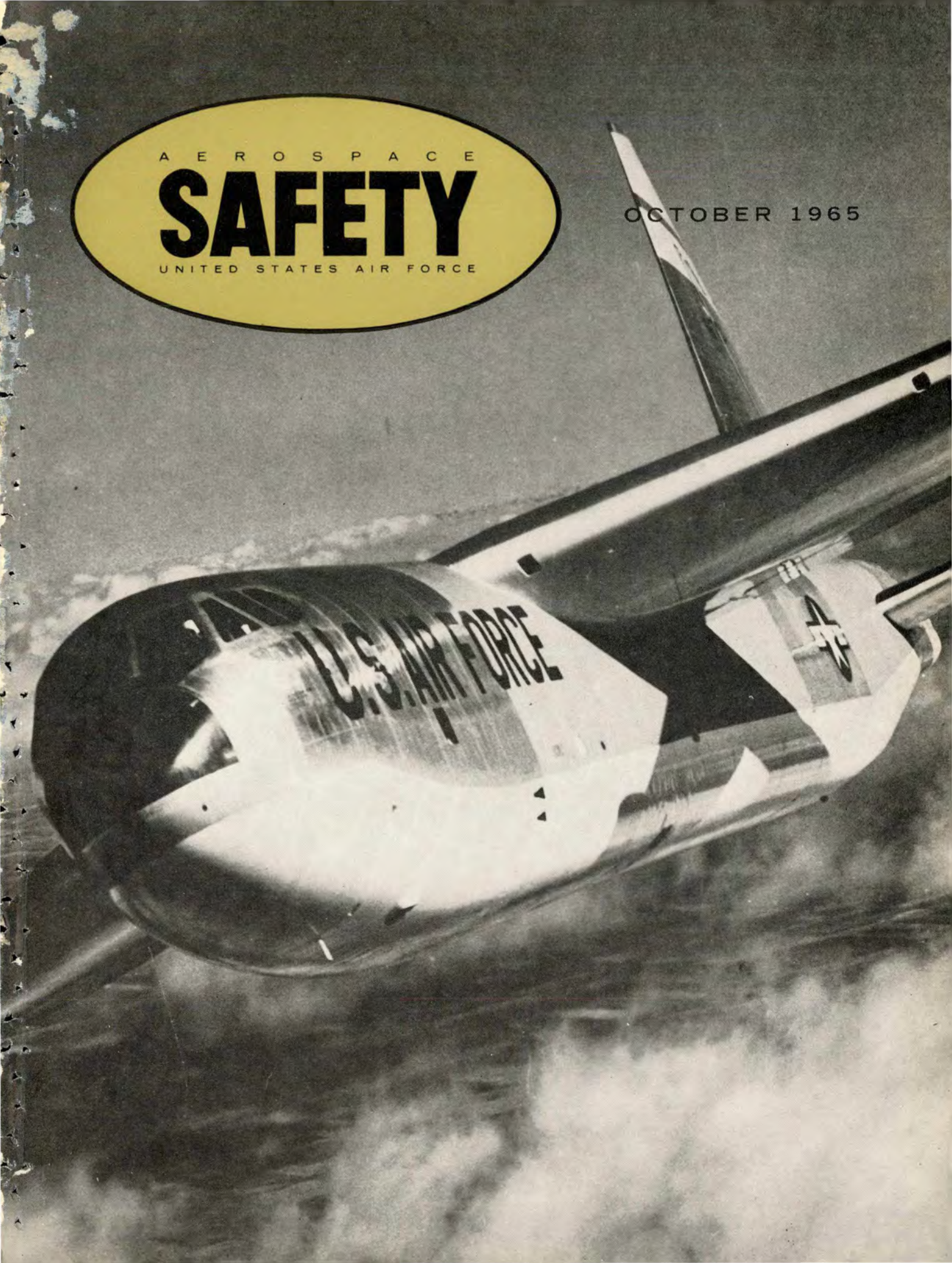
AEROSPACE
SAFETY
UNITED STATES AIR FORCE
OCTOBER 1965
U.S. AIR FORCE

AEROSPACE SAFETY

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FALLOUT

F-4C MURPHYS

Request you send the list of F-4C Murphys which has been consolidated, per the article titled "Let's Coldcock Ol' Murph!", page 13 of the August issue of AEROSPACE SAFETY. Since the 33d Tac Fighter Wing has just been activated, we do not have any Murphys, but we will be happy to pass along any new ones we find as we progress into full scale maintenance.

2/Lt Warren D. Hilton
Eglin AFB, Florida

ONE INCH TO SURVIVAL

I suppose you have or will receive a number of letters about your story "One Inch To Survival" in the August issue. After reading that the pilot received a low-low reading of 29.68 (in the opening second sentence) and then (in the second paragraph, second sentence) of the pilot indicating that he received a low-low reading of 28.68, I am in doubt as to what he did receive.

I suspect the reading of 28.68, as given in the second paragraph, second sentence, should be 29.68 to be entirely consistent.

Regardless of the above, it is an incident that has happened. Our answer to preventing this hazard at our weather detachment is this: When the weather observation is disseminated via electrowriter to using agencies, the tower operator immediately checks with his altimeter and if a significant discrepancy exists. he immediately calls the weather observer who, in turn, sends out a correction.

Maj Victor A. Schmidt
Det 12, 15 Wea Sq (MATS)
Olmstead AFB, Pa.

Someone wrote a sloppy 8 that looked like a 9. This could have been fatal. We like your method of preventing this sort of thing. Thanks for writing.

ABOUT THE COVER

A 250-ton behemoth rises from the ground, flies thousands of miles at speeds approaching the speed of sound. Sounds difficult. But it happens every day — each time a B-52 lifts off the runway. When this complex machine is mated with its highly skilled crew the whole becomes greater than the sum of its individual parts.

The following article was adapted from the South Dakota Conservation DIGEST. It is aimed primarily at hunters, but is applicable to Air Force personnel, be they out hunting or down in remote areas as a result of ejection, or aircraft crash.

LOST ? WHO, ME?

First to be considered should be proper clothing and equipment. In regard to the color of hunting clothes: for safety reasons we recommend fluorescent yellow-orange, bright yellow or red. Be sure you will be warm enough and that your feet will stay dry. Have a good cap and warm gloves or mittens. Other necessary items should include a watch, knife, compass and plenty of matches (preferably in a waterproof case). It's also a good idea to have an apple and a candy bar or two in your coat pocket.

Rule number one is to not get excited or panicky. This is the greatest single danger of being lost. Stay calm and stand still for a minute until your good judgment has complete control. No good will come of starting out blindly. In fact, an excited person, running or walking fast, can easily fall and get hurt, even drop from exhaustion or a heart attack. Often, after a little rest and calming down, things seem to fall into place and the situation is far less grim.

Assuming you are still confused, if you have a compass you should be able to chart a course and stick to it. In following a compass remember to take frequent sightings on a tall tree, mountain peak or other land mark in the direction you wish to travel, otherwise you can end up walking in a circle. Believe what your compass tells you even though you may feel that it must be wrong.

If you have no compass, but the sun is visible, of course you can get your direction fairly well from it. You can be even more accurate with the use of your watch and the sun. Hold your watch so that the hour hand is pointing toward the sun. Half way between the hour hand and 12 o'clock is south. On a clear night, remember that the two stars forming the side of the Big Dipper away from the handle, point straight up toward the North Star.

But it is an overcast day, perhaps it is even snowing and you do not have a compass. There are three other alternatives:

If there is snow on the ground the best thing to do is to back track yourself out the way you came in. I'll admit that I have done this a couple of times.

In case there is no snow, or your tracks have drifted in, then we will go to my second choice. This is simply a matter of going down hill. Each drainage you follow down will join another until you come to a trail or side road and eventually even a traveled road or highway where you can catch a ride. This down hill trick is especially good in the Black Hills.

Perhaps for some reason or other you can not use either of these two plans. Maybe you feel it is too late in the day to try to get out; you are too tired or have sprained an ankle or broken a leg. Then we must go to our third choice.

This choice involves finding a sheltered area out of the wind. Gather some firewood and settle down for the night. At about this time or before is when most lost hunters start shooting up all their shells, having heard that three shots are a signal for help. During daylight hours in particular this will probably not accomplish anything except to use up your ammunition. If there is a hunting season in progress your shots will not sound any different from the others. Of course, after dark, if you are really in need of help because you are sick or hurt, it may be the thing to do, particularly if you hear a vehicle or voices nearby.

You will probably have to stay awake all night to keep a small fire going, but you will be all right in the morning aside from being tired, a little cold and real hungry. Here is where those candy bars and apples would have come in real handy. When daylight arrives, unless your directions have straightened out, you are ready to start the downhill hike. Remember to be sure your fire is completely out.

Being lost is a serious, dangerous situation. But, by keeping your head, planning, and following your plan, you can count on resolving your problem in the safest possible way. ★

Darrell Brady, Asst Chief Warden, Div. of Law Enforcement Dept. of Game, Fish, and Parks, Rapid City, South Dakota

IFR-VFR

HAVE ONE... BUT NOT THE OTHER

Lt Col Merle B. Nichols, Directorate of Aerospace Safety

The winter morning chill caused the cattle to turn their rumps into the wind as they huddled together for warmth. Inside the pickup truck the farmer was snug with the heater full up. Slowly the truck bumped along the country road as the man peered through the swirling snowflakes, checking fences and noting the condition of his livestock.

As the truck made a turn and started down a narrow lane between two fields, the farmer squinted into the gloom trying to penetrate the flaky curtain that veiled some strange form far out in the field. He stopped the truck, turned up the collar of his heavy coat, then reluctantly opening the door, he stepped out into the cold.

Twenty minutes later he was talking to the State Police on the telephone.

"Yes, it's an Air Force plane, can tell by the markings . . . only one man — he's dead . . . "

Earlier that morning squadron pilots assembled for the 0730 briefing with the operations officer presiding. First order of business was the weather briefing:

As of 0745 the report was 6000 broken to overcast, visibility 15 miles plus. A surface low with occluded front was located northwest of the base with the low center moving southwest at 5-10 knots bringing light snow with it. The forecast was for 4000 broken, 8000 overcast, visibility 10 miles with snow. Alternate bases and the briefing officer were designated.

After calling the weapons director at Air Defense Sector Headquarters, the briefing officer announced the mission. It would be a low level – three interceptors, with a T-33 as the target aircraft.

At 0800, the T-33 pilot arrived just as the general briefing ended. His late arrival required a specific briefing just for his benefit. Emphasis was placed on the fact that the target aircraft would be on a VFR flight plan. If VFR conditions could not be maintained, the pilot was to either return to base VFR or obtain an IFR clearance.

At 0830, the T-33 pilot arrived at the aircraft, completed the preflight and looked around for his passenger, a maintenance airman. Fate was in the airman's corner – the man failed to arrive in time and departure (0910) was made with an empty rear seat.

The mission was more or less routine, and at 1000 hours the flight leader requested and received vectors for one last intercept each. As the interceptors maneuvered for position to commence their run (weather now 5000 feet MSL – 3000 feet AGL) the target pilot called, "I'm descending lower to remain in the clear."

The interceptor pilots later reported that as they continued with the last intercept, the weather, like a funnel, forced them to descend. Horizon references were lost, and the ground was obscured by fog. They could not see the T-33 target, now six to eight miles in front of them.

Interceptor Nr 1 completed his run on Nr 3, climbed to altitude and headed home. Interceptor Nr 2 descended to 4000 feet, saw the two interceptors ahead, turned to the west, climbed to altitude and, like Nr 1, headed home. Nr 3 called, "breaking off," saw Nr 1 pass off his right wing, then glanced at his altimeter, read 3000 feet and looked to his left – "hills!" Afterburner! Pull up!

He entered the overcast at 3500 feet, broke out on top and pointed the nose toward home.

Meanwhile the pilot of the target aircraft began a left turn. Witnesses later stated that the weather was variable snow showers and changing visibility. The pilot was either too low when he started the turn or he allowed the aircraft to descend in the turn.

He crashed at 1010.

The board decided that the most probable cause of the accident was "Pilot factor in that the pilot allowed his aircraft to descend into the ground during IFR condition due to disorientation, vertigo, distraction or an attempt to maintain VFR while in IFR conditions." There were other probable and possible causes, but this one sounds important to me – "Pilot factor in that the pilot violated AFR 60-16 and his mission briefing by failing to maintain VFR."

Now, let's review a bit. The interceptor pilots all came to the same conclusion at about the same time – *the weather would not allow continuation of the mission.* They altered their flight plans, climbed to a safe altitude and headed home. The target pilot also changed his altitude and direction of flight but the procedure he used, VFR, IFR, or a combination of both could never be specifically determined by the board. Nor could his final maneuver be determined.

Now if you are a pilot, let's hope that you recognize the hazards of partial visual – partial instrument flying. If you are a commander, how about reviewing your operation and make sure that you have an adequate policy that will terminate training missions and maneuvers when the encountered weather makes their safe completion questionable.

PILOTS NOTE: It has not been my intent to imply that if you're 30 minutes late for the morning briefing your succeeding flight will end in disaster. If, however, you have ever been late for an important engagement, you will recall that it usually causes deep concern, a feeling of anxiety or at least pangs of conscience. Don't let this feeling drive you into a corner from which there is no escape. ★

THE IPIS APPROACH

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

Q. Is the holding pattern entry depicted on the upper right corner of approach procedure charts directive upon pilots?

A. Not specifically. As it says in FLIP II: "Holding pattern entry procedures shown on high altitude instrument approach charts are provided as a pilot convenience." However, AFR 60-16 does require you to comply with the entry procedures outlined in FLIP II, so it is, in fact, a visual aid for a required maneuver. Incidentally, had you noticed that the group of headings depicting the TD entry sector are drawn 40 degrees on each side of the applicable tear drop heading?

Q. What is the meaning of the symbol $\overline{4000}$ on the high altitude approach chart for the James Connally VOR/ADF approach?

A. The symbol $\overline{4000}$ designates a maximum altitude for that portion of the approach. Prior to the next time you report leaving an altitude you ought to review the important format change sheet posted near the front of the latest FLIP (Terminal).

Q. The guidance for flying through Intensive Student Jet Training Areas was deleted from the Special Notices some time ago. When can I fly through these areas and what procedures must I follow?

A. There are no specific rules. The local FSS, Center, or tower can provide advisory service to the pilot as to whether or not the area is in use.

Q. I recently had occasion to study the TACAN approaches to Cannon AFB, New Mexico. Do you know why there is such a difference of minimums between TACAN #1 and TACAN #2? The minimums for TACAN 1 are 300-1 and the final approach course is 040 degrees to runway 03, or a ten degree angle. TACAN 2 has a final approach course of 027 degrees, only three degrees from the runway; yet, its minimums are 500-1.

A. JAFM 55-9 (Manual of Criteria for Standard Instrument Approach Procedures) states that "The final approach radial is that TACAN radial which will bring the aircraft to the point of interception with the runway *or* the runway center line extended. For a straight-in approach to a specific runway, the acute angle (angle of interception) formed by intersection of the final approach radial and the runway center line extended shall under no circumstances, exceed 20 degrees . . . " If you extend the center line of runway 03, you will find that 040 degrees, the final approach course for TACAN 1, intercepts the extended center line at approximately one mile, and forms a ten-degree interception angle. However, the final approach course on TACAN 2 does not cross the center line extended until you have passed the airfield. So, even though you may be in better position for a landing on TACAN #2, the criteria as outlined in JAFM 55-9 for straight-in approaches are not met and circling minimums apply.

POINT TO PONDER

Have you heard about the rule-of-thumb that can be used to determine the amount of pitch change necessary to produce desired changes in vertical velocity? TAS or Mach number directly affect the amount of vertical velocity that will result from a pitch change. A one-degree pitch change will result in a change in vertical velocity equal to the Mach number times one thousand. For example, at .5 Mach a one-degree pitch change will result in .5 times 100 = 500 feet per minute. There are numerous applications of this technique. The next time you want to demonstrate a precise descent of 1000 feet per minute glance at the Mach indicator. "Let's see, at my present Mach of .4, a one-degree pitch change will produce 400 feet per minute, so I'll change my pitch attitude about 2½ degrees to produce 1000 feet per minute." The technique can also be used during level-off from a climb. Assume you are climbing at .6 Mach and the vertical velocity is 1200 feet per minute. "Let's see, at .6 Mach a one-degree pitch change will change my vertical velocity by approximately 600 feet. When I reach the lead point for my level-off, I will lower the nose two degrees so as to establish a level flight attitude." This technique helps compensate for attitude indicators which precess or have to be reset after level-off from a climb. Try it, you will be both pleased and proud of your newly-acquired skill. ★

Lt Col Robert E. Englebretson, Directorate of Aerospace Safety

At 1530 local time the HH-43B helicopter took off on a scheduled one hour base support mission. Purpose of the flight was to perform a security check of the base perimeters and to acquaint the base commander with the location of a proposed fire pit training area and building site for relocation of the helicopter alert facilities. A local flight clearance had been filed by the pilot and a TOLD card completed. The crew consisted of the pilot and copilot with a passenger (base commander) occupying the copilot's seat.

During the first 50 minutes, the base perimeter was inspected with the aircraft remaining within five miles of the base at all times. The helicopter was then flown to one of the hardstands and landed. The building site was pointed out to the base commander and a short discussion held over the aircraft intercom. The pilot then made a takeoff to a five-foot hover and a 270-degree turn to afford a better view of the area. From a position on the east edge of the hardstand and while moving forward at approximately five knots, the pilot decided to land the aircraft on the hardstand again. During this portion of the flight there was no conversation over the intercom and no actions taken that would have unduly distracted the pilot. He decided to touch down while maintaining his forward movement. However, realizing that his rate of descent was higher than normal, he attempted to slow his descending movement by application of aft cyclic stick which raised the nose of the aircraft. As the nose came up, the pilot did not add sufficient collective pitch to slow the rate of descent because he did not think the aircraft was descending fast enough to cause an overly hard landing. The aircraft touched down in this attitude and rolled and skidded forward approximately 8.5 feet.

After the helicopter came to a stop the copilot got out and observed that the main gear shock

HARD LANDING CHOPPER STYLE

struts had penetrated the side of the fuselage. He then gave the pilot the shutdown signal.

Thorough investigation of the possibility that the passenger distracted the pilot revealed that although the base commander occupied the copilot's seat, his presence had no bearing on the accident. At no time during the flight did he fly the aircraft. He did place his hand on the cyclic control to actuate the interphone. However, immediately prior to and during the landing which resulted in aircraft damage, he was not touching any aircraft control nor was he talking to the pilot.

Sun glare was investigated as a possible distraction factor but was discounted.

The board investigated and ruled out the possibility of distraction caused by either the presence of a flight of jet aircraft or ramp traffic.

Finally, the board concluded that at the moment of touchdown the helicopter encountered ground resonance. Close examination of the main tire marks showed that the left main gear contacted the concrete first, followed closely by the right main gear. The right main gear shock strut and fitting and a small surrounding portion of the aircraft skin penetrated the fuselage after shearing the right main gear attaching bolt. This was followed by a stripping of the threads of the left main gear shock strut attaching bolt in the area of a gear fitting modification, which allowed the left main gear shock strut and fitting and surrounding skin area of the fuselage to tear loose and penetrate the cabin. The fact that the aircraft touched down with more force on the left gear than the right, coupled with the fact that the right gear penetrated the fuselage with more force than the left, indicated the beginning of ground resonance.

One of the prime conditions required to induce ground resonance in the H-43B is that the aircraft be light on the front tires or that the front tires be off the ground. Increased gross weight aggravates this condition. During this landing a nose high attitude and high gross weight conditions were present. Although the weight of the aircraft (estimated at the time of the accident to be 6100 pounds) was not heavy, it was believed by the board that conditions similar to high gross weight were induced by (1) a faster than normal rate of descent, and further aggravated at touchdown by (2) a fairly rapid rotation of the aircraft from a level descending attitude to that of a nose high attitude with simultaneous contact with the ramp.

The following facts are based on the experience of the board members in investigating previous H-43 accidents which indicates that the damage was not caused solely by a hard landing.

• H-43 accidents that have resulted in main gear damage as a result of a hard landing have had accompanying damage to one or more of the following areas: tail boom, rotor blades and flaps and auxiliary (nose) gear.

• Conversely, in several instances of H-43 accidents where ground contact was known to be severe, there was no damage to the main landing gear fitting area, although in each case there was damage to other major components.

The possibility of materiel failure in the area of the main landing gear fitting assemblies could not be ruled out. The landing gear main attaching bolt on both the left and right fitting assemblies failed upon intial ground contact.

Examination of the fitting assemblies revealed that the aircraft had been modified at a previous station with a steel strap manufactured from 1/8 inch steel stock approximately one and one-quarter inches by five inches.

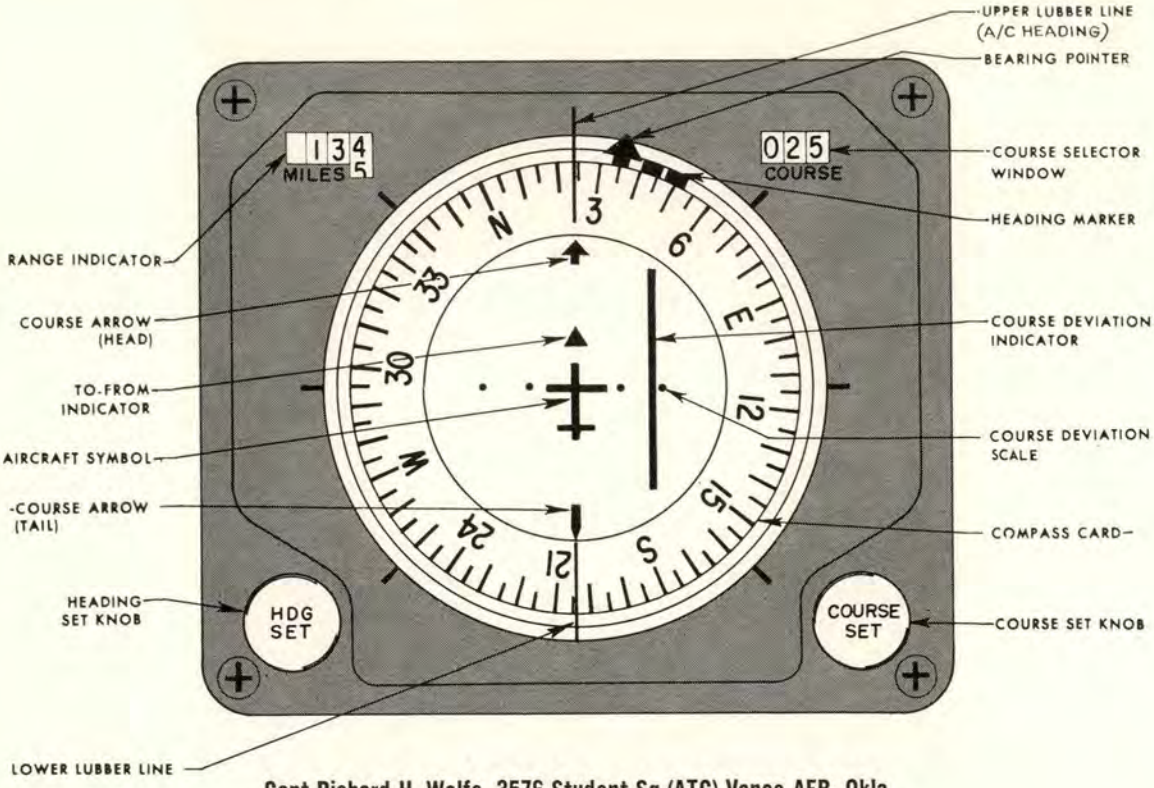
In addition to this helicopter having been used in a student training program, it had been loaded and unloaded several times aboard cargo aircraft while being airlifted to various ZI and overseas bases. Also it had suffered several shrapnel hits and explosive damage during a mortar attack. This combination of unusual stresses possibly could have weakened the main landing gear fitting assemblies.

The investigating board decided the primary cause was pilot factor because the pilot, in attempting to reduce rate of descent during landing from a hover applied aft cyclic control and an insufficient amount of collective control to cushion the landing. This action allowed the helicopter to strike the ground at a rate of descent higher than normal, creating undue stress on the main landing gear shock struts.

A contributing cause was ground resonance. The aft cyclic control applied during touchdown coupled with the harder than normal landing forces induced the beginning of ground resonance which caused the main landing gear shock strut attaching points to fail.

A possible contributing cause was materiel failure in the area of the main landing gear shock strut fitting assemblies ★

Hazy on HSI?



Capt Richard H. Wolfe, 3576 Student Sq (ATC) Vance AFB, Okla.
(Illustrations by SSgt L. W. Chisholm)

Many pilots are now flying aircraft which incorporate either the Integrated Flight Instrument System or the Flight Director System. These jocks should be pretty familiar with the Horizontal Situation Indicator (HSI) and they can find out if they know the equipment as well as they thought by filling in the six missing indications for each of the seven situations given here.

TACAN is used as the Navigation aid in these situations but remember that some designs enable VOR, ADF or ILS to be played through the system.

Now, how about the rest of the pilots who know little or nothing about these new fangled systems? Here's a picture of an honest to goodness Horizontal Situation Indicator (HSI) (above). One quick glance reveals that there's a lot of information presented on this HSI. The instrument is essentially a combination Course Indicator (ID-249) and an RMI (ID-250). The big advantages of the HSI are that it lets you "see" exactly where you are in relation to the TACAN station and in relation to the course which you have selected. It also provides for an easy and more natural cross-check. Here's some background information that should help you prior to starting the quiz:

• Compass Card: Generally operates like an RMI, aircraft heading is under the upper lubber line.

• Aircraft Symbol: Fixed, always in the same position.

• Range Indicator: Presents slant range to the TACAN station in nautical miles.

• Bearing Pointer: Gives magnetic bearing to the TACAN station. The radial that you are on would be the reciprocal of the magnetic bearing under the bearing pointed. You can "see" relative bearing in relation to the fixed aircraft symbol.

• Course Arrow: The head of the arrow points to the course you have selected (this course is repeated in the course selector window).

• Course Deviation Indicator (CDI): The CDI is ALWAYS DIRECTIONAL with TACAN and will indicate where the selected course is in relation to your position (aircraft symbol). The entire CDI will rotate with the compass card as the aircraft turns, and the CDI ALWAYS remains parallel to the course arrow. The picture displayed on the HSI is as though you were looking down and could see your aircraft in relation to an imaginary course line drawn on the ground. For TACAN (same as ID-

TRY THIS QUIZ

249 for VOR), the course deviation inner dot represents a five-degree deviation from the selected course and the outer dot a 10-degree deviation.

• TO-FROM Indicator: Appears just outside the aircraft symbol and is a triangular-shaped pointer. If the pointer points to the head of the course arrow you have a TO indication; if it points to the tail of the course arrow, you have a FROM indication. The TO-FROM tells you that the course selected, if intercepted and flown, will take you TO or FROM the station. Notice that anytime the bearing pointer is within 90 degrees of the head of the course arrow, you will have a TO indication, and anytime the bearing pointer is within 90 degrees of the tail of the course arrow, you will have a FROM indication.

As you probably have discovered, the bearing pointer, CDI and TO-FROM all function together and they give you a picture so that you can "see" where you are in relation to the TACAN station and the selected course. If you can readily orient yourself with the HSI you will be able to easily apply the desired TACAN procedure.

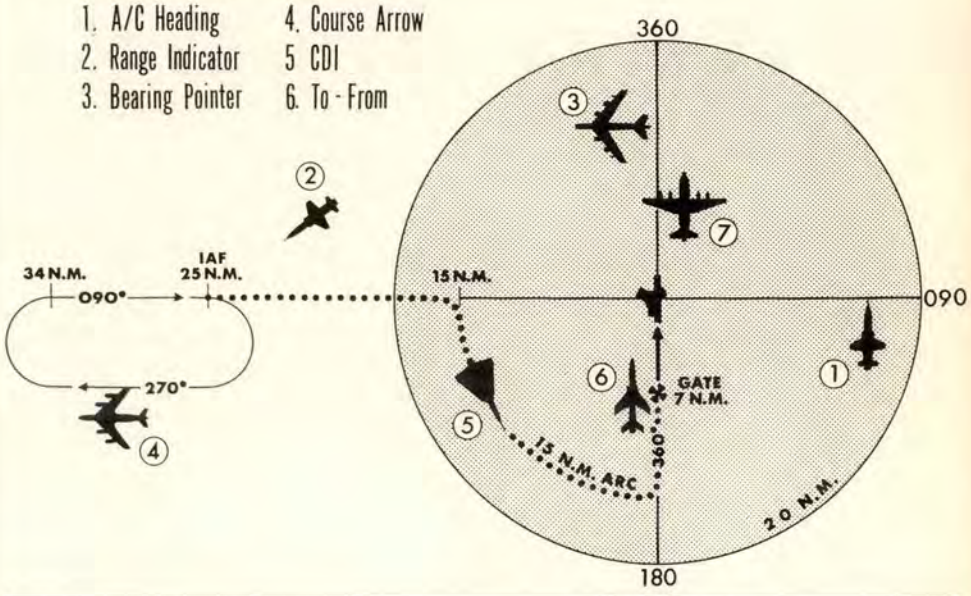
Now, let's try the quiz. You have seven situations: numbers one and three represent aircraft flying locally; number two illustrates a situation you might have if you were proceeding direct to an Initial Approach Fix or a Holding Fix. Number four places you in a holding pattern and number five represents maintaining an arc on a TACAN approach. Number six places you to the left of the TACAN gate, and number seven is a missed approach.

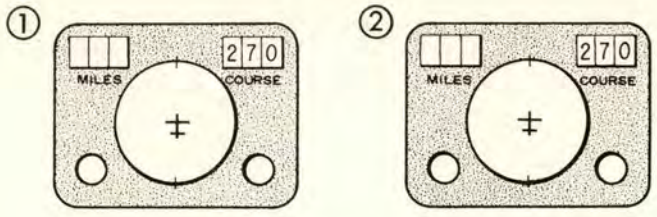
Try filling in the six missing indications for the number one and two situations and check page 10 to determine how you have done. Remember, the aircraft symbol is *you* in the miniature aircraft, and all your HSI information is in relation to the aircraft symbol.

Did OK? Finish the last five situations to tell if you are "Hazy on HSI?" (See page 13 for the answers.) ★

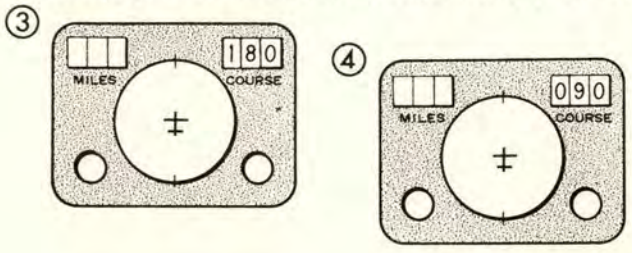
Draw in the following for each situation, using the order given:

1. A/C Heading
2. Range Indicator
3. Bearing Pointer
4. Course Arrow
5. CDI
6. To - From

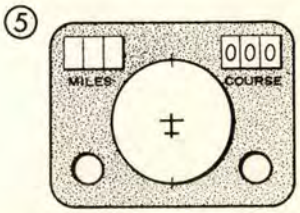


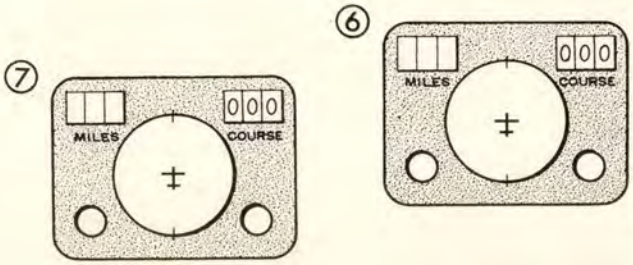


See page 10 for answers to questions 1 and 2 .



See page 13 for answers to questions 3 thru 7.





INFLIGHT WEATHER WATCH

Lt Col Jerry Creedon, AWS Liaison Officer, Directorate of Aerospace Safety

Are pilots fully aware of their inflight weather responsibilities? Recent OHRs indicate that some are not, hence the following. It is no small task to keep up with the ever-changing scene, so there may be a gem or two here that will hold the sweat factor down to a pint or so.

In a couple of similar situations recently, pilots encountered severe weather enroute. They properly called METRO to obtain the latest weather information, then diverted to alternates for safe landings. But they both considered it dangerous that they had not been advised enroute of the changes in the weather. Before we jump on the forecaster, we should realize that although weather warnings had not been issued, in both cases thunderstorms had been forecast.

Here's the point: *Pilots are responsible for maintaining their own weather watch while enroute.* With the high density traffic of today individual route metwatch is not feasible, but inflight information *is* available. Check your Enroute Supplement; it says that pilots are responsible for flight meteorological watch while enroute. It further says, "Call on 344.6 mc for updating forecasts, and FAA communications for SIGMET information."

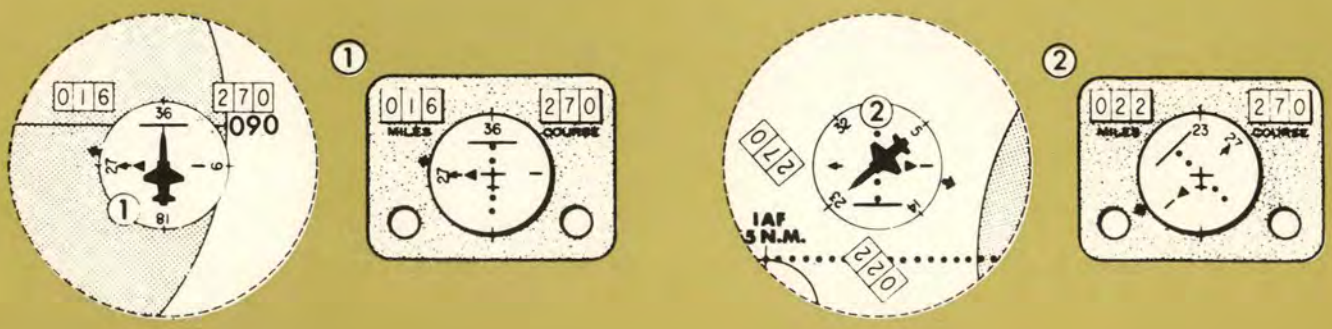
Staying ahead of the weather is part of staying ahead of the aircraft. Remember, the weather forecaster is not expected to pass advisories to aircraft after departure except when he feels that a serious hazard to flight exists and that the pilot may not have had the opportunity to obtain this information, i.e., immediately after takeoff. Bear in mind that ATC's primary responsibility is traffic control, so passing of inflight advisories cannot be assured.

Here's a brief review of what is available to us with respect to flight meteorological watch while enroute:

- METRO for military weather warnings anywhere in the U.S. and other updated forecasts.
- VOR/TACAN broadcasts for SIGMETS every 15 minutes beginning on the hour. SIGMETS cover weather within a radius of 150 NM of the FSS broadcasting.
- VOR/TACAN broadcasts weather observations 15 and 45 minutes past the hour.
- FSS stations may provide direct pilot to forecaster service with an FAA briefer in event a METRO is not within reach.

Remember that military weather warnings and the USWB SIGMETS are issued independently. Don't expect the FAA facility to have military warnings. We should use all information available to us for making safety of flight decisions; however, severe weather limitations on your aircraft are based on military warning criteria. ★

Answers to HAZY ON HSI?

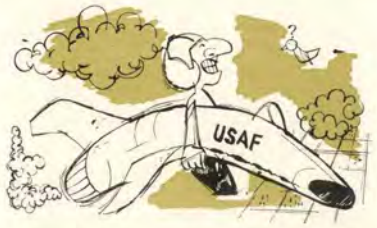


QUIT ASKING FOR IT!

A. W. (Smokey) Dean, Hq AFLC, Wright-Patterson AFB

We in the Air Force Materiel Safety Office at Headquarters AFLC review all accident and incident reports to pick out and correct materiel failures and any trends that may be developing. This is our primary business; but in reading all these reports, we also see other things, like bird strikes, maintenance malpractice, and pilot error.

Now don't get huffy, pilot error is emphasized for a reason. You jocks are, by and large, good troops but sometimes you don't pay attention. Want some examples?



Take, for instance, the F-100 driver who reduced power to 79 per cent and when he brought it back in, it took one minute and 45 seconds to accelerate to MIL. This should have scared him, but it didn't because he tried it again (instead of leaving well enough alone) and flamed out. He was fortunate enough to get an air-start on the emergency fuel control.

A B-47 type ran into stiff elevator controls after a couple of hours of flight. Instead of making a landing ASAP, he elected to shoot a few low goes. After two or three, the controls really got tense and on round-out for a full stop, he bounced that stratojet all over the airpatch 'cause both he and the co-driver couldn't pull the yoke aft of neutral.

Two jocks in a hundred 'F' ran into one of those severe yaw situations and went sliding through the sky slaunchwise for a spell. This didn't bother them too much though because they charged around in the local area for another hour.

Seems the pilot got a fire warning light and power failure, but instead of shutting down, he taxied all the way back to Operations. 'Twas about a mile to Ops. When they opened the doors, of course, there was a fire!

Here's the hairiest: An F-106B was making a wing takeoff and encountered a severe yaw toward the leader at approximately 115 knots. The IP took over, applied full opposite stick and rudder, and barely avoided a collision. The takeoff was *continued* — and the mission flown. Suppose these guys never heard of an abort?

Get the point? In case you didn't, we again emphasize:
WHEN SOMETHING UNUSUAL HAPPENS TO YOUR BIRD, LAND AS SOON AS POSSIBLE, OR ABORT. Quit asking for it! ★

THROTTLE LINKAGE FAILURE CAN MEAN

A LOSING HAND, UNLESS YOU HAVE . . .

THE ACE IN THE HOLE

Capt William O. Harris, III

ADV TM-63, APO San Francisco, Calif. 96296

Hey, you T-Bird jocks, if you tire of talking about women at the bar, here's another subject that might be to your liking. The subject is Throttle Linkage Failure. If you say that's a lousy subject for conversation you could be wrong, so bear with me a few lines more.

Recent information should restore some of the gray hairs you've acquired contemplating throttle linkage failure in the idle position.

As a quick review, the throttle can mechanically stick at any RPM. If it sticks at an RPM high enough to sustain flight the problem is relatively minor. But if the linkage fails, or breaks, the tension on the governor spring is released and the RPM decays to idle. Then you've got a giant size problem.

The Dash One says to place the Starting Fuel Switch to the manual position and you will get an approximate increase of 30 per cent RPM at low altitudes. This increase will generally be enough to get you into the SFO pattern for a safe landing. To quickly review, when the pilot places the Starting Fuel Switch to manual (with the throttle in the operating range) current is sent to the electrically controlled

Emergency By-Pass Valve which closes. This closing allows both the Main and Emergency Fuel Controls to feed to the engine at the same time, therefore the RPM increase of approximately 30 per cent at low altitude.

Now let's set the stage. You're solo in the T-Bird and you have throttle linkage failure in idle. You select Manual Fuel with the Starting Fuel Switch and you're running at about 67 per cent RPM. As you head for the field at about 180 knots, you're kinda pleased with the whole situation. You hit high key at the home base with 6000 feet of air below you with no problems. Now comes the dirty part: you misjudged the SFO and find yourself too far out on final approach. Now you've got a problem. You can't use the procedure mentioned in the Dash One concerning Manual Starting Fuel in one cockpit and Automatic Starting Fuel in the other because you've got no one in the rear bucket to help you. You quickly look again at the rising runway and decide that you're going to land very short and probably hit a ditch 3000 feet short of the overrun. This is not too appealing, so you decide to eject. Hold it a second — you've still got an Ace In The Hole! There is a procedure you can accomplish solo that will give the same results as Manual Starting Fuel in one cockpit and Automatic Starting Fuel in the other cockpit. This procedure is to select GANGSTART ON, after putting the Starting Fuel Switch to Manual, which will speed up the engine to a healthy 86 per cent RPM. Once the pilot realizes he is going to land short with 67 per cent RPM (obtained from Manual Starting Fuel) selection of GANGSTART ON can save the pattern, the pilot and the bird.

I can hear the mumbles now, "Where does that extra fuel come from?" Well, here's the answer. It comes from the Starting Fuel Control. What? I hear another mumble? "The Starting Fuel Control will not furnish fuel unless the throttle is stopcocked and in this case it's in idle." You're right, but as we all know, the T-Bird has been electrically modified and remodified so many times that it's an electrician's nightmare. One of these many modifications permits electric current to by-pass the opened micro switch on the Main Fuel Control which usually prevents use of the Starting Fuel Control with the throttle in the operating range. The current then goes to the Starting Fuel Control Inlet Valve which opens and allows fuel that is always trying to get into the Starting Fuel Control (from the Main and Emergency controls) to flow to the engine. This extra fuel accounts for the approximate 20 per cent rise above 67 per cent RPM. This same electrical malfunction is set up when you place the Starting Fuel Switch in the front cockpit to Manual and the Starting Fuel Switch in the rear cockpit to Automatic.

This procedure is not only good VFR, it can land you from a GCA or ILS if you are in weather. The 67 per cent gained from Manual Starting Fuel will sustain flight in the pattern and once you have set up your landing configuration, air speed can be maintained by selecting GANGSTART ON and GANGSTART OFF to keep the final airspeed at the recommended speed for your fuel load. Once the landing is assured, GANGSTART OFF will drop the RPM to 67 per cent for the last portion of the approach and, when you are ready to touch down, Starting Fuel Switch OFF will drop the RPM to IDLE and you touch down normally.

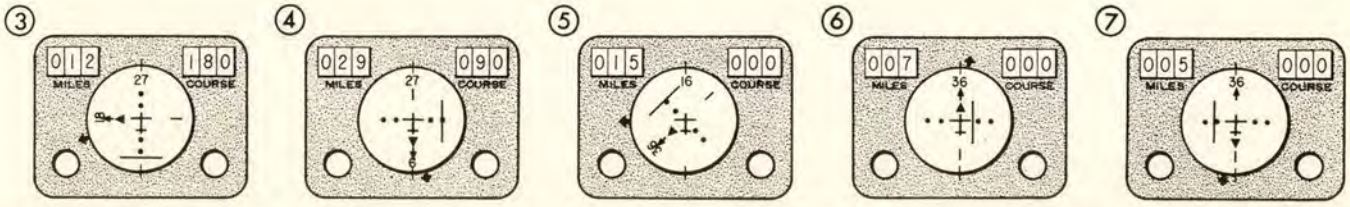
You may have noticed that in all procedures mentioned, the Starting Fuel Switch is placed in the Manual position before selecting GANGSTART ON or before turning the rear cockpit Starting Fuel Switch to Automatic. There is a reason for this: If you place the Starting Fuel Switch to Automatic, with the throttle in idle, nothing will happen, but then when you turn the other Starting Fuel Switch to Manual the whole increase of fuel flow will occur at once. This could cause an overspeed and overtemp of the engine. The same thing occurs if you select GANGSTART ON first. In this case the Emergency system will be turned on and the RPM will remain approximately the same. Then, just as before, when you select Starting Fuel Switch to Manual, the whole fuel increase will come at once. The procedure that should be followed is: Starting Fuel Switch Manual, then GANGSTART ON or rear cockpit Starting Fuel Switch to Automatic.

These procedures have been checked on 51 through 58 model T-Birds while completing more than 50 functional test flights. The procedure mentioned, concerning the solo pilot, has consistently given 82 to 88 per cent RPM at 5000 feet and below.

(An added note in the interest of safety. It would be wise indeed to check out the GANGSTART function early in the SFO pattern. We have no way of guaranteeing that it will work as we know it should.—Ed.)

I may have been wrong to insinuate that this procedure will replace talking about women at the bar, but it just might get you back safely one day, so you can talk about women at the bar. I hope so . . . ★

Answers to HAZY ON HSI?



THE YAW MAKERS

The problem of yaw continues to be a big factor to be reckoned with in all airplanes. Yaw is defined as the movement of an airplane about its vertical axis. What can cause an airplane to move about its vertical axis? The pilot, of course, by a movement of one control, mainly the rudder. Too simple? Let's restate the question. What can cause an airplane to involuntarily (meaning other than the pilot's intended action) move about its vertical axis? Complicated? Somewhat, in the sense that there can be an almost countless number of answers to a condition that causes a pilot to compensate for his airplane's erratic flight.

Your first answer would most probably be "improper rigging." And right you may well be, except that pilots frequently squawk "pulls left," "right wing heavy," "flies ½-ball left," etc., in spite of the fact that the airplane had been signed off as properly rigged. So, for our purpose here, let us assume that proper rigging procedures are adhered to, and that the responsible people are thoroughly familiar with, and religiously follow, the "Dash Five" in this respect. But we still have yaw.

Take a long look at your airplane from the rear, standing at the center line about 30 feet aft of the tail, facing forward. Note that everything you see, including external stores and tanks, parallels the longitudinal axis (fuselage) of the airplane. Anything you spot that's off this line, or that hangs crooked, can create a drag in flight by causing a deflection of airflow about that area.

Here are a few examples of typical yaw makers that have been found as a result of taking a good look at the airplane:

• After a rig check, the same condition (yaw) was verified by several pilots. An alignment and elevation check was then performed, and all surfaces were found to be well within tolerance. While everybody was scratching their heads, a "good-looking" mechanic noticed that the fiber-glass vertical stabilizer tip that houses the UHF antenna appeared to be angled off to one side. A measurement was taken, and sure enough, the center line of the tip was 7-16 inch off center — yaw eliminated.

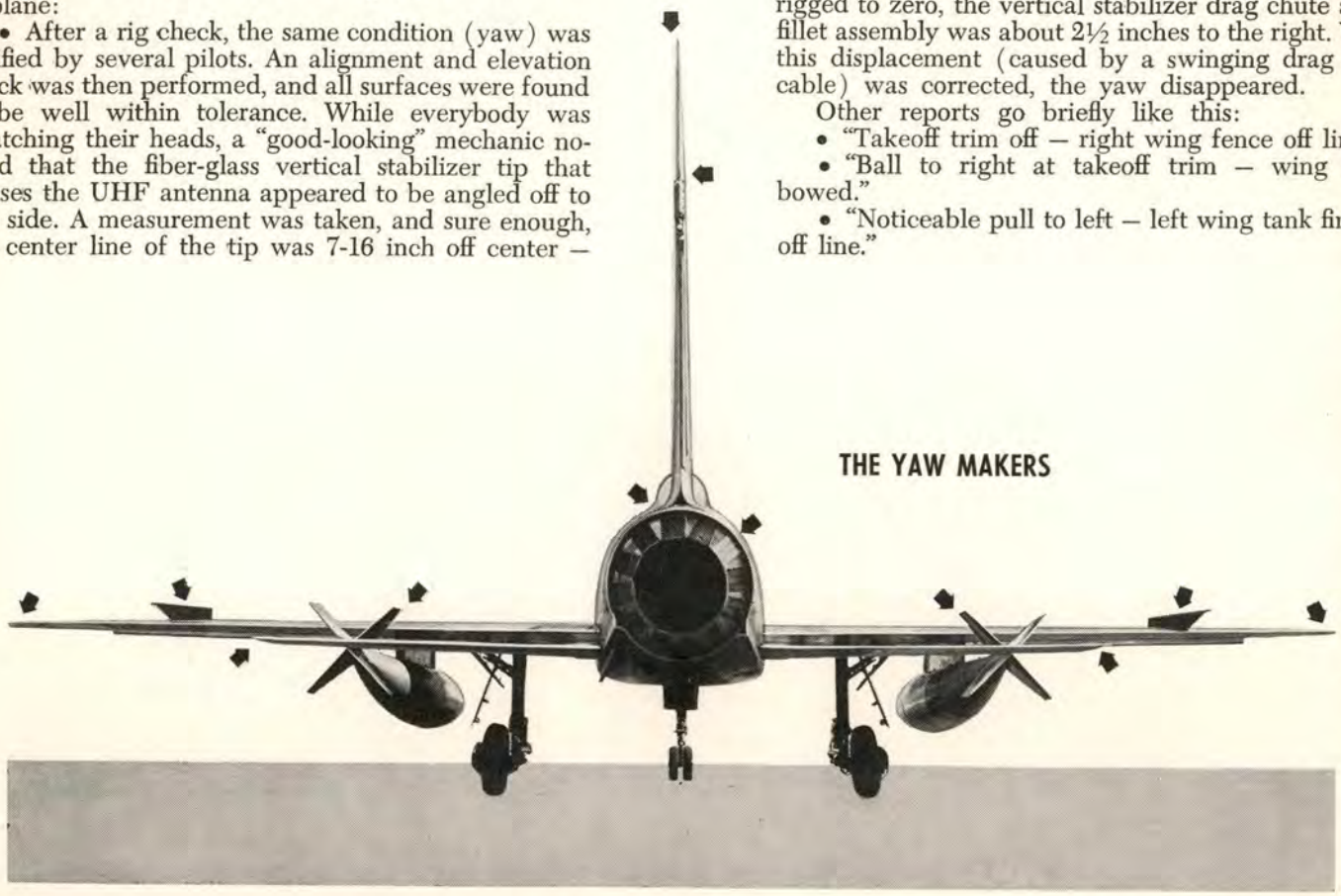
• One particular bird had been hard to handle both on the takeoff and in flight, because of a pull to the right, despite repeated riggings of nose wheel steering and control systems. Then it was noticed (from a rear-end view) that while the rudder was rigged to zero, the vertical stabilizer drag chute attach fillet assembly was about 2½ inches to the right. When this displacement (caused by a swinging drag chute cable) was corrected, the yaw disappeared.

Other reports go briefly like this:

• "Takeoff trim off — right wing fence off line."

• "Ball to right at takeoff trim — wing fence bowed."

• "Noticeable pull to left — left wing tank fin bent off line."



THE YAW MAKERS

Reprinted from North American Aviation Operation & Service News

• "Subsequent inspection revealed splitter rudder bent at the trailing edge."
• "Rudder warped."
• "Flies ¼-ball left at 300 knots. Right-hand aileron segments out of tolerance."

Some yaw makers are not as readily apparent or as easy to spot, and some must be found the hard way. Take these:

• "Noticeable yaw on takeoff. Tests show right-hand gear retracts much faster than left." Cleaning hydraulic flow restrictors corrected the yaw in this case.
• "Afterburner on, nose left; afterburner off, nose right. Nozzle segments found hanging up and improperly aligned — situation corrected, yaw eliminated."

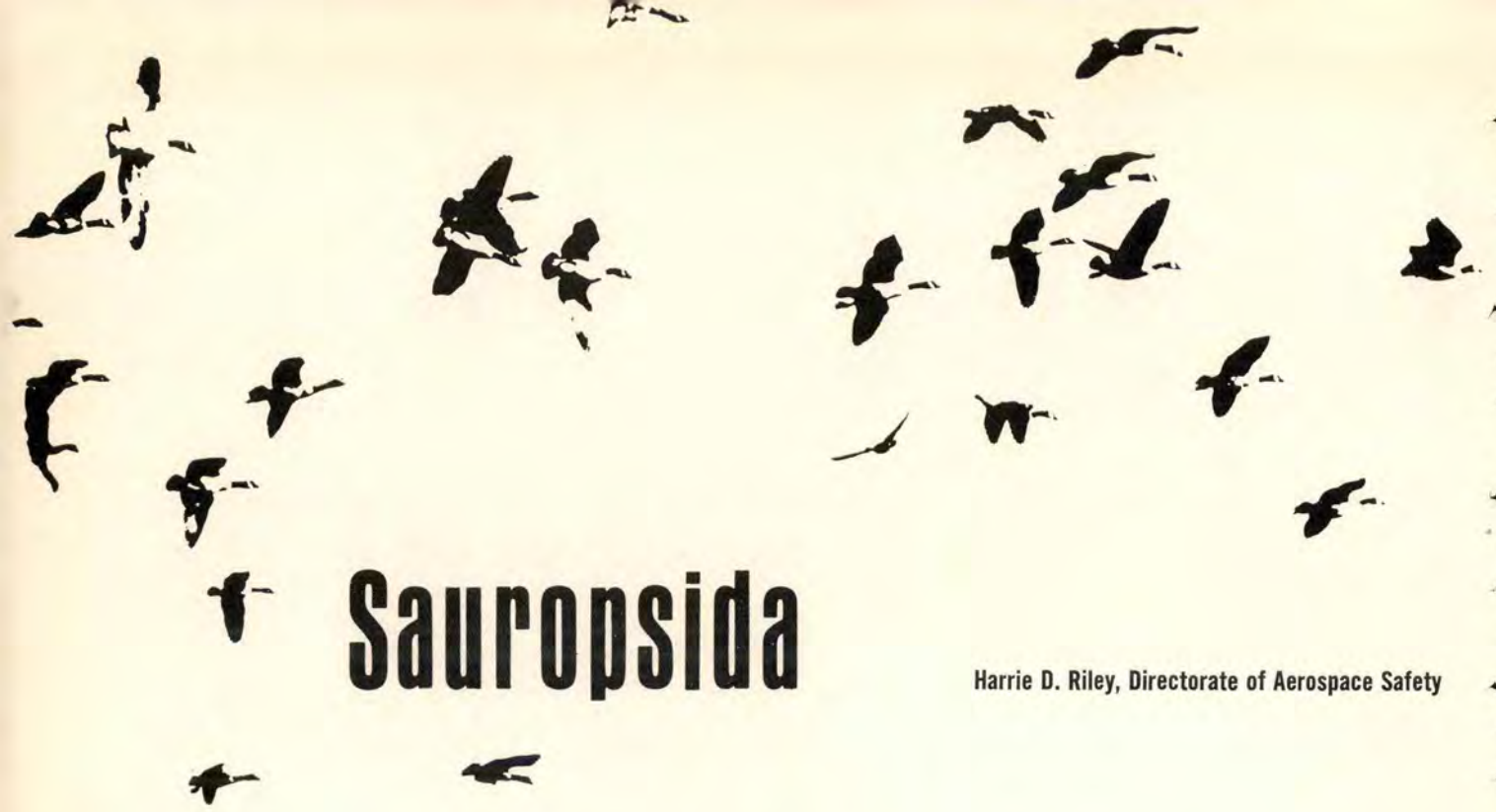
Here are a few other yaw makers to be on the lookout for:

• Hung slat
• Misaligned engine
• Warped flap, aileron, stabilizer, or wing tip.

At one base, the pilot had a yaw problem where there really was no yaw at all. It seems that after all possible sources of yaw were exhausted, the turn-and-slip indicator was replaced and the plane flew "straight" ever after.

Our pilots like to fly those birds, and rather than abort another mission, they will learn to live (sometimes dangerously) with yaw. Let's help them live without it. Remember, when a swept-wing airplane reaches a high angle of attack, near the stall point, a spin is only a yaw away. ★

THE YAW MAKERS



Sauropsida

Harrie D. Riley, Directorate of Aerospace Safety

Larus, buteo, sturnus vulgaris, and tardue merula are sauropsida. No, this is not double talk gobbledygook. It is just about the birds. Not for them, but against them — gulls, buzzards, blackbirds, starlings — all the feathered flock.

Usually everyone is interested in protecting the feathered friends, however, it appears that maybe they have been over-protected and now you as a pilot need the protection more. In fact, there are investigative programs afoot to try to eliminate the birds from the airfield and to give pilots better protection from them in the air.

Last year the USAF experienced 145 reported bird strikes. This was a 107 per cent increase over the number reported for the previous year. Partially this was due to one or more of the major commands placing increased emphasis on reporting of bird strikes in the latter part of the year.

The most tragic bird/aircraft collision resulted in a pilot fatality and a destroyed aircraft. This occurred when the aircraft, breaking out from an initial approach, collided with a snow goose. The goose entered the rear left side of the front canopy. Subsequent pilot disorientation and loss of engine power resulted. Ejection was at too low an altitude for survival. Three other incidents resulted in minor injuries to air crew.

Engines and wings were the components most often involved in the bird strikes. Engines ingested birds in 55 incidents, necessitating replacement of 42 engines, because of internal damage. The wings, although involved in numerous incidents, usually only sustained dents and occasionally tearing of the skin. No fatalities or major accidents resulted from bird strikes on engines or wings.

The birds were the kindest to the bomber fleet. Only 14 cases of bird strikes against bombers were reported. Trainers had the most strikes (61). Most of these occurred in the southern half of the country where there is a heavy concentration of training bases. T-38 pilots have been experiencing numerous bird strikes; speed and relative quietness of engines of this aircraft are considered to be contributing factors. Strikes were so numerous at one ATC base that state and federal ornithologists were called in in an effort to try and reduce the hazard. The only solution seemed to be to stop flight operations during the early morning and late afternoon hours. This was not an acceptable solution to the commander.

Most collisions with birds occurred below 3000 feet and over a

This is what happened when a 3-lb duck and the windshield of a T-38 collided. Bird did not enter cockpit, but residue was found on student pilot's visor, which was down.

mile from the runway. Thirty-three incidents occurred during low level missions, including gunnery practice. Fifty-five occurred less than one mile from the airfield, with 18 actually on the airfield.

These are the statistics. Now what's the answer.

The answer lies mostly in the research effort being done in several countries. In the United States, the FAA and the Department of Interior are the principal investigative agencies working toward reducing or solving the problem. Governmental agencies in Canada, England, Holland and other nations are doing likewise. Our Bureau of Fisheries and Wildlife has been conducting research programs on bird habits, migration and methods of minimizing or eliminating birds in the vicinity of airfields.

Engineers at FAA NAFEC are studying effects of bird strikes on airframes and engines. These investigative programs will require considerable time and money. Increase in strength of windscreen materials and improvements in some turboprop engines by simple changes in the engine ignition circuits that provide engine recovery after bird ingestion are indicated in test results to date.

Around airfields the three most effective bird hazard deterrents are (1) denial of food, water and roosting areas (this is known as creating a biological desert), (2) clearing and gravel-surfacing airfield areas not immediately adjacent to airfield pavement, and (3) scare device programs using recorded bird distress and enemy calls, carbide explosives, etc. Distress and enemy calls have limitations since the many species of birds require different recordings. Destruction or scaring of birds is not a true solution since this is only temporarily effective due to constant bird migration. The real solution is to make the airport unattractive to bird life.

To help the pilot in flight the FAA has on occasion issued advisories concerning migratory flights of whistling swans, geese and other massive formations of birds. You may help yourself by wearing your helmet with visor extended. In attempting to avoid a collision with birds, the best maneuver is a climbing one. It seems that the bird's reaction is always to dive when attempting to avoid a collision. They use gravity to aid in their escape mechanism.

During the first two months this year 87 reports were received. This is 80 per cent of the number reported for the entire previous year. This points toward a probability of 500 or more reports for 1965.

This year, 1965, the Director of Aerospace Safety, in order to get a more valid picture of the potential hazard to aircraft from bird strikes, has requested that all bird strikes against USAF aircraft be reported, regardless of any damage. The information obtained will be fed into the bird research hopper to help in the national investigation program. ★

SSgt J. T. Lambert, 1607 Air Transport Wing (MATS), Dover AFB, Delaware

Last winter 180 MATS families moved from Dover to McChord. A transfer of this sort is not without precedent, but the significant thing is that the move was made without accident. This may be due to luck, but luck is a very tenuous thing to depend on, so those in charge of the move turned to the more substantial process of providing concrete assistance to the families making the trek west.

The big concern was the trip by automobile across the country from Maryland to Tacoma, Wash., during the dead of winter when driving conditions would be at their worst. With this in mind, the planners devised a three-point effort to prevent accidents.

- Every family was briefed on what to expect as to weather, road hazards and routes.
- Three recommended routes were laid out and supplied to each family.
- A handout was distributed which contained a winter car care checklist and tips for bad weather driving.

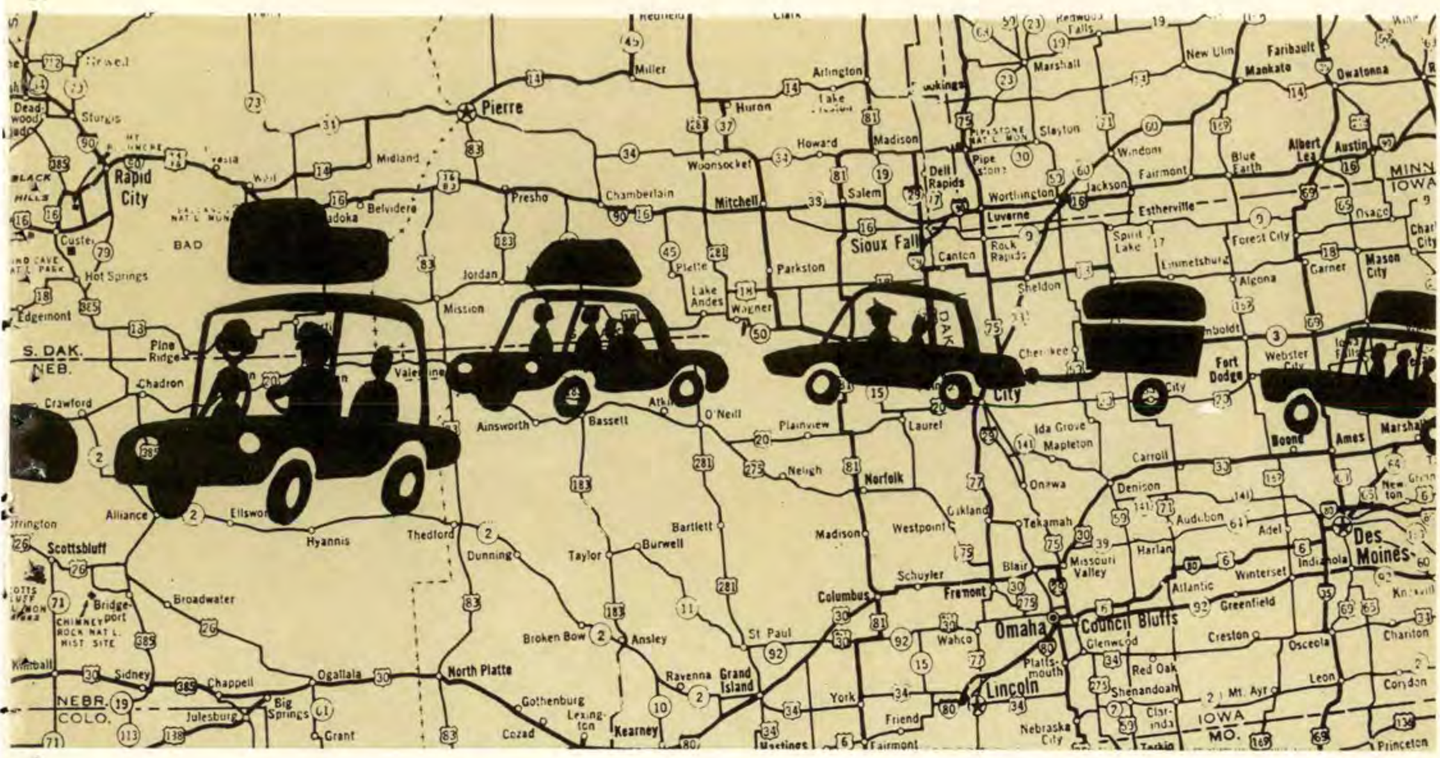
Many Air Force families are on the move during every month of the year. For those who may be facing a long trip this winter, AEROSPACE SAFETY presents an extract from a briefing presented by SSgt J. T. Lambert of Dover AFB, Del., to the McChord bound families. The points he makes are valid and are recommended reading for anyone who drives during the winter, regardless of the length of the trip.

My goal today is to help you get to your destination in one piece. Toward that end, here are some suggestions.

Have you ever been blinded by the lights of an oncoming auto? When you passed the car you discovered that the driver wasn't really what you'd called him but another Air Force family on the move, with the car top carrier loaded and the back springs compressed. It might save your life to spend a dollar and a half to have your lights adjusted before leaving and after loading your car. The lives endangered are not only those in the approaching car but also your own, if the lights are in a blinding condition.

And now consider road traction on ice. When is ice slickest? Why do you have good traction in the early morn and very little by 10 o'clock. Traction on ice is affected by temperature. To give you an idea of the effect, consider a car at 20 mph with regular tires. At zero degrees it would take 110 feet to stop; at 20 degrees 200 feet; at 30 degrees 250 feet. Compare road traction to an ice cube at a cocktail party. When you first take an ice cube out of the freezer it is very easy to hold, easy to control. But after it has been in a drink, have you ever tried to lift the ice cube out? You'll find it's almost impossible to hold on to. It's really slick. That ice cube has had a temperature rise to near the freezing point. Traction loss on ice does make sense, doesn't it?

And now while at a party, let's consider another thought. Before leaving we know there will be many farewell parties. Please don't make the party a practice for a wake. Get a good night's rest prior to leaving. Fatigue does accumulate. It builds up and once you have started on your trip you'll find it's hard to overcome. It might even



pay to go 10 to 20 miles down the road to let your friends know that you're out of town and can't be reached. If the party was too rough the night before, stop there to rest.

On the road there are certain treacherous times that should be considered. It's a good idea to drive as if the car in front of you were a police car. Did you know that most injury accidents occur between four and five in the afternoon? And that most fatalities occur between one and six in the morning?

What is the most treacherous period during a rain? You'll find the first five minutes, before the water has had a chance to wash the accumulation of tar, grease and mud off the pavement, is the most treacherous period.

Snow is at its worst when the temperature is just above the freezing point — when it starts to melt.

Here's one that might surprise you: Did you know that nine out of ten fatal accidents and four out of five injury accidents occur during clear weather? Seven out of ten fatalities occur on dry roads. These treacherous times will give you some indication of periods to watch and prove that you must stay alert to arrive at your destination even in good weather.

You might plan your meal between four and five in the afternoon to stay out of the heavy traffic when people are on their way home from the office, rather irritated.

A good time to sleep is during the normal sleep hours. Be off the highways from one to six a.m., when you're tired and when your body ebb reaches its lowest point.

During rains be particularly careful during the first part of the rain.

If you leave in the early morning and snow and ice are on the ground, check your traction occasionally; test your brakes to be sure you still have traction, and to know how much traction you have at that moment.

Stay awake — stay alert during clear weather and don't think that clear roads mean a guarantee of safety.

I understand that in America there are two classes of travel: "First Class" and "With Children." We realize that children can frequently be somewhat annoying while on a trip. Have you thought of putting the children in the back seat and using seat belts? This keeps them in one place. And in case of an accident, the children are away from the dashboard and "little knobs" that make "little holes" in the "little heads." You do have your seat belts installed? Don't be found dead sitting on them! Use them!

Another thought for your safety: How about spending a dollar for flares, in case of a breakdown? This is a small price to pay for the safety they give you in the event your car stalls. Annually many Air Force people are injured because they are struck while trying to repair a car along the side of the highway.

Put a dime in your wallet. Then you'll always have telephone money for an emergency in a remote location if there's a pay phone available.

I have tried to give some facts and suggestions for you to consider. I hope that you will think about and use them. I would like to leave you with this thought: If you drive as well as you are capable of driving, you don't have to worry about this trip. ★

Missilanea

HEAVY HANDS — A rash of arm/disarm switch failures have occurred during the past few months throughout the Minuteman fleet. Careful analysis of the reported failures by OOAMA specialists has revealed that the failures were induced by faulty techniques or procedures being used by missile personnel. In each case, excessive pressure or torque during insertion or removal of the safing pin was the cause of the reported failure.

All personnel involved with the removal of the safing pin in arm/disarm switches must be advised that TO 21M-LGM30A-210, pages 4-12, 4-13, paragraph M, Steps 1 through 7, must be followed. These procedures are mandatory in order to preclude future damage to these sensitive switches.

Lt Col R. S. Kane
Directorate of Aerospace Safety

IMPROPER CONNECTION — The AGM-28A was in station for a guidance verification check. Electrical cables were connected and power applied to the missile. Smoke was observed around the forward compartment "I" beam, and all power was immediately removed from the missile. Investigation revealed pins v and x were shorted at the ground power receptacle M14J1. This caused burned wiring in the forward equipment compartment.

The primary cause of this incident was a worn keyway in the M14J1 ground power receptacle, which allowed an improper connection of the electrical cable to the receptacle. Extreme care must be exercised in the connection of the C2-34A-9 ground power cable.

As a result of this, and numerous other mishaps caused by improper alignment of the ground power cable, the ground power receptacle M14J1 and the mating plug on the ground power cable C2-34A-9 are being replaced with a newly designed, ruggedized, five key-way receptacle and mating plug.

BENT PROBE. A B-52 with two AGM-28Bs mounted under the wings was standing in alert configuration. Suddenly a COCO alert was called and the security guard went to the assistance of maintenance personnel in aircraft preparation. Removing the probe cover, the guard exerted too much downward pressure, bending the probe. This action caused the loss of one each Hound Dog until such time as the probe could be replaced! Another mishap attributed to personnel error caused by improperly trained personnel working around the missile.

If guards and other types of nonmaintenance personnel must be employed in the preparation of aircraft for an exercise, a suitable training program must be instituted. This is particularly necessary during winter months when engine covers, plugs, and heaters must be used extensively.

Maj E. D. Jenkins
Directorate of Aerospace Safety

MGM-13A. A missile was being returned to ready status following an engine run. As the hydraulic return squib firing cable was being connected, the two return squibs detonated. Fortunately, there were no injuries and damage was limited to squib expenditures. The most probable cause of this incident was tech data deficiency which allowed a 28 VDC circuit breaker on the selector control panel to be on during cable connection and provide a possible source of 28 VDC. Action is being taken by WRAMA to insert cautions in applicable tech orders which insure the 28 VDC circuit breaker remains off during connection of all squib firing cables.

Capt R. A. Boese
Directorate of Aerospace Safety

CORRECTION

Some lines of copy were inadvertently omitted from the item titled "Arm! Disarm!" on the Missilanea page in the September issue (page 20). The third paragraph should read as follows:

To remove the safing pin in the style B switch, first, engage the special wrench per Technical Order 21M-LGM30A-2-10; second, carefully but firmly push the safing pin straight into the missile until a definite stop is reached; third, release the pressure on th safing pin allowing the pin to back-off of its own accord (about an eighth of an inch); fourth, rotate safing pin slowly counterclockwise until a stop is reached; and fifth, pull safing pin straight out.

MEN TO COUNT ON

Major Thomas J. Slaybaugh, Hq USAFE

It was quiet in the blast lock area of the Titan II complex. Airman Randall was eating an apple and his buddy, Airman Zabronski idly stirred a cup of coffee. Between them, on the small table, were scraps of wax paper flecked with crumbs from the sandwiches they had eaten. The faint humming and soft rushing-air sounds of the air conditioning system were too familiar to be disturbing.

Lunch had been late today, by about an hour, because of a maintenance task deep in one of the silos. They had been making a routine walk-through inspection, Randall carrying the checklist, when Zabronski stopped, listening, head cocked to one side, senses alert, then asked Randall, "You smell something?"

Randall sniffed, noted a slight irritation. "Yeah . . . yeah, sure do."

"N_2O_4," Zabronski said. "Better get the PVD — its right over here."

They walked over to where the portable vapor detector had been placed and carried it back to the spot where they had noted the odor. Zabronski held the probe out and checked the dial. The needle quivered. They moved nearer the bird and Randall said, pointing, "Over there, I think. Looks like a very fine brown mist."

"Yeah." They moved over. "Stronger here," Zabronski added. "Five parts per million now."

"Looks like it's around that joint —we better call it in."

They left the area, located a jack box, plugged into the comm circuit and called the MCCC. They gave their report and suggested that a RFHCO (Rocket Fuel Handlers Clothing Outfit) team be called from the MAMS. The maintenance officer, who was at another site at the time, also was called.

Within 30 minutes the RFHCO team and the maintenance officer had arrived.

Randall and Zabronski had briefed the maintenance officer, a captain, while the three of them donned extra RFHCO suits. They

went through the tech data and, from a diagram, indicated the area of the leak. The captain called production control, identified the joint and obtained the seal stock number.

Together with the RFHCO team, the three of them went to the silo, checked the leak with the PVD and consulted the tech data. Instructions were detailed. For maintenance, valves to be closed were identified. The three cross-checked, then Randall turned the specific valve clockwise until it seated. They checked the leak again.

"Stopped now," Randall said, after moving the PVD probe around the flange and noting no indication on the needle.

"Right," the captain agreed. He looked at Zabronski. "Where'd you put the new seal."

"I'll get it." Zabronski went over to a small table, picked up a plastic bag with the seal in it, came back and opened the bag.

The captain opened the bag, examined the seal, handed it to Zabronski and looked up at a pressure gage. It's pointer was steady on zero. "O.K.," he said to Randall. "Let's open it up."

Randall fitted a wrench to one of the flange bolts and began loosening it. When he had the bolts out he pulled the line apart and the captain removed the old seal. He turned it slowly until he noticed a wrinkle across it. "There's our trouble," he said, "seal had a crimp in it; pressure finally worked through and she began to leak." He picked up the new seal, turned it over, examined it carefully, then handed it to Zabronski. He said to Randall. "See if you can spread those pipes until I check for remains of the old seal or contamination." He examined the joint carefully, using his flashlight, then nodded, "O.K., Zabronski, let's put the new one in."

Zabronski fitted the new seal in place and, while the captain watched, Randall fitted the two ends of the pipes together. He reinstalled the bolts through the flange holes and drew them tight. Again the captain examined the joint, then said, "Open the valve, slowly." Randall walked over to the valve and began opening it. "Keep that PVD handy," the captain said to Zabronski, then looked up at the pressure valve. "Pressure's coming up — hold it there, Randall, until we can check it." Zabronski moved the PVD probe completely around the joint. The needle didn't move. "O.K., looks like we have it. Open the valve all the way." Randall opened the valve. "Check it again," the captain said. Randall came over to watch as Zabronski probed with the PVD. "Good," the captain said, "be sure and put it in your report." The two airmen nodded.

The captain called the MCCC, reported work completed and noted the time.

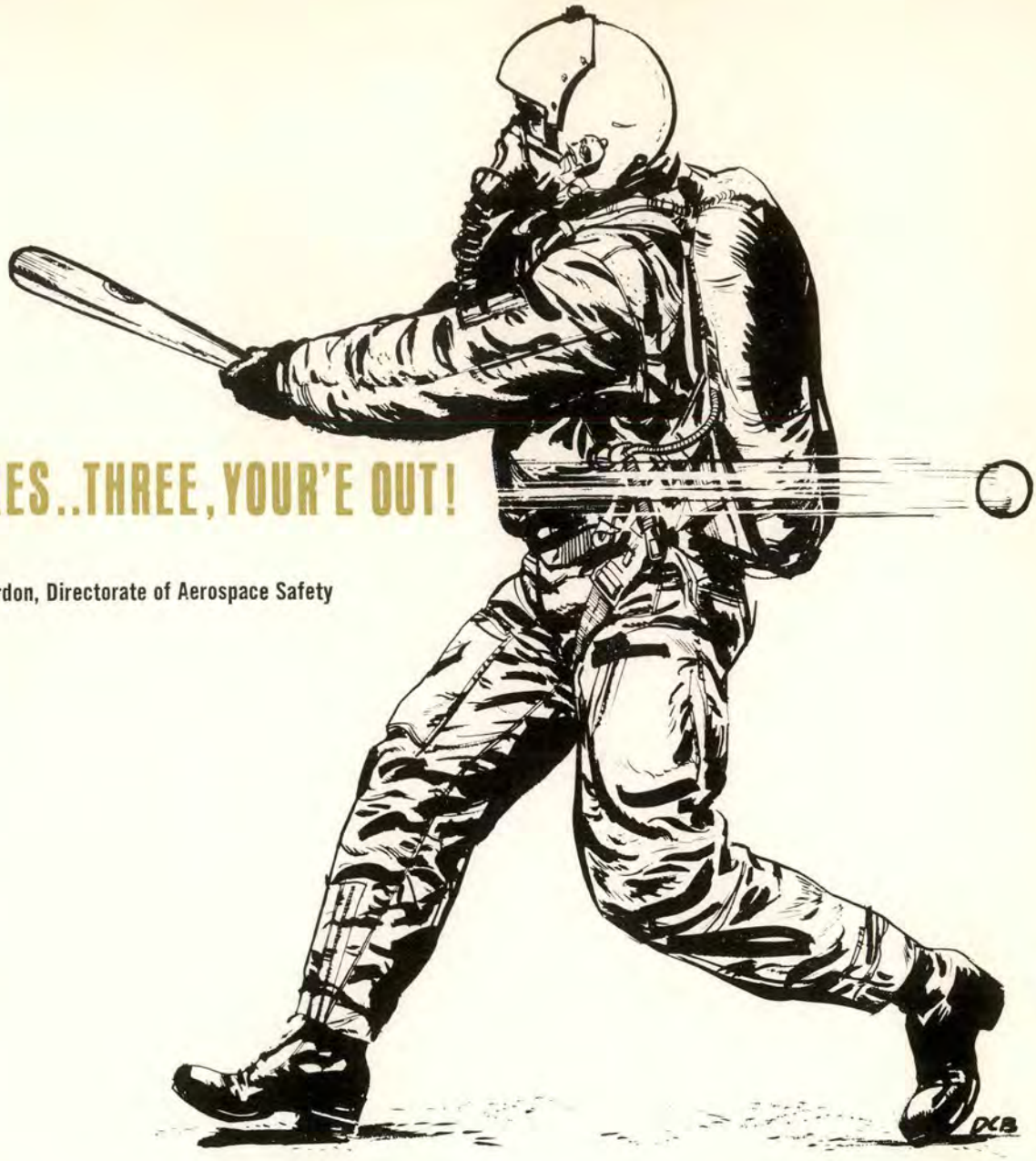
Now, relaxing after lunch, Randall looked at his fellow technician and said, "Zab, this is quite an operation, when you think about it. We found a simple little old leak — replaced a seal and it's fixed. But, we had to get the books out, have a supervisor on hand — really make a production out of it."

Zabronski sipped his coffee, thinking of what Randall had said. This was a way of life that, as a missile technician, had become second nature to him. He didn't think about it much anymore; just performed each task, methodically, exactly as tech data prescribed. But now, in response to Randall's comment, he ventured an analysis. "You're right, but I understand why we have to do everything by the book. The leak occurred because someone failed to do a simple task properly. No harm was done. We found the leak, put in a new seal and made sure the leak has been fixed." He drank the last of his coffee and began to scrape the crumbs onto a piece of wax paper. "Remember that safety magazine article about the investigation of a fire that destroyed a silo and a missile — I think it was an Atlas? The most probable cause, according to the article, was ignition of a fuel spill by a spark from an electric pump. The fire had been fed by LOX. You know, the first step in the sequence that blew up that hole might have been some little thing like a crimped gasket."

"Yeah," Randall sat, thinking. Then, glancing at the clock, "Say, we better get with it. We're five minutes late for our 1430 inspection. And we've got to finish in time to make out our report on that leak." ★

TWO STRIKES..THREE, YOUR'E OUT!

Lt Col Ray C. Gordon, Directorate of Aerospace Safety



Weather for that time of the year was typical – thunderstorms, wind, rain and low ceilings. The T-33 pilot, enroute to a midwest base, was approaching his last reporting point, when, at 37,000 feet in the soup, smoke started coming into the cockpit. All instruments checked normal with no indication of a malfunction. But white smoke was still entering the cockpit. Then he saw a wisp of white vapor coming out of the battery vent in the nose. Off with the mask. Check for the odor. Sure enough, electrical smoke.

The pilot informed Center of the emergency, requested an enroute descent and asked Center to alert the base. Meanwhile he was taking precautions to reduce all unnecessary loads on the electrical system. Descent was begun. Approximately eight miles out on GCA final the situation appeared to be getting worse – more smoke in the cockpit, moisture from the vent on the windscreen. Still in the soup and approaching glide path. Finally, at about 800 feet, he could see the runway and the fire equipment waiting. He breathed a sigh of relief. The landing was made without further problems.

After engine shutdown, the pilot and the fire chief opened the nose, taking proper precautions because of the heat and possibility that an explosion might still occur. The

Culprit! Voltage regulators were involved in 12,600 malfunctions and nearly 500 aborts during a six-month period last year.

sight that confronted them when the smoke cleared was: one battery melted in half and the top of the other one melted away. Electrolyte covered the nose and canopy. After maintenance it was determined that the voltage regulator had fouled up. A near miss — *strike one.*

A few weeks later, the same pilot in another T-33 had departed a southern base and leveled off at 33,000 feet, again in weather. Suddenly the generator light came on. He checked the instruments and cut off the non-essential electrical equipment. The center was notified of the situation and an emergency was declared.

Now a decision was necessary; should he return to the base of departure, where the weather was broken to overcast at 3500 feet and visibility about three miles, or should he find a closer base? To return would mean retracing the route for approximately 160 nautical miles. Realizing that, at the worst, there should be time to make a few radio calls, the pilot asked Center for the location of the nearest airfield, and the existing weather. Center supplied this information and the pilot decided to go the 60 nautical miles to this field. Center was requested to approve an enroute descent and also informed that the aircraft radio would be off for five minutes. Weather now was 1500 feet overcast, 2½ miles visibility. Descent was started , radio again activated and a hand-off to GCA accomplished without incident. The pilot made visual contact with the ground immediately after intercepting the glide path and sighted the runway at about two miles. An after-landing check revealed that the voltage regulator had malfunctioned. Another near miss, *STRIKE TWO.*

These two mishaps occurred within a few weeks of each other and neither found its way into *UR's* or incident reports. Why? How many others are occurring and not being reported? What does a voltage regulator malfunction cost the Air Force in accidents and incidents? The pilot with the two strikes on him did not want to strike out, so he got curious and started checking into the answers to these questions and some others. Here are some of the facts he uncovered:

During the past three years, there have been 26 voltage regulators reported on UR's, 34 incidents, 1 minor and 1 major accident where the voltage regulator was involved. During a six month period in 1964, 66-1 data for all aircraft showed a total of over 12,600 malfunctions and almost 500 aborts where the voltage regulator was involved. This is quite a difference and it brings to light a problem that should interest all pilots: Pilots are not reporting or causing this discrepancy to be reported so that the personnel responsible for analysis of such problems can take the necessary action.

One thing for sure — the next time the pilot with two strikes on him gets up to the plate, he will help insure that he gets a home run by reporting malfunctions of this kind. HOW ABOUT YOU? DO YOU WANT TO STRIKE OUT?★

In the past three years, voltage regulators have been UR'ed only 26 times. Better reporting is necessary.

Aerobits

FREQ CHANGE — Pilots of VHF equipped aircraft should take note of a frequency change that will go into effect October 14. At that time, 135.9—the frequency assigned for communication with flight service stations—will be changed to 123.6.

This will be of particular interest to Aero Clubs, since most of their aircraft are VHF equipped.

HINDSIDE-BEFORE — In the old-style comedies when someone accidentally set off a fire extinguisher and doused everyone with a harmless powder, it was funny. But there weren't any laughs in the cabin of a U-3 when the copilot hit the fire extinguisher with his left heel and it discharged in the cockpit. Yes, somebody installed the extinguisher bracket backwards. When this bracket is properly installed it is virtually impossible to discharge the extinguisher. That's the way it was intended to be, so why try to improve on it?

MURPHY AGAIN — Pilots supposedly have 20/20 vision (possibly with a little help), but this doesn't guarantee that they will always see what they're looking at. Case in point: After a pilot reported smoke coming from the left side of the cockpit of a T-38, a check revealed the engine start ignition circuit breaker panel installed backwards. As a result, the turnbuckle on the left throttle cable had rubbed against the C/B wiring harness until a short circuit occurred. The throttle cable was burned apart and several wires in the harness were shorted. This panel had been removed during other maintenance and nearly 40 flights had been made since then without a pilot's noticing the panel was installed backwards. The base where this occurred placed alignment marks on all panels to prevent recurrence and recommended that the panels be modified so that improper installation would be impossible.

UNMANNED MENACE. The pilot (?) of a light aircraft discovered his battery was dead so he crawled out and attempted to prop the bird by hand. He was successful — there was no one in the cockpit, the brakes weren't set and the aircraft did just what it was built to do. The man jumped out of the way and grabbed a wing strut but he couldn't hold the beast which promptly chewed up two aircraft parked nearby. One of them was an aero club T-34 that was at the airport for maintenance.

In this case no one in the aero club was to blame. We simply mention it here because this sort of thing happened three or four times last year with aero club members being the guilty parties. Therefore we reiterate: never, NEVER, prop an aircraft for starting unless a pilot qualified in that type aircraft is in the pilot's seat, the aircraft is chocked and the brakes are set. (See AFM 215-4, Attachment 3, Part VIII, Section 2.e.)

Aerobits

ONE PIN FOR A T-37 — The pilot was showing the crew chief the pins when one dropped and was ingested into the left engine. The engine was immediately shut down, but damage had been done.

REVERSED LEADS — During takeoff on a functional check flight following PE the aircraft began yawing right and left at about 140 knots. The yaw stab aug was turned off and control was normal. After the pilot leveled the T-38 at flight level 410, point nine mach, one "G" flight, the left engine flamed out. A normal restart was made at FL 300, 240 KIAS. The engine flamed out again at FL 300 and was restarted. Subsequently flameouts were experienced at FL 200 and at 15,000 feet. Normal restarts were made. After the last restart the left engine was left in idle and the aircraft landed. Investigation revealed that the phase A and B leads to the left generator had been reversed during the PE and this reversal caused the left fuel boost pump to run backwards and the input to the yaw stability augmenter was out of phase, causing it to malfunction. Probing further, investigators found that there had been several reports of electrical malfunctions which affected certain systems but did not cause the respective generator to go off the line. In this case, if the left generator had been turned off, the yaw augmenter and the left boost pump would have operated properly off the right generator. However, had some failure in the right system caused the electrical load to shift to the left generator all three phase systems would have operated in reverse.

LOSS OF RUDDER MOVEMENT — The following incident was related in an OHR that was submitted by the flight mechanic who was part of the crew that experienced the incident.

While cruising at 10,000 feet with a free air temperature of -20° C. and with an aircraft anti-icing temperature of 100° C. the pilot of a C-123B reported loss of rudder movement. Flight mechanics checked all accessible parts of the rudder and could find no cause. The anti-icing ducts in the tail section were all hot and there was no ice on the outside of the aircraft. The rudder gust lock was in the release position. The flight crew decided there had been water in the tail section before takeoff and that it had frozen around the rudder torque tube. The crew chief removed the cargo compartment heater ducts from the side of the aircraft and connected them to the left horizontal stabilizer anti-icing duct so he could get heat to the bottom rudder support bearing. After about 20 minutes with heat in the tail cone, the rudder started working normally. After the aircraft landed the rudder system was inspected, and nothing was found that could cause the rudder to bind. There was indication that water had accumulated on the rudder bell crank in a position where it could run down in the lower bearing. There is a recess in the lower bearing that could collect water and freeze.

The OHR has been forwarded through channels for consideration of a possible fix through the drilling of a drain hole.

Maj John J. O'Connor
Base Director of Safety
825 CSGp(SAC) Little Rock AFB, Arkansas

HOT PILOT — The F-100 jock was understandably annoyed. First, he reported to fly only to be delayed an hour while some maintenance was being done on the aircraft. Then, because of heavy traffic, he had to wait 30 minutes for takeoff clearance. By this time he was mad at the world. While he was sitting on the ramp he was on 100 per cent oxygen; at 10,000 feet he switched the regulator to normal. A few minutes later, with cockpit pressure at 12,500, he began to notice the same symptoms of hypoxia that he had experienced in the pressure chamber — blurring of peripheral vision woozy sensation and tingling of hands and feet. He went to 100 per cent, checked the blinker and O_2 quantity both of which appeared okay. He started descending and headed toward home, and within a few minutes began to feel better. After he got on the ground he was taken to the flight surgeon where he was checked over and found to be shipshape. The PE troops examined his mask and found it to be okay, and a thorough check of the aircraft oxygen system failed to turn up anything.

The medics finally concluded that this pilot was hyperventilated due to his emotional state during the first part of the flight, and that when he switched to 100 per cent he probably also controlled his breathing which corrected his condition.

QUALITY CONTROL is a much belabored subject, but deservedly so when one considers such occurrences as the following:

During climbout the IP discovered that the elevator trim worked in reverse, so he made a precautionary landing and took the bird into the shop for repairs. Seems that after the previous flight a runaway nosedown trim was reported and the trim actuator was changed, inspected and the aircraft, a T-37, was released for flight. Now the trim worked in reverse. Why? Maintenance personnel dug into the system to find out and noted that the trim actuator leads on terminal strip Nr 1 were reversed. Then the old actuator was checked and found to work in reverse. Apparently when it was installed at another base the leads must have been reversed. No maintenance since then had been performed on the actuator.

Granted that there was a goof where the old actuator had been overhauled, the reversed condition should have been detected, 1) during installation of the new actuator, 2) during inspection of this installation. Another Murph compounded by carelessness!

HORSE SENSE IN THE JET AGE? —Maybe we should entitle this "Lack of Common Sense."

In two recent incidents the pilots were informed by ground observers that their aircraft were shedding parts. One was on the gunnery range; the other was taking off on a cross-country. In neither instance did the pilot investigate to determine the extent of the discrepancy; however, the pilots did report that all instrument readings were normal. How about that! Since when have we had sensors and instruments that reflect the condition of the entire aircraft?

Maybe I'm a coward, but upon receiving such news I would start thinking in terms of getting the machine and yours truly safely on the ground — but fast.

I would not continue to make gunnery passes and neither would I proceed on a cross-country flight.

Faulty reasoning? Possibly, but we have the best engineers design our aircraft and I accept their judgment that only those bits and pieces are used that are necessary for an aircraft to accomplish its mission. Consequently, when things start falling off, you are short already!

Why try to do the job with part of an aircraft? The job you do may be your last.

Lt Col Harold K. Boutwell
Directorate of Aerospace Safety

Aerobits

BENT TRIGGER — If this mishap had occurred a minute or two sooner we might have had to label it BENT PILOT. Just before the F-105F turned off the runway, the front cockpit pilot's lap belt initiator fired, releasing the belt and firing the seat-man separator. This pushed the pilot against the canopy. After the aircraft cleared the runway and was shut down, a check revealed that the lap belt initiator trigger was bent just aft of the attachment point to the activator link. This permitted the trigger latch to work its way under the bottom of the track. With the trigger in this position, the motion of the aircraft caused the trigger to fire the initiator.

The only answer that could be found for this condition was that at some time a foreign object — tool bag, clipboard, etc., — had been placed behind the seat. This could have bound the linkage so that it would have been bent when the seat was raised electrically.

A few days later, during a 50-hour inspection, a similar condition was found in the rear seat of another aircraft. This led to a 100 per cent inspection of all the other '105s at this base and one more was found. Recommendation was that all F-105 wings perform a similar inspection.

ICED T-39 — There is plenty of cold weather ahead, and one of the things to watch for is the formation of ice. This occurred on a T-39A aircraft in the following manner:

An out-and-back flight was planned for a T-39, with a stop at the far end. Since it was only about an hour each way, there was no need to take on more fuel. It was freezing at the base of departure, and the short flight at altitude was all that was needed to coldsoak the fuel. It was night when the T-39 landed to discharge a passenger. The weather at this time was not critical; however, a bitter cold drizzling rain was falling — nearly at freezing temperature.

The pilot taxied in, shut down one engine, let out the passenger, and prepared to continue. As a safety precaution, however, the pilot decided to take a close look at the wing. Although there was no indication of ice on the windscreen or nose section, the wings glistened as if there were a sheet of ice on them. Closer inspection revealed this to be ice.

As the near-freezing rain fell on the wing, it immediately froze. In the few minutes that the aircraft had been on the ground, a heavy coat of ice formed on the top of the wing. Needless to say, plans for an immediate take off were canceled.

The base originating this report attributed the formation of ice on the top of the wing to the fact that the wing had been cold-soaked by the wing fuel during flight. However, depending on the amount of fuel in the wing, ice may or may not be indicated on the wing upper skin over the fuel tank and not at all on the wing leading edges. Yet there could be a large build-up of ice on the wing lower surface. This condition could continue even after the airplane had been on the ground in above-freezing temperatures because of the cold-soaked fuel which would always be in contact with the bottom of the wing skin. Therefore, the lower wing skin should always be checked for ice any time the airplane has descended from high altitude. ★

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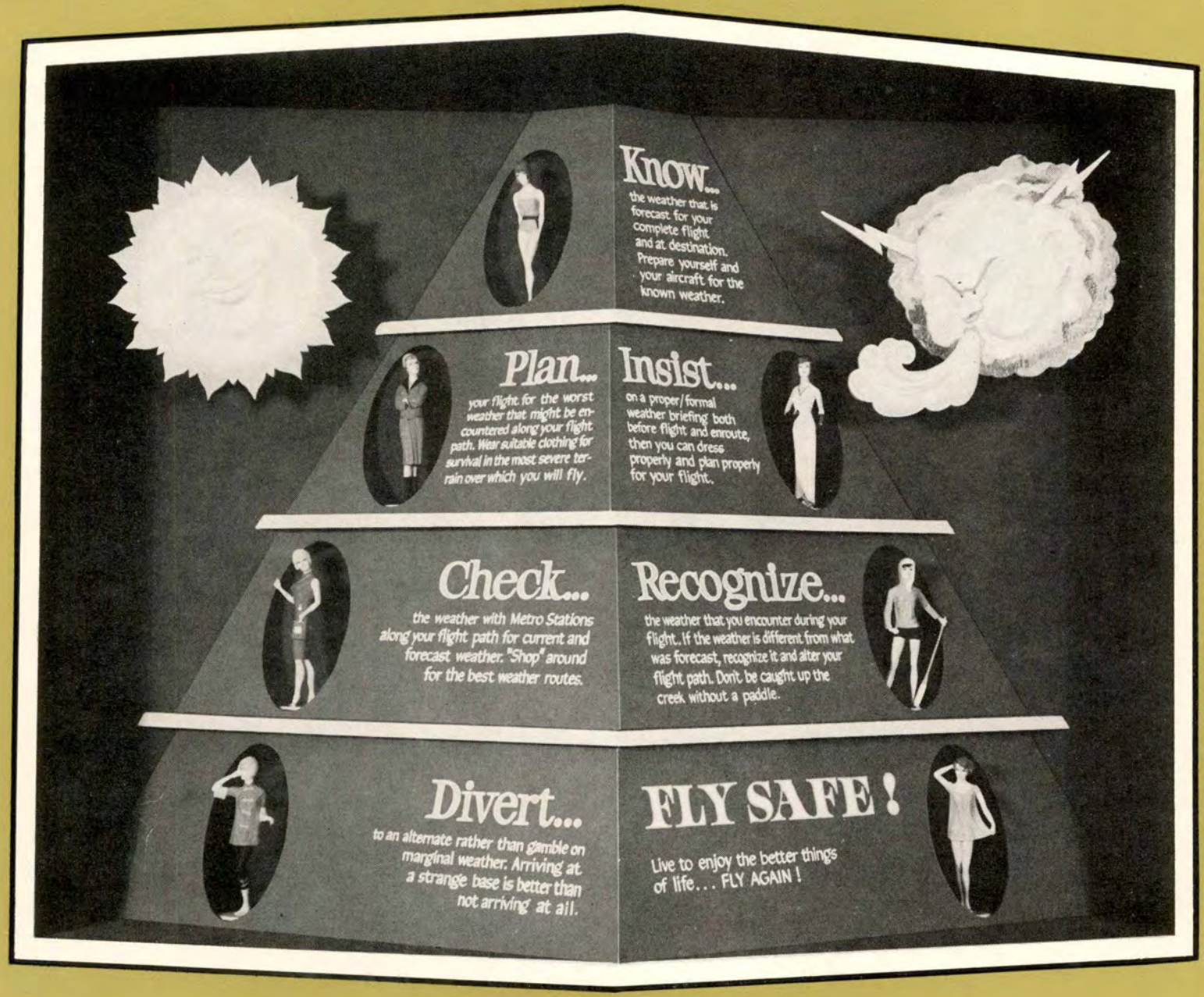
WELL DONE

CAPTAIN RICHARD P. MILLS

195 AIR TRANSPORT SQUADRON (H), VAN NUYS ANG BASE, CALIF

On 16 August, 1964, Captain Richard P. Mills was Aircraft Commander on an Air National Guard C-97 carrying 47 military passengers from Alameda, California, to Hurlburt AFB, Florida. Two hours from departure point and at 17,000 feet in weather over mountainous central Colorado, the aircraft was struck by lightning. A loud explosion followed and a crewmember reported fire trailing from the wing behind Nr 2 engine. Captain Mills immediately called for feathering of the engine, however, fire continued and an emergency descent was made with vectors from Denver Center to Grand Junction, Colorado, the nearest suitable airfield. Increased airflow extinguished the flames, however, the left flap was burned nearly in two, and a no flap emergency landing on 5400 feet of runway at 4850 elevation with heavy passenger and fuel load was imminent. Captain Mills executed a three-engine ILS and by careful airspeed control was able to touch down just over the threshold. With three engine reverse and maximum braking the aircraft was stopped within the available runway. His calm analysis of the emergency, inspiring complete crew coordination, avoided a disastrous crash which would have been fatal to 47 passengers and six crewmen. The superior skill of Captain Mills in successfully executing a no flap landing with 140-knot minimum touchdown speed on a short airfield saved the aircraft, crew and passengers. WELL DONE! ★



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