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OUT OF GAS

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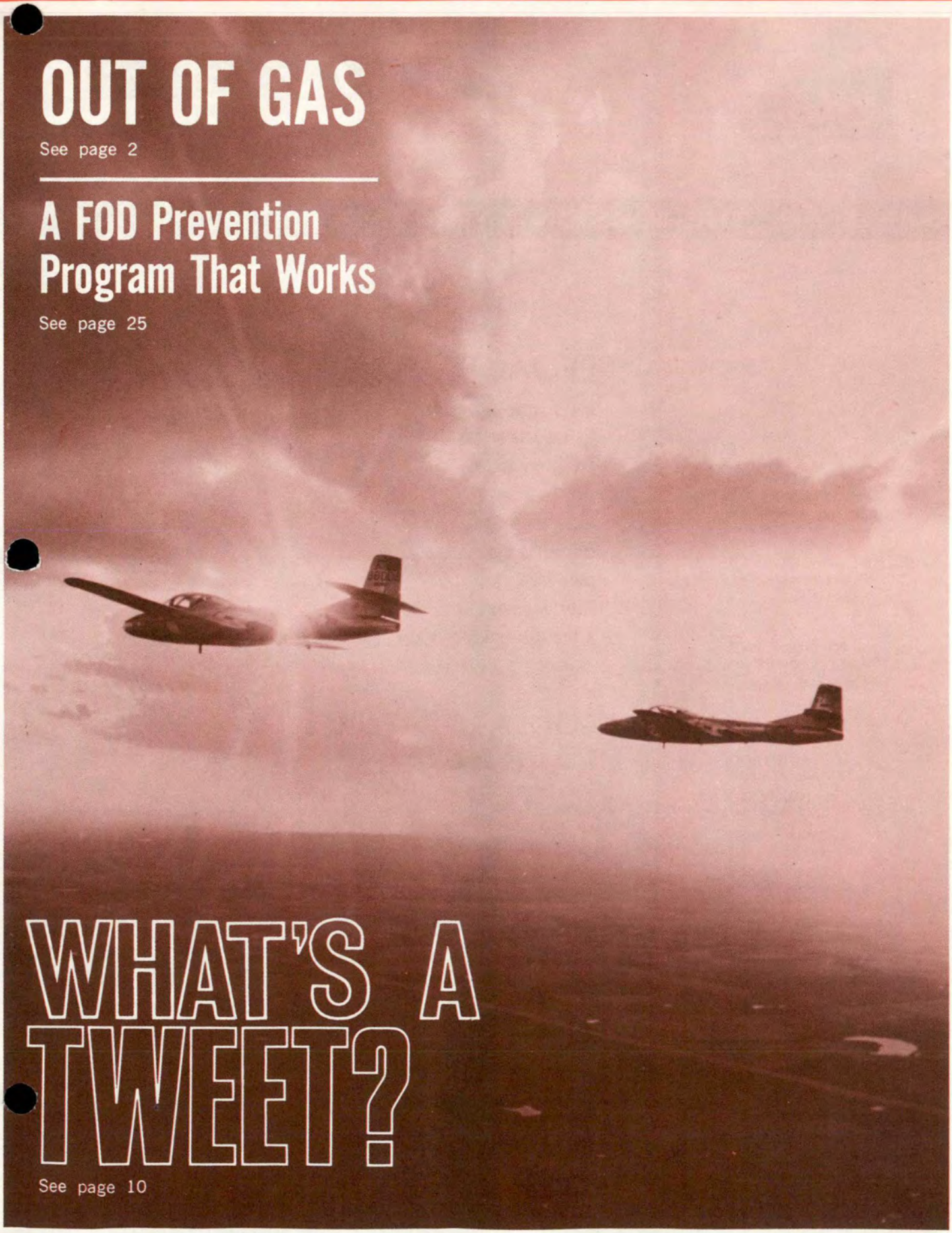

WHAT'S A TWEET?

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OCTOBER 1978

UNITED STATES AIR FORCE

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THE MISSION - - - - - - SAFELY!

SPECIAL FEATURES

REGULAR FEATURES

DEPARTMENT OF THE AIR FORCE • THE INSPECTOR GENERAL, USAF

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OCTOBER 1978 AFRP 127-2 VOLUME 35 NUMBER 10

WHO'S DOING THE FLYING?

He never thought it could happen to him. Ever heard those words? Sure you have, and you've thought to yourself that there are a lot of things—mostly bad—that you are convinced could never happen to you. Now this optimism is good; in fact, it is what helps us cope with hazardous situations.

For example, we have all read about aircraft accidents and thought to ourselves that that couldn't happen to me. Take the airliner that crashed in the everglades a few years ago. It was a dark night, no lights there, and the aircraft was about to land at Miami when a gear light failed to illuminate. No big thing. The cockpit crew began concentrating on replacing the bulb to the extent that no one was flying the airplane. When this event occurred the aircraft was low—perhaps a couple of thousand feet. If you remember it, you'll recall that the aircraft *flew itself* into the ground with no help from the crew.

Now you can imagine something like that happening to you and your highly disciplined, professional crew?

It was an early morning, before daylight, takeoff and short flight to a DZ for the transport. Routine, ho-hum. By the time they arrived at the field, the before landing pattern checklist had been completed. After a turn to miss some clouds and stay VFR, the crew began a descent and completed the before landing checklist. However, when the pilot saw the field, he believed he was in too close and started a turn to a new pattern to lose altitude.

On downwind the pilot couldn't see the runway, but he had the copilot and nav looking out for traffic and the runway and they okayed a turn back toward the runway. After a few turns to orient himself, the pilot decided he was too close so he made an angling turn to approximate a right base. Just then the nav said he saw the ground and the pilot and flight engineer felt the aircraft buffet. Immediately the pilot called for flaps, added power and lowered the nose.

Too late.

The aircraft stalled and struck a small hill just a couple of hundred feet above runway elevation. It was totally destroyed by the impact and fire damage.

As in the Everglades accident, this crew was so preoccupied with something else that their attention was diverted from the critical task of flying the airplane. Locating the runway was important, but nothing—nothing—is more important than flying the airplane. All else is secondary, as this accident indicates. While the airspeed decreased, no one was watching. Finally the aircraft stalled, and despite the pilot's best efforts, crashed.

Basically there are two points to be made from this narritive. We've made one—someone has to *fly the airplane*. The other is that organized effort to accomplish a task or set of tasks which we call *crew coordination*. With it, with each crewmember performing his assignment, an accident such as this would never occur. We're not going to beat this theme to death, but merely observe that had these two points, flying the airplane and crew coordination, been strictly adhered to over the years, the accident files would be very much skinnier. ★

WE ARE OUT OF GAS!!

CAPTAIN KENNETH S. HARVELL
4235th ISD Sq • Carswell AFB TX

"I can't believe it's happening to me; I know I computed my fuel requirements correctly; I just can't be out of gas." How many pilots in the course of aviation history must have found these thoughts racing through their minds when their engine coughed and sputtered followed by the unnerving quiet of their airplane gliding unpowered through the air?

We have all read articles and seen training films depicting a mishap that was caused by some fighterjock's inattention to his fuel status, and for those of us who fly the heavies with enough engines and gas to go halfway around the world, the possibility of running out of gas on a routine training mission seems totally remote.

Everyone who has manipulated the fuel panel in multi-engine airplanes has made mistakes that have led to some embarrassing centers of gravity, both fore and aft, and on occasion an engine flameout, but to completely run out of gas on a training mission—it just couldn't happen. However, several years ago a KC-135 crew flying a routine training mission on a nice summer day managed to do just that. This is what happened.

The crew was scheduled for a 4½ hour pilot proficiency mission. The pilot and copilot had failed an earlier check ride, so an instructor pilot flew with the crew. A taxi-back landing was scheduled to pick up a standboard instructor pilot to recheck the copilot on an ILS approach and complete his annual instrument check.

Everything was normal for the first 4 hours. The taxi-back landing to pick up the standboard evaluator was uneventful, and the IP deplaned. There were 15,000 lbs of fuel remaining which was adequate to complete the two scheduled approaches and land with the required fuel reserves, but the evaluator was faced with a dilemma. The ILS at home base was NOTAMed out for repairs, so he had to decide whether to cancel the rest of the mission or fly to a nearby base to complete the check ride.

When the first IP deplaned he told the evaluator that he felt there was insufficient fuel to fly to the alternate and return. The pilot and copilot had discussed the plan, and they too agreed that they could not safely make it to the other base and return home. The desire to complete the mission and fill that square must have been very strong because the evaluator, after quickly computing the fuel required mentally, requested a 30-minute overflight and decided to go to the other base. This was against the advice of the other three pilots.

What in the world possessed the evaluator to "press" on such a routine mission? This is conjecture, but my view of the crew force over the years leads me to believe that it must have been a case of "mission lock-on." This man was in a position of leadership within his wing that was undoubtedly earned by getting the job done. Mission is the reason we all fly, but in this case it may have resulted in tunnel vision that prevented even a cursory review of the consequences. The chart (page 4) shows the figures the evaluator said that he mentally calculated versus the fuel required taken from the performance section of the KC-135 Dash One. His altitude going to the alternate was 5,000 ft MSL; returning was 6,000 ft MSL.

	EVALUATOR	DASH 1
TIME ENROUTE/RETURN	30 Min	56 Min
TIME FOR APPROACH	Not considered	8 Min
FUEL FOR ROUND TRIP	6,000 lbs	12,700 lbs
FUEL FOR APPROACH	1,500 lbs	1,500 lbs
RESERVE	7,500 lbs	800 lbs
TOTAL FUEL	**15,000 lbs**	**15,000 lbs**

Evaluator's estimates of fuel required vs Dash One figures.

WE ARE OUT OF GAS!! continued

What caused this highly qualified and experienced pilot to miscalculate to this degree? He may have been thinking of the standard planning figures used at his base for this alternate. It called for 17 minutes enroute and 2,600 lbs of fuel. The kicker was that these figures were based on an altitude of FL330.

The flight to the alternate base took 25 minutes, and when they arrived they were vectored for an ILS. Either before or during the ILS the crew discussed the fuel status. The pilot and copilot recommended to the evaluator that they land and refuel, but the evaluator decided to return home based on his original estimate of 3,000 lbs enroute fuel. He further stated he thought that he had 10,000 lbs remaining; however, he had just computed a touchdown speed for the ILS approach that, from performance data, indicated fuel on board of 5,000 to 6,000 lbs.

During the return to home base, apprehension continued to increase, and the boom operator stated that he computed three possible center of gravity figures including one with no fuel remaining in the forward body tank where most of the fuel reserve would normally be located because of center of gravity requirements. Even though the crew was concerned about the fuel status, they did not take a fuel reading or check the performance data in the Dash One, and no one suggested that they return to the alternate for more fuel.

As the fuel status became more critical the evaluator who was in the pilot's seat shut down engines

2 and 3 to conserve fuel while the rest of the crew prepared to bail out. As the evaluator was descending for the approach at home base, the number 1 engine flamed out and he immediately initiated a restart on engines 2 and 3. His altitude was between 2,500 and 3,000 feet. At this time, the boom operator decided it was time to exit, so he released the emergency exit hatch and bailed out, and when the rest of the crew saw the boomer go, they immediately followed. The evaluator felt that he had power and could make the runway, so he stayed with the airplane. He cancelled his IFR clearance and tightened his pattern. During his turn to final the rest of the engines flamed out. He lowered the gear and got a down and locked indication and placed the flap handle to 30 degrees. The airplane touched down 640 feet short of the overrun, skipped to 147 feet short of the overrun then rolled onto and down the overrun and runway. He turned off at the first taxiway, 3,000 feet from the approach end of the runway.

Miraculously no one was hurt and there was only minor damage to the airplane. When maintenance checked all the fuel system components they found everything to be operating normally. They carefully drained the fuel from each tank and manifold and found 71 gallons of fuel which equates to 461.5 lbs.

Could this happen to you? The pilot and evaluator had over 3,100 hours of flying time each. The weather was beautiful and this mission was simple, yet because they hastily planned a change in their flight without using tech data and disregarded fuel reserve requirements outlined in Air Force and command directives, the seemingly impossible did happen.

The possibility of history repeating itself is very real. There may be a few adverse circumstances added to the next accident such as bad weather at your intended landing base or maybe your gear or flaps will malfunction, increasing fuel consumption, but these problems are often overcome by Air Force crews around the world. At best, they will be weak excuses for poor planning; that is, of course, if you are around to use them. ★

NEWS FOR CREWS

Information and tips to help your career from the folks at Air Force Military Personnel Center, Randolph AFB, TX.

LT COL JIM WILLETTE
Deputy Chief, Rated Officer Career Management Branch
Air Force Manpower and Personnel Center

"OFFICER CAREER OBJECTIVE STATEMENT— THE AIR FORCE FORM 90"

I have noticed that many Form 90s are terribly out-of-date. To understand why I consider this so important, let me explain a couple of ways your Form 90 is used in the assignment selection process.

First, let's examine the normal assignment process for you as a rated officer. Nine months prior to your being "available" for assignment, your assignment folder is reviewed by the Rated Officer Review Board (RORB*). To be "available" for assignment, you must have an established DEROS from overseas, be completing a rated supplement tour, graduating from PME or AFIT, finishing an Air Staff tour, or released for assignment by your MAJCOM. Additionally, if you are nearing three years time-on-station in the CONUS and are not in any of the previous categories, you will also be reviewed for possible reassignment.

The primary job of the RORB is to review your records and initially recommend you for a rated or nonrated position. Recommendations would include Air Staff duty, aircrew or staff positions within a MAJCOM, supplement extensions or curtailments, or supplement duty. One of the most important instruments used by the RORB is your Form 90. We (I am a member of the RORB) are not clairvoyant. To know what you want to do, we must have a Form 90. All of us know that a Form 90 will not guarantee you your first or even second choice of assignments; however, with some help on your part (a complete, updated Form 90), perhaps we can get close. I will guarantee you this much: give us a Form 90 and we will do all we can to match your desires against requirements. An appalling fact is that over half of the officers reviewed by the RORB either have no Form 90 at all or one that is obviously out-of-date.

A second use for the Form 90 occurs when resource managers are trying to find volunteers to go overseas, change weapon systems, move to staff or supplement positions, etc. Because there are about 25,000 pilots and 12,000 navigators** in the active inventory, it is impossible to remember who wants what type of duty. Therefore, an initial "scrub down" of possible candidates is accomplished via the computer. We look for volunteers who meet the job criteria first, and turn to nonvolunteers second. The job you wanted may have been yours had your Form 90 reflected your desires. By the way, there are 39 different pieces of information on your Form 90 stored in the computer. Take a look at the circled numbers as that's what can be retrieved via the computer when looking for volunteers. The "bottom line" is this: with an outdated Form 90, you may either **not be considered for a job you want,** or, worse yet, **be considered** (and maybe selected) **for a job you do not want!**

Okay. Enough said on why you need a current Form 90. Let me wrap it up with a few hints about how to fill one out. First, fill it out completely. If you want to change only one or two parts of the form, do so, but be sure the rest of the spaces are filled in with what was there previously. This precludes second guessing on our part on whether or not you still want whatever was not changed. Nor does the individual at the CBPO know whether to change all or just a few of the 39 pieces of information stored in the computer. "No harm—no foul" only counts in the NBA. Second, fill out the Remarks Section of the form with any additional information you want us to know. Regrettably, the data in the Remarks Section cannot be input into the computer, but during the normal assignment cycle (the RORB) we will certainly read it. Third, give us some options. Give us both rated and nonrated choices with more than one choice in either type of duty. Also, give us more than one base or geographic area to choose from. Fourth, you may want to choose between jobs or geography. For example, if you are considering retirement at the end of your next assignment, no doubt geography will play a great part in your choice of assignment. (Good item for the Remarks Section.) However, if you have greater interest in job potential, don't tie us to geography. The more places you are willing to go, the more jobs that are available. Lastly, if your Form 90 still does not say it all, write us a letter. We will put both your letter and our answer in your assignment folder for use when your next assignment comes up.

Thanks for hearing me out. If you are one of the many without a current Form 90, schedule yourself an hour next week to go to your CBPO and bring it up-to-date. It will certainly be time well spent. ★

*The RORB consists of the Chief or Deputy Chief of the Rated Officer Career Management Branch, Chief, or Deputy Chief of the Support Officer Career Management Branch, a member of the Rated Supplement Manning Section, and a representative of the Force Utilization Branch.

**Lieutenant colonel and below.

OPS TOPICS

CLEAR THE RUNWAY

About a half mile out on final at 500 feet, the tanker crew spotted a truck in the overrun. The aircraft went around and the incident prompted an investigation by Safety and the Squadron commander. Seems there was a condition of low viz and even lower communications level between the tower and various vehicles operating on or near the runway. Consequently, some changes were made which should be of interest to those who use/run our air patches. All radio-equipped vehicles will use different numbers and different call sign prefixes; flight line driver training procedures have been reviewed; all drivers have been made aware of the importance of communication between them and the tower; tower procedures for vehicle control have been examined; tower personnel are briefed to be alert for any sign of confusion between them and vehicle operators. Now is as good a time as any for each base to make a self-examination re this subject. For more on this subject with different circumstances, see the following item.

TALK TO ME

With a helicopter on PAR final and a C-130 making touch and go's in a VFR pattern, the tower controller cleared the Herk for a touch and go and issued traffic at 10 o'clock. The chopper pilot, spotting the '130 moving from his 2 to 1 o'clock positions, broke off his approach and filed a Hazardous Air Traffic Report. Investigation of the circumstances indicated that there was no danger of a collision, that the tower controller had properly cleared the faster C-130 ahead of the helicopter. What he failed to do was pass the word to GCA. This occurred at night when it is difficult to visually assess the distance between aircraft, and the chopper pilot was justifiably nervous. A little communication will always help the operation.

AIRCRAFT DE- & ANTI-ICING

An overseas airline member of FSF (Flight Safety Foundation) has offered the following. Although in this instance "they" refer to DC-9 aircraft, it could apply to others as well.

"The first 'winter day' of this season with adverse wx conditions resulted in two DC-9 incidents. The two aircraft involved, both departing around 1600Z, experienced increasing problems with elevator movement during climb-out. Investigation revealed the elevator movement problems resulted from freezing of wet snow in between stabilizer, elevators, and tabs.

"Although both aircraft had been on the ground for more than four hours, they had not been sprayed. The decision that spraying was not required had been based on the fact that the snow apparently did not stick to the wing surfaces. Tail surfaces weren't inspected.

"However, it had not been realized that a large amount of relatively warm fuel had been tanked which sufficiently warmed the wing surfaces to prevent snow accretion.

"Attention is drawn to the necessity to inspect the tailplane visually when weather conditions require it."—Courtesy *FSF Accident Prevention Bulletin.*

OPS TOPICS

GROUND LOOP

An Aero Club instructor and student were practicing various maneuvers with the next to be a soft field landing and takeoff (on a hard surface runway 50 feet by 3,000 feet). The snow had been cleared but some normal drifting had occurred. This runway had been used by other instructors the same day without incident. Touchdown was normal. During roll-out, power was applied by the student, causing the nose of the aircraft to rise excessively and obstruct the pilots' view of the runway. The aircraft veered left 5 to 10 degrees which was not detected by the instructor pilot. The left landing gear then struck some drifted snow on the left side of the runway and caused the right wing tip and nose gear to strike a snowbank. Instructors of any airplane need to stay ahead of the bird and the student.

WEATHER WORRIES

No matter how sophisticated our weather reporting abilities have become, no matter how well-equipped our aircraft, how well built, no matter how good our crews—nature naturally gets to us now and then. *Like* ...

An F-15 recovering from a mission was descending and entered IMC at 12,000 feet. Shortly the aircraft encountered 1/2" hail and what the pilot described as severe turbulence. No lightning or other T-storm activity was noticed. Damage was estimated at nearly $50,000.

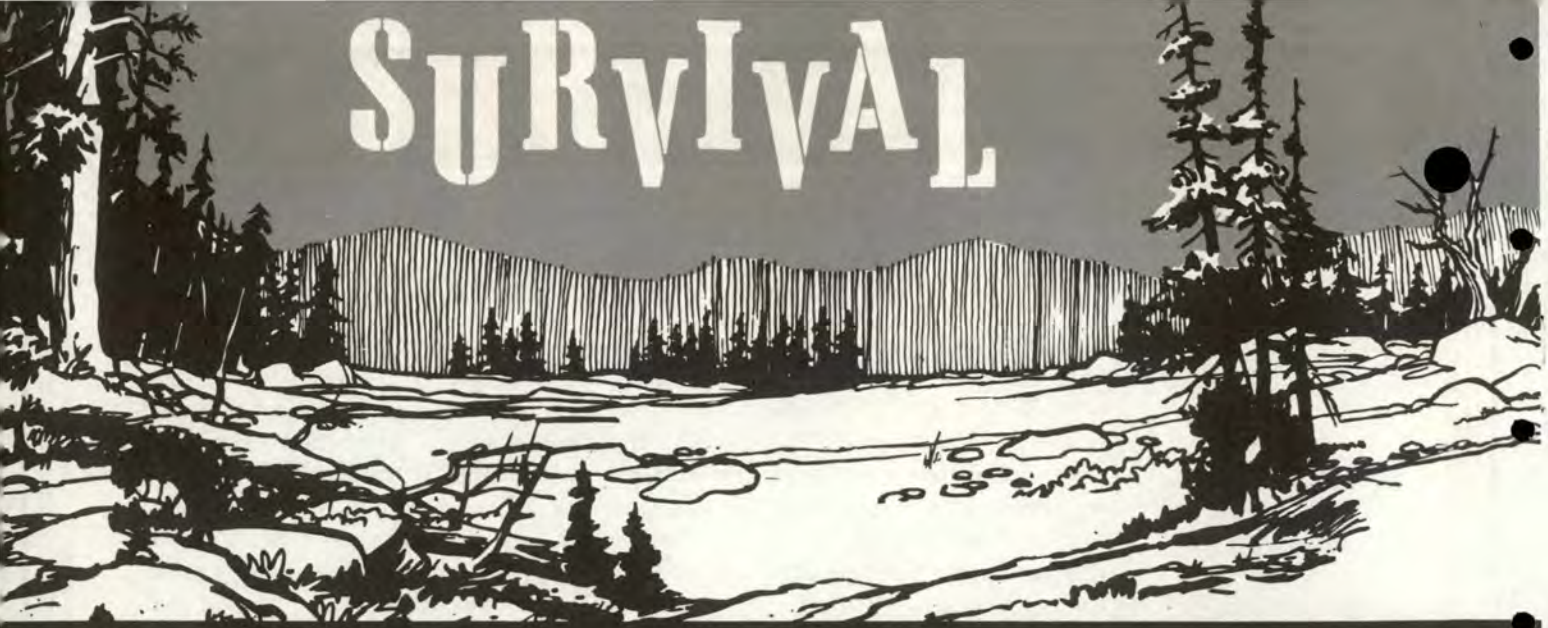
A flight of three cancelled the mission because of weather and began RTB. In thin cirrus at 22,000 feet a lightning bolt similar to St Elmo's fire was observed to strike lead's pitot boom. After landing, they discovered a small hole in the tail cone of each external wing tank. One of the other aircraft had damage to the trailing edge wing tip light lens. No big thing, total damage about $400, but the flight apparently never got closer than 10 miles to any thunderstorm. Remember, those storms have mighty long arms.

HEADS UP MAINTAINERS

While aircrews generally appreciate the good work done by our maintainers, we tend to take them for granted, which is a mistake. Here's an example of sharp action by a couple of maintenance types which the crew certainly won't forget for a long time.

A fuel leak was detected in the tail section of a T-39, but fuel cell specialists could not find a leak; so the write-up was signed off. Next morning MSgt Dewitt D. Bates and TSgt Robert A. Rice were reviewing the 781 and were dissatisfied. They decided to check the leak before the aircraft flew again only to find it had already left the chocks. They immediately called the tower and asked that the aircraft return to the ramp. It did and they found a leaking line coupling in the main fuel line between the main boost pump and engine. This could have been extremely dangerous.

We have many heads up mechs who deserve our respect for the fine work they do. Let's not forget it. ★



THE GREAT ESCAPE

The famous movie, based on the book, **The Great Escape,** depicts allied escapees making their way through Nazi Germany by mingling with the local peoples, only to be caught by answering to a "Have a nice trip" spoken in English by an enemy policeman.

Picture yourself trying to blend with the local populace in, say, Vietnam, Angola, or Egypt. You might have a reasonable chance to look like a Russian, but it will take more than disguise to avoid detection.

All those great Hollywood movies a la Hogan's Heroes may have deluded you into thinking you can fool all of the people all of the time. However, in the real world it's highly unlikely you could fool anybody long enough to sneaky pete out of a hostile country—even if you could speak the language. Your clothes, your smell, your gestures will give you away. Consider the reverse situation, a Russian pilot down in the US. Would his letter-perfect English

seem out of place? Could he know the idiosyncrasies of our slang-filled vocabulary? The **Penkovski Papers** relate just how much detail is taught to Russian Intelligence people concerning American mannerisms. For example, they are told Americans wear a clean shirt daily (doesn't everyone), or they learn how to dial a telephone in the US (could you do that in all parts of Ma Bell country?). The point is that there are so many things we do unconsciously that we take it for granted the rest of the world works the same way. When I was in Zaire, so many little things were done differently (from what I have known) that I became leery of even pushing an elevator button, or turning on the water for fear of showing my ignorance.

To successfully evade through an enemy populace, you need to know all of the customs and mannerisms different from your own. The familiar thumbs-up hitchhiking gesture is now used in Europe. Americans use their knife and fork in opposite hands from other countries. A Turk lifts his head to say "no" and drops it to say "yes." An American shaking his head "yes" would really be saying "Yes-No, Yes-No." A "come-here" gesture is different. Any one of these slipups could identify you as a Yankee and never, repeat never, flash a "hook 'em horns" because you may get a football yell in Texas, but in Europe, you will incur the wrath of an irate husband. An Englishman once told me he could always tell an American by his demand for ice in his drinks. Let's face it—Americans are conspicuous when they're out of their environment.

To avoid capture, you avoid people. People catch people. Your size, language, and manner mark you distinctly. Don't be seen and you don't get caught. Evade through the woods, hide, move from shadow-to-shadow. Patience. Don't allow temptation to trick you into shortening your trip by mingling with the people. Patience. Avoid public transportation. It's tough to understand the simple ins-and-outs of riding European trains. I once entered the wrong coach in Germany. Another time, I almost rode the Moscow subway forever because I couldn't read the Cyrillic alphabet on the map.

Changing from a military uniform to civilian clothes might help you blend in but if you get caught, you are jeopardizing your rights under the Geneva Convention.

Since we're not at war, you probably see very little relevance in all this. With terrorism and kidnapping the order of the day, there are many nations where a "rich" American could be in danger. A friend of mine was shanghaied by bandits in the Middle East. Their motive—only robbery. When the captors discovered they had an American Army colonel, he was held for ransom, and his life became threatened. Moral of the story, keep a low profile in foreign countries. You must survive away from people.

Like any survival training, we hope you never use this information but when escape and evasion time comes, remember—patience pays off. What have you got to lose by taking chances? Ask any PW. ★

CAPTAIN HOWARD R. ALLAN
Training Development Branch
3636th Combat Crew Training Wing (ATC)
Fairchild AFB WA

"WHAT'S A TWEET?"

CAPTAIN EUGENE A. ROSE • US Air Force Academy

A six thousand pound dog whistle? Nope. An Air Force aircraft used to train student pilots? Yes. A fighter type aircraft used to train student navigators at Mather Air Force Base? You must be kidding!

The T-37 is alive and well in UNT. Since the conversion to the all-jet navigator training program in the summer of 1975, the T-37 has assumed increased importance in navigator training at Mather. This article will familiarize navigators throughout the Air Force with this new phase of training and briefly describe some of its fundamental elements of instruction.

The T-37 training is conducted by ATC instructor pilots assigned to the 455th Flying Training Squadron. The unit, consisting of nearly 50 instructors, is composed of recent UPT graduates and pilots with previous operational flying experience. At present, this experience covers nearly all Air Force aircraft, except some of the more recent tactical fighters. The squadron provides both academic instruction in Advanced Airmanship and flying training in the T-37.

Advanced Airmanship is the third phase taught in UNT. The academic instruction consists of basic VOR/DME navigational procedures (RMI only), course intercepts, VFR map reading, wind analysis, dead reckoning, use of low altitude charts, approach plates and AFM 51-37 instrument procedures, time control, flight plans, use of FLIP, clearing, crew coordination, and an introduction to the T-37 aircraft.

T-37 flying training consists of the first five flights in UNT. For many students this is the first flight in an Air Force aircraft, and occasionally the first flight of any kind. The flights are carefully scheduled so that they closely follow related classroom instruction and two practice sorties in the T-40 simulator. The first two flights are VOR/DME airways navigation missions and are generally flown around 15,000 feet MSL. The next two rides are essentially VFR map reading routes flown at around 10,000 feet AGL, although an IFR

clearance is maintained throughout the flight. The fifth and last sortie is a combined formation and contact sortie that includes an introduction to acrobatics and maximum performance flying. All rides are graded but there is no check ride flown in the T-37 phase of training.

Now that you are familiar with the general course, let me discuss some of the fundamental elements of instruction:

CLEARING

Clearing is one of the most important jobs that a student navigator has in the T-37. Not all navigators will have a crew position with a capability to see outside and clear, but many will. Even those who will not have a window can gain an appreciation for this time consuming, difficult, and critical job continually performed by all pilots. Also, it is essential to have every one possible clear at all times when flying in the Sacramento area as 90% of the general aviation traffic in the United States is over the great central valley of California. The collision potential is very high and proper clearing is absolutely necessary. Clearing must be done continuously — with only momentary breaks to perform other duties. Much as a pilot always refers back to the attitude indicator as the primary reference point when flying in the weather, all crew members with the ability to clear must look outside for other aircraft. The importance of proper clearing is continuously stressed by all IPs and we try to keep in mind that Air Force navigators are initially taught to clear by a member of the 455 FTS.

CREW COORDINATION AND CHECKLIST USAGE

The student navigator is an active and aggressive crew member who works with me to accomplish our training mission. We use the "challenge and response" method of checklist usage. The student is the checklist manager and must ensure that all checklists are completed properly. If ever in doubt as to whether I responded properly, the student must ask me again for my response. I never criticize a student for asking a second time. Coordination between the pilot and navigator as to condition of flight, i.e., altitude, airspeed, heading, etc., is stressed with particular attention to altitude calls. The student navigator must advise the pilot approaching all level offs. I point out to my students that the height above touchdown (HAT) for the PAR to runway 22L at Mather is 100 feet. Since the altimeter can have a 75' error, two or three seconds of inattention resulting in a missed altitude call can spell disaster in the weather. From the very first ride, I teach my students to maintain a questioning attitude about everything that takes place in flight. Every aviator makes mistakes and the student should not hesitate to challenge the instructor. There is no such thing as a dumb question when flying—the student should participate as an active member of the crew.

RADIO PROCEDURES

The student is in charge of the navigation and communication radios throughout the flight and must TIM (tune—identify—monitor) the correct VOR and DME frequencies as well as manage the transponder from takeoff to landing. The UHF communications radio is also the student's responsibility, except during the instrument approach phase when I usually make the calls to let the student concentrate on the instrument approach. Brevity and clarity are stressed in this area. With only five T-37 rides, the student must pass his initial "mike fright" and practice on the "real world." Standard Air Force terms are taught but when in doubt, state in plain English what you want to get across. Although a recent call one of my students made, namely "Oakland Center, Colt two zero, level one-three-thousand nine-hundred and seventy-five feet" was a little bit of overkill, I had to give him credit for accuracy.

First five flights by UNT students are in T-37. For some, this is their first flying experience.

WIND ANALYSIS

All flight planning in the T-37 is accomplished "no wind" as the student has not yet been introduced to the hand-held, air navigation computer. Once airborne, we discover that wind significantly affects our aircraft and we attempt to analyze its direction and velocity. Towards the end of the first flight, the student begins to anticipate the effects of the wind when turning to a new course. One technique I teach is that 10 degrees of drift correction is necessary to compensate for a crosswind component equal to 1/6 of your TAS. Since we normally fly our sorties at 240 KTAS, 5 degrees of drift correction results in a 20 knot crosswind component. Using a standard DME groundspeed check, the student can also determine the headwind or tailwind component and then mentally combine these two vector components of the wind. This can be done on the face of the RMI, much as one solves a fix-to-fix. When turning to a new course, the student then applies this same process in reverse and provides a new heading that includes a drift correction angle. Adjustments are made in ETAs based on the new headwind or tailwind components. Using this basic technique, it is not difficult to determine the actual wind at altitude within 10 degrees and 5 knots.

TIME CONTROL

On the first two rides the student never changes airspeed and we always fly at 240 KTAS. Time control then becomes nothing more than determining the actual groundspeed through DME checks and then revising ETAs. The problem is much more complex on the third and fourth rides (map reading) as the student must make airspeed adjustments in order to reach each checkpoint on time. We teach two methods, the incremental and the 10%. Essentially, in the incremental changing the airspeed by 1/6 will provide a 10 second per minute gain or loss. For the second method a 10% airspeed change will result in a gain or loss of 6 seconds per minute. Both of these methods are based upon correcting in a no wind situation. If the wind caused the off time, which is usually the case, then the rate of correction may differ, but at least these corrections get the aircraft moving in the right direction — the important factor. There is nothing more discouraging to me as an IP than having a student realize he is 30 seconds behind time, spend 2 minutes figuring approximate airspeed correction, and end up 60 seconds behind. The secret to good time control is to anticipate the winds and change airspeed as soon as a deviation is noticed. The incremental or 10% method can then be used and the airspeed further refined as necessary.

VFR MAP READING

The key here is to go from the map to the ground—not the other way around. At this time I introduce the student to a new term "assumed position." While looking at the elapsed time from the start of the map reading route, and referring to the tick marks on the chart, the student determines the present location, i.e., assumed position. The student then projects the flight path on the map, picks out some good visual references such as lakes, rivers, airfields, bridges, mountains, towns, etc. The student then looks for the selected landmarks on the ground. As soon as the landmarks are located, the student should try to confirm them with at least one more visual reference, and then use the landmarks to analyze track and time. I encourage the student to find the next turn point as early as possible. If it is moving neither right nor left in the windscreen, then the

student has the drift killed and is tracking to the point. As a bottom line, if lost, go back to the "big picture," start with something large and obvious, maybe a city or lake, and from there determine general orientation. The student can then proceed from the obvious to the less obvious and find the exact location. Easy to say—but hard to do. The ability to read a terrain chart (we use TPCs) cannot be mastered in two rides, but we do at least provide an introduction to the task. VFR map reading is also an excellent lead in for radar interpretation that will come shortly after completion of the T-37 phase.

PRIORITIES

This item isn't even on the grade sheet but to me it ties together everything that we try to teach in the T-37 phase. The student must learn that everything cannot be done at once. The most important things come first, i.e., clear and navigate. When time permits, the less critical things can be done, such as checklists and flight log entries. I encourage the student to get things done early if possible. Fuel can be logged a minute or two before the turn point by subtracting the fuel flow per minute from the total at the time. Control ETAs can be computed as early as possible instead of computing them one at a time over a turn point when things are all happening at once. The key to the art of airmanship is: Keep your wits about you, don't get flustered, line up your tasks, and get them done one or two at a time. Everyone has heard the old adage that flying is "hours of boredom punctuated by moments of stark terror." Perhaps it overstates the truth, but the general principle is as true today as ever. To help ourselves function during those moments of "stark terror" (the busy times), it only makes sense to do jobs early when possible. As an aid to determining priorities, the student is taught to aviate—navigate—communicate, in that order. To do that effectively is the essence of airmanship, and that's what we are teaching in the T-37.

Even though the T-37 has been at Mather for only slightly over 3½ years, several major changes have occurred. Two of the most significant are the introduction of hands-on-training (HOT) and formation on the fifth sortie.

Hands-on-training consists of allowing the student to practice several basic flight maneuvers. Among these maneuvers are: straight and level flight, turns, climbs and descents, and airspeed changes through proper throttle technique. Also, the student is given the opportunity to practice AFM 51-37 unusual altitude recoveries as well as several basic aerobatic maneuvers. The goal of this training is to expose the student to the pilot's duties, thus making the student a well-rounded crew member. The goal is not to develop flying proficiency. Although the student is not graded on hands-on performance, this training provides the student with a greater appreciation of the flying profession.

The formation profile flown on the fifth ride has been in existence for a little over a year. The profile is a two-ship IFR departure to a contact working area over the Sierras near Lake Tahoe. Once established in the area, the two aircraft split up and accomplish selected single-ship maneuvers. Included among these are steep turns, aileron rolls, barrel rolls, loops, cloverleafs, lazy eights, the split S, and recoveries from inverted flight and unusual attitudes. The student may fly the recoveries, as well as some of the acrobatic maneuvers. After this single-ship portion, the formation then rejoins for some wing work and extended maneuvering where the second aircraft flies approximately 500 feet aft of lead. The formation then normally makes an IFR recovery to Mather for a wing landing. This sortie exposes the student to some tactical type flying, develops an appreciation for the concept of mutual support inherent in formation flying, and helps develop the aggressiveness required in a tactical situation. Flight Mission 5 is not merely a demonstration ride. Although the student is not graded on his or her performance of formation duties, the student is graded on all other aspects of the mission. There is no check ride in the T-37 phase, but this is the last ride and the student must put together all that has been learned in the previous four flights and perform accordingly. This exposure to fighter type maneuvering also helps the student determine if a tactical assignment is desired after graduation.

Yes—The Tweets are alive and well at Mather. We are performing an important and unique mission. All of us in the unit are very proud of our role in preparing navigators for today's Air Force. The T-37 phase is still a new and evolving element of UNT, and the members of the 455th Flying Training Squadron look forward with confidence to the challenges of the future.—Courtesy *The Navigator.* ★

ABOUT THE AUTHOR

After Air Force Academy graduation in 1968, Captain Rose obtained a master's degree in Aeronautics and Astronautics from Purdue University. His assignment history includes pilot training, a SEA tour in the OV-10A, a SAC tour in B-52Ds, an ASTRA assignment at the Pentagon where he also flew the T-39, and T-37 instructor pilot and Flight Commander in the 455th Fly Tng Sq, Mather AFB. He is currently assigned to the Air Force Academy as an instructor in the Aeronautics Department.

Night

Nothing seems as effortless or as smooth as the movement of a small jet through calm night air. When everything works right there are no bumps or friction or passing headlights. Just you and solitude.

The takeoff was uneventful, as usual. As soon as we passed the runway departure end, familiar environment ceased. The sky met the horizon and looked like an inky curtain. It had the exact same number of lights as the inky ground. I couldn't tell one from the other. There was no moon.

I thought of Bud McGill who rode an F-4 into the ocean near Okinawa. Same thing. Black sky, black sea. A few stars and a few lights. Everything looked the same. Bud tried to land on a star. Who knows? Maybe he made it.

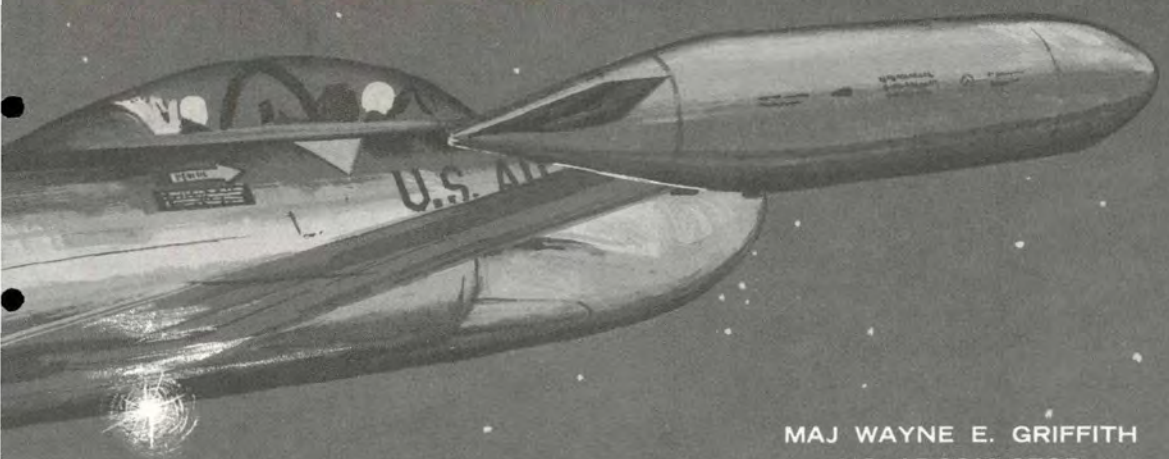
The gauges read exactly as they should. I sometimes wonder what I'd think if they didn't. Engine smooth, fuel system perfect, easy climb to altitude, comfortable cockpit. We've been living in Star Wars for years. Here are more than half a hundred gauges, dials, and switches, all crammed with numbers and arcs, all telling something about how far you can go, where you have been, how you are controlling the explosion in your engine, how fast, how high, how long. . . . They are all invisible except for the sterile and dull, dim red lights illuminating each gauge. "Too much," I think. I reach down and dim all the lights. I cannot see the altimeter, but my eyes will grow accustomed to the dark.

I wonder when—or if—Bud knew he was a dead man. What did he do in those last life-long seconds? Did he curse himself when he realized he was killing himself. Did he curse a friend who left something undone and became his killer? He probably didn't even know what happened. I hope not.

Delgado was giving his prepared briefing on ejection seats. It was mostly rates. Numbers. "The first USAF ejection was in August 1949," he said—"from an F-86A."

Nice airplane. I always wanted to fly one. It seems that I came along twenty years too late. They really did some flying in the late '30s through the late '50s. There weren't any rules, little or no radar, no IFR, no PCA, no "help." Just you and your Jug or Mustang—or Sabre Jet—and a sky full of comrades carrying out a war. It never occurred to me that I might have flown bombers or cargo craft. No —that's out of the question. They recognized talent back then. I still enjoy hearing an occasional colonel talk about the F-86s and F-104s. Some even flew P-47s or P-51s. My boss has checked out in 26 fighters.

Flight



MAJ WAYNE E. GRIFFITH
HQ ADCOM/SEOD

baer

He may be the last of a breed that I envy.

"Since then we have had 4,330 more ejections."

Not too impressive. 4,330 USAF ejections in, let's see . . . almost 30 years.

Well, on the other hand, that's 360 months minus 12 and 5, 17. 343 months. That divided into 4,330 comes out to . . . more than you would think. Almost 13 ejections per month for the last 30 years! I wonder what the Navy, Army, and Marine Corps have done? How many guys were never even heard from? It must be up to 25 or so ejections per month.

Well, they had so many more airplanes back 30 years ago and that is doubtless when most of our losses occurred. Good thing, too, seeing the price of machinery escalate so drastically with each succeeding generation.

"In the last ten years, we've had 1,188 ejections."

Well, okay, 120 months divided into 1,188 cases. That sounds better; less than ten. That's 9 point something. 120 into 1,080 is . . . 9. Okay, 9.9 ejections per month. Jeez!

We're going into the murk. Cirrus. I always like to look down at city lights at night and wonder what the town is like. The people and their businesses, lovers looking for solitude. Some people retiring from the day, and others just beginning it. I subconsciously check airspeed, rpm, heading, and attitude indicator. Make sure it all agrees before I get into the weather. I'm not as good at instruments as I used to be, but I don't get to fly much any more. I still like to look outside when I fly, but spend more and more time under the bag working because I need it. Pitot heat rechecked on. Yeah, we're okay. We're ready for some gauge work.

When I was a new first lieutenant, I was flying a night low-level in a much finer airplane. There was an overcast and thunderstorms. I was VFR. Rising terrain kept moving me closer to the clouds. Suddenly and unexpectedly, I was in the clouds and it was R-O-U-G-H! I rolled inverted and pulled and came out upside down and utterly confused. Some little town sat twinkling on the upper right corner of my canopy. VFR again. I went to the gauges, rolled right side up, and relocated the town in the lower left hand corner, and remained confused for another 10 to 15 seconds. Well, maybe I was better then, but I'm smarter now. I hope.

Saskatoon is disappearing under the outreaching fingerlets of some low stratus. There is only a glow in the clouds. And in front is a vel-

vet curtain of dark now masking the stars at 10 o'clock high and moving at me in a rush. I go to the gauges. What's the worst thing that could happen now? Engine quit? I subconsciously finger the fuel toggles. They're in the proper position.

I really wouldn't want to bail out. I trust the system enough, I guess. I think I would be one of those guys who draws his legs up delaying the inevitable for as long as possible. I'd hit my legs or elbows on something on the way out. I remember the kid in north Texas who ejected one night. He didn't have his velcro cuffs cinched tight. A loose cuff caught between the seat and the handle. He came out all right and separated from the seat, except for his right arm. The 300-pound seat whirled around his body breaking his arm and shoulder, then his leg. Finally, the chute opened and forced the seat loose. The guy lived, but it must have hurt like hell. When he landed, unconscious, his compound-fractured leg . . . stuck in a tree stump.

North we go. I can still see a star or two on top through the cirrus, but it's getting thicker. The rotating beacon begins to reflect off the clouds and back into my face. It's distracting. I reach down to turn it off without looking. Switch off. Nope that's not it. Next switch forward. That's not it either. Crap! I should know the system better. Two switches back; yep, that's it.

"I've got ground fire at 10 o'clock and 12 o'clock," I chattered into the mike.

Somebody asked, "What is it?"

"I don't know. Muzzle flashes." They twinkled silver and orange from a very black ridge line, barely discernible. I started a climb and a hard left turn. RHAW gear tuned but quiet. At least it was not radar-directed. Reverse back to the right, check airspeed. Flash, dark, flash. Thump. I've taken a hit, but everything's still working. Hard left and up. Up into the black, half on the gauges, half looking for those killer twinkles. Radio chatter is distracting; everyone is reporting the same thing and asking the same thing, and screeching each other out with simultaneous transmissions. Typical —everybody talking, nobody listening. Whack! Another hit. This time my attitude gyro tumbles but still no "this-time-you-die" lights. I know I'm overcontrolling the airplane, fist white-knuckled around the stick. Some guy is breathing over the UHF. It's me. I turn the cockpit lights up and look for damage. All I can find is a tumbled gyro. I reach for the alternate remote gyro switch. Can't find it. Damn! Lights full up, head down on the right console. There it is. Flick.

"Nuts!" That can't be right. 80 degrees of bank and rolling, 10 degrees nose low and increasing. I look outside and can't see a thing. Lights down. Yep. There are the twinkles on the right middle canopy. Onto the gauges, swallowing my heart. It'll be over soon, and I'll be okay, and act like it was purely routine. Act very calm. Ask who was the timid soul breathing over the radio. I wish they would shoot tracer. They used to, but we pummelled them for it.

It's on the windscreen now. I mutter casually to Deano, "I haven't seen St. Elmo's fire in years." He mutters something back, but I'm lost in the minor miracle of green and silver-green flashes and dances on my windscreen. It's like a miniature fire fight or a ballet of wisps. Funny, I never considered the two alike before. Somewhere in the back of my head comes Shakespeare:

"All the world's a stage, and . . . the people but actors upon it, strutting and fretting their hour upon the stage . . . full of sound and fury . . . And then is heard no more.

North we go, north, north of Saskatoon, out to the ADIZ. There are no stars now. Only St. Elmo and his little fire dance. I turn east for a radial north out of Prince Albert. Somewhere just now a fighter is scrambling to come out and do battle with us. There is a terrible orange roar as his afterburner devours air and fuel. He is the point of a spear of fire. And somewhere some kid is looking on, wishing he were riding on the fire and noise. Just like I used to do.

We start to break out of the clouds. A star here, a light there. Suddenly, we are in the clear. There are a thousand stars and a thousand lights. On the left, the northern lights shimmer for ten thousand miles. They are beautiful. The ground is covered with snow. The lights of the distant city frees the horizon from anonymity. We turn back to the south.

"Coronet flight, this is Eastern Radar, descend to flight level one-six-zido." Very properly spoken English. We were ferrying fighters across the pond. It always amused me how pilots can understate anything and everything. This was anything but a pond. A guy gets killed and he "dinged"—or he "bought the farm." Or he "bent an airplane." Some guys go tango uniform. Others drink pea soup. There is "green

apple two-step" and the "leans." Some airplanes go warp 5, others hoover. (Didja ever fly formation with a tree?") PJs went down on "the string" to rescue you. Some guys went feet wet. There were flying telephone poles, aluminum overcasts, automatic bullet launchers, and going Winchester. Kinda funny, really. A few facts are sierra hotel. Others are fox uniform.

Into the European soup.

"Coronet flight, turn right 170 degrees, good time, please."

"Don't do it, Bill," I interjected. I couldn't see his airplane at all, only the fuzzy flash of his red wingtip light. "At least do it easy!" Talk about the leans. I didn't dare move any farther out or I'd be on my own. That's always been one of the more difficult tasks for me, to be flying on the wing in the soup with the leans and have to break out of formation, take spacing, screw my head on tight (almost impossible), fly gauges, and figure out where I am. Not only that, a good wingman hates to lose his leader, and I'm sure guys have died for it. I was flying too close, anyway. But Shepard was a good leader and got us down okay. Good thing. We were both out of petrol. I was tired from the poopy suit which was filled with pounds of sweat. I felt like I earned that beer at the bar that night, but it remained a private celebration.

We pass the city and its neat lines of lights. It looks sterile and clean, extremely uniform. I know it's not really that way, that there's garbage in the streets, people in jail, and hungry kids down there. But from the air it is very pretty, like everything is. I glance at fuel and time and see that it matches my flight plan perfectly. I can't help but congratulate myself verbally to Deano, but he's caught up in his own thoughts and doesn't answer. No matter, I don't like the noise either. We don't need to talk to feel each other's company. I like that. I roll the airplane up on its left wing and look down at the fairy-tale city. Things are not what they seem, but my vision is as real as the streetwalker's down below. We just see things from different points of view.

I rolled it up and looked down at Muang Suey. My thoughts took a romantic back turn into history almost 20 years before. It was from there that the French launched their abortive counteroffensive to relieve the crumbling group of tired heroes at Dien Bien Phu. Just as we were doing now, trying to relieve the siege at Ban Ban. From up here the jungle and karst were lovely. The closer you got, the uglier it became. I was busy looking at terrain when I saw his red beacon much too close. No time for daydreaming at the expense of clearing. You'd think a man could fly over a remote jungle site in Laos without having to worry about running into somebody else.

I see flashing red lights stationary on my canopy. Faker monitor immediately calls, "Chick bearing 150 degrees for 30 miles, Angels 29." Not bad, we've got a visual at 30 miles.

He comes on in and passes off to the port side and begins his reverse for a stern attack. I want to pour the coal to it, yank it up and around and shoot back nose-to-nose, but I can't. It's a 106 and he'd finally beat me anyway since his machine can go up and fast better than mine, but it would be fun to turn with him. Antoine de St. Exupery's "Flight From Arras" comes to mind:

"Fighters are not fighters. They're murderers." "And on the ground, a 20-year-old lieutenant cuts down a stand of 300-year-old oak trees because they obstruct his field of view."

Who are the murderers now? The fighters, the bombers, the missiles? No, they are static for now. The murderers are the highways, the foods, the drugs, the beverages, and people in general. They are not only killing each other, they are killing themselves and their environment. They eat and drink poison. They put poison in their veins. They treat responsibility poisonously and the noxious tidings kill and kill. It kills their children, it destroys the mountains and rivers, and the gentle game, some of whose species are no more. It seems an irony, so many of the killers are unaware of what they are, yet manage to worry about some of the most responsible citizens remaining, the military professionals. To them we are killers. The first ground fire I received was in the mountains east of Ogden—during deer hunting season.

"Rosa 234, you have a chick bearing 360 degrees for four miles, Angels 22." I bank gently and look back over my shoulder and find him tracking us for his kill. What would I do if this were real? It would not be this.

"Rosa 234, this is Rosa Control, confirm you are dead."

I had been home for only a couple of hours after a five-day CTO away from the war. The phone rang. It was Harry Powell. He said, "Roger is dead. Shot down in the 'J'." I was stunned. We had breakfast that morning just before his mission briefing. Later I heard that

he had been pressing; too much time on target, one more pass. His backseater died, too.

I glance at the clock. It's 2346 body time, 0645 zulu. Deano enters it, our deaths, into the log.

He flies it for awhile. We're still almost an hour from landing. A bright red light flickers on. The tip tanks are dry. I sequence the fuel and settle back into thought.

Looking around the cockpit, I find another gadget that I'm not familiar with. That happens a lot. I like to look up under the side panels and around the corners of the cockpit. I frequently find gadgets or signs or stickers that I haven't noticed before.

Once again, I am amazed at how smooth it is. For 450 nautical miles we haven't experienced a single bump. No other ride is so smooth. It all depends on the wind.

I see myself in my sailboat, sails straining in the wind. When I retire I am going to sail around the world, probably alone, although I would like Elston or Hoffmann, or both, to come along. I want to put in up around Cape Cod, or farther north in Maine. Sail the North Atlantic up around Scotland and down by the Cliffs of Dover. I'll zig over to Normandy then down to Spain. I'll work my way down the west coast of Africa around the Cape of Good Hope. Up the east coast of Africa and through the Suez Canal.

I'll stop in Israel, and the Bosporous. Then over to Greece, Crete, and Italy. From there I'll sail to Egypt, up the Nile a pace—up near the Aswan Dam—and back out through the Suez into the Indian Ocean. Around the horn of India. I'll go as far north as Ceylon. Into the Pacific. I am going to do the South Pacific tour, the islands. Timor, Philippines, Guam, New Guinea, New Zealand, and Australia. Up to Hawaii or maybe down to the Antarctic and up. I'll hit the southern tip of the Baja at about LaPaz and down the west coast of South America around Tierra del Fuego. I want to see the Galapagos first, then up to Sao Paulo and Rio de Janeiro. On around the lip to the mouth of the Amazon.

I'll sail 1,500 miles or so up the Amazon's east bank to the Orinoco River, then back out the west bank. Northwest to Vera Cruz, then northeast in the Gulf of Mexico to the Keys. West and north to Tyndall, where I'll meet an old girlfriend and over to New Orleans. Then up the Mississippi to about Vicksburg, back down and out to Houston, where my little ranch is going to be waiting. I have a thing for rivers. I'll sail a piece up all the great ones, the Thames, the Zambezi, the Ganges, the Brahmaputra, the Mekong, and others.

Far away places with strange sounding names. Samuel Taylor Coleridge comes to mind:

"About, about in reel and rout
The death-fires danced at night;
The water, like a witch's oils,
Burnt green, and blue, and white"
and
"The moving moon went up the sky
And nowhere did abide;
Softly she was going up
And a star or two beside"

Why do I want this freedom? I don't know. It is the reason I fly. It is the reason that I live as I do. Unattached, unwilling to include another person. I miss a family, sometimes. I used to think the greatest gift I could give a woman would be to take her in my airplane and show her the airman's world. Show her the mountains and oceans from the sky. Straight up; inverted.

We're approaching the target now. In a little while we'll be descending. It's clear and very dark outside, except for the city passing off the left fuselage. Poor dummies are all asleep readying for labor in the morning. It is 0100 and I, too, am beginning to feel tired. I remember the nights when the club would stay open for the night flyers. They don't do it any more. In fact, it is hard to find an airbase that welcomes transients at all any more. I think a nice part of our heritage died when they stopped welcoming ALL airmen, and before ingrate radars began to dictate, and when flying was enough to keep the young guys in. In fact, a flyer is not welcome in most clubs in flying clothes any more.

I pitch hard left and look through the top of the canopy at Aurora Borealis once again. No one person in 10,000 on this earth has done that. Fewer, even, appreciate it like I do. Maybe after the world sailing tour, I'll settle down with a nice 8-to-5 routine and start a family.

Down we go, now. From 80 miles away I see the aerodrome. We're on long final for GCA. The approach controller hands us off to GCA final controller. His first instruction is: "Rosa 234, say your altimeter setting." Now that is a good idea. Deano answers, and the controller responds, "Your altimeter is correct." He brings us down final like a real professional. A half mile out I take the airplane and land it.

As we taxi in I open the canopy and feel the cold blast of air greet my skin. It is refreshing. The night is alive and exciting. I do not know why. It has been a routine night flight.—Reprinted from *Interceptor* magazine. ★

CHECKLISTS AND CHOW-BOXES

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Most of the following article is written in Odomese as opposed to Coast Guardese. When reading Odomese you should place your tongue firmly against one cheek. Cheek selection is at your option but the selection should be made carefully. An incorrect decision and a misplaced tongue can sometimes lead to aggravations. In essence that is what this article is all about.

There has been a great deal of talk around the C-130 community for years concerning the correct terminology for those big black retractable rollers. Ever since an Air Force major said "Cheer up, Charlie," and the landing apparatus was raised on the takeoff run, the term "gear" has been as verboten as George Carlin's "seven dirty words." History seems as fickle as the people who make it. Just suppose that the term for the rollers had been "wheels" and that infamous major had said "Why don't you put your heels up and relax, Charlie?" Where would we be now? The much maligned term "gear" would probably be as vogue as the term "wheels." Gear —cheer/wheels—heels; the real problem is not so much terminology as just plain professional cockpit communications.

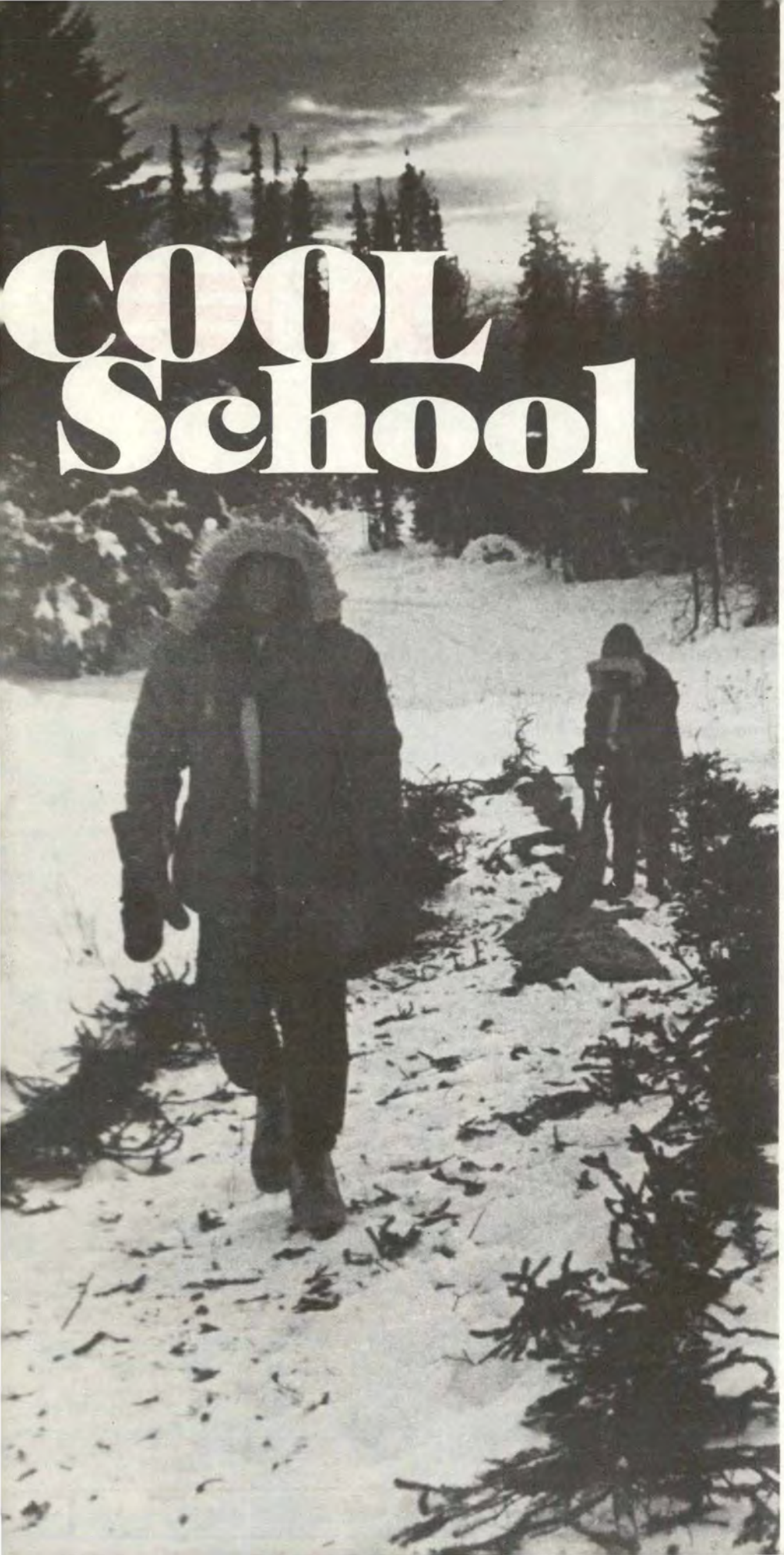
As military people we dearly love the art of taking unbelievably long titles and shortening them into neat little many syllable words. The acid test for "having arrived" is knowing what these tongue twisters actually mean. This situation is just fine for the staff officer, but it has no place in the art of flying.

The C-130 community, that same community where you never mention the term "gear," except in the privacy of your bedroom, now has a new source of communications irritation. We actually have pilots asking for a BLP, which sounds strangely similar to BLT. The frustration that a new scanner must go through rummaging through the chow-box looking for the bacon and pastrami (we always have the lettuce) is needless. There we sit in the front, standing by for a response from the scanner on "The Before Landing Pattern Checklist" and he is madly tearing through the chow-box.

Charlie is happy and well-adjusted these days; he hasn't had a problem with the rollers in years. The scanners on the other hand, are getting old at 20 and now most have police records since their paranoia for chow-boxes has manifested itself into physical harm for Coast Guard cooks. Please save the scanners and the cooks and either order pastrami and bacon as supplements to your ration components or call for the "Before Landing Pattern Checklist."

You can take your tongue out of your cheek now. I am certain that you can detect my decided dislike for dry, technical verbage. I now must regress, however, into the serious.

Checklists are provided to us professionals by professionals for a number of reasons. They can assist in keeping all of us out of difficulties only if they are used with as much absolute exactness as we can muster. Checklists, like any other tool, are of great benefit if properly used, but like the misplaced hammer—if improperly used they can inflict a lot of needless aggravation. ★



COOL School

Story and Photos By:
SSGT ROBERT S. THOMPSON
Det 5, 1369th Audio Visual Sq

Each year, more than 500 military and civilian personnel receive what they will affectionately call their "Cool School" certificates. These individuals will have attended the Arctic Survival School at Eielson Air Force Base, near Fairbanks, Alaska.

Though located at an Alaskan Air Command (AAC) base, the school is run by Air Training Command instructors of Detachment 1, 3636th Combat Training Wing. The school strives to indoctrinate and train people in survival techniques needed under emergency conditions in the Arctic or in arctic-like conditions. Air Force personnel in the Alaskan Air Command and individuals from other Air Force units attend the course, and, the school studies are open to other government agencies such as the Bureau of Land Management, the National Marine Fisheries Service, US Forest Service, and the Alaskan State Troopers.

The first organized cool school was set up during the winter of 1947 at Nome, Alaska. Three years later, for economic reasons, it was moved to Ladd AFB, near Fairbanks. Ten years later the base was turned over to the Army and all Air Force operations—including the school—were moved 21 miles south to Eielson.

The school's academic staff has set up courses of study that give students a better understanding of the natural resources and to show them how to use these resources to their advantage. The school runs weekly courses each year from mid-November through March. During those months, the weather conditions may vary from −20 to −40 degrees, and as one instructor said, "The colder it is in the field, the more realistic the training environment for the students."

Day one (Tuesday) of the school,

and the first half of the second day, are spent in the classroom. There the students follow courses designed to mentally and physically prepare them for the possibility of a survival episode in the Arctic. In the classroom, the men and women learn how to react to unattended injuries; prolonged exposure (also how that may lead to shock, hypothermia and frostbite); and how lack of water causes dehydration even where there are enormous frozen water resources. Other classroom lectures teach the procedures for coping with stress, how to build shelters and how to enhance the chances of recovery by knowing the mechanics of search and rescue.

For the noon meal of that second day, most students—having heard by the grapevine what the next two days hold for them—eat extra helpings of everything. After lunch, instructors and students load their gear aboard military buses for the trip to the field training area. There, they are divided into small groups before moving off into the bush.

Each individual carries a 50 pound M-1 bag packed with heavy parkas, down-filled pants, two sleeping bags, a saw-shovel, and two cans of flight rations (the latter is the extent of their food for 50-some hours). The students and instructors hike until they come to training areas that have been set up with common-use shelters and pits for building fires.

Within minutes of their arrival, each instructor has students in his group digging into their individual survival gear for saws to cut firewood (the students search for dead wood rather than cut living trees). When the fire is started, two students will shovel snow into a section of parachute material, bind the edges together, and hang it from a pole so as to be directly over the fire. The snow melts into a can underneath, providing water for coffee and soup.

Later, the students huddle around the fire, drinking coffee, as the instructor stresses the point of drinking large amounts of liquids to prevent dehydration. The instructor also lectures, in detail, on the use of signaling devices to attract the attention of rescue crews searching for downed survivors of an aircraft accident, or other persons in an

Below, students warm by fire while instructor lectures. Right, top to bottom, student builds one-man shelter; Linda Glenboski, research biologist was only woman in class; using parachute material for shelter.

Captain Alan K. Lambert, 18 TFS, Elmendorf, Alaska, and Mr. David C. Flannagan, National Marine Fisheries Service, Kodiak, Alaska, eat their individual flight rations. Sergeant Roger Hinz starting fire.

emergency situation. Under the guidance of the instructor, the students learn to use jet flares, "gyro-jets" and other signaling equipment.

Finished for the day, the instructors depart, leaving the students to face alone their first night in the field. The tired students head for their sleeping bags in the common-use shelter, a small hut built into the ground and covered with tree branches, parachute material, and several feet of packed snow. Normally, 12 students will squirm into their sleep-bags in these purposely-cramped quarters. Through the night the body heat from all of the students will raise the temperature in the hut by some 20 to 30 degrees.

Early Thursday morning, the instructor conducts a short session on the building of one-man shelters. Following that, the class starts a full day of working on their individual shelters—which they will sleep in that evening. Master Sergeant Peter Kummerfeldt, instructor, comments, "Lots of time is given to the students to build their own shelters because this is an important factor in survival against an arctic environment. If an individual can recover from the shock of finding himself in an emergency situation, and can quickly recover to build a shelter, his chances of survival are much better."

After their second night in the field, the students and instructors set up several signaling devices in an open field. Devices of this type are made of an old parachute and a large fire, and are used to signal searching aircraft.

Later that morning, each student uses a radio to signal to an aircraft circling overhead (the aircraft is simulating a search and rescue mission).

As noon approaches, everyone returns to camp to tear down their individual shelters, clean up the training area, and then walk back to the road for the bus ride back to Eielson.

Back at the base, another hour will be spent in the classroom during which they will receive their completion certificates.

Each student may now feel a little more confident that, should he or she be involved in a "hot" situation while in an arctic environment, the experience gained at the "cool school" may be the deciding factor for survival. ★

Staff Sergeant Robert S. Thompson is a photo-journalist with Detachment 5, 1369th Audio Visual Squadron (1369AVS/DOC-PJ) at Elmendorf AFB, Alaska. Master Sergeant Jack Conner who edited this article is an information technician with the Office of Information, Alaskan Air Command, also at Elmendorf AFB, near Anchorage.—Ed.

PILOT IN COMMAND

LT COL CHARLES L. POCOCK, JR. • Directorate of Aerospace Safety

Pilot responsibility is defined, spelled out, specified or implied in almost every Air Force flying directive.

Definition and limits of pilot authority, on the other hand, are not as easy to grasp. In general terms, the designated pilot in command is ultimately responsible for the safe mission accomplishment.

Sure, a lot of people have contributing responsibilities. The maintenance officer's signature on the AFTO 781 acknowledges his responsibility to provide an airworthy aircraft. An IFR clearance signifies ATC responsibility to provide separation from other IFR traffic. But, if the nose gear won't come down, the pilot in command is still responsible for the safety of the aircraft and all people on board. By the same token, if an aircraft is flying along at the proper assigned route and altitude and another aircraft wants to occupy the same airspace, it is the pilot's responsibility to take evasive action.

Where does the authority to carry out this responsibility come from? Basically, it has evolved from Maritime law. More specifically, the authority to deviate from established rules is contained in those rules. For example, AFR 60-16 contains authority to deviate from AFR 60-16 when an emergency or unusual circumstance occurs. It also states that the designated pilot in command, commands all persons on board and all aircraft in the flight, regardless of rank.

During the public hearings into a recent airline accident, involving flight into severe weather, several airline captains flying in the same vicinity were questioned. These pilots had deviated around the storm that caused the accident. A key question they were asked was: "Without knowledge of the accident but with the picture you saw on your radar scope, what would you have done if ATC had denied your deviation request?" Each captain replied, in about the same words, that they would have exercised their emergency authority as captain and deviated around the storm, regardless of ATC clearance. There was no question in their minds about their responsibility or their authority.

A hundred years ago a military commander was given a mission and the resources to accomplish it and sent off. When he returned he turned in his "trip report" and log. Little else was mentioned, particularly if the mission was successful. He had the responsibility to accomplish the mission as he perceived it, and almost unlimited authority.

Today, through the miracle of electronics, no military commander is more than a few minutes away from some higher authority. This world-wide communication system gives much better command and control and resource management, but is perceived by some as being a tie to mother's apron strings—having responsibility for mission accomplishment but no authority. This is a mistaken perception since there can be no responsibility without authority.

It is much easier to sit up in a tree and tell the man on the ground how to fight the bear than get down on the ground and fight the bear yourself. Once again, a matter of perception. The astute aircraft commander uses the communication system to fight his bear rather than let it use him.

The guy in the command post is human; he likes things to go smoothly and dislikes things that

make waves. He would much rather hear: "CP, this is Air Force 12345, destination, ABC Base, is below minimums with no improvement expected for two hours. I'm diverting to XYZ base at this time. Expected landing time is 0000 hours. I'll call you when I'm on the ground," than for the radio to say: "CP this is AIR FORCE 12345, my destination is ABC Base and the weather is not too pure, what do you want me to do?" Obviously, the latter is going to make waves in the otherwise tranquil command post routine, and any controller worth his salt is going to counter that question with another question, or several such as: "What's the ABC forecast?" "What's your fuel state?" "What's your alternate?" "What's the weather at XYZ", etc., etc. It would be much easier to just say "Roger." The aircraft commander would have made the decision and the controller would have been happy. Of course, if the controller did not like the decision, he could have made his own waves and this would require some effort and possibly your concurrence and the DO's coordination.

Complaints often heard (over at least the last 20 years) are: "Why can't maintenance fix the airplanes?", or "The only thing they care about is on-time departures", or "How come they want me to take a broken airplane?" Remember, if you let someone else talk you into an unsafe airplane that's your fault.

I don't ever hope to beat a maintenance man at his job. I understand his problems, and while I may empathize with his problems I also know we each may represent adversary positions. His job is to get the aircraft airborne. Mine is to get it back on the ground. No one expects a pilot to know what is in all the maintenance tech orders, regulations and manuals. What is expected of pilots is that they know what is in the Dash One, and all the flying regulations and manuals, particularly the mission requirements, minimum equipment list. And they are expected to exercise sound judgment in relating the aircraft condition to mission requirements.

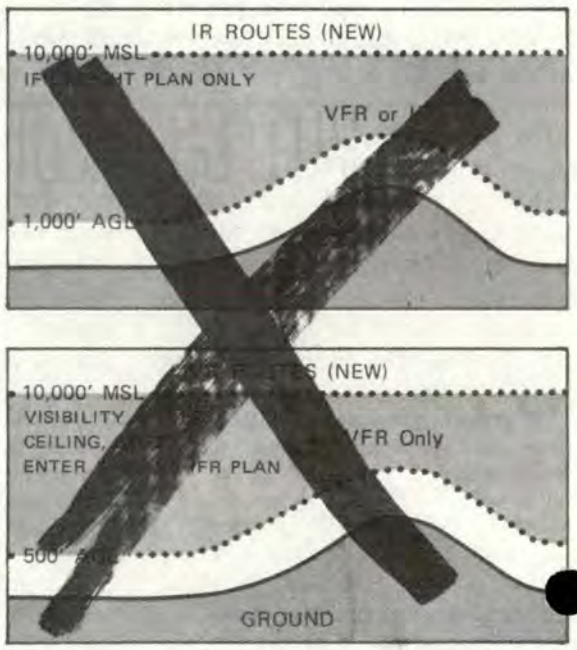
Flying a local transition mission with a tire worn to the first cord layer, or taking off with an inoperative radar to a destination forecasting thunderstorms, or taking off on a gunnery mission with an inoperative gunsight simply reflect poor judgment. Sure, you may take some verbal gas but no one said flying was *all* fun. On the other hand, turning down a morning local for an inoperative landing light, or a ferry flight to the depot with an inoperative gunsight, or a day VFR ACM mission with an inoperative ILS reflects equally poor judgment.

The pilot has the ultimate responsibility for the safety of the mission. He has, and must exercise, the authority to carry out that responsibility. And accountability for the decisions must follow. Do whatever is necessary to accomplish the mission safely and be willing to defend your position. Just because your commander asks why you made a decision doesn't mean he is criticizing you. Most of our flying regulations and manuals are written in blood. They should never be used as a crutch or substitute for good judgment. Most important — they can be legally violated to protect life or property when a pilot deems necessary.

"Regulations are directive upon uninformed and guidance for the informed." "It doesn't require a highly codified body of regulations and directives for an intelligent man to exercise good judgment." The first quote is by an RAF Air Commodore and the latter by a former CINCSAC. ★

CORRECTION

In the article "Sharing the Air with Military Jets", **Aerospace Safety,** May 1978, charts depicting the new IR and VR routes indicated a floor of 1,000' AGL for IR routes and 500' AGL for VR routes. Actually, military flights may operate at any level from the surface up.



A FOD Prevention Program That Works

LIEUTENANT COMMANDER DAVID J. CAREY
NAS Miramar
San Diego, California

The Air Force has been working hard at FOD prevention but we still have several occurrences daily. We are not alone; other services have the same problem. Here's what one Navy unit has been doing about it.

If—you're FODDING engines faster than you can build them; if—you're flying less (and enjoying it less) because you suffer from bare firewalls; if—you're changing FODDED engines more and enjoying it less—then what you need is a FOD PREVENTION PROGRAM THAT WORKS! FOD prevention—a traditional apple pie and motherhood item—that works? It may sound like a dichotomy, but COMFITAEWWINGPAC* is embarked on an aggressive prevention program—and it is working!

From July-September 1977, the COMFITAEWWINGPAC community suffered 42 FODDED engines with major damage, 35 of those were TF30 engines from the F-14. (The TF30 engine is particularly susceptible to FOD due to the location of the intakes and the large volume and high velocity of intake air). In that quarter the wing averaged 24 bare TF30 firewalls a week. In the third quarter of FY 78, there were 29 major FODs, of which 22 were TF30s, with an average of five bare TF30 firewalls a week. The number of major FODs (all types) aboard NAS Miramar has gone from 20 during the first quarter of FY 78 to nine during the third quarter of FY 78. A noticeable improvement, which has been produced in large measure through local FOD prevention efforts.

Recognizing the FOD rate as unacceptable in autumn 1977, the Wing Commander, RADM F. G. Fellowes, made the decision to

*COMMANDER FIGHTER AIRBORNE EARLY WARNING WING, US PACIFIC FLEET

A **FOD** Prevention Program That Works

continued

Scrubber & Roamer Vacuum Sweepers for inside/outside hangar cleaning.

launch a massive FOD prevention effort. He announced his complete dedication to reducing the FOD rate and directed all units to critically review their FOD Prevention Programs. A former squadron commanding officer was then appointed as the Wing FOD Prevention Officer, a billet formerly the collateral duty of a LTJG. The FOD Prevention Officer was given department head status, with attendant authority, and reported to the Wing Commander daily. Each unit in the Wing was tasked to provide one innovative FOD prevention idea. Meetings were held with commander carrier airgroups (CAGs) and commanding officers to screen and analyze the inputs. Those ideas which were of merit were assigned to a command for study and evaluation. The products of this process became the elements of the present program.

In November, as the program began to take shape, a two-fold goal was identified: (1) dry up sources of FOD, (2) improve, change, or eliminate procedures that have potential for causing FOD. Ground operations at Miramar were tailored so as to be as "FOD preventive" as possible without disproportionately ham-stringing operations.

a. Section taxi was not authorized (except A-4s).

b. Minimum taxi interval was set at 1,000 feet.

c. Taxi power was to be absolute minimum required.

d. For flight take-offs:

(1) Encouraged use of maximum runway interval.

(2) Encouraged use of both parallel runways for flights of three or more aircraft.

e. A review of ramp layout and taxi procedures was undertaken.

f. Duct walkers were to wear bunny suits and use non-explosive flashlights (both supplied by the Wing) for duct inspections.

g. Required quality assurance representatives and collateral duty inspectors to:

(1) Inventory tool boxes.

(2) Check area for FOD.

(3) Observe panel installation.

(4) Down aircraft when unexplained missing fasteners/screws were found forward of intakes.

h. Observe strict compliance with maintenance requirement cards (MRCs) for complete cleanliness of Ground Support equipment (GSE).

i. Submit squadron FOD directives for wing reviews.

At that time there were three R/W sweepers (vintage '61 and '68) and three billy-goats (small portable vacuum sweepers) aboard Miramar. Subsequently the schedule for replacement of the R/W sweepers has been accelerated. Twelve roamers (billy-goat type sweepers) have been purchased, allowing two per hangar. Three small industrial sweepers with scrubber attachments have been procured and are being modified for use both inside and outside the hangars. Monthly squadron FOD Prevention Officers' conferences were instituted, chaired by the Wing FOD Prevention Officer, for an active update on progress and an interchange of ideas and proposals.

All-hands FOD walkdowns of the entire ramp, taxiway, and runway areas became a regular evolution. They are held once every 6 weeks or as weather conditions might dictate, i.e., after a heavy rainstorm.

A taxi interval of 500 feet and a traffic flow pattern was mandated for the octagonal refueling pits.

Pre-expanded bin (PEB) material was removed from individual work centers and centralized under the cognizance of material control. Monitoring procedures were to be developed to eliminate the accumulation of such material in work centers and to allow close accounting for items used.

The cleanliness of vehicles and GSE having access to the line areas became the next target of the program in December, 1977. Vehicles were inspected for FOD upon issue and return to AIMD, GSE; at fueling stations; and at access gates to the line area with FOD violation reports requiring a response to the Wing as the penalty for non-FOD free vehicles. Littered vehicles were turned away from the gates, and violation reports were issued. It didn't take long for everyone to get the word, and at present vehicles in the line areas are remarkably FOD free.

Tennant 240 Power Sweeper, one of Miramar's weapons in war on FOD.

NAS was directed to sweep the **hold short** area twice daily and the FINAL Inspection Team was directed to down aircraft with missing or ill-fitting fasteners which were not clearly marked prior to taxi as satisfactory for flight by the squadron.

Early in the game the "bible," OPNAVINST 4790.2A, was considered to be deficient in its treatment of FOD definitions and criteria. As progress became evident, closer reporting and tracking of FODDED engines became necessary in an attempt to identify cause factors and to eliminate them. First, the definition of FOD itself needed clarification. Criteria were established for major and mi-

nor FOD damage. This local definition of FOD was adopted:

> **"FOD is damage caused by an object alien to an engine or aircraft which is either ingested or or lodged in a mechanism which will render the system/equipment unusable or unsafe for operation. Damage caused by material failure of a component which is an integral part of an engine is not considered FOD."**

Of note is that damage caused by some natural hazards (example: bird or ice ingestions, etc.,) is considered FOD. Major engine FOD is defined as damage beyond the "O" level capability and requiring more than 75 manhours at the "I" level to repair. Conversely minor engine FOD is defined as damage which can be repaired in less than 75 manhours at the "I" level. At present, revisions of this definition and the criteria for a Major/Minor FOD are being considered. An attempt is being made to more closely align the definition/criteria within AIRPAC/AIRLANT (Naval Air Forces Pacific/Atlantic) and the USAF for standardization of definition and commonality of reporting criteria without degrading the impact of the present local system. Thus, reporting for accounting purposes throughout the Wing was standardized. An immediate report by telephone (message if deployed) is required upon the discovery of FOD damage. It is to include, among other items, circumstances of discovery, cause and classification (major or minor).

The FOD Prevention effort now had the ability to closely track all units, including those which are deployed. Thorough investigation was directed in order to discover causes of FOD, and hopefully, once identified, to be able to eliminate them. The Wing established a FOD Reaction Team to assist squadrons in this investigation. Miramar-based units are to impound an aircraft until a thorough investigation is completed. Non-Miramar based units are to use all available expertise to investigate each FOD incident.

In March 1978, all non-GSE was removed from around temporary buildings on the ramps. For several hangars specific GSE areas were designated. Nine temporary buildings were removed from the areas adjacent to the ramps.

To minimize the FOD potential for units on detachment to the National Parachute Test Range, El Centro, California, some unique operating procedures were set forth:

- 3,000 feet taxi interval.
- Use only centerline of runways, taxiways.
- No section take-offs.
- One aircraft on runways at a time.
- 4,000 feet landing interval.
- Detachments are to take a Roamer with them.
- FOD walkdowns are to be conducted prior to each launch.

A great deal has been done to date. What has been accomplished? The FOD Prevention Program is:

- Producing data for management and analysis of the program which is now highly reliable.
- Aggressive.
- Highly visible.
- Clearly identifiable and defined.

	JUL-SEP 77	OCT-DEC 77	JAN-MAR 78	APR-JUN 78
MAJOR FODs	42	31	37 (1)	28
MAJOR TF-30 FODs	35	22	25	21
TF-30 BARE F/W	24	16	5 (2)	5
SAVINGS FOR TF-30 (based on $50,000 per major FOD)		$650,000	$500,000	$700,000

Note (1) Specific reporting requirements which were more demanding established 31 Jan 78. Note (2) Reached ZERO bare firewalls 23 Mar 78.

Resolution of TF-30 bare firewall situation, attributed in large measure to the FOD prevention effort, has unmasked numerous other not operationally ready supply problems which are being pursued.

Will a FOD Prevention Program work? Unequivocally the answer is yes; however, it takes a great deal of dedicated effort on the part of all hands. There is no easy way to reduce the number of FODs—but there is a way, and more correctly, there are many ways. Good luck. ★

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UNITED STATES AIR FORCE

Well Done Award

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

CAPTAIN

Jerry O. Foote

41st Air Refueling Squadron
Griffiss Air Force Base, New York

On 4 March 1977, at Griffiss AFB, New York, Captain Foote was conducting the preflight inspection of a KC-135 aircraft when another KC-135, located across the parking ramp, suddenly burst into flames. Realizing that the burning aircraft would soon be a total loss, Captain Foote's attention was directed toward a KC-135 aircraft parked adjacent to the one which was engulfed in flames. With total disregard for his own safety, Captain Foote rushed across the ramp to the KC-135 that was in obvious jeopardy. As he approached the scene, the intense fire, spontaneous explosions, and accompanying shock waves were nearly unbearable. Captain Foote directed maintenance people to assist him, then climbed into the pilot's seat and prepared the endangered aircraft for engine start. During the engine starting process, fragments from the burning, exploding plane pelted the aircraft. Although Captain Foote realized the obvious threat to his own life and the maintenance people assisting him, he persisted in his efforts to remove the endangered aircraft from the scene. After starting only one of the aircraft's four jet engines, and seeing flames only a few feet from his right wing, Captain Foote released the aircraft's parking brakes and began to taxi with only his left outboard engine running, which rendered the aircraft's nose wheel steering inoperative. Using only the aircraft's wheel brakes to guide its direction, Captain Foote managed to taxi the aircraft through a complete turn and onward to an area where he, his maintenance assistant, and the aircraft were safe. Captain Foote's exceptional alertness, professional skill, and ingenuity possibly prevented the loss of several other aircraft and the lives of other flight line personnel. WELL DONE! ★

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