increasing airspeed!

Not all CRITICAL procedures were that bad. But in many the wording was confusing, the logic was hard to follow, or the last bird you flew didn't handle the same emergency the same way. One more horrible example, though, to show how bad things can get:

One of the single-engine fighters used to have a ten-step procedure for Belly Landing. The Dash One went into great detail to explain that you should use the procedure only when all your efforts to lower the gear have failed. Only step four was considered CRITICAL ... in bold face type. It said, would you believe, GEAR HANDLE - DOWN!!

This procedure didn't meet our definition of CRITICAL. And it's kinda hard to explain the logic of preceding a CRITICAL step with three non-critical steps.

Many different people, in many agencies, are involved in writing our flight manuals. Each has his own ideas. And therefore we wind up with many differences in terminology.

Take speed brakes ... in one book you may find them called speed boards, or dive brakes, or dive flaps ... even air brakes! How about a throttle? You can call it a thrust selector or a power lever. You can close it, shut it down, stopcock it ... or just plain move it to OFF. You can place it in military power, full open, full mil, or 100 percent. If that's not enough ... when you're trying to recall the exact wording, you wonder whether the book said to move it outboard, to afterburner, to maximum, to full A/B, or to Max thrust!

The Eglin study went through the emergency procedures for eleven current jet fighters It compared the equipment and the emergency situations. And it arrived at wording most likely to trigger immediate, specific action on the part of the pilot. In almost every case, the people conducting the study found they could recommend a standard sequence of steps for all aircraft ... right down to the wording in each step. In the few cases where one airplane is equipped with systems or capabilities different from all others, they added special steps.

The review also cleaned up the procedures. It moved the CRITICAL steps to the top where they belong. And it dropped procedures that didn't belong in the CRITICAL category to the get-out-the-book-and-read-'em category.

We don't have the space here to list all the bold face procedures the study recommended. A quick

BOLD FACE

look at the thinking the Eglin people used on takeoff emergencies will give you a good idea how the rest of them go.

The Eglin study approached takeoff as perhaps the most critical phase of flight ... where a rapidly deteriorating situation can suddenly become catastrophic. And they found that almost every one of the flight manuals used different terms for the most critical part of this critical phase of flight ...

IF COMMITTED TO TAKEOFF	REFUSAL SPEED
GO-NO-GO	IF AIRBORNE
TAKEOFF NOT COMMITTED	AFTER LIFT-OFF
DECISION SPEED	BEFORE AIRBORNE

All of these terms were used to describe the magic point where you must either abort or continue your takeoff.

But when you look at them carefully, none of these terms actually mean what they intend to say ... for various reasons. For example, "refusal speed" is defined as the maximum speed at which engine failure permits you to stop at the end of the runway. It doesn't consider that you probably have a barrier of some sort, perfectly capable of stopping you safely. You could very well be far beyond refusal speed and still have the capability to abort. With a burning aircraft, this may be your best course of action.

They found it one of their most difficult choices of terminology, but the people conducting the study decided to divide takeoff emergencies into two major categories:

1. IF DECISION IS MADE TO STOP (Based on available runway, arresting gear, barrier, overrun, terrain.)

2. IF TAKEOFF IS CONTINUED.

They decided it is impractical to deny the pilot the use of his judgment in this extremely critical situation. Phrases such as After Airborne, After Refusal Speed, or After Lift-Off leave no room for judgment. They can lead to an arbitrary ... and perhaps incorrect ... decision to press ahead with the takeoff, even when a successful abort may be possible. The term If Committed to Takeoff is technically meaningless until you have performance data from which to compute this point ... such as a chart for Abort After Takeoff.

If you do make the decision to stop, you're faced with the first CRITICAL takeoff emergency the study group considered ... ABORT. They found these titles for the abort procedures in the manuals they studied:

ABORT
BARRIER ENGAGEMENT
ABORT OR BARRIER ENGAGEMENT
RUNWAY OVERRUN BARRIER
ABORTED TAKEOFF
ABORT (BEFORE LEAVING GROUND)
ABORT (AFTER LEAVING GROUND)
ABORT/BARRIER ENGAGEMENT

The first conclusion they came to was that an abort is a Takeoff Emergency and includes barrier engagement as an integral part of the procedure. Of course, barrier engagement should also be considered a Landing Emergency. It should be repeated in the landing section of Chapter III. In all cases, they reasoned, the procedures should be identical for both.

Going through eleven flight manuals, the study group found the 29 bold face steps listed (right) in the procedures for aborted takeoff. When you apply these steps to the individual aircraft, you notice several interesting facts:

- All have throttle movement as Step 1.
- Only four aircraft call for wheel brakes.
- The F-101A and F-101B, which are sometimes flown interchangeably by the same pilots, require different procedures for this emergency.

Note the lack of standardization in terminology ... steps 16 thru 19 (speed brakes), steps 1 thru 7 (throttle), steps 8, 9, 10, and 12 (external load jettison). Here they selected the phrase "EXTERNAL LOAD - JETTISON" as the best option for all aircraft. The word "Load" covers all possibilities, where "Tanks" implies tanks only. "Stores" is usually taken to mean all items other than fuel tanks, such as bombs, special pods, and so forth.

The Eglin study recommended this abort procedure for all jet fighter aircraft:

1. THROTTLE(S) - IDLE (OFF FOR FIRE)
2. SPEED BRAKES - CLOSED (For aircraft where extended brakes interfere with engagement)
3. DRAG CHUTE - DEPLOY
4. EXTERNAL LOAD - JETTISON (AS NECESSARY)
5. ARRESTING HOOK - EXTEND

Only the steps which apply will appear in any particular flight manual. The F-100 is the only aircraft that will show all five steps. By comparison, the T-33 will have only two steps ... numbers 1 and 2. However, the sequence will remain standard in all aircraft, as will the terminology used.

ABORT

1. THROTTLE - OFF
2. THROTTLE - IDLE
3. THROTTLES - IDLE (FOR FIRE - AFFECTED ENGINE - CLOSED)
4. THROTTLES - IDLE (OFF-FIRE)
5. THROTTLE - IDLE OR OFF
6. THROTTLES - IDLE
7. THROTTLE - IDLE (OFF FOR FIRE AND EMERGENCY BRAKE HANDLE - PULL FULL AFT)
8. EXTERNAL STORES - JETTISON AS REQUIRED
9. STORES - JETTISON (IF NECESSARY)
10. TANKS - JETTISON
11. CANOPY - JETTISON (IF NECESSARY)
12. EXTERNAL LOAD - JETTISON (IF NECESSARY)
13. CHUTE - DEPLOY
14. DRAG CHUTE - DEPLOY
15. DRAG CHUTE - EMERGENCY DEPLOY
16. SPEED BRAKES - IN
17. SPEED BRAKES - UP
18. SPEED BRAKES - OPEN
19. SPEED BRAKES - CLOSED
20. TAILHOOK - DOWN
21. HOOK - EXTEND
22. HOOK - DOWN
23. BRAKES - AS REQUIRED
24. WHEEL BRAKES - APPLY
25. BRAKING - STEER FOR CENTER, STOP BRAKING PRIOR TO ENGAGEMENT
26. BRAKING ACTION - AERODYNAMIC, NORMAL, EMERGENCY
27. ARRESTING HOOK - RELEASE
28. BARRIER - ENGAGE SQUARELY
29. CONTROL STICK - AFT TO RAISE NOSE. AVOID NOSEWHEEL LIFTOFF

This list doesn't show the procedure for any specific aircraft. Each manual used the steps in this manner:

T-33	T-38	F-4	F-5	F-100	F-101A	F-101B	F-102	F-104	F-105	F-106
1	6	6	6	2	3	4	5	5	7	2
17	19	13	14	16	18	18	14	9	8	15
28	25	24	24	14	14	14	27	14	14	20
	29	22	16	12	26	12	10	21	27	23
			8	27	12	20	23			
					20	11				

Study the chart below and you'll get an idea of the changes that will take place in each flight manual when this program is fully adopted. The study group slightly increased the number of CRITICAL procedures required on three aircraft. But they greatly decreased the number on the other eight.

You'll also see that the maximum number of CRITICAL procedures for any one aircraft will decrease from 27 to 13. And the maximum number of steps in any CRITICAL procedure will come down from ten to five!

The most important factor ... and it's not shown by these figures ... is that the procedures which do remain bold face will all be alike throughout the entire USAF jet fighter and trainer inventory!

When this program has been fully adopted, it will benefit more than just the pilots who fly the aircraft. Some of the benefits may be rather subtle and intangible, but others you can readily identify:

Accident Prevention

This program places added emphasis on CRITICAL EMERGENCY PROCEDURES. Those selected as meeting the criteria for CRITICAL are clear, concise, and positive. They are short enough to be memorized and comprehensive enough to cope with the emergency.

Operations

Initial qualification, requalification, and multiple currency will present fewer problems to aircrews and flight managers.

Training

Cross-training will be expedited. A minimum of unlearning and relearning will be necessary while you check out in a new aircraft.

Standardization

The increase in standardization will have positive effects in Safety, Operations, and cost reduction.

by William L. DeGinder, M.D.
reprinted from FLYING MAGAZINE

RED LIGHT BLINDNESS

Could you read the rest of this page by the red illumination of your cockpit lights? Are you sure? You may be reading this without glasses, but you could still be subject to "red-light blindness"!

This visual handicap develops gradually, and it eventually affects most pilots, including many who still seem to have "perfect vision" under daylight flying conditions. Pilots who fly after dark only on rare occasions sometimes discover this peculiar disability suddenly. If you are approaching or passing 40 years of age, it might be a good idea to try reading some fine print by red light before your next night flight. You could find out the hard way.

Let's suppose that you have done no cross-country night flying for several months. You take off in perfect weather just a little before sunset. Everything is going fine, but you need to find the frequency of the next VOR and make some cross-checks on your exact position.

It's now dark in the cockpit, so you turn on the red map lights and spread a chart on your knees. You can't read it there so you pick it up for a closer look... still blurred. You move the chart right up under the red light, then your eyes widen and your forehead wrinkles with strain as you try to focus the fuzzy figures. That's red-light blindness.

HOW DOES RED LIGHT BLUR VISION?

The eye and the camera are surprisingly similar (Figure 1). In both, a lens system collects light and forms a picture image. The amount of light entering the eye or camera is regulated by a circular iris behind the first lens component. The correct amount of light then passes through a second lens component for final focusing into a sharp image on the light sensitive surface of the retina in the eye or film in the camera.

The camera's lens must be moved forward or backward from the film to focus the light rays precisely upon the surface. Instead of moving forward or backward, the lens system of the human eye focuses automatically and almost instantly by a remarkable mechanism that causes slight changes in contour and thickness of the second lens.

To see something close, we focus the picture by contracting a circular (ciliary) muscle about the rim of this lens just exactly the right amount to increase its thickness and curvature enough to produce a sharp picture image at the retina. Moving the object closer requires stronger contraction of the ciliary muscle, greater change in contour and thickness of the lens.

For each individual there is a limit of close focus. Some individuals can barely focus at arm's length, in bright illumination (moderate far-sightedness). After the eyes have been used for 40 years or so, this extra effort becomes less and less effective, even with good illumination (presbyopia). Looking at small

type under red light illumination forces the eyes to work at the greatest possible disadvantage.

SOME OVER-SIMPLIFIED OPTICAL FUNDAMENTALS

When white light passes through a prism, the constituent wave lengths or colors are bent to different degrees and emerge in a rainbow spectrum. (Figure 2). Light passing through a simple converging lens is also dispersed to some extent as it converges behind the lens.

This dispersal of colors is most pronounced when light penetrates the peripheral part of a rather thick lens (chromatic aberration). Therefore, the precise focal points of the various colors of light are found at slightly different distances behind the lens.

The human eye and the more expensive cameras have built-in features to compensate for this. But the compensating factors are inadequate under the conditions we have described.

Color dispersal is most severe when light penetrates the peripheral part of the lens, and it is almost insignificant when a small iris confines light to the central part. The pupil dilates to its maximum under dim red light, attempting to admit more light to the retina.

At the same time, the lens increases its curvature and thickness, attempting to focus a sharp image of the print at short distance. Both of these factors decrease the optical efficiency of the simple lens system, and the image formed by the red light has a tendency to focus behind the retina.

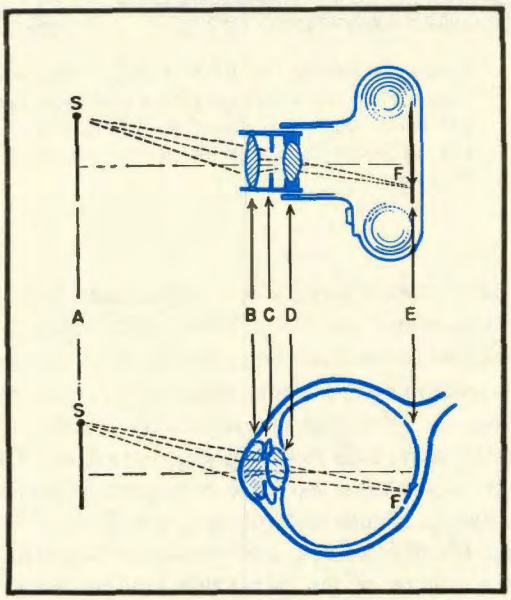
The print appears blurred. Some extra effort to contract the ciliary muscle and increase the curvature and thickness of the lens a bit more might make it possible for the young person to go ahead and read the print, even though he might feel some sensation of eye-strain.

If the lens system is no longer able to make this extra effort to bring red light into sharp focus upon the retina, the image remains blurred.

A pilot who passes all of the standard eye examinations under standard conditions of illumination may still find himself unable to read the vital figures and facts on his flight charts under red-light illumination.

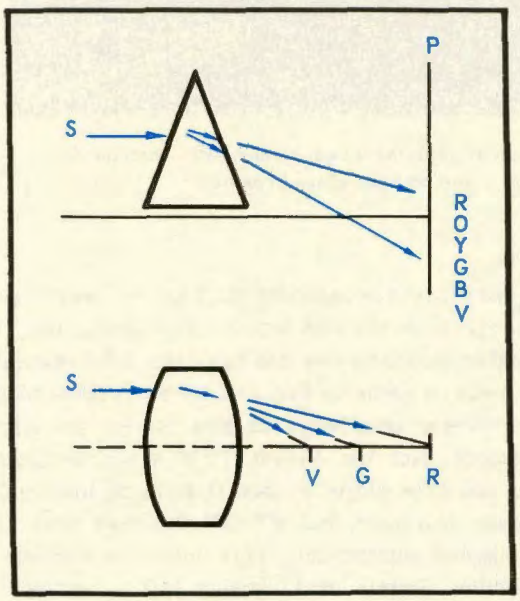
Manufacturers are now beginning to equip planes with white light (all new Cessnas have "blue-white" lighting), but if you still have red lighting, you can get prescription glasses for night flying, or carry a hand lens or flashlight for better vision.

FIG # 1



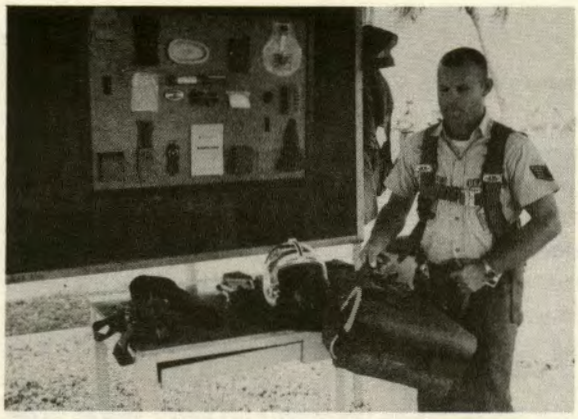
Focusing mechanics of camera and eye.

FIG # 2



Light dispersal by prism and lens, with red falling most distant from the lens.

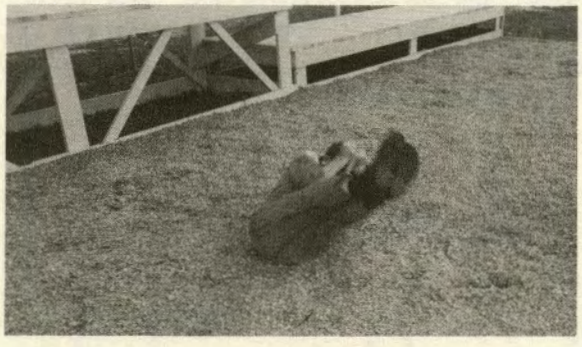
TO SAVE



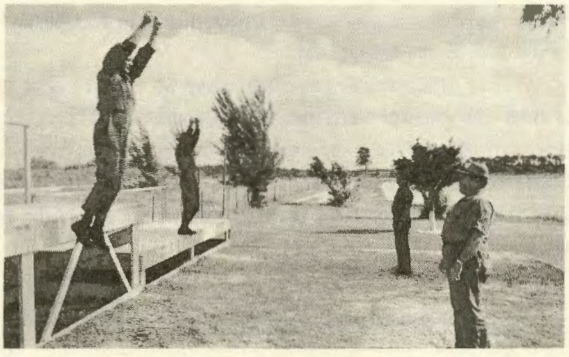
Classroom instruction, Florida style, is designed to acquaint F-4 crewmembers with the proper procedures to fit, adjust, and use survival equipment. This includes everything from the pilot's helmet and mask to the LPU-2, G-suit, parachute harness, and Martin-Baker seat.

Special emphasis is given to the Bendix survival kit and its contents. The kit shown here is a functional training mockup made of scrap metal and fabric. Use of this kit prevents wear and tear of the more expensive Bendix.

Open air classroom was built through the extra efforts of the Wing welding and fabrication shops.



Student hits the sawdust and rolls through the five points of body-ground contact.



Parachute landing fall training begins on the 2-foot platform. Here the importance of keeping feet and knees together is stressed. Improper landing fall accounts for one-third of the parachuting injuries.

Every aircrewmember in TAC is aware that familiarity with his life support equipment may mean the difference between life or death. TAC regulations have been written to insure that each crew member has a basic knowledge of how to use his survival equipment. But the 4531st TFW at Homestead has taken positive steps to see that each man not only becomes familiar, but STAYS familiar with all his life support equipment. This includes emphasis on parachute control and landing fall... source of a large percentage of our injuries and deaths.

The Life Support program at Homestead is directed by Captain Ken Ekberg (OIC) and MSgt Machment Thompson (NCOIC). Their Life Support team constructed an outstanding series of training platforms and mock-ups from waste lumber, sheet metal, and fabric. Total cost of materials... under $1200.

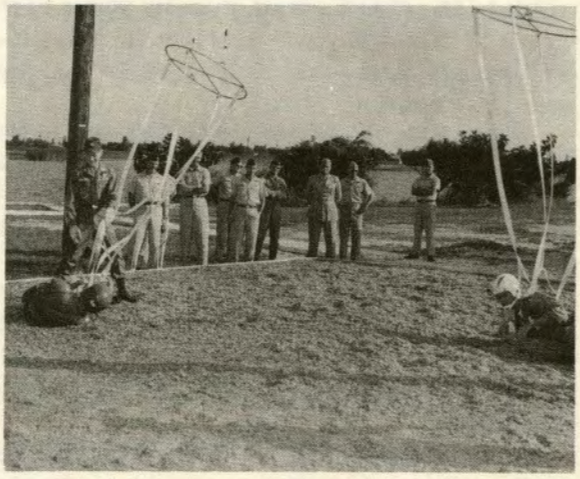
Their parachute training warrants special mention. It is perhaps the best in the entire command. Under the tutorship of Captain Louis Mari, USArmy Ground Liaison officer, crewmembers begin learning the fine points of the parachute landing fall (PLF). This one area accounts for more than one third of our ejection injuries.

A LIFE

Suspended from the swing landing trainer, the aircrewman practices deploying the mockup Bendix survival kit, getting the feel of the hardware. Parachute control steering and maneuvering, is also rehearsed during this phase.

Final phase of the PLF training is a trip on the swing landing trainer. The student swings back and forth, simulating an oscillating chute.

F-4 student and instructor pilots get intimately familiar with their water survival equipment. Trainees also practice parachute disentanglement procedures while in the water.



He is then dropped into the sawdust at some time during the simulated oscillations. He must then hit the ground in position for a PLF.

The first stage of PLF training begins with the students jumping from the two foot platform into soft sawdust. When he masters the rudiments the crewmember then progresses to the higher four foot platform. Here he continues to perfect his PLF technique.

Finally, comes the big test on the swing landing trainer. Here the student swings back and forth in full parachute harness until the instructor decides to release him. Since he can't forecast his touchdown the student assumes the landing position and, by reflex, performs the PLF on touchdown.

This training has proven that only actual practice can insure proper responses in an emergency. Even airborne school graduates acknowledge benefits from the PLF training.

The life support apparatus adds nine hours to the 4531st RTU syllabus. Instructors also get their fair share of training. In an effort to aid other Blue Suiters the 4531st allows the 19th Bomb Wing (SAC) and 319th FIS (ADC) to use the training apparatus for their survival training.

The life support mission is to save lives. Captain Ekberg's team is doing just that.

CHOCK TALK

. . .incidents and incidentals with a maintenance slant.

last chance lost

Number Three in a flight of three F-105s had just landed from a GCA behind Lead and Two. On the rollout, he noticed a trail of empty 20mm cartridge cases on the runway in front of him. He found it winding through the de-arm area, down the taxiway, and into Lead's parking place.

When they all got out and looked at Lead's airplane, it became very obvious. The forward ammo compartment door was open! It apparently had not been secured before takeoff, but had remained closed until the nose gear touched down on landing.

You can slam this particular door shut and it will stay there without the camlocks secured. And although the camlocks protrude 1/4-inch when they're not locked, they're easy to miss unless you look directly at them.

The big mystery is how the bird got past the end of the runway, last-chance, inspection. That's what it's supposed to be for . . . to catch the items that everyone else missed!

last chance...again

It all came up when an overseas F-100 outfit found that one of their birds lost an access panel during takeoff. When they picked up the panel on the runway, they found only one of the dzus fasteners was bent. Apparently it was the only one that had been fastened.

After a little checking, they learned that the crew chief who launched the airplane also made the last-chance inspection at the end of the runway. And that kinda takes all the steam out of the last-chance check . . .

Isn't that supposed to be where you catch the things all the other folks have missed . . . ??

confidence?

An overseas Phantom crew aborted takeoff after about 1500 feet of roll because they had no airspeed indication. They followed the book and stopped their heavy bird on the runway without any difficulty.

After the bird taxied in, inspectors quickly determined what had caused the trouble . . . water in the pitot-static system. The crew chief should have drained the water from the system during his preflight. After they purged the system it worked the way it's advertised.

The maintenance folks had a long talk with their flight line troops. Then they decided to ask the aircrews to drain the system on their preflights . . . just to be sure.

Doesn't say much for their confidence in the quality of maintenance, does it?

phantom pins

The aircraft commander had just started the left engine of the F-4 when the crew chief reported sparks coming from the rear of the bird. They quickly shut down both engines and stepped out.

In short order they found the remains of a ground safety pin that had gone through the engine. It had done the normal amount of damage . . . they had to remove the engine and ship it to the depot.

Nobody could identify the fragments that had come out of the tail pipe. Both air and ground crews were sure the intakes were clear of foreign objects during preflight. And they accounted for all the pins that were supposed to be around the airplane.

They're still scratching their heads . . . but everyone concerned is being a lot more careful about foreign objects, and ramp cleanliness . . .

warnings

The F-105 pilot had been airborne about 15 minutes on a conventional gunnery mission when he noticed a moderate low-frequency vibration in the airplane. Then he noticed that the exhaust gas temperature had climbed up to 675 or 680 degrees. Without hesitation, he diverted to a civilian airfield close to the gunnery range. He landed before any more serious trouble developed.

The engine specialists suspected a bearing failure. And when they took an oil sample they had their suspicions confirmed. Spectrometric analysis of the oil showed it contained an abnormally high iron content... 39 parts per million.

They removed the engine for teardown and installed a new one in its place. That could have been the end of the incident, but some curious folks at the base checked back over the records. They found this engine had given ample warning that it was having trouble.

The engine had been flushed three times in its last 80 hours of operation because an iron content of over 15 parts per million showed up in routine oil samples. Each time the iron content would drop to about three parts after flushing. And it rose gradually ...one or two parts at a time...never at an alarming rate.

The unit involved has decided that in the future they will tear down and inspect any engine after it has been flushed twice and still shows an increase in iron content.

fowl play

The C-119 pilot watched the right engine torquemeter unwind to 60 psi during takeoff climb. No surging, no backfiring, just a slow decaying of power. With the thrust loss his Number Two fuel flowmeter fell to 500 ppm. Fully convinced his bird was ailing he cut the fuel mixture and completed his shutdown checklist. His engine-out return and landing was routine.

Surprised maintenance inspectors found three dead rats in the carburetor air intake. Ram air on takeoff roll pushed them against the carb air intake screen cutting air flow. Fuel flow dropped correspondingly with reduced air intake, resulting in low power output. They're discouraging Owls Club banquets in their Boxcars by more frequent engine intake inspections.

Can you imagine the screeching complaints when the owl discovered his in-flight lunch was stolen by that twin-tailed silver bird?

SO LONG

Shack

Our Editor, Major John Shacklock, departs for SEA and Skyraiders after this month's issue. We'll miss him and his objective commentary. Of course, TAC ATTACK's loss becomes PACAF's gain; this is part of the Air Force way of life.

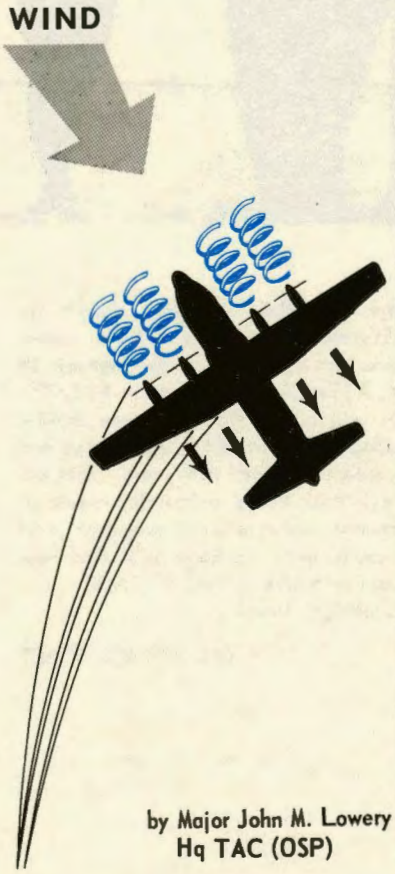
John guided TAC ATTACK's personality and edited its content for over two years. His accident analysis was based on careful research; editorial comment reflected his judgment and operational experience. We hope he'll find time to keep his byline active in TAC ATTACK.

Happy Landings, John.

TAC ATTACK STAFF

REVERSING'S THE PROBLEM!

not the solution



by Major John M. Lowery
Hq TAC (OSP)

Many multi-engine pilots are unaware that crosswinds, wet, slick runways and reverse thrust can combine to spell disaster. With a crosswind on a slick runway you expect some push toward the downwind side. However, when you apply reverse thrust you actually accelerate your drift and almost guarantee going off the side. Here's why.

Let's say you've just touched down in the center of the runway on the runway heading. You used the wing down or crab method for crosswind correction. Your touchdown speed is well above the speed at which your tires will hydroplane. So on touchdown you get absolutely no traction from your tires. In fact, many times the wheels never even begin to rotate. Instead they simply plane on the surface water film.

The crosswind then begins pushing the aircraft downwind. (There's no tire-ground friction to counteract the drift.) If you try to maintain the runway heading you'll continue to skid or drift toward the downwind edge of the runway ... and off the side.

This sideways push can be surprisingly forceful. NASA says, "These (side) forces are proportional to the square of the crosswind velocity; thus, a 10 kt crosswind would quadruple the side force developed by a 5 kt crosswind on an aircraft."

If you release your crosswind controls on rollout, for example, to get a-hold of the nosewheel steering control, the aircraft will weathercock into the wind, drift toward the downwind edge of the runway. Now, if you go into reverse thrust while weathercocked, the reverse thrust pushes you with the wind. In other words, it essentially adds velocity to the crosswind which accelerates your drift (see diagram).

The only way you can effectively counteract this sideways drift while using reverse thrust is to yaw the aircraft DOWNWIND. This makes your thrust vector act against the wind. However, this technique is not the answer since it is contrary to all our training and habit patterns.

Now, you can apply enough forward thrust to counteract your drift and stay on the runway. However, you then have a problem of runway length. Fortunately, in most cases the aircraft gets below hydroplaning speed before leaving the runway.

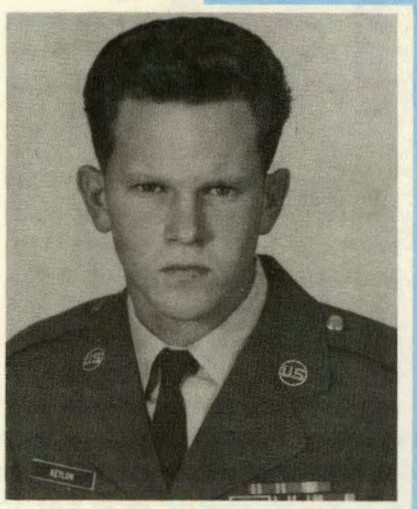
The best procedure to follow, when you have a crosswind and all the right conditions for hydroplaning, is go to your alternate. Many of our airlines have identified problem airfields which they avoid altogether when it's raining or the runway is wet. And remember, these airline pilots are required to divert at a large financial loss to their company. Naturally all this applies to snow and ice covered runways as well.

With the right conditions for trouble ... you must decide: "Is landing at your filed destination worth the risk to your aircraft, passengers, and crew?"

References: Cobb, J. B., Horne, W. B.: "Performance on Slippery Runways In A Crosswind." AIRLINE PILOT, June 1964

CREW CHIEF OF THE MONTH

Sergeant Melvin H. Keylon of the 61st Tactical Airlift Squadron, Sewart Air Force Base, Tennessee, has been selected to receive the TAC Crew Chief Safety Award. Sergeant Keylon will receive a letter of appreciation from the Commander of Tactical Air Command and an engraved award.



Sgt Melvin H. Keylon

MAINTENANCE MAN OF THE MONTH

Technical Sergeant Thomas P. Dobbins of the 481st Tactical Fighter Squadron, Cannon Air Force Base, New Mexico, has been selected to receive the TAC Maintenance Man Safety Award. Sergeant Dobbins will receive a letter of appreciation from the Commander of Tactical Air Command and an engraved award.

Sgt Thomas P. Dobbins

TAC TIPS

McDonnell Douglas has issued a warning to all F-4 pilots flying aircraft with the new H-7 ejection seat. This seat will be showing up in TAC in/around February or March.

Seems that pilots are storing personal baggage and packages underneath the seat. Down locks and safety pins have also been stuck back underneath the seat.

These items, they caution, can cause damage to the ejection seat rocket nozzles. This would, of course, endanger crew members forced to eject.

TOO PROUD?

Landing at a strange base on a flight away from home, the F-100 pilot found he couldn't get his drag chute to deploy. He cycled the handle three times, but the chute wouldn't come out.

Approaching the far end of the runway, he felt he could turn off without trouble. He thought about the barrier briefly, then dismissed it. He left his speed brakes down, his hook up.

But when he reached the last taxiway, he was still too fast to turn. He crossed the BAK-9 and rolled into the overrun. And his extended speed brakes deflected the MA-1A cable.

When he finally stopped, he was 500 feet into the overrun. And his right brake was on fire. It took the maintenance folks 30 manhours to replace the nose tires and the main gear tires and brakes.

Like many others before him, this troop didn't want to look silly . . . calling for someone to come and raise his hook after he turned into a taxiway. But that would have looked a lot better than sitting in the overrun and calling for fire trucks.

. . .interest items, mishaps with morals, for the TAC aircrewman

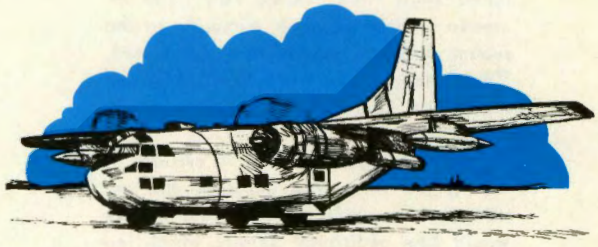
TIPSY

It was a fairly tight squeeze behind the Herky, but the C-123 driver decided he could get through. And besides, the C-130 had its engines at idle . . . they never performed their runup pointing 90 degrees to the runway the way this guy was.

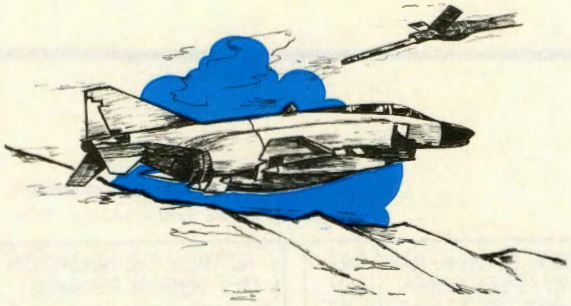
But when the C-123 was passing the C-130's tail, the Herky crew advanced power. It looked like full power!

Although the C-123 pilot used full left aileron as his left wing came up, he couldn't stop it. The bird tipped over. Its right wing tip, jet pod, and prop blades came in contact with the PSP. It cost them 108 man-hours to repair the damage.

It was on one of those very crowded airfields, but



that really wasn't much of an excuse. And the crews of both airplanes had to share in the blame.



THE LITTLE THINGS

The F-4 student aircraft commander was on his first air refueling mission. He had stabilized nicely in the pre-contact position, but when he started forward to contact, he was moving too fast.

When the instructor, in the rear seat, tried to pull off some power, he found the throttles wouldn't budge. The student had tightened his throttle friction too far. And he was still trying to advance the throttles!

The IP didn't get the power off in time.

Despite all this, the boomer managed to insert his boom in the Phantom's receptacle. But the bird continued forward and up until it came in contact with the lower portion of tanker's boom collar. By this time the boomer was calling "Breakaway!", and the IP was pushing forward on the stick.

As the F-4 broke down and away it took a piece of the ice shield with it, trapped in the receptacle . . . a mute reminder that a little thing like throttle friction too tight can cause all kinds of trouble.

LETTERS

. . .to the editor

I have just finished reading your November issue of TAC ATTACK and, as always, consider it outstanding. The article, "When Your Tires Become Skis," written by Major John M. Lowery, states that NASA found even the wire-impregnated snow tires offered very little increase in friction, due primarily to the rubber flexing. In addition, he stated, "We know now, as a result of NASA and Air Force Tests, that RCR means very little."

This is a problem that is critical to the C-130 when you consider the environment in which we must operate. We would like additional details which led to the above conclusions.

Thank you for your kind assistance in this matter.

Major William R. Dybvad
Hq 315th Air Division
APO San Francisco 96323

NASA conducted tests for the Air Force to determine the effect of the ice grip features on aircraft tires. Their results showed "... the ice grip feature has little effect on tire traction for wet ice conditions investigated." Wet ice is the most severe surface condition a pilot can encounter. The author's reference was a NASA publication, "Recent Research On Ways to Improve Tire Traction on Water, Slush or Ice," by Mr. Walter B. Horne, Nov. 1965.

The referenced statement concerning, "... RCR means very little" was a conclusion by the author based on several published tests.

The ability of a tire to produce traction is dependent on many factors, tire tread design, tire wear, rubber composition, tire pressure, runway surface texture ... For example, a smooth tread design, or a tire with more than 80 percent tread wear, very rapidly loses traction on damp or wet runways. A synthetic rubber tire produces more coefficient of friction than a natural rubber tire. Auto tires are synthetic rubber and aircraft tires are natural rubber. Tire pressure has a direct bearing on the speed at which a tire will begin skidding. In other words, your ability to stop depends on many factors not measured by RCR.

NASA's Wallops Island test due to start this spring will test various measuring devices to ascertain the best method for forecasting available runway surface traction.

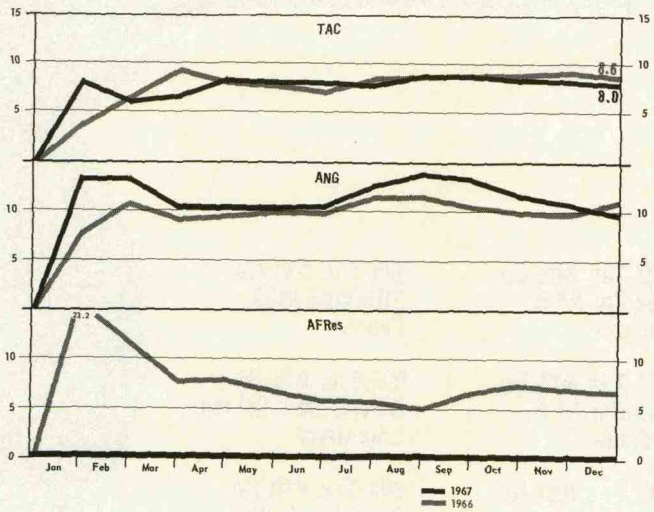
– Ed.

PEANUTS

TAC TALLY

MAJOR AIRCRAFT ACCIDENT RATES as of 31 DECEMBER 1967

estimated per 100,000 hrs flying time



UNITS

	1967	1966		1967	1966
9 AF	6.7	5.6	12 AF	9.8	12.3
4 TFW	4.6	15.4	23 TFW	14.3	29.6
15 TFW	23.8	3.2	27 TFW	9.1	11.2
33 TFW	7.4	12.6	479 TFW	7.6	7.5
354 TFW	27.8	28.9	67 TRW	9.4	10.3
4531 TFW	0	0	75 TRW	20.9	0
363 TRW	7.5	9.8	313 TAW	0	9.1
64 TAW	0	0	516 TAW	0	8.0
316 TAW	0	0	4453 CCTW	5.6	6.4
317 TAW	4.2	0	4510 CCTW	8.3	13.2
464 TAW	2.2	0	4520 CCTW	9.0	15.6
4442 CCTW	5.7	0	4525 FWW	22.6	22.3

SPECIAL UNITS

1 ACW	4.6	11.3	4500 ABW	0	0
4410 CCTW	9.8	12.4	4440 ADG	0	0

AIRCRAFT

TYPE	TAC (1967 / 1966)	ANG (1967 / 1966)
A-1	22.9 / 26.3	0 / 0
RB-66	0 / 0	0 / 0
F/RF-84	0 / 0	14.2 / 12.1
F-86	0 / 80.5	7.9 / 14.2
F-100	13.2 / 17.5	18.0 / 17.0
RF-101	27.3 / 27.1	17.0 / 33.6
F-105	16.2 / 25.6	0 / 0
F/RF-4	12.4 / 6.1	0 / 0
C-47	3.8 / 0	0 / 0
KC-97	0 / 0	0 / 0
C-119	0 / 0	0 / 0
C-123	4.2 / 0	0 / 0
C-130	0.5 / 1.8	0 / 0
T-29	0 / 0	0 / 0
T-33	4.3 / 0	0 / 6.3
T-39	0 / 0	0 / 0
O-1	9.9 / 12.1	0 / 0

TAC SALUTES

12 MONTHS ACCIDENT FREE FLYING

906 Tac Alft Gp
Clinton Cy AFB,
Ohio

907 Tac Alft Gp
Clinton Cy AFB,
Ohio

910 Tac Alft Gp
Youngstown MAP,
Ohio

914 Tac Alft Gp
Niagara Falls IAP,
New York

927 Tac Alft Gp
Selfridge AFB,
Michigan

928 Tac Alft Gp
Chicago O'Hare IAP,
Illinois

903 Tac Alft Gp
McGuire AFB,
New Jersey

912 Tac Alft Gp
Willow Grove ARF,
Pennsylvania

913 Tac Alft Gp
Willow Grove ARF,
Pennsylvania

922 Tac Alft Gp
Kelly AFB,
Texas

930 Tac Alft Gp
Bakalar AFB,
Indiana

931 Tac Alft Gp
Bakalar AFB,
Indiana

943 Tac Alft Gp
March AFB,
California

944 Tac Alft Gp
March AFB,
California

939 Tac Alft Gp
Portland IAP,
Oregon

925 Tac Alft Gp
Ellington AFB,
Texas

926 Tac Alft Gp
USNAS New Orleans,
Louisiana

908 Tac Alft Gp
Brookley AFB,
Alabama

933 Tac Alft Gp
Mitchell Fld,
Wisconsin

934 Tac Alft Gp
Mnpls-St Paul IAP,
Minnesota

924 Tac Alft Gp
Ellington AFB,
Texas

its Air Reserve fleet