flying

SAFETY | JUNE 1982

THE WORST THAT COULD HAPPEN

I Guess I Pressed

Bird Avoidance Model

Bright Star '82

The Story of a Successful Mission

■ I had seen all of the required training films on visual illusions and filled all of the annual squares on the subject, but my attitude remained: not this kid; my eyeball is too good for those tricks. Well, for all you super jocks, it can happen to YOU!

I briefed and led a three-ship from Bentwaters to the range at Spadeadam and nearly became part of the terrain within the range boundaries. The weather was perfect, not a cloud in England, and visibility unlimited. One of the contributing factors was the clear weather and 50+ visibility that we had enroute to the range. The fact that I could "see forever" lulled me into a sense of "low threat." I could see the Spadeadam IP from 60 miles away and, due to time and fuel considerations, I made a high speed enroute descent to arrive over the southeast IP at about 500' AGL and started my first run against the site.

Enter factor two. Everything west and north of the IP was covered by a solid, white blanket of ground fog, the first weather we had encountered, But, not to worry. We climbed 300 feet or so and made our runs above an apparently flat surface of fog at 800 to 1,000 feet AGL. And it's still clear, sun shining, and unlimited visibility above the white, flat layer of fog. We made three runs, using heading and time to approach Berry Hill with all of the standard radio calls, button punching, chaff calls, etc. On each run I managed to see the Berry Hill complex through a small hole in the fog and always seemed to be 500 to 800 feet over the site.

On the fourth run, we were attacking from the big lake to the north, and I was hugging the top of the fog layer hoping to avoid more beeps and chirps. The heading took me slightly left of Berry Hill, and the fog gave way to a snow-sprinkled valley while I was still searching for the target area. I was using peripheral vision to judge height above the lower valley when I finally acquired the target area off my right wing at one to two miles. I was returning my attention to an egress route and flying when Spadeadam asked me to check my altitude!

Instantaneously, the altimeter seemed too low, and off the left side there appeared a "massive" house and stone wall. I pulled up, and my large snow-laced valley became a frost covered depression in a featureless field. Spadeadam had lost my radar return in the ground clutter, and I have no doubt that I was down to 50 feet AGL (give or take a wing pylon). Any nose drop or a hard bank and I would have been a permanent resident of the range complex. Having recovered successfully, it took me a while to figure out what lured me down to an unperceived grass cutting altitude.

First, the "severe clear" weather, particularly for England, lulled me into a sense of "fly by the seat of my pants." The fog layer obscured all of the standard altitude cues while I was VFRing around. The fog layer that I had first encountered at 500 to 800 feet AGL was in no way constant in its thickness. The few glimpses I had through holes in the fog reinforced the perception that the fog layer top was well above the ground. The "flat" top of the fog layer, in fact, sloped down into low ground at an unperceivable rate until it met the ground. No more 300 to 500 feet drop-off such as I had seen in the southeast IP. Then the sun shining on a frosted, featureless depression looked like the snow-covered higher hills around Spadeadam. Combine these with divided attention due to very tough target acquisitions and the EW workload, and it could happen to you!!

Visual illusions and gear-up approaches. Pilots that have and pilots that will. Think about this tale, cross-check your instruments when any visual cues change, and stay in the pilot category of those who never will. ■

This could so easily have been one more "unexplained" collision with the ground mishap. Yes, it can happen to you. Thanks for sharing.

Brig Gen Leland K. Lukens
Director of Aerospace Saf

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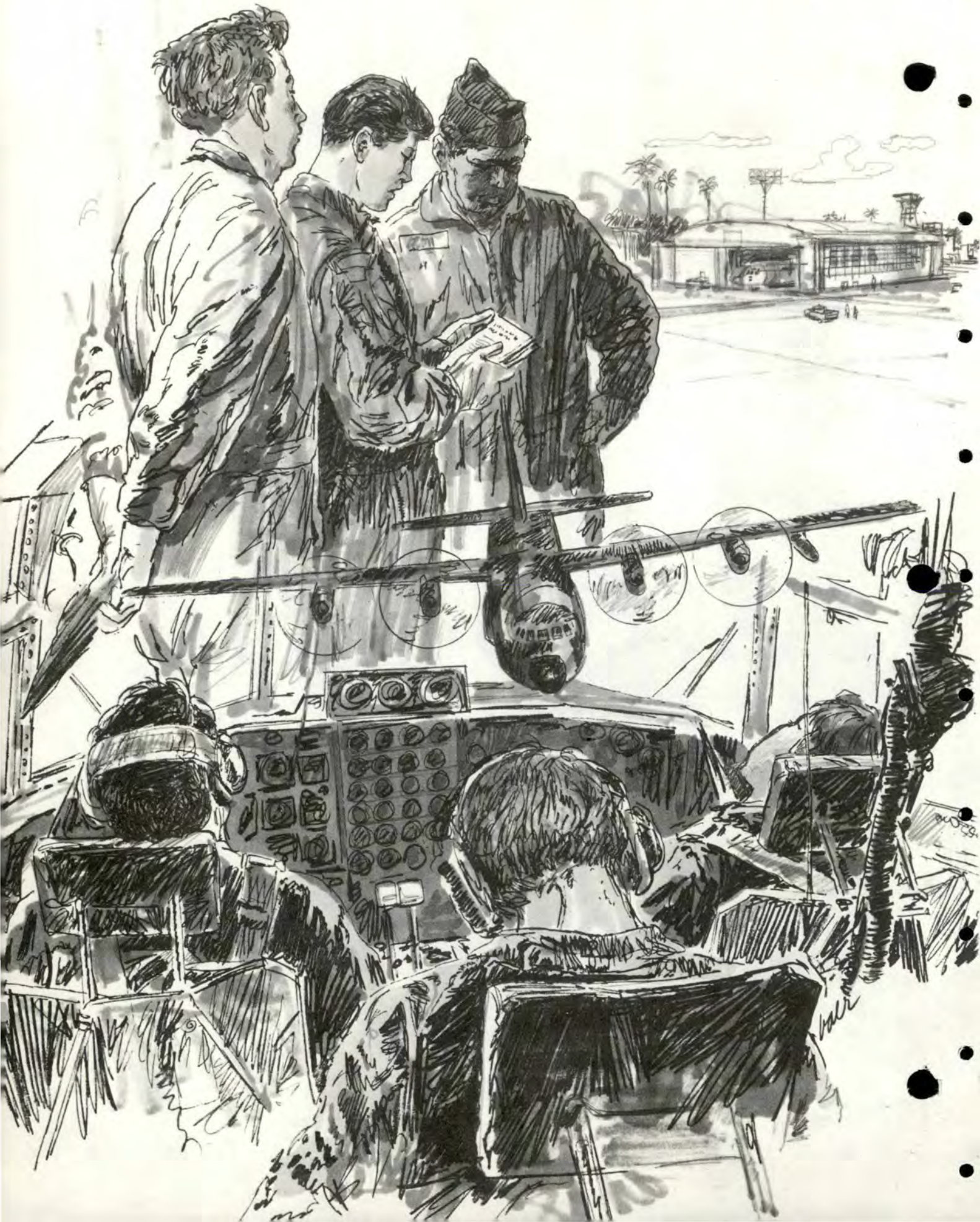
REGULAR FEATURES

DEPARTMENT OF THE AIR FORCE • THE INSPECTOR GENERAL, USAF



THE WORST THAT COULD HAPPEN

MAJOR JOHN J. COLSCH
Directorate of Aerospace Safety

■ I was aircraft commander of one of two crews deployed with one C-130 to fly airborne command and control missions for a large Army/Air Force exercise. Our two crews had stopped off at Dyess AFB to pick up the command and control capsule during our deployment to Seymour Johnson.

The day before the exercise ended, Pope Airlift Control Element (ALCE) called and told me that a motor pool car would pick my crew and me up at noon the next day. We were to go to Pope AFB by car to help redeploy the Army troops back to Ft. Campbell. I was told to get my crew well-rested and to be ready to fly when we got to Pope. The other crew was to return the command and control capsule to Dyess and then fly to Pope to assist in the redeployment.

I wasn't very excited about the change of itineraries because we had deployed about three or four days before the rest of the squadron, and the next week I was to pull a rotation to Panama. I had only been an aircraft commander for five months, and this was already my third major exercise or rotation.

Since they told me to show up at Pope ready to fly, I presumed we would fly the same day we arrived. I told my crew to stay up late so they could sleep late the next day. We could then be fresh and ready to fly when we got to Pope. The crew did just that, and we all slept until about 1100.

We checked out and caught the motor pool car at noon. I don't remember exactly how long it took to get to Pope, but I know as soon as we arrived we were taken into a briefing for what I thought would be the afternoon and evening redeployment missions. No such luck! We were to go into crew rest for flights starting early the next morning.

We were released for crew rest. There were no quarters available on base so we were bused downtown, and it was close to 1800 before we arrived at our motel. By the time we checked in, changed into civies (we had traveled in flight suits expecting to fly), and found something to eat, it was 1930. We tried to sleep because our pickup time was 0200 for an 0330 brief, but we had only been up for eight and a half hours. We just weren't sleepy.

The motel walls were thin and there were several "get-togethers" going on in the rooms adjacent to mine. About 2300 I finally dozed off, and my alarm awakened me at 0130.

At the bus, I asked my crew if they were able to get any sleep. Some said they didn't get any sleep at all, and a couple of them said they got about an hour or two.

The bus delivered us to Pope about 0300. The briefing had no exciting news—the missions would be multiple shuttles of troops and equipment back to Ft. Campbell.

My crew's takeoff time was supposed to be 0545, but when the nav, copilot, and I arrived at the aircraft, the engineer told me we had a brake leak. He said he had already contacted maintenance twice but couldn't get any response other than that they would "get to us as soon as they could." At our takeoff time, several maintenance men showed up. They found the leak was due to some sand in a swivel fitting so they disconnected the fitting, washed it with solvent, and replaced it. We were airborne about an hour late. On the way to Ft. Campbell I asked everyone how they were doing. They seemed alert and said they were fine.

About a hundred miles out of Ft. Campbell we started getting into some pretty big buildups. Thunderstorms were forecast for the Ft. Campbell area because a front was moving through. It took about 45 extra minutes to reach our destination due to deviations around buildups. When we finally did get on final approach, the cross winds were near the limits for landing. We got the aircraft safely on the ground and taxied to the off load area.

While the off load was in progress, the engineer told me we should get some more fuel because we would probably do more deviating on our way back. We could not be refueled in the off-load area and would have to move to the refueling pits. The off-load was completed and we started the gas turbine compressor only to learn that the air turbine motor (ATM)

THE WORST THAT COULD HAPPEN continued

was out and it wouldn't reset. Thus, we had no emergency source of electrical power. After more delays, we refueled and were on our way.

The storm had moved as the engineer said it would. We were in the weather for well over an hour before we broke into the clear. We all breathed a sigh of relief. None of us were crazy about flying in the soup without an ATM.

How much time passed, I don't know. I was dozing at the controls when suddenly I noticed there was no interphone chatter and no ATC chatter. I looked over at the copilot who was dead to the world. A glance at the engineer and nav told me I was the only one on the flight deck awake. I called the loadmaster on the interphone, and there was no response. The engineer roused at my call for the load, but he really didn't wake up. I started talking on the interphone and shook the copilot out of his slumber. The commotion woke up the nav and engineer, but the engineer had to go to the cargo compartment to wake up the load. While the engineer was out of his seat, ATC called and told us to give Pope ALCE a call. We tuned up the HF and gave them a call.

Pope ALCE was calling to change our itinerary. They wanted us to go to Cherry Point for our next load to Ft. Campbell. I told them "negative." We were proceeding direct to Pope and would declare crew rest after landing. Their response was "negative" — proceed to Cherry Point for another shuttle to Ft. Campbell. I asked them to stand by while I checked on something.

I turned to my crew and asked them to look up the reference for an aircraft commander declaring crew rest. After they found it, I called ALCE, advised them I was proceeding to Pope and invoking AFR 55-130, declaring crew rest in the interest of safety. The only response was that the mission commander would like to talk to me right after I landed.

What had I done? I had only been an aircraft commander for five months and now this. The ALCE mission commander for the exercise was my own squadron ops officer who had never impressed me as being overly friendly. There I was, a young upstart aircraft commander declaring crew rest less than nine hours into my crew day.

He was not only the mission commander and my ops officer, but he also wrote my OER. My action would likely mean a 3 (on the old 9-4 OER). Probably the best that could happen would be downgrade to copilot and a bunch of extra duties. At least I would be alive to dislike the duties. The alternative, staying in the air, held too high a probability for mistakes — big mistakes. None of the crew were really alert. If nothing happened we might make it, but if even a simple emergency came up, we could be in real trouble. The possibilities if we continued flying were only too obvious.

The remainder of the flight brought a lot of encouragement from the crew for what I was doing — although nobody volunteered to go see the mission commander with me. My anxiety about facing him didn't allow time for relaxing or falling asleep. I was wide awake now. How do you convince someone you need rest when you're wide awake from nerves?

We landed at Pope, parked, shut down, and filled out the forms. I was in no big hurry to face the man, but the time of truth was at hand.

When I opened the door of the ALCE building there stood the mission commander/ops officer. His eyes were flashing. He approached me and asked what was going on. I told him what had happened from the time I received the call at Seymour Johnson telling us to show up at Pope ready to fly. As I told my story, his eyes softened.

He patted me on the shoulder and said "That's what we pay aircraft commanders for — making decisions. Good job, John. Take your crew to quarters and get some sleep. You'll be primary tomorrow for deploying today's flying crews home. See you at the 0700 briefing tomorrow."

This was not at all what I had expected. I believed mission commanders/ops officers only thought of accomplishing the mission. Maybe that was his thought. My declaring crew rest *was* part of getting the mission accomplished.

As you can see, I'm still in the Air Force and proud of it. I would like to take this opportunity to thank my former ops officer. The day he patted me on the shoulder and said "Good job, John," was the first day I can really say I was an aircraft commander. He taught me more about what it meant to be one than all the manuals in upgrade training. ■

What's The PRICE?

Rapid decompression is a great attention getter . . . but if you're not prepared, it can spoil your entire day.

■ It's a beautiful day for flying, and you're cruising at FL 350. The KC-135 (or C-141 or any other big, pressurized aircraft) is flying smoothly on autopilot.

Just as you are reaching for your coffee cup, there's a loud bang, the cockpit fills with vapor, and papers and other loose objects fly around. It takes a second or two, but then you realize that there has been a decompression. Now your training takes over.

You quickly grab your oxygen mask and put it on. Once that is done you are ready to figure out what happened, right? Maybe! Is your equipment working? What about the other crewmembers and passengers? If you think back to your last physiological training session you may remember hearing about Time of Useful Consciousness (TUC). At FL 350 the average TUC is between 30 seconds and one minute. However, such a figure may be almost meaningless in a given situation. Many factors affect TUC — the rate of pressure change, for example.

In a rapid decompression such as the case described, TUC's can be reduced by up to 50 percent. Then, too, physical activity increases the body's oxygen requirements, so a loadmaster in the back who is actively moving around will need more oxygen than the nav seated up front.

The point of all of this is that in the event of a decompression at altitude you and your crew have only a very short time to react and get on oxygen before hypoxia causes significant performance degradation. By short time I mean 15 seconds or less.

These very short TUC's mean that unless the supplemental oxygen equipment is immediately available *and working properly* you may not make it. In a decompression situation you don't have time to consult a T.O. and check out your oxygen equipment.

The way to be prepared for a pressurization emergency is to check out your equipment during preflight. The most common method of checking your oxygen equipment is the PRICE check. Physiological training people have been teaching this method as an easy and, if done in sequence, effective check.

One problem that has developed through the years is that not all aircrew checklists and Dash One's follow the PRICE check sequence in their oxygen system check procedure. The difference between what is being stressed in the classroom and what is being directed by tech order may well be contributing to the problem of checks not being accomplished or procedural steps being omitted.

Figure 1

P —Pressure
R —Regulator
I —Indicator
C —Connections
E —Emergency assembly

■ See AFP 160-5 for the detailed check.

■ Check walk around bottles, too!

■ The PRICE check makes no provision for checking masks and helmets. If you have your own, check it in the PE shop before going to your aircraft. (For quick donning masks installed in the aircraft, the Life Support shop does this inspection, but you need to check it in the cockpit.)

Basically, the crewmember must follow the checklist, and we are *not* advocating deviating from this philosophy if your Dash One directs an oxygen check sequence different from the PRICE sequence. Do as the checklist directs. If no procedure is directed, the PRICE check as shown in Figure 1 is an excellent check sequence.

AFISC is working with AFLC and the USAF Surgeon General to align the various oxygen system procedures now in use.

Back to our original example. You have your mask on. What's your next step? Check on the crew. Make sure everybody is on oxygen and interphone. If you are carrying passengers insure that the loadmasters or whoever is in the aft compartment are able to handle the situation. If necessary, consider sending another crewmember back to help.

We haven't discussed fighters in this article because fighter types wear oxygen masks all the time. But the necessity of a good oxygen check is even greater for fighter/trainers. Many aircraft of these types have systems which allow the cabin altitude to exceed 10,000 feet. A malfunctioning oxygen system can easily set you up for a serious problem.

The whole point of this article is summed up in one sentence. *Check out your oxygen system – make sure it's up-to-speed BEFORE flight.* ■

The success of a mission like Bright Star involves many people — from the wing commander down to the members of the munitions load crew.

The Start of a very long day — four B-52Hs from Grand Forks taxi for take off on Exercise Bright Star '82.

One of the aircraft deploying to Egypt refuels over the Atlantic.

Bright Star '82

A1C PAMELA J. PREVOST
91st Strategic Missile Wing
Minot AFB, ND

Last year Flying Safety *told the story of a successful airdrop mission in Antarctica. We told that story because it* was *successful. That is the essence of flying safety. A mishap-free mission completed.*

Here is another such story from a different command and mission but which once again dramatically points out the keys to flying safety – planning, preparation, and professional disciplined operations.

■ Late one gray morning, four B-52H Stratofortresses lifted off the runway at Minot AFB, North Dakota. It was 7 p.m. in Cairo, Egypt, the eve of an unusual live firepower demonstration. This demonstration, a first for SAC, would be the climax of a month long exercise involving American and Egyptian air and ground units.

Four B-52Hs from Minot AFB and four from Grand Forks AFB, North Dakota, headed, in two cells, for their first refueling point. At the second refueling point the six best aircraft were chosen to complete the mission, and the extra two aircraft returned to Grand Forks and Minot.

This exercise had been in planning at the Headquarters Strategic Air Command and 57th Air Division for three months before being passed to the wing. The 5th Bombardment Wing's involvement was intensified two weeks prior to the mission when it received the mission specifics from SAC. A week before the actual flight, the 23rd and 46th Bombardment Squadrons flew DIM STAR over the White Sands missile range, providing the aircrews a "drop rehearsal" of BRIGHT STAR using live, conventional 500 lb. high drag munitions.

Finally the six B-52s set out for Egypt. Following a flight path over the Midwest, across the Atlantic Ocean, over the Mediterranean Sea and south to Egypt, the two cells approached their destination. They flew in west of the Nile and circled south of Cairo to the bombing range northwest of the ancient Egyptian city.

They flew the 7,500 miles in about 15 hours, and then dropped 27 live MK82 Snakeye bombs each from an altitude of 600 feet. Only one minute separated each of the six aircraft, making timing and navigation critical. The aircraft released all bombs within their timing and all bombs were on target.

Lieutenant Colonel Glenn R. Schaumburg, 23rd BMS commander, was airborne commander for the mission. "Basically, we were involved in the planning, so that if anything came up during the mission, we would be able to compensate. Our job was to keep things organized and try to cover any contingencies that might come up in the mission," Colonel Schaumburg stated. The mission required a lot of coordination since the crews were assigned to either Minot or Grand Forks. The coordination problem was solved by conference calls in the initial stages of planning and then by detailed briefings at Minot two days prior to the mission.

Safety was of prime concern. The

Bright Star '82

continued

key items were making sure the crews had adequate planning, adequate time to work with the mission and the mission paperwork, and of course, augmenting the crews to cover crew duty limitations.

There was also some new equipment as well as some procedures that had to be reviewed. In order to comply with ICAO rules the aircraft were fitted with an inertial navigation system similar to the one used in the KC-135. Some of the crews had never flown with an INS so they needed training with the new equipment. They also had VHF radios installed because much of the area over which they would fly used VHF as primary communications.

To accommodate this mod the Number 2 UHF radio was moved back to the gunner's station. The aircrew coordination on communications was different than normal and so had to be practiced. There was also the problem of intercom and intercell communications.

The difficulties of moving a six-ship cell of bombers halfway around the world through some of the world's busiest airspace required careful, precise communications discipline. This is not unusual but still required some extra attention.

Obviously, one of the most important safety factors to consider was the experience of the crews. Colonel Schaumburg flew with Crew S02, a standboard evaluation crew. Crews S01 and S03, flying the mission, were also standboard evaluation crews.

According to Major Charles Mollenkopf, 5th BMW chief of safety, Bright Star '82 gave everyone a lot of confidence that the standard tactics work. The most important safety factors involved in the mission were extremely thorough mission planning, intensive target study, and development of contingencies for almost any scenario.

"The crews were augmented to make sure that people were able to rest during the mission," Major Mollenkopf said. And, of course, nutrition was very important under these circumstances. For the most part, however, normal day-to-day procedures were generally employed. "That's what SAC training is all about, to have you prepared for your wartime mission," Major Mollenkopf explained.

Captain Dennis L. Snyder, aircraft commander and lead pilot, found fatigue to be the biggest problem. "I found it quite evident after flying for 31 hours and then trying to land at Minot in bad weather, demanding top instrument skills, that my skills in flying the aircraft were somewhat diminished. For the first time, I really could see an obvious degradation in my performance, based on the time factor," the pilot said.

Captain James W. Ewing, copilot, enjoyed participating in this internationally recognized exercise. "I guess I always wondered about the bomber doing its mission under those kinds of circumstances — a long flight, the crew fatigue, and so on. I learned something about just what I can do under those circumstances and what the rest of the crew can do to work together," he said. "We divided the duties among the three aircraft and the crewmembers to try to keep any one person on any one aircraft from taking the brunt of the communications or whatever circumstances there were."

Captain John D. Rose, the radar navigator, explained some of the preparations the crews went through to ready themselves for this exercise. "Most of the time that we devoted to study, I would say, was directed toward the 'what if' game — what if you can't get a certain refueling, where would we go? We did a lot of backup planning for what we would do if we had problems in flight. We had lots of extra charts for that purpose," Captain Rose said. "Additionally, the live drops that we did in preparation for this were done not only to familiarize ourselves with the scenario that we were going to fly, but also to observe the weapons and their effects.

"It's really satisfying that you can tax yourself a little bit more than you're used to and still perform as you're expected to if you're ever required to do that. It's not something that I want to do every day — fly 30 plus hours," Captain Rose revealed. "When you've done this once or twice, you know the preparations that you have to make. I don't really think you could go home tonight and get six or eight or 10 hours sleep and come in tomorrow and be fully prepared to go fly a mission like that. It heightens your awareness of how prepared you have to be to handle a long mission."

First Lieutenant Keith E. Offel, navigator, had a different viewpoint of the mission, his third over-30-hour flight. His primary concern throughout the flight was timing. "It was of particular importance that each navigator on each crew made sure that his aircraft was at each point throughout the low level leg so that when he got to the target, he wasn't on top of somebody else. If, by chance, the winds were not what we planned for, or somebody was not watching their timing, it could have caused a lot of problems for the plane behind them." According to Lieutenant Offel, the worst timing throughout the bombing exhibition was just a few seconds off. Not bad after a 15-hour flight to get to the target!

The bomb demonstration ended a three-day battlefield exercise involving 4,000 American troops. The exercise began November 22nd with an airborne assault by 600 American paratroopers and 400 Egyptian soldiers in the desert near Cairo West Airbase, 18 miles west of Cairo. Soviet-built Badger bombers, MIG fighters and French-made Mirage fighters of the Egyptian Air Force, along with American A-10 and F-16 jets, took part in the exercise.

The pay off for proper preparation and training was fully demonstrated when the aircraft returned to Minot. The weather for recovery at first report was not too bad — about a 1,000 foot ceiling with two miles visibility. Even after 31 plus hours the approach should not have been too difficult. However, the temperature and dew point were perfect for the formation of ice fog.

The first two aircraft recovered without difficulty. But when Number three started the approach

the moisture from the engines of the two previous bombers had created a blanket of ice fog over the runway. The pilot of bomber Number three brought the aircraft down to the decision height for the approach but without sufficient visual cues had to go missed approach.

Now the effects of good training and crew coordination became evident. The radar navigator (RN) had backed up the pilot's GCA using airborne radar approach (ARA) techniques. It was the RN who first detected the drift which placed the aircraft too far right of centerline to make a landing. Then, after the missed approach, the pilots set up for an ILS to the opposite runway hoping that the ice fog was not as severe in that direction.

The effects of the 31 plus hours were taking their toll. Both pilots were concentrating so hard on flying the approach that they missed the RVR call from Approach. It was not until the RN, who was monitoring approach control frequency, queried them that the pilots realized that the RVR was below minimums.

So now the crew was committed to diversion. There is a corollary to Murphy's Law which states that when things start to get bad they almost always get worse. Sure enough, upon arrival at Minot the crew had checked the fuel as normal and were well ahead of the planned fuel remaining. But on climb-out for diversion they discovered that the number four main tank was not feeding. This trapped over 7,000 pounds of fuel and seriously reduced the fuel available for diversion. Then, in addition, other systems began failing.

First, number five engine had been out for some time (since the Azores, but one engine out is not a serious problem in a B-52). Now another engine had to be shut down, and the accompanying hydraulic pump failed. Then the main rudder boost failed. The crew coped successfully with these problems plus the unusual circumstance of low fuel.

All of these factors combined to create a significant stress level. Nonetheless, the crew quickly and professionally refiled for the diversion, accomplished the appropriate emergency procedures for the systems malfunctions, and began concentrating on the approach.

The first weather report they received on Grand Forks seemed to confirm their worst expectations. It was almost identical to the one for Minot. The crew started making contingency plans just in case this field went below minimums. But when they arrived it seemed that their bad luck had run its course. The actual weather at Grand Forks was VMC with 7+ miles visibility.

The penetration approach and final landing were almost anti-climactic after the experiences of the flight. Many times during this mission and especially during the recovery and diversion phases, the potential for a mistake and mishap was extremely high. The fact that the mission ended routinely with only an interesting war story for the crew is a tribute to their preparation and training. The unusual became routine because they were prepared to handle it. This is the mark of the professional and the essence of flying safely. ■

I Guess I Pressed

The Windshield was Full of Hillside — Leaves and Branches Right in Front of the Prop!

New airplanes — new tactics — different locations. Things are a lot different now than they were 12 years ago. Or are they? This article was published in 1970. Change the date and the location and the story could happen today.

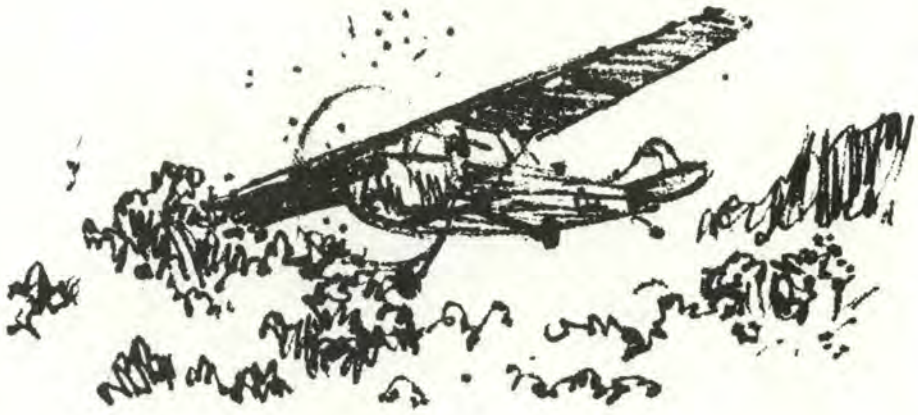
■ During mission planning, the intell briefer singled out one target for special attention. It was hidden in the trees and photography didn't really show anything but the foliage patterns. But, he said, it was there, all right. If we got it, we'd know. Above-ground ammo storage. It should blow sky-high!

I remember thinking that it's a lot better to get it while it's still in the boxes and crates.

I'd been given two flights of fighters to put on it. With two flights of four I was sure to get it. I was visualizing the fireball and secondary explosions while I flew to the target area.

When I got there, I was glad I had a few minutes before the first fighters would arrive. There had been no difficulty finding the ravine where the target was located; the area looked just like the photos. That was the trouble, it looked *just like* the photos. All trees. Thick foliage. No way of seeing through it to tell what was underneath.

I got down lower than I liked and still couldn't see below the jungle canopy. The intell guy had said to be prepared for moderate automatic



weapons fire. I kept the airplane moving, jinking. But all I could see was treetops.

I climbed back up to a more comfortable position and picked out some landmarks to use in directing the fighters. When the first flight of F-4s checked in, I was waiting for them. I gave them a heading to fly after a couple of hold-downs and ADF cuts. While they were inbound, I described the ravine and the target. By the time we spotted each other, we were ready to go to work. Dropping pairs, they could each make several passes. I didn't see any ground fire so we kept at it, kind of pattern bombing. I started working the east side of the ravine from north to south. As each pair of bombs went off, I expected to see the secondaries I had visualized. But they didn't happen.

Then the F-4 leader called "last pass," and they were gone. I was disappointed. But then the second flight was checking in. I gave them my preliminary spiel of target and terrain information and a heading to fly. They estimated about five minutes out, so I decided to take another close look. Assuming the area covered by the first flight didn't contain the storage area, I had a much smaller area to search.

Right down on the trees this time, I spotted something on the second pass. Couldn't be sure. I pulled up and bent it around and back over the very small clearing in the trees. But on this heading I couldn't see a thing down there. The fighters reported over me and had me in sight. I told them to orbit left for a while — I'd be right with them. Then I made another pass up the east slope of the ravine where I'd spotted something below the trees. That was it! There it was!

Covered with something black, tarpaulins perhaps. But that was it. If I approached from the west, from the bottom of the ravine, I could see it!

Climbing up to mark, I described in detail the spot I wanted the fighters to hit. Lead said he was pretty sure he knew where I meant, and I rolled in to mark.

It was beautiful. On this heading, the dark forms were obvious below the trees. I watched the marking rocket for a second before I started my pullup. It was headed straight and true. I was ready to call "Hit my smoke."

But when I'd pulled the bird around to where I could see the target over my shoulder, there was no smoke!

Lead called, "No smoke." I knew he was waiting to roll in.

"Okay, I'll mark again real quick." I ruddered the little bird around. "In to mark."

The familiar trees came into my windshield. But I was too far south, slanting up the hill instead of directly toward it. For several moments I couldn't find the black shapes under the trees. Then I saw them.

Nothing happened when I punched the rocket button on the stick. I glanced instinctively at the wing. The rocket was still there. I jabbed viciously at the button again. This time a rocket went. But I didn't have time to watch it. The windshield was full of trees and hillside.

I pulled.

The airplane rotated and started up the hill. But the hill was going up, too.

My God! I'm not going to clear it! The leaves and branches are right in front of the prop!

And then I was through them. There had been a jolt, almost as if the airplane stopped for a moment. But it was still flying. Yawing, rolling to the right. Left rudder —

Lots of left rudder and left aileron brought it back under control. Headed up again. The trees fell away beneath me. Climb —

Keep climbing. The engine sounds okay. Gages look good.

"I've got your smoke — Lead's in on your smoke." It sounded far away.

I wasn't concerned with anything but learning if the airplane would fly me home. As I climbed, gingerly feeling out the bird, my confidence returned. The machine was going to hold together. I'd take it up high enough to check it in landing configuration.

Lead called off and Two called in. Then another voice called excitedly, "Hey, the FAC's in trouble — you all right? — you been hit?"

My mouth was dry. I swallowed hard and tried to sound calm.

"Okay now — brushed the trees — overeager — I guess I pressed."

— Reprinted from *Aerospace Safety*. ■

Bird Avoidance

■ Current military tactics stress high speed low level flight operations to significantly increase the chances for successful mission completion. However, low level operations also significantly increase the risk of encountering birds. About 20 percent of all US Air Force birdstrikes happen while the aircraft is engaged in low level operations. During the last three years over 1,000 birdstrikes occurred during low level operations at a cost of almost $5 million. Recent birdstrike mishaps involving high airspeeds and low altitudes have underscored the fact that aircraft are still very vulnerable. What more can be done other than increasing awareness, keeping your eyes open and prebriefing emergency procedures in case of a birdstrike?

Designing aircraft to withstand all bird impacts would sacrifice important performance characteristics for added safety. It is virtually impossible to protect jet

Model

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engines from ingesting birds. It is possible to develop birdstrike resistant aircraft components, e.g., canopies, but this method does not reduce birdstrikes, only the damage they cause.

Avoiding known bird concentrations or movements offers the most feasible method of reducing birdstrikes during training. The USAF Bird/Aircraft Strike Hazard (BASH) Team is attempting to reduce birdstrike hazards during low level training through a predictive bird avoidance model. The purpose of this model is to estimate the birdstrike risk on low level routes given date and time of flight, low level route number, and type of aircraft. This computer analysis can help schedulers consider bird concentrations in advance, before the flight is made. Using a predictive model, seasonal bird hazards can be factored into planning for operations on low level training routes or ranges.

The bird avoidance model considers both changes in aircraft mission profiles and bird populations within a particular geographic region. It is versatile enough to accommodate various aircraft types, schedules, and missions. In addition, the model considers the timing of bird movements as well as the intensity of migration taking into account differences in bird behavior and variations in the regional availability of habitat.

Low Level Routes

There are several hundred military low level routes, ranges, and operating areas throughout the CONUS. Low level operations occur over all terrain and under a variety of conditions. A wide assortment of aircraft and missions use these routes for training. Some missions are scheduled several months in advance while others are flown almost on the spur of the moment. Mission profiles vary extensively depending on aircraft model, altitude, airspeed, time of day, and route entry and exit points.

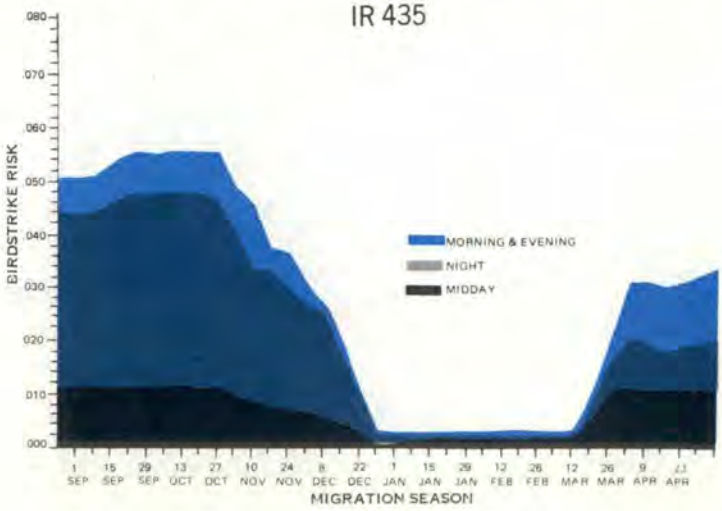
Each low level route or range has a certain degree of bird risk associated with flying a particular mission profile. This risk can be calculated to help plan and schedule flights to minimize the risk of a birdstrike.

Waterfowl Populations

Information about bird populations is basic to estimating the relative risk of low level flights. For example, 12 to 15 percent of all US Air Force birdstrikes involve ducks, geese, or swans, most occuring during low level operations. During the last century, large amounts of information were accumulated on waterfowl activities including population estimates, preferred migratory routes and behavior. To adapt this information for Air Force use, migratory data on waterfowl was consolidated to depict preferred migratory routes.

Low level routes are often located in remote regions where operations will not interfere with other air traffic, municipalities and farming. Remote areas are also regions of intense bird activity, particularly during migration. Waterfowl travel in flocks and prefer specific wetland areas. Risk from waterfowl movements depends on whether the birds are involved in migration or feeding activities, i.e., whether hazards are posed by migrating or non-migrating waterfowl. Generally migration takes place between refuges which are located in prime wetland areas. Birds at refuges, within 30 miles of a low level route, were considered to be a hazard to low level operations because of their far-reaching

IR 435



A graphic display of the birdstrike risk for a new IR route located in the central Northwest. The graph shows peaks in bird activity in fall and spring. The greatest risk from birds occurs in early morning and evening followed by night. The best time to fly this route for bird avoidance is midday.

Bird Avoidance Model

continued

feeding flights.

Birdstrike risk is related both to the density of birds in the airspace and the volume of airspace swept by an aircraft. The chance of an aircraft hitting a bird is directly proportional to the frontal area of the aircraft. The amount of damage that occurs is related to the aircraft speed, the size of the bird, the location of the strike on the aircraft, and the materials the strike area is fabricated from, e.g., titanium, glass, fiberglas. Note: KE = ½ MV^2(Kinetic Energy) (Mass) (Velocity)^{2}This says that the energy exchanged on impact is directly proportional to the mass of the bird (weight) and proportional to the square of velocity, this means:

- A four pound bird impacts with four times the force of a one pound bird.
- 300 kts results in an impact force of 1.44 times the force at 250 kts.
- Moral — stay away from seagulls and keep your speed as low as reasonable in a possible bird strike area.

Naturally, the more birds flying through the airspace the greater th hazard to flight operations. Bird density is closely related to waterfowl behavior, i.e., the number and altitude of birds migrating through a region at any one time. To estimate bird density, the following categories of waterfowl activity are modeled: (1) morning or afternoon flights from refuges to feeding areas (altitudes under 750 feet AGL, (2) minimized waterfowl flying activity at midday, and (3) nighttime migration (altitudes from 1,500 to 3,000 feet

Migration corridors are a convenient (and historically accurate) means of depicting routes of waterfowl passage. Figures 1, 2, and 3 show major migratory corridors for ducks, geese and swans, respectively. These corridors represent numbers of waterfowl migrating through the CONUS during the fall and are based on state and federal refuge data, banding returns, hunting statistics, radar movements, and aircraft observations. Generally, the same corridors are used for the return in the spring. Some corridors are travelled more than others and can be ranked according to highest densities to the least travelled. Figure 4 shows the location of state and federal wildlife refuges larger than 1,000 acres. Aircraft operations near wildlife refuges are more likely to hit a bird. Refuges are relevant to bird hazards on low level routes because waterfowl often make daily feeding flights as far as 30 miles from the refuge at altitudes below 750 feet.

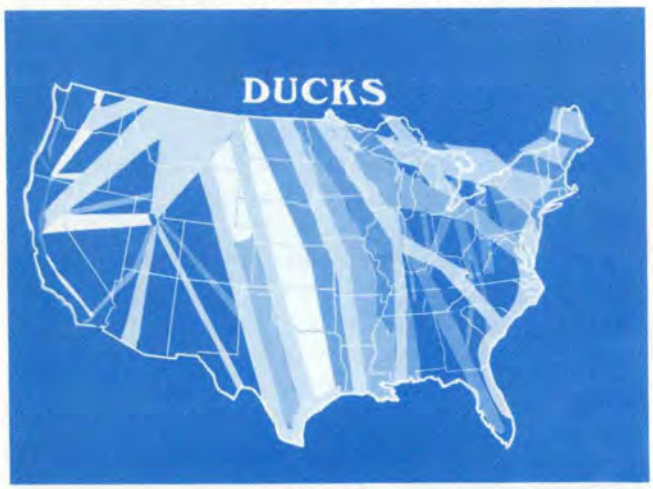


Figure 1

Figure 2

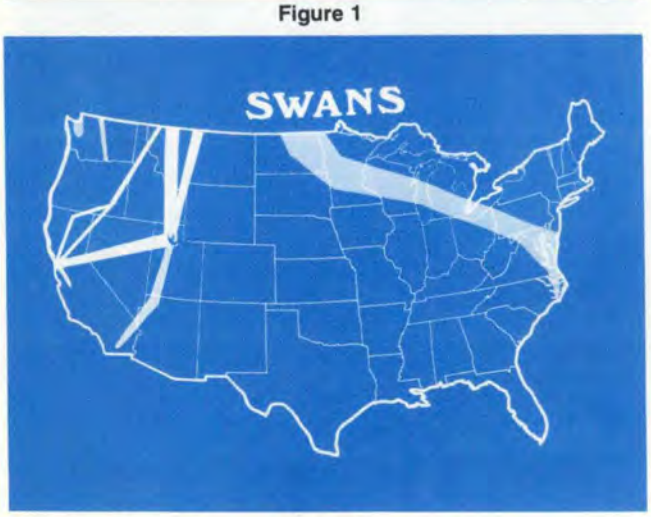


Figure 3

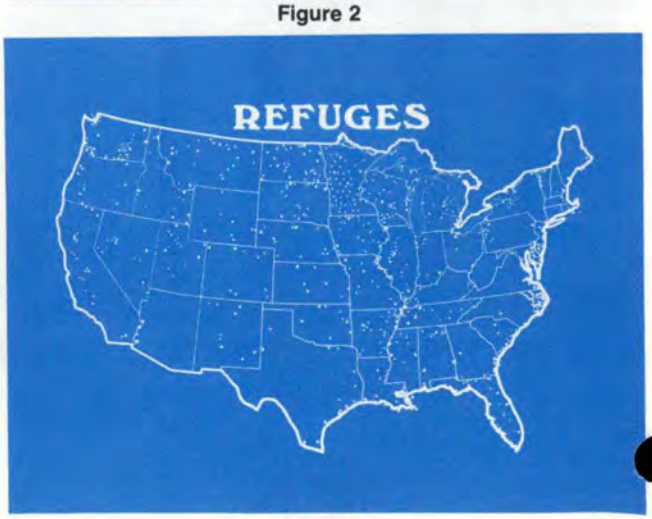


Figure 4

AGL).

Does the bird avoidance model portray the real world of birdstrikes? The Air Force reported twelve known damaging birdstrikes on IR-502* in 1981 resulting in $386,000 in damage to B-52 aircraft. Half of those were due to waterfowl. We know from past experience (USAF Birdstrike Report) that one out of every six birdstrikes causes reportable damage. IR-502 was flown around 1,200 times last year. This suggests that the total number of waterfowl birdstrikes on IR-502 was closer to 36 (three birdstrikes for every 100 flights). The model predicts that the risk will range from 1/100 to 11/100 on IR-502 from early October through December (depending on which period of day and week is used). This suggests the model is in the "ballpark" with the actual strike data using the limited data accumulated so far. It is important to remember that the model is probably more valuable in determining the relative birdstrike hazard than predicting actual birdstrikes. Population migratory data on additional types of birds (gulls, hawks, shorebirds) will be included in the model as the data becomes available. What the model can provide is a clear-cut picture of when the birds are to be expected.

A good example of this is the graph of birdstrike risk (page 13) for the proposed route, IR-435, which is a part of the Strategic Training Range Complex (STRC) to be located in Montana and Wyoming in 1982. Bird activity on the route will peak early in the fall and decline steadily until it bottoms out in late December. The birds are virtually absent from the STRC until March when they return in smaller numbers. The fall season usually poses the greatest potential for birdstrikes because there are more birds just after summer and the weather patterns stimulate intense migrations. But even in the high risk seasons the model can highlight the periods most favorable for flight operations. If the route "must" be flown during the heavy migratory season, midday (0930-1530) flight times are recommended.

How can the unit scheduling officer use the bird hazard information? One method would be to compare the risk for all routes available to be flown during a certain week and fly the route having the least risk. Heavies usually have more choice because of their greater range. This gives them the ability to fly different routes each month as the bird migratory activity progresses from north-to-south in the fall (vice versa in the spring). This method may require considerable coordination and planning but could significantly reduce waterfowl birdstrike risks.

The bird avoidance model allows updates as new information becomes available such as the formation of new waterfowl refuges or development of a new low level route. The model can examine the birdstrike risk on each segment of a route. This option is valuable in order to plan routes. Alternate routing now can be more quickly analyzed for bird hazards than was previously possible.

In the future, a centrally located system with multiple access via telephone lines could allow route planners/users to query the system about bird hazards expected on a particular route or range at a specific time. Eventually, given access to the system, pilots could alter their flight plans to fly routes having lower birdstrike risk.

The bird avoidance model will serve to increase overall aircrew awareness of the problem and will provide a basis for further research to reduce birdstrikes away from airfields. ■

*IR — instrument route

DO YOU CHECK NOTAMS?

MAJOR JOHN E. BLEVINS
Air Force Communications Command
Scott AFB, IL

■ Regulations require pilots to check weather and NOTAMs (Notices to Airmen) prior to each flight. Most of us religiously consult with the weather forecaster and usually at least glance at the NOTAM board before filing our flight plan. Do you obtain *all* available information concerning your flight? Do you even know how to obtain all available NOTAM information?

As NOTAM System Manager, I am particularly interested in how well the system is serving you, the aircrew. Personnel at the Air Force Central NOTAM Facility (AFCNF), the FAA National Flight Data Center, Base Operations at all military installations, and Flight Service Station specialists at civil airfields put much effort into providing you timely safety of flight information. Our system is good, and we are continually improving it.

However, from personal observation and discussions with other pilots, I have concluded that the weakest link in the NOTAM chain is you, the aircrew. Although you probably don't consciously jeopardize your own safety, I am sure that many pilots routinely fly without obtaining all available NOTAMs either because they don't know how to obtain them or because they have been lucky in the past and don't think that a thorough check of all NOTAMs is worth the extra effort during preflight planning. If you are in the first category, this article can help you. If you are in the second category, you are gambling for high stakes and probably someday you will lose.

In order to comply with AFR 60-16 and become aware of all appropriate procedures and available information applicable to the intended operation, the pilot in command should review the following, in addition to terminal FLIP.

- FLIP IFR or VFR Enroute Supplement.
- FLIP Area Planning.
- FAA Class II NOTAMs (Notices to Airmen).
- AFCNF NOTAM Summary and Hourly Update.
- FAA D Series NOTAMs (for civil airports if AFCNF products are not available).
- FAA L Series NOTAMs (obtained by phone or radio from tie-in FSS serving destination airport).

The FLIP Enroute Supplement and Area Planning documents probably do not require exposition; however, the various types of NOTAMs warrant some discussion. We should begin with a definition of a NOTAM and a brief explanation of the different types of NOTAMs available and their applicability. NOTAMs contain notification of the establishment, condition, or change of an aeronautical facility, service, or procedure that may be a hazard to flight.

FAA Class II NOTAMs is a booklet published every two weeks by the FAA to reduce congestion on the teletype circuits. This booklet is available in military Base Operations and FAA flight service stations and should be consulted prior to all flights conducted in US civil airspace, even though landing at a civil airfield is not intended. This publication is divided into two sections. The first section is arranged by geographical areas and states within those areas. It contains selected notices which are expected to remain in effect for an extended period, for example, restricted areas, airway changes, minima changes (for civil airports), special procedures. Although general notices are included at the beginning of the booklet, enroute NOTAMs are found throughout the publication under the state in which the NOTAM applies. Therefore, you should first determine which states your flight will transit and then review the NOTAMs for those states.

The second section of Notices to Airmen contains special notices that, either because they are too long or because they concern a wide or unspecified geographical area, are not suitable for inclusion in the first section. The content of these notices vary widely and there are no specific criteria for their inclusion, other than their enhancement of flight safety. All information contained in this publication will be carried until the information expires, is canceled, or in the case of permanent information, is published in the appropriate publication.

The next NOTAM products that you should be familiar with are the military NOTAM products from the AFCNF. These are the NOTAMs on the display board in most military Base Operations. The

AFCNF at Carswell AFB, TX, receives NOTAM inputs from all military Base Operations, the FAA, and from nearly all free world countries. The raw NOTAMs are manually edited, translated, and researched if necessary, and compiled into products called summaries and hourly updates. Separate products are developed for North America, Central and South America (CSA), Europe, and Pacific theaters. At specified times (Monday through Friday in the CONUS), the summaries are transmitted to US military Base Operations. Because of the time required to compile and transmit the lengthy summaries, some may be noncurrent when received. For that reason, it is essential that you consult the current hourly update immediately after reviewing the summary. If, at any time, a *current* hourly update is not posted, you should consider all NOTAM data posted to be unreliable and contact the dispatcher for assistance in obtaining current NOTAMs applicable to your flight. A phone call to your destination may be required. Do not, however, call the AFCNF, because their workload does not allow time for individual aircrew briefings.

The Europe, Pacific, and CSA products contain all applicable NOTAMs, including Class II, for all airports in those theaters for which instrument approach procedures are published in DOD FLIP. Therefore, when flying in the overseas theaters, the AFCNF NOTAM summaries and updates provide the best single source of NOTAMs. In those theaters, a problem arises if you transit an airport that does not receive AFCNF NOTAMs. In that case, you must obtain NOTAM information through the nearest civil aeronautical information service (AIS).

When flying in the United States, outside local military airspace, you must consult more than one NOTAM source. Keep in mind that AFCNF North American summaries and updates contain only military NOTAMs and FAA D Series NOTAMs for civil airports, which are included in FLIP, and enroute/special NOTAMs not included in the FAA Class II NOTAM booklet.

In summary:

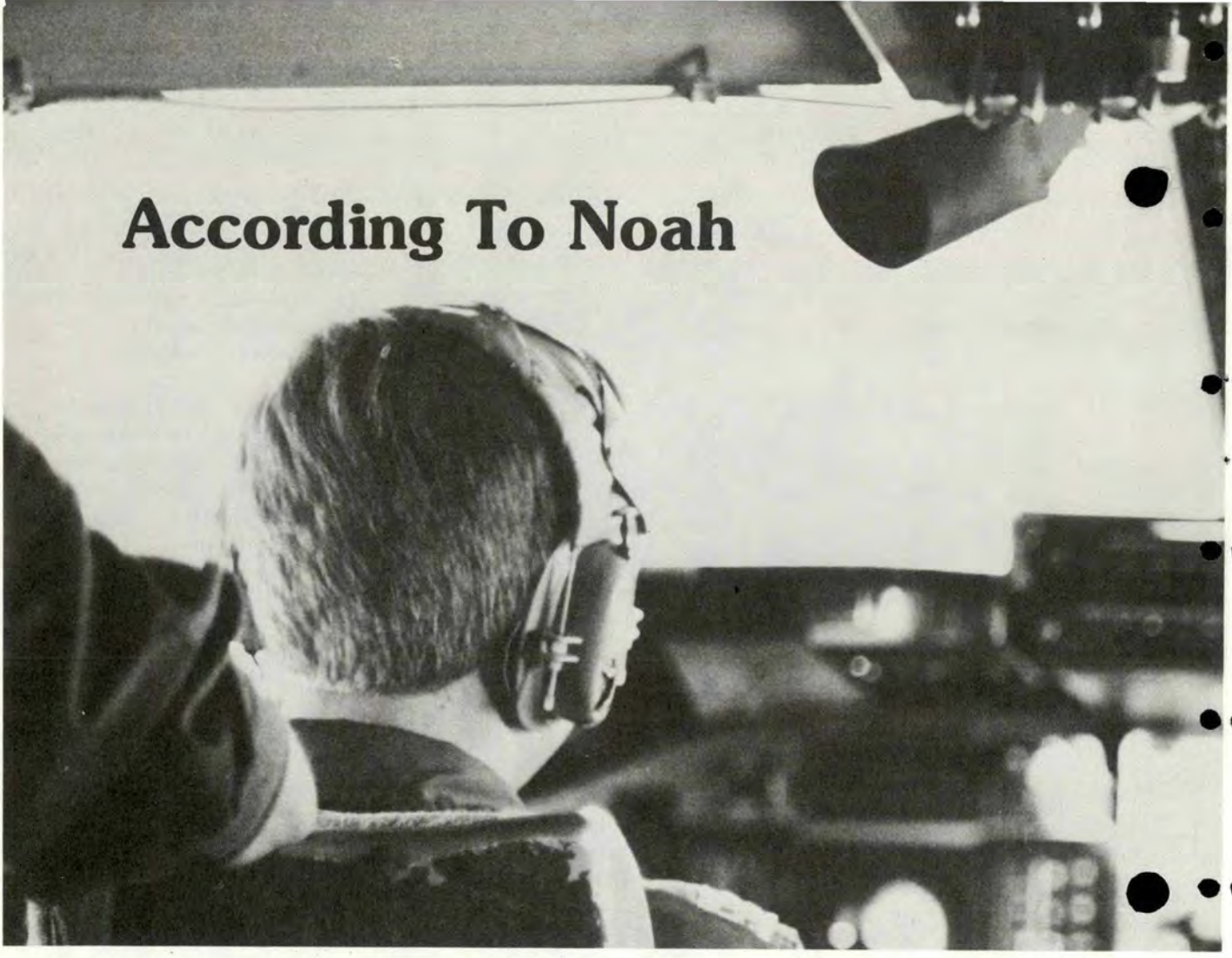
- When departing a CONUS military airfield for a CONUS military airfield, you should check FAA Class II NOTAMs for enroute and special NOTAMs and the AFCNF summary followed by the hourly update for point of departure, enroute, destination, alternate, and special NOTAMs.
- When departing a CONUS military field for a civil airport, you should check the NOTAMs above plus FAA "L Series" NOTAMs for the destination. If the destination civil airport is not covered by FLIP and the AFCNF NOTAMs, FAA "D Series" NOTAMs must be obtained from any FSS. For flights to all civil airports, FAA "L Series" NOTAMs should be obtained by contacting the tie-in FSS serving the destination airport either by radio or by telephone. The telephone number of the appropriate FSS may be obtained from any FSS.
- When departing a CONUS civil airport for a military field, you should obtain military NOTAMs by calling any military Base Operations. Don't forget to also check with FSS for departure airport and enroute NOTAMs, including Class II, and "D" and "L" Series.
- When departing a CONUS civil airport for another CONUS civil airport, you should obtain FAA "D" and "L" Series and Class II NOTAMs for departure point, enroute, destination, and alternate.

As you can see, there is much more to a thorough check of NOTAMs than merely glancing at the board. Although there are several sources of NOTAM data and a complete NOTAM check may be time consuming, is it worth a flying violation or possible loss of life to be lax in this area? ■

About The Author

Major Blevins is a staff officer in the Flight Standards Division of the Air Traffic Control Services Directorate of HQ Air Force Communications Command. He is manager of the US Air Force NOTAM System, a NOTAM evaluation pilot, ATC operational evaluation pilot, and flight inspection pilot with the 1866 Facility Checking Squadron. Prior assignments include Air Traffic Control Officer and T-38 Instructor Pilot.

According To Noah



Crew (KROO) n (O.F. crëue "growth, increase," fr. creistre "to grow").

The body of men manning or trained to man a machine, . . . or the like, or employed under one officer or foreman.

— Webster's New Collegiate Dictionary

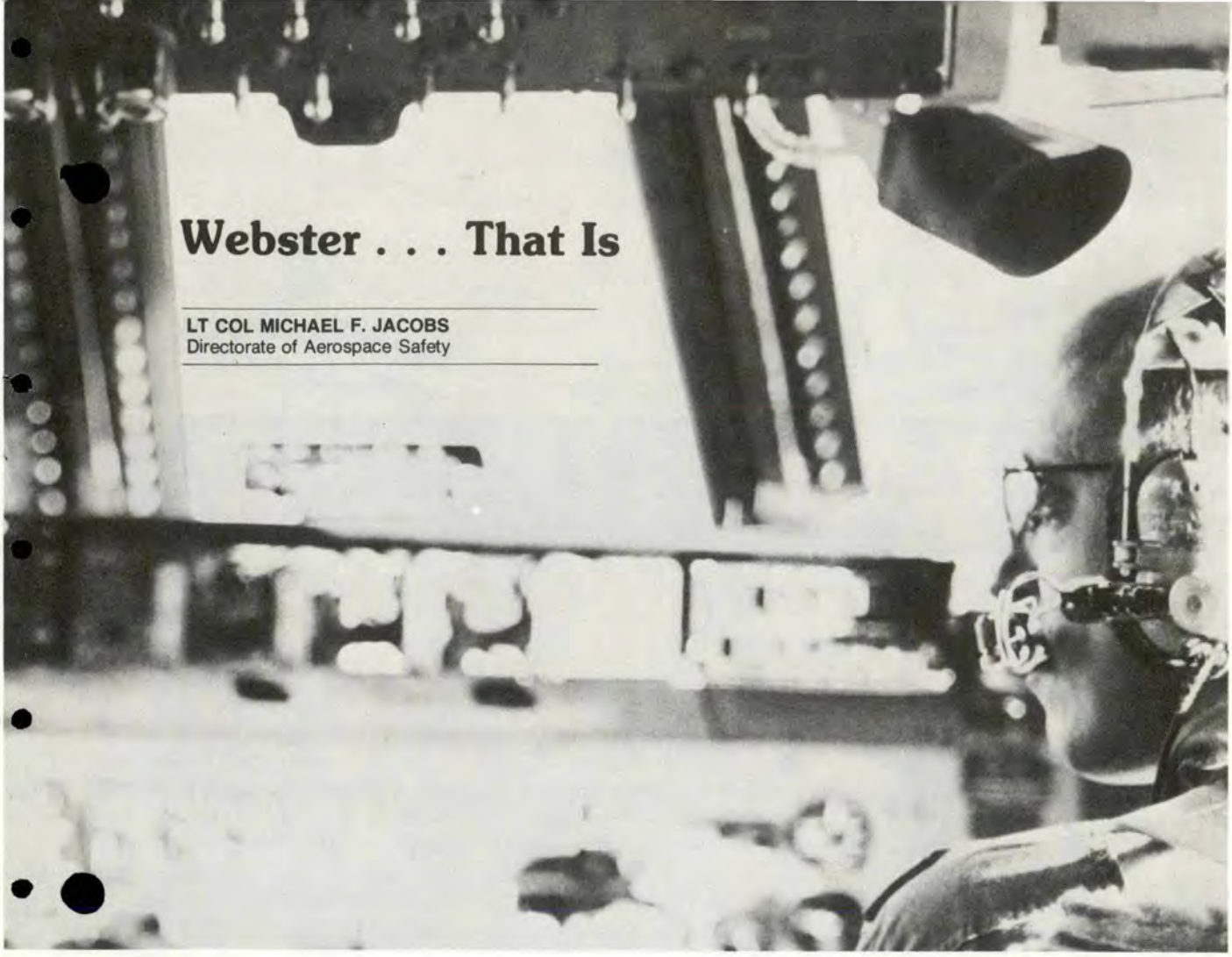
■ Isn't it strange that the very word we use to define a group of professional aviators means such a broad variety of things?

You probably noticed that Noah hedged his definition so that a "crew" may or may not be trained or led. As it stands, almost any group of people would fit — virtually anything from a mob to a gang to a team. Where are we, as military aircrews, supposed to fit?

Although it's not Noah's fault, we've seen the entire range over the course of the years. War stories always come from the extreme ends of the spectrum — the "mob" that flew a perfectly good aircraft into the ground — the "team" that brought back a bird that "couldn't possibly fly." What made the critical difference? The vital link was coordination. In Noah's words: coordination n– harmonious adjustment or functioning. Thus, crew coordination is the "harmonious functioning" of our "body of men" that are "trained to man a machine." There is no doubt that the team bringing back a broken bird under impossible conditions had all the elements — the "mob" didn't.

Crew coordination is a phrase that has been used (and misused) from the first days of aviation. It is frequently blamed for accidents or inefficiency. Yet, it has remained a gray area of instruction and regulation due to the broad variety of individual duties. Like the word "judgment," it is difficult to pin down.

Using Noah's definitions, let's investigate some of the elements necessary for effective Air Force crew coordination.



Webster . . . That Is

LT COL MICHAEL F. JACOBS
Directorate of Aerospace Safety

- Training.
- Leadership.
- Harmonious functioning.

Training generally starts with the formation of the "crew" on paper. After completing courses in aircraft systems, emergency procedures and mission elements, the group goes on to continuation training designed to maintain proficiency. It is possible to complete all phases of training without efficient crew coordination if tasks are complex, individualized, and not compared to the overall effect.

When precise, yet widely differing specialties are involved, instructors at all levels must insure that their students are trained and evaluated on their contributions to the rest of the crew. Emphasis must be placed on smooth, efficient mission accomplishment.

Leadership may also be misused to preclude the formation of a "coordinated" crew. Supervision that suppresses or excludes the weak individual(s) or that operates in a dictatorial manner divides the unit into "mobs" that often work against mission accomplishment. Misuse of leadership also includes lack of direction or self-isolation by the designated boss. The leader must have a thorough understanding of the mission goals and the individual elements required to achieve them. His decisions must create an atmosphere that insures instant response at the appropriate level to mission demands. Abdication of this responsibility will guarantee failure and may set the stage for a tragedy.

Harmonious functioning is too often misinterpreted to mean the creation of a "happy herd." From sunup to sundown, they mill around together without a specific purpose. The smiles on their faces often imply total integration where none exists in reality. When the "crew" becomes a social club, the frequent result is a breakdown of discipline when it really counts. Conversely, open hatred between members may also indicate a continual lack of discipline. Most desirable is an atmosphere such as may be present in an orchestra. The violinist and the flutist are professionals who feel neutral toward each other, but work with the conductor to produce a beautiful symphony.

What, then, is the answer for effective crew coordination? In simple terms (Noah's, in fact), the team must consist of expertly trained troops with good leadership who have free and open communication while they are accomplishing the mission. ■

SURVIVAL TRUTHS

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Fairchild AFB, WA

After 16 years in the Survival career field, and having taught at the Basic Survival School at Fairchild Air Force Base, the Jungle Survival School in the Philippines, and the "Cool School" in Alaska, a number of "Survival Truths" have become apparent to me. These truths are often ignored or overlooked because they are too obvious and, consequently, not even considered by many aircrew members. This article discusses seven of these truths in an effort to bring them to your attention. In doing so, I hope to assist the next aircrew member who finds himself sitting on a stump wondering what to do!

■ **Truth 1: It always happens to the other guy.** Intellectually, this is what most of us think when we read or hear about any incident where someone else has come to grief. Aircrew members tend to have absolute faith in their aircraft and its ability to transport them from one place to another, and in their own skills to overcome any inflight emergency. They tend to downgrade or not even think about the many factors that could result in a bailout, ejection, or crash landing and the survival episode that follows. We are always very sympathetic of that other "poor troop" who was forced to leave his airplane and the hardships that he endured. What we should be is empathetic! Recognizing that "it could happen to me" is the first important step in the next truth.

Truth 2: Preparation is the key to successful survival. It falls in two categories, mental and physical. One way to approach mental preparation is to ask yourself such questions as, "What scares me about surviving — wild animals, the dark, bad weather, my ability to save myself?" Once you have identified potential problem areas, it is relatively easy to eliminate or at least minimize them by taking every opportunity to learn more about those areas that concern you. One objective of survival training programs is to expose each trainee to a simulated survival problem and in doing so enable the individual to recognize his weaknesses and learn how to overcome them with the help of a highly skilled instructor.

Nowhere was this more clearly demonstrated than at the Jungle Survival School in the Philippines where aircrew members bound for Vietnam were given a task of surviving and evading in a Southeast Asian jungle. There they could listen to the new sounds, observe firsthand some of the strange plants and animals, and learn the techniques of evasion while being hunted by the "enemy" forces.

Once on the ground in Southeast Asia, the aircrew member was better prepared and knew what to expect from the environment and the enemy. The more you know about an environment, the less you will be intimidated by it. Physical preparation includes maintaining your health, practicing the survival skills that will enable you to protect yourself from the elements, and having with you the equipment you need.

Truth 3: Once on the ground, the survivor often experiences an almost overpowering urge to travel out under his own power, to get home at all costs. Unfortunately, this often results in the death of the individual. Rescue agencies, both military and civilian, advocate that the survivor *stay put!* Shock, dehydration,

hypothermia, or other physical injuries drastically reduce a survivor's ability to travel safely in unfamiliar terrain. Remain where you are, utilize the resources (both natural and those that you brought with you) to protect yourself from the elements, and let the rescue forces perform the mission for which they are trained, equipped, and ready to accomplish at a moment's notice.

Truth 4: Firecraft is the most important skill that crewmembers should master. The ability to light and maintain a fire provides a means to stay warm, signal, cook food, purify water, and dry clothing. Its value as a morale factor should not be overlooked either. With the possible exception of smokers, we have become a matchless society and do not use matches very often in our daily lives. Consequently, when the need arises to start a fire, we often have great difficulty. Review AFM 64-3 for the techniques of survival fire starting.

Truth 5: Hypothermia and dehydration are the causes of many needless deaths. Hypothermia, low body temperature caused by excessive loss of body heat, can quickly affect a person's ability to function effectively and make rational decisions. The signs and symptoms of hypothermia are too many to list and are often of little value to the victim. He is usually unaware of what is happening. As the body loses heat, cool blood circulating to the brain impairs its ability to function and causes the victim to make life-threatening mistakes.

I recommend aircrew members learn to recognize the factors that cause hypothermia: (1) cool to cold temperatures, (2) wet, windy conditions, and (3) a likely victim (one who is in shock, hungry, tired, and/or inadequately dressed). Any combination of these factors can very quickly lead to an individual becoming hypothermic. Protect yourself from the elements by wearing suitable clothing (This means proper clothing for the terrain under the intended route, not necessarily what's proper for the home base.); supplement the clothing with an improvised shelter; treat for shock; eat energy-producing foods (carbohydrates); and rest.

Dehydration is another silent killer! Like hypothermia, the lack of adequate water affects the brain very quickly. Approximately two and one-half quarts of water per day are expended by the body involved in routine daily activities. The body's water needs are significantly increased when working hard in the outdoors under adverse environmental conditions. This water loss must be replenished or, within a very short period of time — hours — the survivor's ability to perform will suffer. Studies have shown that a 2.5 percent loss of body fluids can result in a 25 percent loss in efficiency! Three early signs of dehydration that the survivor should pay attention to are: (1) a darkening of urine, (2) headaches, and (3) nausea. When any one of these appear, the victim should increase his water intake. Three to four quarts of water per day should be consumed in order to maintain efficiency. Once the survivor has his survival house in order, he then should be concerned about rescue.

Truth 6: A survivor who does little or nothing to draw attention to himself may be in for a very long stay. Trying to see a person on the ground dressed in flying clothing against a dark background from an aircraft flying at search altitude is very difficult. Survival radios have helped tremendously in locating downed aircrews. However, radios may not always be available when you need them most due to loss, damage, and cold-soaked batteries. Enlarge yourself by using whatever resources you have to draw attention to yourself. Do not underestimate the effectiveness of the signal mirror and the whistle to attract attention.

Truth 7: Your survival depends on your ability to maintain body temperature. Those activities that cause you to lose heat should be avoided. Stay out of the rain and wind; drink warm liquids rather than cold; don't sit on the cold ground; and, above all, do not eat snow to quench your thirst. Preserve your body heat by wearing adequate clothing, especially protecting your head and neck. Construct a shelter; build a fire; eat to prevent hypothermia; and maintain your fluid level.

This list of "Survival Truths" is by no means complete. You can add truths that you have discovered from your own experiences. At the very least, this article should provide some food for thought. Hopefully, it will cause you to study further and practice your survival skills before you, not that "other guy," need them. ■

OPS topics

Fly the Aircraft Now!

■ A good IP is always alert for the unexpected. Even so, there are times when the best you can hope for is not prevention but rather a superb recovery from a bad situation.

Here is an example. The student pilot was within three rides of completing the T-37 phase of training. He was not a marginal performer and had no special problems in the traffic pattern. So, as the student completed the ILS approach and flared for touchdown, the IP had no reason to suspect that this touch-and-go would be different. But, it was.

After touchdown, the student suddenly raised the gear handle *out of sequence and before adding power* or making sure the aircraft was safely airborne. There was enough extension in the gear struts to open the squat switches and allow the retraction cycle to start.

As the aircraft began to settle, the IP took control. He ballooned the aircraft and slapped the gear handle back down. The gear warning horn beeped for one or two seconds and then the gear indicated safe, just prior to the aircraft touching down again.

Because he though that the gear had been damaged, the IP elected to remain on the ground and aborted. Thanks to the IP's quick action, damage was limited to a scrape on the left inboard gear door.

The student explained his procedural error this way. Once he flared for the touch-and-go he began thinking ahead to entering the overhead pattern. This interrupted his thought patterns for the touch-and-go, and he got the steps out of sequence.

Thinking and planning ahead are essential to good aircraft control. But the requirement to plan ahead is secondary to the one cardinal rule — fly the aircraft now!

Lightning Strike

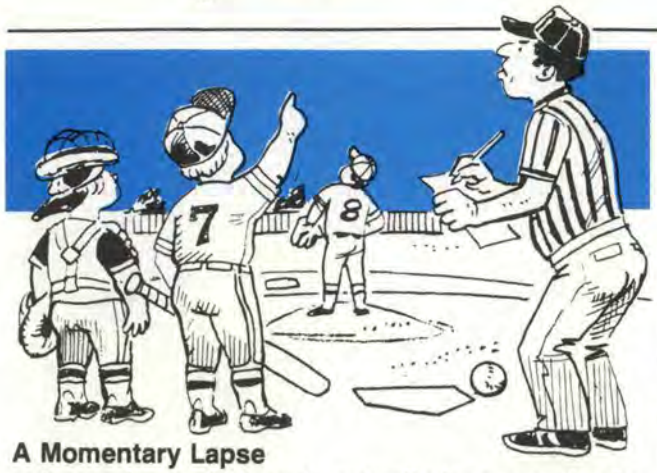
A B-52 was part of an ORI stream en route to the low level route entry point. The aircraft had descended from cruise altitude to entry altitude of 17,000 feet six or seven minutes before arriving at the final fix prior to route entry.

During the descent, the B-52 had entered clouds at FL 230 and started picking up light rime ice and St. Elmo's Fire at FL 200. At level off, the OAT was 0°C. Shortly before making the final turn over the VORTAC before entry, the crew began to hear static from the UHF radios.

This static increased to almost a painful level when about halfway through the turn there was a bright flash, and the aircraft lost all AC power. The copilot was able to bring three of the four AC generators back on line.

The aircraft commander aborted the route, declared an emergency and climbed out of the clouds en route home. After landing, maintenance found the number 3 generator burned out. The next two aircraft in the stream also suffered strikes and aborted the route at almost the exact same place.

At no time did any of the crews see lightning or thunderstorm activity either before or after the strikes.



A Momentary Lapse

I rented a small aircraft at the airport for the purpose of flying to the coast to practice maneuvers, stalls, etc. Flying over the town after takeoff I had the whim to find my old baseball field that I had played on for so many years as a youth. In doing so I inadvertently went below the minimum altitude (1,000') in an area considered to be congested. Upon finding the field after approximately five minutes, I made a pass over at about 300' to 400'. After passing I climbed out to 2,500' en route to the coast which turned out to be fogged in, so I then returned to the airport.

After landing I was made well aware of my mistake by the airport manager. Apparently several complaints were phoned in of a low-flying plane in the area. This was a totally ignorant mistake on my part . . . I never really stopped to think about what I was doing . . . I've learned a valuable lesson and am very sorry . . . I wanted to make aviation my career. This is a very humiliating experience and never again will I "not think" before acting . . . Such an unnecessary, idiotic mistake! — Courtesy NASA *Callback*.

A-10 Heads Up

As an A-10 began turning left out of the arming area, the left rudder pedal released and went full forward out of the pilot's reach. The pilot was able to stop the aircraft using right brake only before the wing hit a wall.

Maintenance investigators found that the rudder pedal adjustment assembly was so worn that the left rudder would not lock in place. The organization involved has recommended increased inspections for this assembly.

Well Done Award

Do you know anyone who, by performing outstanding feats of airmanship or support to an aircrew, has prevented or reduced the effects of a serious flight mishap? If you do, they're candidates for the Well Done Award.

This award consists of a narrative and picture of the recipient in *Flying Safety* magazine. A certificate and a letter of commendation from the Director of Aerospace Safety are also presented.

The criteria on how to go about nominating a person or persons for the award is spelled out in Section I of AFR 900-26. Take a look at it, and if you have any questions call the Editor of *Flying Safety* magazine at AUTOVON 876-2633.

Look around and submit those nominations!

Professionals Can Forget, Too

I was flying a small plane on a search for a missing aircraft in weather conditions that varied from 500 to 1,500 feet ceiling and five to 25 miles visibility. My assigned search area included an uncontrolled airport and its associated control zone. I conducted my search at 500 feet above ground level and as I approached the airport to examine the traffic pattern and approach routes a commuter airline flight on an IFR approach heard my position transmissions and confirmed with UNICOM that field was IFR.

Upon hearing this I realized that I was in the

continued

OPS topics continued

control zone illegally and proceeded to leave. I communicated my intentions and that I was well in the clear and would stay away from the airport to the commuter . . . and don't believe there was any danger of collision.

I have to say that I was entirely responsible for the situation. I was using a TCA chart to check for obstructions and to navigate my search track but failed to notice the control zone symbol. I did see the airport white beacon but this failed to register and I was flying in good visibility over flat land and with a definite cloud base . . . It never occurred to me that I wasn't legally VFR.

Anyway, the basic problem was that I am an airline pilot, and while I am familiar with airline totally IFR procedures, I had become weak on light airplane VFR procedures.

Air Force pilots need to review little used procedures also. Whether you are a weekend aero clubber or not, the VFR procedures, and even those less used IFR ones like lost com. and procedure turns deserve review. The cockpit in flight is no place for a quick refresher course. — Adapted from NASA *Callback*.

Safety Mishap Reporting

All too often field units wonder if their time and efforts in reporting mishaps really make any difference. Sometimes they never receive a response, and frequently corrective actions take a long time to come about. However, a recent example shows that timely reporting and performance of an inspection by an addressee clearly aided in preventing a potentially serious mishap.

Late last year an Aerospace Rescue and Recovery unit in the United Kingdom reported an incident where a cartridge-activated, inflight refueling hose cutter failed to operate. Their investigation revealed that the guillotine ejector cartridges for both hoses were missing, and neither hose cutter was operable. The investigation further disclosed that no work had been performed in that area since the cartridges were last removed when the aircraft was in contractor programmed depot maintenance.

As a result of the Class C flight mishap report submitted, an Air Force Systems Command test group in Hawaii performed a onetime inspection of their "tanker" model C-130s and found an aircraft also missing the hose guillotine cartridges. The following quote from a followup message from the Hawaii unit vividly makes the point of this article:

"Aircraft 225 experienced an inflight failure of the refueling reel assembly which required that the extended refueling hose be guillotined. Had this incident occurred prior to 19 September, it could easily have been a serious aircraft mishap. In this case, the safety reporting system clearly aided in the prevention of a serious mishap. Thanks for telling us." Lt Col Gardner, AFISC/SER. — Courtesy *TIG Brief*, No 1, 8 Jan 82.

Checklist, Checklist

There I was . . . Friday afternoon, T-37 student cross-country at an out base after the first leg. Since we were running behind (like everyone departing XC on Friday), we didn't file a stopover. You can imagine how much farther behind we became when I let the student mission-plan the leg. Not too smart a judgment call on my part. Live and learn!

On our way to the aircraft, I told the student to jump in and I'd do the walk/run around. As I g to the left engine nacelle, I remembered the life pre-

servers in the nose compartment (this leg was over water). As I pulled them out and threw one to the student, I saw he was having difficulty with his lap belt. What now! I really don't need this! HABIT PATTERN BROKEN! I rushed around to him and worked feverishly to fix his lap belt. I'm just a little upset now and still keeping my cool — but I am rushing!

I ran around the aircraft, jumped in, and off we went. Tower cleared us for takoff and a change to departure control. You guessed it — just as advertised: 90 knots equals a fully opened nose compartment. I watched in awe as it started to open upon rotation. My student didn't even notice it, so I took the aircraft and aborted.

There was some radio confusion until I finally got on ground control. How embarrassing do you think it is when the ramp is full of transient XC aircraft watching me taxi by, and half were from my base? Believe it, it's VERY embarrassing!

Moral: USE the checklist! That's what it's for, especially after something interrupts you. — Courtesy ATC Flight Safety.

Airborne Refueling Mods

In two separate mishaps receivers have been guilty of performing unauthorized mods on KC-135 tankers. Air refueling boom nozzles have been ripped from KC-135s by lower limit brute force disconnects as a result of receiver maneuvers.

An F-15 pilot was current and qualified in A/R but rather inexperienced. On the first attempt, the F-15 became very unstable in the envelope and was sent back to the precontact position. The contact was made on the second attempt and refueling started.

After about 500 pounds had been onloaded, the F-15 suddenly moved rapidly toward the inner/lower limit of the envelope. The boom operator called for a "disconnect" and "break away" in rapid succession. Even though the disconnect system was operating, the position of the F-15 caused the nozzle to bind in the receptacle, preventing release. The receiver pilot lowered the nose of his aircraft prior to retarding power or clearing the boom. The ensuing brute force disconnect overstressed the boom connections, and the F-15 brought the nozzle home in the A/R receptacle.

An F-4 also brought a nozzle home. But this case is even more interesting. Again, a lower/inner limit brute force disconnect caused the damage. However, prior to the refueling the F-4 had experienced *flight control problems*. In fact, the pilot had descended periodically to 10,000 feet to clear up the malfunction.

During air refueling, the F-4 started a minor PIO. The pilot reacted, but the erratic stick forces caused the aircraft to exceed the lower/inner limits before the boom operator could react. The pilot did trigger the F-4 disconnect button but it was inoperative.

39th ARRW Wins SICOFAA Trophy

The 39th Aerospace Rescue and Recovery Wing, Eglin AFB, Florida, is the winner of the System of Cooperation Among Air Forces of the Americas (SICOFAA) Flight Safety Award for 1981.

This award was established by the Inter-American Air Forces chiefs in 1976 to recognize aircraft accident prevention accomplishments of military organizations.

Wing-level organizations involved in defense, airlift, training, rescue, refueling, bombardment, strategic reconnaissance, and airborne control operations are eligible for the award. Tactical fighter, attack, and reconnaissance units are not eligible because they compete for the Colombian Trophy. The winner must have accident-free flying operations and other significant safety accomplishments during the award year.

MAIL CALL

EDITOR:
FLYING SAFETY MAGAZINE
AFISC (SEDF)
NORTON AFB, CA. 92409

Lightning Strikes

■ Reference Maj James E. Ellis' article, "Aircraft Lightning Strikes — An Unavoidable Phenomena," Flying Safety, Jan 82.

Many of the conclusions derived from Maj Ellis' statistical analysis of "less than 100 useful reports" verify what we have been advertising in the Air Weather Service Slide and Sound Presentation #51789-DF Lightning Strikes to Aircraft; however, two points need clarification.

While one aspect of the article dealt with the vertical envelope in terms of flight altitude, it is more important to relate the strikes to proximity to the freezing level. Quite simply, we have found that optimum conditions for a strike or electrostatic discharge are: in cloud, in precipitation, close to the freezing level and/or close to convective activity.

Secondly, lack of a summer maximum of strikes is not "surprising." We have found that fall and spring offer the greatest hazard based upon the combined influence of factors cited above. See your staff weather officer for a more detailed explanation.

John R. Sweeney
Colonel, USAF
Air Weather Service
Scott AFB, IL

Triple R

Major Fred Haggard's article on "Triple R" that appeared in your November 1981 issue was interesting and should be informative to the field. However, as the Tactical Air Command project officer on the North Field Test I would like to point out that his concluding paragraph may be misleading to those not familiar with the base recovery after attack program and the HAVE BOUNCE program.

While the North Field Test did demonstrate that the Air Force has the capability to repair bomb damaged runway, insufficient data was generated to positively determine the time required to repair craters of various sizes. The Triple R team goal is to repair three craters in four hours; however, this goal is considered to be very optimistic. In addition, the crushed limestone method requires a FOD cover to prevent damage to the aircraft. At North Field, a T-17 (neophrene-coated, nylon) membrane was used and two limitations on aircraft operations were discovered. The first problem was the inability of the FOD cover to support aircraft braking — the membrane would tear when brakes were applied. Second, the membrane also tended to tear when the F-4 tailhook was dragged over it.

The repairs at North Field were of high quality, which increases repair time. The F-4 requires high quality repairs and the North Field repairs were flush with the runway with maximum upheaval of two inches and maximum sag of one-half inch.

The HAVE BOUNCE program has shown that the F-4 requires a high pressure strut relief valve to operate on lesser quality repairs.

Base recovery after attack operations are very complex and require further testing and training, especially in a chemical defense environment. The Air Force recognizes this and tests similar to North Field will be conducted throughout the 1980's.

Bob Hoffman
Major, USAF
Langley AFB, VA

American Heroes

I read with extreme interest your article, "The Great American Hero," in the January 1982 issue of *Flying* magazine, and turned the page saying "yeah, yeah, yeah." As the wife of a "steely eyed, aggressive, and certainly intrepid F-15 aviator," I am definitely interested in articles regarding flying safety.

While I cannot lend any new revelation as to why we (and pilots included) do the things we do, I can say that articles that highlight flying safety tips are positive clues to the "BIG PICTURE." If just one of your cited "cases in point" jars an aircrew's memory during some critical phase of flight or emergency, hopefully a thankful aircrew will drop you a line.

For me and all the other "fighter-wives" here at Eglin, thank you *Flying* magazine and Major Gary L. Studdard for your concern and efforts in avoiding accidents and incidents.

Judy K. Szczur
Fighter-Wife
Shalimar, Florida

Our only purpose in Flying Safety *is to preserve our ability to fly and fight and win. And you're exactly right — people really make the difference. We've reprinted your letter in the hope that all steely eyed ones will read it. Thanks, Judy.*

Flying Safety Information

As a career aircraft maintenance officer, I read your magazine on a regular basis. I particularly look for articles that have maintenance-related implications to flying safety. Your Ops Topic feature titled "Aircraft Deicing" that appeared on page 28 of the December 1982 issue (Vol 37, No 12) interested me, but not to any great significance until the recent tragic accident involving Air Florida Flight 90 at Washington National Airport. The accident, its intensive news coverage, and an article that appeared in the 25 Jan 82 issue of *Newsweek* titled "Death on the Potomac" by Peter McGrath et al, brought to light too many similarities with the subject and content of your article.

I do not, in any way, make the suggestion that improper deicing or negligence in checking the tail surfaces for snow/ice accumulation caused the accident. Whether it was a contributing factor or not will be determined by people far more experienced in accident investigation procedures than myself. What I am concerned about is the exchange and use of flying safety information between agencies such as the Air Force Inspection and Safety Center (AFISC) and other Federal agencies such as the National Transportation Safety Board (NTSB) and Federal Aviation Administration (FAA).

The purpose of this letter, to conclude, is to suggest either an initiation or review of existing flying safety information exchange procedures between agencies such as the AFISC, NTSB, FAA and any other DOD, Federal, or commercial organizations interested in flying safety. I can only add, in closing, that providing the information to the field is only one-half of the battle — using it is the other. Keep up the quality of your fine magazine.

Robert A. Drewitt
Major, USAF
Montgomery, Alabama

There is a very comprehensive safety information exchange already in existence throughout the aviation community. AFISC receives safety information inputs from governmental agencies and civilian organizations worldwide. Whenever the information is thought to be of value to US Air Force personnel, it is disseminated in the most appropriate manner. The Ops Topic you refer to and Flying Safety *itself are part of this process.*

We agree with you that providing information is only the first step. The rest is up to operators, maintainers, and commanders. They are the real mishap preventers.

Potential FOD Incident

Enclosed is a photograph of what is left of a 781 aircraft form that was ingested into the intake of one of our F-4C aircraft and ended up lodged at the eleven o'clock position on the number 1 engine. This aircraft was cross country when the forms were misplaced and not discovered in the intake until it landed at the next landing base. The only problem noted by the aircrew was the missing aircraft forms. The forms were discovered during the post flight inspection by maintenance personnel. A thorough engine FOD inspection revealed no damage.

As the base FOD prevention officer, I thought that you might be interested in publishing this incident for others to learn from. How lucky can we be? ■

Robert L. Myer
Maj, IN ANG
Ft. Wayne Municipal Arpt, IN

NEWS FOR CREWS

Career information and tips from the folks at Air Force Manpower and Personnel Center, Randolf AFB, TX

UPT/UNT Instructor Opportunities

■ UPT and UNT entry rates are higher now than they have been in six years. Due to this increased production, the Air Training Command (ATC) is actively seeking highly qualified and motivated pilots and navigators to serve three to four year tours as ATC instructors.

UPT

The ATC instructor pilot (IP) force has increased considerably over the last five years. Each major weapon system (MWS) has a quarterly quota into the ATC IP force. Presently, the force consists of approximately 800 MWS-background pilots and approximately 1,100 first assignments IPs (FAIPs). What does this mean to you as an experienced pilot in the ATC IP force? Many supervisory jobs are currently held by MWS pilots because a FAIP is usually too young and requires a longer time to become experienced. After six to nine months on the flight line, MWS pilots are eligible for positions as Operations Officer, Section Commander, Flight Commander, Chief of Stan Eval, Chief of the Student Branch and Academics. Opportunities exist for these supervisory positions initially at the UPT level and later at PIT and HQ ATC.

Presently, ATC needs numerous qualified and motivated pilots to fill slots in the T-37 and T-38 at Laughlin, Columbus, Reese, Vance, Sheppard, and Williams AFBs, as well as T-37s at Mather, and the T-41 at Hondo and the Air Force Academy. If you are interested in ATC IP duty and desire more information on many of the opportunities, please call Capt Tom Jackson or Capt Jack Mohr, HQ AFMPC, AUTOVON 487-6124/6125.

UNT

UNT production is scheduled to increase from just over 600 navigators in FY80 to 1,000 navigators in FY83. Mather has experienced more than a 35 percent increase in instructor requirements over the past 18 months to prepare for the highest UNT production level since 1975.

ATC requires a balance of MWS inputs that total almost 100 navigators per year. Included in this instructor force are fighter and recce WSOs, bomber navs (radar navs preferred) and EWOs, tanker and recce navs and EWOs, and strategic and tactical airlift navs.

These inputs go to three UNT squadrons, one EWT squadron, and an NBT/Advanced Navigation (tanker, transport, bomber track) squadron. There are also opportunities for a few select WSOs to move into the T-37 squadron as tactical navigation (fighter track) instructors after gaining some UNT experience.

Presently, the primary requirement is for captains with at least three years of MWS experience. Prior instructor qualification is desired but the overriding qualifications are motivation and an above-average performance record both as an officer and as an aviator. There are also periodic requirements for a few field grade officers at Mather, initially as instructors, but with further utilization in supervisory and staff positions.

Ample opportunities exist at Mather for instructors to move into positions of responsibility that may not be available in MWS flying or that would only be accessible to more senior officers. Staff positions in operations, scheduling, standardization, safety, training, and trainer systems are available for all grades. Assistant and flight commander duties, operations officers, squadron commanders, as well as branch and division level chiefs positions are some of the supervisory responsibilities available to officers in the senior captain to lieutenant colonel grades.

If you think you might fit into the challenging and very rewarding responsibilities of training future Air Force navigators, and need the opportunity for career broadening, please call Capt John Park, HQ AFMPC, AUTOVON 487-6831. ■

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UNITED STATES AIR FORCE

Well Done Award

Presented for

outstanding airmanship

and professional

performance during

a hazardous situation

and for a

significant contribution

to the

United States Air Force

Accident Prevention

Program.

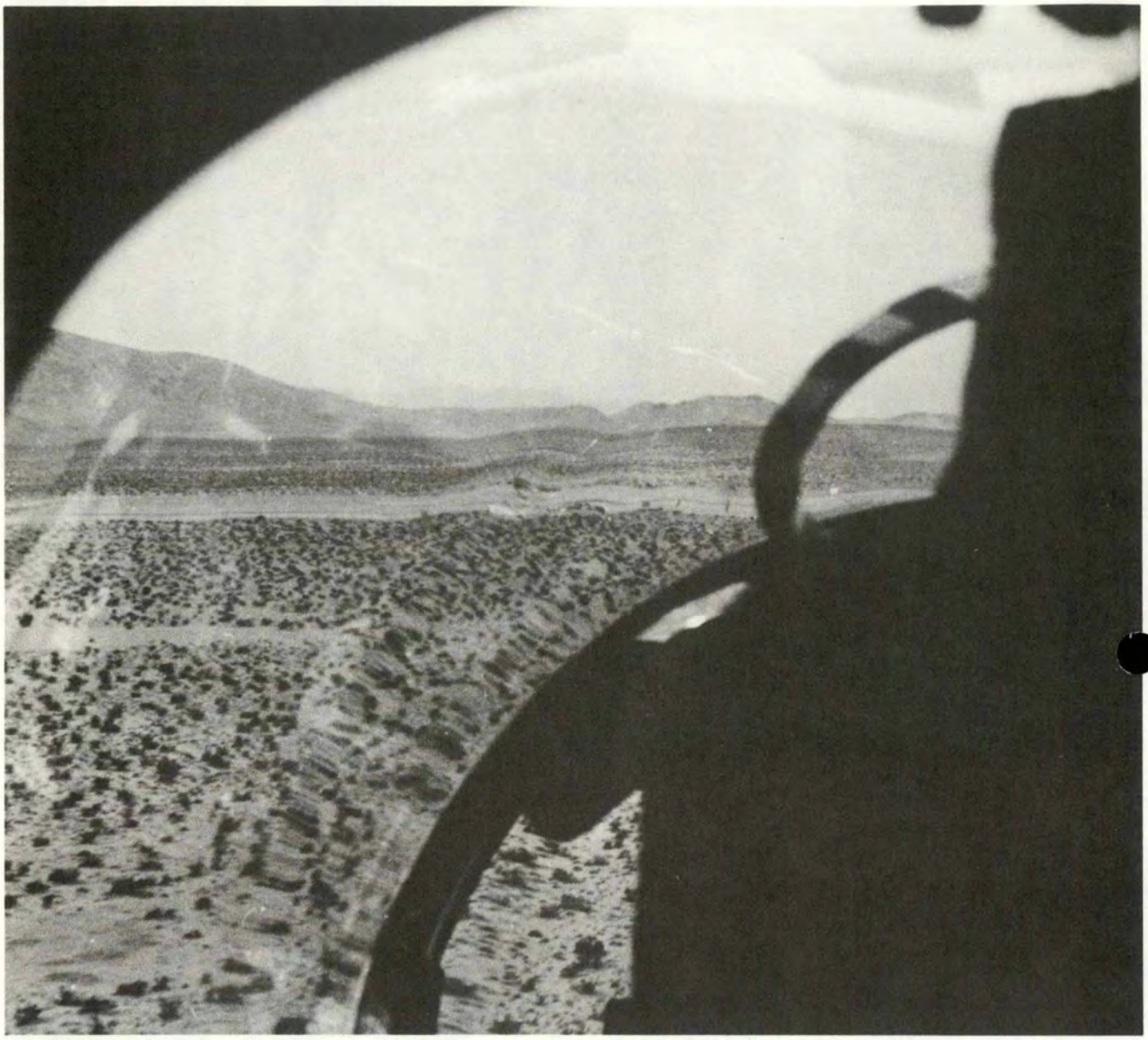
CAPTAIN

Edward W. Bular

146th Tactical Fighter Squadron
Greater Pittsburgh IAP, Pennsylvania

■ On 6 June 1981, Captain Bular was returning to Greater Pittsburgh IAP in an A-7D aircraft. He was approximately four miles southeast of the airport at 3,400' MSL (2,100' AGL) preparing to enter initial for an overhead approach when his engine flamed out. His airspeed was decreasing and soon would be below the speed necessary to maintain sufficient rpm for an airstart, and his altitude was approaching the minimum recommended controlled ejection altitude of 2,000' AGL. At the moment the flameout occurred, Captain Bular's aircraft was directly over the suburbs of the city of Pittsburgh. He recognized the potentially disastrous consequences of abandoning his aircraft at low altitude over a heavily populated area and elected to use his available excess altitude and airspeed in an attempt to turn the aircraft away from the city prior to ejection. The only less densely populated area was to his right rear, so Captain Bular started a turn in that direction. During the turn he extended the RAT, selected manual fuel, and attempted an airstart. As he was nearing a position and heading where he could safely abandon the aircraft with minimum danger to people on the ground, he heard the engine accelerating. He advanced the throttle and the engine responded, then after evaluating engine reliability, elected to land rather than eject. He reversed his turn and made an immediate landing. WELL DONE! ■

P_k* The Earth=Almost 100%



STAY ALERT

*Probability of Kill

STAY ALIVE