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SAFETY OCTOBER 1976

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UNITED STATES AIR FORCE

aerospace SAFETY

OCTOBER 1976

THE MISSION - - - - - - SAFELY!

SPECIAL FEATURES

REGULAR FEATURES

DEPARTMENT OF THE AIR FORCE • THE INSPECTOR GENERAL, USAF

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OCTOBER 1976 AFPR 127-2 VOLUME 32 NUMBER 10

SEL

SIMULATORS

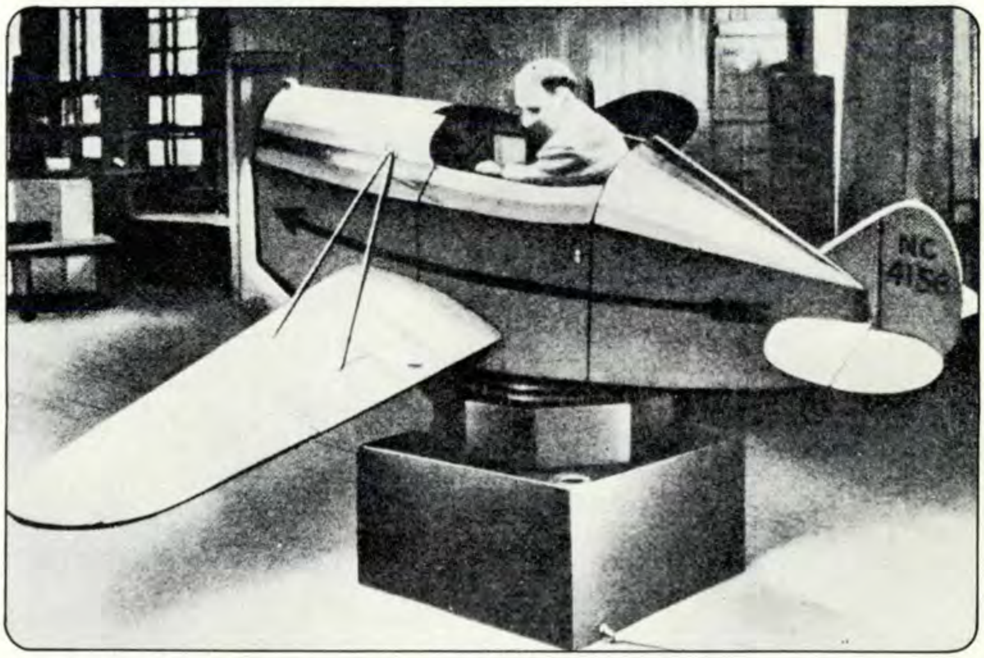
ANCHARD F. ZELLER, PhD
Directorate of Aerospace Safety

So you, like most aircrew members, never really cared a great deal for simulators, could take them or leave them, but would rather leave them. Well, chances are that is going to change. You may not have a genuine fondness for simulation devices, but you do have a very real fondness for two things, both of which will most certainly become increasingly dependent on their use. The first of these is that desirable addition to your monthly income known as flight pay. And the second is that posterior segment of your anatomy which you would not like to bust, but which you very well might if your proficiency is not up to par—not proficiency in the simulator, you understand, but proficiency in your aircraft, which you may only get to fly on rare, possibly critical, occasions.

Although the petroleum shortage has been given credit for many of the changes which have taken place or are proposed in flying, it is only one of many variables forcing greater consideration, greater use, of simulation devices. It is no secret that the cost of many of our weapon systems is becoming very high; not only very high to procure, but even higher to replace. This means that accidents, which have always had a major impact on preparedness, have become critical. The loss of even one of our more expensive and sophisticated aircraft can have a very measurable detrimental effect on our defense capability.

While our aircraft have become more expensive and more complex, in many instances their flying life is markedly less than that of some of their sturdier, lower performance predecessors. This means that we cannot afford the luxury of using the aircraft itself for extensive training. Even though the training is performed safely with no accidents, the impact on the life expectancy of the system is such that every possible avenue for maintaining proficiency without aircraft wear and tear must be explored.

Another sometimes unrecognized fact is that some things can be taught better in a simulator and certainly more safely than they can in the aircraft itself. A pilot training in air combat maneuvers in a simulator can get more experience quicker than many of his predecessors have had in a lifetime of flying. In the



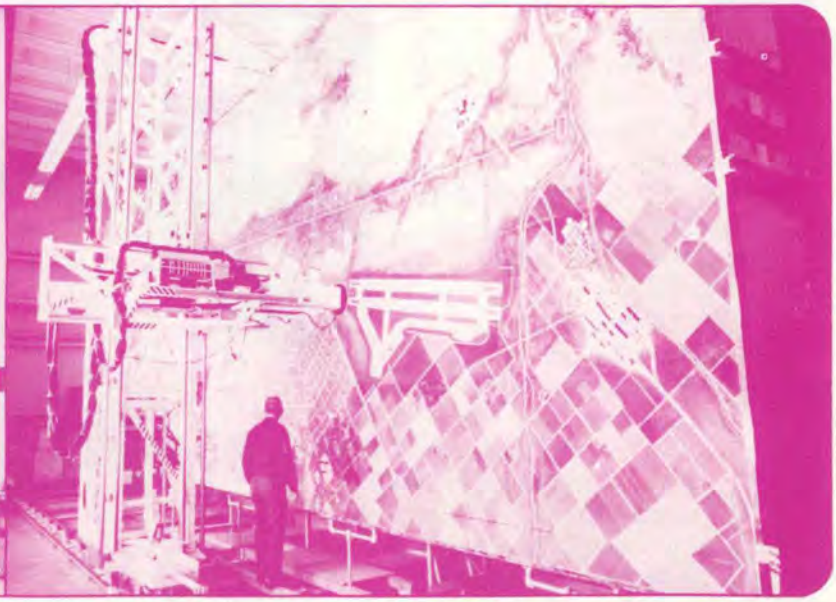
We have come a long way in simulator developments from this early model.

simulator, flying against an opponent who doesn't make mistakes and who takes every advantage of those made by the flier, an expertise can be developed in the average pilot which only the most talented few survived long enough to develop in the real world of combat. The sophisticated software of a modern computer, with its ability to multiply options and its replay capability, is indeed a positive adjunct to the simulation field.

This is not meant to imply that the make-believe world of simulation is about to supplant the cold, harsh world of reality. Far from it. Although simulators were around even before Mr. Link discovered that he could train pilots faster and cheaper, and hence get more students, by using a simulator, their general acceptance has been less than totally enthusiastic. The reasons for this are quite simple: pilots are pilots because they like to fly. Other airmen chose their professions for the same reason. It was reasonable, therefore, that anything which in any way threatened to decrease the amount of flying was looked upon with suspicion and, consequently, little encouragement was given to developing such devices. The result has been that, in spite of the current proliferation of devices, there is a goodly number of questions which must be resolved before an integrated simulator program which will optimally meet the Air Force's needs is developed.

One of the questions currently being addressed which must be resolved is what kind of simulators really need to be developed for the various piloting tasks? It is obvious that the simulators for the novice learning the routines of taking off and landing must be very different from the highly sophisticated air combat simulators mentioned previously. Surprising as it seems, it also needs to be determined what degree of sophistication or precise simulation is required for optimum learning. There is a real possibility that simple part-task trainers will result in better and faster learning than the most sophisticated devices. They would also be cheaper, and the more complex pieces of equipment could be reserved for putting together a number of the part tasks learned in a simpler setting.

One of the concepts of simulation which has been pursued by many is



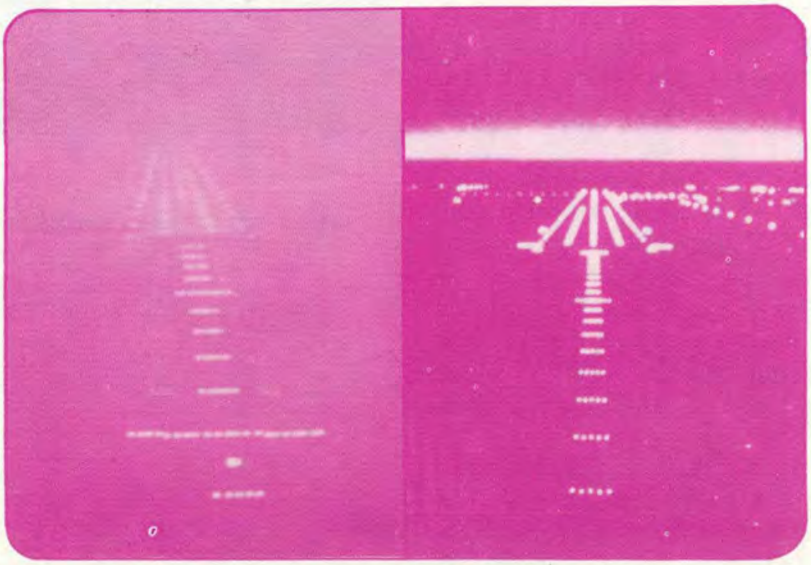
Left—The advanced simulator for undergraduate pilot training. It is a T-37 cockpit with 7 visual displays and 6 degrees of movement. Right—This is the visual display model board used as one method of depicting visual display on newer simulators.

A major advantage of the new simulators is ability to simulate complex or even untried tasks. On the left, a pilot simulates combat 2 on 1 with F-15s against a MIG. On the right, an experiment simulating air refueling F-15s with a DC-10.

that the simulator should be essentially a duplication of the aircraft. There is good reason to believe that this is not necessarily so. The exact degree to which precise simulation must be pursued needs to be further explored. It is self-apparent but not necessarily valid that, because an aircraft is a moving body, a simulator should move. With a highly developed visual system, however, it is quite possible that the human body responds to visual cues received as it would if motion were actually involved. The sophisticated motion systems may not need to be employed except with discrimination and selectivity. Anyone who has ever sat in a train and had an adjacent train move knows the very real sense of movement which can be generated by a visual cue. This experience is so standard that it is referred to as the train illusion and can be experienced from automobile movement or in any other context where the major portion of the visual field is moving, even though the observer is static.

It also appears quite possible that movement may be simulated by the use of G-suits and G-seats, which, by applying pressure to the body, produce the same sensory cues as the individual would get if actual movement were involved. The role of these variables is being explored and, I hope, the results will be incorporated in newer equipment.

Some other questions which have not been as thoroughly answered as they should be relate to transfer of learning. It must always be kept in mind that the use of any simulated device is only incidental to learning a basic task in the equipment actually being simulated. If the learning doesn't transfer directly, little has been gained. In fact, if the procedures learned are in conflict with the same procedures in the basic equipment, then something has been lost, as an erroneous set of behaviors has been learned. This, re-



The state of the art for computer generated visual imagery is impressive. These two pictures are what the pilot would see in the simulator on final approach under either IMC (left) or night (right).

ferred to as negative transfer, is always a possibility.

One of the greatest potentials in the simulator world is not in the hardware per se, but in the ingenious programming (or software) which drives the hardware. This is one of the most open fields in the simulator business. The learning potential of air combat maneuvers with an enemy who never makes a mistake and the possible use of a computer to optimize your own maneuvers offer limitless possibilities. On a real-time basis, these have some defined limitations. If time can be permitted for computer iterations, the potential for logic decision making is almost infinite.

To get back to reality, while these esoteric predictions are certainly valid and sometimes overwhelming, some uncertainties remain. There needs to be a definition of what is to be learned, what kinds of equipment are required, what the characteristics of these must be, and how these are to be used. Only as these basic and not fully documented questions are answered can maximum exploitation of the major sophistications be possible.

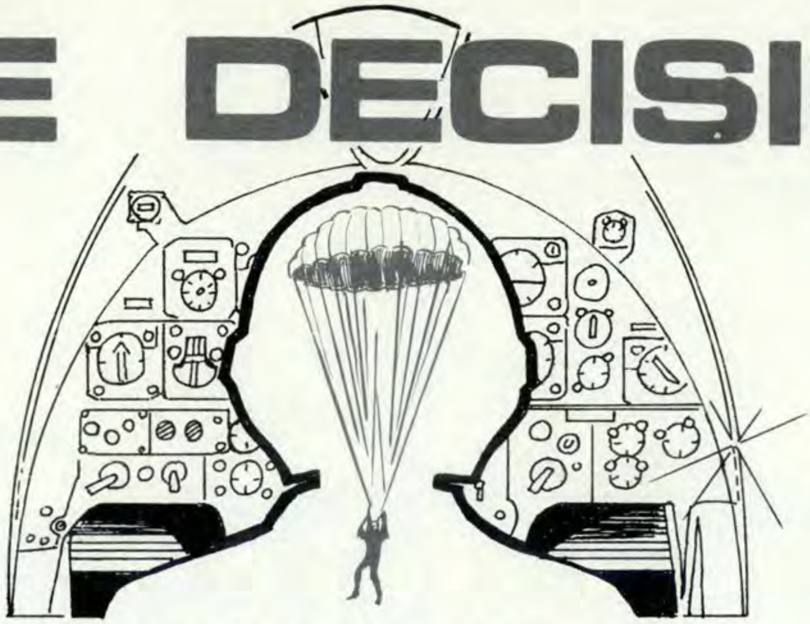
This brings into focus a consideration for all simulator use—those which we now have and those which may be forthcoming. No piece of equipment is of particular value unless its potentials are exploited to a maximum. It is doubtful that anyone in charge of a simulator program could be found who would assert that his simulation devices, whatever they are, are currently being used to their maximum, that a program has been consciously developed to make use of every minute of training time, that instructors have been carefully chosen and trained, and that the crewmen flying have been exercised to the extent of their competence. One is acutely aware of the many times that a crewman has entered a simulator, put in his time, and climbed out.

It is as possible in a simulator to get one hour of experience a thousand times, as it is in the aircraft. This motivation is almost certainly going to change, however. For one thing, the shrewd crewman will know that his proficiency has become marginal and that he must use every possible aid to assure that when he does fly his equipment, he can do so both efficiently and safely. And for another, his flight pay may well depend upon simulator accomplishment, possibly based on stan evals conducted in the simulator. Even now, in our sister service, the Navy, portions of a pilot's annual flight requirements for flight pay can be accomplished in the simulator.

It may not be what you always planned, but a look in almost any crystal ball will indicate that there are more and more simulation devices in your future. ★

The whole purpose of simulators is to make the USAF pilot the best trained pilot possible. While they can never replace the reality of flight, simulators have become a valuable tool in USAF training plans.

THE DECISION



LT COL JAMES A. LEARMONTH, Directorate of Aerospace Safety

Over the years, since the advent of the ejection seat, our statistics have shown consistently poor results from emergency egress attempts initiated at altitudes lower than 2000 feet AGL.

From January 1975 through June 1976, we have had 23 attempted ejections at or below 500 feet AGL, resulting in nine fatalities. Technological advances have had little effect it seems in preventing low-altitude ejection fatalities. The greatest successes in preventing low altitude fatalities have been the PSY-WAR efforts directed at the prevention of low altitude attempts. Dash Ones have for years warned us to eject above 10,000 feet when out-of-control and above 2000 feet in controlled flight. These warnings were developed from a statistical analysis of ejection experience and are not representative of the capabilities of the modern escape systems.

Pilots have been lauded for exploits which have saved lives and valuable equipment at great risk to personal safety. Perhaps each of us in the darker recesses of his mind nurtures the Walter Mitty dream of saving the city from catastrophe by staying with his crippled craft until the last second. In the cold light of day, this dream is soon replaced with sound reasoning and the ejection decision now must be when there is no hope of saving the aircraft.

Here are two examples: An F-100 pilot returned his fighter to the field shortly after takeoff with a fire warning light. A chase pilot reported flames from the lower fuselage. As the final approach was established, it became painfully apparent that the airplane wouldn't make it with the failing power available. The pilot persisted in the approach, attempting an afterburner light (unsuccessful), and raising the flaps to one-half. On short final, the pilot ejected and the aircraft crashed on the airfield. The pilot was incapacitated for several months before he was returned to flight status.

On a routine navigation flight, an A-7 started to compressor stall. A precautionary approach to a civilian field proved unsuccessful when the pilot commanded military thrust to arrest the high descent rate on final. The aircraft crashed on the airport. The pilot was saved from certain death when his ejection trajectory carried him into a 60-foot depression in the approach terrain.

In my observation of fighter/trainer accidents in the last couple of years, I've seen what appears to be an increase in last minute ejection attempts. I can only relate this to a failure to recognize the hazard presented until the outcome becomes obvious. Each of us flying an ejection seat equipped aircraft should spend some time with himself thinking through the possible situations that may require him to make the ejection decision. This conscious pre-thought process will, if the situation develops, reinforce your ejection decision.

Notice that I do not demand faithful adherence to the 2000/10,000-foot rules. I would rather you consider them as factors to be used when an ejection decision must be made. Each of us weighs the factors in the decision-making process differently. I would be presumptuous to assume that regardless of the factors at a given situation, we will all eject at 2000 feet AGL. But for me. . . .

When the situation presents itself, recognize it for what it is, then eject early and enjoy the view. ★

About Aborts

CAPTAIN DICK MORROW
116 TFW, GA ANG
DOBBINS AFB GA

Frequently I think we in the flying safety business beat to death the obvious. I remember, for example, sitting through thunderstorm briefings ad nauseam—all just to convince me not to fly into them. Really now! Does anyone try to fly into thunderstorms? Having blundered into one in my brown bar days, I know better. And yet we harp and harp on the obvious danger of thunderstorms.

Lest I be misunderstood I must hasten to say I am not trying to eliminate all thunderstorm briefings. Rather I am using them as an illustration. My point is this. Rather than continually reviewing the obvious, maybe we should poke around under rocks and explore the dark, dusty, mysterious coffin corners. Occasionally we need to wrestle with some gray areas, and help rope off corners before pilots are boxed into them.

My purpose here then is to discuss one of these gray areas, show how I've attempted to tackle it, and to promote discussion. Perhaps from the collective wisdom of USAF pilots we can distill some better guidance. The topic—aborting.

High speed aborts are always dangerous, particularly so, in an aircraft like our venerable F-100 which gobbles up lots of runway getting airborne. On every takeoff the ever present choice looms: Is it now less dangerous to abort or continue takeoff? A knotty problem always. Our F-100 Dash One provides but sketchy help. It's replete with phrases similar to this: "If blank happens and *sufficient* runway or overrun is available, abort the takeoff. If not *feasible* to abort. . . ." That's not much help, especially to new pilots without the gray hairs of Hun experience.

Of course, I realize emergency procedures must be flexible. Every situation is unique. Yet it should be possible to better define when to abort and when to continue.

Looking again to the Dash One we can compute a refusal speed. This tells us how fast we can accelerate and still stop in the remaining distance with or without a drag chute. However, even this is relatively meaningless because we operate from runways with barriers, thereby allowing us to go faster and still stop. So, that still leaves us pretty much in the dark.

My problem then was how to better define when to abort. To start, I had only my own personal opinions, but they needed challenging. Therefore, I began by devising a questionnaire for our pilots. I asked if they would abort in each of many situations. Additionally, I asked how these would change under IFR conditions and provided space for questions, comments, techniques, and opinions. Particular weight was given to answers by IP's and "old heads." Besides soliciting ideas, the questionnaire forced our jocks to think through their own personal abort parameters. Surprisingly, some admitted they'd never considered each abort situation completely and had indeed learned from just this detailed personal analysis.

Next I reviewed data from Norton. Then armed with all this material, plus my own personal ideas, I waded into a flying safety meeting. And did we have a dandy! I refereed a rip roaring good argument. (In fact, we continued over through a second meeting.) Amazingly enough, however, we ended by agreeing on many major areas.

On the next page is a simplified version of the questionnaire with our conclusions.

QUESTIONNAIRE

CONDITIONS: Dobbins AFB, F-100 with full 335 drop tanks, Wt. 36,000 lbs., Temp. 70^{o}, P.A. 1000', Line speed 122 knots at 2500', T.O. 172 knots at 5600', Formation takeoff, VFR day.

WOULD YOU ABORT UNDER THESE CONDITIONS?

THIS LIGHT COMES ON:	*AT LINE SPEED 122 KNOTS*	*AT ROTATION 157 KNOTS*	*AT LIFT OFF 172 KNOTS*
Fire	Yes	Yes	Divided
Engine Overheat	Yes	Yes	Divided
Fuel Valve Fail	Yes	No	No
Boost Pump Inop	Yes	No	No
Anti Skid Off	Divided	No	No
Heat & Vent Overheated	Yes	No	No
Engine Oil Overheated	Yes	Divided	No
Flight System Failure	Yes	Divided	No
Inst AC Power Off	Yes	No	No
AC Generator Off	Yes	No	No
DC Generator Off	Yes	No	No
THIS OCCURS:			
Loud Thump Or Bang	Yes	Yes	No
AB Failure	Yes	Yes	No

NOTES:

1. Many believe we should abort under any of these conditions at line speed to keep a simple, consistent decision technique. Many think anti-skid a legitimate exception, as it is better to continue the mission and return to land and stop a lightweight aircraft.

2. The questionnaire was worded, "This light comes on" purposefully to bring up the problem of false warnings. Also the occurence of transient conditions and the probability of concurrent failure in backup systems were discussed frequently. These problems lead partly to our divided opinions on "engine oil overheated" and "flight system failure."

3. With low overcast skies the "generator off" light changes to an abort decision.

4. At lift off we are divided for fire and overheat. It depends basically upon whether one trusts the ejection seat or barrier more.

5. The "no" answers in both lift off and abort speed decisions are because we agreed the dangers encountered by continuing are less severe than those of a high speed abort. It is not because we want to get airborne with a sick bird!

Nothing revolutionary here—but a good start. At least now we have each forced ourselves to define and decide on our own abort parameters. Probably that's the real key anyway—more important than any group decisions. One must have a plan of action and carry through.

Our decisions here obviously apply only to one specific set of conditions, not to any other base nor any other fighter. But we have tried coming to grips with one of our gray areas. In doing so we have had some interesting fallout. First, our simulator program has been improved with much more knowledgeable and specific abort training. Second, we have identified an aircraft design and Dash One weakness. They are:

1. We need better designed caution and warning systems. Advisory lights indicating abnormalities should trigger either a "Master Caution" (amber) or a separate "Master Warning" (red) light. This would help pilots make those split-second decisions and help eliminate our present confusion.

2. Our present refusal speed is almost worthless. We need a usable, realistic refusal speed which includes barrier systems and some probability of engagement success. This should give us a successful abort probability versus speed and runway remaining for a specific barrier configuration.

In concluding I'd like to challenge other pilots to analyze their abort procedures and techniques. Through the Air Force pilot group we can surely generate better information than we now have. Certainly any crossfeed between units would be helpful, and in particular, we would appreciate hearing from other Hun drivers any opinions on aborting.

Finally, I must restate these tried and true abort rules.

- Practice, practice, practice in the simulator. That's the best way to become proficient at interpreting warnings, assessing airspeed and conditions, making the proper split-second decision, and executing the abort.
- Have a plan for the day. Before taxiing onto the runway decide for that takeoff, based on runway, barrier and weather condition, what will cause you to ground abort. At 170 knots is no time for a mental debate.
- Review the abort procedure just before takeoff. Look at and physically touch all the necessary switches and handles. Crossing the BAK-9 looking for a tailhook button at night takes years off your flying career.
- Don't delay. ★

CAPTAIN PHILIP M. McATEE, Directorate of Aerospace Safety

The PA-23 pilot was enroute home to Texas from Montana, when weather forced him to remain overnight at his first stop.

The next morning he filed VFR for home and departed at 0840 MST. When he didn't arrive at his destination, a search was launched and the wreckage was found the next morning at an elevation of 5000 MSL. Local residents said snow began falling about 0800 the previous day; and by 1000 about two inches had accumulated. The ground visibility was 100 yards while the snowstorm was in progress; but the weather was clear by noon.

The above is typical of accidents involving light aircraft each winter. Along with the winter season come many seasonal hazards which, although they are not new, continue to take lives year after year. Since many of our readers fly general aviation aircraft, we thought it would be beneficial to review the most common major causes of winter accidents.

WEATHER Rapidly changing weather is by far the greatest hazard in winter flying. Weather gets both novices and experts. Don't assume it's just the low time or inexperienced pilot.

Fog and reduced visibility are always major factors. Remember, in winter rapid temperature changes are common. Most of the time the weatherman is right. *Always* get a weather briefing. Know yourself what conditions are likely to produce fog. While enroute, keep up-to-date with latest developments by using your flight service stations. Both enroute and destination weather can change very quickly during this season. Plan ahead and always have an alternate plan in mind if conditions deteriorate. Never push to get home. If conditions start to go down, land at a suitable field and wait awhile. The weather is bound to improve. Better to be late than to contribute to the scenery.

POOR FLIGHT PLANNING Just plain running out of fuel continues to take its toll. At this time of the year, add an extra reserve of fuel to allow for deviations around weather. Remember, the days are shorter, and headwinds are frequently stronger than forecast. Don't try to stretch your fuel. If conditions change, change your plan. Plan another stop for fuel so you will have enough for any alternative plan you may need. A good rule is to fly VFR with at least the same reserves required for IFR. Never be reluctant to add an unscheduled stop for fuel in order to make certain to have the reserve.

HIGH GUSTY WINDS This common condition is often coupled with icy runways, crosswinds and, for good measure, high snowbanks on each side of the runway. Also, many runways are not plowed to their full width after snowstorms.

The only way to learn how to handle certain conditions is to experience them. But don't wait until there are ice and snow on the runways to practice those crosswind landings. Landing in gusty crosswinds in the winter calls for plenty of practice and precision on the part of the pilot. Practice now, nailing it right down the center of the runway on both takeoffs and landings. And remember that driving through puddles or slush can cause problems, especially for retractable gear airplanes. It is very embarrassing not to be able to retract the gear, or worse, have it not come down.

Each winter hundreds of search and rescue missions are necessary to locate missing aircraft.

In winter, weather can rapidly change. Always leave yourself an out.

CARBURETOR ICE Every time we think that reams have been written about carb ice and that everybody knows about it, we have another accident.

A Cessna 150 pilot was on a cross-country when the engine began running rough and then lost complete power. He never thought of carb heat and was forced to make a forced landing under less than ideal conditions, wiping out the gear.

Carburetor icing is still a major cause of accidents. If you suspect icing, try carb heat. Don't just apply it and shove it right back in. Apply it, see if there is a drop in rpm, and wait a few seconds. The engine may run rough for awhile then clear and regain rpm and smoothness. But check the operating manual and the engine manufacturer's specifications for your aircraft to be sure you apply heat properly.

STRUCTURE ICE Surprisingly, most airframe icing accidents do not occur from in-flight conditions, they are a result of pilots' attempts to take off with frost or ice that accumulated on the airframe while it was parked and was not properly cleared. *All* ice and frost should be cleared before flight. Even a very thin layer of frost can change the aerodynamic characteristics of the surfaces and drastically increase stall speed. Snow can be brushed off with a stiff broom or brush; but frequently underneath the snow there is a layer of ice. Since deicing fluid is often difficult to get at smaller airports, during the winter you should anticipate and carry your own. Several companies make small spray containers of aircraft deicer compounds. Each can is usually sufficient for one application necessary to clear a single layer of frost or ice and is available from most fixed base operators. Add a can to your winter gear now.

Airframe ice can also be accumulated after the aircraft has been taxied, as the following accident account shows.

The flight was a Beech 99 scheduled air taxi run with a planned departure of 1500 EST. Due to weather, the flight was late in arriving. Prior to departure the aircraft was deiced. *The passengers boarded and the aircraft taxied at 1615. The weather at the time was overcast indefinite 1200 feet; 1½ miles visibility with ice pellets; light snow and fog; temperature 29 degrees; dew point 27 degrees. Snow had started falling and was accumulating.*

Shortly before takeoff, the runway was checked and ½ to ¾ inch of slush was on the runway.

The pilot stated that during takeoff roll the engines appeared normal; and the ice pellets that were on the wing were blown off and the surfaces appeared clean. The takeoff roll was longer than normal with rotation speed 90-95 knots. As the aircraft climbed through 100 feet, airspeed 116-120 knots, stall characteristics became present and loss of aileron control became evident. Full power was maintained; but the stall and control problems became more severe.

The pilot decided to land in a rough field ahead and to the left. He landed with full power and gear down. The aircraft was destroyed, but all survived.

Scenes like this unfortunately become far too common at this time of the year.

Now what happened can only be surmised, but obviously the stalling speed was greatly increased. Possibly the slush on the runway was thrown up and stuck to the aircraft on takeoff roll. Also, ice can accumulate very quickly on surfaces with those conditions present.

One final thought on winter flying. In recent years several aircraft have gone down; and the people survived the crash only to die from the elements. Always file a flight plan and check in along the route. Carry clothing and a small survival kit suitable for your route of flight. It won't do you much good to be dressed for the beach if you go down in the mountains on the way. A survival kit need not be large or complex to contain enough vital equipment to make the difference. Build yours now! With proper planning and care you can have many hours of safe flying this winter. ★

OPS TOPICS

BLOWN TIRE

The cause of an HH-53C blown tire may have been a combination of low tire pressure and high side loading on the tires during taxi. This combination distorted the tire to the point where it rubbed against the brake bleeder housing. The bleeder cap cut through the tire sidewall and caused a blowout. While maintenance is responsible for correct tire pressures, the pilots are the ones who can use proper taxi speeds and minimize side loading on tires and gear.

THE OTHER LEFT

The B-52 aircrew was at a strange field preparing to return home. During his preflight, the aircraft commander requested that some maintenance stands near the left wing be moved. The stands were moved; but a large power unit was left parked close to the wing tip. The unit required a special tractor to be moved. The maintenance crew agreed to furnish wing walkers; so the pilot did not insist the unit be moved. Once the engines were started and the brakes checked, the pilot, after noting that the right wing area was clear, decided to increase the distance from his left wing to any obstacle by use of crosswind crab. He started to feed in right crab in order to turn right. Unfortunately, right crosswind crab causes the wheels to turn *left*. So before the pilots or the marshallers realized the mistake or could take action, the aircraft's left wing tip struck the power unit.

FORMATION FLAMEOUT

Two T-37s took the active for a formation takeoff. During the takeoff roll the left engine of number 2 flamed out. The crew successfully aborted the takeoff. Maintenance could find no defects in the engine. Since the runway had numerous puddles of water on it, the most probable cause of this flameout was water ingestion. Since number 2 was on the left wing, it is unlikely that the lead aircraft's main gear wheels were the cause. Rather, the nose gear of the number 2 aircraft splashed sufficient water to cause a flameout.

DID YOU KNOW?

Breathing 100% oxygen reduces your tolerance to sustained high-G maneuvering. This phenomenon has been established during experiments in the human centrifuge at Brooks AFB, Texas, where the experimenters reasoned that 100% oxygen would improve G tolerance but found just the opposite to be true. The same thing has been noted by engineering test pilots at Edwards AFB during sustained high-G maneuvering (5 to 8 G's exceeding 10 to 15 seconds) in high performance aircraft. During these conditions, crewmembers breathing 100% oxygen experienced trouble with breathing. They found that efforts to breathe deeply produced continuous coughing, violent enough to cause eye-watering and blurred vision, which essentially incapacitated them as long as the high G's were sustained. The problem went away when the G's were relaxed. Postflight physical exams revealed no lasting effects.

The cause of the problem was traced to the fact that air cells in the lung (the alveolus) collapse under sustained high G's in the absence of a buffering inert gas, such as the nitrogen that is inhaled into the lungs when you are breathing air, but not when you are breathing 100% oxygen.

The message to be gleaned from all this is obvious: If you're feeling rough and must pull high, sustained G's, don't go on 100% oxygen. You'll feel rougher.—Courtesy F-5 Technical Digest

OPS TOPICS

WHAT'S MY WHAT?

A recent air traffic procedure change is to provide the pilot with *circling* Minimum Descent Altitude (MDA) when a surveillance radar (ASR) approach will terminate in a circling approach. The pilot is expected to announce his aircraft circling approach category in such cases. If not, the controller has to ask. So, know your aircraft circling approach category. You could be tested on that subject on short final; that is not the time to ask for the question to be clarified.

STAYING ALERT

The Canadians put it this way: The captain and first officer received their clearance for a short segment of their route, one which they'd flown many times. There was an altitude restriction for the initial climb to remain below inbound aircraft. The 4,000-ft restriction was acknowledged, but the captain set 6,000 on his altitude alert system. The copilot did not notice the mistake. The result—two aircraft too close.

Aero medics say that when senses are not being continually stimulated, boredom will set in. In such a state a pilot (or anyone else) can do something he is not even thinking of doing and never intended to do. This is a human frailty.

The fact that the captain set the wrong altitude and that the copilot missed it, indicated a low level of stimulation for both crewmembers, with the attendant low level of alertness. This human quirk is a factor in many accidents and incidents. To reduce inattentiveness, get in the habit of continually being on top of cockpit developments, even when nothing noteworthy seems to be happening. This may appear to be unnecessary, but the mind needs stimulation to remain alert. That is really tailoring behavior to make up for a major human limitation everyone is born with.—Courtesy Flight Safety Foundation Accident Prevention Bulletin

CABLE BOUNCE

Rolling over barrier cables on landing is still causing problems. A C-130 lost both lower UHF radio antennas when the arresting cable bounced up and struck the aircraft. It is not always possible to avoid the arresting gear. In the mishap above, the cable is 3500 feet from the approach end of the runway. But where possible, you should plan to land past the cable or be slowed down as much as possible before crossing it.

IT PAYS TO BE READY

While on a local training flight, the UH-1 tail rotor servo pressure return line ruptured causing hydraulic failure. Fortunately, this crew was well prepared and successfully completed a hydraulics off landing at a nearby civilian airport.

COCKPIT DAMAGE

When the rear seat pilot climbed into the cockpit of the T-38 he stowed his helmet bag under the seat. Normally this would be no problem. However, the pilot forgot that his flashlight was still in the bag. So, after engine start when he lowered his seat, the flashlight was forced into the floor making a hole 4 inches in diameter. The pilot had been briefed by the IP not to place hard objects under the seat, but had forgotten about the flashlight.

WIRE MISS The UH-1 was on final approach to the landing zone when the crew saw some wires about 10 feet in front of the helicopter. At this time the aircraft was at about 20 feet AGL. The crew was forced to use rapid application of power and aft cyclic to avoid the wires. The crew did not notice the torque reading during this time; but the low rpm warning did come on. After landing, the aircraft was inspected for overtorque.

JET BLAST Jet blast has caused pilots some embarrassment lately. In the September Ops Topics we told of the RC-135 that sandblasted some cars. This month we have a C-5 substituting for a wind tunnel. The C-5 had landed at a civil field for a cargo mission. After engine start, the C-5 began to taxi. However, the crew misinterpreted their taxi clearance and proceeded to the wrong taxiway. When they realized their error, the pilots increased power on engines one and two to aid in making the hard turn necessary. During this turn, the blast from the engines overturned a Cessna 150 parked 280 feet behind the C-5. Test data indicates that with an EPR of 1.64 the blast velocity from a C-5 engine is 50 mph at 290 feet. Since the Cessna 150 was not tied down, this blast was more than sufficient to overturn it. Obviously, blast effects must be a major consideration in crew planning, particularly in the case of larger, more powerful engines.

LOOSE SCREWS As the A-7 pilot unfastened his parachute harness after a flight, he noticed a loose screw on the back of the CRU-60/P mounting bracket. When he tightened this screw he discovered two others missing. The screws were found in the cockpit. The unit made an inspection of all parachute harnesses and found three more harnesses with loose screws.

"EYE" FR Lest we become too complacent in our positive control, all IFR cocoons, a C-141 was cruising at FL 310, as cleared, when the crew noticed a 707 co-altitude and going the opposite direction at their 12 o'clock position. After taking evasive action, the crew found out that air traffic control *thought* that the C-141 was at FL 350.

PIGEON HUNTING Just before the C-123 touched down, the crew saw a flock of birds in the touchdown zone. It was too late to avoid them, and the aircraft flew into the flock on touchdown. The aircraft sustained only minor damage but the impack killed approximately 250 pigeons.

CLEARING AGAIN Here are some more very good reasons for clearing, especially at lower altitudes.

- A T-37 was making a radar monitored letdown to an auxiliary field when the aircraft had a near miss with a civilian light twin flying VFR without transponder.
- A B-52 almost hit a small Cessna aircraft while making a low level bomb run on a published OB route.
- A flight of four F-4's was forced to discontinue their approaches because a light aircraft flew unannounced through the airport traffic area. ★

THERE ARE . . .

MAJOR JACK SPEY
475 ABW

When was the last time you landed at Taipei, Hong Kong, or Manila? In all probability, for most of us it was sometime ago. Command directives require aircraft commanders to have route checks into such exotic places. While they may be qualified by regulation, unfamiliarity due to time may cause a feeling of insecurity to develop. Overembellished war stories may spring to mind about instrument approaches into some overseas airports. Wild tales have been told about the dragons in the hills surrounding Taipei. Pilots still talk of their first wild ride through the famous Cheung Chau Stonecutters ADF to the Hong Kong curve for Runway 13. Most of these stories exist because pilots were unfamiliar with what to expect and unaccustomed to the sounds.

Assuming our route check was some time ago or we find ourself as AC for the first time due to crew availability, let's examine a few ways in which we can give ourselves a mental route check.

Our FLIP contain more than enough information, but it is important to try to develop a possible scenario or mental picture of what to expect.

First, examine the Low Altitude Instrument Approach Procedures for the airport and note the runway having the ILS approach. In most cases this will be the preferential runway to effect the rapid flow of traffic unless surface wind becomes a major factor. Again using the low altitude approach book, note the IAF altitude (High Station Outbound) for the ILS approach. Quite often, this will be the downwind leg Minimum Vectoring Altitude (MVA). Now note the procedure turn altitude. This will often be the Base Leg MVA while on vectors to the final approach course.

Check the Glide Path Intercept (GPI) altitude. If this figure is not in 500 ft increments (2500 ft—3000 ft, etc), round it off to the next highest 500 ft increment. (For example: 2200 ft = 2500 ft) This will often be the dogleg altitude while on radar vectors. The IAF and procedure turn altitudes depicted on a low altitude ILS approach chart are often the Minimum Vectoring Altitudes (MVA) for the downwind and base leg respectively, assuming that optimum pattern size has been maintained by Approach Control. The final descent directed by Approach Control will usually be on a dogleg to the final approach course and will be the GPI altitude rounded off to the next highest 500 ft increment.

By investigation, we are able to anticipate the pattern altitudes to expect upon arrival at a strange field. Now let's see if it is possible to determine the direction of traffic for the runway. Again, referring to the Low Altitude ILS plate, check to see on which side of the localizer the procedure turn is located. Now let's check the sector altitudes. Are they the same or lower on the corresponding side? Examine the remaining charts for the airport. If the airport has a non-precision approach for the same runway, see if the procedure turns are located on the same side of the localizer as the procedure turn for the ILS. Then note the direction of the missed approach courses for all approaches. Normally all maneuvering to final approach on a non-precision approach or ILS/PAR will be done on the side of the airport which has the lowest terrain. The downwind leg, for radar vectors, will normally be placed on that side. Again, by investigation we can anticipate the direction of traffic.

Now let's have someone else give us a route check or a refresher ride.

"Clipper 843, this is Taipei Control. Descend and maintain one zero thousand, altimeter 29.78. Report 30 miles NE of Taipei VOR."

"Clipper 843, wilco. Leaving flight level three one zero for one zero thousand, altimeter 29.78."

"Taipei, this is Clipper 843. Level one zero thousand, 30 miles Northeast, Taipei VORTAC."

"Clipper 843, Taipei. Roger. Squawk zero four one six and Ident. Contact Taipei Approach on 125.1."

The sounds of international airports can create problems for the unfamiliar pilot. Commercial airline pilots are more familiar with them because they frequent the same airports. However, for many of us, the names of navigation fixes are strange and sometimes difficult to pronounce, and controllers' instructions are more difficult to understand due to accented English. Our confidence may even be shaken when the voice of the controller is heavily accented, or we sense a lack of command in his second language. But remember, he knows his job, and by listening to the instructions given to the aircraft preceding

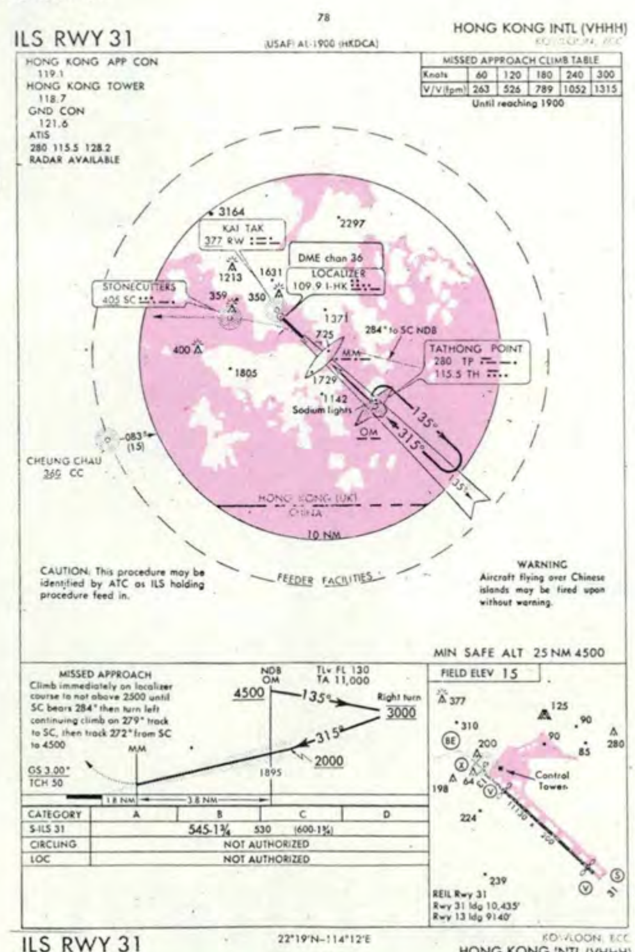
NO DRAGONS

us, in addition to ATIS, we can familiarize ourselves with the sounds, the names of reporting points, controllers' accented voices, and procedures to expect when it's our turn to start down "the chute."

Note the frequency sequence. (Some in use may not be in the Enroute Supplement.) By listening to the instructions given to the commercial traffic preceding us, we can receive a free route check and also monitor for possible conflicts. This, of course, means utilizing VHF for primary communications with ARTC and Approach Control, or by obtaining and monitoring both the UHF and VHF frequency used by that controller. Commercial and general aviation utilize VHF for air traffic control exclusively. If the military pilot is using UHF only for primary communication, he will be hearing less than half the action and losing the benefit of hearing, and thus becoming familiar with, the sounds and the procedures.

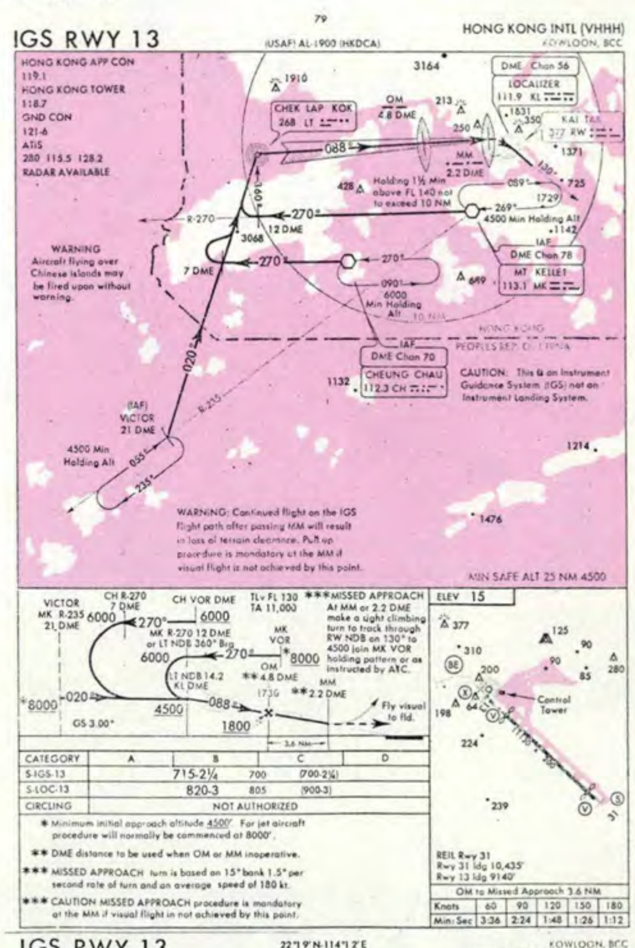
Both at home and abroad, careful examination of the Low Altitude Instrument Approach Procedures and STAR charts can provide a clue to the MVA's and direction of traffic to the unfamiliar airport. Armed with this information, and ATIS, a little extra attention to the preceding traffic can acquaint us with the unfamiliar and help kill the dragons in our minds. ★

ILS RWY 31



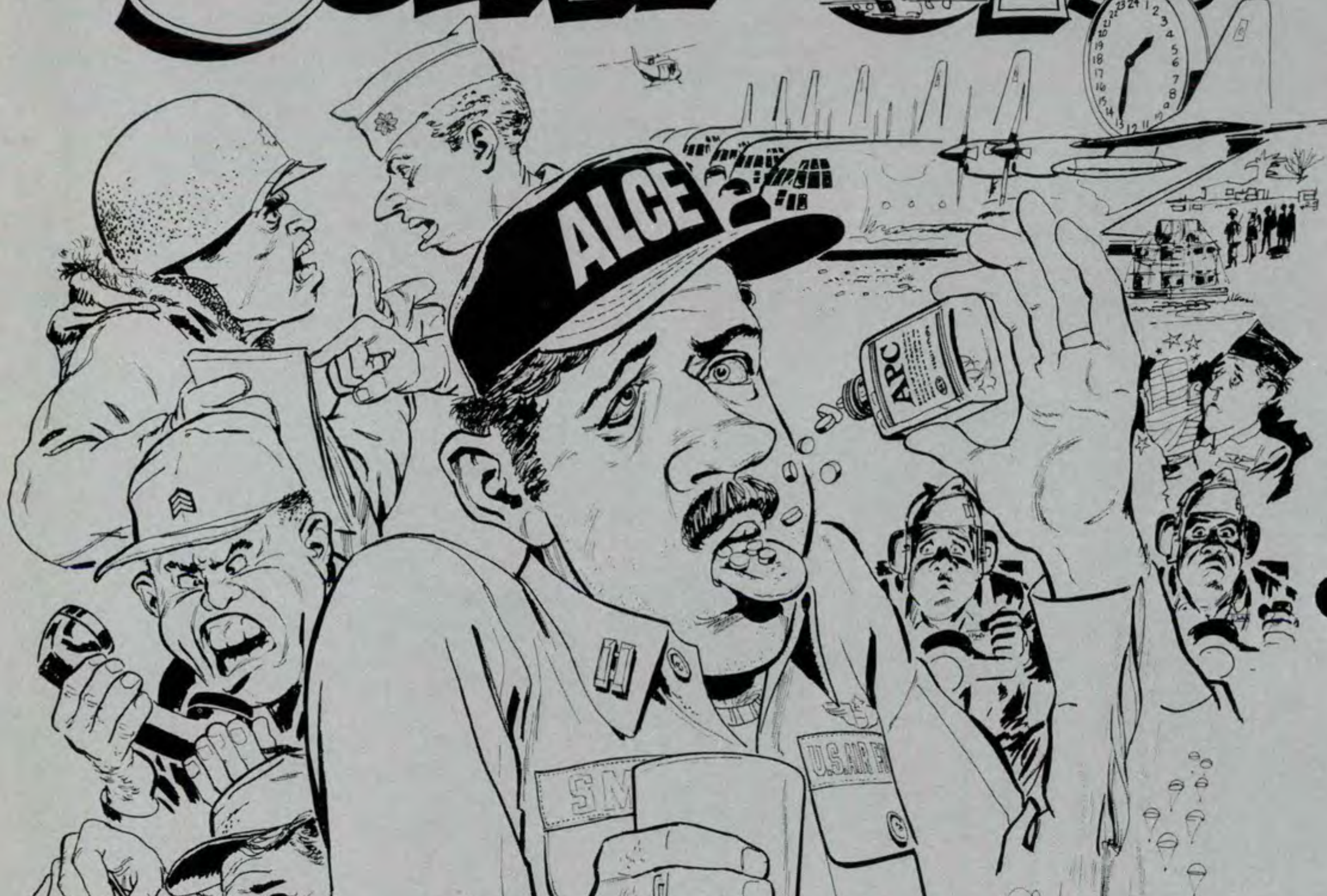
This is a standard ILS but study, like the article suggests, would be necessary for a missed approach.

IGS RWY 13



Without some prior study, an attempt to fly this approach could easily become a nightmare. Notice this is an IGS (Instrument Guidance System) not ILS.

JOINT OPS:



An Exercise In Frustration

CAPT J. T. REYNOLDS, Dyess AFB TX

Like most MAC pilots, especially those of us who drive Herky's for a living, I have participated in seemingly countless Army/Air Force joint training exercises. The frustrations experienced by airlift crews when working in and out of various ALCE's at short dirt runways are awesome. For you fighter jocks, the ALCE (Airlift Control Element) is airlift's answer to the Tactical Air Control Party (TACP). Yes, we actually land our air machines in those forward battle areas while you guys fly around and strafe trees. Let me cite a couple of examples of the kind of frustrations that can lead to a real case of accident proneness during joint exercises.

WEIRD HOURS: The Army, to my knowledge, has never asked to have a man or piece of equipment moved during the hours of daylight. No doubt it is a tactic carried over from the "attack at the stroke of dawn" days. Whatever the reason, airlifters seldom see the light of day during a joint exercise. If they do it is while enroute to the Q's after a long night of flying.

FORMAL AIRLIFT BRIEFINGS: A jointly conceived plan which when combined with the weird hours concept (see above) can thoroughly confuse an aircrew as to when, where, and how they are to go, regardless of how clear it may have seemed before the briefing started. The confusion generated during a formal briefing is awe-inspiring. If it is resolved at all, it is resolved at the INFORMAL AIRLIFT BRIEFING: a discussion which immediately follows the formal briefing. Each aircrew usually has its own plan for determining the correct interpretation of the formal briefing. They argue with the briefing officer until they decide what they are really going to do.

Of course frustrations don't exist only at the formal and informal briefings. In fact, they often increase in number and complexity when the crew reaches the aircraft. Here's how it looks. We reach the

aircraft late because the crew bus had to follow a whole bunch of marching Army troops at least a mile down a narrow road. When we do arrive at the aircraft, the load is on backwards, but it will still work out because we have to go to the spare anyway. After we have quickly preflighted the spare, the ground power cart runs out of gas 3 minutes before start engine time. Second element lead aborts at taxi time and number two (the one in front of us) can't get his attitude gyro to erect. Since I didn't talk to the aircrew of the aircraft now preceding us, I don't know exactly what to expect, but in true airlift tradition, I'll muddle through somehow.

So we launch, hoping the guy I've picked to follow is the correct one and knows where he is going. However, my Station Keeping Equipment (SKE), the computerized black box that allows us to fly and drop equipment and troops in formation from a thousand feet AGL when the ceiling is at 200 feet, and the tops are somewhere beyond our cruise ceiling, has just picked up three aircraft at two o'clock that aren't supposed to be there and two at 10 o'clock that are. With a flip of the old coin and a stiff arm to the throttles, we are now on somebody's tail. I hope he's going where we're going.

Many of us have experienced such predicaments and most have been able to cope with them. Some of us have even devised our own safety slogans. "Don't fly at night, in the weather, or fool with the red guarded switches," or "Black boxes work great when used as VFR backups" are typical examples.

Having just air dropped the 30,000 pound Army tank right in the middle of the drop zone, we head back to the 2800 foot landing strip. I guess it frustrates us a little that the chutes streamered and the tank recovery team will be digging in the sand for a week to get that beauty out, but now comes the real frustration. After landing, we troop into the ALCE to find out what dangers await us for our next launch. Aircrews hate ALCE's. They represent the frustration capital of the battlefront. And now comes the biggest shaft of all times; ME, an ALCE flight commander! Not since survival school have I worn those *green fatigues* and never

have I worn them starched. Not on your life, ol' buddy—the other half of the bucket of worms.

Here I am on day one located on a very remote edge of an Army airstrip some 30 miles from the nearest motel sanctuary. Wearing my "greenies" and standing in front of a sign that says "ALCE." We quickly discover that the day and a half preparation time we allowed for setting up is not nearly enough. Much valuable time is consumed in simply becoming minimally familiar with Army operations.

When the first of 30 or so C-130/141 missions taxis on to our newly marked off ramp, we are still busily installing AUTOVON lines, secure radios, land-line radios, antennas, etc. Some of the aircraft are arriving earlier than expected and some aren't expected at all. A few of the crews seem a bit put out when we cannot approve early departures or provide information about the exact nature of their loads. As of yet we have not found the Army dude who knows all the goodies about load information. Not only are we struggling with our internal functions, but now we discover that our only link with the outside world, our teletype, is all fouled up.

Each ALCE unit is equipped with an AN/UYA-7 teletype that is linked with the exercise TACC/ALCC as well as with all other participating ALCE's. This HF teletype link provides us with all data on incoming and outgoing aircraft and loads. We begin to seek a cure for whatever ails the machine but meantime we are up to our armpits in airplanes.

Some upstream ALCE's are approving early departures: We can't. As we advise the aircrews via radio that ALCC is not approving early goes from our field, each aircraft commander (or designated delegation) comes storming into the 10 foot square ALCE trailer demanding an explanation. Meanwhile, as we field the harassments and insults of the crews, we press on trying to ensure that the proper loads are being loaded on the proper aircraft. Of course, I realize there is no way for the flight crews to appreciate what all goes on within the little olive-drab cubical. To them there could be no possible excuse for an ALCE troop not to be able to honor such a simple request as one or two AUTOVON calls. All too often there simply is not time and the crews stalk out frustrated and sick at the thought of having to finish off a picked over, rapidly aging flight lunch while sitting in the shade provided by the wing of a sick Herky.

Other seemingly simple deviations continually snowball into heartburn situations. Because we have no maintenance or servicing facilities, short notice requirements for any maintenance problems become major projects themselves. With each tense situation, frustrations eventually surface. It plainly would not be possible to describe all of the many similar instances which crop up during a "highly successful joint operation in which

In spite of countless frustrations and numerous problems, the job gets done safely and effectively through the hard work of professionals on both teams.

all training objectives were met."

So, what lessons do I learn from a journey into the land of gas powered generators and "port-a-potties?" The most obvious lesson is that I will be somewhere else the next time the ALCE is looking for volunteers. Just joking, of course?! The most important thing that impressed me is how often I have flown in and out of ALCE's expecting that small team of men to be able to support me the way the command post at the home drome does. A joint operation on unfamiliar turf is difficult at best. The ALCE team coordinates on a minute-by-minute basis with numerous command and staff elements. The local Army units are most interested in airlift schedules. The big boys at TACC/ALCC are busy pumping birds into the system; weaving a web of airlifters throughout the theater on a scheduled and immediate request basis. The aircrews depend on the ALCE team for numerous items from providing adequate taxi clearances on inadequate ramps to directing the way to the nearest place to get a warm meal or quick snooze.

The old cliché about safety being everybody's business is especially true in a joint operation. Frustration over an ever growing sequence of little things can lead an aircrew into an accident. I had always figured that frustration was just one of those things present in flying (like bad coffee and air-sick navigators) that you have to accept and learn to live with.

As I worked in the ALCE I could identify many who were tired and frustrated. Weariness and frustration, like fuel and oxygen, can be a deadly combination to the crew that has given up on maintenance and headed for the billeting office only to be informed that the crew chief has found the proper engine stand and should be finished in time for the crew to pick up the last hop on the frag.

I have exaggerated here and there in the interest of humor and to make a point, but I am confident that even fighter pilots and Army "grunts" get frustrated. Even so, the job must continue to get done safely and effectively and this requires people who are professional and alert to pitfalls that lure a crew into disaster. In this year of emphasis on readiness, are we ready? ★

ABOUT THE AUTHOR

A native of Illinois, Captain Reynolds attended Southern Illinois University where he received B.A. and M.S. degrees. He was commissioned into the Air Force via OTS in 1969. First tour of duty after graduation from UPT was as a T-37 instructor pilot at Vance AFB, OK. Upon completion of the ATC assignment in 1974, he transitioned to C-130's at Dyess AFB, TX and was tactically qualified as an aircraft commander. He has since attended the USAF Flying Safety Officers' Course at the University of Southern California and now serves as a wing flying safety officer.

Photographs by
Lt William Provance
Cartoons by
SSgt Robert Kolinsky

when it's REELEY cold

FIRST LIEUTENANT DON PIERSON
Elmendorf AFB, Alaska

You hear a lot of old sayings in the Arctic.

"It's cold out there" is probably the most frequently said "old saying" in the Arctic. Since cold is what the Arctic is all about it isn't surprising that people say that a lot.

Cold does nasty things to people and airplanes.

When the temperature gets down to zero most old sayings have undertones of *reverbratto* caused by shivering. When it gets down to −20 the old sayings are accompanied by loud chattering and laced with adjectives like "reeley cold", "frozen solid", "cold soaked", and references to left parts of witches' anatomies. When it gets down to −40, airplanes and people don't operate very well. Seals get brittle, and leak, valves stick, fingers, toes, and noses get frostbite quickly.

That brings up another famous old saying on any flight line anywhere in the Arctic, "Put some heat on it." It's amazing what the hot air machine, the Herman Nelson, can do to stop leaks, free valves, and put feeling back into toes and fingertips.

In addition to normal operations, you have got to consider what the cold can do to the macinery. Operating hydraulic systems in cold weather can cause seals to blow. Slowly cycling controls or brakes will warm the fluid and the system to a more forgiving temperature. Cold temperatures can also affect the flight characteristics of planes. Everybody knows planes get off the ground quicker on cool days. You can easily over torque on cold days. The high torque will also increase minimum control speeds.


Photo by Capt Don Bowers

It is cold outside.

Something that doesn't affect equipment but has profound affect on people is windchill. How about the old saying, "Jeez, that wind is cold." It's true concerning people. Twenty degrees below zero is the same for equipment whether the wind is blowing or not. Thirty knots of wind added to that twenty below can change an uncomfortable but safe temperature to a situation that will freeze exposed flesh in 30 seconds. If you're in the cold conditions, staying out of the wind is an important consideration.

Every time people operate in the cold somebody is going to coin that old phrase, "These boots aren't very warm." Trudging around Base Ops in muckluks, with sweaty feet is a hassle, but it won't hurt you. You have got to anticipate the worst conditions you'll be in and wear or take what will be required.

If you fly in the fall, you will experience termination dust. Later on the same stuff will be called snow but the sourdoughs call it termination dust because it terminates summer. Whatever it's called, it's a first class hazard. Low visibilities, whiteouts, a white ground blending with white skies, false horizons, or no ground references can make instrument flying the only game in town.

The Northern Lights can be an added optical illusion. A sheet of green light makes a beautiful picture but when it dances around at a constant 30° angle it tends to appear to be vertical, and you have an instant case of the leans.

Ice is a continual problem in arctic operations. It can freeze on the landing gear doors after retraction and prevent subsequent lowering. That would be a hard one to explain, especially since normal procedure is to recycle the gear when operating in icy or slushy conditions.

Photo by Capt Don Bowers

With these temperatures everything is more difficult. Men and machinery both work slower.

Photo by Capt Don Bowers

How's this for runway slope? Landing could be a pretty slick experience.

The biggest problem isn't ice that's too sticky. Generally it's too slick. Arctic locations can get too slippery to taxi or take off. You'll hear RCR readings so low you'll wish they were reported wrong. You may not be able to keep from sliding with idle thrust. Or you could slide out of ice chocks, sideways parked on a slant. Any operations on ice better have plenty of room for an added pucker factor.

USAF Photo

Another vast assortment of old sayings deals with short daylight periods and long periods of darkness. "Where's the sun been for the last month; the days sure are shorter these days." "It must be lunchtime; the sun is setting", and "it's too dark to get anything done", are often heard in the Arctic.

Cold weather operations need some special considerations. Some other old sayings apply when operating in this "unique environment." There is no substitute for sound judgment. Anticipating and preparing for the worst situation will prevent the Arctic hazards from biting you. ★

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water

Next to air, what is probably the most important element in the world? Would you believe water? But if I asked, "Why is water important?" or "Where could you procure it if you were in a survival situation?" a lot of you probably couldn't answer. This article will cover the importance of water, water related problems, and water sources, to a depth that should enable you to answer these questions in any survival situation.

Of all the substances in the world, potable water is probably the most universally important, and in a survival situation, the need for safe water is acute. People who have returned from survival episodes have indicated that water, thirst and dehydration were problems that had to be constantly coped with.

WATER INTAKE AND DEHYDRATION: In hot areas of the world, or when you're working hard, a gallon of water a day may be needed just to maintain normal efficiency. As a general rule, your body requires a minimum of two quarts per day to remain hydrated, an amount of water not complicated by food intake or sickness. Add these factors and your requirements rise dramatically.

The thirst sensation alone is not an indication of the amount of water your body needs. If your mind is preoccupied with other survival problems, the thirst sensation could be suppressed and little by little you would dehydrate. Dehydration is a problem which occurs when water intake is less than water output or utilization. Signs and symptoms of dehydration are thirst, sleepiness, vague discomfort, dizziness, headaches and, eventually, delirium, spasticity and dim vision. Only water, in some potable form, will prevent and reverse dehydration. Your best plan of action in a survival situation would be to drink plenty of water anytime and anywhere you can.

When water is limited, don't ration it! The reason is, if you do not drink enough water to overcome your water debt, it is unlikely that the water you do drink will do you any good. Once dehydration starts, it takes longer and more fluid to reverse the process. The best rule to follow is to *ration your sweat, not your water*.

WATER UTILIZATION: It is also important to understand some of the ways that your body uses water so that you can increase consumption accordingly.

First, all the chemical activities within your body occur in solution. Secondly, evaporation, cooling and perspiration help maintain optimum temperature of the body at approximately 98.6 degrees. Water is also used in the removal of the toxic body waste. During food metabolism this waste increases. As the waste increases, it causes a need for more water to remove the waste, and still more water to replace the loss. This is the reason why the need for water supersedes the need for food. A good rule to follow is to *adjust your food intake according to your water intake, not vice versa.*

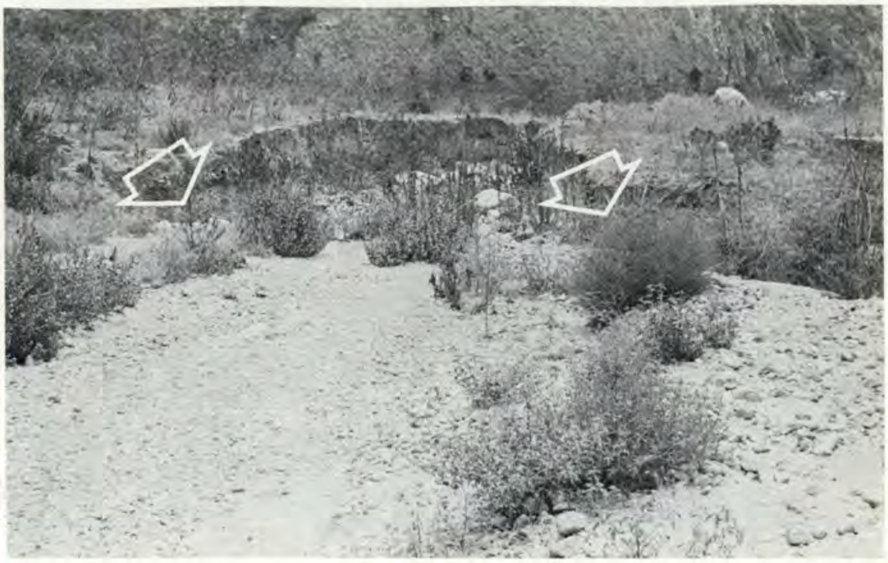
IMPURE WATER: Though drinking large quantities of water has been stressed, there is a stipulation: purify your water before consumption. (Of course, there are some situations where this would not be practical or possible.) One of the worst hazards in a survival situation is water borne diseases spread by untreated water. Some of these are typhoid, paratyphoid fever, bacillary dysentery, cholera, infectious hepatitis, schistosomiasis, and amoebic dysentery. Impure water may also contain leeches and flukes. These parasites can cause painful and even fatal diseases. Therefore, the rule *purify all water*.

PURIFICATION: There are two ways in which water can be purified: boiling and chemical means. Boiling as a means of purification would be utilized in most basic survival situations. This method should also be utilized in a PW situation, if possible. The rule is to boil water for one minute at sea level and an additional minute for each thousand feet in elevation. If the elevation is unknown or if you suspect the water may be extremely contaminated boil for approximately 10 minutes. The water will probably be flat or bitter tasting after boiling, but some taste may be put in by aerating the water (pouring the water from one container to another). Chemical purification is normally accomplished in a couple of ways. The disinfectant most often used is chlorine, which comes in a small kit (used by Army personnel). The other method, the one you will probably have access to, is iodine. The chlorine kit and iodine tablets have instructions with them pertinent to their use. Liquid iodine, found in first aid kits, can also be used; add eight drops of iodine to a quart of water, stir or shake, and let stand for 10 minutes before drinking. You may want to include some more iodine in your own personal survival kit.

If you have no means or methods of purifying or obtaining fresh water, at least filter your water before consumption. Water can be filtered by digging a seepage hole a few feet from the edge of a water source. Allow the water to seep in and the mud to settle. Clothing can also be used to filter water.

There are some situations where it is not possible or feasible to purify water. In an escape and evasion situation, one of the things we recommend is that, when the time and situation permit, drink some water. Reports from Southeast Asia indicated that thirst was one of the first things the evader was confronted with but purifying water was impractical. Drinking some water immediately will give you time to think about what you are doing and what to do next. It will also aid in helping to control shock, fear and panic. In desert areas of the world (or anywhere else where water may be limited) you do not want to waste it. Boiling will evaporate large quantities of water so if large quantities are available, boiling may prove feasible. If not, utilize chemical treatment.

WATER SOURCES: In any survival situation you should start searching for water immediately. But where to locate it could pose a problem. Here are three facts to consider: (1) water seeks the lowest point by the easiest path, (2) plants and animals need it, (3) it's in the atmosphere. Seeking lower elevations could reveal water—most likely open bodies of water (lakes, streams, rivers). If you find water, drink your fill anytime and anywhere you can. If a dry stream, lake or riverbed is found, don't give up. Dry water beds often yield water underground in the lower depressions or near green vegetation. So dig, and if water is to be found, it will be within the first four feet. On river and stream beds, try digging on the outside bends.



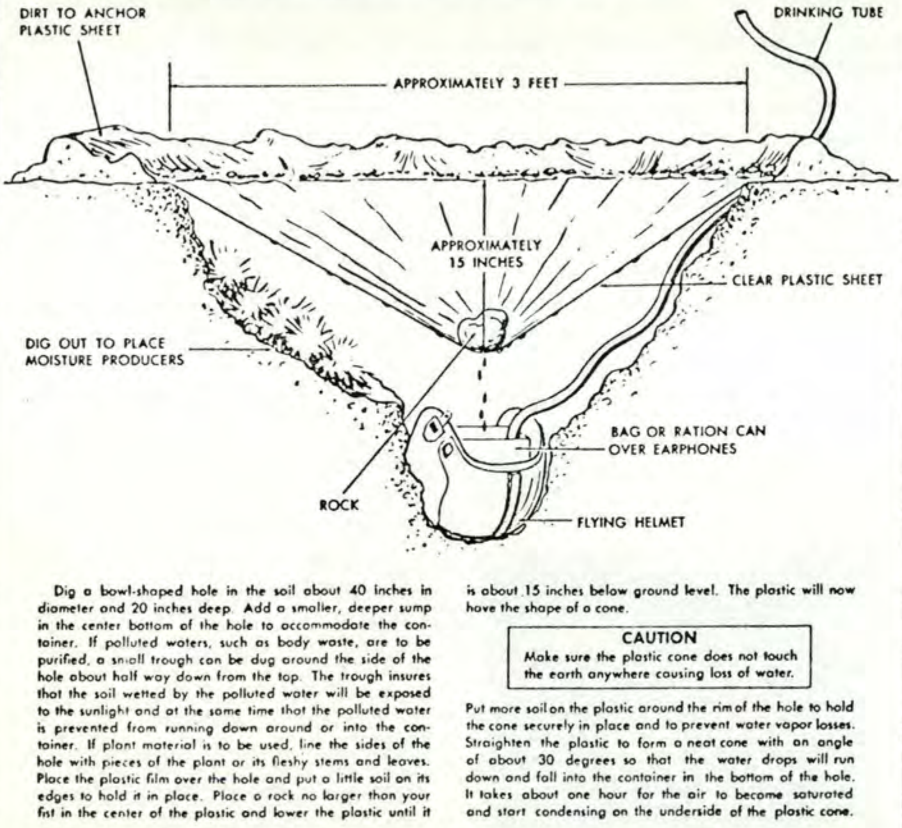
Dry water beds often yield water in lower depressions. Try digging on the outside bends near green vegetation.

Wells are the main source of water in desert regions. The wells are normally quite deep and a rope would be needed to get the water. Natural tanks and cisterns are other sources of water which may fill during or after rains. So check at the base of cliffs and depressions in rocky ground.

Natural tanks and cisterns are other sources of water which may fill during or after rains. Check at the base of cliffs and depressions in rocky ground.

Green vegetation may yield water but not without work. For example, the barrel cactus, native to the Southwestern United States, contains a fluid which may be obtained by removing the top and smashing the pulp. Vines and trees in tropical regions may be tapped as a source of water. The water from these vines and trees should be pure. If it's sappy, extremely discolored, or tastes bad, discard the water. Other plant water sources include green coconuts, banana plants and sago palms. For their full utilization, see AFM 64-5.

Atmospheric moisture (rain, dew, condensation) is a source of water. Rain need merely be caught in a container. The dew found in early morning can be absorbed by using a cloth and then squeezing it into a container. Solar stills can produce some water, but some notes need to be mentioned. First, a still will not normally create enough water to keep a man alive indefinitely. Second, they need sunlight, but on your side is the fact that they can make water where there is none otherwise available and they can make pota-



Dig a bowl-shaped hole in the soil about 40 inches in diameter and 20 inches deep. Add a smaller, deeper sump in the center bottom of the hole to accommodate the container. If polluted waters, such as body waste, are to be purified, a small trough can be dug around the side of the hole about half way down from the top. The trough insures that the soil wetted by the polluted water will be exposed to the sunlight and at the same time that the polluted water is prevented from running down around or into the container. If plant material is to be used, line the sides of the hole with pieces of the plant or its fleshy stems and leaves. Place the plastic film over the hole and put a little soil on its edges to hold it in place. Place a rock no larger than your fist in the center of the plastic and lower the plastic until it is about 15 inches below ground level. The plastic will now have the shape of a cone.

CAUTION
Make sure the plastic cone does not touch the earth anywhere causing loss of water.

Put more soil on the plastic around the rim of the hole to hold the cone securely in place and to prevent water vapor losses. Straighten the plastic to form a neat cone with an angle of about 30 degrees so that the water drops will run down and fall into the container in the bottom of the hole. It takes about one hour for the air to become saturated and start condensing on the underside of the plastic cone.

ble water from an otherwise non-potable source. (See picture number 3 for description of the still construction).

Snow and ice may be utilized as a water source, but you should melt them to obtain the water. Do not eat snow or ice raw, because the cold will lower your core temperature, thus requiring the body to produce more heat. This could eventually lead to dehydration even though you are taking moisture in. Ice will yield more water than snow per volume but it also requires more heat to melt. Also, use only pure ice (salt free), which is recognized as being clear to dark blue. Salty ice will be grayish in color. Snow must also be salt free.

NON-POTABLE SOURCES OF FLUIDS: Raw sea water should never be used in part, mixing with fresh, or whole as a source of drinking water. It will not satisfy your thirst and will increase dehydration.

The blood and juices of animals and fish are not sources of water but they may serve as a salt substitute or bait for catching other animals. Never drink urine as a source of water.

The following is a list of rules you should remember and follow in a survival situation:

1. Start looking for water immediately.

2. Drink plenty of water anytime and anywhere you can.

3. Purify your water.

4. Ration your sweat not your water.

5. Adjust food intake according to water intake.

The key to water procurement and utilization is preparation. Knowing where and how to find water, how to filter it and what to use as a water substitute, along with survival training and premission briefings, are the necessary foundation. ★

THE IFC APPROACH

By the USAF Instrument Flight Center
Randolph AFB, Texas 78148

Even in today's radar environment, Air Traffic Control (ATC) still issues cruise clearances. What is a cruise clearance? What are the pilot procedures to be complied with?

A cruise clearance is an ATC clearance which authorizes a pilot to fly at any altitude from the minimum IFR altitude up to and including the altitude specified in the clearance. You may also level off at any intermediate altitude within the block of altitudes.

Climb and descent within the block of altitudes, between the MEA/MOCA and the cruise altitude specified in the clearance, may be made at your discretion without advising ATC. However, once you start descent and report leaving an altitude in the block of altitudes authorized, you may not return to that altitude without an additional ATC clearance. An example of the controller's phraseology would be: "POST 11, CRUISE 5000."

Q: Is a cruise clearance a clearance for an approach?

A. When an airport has a published instrument approach procedure, a cruise clearance is approval to make a published approach at the destination airport. However, if the destination airport does not have a published approach procedure, a cruise clearance is not authorization to descend below the applicable MEA/MOCA in IFR conditions. Also, in cases where no instrument approach is available, a cruise clearance provides search and rescue protection until the IFR flight plan is closed. In the situation where no published approach is available, be sure to close your flight plan as soon as possible after landing or, if a safe landing is assured, you may close your flight plan while airborne.

Q. Can a cruise clearance be issued while flying on an unpublished route, i.e., one with no minimum altitude depicted?

A. Yes. ATC can issue a cruise clearance to an aircraft when it is on either a published or unpublished route. When a cruise clearance is issued via an unpublished route, the ATC controller will issue a crossing altitude to ensure adequate terrain clearance until the aircraft reaches a fix, point, or route where minimum altitude information is published. EXAMPLE: "POST 11, CROSS SAN ANTONIO ZERO ONE ZERO RADIAL, TWO THREE MILE FIX AT OR ABOVE EIGHT THOUSAND, CRUISE ONE ZERO THOUSAND." The crossing altitude specified in the clearance will ensure minimum IFR obstruction clearance until the aircraft is established on a published route or segment of an instrument approach procedure.

STAGE III RADAR SERVICE

With the advent of Stage III Radar Service at many Air Force bases, some pilots have complained of experiencing delays. Since one of the main purposes of Stage III is to provide radar sequencing and separation to all participating aircraft, you may experience some delay. However, the increase in the level of safety within the terminal area should more than compensate for any delays experienced.

Since Stage III Radar Service is provided in all Terminal Radar Service Areas (TRSA) and Terminal Control Areas (TCA), the following tips should help pilots when operating within these areas.

a. Check the aerodrome listing in the FLIP Enroute Supplement to find out if your destination lies within a TCA or TRSA. If it does, it will be annotated in the communications listing, i.e., Las Vegas Terminal Control Area, Stage III Radar SVC, etc.

b. Become familiar with the structure of the TRSA or TCA during preflight planning. Depictions of TCAs are contained in FLIP AP/1 and the Airman's Information Manual (AIM), Part 4. TRSA graphics are portrayed in AIM, Part 4, which can be found in the flight planning section at your local Base Operations.

c. Upon initial contact with the controlling ATC facility, state your intentions, i.e., type of approach (visual overhead pattern, ILS, visual straight-in, etc.) and type of landing (full stop, touch and go, low approach, etc.).

d. Promptly acknowledge and comply with control instructions. Since most locations using Stage III have a large amount of traffic, keep radio transmissions short and concise.

e. When meteorological conditions permit, regardless of type of flight plan, the pilot is still responsible to see and avoid other traffic, terrain, or obstacles. Do not depend solely on radar traffic advisories, since within a TRSA, some aircraft

CONTINUED

may not be participating in the Stage III service. All aircraft are required to receive an authorization to operate within the TCA from the controlling agency and all aircraft will be radar separated; however, pilots still should apply the see-and-avoid principle.

f. If you are on an IFR flight plan, do not cancel IFR in hope of avoiding delays. Since all participating aircraft, whether IFR or VFR, are sequenced for landing, a pilot will gain no benefit from cancelling IFR.

g. In most TCAs and TRSAs, visual approaches are used to expedite traffic movement. If you don't desire a visual approach, advise ATC. After being cleared for a visual approach, proceed to the airport and remain in VMC. Acceptance of a visual approach clearance is acknowledgement by a pilot that he will ensure a safe landing interval behind the preceding aircraft and he accepts responsibility for his own wake turbulence separation.

h. Most important of all, if you have a question concerning a clearance or an ATC instruction, don't hesitate to request clarification. Arrivals to and departures from aerodromes utilizing Stage III Radar Service should not pose any additional problems to the well-informed pilot. By having a thorough knowledge of the services provided and the limitations of Stage III Radar Service, pilots should, in fact, be provided a greater degree of safety when operating within a Stage III environment.

Do you have a gripe, complaint, or question that is really bothering you? Whether your problem involves published approaches, procedures, or air traffic control, the USAF Instrument Flight Center is ready to help you. Just pick up the nearest phone and call AUTOVON 487-4276/4884, or Area Code 512-652-4276/4884. ★

HOW TO STAGE A SINGLE engine landing

mail call

Send your comments and questions to:
Editor, Aerospace Safety Magazine
AFISC/SEDA
Norton AFB, CA 92409

Your fine magazine is part of our regular fare here at the maintenance division of Central Air Force Reserve Region Headquarters. (CenAFRR/LGMV)

Pride is an inherent part of our being as much as the aircraft we fly, missions we accomplish, and defense posture we help to maintain.

Until recently our flying safety record was either not recognized or was lumped together with gaining command statistics. Not listed separately as was ANG.

Reading your July 1976 issue of "Safety Awards for 1975" we again find most commands represented except AFRES. In this case we apply under your "Explosives" category, as we possess two fighter wings and one AC-130 SOGp, operating from seven locations, flying daily range missions. As an armament technician I have intimate knowledge of each of these units and their explosive safety records which are second to none!

My question is, why are we not represented in your statistics for awards? Do you possess data from AFRES? How is data submitted or gathered by your staff? Were any of our units in competition for your

It was a beautiful afternoon as Lieutenant Jon Smith walked out to his T-38. He liked solo flying. It allowed him to experiment a little and really get the feel for the aircraft. Besides, it was nice not having an instructor critiquing each little error. As he crossed the warm, sunny ramp toward the aircraft, the fledgling pilot reviewed his flight profile for the mission. "I really need to work on my Immelmann and barrel roll. I need a good grade on my contact check. Okay, so I'll start with a barrel roll entry and then do an Immelmann; after that, I do a couple of other maneuvers and then come back for some patterns. Let's see, 838 is mine. It looks ready to go."

After an uneventful preflight and start, aircraft 838 is cleared for takeoff and proceeds to the practice area. Soon, high above the western plains Lieutenant Smith hears: "Rory 641 cleared golf area, block altitudes 12,000-26,000." Lieutenant Smith then starts his letdown, and as the airspeed builds, sets up for a barrel roll.

The barrel roll goes well and, quite pleased with himself, Lieutenant Smith then rolls over into a descent to gain airspeed for an Immelmann. "Let's see, 500 knots. Okay, start the pull up. Hey, what's the matter with the EGT on the left engine? It's zero! But everything else indicates all right. I better check this out."

In order to check out the problem, Lieutenant Smith breaks off the aerobatic maneuver and begins to climb slowly. As he climbs he leans forward and taps the number one EGT gauge. It stays at zero. The next step, Lieutenant Smith decides, is to retard the throttle to idle. Shortly thereafter the master caution light and the left generator light come on. When Lieutenant Smith looks at the rpm it is at 40 percent. Although he is somewhere around FL 220 with one throttle in idle, the pilot does not think to check his airspeed, which is decreasing through 195. Instead, he merely advances the throttle and when the engine rpm does not recover, shuts down the engine and heads for home.

Next morning, Lieutenant Smith is rather proud of his cool handling of the emergency. Unfortunately, his IP is not totally impressed. It seems that the only problem with the engine was an EGT gauge malfunction. The reason the rpm decayed and would not recover is explained in Chapter Seven of the Dash One. Below 200 KIAS and above FL 200, with the engine in IDLE, the rpm will decay below normal idle rpm and cannot be recovered by advancing the throttle. The proper remedy is to lower the nose and increase airspeed above 200 KIAS. After a short, rather pointed discussion with the IP about the subject, Lieutenant Smith concludes that perhaps a more thorough knowledge of the Dash One would be to his advantage.

This is a fictitious account based on several incidents which have occurred recently. Lest you discount them as the foibles of students, several similar mishaps involved highly experienced pilots.—Ed. ★

award? Finally, what can we in AFRES do to receive the recognition we have justly earned as part of the aerospace team?

Respectfully
WILLIAM W. SHERMAN
Equipment Specialist (Ordnance)
Bergstrom AFB TX

The Directorate of Aerospace Safety is not purposely discriminating against Air Force Reserve in awarding safety plaques. The problem is that we cannot make an award unless we know the unit is eligible. And the only way for us to know that is for the unit to be nominated.

Most of the questions you asked in your letter are covered in AFR 900-26 "Safety Awards." Since you mentioned the explosives category, here is a brief summary of the nomination and selection procedures:

First, any operational wing, group, squadron or comparable organization engaged in explosives operation is eligible for the award in Category I. AFR 900-26 gives a list of selection criteria. These are not the only ones which can be used but the guiding principle is some positive achievement or contribution to explosives accident prevention.

Normally, a MAJCOM nominates one unit in each category. The procedures for Air Force Reserve are slightly different. Each reserve region commander forwards nominations to the commander, HQ, AFRES. The commander then selects one nominee in each category and sends the nomination to the Air Force Inspection and Safety Center.

The USAF Safety Awards Board makes selections for the award from among those organizations nominated by the MAJCOMS. The nominations are evaluated by 15 April each year.

Finally, the best thing you can do to make sure you receive recognition for your achievements is get with your unit safety officer, read AFR 900-26 and then send a nomination to your region commander. This same procedure works for the other plaques in flight, ground, missile and nuclear safety. If you think you might be eligible check AFR 900-26—Ed.

Mail Call
CONTINUED

Sir, we at the 53d Tactical Fighter Squadron noted with great respect the accomplishments of the 336th Tactical Fighter Squadron at Seymour Johnson in attaining 8 years and 58,500 hours since their last accident. However, we must point out that the last accident in this unit was nearly 10 years ago in October of 1966 and that since then the 53d "Tigers" have flown over 66,500 hours. Our congratulations to the 336th on their noteworthy accomplishment.

FREDERIC S. FITZSIMMONS,
Lt Col, USAF
Commander
53d Tactical Fighter Squadron

I read the article on the 336th TFS flying record. I wish to add my congratulations and those of the 179th Tactical Airlift Group. It is no small feat to fly eight years accident free in fighters.

But while their record is outstanding, it is hardly "unprecedented." From May 1967 to Feb 1976 we, the 179th Tac Ftr Gp, Ohio ANG. flew T-33s, F-84s, and F-100s for over 8½ years accident free (see letter to Ed. *Aerospace Safety*, Dec 75, Capt James F. Robertson). Also, I believe the 103d Tac Ftr Gp, Connecticut ANG has an even longer period of accident free flying in F-102s and F-100s.

JAMES A. KEHRLE
Lt Col, OHANG ★

GLOSSARY AVAILABLE

The FAA has published a new and expanded Air Traffic Control Glossary designed to enable pilots and controllers to speak the same language. Until December, pilots can obtain their own free copy from any FAA facility by presenting a current airman's medical certificate.

Sergeant
ROBERT C. CREVIER

Detachment 18, 39th Aerospace Rescue and Recovery Wing
Plattsburg Air Force Base, New York

On 31 December 1975, Sergeant Crevier was refueling a UH-1N helicopter at Loring Air Force Base, Maine. After properly bonding the aircraft and completing the applicable refueling checklist items, Sergeant Crevier began filling the main fuel tank with JP-4 fuel. Approximately 65 gallons of fuel had been pumped into the tank when, without any warning signs, a flash fire erupted. Reacting instantly, Sergeant Crevier immediately discontinued the refueling and began fighting the fire. He first tried to use a 50LB CB fire extinguisher which was positioned next to the aircraft, but the nozzle was firmly frozen and would not operate. Next, he called to the driver of the fuel truck to bring his fire extinguisher, but it also malfunctioned. Finally, Sergeant Crevier rushed to the aircraft cockpit and secured a small, type A-20 fire extinguisher located next to the pilot's seat. He returned to the fire and successfully extinguished it. As a direct result of Sergeant Crevier's actions, the fire was extinguished in less than a minute and the aircraft received negligible damage. Sergeant Crevier's quick reactions, sound judgment and personal courage during this emergency saved a valuable aircraft. WELL DONE! ★

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UNITED STATES AIR FORCE

Well Done Award

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

Major
SAMUEL M. BROWN

Captain
DENNIS JORGENSEN

Technical Sergeant
LOUIS E. BOOS

Staff Sergeant
TERRY L. BEAVER

Dobbins Air Force Base, Georgia
700th Tactical Airlift Squadron

On 16 October 1975, Captain Jorgensen and his crew were flying a tactical training mission in a C-7A aircraft. The mission was scheduled to include a tactical training bundle drop followed by a short field landing. After completing the air drop, the aircraft entered the traffic pattern for landing, and the landing gear lever was placed down. The right main gear indicated unsafe. Major Brown, Sergeant Boos, and Sergeant Beaver confirmed that the right main gear was stuck in the wheel well. The next two hours were spent trying all flight manual procedures and suggestions from technical representatives of deHavilland Aircraft of Canada, San Antonio Air Logistics Center, Warner Robins Air Logistics Center and Dobbins Air Force Base. When all attempts were unsuccessful, Major Brown, Sergeant Boos, and Sergeant Beaver decided to remove the cabin windows adjacent to the right wheel well and use an aircraft seat rigging rod, attaching hooks used to hang parachutes inside the aircraft to the end of the rod. The following hour was spent pulling on the wheel well gear door and replacing hooks that had become straightened due to the forces being applied. Finally, the right main gear door opened and the gear dropped to the locked position. The extraordinary skill and ingenuity of Major Brown, Captain Jorgensen, Sergeant Boos, and Sergeant Beaver possibly averted a serious aircraft accident and loss of life. WELL DONE! ★

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