flying SAFETY

GLOC Update

Traveling Through Time

Food & Long Haul Flying

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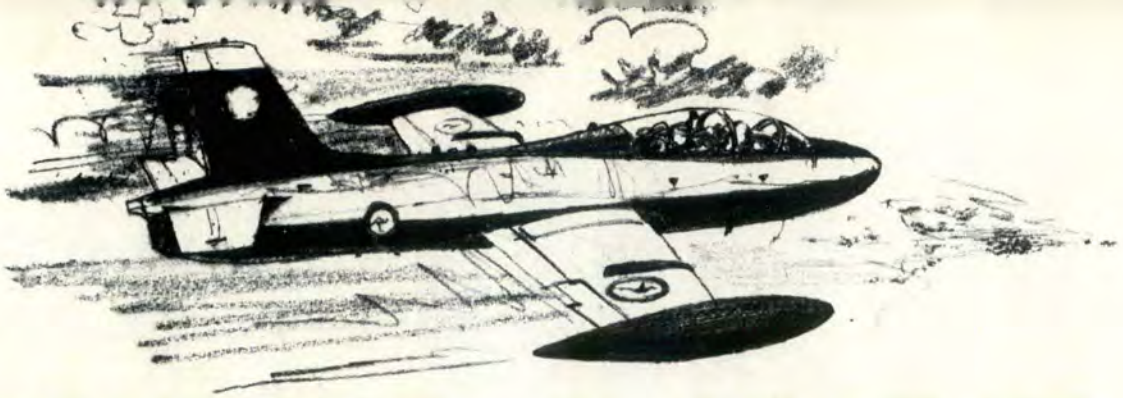
MAY 1992

FIT TO FLY



THERE I WAS

■ Not so many years ago, I was a student pilot in the Royal Australian Air Force about to embark on my wings test. Naturally, I was quietly confident of my ability, and I knew I would do well. I managed to hide these feelings by behaving like a nervous jellyfish with two left tentacles.

My nervousness increased when the chief flying instructor, who was to judge my performance, was nearly an hour late. This meant, after enduring a morning of inactivity, I was suddenly late and trying to make up time. Following a rapid preflight, the test was on.

The departure went well, and it was a beautiful day, so I was starting to feel pretty good. The voice from the back said, "Okay, Bloggs, show me your aeros." I remembered my pre-maneuver checks, and a clearing wing over, then selected my line feature and pulled into a loop. I suddenly realized I had forgotten to plug in my G-suit, and my career flashed before my eyes.

To correct this error, I would need to interrupt the aerobatic sequence, release the control column, and use both hands to plug it in. My thoughts were the testing officer would realize I had done a poor preflight by not connecting it prior to takeoff. I didn't want him to know I was guilty of such poor airmanship, so I decided to "tough it out" and continue on without a G-suit working for me. This was not the best decision under the circumstances, but it seemed good at the time.

So, on with the aerobatics. Barrel roll, vertical eight, and the voice from the back says, "What's that noise?" The noise was a "clunking" caused by my G-suit connection banging between the ejection seat and the side of the cockpit. Terror filled me again, and when the voice from the back said, "Taking over," I fumbled, furiously trying to connect the hose without appearing to move, while the voice from the back tried to reproduce the noise. Well, as luck would have it, I was unable to connect the hose, and the voice in the back said, "Handing over." More aerobatics and more "clunking" followed.

Finally, the voice in the back said, "There's something wrong with the aircraft. I'm going to declare an emergency, and we'll go back." I decided now was the time to try and recover the situation, so I mumbled something about suddenly realizing what the problem was. The voice from the back was very angry. He did not believe I had "just discovered" the problem. I had a lot to learn about being a plausible liar, too, it seemed. A veritable torrent of abuse rained down upon my head, and I started to lose interest in my test.

The test continued. I flew with the extra burden of what I had done and with an angry testing officer. My performance suffered badly during this flight because of my feelings of guilt and self-recrimination. I was unable to forget this example of poor decision making, so I continued making mistakes. Eventually the ordeal ended, and, happily, I passed the test. I went on to become a "voice from the back" in my own right after some years in the operational world.

I have often thought back over this particular lesson as I have watched pilots and copilots create hazardous situations where there was no need for them. If you make a mistake, this makes you as human as the next guy, but don't make it worse than it is by trying to hide it. A testing officer is impressed by the way you control the aircraft, and this includes how you cope with the unexpected human error. People are always willing to help you correct mistakes, and testing officers are people, too. In my case, the smart solution was a simple "My G-suit is disconnected. Handing over while I reconnect it." This would have prevented the wasted time and effort I caused.

I hope you think of my experience the next time you recognize you have made an error in judgment. We are all prone to such errors, but you can minimize their effects if you obtain help to correct them before they develop into something more serious. The embarrassment you prevent may be your own. ■

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page 2

page 8

page 15

SPECIAL FEATURES

REGULAR FEATURES

DEPARTMENT OF THE AIR FORCE • THE CHIEF OF SAFETY, USAF

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GLOC UPDATE

Photo by Robert King

During a 10-year period, GLOC resulted in 19 Class A mishaps and claimed 15 lives.

CMSGT ROBERT T. HOLRITZ
Technical Editor

■ On 15 October 1922, Lt Russel L. Maughn won the Pulitzer air race by averaging 205.8 miles per hour around a closed course. When interviewed by a New York Times reporter, Maughn stated he "was stunned around the 15 turns and even became unconscious for 3 or 4 seconds." What Lt Maughn experienced was G-induced loss of consciousness, better known to today's pilots by the acronym GLOC.

While GLOC can occur in any aircraft, as the performance and agility of modern aircraft continue to increase, so does the problem of GLOC. In spite of the continuous study of the problem, and the development of procedures and equipment such as anti-G suits, over decades, GLOC remains a serious problem. During the 10-year period 1982 to 1991, there were 19 Class A mishaps, resulting in 15 fatalities attributed to GLOC. Clearly, the physical capabilities of today's pilots are being challenged by the speed and agility of modern fighter aircraft.

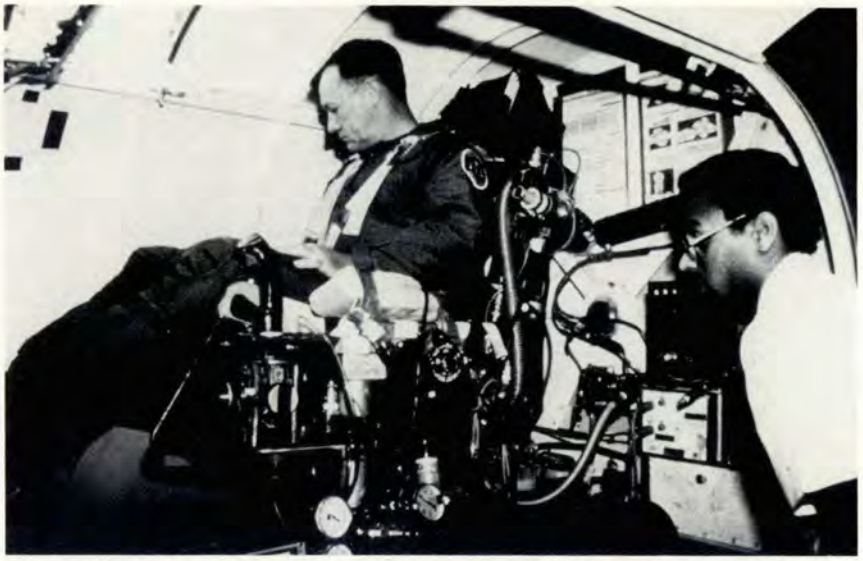
CLASS A GLOC MISHAPS
1982 - 1991

F - 16	8
T/A - 37	3
A - 10	2
F - 5	2
F - 106	1
A - 7	1
F - 15	2

The Air Force is approaching the GLOC challenge from two aspects: Aircraft and life support equipment design and physiological training.

GCAS

A ground collision avoidance system (GCAS), initially designed to



High-G centrifuge training as part of basic fighter training is effective in preventing GLOC.

prevent a pilot from auguring in from task misprioritization or channelized attention at low altitude, is also useful in combatting GLOC or spatial disorientation. One is being tested in an F-16 airframe as part of the F-22 development program. It uses a relatively simple software change to the aircraft's computer which monitors the aircraft's flightpath, altitude, airspeed, and trajectory. The algorithm computes this information to provide a voice warning to the pilot at a predetermined altitude and certain other parameters. If the pilot does not respond to the warning within a certain period (about a second), the computer will automatically recover the aircraft to a safe altitude and attitude.

LOCOMS

The folks at the Armstrong Aerospace Medical Research Laboratory at Brooks AFB, Texas, are developing a loss of consciousness monitoring system (LOCOMS) to warn the pilot of impending GLOC. It could also interface with GCAS to signal the computer the pilot has become incapacitated due to GLOC. LOCOMS uses an advanced helmet equipped with a sensor near the front of the ear which monitors the pulse and can measure the oxygenation of blood flowing to the pilot's eyes and brain.

LOCOMS also uses a device which works on the principle that blinking ceases when a pilot becomes unconscious. Mounted on the front of the pilot's oxygen mask, it uses an infrared light source about an inch long, and the diameter of a pencil, to monitor the changes in reflective light off the cornea of the pilot's eye.

Another device for detecting an unconscious pilot is the electroencephalograph, or EEG. Tests have shown, just as in deep sleep, the brain generates low-frequency Delta waves when a pilot loses consciousness. Until recently, one of the drawbacks of the EEG was that the electrodes had to be attached to bare skin over a coating of conductive gel. However, a new dry electrode is under development which can be installed in the aviator's helmet, allowing the brain waves to be monitored in flight.

Although GCAS and LOCOMS seem like logical approaches to the GLOC problem, not all fliers are in favor of these concepts. According to Dr William L. Albery, Chief of the Combined Stress Branch at the Armstrong Lab, "Pilots are reluctant to be monitored — to have their physiology watched. And they sure don't want the airplane taken away from them [by a computer]."

In addition, researchers at the Navy Air Development Center have discovered a semiconscious state not observed until recently. In this condition, the pilot is disoriented and confused, yet everything being monitored, including the EEG, appears normal. This discovery clearly complicates solving the GLOC problem. Instead of monitoring the pilot, Dr Albery suggests the emphasis should be on how to prevent GLOC.

Cockpit Configuration

There are several projects in the works to help prevent GLOC. One of these is cockpit configuration.

Studies showed a pilot in a reclining position is less likely to experience GLOC than one sitting upright. This is because the greater the angle the pilot sits in the cockpit, the shorter the column of blood between the brain and heart relative to the applied G forces. For example, the 30-degree incline of the F-16 seat provides the pilot with a slight increase in G tolerance. But according to Dr Albery, "To be effective, we need to increase the seat angle to 65 degrees. This is not likely to make pilots very happy. Imagine driving a car while laying on your back. This situation is also very likely to increase the possibility of spatial disorientation. But we have gone as far as we can to protect the upright pilot."

To achieve the 65-degree angle will probably require the development of a helmet visor display unit. The technology is almost available, but there is some doubt if it would be worth the expense and tradeoff in pilot comfort.

Combat Edge

G-suits have been around since WW II, and their design has changed very little over the years. The principle of the G-suit is simple. When an aircraft senses increased Gs, the suit is inflated, squeezing the lower extremities and lower abdomen, preventing blood

continued

GLOC UPDATE continued

from being drained from the brain to the lower parts of the body. But even a properly fitted and snug G-suit only provides 1½- to 2-Gs protection. However, when used in conjunction with proper straining techniques, a pilot can avoid GLOC in maneuvers over 9 Gs.

But many GLOCs occur because of a rapid or unexpected onset of high Gs. When this happens, the pilot is not prepared to execute a proper straining maneuver, and the G-suit does not have sufficient time to inflate. Combat Edge is a program designed to help prevent GLOC under unexpected and high-G conditions.

Under development by the Air Force's Human Systems Division at Brooks AFB, Texas, Combat Edge is an assisted positive pressure breathing system. Under rapid or high-G conditions, oxygen is forced under pressure into the pilot's lungs through a special mask. The straps of the mask automatically tighten to maintain the face seal and positive pressure in the pilot's lungs. At the same time, a counter-pressure vest inflates applying pressure to the pilot's chest, achieving the same effect as a straining maneuver.

In conjunction with Combat Edge, a rate-sensitive anti-G valve has been developed which is interfaced with the flight control data bus and anticipates a high-G condition when the pilot commands a high-G maneuver, instead of reacting to a high-G condition. Combat Edge will improve G tolerance, but Dr Albery warns, "The pilot will still have to use the straining technique."

Hydrostatic G Protection

The hydrostatic G protection system is based on the following principle: For an individual immersed in water, hydrostatic pressure exerted on any portion of the body is proportional to the depth of the water multiplied by the G forces. Therefore, the acceleration forces on the body result in an identical opposing force exactly balancing the body's vascular system.

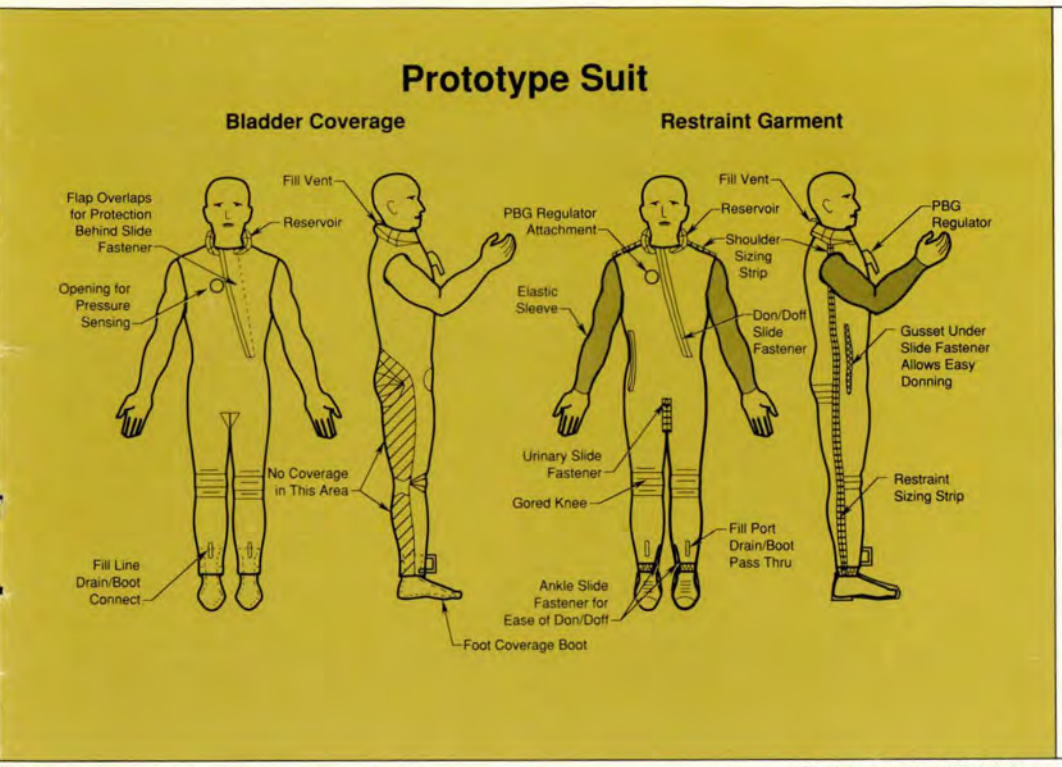
The idea of hydrostatic G protection is not new. In fact, hydrostatic G-suits were used with limited success during WW II but were abandoned in favor of the lighter, more comfortable pneumatic G-suit used today. Now, advanced technology and the need for a more effective G-suit has spawned renewed interest in the hydrostatic system.

The McDonnell Aircraft Company has built a prototype suit called Atlantis Warrior™. According to MCAIR tests, the suit provides protection to 7 Gs for 5 minutes with-

MCAIR project pilot in the Atlantis Warrior™ fluid-filled anti-G suit.

During centrifuge testing of the Atlantis Warrior™ system, pilot Al Frazier sustained 10 Gs for 3 minutes.

Weight training, neck exercises, and *moderate* aerobic training help increase G tolerance.



An artist's concept of MCAIR's hydrostatic G-suit of the future.

Diagram courtesy of *MCAIR Digest*

out straining and up to 10 Gs for 3 minutes with moderate straining.

Training

In spite of all the high tech design and engineering, training remains the long pole in the tent for avoiding GLOC. The average GLOC mishap rate for 1982-4 was 4.0 per million flying hours, decreasing significantly to 1.3 per million flying hours for 1985-90. This decrease is associated with the USAF initiation of an anti-GLOC training program. Frequent high-G training sorties not only increase the pilot's resistance to GLOC, but also provide an opportunity for practicing the straining maneuver.

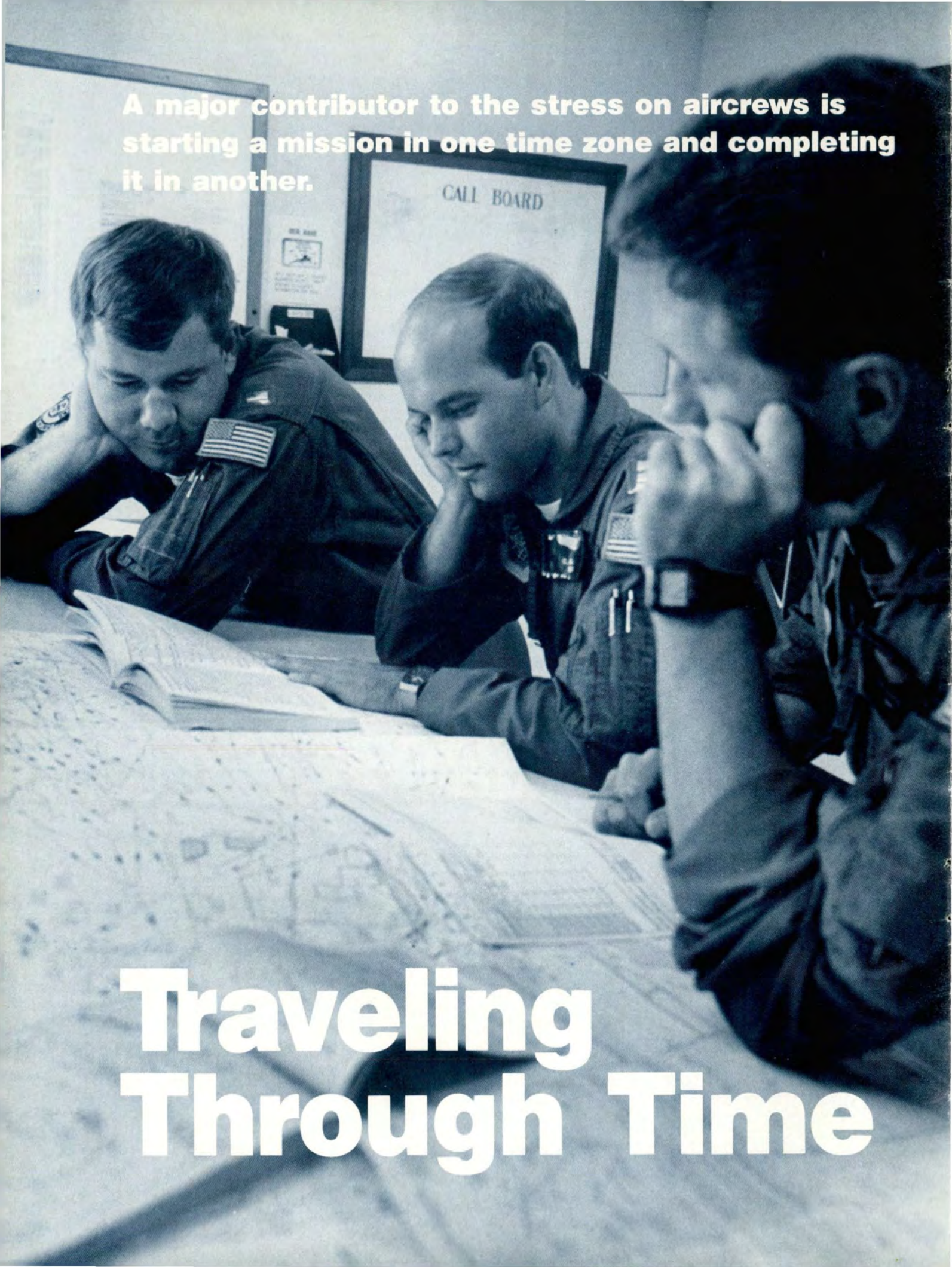
The high-G centrifuge training, which is now being conducted at Holloman AFB, New Mexico, as part of Basic Fighter Training, is an effective tool in the prevention of GLOC. For example, during this training, pilots learn how to minimize the effects of high Gs by using defensive head posturing. They learn turning to check six during a high-G evasive turn, if not properly coordinated with a straining maneuver, can quickly induce GLOC, and leaning forward toward the instrument panel (except in the F-16) can help increase tolerance.

Photo courtesy of *MCAIR Digest*

The Future

In spite of the increased speed and agility of future aircraft, there are those in the military who believe GLOC will not become a serious problem. They make the argument that new target acquisition systems and long-range missiles make the "high-G dogfight" a thing of the past. To them, an aircraft gun system is just so much excess baggage.

Others think stealth technology and ever decreasing IR signatures may degrade missile effectiveness. In the next generation fighter, pilots may once again depend on their eyesight and gun. In this scenario, flying skill and G tolerance will give the fighter pilot the combat edge. Whatever tomorrow's combat scenario, the folks at the Armstrong Laboratory will continue to research the problems of GLOC. ■



A major contributor to the stress on aircrews is starting a mission in one time zone and completing it in another.

Traveling Through Time

LT COL SAMUEL STRAUSS
Medical Corps Flight Surgeon

Photo by CMSgt Robert T. Holritz

Crossing nine time zones, aircrew members, like C-141 Flight Engineer SSgt Rhonda Maloney, have had to learn to cope with effects of jet lag.

■ Much of today's military flying is done in an environment of long workdays, irregular work hours, and travel to distant locations. Many mission schedules plan several consecutive days of such flying. In addition to following crew rest directives, it is important for aircrews to understand and compensate for the effects of jet lag.

Understanding Jet Lag

A major contributor to the stress of military flying on crews is starting a mission in one time zone and completing it in another. Research into the physiological and psychological effects of the resulting "circadian dysrhythmia" suggests the effects, although temporary, may be serious and could affect the safe operation of our aircraft.

The circadian rhythm is a 24-hour cyclic variation of our psychologic and physiologic functioning. It is influenced by hormones secreted by the pituitary gland under the brain and our "chronotype." Our chronotype characterizes us as a "morning person" or a "night person."

The circadian rhythm actually consists of several separate rhythms, such as sleep-wake cycles, hunger and digestion, and body temperature. These are synchronized by day-night cycles and social interaction patterns. Each of these rhythms synchronize at their own rates.

When the rhythms are disturbed, as occurs when traveling across several time zones, the resulting changes affect the way we feel and function. Psychological effects, such as mood dysfunction, usually resolve rapidly. However, physiological functions, such as sleep-wake cycle, food digestion, control of body temperature, heart rate, renal function, hormone levels, alertness, and fatigue can take several days to fully adjust. Some common complaints of jet lag sufferers are difficulty falling asleep, difficulty staying awake on the job, and generalized gastric discomfort.

Some studies suggest the most stressful transmeridian flights are those in the west-to-east direction. This is due to the effect of "lost time" when comparing local time to lapsed time. When traveling westward, essentially pacing the earth's rotation, local time at arrival is often not much different from departure time. Therefore, the effect on circadian rhythms may not be as dramatic.

Complete recovery may require as much as 1 day per time zone. But the actual recovery time depends mostly on the number of time zones crossed, the direction of travel, and individual variability.

Minimizing Jet Lag's Effects

The effects of jet lag can be reduced by taking several measures to minimize its effects. One to consider is a gradual alteration of sleep-wake cycles to approximate the time at destination. If possible, this should be started several days prior to the trip. Some studies have shown that to equalize sleep balance, naps are helpful in improving alertness and performance.

Another measure shown to be helpful is a diet change starting 4 days before the flight. This would consist of high protein meals on days 1 and 3 and light meals on days 2 and 4. Timed use of caffeinated beverages can supplement the need for mild stimulation when necessary.

In some military situations, a sleeping medication, temazepam, has been used with great success. The safety and effectiveness of this drug taken by military aircrews was demonstrated by the Royal Air Force of the United Kingdom in the Falkland Islands War. During these operations, some flights extended to 30 hours.

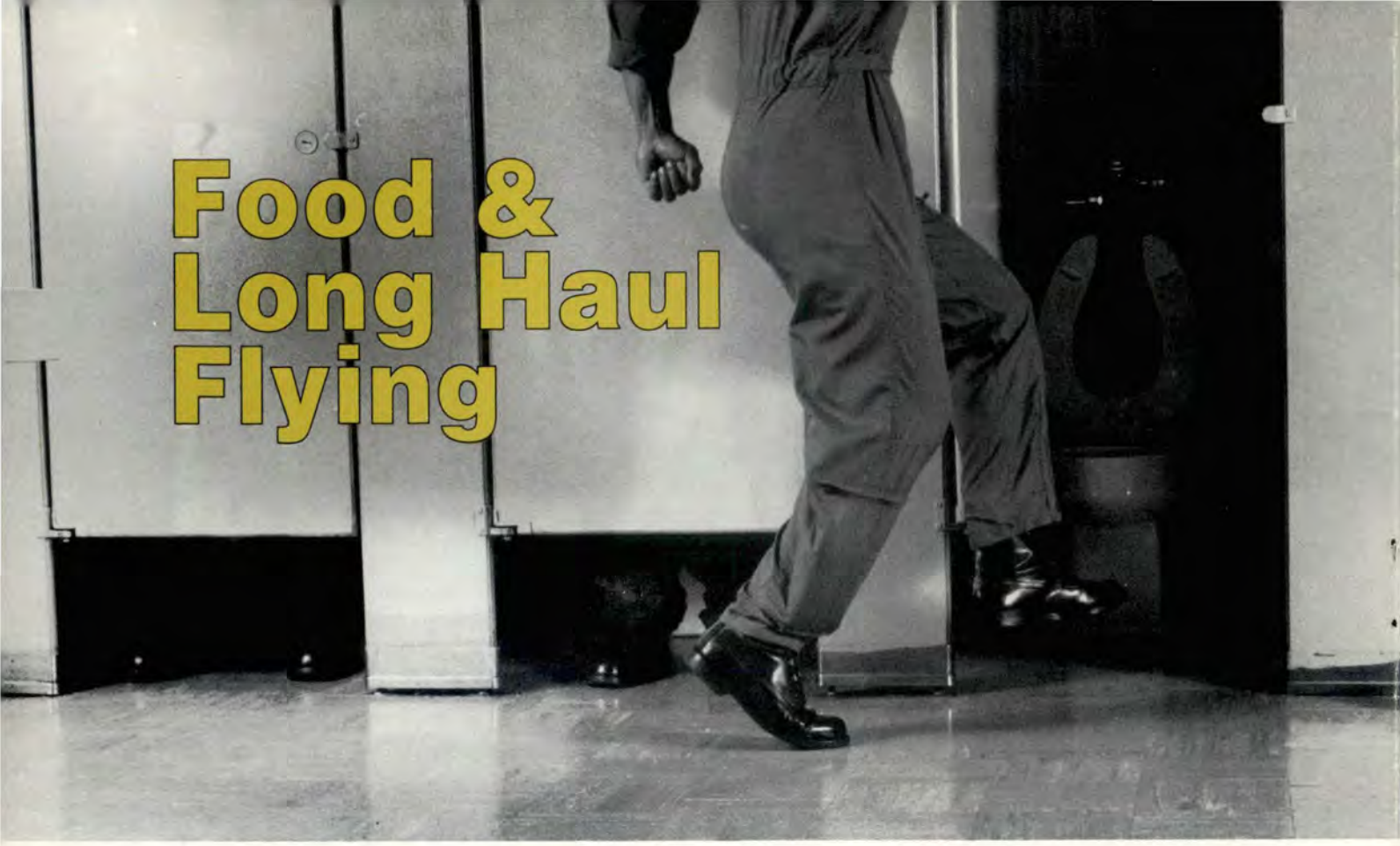
Aircrews were able to sleep at unusual times using temazepam. They returned to flying duties 6 hours after taking this medication with no reported decrement in flying or fighting performance.

Please note RAF temazepam is different from the US Air Force's drug. The RAF temazepam has a much shorter life span in the body. The variety available to our aircrews — Restoril — lasts 9 to 12 hours, whereas the RAF drug lasts 4 to 5 hours. We must also emphasize these were highly controlled tests and under very extreme conditions. The drug is *not* for routine use.

The USAF Surgeon General has authorized the use of temazepam as a sleeping pill for aircrews under special operational conditions, with approval of their flight surgeon.

A Positive Approach

For all of us who fly, jet lag can interfere with optimal effectiveness on trips. With some of these ideas in mind, thoughtful flight scheduling, planning, and a few preventive measures can make these flights safer and more effective. ■



Food & Long Haul Flying

CMSGT ROBERT T. HOLRITZ

■ There's an old saying: "Getting there is half the fun." For long-haul flightcrews, the other half is the variety of exotic foods they enjoy along the way. After surviving on flight lunches during an extended duty day, crews look forward to dining on local cuisine. After all, during a layover at Frankfort, Germany, who could resist dining on a lightly battered jeager schnitzel or a juicy bratwurst?

But, dining on local restaurant cuisine can put aircrews, especially those flying long-haul missions, at additional risk of contracting a disabling dose of food poisoning.

Incapacitated

Consider the C-141 crew who, after 2 days of turkey-on-rye flight lunches, enjoyed a meal of fresh fish and rice on a short layover during a Pacific crossing. Several hours later, departing the small island, the crew, with the exception of the pilot and the flight engineer, began to experience severe stomach cramps, vomiting, and diarrhea.

At one point, one of the loadmasters passed out for a brief period. Fortunately, the copilot recovered enough to perform his duties during the otherwise uneventful landing.

The flight surgeon diagnosed the afflicted crewmembers as suffering from a form of staphylococcal food poisoning. The source was probably tainted tartar sauce which, fortunately, the pilot and engineer did not consume.

Cause and Effect

Food poisoning is a fairly common aircrew affliction. In fact, it was the leading cause of crew incapacitation during Desert Shield. Fortunately, most occurrences result in fairly mild symptoms. But, as we have seen, food poisoning can completely disable an aviator or an entire crew.

The poisoning may be caused either by toxins produced by bacteria such as staphylococcus or deadly botulinus (botulism). It can also be caused by eating foods contaminated by bacteria which then multiply and produce the toxins inside the victim's digestive system.

Typically, symptoms are general malaise, upset stomach, diarrhea, and vomiting. But in rare, more serious cases, blurred vision, dizziness, respiratory failure, and coma are also symptomatic. These symptoms can appear in as little as 1 hour or as long as several days after eating tainted food.

Precautions

Fortunately, by following these simple rules, aircrews can enjoy their favorite Epicurean delicacies with minimum risk:

- Avoid eating raw seafood such as clams, oysters, and sushimi. Keep in mind seafood poisoning is potentially fatal.
- Do not eat soup unless it is served piping hot. At temperatures below 165 or above 40 degrees, soup is a fertile environment for breeding bacteria.
- Ensure meat and poultry are thoroughly cooked. Some experts estimate about 20 percent of all poultry is contaminated with salmonella.
- Don't eat eggs unless they are

thoroughly cooked. Soft scrambled or sunny-side up may not be cooked enough to kill salmonella. Eggs can be contaminated with salmonella even with the shell intact. The risk of infection from eggs is high enough for two states to propose banning the sale of soft-scrambled or sunny-side-up eggs in restaurants.

■ Hold the mayo. Mayonnaise is seldom the direct cause of food poisoning. It's actually too acidic to easily promote bacteria growth. But, when it is combined in salads with other foods, it becomes an excellent medium for bacteria growth.

Safety in Numbers

It's common for aircrews to dine together during layovers. For most crews, it is a very good way to unwind and discuss the mission. But dining at the same restaurant increases the possibility of the entire crew being afflicted by a single source of contamination.

However, the odds can be improved if members order different foods from the menu. Had the pilot and navigator, in the above incident, consumed the tartar sauce along with the rest of the crew, the situation would have undoubtedly been more serious.

Flight lunches and other foods purchased from the same facility can also lead to multiple crewmember poisoning. The best insurance against this is for the pilot and copilot to eat ½ to 1 hour apart. This also applies to all augmented crewmembers.

Food for Thought

The new Air Force motto, "Global Power, Global Reach," and the new world order suggest our airlifters will be flying more long-haul missions to more exotic places than ever. As a result, we can expect to see an increase in food-poison-related incidents.

This article does not imply food poisoning is only a threat while overseas. On the contrary, crews flying CONUS missions are also at risk. In fact, an estimated 7,000 Americans die from food poisoning every year.

Play it safe. At the first sign of symptoms, see the flight surgeon. But, following the commonsense rules in this article will greatly lessen your chances of coming down with a severe case of the trots or worse. ■

HYPOGLYCEMIA

Rather than risk going without sustenance, flightcrews often stock up on junk food such as candy bars and chips. Better than starving? Maybe not.

The problem with most junk foods is they are usually high in sodium, saturated fat, cholesterol, and raw sugar. While the effects of sodium, fat, and cholesterol are usually deleterious only in the long term, high doses of sugar can lead to a rapid onset of incapacitating symptoms including sweating, nausea, vomiting, and impaired vision, plus more subtle effects including poor judgment, fatigue, slow reflexes, and a lack of sense of well-being.

Oddly enough, these symptoms are not caused by hyperglycemia or high blood sugar level. Rather, they are the result of a low blood sugar level or hypoglycemia. Here's how it works:

When a person consumes a high-sugar meal such as a couple of candy bars, the pancreas secretes a larger-than-normal amount of insulin to metabolize the sugar. But, because the production of insulin lags behind the rising of blood sugar, the result is soon an excess of insulin which lowers the blood sugar level below normal limits (less than 50 milligrams of sugar per 3½ ounces of blood in your body), causing the incapacitating symptoms.

Fortunately, with a little planning, flightcrews can avoid finding themselves in the position of choosing between hypoglycemia and starvation. Many have learned to pack a variety of fresh fruits in a small bag along with their flight gear.

As with high sugar foods, fruits contain simple carbohydrates which are a source of quick energy. But unlike candy bars and other raw sugar foods, fruits consist mostly of complex carbohydrates which are converted gradually into blood sugar, avoiding excess insulin production and hypoglycemia.

Fresh fruits are also a rich source of vitamins and minerals. Bananas, for example, are high in magnesium which is necessary for the proper functioning of nerves and muscles. They also contain potassium which helps control muscle contraction and the conversion of carbohydrates into energy. Many fruits, such as apples and bananas, are also rich in fiber. Since most fruits can be stored in a cool, dry environment for days without spoiling, they can provide a crew with a reserve source of healthy nutrition during times of mission famine.

The bottom line is, while a high sugar meal, such as a candy bar, may provide some instant energy, a crewmember should consider the effects of a hypoglycemia letdown and the potential problems on flight crew performance. ■

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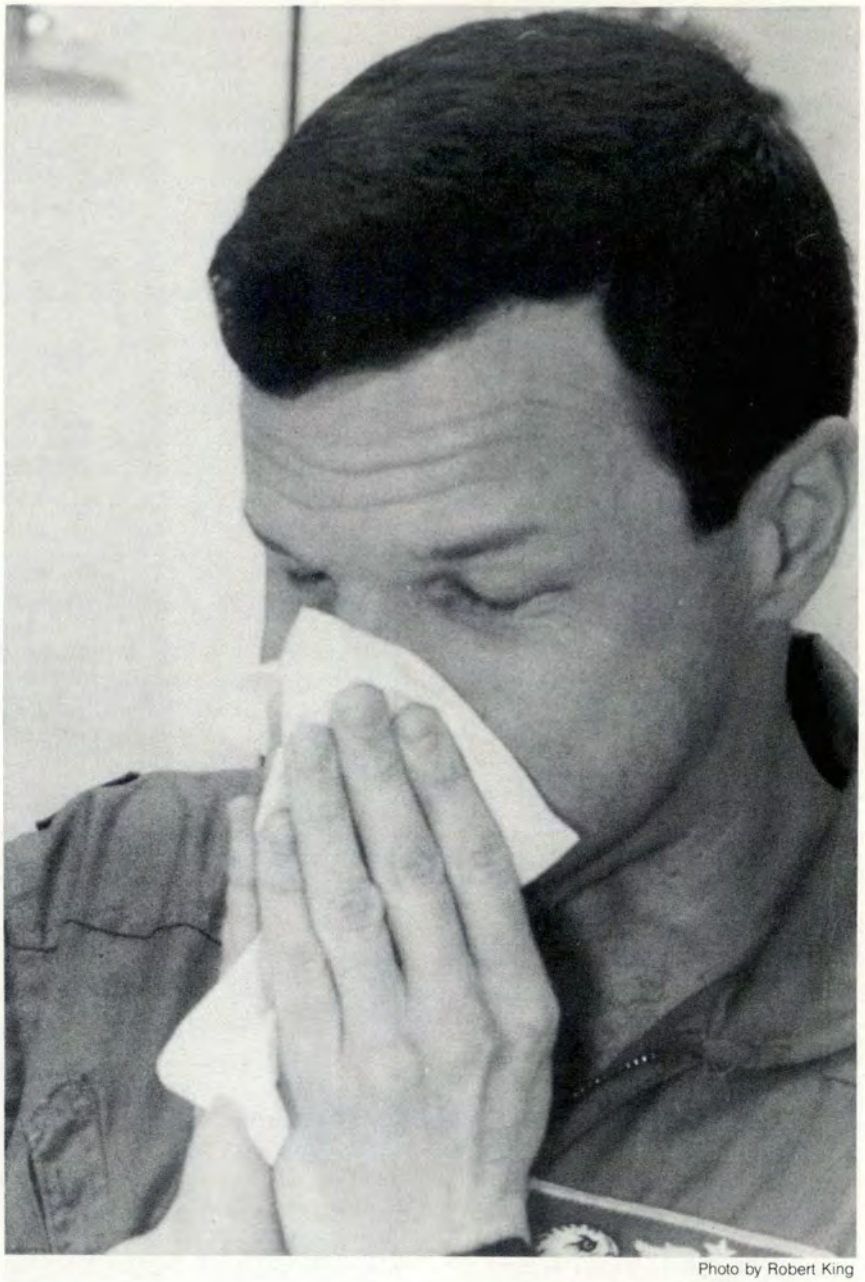


Photo by Robert King

For an aircrew member, there is no such thing as a little cold. A cold is an infection and must be treated by the Flight Surgeon.

MAJOR ROY A. POOLE
Editor

■ "Bud idz jus' a liddle code. I won't hab any trouble clearing my ears."

First, there's no such thing as a "little" cold. Second, clearing your ears may be the least of your worries. Actually, the symptoms which lead most of us to acknowledge we're getting a cold can also apply to a variety of illnesses. (Did you ever notice the time spent "getting a cold" is longer than the time we actually have a cold?)

These illnesses are lumped under the benign-sounding name of upper respiratory infections or URIs. URIs are bacterial or viral infections which result in runny noses, scratchy throats, coughing, and itchy eyes. In case those don't make you feel bad enough, they often come with fever, headaches, and a loss of equilibrium. "Sure," you're thinking, "and I've got a box of medication I picked up in the 'Cold Remedies' section of the BX which will take care of every one of those."

Possibly, but what you've probably got is a box of pills which will cover up the symptoms without treating the cause.

Given the wide range of URIs, even a Flight Surgeon has a tough time effectively treating you. Not only does the infection have to be cleared up, but to the maximum extent possible, the medication should not have a negative influence on your flying skills.

Viral Infections

The toughest infection to fight remains the common cold. It is caused by a virus about which we know very little. Once the virus invades the body, the immune system reacts and sends out antibodies to fight it off. Eventually, the antibodies win, but not before you have had the chance to share the virus with someone else. Time and the body's own immune system are the most effective ways to treat a cold.

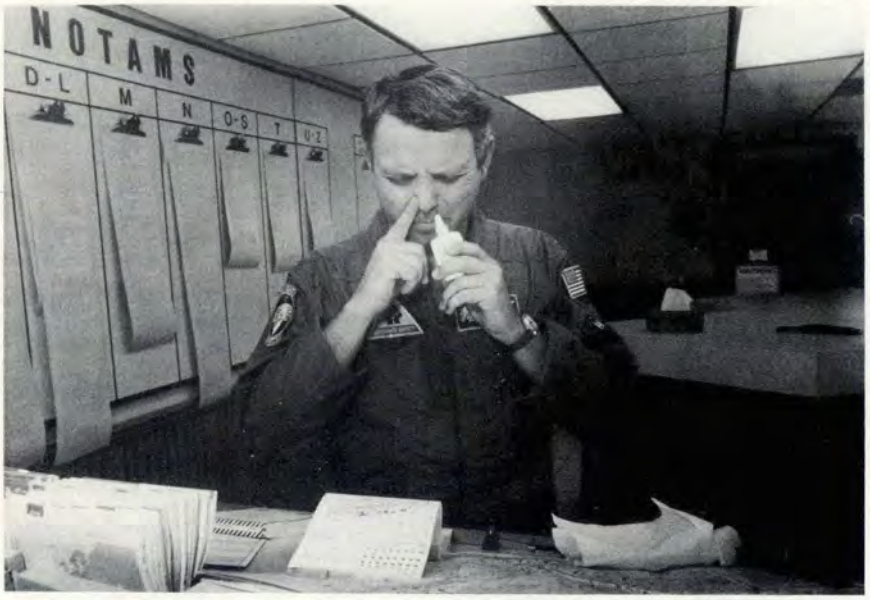
Bacterial Infections

What's the difference between a virus and a bacteria? As far as your nose and sinuses know, nothing. They both feel miserable when attacked by either. However, just to add insult to misery, the bacterial upper respiratory infection usually brings a fever and stays for a lot longer. It is also possible for the bacteria to find an adenoid or tonsil to infect. Really nasty bacteria are capable of oozing a toxin which can injure the heart or kidneys. After identifying a bacterial infection, the Flight Surgeon will probably treat it with one of the highly effective antibiotics available through prescription only.

Allergic Infections

Let's say you get to RON in Southern California. Before it gets too dark, you put on your jogging shoes and head for the golf course perimeter. A little pollen from the fairways, a little dust from the road, and a second stage smog alert will help an allergic upper respiratory infection get started. A runny nose, irritated eyes, constant coughing, and even headaches are almost guaranteed. With a correct diagnosis, the Flight Surgeon may even be able to keep you on flying status while all the symptoms are clearing up.

Photo by Robert King



The problem with most over-the-counter medications is they cover up the symptoms without treating the cause.

Still More Infections

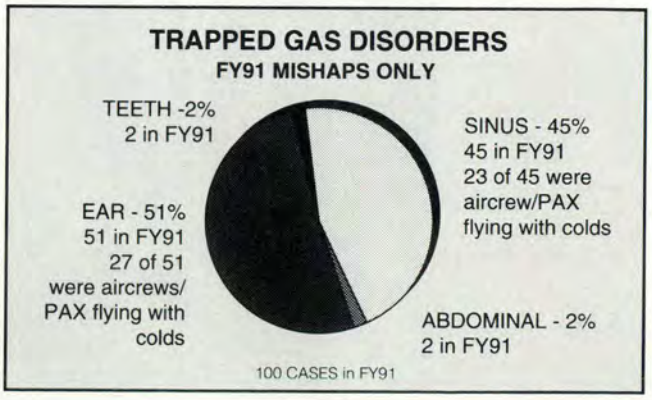
Most of us immediately associate the influenza, or flu, virus with symptoms located far from the sinuses. But the flu usually strikes the upper respiratory system as well, with symptoms which mimic the common cold. Some vaccines may ward off the virus, but since flu virus can mutate from year to year, vaccines may not be totally effective.

Sore throat and persistent fever, accompanied by chronic fatigue, may also be caused by infectious mononucleosis or streptococcal disease. The symptoms may last for weeks unless properly diagnosed and treated.

There are also an ever-growing number of URIs caused by different organisms. These include rhinoviruses, corona-viruses, adenoviruses, and micoplasma organisms. Micoplasma organisms typically are the cause of pneumonia. If you think a cold virus is tough to shake, then try getting rid of a micoplasma organism.

. . . And Call Me in the Morning

Given the wide range of reasons why you may have a "cold" (Go on! Admit it! You *do* have a cold.), self-medication should be out of the question. (See "Just Don't Do It!" on page 18.) Maybe you'll take a couple of aspirin, but then you must see the Flight Surgeon in the morning. After all, there's no such thing as a "little" cold. ■



You're part of a flightcrew been suffering from a cold hopefully for a quick cure.

Just

PEGGY E. HODGE
Assistant Editor

■ Did you know that diet pills can raise your blood pressure, or make you anxious, even tense? Did you know that two or more aspirins can increase your oxygen consumption and carbon dioxide production contributing to hypoxia and hyperventilation?

Self-medication is a potentially hazardous undertaking — *at best!* The Air Force has an exceptionally good flying record where drugs are concerned. There have been very few instances where they have been a factor. But even one drug-related mishap is one too many — so let's look at this problem, some new information, and our current Air Force policy.

The Problem

Every medicine in a drug store has the potential for some adverse side effects which could be detrimental in the cockpit. Take the following mishap reported in a recent "Ops Topic" in *Flying Safety.*

"The pilot of a single-seat fighter was flying as no. 3 in a 4-ship DACT mission. He made a formation takeoff and closed to 1nm behind the lead element. Passing 4,000 feet in a right 30-degree turn, the mishap pilot turned his head to watch his wingman cross under from right to left.

"When he brought his head forward, the pilot experienced tumbling vision followed by uncontrollable, rapid eye movements. He immediately informed lead of his problem, turned the autopilot on, and selected 100 percent oxygen.

Even common, everyday drugs have a potential for causing us some problems in the cockpit!

Photos by Robert King

and you've got aches and pains — or maybe you've or upset stomach — and you head for the drug store Here's something to remember ...

Don't Do It!

After 15 to 20 seconds, his vision returned to normal. He declared an emergency, dumped fuel, and returned to base for an uneventful straight-in landing.

"The Flight Surgeon met the pilot at the aircraft and took him to the clinic for an evaluation. The Flight Surgeon learned the pilot had been suffering from symptoms of upper respiratory infection for approximately 48 hours prior to the flight. Instead of going to the Flight Surgeon, the pilot took an over-the-counter cold tablet approximately 6 hours before the mishap flight.

"During the physical examination, the Flight Surgeon discovered the pilot had ear blocks in both ears. The doctor's opinion was that the tumbling vision and vestibular disorientation were most probably aggravated by these ear blocks combined with the effects of the cold tablet."

This is only one example of the dangers of self-medication by fliers. This pilot was lucky. What if he had experienced the disorientation during the DACT portion of the flight? During close formation? On short final? I'm sure you can conjure up many visions of potential disaster in this situation.

The *availability* of over-the-counter medicines further compounds the problem. Many of these medicines, which advertise a cure for colds, headaches, muscle aches, as well as a host of other ailments, are no different than prescription drugs. They can cause side effects that are undesirable in the cockpit. With so many medications close at hand, it is easy to become complacent about them and not think about possible side effects. (See "Everyday Drugs," page 14 for a review.)

You May Not Know

Recent research provides us some important information on phenylpropanolamine (PPA) — the drug found in diet pills.

For your information, the facts are:

- PPA alone, or taken in combination with caffeine, is widely promoted as an over-the-counter appetite suppressant.
- Anxiety, hypertension, seizures, and psychotic behavior (lasting up to several days) have been reported in users of these drugs.
- Over 100 formulations of PPA are presently marketed in the U.S.
- Frequent or excessive use of nasal solutions containing this drug may lead to functional dependence.
- Hypertension from PPA alone is accompanied by a slow heart action.
- PPA can be incompatible with other medications. Some combinations can cause dangerous elevations in blood pressure.

Prescriptions issued by a flight surgeon are your only *safe* bet!

Air Force Policy

Current Air Force policy is that aircrew members taking any medication will be temporarily disqualified from flying (grounded) until the drug is no longer required and all possible effects of the illness are dissipated.

Fliers requiring chronic medications, even without side effects, will be temporarily grounded pending a 30-day test period and then approval (waiver) from appropriate higher headquarters. If significant side effects should occur, you will be disqualified from flying as long as the medication is required unless a suitable alternative is initiated.

Air Force policy has halted the use of "Go" medication (currently dextroamphetamine). According to AFP 161-18, *Flight Surgeon's Guide,* the use of "Go" medication began during World War II to maintain alertness for many hours longer than normally expected when necessary for mission completion. Prior to the recent Air Force decision, "Go" medication was used but limited to long-duration missions involving single-piloted aircraft, multiple refueling missions, and ferrying aircraft across ocean expanses.

Just Don't Do It!

The bottom line is "just don't do it!" Self-medication is dangerous and can lead to mishaps. Leave the diagnosis and treatment of physical disorders to those who are trained for it — the Flight Surgeons. ■

See our listing of Everyday Drugs: Recognize Their Effects, on page 14 — a handy reference to copy and keep.

EVERYDAY DRUGS: Recognize Their Effects

Unknown Side Effects

Apart from the primary purpose for which drugs are intended, it is generally true to say most of them also have unwanted side effects. We highlight here some of the more common drugs — drugs which could be mistaken as an innocent and quick cure.

Antacids

- Some contain sodium bicarbonate which liberates carbon dioxide. At altitude, this may give rise to acute pain due to distention of the stomach on top of the original upset.
- Calcium-based antacids can be a great source of calcium, but an hour or two after taking them, there is a rebound stomach acid secretion. This could be a heightened distraction if your stomach had already been insulted.

Antihistamines

- These may cause drowsiness, dizziness, dry mouth, headaches, nausea, and muscular twitching. The drowsiness can be a particular hazard because it may not be recognized and because it may recur after seeming alertness.

Aspirin

- Affects the regulation of your body temperature by acting on the hypothalamus.
- Causes greater heat loss due to increased blood flow to the extremities and sweating.
- Affects the acid-base balance of the body, causing a variation of rate and depth of respiration.
- Two or more increase oxygen consumption and carbon dioxide production contributing to hypoxia and hyperventilation.
- Excessive dosages cause nausea, ringing in the ears, deafness, diarrhea, and hallucinations.
- May cause corrosion of the stomach. Two on an empty stomach can irritate the lining enough to draw a teaspoon of blood.

Caffeine

- Causes wakefulness, tremors, gastric hyperacidity, indigestion, cardiac arrhythmia, increased heart rate, dehydration, headache, dizziness, and nausea.

Cold Tablets

- Many of these contain antihistamines, often in sustained release form. Drugs included in these compounds can diminish your visual efficiency.
- Some drugs used in the treatment of colds or influenza contain quinine which can, in large quantities, adversely affect hearing and cause dizziness.

Antidiarrheal Agents

- Many of the tablets contain opiate-type compounds which have a depressant effect on the brain.
- May cause nausea.
- May cause dehydration which reduces "G" tolerance.

Nasal Decongestants

- These cause prolonged increase in blood pressure and pulse, insomnia, fatigue, headache, dizziness, incoordination, and confusion.
- They can also bring on drowsiness, amnesia, depression, dry mouth, loss of optical accommodation, rapid heart rate, double vision, euphoria, tremors, nausea and vomiting, and diarrhea and gastrointestinal effects.

Nicotine

- Increases blood pressure.
- Constricts small blood vessels.
- Increases need for oxygen 10-15 percent.
- Can increase reaction time to twice normal by paralyzing nerve cells.

Sleeping Pills

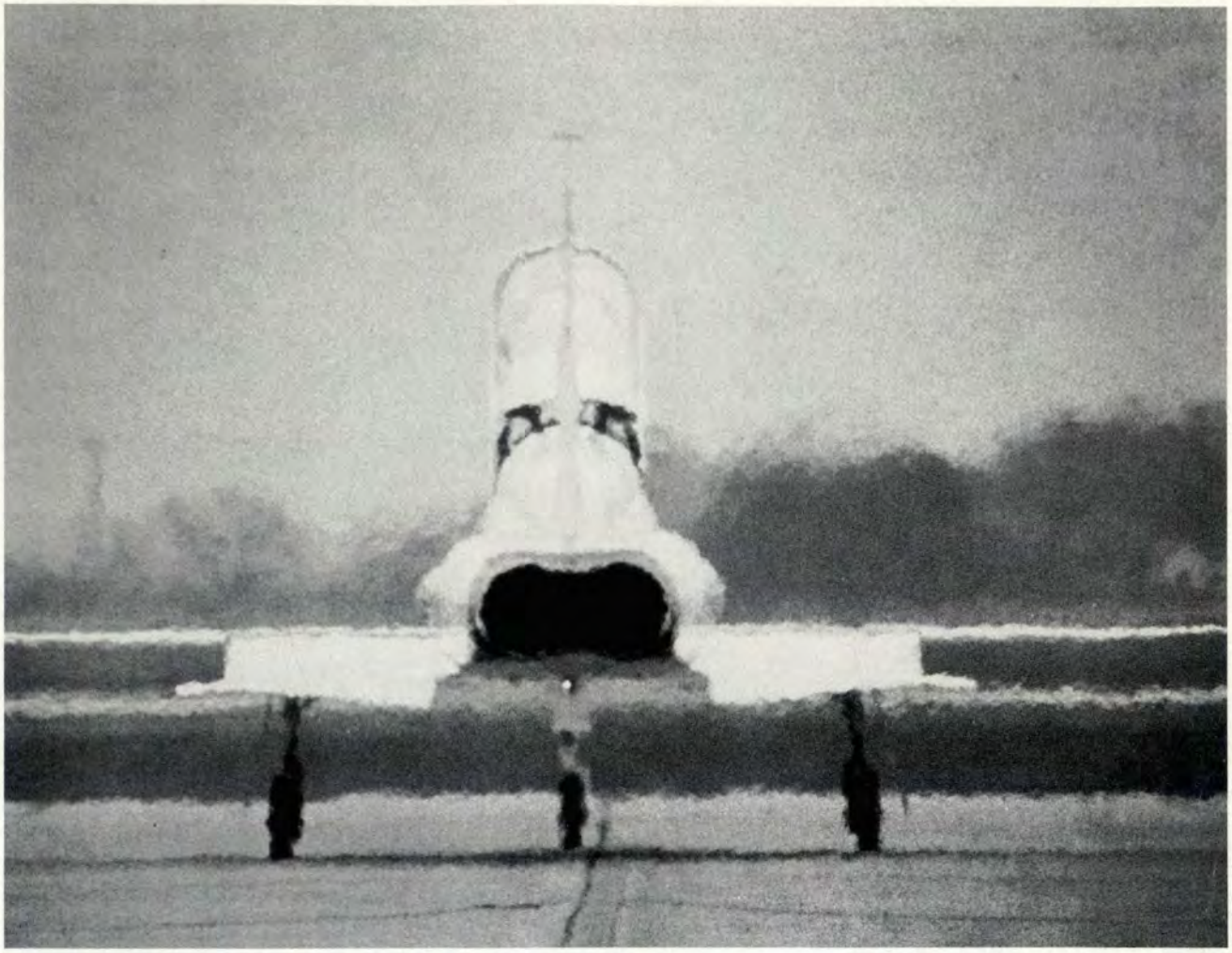
- Depress the central nervous system and your autonomic nervous system.
- Reduce alertness.
- Predispose people to heat stroke (i.e., greenhouse effect).

Throat Lozenges

- Damage blood cells.
- Create potential kidney and liver damage when toxic.
- Damage skin mucous membranes because of the presence of alcohol.
- Depress the central nervous system in high dosages.
- Increase reaction time with high dosages.
- High overdose probability. To suppress the cough reflex, act on the cough center of the brain. To suppress the cough usually requires a dosage three to four times higher than recommended for adults.

Tranquilizers

- These not only cause sleepiness, but also nausea, depression, and visual disturbances in some cases.
- Some of them produce intolerance to alcohol and may cause quite severe mental disturbance.



When Things Get Hot . . .

CMSGT ROBERT T. HOLRITZ
Technical Editor

■ Combat capability is, to a large extent, contingent upon the ability to adapt to the environment. Our aircraft and support equipment are designed to operate efficiently in almost any climate and temperature imaginable.

However, unlike our equipment, the ability of our people to perform combat duties varies significantly depending on the environment. One of the most debilitating environmental factors is the effect of heat stress.

This is because the human body can survive only at a narrow range of core temperatures, that is, the temperature which is measured deep within the body. Core temperatures which vary more than 2 or 3 degrees from the normal 98.6° impede mental and physical performance, and variations of more than 5 or 6 degrees can be fatal. Fortunately, the human body has a system which constantly monitors and controls body temperature and, except for extreme conditions, keeps it within a safe range.

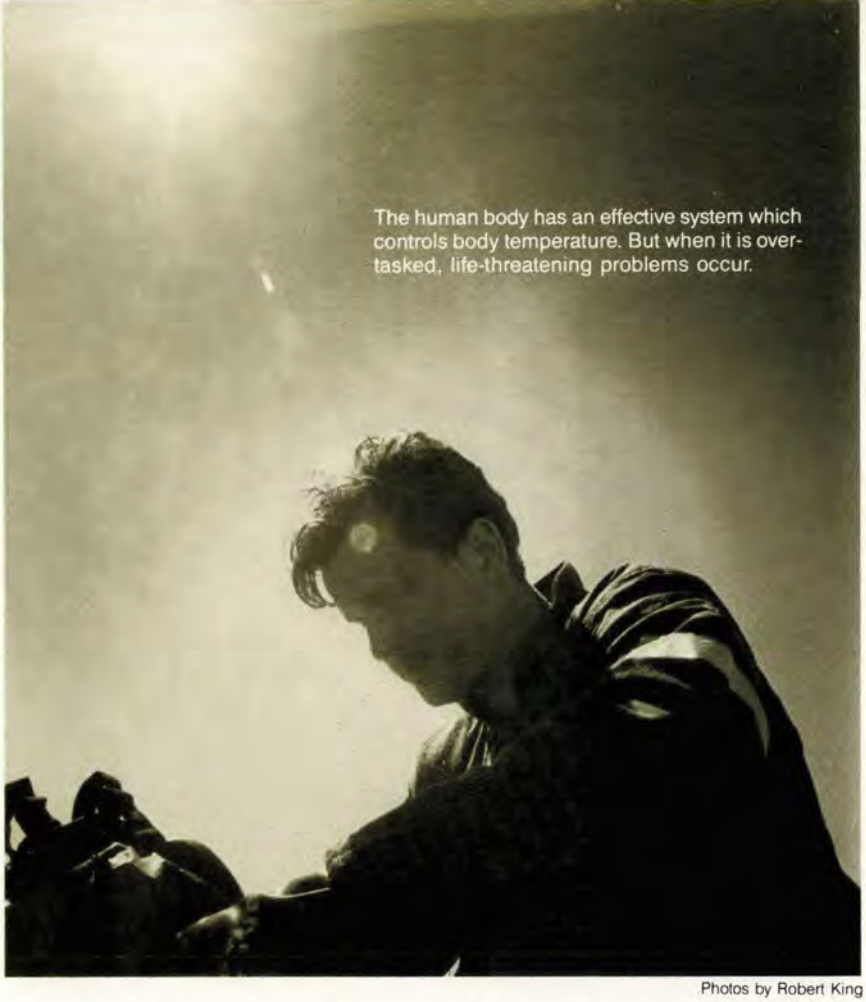
This system, called, appropriately enough, the thermoregulatory system, controls the inner temperature of the body by coordinating the body's activities to produce or dissipate heat. It is normally quite an effective mechanism. However, if overtasked, it can cause serious, even life-threatening, problems.

The Thermostat Mechanism

The regulation of body temperature is controlled by a thermostat in the inner part of the brain. This thermostat reacts to temperature changes in the body by stimulating responses from receptors in the skin. In cold conditions, the receptors restrict the flow of blood near the surface of the skin. In warm conditions, the receptors dilate the blood vessels near the skin surface, providing improved blood flow to increase heat loss through the skin. At the same time, sweat glands re-

continued

WHEN THINGS GET HOT continued



The human body has an effective system which controls body temperature. But when it is overtasked, life-threatening problems occur.

Photos by Robert King

lease perspiration. The evaporation of sweat on the skin cools the blood near the surface which is then circulated through the body.

Subtle Effects

The effects of heat stress are not restricted to the more dramatic characteristics such as heat stroke. Consider this: When a maintenance technician wearing chemical warfare gear loses just 2½ percent of the body weight, 25 percent of the ability to function mentally and physically is lost as well. And, if working at temperatures above 100° F, the ability to function is reduced by another 25 percent. This means our technician's performance has been reduced by 50 percent.

What about pilots and crews? It is interesting to note most heat stress encountered by flight crews occurs while on the ground during preflight and taxiing. This is particularly true during combat (or exercises) when aircraft are lined up at the end of the runway for quick check or arming. It is not unusual for a flightcrew to spend over an hour in high temperatures from the time they step to their jet until takeoff.

The Fliers' Index for Thermal Stress (FITS) gives aircrew members guidance as to their *approximate limitations*. However, a wise aviator will not push the limits of the FITS table. Consider the following.

■ Six minutes into the mission, a pilot noted the cabin temperature control had gone to full hot. When it could not be adjusted, the pilot immediately turned back to the base. After 17 minutes, the tower controller noted the pilot was experiencing an inability to concentrate and understand standard radio and aircraft procedures. Fortunately, landing was uneventful.

Investigation of the incident revealed the pilot was exposed to temperatures exceeding 140° F for 25 to 30 minutes. If the pilot had reached the maximum exposure time shown in the FITS table prior to flight, the aircraft possibly would not have made it back.

The FITS table cannot be used when chemical defense or arctic flight equipment is worn because either one will severely limit sweat evaporation. Since evaporation is the body's primary means of cooling and a key ingredient to the development of FITS tables, a lack of evaporation makes the table unreliable. In fact, with survival gear on, the exposure times to heat will be less than the FITS table indicates.

Acclimatization

Although the human body has the ability to adapt to heat stress, the amount of time it takes for a person to acclimate varies with the severity of the environment and from person to person. Most people acclimatize within a few weeks. Some require only a few days, while others may never adapt. This depends on the individual's physical condition and, to a certain extent, physical makeup. Some people, raised from infancy in a hot climate, have more sweat glands than those raised in a cold climate.

During adjustment, the normal sweat response gradually becomes more efficient, allowing better evaporative cooling. Additionally, there are changes in circulation. For example, the body may increase the volume of blood. The added blood carries body heat from the core to the cooler skin areas without depriving other normal body functions of needed blood supplies.

Knowledge of the Problem

Recent history has demonstrated heat stress can have a greater impact on our mission than ever before. The realistic scenarios we use in the "train as we fight" concept emphasize the effects of heat stress on our ability to operate in a warm environment. Therefore, knowledge of the cause, prevention, and treatment of heat stress is vital to every person in today's combat unit. ■

HEAT DISORDERS

■ There are three major disorders we are susceptible to which result from the overtasking or failure of the thermoregulatory system.

■ HEAT EXHAUSTION results from failure to replace water lost through prolonged sweating. The main symptoms are thirst, dizziness, and fatigue. Treatment and prevention are the same — drink plenty of water. Each gram of water which evaporates from sweat dissipates almost 600 calories of body heat. In extremely hot weather, it may be necessary to drink up to 10 pints of water per day.

A lack of salt can also lead to a form of heat exhaustion. In addition to the symptoms mentioned above, failure to replace salt lost through sweating may also cause nausea and muscle cramps. The symptoms can, of course, be prevented by replacing salt. The typical American gets more than enough salt in normal meals or MREs, so salt depletion is not usually a problem.

■ HEAT STROKE is always a life-threatening condition. Characterized by a sudden onset of delirium and coma, it is brought about by the total failure of the thermoregulatory system. Heat stroke usually occurs when the body (core) temperature climbs above 105 degrees Fahrenheit. At this temperature, the system simply quits. The only first aid is to cool the victim as soon as possible by placing in the shade and spraying with water. Remember — the victim is near death, so call for medical attention immediately. The best prevention of heat stroke is to not impose strenuous duties on persons not yet acclimated to extreme heat.

■ HEAT SYNCOPE also occurs when people who are not acclimated to heat perform strenuous work. The symptoms are giddiness and fatigue. It occurs in spite of ample fluid and salt intake. The victim usually recovers rapidly when he lies flat in the shade and is reassured.

PREVENTION

In most cases, the effects of heat stress can be prevented, or at least limited, by following these helpful guidelines.

■ Plan low-altitude training missions early in the day.

■ Avoid flying combat turn missions with crews not yet acclimated.

■ Drink plenty of water prior to hot weather missions. (Thirst is a poor indicator of the body's need for water.)

■ Maintain a good physical condition through a sensible exercise routine.

■ Use the FITS table, but use it conservatively.

■ Open cockpits well in advance of flight. Use ground air-conditioners to cool off flight decks at least 30 minutes prior to crew show.

■ Remember G-tolerance can be significantly reduced by dehydration. ■

Drinking plenty of water is the best way to help prevent heat disorders.

Fliers Index of Thermal Stress (FITS) °F

Instructions: Enter chart with local air temperature (°F) and relative humidity (%). At intersection, read FITS value and determine Zone.

Air Temp (°F)	Zone	Relative Humidity (%) 10	20	30	40	50	60	70	80
70		67	70	72	74	76	78	81	83
75		71	74	77	79	82	84	86	88
80		75	79	81	84	87	89	92	94
85	Normal	79	83	86	89	92	95	97	99
90		83	87	91	94	97	100	103	105
95		87	92	96	99	102	105	108	111
100		91	96	100	104	108	111	114	117
105	**Caution**	95	100	105	109	113	116	120	122
110		99	105	110	114	118	122	125	128
115	**Danger**	103	109	115	119	124	127	130	134
120		107	114	119	124	129	133	136	140

Comments:

1. Chart is valid for clear sky to light overcast (shadows visible).
2. **Caution Zone:**
   a. Be aware of heat stress.
   b. Limit ground time (preflight, cockpit standby) to 90 minutes.
   c. Recovery time minimum 2 hours between flights.
3. **Danger Zone:**
   a. Limit ground time to 45 minutes or less if possible.
   b. Avoid more than one flight a day if possible.
   c. Low-level mission with temperatures in this zone are not advised.
   d. Recovery time as above.
4. When index is greater than 115, consider canceling all non-essential flights.

CROSS-COUNTR

■ Recently, no-notice Rex Riley surveys were conducted at 14 bases by 6 different Rex-trained pilots. Nine bases retained the award, while five bases were added to the list for the first time. Although this time all bases surveyed met the minimum standards for quality service to transient aircrews, it was obvious, after reviewing the reports, some bases, and especially some individuals, have put forth the extra effort which makes them stand out from the rest. They are not satisfied with being good, but are continuously improving the quality of their services.

New Award Recipients

McConnell AFB, Kansas Just over a year ago, Rex received a letter from the Wing Commander at McConnell AFB inviting him to come and survey what he called "one of the finest transient facilities in the Air Force" and give them the opportunity to compete for the Rex Riley Award. Although it took a while, a Rex Riley pilot was finally able to experience McConnell's hospitality first hand.

Rex was extremely impressed with the services. He rated base ops, weather, crew transportation, and Transient Alert "outstanding." Everyone was anxious to take care of any needs he had and some he didn't know he had. Every service received far exceeded his expectations. If you are going anywhere near the middle part of the country, Rex highly recommends you take advantage of the outstanding service McConnell provides either during a gas 'n go, or when remaining overnight.

Yokota AB, Japan Base ops personnel have worked hard to create a usable flight planning room out of what used to be a fairly cramped space. The weather folks still provide one of the most complete and easy-to-understand briefs in the Pacific. Quarters were rated outstanding this time because minimal time was spent in the billeting office. The contract hotel just off base was very nice and even had several bicycles available for use by crewmembers.

Kadena AB, Japan Weather and base ops got high marks for providing the transient crewmember with exactly what they need. The shaved steak sandwich with grilled onions, mushrooms, and extra cheese served by the passenger terminal snackbar is one of my favorites, even at 0400.

Ellsworth AFB, South Dakota Base ops dispatchers earned themselves an outstanding rating because they made all the aircraft servicing, billeting, and crew transportation arrangements for Rex Riley, greatly decreasing his workload and allowing him to concentrate on mission planning for the next day. Rooms provided by billeting were also excellent. Everyone at Ellsworth goes the extra mile.

Congratulations also go to **Homestead AFB, Florida,** for winning the award for the first time.

Retaining the Award

McClellan AFB, California Only Loring AFB, Maine, has continuously held the Rex Riley Award longer than McClellan AFB. Rex recently had the opportunity to experience the transient services at McClellan. I can see how they have managed to keep the award so long.

When the winds went out of limits at Travis AFB, Rex had to divert to McClellan in a C-141 at about 2100. With less than 10 minutes notice to landing, he received service he would not have expected with a week's notice. Transient Alert had a parking spot set up with two lighting carts, power cart, and fuel waiting when they blocked in. Within 5 minutes of blocking in, the motor pool produced a 28-pax bus to offload my 90 passengers and shuttle crew back and forth to base ops.

When Rex got into base ops, he discovered the primary reason for the outstanding service received was the coordination done by the two dispatchers, Mr Charles Nelson and Mr Donald Miller. They had arranged for everything, including co-

Y NOTES

ordination with the MAC command and control system. Everyone responded quickly to any request we made. Rex expected much less, but received much more. His hat is off to the professionals at McClellan AFB.

Tinker AFB, Oklahoma Tinker continues to have one of the largest transient aircraft rates around. They averaged over 950 transient aircraft per month in 1991. One reason is their central location which makes them a logical choice as a gas 'n go stop. But more importantly, the quality service they provide is well known throughout the DOD and brings crews back again and again. Keep up the excellent work.

Vance AFB, Oklahoma Base ops, weather, and Transient Alert were all rated outstanding. Rex thinks the flight planning room at Vance is one of the best in the Air Force. It is spacious, well laid out, lots of visual aids, plenty of publications, and is extremely user-friendly. It could easily be the model for the rest of the Air Force. Vance is another one of those bases not well publicized, but you'll get treated like a king if you choose to stop there. Because it's a pilot training base, you could also score some big points with some of the students there if you called ahead and let it be known you would be available for a close-up tour/look at your aircraft and answer questions about your particular experience.

Mountain Home AFB, Idaho Base ops and Transient Alert were both rated outstanding. SSgt Brian Camp was given a "well done" by Rex because he went out of his way to work an outbound clearance problem, arranged crew transportation, and provided a quiet, private room for mission debriefing. TA had his T-38 fueled and ready to go in less than 15 minutes.

Congratulations also must go to **Norton AFB, California, Holloman AFB, New Mexico, Robins AFB, Georgia,** and **Peterson AFB, Colorado,** who were recertified during recent surveys. ■

Most bases surveyed by Rex-trained pilots continuously improve the quality of services.

Photos by Rex Riley

Because of its central location, Tinker AFB OK has one of the busiest transient operations in the Air Force. It is also known for quality transient service.

Vance AFB OK Transient Alert is a model for the rest of the Air Force. The student pilots always welcome a look at transient aircraft.

The folks at Norton AFB CA Transient Alert continue to provide excellent service to visiting aircrews.

ASPARTAME ALERT

Photos by Robert King

According to Lt Col James S. Freeman, an aerospace physiologist at the Air Force Safety Agency, many crewmembers question him on the effects of artificial sweeteners on their performance. The following is extracted from a recent issue of *Navy Physiology* which sheds some light on the subject.

— Ed.

■ In December 1965, James M. Schlatter (while working for Searle Pharmaceuticals) accidentally discovered aspartame . . . the artificial sweetener we know as NutraSweet®. Patented and approved by the FDA in 1974, it was pulled from the market 5 months later due to questions about the test data supplied by Searle.

In 1981, NutraSweet® was recertified for market introduction and was approved as an artificial sweetener in breakfast cereals, powdered beverages, gelatins, puddings, whipped toppings, and chewing gum. Two years later, the FDA approved its use as a sweetener in carbonated beverages.

Aspartame is voluntarily consumed by more people than any other synthetic chemical in history. By 1985, we were buying 7 million pounds of this substance annually. Today, it is more than twice that amount.

After it was approved for sale in beverages, a marked rise in aspartame-related complaints to the FDA occurred. Neurologic and behavioral symptoms (including migraine headache, dizziness, and visual disturbances) were the most common grievances. In 1984 alone, over 250 reports against aspartame had been registered with the FDA.

After investigating 50 of these, the FDA rejected a request to hold a public hearing on the safety of aspartame.

By 1986, aspartame had been linked to seizure activity, changes in brain chemicals responsible for mood and behavior, deterioration of higher brain functions, and as many as 50 allergic reactions. By 1988, over 551 additional complaints had been studied including severe dizziness, blindness in one or both eyes, and sudden loss of memory. Other side effects which had been reported include diarrhea, mania, pain attacks, rashes, and respiratory distress.

To date, over 3,000 complaints have been lodged against the sweetener. Sixty-nine percent involved neurological or behavioral problems including headaches, dizziness, and mood alteration.

Inconclusive Research

The Center for Disease Control studied 517 of those 3,000 complaints and found no common thread which linked aspartame with any specific symptom complex. Other researchers were more successful and have linked aspartame ingestion to allergic reactions, headache, dizziness, and various brain functions.

Still, the evidence derived from these investigations is statistically inconclusive. The FDA maintains "we cannot definitely state aspartame is or is not associated with any specific clinical syndrome." Monsanto Industries (which currently manufactures NutraSweet®) sticks to their assertion that aspartame is completely safe.

When NutraSweet® Isn't

Before you can make any judgments about whether NutraSweet® is safe, you have to understand some of its chemistry. The aspartame molecule is stable in its dry form for more than a year (at temperatures up to 104 degrees Fahrenheit). When dissolved, however, it rapidly decomposes. Within 8 weeks, the aspartame in carbonated beverages has decomposed about 38 percent (about 10% of the

byproduct is methanol . . . wood alcohol).

When digested, aspartame breaks down into its three essential ingredients . . . methyl alcohol, aspartic acid, and phenylalanine. Methanol has been proven to damage the eyes and the central nervous system, and phenylalanine affects the chemical balance of the brain.

Wood Alcohol in Your Cokes

Medical test subjects get pure, encapsulated NutraSweet® provided free of charge by Monsanto. But some of the problems with aspartame seem to be linked to the methanol byproduct rather than to the sweetener itself. Because of the decomposition, people who drink carbonated diet beverages are consuming a substantially greater amount of pure methanol than any research subject would.

The FDA has concluded that even with high doses of aspartame ingestion, serum methanol levels are nontoxic. Further, they stated only people who have deficient phenylalanine hydroxylase genes are likely to suffer from NutraSweet® (about 1 person in 60).

Excessive amounts of phenylalanine, even in normal people, affects the brain and central nervous system. And those "1 in 60" people are likely to exhibit symptoms of Alzheimer's disease, seizures, or even mental retardation.

How Much is Too Much?

There is no safe dosage for methanol. The FDA has stated the methanol content of aspartame is subtoxic, yet has not addressed its cumulative effects on the brain and eyes.

The FDA has established the "acceptable daily intake" of aspartame at 50 mg per kilogram of body weight. For a 200-pound man, this is roughly 25 cans of diet soda per day. For a child, it is far less.

If that child is one of the "1 in 60," a single diet drink per day may be sufficient to severely impair their learning and thinking ability. In pregnancy, the effects of aspartame can be passed directly on to the fetus, even in very small doses.

Some people have suffered aspartame-related disorders with

It may taste like sugar and it may cut down on caloric intake, but, as aircrew, we must be alert for potential in-flight problems.

doses as small as that carried in a single stick of chewing gum.

Implications for Aviators

Phenylalanine inhibits the body's ability to manufacture certain chemicals essential for nerve function. Several researchers have found aspartame can increase the frequency of seizures, or lower the stimulation necessary to induce them.

This could mean a pilot who drinks diet sodas is more susceptible to flicker vertigo, or to flicker-induced epileptic activity.

It also means that ALL pilots are potential victims of sudden memory loss, dizziness during instrument flight, and gradual loss of vision.

Washington Responds

Because aspartame is a food additive rather than a drug, adverse reactions do not have to be reported to any government agency, and continual safety monitoring is not required by law. For the same reason, the testing of human subjects is not required prior to approval for marketing.

On 15 March 1990, the FDA prohibited the use of sulfates in certain fresh potato products (such as potato salad in salad bars) after approximately 1,000 complaints of diverse reactions.

Yet, after receiving more than 3,000 complaints against NutraSweet®, including seizures and incapacitation, the only restriction placed on aspartame is a warning label for phenylketonurics.

A Heads Up!

The Surgeon General's office has reviewed the research on aspartame and feels there is *not* sufficient evidence to justify a policy prohibiting its use. This article offers a "heads up" to a *potential problem* which may affect a few people without warning. If one of those people is a pilot, there could be serious problems with in-flight performance. ■

Research shows us this artificial sweetener could cause problems in the form of flicker vertigo, sudden memory loss, dizziness during instrument flight, and gradual loss of vision.

MAINTENANCE MATTERS

Engine Cover Inspection

■ Jet engine covers are designed to prevent foreign objects from finding their way into intakes and causing extensive damage to engines. Unfortunately, on at least two occasions during the past several months, the covers were the *cause* of serious foreign object damage.

Here's an example:

For the crew of the C-141, the flight was uneventful. Neither the pilots nor the flight engineers noticed any engine problems. But during the postflight inspection, the crew chief discovered damage had been done to the no. 4 engine.

A closer inspection by an engine specialist showed 13 nicked fan blades, 3 of which were not blendable. The first-stage stator had a cracked blade, and a borescope revealed nicks to the ninth stage. It was determined the engine was not repairable at the field level.

A close look showed the most probable cause of the damage was an "S" hook which strayed from the engine's intake cover and probably remained in the attach hole above the engine inlet after the cover had been removed.

It is a good idea to inspect engine intake covers and run screens before *and* after use for loose or missing hardware. The cost to the Air Force to repair this motor was more than $91,000. ■

Overweight?

■ The C-141 was loaded with 2 pallets and 11 ground support air-conditioners. Each of the air-conditioners was placarded as weighing 3,100 pounds.

Using the information on the placard, the crew computed the aircraft's weight and balance and performance data. During takeoff and climb, the crew noticed the aircraft's performance was significantly below what they had computed on their planned load.

Because of the poor performance of the aircraft, the crew had the load reweighed at their destination. They found the two pallets weighed exactly as they were manifested, but those air-conditioners weighed from 6,000 to 6,570 pounds, double the weight on the placards and manifest. The total cargo weight was actually 71,750 pounds versus the 39,000 pounds the crew was given at the departure station.

This incident highlights the need to weigh each

piece of rolling stock after it is prepared for shipment. In this case, taking the weight of 11 pieces of rolling stock for granted could have easily resulted in the loss of a valuable aircraft. ■

Mishap Reporting — Be Specific

■ Mishap reporting is an important part of the way the Air Force does business. Contrary to what some folks may believe, the purpose of a mishap report is not to tell the world how we screwed up. The fact is, these reports are put to use by many agencies engaged in mishap prevention throughout the Air Force to gather information which will then be used to find unsafe

trends, analyze materiel failure, and improve the overall safety of the way we do business in the Air Force.

But to make the mishap reporting system work, it is important the information contained in the reports is accurate and specific. The procedure for reporting mishaps is contained in AFR 127-4, *Investigating and Reporting US Air Force Mishaps*. The OPR for this reg, the folks at USAF SEF, spent a lot of time to make the reporting format straightforward and uncomplicated. Still, many reports are received from the field with either vague or incomplete data. This is especially true when reporting mishaps which occur as the result of materiel deficiencies.

According to Bob Engle of the Operational Systems Engineering Div at AFSA, "The biggest problem we find with mishap reports involving materiel failure is incomplete or ambiguous reporting of technical information." Quite often, this information is either not included in the report or it is incomplete. For example, in many cases, the WUC, part number, or the NSN is omitted. In addition, the description of the item is often unclear. To illustrate, in a report concerning a defective pin in an aircraft gun system, it was unclear if the deficient item was a roll pin alignment pin, or a cotter pin. The system contains many of each type.

Reports concerning aircraft engines are another area of concern. When reporting engine-related mishaps, it is not only important to list the type of engine, but it is also vital to the analysis and investigation of these deficiencies to know the serial number and hours on the engine.

While this information can be tracked down, this can only be done through time-consuming and costly communications. Considering, on average, about 100 mishap reports are generated every month, the little time and effort it takes a unit to provide accurate and detailed information can not only save a lot of man-hours and unnecessary message traffic, but it can also help quickly alleviate materiel and safety deficiencies. ■

Walk the White Line

■ A pickup truck making an early morning high-speed run down the runways is a common sight to most maintenance folks. The purpose of this vehicle, which usually sports a flashing red light, is to check the runway for obvious damage and foreign objects.

The question which has long been in my mind is: *"Just how much damage or FOD can a driver spot traveling down the runway in a truck?"* The obvious answer is, as one unit found out, "not a heck of a lot."

The first sign of trouble occurred during a phased inspection when maintainers discovered FOD damage to all four of the tanker's engines. The extent of the damage prompted the Wing Commander to order all aircraft engines be borescoped. The result of the one-time inspection was, to put it conservatively, horrendous.

Nearly every engine on the base exhibited some FOD damage. And much of the damage was beyond limits! The source of the FOD was the porous friction surface of the runway which was severely deteriorated. As a result, flying had to be moved to another base until the surface could be repaired.

The lesson learned is that in addition to flight line and other maintenance areas, the runway and taxiways are a rich source of FOD. While most units conduct FOD walks every day, or even at the end of each shift, few units walk the white line of the runway on a periodic basis.

After a series of FODs from "an undetermined source," one wing commander ordered the entire wing, including admin, life support, and CBPO folks, to conduct a FOD walk on the runway and taxiways. The result of the walk was, to say the least, eye opening. In addition to pieces of tire and runway, it also yielded various pieces of safety gear, hardware, and numerous fasteners, the type of which had been the suspected source of FOD which had plagued the unit. They now conduct periodic "white-line walks" and, as a result, have experienced a significant decrease in FOD from an "undetermined source."

If your unit is experiencing a high amount of FOD from an "undetermined source," maybe it's time to walk the white line as well as the flight line. ■

Write a Dumb Caption Contest Thing ...

We have a legendary Cheap Little Prize with YOUR name on it. (But after you win it, don't run it through the wash — your name will disappear.) To receive your personalized prize, make lots 'n lots of copies of this month's contest and match lots 'n lots of brilliant captions to them. Then, send them to:

Dumb Caption Contest Thing
***Flying Safety* Magazine**
AFSA/SEDP
Norton AFB CA 92409-7001

Once Again, Thanks For Your Support

AND THE WINNER FOR THE NOVEMBER 1991 DUMB CAPTION CONTEST IS . . .

CMSgt Charles Woodhead
35 AGS/MAAM
George AFB CA

Congratulations to the wondrous winner of our November contest — CMSgt Charles Woodhead. His celebrated Cheap Little Prize will be mailed to George AFB before you can say "base closure." We also would like to mention, with no small degree of honor, the Honorable Mention writers shown below.

HONORABLE MENTIONS

1. **All right, which one of youse mugs used the chewing gum and bailing wire to patch this fuel line?**
   MSgt Chuck Mackey, 35 AGS/MAAM, George AFB CA

2. **We've identified the skeleton in the liferaft compartment, sir. It's the 1939 squadron hide-and-seek champion.**
   Jim Burt, NAS Corpus Christi TX

3. **Gee! These inflatable decoys are great! At 10 pounds of pressure, it's a P-51; at 20 pounds, it's a B-10; and at 50 pounds, it's a B-24.**
   CMSgt Charles Woodhead and MSgt Chuck Mackey, 35 AGS/MAAM, George AFB CA

OPS TOPICS

One-Quarter Inch Equals 2 Feet

■ No, this is not a story about the latest plastic model kit for the F-117. Nor is it a story about how small your new office is going to be after remodeling. Instead, it's a story about how a simple ¼ inch can equal a big 2 feet of embarrassment.

The story begins with the IP and student performing a walkaround of their waist-high training jet. During the preflight inspection, the IP pointed out to the student that the flaps and speedbrake were still extended. The instructor suggested to the student the hydraulic pressure would be a little slow to build upon engine start since the flaps and speedbrake would be retracting automatically.

As part of the interior cockpit check, the pilot was careful to note the position of the speedbrake switch, the flap handle, and the gear lever. All were visually checked in the correct positions.

Almost as soon as the no. 1 engine rpm began its climb to idle power, the little jet began to bow to the crew chief in front of the aircraft. The crew chief's eyes were getting very big by the time the IP cut off the engine and directed a ground egress.

After easily stepping over the side, the crew waited alongside the crew chief for the safety folks. Despite the position of the landing gear lever, the nose gear had clearly retracted.

When safety and maintenance arrived, they reached inside and pushed down on the gear lever. It moved ¼ inch. The two of them then lifted the nose of the aircraft, and the nose gear fell back down.

Later, with the aircraft on jacks and the landing gear hydraulic systems powered by a "mule," they discovered more. Not only did the landing gear lever move ¼ inch, it did so with the solenoid locking pin (which is supposed to prevent gear retraction on the ground) firmly in place. Somebody had misrigged the landing gear actuator rods, allowing the ¼ inch of movement. When the gear handle appeared to be down, it still had another ¼ inch to go. Six other aircraft on the field were also found misrigged.

They say you can tell a pilot from this unit quite easily. They are the one's who always push down firmly on the landing gear lever to make sure ¼ inch of adjustment doesn't become 2 feet of embarrassment. ■

"Say again, Tower. You're coming in garbled and st#**!&*."

■ So what's the biggest headache your average light airplane pilot has to face every weekend? Right. Radios which never seem to work when they're needed most. Perhaps the following tips will help you sort through the static.

First, use a headset. You'll save your hearing while improving the clarity of incoming radio calls. While you're at it, install a push-to-talk switch (even a temporary switch attached to the yoke with Velcro™ will help).

Next, listen for electrical noise on the radios (a major source of poor radio performance). A "popping" noise could be an indicator of broken ignition cable shields. A "whistle" which varies with engine rpm could mean there's a defective diode in the alternator.

While you're checking out the aircraft's electrical system, take a hard look at the microphone. The WWII vintage carbon microphones can experience diaphragm solidification during high humidity. Your best bet is to replace the old microphones with newer, dynamic or Electret models.

Lastly, check the squelch control frequently during flight and pay attention to any transmission indicators. You may have turned the squelch too much for incoming calls or you may have a stuck mic. Actually, most stuck mics are not from defective microphones, but from pilots putting the mic on the seat and then resting their legs on top of it.

Although it may impress your friends when you can make out *anything* intelligible on those radios, it doesn't have to be that way. Good equipment, a little checking, and a little care can make using your light airplane radio as easy as using your office phone . . . even easier. ■

OPS TOPICS

What . . . Me Worry?

■ If things start moving from the boring to the exciting, when is it time to worry? And how much worrying will you do before you actually declare an emergency?

The flight in a single-engine airplane all started routinely enough. It was nothing more than a pleasurable cross-country flight. The pilot of the Aero Club airplane had even filed an IFR flight plan. After 2½ hours of monotony, things started happening.

Specifically, the engine began running so roughly, the whole airplane shook violently. A call to Air Traffic Control brought a vector to the nearest airfield. The engine kept running long enough for the pilot to make a safe landing. Although there was no emergency declared, the pilot hinted one might be called in a few moments.

After landing, maintenance opened the engine cowling. The no. 3 cylinder was almost completely loose from the engine block. Only one of the eight bolts was still attached. The mechanics estimated there were only 5 minutes, maybe 10, of life left in the engine before it "ate" itself. The engine was found to be beyond economical repair due to damage sustained during the last moments of the flight.

Let's try to figure out why the pilot didn't declare an emergency. He was flying a single-engine airplane on top of an overcast deck. The engine had only four cylinders. The only engine began to shake violently, possibly indicating it was going to quit. The pilot had been flying solo for over 2 hours on an IFR flight plan. The nearest airfield had neither a control tower nor a precision instrument approach. Other aircraft on IFR flight plans would have received priority over this simple "divert." There was a high probability the engine, shaking as badly as it was, would quit in a matter of minutes.

Hmmm. All of those seem like pretty darn good reasons to declare an emergency with the whole world. The sooner a pilot with a problem declares an emergency, the sooner the pilot will get help to put the airplane safely on the ground. ■

MAIL CALL

LONG LIVE REX

Editor,

In these times of the "Great American Health Craze" and the "Manly Men" of the Air Force, why does Rex Riley still smoke? (Reference *Flying Safety*, January 1992, page 12.)

We're working hard to bring the Air Force people into lean, mean health machines. It's time for Rex to get in step and kick the habit!

Yours, in 31 years of service,

CMSgt Robert W. (Bobby) Hall
4 EMS/MAS
Seymour Johnson AFB NC

Chief we'll let you in on a little-known secret — only the spirit of Rex Riley lives forever. Page 12 was a peek back into time, Aerospace Safety *for January 1963, to be exact.*

Today's Rex, who claims to be a distant cousin once removed on his mother's side, is an ardent non-smoker. Ever since his long-lost uncle died of lung cancer, young Rex has avoided even second-hand smoke at the Club. In fact, when he's not keeping an eye on crew safety at airfields, Rex can be found running laps around the Safety Agency.

Thanks for helping us remind everyone that health and fitness are essential to a safe and successful mission.
Ed.

AFSA G-Induced Loss of Consciousness (GLOC) Anonymous Survey

This survey has been developed to help AFSA continue to monitor the G-induced loss of consciousness problem. We are well aware that fighter pilots have been reluctant to report such problems, fearing medical groundings. To assure you will remain anonymous, while providing us this data, we ask that you fill this form out at home (use additional paper to complete questions if desired) and drop it in your local mail box.
Send to AFSA/SEDP, Norton AFB CA 92409.

Experience on the centrifuge at the USAF School of Aerospace Medicine has shown that amnesia (no recollection of GLOC) due to high G is very common. Please provide any unusual experience(s) you have which might have been due to G-induced LOC. Please give as many details as you recall which lead you to suspect GLOC.

---

1. What is your current MAJCOM? TAC ☐ USAFE ☐ PACAF ☐ ATC ☐ OTHER ☐
2. What is your current aircraft? _____
3. Since graduating from UPT, have you ever had a G-induced loss of consciousness (LOC) episode? YES ☐ NO ☐
4. If yes, please give a brief narrative of the circumstances and continue with the questions below: (Provide type aircraft, approximate date of occurrence, starting and ending altitudes, max G, feelings while waking up such as confusion, disorientation, etc.) _____

a. Have you ever had centrifuge training? YES ☐ NO ☐
b. Was your aircraft equipped with the high flow ready pressure valve? YES ☐ NO ☐
c. Were you wearing a G suit? YES ☐ NO ☐
d. Was it working correctly? YES ☐ NO ☐
e. Did you do an L-1 maneuver to assist in maintaining your G tolerance? YES ☐ NO ☐
f. Did the LOC occur immediately after applying Gs? YES ☐ NO ☐
g. If you answered yes to f above, give an estimate of your rate of G buildup and total Gs reached (i.e., 6 G/sec to 7.5 Gs max). _____
h. If you answered no to f above, how long had you been holding the Gs _____ and what was the max G attained? _____
i. To what do you attribute the GLOC? _____
j. As a result of this episode, describe the changes, if any, in your flying techniques. _____

5. Are you actively pursuing a physical conditioning program? YES ☐ NO ☐
6. If you answered yes to 5 above, what were your conditioning programs before and after the LOC incident?

Aerobic: Before ☐ After ☐ Weights: Before ☐ After ☐ Other (describe): Before _____ After _____

Frequency: 2-3 times per week ☐ Once per week ☐ Less ☐

7. What is your age? _____ Weight _____ Height _____ Build _____
8. If the current publicity over GLOC episodes has changed the way you fly, please tell us what you do differently now. _____
9. What are your thoughts on fatigue as related to GLOC episodes? _____

10. Do you consider G-induced visual field contraction (grayout, blackout) a problem even without GLOC? YES ☐ NO ☐

If so, what problems occur? _____

11. Please provide any other comments you have regarding the GLOC problem and its solution. _____

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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 Mishap Prevention Program.

CAPTAIN

Christopher F. Ackerson

10th Tactical Fighter Wing

■ On 13 March 1991, Capt Christopher F. Ackerson was leading a four-ship, A-10 air combat maneuvers sortie when he experienced an engine fire. His first indication was illumination of a left generator caution light. As he started to apply proper checklist procedures, he was interrupted by two additional caution lights — a left engine hot light and a left engine oil pressure light. Although there was no fire warning light, his left engine ITT gauge was pegged at 1,200 degrees, the engine core RPM was down to 18 percent, and the oil pressure was reading zero.

Fire was soon visually confirmed by the wingman, and Capt Ackerson executed the Engine Fire BOLDFACE procedures. Both he and his wingman then saw a stream of black smoke trailing from the now shutdown engine which soon seized. Capt Ackerson declared an IFE and turned towards RAF Conningsby as the nearest divert airfield with acceptable weather.

As Capt Ackerson prepared for his penetration and approach, he elected to configure via alternate gear extension above the weather and leave his wingman in the clear on top to read appropriate checklist instructions. With a rapidly fatiguing right leg, he flew a flawless penetration and instrument approach, visually acquiring the runway at approximately 1½ miles, and landed safely.

At touchdown, the left engine was still burning. After stopping, Capt Ackerson egressed the aircraft, and the fire was finally extinguished by the ground crew. Capt Ackerson's quick reactions, excellent systems knowledge, and superior airmanship and situational awareness saved a valuable combat aircraft, minimizing the danger to his own life in the process.

WELL DONE! ■

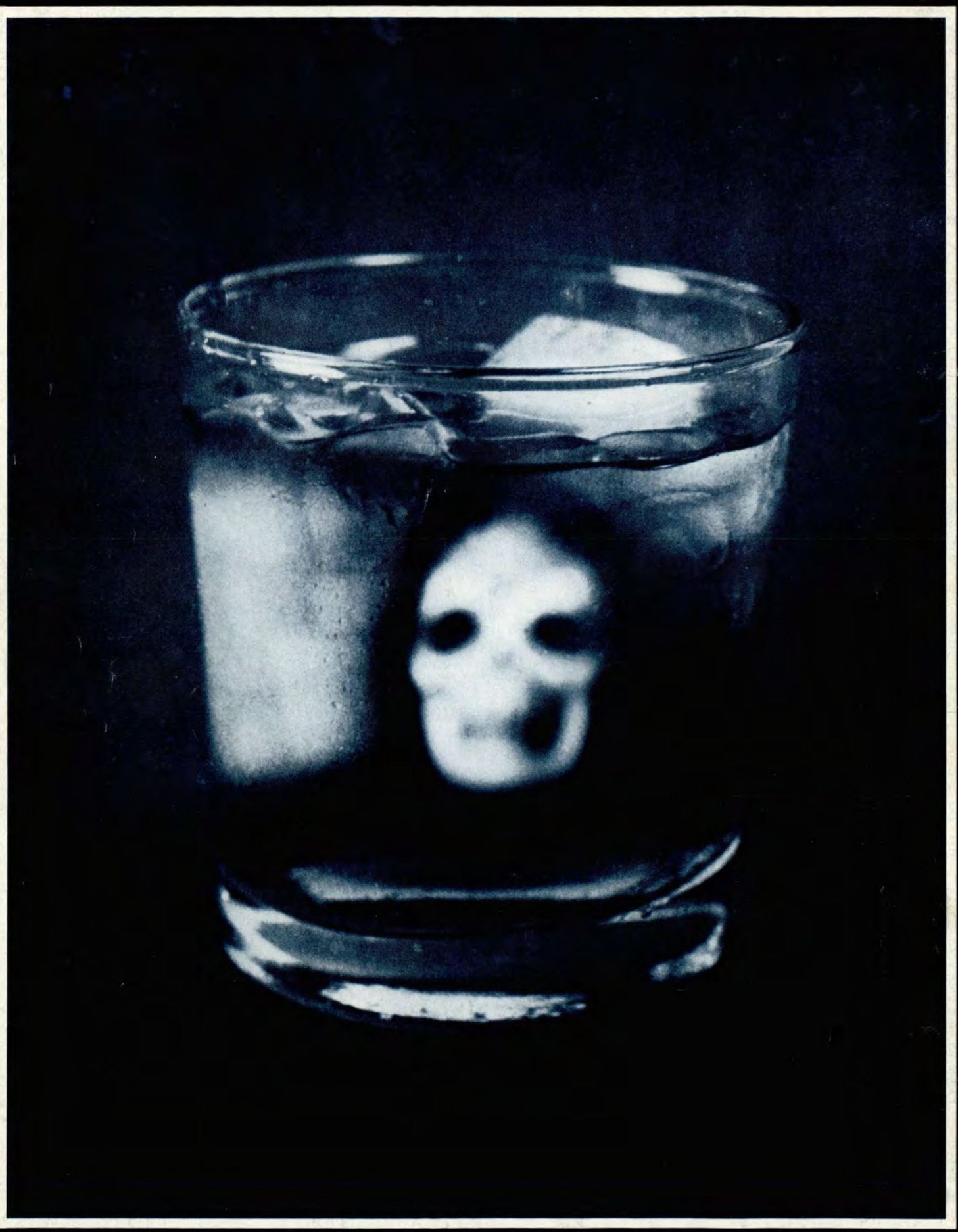

Photo by Robert King