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Aerospace SAFETY

THE MAGAZINE DEVOTED TO YOUR INTERESTS IN FLIGHT

THE FUTILITY OF DELAY!

ejection indecision may cost your life

IT'S YOUR CHOICE

helicopter drivers have some options

SPECIAL REVISED USAF AERO CLUB DIRECTORY

Aerospace SAFETY

THE MAGAZINE DEVOTED TO YOUR INTERESTS IN FLIGHT

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SPECIAL FEATURES

REGULAR FEATURES

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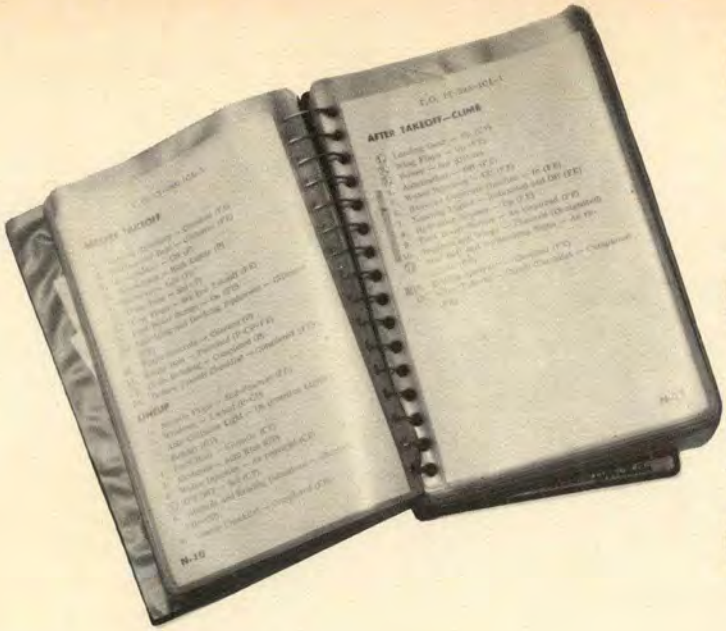
PREFLIGHT

When emergencies occur, helicopters offer their crews some options that most fixed wing aircraft don't. These options are the basis for the article, "It's Your Choice," beginning on page 2. Captain Michael Tennery, an instructor at the helicopter training school at Sheppard AFB, Texas, wrote the article, but, he says, nearly every IP at the school had a critical look at it. So it represents the best thinking of some real experienced and highly proficient chopper pilots.

In "Futility of Delay" flight surgeon Lt Col Bob Bonner points out some of the fallacies in delaying the decision to eject. Knowledge and planning what to do in specific circumstances are the important elements in a successful ejection, says the author.

Last month *Aerospace Safety* contained an article on the Air Force Technical Order System. Now we are fully aware that the article wouldn't win any prize in the *suspense novel of the month contest*, but it was a very important dose of knowledge slipped in among more exciting stories. This month there's another bit-of-knowledge-article called "URs and You." Not everyone needs the info contained in the article but a lot of jocks do and will. Those who need this knowledge include those of you who will someday find yourselves serving on accident investigation boards, and those who will wind up in responsible Ops and Maintenance jobs. Until next month — Fly Safe!



CHECK & DOUBLE CHECK

Maj John P. Garbe, Directorate of Aerospace Safety

How many missions are rushed in an attempt to make an on-time takeoff? Ask any pilot and he will undoubtedly give you one example after another. Here is a recent one.

The crew was unfamiliar with the airfield and the surrounding terrain. They were concerned about being able to reach the assigned altitude at the existing gross weight; the runway was icy and slick; the void time for their ATC clearance was revised four times. All of these factors combined to distract the crew prior to takeoff.

The taxi checklist was initiated as the aircraft blocked out for departure. The second item on the checklist called for flaps to be set for takeoff. This was accomplished by the copilot who was in the left seat. Shortly thereafter, he remarked that flaps were up even though he had set them. The aircraft commander replied that he had retracted the flaps and to leave them up until later. Leaving the flaps retracted while taxiing was in accordance with the aircraft cold weather operating procedures.

As extracted from the cockpit voice recorder, one of the crewmembers said, "Let's be sure not to forget them."

No further mention of flaps could be detected throughout the remainder of the voice recorder tape which continued until the crash. There was an excessive amount of interphone chatter and idle talk while taxiing which helped to divert the crew's attention from their primary duties.

Based on normal flap takeoff setting the computed takeoff distance and speed were approximately 8200 feet and 168 KIAS. A zero flap setting increased these to approximately 10,500 feet and 178 KIAS. The runway in use was 10,000 feet long.

It was evident that the flaps-up condition was not detected by the crew prior to the normal computed takeoff speed. As a result, rotation was attempted at too low an airspeed to sustain flight. In the short amount of remaining runway the aircraft managed to stagger off; however, its attitude was such that compressor stalls occurred on three engines. The aircraft settled back to the ground and crashed.

Of course, this is another pilot factor type of accident. In the rush to get airborne, because of clearance void time and the other items that caused concern to the crew, the repositioning of the flaps to the takeoff position was forgotten.

As a result of this accident, it was recommended that a review of existing checklists and flight manuals be accomplished to insure that temporary deviations from routine procedures are corrected in a subsequent checklist entry prior to a critical phase of flight. Had the checklist for this particular aircraft repeated the flap entry on the line-up checklist, the oversight would have been discovered.

If you omit a critical checklist item in its normal sequence do you have to remember it, or does a subsequent checklist repeat it? If not, don't start the checklist unless conditions allow you to complete it. If you have a suggestion to improve your aircraft's checklist, discuss it with your standardization section. They are familiar with the procedures for forwarding recommendations for checklist changes. ★

Helicopter pilots, in an emergency, usually have some options. An instructor at the USAF helicopter pilots school discusses some typical types of emergencies and points out to pilots that . . .

It's Your CHOICE

Capt Michael Tennery,
USAF Helicopter Pilots School,
Sheppard AFB, Texas

Except for a few critical seconds after takeoff, we as helicopter pilots can offer ourselves some form of choice in selection of an emergency landing site. This does not mean we should fly around preoccupied with losing an engine or the rotor blades. It does mean we should develop some protective instincts and habits which will let us walk away from any emergency.

First, let's talk about routing. Use your imagination to plan your route. Oftentimes a couple of pounds of fuel or a few minutes extra will fly you around a lake instead of over it. There's more scenery on the beaches anyway! Flying over a valley instead of along a ridge will offer better emergency landing sites. Remember, in planning your route you are flying (in most cases) a single engine aircraft. The engine does not quit often, but when it does you're going to go down.

Now, let's talk about altitude and airspeed. The fixed wing philosophy of "the higher the better" does not necessarily apply. We must think more in terms of high enough to make an autorotation and low enough to get the aircraft safely and quickly on the ground in case of a critical malfunction. Airspeed can often be traded for altitude, but remember, as you increase your speed you reduce the time you have to see and react to obstacles. Leave yourself enough altitude for a quick stop and don't fly lower than the top of the highest obstacle. We all have had friends in the helicopter world who aren't with us anymore because they flew low and slow over bone-crushing terrain. Check your Dash One charts for the minimum autorotation speed of your machine. Don't go below that speed. It is theoretically impossible to hack it when the engine quits at a lower speed.

Most of us have been in rescue work at some time, and have been presented with the problem of having to search areas which were very poor for engine failures or the like. We were not given a choice of routing. Airspeed was often controlled by how well we could see what we were searching for. Often we were put beyond reach of a suitable landing area.

The pilot is left with having to accept the possibility of aircraft damage if an emergency occurs, so you must think in terms of making an emergency landing which you and your passengers can walk away from. You must try to protect the cockpit/cabin area. The following is a discussion on some ways to do this. The particular helicopter you fly and its mission will have considerable bearing on what you do. This discussion is intended to stimulate your thinking in this area and is not directive. It's still *your choice!*

When the emergency happens, you must immediately judge the terrain within gliding distance for its energy absorbing capability. If sufficient altitude is available, you should head for the area which seems to offer the best choice without being concerned immediately with a specific spot. When the time available is very short, the choice may be limited to a variety of individual obstacles, but it is still a choice as long as you, the pilot, maintain control of your helicopter. Now, let's get down to specifics:

Open Terrain Before instinctively heading toward open terrain, you should ask yourself:

- Can I reach the open area with normal glide, without being tempted to stretch it? (Note: The maximum glide speed is usually different from your power-off minimum rate of descent speed. See your Dash One.)
- Does the surface permit a running landing in case of a hard, fast touchdown?
- If I must touch down fast, can I control the aircraft enough to prevent drift or the tail from swinging?
- If the surface is poor, do density altitude and gross weight per-

Water landing—doors should be open; rotors should have stopped before evacuation by crew, passengers. Desert landings normally don't present serious problems, but appearance of terrain can be deceiving. Of course, rocks and canyons such as these offer little hope of safe landing.

mit a zero groundspeed touchdown or must I aim for a minimum groundroll touchdown?

Trees (Forest) Accident experience shows that landing in trees is very hard on helicopters, but not as bad as you might think on the people inside. When a tree landing is unavoidable, you should select a touchdown spot based on the following considerations:

• The height of a tree is less critical than the height above the ground where the tree begins to branch. Tall trees with thin tops allow too much free fall height before the aircraft reaches the cushioning branches.

• When faced with young or short trees, the most densely and evenly wooded area would be good. This ideally allows the bottom of the helicopter and the rotors to create a cushioning effect at the same time as they contact the trees.

• In very tall trees try to get the fuselage between the basic tree trunks before the rotor contacts them. Look for a spot where the rotors will contact the trees evenly.

• Landing in a sparsely wooded area may be more difficult than in a dense forest. The problem is that individual trees act more like hard obstacles than energy absorbers. A rotor on one side will strike a tree while the other side is free. This tips the chopper over to land on its side.

• Brush type vegetation is usually not a major problem, but remember it may hide tree stumps or large rocks which can penetrate the cockpit/cabin.

• Dead trees are dangerous. They offer little energy absorption and tend to puncture the fuselage.

In general, the best method of emergency landing in trees is first to have a zero or near zero ground speed. Try to have a high, rather than low, rotor RPM as you enter the tops of the trees. Keep the downward velocity as slow as you can.

Water For years there has been a debate among helicopter pilots about what to do when you ditch a helicopter. Roll it left, roll it right, don't roll it. What you do depends on the type helicopter you fly, but two things hold true for all of our helicopters. One, have all the doors open when you contact the water. Two, don't prematurely evacuate the helicopter; wait till the main rotor(s) stop.

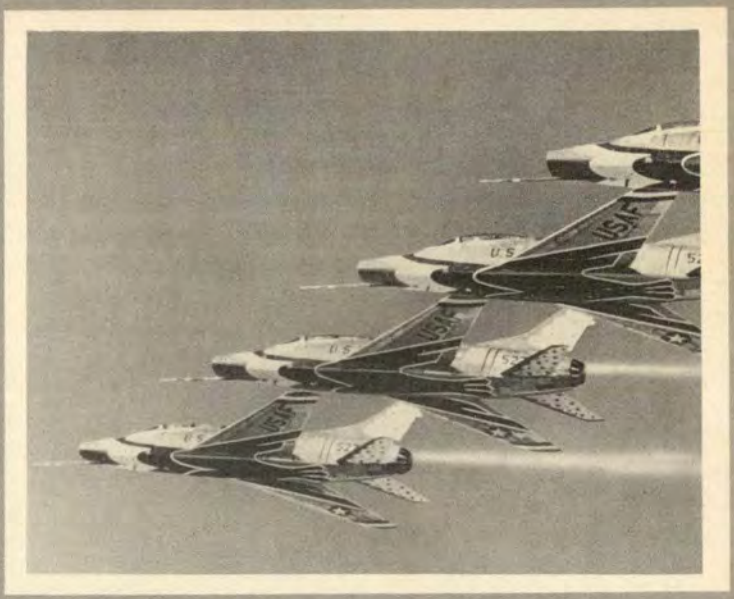
Desert Selecting the landing area usually does not present too much of a problem. Remember the surface may be soft; due to blowing sand your visibility for touchdown may be reduced. The major problem will be survival after the landing. For this reason your initial choice of touchdown might be one of direction rather than specific terrain. That is, direction toward a settlement or specific landmark. Orientation is very difficult on the desert, and if you plan to walk out, getting your bearings in the air as you come down will greatly aid you. This suggestion of walking out is not to imply that a conspicuously located aircraft should be left in favor of an uncertain search for comfort.

One final comment on approach and landing. Terrain selection from

Brush may hide obstacles such as stumps, rocks or debris that could penetrate the aircraft. During tree landing (right) be particularly careful of dead trees — they absorb very little energy. In either case, keep downward velocity low as possible.

altitude is initially based on appearance, and is not always final. As the actual terrain features become more apparent, you should not hesitate to discard your original choice for one that is obviously better. However, as a general, but not unbreakable, rule you should not change your mind more than once. A well-planned and executed crash can be less hazardous than a wild, thoughtless approach into a large established field. Once you have made your final choice, stick with it and concentrate on the approach. The best advice is to use standard procedures and not aggravate your problems by using non-standard or unapproved procedures.

Know your aircraft and don't fly in the unsafe areas of the Height-Velocity chart. Pick your route and fly at a safe altitude. Approved procedures will usually result in less damage to the machine in a dead stick landing. Except on certain operational missions, it's your choice to fly at an altitude over a route that gives you an option in case of engine failure. ★



THUNDERBIRDS

USAF Official Demonstration Team

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

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

Applicants for demonstration pilots and narrator must have 1000 hours jet fighter or trainer time. These applicants must have completed a SEA tour and have less than 10 years active commissioned service as of 31 December of this year. One selectee will perform the duties of narrator for one year, then fly as a demonstration pilot for two years. It is desired that he have public speaking experience.

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

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

An Air Force flight surgeon discusses ejections and the...

Lt Col Robert H. Bonner, USAF, MC, Directorate of Aerospace Safety

When the pilot of an F-105 flying a day VFR mission ran out of fuel, he was both surprised and dismayed. Then the practical aspects of his situation became apparent and he decided, at 2000 feet, that he probably would have to eject. He stated in his narrative, "I mistakenly turned away from an airfield I could possibly have made, though I was told afterward it was best I had not made the attempt," He stayed with the aircraft until 500 feet altitude, then he ejected. Luckily, in spite of the low altitude, the ejection was successful. A final comment of the pilot was, "Throughout the entire sequence of events, I was more distressed about losing the plane than any fear of life or limb."

The mental processes involved in delaying ejection and lack of concern for one's life or safety is more common than one may expect. In 1968, 17 per cent of all fatal ejections involved individuals whose emergencies occurred at an altitude where safe, successful egress was possible, yet for reasons known only to themselves, ejection was delayed to a point where success was impossible. Luckily, the pilot mentioned at the beginning of this article made it. Another second or two delay could have resulted in an entirely different outcome.

The problem of delayed ejections has always troubled flight surgeons

Futility Of Delay

and egress specialists. Certainly there are many factors to consider. Fear of reprisal or criticism, lack of confidence in the egress system, and lack of preparedness when an emergency arises are just a few of the possibilities. Fear of reprisal, perhaps, is engendered because of the meticulous attention devoted by accident investigation boards to testimony and the fact that judgment is a frequent factor in accident causation. No one is perfect and all of us, being human, are subject to human error. An honest mistake, though labeled as such, is not criticised. The identification of mistakes assists safety experts in preventing other accidents of a similar nature. In the final analysis, is the loss of your life really less important than the possible imagined criticism you may receive because of human error?

Confidence in egress systems perhaps can be gained if we approach our ejection seat and parachute not as a fearful emergency, sometimes reliable system, but as a nonfearful, highly reliable, simple secondary means of transportation. If we exclude ejections which occur *outside* the envelope, many of which are a result of delayed decision to eject, the reliability and success rate of our egress systems are outstanding. The physical occurrences during ejection, as repeatedly related by individuals who have had the experience, are not fearful nor necessarily uncomfortable. In fact, most ejectees express considerable surprise as to how smooth and comfortable the secondary means of transportation actually was. Also, the engineers are continually updating ejection systems to provide the optimum in reliability and success.

Even though we may have heard stories or may have known individuals whose ejections were not successful, we know many more whose ejections were. If in the envelope our chances of surviving were 95 per cent, and outside the envelope, or with no ejection at all, the chance of surviving were essentially zero per cent, what is clearly the best choice under the circumstances? Obviously ejection within the envelope, which means *do not delay*. If you've run out of fuel, you are not miraculously going to create fuel by sitting in a flamed-out aircraft from 2000 feet to 500 feet in a situation where flameout recovery is obviously impossible.

Lack of preparation for ejection can be corrected in many ways: *First,* perhaps mental attitudes need changing. We have to accept the fact that sometime in the course of our flying career we may be faced with an emergency requiring prompt egress. Once we accept this fact, then we no longer have the somewhat supernatural feeling that "it can't happen to me."

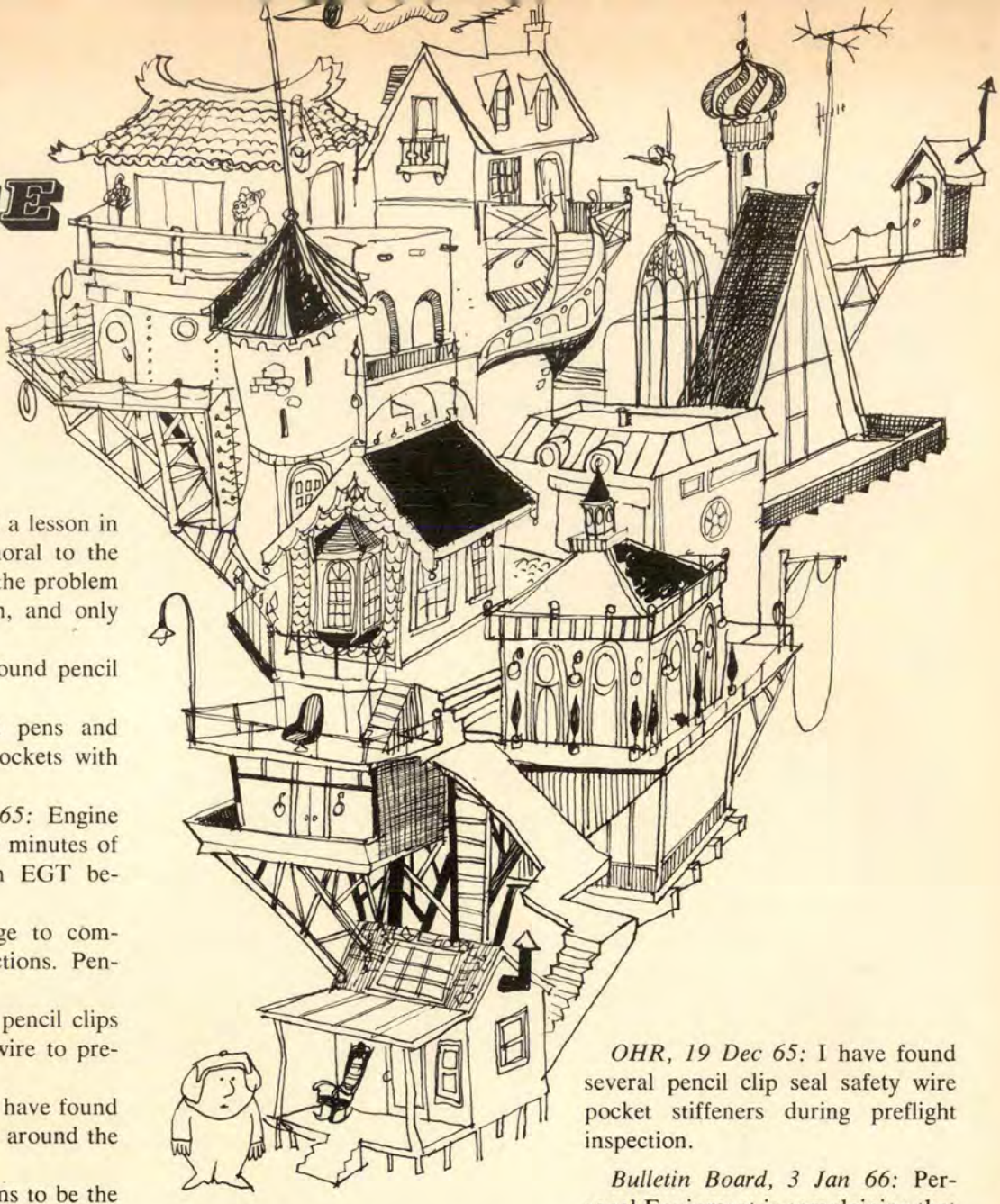
The combat ejection success rate is 95 per cent, which is much better than the noncombat rate. Why? The reason is quite simple. The combat pilot is mentally prepared for ejection and consequently he doesn't delay. He knows that his probabilities of having to eject are quite high. Once we accept that we probably will have to eject sometime, then the next logical step is to be as well prepared for that moment as we can.

Next, we should learn, practice, and continue to practice ejection procedures in our assigned aircraft. In fact, prior to each flight, a few seconds delay in engine start to mentally rehearse the ejection sequence might influence one's behavior if he has to make the decision to eject.

Secondly, we must know the ejection envelope for the aircraft in which we are current; not just the routine envelope, but that for each type of emergency we might face. Also, we should consider each phase of flight and decide before the emergency arises when we will eject. In other words, have clearly established in our minds the set of circumstances under which we will eject if the situation arises. This single factor has been related by aircraft accident survivors as the most important element in their decision to eject.

Periodically, it would be beneficial to reassess the conditions under which we would eject. If each one of us would honestly and rationally prepare ourselves for the use of our secondary transportation system, both physically and mentally, then we would approach this phase of our flying career with the same professionalism with which we have approached all other phases. ★

this is the HOUSE that JACK built



There is a laugh and a lesson in this article. The moral to the story is: "Analyze the problem . . . and the fix." Then, and only then, fix it.

OHR, 11 Nov 65: Found pencil on floor of T-37.
Recommendation: That pens and pencils be secured in pockets with pencil clips.

Form 781, 17 Nov 65: Engine began vibrating after 10 minutes of flight. Shut down when EGT began rising.
Findings: Severe damage to compressor and turbine sections. Pencil clip ingested.
Recommendation: That pencil clips be secured with safety wire to preclude loss.

OHR, 23 Nov 65: "I have found numerous pieces of wire around the aircraft parking area."
Findings: That wire seems to be the same type and size as that used to secure pencil clips to pens and pencils.
Recommendation: That pencil clip safety wires be secured to pencil clips with a lead seal.

Form 781, 29 Nov 65: After leveloff, student attempted to adjust throttles for stall series. Throttle hard to move. Could not retard below 70 per cent. Shut down in flare.
Findings: Lead seal jammed in throttle quadrant.

Fly Safe, 3 Dec 65: Several lead seals from pencil clip safety wires have been found in and around cockpits. One of these caused throttle binding. It could have been worse. To prevent further loss of pencil clip safety wire lead seals, we recommend that about an inch of wire be left to protrude beyond the seal and that this wire be twisted double.

Flight Surgeon, 12 Dec 65: Several flyers have been treated by this office in the past week for minor punctures of the upper left arm. While not serious, these injuries are painful and can be easily prevented. We recommend that a stiffener of some sort be provided for the pocket.

OHR, 19 Dec 65: I have found several pencil clip seal safety wire pocket stiffeners during preflight inspection.

Bulletin Board, 3 Jan 66: Personal Equipment is complaining that pilots are losing pocket stiffeners. They are looking for a device that will hold them more securely.

T-37 Incident, another base: Smoke in cockpit. Made precautionary landing.
Findings: Three-inch metal clip came in contact with starter relay.
Recommendation: All flying personnel using metal clips be required to tie them to their flight suits. (That takes care of that!)

"This is the house that Jack built. This is the malt that lay in the house that Jack built. This is the . . . " ★

(ATC Safety Package)

the I.P.I.S. approach

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

Q May a pilot filing a route in the low altitude airway structure file to a high altitude IAF?

A Yes. The airway structure in which the enroute portion of the flight was filed or conducted does not dictate the type of approach to be flown. The type of approach an aircraft can fly depends upon the aircraft category and available approaches. A pilot is authorized to fly an approach only when his aircraft's category is listed on the approach chart. A problem usually occurs when the pilot of a Category E aircraft files in the low altitude airway structure. Because Category E aircraft are not listed in low altitude terminal approach charts unless a special operational requirement exists, the pilot of a Category E aircraft can neither file to nor fly most low altitude approaches. Such a pilot, flying low altitude, may have no choice but to file to a high altitude IAF. However, controllers may logically assume that a pilot flying in the low altitude structure will fly a low altitude approach. To avoid misunderstanding, a little extra care in pilot-to-controller coordination may be needed.

Q If a pilot is flying a VOR approach and the VOR facility is located on the airfield, where should the pilot execute a missed approach? Also, on some on-field facility approach depictions, the time/distance table is omitted. Why is this omission allowed?

A The missed approach surface for a VOR approach depicted to an on-field VOR facility starts at the VOR (JAFM 55-9 TERPs). A pilot can start a missed approach any time prior to, but no later than, the on-field VOR. The Inter-Agency Air Cartographic Committee (IACC) charting specifications direct the time/distance table to be omitted when the missed approach point is an on-field facility. When the approach is designed without a final approach fix (FAF), a time/distance table would be of no value. With no FAF, the final approach segment starts upon completion of the penetration or procedure turn. The final approach distance will vary with aircraft types, and a pilot would not know where to start his timing.

Some approaches to on-field facilities depict FAFs. These approaches are frequently combined with localizer approaches which require time/distance tables. Although a pilot could legally fly to the on-field VOR before executing a missed approach, he is primarily concerned with the location of the end of the runway. If the VOR is located a substantial distance downfield, and the runway environment is not sighted until the VOR, a landing may not be possible. Circling weather minimums may not exist. Consequently, when a FAF and time/distance tables are depicted, the pilot should use these in his approach planning. He should ensure the MDA is reached in time to identify the runway environment and land straight-in. At the end of the timing period and at the MDA, if the runway environment is not sighted, a missed approach is recommended. If circling weather minimums do not exist, overflying the computed time period will serve no purpose.

Q Must a pilot flying a PAR approach execute a missed approach at the decision height (DH) as identified by the controller, or may he continue the approach until the DH is indicated on his aircraft altimeter?

A The missed approach decision must be made at the DH as called by the controller or the DH indicated on the altimeter, whichever occurs *first*. The reasons for this policy are obvious:

1. We accept up to a 75-foot pressure altimeter scale error as within usable tolerance.

2. Civilian radar controllers are not required to identify the DH to the pilot.

3. Although unlikely, a military controller can unintentionally omit the DH warning.

Ideally, the controller's DH warning and the altimeter DH indication should coincide. However, because of the many variables present, differences in the two DH indications are not infrequent. Individual controller interpretation of the radar blip position and altimeter inaccuracies will cause DH indication differences. The requirement to abide by the first DH indication to occur is the only safe policy. This is particularly true when an approach to a 100-foot DH is considered. ★

KEEP THOSE CARDS AND LETTERS COMING, FOLKS
FT-IPIS-PS (IPIS Approach)
Randolph AFB TX 78148

BIRDSTRIKE. From time to time all aviation magazines present something on the hazards of birdstrikes. Here's a brief item that will give the uninitiated an idea of the damage birds can do. The aircraft was a B-52 descending on final approach at 150 KIAS. The pilot reported seeing a bird pass overhead and to the right. No impact was felt or observed by any crewmember, but during postflight a four-inch hole was found in the leading edge of the right wing.

TALK ABOUT SERIOUS OPERATIONAL HAZARDS, try this one on for size, and profit from a pilot's reluctance to declare an emergency. After takeoff an F-101 pilot discovered he had a rudder control problem which necessitated holding constant rudder pressure. He flew VFR in the local area for 35 minutes before requesting an ILS to runway 06 for a full stop landing. The active was 24 and the jock didn't tell RAPCON about his control problem. Radar picked him up at 25 miles and cleared him for a full stop ILS to runway 06.

When he reported 15 out on final, RAPCON informed him that there would be a 10 minute delay and to hold southwest in VFR conditions. At 11 miles the pilot told RAPCON, "I will declare an emergency if I have to so I can land on runway 06 right now."

RAPCON asked, "Are you declaring an emergency?"

The pilot repeated, "I will if I have to."

RAPCON then instructed him to hold southwest or accept a vector to runway 24. This did it; finally the '101 pilot declared the emergency and reported seven miles out on final. Control tower personnel were not aware that opposite direction traffic was developing.

At this time the control tower supervisor told a KC-135, which was in position on the runway awaiting final instructions, "Takeoff immediately or taxi off the runway."

The KC-135 pilot had completed his checklist, was spring-loaded to the "go" position, and elected to take off. He was not aware of conflicting traffic. During the tanker's takeoff roll the GCA controller observed the converging aircraft. He advised the F-101 to break left. Just as the KC-135 was breaking ground, its pilot saw the F-101 and turned slightly left to avoid a collision.

Of course, there were other people at fault in this hairy situation, but the F-101 pilot's failure to declare an emergency triggered the close call which could easily have been a catastrophe.

GRAND CANYON AERO CLUB. We understand from our friends at Luke AFB that the park rangers at Grand Canyon are getting a bit concerned about the

number of jet aircraft flying into the canyon. They keep track and, apparently, there were 25 logged last year. How many of these were military jets, and how many Air Force we don't know. We do know that isn't the place for sightseeing jets (below the rim yet) even though we were ducking in there back in World War II, maybe even in the first big one. Anyway, it's being done so there is the possibility of hitting a cable. Also, anyone contemplating such a visit should realize that he is not unique in this respect. What a place to meet another jet coming headon. Gulp!

RESPONSIBILITIES OF COPILOTS. A couple of months ago in Southeast Asia a C-7A got away from the aircraft commander during a crosswind landing, and the A/C ended his overseas tour with a major accident. Crosswind limitations established by his wing were exceeded for no good reason because a runway was available which was directly into the wind. The cause was operator factor: In addition to exceeding the maximum allowable crosswind component, the pilot engaged the gustlocks at too high a speed (about 40 knots) for the landing conditions and not in accordance with the procedures recommended in T.O. 1C-7A-1. As a direct result, he lost control of the aircraft. The copilot wasn't able to help much because he didn't know the flight manual procedures for engaging the gustlock nor was he aware that the landing would violate existing directives.

The old bug-a-boo of wasting a valuable resource rears its ugly head—all copilots must realize that they are entrusted with the responsibility for a proportional share of mission accomplishment. In this case, the copilot could have computed the crosswind component and saved the day with a timely warning.

The accident board also concluded that the pilot did not use appropriate correcting techniques for preventing the aircraft from leaving the runway. T.O. 1C-7A-1 states: "In strong crosswind, it may be necessary to augment nosewheel steering with rudder, brakes and differential power while the copilot maintains a wing level attitude with aileron." This emphasizes the absolute necessity for close coordination and teamwork which can come only with good training and adequate crewmember briefings by the aircraft commander. The pilot in command of this C-7A obviously wasn't using his fellow crewmembers to best advantage.

Unfortunately, a couple of days later, in the same part of the world, a CH-3 helicopter pilot proved the value of adequate briefings for crewmembers, especially those who have not flown together regularly. A local training mission was diverted to the site of an emergency—a smoldering hut where the bright flames had died out and left almost no visual reference. The pilot set up his traffic pattern and notified the crew over intercom to prepare for landing. Without notifying the pilot of his action and contrary to standard crew procedures, the engineer left his position to aid another crewmember in fastening his restraining harness.

On base leg the copilot began to worry about the situation in the cabin and turned his head to see what was happening. While his attention was diverted the copilot heard the pilot say on the interphone, "Take the controls, I'm disoriented." The copilot returned his attention to the cockpit and attempted to assume control of the aircraft. At this time they were about 50 feet above the treetops, in a nose high attitude and going backwards.

It was too late! The tail rotor and the main rotors struck the trees. The CH-3 fell to the ground, rolled on its left side and immediately started to burn.

The copilot was inattentive at a critical phase of the flight—nearing a landing on a very dark night with almost no visual references. As in the case of the C-7A the pilot at the controls needed help and it wasn't there. Primarily the pilot's fault? Sure, but briefing information, manuals and unit regulations must be closely adhered to by the other crewmembers—especially when the circumstances are out of the ordinary. Training cannot

cease when we leave school; when we stop learning, we are no longer professionals.

Those "other crewmembers" are not just along for the ride; they must know beyond any doubt how and when their services are critical to mission success. Takeoff, climbout, formation flying, traffic patterns, approaches and all ground operations are some of the maneuvers which require the undivided attention of all crewmembers. ★

The Challenge of Change

Lt Col Scotty O. Ferguson, Directorate of Aerospace Safety

T-6 Now there was a bird. The British called it the "Hahvahd."

B-26 (the original), also known as the "Widow Maker"

The modern day Air Force aviator, if he has been around any length of time at all, has been required to adjust to changes in his world above buildings, probably more often and to a greater degree than has anyone in any other field of endeavor.

For instance, consider the individuals who began their flying careers in the T-6, progressed to the F-51, F-80, F-86, and on to one or more of the century series fighters, requiring more and more technical knowledge and operational skill; then, all of a sudden found themselves in the cockpit of a T-28, A-1, A-26, or some other antediluvian nightmare of prop pitch, mixture control, torque and three point landings, requiring old, yet new, or long forgotten techniques.

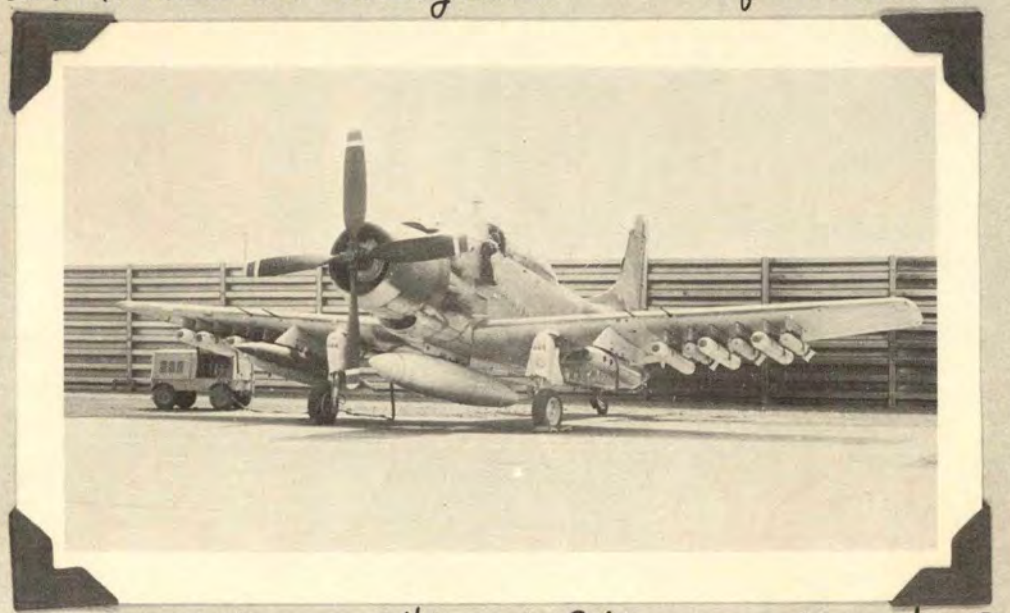
Or how about the types who preferred many motors and progressed from the T-6 to the B-25, B-29, B-47, B-52, not to mention a stop along the way in the B-36. Then, suddenly, they found themselves in the cockpit of an F-4 performing a mission completely foreign to them with only a guy in back to offer advice and consent. Following this, they were delivered back into their real world and were subjected to another transition period to catch up to the current state of the art.

A lot of these people were able to adapt to these extreme technical and environmental changes. Some excelled. But some were not up to it, and the results in those cases were drastic—even fatal!

The changing roles and missions of the Air Force will continue to place such demands on pilots — from F-106 to A-1 and back again; from B-52 to O-2 and back again; from BUFs to fighters and back again; and how about C-130 to O-1 to F-15? Perhaps. The thing is, the possibility, or more correctly, the probability, is there. The basics are the same. That is, pull back on the stick and you go up, pull back a little farther and you go down. But the transition from one to the other in all aspects is great indeed.

B-29—A giant in its day—One of our WX Recce birds coming home.

B-52—Talk about a handfull of throttles !!!!



A-1—Then came Vietnam and this bird. Quite a jump from the B-52!—F-105s next?

The key word is ADAPT — ADAPT — ADAPT. Whether you are flying the sleekest, most beautiful, most technically advanced flying machine in the fleet, or you are strapped to an anachronistic bucket of bolts, the necessity to adapt to that particular machine and mission is absolute. No halfway stuff—no thinking back to how sweet it was, or ahead to how sweet it will be. Your thing is now. So adapt and put everything you have into what you're doing now. To lose an airplane to enemy air or ground action after a pilot has done his damndest to prepare himself for his role in that particular mission is regrettable, but certainly nothing to be critical of. In fact, we're usually mighty proud of his efforts. But to lose one because the pilot didn't know his equipment and how to use it to the greatest advantage for that particular mission is a sad, sad scene.

Most Air Force aviators are above average mentally and physically, but some lack the spark to completely accept and adapt to change. This is a weakness that can be corrected.

New challenges in the Air Force pilots' world are just over the horizon and fortunate is the man in the early years of his career. But remember, no matter how far out we get technologically, a lot of the world that doesn't take too kindly to us is way behind and may force us to do things the old way. And the demand for pilot skills may be greater in one area than another. So no matter how far up the technical ladder you go, you may be required to go back for awhile before you continue on up; or you may have to jump across to a technically equal but foreign environment. Whatever the case may be, accept it and adapt to it at full throttle and with an open mind.

The future looks bright and the detours along the way will only add to your worth as an experienced aviator. It's a fascinating, rewarding, and exciting business. Don't blow it!! ★

As a service to Aero Club members, AEROSPACE SAFETY provides this directory. We will try to update it from time to time by listing any changes, and we'll also try to give you a complete new listing once a year.

Here's the way to read it: Base name, hours of operation, gas (octane), all have oil available, and phone number. Clubs located on base are printed in black, and those located off base are in color with the name of the airport. Happy Landings!

STATE & CLUB	SERVICE AVAILABLE	PHONE NO.
ALABAMA		
Maxwell-Gunter AFB Aero Club (AU)	0800-Sunset	5141
Gunter AFB (Montgomery) AL	Gas 80/100 Oil	
ARKANSAS		
Blytheville AFB Aero Club (SAC)	0800-1700	691
Blytheville AFB AR	Gas 80 Oil	
Little Rock AFB Aero Club (SAC)	0730-1700	988-1234
Little Rock AFB AR	Gas 80/87 Oil	
ARIZONA		
Davis-Monthan AFB Aero Club (SAC)	0800-1700	327-7632
Davis-Monthan AFB (Tucson) AZ	Gas 80 Oil	
Luke AFB Aero Club (TAC)	0600-2000	935-4891
Phoenix-Litchfield Municipal Aprt	Gas 80/100 Oil	
Phoenix AZ		
CALIFORNIA		
Beale AFB Aero Club (SAC)	0800-1900	788-1972
Beale AFB (Marysville) CA	Gas 80 Oil	
Castle AFB Aero Club (SAC)	0800-Sunset	722-3638
Merced Municipal Airport	Gas 80/100 Oil	
Merced CA		
Det #1 AFSCF Aero Club (AFSC)	0900-1500	739-4510
NAS Moffett Field (San Francisco)	Gas 80 Oil	Ext 2564
Edwards AFB Aero Club (AFSC)	0800-1500	72474
Edwards AFB CA	Gas 80 Oil	
Hamilton AFB Aero Club (ADC)	0800-2000	838-4447
Hamilton AFB (Ignacio) CA	Gas 80 Oil	
Los Angeles AFS Aero Club (AFSC)	24 Hours	643-1668
Los Angeles International Airport	Gas 80 Oil	
Los Angeles CA		
March AFB Aero Club (SAC)	0800-1700	2455
March AFB (Riverside) CA	Gas 80 Oil	
McClellan AFB Aero Club (AFLC)	0800-Sunset	927-4292
McClellan AFB (Sacramento) CA	Gas 80 Oil	
Norton AFB Aero Club (MAC)	0800-1700	382-2545
Norton AFB (San Bernardino) CA	Gas 80/100 Oil	
Oxnard AFB Aero Club (ADC)	0730-1800	486-1631
Oxnard AFB (Camarillo) CA	Gas 80 Oil	Ext 3279
Travis AFB Aero Club (MAC)	Daylight	437-3470
Travis AFB (Fairfield) CA	Night on Request	-3237
	Gas 80 Oil	
Vandenberg AFB Aero Club (SAC)	0900-1800	866-5310
Vandenberg AFB (Lompoc) CA	Gas 80 Oil	
COLORADO		
Ent AFB Aero Club (ADC)	24 Hours	635-8911
Peterson Field	Gas 100 Oil	Ext 4310
Colorado Springs CO		4759
Lowry AFB Aero Club (ATC)	0730-1630	366-5363
Buckley Field	Gas 80/100 Oil	Ext 508
Denver CO		
USAF Academy Aero Club (USAFA)	0800-Sunset	472-4423
USAF Academy Air Field	Gas 80/115/145 Oil	
Colorado Springs CO		
FLORIDA		
Eglin AFB Aero Club (AFSC)	Irregular	882-1948
Eglin AFB FL	Gas 80 Oil	
MacDill AFB Aero Club (TAC)	24 Hours	830-3364
Peter O. Knight Airport	Gas 80/100 Oil	
Tampa FL		
Patrick AFB Aero Club (AFSC)	0700-1700	494-4356
Patrick AFB (Cocoa Beach) FL	Gas 80 Oil	
Tyndall AFB Aero Club (ADC)	0900-1600	283-2636
Tyndall AFB (Panama City) FL	Gas 80 Oil	
GEORGIA		
Moody AFB Aero Club (ATC)	Daylight	244-1527
Valdosta Municipal Airport	Oil Only	
Valdosta GA		
Robins AFB Aero Club (AFLC)	0800-1700	922-2634
Robins AFB GA	Gas 80 Oil	
ILLINOIS		
Chanute AFB Aero Club (ATC)	0730-1630	893-3111
Chanute AFB (Rantoul) IL	Gas 80 Oil	Ext 2284
Scott AFB Aero Club (MAC)	0930-1730 Daily	AL6-4394
Scott AFB (Belleville) IL	0800-1700 Weekends	
	Gas 80/100 Oil	
INDIANA		
Grissom AFB Aero Club (SAC)	0800-2000	689-7268
Grissom AFB (Peru) IN	Gas 80 Oil	
KANSAS		
Forbes AFB Aero Club (TAC)	0800-1700	4517
Forbes AFB (Topeka) KS	Gas 80 Oil	
McConnell AFB Aero Club (TAC)	0800-1700	685-1151
McConnell AFB (Wichita) KS	Gas 80 Oil	Ext 5180
		6255

STATE & CLUB	SERVICE AVAILABLE	PHONE NO.
LOUISIANA		
Barksdale AFB Aero Club (SAC)	0800-1630	423-8871
Barksdale AFB (Shreveport) LA	Gas 80 Oil	
England AFB Aero Club (TAC)	24 Hours	346
England AFB (Alexandria) LA	Gas 80 Oil	
MAINE		
Loring AFB Aero Club (SAC)	0700-2000	Ext 7284
Loring AFB (Presque Isle) ME	Gas 80 Oil	
MARYLAND		
Andrews-Bolling AFB Aero Club	0800-1900	297-9229
(HQ COMD USAF) Hyde Airport	Gas 80/100 Oil	
Clinton MD		
NOTE: Services are not available at Andrews AFB and aero club aircraft should not land there.		
MASSACHUSETTS		
Hanscom Field Aero Club (AFSC)	24 Hours	274-6100
L. G. Hanscom Field (Bedford) MA	Gas 80 Oil	Ext 5731
Otis AFB Aero Club (ADC)	Sunrise-Sunset	563-2215
Otis AFB (Falmouth) MA	Gas 80 Oil	
Westover AFB Aero Club (SAC)	24 Hours	593-3183
Westover AFB (Springfield) MA	Gas 80 Oil	
MISSISSIPPI		
Keesler AFB Aero Club (ATC)	0600-Sunset	Ext 3849
Keesler AFB (Biloxi) MS	Gas 80 Oil	
MISSOURI		
Whiteman AFB Aero Club (SAC)	0800-Sunset	LO3-3311
Whiteman AFB (Knob Noster) MO	Gas 80/100 Oil	
NEBRASKA		
Offutt AFB Aero Club (SAC)	24 Hours	Ext 3939
Offutt AFB (Omaha) NB	Gas 80/100 Oil	
NEW JERSEY		
McGuire AFB Aero Club (MAC)	0800-1700	Ext 3113
McGuire AFB (Mt Holly) NJ	Gas 80 Oil	-4057
NEW MEXICO		
Holloman AFB Aero Club (AFSC)	Daylight	437-0490
Midway Airport (Alamogordo) NM	Gas 80/100 Oil	
Kirtland AFB Aero Club (AFSC)	Prior Request	247-1711
Kirtland AFB (Albuquerque) NM	Gas 80 Oil	Ext 3486
NEW YORK		
Griffiss AFB Aero Club (AFLC)	24 Hours	330-3435
Griffiss AFB (Rome) NY	Gas 80 Oil	
Stewart AFB Aero Club (ADC)	0800-Sunset	Ext 3653
Stewart AFB (Newburgh) NY	Gas 80/100 Oil	
Suffolk County AFB Aero Club (ADC)	24 Hours	288-1900
Suffolk County AFB	Gas 80 Oil	Ext 410
(Westhampton Beach, L.I.) NY		
NORTH CAROLINA		
Seymour-Johnson AFB Aero Club	0730-1730	Ext 6255
Seymour-Johnson AFB (Goldsboro) NC	Gas 80 Oil	
OHIO		
Wright-Patterson AFB Aero Club (AFLC)	0730-1630	255-3847
Wright Field (Dayton) Ohio	Gas 80/100 Oil	
OKLAHOMA		
Tinker AFB Aero Club (AFLC)	0830-1700	PE2-7321
Tinker AFB (Oklahoma City) OK	Gas 100 Oil	Ext 2467
Vance AFB Aero Club (ATC)	0700-Sunset	237-2121
Vance AFB (Enid) OK	Gas 80 Oil	Ext 2223
OREGON		
Adair AFS Aero Club (ADC)	Daylight	924-5511
Corvallis Municipal Airport	Gas 80/100 Oil	Ext 714
Corvallis OR		
SOUTH CAROLINA		
Charleston AFB Aero Club (MAC)	0800-1700	747-4111
Charleston AFB SC	Gas 80 Oil	Ext 3614
Shaw AFB Aero Club (TAC)	0800-Sunset	Ext 2636
Shaw AFB (Sumter) SC	Gas 80 Oil	
SOUTH DAKOTA		
Ellsworth AFB Aero Club (SAC)	0800-Sunset	399-7967
Ellsworth AFB (Rapid City) SD	Gas 100 Oil	
TENNESSEE		
Arnold AFS Aero Club (AFSC)	Daylight	455-2611
Northern Field	Gas 80/100 Oil	Ext 568
Tullahoma TN		
TEXAS		
Bergstrom AFB Aero Club (TAC)	0800-1800	EV5-3586
Bergstrom AFB (Austin) TX	Gas 80 Oil	Ext 2301
Kelly AFB Aero Club (AFLC)	24 Hours	TA4-2313
International Airport	Gas 80/100 Oil	Ext 64
San Antonio TX		
Perrin AFB Aero Club (ADC)	0800-1800	Ext 504
Perrin AFB (Sherman) TX	Gas 80 Oil	
Randolph AFB Aero Club (ATC)	0900-1830	Ext 3115
Randolph AFB (San Antonio) TX	Gas 80 Oil	
Reese AFB Aero Club (ATC)	0900-1700	885-4511
Reese AFB (Lubbock) TX	Gas 80 Oil	Ext 709
Sheppard AFB Aero Club (ATC)	0800-1730	Ext 2160
Sheppard AFB (Wichita Falls) TX	Gas 80 Oil	
Webb AFB Aero Club (ATC)	0700-Sunset Daily	267-2511
Howard County Airport	0800-Sunset Weekends	
Big Springs TX	Gas 80 Oil	Ext 2162
VIRGINIA		
HQ USAF Aero Club (HQ COMD USAF)	0800-Sunset	Quantico 1000
MCAS (Quantico) VA	Gas 80 Oil	Ext 26770
		23788
Langley AFB Aero Club (TAC)	0800-Sunset	764-2743
Langley AFB (Hampton) VA	Gas 80/100 Oil	
WASHINGTON		
Fairchild AFB Aero Club (SAC)	0800-Sunset	CH4-9292
Fairchild AFB (Spokane) WA	Gas 80 Oil	
ALASKA		
Eielson AFB Aero Club (AAC)	Daylight	377-1223
Eielson AFB (Fairbanks) AK	Gas 80 Oil	
Elmendorf AFB Aero Club (AAC)	24 Hours	752-4167
Elmendorf AFB (Anchorage) AK	Gas 80/87 Oil	
CANAL ZONE		
Albrook AFB Aero Club (USAFSO)	24 Hours	83-7210
Albrook AFB (Balboa) Canal Zone	Gas 80 Oil	
PUERTO RICO		
Ramey AFB Aero Club (SAC)	0600-1800	Ext 22251
Ramey AFB (San Juan) PR	Gas 80/100 Oil	7278
EUROPEAN AREA		
Bentwaters/Woodbridge Aero Club	Daylight	WOOD3737
(USAFE) RAF Bentwater (Suffolk)	Gas 91/96 Oil	Ext 457
England		
Bitburg AB Aero Club (USAFE)	Daylight	Ext 7410
Bitburg Germany	Gas 80 Oil	
RAF Wethersfield Aero Club (USAFE)	24 Hours	Ext 2478
RAF Wethersfield (Essex) England	Gas 100 Oil	
Sembach Air Base Aero Club (USAFE)	0800-Sunset	06302-7-7630
Sembach, Germany	Gas 115/145 Oil	
Torrejon Air Base Aero Club (USAFE)	0800-1700	Ext 5217
Torrejon Air Base, Spain	Gas 115/145 Oil	
Wheelus Air Base Aero Club (USAFE)	Daylight	Ext 3311C
Wheelus Air Base (Tripoli) Libya	Gas 100/130 Oil	
PACIFIC AREA		
Clark Air Base Aero Club (PACAF)	0600-1800	Ext 44201
Clark AB, Philippines	Gas 80/100 Oil	42293
Hickam-Wheeler AFB Aero Club (PACAF)	0700-1900	667-161
Wheeler AFB (Oahu) Hawaii	Gas 80 Oil	
Kadena AB Aero Club (PACAF)	Daylight	Ext 24296
Yontan Airfield, Okinawa	Gas 115/145 Oil	24460
Misawa AB Aero Club (PACAF)	24 Hours	Ext 3881
Misawa AB (Honshu) Japan	Gas 115/145 Oil	

(Information prepared from "Status of Aero Club Aircraft and Operations" as of 30 September 1968.) ★

THE UBIQUITOUS HAIL

If you ever see an airplane or a car that looks like it has been worked over by a ballpeen hammer, you can be sure that a hail storm has been at work.

Despite all our modern equipment and the latest forecasting techniques, Air Force aircraft still receive hail damage in flight. There were 19 incidents reported last year from April through October. Hail is enough of a problem to cause concern, and every pilot should be aware of the damage that hail can cause and should know something about hail, primarily where and when to expect it.

The editors set out to do an article on hail and in the course of research came across a 1961 story in *Aerospace Safety* titled "Ubiquitous Hail," by a Captain Leo S. Bielinski who was assigned to Air Weather Service. That article was so good that we gave up doing a new one and are presenting most of the original here, with annotations in italics. Captain Bielinski studied 272 hail incidents and 541 PIREPs of hail.

Here are some of the facts uncovered in my survey. Fifty-six jet aircraft were damaged by hail during the four-year period 1952 through 1955. From 1956 through 1959, the number increased to 76. *(We don't seem to be improving.)* While this reflects an increase in jet flying, it also shows that the hail problem has not lessened with higher-flying aircraft. *(Of the 19 reported April through October 1968, only three involved reciprocating engine aircraft.)* Almost half of the 272 damaging hail incidents occurred at or above 20,000 feet, as shown in Figure 1. Note that the maximum altitude of the hail encounters gets higher as the year progresses, reaching a peak in about June with an isolated case at 44,000 feet in September. It appears that, for the months of January, February, November and December, the possibility of encountering damaging hail above 20,000 feet is quite remote, at least in the United States. It should be noted that hail occurs most often in May and June. So, during the storm season, if this "Command Jockey" can't fly over it, and he can't fly under it, then I say it's ubiquitous in the vertical!

One surprising item brought out by the survey was that nondamaging hail *(probably less than one-half inch)* rarely occurred at or above 20,000 feet. Practically all hail reported at these altitudes caused some sort of damage. Now one might suspect that "Jet Jockeys" simply ignore the reporting of nondamaging hail. But such is not the case; for it was shown that below 20,000 feet they report nondamaging hail at about the same proportionate rate as pilots of conventional aircraft. Therefore, it's a pretty good rule to assume that any reported above 20,000 feet is capable of "clobbering" your machine, but good! *(Last year the altitude range for hail damage was from 1400 feet to above 30,000 feet.)*

Can you imagine what a five-inch diameter chunk of ice would do to your machine at 29,500 feet? That's enough ice for several glasses of "scotch on the rocks."

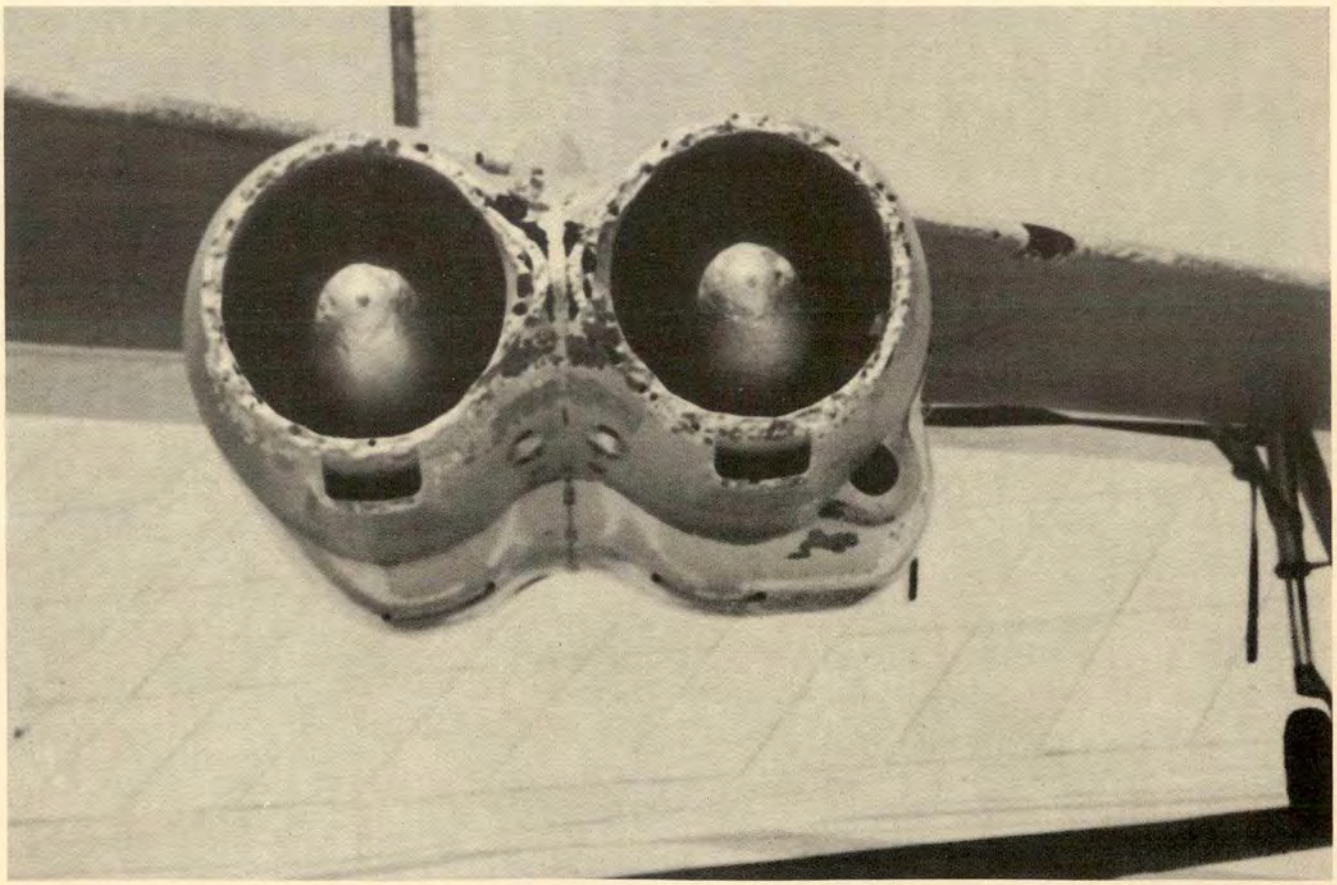
Then there are other reports of four-inch hail at 31,000 feet, three-inch at 37,000 feet, and two and one-half inch at 25,000 feet. These incidents occurred at temperatures well below zero degrees Centigrade; however, there is reason to suspect that the largest hail size occurs near zero degrees Centigrade. This is based on the fact that five out of six reports of four-inch hail occurred near this temperature, which is the altitude range from 11,000 feet to 15,500 feet.

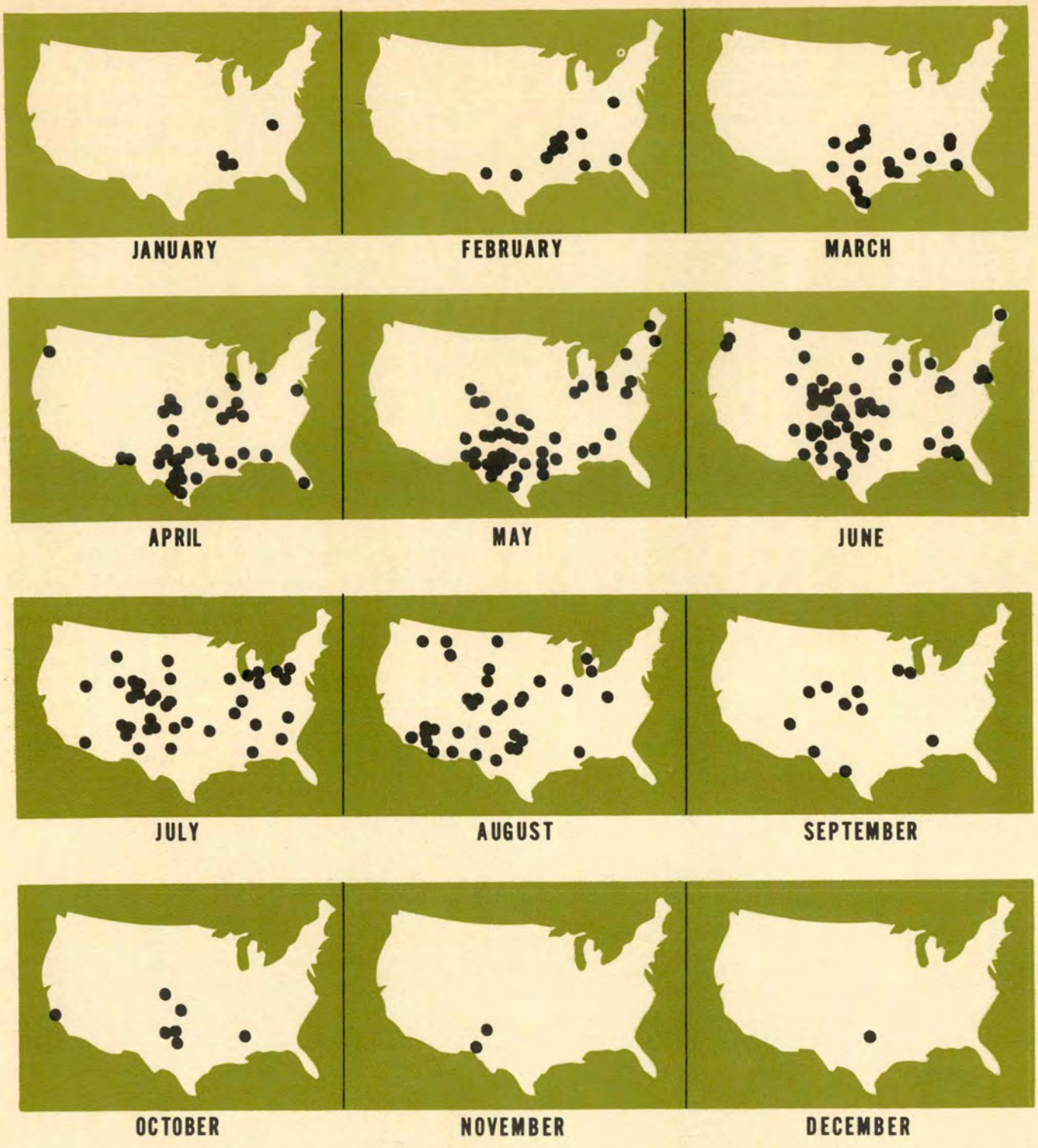
What sizes of hail constitute damaging and nondamaging hail? About 78 per cent of the damaging hail reports for jets and about 70 per cent of the damaging reports for conventional aircraft listed a hail size of three-fourths of an inch or larger in diameter. Most of the nondamaging hail reports gave a size of one-half inch or less in diameter. Thus, a damaging hail size probably begins around three-fourths of an inch. *(Damage ranges from very minor—dents in plastic nose sections, for example—to very serious. Last October a T-38 received a broken windshield and broken glideslope antenna; both wings and the vertical and horizontal stabilizers of a VT-29 were damaged. Aircraft deliberately flown into hail areas have been severely damaged.)*

While attempting to circumnavigate or to top thunderstorms, pilots frequently encountered hail in clear air, adjacent to the build-ups, or from overhanging clouds. In the period covered by the study, 23 such incidents were reported, about 87 per cent of which occurred below 20,000 feet. Sometimes you can't fly over hail, under it, or even around it. And that's 3-D ubiquity!

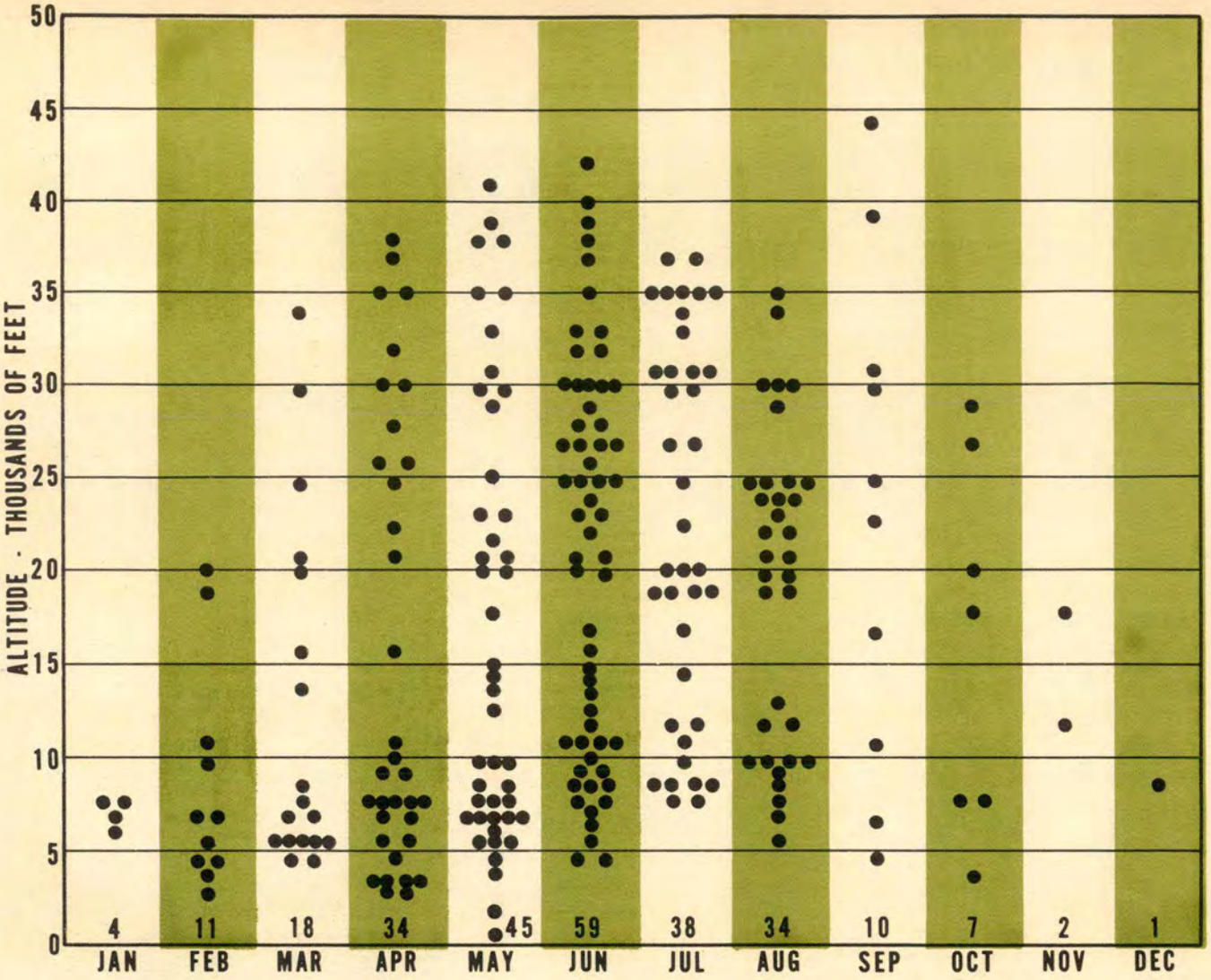
From a small area in the southeastern United States in January, the aerial extent of the damaging hail aloft spreads northward and westward as the year progresses. The northernmost extent of the damaging hail aloft is probably reached in August, after which a southward recession takes place. The few hail reports in the northern United States may not present a true picture of the hail risk there due to less flying in this region. The rare occurrence of damaging hail in the Gulf States during the summer months, on the other hand, is undoubtedly representative of meteorological conditions there.

Damage to B-52 engine pods caused by hail. Largest hail occurs at approximately zero degrees Centigrade, most often at altitudes between 10,000 and 18,000 ft.





PIREPs are tremendous aids for avoiding hail, and all pilots should report immediately to METRO all hail encounters. From the 541 PIREPs of hail for the period covered by the study, it does appear that better descriptive terms for hail are required. For example, a pilot reports "heavy" hail. Does this mean numerous small hailstones or a few large size hailstones? Would this be damaging to your aircraft? "Intense" hail might be taken to mean numerous small hailstones or large size hailstones. What kind of hail would a pilot anticipate upon receiving a report of "moderate" hail? These are very common reporting terms for PIREPs, but perhaps better descriptive terms might be "few large hailstones with one-inch diameters," "intense small-size



hail," "intense nondamaging hail," or "damaging hail," etc. In all cases the type of aircraft and the altitude should be specified in pilot reports of hail.

The best procedure for avoiding hail aloft is to heed the severe weather warnings and check with METRO on any ominous-looking situation. It is not possible to avoid hail in all instances; however, certain considerations, which are summarized below, may aid in minimizing damage:

• During the winter months, most of the damaging hail aloft can be expected in the southeastern portion of the United States. During the spring and summer months, the region between the Rocky Mountains and the Mississippi River is highly favored. In some cases the vertical extent of hail may be as high as 70,000 feet.

• Any forecast or report of three-fourths inch hail is *most likely* to be damaging hail and any hail reported above 20,000 feet *may* be damaging. Due to decreased convective activity, damaging hail aloft is less likely during the hours between 2300 and 0900 local time.

• Damaging hail aloft rarely occurs during the late fall or early winter and damaging hail above 20,000 feet during January, February, November and December is not too likely. The largest hail can be expected near zero degrees Centigrade, or in an altitude range from 10,000 to 18,000 feet.

• *Allow plenty of leeway* in circumnavigating convective type clouds.

• *Report all hail encounters immediately to METRO.* Aircraft Weather Incident Reports should be submitted for all hail encounters, particularly any damaging hail. But the clincher is that our aircraft are still being clobbered simply because hail occurs unexpectedly in many different places. Hail is ubiquitous! ★

Following lead down through thick, wet pea-soup, and running short of fuel, you had better have a generous portion of advance...

PLANNING!

Maj Douglas L. Thomas, Tactical Air Reconnaissance Center, Shaw, AFB, S. C.

Our mission was to deliver an RF-4C to an IRAN facility. We were allowed 10 days for the TDY, in case we ran into unforeseen difficulty. The first leg was about 1000 NM—well within the RF-4C fuel range. That is, provided we went direct, which we didn't. And that is one point of this narrative—planning.

We had ample time for flight planning and coordination with flight-following facilities enroute and at the IRAN destination. All items were planned and briefed for an uneventful flight and R&R. Coast cut point was channel 34, Cam Ranh Bay, where we were to meet a flight of F-4s from Danang. We could not proceed across the water without another aircraft along for rescue and survival considerations. In addition, we had a "Duck Butt" aircraft to help us across. He was located about two-fifths of the way across. Once we had UHF radio contact with him, he would lead us on, then we'd pass him and he would follow us on to Clark AB in the Philippines.

Everything was set—takeoff time, altitude for join-up, airspeed, abort procedures, ICAO clearance and so on. Even though most of the briefing was accomplished on the telephone, we had briefed all details including those for recovery at Clark. We had never met the other flight members, nor have we seen them since.

We departed at the planned time in order to make the join-up. During climbout ATC vectored us SSW instead of ENE which was our desired course. About 30 miles SW of the base we lost radio contact with ——— radio. We were in the clear and turned on course, changing frequency to the nearest CRC. Things went smoothly until we heard ——— radio calling us. We tried several of the frequencies they suggested and eventually re-established radio contact. We could tell that the controller was rather perturbed at us because he cancelled our IFR clearance.

We proceeded to our rendezvous point VFR and made radio contact with channel 34. The flight of F-4s from Danang had not reported in, so we orbited about 20. With a couple of calls through the UHF/land line facilities we learned that the flight was still on the ground with maintenance difficulties. In order to make a faster join-up we proceeded north to a point closer to Danang.

Eventually the flight was airborne and we switched to their UHF frequency. Join-up was successful, leaving us with about 9000 pounds of fuel. We recomputed and found that we would have adequate fuel reserve at Clark. Weather was supposed to be clear at our altitude, but it wasn't. I hadn't had any formation experience for about one year, so I had quite a time holding position. We were in and out of clouds for an hour and fifteen minutes.

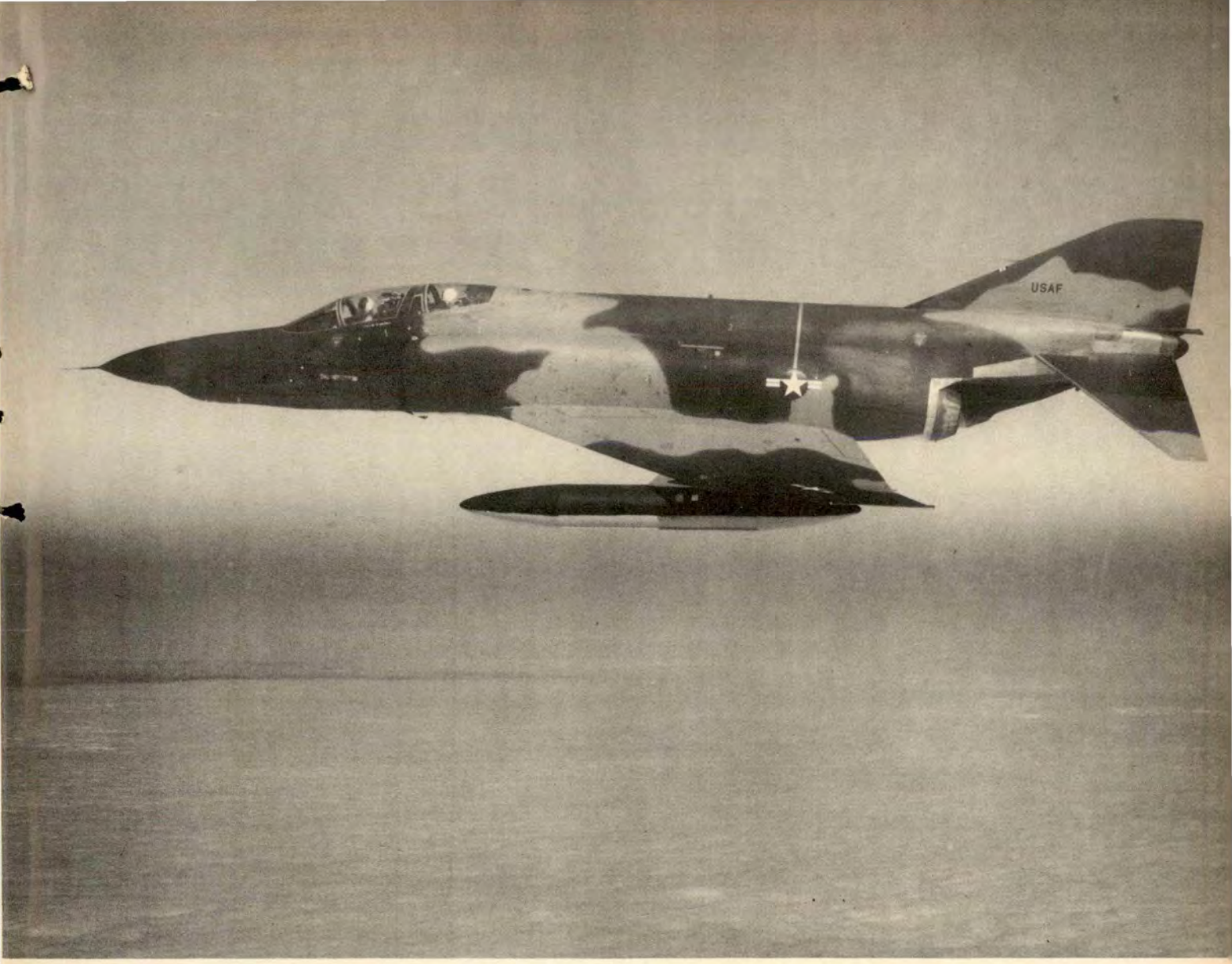
The flight was making good time, but using a little extra power, so I informed Lead of our fuel state. He climbed to a higher altitude and throttled back to normal cruise.

We made the letdown point with 3000 pounds of fuel which was OK for the weather conditions—2000 feet, 10 miles, winds 15 knots—rain showers in the area — no problem.

We got clearance for a formation penetration which seemed to be no problem at that time. Approach Control was vectoring us for a straight-in GCA.

The flight entered the cloud tops about 12,000 feet. The clouds were thick, dark, and wet — like cold pea soup.

A left turn to follow a vector—the second heavy cloud—10 seconds—no problem. Back in the Nr 2 slot, I asked Lead to turn his position lights to full bright. Then the next cumulus—we're close—"I've lost you, Lead"; tighter turn, throttle back, then in the clear. "OK, Lead, Two is back on your wing;" closer now—another heavy cloud. "Lead, Two has lost you, Number Two is breaking out." A few seconds pause. "Four has lost you, Lead; breaking out;" then, "Number 3's lost you, Lead, breaking out, too."



Four aircraft, and three of them are disoriented. Hairy? You bet! Full military power, hard turn, climb, then on top, in the clear. About 10,000 feet. No sweat, still 2500 pounds. But where are the other three? We can hear Approach Control. They are doing the best they can with the situation. We remain silent until the radio is clear. Down to 2300 pounds, better call. It's VFR beneath the clouds anyway so no sweat.

We find a clear area and get beneath the clouds. Approach Control is vectoring us away from the field. We wanted some concrete and headed for it. Soon GCA picked us up on their radar and vectored us to a touchdown. Seventeen hundred pounds, in the chocks. Logged three hours and five minutes. Only one F-4 near our parking area. We proceeded to base operations. The other flight members had landed safely and gone to the BOQ or wherever —we never saw them again.

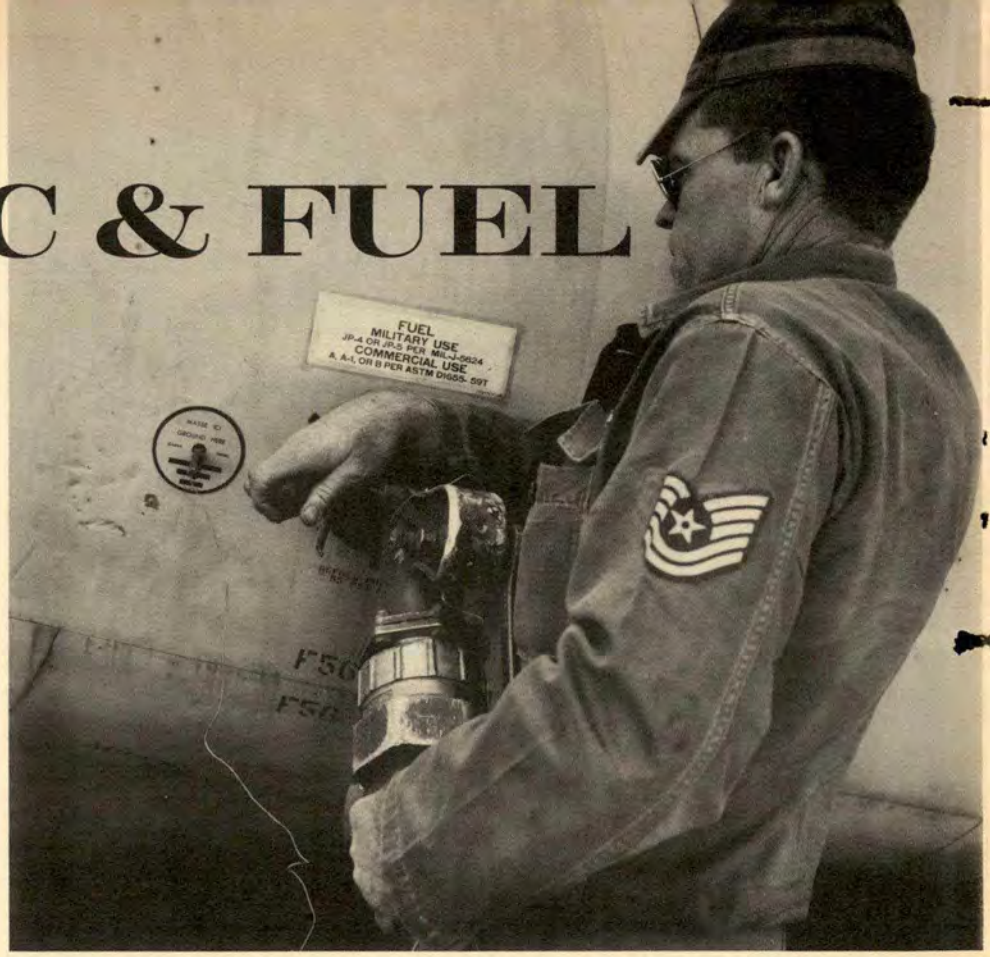
Looking back on the flight now, we realize it could have ended differently, and almost did. Several things could have caused this mission to be unsuccessful. To mention only a few which could have contributed:

- Non-current in formation flight
- ATC/lost radio procedures
- Weather penetration/approach with four aircraft
- Low fuel status.

You can very easily identify with some of the mistakes listed, either through a personal experience or maybe in a supervisory capacity. In addition, you may well recommend thorough training, good planning—follow the plan, efficiently, safely.

The procedures used in accomplishing this mission have long since been modified. Suffice it to say, that at least one OHR was submitted as a result of this mission. ★

STATIC & FUEL



Most Air Force gas turbine (jet) engines are designed to use JP-4, a blend of kerosene and straight run gasoline. Any type of fuel can be hazardous when handled in a transportation system, because an ignition source may be introduced at the receiving tank when the area above the liquid is optimum for combustion. JP-4 is more hazardous as compared to AV GAS 115/145, because of its lower volatility and electrostatic generating tendencies. During aircraft refueling, for example, the air fuel mixtures are predominantly in the explosive range, and only a spark is required to bring on a disaster. Maximum precautions should be taken by all concerned to assure safety to personnel and property. The Air Force places special emphasis on proper grounding and bonding procedures to maintain electrical continuity. During refueling, the sequence of grounding servicing equipment and the aircraft serves to reduce electrostatic sparking in the vapor space above the fuel.

Technical Orders, including aircraft flight manuals, outline the procedures for bonding and grounding aircraft and servicing vehicles. For years identified static grounds, flexible cables and battery clips have been used for this purpose. But the system has never been entirely satisfactory. The battery clips came in various sizes, as did the cable, and were connected to convenient places on the aircraft. But sometimes there was no electrical continuity because the clips were attached to non-conducting parts. And the clips had other deficiencies: frequently they damaged aircraft control surfaces, or they came apart or disconnected from the cable and fell to the ground where they caused tire cuts or were sucked up and ingested by jet engines. These operational deficiencies were magnified in Southeast Asia during quick turn around missions when the aircraft required concurrent refueling and rearming. The inadequacies of the procedures were:

- The battery clips were fragile and when broken would cause extensive damage as well as fail to complete ground connections.
- Camouflage paint acted as an insulator between the hardware and the air frame. No electrical continuity could be maintained.
- The lack of adequate grounding points on assigned aircraft. Example: the A-1E had no receptacles available for grounding, and the F-100 and F-102 had only one grounding point. Concurrent servicing could not be accomplished safely; therefore, servicing time would be extended and the mission assignment jeopardized.
- Real estate at air bases in SEA is limited and frequently the aircraft are parked with overlapping wings. Any ignition of flammable vapor

or ordnance by static electricity or improper grounding could create a catastrophic condition.

• Grounding receptacles, quantities, locations and methods clearly dictated a need to standardize grounding procedures on all aircraft in inventory and acquisition.

Recognizing the problem, Headquarters Air Force Logistics Command established a project to standardize aircraft grounding to assure uniformity. The Directorate of Air Force Aerospace Fuels was designated the office of prime responsibility since it is prime for a publication on static electricity in refueling systems.

An official Air Force Static Grounding Team was chartered in 1967. It is comprised of scientific and technical personnel experienced in dealing with electrostatic problems. The primary objective was to standardize grounding systems in order to reduce or eliminate static electricity hazards during aircraft servicing, i.e., refueling, rearming, testing.

The battery clip was eliminated by selection of a female electrical receptacle to be mounted on each aircraft. All aircraft systems managers have completed engineering and are now modifying their aircraft, either during inspection and repair or with field modification kits. The target date for completion of this project is December 1969.

As an integral part of the project, aerospace ground equipment modifications will be completed well ahead of the aircraft target date. Systems Command, the activity responsible for aircraft in acquisition, has taken action on commercial contracts in accordance with Military Specification MIL-E-6051D, "Electromagnetic Compatibility Requirements, Systems."

For the Air Force program to be totally effective, expanded coverage is necessary so that transient Air Force aircraft landing at other military bases and civil airports, will find these new grounding devices. The Army and Navy have initiated a standardized aircraft grounding program using the same electrical fixtures and procedures. The Air Force and Navy will concentrate their efforts on fixed winged aircraft, whereas the Army will devote their attention to helicopters. The effort will require world-wide coordination and expansion into civilian agencies. In the interim, an adaptor will be required to make the system usable at other than military bases.

Standard grounding system, plug and receptacle such as shown here in photo of C-141. Program seeks to standardize grounding among military services, civilian agencies, foreign nations.

The next facet of the program will be a world-wide coordinated effort to include North Atlantic Treaty Organization (NATO) aircraft. The decals to be used to identify the static grounding points on the aircraft have already been coordinated with NATO. The same NATO design will also be designated for use on aerospace ground equipment.

If you haven't noticed, landing gear static ground straps have been removed from all Air Force aircraft. An engineering evaluation proved these drag straps to be of marginal value in removing static electricity build-up on the aircraft. Their removal resulted in an Air Force cost reduction of $637,000 for 1968.

Higher refueling rates and improved handling systems will be required for the air bus and supersonic type aircraft. The latter will employ petroleum as fuel and as heat exchange media. Further, the cleaner fuels for high performance aircraft will require extended relaxation times and updated methods for dissipating electrostatic charges. Measures must be incorporated in refueling and defueling procedures for hazards protection. These updated requirements must be based upon validated engineering data rather than the present state of the art assumptions and individual theories.

This article was adapted from a paper "Static Electricity in Air Force Refueling Systems" by J. B. Godwin, Jr, a mechanical engineer with the Air Force Aerospace Fuels Directorate, Kelly AFB, Texas. The Directorate of Air Force Aerospace Fuels is responsible for assuring that qualified fuels are procured and transported from the source to the skin of the aircraft through a wide variety of equipment and operating conditions. The Directorate also provides guidance on static electricity controls for all types of Air Force fueling systems. ★

URs and YOU

While materiel deficiency reporting is thought of as a maintenance function (quality control), all young men on their way up should know something about the system. Who knows when one will find himself assigned to a maintenance or ops job that will require such knowledge? Or, assignment to an accident investigation board may be one of your next tasks. Knowing the difference between an UR, TDR or QCDR will be handy knowledge.

The author is an expert on the system and has many years of experience on the receiving end of these reports. Read what he has to say and be prepared to demonstrate your knowledge when next someone mentions Critical Safety Hazard EUR.

Donald V. Leavitt, Directorate of Materiel Management, OOAMA, Hill AFB, UT

The Materiel Deficiency Reporting System as outlined in Technical Order 00-35D-54 is probably one of the most used (and many times misused) systems in the Air Force. TO 00-35D-54 is a short, clearly written document which outlines the criteria to be used when submitting an Unsatisfactory Report (UR) or Quality Control Deficiency Report (QCDR). The system provides for reporting unsatisfactory conditions which adversely affect equipment performance or safety.

Being on the receiving end of these URs and QCDRs has prompted me to offer a few comments and suggestions to field personnel preparing these reports.

When a failure occurs, the Quality Control Specialist should investigate it thoroughly. Actions to be taken include finding out all the circumstances leading up to the failure; checking all the other aircraft on base for similar or pending failures and including results in the narrative; insuring that corrective action is not already published in TO changes or TCTOs. He should take pictures if it will help to illustrate the problem, and make sure that maintenance was properly performed prior to the failure—such as correct torque, pressure or assembly. He should write the UR or QCDR giving the complete details of the failure and include serial numbers, date of manufacture, contract number, last overhaul and agency, and any other identifying data.

If an exhibit is involved, it should not be disassembled or otherwise disturbed in any manner that could destroy evidence of what caused the malfunction or failure. The TO specifically states, "Under no condition will any disassembly or repair be accomplished on the exhibit by field activities pending disposition instructions. When directed, the item will be forwarded to the investigating agency in the exact condition as when it was found deficient."

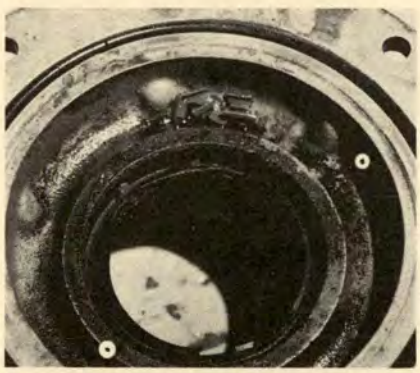


Photo of section of engine starter, one of several that failed because seal tore apart allowing oil leak.

Failure to comply with these instructions results (in most cases) in wasted time and effort, because evidence of the failure or malfunction may be lost or destroyed. Some exhibits received have obviously been disassembled and improperly reassembled with parts missing or misassembled. So *don't* tear down an exhibit; and if a part is being submitted for metallurgical analysis it should *not* be cleaned except as directed by TO 00-35D-54. Fractured surfaces should be protected from further damage.

When shipping an exhibit be sure it is properly identified, and follow up with supply personnel to insure it gets shipped. Many UR investigations have had to be terminated because the exhibit was never received. It is extremely difficult to find out why an item failed if it cannot be examined.

Each EUR must be properly categorized as Flight Safety, Mission Essential, etc. Many EURs are coded as a "Critical Safety Hazard," yet the reporting activity has taken no action to ground or restrict the use of the aircraft or equipment involved. The TO specifically states that a UR determined to be a Critical Safety Hazard requires all identically equipped aircraft and missiles possessed by the submitting activity to be grounded

or restricted in use. In most cases this is not done. The point is that assigning a higher category than is justified to obtain priority handling of your particular problem only delays corrective action on *true high priority* deficiencies. The maintenance officer has the final responsibility to insure that the UR is necessary, accurate, properly categorized and that any recommendations are realistic before releasing the UR for transmission.

Many times a formal accident or incident report is provided to the Inventory Manager or System Manager technician for review and comments concerning a materiel deficiency when no UR was ever received. In these cases they find it very difficult to comment on the materiel failure aspect when they were not provided the opportunity to investigate the problem. So when your activity has the misfortune of having an accident or incident in which materiel failure is a factor, be sure you submit an EUR. The TO clearly states that EURs *will* be submitted on items involved in accidents or incidents when materiel deficiencies are involved.

During investigation of an accident or incident where materiel failure is known or suspected, it is appropriate to have the president of the investigation board request technical assistance from the applicable Item Manager (IM), System Manager (SM) or both for on the spot analysis. Another way of insuring that materiel failures resulting in accidents or incidents are investigated on an expeditious basis would be to contact the appropriate IM or SM Technical Services Branch by telephone and arrange to airlift the exhibits to the AMA for a priority teardown deficiency report (TDR) or metallurgical analysis. This type action will expedite any corrective action deemed necessary to prevent recurrence.

A word of caution to all maintenance troops. If, during routine maintenance, you find any unusual conditions such as abnormal wear, chafing, etc., that cannot be corrected through normal maintenance procedures, be sure to report it to Quality Control for investigation. A recent aircraft accident resulting in total loss of an aircraft was caused by two parts chafing together. During the accident investigation it was found that the condition had been previously found on several other identical parts but nobody was advised nor was a UR submitted. If the condition had been reported previously, the accident could have been prevented.

Quality Control Deficiency Reports (QCDRs) are relatively new in the materiel deficiency reporting system and I'm sure they are not yet thoroughly understood by everyone. This is illustrated by the fact that URs are received that should be QCDRs and QCDRs are received that should be URs. It all boils down to the fact that a QCDR is appropriate if a deficiency can be traced to *poor workmanship during manufacture or repair.* If an item has been in service for sometime before a deficiency is found, and a question exists as to whether workmanship is involved, a UR would be more appropriate.

One complaint heard quite often is that activities never get an answer on QCDRs. Routing of these to the wrong action agency seems to be the problem. So when you submit a QCDR be sure to send it to the correct action agency. QCDRs on new items or items repaired by a contractor will normally be routed to a Defense Contract Administration Services Region (DCASR) for action. QCDRs on items repaired within the Air Force will normally be routed to the Maintenance Quality (MQ) organization at the Specialized Repair Activity (SRA). In any case, be sure to refer to the TO for specific instruction. Misrouting not only delays an answer, it sometimes causes it to get lost. So if you don't get an answer within 30 days, follow up and find out why. *Remember:*

Do submit a UR when justified.

Don't submit a UR if a QCDR is appropriate.

Do submit a UR when a materiel failure causes an accident.

Don't submit URs on problems caused by improper maintenance.

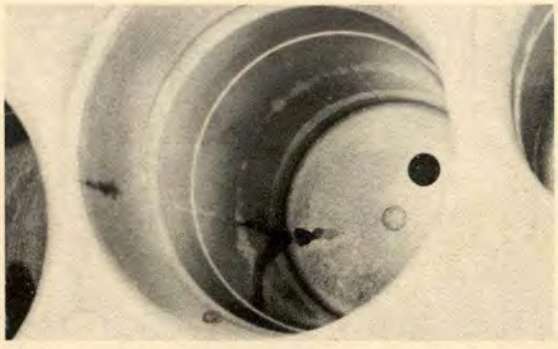
Do assign the proper category to URs (Critical Safety Hazard, Mission Essential), and routing.

Don't disassemble or otherwise tamper with UR exhibits.

Do follow up to insure exhibits get shipped.

Don't submit a UR if the problem has been investigated and corrective action already published.

Do follow up on QCDRs. ★



During aircraft accident investigation crack in aileron power control cylinder was found. Crack, determined to have resulted from materiel failure, caused system failure and subsequent accident.

AEROBITS

AGAIN, AGAIN and again it keeps happening! The T-33 pilot took off, cruised at flight level 330 to a nearby base, and shot three low approaches. He then entered normal VFR traffic and flew two closed patterns. A final closed pattern was performed for a full stop landing. During this approach several witnesses observed his bird on final and in the flare without the gear extended. The bird slid to a stop on the chaff tanks and speed brakes. How did it happen? Well, the pilot failed to perform the before-landing check according to TO IT-33A-1.

A little over a week later an F-102 slid to a noisy, wheels-up halt after shooting several low approach GCAs. The pilot stated that he thought he had rounded out high and then suddenly realized the gear was not down. He immediately advanced the throttle, but it was too late. He touched down and killed the engine. Operator error in that the pilot failed to lower the gear prior to landing.

HOW IMPORTANT IS the rule of thumb which says "Always refer to the tail of the bearing pointer for information pertaining to station radials?" To make a bad pun here's a true tale which emphasizes the importance of that tail. A T-38 solo out and back requested vectors to VFR pattern entry at home plate. When asked for radial and DME, he gave 040 degrees and 33 NM (he was actually on the 220-degree radial). He was told to ident and RAPCON got positive radar contact at 040 degrees and 33 NM. They then vectored him accordingly and he complied, even though he knew his exact position. The pilot thought they were turning him for traffic separation. After several turns, idents, and much confusion between control and the T-38, RAPCON assumed he was lost or hypoxic and vectored a dual T-38 to his position to bring him in. The dual aircraft never established visual contact. RAPCON then told the troubled pilot to climb to 15,000 feet for fuel conservation and better radar and radio reception. They then asked him to go to Guard channel and squawk MAYDAY. A position was established and a normal recovery made. Here's what caused the mixup:

1. The reflected or "ghost" return, and the true return, when graded on scale of 1 to 5, five being a perfect return in clarity and intensity, were both graded Code 4.

2. The fact that the pilot, when asked for radial and DME gave his bearing "To" instead of radial "From" the station, coupled with the "ghost" return on the radar scope, made RAPCON believe he was NE of the field when he actually was SW.

3. The controller did not check the other quadrants of his scope, once he had the student identified in the NE quadrant.

4. The pilot, even though he knew his exact position, did not correct the controller when he said "positive radar contact 25 NM NE of the station."

5. A test was made, using a T-38 flying an identical profile. The radar scope again had the reflected or "ghost" return anytime the aircraft was between the TACAN 265 degrees and 280 degrees radials. It also had the true return in the SW quadrant, and both returns were identical in range, azimuth (180 degrees apart), intensity, and clarity.

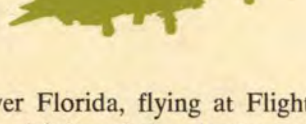
This incident ought to be ample proof of the importance of keeping the difference between radials and bearings ever present in your mind. Also, if the controller is obviously wrong, correct him; and don't waste any time doing it.

"BUT IT WAS A NORMAL LANDING, NOT A CRASH" the Aircraft Commander insisted, as he parked his B-52. His Electronics Warfare Officer had fallen asleep during the approach and woke up just prior to touchdown. When the power was reduced he thought the aircraft was in distress and, by reflex action, rotated the ejection seat arming lever to prepare himself for bailout. By the time he was fully awake, the hatch had already departed the aircraft, and he was beginning to feel a bit sheepish.

Crewmembers must remain alert during critical phases of flight; approach and landing is one of these phases.

THE SEASON is upon us; thunderstorms are taking their toll almost every day. Here are a few recent incidents to remind us of the hellish potential that waits inside the tall angry ones. A T-39 was approaching in light rain at a northern California base. One flash of lightning accompanied by a loud popping noise was observed by the crew. This crew felt no electrical shock nor were they disoriented. However, the bolt made a good sized hole in the radome.

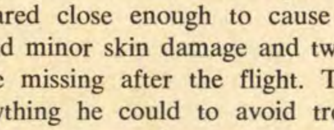
A bomber departed Berlin to return to its West German base. The pilot leveled off at 8000 feet, in solid clouds. The crew saw two lightning flashes on the trip but encountered no turbulence or precipitation. At destination they found considerable damage had been done to the nose cone, elevators and radio antennas.



An F-4 over Florida, flying at Flight Level 370 in clouds in the vicinity of thunderstorms was struck by lightning. The strike caused both generators to drop off the lines and all front cockpit lighting was lost. The rear cockpit pilot had his emergency red flood lights on and took control of the bird. He flew on needle, ball and airspeed while the aircraft commander turned his flood lights on and reset the generators. After making a safe recovery they could find no visible damage to the aircraft.

An RF-4 was flying at 8500 feet in heavy precipitation over the British Isles when the pilots heard a very loud explosion, accompanied by a bright orange flash. They were in a penetration turn at the time and leveled off at 4000 feet. The heading indicator was then noted to be 15 degrees in error, and the right engine was hung at 65 per cent rpm with the throttle in military. The left engine responded normally so they made a single engine, gyro-out GCA and recovered without further incident. On post flight runup the right engine responded normally so they logically blamed the power shortage on ice ingestion. They had observed about one inch of ice on the top of each air inlet duct. The rudder, the top of the vertical fin, the pitot tube assembly and many radio components had to be removed and replaced. What a way to end an annual instrument check!

Three F-105s were orbiting a Nevada TACAN in close formation at 7000 feet. The weather was overcast with cloud bases at 9000 feet. Lightning struck all three birds at the same time with these results: All pilots felt a firm "jolt" in the helmet area and their hands tingled. The tail hooks extended on two aircraft; the IFF failed on one; the fuel system circuit breaker popped on another and there were numerous burnt holes on two of them. They were VFR in light rain at the time.



A C-141 was approaching a North Carolina base in solid weather. It was struck by lightning passing 20,000 feet. The radar set was operating and the pilot stated that although there were a few targets on the scope, none appeared close enough to cause trouble. The strike caused minor skin damage and two static eliminators were missing after the flight. This pilot was doing everything he could to avoid trouble because only isolated storms were forecast.

So, it can happen anywhere to anybody, even you. Avoid those thunderbumpers if possible; the Hammer of Thor strikes without discrimination. ★

Mail Call

FROM GERMANY

Recently, I happened to receive an old copy of your magazine and I thought you might be able to help me.

I am a 20-year-old German with a very strange hobby (here in Germany it is strange). I'm collecting badges and insignia of the USAF and the RCAF. As those patches are very hard to get over here, my collection is still very small. It consists of about 35 American and Canadian Air Force patches. I would appreciate it very much if you would publish the following request:

Air Force members who would like to help me to increase my patch collection can write to me. I am willing to pay for and would greatly appreciate each patch that I receive.

Albert Lohr
666 Zweibrucken
Riedingerstr, 32
Germany

REX RILEY POSTER

The January magazine (page 14) brought our attention to the Rex Riley poster, picturing Rex with a blank balloon. It provided us with another and I might add, excellent, media to maintain the air traffic controller—pilot exchange of information.

We would like 10 copies of the poster for use in the following manner:

- One copy will be sent to each of our units with a pilot-to-controller directed comment in the balloon, i.e., "My life depends on your actions in this facility. Think!" These will be posted at the entrance of the radar unit or control tower.
- The remaining copies will be photographed and utilized at our instrument school presentations with pilot-to-pilot comments tailored to assist the controllers with some difficulty they are experiencing with the local pilots. For instance, "Use your full call sign when communicating with air traffic control facilities. The life you save may be mine."

Maj James F. Meyers, USAF
Chief, Navaids,
Ops & ATC Analysis Div
AFCS APO NY 09125

GEAR UP ACCIDENTS

It was astonishing to me that the Air Force still has so many gear up landings ("New Year's Resolutions," January *Aerospace Safety)*. I recalled a rather embarassing circumstance that happened to me a few years back. We were flying in the pattern to land at Madison, Wisconsin, in the old Bug Smasher (C-123), with an Aero Commander number two behind us. I made one of my precise tactical approaches, landing 2000 feet down the runway and turned off at the end. The Aero Commander had to go around, but not without relaying a few friendly words over the radio about our landing. As we taxied in toward the terminal, here he came again, this time the tower cleared him to land and he did—"gear up." Amid such a shower of sparks, and with the pilot's previous comments ringing in my ears, I wanted to say "nice landing," but refrained. I felt somewhat responsible for that accident and ever since then have wondered, why, oh why, do pilots still land gear up, with all the warning horns, lights and position indicators our aircraft now have.

I see my children watching cartoons, wherein there is always some character with a big wooden mallet rapping someone on the head—is this what we need? My computer-like brain begins to function. I read on to the next article. Colonel Szaniawski says: "What are some of the things you and I can do to reduce this wasteful loss of equipment and human lives?"

I say to myself, I am a human factors engineer. I could suggest that the Air Force buy all de Havilland Twin Otters with the gear down and welded, or we might let a big fat contract to design landing gear and struts in the shape of air foils. Then we could fly mach infinity gear down. No, there must be a better solution. Where does the pilot look when flying down final approach? Unless your name is Orville, the airspeed indicator is a good bet. Where does the flight engineer look on a big bird? He observes the primary power instruments —I hope. Can the gear be seen by a crewmember? We don't really trust these electrical systems you know. If there is a way to look at the gear, is it on someone's checklist? Or, could a simple mirror or mirrors be installed to enable somebody on the crew to check the gear with an eyeball? A shiny reflecting surface on the canopy might work.

My brain stops, I didn't drink my Gorilla Milk instant breakfast this morning. But tonight I'll snitch my son's model airplane paint and tomorrow I'll find a place near the airspeed indicator to post a sign—*CHECK GEAR*. So, one more reminder—what will it hurt?

Maj James A. Schmitendorf
21 Ops Sq
APO Seattle 98742 ★

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UNITED STATES AIR FORCE

Well Done Award

Presented for

outstanding airmanship

and professional

performance during

a hazardous situation

and for a

significant contribution

to the

United States Air Force

Accident Prevention

Program.

SSgt Frank D. Woods Maj Stanley K. Bramwell TSgt Hermann J. Barron

Capt John F. Lynch 1st Lt Joseph H. Holt, Jr.

29th Military Airlift Squadron, McGuire AFB, New Jersey

Major Bramwell and his C-130 crew had just passed the mid-point of their flight at 21,000 feet from U-Tapao Air Base, Thailand, to Mactan Air Base in the Philippines when the airplane's Nr 2 AC generator failed. Captain Lynch, copilot, shut down the Nr 2 engine to preclude an engine fire and asked Clark Airways to request an intercept by rescue aircraft. Forty minutes later, the Nr 1 generator also failed. After discussing with the flight engineer, Sergeant Barron, the problems they would face if the generator disintegrated in flight and considering the risks involved in two engine operation, Major Bramwell ordered the Nr 1 engine shut down and descended to 10,000 feet, whereupon another dilemma confronted him. The airplane's relatively high gross weight limited its airspeed to 145 knots, causing a serious control problem; to descend further, on the other hand meant penetrating a line of thunderstorms in IFR conditions with a very weak radar. At this point the navigator, Lieutenant Holt, advised the crew that Clark Air Base was an hour closer than Mactan and calculated the course and fuel required to reach Clark. Closely coordinating their efforts, Sergeant Barron and Sergeant Woods, loadmaster, dumped 10,000 pounds of fuel, and jettisoned 6000 pounds of cargo, enabling the airplane to maintain a higher airspeed at 10,000 feet and thereby alleviating the control difficulties.

As they proceeded inbound toward Clark, Lieutenant Holt successfully circumnavigated the thunderstorms, continuously monitored their fuel consumption, and provided the rescue center with all the information necessary for a good intercept. Captain Lynch related positions through other aircraft when communication with Clark Airways deteriorated and finally established contact with a GCI site in the Philippines, while Sergeant Woods prepared the airplane for a possible ditching. Approaching Clark, Sergeants Barron and Woods manually cranked down the landing gear because, with the second engine shutdown, they had lost all utility system hydraulic pressure. Lieutenant Holt closely monitored their progress to prevent an unnecessary go around, and Captain Lynch made sure that crash equipment would be standing by upon their arrival. Major Bramwell made a smooth, two-engine, no flap landing.

The example these five men set is one of exceptionally fine crew coordination, based upon highly professsional knowledge and competence at each crew position. WELL DONE! ★

MISS LIFE SUPPORT SEZ

Don't Let A Bad HOOK-UP Be Your HANG-UP!

Our thanks to pretty Miss Renee Intili for being our Miss Life Support this month.

PLEASE... BEFORE YOU TAKE THE ACTIVE MAKE SURE THOSE SNAPS, PLUGS AND BUCKLES ARE FASTENED RIGHT!!