AEROSPACE
SAFETY
UNITED STATES AIR FORCE

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VIETNAM AIRLIFT

AEROSPACE SAFETY

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AFRP 62-1 MAY 1966 VOLUME 22 NUMBER 5

FALLOUT

TAKEOFF

The closing line of "Takeoff" (Jan '66, pg 3) was a real eyebrow-raiser, coming as it did in an official USAF magazine.

One of the classic shortcomings of any house organ—government journals even more so than others—is their general parroting of the official line, with little, if any, disagreement of those On High.

Here's hoping that more sounds of dissent will be heard in AEROSPACE SAFETY in the future. It could make a first-class journal even better!

SMSgt Edward M. Parr
USAFR, 3 Donna Way
San Fernando, Calif

CIGARETTES

In the Rex Riley poster on the back cover of the February issue, is it necessary to depict two officers smoking cigarettes? What does this contribute to aerospace safety?

Show non-smokers, or pipe and cigar smokers. Are you with the U. S. Surgeon General or against him?

Albert Goldman (AVP)
Air Force Avionics Lab
Wright-Patterson AFB, Ohio

Rex is suffering withdrawal pangs.

SPINS

I was happy to see you reprint Don Engen's spin article in the February magazine. He certainly speaks from experience. I can't take exception to anything Don says but would like to make some comments concerning that champion of all spinners called the F-100F.

Don implies that if proper handbook procedures are followed, all of our fighters can be recovered from spins. F-100F pilots should be aware that if they do not recognize a spin and apply proper recovery controls quickly, the aircraft *most probably* will not recover. As stated in the handbook, recovery must be initiated before two turns are complete. It is *most* important to get the recovery controls in first and then to worry about jettisoning stores, etc. This can easily mean the difference between success and failure.

Naturally the pilot should be certain he is actually spinning before applying recovery controls. As an item of interest, the front seat pilot will likely find difficulty in holding full anti-spin control because of centrifugal loads and will probably have difficulty in getting into a good ejection posture.

During recovery attempts two hands are better than one and the rudder pedals should always be far enough out to allow full travel when needed the most. (Short fighter pilots, take notice.)

Most of what I have said is covered in the Handbook, but you would be amazed at the amount of misinformation concerning F-100F spins floating around this Air Force. Many pilots are under the impression that F-100Fs will not recover from spins. This is just not true and the test program bears this out.

The facts are that the aircraft in its present configuration with no strakes installed does not have the recovery characteristics desired

Continued on page 28

Mildred A. Norman, Directorate of Aerospace Safety

Do you remember that guy who used to come into the headquarters building several years ago? He was always checking on electrical outlets, percolators, extension cords, over-waxed floors, and even over-loaded filing cabinets. We had a nickname for him — "Safety Sam." We always thought he was some kind of a "kook," forever poking around into things he thought were unsafe.

Well, I've been thinking a lot about this safety business lately. It seems he wasn't the one who was out of step; we were! His job mushroomed as safety caught on and people all over the Air Force began to realize its implications. From just general safety, it became ground and flight, and then — with our ballistic missiles and complex weapon systems coming along — missile, nuclear and explosive safety.

Safety cannot be computed by any of our tables of measure. It isn't measured in terms of tons, pounds, feet — or bucketfuls. The dollar savings in materials will never make the cash register ring or show up in black ink on the ledger. Safety can only be measured by that warm glow you may experience from the knowledge that by doing your job properly, you have saved money, materials, lives, or most importantly, conserved a capability. No tangibles — just the satisfaction that, by correcting a potential hazard, you may have prevented a serious accident.

That accident you may have prevented could have been in your own home—the rickety kitchen stool you threw away possibly saved your wife's life or, at least, prevented a bad fall. That ground wire you put on the hedge trimmer may have saved your son from a lethal shock when he trimmed the ivy last week. Or, that warning note you put up may have prevented those workers being electrocuted by hitting the high-tension lines! The spill of oil you cleaned up, maybe that kept ol' Joe from taking a bad fall. Who knows? A bit of housekeeping may have kept the whole place from blowing up when later on you found that oxygen valve leaking! That checklist you followed so meticulously in making those wiring connections — suppose that prevented an inadvertent firing? Or, how about that paint job? That possibly saved thousands of dollars by retarding or preventing corrosion, and by sweeping up those flakes of chipped paint, you may have prevented a stopped-up drain. Then there was that time you cautioned that newly assigned young man to be sure to fasten his safety belt properly. If you hadn't, it's possible he could have fallen and broken his neck. Oh yes, how about the other day when you decided to make one last check on that elevator cage and you found it wasn't assembled properly. Gives me the creeps just to think about that thing crashing down on the silo floor! There's more, but I could come unglued at the seams just thinking about the things that might have happened.

So, looking back to that funny little guy who used to come into the headquarters building, he doesn't seem so funny any more. He seems to have gained stature and I don't think of him as a "kook." I'll bet he feels 10 feet tall when he sits back and recalls that in spite of the jeers he took in those days, people at last caught onto SAFETY. That "Safety Sam" is now politely referred to as the Safety Officer and takes his place on the righthand side of the Commander. ★

TWO MILES SHORT

When a T-39 crashed into a stand of trees on final approach, the subsequent story in the newspapers would have read something like this:

SIX SURVIVE CRASH

Six Air Force men miraculously escaped death today when their light jet transport crashed just two miles short of the runway.

The story probably would have dwelled on the fact that no one was seriously injured and included a brief discussion of the immediate cause. Since there were no fatalities and little civil property damage, the event was no longer news after the initial story and probably vanished from the pages of the newspapers forever.

Our discourse, however, must go beyond the immediate cause. We know that most of our aircraft accidents are preventable. Was that true of this one? Let's see.

The flight was a routine passenger haul with a T-39 IP in command of the aircraft. The only problems noted until penetration for the approach were that the TACAN did not respond to one enroute station and Control reported a weak IFF/SIF. This later was to prove a crucial factor. Briefed destination weather was forecast to be generally good, with 2500 feet overcast and seven miles visibility. While the aircraft was enroute, the destination forecast was revised to below minimums at times with snow showers during arrival period. The crew, however, was unaware of this change, since they did not request any weather reports while enroute.

The first indication of changing weather was received when the aircraft was over high station at destination. The crew was advised that their destination was closed for snow removal and asked to state their intention. The pilot replied that he had 45 minutes of fuel (1400 lbs) and that he wanted to land at home base. He then called the tower and was advised that the snow removal operation would soon be finished.

Meanwhile, the aircraft had entered a holding pattern and the pilot's next action was to call the command post, which gave him .2 miles visibility. The pilot returned to the tower and got an entirely different observation of 600 feet overcast and two miles visibility.

After holding at altitude for 14 minutes, the aircraft was cleared for approach. Two and one-half minutes later Control advised that the field was below minimums. The controller then added that the weather was expected to improve momentarily.

The aircraft was now at about 10,000 feet with 800 lbs of fuel remaining. The pilot said that he would continue the approach to ADF minimums and requested that he be kept informed of the visibility. GCA replied that the weather was still .3 mile and that they would keep the pilot informed. Two minutes later GCA reported the weather was .4 mile with snow showers over the approach zone and said the Ops officer wanted the fuel status. The reply was, "Forty minutes."

The pilot decided now that the visibility wouldn't improve enough by the time he was ready to land, so he broke off the approach at 3000 feet and asked for a vector to his alternate. Then, for the first time he became concerned about fuel. He reported 20 minutes remaining, which he immediately corrected to 30 minutes, and asked for a radar vector to a second alternate that was closer than his original alternate. At this point he reported that they were coming up on minimum fuel.

Control cleared the aircraft to the radio beacon at the alternate and informed the pilot that they were unable to get a radar return. Although both the ADF and TACAN were tuned to the station, the crew refused the clearance direct to the beacon and continued to request radar vector. Control, meanwhile, had misinterpreted the pilot's position report and confused the aircraft with another target. This required identification turns which consumed time and fuel. After contact was made, radar corrected the aircraft heading to intercept the final approach at the normal intercept point. Since the crew had not declared an emergency or even minimum fuel, they did not receive the most expeditious handling by radar.

Enroute to the alternate, the pilot maintained a low indicated airspeed rather than max range speed. This, with strong headwinds and turbulence, combined to reduce ground speed.

Although they had not declared an emergency, the crew now became so concerned about their fuel state that they shut down one engine in an effort to conserve fuel, which further reduced IAS and ground speed.

The approach was continued with normal GCA handling until the aircraft was about three miles out on final where the engine flamed out. Despite attempted airstarts, the crew could not get the engines running and the aircraft crashed two and one-half miles short of the runway.

Aircraft sliced through trees, shedding wings, engines and part of tail, but fuselage remained intact. Crew and passengers escaped with only minor injuries.

When the accident board finished, they had found the primary cause to be pilot factor in that the pilot did not use the proper indicated airspeed to obtain maximum range during a diversion. It would be hard to argue with this finding, but we think there are several significant factors that influenced this pilot's decisions and led to the accident.

In order of occurrence, these were:

• One of the enroute TACAN stations was NOTAM'd out, but the pilot did not catch this during preflight planning and believed that his radio was acting up when he failed to get the station. This possibly led him to not completely trust his equipment when he was cleared to the alternate base radio beacon after making the missed approach.

• When the pilot received conflicting weather from the command post and tower, he was inclined to go along with the tower observation because he had worked in the command post and knew that the weather available there did not necessarily reflect actual current conditions. Obviously, he was faced with a rapidly changing situation. GCA reported .3 then .4 of a mile visibility. But after the pilot had broken off the approach and headed for another base, the weather improved. The GCA controller, in fact, considered bringing the aircraft back to the original base but the weak IFF/SIF decided him against this action.

• The command post at no time exercised any authority and consequently never directed the pilot to take any specific action.

• The pilot did not make any fuel entries on the Form 21a. This was due to his familiarity with the route, which he had flown many times, and lulled him into a false sense of security as to his fuel state. Further, neither crewmember realized the effects of low altitude, low airspeed, wind and turbulence on the fuel consumption during the flight from the missed approach to the alternate. The Board had three recommendations in regard to this point: (1) airspeeds versus range and fuel consumption be reviewed in ground schools and included in annual aircrew proficiency exams, (2) a Diversionary Range Summary table be published, (3) the present T-39 checklist cruise chart be expanded to include data from sea level to 20,000 feet.

• The pilots apparently had a misconception of the term "minimum fuel," expecting that when they declared this condition they would receive emergency handling. But there was a reluctance to even declare minimum fuel. In fact, the closest they came to hinting that they might be in trouble was when they started "coming up on minimum fuel" just after making the missed approach, some 20 minutes before the accident. Consequently, they received no special radar handling. For those pilots not sure of what minimum fuel means, the following is quoted from AFR 60-16:

"Minimum fuel describes a flight condition in which all of the remaining usable fuel supply is necessary to assure a safe landing in normal sequence with other traffic. This condition does not warrant priority traffic handling; instead it will be used as an advisory to the traffic controller that any unusual delay will result in an emergency."

The definition of the term minimum fuel was changed on 31 December 1964. Both pilots and air traffic controllers should understand this term and the meaning should be the same to both.

Editor's Note: The Directorate of Aerospace Safety is proposing another change to AFR 60-16. Minimum fuel will be defined as sufficient to reach the runway and complete one go-around. The pilot will have more fuel available at minimum fuel but there will still be no priority in traffic handling. The pilot is still responsible for declaring an emergency when he feels that he has reached a fuel situation where he requires priority in landing. ★

FASTEN THAT TOP BUTTON

After graduating from single engine advanced flying school back in the brown shoe days, I was assigned to a fighter squadron and have been flying fighters ever since. Upon reporting to the fighter squadron, I was indoctrinated in the concept of fighter pilot thinking. That is: all pilots not flying fighters are bums and shouldn't even be allowed in the same sky with us—the cream of the crop. Even our dress was different: Leave the top button of your blouse unbuttoned and other pilots will recognize you as the rock that you are. Well, I endured numerous reprimands from commanders concerning the top button until a few months ago when I was forced to convert.

The word was out that our base would eventually lose all its jets. This had been declared before and nothing came of it, so I figured, "no sweat," I'll be gone from here before they shove a recip under me. Then one fatal day I saw a note standing out on my usually clean desktop. It read, "You are hereby relieved of duty as a T-33 pilot and will proceed to base ops on such and such a date to attend T-29 ground school." I raced around ranting and raving to all my boondoggle buddies only to find that they had received the same "greetings." No amount of pleading seemed to help because of the simple fact that there were no more T-33s.

The next step was T-29 ground school. That was a laugh. Not that the instructors weren't competent, but that we were so stupid. It suddenly dawned on me that I had been flying along fat, dumb and happy all these years with nothing more to do than kick the tires, light the fires and zap off. I also learned that all these years the multi boys had been happy that we were leaving the top button open. They didn't want to be associated with such a dumb lot.

Any ideas I had been harboring concerning the simplicity of recips were quickly eliminated. I was introduced to the hydraulic system, the electrical system, and the oil system. They are all complicated and all have at least three emergency procedures for each component failure. I previously thought that the flight mechanic had to know all the procedures, limitations and capabilities and all I had to do was fly the aircraft. I was right about the flight mechanic but wrong about the pilot. The flight mechanic is there to assist the pilot but he is not to make decisions concerning the safety of the aircraft.

Making a recip driver out of me looked like a hopeless case, but only from my viewpoint. The instructors nowadays are a new breed of people apart from my cronies of yesteryear. They give a student pilot credit for knowing absolutely nothing and start from there. They correct stupid mistakes, like feathering Nr 2 when Nr 1 has failed. They do these things without backhanding the student or blowing their tops. In the old days the instructors had to have two horns, two tusks and a loud voice. I finally realized that they were getting things across to me in their calm manner and I also began to realize why I had such a hard time teaching my daughter how to drive. The days of shouting and ridiculing are over. The younger breed has brought reasoning into the program. Of course there were some instances in my training where a well-laced shout was necessary, but only to save life and limb.

Day after day these flights went on, with me answering maybe 50 per cent of the questions, making half a dozen repeat mistakes, making a dozen new mistakes, and telling the instructor that I would dig more into the Dash One. Actually there's nothing duller than reading a Dash One on a strange airplane. It's like a doctor reading Hudson's Engineering Manual. But the boys kept plugging at me because they knew that eventually (twice as long as the ordinary young recip student) I would learn through repetition. Things were actually repeated twice because on the training flights two student pilots are scheduled. Each one flies for two hours and the other can watch his fellow student's mistakes. Luckily I was paired with one no more endowed with aptitude than myself. I learned from his mistakes as well as my own. This system also gave some added incentive because I thought, if this guy can fly the aircraft, I know I can. I'm sure he harbored the same thoughts about me. We got along fine with each trying to outdo the other, and I strongly suspect that this was the IP's *modus operandi* all along.

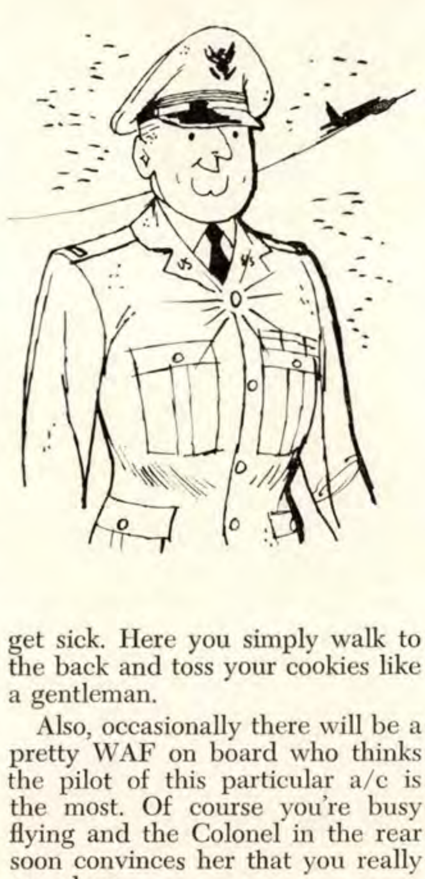
The training program consisted of many strange little goodies. Take the brakes: I thought the F-100 brakes were sensitive, but these are more so and more critical, for this sensitivity at low speeds. That's when you're taxiing and you don't want to jounce the Colonel passenger around. This brings up another point – passengers.

I had never bothered with them before. Now you have to wet nurse at least 20 passengers on each flight. Of the 20 there will be at least two high ranking officers who persist in being late for takeoff, or one is late and one is early. Then your only problem is to find out which outranks the other. So diplomacy and protocol are part of the training program.

Straight and level flying has always been a sore spot to me, for I thought of all the time the auto pilot was logging while the pilot made only takeoffs and landings. This conception changed when I found out that many auto pilots don't work, plus the fact that flights are made through or around the thunderstorms that I used to fly over. Radar? No such animal; you just have to buddy-buddy the centers for vectors.

I had thought before that landings were simpler because of the low landing speeds. I didn't stop to think that these low landing speeds make you vulnerable for short runways—all runways are not 10,000 feet long. The landing speed is not that slow anyway. A ballpark final approach is 120 knots and on a 3500-foot runway reverse should be used. This in itself is not simple. Both props in reverse are never synchronized so throttle steering must be used in the reverse range. Nose wheel steering can be used if you don't mind grinding off both nose wheel tires at this high speed. The landing itself is critical, for you can never make a landing so smooth that the passengers in the back don't think that they could have done better.

If you think there must be something better about this aircraft, you're right. Sometimes pilots do



get sick. Here you simply walk to the back and toss your cookies like a gentleman.

Also, occasionally there will be a pretty WAF on board who thinks the pilot of this particular a/c is the most. Of course you're busy flying and the Colonel in the rear soon convinces her that you really are a bum.

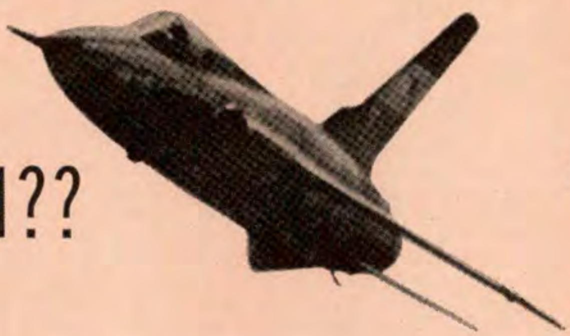
Anyway, we (my fellow student and I) finally finished our training and were ready for the final test flight. This was to be the most comprehensive check ride I had ever taken. I remembered the instrument checks that I had taken in jets. I was always briefed before I took off on the approach to be used so that very little brainwork would be required while I was airborne. Not so in this bird. I was handed a SID immediately before takeoff, given revisions while climbing out, required to answer all sorts of questions about the aircraft as to what powers which instruments? And I was given the normal emergencies such as single engine, electrical failure, hydraulic failure, fire warning lights, low pressure lights and warning horns.

The IP tuned in one station on the bird dog and gave me a letdown for some station thousands of miles away. He said, "Look at this for one minute while I've got the aircraft." After one minute he said, "You've got the airplane, you're cleared to Podunk AFB, cleared for an approach." About then the station starts the swing and you make decisions fast. You ask at minimums if he has the field in sight and he never does so you execute a missed approach. When you reach the missed approach fix, he says, "Look at this for one minute." You go through the same thing again and repeat for TACAN, GCA, and ILS. Of course all the time he is simulating emergencies, so much so that I don't believe I completed any approach on two engines.

Just when I thought we had the last one knocked, he went to partial panel and I completed a gyro out approach on needle, ball, and airspeed. This entire check required three hours and three gallons of perspiration. I had never worked so hard before and felt good that I was able to complete the check. I am proud to say that I keep my top button fastened and don't want to be associated with the hot rocks.

I keep company with a different crowd now and I am regularly surprised at the intelligence these people have acquired in the last 22 years. No more kick the tires, light the fires and zap off for me. ★

SILENCE IS GOLDEN??



Maj James H. Broussard
Directorate of Aerospace Safety

A fighter formation returning from a gunnery mission entered the traffic pattern for a final landing. The leader pitched, lowered the gear and flaps on down wind, made a routine call on the base leg and landed. The wingman delayed his pitchout as briefed, but when he lowered the gear handle on the downwind leg, he noted the following:

- no red light in the gear handle
- no unsafe gear buzzer sound
- no green lights for the three gear
- no "feel" of the gear lowering.

In short, no lights of any kind glowed from the landing gear system. But on base leg he reported, "Gear down and checked."

On final approach, with the gear handle in the DOWN position he executed a go-around without stating any reasons and requested a closed pattern. As he flew past his leader he called, "Check my gear," and got the reply: "Looks OK from here." To the wingman this meant that the gear was down – actually he was clean as a whistle.

The pilot completed his closed pattern and was on the downwind leg for the second time when some "goodies" began to display themselves in the cockpit – in contrast to those in the gear system that failed to appear. A few of the more important indications are listed:

- Fuel low level warning light blinking
- Fuel quantity gage stuck at below 2000 lbs.

As added insurance, the pilot pulled the emergency gear extension handle while on the downwind leg; on base leg he reported, "Gear down but I get no gear indications in the cockpit."

Upon hearing this statement, Mobile Control got quite concerned over the issue, took a good look at the aircraft and told the pilot, now on final approach, that he had no gear.

SURPRISE! SURPRISE! SURPRISE! not only to the pilot but to everybody who had been listening to the radio transmissions.

Let's stop here, review the proceedings and recapitulate for a moment.

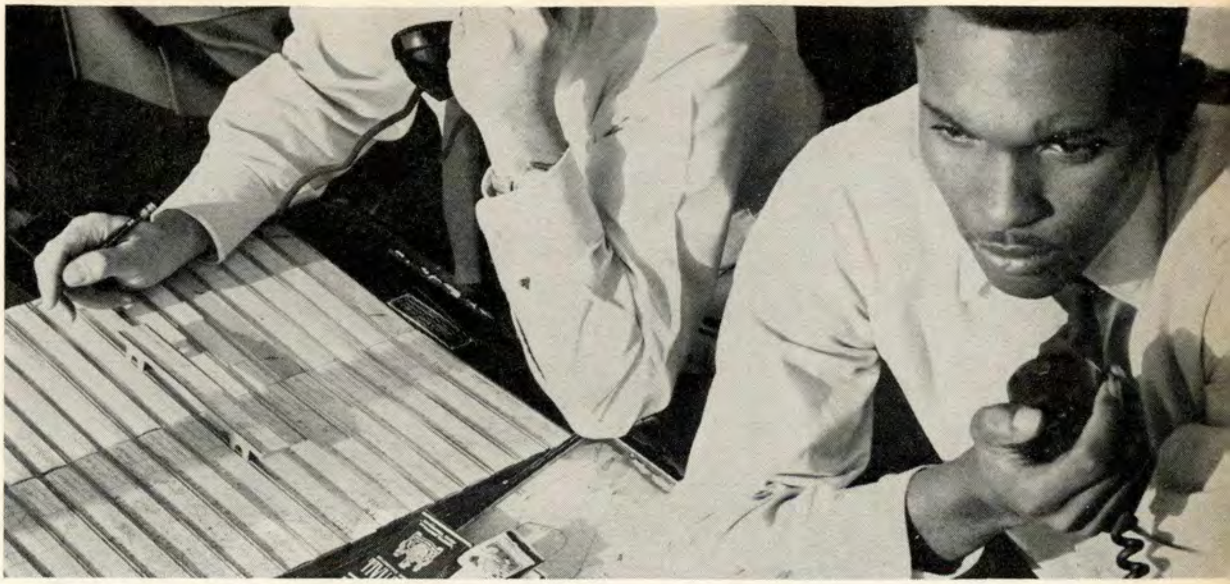
From hindsight, it's easy to criticize a pilot's action or inaction, but basic practices which have been instilled in us from the very beginning of our flying days and generally accepted by professional flyers as canon law, were ignored. One might ask, "Was it really necessary for the pilot to relate his cockpit observations, action taken and general feeling about the situation when he first noticed them?" We say yes.

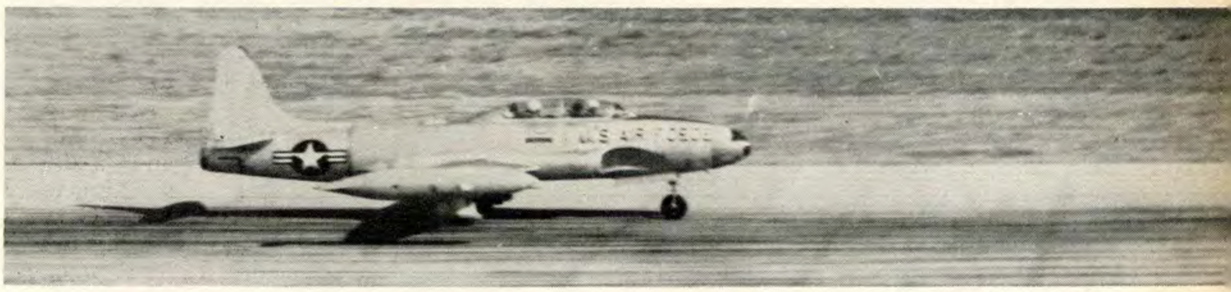
When the pilot was positioned on the downwind leg, was it really necessary for him to relate his original cockpit indication, plus low fuel state and the fact that he had pulled the emergency gear extension handle? Again, we say yes.

Now let us continue with our story and see how the lack of vital information from the pilot compounded this problem and forced him into a situation that nearly cost him his life.

When the pilot was told by Mobile Control that he had no gear down, he acknowledged and initiated a go-around. Because of the unknown fuel status, he decided to get away from the populated area, gain altitude and make bailout preparations. He orbited about 10 minutes, requesting aircraft to observe his gear status. About the time he was sighted by the pilot of another aircraft, he pulled the manual gear extension handle for the second time and was told that his gear was down. He elected to return to the base but the engine flamed out approximately ¾ mile from the runway. He continued to maintain control and the aircraft impacted on fairly level terrain approximately 900 feet short of the overrun. The pilot survived the crash and walked away from the wreckage.

In summary, it is fair to say that a little talking might have prevented this accident. ★





Communication: Some say it is the art of getting the other fellow to see your point of view. Regardless of how one defines it, communication is an essential part of accident prevention.

HOW DO YOU HEAR ME?

Bob Harrison

One of the remarkable attributes of human beings that separates them from lower forms of life is their extraordinary ability to communicate. Other forms – even insects – apparently do communicate with each other, but their capabilities are limited to functional transmissions, whereas we humans operate across a much broader spectrum up to and including the communication of abstractions. Yet, paradoxically, one of our greatest shortcomings is lack of communication. How do we account for this paradox and what are its implications? Before we try to account for it, it might be best to discuss some of the results of our lack of, or imperfect, communication.

The consequences of not communicating depend on the situation and range from perhaps minor annoyance to disaster. A person would be annoyed, but there would be no hazard involved, if he ordered a white car with red upholstery and, instead, got a red car with white upholstery. Misunderstandings of this degree occur every day and about the only thing that flares is tempers. But what about the driver who signals a right turn then turns left? This can cause all kinds of havoc, even a catastrophe, if the driver behind acts on the signal he perceives and attempts to pass on the left. Chances are, he is wary of any such signal and waits until the other driver has made his move.

Pilots, too, have communications problems, some minor, others that

One of the most serious problems is communications between people. Having been conditioned to

are of more serious import. A mistake on the part of a wing walker—or the pilot's misinterpretation of his signal — might result in a dinged wingtip. But a misunderstanding of assigned altitude could culminate in a midair collision.

But there are more than mechanical breakdowns in our communications processes. Interpretation plays a big role, perhaps even a greater role than the mechanical aspects. We humans are the product of all of our experiences — experiences which shape and mold the way we behave and the way we look at things. Just as an object may appear different to two observers standing at different places in relation to the object, so do we tend to see things differently due to psychological variances. Supersonic flight, for instance, may seem extremely hazardous to the uninitiated, but to the pilot who does it every day it is routine and holds no terrors.

The man who must give a speech for the first time may be terrified. But after several exposures he usually adjusts to this frightening experience and has no qualms at all. Some of us may, for some reason, never become comfortable before an audience, or at ease flying a high performance jet.

How we perceive things and situations depends to a great extent upon past experience, or lack thereof. If experience indicates that a particular course of action could be hazardous, embarrassing, or just uncomfortable, then we are reluctant to get ourselves involved. If we have never been there before, so to speak, then we may react in a number of ways. We may relate the situation to a different kind of experience but one that is painful, in which case we will try to avoid involvement. Of course, the opposite is true when we draw a parallel with a pleasant experience.

To the experienced pilot, who is also current, weather within certain limits has no terrors. But to the student pilot, the idea of penetrating and landing when the weather is near minimums may be extremely frightening, possibly to the point where he will refuse to make the attempt, even though he has the assurance of training and practice in a simulator that he can make a successful landing.

One of our most serious problems is communications between people. Having been conditioned to look at things from a certain point of view, we often refuse to accept another's point of view. The controversy now going on in this country over the Vietnam war is an example.

To a pilot, communications with air traffic controllers is vital, yet there are often differences of opinion and misinterpretations. Some of these result from mechanical problems in transmission of messages. Until our electronic communication equipment becomes perfect, this will continue with, occasionally, drastic results. But more difficult to overcome, perhaps, are the interpretations of communications between pilots and controllers by one or both parties. Here's an example. As you will see, there are two sides and I'm sure it would be very difficult to convince either side that the other is 100 per cent right.

At 1800Z the pilot taxied his aircraft to the runway, received the clearance he had filed two hours earlier and was instructed to hold clear of the active. His description of the next few minutes is as follows:

"At 1805Z I called the tower and requested the reason for the delay. The tower operator informed me we were being held due to inbound IFR traffic. At this time, there were approximately two C-141's, and one each C-124, T-39 and T-29 in the traffic pattern shooting touch and go's and practice GCA's. At approximately 1810Z, two F-84F's completed a VFR practice GCA with a low approach and a go-around to re-enter the GCA pattern. I then went to the departure control frequency and asked why we were being held. Departure control stated that we were being held for two inbound F-84F's and the controller also stated, in accordance with a letter of agreement, no IFR traffic could depart if any inbound conventional IFR traffic were within four miles of the base or any IFR jet traffic were within six miles of the base. I informed him that the two F-84's had already completed one practice GCA and had re-entered the GCA pattern. He reiterated we were being held for inbound IFR traffic.

"We returned to the tower frequency, contacted the tower operator and asked if we were being held for these two F-84's, but the tower controller would only admit that we were being held for inbound IFR traffic. At 1820Z the two F-84's completed another practice VFR GCA, initiated a go-around and again entered the GCA pattern. At 1825Z, after more conversation with the tower operator, we were cleared into position for takeoff. Total time spent on the ground awaiting departure was 25 minutes.

look at things from a certain point of view, we often refuse to accept another's point . . .

"The cited situation and procedures are inconsistent with efficient and intelligent traffic control concepts. A procedure which allows one inbound IFR aircraft to hold up departure aircraft does not fully utilize the capabilities or the flexibility of modern radar control techniques and equipment. One efficient controller should be able to direct seven aircraft simultaneously or he should not be a controller."

Now this sounds pretty bad. I'm sure that this pilot has a lot of sympathy and many of his brethren are undoubtedly saying amen! But let's flip the old coin and take a look at the other side. Here was the reply:

"The tower tape has been reviewed and the following facts have been revealed. From the time of the first contact with the tower, when the pilot requested taxi and takeoff instructions, until the aircraft was in the vicinity of the runup pad for runway 35, the lapsed time was six minutes. At this time, the aircraft was number three for departure. From this time there was an actual 12 minutes delay due to conflicting traffic. The traffic consisted of numerous arriving IFR aircraft and departing aircraft that were ahead of this aircraft which was being held awaiting ATC release.

"After the 12 minutes delay, the pilot elected to leave ground control frequency to attempt contact with the center. This was unsuccessful, so contact was made with departure control. The aircraft was standing by on Guard frequency. At this time, the tower received an ATC release on the aircraft. Attempt was made to contact him on the ground control frequency with no response. Contact was not made on Guard as the release of this aircraft is not considered an emergency. He was off ground control frequency for approximately three minutes. During this time, the ATC release was canceled due to conflicting traffic. The pilot came back to ground control frequency and made several unnecessary radio transmissions concerning why he was being held. Another ATC release was received by the tower in approximately two minutes and the aircraft departed.

"From the time the aircraft taxied to the runup area, and reported that he was number three for departure, until takeoff, the elapsed time was approximately 17 minutes. Three minutes of this delay was self-imposed when the pilot elected to take it upon himself to determine the delay by contacting FAA. An additional delay was encountered of two minutes when the ATC release was canceled as the tower could not contact the aircraft while he was talking with the center. The aircraft could have been released approximately four minutes sooner which would have made the actual delay approximately 13 minutes. The six minutes required to taxi from the ramp to the runway end cannot be construed as a delay."

Now I submit that there are two sides to this story and that, depending upon one's job—pilot or controller—the reaction is going to be to go along with one side or the other. How many of us are willing to accept, at first blush, the possibility that neither side is wholly right nor completely wrong. Have you ever met a truly objective man?

One of the fascinating things about people is that most of us really expect other people to see things in the same way that we see them. True, people from similar ethnic, social and economic backgrounds will usually tend to agree upon certain things. Meanwhile, they may be disagreeing violently in other respects. Who knows? The pilot and the controller whose stories we related above may have been born and reared next door to each other back in Whippoorwill Falls, attended school together and roomed together in college. But when they eventually went their diverse ways, well they certainly have some differences. On the other hand, would you like to bet how two such individuals might feel about social and religious matters?

This discourse is not without purpose. Perhaps it is a sneaky way to get around to safety, but the impact of our imperfect communications on safety is tremendous. Obviously safety is dependent upon good communications; therefore, as we improve our ability to communicate, so will we improve our accident record. Education, I believe, is the key, on the one hand, and, of course, the advance of technology that enhances our mechanical ability to communicate, on the other.

I doubt if we will ever completly lick this problem of communications but certainly there will be some improvements. Some needed improvements that have occurred to me, in the area of flight safety, are:

- Similar interpretation of such terms as turbulence, emergency, Roger, guard channel. If we can't get common understanding of these and many other terms, then we ought to try to either eliminate them or at least make them more specific in definition.
- Better understanding of other people's jobs and requirements. For example, Ops versus Maintenance, Traffic Control versus Operations, safety versus getting the job done, R&D versus the user, weapons designers and users, weatherman and pilot, passenger and pilot, commanders and subordinates.

You can undoubtedly add pages to this list. The point is that, as differences are eased and understanding between different activities becomes clearer through better communications, the accident rate can go only one way — down. ★

Rex Riley CROSS COUNTRY NOTES

WHEN THE DRAG chute didn't jettison and the F-102 taxied over it, the events that followed led to a 96-manhour repair job. The chute got tangled up with the left brake and finally tightened enough to break the air line to the brake. Eventually the aircraft ran into a building.

As a result of this mishap, unit procedures have been revised and a change to the Dash One recommended, as follows: "The drag chute should be jettisoned before taxiing downwind in winds exceeding 15 knots, due to the possibility of the drag chute collapsing and becoming entangled in the wheel area which may cause brake failure."

ALL OF US MAKE mistakes, and the person who says he doesn't is either a liar or a fool. Most of us, however, try to correct our mistakes. When a mistake can't be corrected by an individual, and there is a hazard involved, is no time to clam up and let the chips fall where they may – but this occasionally happens.

After the loss of an F-100, investigators found that the Nr 4 engine bearing failed due to oil starvation. It is thought that an oil sampling bottle that had been dropped in the reservoir blocked the oil supply line.

It is not inconceivable that such bottles could and have been dropped into reservoirs. It is hard to believe that anyone would let such a situation go uncorrected and unreported, but apparently that was the case.

There is one person who knows who dropped the bottle and that it was not recovered. Rex hopes he is reading this because it is possible that he does not know of the loss of this aircraft. Perhaps knowledge of what occurred will prevent a like situation in the future. As for those to whom it hasn't happened yet, it could – as we said, it is human to make mistakes. But it is inhuman not to correct them or, at least, report them so that action can be taken before someone else's life is jeopardized.

PEOPLE, ESPECIALLY children, swallow all manner of things and survive. Jet engines are not so hardy. Take the F-102 that gulped down an external tank safety pin the other day; the engine had to be overhauled. Seems that a maintenance technician removed the pin and started up the ladder to hand it to the pilot. He didn't have a good grip on the pin, the streamer fluttered and away went the pin into the engine intake.

This sort of thing happens frequently enough to be serious. Rex would hate to have to pay for all the engines thus ruined, but when he pays his taxes a bit of the bundle goes toward financing this sort of foolishness. What say we all be more careful? Wrap the streamer around the pin, then hold it tightly; be careful of hats, objects in pockets and people to be sure they don't get sucked into jet engines. Rex can't afford it and neither can you.

CAPT ROBERT H. MORGAN, a member of The Thunderbirds, had an encounter with another kind of bird and the manner in which he handled the ensuing emergency won him TAC's *Pilot of Distinction* for February.

During a Thunderbird demonstration at Waukegan, Ill., Captain Morgan, a solo pilot, was flying in a two-ship formation. Approximately 50 feet above the water of Lake Michigan and at a speed of more than 425 knots, his aircraft struck a sea gull. The accident happened at the start of a roll, and caused a hole in the left side of the cockpit and a loss of pressurization.

Before the roll was completed, a second bird struck the aircraft shattering the canopy. The bird continued into the cockpit, striking Captain Morgan on the head. His left hand was knocked off the throttle and pierced by splinters from the canopy.

With the cockpit littered with broken fragments and the remainder of the bird, Captain Morgan, although unsure of aircraft condition, landed his F-100 successfully.

PERSONNEL ERROR (BUZZARD) — Among the many, many mishap reports that arrive daily there occasionally is one that lightens the monotony and cheers one's spirit. Such is the following message, reproduced here with only minor editing.

"Immediately after takeoff, before retracting gear, aircrew observed a large airborne bird on collision course with aircraft. Bird apparently recognized impending disaster, and initiated violent evasive action, consisting of folding wings, and entered near vertical dive. Aircrew observed bird pass under aircraft nose and heard thump from somewhere on underside of aircraft. Post-flight inspection of aircraft showed no damage or indication of where bird had impacted.

"Inspection of runway revealed carcass of large buzzard-like bird of approximately 40-inch wingspan. Suspect that bird struck landing gear tire. Primary cause of incident is personnel error (buzzard) in that he attempted to fly through airport traffic area without proper air traffic clearance . . ."

HEADS UP — A3C Paul Gardner didn't really lose his head. Another airman who used his head was A2C John Offutt, who snapped this picture at just the right time. It happened at Hamilton AFB while Airman Gardner was installing sign over main gate. ★

FLYING SUPERVISION

Maj Joseph L. Ashbrook, 3625 Tech Training Sq (SC) (ATC), Tyndall AFB, Fla. 32401

The weathervision indicated the ceiling was 700 broken, several intermediate layers, tops 20,000 feet with surface visibility four miles in light rain. Having just arrived at operations from outside, I accepted the latest weather sequence except for the rain. Outside it was pouring and there was a 10-15-knot wind which caused the rain to fall mostly in a horizontal rather than vertical plane.

The thoughts racing through my mind were the same as those that had occurred several hundred times during 22 years of military flying: The weather sure isn't too bad to fly in, but how I hate to preflight in the rain and have to fly a mission dripping wet!

In combat during World War II, Korea, the Formosa skirmish and currently Vietnam, operational missions in heavy downpours are a necessity; however, is there a real need for conducting training missions where both aircrews and ground crews are drenched, ground equipment is thoroughly wet, personal equipment is soaking wet, ground preflights are performed too quickly and ground operations (taxi, moving ground power equipment, parking, etc.) are all jeopardized? Finally, *where is the Flying Supervision?*

The USAF has long advocated the concept that flying operations start with mission planning in the operations building. They don't end until the mission has been concluded, you return to operations, and all mission critique and debriefing forms are completed. I, for one, am a disciple of this concept and have followed, supported, participated in and directed adherence to it for many, many years. This day, I wondered where all the other disciples might be, as I watched ground and aircrews do a very unprofessional job in preparing F-101, F-106 and T-33 aircraft for training missions in a driving rain.

Accepting the frailties of man, I suited-up, filled out my clearance and proceeded to PE for my flight gear. By the time I had run the 150 yards to PE I was quite wet (my orange flight suit was the shade of a dull red brick). Bus transportation was available from PE to the aircraft, so my equipment was protected. But on the flight line, there was no cover, the ramp was a mass of puddles, all the ground crew were completely drenched (even with water repellant clothing) and all aircraft were buttoned up against the blowing downpour. My personal poncho (PE had none) was blowing such that my chute, LPU and safety accessories became as drenched as they would be during sea survival.

Surveying the ramp, the ground crew that were drenched, the aircrew scurrying around their aircraft performing hurried, partial preflights, I proceeded to the Wing Operations Command Post to ascertain whether they were aware of the situation and if they were evaluating or taking any action to eliminate the potential hazards caused by the heavy downpour.

As is usually the case, the command personnel disclaimed any responsibility for postponing flying operations until the rain subsided; in fact, their attitude was one of complete professional apathy. *"Flying Supervision, where are you?"*

The remainder of this story is anti-climactic. I started on my scheduled target mission with full chaff tanks; almost taxied into an F-101 pulling out of his parking spot (rain was so heavy on the T-Bird windscreen); took off through puddles so large they completely engulfed the T-Bird. Due to nose gear trouble (cocked or partially retracted I couldn't ascertain because of the weather) I aborted the mission 10 minutes after takeoff. I flew a highly erratic GCA approach due to yawing of the aircraft (ball of needle-ball deflected one full ball-width to left) and full chaff tanks that wouldn't permit reducing speed to below 170 kts indicated. The nose gear was finally locked in the down position with the emergency system and I landed on a 12,000-foot runway, using 11,500 feet, and avoiding the "rabbit catcher" only by opening the aircraft canopy.

NOTE: Touchdown was 1000-1500 feet from the approach end of the runway at approximately 125-130 kts. Brakes became effective at the point where runway markers showed 4000 feet remaining.

Landing gear pins were installed on the runway and I returned to the ramp and shut down. At operations I completed my mission card, debriefed base weather (landing weather was 400 broken to overcast, one mile in moderate rain showers, haze and papermill smoke) and proceeded home.

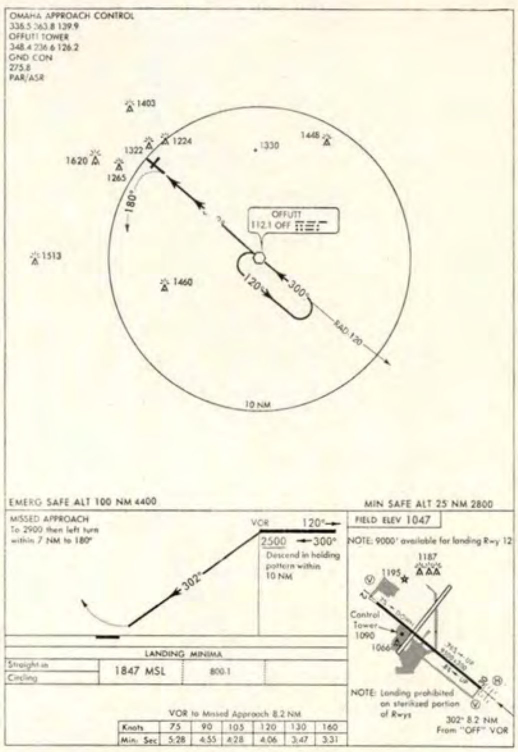
The incidents described occurred on Saturday. On Monday I had a runny nose, slightly sore throat and some intestinal problems. All my PE equipment had to be opened, dried and re-packed.

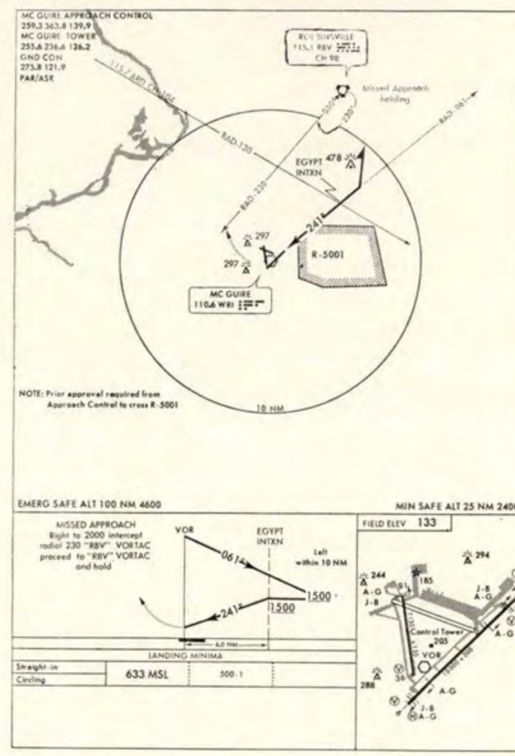
I do not feel any personal animosity toward any individual, unit or organization, I only question the professional need for placing flying operations, other than those of a combat or emergency nature, in such jeopardy because of human frailties.

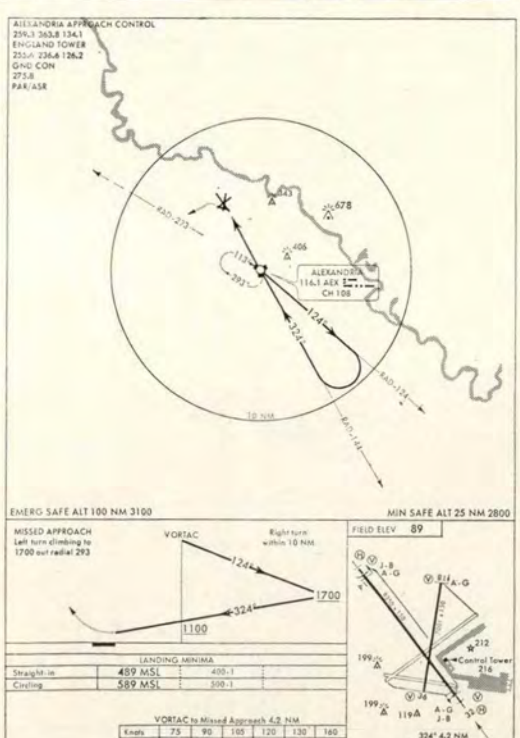
To all who read this article, I hope the next time you are AO, Supervisor of Flying or the Duty Officer in a command post, and you look out into a sea of blowing rain, plus wet ground and flying crews, the thought of, *"Flying Supervision, Where are you?,"* may penetrate your warm and dry working area as a message from that same wet, windy ramp! ★

THE IPIS APPROACH

By the USAF Instrument Pilot Instructor School, (ATC)) Randolph AFB, Texas







Q. These three types of procedure turn depictions are being used in FLIP Terminal Instrument Approach Procedure Charts. What are the procedures for flying each?

A. Procedures for flying the procedure turn are contained in AFM 51-37 and are the same for all three depictions. Also, unless otherwise noted on the approach chart, obstruction clearance area provided is the same for all three depictions. The IPIS is evaluating the different depictions in an effort to arrive at a single DOD standard. Which type portrayal do you prefer? ★

VIETNAM A

A lot of crews who haven't had the experience of flying in a combat zone may get that experience someday in Vietnam. Here's what it's like for cargo pilots.

Counterinsurgency operations in Vietnam are largely dependent on airlift for supply. Transportation on the surface is at best difficult and frequently hazardous. Roads and railroads are scarce and are vulnerable to damage, interdiction and ambush, by the Viet Cong, besides being frequently damaged by heavy rains and floods. Airlift must, therefore, assume much of the burden for the movement of men and supplies into and within the country. In the case of remote and isolated outposts, such as Special Forces camps near the Laotian border, airlift may be the only source of supply, and these supplies must be delivered (directly) to the front door of the user.

Even under the best of conditions, aerial supply in a combat zone is challenging. This is a particularly difficult mission in the northern provinces of South Vietnam because of the strategic situation, the low ceilings and visibilities of the monsoon weather, and the very rugged terrain. These northern provinces are under the jurisdiction of the I Corps of the Army of Vietnam.

The 315th Air Commando Group's 311th Air Commando Squadron at Danang AB, Vietnam, supplies the lion's share of the airlift in this area with twin engine C-123 Providers.

A glance at the map reveals the strategic value of the area, and also indicates some of the reasons why the mission is a difficult one. The I Corps borders North Vietnam on the north and Laos on the west. A narrow coastal plain borders the eastern coast, which is a rich, densely populated rice growing area. To the west of this plain, the Annamite Mountains rise abruptly, with peaks approaching 10,000 feet. The average elevations of the higher ridge lines would run about 6500 feet, and the valleys are steep sided with very rough and rugged terrain. The dense jungle foliage on these mountains sometimes reaches 200 feet in height. This continuous

IRLIFT

Col Harry G. Howton, 315 Air Div, PACAF

canopy could easily swallow an aircraft and re-form over the wreckage to completely obscure all evidence of the crash.

Nevertheless, this is a vital area which is significant not only for the security of the rice-rich coastal plain, but also for the Ho Chi Minh Trail, which parallels its western slopes on its way to the south. The outposts in these mountains are generally small and manned by Vietnamese Special Forces troops, Nungs, Montagards, or US Army Special Forces advisors.

At some of these stations, an assault landing strip has been prepared, but at others it has been possible to hack out only a small "postage stamp" sized Drop Zone. There are no NAVAIDS at these Landing Zones (LZs) and Drop Zones (DZs), and they must be located visually. During the summer, when the weather is generally good in the mountains, these fields can be found easily enough, but the tricky mountain winds, the short, narrow fields with improvised surfaces, and the terrain obstructions in the approach zones requires very high pilot proficiency. During the winter, when the northeasterly monsoon brings low ceilings, rains, and low visibility to the entire area, the mission of supplying mountain outposts is as tough a flying assignment as can be found anywhere in the world, but supplies must flow 12 months a year.

When the weather is bad in the mountains (there is no reliable weather reporting) the first attempt to locate a mountain LZ or DZ is normally the "on top" approach. The aircraft attempts to climb over the overcast, perhaps to 7000-9000 feet. If the clouds cannot be topped at this altitude, it is sometimes possible to circumnavigate buildups and fly between layers to thread one's way to the target.

C-123's flown by 315 Air Commando Group provide airlift to remote areas.

Since there are no weather minimums for tactical aircraft in Vietnam, crews use "common sense clear of clouds" and "safe visibility" as visual conditions. Visual flight may be made in conditions much lower than minimum standards back in the United States. Obviously, navigation under these circumstances is very difficult. Much navigation must be done by dead reckoning or by the limited visual contacts that can be made. Since there are no navigational aids, descent to the target LZ and DZ cannot be made blind, and visual conditions must exist that will allow the aircraft to make a maximum performance descent with low manifold pressure and low RPM, and with gear and full flaps down.

There is no room for error under these conditions, and all members of the crew must assist in visual identification of the position. It is extremely easy to become disoriented in a high rate descending turn with no references except clouds and green jungle slopes. Even crewmembers who ride in the cargo compartment learn enough of the terrain to be of assistance by looking out of the side windows or out the open tail gate. Prominent peaks,

Live cows are unloaded at Ashau, a remote Vietnamese outpost. Despite the stringent security this C-123 was hit several times by Viet Cong sniper fire.

C-123 crews are accustomed to strange cargoes. Bovine passengers, other livestock are carried routinely to remote sites.

when their tops protrude ominously through the clouds, occasionally may be useful landmarks for position identification.

If it is not possible to find the target over or around the clouds, the next attempt is to try to go under the clouds by flying the valleys. The aircraft may return to the coast and descend through the clouds over the south China Sea or the coastal plain. Sometimes, however, it is better to continue westward beyond the higher ridges to the better weather on the west side, and then double back by flying east from the good weather area.

Once under the clouds, the pilot will attempt to find the valley or valleys that lead to the target area. A 900- to 1000-foot ceiling on the coast with visibilities of two to three miles may be enough to allow the aircraft to use these canyon flying techniques.

Frequently it is necessary to zig zag back and forth along the base course to get into the destination. The valley walls are steep, however, and as soon as the aircraft enters the higher mountains from either direction, the valley walls extend up into the clouds above the aircraft on both sides. Obviously, this business of canyon flying requires a great deal of coordination among the entire crew. The aircraft should never enter a canyon or valley unless there is another way out, i.e., an alternative course of action in the event it is not advisable to continue straight ahead. Mechanical failure, deteriorating weather, and ground fire are all factors that may make it mandatory to look for alternatives.

Some of the canyons are wide enough to allow a 180-degree turn, but to get maximum performance in these turns it is sometimes necessary to use steep bank (60 degrees), maximum power, and flaps to reduce stall speed. If the aircraft is flown down one side of the canyon to permit more turning room, it may be exposed to ground fire since the VC like to concentrate in the valleys of known routes during the bad weather season to take shots at the low flying aircraft.

Map reading from large scale maps (1:250,000) is a critical skill that many pilots and navigators must re-learn, especially if their recent experience has been in high performance aircraft. Not only must the precise position of the aircraft be known at all times for navigational purposes, but it is also necessary for pin-pointing the location of ground fire, and for keeping abreast of terrain clearance information on the ridges in the clouds above both sides of the airplane. One pilot flies the aircraft, and the other pilot monitors the instruments, the map, and cross-checks the terrain. There is a previously agreed upon emergency climbout procedure at all times in the event it is necessary to enter the clouds, and only the most accurate map reading will determine a climb heading with adequate terrain clearance that will allow this to be done safely. Navigators, when available, are invaluable under these circumstances because they allow both pilots to pay more attention outside the cockpit.

Air drops are among the most difficult missions flown by the 311th for several reasons. The DZs most commonly used are very small, and require high precision drops. The squadron rarely uses free-fall techniques because troops and camp buildings crowd the DZs. Parachute techniques from very low altitudes are used to minimize wind drift. Air drop cargoes vary widely from food and ammunition to almost any thing an outpost might need, including lumber, ducks, cows, pigs and chickens. Bundle weights range from 200 to 1500 pounds.

Hiep Duc, one DZ, is on the side of a hill in a bowl shaped valley with higher terrain on all sides. Surface winds are gusty and unpredictable. Extreme precision is necessary on this drop. The pilot flys the pattern, and when turbulence is encountered, he handles the throttles. The co-pilot monitors the instruments and is prepared to take control of the aircraft instantaneously in the event the pilot is incapacitated by ground fire. The navigator gives the pilot vectors and controls the drop signals. The crowded terrain limits the size of the pattern and requires the loadmaster, the Special Forces paratrooper and the flight mechanic to rapidly prepare subsequent bundles for delivery after each pass.

Flying into Diep Duc with a gross weight of 52,000-53,000 pounds and low airspeed leaves limited reserve power emergency. Although the assault landing characteristics of the C-123 are very good, there are many times when it would be convenient to have more horsepower, especially when flying with heavy loads. An engine failure under these circumstances can create a very interesting situation, in which about the only thing that will save the aircraft will be jettisoning the cargo as rapidly as possible and finding a passage to lower terrain through the valleys.

Ground fire is common on air drops because the Special Forces camps are located in areas where the VC operate and because the aircraft must make repeated passes at low altitude. Constantly changing patterns help to reduce the problem of ground fire. Sometimes fighter cover by Vietnamese A-1Hs is available, but frequently the weather is too bad for fighters during a drop.

Defense techniques have had some success against ground fire. One procedure that has been successful at a DZ is mortar coordination with the Special Forces camp. When ground fire is encountered, a smoke grenade or flare is dropped by the C-123. The camp then lays mortar fire a few meters back along the track of the aircraft. Not only does the smoke pinpoint the ground fire for the mortars, but it also allows the pilot to avoid flying over the same area on subsequent patterns. Few VC snipers are eager enough to ask for a mortar attack on their position.

All landing zones have their peculiar challenges. At Khe Sangh, for

ARVN soldiers wait to board transport for airlift to combat area.

example, the elevation is 1600 feet, the runway is 66 feet wide and only 3200 feet long. The surface is PSP (pierced steel plank) laid over latterite clay. When monsoon rains soak the field, the clay oozes up through the holes in the PSP and the surface gets so slick that there is no nosewheel control or braking action.

Since the normal winds at Khe Sangh are very gusty quartering tail winds on final approach, and since the touchdown end of the runway, with a 10-degree upslope, is only 200 feet away from an 800-foot gorge, it is clear that mountain flying is no child's play.

Or take Kham Duc. The final approach there is over a ridge which is perpendicular to the runway. The ridge was so high that the engineers had to cut a notch 50 meters deep for the final approach, but even with this assistance, it is still necessary to fly an exceptionally steep final.

Several passes are needed to drop the cargo, and ground crews hustle to retrieve the precious supplies before the enemy can snatch them away.

Or Gia Vuc. The field is a rolling, narrow former pasture that has the usual ruts and mud holes in it. If you miss it, just fly up the valley about five clicks (kilometers) until you get shot at and you'll know you missed, but be careful on that final approach or you will hit the water buffalo fence. If one of the engines fails to reverse you may be introduced to the actual performance of a mine field in full operation.

Although flying C-123s into the mountains is very demanding, it does provide opportunity for great aircrew satisfaction. It demands a maximum of judgment and discretion on the part of the aircraft commander. He must decide whether the urgency of the load for his target at this time justifies the degree of risk implied by the conditions he encounters. This is a situation which emphasizes the judgment of the man-on-the-spot who is the only one with sufficient information to make that decision. In this respect it stands in contrast to the recent tendency in some areas to centralize decision-making in the Command Posts. To meet this challenge aircrews must constantly strive for maximum proficiency in all aspects of the mission. Precision in procedures and techniques is the word-of-the-day.

The unique conditions in Vietnam and the urgency of the missions makes theater orientation a very important aspect of the crewmember's training. Even the best must first see exactly what the situation is before they are fully qualified. Still, there are few flying jobs anywhere in the Air Force that give the crewmember a higher sense of achievement or a stronger feeling after a successful mission of a good job, well done, with minimum compromise to safety. ★

THE MAN FROM NORTON

The man seated at the desk in the picture is a system project officer in the Directorate of Aerospace Safety. The letter he is writing might be addressed to almost any unit or organization that operates or is responsible for the control, maintenance or support of any USAF aircraft or other system (the term aircraft will be used in this article, but refers to other systems also). The subject line of the letter probably will begin, "Notification of Project Officer Visit to. . . ."

When one of these letters arrives, the result can be quite similar to our ancestors' reaction to Paul Revere's cry about the Redcoats coming, only now the cry is about that "durn IG's" coming. The impending visit will sometimes disrupt things around a base, since notification normally allows almost a month for hiding skeletons before the "inspection." The truth of the matter is that a Project Officer Visit is NOT an inspection, and it is NOT an "assistance" visit. Rather, it is an information and educational effort intended to help the visitor.

This type of visit is a necessary part of the activities of project officers from the Directorate's Flight Safety Division. In order to keep abreast of problems concerning the aircraft he monitors, it is necessary for him to travel through using and supporting organizations, and there aren't many of these in our local traffic pattern.

There are other types of scheduled visits such as Safety Surveys, Staff Assistance Visits or Safety Study Research Visits. These are more formal and generate a formal report. There are also some unscheduled visits in which the objective may be only a flight sortie in a tactical aircraft.

Let's look at the individual who carries the title of Project Officer and at the organization he represents. We will also discuss some of his more specific duties. He is usually a major or lieutenant colonel who has been selected from a tactical organization, or similar source, where he has qualified in one of the more important aircraft currently in use.

Norton AFB is the home of the Deputy Inspector General for Inspection and Safety, USAF, and its two subordinate directorates, Aerospace Safety and Inspection. The Flight Safety Division is one of several offices under the Directorate of Aerospace Safety, and consists of Bomber/Transport, Fighter, and Research and Engineering Branches. The first two of these branches break down into Bomber, Transport, Defense Fighter and Tactical Fighter Sections, and it is to these offices that the project officers for every aircraft in the USAF inventory are assigned.

Specific tasks for a project officer can vary quite widely and are difficult to define since much depends on the accident picture of the aircraft he monitors. One facet of his work is accident investigation or observation of the investigations performed by other units. He must also analyze, evaluate, and accomplish the final review of accident reports and make appropriate recommendations to supervisory personnel. Preparation of accident briefs and of the annual summaries are also part of this activity.

Project officers are required to attend many meetings: system phasing group meetings, mockup reviews, configuration control boards, flight manual conferences, and other meetings concerning safety problems. In preparation for these he must review all types of Unsatisfactory Reports, Operational Hazard Reports, Incident and Accident Reports, and other sources of data to detect trends or indicators of accident-potential areas.

A third general area is the accomplishment of Project Officer visits, Staff Assistance visits, Safety Surveys, Safety Study Research visits, and the Monitoring of Safety Surveys, all of which provide the media for coordination with the using commands, the system support managers, contractors, and many others, to establish a common understanding of items of mutual interest.

Occasionally he writes articles for AEROSPACE SAFETY and AEROSPACE MAINTENANCE SAFETY

magazines, TIG Briefs, and other publications which are supported by safety agencies.

In order to keep in touch with aircraft from the tiny 0-1 to the huge C-5, a project officer must talk to the commanders, staff officers, aircrew members, safety directors, maintenance personnel in all categories, engineers, designers, and others. These efforts generate the visits referred to in the letters of notification. Upon arrival he will brief the commander to explain the purpose and scope of the visit. He can be expected to make an informal exit briefing before leaving to discuss pertinent observations and pass on comments. No written report is submitted to the unit or the command except as noted below. There are usually four or five items of specific interest to discuss on a visit, but, invariably, many other items come up which can result in some positive assistance by the Directorate of Aerospace Safety. During the time on station he will want to talk *freely, frankly*, and *informally* about operating conditions and problems being encountered with the equipment. He is vitally interested in your problems and will do his level best to help.

Back home, the project officer will prepare a Contact Report (an internal means of letting the chiefs know the what, where, why, when, who and how of the visit) which does not go out to the field. In the event some formal action is necessary, based on his observations and conversations, this item will have been discussed during the exit briefing and is forwarded for action in separate correspondence to the appropriate agency. Most often the problems can be solved by more informal means, such as discrete telephone calls, recommending that responsible agencies study the situation and correct it themselves.

The agency that needs to take action is often not the organization visited. The complete staff job for a project officer is to detect, advise, and monitor. Then, when a problem is solved or on the road to a solution, he can start looking for the next area of potential mishap; there are always more problems waiting for attention.

Here are some examples of problems in which project officers become involved: The T-37 spin recovery situation was improved by a recommended flight test program; the tire and wheel failures on the B-58 resulted in retrofit with nonfrangible wheels, which have since recorded several "saves"; the number of F-100 accidents for which the cause was undetermined was decreased by improved maintenance of the flight control and autopilot systems. Some current problems being worked on are the deficiencies in the C-133 fleet, attitude indicator malfunctions and warning systems in practically all aircraft, and the spin recovery situation for the B-57. There are many others.

A project officer can accomplish useful work for the organizations concerned with an aircraft only if he is given access to or can detect the problem areas. His prime method of operation is in the interest of flight safety and accident prevention and must be founded on the free exchange of ideas, procedures, problems and corrective methods. If this free interchange does not exist, his hands are tied, and the services of the Directorate of Aerospace Safety to the USAF are severely limited.

The goal of all safety organizations is to bring the accident rate (regardless of the criteria used to compute it) down to the final goal of ZERO. This is almost impossible, but in order to come close, the combined efforts of personnel at every echelon are essential. Let's keep the channels of communication *open, honest* and *free* to help achieve this goal. Accident prevention is not an end in itself; rather, it is a means through which training can be accomplished and combat effectiveness maintained throughout the United States Air Force with a minimum loss of personnel and equipment.

For additional information on project officers, see the following two pages. ★

YOUR MAN AT NORTON

The officers whose pictures appear on these pages are "Men from Norton," as described in the preceding article. These aircraft project officers of the Directorate of Aerospace Safety may be reached by writing to the symbol shown with each group of photographs or by calling the telephone extension number. The correct address is Dep IG for Insp & Safety, USAF (symbol), Norton AFB, Calif., 92409. Below each photograph are the individual's name and his aircraft assignments. As new project officers are assigned, AEROSPACE SAFETY will keep you informed.

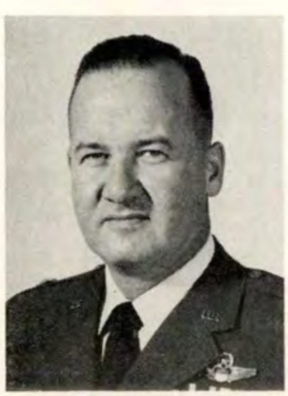
Bomber Section

AFIAS-F-1A
Ext. 4133, 3416

Lt Col I. D. Rothwell
B-58, SR-71

Lt Col Harold E. Brandon
B-52, XB-70

Lt Col Eugene J. Budnik
B-57, B-111



Lt Col Harold T. Stubbs
B-47, B-26, B-66

Transport Section

AFIAS-F-1B
Ext. 6284, 6258

Col James S. Keel
C-54, C-5A, C-121,
T-29/C-131

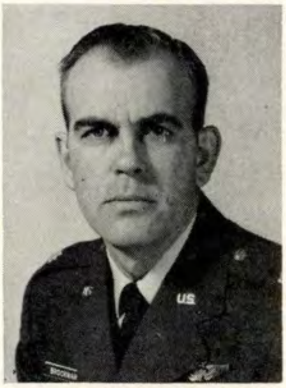
Lt Col Wallace H. Carter
C-124, C-118, U-3, 4,
5, 6, 7, 10. Aero Club

Lt Col Robert E. Englebretson
C-47, 0-1, T-34, T-41, HU-16
All helicopters

Lt Col J. D. Oliver, Jr
C/KC-135, C/KC-97, C-140,
T-39, VC-137

Maj William M. Bailey, Jr
C-141, C-133, C-130, C-119
C-123, XC-142, X-19

Tactical Section
AFIAS-F-2B
Ext. 6778, 3886, 2277



Lt Col Robert F. Brockmann
F-104, F-4

Lt Col Robert W. Cunningham
F-100

Lt Col Norman H. Frisbie
F-4

Maj James H. Broussard
F-105

Maj Marshall D. Norris
F-100

Defense Section
AFIAS-F-2A
Ext. 6244, 3015

Lt Col Thomas J. Cribbs
F-111

Lt Col Jack R. Pulliam
F-5, T-37, T-38

Maj Donald R. O'Connell
F-101, F-89

Maj Francis J. McCarthy
F-102

Maj Guy J. Sherrill
F-106, F-86, T-33

Maj Frank J. Tomlinson
A-7A, A-1E, T-28
OV-10A

WAKE TURBULENCE

FEDERAL AVIATION AGENCY

For years turbulence generated by aircraft was attributed to "prop wash." The "prop wash" behind other aircraft caused some pretty rough rides, "go-arounds," some accidents and was the subject of a lot of "hangar flying."

With the advent of the large jet transport and helicopters, the dangers associated with vortex turbulence were greatly emphasized and the so-called "prop wash" problems enlarged to include "jet wash" and helicopter "down wash" turbulence. By this time, however, the problems associated with aircraft wake turbulence had been broken down into two categories – "thrust stream turbulence" and "wing-tip vortices."

What was once thought to be "prop wash" was in fact vortex turbulence. "Prop/jet wash," i.e., thrust stream turbulence, can be a hazard to aircraft operating on the ground and pilots should take normal precautions to avoid taxiing closely behind larger aircraft making an engine runup or running up when other smaller aircraft are close behind them, as the case may be. At distances of 400-500 feet "prop" or "jet wash" normally will not constitute a serious hazard to other aircraft operating on the ground. Also, it should not be a hazard to aircraft in flight except possibly in the case of a takeoff or landing in the immediate area of an aircraft making a ground runup.

A vortex core is the center of a trailing mass of disturbed air created by the wing of an aircraft as it produces lift. An aircraft creates two such vortices with rotational air movement. As a lift-producing air foil passes through the air it leaves a continuous sheet of unstable air behind the trailing edge. Due to spillage about the wing tips, the air rolls into two distinct vortices, one trailing behind each wing tip. The rollup process is normally complete at a distance equal to about two to four times the wing or rotor span of the aircraft – about 200 to 600 feet behind the aircraft. If visible, formation of the vortex cores would appear approximately as shown in Figure 1.

Vortices generated by the rotors of a helicopter are shed and trail along the track behind the aircraft in the same manner as those generated by a fixed wing aircraft. These vortices have the same internal air circulation as those generated by fixed wing aircraft and have the same effect upon other aircraft.

When an air foil passes through a mass of air and creates lift, energy proportional to the weight being lifted is transmitted to the mass of air. Generally, the greater the lift, the greater the energy transmitted to the air mass in the form of turbulence. The turbulence is directly related to the weight, wing span, and speed of the aircraft. Its intensity is directly proportional to

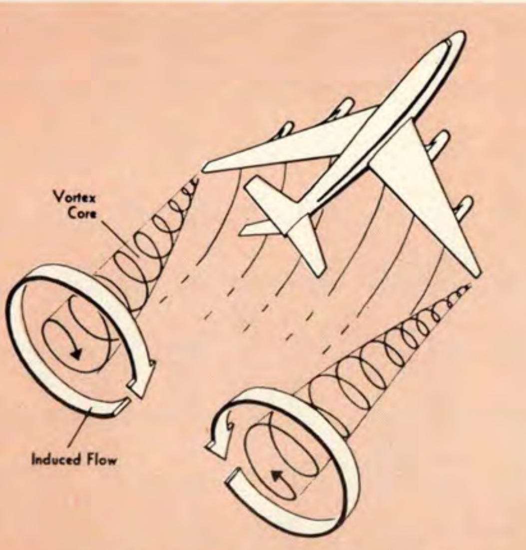


FIGURE 1.—Example of wing-tip vortices initial formation. (Once formed, vortices extend and may be hazardous for an undetermined distance behind the generating aircraft.)

the weight and inversely proportional to the wing span and speed of the aircraft. The heavier and slower the aircraft, the greater the intensity of the air circulation in the vortex cores. Thus, it can be seen that modern large transport aircraft will create vortices having maximum rotational velocities during takeoff and landing at or near maximum gross weights.

There is no current practical knowledge that can be used as a yardstick to accurately measure the period of time vortices will be a hazard to other aircraft. Studies have been conducted and measurements made of the size of vortices and velocity of the air within them up to nearly three minutes after passage of large aircraft. Pilots have reported what they believe to be vortex turbulence five minutes and more after passage of another aircraft. No practical rule involving a time interval for one aircraft behind another will assure avoidance of the vortices generated by the first. However, other methods of avoiding the hazards associated with aircraft vortices are known and can be applied by pilots.

"Why should I avoid flying in or through the vortex turbulence behind large aircraft?" is a question that a pilot might ask if accustomed only to the turbulence created by light single- and twin-engine aircraft. Perhaps the best answer, and the most impressive one, is that the aerodynamic forces applied upon the light aircraft by the circulation of air in the vortices and the pilot's attempt to counteract it could result in the airframe design limits being exceeded and possibly structural failure.

And then there is the pilot who has always been able to control his aircraft through any "prop wash" he has encountered. His excellent ability may mean nothing because the forces he encounters behind a heavily loaded large aircraft could exceed the control capability of his aircraft. A roll, descent, or combination of the two could continue even though full control travel or power is applied. The forces of the air in wing-tip vortices can well exceed the aileron control capability or the climb rate of some aircraft. For those who want figures, the air in a vortex core can produce a roll rate of about 80 degrees per second which is about twice the roll rate capability of some light aircraft when using full aileron deflection. If the light aircraft stayed directly between the center of the vortex cores from a heavy jet transport it could encounter a downward flow of air of about 1500 feet per minute. A light aircraft with a continued climb capability of 1000 to 1200 feet per minute could go only in one direction *—down*. Caught in such a position the pilot who altered his course could get caught by the roll forces or a combination of downward and roll forces. These forces have been sufficient to cause aircraft to do one or more complete rolls, to force them into the ground and in some instances a combination of the two actions.

The best way of avoiding the vortices hazard is to know where they are most likely to be encountered and act accordingly. Since vortices are not formed until lift is produced they will not be generated by an aircraft taking off until just before lift off — at the point where rotation is made. Vortices cease to be generated by a landing aircraft when its wing ceases to produce lift — when it has actually landed. However, remember that a large aircraft could have taken off and be out of sight, or landed and be on the ramp and the vortex turbulence could still be present near the runway.

Another factor to remember is the vertical and lateral movements of vortices. Vortices generated more than 100 feet above the surface will drop nearly vertically in a no-wind condition until reaching a height equal to approximately one-half the wing span of the generating aircraft. At that point they start to curve outward and spread laterally away from the track of the aircraft. There is one other thing that must be remembered, that is — both the vertical and lateral movement of the vortex cores will be affected by and move with the encompassing air mass. A crosswind will displace the vortices from the vertical in their downward travel and affect the lateral rate of travel. A crosswind component of approximately four to six knots, depending upon the lateral rate of vortex travel, is sufficient to cause one core to remain laterally stationary over a line on the surface while the opposite core will travel at its own lateral rate plus that of the effective crosswind.

HOW TO AVOID WAKE TURBULENCE

Unfortunately, the best advice is not always the most practical. In the case of vortex turbulence hazards avoidance, to insure 100 per cent success would require pilots, particularly those flying relatively smaller aircraft, to refrain from operating in areas where the very large and heavy aircraft regularly operate. It would produce the desired result but would not be practical. The following suggestions are therefore offered on how best to avoid wake turbulence:

• *General Rule*. When it is necessary to operate behind a large heavy aircraft try to remain above the flightpath of that aircraft. Remember that vortices settle toward the surface and also that they are affected by the wind and move with the air mass down to within 100 or so feet from the ground before spreading laterally away from each other and that the wind will continue to affect the vortex cores until dissipation occurs. Because of the infinite number of different circumstances that can exist, it is not practical to establish a set of inflexible rules. Therefore, we have outlined several possible courses of action and included their depiction in Figure 2, which, depending upon existing conditions and types of aircraft, pilots may wish to consider.

• *Takeoff/Takeoff*

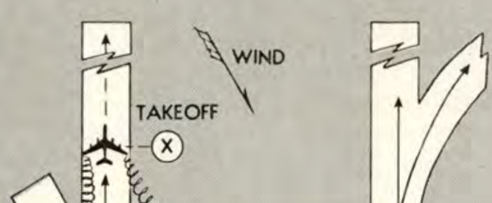
(a) Same or parallel runway. Start the takeoff roll at the end of the runway so that your takeoff will be before the point where the previous aircraft's takeoff was made. Make a normal performance takeoff and climb and you should be behind and above the settling vortices of the preceding aircraft. Don't depend upon the wind to dissipate the vortex core circulation appreciably unless it is 10-15 knots or higher and even then it could take several minutes. Also, remember that the lateral movement of vortices, even in a no-wind condition, may place a vortex core over a parallel runway. With a light crosswind one vortex can remain stationary over the ground for some time, or even move upwind, before dissipating to any significant degree.

WAKE TURBULENCE continued

(b) Intersecting runways. If the large aircraft was still on the ground until well past the intersection and your takeoff will permit climb to approximately 100 feet or more before you pass the intersection, you should not encounter either the vortices or any appreciable thrust stream turbulence. Remember the general rule and make certain that you cross above the flightpath of larger aircraft. Also remember that the larger aircraft will probably have a high gross weight at takeoff and thus will generate vortices of maximum intensity. Also, consider the lateral movement of vortices and the possible effect the wind will have upon that movement.

• *Takeoff/Landing*

(a) Same or parallel runway. When taking off after another aircraft has just landed, plan to become airborne beyond the point where the other aircraft landed. Remember, while starting takeoff from an intersection may keep you out of the vortices of an aircraft that has just landed, it could place you in the vortices shed by one that took off several minutes before on the same or a parallel runway.



LARGE AIRCRAFT	SMALL AIRCRAFT	
	TAKEOFF*	LANDING*
TAKEOFF at X	B, D, C, A	D, C, B, A
LAND at Y	A, C, E, B	A, B, E, F

FIGURE 2.—Example Takeoff/Landing Alternative courses of action.

(b) Intersection runways. The precautions to heed when taking off after another aircraft has just landed on an intersecting runway are the same as those for a single or parallel runway. But don't forget the "heavy" that may have taken off from either your runway or the other one within the past several minutes.

• *Traffic Pattern.* Don't fly below and behind a large aircraft in the traffic pattern. If practicable, plan your pattern to stay laterally separated from large aircraft by at least several hundred feet. When on the final approach, an above and behind position should keep you clear of the turbulence created by the preceding aircraft.

• *Landing/Landing.* The same above and behind position on final approach will place the light aircraft pilot in a good position to touch down beyond the point where a preceding large aircraft landed, length of runway considered. If the runway has a visual approach slope indicator (VASI) system, a flightpath in the "red and white" or with the top bar appearing a bit pink will keep you on or slightly above a normal glide slope. The *Airman's Information Manual* contains a complete description of the VASI system.

• *Landing/Takeoff.* When landing after the takeoff of a large aircraft, make a normal landing near the approach end of the runway and be solidly on the ground before reaching the point where the large aircraft took off. Although vortices from the departing aircraft will not be formed until the point of rotation, remember that the wind can cause the turbulence to move down the runway toward you.

When operating in the vicinity of an airport, you may receive an advisory, "CAUTION WAKE TURBULENCE," etc., warning you that it may exist because of an aircraft that recently made a takeoff or landing. When you receive such an advisory, don't hesitate to request further information if you believe it will assist you in analyzing the situation and determining the course of action you wish to take.

Remember, even though a clearance for takeoff or landing has been issued, if you believe it safer to wait, use a different runway, or in some other way alter your intended operation, ask the controller for a revised clearance. Sometimes air traffic clearances include use of the word "IMMEDIATE." For example, "CLEARED FOR IMMEDIATE TAKEOFF." In such cases, the word is used for purposes of air traffic separation. The clearance may be refused if you believe another course of action would be better suited to your intended operation. The controller's primary job is to aid in the prevention of collision between aircraft. However, he will assist you in any way he can while accomplishing his job.

Information on this subject may also be found in the *Airman's Information Manual.* ★

Missilanea

CORROSION CONTROL – MINUTEMAN. While troubleshooting a Minuteman (LGM–30A) launch facility during site shutdown, a missile maintenance team discovered four to six inches of water on the floor of the second level equipment room.

Water damage to the motor generator, two RFI filters, and the power signal distribution unit necessitated the removal of these items for inspection and repair. Cause of flooding was attributed to a clogged rattle space drain pipe from the second level equipment room. Clogging occurred at the 90 degree elbow that connects to the sump drain line. Analysis of residue taken from the drain pipe revealed a gummy-like substance apparently caused by a mixture of paint and water.

It was suspected that over a period of time this accumulation resulted from the flow of water over painted floor areas into the drain pipe. *Review of maintenance records indicated that the last corrosion control at this particular site was accomplished on 29 Sep 65, at which time the drain was visually inspected.*

T.O. 21M-LGM-30A-6 does not require inspection of the rattle space drain; however, locally produced site inspection checklists establish this requirement. Additional corrective actions taken by this particular unit were: (1) inspection of the rattle space drain was included in the site inspection checklist used by staff officers, QC&E personnel, field supervisors and work center supervisors; and (2) similar checklists are being made available to mobile teams and specialists for their use. In addition to the above, this unit is recommending that both inspection and clean-out of rattle space drains be included in corrosion control 180-day site inspections.

Other possibilities may exist which can cause the same condition indicated by this unit. Debris from corrosion control operations can very easily find its way into the drain system with the help of a little water seepage. *Chipped or flaked paint, as well as other debris, should be carefully cleaned up after each corrosion control operation.* ★

Lt Col A. F. Zalonka
Directorate of Aerospace Safety

THE "GO-GO" SUPERVISOR. You know him – the boss man in action. The supervisor who attacks his job with the thundering animation of a maddened bull! It's like a three-ring circus. It can even make you feel that, because you are not making all this fuss, you are not giving your maximum energies to your job. I'm sure you are familiar with this type – one who is reluctant to delegate authority and who tries to impress his superior that he is indispensable, and that without his presence, the primary mission would collapse.

Much too often, the individual who literally throws himself into his work is accomplishing very little. He may have good intentions, but for all the results achieved, he might as well be out playing golf. Tackling a job calls for an orderly sequence. Size up what's to be done; develop a plan to include the safest and most efficient way of accomplishment – then do it! None of this calls for arm flailing or hollering; conserve your energy for the task at hand.

Human relations are an important factor in supervising. None of us like to work side by side with a bloodless supervisor who never comes up for air. Not that healthy enthusiasm for the task at hand isn't a desirable trait. A smile, a cheerful answer to a question, help create a better working atmosphere. It is in such an atmosphere where friendly understanding and mutual cooperation promote the highest degree of safety.

Lt Col A. C. Eggleston
Directorate of Aerospace Safety

AER BITS

HANDY HANDLE – During flight in an RB-57, the rear seat observer dropped a map. When he bent over to pick it up, he automatically reached for something to hang on to. What he grabbed was the right hand seat grip. He pulled and off went the canopy.

This sort of thing doesn't happen every day, but it is one of those hazards that is with us every time we get into a cockpit. The unit involved is making some canvas bags for map stowage which may prevent another such incident.

LIGHT DAMAGE – As the C-119G was inbound on a night GCA, the pilot made a correcting turn to the left prior to intercepting the glide slope. When he attempted to roll out, he discovered the aileron control was locked in the left turn position and the aircraft could not be rolled level. A 360-degree turn was made before the crew discovered the cause of their difficulty – the copilot's C-4 spotlight was hanging by its extension cord and had wedged between the yoke and the wheel. Attempts to turn the wheel to the right only wedged the light tighter.

The noise caused by cracking of the light case caught the copilot's attention and led to discovery of the problem. A greater left roll permitted removal of the light and there was no more trouble.

T-39 INSTRUMENT READINGS DURING FINAL APPROACH–A recent message from the field reported fluctuating flight instruments in T-39 aircraft. These occasions of erroneous instrument readings have occurred while the aircraft was on final approach in light to moderate rain. In each case the vertical velocity indicator fluctuated erratically or remained at zero, with the altimeter reading in error as much as 200 feet. At times only one set of instruments have been affected. At other times both pilot's and copilot's instruments were involved. When the alternate static source has been selected all instruments have stabilized. However, since there is always some error due to static source location, to continue an instrument approach under this condition could be hazardous.

This is the first reported discrepancy of the T-39 static system which indicated high fluctuation of the vertical velocity indicator. The most probable cause is defective static ports caused by dirt in or around the ports, paint around the port area, or the ports themselves distorted by wear or improper cleaning. Anything that changes the smooth plate area around the ports will cause errors in static pressures.

An engineering investigation of this problem is now underway. In the meantime, to protect against this condition, all units possessing T-39 aircraft should insure properly operating static systems. Systems should be checked for loose fitting connections, cracked or corroded tubing, and special emphasis should be given port areas for obstruction or elongation of static port holes.

Lt Col J. D. Oliver, Jr
Directorate of Aerospace Safety

WRONG SWITCH — A recent T-39 mishap occurred when the copilot moved a cockpit switch without looking at it. Upon returning to home station, the aircraft started an enroute penetration under ATC control. During the descent, in weather, the right AC generator OFF warning light came on, followed shortly by total electrical failure. After several wild gyrations the aircraft broke out of the bottom of the overcast at 500 feet. Visibility was approximately ½ mile in fog and rain. Flying around below the clouds with no instruments and with the windshield icing up, the pilot was unable to locate an airfield or determine his location. He became concerned about the amount of fuel remaining in the tanks, so elected to land, gear down, in a stubble field. During the landing the aircraft sustained minor damage but the crew and passengers escaped without injury.

Investigation of the accident led to a finding of pilot factor as the cause. All electrical components were operational. During the penetration the copilot had inadvertently turned off the *electrical master switch* while attempting to get the right AC generator reset and back on the line. During the ensuing checks and attempts to regain electrical power neither pilot noticed the OFF position of this most important switch.

Lt Col J. D. Oliver, Jr
Directorate of Aerospace Safety

MARTIN-BAKER SYSTEM — While installing the rear seat bucket in an RF-4C aircraft, egress maintenance personnel noted that the front seat personnel parachute withdrawal line connector was disconnected. With this line disconnected, the automatic feature of the parachute is lost—the drogue chute will not pull the personnel parachute from the seat if this line is separated. Unfortunately, this incident is only one of several reports concerning the F-4C escape system.

This condition presents a hazard to successful ejection, particularly if ejection is initiated at low altitude. At least one or two ejection fatalities per year are attributed to loss of automatic parachute function in all systems.

It was recommended that aircrews thoroughly check this item during seat inspection. Granted that a pilot is going to live longer if he preflights his aircraft, the responsibility for having it ready to fly still belongs to maintenance. The increasing frequency of discrepancies that would render the system inoperable is a matter of great concern.

The U. S. Navy and the RAF have compiled an enviable record of saves with the Martin-Baker escape system. During the last six years they have demonstrated a successful recovery rate of approximately 70 per cent below 500 feet. This record, however, has been achieved because the Martin-Baker has many added features that make it more complex than most current USAF systems, but such complexity will probably be necessary in any successful escape system. By definition, this requires increased maintenance efforts to insure maximum reliability. The AF has already experienced the costly replacement of a complex escape system because it could not be maintained in the field. This was costly not only in terms of dollars but in the tragic and irreplaceable loss of human life. We can ill afford a repetition of this experience.

Competent maintenance must be continually stressed to insure proper functioning of the escape system. F-4C egress system maintenance personnel should be thoroughly trained in all aspects of this system. Periodic refresher training is necessary to maintain their proficiency. To preclude maintenance errors, supervisors should assure strict adherence to checklists that have been developed for the F-4C escape system. No maintenance should ever be attempted without these checklists.

Robert H. Shannon, Safety Officer
Life Sciences Division

AERO BITS

THE FLYING SAFETY OFFICER will no longer have to beg, borrow or steal, and he may lose his reputation as a first class scrounger. Often hampered in performing his mission by lack of equipment, he now has a good thing going for him. It is a document titled TA-142, and its importance lies in what it authorizes for the safety officer in the way of needed equipment.

The new TA-142 lists the few pieces of equipment heretofore available through other tables of allowance, then adds a number of other long-sought items. It is part B of the new TA that is most significant and will be most welcomed by safety offices throughout the Air Force, because it authorizes 24 new pieces of equipment. Now all the flying safety officer has to do is place his order.

In addition to the equipment listed in TA-142, an interim message from SAAMA authorizes a movie camera as an additional item on the table of allowances. The camera, model 70DR, is a magazine loading 16mm. The TA also provides a projector.

All the newly authorized items are listed in the box on this page. For further information, see the April-May Flying Safety Officers' Kit which will include the entire TA-142. ★

TA 142

ALLOWANCES OF EQUIPMENT TYPE ITEMS

Aircraft Loadbalancing Computer
Fire Extinguisher, CO_2
Pick Axe
Fire Extinguisher, Water
Inspection Mirror
Dividers, Mechanical Drawing Type
Electric megaphone
Vehicle Warning Light
Gasoline Lantern
Siren
Mouth Examining Mirror
Magnifier
Binoculars
Triangle
Compass
Scale Draft Triangular
Drafting Compass
Drawing Board
Polaroid Camera Set
Motion Picture Screen
Motion Picture Projector
Strobelight
Recorder

FALLOUT

Continued from inside front cover

by USAF. However, it can be recovered if the recovery is started early.

I have been successful for a number of years in keeping my own pilots out of spins and have not resorted to the favorite restriction of setting an indicated airspeed limit as being the answer. They are taught to use that big hairy slab tail that got them into trouble in the first place. It is just as capable of reducing high angles of attack as it is in creating them. In other words, dump the stick smoothly before things deteriorate to a spin entry.

Major Jim Fox
352 Tac Ftr Sq
Myrtle Beach AFB, S. C. 29577

IT'S AFCS

Reference pages 18-19, March issue. I've long suspected a certain bit of confusion within AFCS Service Evaluation. Now I note they are using Systems Command aircraft.

Maj Herbert C. Metcalf
1994 Comm Sq AFCS
APO New York 09017

Please don't blame AFCS. The error is ours and we hope they'll forgive us.

LET 'EM LEARN

The article "Let 'Em Learn" (February) was most informative and I'm sure that all instructors cannot help but appreciate what Captain White has so demonstratively put in words.

As Officer Commanding the Primary Flying School at RCAF Station Centralia, Ontario, I have been subjected to a large turn-over of instructors, many of whom have never instructed before. Many heed the advice of the "old sweat" but others must learn the hard way. "Let 'Em Learn" has been included as compulsory reading for new instructors.

G. R. Hollinshead, Sqdn Ldr
Officer Commanding, Primary Flying School
RCAF Station Centralia,
Ontario, Canada

U.S. GOVERNMENT PRINTING OFFICE 1966 201-216/8

WELL DONE

CAPTAIN HARRY M. BRENN

62 AIR TRANSPORT WING, MCCHORD AFB, WASHINGTON

Captain Brenn was the Pilot Flight Examiner on a scheduled military airlift mission from Elmendorf AFB, Alaska, to Shemya AFB, Alaska, and was occupying the left seat in relief of the aircraft commander. Cruising at 8000 feet, the C-124 Globemaster was encountering nearly continuous icing under night instrument conditions. The flight progressed normally until about 300 miles from Shemya when a slight vibration was felt, followed almost immediately by a violent roll to the left. The Nr 1 propeller reverse telelights came on and the Nr 1 fire warning light illuminated. Captain Brenn quickly ordered the Nr 1 propeller feathered.

Despite heavy control pressures, the uncertainty of what had happened and the necessity to use asymmetrical power, Captain Brenn was able to regain control while in a slight descent toward the ocean. At this point the crew discovered that Nr 1 engine had completely separated from the wing leaving the engine firewall to act as a tremendous drag on that side. It was necessary to use METO power on the three good engines to maintain a 600 fpm descent at 130 knots. The aircraft was buffeting continuously in a semi-stalled condition.

Captain Brenn declared an emergency and ordered the crew to begin jettisoning the 26,300 pounds of cargo and to prepare for a night ditching. Due to the buffeting, flight and engine instruments were unreadable and the crew was unable to stop the slow descent toward the sea. Under these severe pressures, Captain Brenn analyzed the situation and decided to divert to Adak NAS, 100 miles closer and with better weather than Shemya. Jettisoning continued rapidly. Within 20 minutes it was completed, and the crew briefed and prepared for ditching. Captain Brenn, continuously playing available power and control against the adverse forces, finally succeeded in holding altitude at 3000 feet at 130 knots. Contact had previously been made with the air/ground radio facilities at Shemya, Anchorage and Adak, and the appropriate agencies had been notified. The aircraft continued to buffet severely and several times appeared to be on the verge of a stall. Captain Brenn, however, managed to retain control and without radar, maneuvered the huge transport to a GCA approach at Adak. The final approach and landing were executed safely using standard three-engine procedures.

Captain Brenn, by his outstanding skill, flying ability, leadership and crew management, was able to save his aircraft and crew. Well Done! ★

BECAUSE I FLY

1st Lt G. C. Norwood
FSO, 4765 Air Def Wg (ADC)
Tyndall AFB, Florida 32403

I

Rocking here
in my high chair
in my sky chair
I look down.
This electric Quiet
Never gets old
Startles my hands
Makes my senses collide
And they fall into a wordless heap,
Unable to survive
Unable to record
flight.

II

I have seen no mountain
High as my unreasoned flight,
Nor loved so thin a form
Nor lost so small a fight;
I have felt no chorus blend
As do we three out of here —
Nor been in unlived air
Nor killed something with cheer;
I have heard no pilot yell,
"Out here, your soul's unshod!"
Out here, God's not inside you, boy —
You are inside God.

III

Because I Fly
I laugh more than other men.
I look up
And see more than they.
I know how clouds feel
What it's like to have the Blue
in my lap
To look down
On birds
To feel Freedom in a thing called
the stick
Who but I
Can slice between God's billow-legs
And feel them laugh and crash with his step?
Who else has seen the unclimbed peaks?
The rainbow's secret?
The real reason birds sing?
Because I Fly
I envy no man on earth.