flying

SAFETY

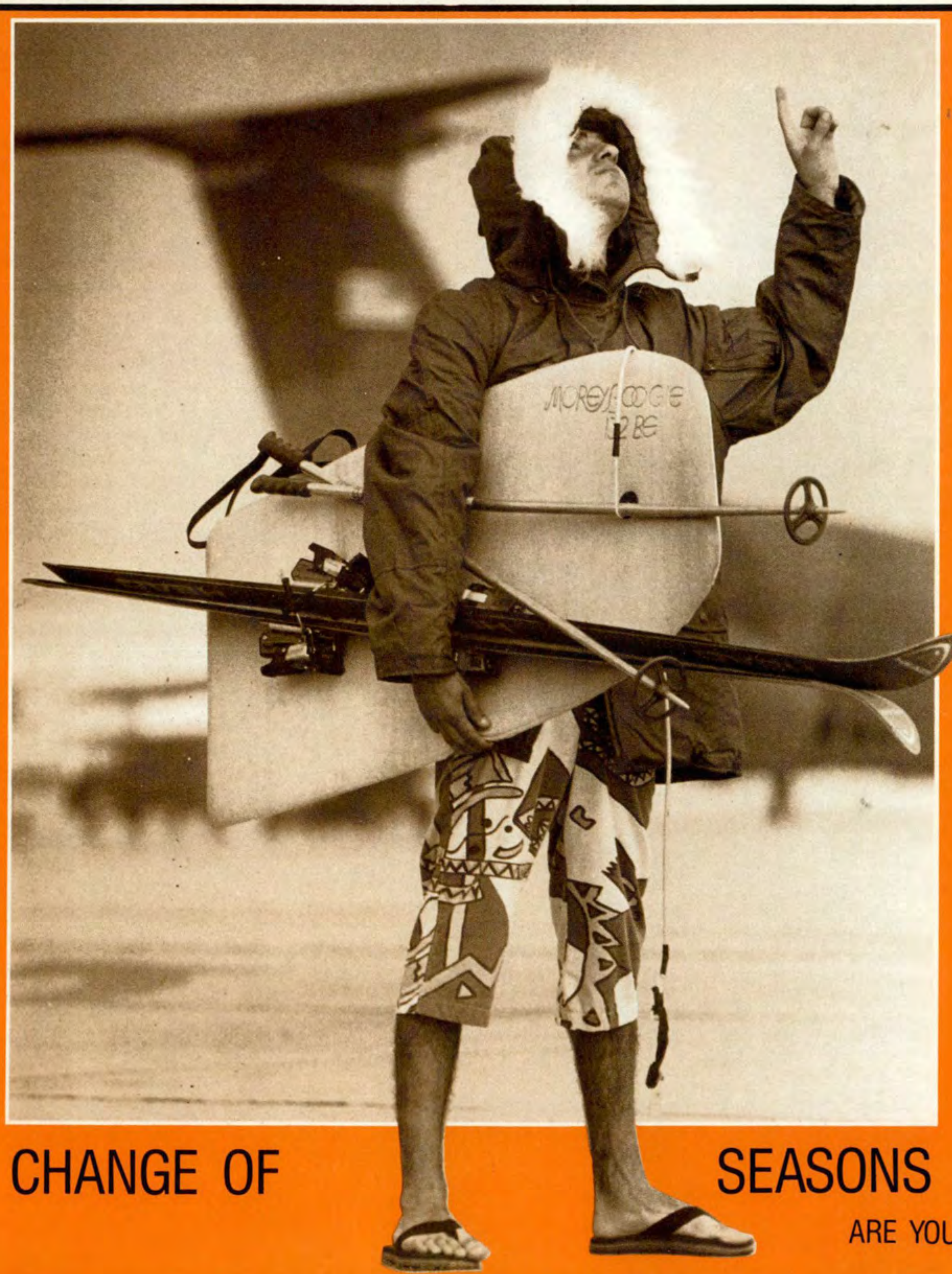
OCTOBER 1988

Cold Weather Demands

Feathered and Metal-Winged Fliers

Surrounded

Rivet Workforce



CHANGE OF SEASONS

ARE YOU READY?

THERE I WAS

■ I am a parachute rigger who has been a member of the aero club since I joined the Air Force. I think the first real challenge a student pilot gets in the aero club is the check ride with the senior flight instructor (SIP). This ride is to determine if you are ready for your first solo. My turn with the SIP came in the summer of 1985. On this flight, I would not only prove I was ready to solo, but also that even a parachute rigger has the capability to crash an airplane. On this flight, I would nearly do it twice.

It was a hot Saturday with the temperature in the high 90s. The Cessna 152 I was going to fly had a full load of fuel, and the SIP was big — over 200 pounds. I was a little nervous, but I checked out the airplane and we were soon taxiing.

As soon as I was cleared for takeoff, I pulled out on the runway. The last 2,000 feet were under construction, but we still had plenty of room. I could see the workers on the other end of the runway through the heat waves. Knowing how important this flight was, I wanted to do everything by the book.

The book called for rotation at 50 knots. I wanted to rotate closer to 60 knots, but with the SIP watching everything I did, I rotated at 50 knots. As soon as we broke ground, I heard the stall siren screaming. I felt the main gear hit the runway and we bounced back into the air. We were less than 10 feet in the air, and the aircraft was bouncing around like it was in wake turbulence.

I wanted so badly to just close the throttle and put the airplane back on the runway to get control. But I stayed with it and tried my hardest to keep it in the air until I could get my speed up and regain control. Before I got the speed up, the airplane was yawing real badly to the right. I can recall looking through the front window at an A-10 on the ramp.

The speed finally came up, I got the airplane straightened up, and started the climb out. We had about 200 to 300 feet as we passed over the construction area. I was ready to call it quits right then and try again another day, but I pushed on. I completed all the area work without much problem. The flight was not one of my best, nor was it an enjoyable one.

Now it was time to do some touch and go's. I really wasn't looking forward to this after the wonderful takeoff I had made. About 4 miles out from the downtown airport, I received clearance to enter a downwind. We were right over a park with the city to our left when something caught my eye. I looked to the left and my heart began to race. What had gotten my undivided attention was a green-and-white Piper we missed by about 500 feet.

The Piper had four people in it. The pilot was a big guy with a white short-sleeved shirt, blond hair, and a partially bald head. I quickly turned to the SIP and said, "Did you see that?" He said, "See what?"

I was mad. The control tower never advised me of the traffic. The SIP never saw it. I didn't see it until too late. This really completed my day. Not only did I nearly crash on takeoff, I also nearly had a midair. In spite of all this, I did pass the check ride.

I learned one thing that day — to go with my instincts. I had all the room in the world for takeoff in the Cessna 152. Since the airplane was heavy and I had room to rotate at a higher speed, I should have done so. Also, even though you have clearance and someone is watching you, you still have to watch out for other airplanes. ■

UNITED STATES AIR FORCE

flying

SAFETY MAGAZINE

AIR FORCE SPECIAL PUBLICATION 127-2 — OCTOBER 1988 — VOLUME 44, NUMBER 10

CONTRIBUTIONS

Contributions are welcome as are comments and criticism. No payments can be made for manuscripts submitted for publication. Address all correspondence to Editor, *Flying Safety* magazine, Air Force Inspection and Safety Center, Norton Air Force Base, California 92409-7001. The Editor reserves the right to make any editorial changes in manuscripts which he believes will improve the material without altering the intended meaning.

page 2

page 6

page 14

SPECIAL FEATURES

REGULAR FEATURES

DEPARTMENT OF THE AIR FORCE • THE INSPECTOR GENERAL, OSAF

PURPOSE — *Flying Safety* is published monthly to promote aircraft mishap prevention. Use of funds for printing the publication has been approved by Headquarters, United States Air Force, Department of Defense, Washington, D.C. Facts, testimony, and conclusions of aircraft mishaps printed herein may not be construed as incriminating under Article 31 of the Uniform Code of Military Justice. All names used in mishap stories are fictitious. The contents of this magazine are nondirective and should not be construed as regulations, technical orders, or directives unless so stated. **SUBSCRIPTIONS** — For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Changes in subscription mailings should be sent to the above address. No back copies of the magazine can be furnished. **REPRINTS** — Air Force organizations may reprint articles from *Flying Safety* without further authorization. Non-Air Force organizations must advise the Editor of the intended use of the material prior to reprinting. Such action will ensure complete accuracy of material amended in light of most recent developments. **DISTRIBUTION** — One copy for each six aircrew members. One copy for each 12 aircrew support and maintenance personnel. Air Force units must contact their base PDO to establish or change requirements. AFSP 127-2 is entered as a publication at the Second-Class rate (USPS No. 586-410) at San Bernardino Postal Service, 1331 South E Street, San Bernardino, CA 92403 and additional entries.

Cold Weather Demands . . .

PEGGY E. HODGE
Assistant Editor

■ A change of seasons is upon us! Migrating birds have gone south, and many retired people have headed for Florida or southern California — but we can't pack up our aircraft and move. As crewmembers, we must face the situation. So, as our weather is beginning to change (and already has in some parts of the country), we offer here a winter preview to remind you of some of the cold weather demands you may face in the next few months, and some checklists to make sure you're around come spring.

I recently flew with a C-141 crew of the 52d Military Airlift Squadron, Norton AFB, California, to find out what most concerns our aircrews today as we approach the cold weather season. I found that cold weather places demands on both equipment and aircrew performance. These may be areas of concern for you also.

Equipment Demands

Lt Col James S. Parker, the Aircraft Commander, says, "the thing that bothers me most about cold weather is operating the airplane on the ground at a cold weather location — landing on a runway that has a low runway condition reading (RCR) and operating on taxiways that have even lower RCRs." Snow and ice on runways, taxiways, and aircraft are a major concern to our crews and do, indeed, present problems. First, let's talk about runways and taxiways.

Runways and Taxiways With moisture from rain, slush, or snow, it is not uncommon for runway conditions to become hazardous, especially at night when below-freezing temperatures quickly change a wet runway into an ice-coated runway.

It is important to point out here that this is even more critical as the season changes because we are used to taxiing our aircraft on a dry, perhaps wet runway, but certainly not an icy or snowy one.

"When you land on a runway that is icy or snowy, you run the risk of not having sufficient braking, so you have to be very careful to prevent skidding," says Lt Col Parker.

Taxiways can be a bigger problem than the active runway. If you've managed to escape the peril of landing on a slippery runway, you then have to taxi on taxiways where the RCR may be lower than it is on the runway. Civil engineering keeps runways clear, but doesn't always have time to get to the taxiways as frequently. It is a good idea to ask for a reading on the taxiway, but keep in mind that RCRs may not always be available, so you may not

A WINTER PREVIEW

really be sure what kind of braking action to expect.

RCRs normally give a good estimate of what kind of braking to expect. Even so, it is a good idea to request more information. How old is the reading? Was it taken right behind a snow plow? What is the RCR in the planned stopping zone? Has precipitation occurred since the reading was taken?

After landing, if the runway is wet or snow-covered, use as much aerodynamic braking as is available and consistent with the wind conditions. Then start braking as soon and as hard as possible without locking the brakes. If available, thrust reversers are, of course, invaluable. Check the Dash 1 procedures for your specific aircraft.

Aircraft "I am also concerned," says Lt Col Parker, "that when our crews get ready to depart an airfield that has snow and ice that they don't depart with an aircraft not ready to fly." "Especially," he says, "if there's freezing rain or it's actively snowing, making sure their aircraft is clean." The engineers also expressed this concern over snow and ice buildup in the engines, on the wings, and on the control surfaces. They emphasized using proper deicing procedures.

Remember the Air Florida Boeing 737 tragedy in January 1982 at Washington's National Airport? The National Transportation Safety Board's investigation into the crash determined that the above concerns were a major portion of what led to the disaster of Air Florida Flight 90.*

- The aircraft was not properly deiced and anti-iced. Procedures used to deice and anti-ice the aircraft were deficient.
- Ground maintenance people and the captain failed to verify that all snow and ice were removed from the aircraft.
- The aircraft was delayed for approximately 49 minutes after deicing and anti-icing awaiting clearance.
- The flight crew did not use engine anti-ice during ground operation and during takeoff.
- The engine inlet pressure probes became blocked with ice during ground operation because engine anti-ice was not used.
- The flight crew observed and commented on ice buildup on the wings while waiting for takeoff.
- Contrary to the flight manual, the crew tried to use the exhaust from aircraft in front of them to deice their aircraft while waiting to take off. This could have caused ice to stick to the wings' leading edges and block the engine inlet pressure probes.
- The flight crew set takeoff thrust using the engine pressure ratio (EPR) gauges, but the EPR gauges were incorrect due to icing on the engine inlet pressure probes.
- Ice and snow buildup on the leading edges resulted in a pitchup at liftoff, and an abnormal forward pressure was required to counter it.

We can see how critical it is to properly clean our aircraft and to take off with it "clean."

There is no sure-fire method that will remove all combinations of ice and snow from an airplane. In general, light, dry snow will blow off during takeoff. Slush or heavy snow will usually be swept off. Frozen snow, ice, or heavy frost will normally have to be melted either with heat or deicing fluid. If a deicing truck appears necessary, make sure you order it early enough to make your scheduled takeoff time.

Remember that snow covering the aircraft during preflight can obscure hard-packed snow and ice *underneath*. The snow can also hide fro-

continued

*Findings extracted from "The Hazards of Winter Flying," *Flying Safety* magazine, October 1982.

Fighters, too, experience their own problems in cold weather. Whatever you fly, be prepared for cold weather demands . . . have a game plan for the worst possible situation.

Cold Weather Demands . . . continued

zen control surfaces or other problems. There have been documented cases of leading edge slats and other controls freezing.

Be sure *all* ice and snow have been removed from the aircraft before taxiing. Be especially careful to check all static ports and control surfaces during your preflight. Watch for places where melted snow could pool and refreeze before takeoff. Also, ensure the aircraft is free of ice and snow just prior to takeoff, *especially if you have been delayed since deicing.*

Aircrew Demands

Extreme temperatures also place a demand on our aircrews.

Performance As aircrew members, you can be exposed to great temperature changes during a single sortie. You may depart from an airfield with a ground temperature of more than 113 degrees Fahrenheit, but may have an en route stop or final destination at a cold weather base. You must be prepared for expected temperature variations. It is a good idea to review your Dash 1 on cold weather operations and bring with you any necessary cold weather gear.

You should also consider a possible bailout or ejection over a "cold" mountain range. *Dress for the worst conditions you will fly over.* Many aircrew members have survived a bailout or ejection over mountains because they were properly clothed.

If the temperature becomes extreme to the point of discomfort, it can interfere with your performance. Extreme temperatures can degrade our ability to perform a specific task. It is difficult to relate this performance loss to a particular temperature level; but if the temperature deviates significantly from a comfortable one, we may have some difficulty in completing a specific task.

When temperatures are excessively cold, your aircraft preflight may suffer. Cold temperatures and windchill add to the stress of preflight operations. You may tend to "rush" through the checklist because you're cold!

Windchill The windchill factor can make things even tougher for our crews. In low temperatures, the added effect of windchill can create a serious additional hazard by lowering the effective temperature and increasing the possibility of frostbite. Even when the temperature may not be particularly low, it is still important to remember the danger of windchill.

A good rule of thumb is for each mile per hour of wind, subtract one

Your cockpit may be toasty, warm, and comfortable. But remember to consider your en route and destination environments. These areas may present a different picture. Cold weather, with its extreme temperatures and winter elements, demands we be ready.

WIND SPEED		COOLING POWER OF WIND EXPRESSED AS "EQUIVALENT CHILL TEMPERATURE"																				
KNOTS	MPH	TEMPERATURE (°F)																				
CALM	CALM	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50	-55	-60
		EQUIVALENT CHILL TEMPERATURE																				
3 - 6	5	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50	-55	-65	-70
7 - 10	10	30	20	15	10	5	0	-10	-15	-20	-25	-35	-40	-45	-50	-60	-65	-70	-75	-80	-90	-95
11 - 15	15	25	15	10	0	-5	-10	-20	-25	-30	-40	-45	-50	-60	-65	-70	-80	-85	90	-100	-105	-110
16 - 19	20	20	10	5	0	-10	-15	-25	-30	-35	-45	-50	-60	-65	-75	-80	-85	-95	-100	-110	-115	-120
20 - 23	25	15	10	0	-5	-15	-20	-30	-35	-45	-50	-60	-65	-75	-80	-90	-95	-105	-110	-120	-125	-135
24 - 28	30	10	5	0	-10	-20	-25	-30	-40	-50	-55	-65	-70	-80	-85	95	-100	-110	-115	-125	-130	-140
29 - 32	35	10	5	-5	-10	-20	-30	-35	-40	-50	-60	-65	-75	-80	-90	-100	-105	-115	-120	-130	-135	-145
33 - 36	40	10	0	-5	-15	-20	-30	-35	-45	-55	-60	-70	-75	-85	-95	-100	-110	-115	-125	-130	-140	-150
WINDS ABOVE 40 HAVE LITTLE ADDITIONAL EFFECT		LITTLE DANGER					INCREASING DANGER (Flesh may freeze within 1 min.)							GREAT DANGER (Flesh may freeze within 30 seconds)								

degree of temperature. For example: A −20 degrees Fahrenheit reading and a 20-mile-per-hour wind will give you an effective temperature reading of −40 degrees Fahrenheit. Note the windchill effects on the table above.

To Make Sure

The winter weather conditions encountered by the crew of the Air Florida Boeing 737 and the cold weather concerns of this 52d Military Airlift Squadron's crew are no different than the ones most crewmembers can expect to see this winter. To make sure you're around come spring, we offer the following winter checklists:

On the Ground

- Clothe and equip adequately for any en route stops, overflight areas, and your final destination.
- Eliminate *all* frost and snow from your aircraft.
- Check flight instruments to ensure they are operating properly.
- Know the complete anti-icing and deicing system of your aircraft.
- Know how to detect and combat engine icing.
- Know the correct techniques for landing on snow and ice.
- Be physically fit.
- Understand cold weather survival techniques.
- Doublecheck with forecaster when weather conditions are reported as marginal.

In The Air

- Avoid flying into known or forecast areas of freezing rain or other precipitation.
- Obtain frequent en route weather advisories.
- Make pilot reports whenever weather has deteriorated from that forecast.
- Use all available approach aids.
- Most importantly, on the ground or in the air, **REMEMBER TO REVIEW YOUR DASH 1!** "Don't forget your Dash 1," says Lt Col Parker. "Don't be the next person to run off the runway or suffer any other kind of cold weather mishap. The only way to prevent this is prior planning and strict adherence to procedures. Our Dash 1s have been written from years of experience."

Serious Business

Cold weather is, indeed, serious business! A review of our 1987 cold weather mishaps (January-March and October-December) included numerous Class Cs, three Class Bs, and four Class As. This report tells us *we are all susceptible* — fighters, heavies, and trainers alike.

So, when cold weather demands, make sure you're ready! ■

Cold Weather Effects

■ As we discussed in "Cold Weather Demands," low temperature has a definite effect on our flying operation, whether it be the aircraft, the crew, or support equipment. We cannot avoid operation in cold climates but we can reduce the effects of low temperatures by being prepared. Knowledge of cold weather procedures and proper preparation will help us to lessen the effects of extreme low temperature on our equipment and our body.

The following information on the effects of cold weather on various materials and fluids may help you to be better prepared this cold season.

■ **Metals** In general, all metals shrink (contract) at reduced temperatures and become harder and more brittle. In practical application, this could mean failure of a metal part under stresses which it ordinarily could handle. Also, due to the different coefficient of expansion (shrinkage rate) for different metals, cold weather can cause leakage at seals, binding, looseness, and maladjustments which would not be evident at normal temperatures.

■ **Rubber and Plastic** These materials harden, lose much of their elasticity, and become brittle. Again, in practical applications, this could mean failure of parts due to stress, leakage of fluids at seals and gaskets, rupture of diaphragms, and so forth. Oxygen and smoke masks may not provide an airtight seal.

■ **Greases/Lubricants** Their viscosity usually increases at low temperatures. The principal effect of increased viscosity is drag and decreased lubrication in the mechanism concerned.

■ **Fuel** The most noticeable effect of extreme low temperature on fuel is its increased density. This is evident in how much the pounds per gallon weight of fuel changes as temperature decreases. ■

Feathered and Metal-Winged Fliers

SSGT MICHAEL CONSTABLE
962 AWACS
Elmendorf AFB, Alaska

■ It's 0600, and you're sitting on your nice, warm bed, watching the morning news in your small, but comfortable room. All of a sudden . . . a horn — loud and unmistakable — SCRAMBLE! At this point, it's all rear ends and elbows as 20 people scurry to that gray-white mass of metal and electronics.

From your warm building, you quickly pass to the outside world where it's a crisp 45- to 50-degree spring day. The sun, just cresting the horizon, turns the morning sky a brilliant crimson — an unknown warning of things to come.

You arrive at the aircraft, climb aboard, and minutes later you're at the hammerhead of the runway waiting for clearance to take off. While monitoring your final clearance, you look again at that majestic sky, thinking it's a good day for flying, or better yet, fishing in the base pond!

But you're back in the E-3, and you hear something about condition red . . . You dismiss it because the next thing you hear is "Boondock 24, cleared for takeoff." If it had been important, the controllers wouldn't have given the aircraft clearance to launch. Besides, you are on an alert scramble.

Throttles up, flaps set, brakes released, takeoff checklist complete, and you're on your way.

The copilot calls, "Eighty knots, then V1 (go/no-go speed), and then rotate."

All of a sudden he says, "Birds, right side."

The pilot says, "Positive rate of climb. Gear up." With the gear up call, you feel bumps, hear thumps and chugs from the right side of the aircraft, and that gray mass of metal shudders.

The engineer calls, "I have EGT, EPR, and N1 fluctuations on no. 3 (engine) and flameout on no. 4 (engine)."

Copilot: "175 knots."

Pilot: "Co, help me keep this thing level."

Engineer: "EGT and N1 on no. 3 going down."

Pilot: "Look for a clear spot — we're going in. Nav, call mayday." The crash light goes on. "Crew, this is the pilot — brace!" The crash bell goes off.

We have tornado watches, flash flood watches, tsunami watches, etc. The wise flier pays close attention to bird watches!

You sit up in a cold sweat and reach over to turn your alarm clock off. It's not 0600, but 0500, and you're in your cozy little room. You realize it was only a dream, but the cold sweat, shaky hands, and labored breath add an unsettling reality to it. Still, it WAS only a dream.

Bird Strikes and BASH

Premonitions? Can birds really do that? Perhaps we should ask the crew of the B-1 bomber that went down over Colorado after it was hit by only one bird (thought to be a pelican).

The Air Force has invested millions of dollars and man-hours in an attempt to cut down the number of bird strike mishaps. Those in the operational field refer to it as BASH — Bird Aircraft Strike Hazard.

The BASH program is designed to teach Air Force people how to make Air Force bases less desirable to migratory and resident birds through habitat changes and abatement procedures. One of the most important aspects of BASH is to familiarize aircrews with these flying creatures and conditions under which they are likely to be encountered.

In Our Scenario

In our little nightmare, many factors came into play with the aircraft. Some will argue that the E-3 could have been saved, and perhaps that is so. But let us focus on what led up to the situation.

The launch time was about 0630, with the sun just peeping over the horizon. Environmentalists say that early morning (½ hour before to 3 hours after sunrise) and late evening (2 hours before to ½ hour after sunset) are the most active times in a bird's day, especially migratory birds.

In the morning, birds are leaving their roosting areas, such as ponds, marshes, and trees, in search of food, or taking off on their migratory routes. In the evening, birds are usually looking for a place to bed down for the night.

In either case, they will be low — ground level to 1,500 feet. Birds are often found in flocks ranging from 3 to 30 in number. Sizes of birds can vary from 3 ounces up to 15 pounds.

In the scenario, it was spring — cool and crisp. This is the time of year when migratory birds, such as ducks and geese, are moving north to their breeding grounds. You can usually find at least one bird in every body of water along your flightpath. The normal northward migration starts around April 1 and ends some time in late June or July in the lower 48. Add 1 to 1½ months in Alaskan and Icelandic regions. Between late August and November, migration reverses, and birds fly south back to their wintering areas.

Pilot: "Look for a clear spot — we're going in. Nav, call mayday." The crash light goes on.

During both spring and fall, migratory birds are found cruising along from ground level to 4,000 feet, with an average altitude between 2,000 and 4,000 feet. They often fly in the characteristic "V" formation, pointed in the direction of travel.

Aside from the time of day and time of year in the scenario being ripe for bird action, another signal for trouble was overlooked — the "condition red" call from the tower. The call was a Bird Watch Condition Red report, which is one of four possible codes designed to inform about bird concentrations. Had the crew in the dream been aware of the BASH program, they would have known what "condition red" meant. For those who caught on at that point, give yourself a pat on the back. For those who missed it, let's look at each condition.

- Bird Watch Condition Red: The most severe code — meaning birds are in heavy concentration on or in the immediate vicinity of the runway. Aircrews should evaluate mission need before operating in these areas. Is a peacetime scramble worth the price in lives and assets? Could a short delay be accepted? Anyone would much rather have a late takeoff than a Class A mishap.
- Bird Watch Condition Yellow: Concentrations of birds have been observed in areas which create a probable hazard to safe flying operations. Be more vigilant, and use extreme caution.
- Bird Watch Condition Green: Like a street light for your car, this is the green light for aircraft when you're talking birds. Essentially, this condition means operations are normal, and there is a low hazard possibility.
- The fourth condition is not really a code, but rather a flag. The Bird Watch Alert simply means conditions — weather, time, season — are right for the birds to come out. Remain extra alert at this point. You may need to call condition red.

In Need of an Ending

Back in your room, you recall the article you read yesterday about an airplane crashing after multiple bird strikes — the culprit behind your bad dream. To get it out of your mind, you switch on the television. The morning news blips onto the screen. The clock says 0600. All of a sudden, the horn goes off . . .

It's up to you to put an ending on this story — tragic or terrific. Talk to your local safety office people, or read up on Air Force Regulation 127-15, Bird Strike Hazard Reduction Program. A little knowledge can help keep our feathered and metal-winged fliers from clashing. ■

SURROUNDED!

LT COL JIMMIE D. MARTIN
Editor

■ October is a time of changing seasons and changing weather. Summer is gone, fall is here, and winter is close behind. The cool, crisp evenings and mornings remind us to start thinking about the upcoming winter hazards of frost, ice, snow, cold fronts, and all the rest. Many places are already experiencing freezing temperatures and snow while others are enjoying Indian summer.

But, we can't forget about those summertime thunderstorms yet. There are still some big ones lurking out there, and you need to be prepared. The following civilian mishap illustrates some important lessons for anyone who flies.

On a warm night, about 1922 central standard time (c.s.t.), a twin-engine, eight-passenger, turbojet aircraft was destroyed when it hit the ground at high speed in an uncontrolled descent following a loss of control at FL 370. The two crewmembers and five passengers aboard were killed. The aircraft had departed a nearby airport only 26 minutes earlier on an executive flight from Texas to New Jersey.

Earlier in the day, the crew had flown the aircraft from New Jersey to Texas, arriving around 1030 c.s.t. Their estimated departure time from Texas was 1430; however, the flight was delayed to wait for the passengers. The aircraft finally departed the airport at 1856.

After takeoff, the captain told departure control, "Our radar is not doing very well this evening." He requested vectors around thunderstorms that were building up to the south and east of the airport. The controller provided the vectors and subsequently handed off the flight to the Air Route Traffic Control Center (ARTCC) controller. The departure controller wasn't required by Federal Aviation Administration (FAA) regulations to pass on the information about the reported radar malfunction to the ARTCC controller when he handed off the flight, so he didn't.

The captain requested additional vectors for weather avoidance from the ARTCC controller. However, he didn't tell this or any subsequent controllers of the radar malfunction. He wasn't required to do so by FAA regulations.

Fourteen minutes after takeoff, at 1910, the captain requested and received clearance to proceed "direct" to the Texarkana VORTAC. About 1917, the ARTCC controller requested a pilot report. The captain reported thunderstorms off to their left still building with tops about 39,000 feet and tops to their right at about 37,000 feet.

About 2 minutes later, the captain stated they needed to maintain their current heading and requested permission to climb from the assigned altitude of FL 370 to FL 390. The controller acknowledged receipt of the request, and about 60 seconds later, the copilot stated, "Center, we need to get up."

Ten seconds later, the aircraft's transponder and altitude readouts disappeared from the ARTCC ra-

It was a routine night flight back home. Suddenly, in less than 4 minutes, the crew found themselves in a fight for control. At stake were their lives and the lives of their passengers.

darscope, and the primary returns were lost 6 seconds after that. This was followed shortly by a garbled transmission from the aircraft just before the ARTCC controller cleared the flight to FL 390. There was no acknowledgement of the clearance.

The aircraft crashed in an open pasture in an 82 degrees nose-down attitude with the left wing leading. The impact site was 4 miles northeast of the point where radar data showed the last transponder encoded return. The aircraft disintegrated on impact.

Reconstruction of the ARTCC recorded radar data indicated that during the 30 seconds immediately before the loss of communications and radar contact, the aircraft was tracking directly into an area of severe weather, and never started the climb from FL 370 to FL 390.

Witnesses said there was a severe thunderstorm at the time of the mishap, it was dark, and hail began to fall shortly after they saw the crash. Radar imagery of the storm cell in the immediate vicinity of the mishap site indicated it was a Video Integrator Processor (VIP) level 6 thunderstorm. (Thunderstorm intensities are measured from level 1 through 6, with level 6 being the most severe.)

Several aircraft transiting the area reported that their radarscopes indicated a severe thunderstorm, and a Beech Baron flying underneath the cell at the time of the mishap experienced a turbulence upset and a loss of control while flying within 3 miles of the crash site. A passenger aboard the Baron reportedly saw the fireball from the crash.

Preflight Weather Briefings

The crew received two weather briefings from the flight service station (FSS) before departure. In the first briefing at 1128, a flight service specialist advised a crewmember to expect thunderstorms in the local area and throughout the planned route of flight through northeast Texas and Arkansas and that the storm cells would continue building throughout the afternoon. This briefing ended approximately 7½ hours before the flight's departure.

At 1714, a crewmember called the FSS to revise the flight plan departure time and to receive a weather update. The FSS specialist mentioned a line of weather that at the time was located to the south of the airport area and ran to the northeast, and indicated to the crew that the line generally would not be a factor once the flight was outside the immediate departure area.

However, the flight service specialist didn't give the crewmember the current Convective Significant Meteorological Information (SIGMET) or brief him on the Alert Weather Watch (AWW) No. 66, which she thought had expired.

AWW No. 66 stated, in part, "Tornadoes. Hail surface and aloft 3½ inches. Wind gusts to 75 knots. Maximum tops to 55,000 feet." The National Weather Service issued several severe thunderstorm warnings during the evening to residents in many counties in northeast Texas, including the county where the crash occurred.

When the briefing ended at 1718, the specialist suggested that the crewmember "Might get a recheck here ... when you're ready to go and see what this line is going to do." There is no evidence that either crewmember called the FSS for an update before departure 1 hour and 38 minutes later. The crew also accessed two contracted weather services, but didn't access the hazardous weather codes on the computer.

In-Flight Weather

A review of the weather data by meteorologists revealed the area of the mishap flight was dominated by a stationary front that ran from southwest Texas up through northern Arkansas. At the time of the crew's last radio transmission, the aircraft was encircled by at least three storm cells located within 13 miles of the aircraft's position that varied in intensity from VIP level 4 to VIP level 6. The core of the level 6 cell, with tops to 45,000 feet, was 7 miles northeast of the last recorded position of the aircraft.

The best information available indicated the cells were still building at the time of the mishap. However, the aircraft was in visual meteorological conditions when the crew lost control. The study also indicated it would have been a dark, moonless night both at the cruise altitude and on the ground.

The Final Minutes

The final transmissions from the aircraft suggested the crew was aware they were in, or about to be in, a hazardous situation. Evidence

continued

SURROUNDED! continued

indicated the VIP level 6 thunderstorm was growing in front of them, and they were going to attempt to climb over it.

Shortly thereafter, the aircraft apparently experienced a turbulence-related upset while in clear air as a result of the outflow of the level 6 storm cell. Following the upset, the airplane penetrated and descended through the cell which contained lightning, extreme turbulence, and severe icing. Sometime during this sequence, both engines flamed out.

Once the aircraft experienced the turbulence-related upset, the crew was faced with multiple emergency situations: A dual engine flameout, possible interruption of electrical power, erratic or erroneous attitude displays, darkness, flashing lightning, extreme turbulence, and severe airframe icing. The crew's ability to recover from this situation would have been taxed to the limit, even before considering the physical and psychological stress that such a situation induces.

However, evidence indicated they were trying to regain control and cope with the situation. When the airplane came out of the bottom of the cell at approximately 4,000 feet AGL, it did so in an inverted, nose-down attitude. In their recovery attempt, they apparently overstressed the aircraft, causing the left main landing gear door to separate and hit the left horizontal stabilizer. The weakened stabilizer then failed in overstress. At that time, the aircraft rolled upright and hit the ground.

How Did They Get Caught?

The handling of the mishap flight by the departure and ARTCC controllers was correct by the ATC handbook. The ARTCC controller was aware of the possibly severe weather in the Texarkana area and briefed his relief on the storm cells in the area. However, he made no attempt to inform the mishap crew that they were heading into the severe weather, probably because of the crew's indications they were providing their own weather avoidance. He was unaware the aircraft's radar was malfunctioning, and the crew did not request assistance.

The crew was probably misled by the FSS briefing into thinking the en route weather conditions were less severe than the conditions that actually existed and were forecast. The FSS specialist didn't completely inform the crew of the hazardous conditions that were expected and did develop. Despite the fact that the crew checked the weather four times from three different sources, they didn't receive all of the pertinent information about the dynamic convective activity along their intended route.

Their decision to continue the flight after they became aware of a malfunction in the aircraft's radar may have been affected by the weather they expected to encounter en route and by what appeared to be only a partial malfunction of their weather avoidance radar.

Lessons Learned

This was another of the many aviation tragedies resulting from mixing aircraft and thunderstorms. However, instead of just feeling sorrow at this needless loss of life, we need to look at the lessons to be learned from this mishap.

The problem really began about 4½ hours before takeoff when the flight was delayed to wait for the passengers. Killing time waiting around an airport for passengers has never been high on a flier's list of fun things to do. They were probably bored and frustrated at this fairly lengthy delay.

The crew checked the weather four times, but never got the full briefing. They seemed to take an optimistic approach to the weather and assumed it would get better, not worse. When dealing with weather, especially convective weather, it's a good idea to be a little bit pessimistic. Find out what the best case and worst case situations are and prepare for the worst. That way you won't get caught short.

The fact that the crew decided to press on into thunderstorm weather with a malfunctioning radar seems to indicate a bit of get-home-itis. They asked for vectors around weather right after takeoff, but then got clearance for direct routing. We don't know if they assumed the ARTCC controllers would automatically keep them clear of weather, thought they were past the thunderstorms, or just why they didn't keep the controllers notified of their radar problems and ask for help.

We'll never know what really happened in this case. But we need to take this as a reminder to make sure our aircraft equipment is adequate for the planned flight. Also, never assume the ATC controller will automatically vector you around hazardous weather. The controller's job is to provide safe separation from other known aircraft. Time permitting, controllers will provide other services, *if requested*. Another point to remember, ATC radar is designed to block out weather returns so aircraft will show more clearly and may not be able to provide safe separation from hazardous weather.

The tragic end of a routine flight. We can't bring these people back, but we can learn valuable lessons from the short flight that claimed their lives. Doing so can help us avoid a similar fate. But only if we take the lessons seriously and don't say, "It couldn't happen to me." Rather, think "it could happen to me," and then make sure it doesn't.

When they got surrounded, the crew apparently tried to climb over an intense storm cell. This is never a good idea. A healthy thunderstorm can build faster than most aircraft can climb, especially at high altitudes. Not only that, but strong updrafts can exist several thousand feet above the cloud tops, and strong downdrafts can exist in the clear air around these severe storms.

Finally, the crew had to be suffering at least some effects of fatigue. They had left New Jersey early that morning and were now flying after dark nearly 12 hours later trying to get home. Fatigue can affect judgment and this, combined with a possible case of get-home-itis, may have degraded the crew's capability to deal with the unexpected situation they encountered.

VIP passengers can be especially persuasive when *they* want to get home. Don't let any passenger intimidate you when faced with bad weather, faulty equipment, and fatigue.

Flying an aircraft in thunderstorm weather is tricky business, and you have to be at your best. Don't take unnecessary chances. ■

HAZARDOUS AIR TRAFFIC REPORT

HATR PROGRAM

SMSGT WILLIAM L. FINCK
Directorate of Aerospace Safety

■ This is the first of many HATR articles that you will be seeing in future issues of *Flying Safety* magazine. This article will briefly inform you about the HATR program, HATR processing, what is reported, and what you can expect to see each quarter in this space. First, what is the HATR program?

HATR Program History

The HATR program was established in June 1976. Like all other programs, there is a regulation covering it. In this case, it is AFR 127-3, Hazardous Air Traffic Report (HATR) Program. The program was primarily designed to establish procedures for reporting and investigating near midair collisions (NMAC) and other air traffic conditions considered hazardous.

Filing a HATR does not negate responsibility for reports required by other directives. Information taken from HATRs must be used solely for mishap prevention purposes and *not* for disciplinary action. HATR information is not privileged and, except for the identity of people involved, can be released outside of Air Force channels.

The information obtained from the reports has many uses. Some of these are special HATR analysis, USAF air traffic control analysis, AFCC staff assistance visits, and proposed changes to airspace or air traffic procedures.

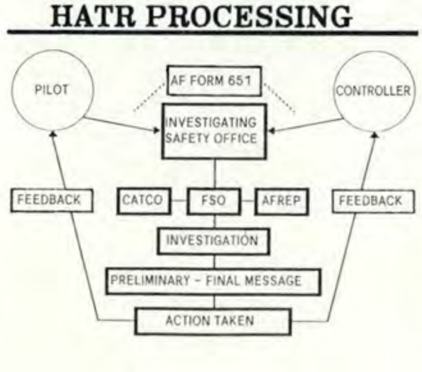
HATR Processing

Now that you know a little bit about the HATR program history, what regulation covers the program, and what the information is used for, let's look at the ways a HATR is processed.

You can find the HATR form displayed in base ops, on safety bulletin boards, etc.

A precise, accurate description of the events that led to the HATR is essential.

HATR PROCESSING



The figure gives you an overview of the HATR process. This chart, along with a review of AFR 127-3, will give you the appropriate information for filing a HATR. Before we move on, note that the chart shows only Pilot or Controller as individuals filing a report. This is not true. Any person aware of a reportable event may file a HATR. So, what's a reportable event?

Reportable Events

As stated earlier, the initial program was designed around reporting and investigating NMACs and any hazardous air traffic condition. So, what is an NMAC? AFR 127-3 defines an NMAC as an unplanned event in which the aircrew took abrupt evasive action to avoid a midair collision or would have taken such action if circumstances had allowed.

Okay, now how about a hazardous air traffic situation? Again, according to AFR 127-3 — a situation where there was less than required separation between aircraft.

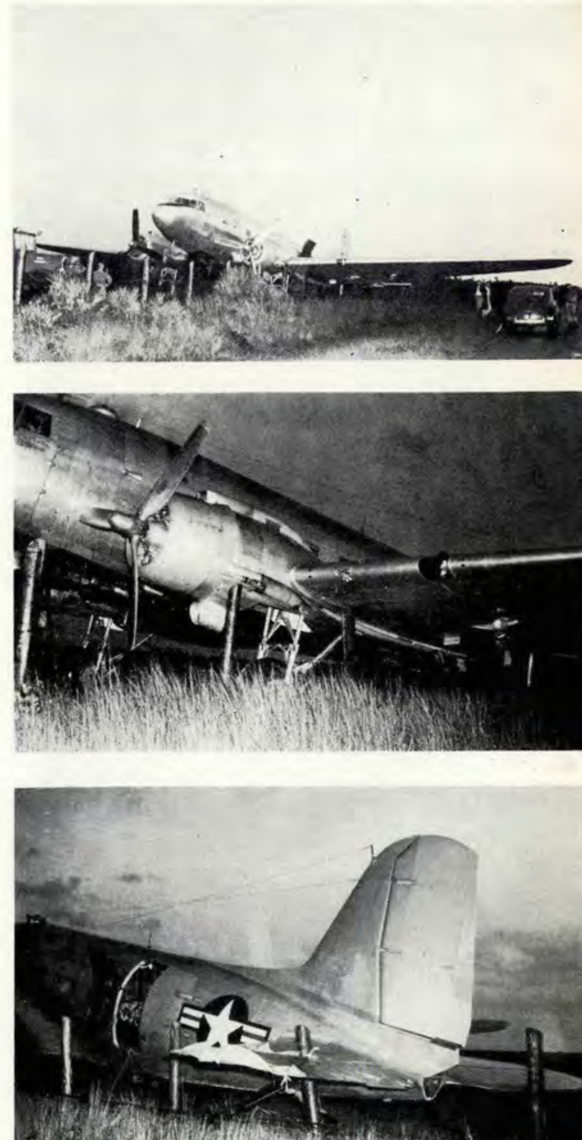
Those are the two main conditions most people think of as reportable conditions; however, since 1976, the list has grown. Items include communications, NAVAIDs, problems in the movement area, runway events, systems, publications, procedures, etc. The bottom line would be any event or procedure that could (or did) contribute to a hazardous air traffic condition.

That pretty much gives you an idea of what the HATR program is all about. Now I'd like to give you an idea of what you can expect to see in the future HATR articles.

Future Articles

Each quarter, we will provide you the summary of the previous quarter. We will be comparing numbers of HATRs filed from the same quarter of the prior year, general classifications, non-near midair classifications, near midair collisions, and a special place at the end of each article for comments. I hope this brief article has given you an insight into the HATR program and maybe cleared up some incorrect assumptions about it. ■

You Can't Beat A Checklist Rap



These pictures show the results of a chain of errors that began when the crew got in a hurry. The chain could have been broken at any point by taking the time to accomplish the checklist properly. They were lucky!

■ This article originally appeared in the October 1949 issue of *Flying Safety*. However, the admonition is just as true today as it was almost 40 years ago when this mishap occurred. You *still* can't beat a checklist rap.

The bottom dropped out of the clouds as the two pilots and crew chief started across the parking ramp to their C-47. Big, noisy raindrops splattered across the ramp, and the three men broke into a run to reach the shelter of the plane.

The thundershower was violent but of very brief duration, and the crew sat it out in the plane. The rain stopped as suddenly as it had begun, and the pilot and crew chief went outside to remove the control locks. The pilot ducked under the plane and pulled the right aileron lock, while the crew chief got the left aileron lock and removed the rudder and left elevator lock. Apparently, each man thought the other had removed the right elevator lock.

A second thundershower was sweeping toward the field, and the pilot hurried aboard the plane to try to get off before the second shower hit. The crew chief stood fireguard.

The crew started the engines and obtained taxi clearance immediately. While the pilot was taxiing out, the copilot began reading off the checklist to save time. The list, including the mag check, was completed while the plane was being taxied, the copilot calling off the items and the pilot acknowledging each in turn.

The second thundershower was moving in on the far side of the field as the plane approached takeoff position, and the pilot called for takeoff instructions while still taxiing. The tower cleared the pilot for immediate takeoff, and he turned the plane onto the runway and pushed the throttles forward.

At 80 mph, the pilot began rolling back on the trim tab to lower the tail which had come up in normal fashion. The trim tab had no effect, so the pilot pulled on the wheel. Nothing happened. Realizing the elevators were locked, the pilot chopped the power and called to the copilot to cut all switches.

Two-thirds of the runway was behind them at this time. The pilot applied full brakes, but the plane rolled off the end of the runway. The pilot unlocked the tailwheel and attempted to ground loop. The plane turned 90 degrees to the right, but skidded sideways across the muddy ground, striking the boundary fence. The left wing, flap, and horizontal stabilizer were badly damaged.

The act of reading off the checklist is of no value unless the items called off are actually checked. The pilot obviously did not run the controls through, or he would have discovered the locked elevators. The haste of the pilots to get airborne set the mishap up because it resulted in a hurried, inadequate pre-takeoff check. ■

RIVET WORKFORCE

Where we are Where we're headed

CMSGT AUGUST W. HARTUNG
Technical Editor

■ Rivet Workforce, as you may recall, is the project aimed at creating a more flexible, mobile, and survivable aircraft maintenance work force. In a nutshell, it's the broadening of skills and task training for those charged with maintaining our aircraft.

The implementation planning phase for Rivet Workforce is complete! Now it's time to highlight what will happen and when.

Avionics

Conventional Avionics Career Fields First of all, the instrument, automatic flight control, inertial navigation system (INS) platform systems, and weapons control systems (WCS) for the A-10 only, skills will be combined into a new Air Force specialty code (AFSC) 455X1 entitled avionics guidance and control systems. The inertial measurement system (IMS) of the A-7 will go into the A-7 WCS shop.

Second, the communications, navigation, and INS doppler systems will be combined into a new AFSC of 455X2 entitled Comm/Nav Systems.

Third, the WCS skills will remain basically the same. For those on active duty with the F-4G/E, the new AFSC will be 455X3A, while the Air National Guard (ANG) units will use 455X3B for the A-7 and 455X3C for the F-4. The A-7 IMS was placed under WCS, while the A-10 WCS duties will be given to the new guidance and control AFSC.

And fourth, the avionics aerospace ground equipment (AGE) skills have been totally eliminated within the active Air Force. The maintenance tasks currently accomplished by this AFSC will be given to equipment users and the precision measurement equipment lab . The ANG will retain these skills for the F-4, A-7, and C-5. The new AFSC will be 455X5A for the F-4 and 455X5B for the C-5 and A-7. Once the Corsair avionics systems tester comes on line and the big eight avionics test station goes away, the A-7 will no longer have an avionics AGE AFSC.

APG/Hydraulics/Engines, Electro-Environmental, and Pneudraulic/Aero Repair Specialties

APG/Engines/Hydraulic Specialist First, we have the APG/Engine/Hydraulic Specialist. This AFSC conversion will require certain engine and hydraulic task transfers to the APG crew chief.

Effective 31 October 1988, currently assigned Tactical Air Forces (TAF) crew chiefs will get the new 452X4 AFSC, engine people will become the new 454XO (engine), and hydraulic people will become 454X4 (hydraulic) AFSCs. Military Airlift Command (MAC) and Strategic Air Command (SAC) units will convert the same way as the TAF, with the only difference being 431XX will convert to 457XX.

Effective 30 April 1989, TAF engine and pneudraulic people in the aircraft maintenance units (AMU) and on-equipment shops will convert to 452X4 to match the APG. (This does not apply to MAC, SAC, or reserve forces.)

Electro-Environmental Specialist This initiative will combine the electrical (423XO) and environmental (423X1) skills into a new 454X6 AFSC for MAC, 454X5 for SAC, and 452X5 for the TAF. The conversion will be 30 April 1989. This does not necessarily mean that the electrical and environmental shops will be physically co-located; only that the people working these skills will now have the same AFSC. Actual unit facility layouts and management concepts will dictate how these shops will be managed.

The overall transition period will be 3 years. Everyone possessing the electrical or environmental AFSC will be awarded the new AFSC at their current skill level, and allowed 3 years to complete the required transition training.

Pneudraulic/Aero Repair Specialist All MAC 431X3s and SAC 431X2s currently assigned to the aero repair/repair and reclamation (AR/RR) shops will be converted to the new pneudraulic AFSC with an "A" shred, 454X4A. Their records must be annotated accordingly. Aero Repair people within Tactical Air Command (TAC) will remain as they are today. All currently assigned pneudraulic specialists 423X4 will become the new 454X4 without the shred. The change for this initiative, which will take effect 31 October 1988, is that the feeder AFSC for AR has changed from the crew chief to the pneudraulic specialist.

The pneudraulic/aero repair transition period will be 3 years. Pneudraulic people awarded the 454X4 must take an AR field training detachment (FTD) course for award of the "A" shred.

During the Rivet Workforce transition period, many specialists will attend formal, in-residence technical training courses. Others will learn through on-the-job training.

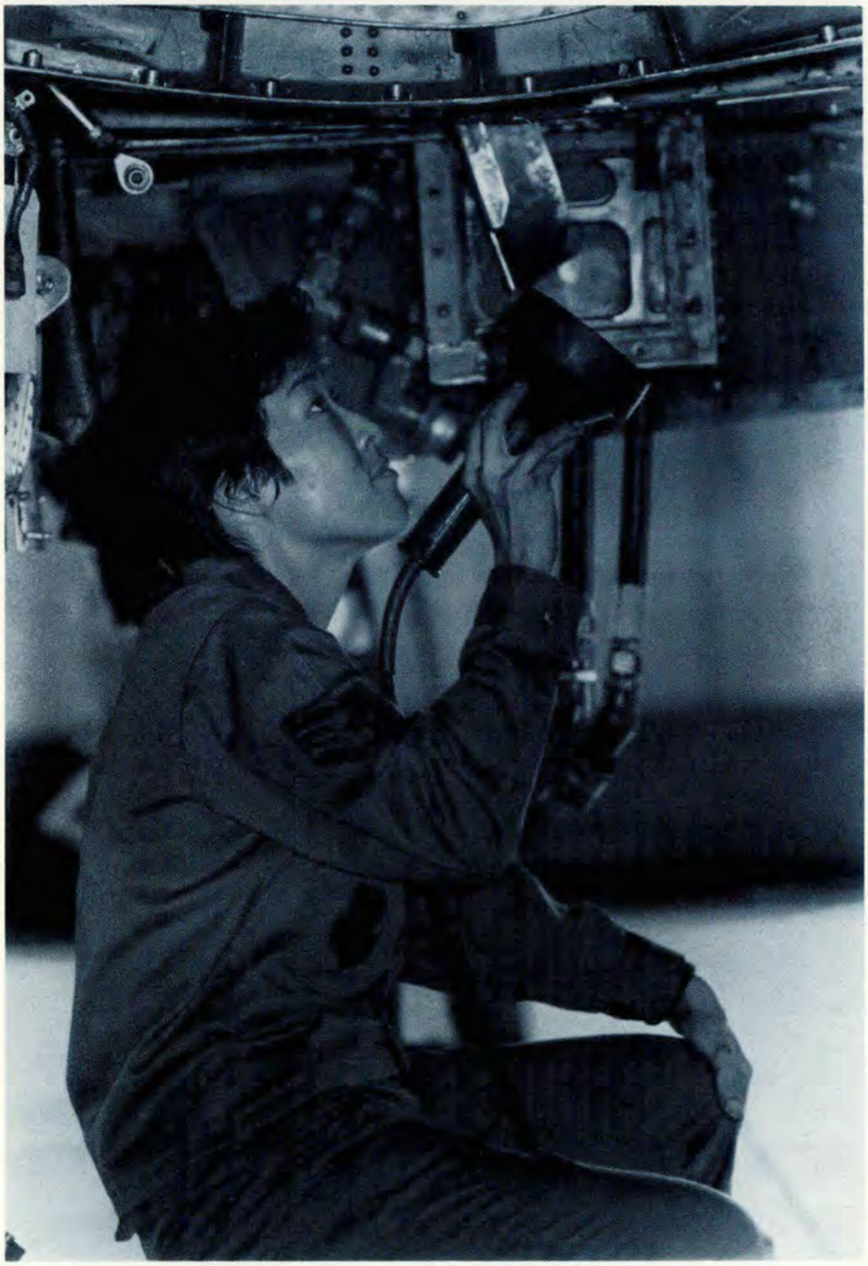
Safety must never be jeopardized. It is a critical aspect that must be considered when training individuals to perform new tasks under a broader AFSC structure.

Sheet Metal/Corrosion Control and Machinist/Welders

Sheet Metal/Corrosion Control The sheet metal and corrosion control specialty duties and responsibilities have been combined into a new title, aircraft structural maintenance, and new AFSC, 458X2.

On the implementation date of October 1989, everyone will be converted to the new AFSC at their current skill level. Excluding those

continued



Rivet Workforce redefines the scope of aircraft maintenance specialists' duties. This will better support the warfighting capability demanded of current and future weapon systems.

close to separation or retirement, everyone will complete a mandatory cross-over training program.

Machinists/Welders The 427XO machinists and 427X4 welders are being combined into the new title of aircraft metals technology, with an AFSC number of 458XO.

Everyone will be converted to the new AFSC at their current skill level. As with the Sheet Metal and Corrosion Control Specialists, the same type of cross-over training program will exist.

Training

Now that we've looked at what will happen, let's briefly summarize the Rivet Workforce training requirements. Please keep in mind that space does not permit a detailed explanation of the difference in training requirements for *each* career field, major command (MAJCOM), and skill level.

Basically, to receive their 3-level, all new recruits in each of the career fields will attend an applicable technical school.

For upgrade to the 5-level, most individuals will complete on-the-job training and perform required MAJCOM portions of the job qualification standard (JQS). Some commands will require a mandatory FTD.

Upgrade to the 7-level varies, depending on the career field and/or MAJCOM. One common thread will be a mandatory 7-level career development course. Also, most technicians will be required to complete appropriate portions of their JQS. Still others will be encouraged to attend applicable FTD courses.

The Key Ingredient

So there you have it — a rather brief picture of the changes within Rivet Workforce. One final note, and that is on the subject of safety — a key ingredient to the Rivet Workforce transition.

Under this new transition plan, there is going to be a tremendous "learning curve" for virtually everyone in the aircraft maintenance business. Regardless of whether we're on the flight line or assigned to one of the many repair hangars or shops, most of us will be learning new skills while showing others the skills that we have already learned.

More than ever, each of us must play a critical role in incorporating safety into our workplace procedures and operating instructions. Don't ever let frustration, complacency, or "mission-itis" get in the way of what you're doing. Provide the individual care and personal guidance that many folks will need. Make safety an important part of the Rivet Workforce program and support it fully.

Anyone interested in further information on this subject should contact Lt Col Thomas Kleiv, HQ USAF/LEYM, Washington, DC 20330-5130. His AUTOVON number is 227-8164. ■

Just Another Tow Job...or is it?

CMSGT AUGUST HARTUNG
Technical Editor

■ "Got a tow job for you. Grab some folks and that tug over there, and move that plane to the hangar. And hurry! The aircraft should have been there an hour ago."

So there it is, another tow job. Perhaps you have heard this statement or may have even said it sometime during your maintenance career. After all, towing aircraft is a fairly simple task and comes quite naturally to many.

Given the tasking, someone rounds up a few people — sometimes regardless of their qualifications or training, gets a checklist, radio, tug, and tow bar, and the entire team moves the aircraft to the required destination. Sounds simple, right? Most of the time it is.

But perhaps because of our hectic daily schedules, the task of towing aircraft is often seen as an interruption to the normal maintenance workload. For these reasons and others, a number of concerns have been raised regarding the safe handling of our aircraft.

The need to prevent towing mishaps seems obvious, but somehow the word doesn't always get around. So let's look at some actual aircraft towing mishaps and focus on the lessons learned so we don't make the same mistakes.

Cargo

A cargo plane was being towed from the flight line to a hangar. When the tow vehicle operator applied the brakes, the wheels locked, causing the aircraft to move forward, then back, breaking the tow fitting.

The plane then began to roll backwards toward a taxiway. When it appeared the aircraft brakes did not work, the tow team members tossed out chocks and jumped from the moving aircraft.

On the sixth attempt at tossing the chocks behind the wheels of the rolling aircraft, the plane finally came to a stop after traveling almost half the length of a football field.

After the towing incident, several precautions were identified that could have prevented this precarious situation. Although all tow team members were certified for the task, the tow team supervisor failed to follow checklist procedures.

Perhaps because this was the seventh tow for the midnight shift, the supervisor shortened his pretow briefing by not covering emergency actions for tow bar or brake failure. Low experience and inadequate training caused the brake rider to panic during braking actions. There were no discrepancies found with either the tug or aircraft braking systems.

continued

Tow Job continued

Trainer

A jet trainer was being towed by a tug when an aircraft chock fell from the tug into the path of the tug's right rear wheel. The chock brought the tug to an abrupt stop, the shear pin on the towbar sheared, and the aircraft hit the tug.

The chief problem here is obvious. The crew did not secure the chock on the vehicle prior to starting the tow. With the sudden, unexpected stop, the cockpit rider was not able to safely brake the jet.

Fighter

While a tow crew was backing the fighter onto the sound suppressor at night, the left horizontal stabilator contacted the partially closed suppressor door, causing damage to the aircraft and the door.

Although the tow crew had the proper checklist for towing, they did not have the local checklist for installing the aircraft on the suppressor. The crew never fully opened the suppressor door, nor did they wait for an engine specialist who was en route with the correct checklist.

Since the crew was one person short for backing tow operations, the tow supervisor also acted as the tail walker. And without the required night signaling equipment, there was ineffective communication between the walkers, the tug driver, and the tow supervisor.

Tanker

An experienced tow team was tasked with moving a tanker aircraft from one hardstand to another. When they arrived at their destination with their plane, they found another tanker already parked in the same area, so they had to back their aircraft onto the hardstand.

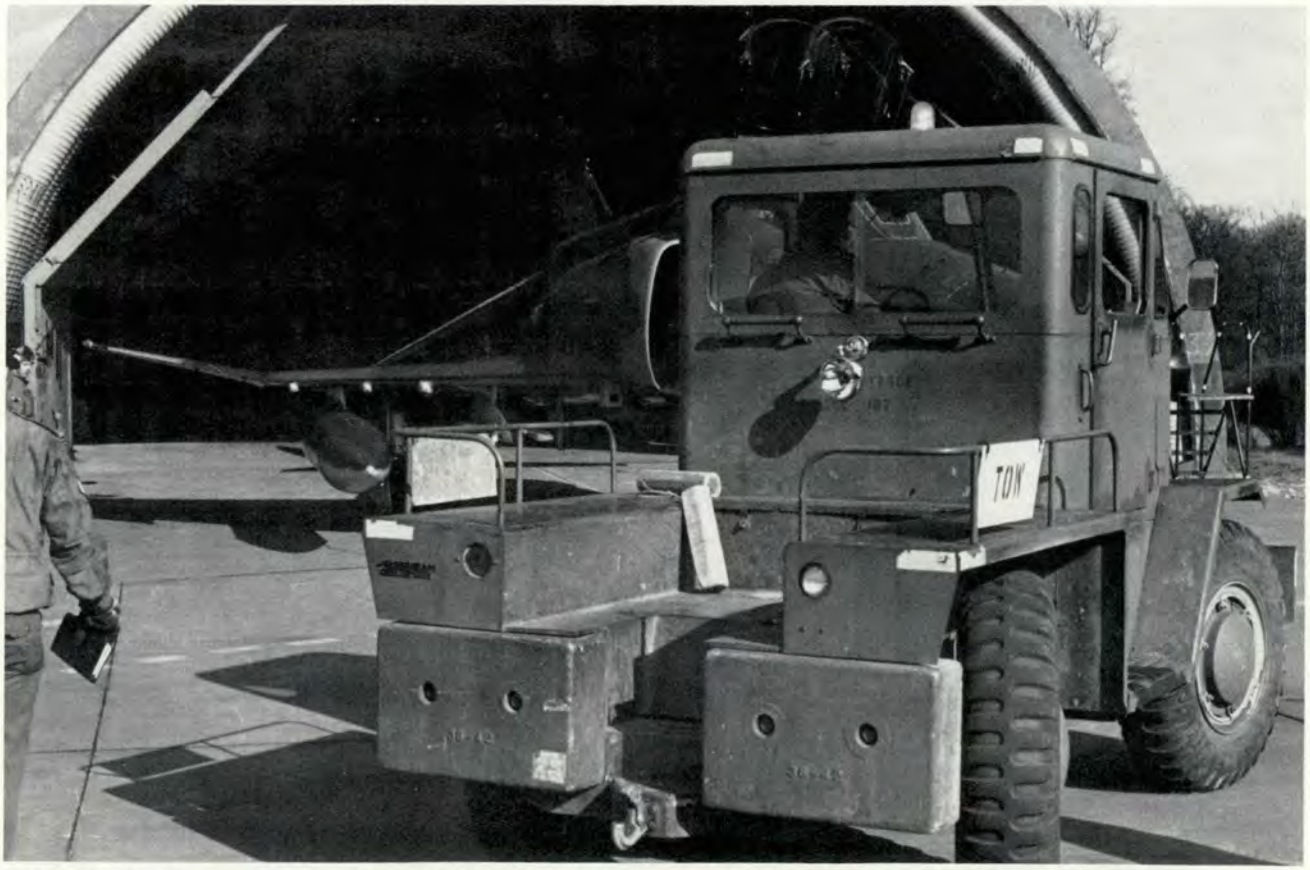
During the backing operation, the tail walker signaled an emergency stop to the tow team supervisor. Although the supervisor temporarily stopped the towing movement, he did not personally check obstruction clearance by going to the tail section or check with the tail walker as to the reason for the emergency stop.

The supervisor attempted to check for obstructions aft of the plane from his position on the ground next to the pilot's cockpit window. Assuming he was still clear to back the tanker farther, he directed the tow driver to resume backing. The towed tanker struck the other plane parked in the same area.

Bomber

A tow team was dispatched to tow a bomber into the hangar. While the aircraft was backed toward the hangar entrance at an angle, the left wingtip struck the hangar door.

Besides the improper backing an-



Just having the right number of tow team members, an applicable towing checklist, and all of the proper equipment needed to move an aircraft isn't enough. We should also consider any potential hazards, such as chocks falling from a tug into the path of a moving wheel.

gle, the tug operator and tow supervisor failed to maintain visual contact with one another. Excessive noise from an aircraft running engines, coupled with the operation of a hydraulic mule, greatly distorted the hearing capabilities of the tug driver.

Helicopter

With ice and snow on the ramp obscuring all taxi/center lines, a qualified towing crew was backing a helicopter into a hangar that had no center line painted on the floor.

When the spotter on the left side and the supervisor realized that the rotor tip on that side would not clear the door opening, they signaled the tug operator to stop. The operator did not receive the verbal and visual warnings.

He couldn't see the spotter through the tug's exhaust vapor. Since the tug's windows were closed, he couldn't hear the supervisor's stop signal above the noise of the tug's engine. Furthermore, all team members had worked 12-hour shifts for the last 10 days, and they may have been suffering fatigue.

The aircraft hung precariously, then fell overboard into the 9,000-foot deep sea.

The helicopter rotor tip struck the hangar doorjamb.

Sister Service Aircraft

Although the Air Force is not the only military service to experience aircraft ground-handling mishaps, we do have certain factors in our favor that are sometimes taken for granted. This is best illustrated with the following Navy mishap.

While positioning a fighter on the flight deck of an aircraft carrier, a tow crew suddenly found themselves in trouble when their ship began to roll. With the tug and tow bar attached, a jet fighter had rolled backwards and forwards twice and was now headed for the edge of the deck.

The pilot, acting as the cockpit brake rider, made a hasty exit and landed on the elevator deck just before the jet pivoted nose up.

The fighter rotated to a 70-degree nose-up attitude, with the drop tanks resting on the ship's coaming. The tug driver jumped to safety before his tractor broke free. The aircraft paused precariously a few seconds and then fell overboard into the 9,000-foot deep sea.

To prevent mishaps in towing operations, proper communication is a must. Every tow team member must know the proper signals, the importance of his or her own role, and the roles of the other team members.

Do not tow any aircraft, regardless of size, unless a qualified person, familiar with the aircraft cockpit and checked out on braking procedures, is stationed in the cockpit.

Lessons Learned

You can see from the previous incidents that regardless of the type of aircraft we may be working with, none of us is immune from towing mishaps.

Towing aircraft is, in itself, not a hazardous operation when accomplished properly. Experience has proven that towing mishaps are usually caused by inexperienced people and failure to follow established towing procedures.

A review of basic safety procedures for towing aircraft, including the responsibilities of tow crewmembers, can be found in Air Force Occupational Safety and Health (AFOSH) Standard 127-66, chapter 8, while specific instructions for each aircraft can be found in the applicable Dash 2 technical order.

Being aware of the proper procedures is half the battle in preventing towing mishaps. The other half is ensuring everyone involved in a towing operation is aware of the possible hazards. A proper briefing by the tow supervisor, before any movement of the aircraft begins, is the key. This small investment in time is well worth the benefits gained.

To anyone experienced in towing activities, it is obvious that a lot of other areas could have been discussed to make this article a complete review of the subject. But I hope that what was presented here will encourage all members of a tow team to reassess their own roles in towing aircraft. This could be the first step in preventing further ground handling mishaps. ■

The Human Element

CAPTAIN EARL McKINNEY
91 TRS/FSO
Bergstrom AFB, Texas

■ "Thirty seconds to three-zero. Today our mission is DACT with two F-16s. We'll step at 20 after for a start time of . . ."

"I've heard this brief a hundred times. I hope it's quick — got some things to finish on that OPR. Wish the kids would get over the flu — I'm not sure how many more nights like last night I can stand. . . ."

Sound familiar? These distracting thoughts and concerns aren't present every day, but we've had them from time to time. It's human. So are fatigue, overconfidence, channelized attention, and complacency. These concepts, called human factors, limit our performance and, at times, fatally interrupt our sorties! If we can learn how we are limited by these factors, we can improve both our safety record and our daily performance.

Understanding human limitations requires more space than available here. Therefore, let's examine just one human factor — overconfidence. By examining this factor, perhaps you will become more aware of your limits as a flier.

Overconfidence

A Test A good place to start this discussion is to test your own confidence level. The following quiz has been used to research confidence. Therefore, the subject matter of the questions was designed to be unfamiliar to most people.

Specifically, the quiz asks for a lower and an upper value for each question. For example, if the question asks for the population of Europe in 1980, a possible answer is 150 to 300 million. For each question, write down your best estimate, such that you are 98-percent confident that your answer is correct.

1. Mobil Oil's sales in 1980.
2. IBM's assets in 1980.
3. U.S. Steel's income in 1980.
4. The number of U.S. industrial firms in 1980 with sales greater than Consolidated Paper's.
5. The U.S. gross national product in 1945.
6. The amount of taxes collected by the U.S. Internal Revenue Service in 1970.
7. The length (in feet) of the Chesapeake Bay Bridge Tunnel.
8. The area (in square miles) of Brazil.
9. The size of the black population of San Francisco in 1970.
10. The dollar value of Canadian lumber exports in 1977.

The Meaning The answers are at the end of this article. Check your responses. If you're like most individuals who responded to this quiz, you only selected four correct answers. But reread the directions. You were to set boundaries that were 98-percent accurate. Therefore, you should have 9 or 10 correct responses. What does this mean? Simply, you didn't make your intervals wide enough. The reason you didn't make them wide enough was because you were confident you knew the answer.

Certainly, the size of Brazil is not important to flying safety. However, your incorrect answer indicates your overconfidence. This overconfident attitude may show up in flying, but recognizing it is not always easy. Clearly, we can identify extreme overconfidence — for example, a new crewmember claims to be the best at everything.

The Problems However, most fliers fail to see their own more subtle indicators of overconfidence. For example, you may be overconfident if you fly when you're ill, or after a night of little rest.

Further, you may be overconfident of your ability to recover a jet during an emergency. This confidence could contribute to a fatal mishap. Specifically, it could encourage a pilot to attempt a flamed-out approach in the weather. Or, it could cause experienced pilots to delay ejection during low altitude flight-control malfunctions. We've lost too many excellent pilots because they were too confident in their ability to save the jet.

One of the characteristics of the truly outstanding flier is confidence. However, this can also lead to serious problems if it develops into overconfidence. This and other human factors can and have contributed to many flight mishaps. The Aircraft Mishap Prevention Program is designed to bring the entire human factors problem into sharper focus.

Overconfidence can keep us from learning from others' mistakes. The "it can't happen to me" attitude when reviewing mishaps is especially dangerous. This attitude keeps us from learning from other fliers' mistakes. And, it can get worse with experience. You may see this in yourself.

Remember during UPT how you listened attentively to Blue 4 News? Like most of us, you thought those mishaps would be difficult for anyone to handle. Now, when you read Blue 4 News, you ask yourself how some pilots could be so dumb.

This attitude encourages overconfidence and could lead to the loss of experienced aircrew. Overconfidence is human nature. Recognizing it and its dangers is difficult.

The Bottom Line

Learn about the enemy — human factors. Interestingly, years ago the Air Force recognized the physiological dangers of flight. Altitude chambers were built, and extensive physiological training programs were initiated.

Similarly, we've now learned of the psychological dangers of flight, and we are seeing human factors education. In fact, the Air Force has initiated a program called "Aircraft Mishap Prevention," specifically studying how human factors affect mishaps.

Here, I have touched on only one significant human factor. But, by seeing your own overconfidence, I hope you will appreciate the importance of the human element. ■

Correct Answers

1. $59,510,000,000
2. $26,703,000,000
3. $504,000,000
4. 473
5. $212,300,000,000
6. $195,722,096,497
7. 93,203
8. 3,286,470
9. 96,078
10. $2,386,282,000

MOMENTS FROM DISASTER

CAPTAIN R. E. JOSLIN, USMC
Naval Postgraduate School
Monterey, California

Captain Joslin is a Marine helicopter pilot currently serving as the Helicopter Aerodynamics Instructor for the Aviation Safety Programs located at the Naval Postgraduate School, Monterey, California.

■ We normally do not associate "pulling Gs" with helicopters, and consequently, our lack of understanding of this phenomenon has been a contributing factor in past mishaps. Undoubtedly, it will be so in the future unless we educate ourselves about exactly what is happening to a helicopter maneuvering at high angles of bank. Two fairly recent mishaps, in particular, involved operating at high angles of bank, close to the ground, with the pilot at the controls flying cross cockpit (flying from the left seat and turning right or vice versa), resulting in the aircraft descending and hitting the ground.

Let us look at the dynamics involved, starting from level flight (rotor thrust equals weight), and then rolling into an angle of bank while maintaining constant altitude and airspeed (figure 1). We know from experience that to maintain this energy state requires an armful of collective. This is because of the increased thrust (manifested as collective position) required to provide an antiweight (vertical) component when the thrust vector is tilted from the vertical upon entering an angle of bank. That is, our apparent weight (G-loading) increases proportionally with the angle of bank when we add sufficient power to maintain flight in a bank without losing any altitude or airspeed. To determine G-loading, take the inverse of the cosine of the angle of bank.

Representative angles of bank and their associated G-load are tabulated in figure 2. Example: If we are in a 60-degree angle of bank, then we are pulling 2 Gs which essentially means that we weigh twice as much as our straight-and-level gross weight. That is if we increase our power sufficiently to maintain the same altitude and airspeed, but in an angle of bank.

What happens if we don't have the power available to lift twice our gross weight or if we don't apply collective immediately upon rolling into an angle of bank? Figure 1 shows that we no longer have an equilibrium of vertical forces, hence we accelerate downwards in the direction of the unbalanced force. For illustrative purposes, let us assume we are flying along at 300 feet above ground level (AGL) and roll into a 60-degree angle of bank while maintaining our airspeed, but without increasing our collective or power. How long will it take before we hit the ground? Figure 3 plots the time to impact from various entry altitudes (AGL) and angles of bank, assuming no initial vertical velocity.

Actually, the plotted time to impact corresponds to when the altitude sensing port hits the ground, which obviously will be preceded by main rotor blade impact. This plot is independent of the type of aircraft or gross weight and is merely a function of angle of bank. Note that a partial application of power or a reduction in airspeed will increase the time to impact and conversely, power reductions or increases in airspeed will decrease the time to impact. Also, any initial rate of descent present upon entry will decrease the time to impact; while any initial rate of climb will increase the time to impact.

Another factor, not considered, is the change in parasite power required due to a change in the area exposed to the freestream flow when we go from straight-and-level flight to an angle of bank. For our example, starting at 300 feet AGL and rolling into a 50-degree angle of bank without any power adjustment while maintaining our entry airspeed, the time to impact is approximately 6 seconds — which is probably how long it took you to read this sentence!

A moment's hesitation in applying collective or distraction — due to radio communication, caution panel/warning light illumination, traffic calls, visual disorientation, or whatever — coupled with a failure to immediately satisfy the power requirements when rolling into an angle of bank at low altitude, will result in a downward acceleration that puts you just MOMENTS FROM DISASTER! ■

Figure 1

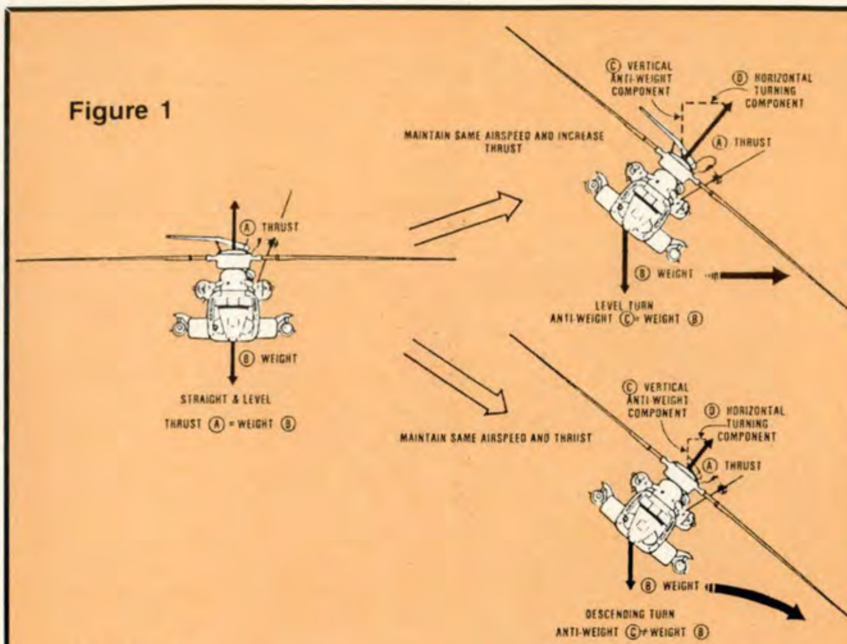
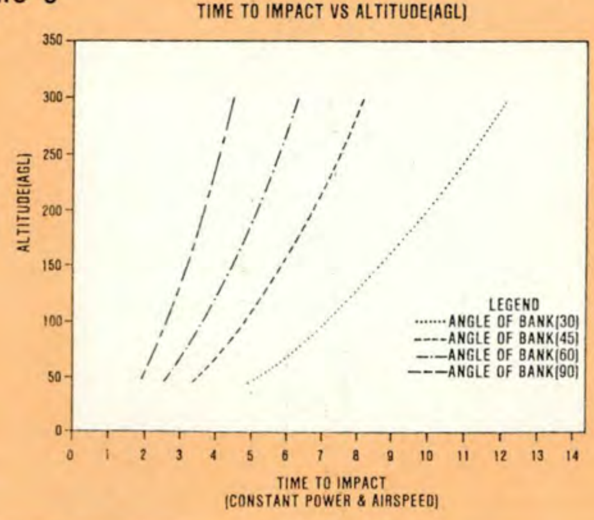


Figure 2

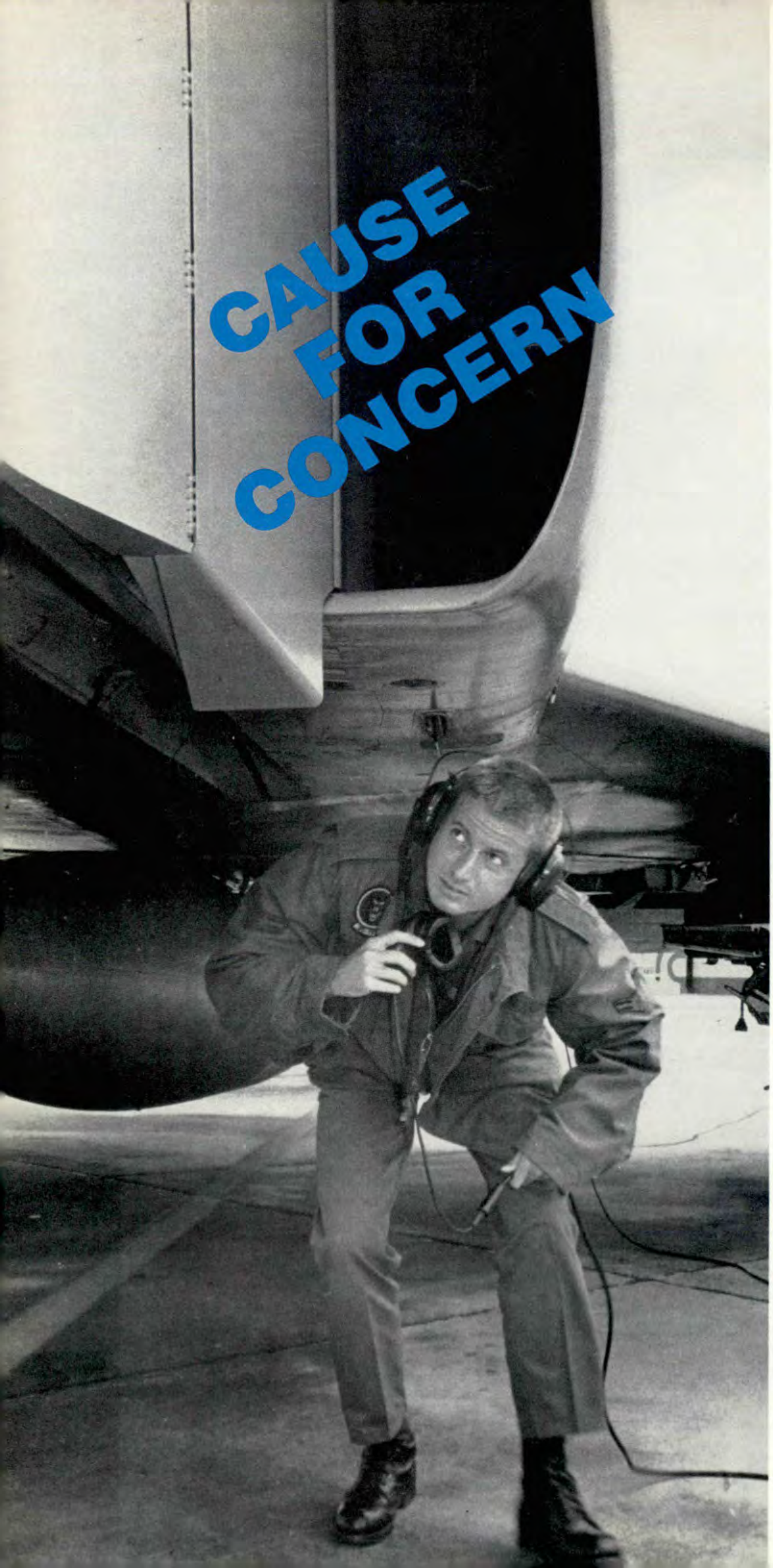
ANGLE OF BANK	★ G LOAD
0	1
10	1.02
30	1.15
45	1.41
60	2.00
75	3.86
85	11.50
89	58.82
90	∞

★ APPARENT WEIGHT WHILE MAINTAINING ALTITUDE AND AIRSPEED AT LISTED ANGLE OF BANK

Figure 3



CAUSE FOR CONCERN



CMSGT AUGUST W. HARTUNG
Technical Editor

■ It seems that no matter how many times we are warned about the dangers of aircraft intakes during engine operation, sooner or later someone will forget and become a fatality. The latest mishap involving a fighter aircraft occurred when an experienced crew chief went under the aircraft in the nosewheel area to check the pressure gauges.

With first the right and then the left engine at 80 percent, the crew chief and pilot compared several pneumatic readings in the wheelwell and cockpit. Approximately 90 seconds later, the crew chief, wearing a bulky, cold weather field coat, exited from under the aircraft in close proximity to the left intake and was immediately ingested.

There are two things available to help you avoid becoming a statistic. First is situational awareness. You must never forget where you are and what's going on. Second is your clothing. Items such as a cold weather coat add significant surface area to the body, without adding a large amount of weight. Also, as the coat is not attached to the pants or waistline, it can fill with air from below and expand, much like an umbrella or parachute, further adding to surface dimensions.

For all of you who work around jet aircraft intakes, there is an 8-minute, 16mm safety film (#605556DF) called "Engine Intakes," which is available from your local base film library or film activity. All maintenance units should obtain this film, especially for showing at newcomer's briefings.

Mishaps such as the one discussed here serve as a grim reminder that aircraft intakes are, indeed, a "cause for concern." ■

FSO's CORNER

A QUICK GUIDE TO THE SAFETY OFFICE

CAPTAIN DALE T. PIERCE
919th Special Operations Group
Duke Field, Florida

■ Who takes care of safety business when you're out of the office? How about when you're TDY? If there was a requirement, how would someone who knew little about your office know where to go to find some answers? The continuity book is a good answer. Where do you keep yours? Who else knows that? If you have a small safety office, chances are good that it's empty on a frequent basis. If your office is larger, it will tend to be empty less often. Either way, there's a chance that someday a nonsafety person will have to negotiate the paths of your safety office.

Lt Colonel William (Bill) Bosley (919 SOG/SE) developed the "Quick Guide to the Safety Office" to enable a novice to find the way through his safety office if the need arises. The quick guide covers ground, weapons, and flight safety. Yes, it even directs the novice to the continuity books. It hangs on the door to the safety office and can also be found in each continuity book. The content of his quick guide is shown in the table below.

The FSO's Corner needs your ideas. If you have something in your program that could help other FSOs if they knew about it, call me (Dale Pierce) at AUTOVON 579-7450; or send your name, AUTOVON number, and a brief description of your program idea to either 919 SOG/SEF, Duke Field, Florida, 32542-6005, or Defense Data Network (DDN) mailbox: AFRES.919SOG-SE@GUNTER-ADAM.ARPA. ■

QUICK GUIDE TO THE SAFETY OFFICE

Information	Source
Major Mishap Response	919 SOGR 355-1
HATR	AFR 127-3 AD/SEOF
Hazard Reports	AFR 127-2, chapter 8 AFR 127-12, section D File 11
Mishap Reporting	AFR 127-4
What Reportable?	Para 2-1, 2-2, 2-3, 2-4
How to Report	Table 4-1
Message Format	Figures 4-1 and 4-2 Files 6D and 6F
Message Addresses	Table 4-2 Bookcase, binder 26
Investigation	AFP 127-1, Vols I, II, & III
Ground Mishap Report	Para 6-8 File 7A

Information	Source
Dull Sword Report	Chapter 10
Non-Lost Workday Injuries	Files 9 and 7B
ALSAFECOM Messages	AFR 127-2, para 5-6a, 9-3b File 5, SAF-1
Safety Personnel	List on wall
Safety Regulations	Bookcase
OSHA Standards	Bookcase
Outline of Duties & Responsibilities	AFR 127-2
General	Chapter 4
Flight Safety	Chapter 13
Weapons Safety	Chapter 14
Ground Safety	Chapter 15
Self-Inspection	Bookcase, binder 35 919 SOGR 123-1
Self-Evaluation	AFR 127-2, chapter 6 File 10

Information	Source
Safety Meetings	
Flight Safety	Scheduled in Bulletin Materials in SE desk File 13D
Ground Safety	Distribute material for UTA
Safety Council	AFR 127-2, chapter 10 AFR 127-12, section C File 13A
Sample Correspondence	File 5
Suspense System	AFR 10-1 File box on admin desk
Continuity Books	
Flight Safety	Bookcase, binder 32
Ground Safety	Bookcase, binder 31
Weapons Safety	Bookcase, binder 30

OPS

Near Miss

■ A T-37 pilot was cleared for an instrument approach into a nonradar controlled airport. Just after breaking out of the clouds which were based at 4,000 feet, the T-37 passed about 50 feet over a light aircraft.

The pilot of the light aircraft wasn't talking to the tower, and the FSS didn't have a flight plan on it.

This incident points up the need to be extra careful in clearing for other aircraft when operating in a nonradar environment. Flying in and out of clouds further decreases time available for spotting traffic.

Only One Bird

Just after entering a low level, the pilot of one of our heavy aircraft saw a hawk approaching. He ducked, but heard the bird strike the aircraft. It felt like the bird hit the lower left side of the fuselage.

The pilots could see no damage and no other hawks. After performing a controllability check, they decided to continue the mission. After landing, they found dents on the ring cowl of one engine and dents on the leading edge of the wing.

The crew was lucky this time. An air abort is the safest decision to make after a bird strike, and a high altitude controllability check gives more room to handle any problems.

A Chain of Errors

You're going to think this incident grew out of imaginations honed by hours at a large gray desk, but this actually happened! This recent A-7D physiological incident emphasizes so many "lessons learned" that it reads like fiction.

Check the small pocket on the sleeve of your flight suit or flight jacket. Have you got a couple of those foam earplugs in there? So where's the cardboard container they came in? One of these containers turned up recently lodged in the forward cockpit air pressure regulator of an A-7D. This kept the cockpit from pressurizing, which the pilot discovered when he became hypoxic.

"Unlucky," you say, but not a major war crime? It wasn't in this case because the pilot recognized his hypoxia symptoms, gang-loaded the oxygen regulator, and descended immediately. But how would you like to be the boomer trying to plug into a jet flown by a hypoxic pilot? Or be a passenger on a MAC flight piloted by a hypoxic crew?

This mishap did not result from the singular event of discarding or losing the container in the cockpit. The area where the container lodged cannot be seen during the cockpit foreign object checks required during pre- and postflight inspections, but the chain of errors continued when the pilot failed to detect the lack of cabin pressure as he climbed out, and again when he removed his mask at level off.

Recounting some of the inexpensive lessons learned from this incident shows us:

■ Altitude chamber training is important! Learn your hypoxic symptoms and react to them.

■ "FO" doesn't have to be hard to cause "D." Take everything out of the cockpit you brought in with you.

■ You may spend most of your time at medium or low altitude, and, if so,

TOPICS

you may get out of the habit of checking cabin pressure. This may cost you if you climb out and forget to confirm the systems are working. Sounds like it ought to be a checklist item? It is: RTFC.

▪ Cabin pressure gauges are traditionally small, poorly lit, and difficult to read. However, it's worth the effort.

Major Linn Van der Veen
Directorate of Aerospace Safety

What's Your Hurry?

A fighter pilot was making a dry, practice hookup to a KC-135. As soon as he got a contact, the fighter pilot simultaneously reduced power, started moving aft, called for a disconnect, and depressed the AAR button. However, the boom did not disconnect and he had to add power to stop the aft movement.

The boom finally disconnected in the lower right corner of the envelope as the fighter was moving forward. The boom appeared to be bowed upward and to spring out of the receptacle when it released.

After the fighter landed, maintenance found the upper portion of the air-refueling receptacle had failed when the boom wedged in it. This pilot could have saved the Air Force almost $17,000 in repair costs by confirming a disconnect *before* reducing power and starting to move.

Manual (or No) Fuel?

The HH-1 crew briefed and began a normal practice manual fuel procedure at 500 feet AGL over the runway. The upgrade copilot in the left seat put the collective down and rolled the throttle to flight idle.

The IP in the right seat removed his left hand from the center console, where he had been guarding the switches and checked to see that the throttle was completely rolled to flight idle. When

he put his hand back on the center console, he inadvertently took hold of the fuel shutoff switch. Thinking he had hold of the fuel control switch, he turned it off.

As you might expect, the engine soon lost power and the rotor RPM began to decrease. The IP took control and successfully autorotated the helicopter onto the runway.

There was no damage in this case and no injuries, but the potential was there. Make sure you know what switches or controls you're activating!

Delayed Discrepancy

After flying a 12-hour night mission, the B-52 aircraft commander returned to his quarters and went to sleep. When he awoke the next morning, he noticed a small amount of blood coming from his right ear canal.

The flight surgeon found the A/C had a perforated eardrum. He had been on 100-percent oxygen for about 4 hours during the flight, and while he slept, the inner ear absorbed the pure oxygen. This caused the eardrum to retract and perforate.

After flying on 100-percent oxygen, remember to ventilate the inner ear. This is not normally a problem unless you're going to bed right away. In that case, perform a valsalva several times, especially if you happen to wake up during the night. ■

MAINTENANCE MATTERS

GOING BALLISTIC

■ It was nighttime when the 7-level pneudraulic technician was dispatched to perform an operational check of the A-10's emergency brake system and landing gear auxiliary extension.

Once at the aircraft, he asked the crew chief, who had never done these tasks, to lend him a hand by performing the necessary cockpit functions.

Working together, they performed the emergency brake check without any problems. But it was a different story with the auxiliary gear extension check.

When the technician told him to pull the auxiliary landing gear handle, the crew chief inadvertently pulled the canopy jettison handle. Since the canopy was up, it did not leave the aircraft. However, the canopy remover fired and went through the canopy frame and glass.

What are the lessons learned? The 7-level pneudraulic technician assumed the crew chief was familiar with the cockpit steps required for the system check. The crew chief, who willingly agreed to assist the technician, never asked for any clarification about specific cockpit handles. You'll also recall this happened during darkness, which may have been a contributing factor.

If we do the planning, coordinating, and training before performing the operational checks, then items like a canopy thruster will be kept under the canopy glass, where they belong.

THE NOSE KNOWS

During flight, the EF-111 aircrew noticed strong fumes in the cockpit. They immediately selected 100-percent oxygen, accomplished the applicable checklist, and diverted to the nearest base.

The maintenance records showed this was the aircraft's first flight after a phase inspection. On the day prior to this flight, someone used sealant to cover a nut plate under a cockpit panel.

Tech order directives require sealant to cure for 72 hours. Although

a supervisor checked for proper installation of the panel, he was unaware of the sealant's use and, consequently, the required cure time, since the use of sealant was not reflected in the aircraft forms.

Whether it be sealant, paint, or any other substance that has strong fumes, be aware of the accompanying cure time for any fumes to dissipate. Also, don't forget to make an entry in the aircraft forms. That way, others will know what you did, and hopefully, we can prevent physiological mishaps and costly aborted missions.

BANGED BY BLAST

The crew chief marshaled a jet fighter forward to accomplish an end-of-runway (EOR) inspection. Meanwhile, another fighter taxied into the adjacent parking spot and stopped.

After assisting with the EOR check on the first jet, an assistant crew chief stood to the left rear of it. The crew chief, standing to the right front of the same aircraft, cleared the aircrew for taxi.

The aircrew visually checked for people and equipment, and seeing none, began to taxi their aircraft. At the same time, the assistant crew chief crossed about 20 feet behind the jet to start an EOR check on the next aircraft. He was knocked down by the jet blast from the taxiing fighter and came to a rest about 75 feet behind it.

It's obvious the ramp is a high-threat area, especially around moving aircraft. Yet, those who spend most of their maintenance shift on the flight line also know how easy it is to become complacent.

Although there are many elements that contribute to complacency, the thing to remember is this: Complacency yields higher mishap potential. Just ask the person in this mishap who missed 6 days of work after sustaining minor bruises and contusions. ■

☆U.S. GOVERNMENT PRINTING OFFICE: 1988 — 579-037/80001

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 Mishap Prevention Program.

CAPTAIN

Michael G. Cosby

35th Tactical Fighter Squadron
Kunsan Air Base, Republic of Korea

■ On 28 July 1987, then First Lieutenant Michael G. Cosby, was on a single-ship night mission in an F-16. Immediately after canceling afterburner, Captain Cosby felt and heard 10 to 15 loud bangs and saw orange and yellow flames behind the aircraft.

He reduced the throttle to idle and started a 10- to 15-degree zoom. He noted his FTIT passing 1,000 degrees and his RPM decreasing below 60 percent. The master caution light, HUD warning light, and engine lights illuminated. Captain Cosby pulled the throttle to off, and the EPU activated normally. He then started the JFS using start 2 and turned the EPU switch on. He was 30 miles away from home base as his altitude peaked at approximately 14,000 feet MSL.

As the airspeed passed 250 knots and with the FTIT reading 600 degrees, Captain Cosby placed the throttle to idle. Passing 12,000 feet MSL, he noticed the RPM falling below 25 percent and the FTIT passing 700 degrees. A recheck of the JFS showed the run light off with the switch still in the start position. He placed the throttle to off and lowered the nose to maintain RPM. He then turned the JFS switch off, placed the EEC/BUC switch to BUC, and made a quick call to the SOF as he waited for the JFS accumulators to recharge.

Captain Cosby placed the throttle to idle in an attempt to obtain a spooldown airstart. At approximately 10,000 feet MSL, he performed a successful BUC airstart. He leveled off at 7,000 feet MSL and proceeded directly to the airfield while keeping the SOF informed of his condition and intentions. He successfully restarted the JFS using start 2 prior to landing, as well as accomplishing all remaining checklist items. He then performed a flawless straight-in SFO at night and used normal braking to stop prior to cable engagement.

Captain Cosby's exceptional airmanship and professional skill, under extremely difficult circumstances, resulted in the safe recovery of a valuable aircraft and averted possible loss of life. WELL DONE! ■

Write A Dumb Caption Contest Thing

Once again we give you the opportunity to beat our dumb caption. If you send us the best caption, we'll send you our cheap little prize and also plaster your name all over our January magazine. How's that for a big deal? Wow!!!

Write your caption on a slip of paper and tape it on a photocopy of this page. DO NOT SEND US THE MAGAZINE PAGE. Use "balloon" captions pointing to either or both of the captains in the picture, or use a caption under the whole thing. You may also submit your caption on a plain piece of paper. Entries will be judged by a panel of experts on dumb humor. All decisions are relatively final. No bribes under $1,000,000 will be accepted.

Send your entries to: **"Dumb Caption Contest Thing." *Flying Safety* Magazine • HQ AFISC/SEPP • Norton AFB CA 92409-7001**