flying

SAFETY OCTOBER 1981

Designed To Crash

Antarctica Air Drop

Take A Last Look

Some Thoughts For General Aviation Pilots

A Look At The Record

Your Ego Will Kill You

THERE I WAS

■ After stowing my gear in the cockpit, my normal procedure is to read the forms. They didn't have the appropriate documentation yet, so I proceeded to do my walk-around. I did my normal preflight, but for some reason left the gear pins in. I broke my normal habit pattern.

After I did my walk-around, the crew chief showed up with the forms. He started around to pull the pins as I started reading the forms. About that time, the line truck drove up and advised my crew chief that he had an emergency phone call. He left before pulling the pins. I forgot them and finished reading the forms.

As I got in the cockpit, a replacement crew chief arrived and proceeded to launch me. He missed the pins also. Thank goodness for EOR. They pulled them for me. Just the slightest break in habit patterns caused me to miss an important item on the checklist. It could have been much more serious.

Good for the EOR crew! Fine example of "human factor" secondary level cause factor. A break in habit pattern due to distraction or channelized attention could have similar impact. Hopefully, the alert RSU officer would provide the final cross check that prevents the mishap. Thanks to the author–may save an aircraft or someone embarrassment. ■

Brig Gen Leland K. Lukens
Director of Aerospace Safety

UNITED STATES AIR FORCE

flying

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SPECIAL FEATURES

REGULAR FEATURES

DEPARTMENT OF THE AIR FORCE • THE INSPECTOR GENERAL, USAF

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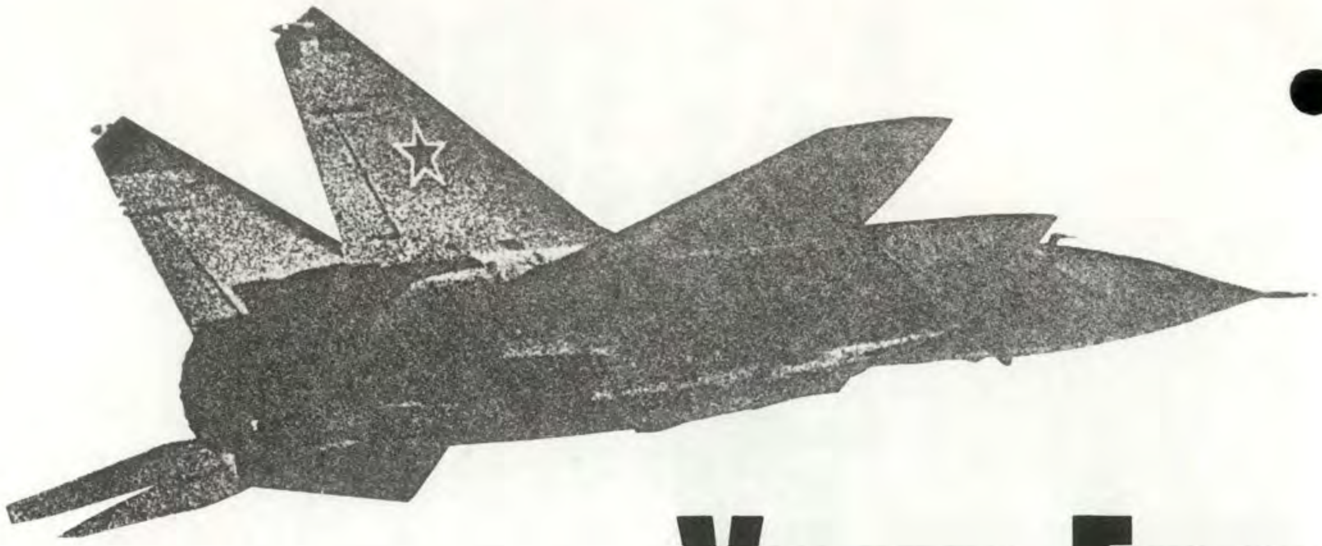


Your Ego

COLONEL GORDON L. CLOUSER
Director of Tactical Fighter Operations • Headquarters USAFE

■ With Safety Day 1981 still in mind, I've concluded it's time to expound on a subject of concern to me throughout my career: air-to-air combat training. The recent accident rate in air-to-air training scenarios has generated considerable discussion on supervision and self discipline—all from a safety perspective. The terms apply equally to wartime survival, but somehow the correlation is forgotten when the emphasis is "train like you will fight."

To train as we would fight, we must know how we are going to fight. Unfortunately, we essentially train only as we think we'll fight.

One wing in the command has amended the slogan to read, "train to fight." What's the difference?

The peacetime mission of the Air Force is to deter war and train, should deterrence fail, to be as effective as possible in combat. The key word in this dissertation is "train." Even within the constraints of peacetime ACBT and the impact of weather on our flying program, how many of you think you and your wingman or leader are adequately trained to take on the hoards from the East? In a tactical formation, are you dependent on a wing flash for turn initiation to minimize the time spent driving back to a line abreast position? Do you go through the motions of activating self-protection chaff and flares to develop habit patterns that can save you? In SEA, both members of the second element of a flight of four were shot down by two Atolls from a MIG-21 in a single pass because during the turn itself, no one was checking 6 o'clock. Do you, on a standard basis, practice the art of maintaining 6 o'clock coverage throughout a turn? Not that I have noticed.

Tactics are fluid; they were changed and modified many times in SEA. We should expect the same in Europe after the first day of conflict.

The fundamental principle in air-to-air combat is to make the opponent play your game.

To train as we would fight, we must know how we are going to fight. Unfortunately, we essentially train only as we think we'll fight. In the early sixties, the universal tactical concept was "low and fast" before it proved untenable, as applied, over heavily defended areas of North Vietnam. Tactics are fluid; they were changed and modified many times in SEA. We should expect the same in Europe after the first day of conflict. But the approach to training must include the fundamental tactical concepts, however, basic, that spell the difference between success and failure.

During Safety Day, an issue

Will Kill You

surfaced regarding the 200 knot, 25 unit AOA limitation for ACT. The argument stated that aircrews need, as a basic requirement, to be familiar with the outer limits of aircraft performance to survive when forced into those regimes by the dynamics of combat. The proponent simply expressed the emotions of every real fighter jock. We definitely should demonstrate and practice handling the aircraft in this realm during the advanced handling sortie of the upgrade program, and we should do it more often. But should we do it during ACT? No.

The fundamental principle in air-to-air combat is to make the opponent play your game. In BFM-101 somewhere, you learn that if the bad guy can out-turn you, a slow speed, turning fight was a no-no. Unclassified literature tells us about only one Soviet fighter that can't out-turn the F-4. That's not a good percentage.

The goal, therefore, is to build upon the valid basics. But why, in Red Flag after Red Flag, do Marine pilots (active duty, reserve, you name it) in old F-4s perform better, on average, against the Aggressors? They keep their energy state high and do not get sucked into a slow, turning engagement! How can the proud F-15 get waxed by two F-4s? It has happened. It happens because the F-15 pilot knows he has a superior machine and relies on that capability to the exclusion of smart tactics. Our own Marine exchange officer does well against the Aggressors. In one example, a defensively turning F-5 continued the fight after Grunt shot for the sky to retain his position of advantage. The smart move for any defender is to dump the nose and convert the disadvantage into a neutral state. But he didn't, and his ego killed him.

The analysis is more severe viewing F-4 against F-4. When we pit our skill against another ''similar,'' the measure of merit seems to be one of stick and rudder superiority. We brief that we must survive in order to fight, but in that ''fangs-out'' environment, we simply don't correlate the other F-4 with a MIG which could turn us inside out at the speeds to which we let the fight degenerate. It's as if we apply two sets of rules: One for combat and one for combat training.

For any one-on-one against a MIG, I cannot let him draw me into a position from which I do not retain the clear option to continue the fight or separate.

If an F-4 pilot permits the airspeed to degenerate to the 200-knot regime against a MIG, he is dead. I must force myself to counter the tendency to continue that turn, to let pride, peer pressure or the motivation to prove my worth coerce me into a low energy state. If I *ever* approach the slow speed limit of ACT, I damn-well better be in a position of distinct advantage (or getting there quickly). For any one-on-one against a MIG, I cannot let him draw me into a position from which I do not retain the clear option to continue the fight or

continued

Your Ego Will Kill You continued

separate. Proficiency at the limit of the envelope is nice, but deep down inside, I know if I permit the dynamics of combat to place me in that situation, I have lost control of the fight and violated the fundamental principle of aerial combat. And that is totally unacceptable!

There are two types of pilots: Those who fly with their muscles and those who fly with their heads; all who flew with their muscles are dead. We acknowledge that, but we don't practice it.

I haven't even begun to discuss a multi-bogey environment. In that arena, you won't have options, and a quick kill will be the only kill (unless it's you). Each of us should not be compelled to see a MIG-19 turn 180 degrees before we adopt a philosophy which optimizes that which is good about the F-4 and absolutely rules out that which is not.

During Safety Day, again, the Wing Commander reiterated the story told by the WWII ace, Erich Hartmann, who said there are two types of pilots: Those who fly with their muscles and those who fly with their heads; all who flew with their muscles are dead. *We acknowledge that, but we don't practice it.*

During the dynamics of an engagement, why do we press beyond the point from which we retain advantage? Or from a stalemate, not separate immediately? As Joe Jock in the squadron, if I got slow with a MIG and blown out of the sky, I would curse every flight leader, every instructor (front or rear), every proud bearer of the Weapons School patch who perpetuated the myth, who permitted me to assimilate a psychology in similar ACT which was not conducive to survival. You may think that's a bit harsh, but in "one vs any" engagements I've seen over the years, people systematically do things they would not do against MIGs. If in combat they plan to do what they practice, I'll volunteer as one of the blighters in the trenches before I'll fly their wing. I fear the concept, "train like you will fight," is not working.

So what are we talking about? We're addressing supervision and self-discipline. Sounds familiar, doesn't it? That's what the senior leadership continues to drive home in the context of flying safety. To put the concern in proper perspective, a couple of years ago General Creech told TAC aircrews he'd authorize flying inverted under a 100-foot bridge if they maintained a zero accident rate. No one realistically expects a command-wide zero accident rate, but the point is obvious. General Gabriel and other leaders of the TAF want you to train to the limits of individual capability, which may not equate to the limits of the aircraft. However, this is precisely my point: There exists a distinct relationship between safety and survivability in war which should govern our training for war. Self-discipline is the key to survivability.

I submit we are not asking the right questions of our training programs to promote survivability. We ought to review how we should go about our business of fighting a war and reap the leftover safety benefits as bonus. "Train to fight" has its appealing distinctions. I challenge each crewmember of this wing to put them to practice. — Courtesy *Airscoop*. ■

About The Author

"Your Ego Will Kill You" was written by Colonel Clouser with one audience in mind–aircrews. The theme is the correlation between flight safety and training to fight. He makes it clear that he doesn't think there is a conflict between the two.

Colonel Clouser is qualified to talk about training for combat. He has been the Assistant Director of Operations of the 50th TFW at Hahn Air Base, Germany and had two combat tours in southeast Asia. He flew F-105s out of Takhli, Thailand, and F-4s as part of a hunter-killer team against SAM sites out of Korat.

He is an 18-year Air Force veteran, a graduate of the University of Oklahoma with a degree in aeronautical and space engineering, and also has a Master of Public Administration degree from Auburn. He has more than 2,100 hours in fighter aircraft, 500 in the F-4.

What's a TIFS?

MAJOR JOHN E. RICHARDSON
Directorate of Aerospace Safety

■ It's a total in-flight simulator used by the Air Force Flight Dynamics Lab at Wright-Patterson AFB for airborne research projects.

The TIFS aircraft, a highly modified C-131H, can simulate the flying characteristics and handling qualities of almost any aircraft in the cargo or bomber category. Current research programs involve the handling qualities of a supersonic transport, active controls technology, and investigation into pilot perceptions of motion cues.

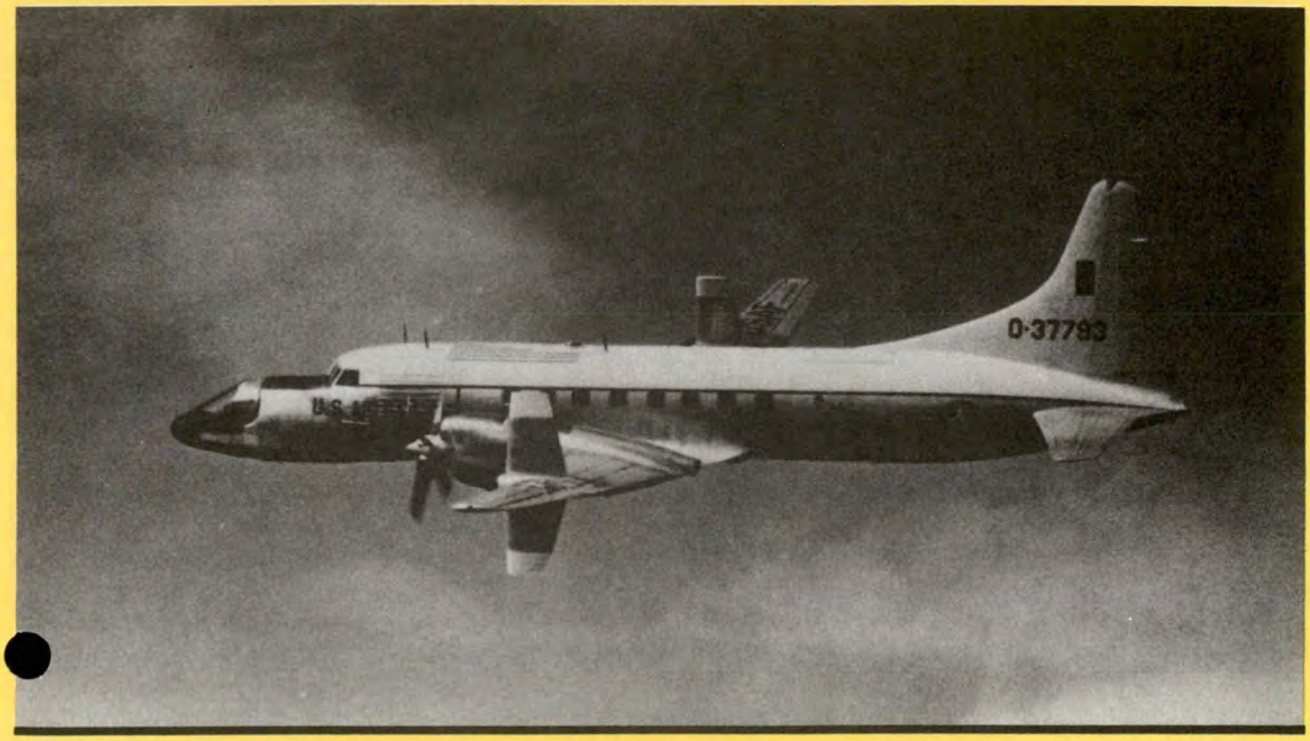
In the Supersonic Cruise Aircraft Research program, the TIFS simulates a generic supersonic transport and aids in studying the handling and control problems associated with flying such a large, flexible aircraft, with the pilot located far ahead of the center of gravity. The results of such tests will help engineers develop standards for handling characteristics of such future aircraft.

The Active Controls Technology program involves identifying the aeroelastic characteristics of the TIFS, that is how the aircraft reacts to the various forces working on it in flight. This program allows engineers to develop better mathematical models and then better means of controlling large aircraft.

The Motion Cue and Pilot Perception study compares a pilot's perception of motion with what is actually experienced. This study relates directly to work being done on design of motion systems for ground simulators.

The distinctive feature of the TIFS which makes all this possible is the variable stability system. The fins mounted on each wing produce side forces, while a special flap produces direct lift and computer controlled servos on the primary flight controls complete the major modifications to the TIFS. All of the simulations are conducted by two evaluation pilots flying in the second cockpit located below and in front of the normal nose of the aircraft. This cockpit is tied into the variable stability system to produce the various effects.

For safety, two more pilots remain in the normal cockpit, ready to take control should the simulated aircraft become too difficult for the evaluation pilots to control. No matter what the characteristics experienced by the evaluators, to the safety pilots, the TIFS flies like a normal C-131. ■



DESIGNED TO CRASH

LT COL ROBERT W. SWEGINNIS
Directorate of Aerospace Safety

So long as man continues to fly he will continue to crash.

■ Despite advances in system and flight safety techniques and enforcement, flying remains an intrinsically hazardous operation. Human error, be it pilot, maintenance technician, designer, or whomever, can and will continue to haunt us. So why not plan for the inevitable?

Why not recognize, while the design is still transitioning from between the ears to the drawing board, that things will go wrong? The big iron bird will take to running through the weeds, with the pilot and other folks, all passengers in that somewhat undefined event called a crash.

We have come a long way since Lt. Selfridge became the first of a long list of statistics; 40 G cockpits, restraint systems for crew,

Drawings below illustrate factors controlling chances of crew/passenger survival during a crash. First four related to the crash itself, while "post crash" factor relates to fire, injuries, escape routes, etc.

passengers, and cargo, and crash helmets. But losses remain. Many are avoidable. One recent study* indicates that from 1967 through 1974, the USAF experienced 224 cargo/transport aircraft accident fatalities. Over 80 percent of the fatalities were reported to have occurred in potentially survivable crashes.**. What can be done to reduce the losses?

In the late 60s and early 70s, the US Army launched a series of studies to examine the chances of crew/passenger survival during helicopter and light fixed wing aircraft crashes. Short term results of these efforts have been amazing. A crashworthy fuel system retrofitted into Army UH-1 aircraft has all but eliminated thermal induced fatalities and injuries. The long term effects of these studies are now coming to light and may be even more spectacular. In addition to fuel systems which resist rupture, puncture, and tearing, seats and restraints have been designed to significantly minimize crew/passenger injury due to G loads. Review of helicopter crash dynamics has also resulted in designs which are highly crash resistant. Prototype designs have lived to fly away from crunches which would have "class 26ed" any of our current generation choppers.

What does this mean to us blue suited, fixed wing pilots? It can mean a whole lot. Our nap of the earth friends have shown that the technology exists to improve our chances when we drive it through the weeds or try to pound the struts through the wings. They have also developed a systematic approach toward developing a crashworthy design by identifying and quantifying design requirements and features.

The Crash Survival Investigators School at the University of Arizona has identified five factors which control the chances of crew/passenger survival during a crash. The acronym for these factors is CREEP.

C—container
R—restraint
E—environment
E—energy absorption
P—post-crash factors

The first four factors relate to the dynamic situation of the crash itself, the initial and subsequent impacts and deceleration forces until the aircraft comes to a halt. The last factor relates to what happens to the occupants after the metal stops sliding. A brief explanation of each of these factors follows.

Container In order to survive a crash, it is first necessary to provide livable space for the occupants. If this space is crushed or punctured, the chances of survival fall drastically. It didn't take long for the founders of the flying services to realize that a 40 G cockpit was a highly desirable feature. Lindy had all the heavy stuff in front of him (engine and fuel) so that if he had to make a very sudden stop he wouldn't become the book mark in an aluminum and steel book. Today we can predict how and where the aircraft structure will fail during survivable crashes. Crew, passengers and critical systems can be located to maximize survival.

Restraint After we provide the travelers with their living space, they should be kept from:

1. Banging against the sides of this space or objects within it.

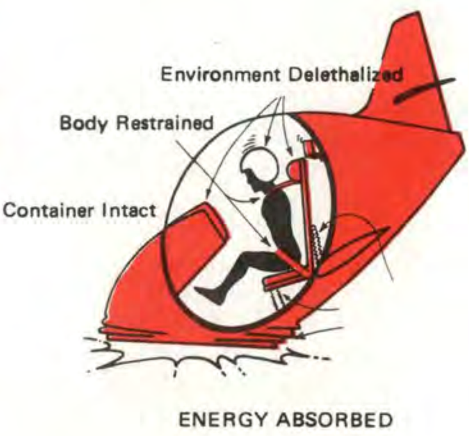
2. Having other objects (e.g., cargo, equipment) bang into them. The strength of all restraints should be sufficient to prevent injury at the

continued

USAF Experience in Aircraft Survivability by Maj Warren D. Tuttle, presented at the Aircraft Crashworthiness Symposium, 6 Oct. 75.

***A survivable crash is defined by the Arizona State University Crash Survival Investigator's School as a crash in which survivable space existed throughout the crash sequence and "G" loads applied to the occupant(s) did not exceed tolerance limits.*

NO ENERGY ABSORPTION



ENERGY ABSORBED

POST CRASH FACTORS

DESIGNED TO CRASH continued

force levels which can be expected during the most severe, but survivable, crash.

Environment We have now built a box around our occupant and glued him to it. However, we can't expect to fully restrain the motion of head and limbs. The volume through which the unrestrained extremities can be expected to move must be delethalized as much as possible. Either move the obstructions or pad them. In addition, energy absorbing devices can be used to attenuate the "G" forces transmitted from the airframe to the restraint systems. Since the body is not rigidly attached to the airframe, the acceleration forces experienced by the body may be either amplified or attenuated. A soft, deep seat cushion (elastic) can greatly amplify vertical "G" forces. Similarly, a deep seat cushion that deforms only at higher than normal loads (energy absorbing) can greatly reduce the deceleration forces experienced by the body.

More than 75 percent of deaths in otherwise survivable aircraft mishaps are caused by post crash fire.

Energy Absorption Did you ever jump off the porch steps stiff legged and flat footed? Quite a jolt. Just as flexing our legs and feet cushion a landing from a jump, flexing (but not breaking) structure can cushion crash loads. If energy absorbing structure exists between you and the impact, your chances of survival are increased. This crushable structure not only reduces the decelerative forces it would experience, but it also tends to protect your container from being penetrated during the same impact conditions.

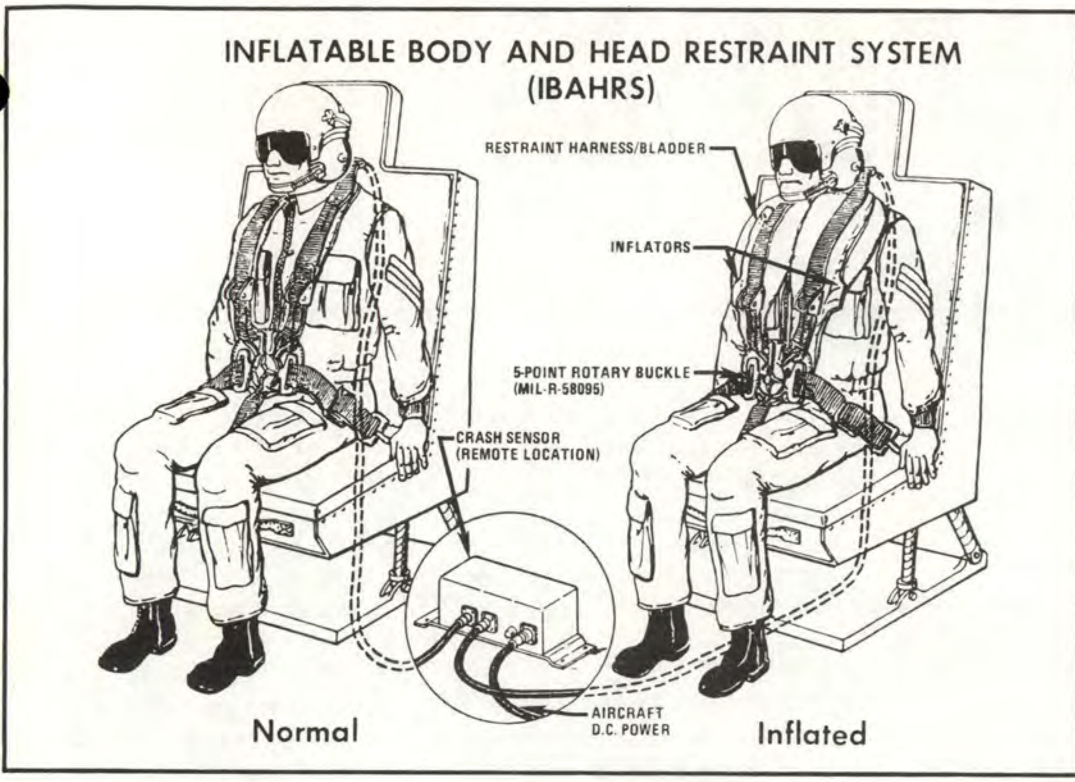
Post-crash Factors Fire, injuries, confusion, escape routes, aircraft damage, visibility. Fire is the most important of the post-crash factors. Over 75 percent of otherwise survivable aircraft accident deaths have been attributed to post-crash fire. Not only can fire kill directly through heat and toxic fumes, but it initiates and compounds the severity of all the other factors. Control of fire, therefore, is a key issue in aircrew survival. Until someone comes up with a fuel that won't burn in the open air (and people are working on it), the most effective means of preventing fire is to contain all fuels and flammable fluids. Intelligent designs can place lines and containers in the least vulnerable locations so that a structure which is expected to collapse or fail during a crash will not cause spillage. Fuel tanks, however, are so large that they most often cannot be "hidden" within the structure.

Because of the high energy exchanges occurring during the crash, only fuel tanks which can withstand extensive deformation without rupture and tearing can be expected to maintain their integrity. When these "crashworthy" tanks fail, the breach tends to be small and nonpropagating. When noncrashworthy tanks fail, they tend to rupture and release large volumes of fuel in a highly volatile mist or cloud. Ignition sources during or just after the crash sequence can initiate an intense flash fire or fireball which provides sufficient heat energy to ignite materials which then sustain the fire.

The US Army has sponsored the development of fuel systems which are capable of withstanding high impact forces without significant fuel spillage. These systems utilize tough tear and penetration resistant fuel tanks, self-sealing breakaway fuel lines, and other design features which eliminate or minimize leak producing damage to the fuel system. The FAA has also successfully tested a full-scale DC-7 crashworthy fuel system. The tests indicated that fuel systems incorporating crash actuated valves and crash-resistant bladder material were effective in minimizing the hazard of post-crash fire in survivable crashes.

The research into crashworthiness designs continues. This past summer the Army, in cooperation with the NASA-Langley Impact Dynamics Research Facility in Virginia, crash tested a prototype YAH-63 helicopter. This aircraft, one of the competitors which eventually led to the Army's new Blackhawk attack helicopter, incorporates several new crashworthiness features. The test was planned to evaluate these and gain further information on crash survivability.

These new features concentrate on



two of the factors described earlier—restraint and energy absorption. The restraint feature was a new inflatable body and head restraint system.

This experimental system uses automotive air bag technology to better restrain a crewmember and reduce the strike envelope within the cockpit in the event of a crash. The system uses a rather smart G sensor to identify a crash condition and then trigger the inflation of air bags sewn into each shoulder harness. Inflation is accomplished by a solid propellant gas generator within 25 milliseconds and acts to tighten the restraint about the crewmember and better distribute the decelerative loads over the upper torso.

The other features tested address the factor of energy absorption. First, the landing gear are designed to absorb crash energy through a process called "stroking." When G loads are placed on a structure, as in a crash, the structure will resist loads to design limit and then fail. But if the structure is allowed to move (to stroke), then a much higher G force can be absorbed. So in the case of the landing gear, the hydraulic cylinders are designed to compress taking up some of the energy of the crash. Then load limiting blow-off valves release the hydraulic fluid in the struts under controlled conditions further reducing the crash forces transmitted to the fuselage. The other major energy absorbers on the test vehicle were the new crashworthy seats. These seats are designed to stroke downward 12 inches at a constant decelerative load of 14.5 G thereby attenuating the crash energy.

Aircraft will continue to crash, but crashworthiness design and testing continue to improve aircrew survival chances.

One other feature tested on this aircraft was an experimental accident information retrieval system (AIRS). A solid state combination flight data and crash data recorder, the AIRS can recreate up to 36 flight and impact parameters over the most recent portion of the flight, typically 30 minutes. Once the AIRS is hardened and fireproofed, it should be able to withstand a severe crash environment and give investigators valuable data not otherwise available.

Although comprehensive information on the helicopter crash test will not be available for several months, the initial indications were that the crashworthiness features were effective in reducing some of the 60 G impact forces, and it is possible that had crewmembers instead of dummies been in the cockpit they could have survived.

Such crash testing and crashworthiness design programs are a part of a program supported by all the services and, in fact, the entire aviation community to design more survivable aircraft. Aircraft will continue to crash, but the better we design them the better we can maximize crew and passenger survival. ■

ANTARCTICA Air Drop

MAJOR JOHN E. RICHARDSON
Directorate of Aerospace Safety

This is the story of a successful mission. It was demanding, with its share of risks and hazards.

We are printing it not because of the number of "firsts" involved (there were some), or because of tragedies narrowly averted (there were none), but because it vividly illustrates that successful mission accomplishment is the essence of flying safety. Getting the job done without bending any metal or tearing your clothes is what it's all about.

Sometimes we tend to overlook the mishap-free mission. We take it for granted. We shouldn't. We can learn from success as well as failure. If this mission had ended in disaster, our investigation would have been full of lessons learned. Predictably, there was no mishap here because everyone involved with this mission planned, anticipated and performed like a pro.

Most people don't realize it, but the pros work just as hard as everyone else. They just make it look easy.

Thanks, troops, for a classic lesson in flying safety.

Brig Gen Leland K. Lukens
Director of Aerospace Safety

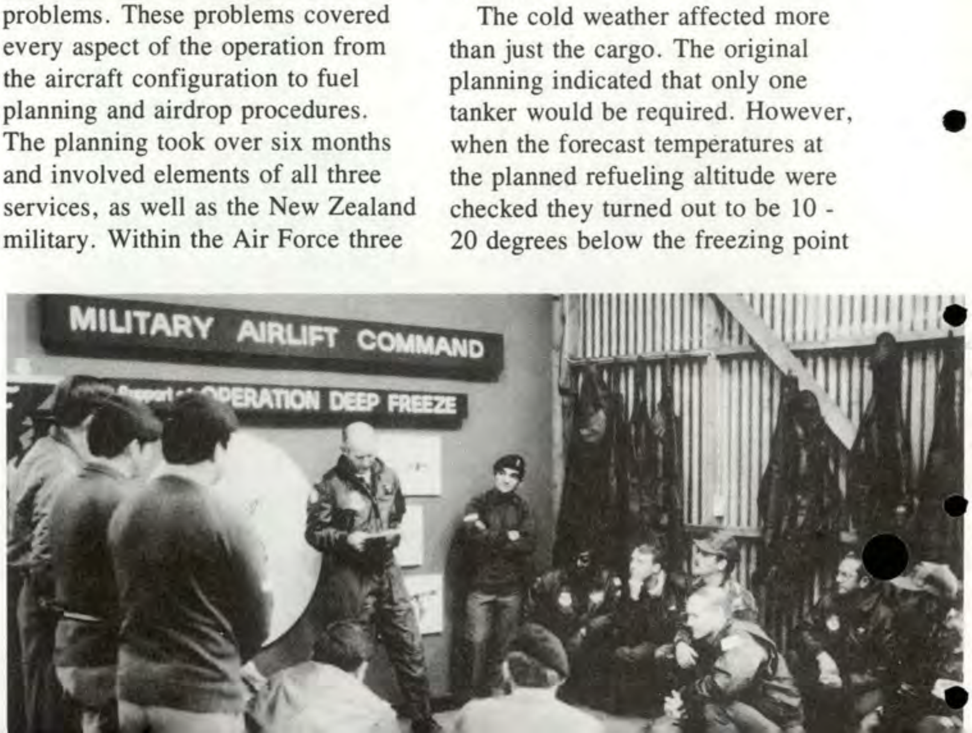
■ A safe and successful mission is largely a function of careful preparation and planning. This is especially true when the mission is somewhat unusual. When we haven't been there before, it's time to consider very carefully just how we will get there. This is the story of just such a mission.

At first glance a resupply mission to Antarctica is not *that* strange. Even in the case of midwinter resupply, C-141s have been doing this for three years. But this time some new elements were added. The refueling capability of a C-141B had added another dimension. This capability meant that for the first time a mission could be planned to resupply not only McMurdo Sound but also the scientific station at the South Pole.

This mission required new approaches to solve some difficult problems. These problems covered every aspect of the operation from the aircraft configuration to fuel planning and airdrop procedures. The planning took over six months and involved elements of all three services, as well as the New Zealand military. Within the Air Force three commands—MAC, SAC and AFSC—were the prime players.

The first problem to be solved was the cargo. The majority of the items to be dropped were perishable foodstuffs. The nature of this cargo was such that exposure to the extreme cold of Antarctica for very long would damage the produce. Therefore, the cartons had to be small enough to be easily handled, but sturdy enough to protect the contents. Because the personnel on the ground had little equipment that could be adapted to cargo handling, the bundles were limited to 500 pounds each. But this presented another difficulty. This type of packaging was not compatible with the conventional 141 cargo rigging. The problem was solved by designing a special rigging system and special packages for this mission.

The cold weather affected more than just the cargo. The original planning indicated that only one tanker would be required. However, when the forecast temperatures at the planned refueling altitude were checked they turned out to be 10 - 20 degrees below the freezing point



Careful planning and coordination—the first step in a successful mission. The mission commander briefs on the complex elements of the flight.

Packing perishables for air drop is a challenging task. For this mission, the extreme cold was an additional problem.

of the jet fuel. This meant that the KC-135 would have to remain lower to prevent fuel freezing in the tanks.

The third major problem presented by the cold was the chance of the hydraulics freezing. In the previous years of midwinter drops all cargo had been released out the side

paratroop doors instead of the large rear petal doors. The concern was that if the doors froze open, the C-141 would not have enough fuel to return to Christchurch.

The refueling capability of the C-141B partially solved the problem of fuel. For even if the rear doors remained open after the drop at McMurdo, the aircraft would have enough fuel to make it back to Australia. But the refueling, too, had problems to be solved. First, because the tankers had to operate at a lower altitude, the number required increased to three. Then the runway at Christchurch was too short for tanker operations, so a nearby airport with a longer runway had to be used. This complicated the planning process because now the

Left, specially designed packaging and a special rigging system for the small packages required some very original thinking on the part of mission planners. Above, the refueling capability of the C-141B was the thing which made the mission possible. Without this extra fuel, the drop at the South Pole was not possible.

crews of the tankers and the C-141 had to do much of their planning and coordinating by telephone.

But even with the refueling, fuel was still a concern. For this reason, fuel planning was especially precise. The navigator and flight engineer carefully computed the best range fuel for the entire route. The many climbs and descents made a fuel curve impractical, so instead the crew established projected fuel loads for checkpoints along the route. In each case these fuel computations included an expected fuel and a minimum safe fuel.

All the planning paid off for the take off, rendezvous and refueling went off flawlessly. The C-141 took on 65,000 pounds during three hook-ups, bringing the aircraft to near maximum gross weight. Then, after the third KC-135 had turned North, the C-141 crew settled down for the final run in to Antarctica.

The visibility at McMurdo was not the best. The darkness was complicated by blowing snow and ice fog. The engines of the recovery vehicles waiting by the drop zone had created a blanket of ice fog, making identification of the DZ difficult. Nonetheless, the crew were able to make the ID and set up for

The snow swirls in the ramp lights as the parcels for McMurdo disappear into the Antarctic darkness.

the drop. As the parcels rolled out the rear door of the C-141, another first was logged. Not only was this the first use of the rear doors in Antarctica, but since the C-141 was at a gross weight of 195,000, this was the heaviest weight at which a C-141 has accomplished an airdrop.

continued

ANTARCTICA Air Drop continued

The icy cold, darkness, and bulky cold weather gear made recovering the parachute bags a special problem.

Above, the side doors were used for the drops at the South Pole. If the rear doors froze open there, the C-141 would not have enough fuel to return to Christchurch. Below, history is made. The aircraft made three orbits over the drop zone as the load crew rolled the cartons out the doors.

There was some concern about whether the new configuration would work, but once the load was started it flowed out smoothly and was away in six seconds. Then as soon as the parachute bags were recovered and the doors closed, the load crew began to reconfigure for the South Pole drop. This time the side doors would be used to preclude the rear doors from freezing, since now there would not be enough fuel to make Christchurch with the doors open.

Now a new problem appeared. The normal navigation procedure in a C-141 is to feed a different INS to each pilot. This allows a back-up in case of error. However, as the aircraft reached the Pole, the convergence of latitude and longitude magnified any position error. The second INS had a slight present position error, which when converted to grid meant a large difference in headings displayed for the pilot and copilot. The error was not dangerous since the proper track was apparent, but it was disconcerting for the pilots. There was also some question in the navigator's mind as to how accurately he could fix the aircraft's position given the darkness, snow, and lack of nav aids. But, fortunately, the large dome of the South Pole station showed bright and clear on radar at 80 miles.

Once at the pole, the aircrew had an extremely delicate task to perform. The weather was so forbidding (a ground visibility of less than a mile with a wind chill factor of 129° below zero) that the recovery team could not travel far from the dome. On the other hand, dropping close to the dome had to be accurate because a carton striking the special protective cover of the dome could be catastrophic.

The C-141 set up an orbit around the Pole. The altitude for the airdrop was 10,560′ MSL. That is only a little over 1,000′ AGL since the elevation at the South Pole is 9,400′. The crew made three passes to drop cartons out both paratroop doors. Like McMurdo Sound, the drop was completely successful.

Almost 16 hours after takeoff the C-141 touched down at Christchurch. The crew had accomplished in one flight just about everything an airlifter can do. Air refueling, long range cruise, grid navigation, night airdrops, and all under extremely adverse conditions. The key to success in this mission was planning. By preparing for contingencies and thinking through options and alternatives, this crew was ready to fly the mission. Given this preparation, it is not surprising that they were successful. This is the essence of flying safety—doing the mission successfully with the minimum of risk. ■

Mission complete and successful thanks to careful planning and professional performance. Just the way it's supposed to be.

OPS topics

Cleared To Land?

■ As a Logair took off from a northern base it passed within 1,000 feet of a Cessna 152 which had landed in the opposite direction unannounced and unnoticed. The student pilot in the Cessna was on a cross-country to a small airport about 8 miles away. He overflew the intended landing site and mistakenly landed at the Air Force base.

Jettisoning Seat Kits

There have been several recent instances where aircrew members jettisoned their survival kits in an attempt to reduce parachute oscillations. The experts advise that jettisoning the kit will not appreciably reduce parachute oscillation. Besides, such action exposes a crew to survival situations with little survival equipment.

The most effective method of combating oscillation is to accomplish the four line release. Survival kit jettison should only be used for power line and tree landing situations.

Some Thoughts On IP Technique

As a result of a mishap, the IP discussed his technique for guarding against improper stick inputs. He usually had his right hand cupped around the stick and slightly in front with the left hand on the throttle quadrant close to the throttles.

On the mishap pattern the IP received visual cues of the aircraft pitching down simultaneously with the physical pressure of the stick moving forward into his hand. The speed at which the stick moved and its pressure were greater than the IP anticipated and resulted in greater than expected stick movement.

The IP instantaneously went to AB and pulled back on the stick. There wasn't time to prevent a touchdown but, more importantly, the IP overrotated and caused the ejectors to contact the runway. As an aside, the abrupt movement of the stick was the result of mistrimming (nose heavy) by the front seater.

Seeing Is Believing

It was a typical summer afternoon at base X: CBs in all quadrants, lightning and hail within 5 miles. An IP and student in a T-38 and a solo student in another T-38 arrive back at the base and prepare to land. A thunderstorm that had been moving west turned southwest and across the approach end of Runway 16, the landing runway.

The decision was made to land on 25 with the solo student in lead position. After touchdown at 130 kts, the solo student's aircraft hit standing water which led to hydroplaning and a slide to the left. The pilot stopped the drift but couldn't get back to the center of the runway. At 100 kts he lowered the nose to the runway and water spray flamed out both engines. With 3,000 feet remaining, he applied brakes and blew both main tires. The aircraft finally stopped on the left side of the runway, cocked to the right.

Meanwhile, the IP landed 9,000 feet behind the student and encountered the same conditions. He was able to maintain directional control but couldn't stop before passing the student. Seeing is believing.

Nomex Jacket Mod

The pleated back on some of the new nomex jackets (CWU 45/P and 36/P) are causing concern. According to reports, the pleated area catches on hatches or other equipment in the cockpit. There is an authorized mod to remove this pleated area. Ask your Life Support Section about it before it gets really cold.

Electrical Failure

After about a half-hour of flight the crew in a T-37 noticed that both loadmeters read zero and both generators were inoperative. After 10 more minutes complete electrical failure occurred. The crew recovered via an electrical failure pattern at a nearby civilian "P" field.

Let's see, what was that electric failure procedure?

continued on page 16

TAKE A LAST LOOK

■ Five times this year USAF aircrews have been caught in an insidious but deadly trap.

Maintaining level flight while in a high G, steep turn is extremely difficult. The danger comes when we are in the low altitude regime. Many of our modern aircraft, A-10 and F-15, for example, do not provide good visual references for a pilot to catch an unplanned descent while maneuvering at low altitude. The only reliable indicators are the attitude and altitude instruments.

This does not mean that you should fly around low altitude "on the gauges." But a quick peek to be sure that you haven't set yourself up for an unrecoverable descent is well worth the extra effort it takes.

There isn't much time for mistakes below 1,000 feet. That last look at altitude and attitude can be very important. ■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OPS topics continued

Losing Your Hat

Many of our aircraft have a high percentage of aircrew helmet losses during ejection (25 percent for the F-15). While there are many factors involved including speed at ejection, body position, aircraft attitude, etc., some are controllable, for example, proper fit of the helmet. When it feels loose, tell the Life Support people. You wear it—they don't, and if you have to eject and have time:

- Lower your visor.
- Tighten the mask.
- Tighten the chin strap.

There is a new helmet currently in testing which has been successfully retained up to 550 kts and 30° of head tilt back.

Tail Scrape

An F-15 was recovering from a practice night scramble. The two extra tanks and four AIM 7's meant that the airplane weighed a lot more and had a lot more drag than was usual for a night approach. The pilot flew the ILS glide slope to about one mile from touchdown when he transitioned to a visual approach.

This approach was made to the alternate runway since the lights on the primary runway were not working. The alternate differs from the primary runway in that there are no VASI lights or overruns and the runway is twice the width (visual illusions?).

The pilot misjudged his height above touchdown and flared too high. As the aircraft started to settle, the pilot realized he was too high and lowered the nose, but without adding power. He then tried to correct for the excessive descent rate by increasing pitch, again without adding power. (What about the region of reverse command?)

The aircraft touched down harder than normal with an excessive pitch attitude. Several panels were lost or damaged and the engine nozzles were scraped. The pilot was aware of the proper procedures for recovering from a high flare, but did not use them because he misjudged the height of the aircraft above the terrain due to the lack of visual clues—"the black hole" effect.

Test Pilot School

The Air Force Test Pilot School is seeking highly motivated and experienced pilots to attend the next class. Application deadline for the new class is January 1, 1982.

The Test Pilot School is one of only four such schools in the free world. The school runs 44 weeks and includes 631 academic and 133 flight hours for selected U.S. and Allied Airmen.

Interested officers should consult AFR 53-19 for application procedures and ask about the new joint AFIT/Test Pilot program. More information about the Test Pilot School can be obtained by contacting your Palace Information Officer.

Tail Skid

Fighters are not the only airplanes with overrotation problems. During a tactical training mission in a C-130 the pilot set up for an overhead pattern and landing. During the flare the aircraft encountered wake turbulence and began a higher than normal rate of descent. The pilot, recognizing the descent, tried to correct with pitch only. The aircraft touched down very nose high damaging the tail skid.

Three In 10

We at the Safety Center are always looking for significant trends. If three similar incidents in one ten day period early last summer are enough to signify a trend, watch out!

In two reported cases controllers gave crews erroneous information which could have caused hazardous situations had the crews involved not been alert. Each incident was a result of controller error. Crews should be aware of "new ways" that things can go wrong, go wrong . . .!

The first incident involved a controller's scope presentation shifting 90 degrees relative to runway heading. In that case, the controller didn't detect the change in his normal alignment markings. Consequently, North became East, East became South, etc. For the KC-135 involved, downwind became base and base became final. The controller cleared the aircraft to a lower altitude, normally accomplished on base leg, while they were on downwind. The crew was VFR and avoided antennas. Intercept headings were then provided for a final approach course which would not intercept the final approach course. Fortunately, the crew knew where they were and the problem was resolved.

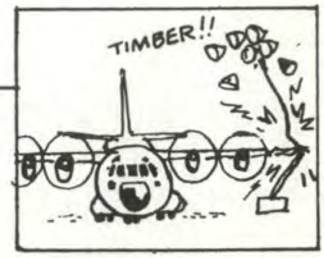
In the second case, the GCA controller had a mental lapse. The active runway changed, but the controller's mind stayed on the old runway. On final approach, headings 180° from what was expected caused the crew to question the controller. The controller repeated the erroneous heading. The pilot complied with the controller's instructions and was sent around for being too far right of course before he conflicted with following traffic. All controller displays on the PAR scope are oriented from right to left regardless of the active runway; thus, it was easy for the controller to "forget" the active runway.

If two incidents don't make a trend, a third may. The day following the "forgotten" active runway mixup, an F-4 reported two near misses on the same flight while under the control of a Center. The F-4 took evasive action twice in 15 minutes while cruising at FL 350. The incidents are under investigation.

Controllers do their best, but the system seems to be telling us not to relax. Remember, controllers have a demanding job too and, like pilots, are subject to human errors. — *Maj Arthur P. Meikel, Directorate of Aerospace Safety.*

Failure to Communicate

The following is a commentary on a mishap. "Originally the lack of communication between the pilot and flight mechanic was not sufficiently stressed. When the crew elected to start engines without transient maintenance present, they assumed responsibility of ensuring the area was clear of obstructions prior to taxi. The flight mechanic failed to communicate his intentions to the aircraft commander and transient maintenance concerning the fire bottle. The pilot failed to confirm that the path was clear prior to taxi. As a result the aircraft taxied into the fire bottle."



A Towering Problem

The C-130 was at an allied base to on-load a deployed unit. The crew was aware of the enroute supplement caution about light towers at the base and had discussed the hazard while enroute. After landing, the crew taxied the aircraft in until they acquired the marshallers. As they approached the parking location, the crew recognized that they would have to make first a 90° and then a 180° turn.

They saw the tower off to the right. Then as they neared the tower in a left turn the marshaller realized that the right wing would not clear the tower. At this point the marshaller became confused and gave a right turn signal instead of stop or left turn. The crew questioned the right turn and did not follow it due to proximity to the edge of the ramp. However, they did not perceive a conflict with the tower and continued to turn left. Just after the pilot started a hard left turn the right wing struck a light tower knocking it over. ■

Some Thoughts For General Aviation Pilots

General aviation mishaps have cost the Air Force a great deal this year. In one recent week there were three mishaps, two of them were gear-up landings and the third—weather related—caused four deaths.

In the April issue of *Flying Safety*, Captain Dennis Storck wrote an article on general aviation flying called "Proficiency and the Private Pilot." Rather than publish a new article on general aviation, we are going to depart slightly from tradition and publish a rather long letter we received in response to Captain Storck's article.

The author, Master Sergeant Harrison Hamer (Retired), formerly a Munitions Superintendent at Carswell AFB, Texas, is a general aviation pilot and instructor with over 3,800 hours of flying time. His letter contains some good thoughts for general aviation pilots.

One other point. Sergeant Hammer and Captain Storck both emphasize the safety of Air Force Aero Clubs as compared with the rest of general aviation. The comments about a less safe environment are supported by the following figures. The mishap rates for Aero Clubs and all general aviation for the past three years are:

	Aero Clubs	General Aviation
1978	6.7	12.6
1979	4.7	10.6
1980	8.5	9.2

Fatalities (Rate)

	Aero Clubs	General Aviation
1978	2	6
1979	0	10
1980	0	8

The emphasis on safety and supervision in Aero Club operations continues to make them by far the best way for Air Force members to enjoy light plane flying.

■ I am an avid reader of your magazine, particularly the articles involving general aviation. However, I feel I must comment on the article in the April 1981 issue by Captain Dennis Storck.

Captain Storck makes the comment that general aviation airplanes are far simpler than Air Force complex bombers, fighters, etc. I feel this statement engenders an attitude on the part of Air Force pilots that aircraft system knowledge in general aviation aircraft is not so important, when, in fact, I feel it is doubly important. The key is that general aviation aircraft are operated single pilot. Of all the aircraft I fly I'll pick two of the "simpler" aircraft as examples.

The first is a 1979 Beechcraft A-36 Bonanza. It is equipped with a flight director, encoding altimeter, RNAV with a memory for 8 waypoints, club seating, and passenger capability for a total of six souls on board, Collins pro line comm-nav, and DME. As you can see, the aircraft is very well equipped and is flown single pilot in *all weather conditions*.

The second is a twin engine Cessna 421. It is pressurized, turbo charged, cabin class with weather radar, flight director, top of the line Cessna avionics, encoding altimeter,

DME, and total souls on board capability of ten. It is capable of flying on jet routes and in mountainous areas and all on single pilot operation. I might point out there are many other light twins in this class such as Cessna Corsair, Piper Cheyenne, and Beech King Air A200. These are turbo props, single pilot operated, and generally very well equipped and expensive, i.e., $1 million or more. The point is well made that all airplanes from a J3 Cub or Cessna 152 to the most complex high performance jet aircraft can kill.

Any pilot should approach flight in any airplane with the same degree of preparation. I have found that pilots who operate aircraft which have a copilot and nav will frequently not put in the same degree of preparation for general aviation flying as they would for the heavies. They are dependent on a copilot and nav, and this carries over into their single pilot operation. The dependency is necessary for crew coordination flight in the heavies and I do not mean to take anything away from that, but single pilot flying requires reorientation of attitude and should be approached in a more respectful manner. Possibly, an attitude of more complexity than their normal flying duties would be a better approach.

Captain Storck goes on to make the comment that the owner's manual is required to be on board the aircraft. This is not so. I would like to point out FAR Part 91.31 which talks about an FAA approved airplane flight manual (AFM) as being required. The AFM was required only for aircraft with a gross weight in excess of 6,000 pounds or which were certified with an AFM. Piper has always had an AFM and also Beech, but not until 1979 did Cessna have one. Cessna chose, instead, to make use of FAR part 91.31(e) dealing with markings and placards. For years Piper has published an owner's manual which is separate from the AFM. Sometime during 1978, General Aviation Manufacturers Association (GAMA) got together with FAA and standardized the owner's manual, converted it to an AFM, called it a pilot's operating manual, and required it to be in the aircraft. This is an improvement. Now Section Three in any aircraft AFM is emergency procedures, Section Four is normal procedures, and so on. V speeds are more clearly defined and definitely an aid to the pilot. However, a description of maneuvers such as chandelles, lazy 8's, short and soft field specific takeoff and landing techniques, flight at minimum control airspeed, steep spirals, steep turns, etc., are not included, other than entry speeds and other limitations. As I have previously mentioned, the new AFM Section Three is now emergency procedures. It is well written and highly informative. I strongly recommend a review of the expanded portion of this section.

Captain Storck mentions pressure altitude with regard to mountains. While pressure altitude is important to the jet pilot, general aviation pilots are more concerned with density altitude. Ironically, density altitude effects can be observed at lower altitudes. For example, the field elevation in the Dallas-Ft. Worth area is approximately 700 feet on the average. On a hot summer day of say a temperature in excess of 100°, the density altitude could very well be in excess of 3,000 feet. Most pilots realize that pressure altitude, temperature, and moisture affect an aircraft's performance.

Prior to each flight I was very careful to review that aircraft's speeds and characteristics several times. In addition to practicing stalls and steep turns, one way I have found to enhance aircraft familiarization is flight at minimum controllable airspeed.

Pilots who think of density altitude will use an E6B and figure density altitude using pressure altitude and temperature. Remember though, moisture content has an affect. By casually looking around the sky, a pilot can get an idea of how much moisture is in the air from the amount and type of clouds. The key here is that even at low field elevation, an aircraft at gross weight might not perform as we are accustomed to, and a takeoff from an airport with a short runway might be disastrous if not very surprising, yet we were flying in and out of the same airport during the fall, winter, and spring with no problems.

continued

Some Thoughts For General Aviation Pilots continued

Now let's get into the other areas. I think Captain Storck's ideas about recurrency and cross-country flight planning are outstanding; however, I would like to add some comments. The idea of the 3" x 5" card is a good one. I have been using the same concept for years and found it very effective. I can carry it with me and, prior to takeoff, review the necessary speeds. In the past while acting as a flight instructor, I have been current in ten separate aircraft at one time. Five were twins and five were singles. The twins ranged from Aero Commander 560 to a Twin Commanche, and the singles ranged from a Cherokee Six and Mooney MK21 to a Cessna 150.

Prior to each flight I was very careful to review that aircraft's speeds and characteristics several times. In addition to practicing stalls and steep turns, one way I have found to enhance aircraft familiarization is flight at minimum controllable airspeed. Just slow the plane down until the stall warning horn is just barely on, trim the plane, and then fly towards a VFR reference point. Gradually work in full flaps, all the time keeping the stall warning horn just barely on. Do some turns in both directions, and notice the flight characteristics of the airplane. Then finish with an intentional stall from this configuration.

A lot of pilots are not aware of FAR Part 91.5 Preflight Action, which simply stated says that each pilot, whether IFR or VFR before beginning a flight, shall familiarize themselves with all available information concerning that flight. This includes runway lengths, expected aircraft performance, weather information, fuel requirements, known traffic delays, and alternatives. I bring this up because if we comply with this during our cross-country flight planning, then we are less likely to get into trouble. When I am planning on a cross-country I will start watching the weather on television about a week in advance. The main thing I'm looking for is what air masses are moving into the United States and their characteristics.

Based upon previous experience I know that the weather in my area evolves around an approximate five-day cycle. This means I start watching air masses that are approaching the northwest part of the U.S. about a week in advance. As the time gets closer, say a couple of days prior to my flight, I touch base with the local flight service people and begin to get some loose facts. All of this helps me early in my planning to decide whether to go IFR or VFR, fuel stops, and maybe changing by a day or so, either way, my trip.

Finally, on the day of the flight I personally visit the Flight Service Station and get a formal weather briefing. At that time there should be no surprises, and I'm just reverifying my information. During all this planning I have gathered my charts. The FAA sectionals have a lot of good information on them regarding aircraft traffic congestion. Stage III Terminal Radar Service Advisories Areas, and military low altitude training routes are now depicted on the sectional. This, along with the TCA's and MOA's, tell me approximately where to expect the high traffic density.

Finally, I think the idea about a survival kit is good; however, you should add a word of caution about carrying the commercially available pen gun flare kits. I would recommend a discussion with the local General Aviation District Office and reading the regulation on Transportation of Hazardous Material by Air, Part 175, issued by the Materials Transportation Bureau, DOT. I have also found that one of the small VHF receivers is handy, depending upon the ELT on board the aircraft. This could give transmit and receive capability.

I only started to write a short note and wound up with all this. The comments about Aero Clubs are correct, however, many of our commanders are afraid of Aero Clubs and take actions to eliminate them. I sometimes wonder if by not having an Aero Club available that possibly a disservice is being done, projecting our military personnel into a less safe area with considerably less or nonexistent supervision, expert advice, and guidance. ■

A Look At The Record

MAJOR JOHN E. RICHARDSON
Directorate of Aerospace Safety

■ Each year the Safety Center publishes a forecast of aircraft mishaps. This forecast is based on sophisticated analysis which combines historical and statistical analysis with judgmental decisions on the impact of such things as changes in minimum altitudes for low level or DACT, mission changes, aircraft modification, and so forth. Once these factors are considered, an extremely accurate prediction of expected mishaps can be constructed.

In fact, over the years these predictions have been exceptionally close to the actual experience. Nonetheless, once all the modifications have been factored in, there is an assumption which is that the remainder of the elements of the way we operate, maintain, and support our aircraft will continue as in the past. This is, then, the key to how we can beat the forecast. If we are successful in focusing on problem areas and then developing better ways of getting the job done, we can reduce the number of mishaps.

It isn't impossible. Last year was a banner year in flight safety. The Air Force had the third lowest Class A mishap rate in history (the lowest since 1973).

Even more impressive is the large reduction from the rates of the two previous years. The Tactical Forces and MAC were the prime reasons for this fine showing. In 1980 we had the lowest number of fighter/attack mishaps in Air Force history. MAC also helped with the lowest number of Class A mishaps in that command's history.

All-in-all, it was a very good year.

But that was 1980. This year things are a bit different. So far we are not doing as well. We are significantly above the predicted numbers, and far above the same time last year.

Let's look a little deeper into this. First, where are the increases? So far, the biggest increase is in logistics-related mishaps. Flight control difficulties, in particular, have caused problems. One case was probably FOD-related, but others run the gamut from equipment failure to poor quality control and maintenance practices.

Before you aircrew members sit back and mutter about poor maintenance, remember that it is you who are flying the aircraft and you who have to cope with the malfunction. More important, it is you who decide when and if to abandon the aircraft. The point is—don't wait too long. In all but one case this year ejections within the envelope were successful. Out of the envelope is a sure loser.

In the operations-related categories of mishaps we are right on the prediction line. But before you relax, consider the fact that at this time last year we were *well below* that line. So we need to ask ourselves "What is different this year? What did we do last year that we aren't doing now?"

There is no simple answer to those questions. If there were, the action would already have been taken. Much is being done across the Air Force, but we can continue to look. The mishap experience has several clues to areas where we can improve our acts and make a mishap less likely. To start this process, let's look at some typical mishap categories that are causing problems this year.

Pilot induced control loss is always a problem. Although we are below our prediction, we've had a number of out-of-control's which could have been prevented. All too often the scenario is like this:

The aircraft is engaged in BFM/ACT. As the pilot attempts to gain the tactical advantage, he loses awareness of the situation and fails to monitor his energy state and/or AOA. He demands more of the airplane than it can give, and the inexorable laws of aerodynamics take over—one each out-of-control situation.

Such cases are preventable. It does no good to squeeze that extra unit trying for the advantage if, in the process, you give up the whole game. Reread what Col Clouser says in "Your Ego Will Kill You" on page 2.

The other familiar scenario occurs when the pilot paints himself into a

continued

A Look At The Record continued

tight corner during low level and then manhandles the airplane trying to get out. Unfortunately, a departure at low altitude not only leaves no room for recovery, it leaves no room to eject, either.

The solution for avoiding tight corners is situational awareness. Of course, that's not news to anyone. But, particularly during low level flight, mishap investigations consistently find pilots taking actions which are directly contrary to good, logical flying practices. There really isn't any good reason for violating ROE or tactical procedures and altitudes. Even when we "train to fight" we have to have a margin for safety because we are training for combat and a smoking hole prior to the IP certainly wouldn't help the war effort. We can eventually get to that 100-foot low level or to the point where we can consistently out-fight and out-shoot anything with wings, but it takes time, good planning, and constant alertness if we are to ever get there at all.

MIDAIRS There have been two midairs this year—both in ACT. In each case the pilots lost the total picture but continued the fight. This is another form of lost situational awareness, one of the most deadly errors in air combat. If you don't know where your friends and your enemies are you can't continue the fight. As was said way back in 1918, "The enemy is a man who will try to kill you before you see him."

The news is not all bad. We mentioned earlier that pilot induced control losses were down. So are takeoff and landing accidents. We have had some in these categories, and one of the more common is the blown tire loss-of-control mishap. Usually this is not in the Class A mishap category but, nonetheless, the potential is there.

Two of the takeoff category mishaps involved pilots who used improper procedures for abort. Part of this problem may be the same as that admitted by an F-15 pilot. He lost an engine on takeoff and had the other burner fail to light. Fortunately, he made it back safely but admitted that he was mentally unprepared to cope with such a serious emergency on takeoff. He didn't think it could happen to him.

OTHER The category "operations other" includes those operations-involved mishaps which don't fit in one of the other major categories. They include a wide range of types, Over G, fuel mismanagement, and pilot failure to cope with a situation are just a few. Normally this would be a small percentage of the total number of mishaps predicted and experienced each year. Unfortunately, we are not doing well so far.

There have been six Class A's assigned in this category so far. Every one of them was preventable, and some are very hard to explain, such as two that ran out of fuel. These are particularly unfortunate mishaps because very often the real root cause is the fact that someone just stopped thinking about what was really happening. It could have been the pilot or a supervisor or a combination, but the point is that somebody forgot what the real objective was. Nobody was minding the store.

We asked earlier why this year was different from last year. Well, one thing that made last year such a good year was supervision. After the terrible record of 1979, supervisors and commanders took a very hard look at how we do business and made changes which were directly reflected in a dramatic decrease in mishaps.

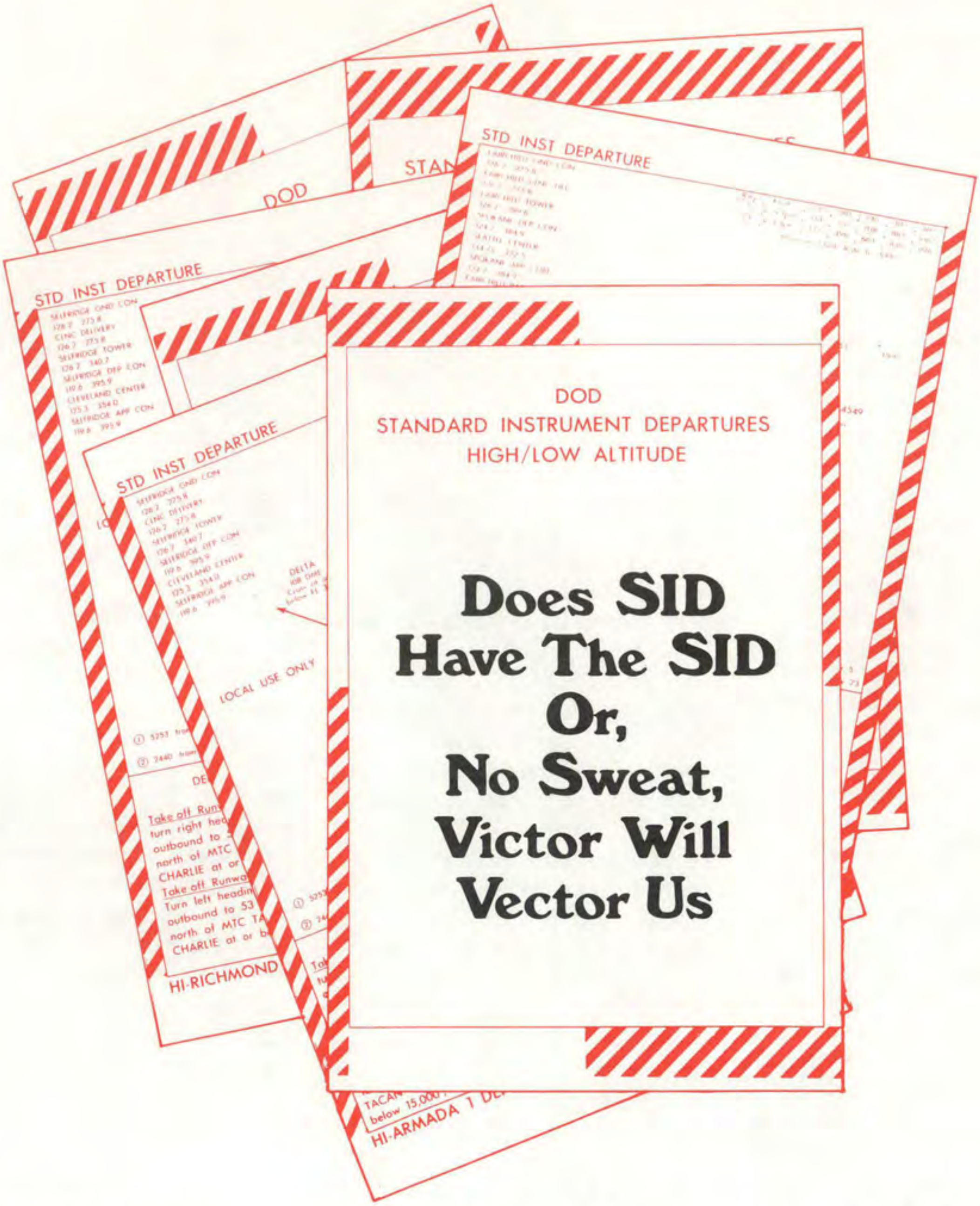
This statement is not meant to imply that all supervision is faulty or even that it is not as effective as last year. Rather, I point out the benefits which are immediate whenever supervisors and commanders bring their knowledge and experience to bear on mishap prevention.

But supervision doesn't mean just the wing commander, squadron ops officer, or even the instructors and flight leads. It means *everybody*. As pilots we are responsible for our own actions. That airplane is ours once we strap it on.

Yes, poor supervision may make it more likely that a mishap will occur, and good supervision does the opposite. But, in the final analysis, if you wear wings on your chest you need to remember the slogan President Truman had on his desk:

"The buck stops here." ■

Does SID Have The SID Or, No Sweat, Victor Will Vector Us



MAJOR DONALD T. HARMON
AFISC

■ "HORNIE 21, Salt Lake Center, say altitude passing." "Salt Lake, HORNIE 21 is passing one-six thousand for flight level one-nine-zero."

"HORNIE 21, your altitude should be one-four thousand until the Frisco intersection."

"Ah Salt Lake, ah HORNIE 21, I thought we were cleared to flight level one-nine-zero."

"That's affirm HORNIE 21, you were cleared the Silverthorne One Departure, Frisco transition flight plan route, to climb and maintain flight level one-nine-zero. There is an altitude restriction of one-four thousand until Frisco on the departure."

Have you ever heard or been a part of a similar conversation? They are becoming more commonplace. During the first half of this year, 22 percent of the alleged Air Force flying violations received from the Federal Aviation Administration involved standard instrument departures (SID). Many of these incidents resulted in a loss of IFR separation. Without action on the part of air traffic controllers, a midair collision could have occurred. Let's take a look at some of the situations that have led pilots down the primrose path while flying SIDs.

To begin, let's continue with HORNIE 21. Did he place himself in a vulnerable position? He most

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certainly did. He was issued the SID, then an altitude clearance limit. The restrictions of the SID apply unless specifically deleted by air traffic control. The altitude clearance limit does not delete restrictions.

The normal, normal routine departing Zonker AFB was to pick up the IFR clearance, which included a SID, and as soon as you were airborne ask for a vector. The vector was always granted, so why worry about having the SID available for reference. This particular day the departure controller had his hands full and didn't have the time to provide vectors to ZOOMIE 12. ZOOMIE 12 tried to find his SID, but to no avail. He had already missed the turn point to an arc and was well on his way through an altitude restriction. This necessitated that the already harried controller vector another aircraft out of ZOOMIE 12's way. This incident could have been avoided had the pilot been prepared to fly the SID. FLIP general planning states, "After a SID is accepted in the Air Traffic Clearance, the pilot will conform to exact routings, altitudes, and specific restrictions shown on the departure chart or received from the Air Traffic Controller." ZOOMIE 12 didn't have much going for him in defense of his actions when the alleged violation showed up at his unit. If you accept a SID, be ready to fly it.

Another situation that seems to cause pilots consternation is illustrated by the following tale. TOAD 33 filed for the Pondview One departure. Like a true professional, he studied the SID and was ready to fly it. TOAD 33 had begun the departure when he got this clearance, "TOAD 33, out of six thousand feet, turn right to two-seven-zero degrees and intercept the Ducky Vortac three-five-one degree radial outbound, climb and maintain one-one thousand feet." It just so happens that there is an altitude restriction at 6,000 feet on the SID until passing 20 DME from the Ducky Vortac. What will TOAD do? Again, a little knowledge of the good book, FLIP, general planning, would enable TOAD 33 to make the right decision. FLIP states, "After an aircraft is established on a SID and subsequently is RADAR vectored or cleared off the SID/SID transition, pilots shall consider the SID cancelled, unless the controller adds, 'expect to resume SID.' " If air traffic control reinstates the SID and wishes restrictions associated with the SID to still apply, they will state, "comply with instructions." This means TOAD 33 should continue his climb, turn to the assigned heading passing 6,000 feet and comply with the revised clearance. If there is any doubt about a clearance, ask for clarification.

These situations have illustrated the majority of problems that have been experienced by Air Force pilots while flying SIDs. A few simple precautions will ensure pilots:

- Understand their initial clearance.
- Comply with depicted restrictions.
- Are prepared to fly the SID, and
- Understand what to do when a revised clearance is received.

A review of the SID during flight planning will allow you to pick out important features rather than trying to find them while you're flying the departure. You can ensure your aircraft is capable of flying the departure (climb gradient, navaids). Note where the restrictions are and how they are identified (DMEs or crossing radials). You should look around the flight planning room to discover any oddities about departing that particular aerodrome. Make sure you have a copy of the SID before you get out of Base Ops. Ensure you understand your clearance before becoming airborne, and be ready to fly the SID. Know what to do when you receive a revised clearance. An occasional review of instrument procedures will keep you up to speed on the latest changes. Taking a few minutes to review and understand SID procedures could prevent your becoming a mishap statistic or at the very least, the recipient of a flying violation. ■

Personal Survival Kits

SGT DONALD D. BUNDY | 3612 CCTS
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■ Often survival is associated only with aircrews; therefore, many Air Force members consider themselves immune from a survival experience. This type of attitude can leave you totally unprepared. A snowstorm in North Dakota, a tornado in Oklahoma, a hurricane in Florida, or a flat tire in Arizona could be the prelude to a survival experience. This type of situation could happen to any Air Force member, including you, thus it is a necessity to be prepared, regardless of your job or location.

What type of preparation do you need? Initially, you should concentrate on acquiring some basic survival knowledge. Such knowledge can be obtained from magazine articles, books, such as "ALIVE," survival schools, continuation training or special classes by area schools.

Preparation goes further than just having the knowledge; it also involves equipment. Having the necessary equipment for the situation enhances your chance of survival. You don't want to carry a backpack loaded with survival gear every place you go, but some of the equipment in that pack may be nice to have. What equipment do you need? How can you carry it? How can you ensure that you will have it when needed? The answer to all of these questions is the PERSONAL MINIMAL SURVIVAL KIT. Personal, in that you decide what you need. Minimal, in that only the bare essential items are included. And it's a survival kit because you can easily carry it with you anywhere and have it when you really need it.

The contents of a kit are determined by environmental factors and personal requirements, thus no two kits need be the same. They all should, however, meet specific criteria: (1) All items must be necessary, (2) They must be practical, (3) They must be compact. A good example is that a gas heater might be necessary for survival in the arctic, but it is not practical for inclusion in a kit because it is not compact enough. Many survival kits are dumped before they are ever used simply because they are too bulky or cumbersome and become a nuisance.

Outdoor magazines and recreational supply catalogues all have advertisements for minimal survival kits. These kits range in price from $5.00 to $80.00, yet they are not as good as the one you can design and construct yourself, because yours can be designed for a specific person in a specific location. Additionally, most of the items can be found around the home, greatly reducing the cost.

The simplest kit, and the one that is easiest to carry, is the pocket survival kit.

To construct this kit, you will need the following:

PEN An inexpensive, plastic, fat barrel pen is the best. Remove the cartridge filler and spring. (A penlight barrel also works well.)

MATCHES Cut a plastic straw the same length as the pen, and seal one end of the straw by melting it or filling it with wax from a candle. Break several wooden matches in half and place them inside the straw so that their heads do not touch. Seal the other end of the straw. The straw can be used later as tinder in starting a fire.

NEEDLE Magnetize a needle by rubbing it with a magnet. Hang it from a string and note which end points to north. Paint that end. Drop it into the pen barrel.

SAFETY PINS Drop two small safety pins inside the barrel.

KNIFE Find a sharp blade, small enough to put into the barrel. A single edge razor blade normally fits. It is best if the blade has a hole in it; that way, the two safety pins can be used as a handle.

BIRTHDAY CANDLE If possible, get a "magic" birthday candle. If

continued

the wind blows it out, it will relight itself. These are common items, but you may have to shop around a bit. If you can't find one easily, try your local neighborhood magic and novelty shop.
WIRE Squeeze some very thin, pliable wire (snare wire) next to the candle and matches so that the end protrudes from the hole in the barrel.
FOIL Fold and tuck a piece of aluminum foil around the candle, matches and wire. This can be used as a reflector or signal mirror. If the pen barrel is large enough, you may be able to pack enough foil into it to make or line a cooking pot. If there is any remaining room, try stuffing in other items, such as iodine or globaline tablets for use in purifying water.

Larger kits can be constructed by using plastic cigarette cases, plastic soap dishes, band-aid boxes or a tin can. Such kits are practical for placement in autos, boats, backpacks, etc. The number of items and the items themselves are again determined by the designer. Remember, special attention should be given to medications needed by yourself or members of your family.

The items in this sample kit are:
PLASTIC Handled carefully, it can be shelter, raincoat, or a sleeping bag (when filled with dry leaves, needles, grass, etc). It will hold body heat in and minimize effects of the wind. In desert areas, it can be used in the construction of a solar still. In order to get it compact enough, it will have to be pricked with a pin to release the trapped air. This will not affect the waterproof qualities of the plastic.
MATCHES Matches are laid with heads alternating, with the second row placed at 90 degrees to the first row. Melt wax over the entire stack. The wax makes the matches waterproof and buoyant.
SAFETY PINS Varied sizes.
FISH HOOKS Sizes 10, 12, 16, plus 16 to 20 feet of 10-pound test line.

KNIFE Multiple-bladed small knife. Be sure to sharpen and oil it prior to packing.
MAGNETIZED NEEDLE Paint the end that points north.
BUTTON COMPASS These can be bought at a toy or sporting goods store for less than a dollar and the adage "what you pay for is what you get" holds true in this case. Don't spend a fortune, but do buy a good compass. It can be the most valuable item in the kit.
BALLOON OR PROPHYLACTIC Use as water container.
BOUILLON CUBES One or two provide a warm drink that really boosts morale.
SALT Place into a sealed straw.
SNARE WIRE
WATER PURIFICATION TABLETS
CAN LID Polish the lid of a tin can so that it can be used for a signal mirror; punch a small hole in the center of the lid for sighting purposes. Seal the lid on the can with wax or plastic tape.

Well, that's about it. The kits are ready. Are you? Try the magnetized needle to see if it actually points north. With the plastic, try constructing a shelter or sleeping bag. Once you know how to use each item, seal the kits and place them where they will most likely be needed. Put the pen kit in your flight suit, purse, field jacket, etc. Remember, the real value of a personal survival kit is that when faced with a survival situation, you will have this life saving equipment with you. It's a totally useless item if it's at home in your dresser drawer when you need it!

Remember, before you can take it with you, you've got to make it. Don't wait—do it now!

Questions or comments concerning the information contained in this article may be directed to 3636CCTW/DOTO, Fairchild AFB WA 99011, AUTOVON 352-5470.—Reprinted from Mar 77 *Aerospace Safety*. ■

DISORIENTATION

■ All pilots have been cautioned about disorientation, illusions, vertigo, and all the other physiological phenomena that can happen in flight. Year after year, however, disorientation accidents continue to account for approximately 10 percent of military aircraft accidents. Accident experience indicates that aviators are still unable to anticipate and recognize the infinite number of conditions that can cause disorientation.

A disorientation accident results from the pilot's incorrect perception of his true motion and attitude. A study of disorientation experiences has yielded some facts that should be noted:

▪ Disorientation frequently occurs when pilots rely on some outside visual reference rather than on their instruments.

▪ Fascination with some object outside the aircraft appears to be a subtle but common cause of disorientation.

▪ Landing is the most frequent phase of flight for major disorientation accidents, especially during periods of poor visibility. Ed note: Although this statement is true in the context of this article, the recent experience of the Air Force is that disorientation mishaps occur more frequently on departure or during formation in weather.

▪ The age of the aviator is not a factor in disorientation. Older pilots with more flight experience are as likely to experience mild, moderate, or severe disorientation as younger pilots with less experience.

▪ Fatigue makes pilots more susceptible to the onset of disorientation and less able to cope with its effects.

▪ Familiarization with conditions and circumstances conducive to disorientation can help pilots handle disorientation.

▪ Frequent instrument flight training appears to lessen the severity of disorientation experience and provides a realistic environment in which the aviator can learn to avoid becoming disoriented. — Courtesy US Navy *Weekly Summary*. ■

Control Problem

■ The flight of two F-4s, configured with three tanks and inboard armament pylons, made a formation takeoff. As the gear and flaps came up, the wingman had an uncommanded left yaw. The wing pilot took immediate separation from lead, but when he tried to roll out, the left rudder pedal would not depress. The pilot leveled the wings using aileron and heavy pressure on the rudder pedals. Next, the crew noticed that the nose of the aircraft wandered randomly up to 20 degrees. These uncommanded movements continued for several seconds and the aircrew, suspecting a hard-over rudder or flight control malfunction accomplished the appropriate emergency procedures including disengagement of the stab aug. Lead assumed a chase position and observed the rudder streamlined and the aircraft stable as the flight climbed and headed out over water to dump fuel in preparation for an emergency landing.

After five minutes of fuel dumping, the aircraft started an uncommanded slow left roll to about 20 degrees. The pilot unloaded and rolled out at 300 knots after about 400 feet of altitude loss. While in a shallow climb back to altitude the aircraft began wing rock about 20 degrees until the pilot relaxed back pressure. The crew continued toward the base and, after controllability checks, made an uneventful approach and landing.

During the takeoff, the pilot of the wing aircraft was correcting for a slightly wide position. As the gear and flaps retracted, the 5 degree rudder input from the aileron rudder interconnect zeroed out. At the same time, the rudder shifted to high feel. These two facts, combined with some previously unknown minor maintenance problems in the rudder system, gave the pilot the sensation of stiffness and flight control malfunction.

The wing rock and other classic indicators of an out of control situation, which the pilot experienced, came from the fact that the aircraft, as configured, had an aft CG. Dumping fuel with external tanks feeding can move the aircraft CG into an area of negative neutral stability. The pilot was unaware of this possibility since he was new to the unit and the three tank configuration. ■

CAPTAIN
Kevin E. Krauter

CAPTAIN
Robert S. Stan

CAPTAIN
Larry A. James

CAPTAIN
John E. Hoffmaster

52d Tactical Fighter Wing

■ On 3 December 1980, Captain Krauter, aircraft commander, and Captain Stan, weapon system officer, were flying in an F-4D aircraft as part of a multi-aircraft ground attack mission. The weapons delivery was accomplished without incident, but prior to range departure when Captain Krauter tried to move into tactical formation, he was unable to move the stick forward of neutral. At 330 knots the aircraft had a 10-degree nose-up attitude. Neither stab augmentation emergency procedures nor pitch trim had any affect. Captain Krauter then informed Captains James and Hoffmaster in the lead aircraft of the problem. Captain Krauter was initially able to control the aircraft by bank and rudder to bring the nose down. He finally was able to establish an acceptable climb attitude and airspeed and maintain control with maximum forward pressure on the stick. Despite repeated attempts, he and Captain Stan were unable to free the stick. Because of the difficulty they were having with aircraft control, Captains Krauter and Stan concentrated on flying the aircraft while Captains James and Hoffmaster provided all the necessary navigation and weather avoidance information, coordinated with the SOF for emergency support, and provided emergency procedures review and advice. Despite uncommanded pitch transients and the jammed stick. Captain Krauter was able to complete a successful approach, landing and BAK-12 engagement. The high skill and coordination of Captain Krauter and Captain Stan and the prompt, accurate information and support provided by Captain James and Captain Hoffmaster, resulted in the safe recovery of a valuable aircraft and crew under extremely adverse conditions. WELL DONE! ■

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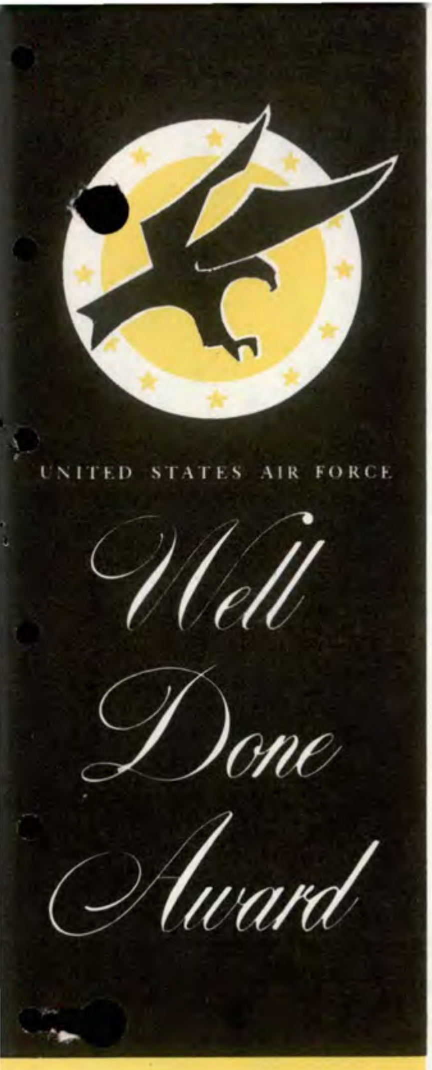

Presented for outstanding airmanship and professional performance during a hazardous situation and for a significant contribution to the United States Air Force Accident Prevention Program.

FIRST LIEUTENANT

Gary A. Frith

CAPTAIN

Keith A. Lewis

347th Tactical Fighter Wing
Moody Air Force Base, Georgia

■ On 30 December 1980, Lieutenant Frith, aircraft commander, and Captain Lewis, weapon system officer, were flying an F-4E on a single-ship low level training mission. While at 500 feet and 480 knots, a large turkey vulture struck their aircraft shattering the right windscreen. Bird remains exploded into the cockpit, destroying several engine instruments. Lieutenant Frith's mask was dislodged from his face and his visor was shattered. He received facial lacerations and a corneal abrasion to his right eye. Captain Lewis immediately took control of the aircraft in accordance with prebriefed procedures, climbed to a safe altitude, and decelerated. Unable to communicate with the pilot or ascertain his condition, he turned the aircraft towards home base, began IFE coordination with the SOF and approach control, and requested a chase aircraft. Lieutenant Frith, aware that Captain Lewis was in control of the aircraft, attempted to clear his vision and reconnect his mask. He then checked front cockpit damage, squawked emergency and tried to establish inter-cockpit communication. Only after slowing to 220 knots were the aircrew members able to communicate with each other. Lieutenant Frith then took control of the aircraft. Captain Lewis continued to make all radio calls due to the noise level in the front cockpit. Bird remains almost totally obstructed vision through the windscreen and canopy. A chase aircraft was vectored to assist the mishap aircrew in aligning for an approach-end cable engagement. Captain Lewis reviewed the checklist for an approach-end arrestment and thoroughly briefed Lieutenant Frith. Despite loud noise and obstructed vision, Lieutenant Frith flew a flawless wing approach and successfully engaged the BAK-12. The professional competence, airmanship, and superior crew coordination displayed by Lieutenant Frith and Captain Lewis prevented a more serious mishap and saved a valuable aircraft. WELL DONE! ■

Before You Go Low

Prebriefed Airspeeds And Altitudes Help Avoid:

- Visual illusions
- Low altitude, low energy maneuvers
- Mishaps