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Aerospace SAFETY

THE MAGAZINE DEVOTED TO YOUR INTERESTS IN FLIGHT

- WOXOF...Cleared To Land
- THE LARGE ONE
- FRIEND OR FOE?
- A story on Supervision
- YOUR NEW KIT BAG

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July 1967 AFRP 62-1 — Volume 23 — Number 7

FEATURE ARTICLES

REGULAR FEATURES

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Fallout

LETTERS TO THE EDITOR

SAFETY BELTS

Being both a Safety Officer and a Toastmaster, I decided to talk about the use of safety belts. In preparing my presentation I did a lot of research and noticed one major weakness in our safety belt campaign. In all the articles that I have read, very little has been written on the need to wear safety belts at speeds under 25 miles per hour. The most common answer from people who are resisting the "Buckle Up Campaign" is that at this speed they would not sustain any injury if they were involved in an accident.

I would like to suggest that in the next article on this subject, more emphasis be placed on the need to wear safety belts at low speeds.

Capt John K. Mooney
Safety Officer 5073 AB Sq
APO Seattle 98736

Good suggestion.

HAND SIGNAL

During a break in flight operations aboard our carrier, USS WASP (CVS-18), I took time out to read the Aviation Safety Required Reading board which our squadron Aviation Safety Officer has posted in the ready room. On it were several articles from the September 1966 issue of *Aerospace Safety,* including "One If By Land" by Captain O. E. Unser.

As a pilot and also our squadron's Line Division Officer, I am particularly interested in getting signals straight between pilots and ground crews, especially since our operation involves day and night carrier operations and frequent stops at various airfields as transients.

I feel that much of our attempt to reduce "hand signal" confusion and accidents is through *Navy-wide* standardization of signals and not just intra-squadron practices. Our squadron Aviation Safety Officer has provided several "Aircraft Handling Signals" charts which are posted in our line shacks ashore and afloat (copy enclosed). This chart was printed in the November issue of APPROACH magazine to refresh the memories of ALL aviators and line crews.

Continued on page 28

ABOUT THE COVER. Major James Lee, USAF IPIS experimental team chief, is shown at the controls of a specially equipped T-39. He is about to penetrate an undercast and approach the runway at Mather AFB, California, during below published minimum weather conditions.

SYSTEM SAFETY GROUP FORMED

System Safety Engineering is the new look within both industry and the Air Force and is being emphasized in the design and development of all new major Air Force aerospace systems.

First applied to the development of a system in 1962, when it was used effectively in the Minuteman missile, the success of the concept led to its use on other missile and space systems and some electronic and aeronautical systems. Although its application was limited, it was used in the development of the C-141 and F-111 when the companies building these aircraft were provided briefings based on accident experience with emphasis on specific items or design deficiencies that were involved in aircraft accidents.

It soon became evident that additional measures were needed if system safety engineering were to become effective. Therefore, in April 1965, Air Force Regulation 127-1 was published. It spelled out specific requirements for application of the concept to all systems development. This led to system safety engineering being applied in depth during the C-5A development.

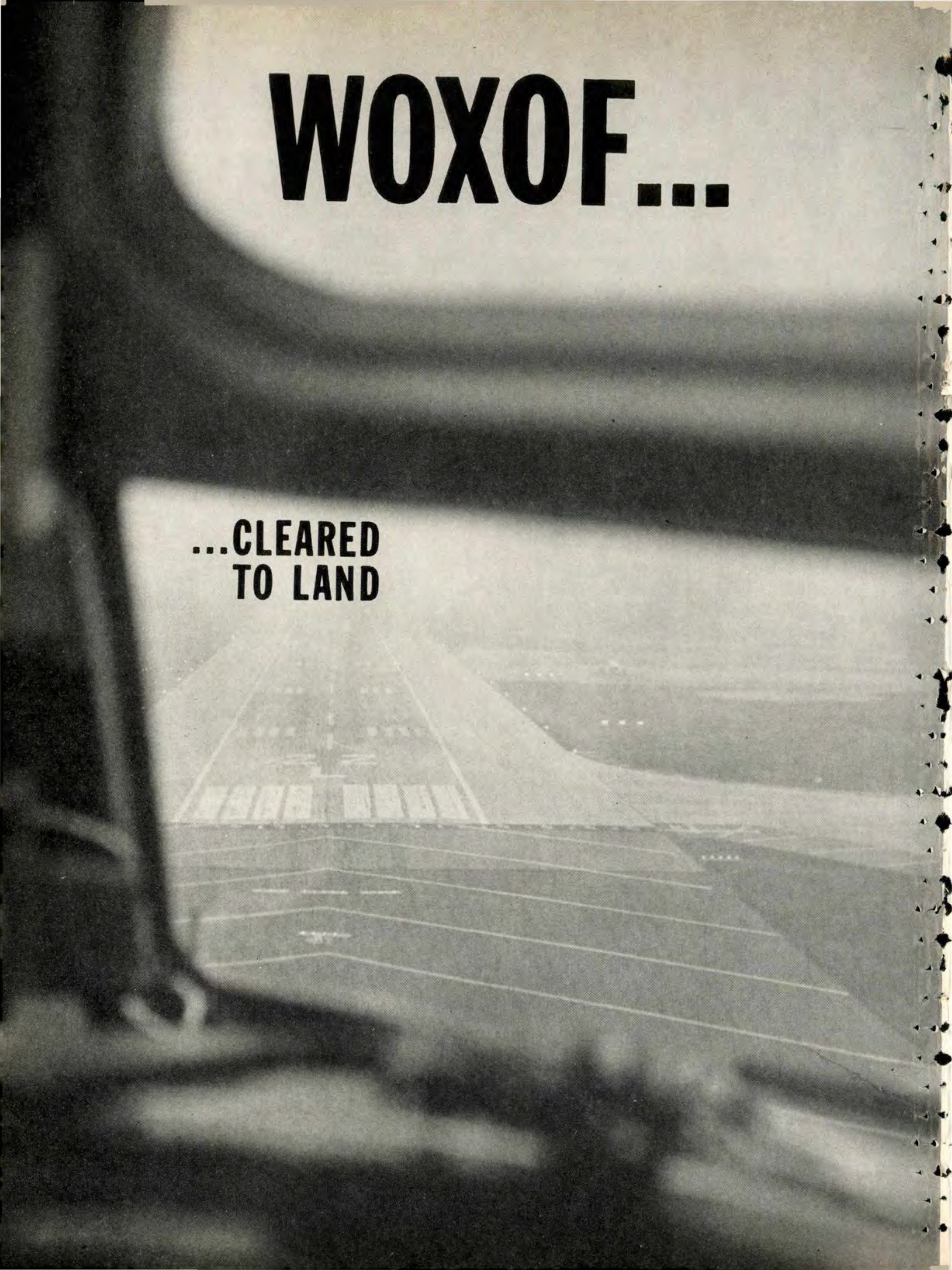
Now a System Safety Engineering Group has been established in the Directorate of Aerospace Safety (AFIAS-S). Headed by Colonel James S. Keel, formerly of the C-5A section in the Flight Safety Division, the new group will establish policy and monitor the expanding Air Force System Safety Engineering program.

The objective of this program is to insure that an optimum degree of safety is built into each new system during design and development. This requires the application of sound scientific and engineering principles and management techniques to the identification of potential hazards, and elimination or control of these hazards once identified.

System Safety Engineering offers, finally, an analytical and systematic approach to eliminating those undesirable design features that crop up time after time during accident investigations. And, if effectively applied, it should reduce the number of changes and modifications to systems that have resulted from deficiencies in design. ★

WOXOF...

...CLEARED TO LAND



Lt Col Henry W. Compton, Directorate of Aerospace Safety

Have you ever heard an approach controller say, "PIFAX 60, the current weather is ceiling zero and visibility zero, you are cleared to land?" Not many of us have, because we aren't usually flying under such conditions. But somewhere in the United States there is a team looking for, planning for, and hoping for weather that is below published landing minimums so that they can continue their project of searching for better instrument landing procedures and equipment.

PIFAX stands for Pilot Factors Program. Contrary to popular belief, the procedures and techniques are the primary consideration and the equipment secondary. You may think that is an audacious statement, but the Instrument System Test and Evaluation Branch of the USAF Instrument Pilot Instructor School has definitely proven that equipment is available which will allow crews to safely make approaches to lower weather minimums than currently authorized. This doesn't mean that we have reached the optimum state of the art; we must continue to improve aircraft, instruments, facilities and approach aids of all types. However, it does mean that IPIS is developing techniques that will save crew and passenger lives in the future. How? you say. IPIS says that they will do it by further defining the pilot's role during all-weather landings.

Until this project was initiated, the systems and concepts were evaluated under artificial weather (hooded) conditions. This is effective for simulating low minimum conditions but may not be realistic when outside visual cues are available under actual weather conditions. The current project, a logical extension of work previously accomplished, is "investigating, under varying environmental conditions (below current minimums), the visual cures available to the pilot during approach and landing." The specific objectives in this Flight Test Plan are:

Determine the visual information available from outside the aircraft during instrument approaches under varying environmental conditions.

Determine how this information complements or detracts from the effectiveness of the instrument displayed information.

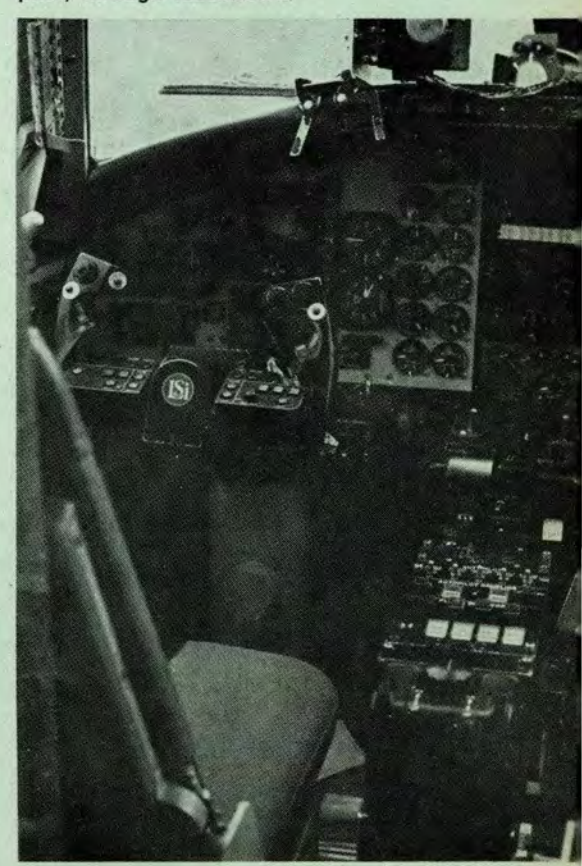
Investigate instrument flying techniques and procedures for use during approaches and landings in minimum weather conditions.

Equipment for accomplishing this includes three T-39s and a T-29, each with advanced control-display systems. The T-39 I flew in with one of the test crews was loaded with these dandies:

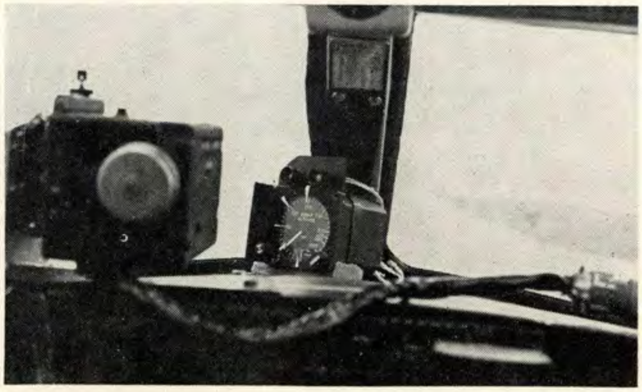
- Lear-Siegler three-axis (each independent) autopilot with displacement force wheel steering on the pilot's side. Autopilot uses flight director computer steering as approach coupler.
- Highly modified Collins CPU-4 flight director computer calibrated for optimum performance from middle marker through touchdown and ground rollout.
- Sperry flight path angle computer for providing pitch augmented instantaneous vertical velocity, flight path angle and reference signal to the flight director computer for flare.
- Honeywell radar altimeter for absolute altitude and rate of closure information. Rate of closure information is base computation for flight path angle computer below 50 feet.
- Experimental attitude director indicator with flight path angle quantity readout to the left of the attitude sphere.
- Radar altitude/pitch augmented instantaneous vertical velocity indicator. Provides qualitive radar height indications from approximately 200 feet to touchdown and anticipatory vertical velocity information.
- Radar altitude indicator for absolute altitude from 1000 feet to touchdown.
- Lateral landing situation indicator for defining middle one-half of runway.
- Approach sequence indicator for monitoring approach progress and function tripping.

These advanced control-display systems and concepts used for making instrument landings permit a pilot, for the first time, to make meaningful control inputs, through the touchdown phase. The Flight Dynamics Laboratory at Wright-

Three axis force wheel steering on pilot's side permits pilot to make control inputs, in conjunction with autopilot, through touchdown.



Instrument panel on specially equipped T-39 contains special instruments described in article. Note vertical indicators on each side of attitude director indicator. Photo below shows movie camera and radar altimeter mounted on glare shield.



Patterson Air Force Base is doing a splendid job of supplying the equipment and avionic engineering support. Exotic equipment is just the foundation, however, because a great deal of careful planning must take place before actual tests can begin.

Many air bases were carefully studied before a few were selected as adequate for the experiments. Test sites had to have a high probability of low weather conditions, suitable facilities and be willing to participate. Essential facilities are:

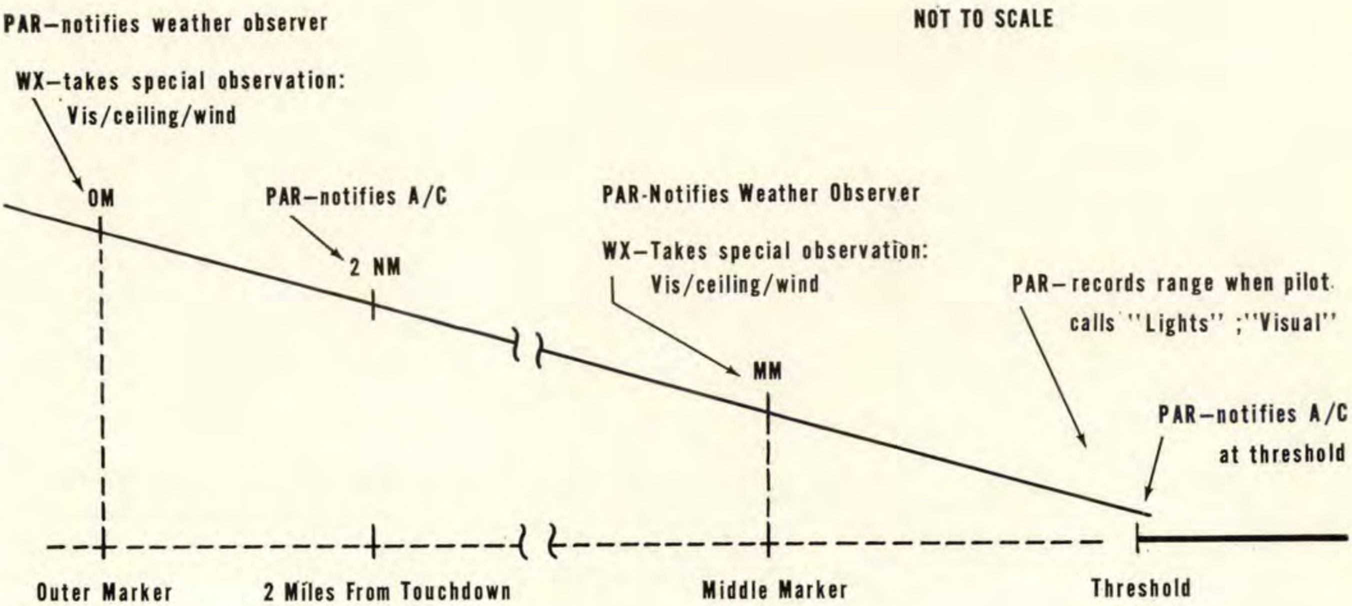
1. An ILS with good demonstrated beam characteristics.
2. Precision approach radar.
3. An operating transmissometer.
4. A rotating beam ceilometer.
5. High-intensity runway lights with U.S. Standard (A) approach lighting.
6. Instrument runway markings.

When the initial survey was complete, each selected base was visited and a series of approaches flown to check the quality of the ILS and GCA guidance, lighting systems, terrain, winds, ATC procedures, communications and any other items which might affect the experiments. Based on this experience, a minimum altitude was established for each site beyond which descent would not be made without visual reference. With the instuments being used in the project, accurate level-offs and go-arounds can be made safely from below published minimum altitudes in the T-39. This may seem incredible until you have observed the methods IPIS pilots are using to fly a bird that is instrumented and equipped like the test aircraft.

One method which is proving effective in the T-39 is the three pilot concept which could be called the "heads up, heads down, monitor" system. The left seat pilot stays strictly on the gages with his head down at all times; the right seat pilot stays heads up looking

LANDING WEATHER MINIMUMS INVESTIGATION

PRECISION APPROACH RADAR AND WEATHER OBSERVER SUPPORT PROFILE



NOTE: PAR and weather data are to be entered on the appropriate data forms.

for outside visual cues; the monitor pilot double checks every move the heads down pilot makes. This system is working beautifully and, needless to say, the old all powerful aircraft commander concept is not used here.

The method used in the T-29 is a bit different; the left seater handles pitch and power and the right seater handles the roll. A monitor is used but the heads up, heads down system is out when using this technique.

No matter what technique is used the results are measured in a standard manner to facilitate easier and more effective evaluation. Oscillographs are used to record pilot control inputs and necessary flight control information using absolute altitude, glide slope deviation, localizer deviation, airspeed error, heading error, event marker, pitch attitude, pitch rate, pitch force, roll attitude, roll rate, roll force. A 16mm camera with a wide angle lens covers the pilot's field of view while making a visual record of each approach. I was privileged to see one of the first rolls of film taken and can guarantee that the evidence clearly substantiates some tentative conclusions and proves that the IPIS pilot techniques work.

A tape recorder preserves the pilots' comments concerning the individual approaches. Continuous special weather observations of visibility and ceiling are recorded on each approach when the test aircraft is over the outer and middle markers. Radar altitude and range are recorded by the precision radar controller at two points: (1) when the approach lights are in view; (2) when the pilot receives sufficient visual cues to land. The support profile chart (above) gives a graphic portrayal of these continuous base support functions.

This program is scheduled to run through February 1968, so it isn't possible to come up with conclusions at this time. A couple of tentative conclusions are: When the weather goes to 100 feet, one-fourth mile visibility and below (1) the approach lights help very little, if any; (2) the texture of the runway and the stripes on the approach end become very important. I asked the team chief, Major Jim Lee, what he considered to be the greatest problem confronted up to that time. He replied that there were two, staying on the runway and finding the taxiways and parking ramp.

I found myself making suppositions while observing these interesting tests. Suppositions like maybe someday both pilots of combat machinery like the F-4 might, in some fashion, physically share the load during precision approaches. I realize that in many pilots there is strong natural resistance to this type of procedure. But, who knows, it may be in your future. ★

THE CASE FOR FLIGHT RECORDERS

Major Roger Budd, Jr., Directorate of Aerospace Safety

Most of us think of flight recorders in connection with accident investigation. Since civil air carrier aircraft have been required to carry "crash recorders" for years and they have proven their value in post accident analysis, their potential is now recognized as an aid in accident prevention.

In this light, it is expected that the flight recorder will play an ever-increasing role in aviation and will have an effect on all phases, from operations to maintenance to logistics—all having a direct effect on safety improvement.

This article will briefly discuss the need and use of recorders and associated equipment and is directed to those people who have not had extensive exposure to the subject of flight recorders.

Back in 1941, Civil Air Regulation Amendment 100 required air carrier aircraft to carry a device that would record altitude and radio transmitter operation. This and many subsequent revisions were cancelled until finally, in 1957, the regulation required all air carrier aircraft over 12,500 pounds operating above 25,000 feet, to carry accident survivable recorders. Some foreign governments adopted similar requirements at about the same time.

USAF has been interested in flight recorders for years and has installed recorders of various types on limited numbers of aircraft. Some of the more significant programs are listed in Figure 1, which shows that most USAF recorders are *not* accident survivable.

Civil carriers today are required also to carry cockpit voice recorders for the specific purpose of post accident investigation. Presently, the CAB and FAA are proposing that the number of parameters recorded be increased from five (time, altitude, airspeed, direction, and vertical acceleration) to 25.

UHF crash locator beacons have now been developed and are being installed on USAF overwater passenger carrying aircraft. Voice warning machines for B-58 crews have proven their value, but these have not been utilized in any other aircraft since. Monday morning quarterbacking shows that many accidents could have been prevented if voice warning had been installed in other aircraft.

CURRENT STATE OF THE ART

Several of the more prominent USAF recorder systems, either in operation or in development, are shown in Figure 1. There are many more. Only the C-133 has been fitted fleet-wide with an accident survivable system. This system records four voice channels plus 84 parameters of performance data and is fitted with a UHF locator packet designed to eject automatically on impact and float in a water accident. Essentially, all other USAF recorder installations are not accident survivable.

There is little question that to be cost effective, recorders must serve a day to day function, as opposed to post accident analysis alone. The current emphasis is on Airborne Integrated Data Systems (AIDS). The Air Force, NATO, FAA, and some airlines are making studies. These studies are aimed at determining: (1) What equipment is available, (2) What kind of active programs are in being, (3) What are the areas of application? Some airlines now have AIDS equipment installed, primarily for recording engine data to be used in malfunction diagnosis. The recorded data are computer analyzed for trend analysis and malfunction/failure prediction. These systems are in addition to the survivable data and voice recorders required by FAA.

More than 35 manufacturers build recorder equipment, and many have fully developed and tested equipment in operational use. Therefore, the hardware to support a consolidated, survivable AIDS is not considered to be a major problem. The major problem is to define what information managers need in order to improve maintenance and accident prevention/investigation. Of course, the system used must be cost justified. Software, the product of analysis of the data recorded, on the other hand, is still a major problem.

What are some of the features that must be incorporated? Briefly, AIDS must:

- Have a day to day ground maintenance and operations benefit.
- Support the aircrew with voice warning and possibly, airborne malfunction analysis.
- Record cockpit voice.
- Record appropriate performance parameters long enough to establish the flight conditions leading up to the accident.
- Be equipped with a record and wreckage locating device.
- Be accident survivable (impact and fire resistant and/or ejectable in cases of midair or water accidents).

The art of wreckage examination is not and probably will not be outmoded in the near future, but valuable time and dollars could be saved by examination of a survivable record. Most important, however, is that in the past, undetermined accident causes and those causes based on circumstantial evidence have virtually eliminated any possibility of preventing recurrence. With performance and voice record analysis, positive causes can be verified quickly and at least interim action initiated for correction. In many cases, it could provide all the information necessary to establish the cause.

The C-5A will have a multiparameter malfunction detection analysis recorder and will have an ejectable voice and data recorder with a UHF locator as an integral part. Equipment is available—we need it now—on existing operational aircraft. ★

USAF RECORDER PROGRAMS

DESIGNATION	AIRCRAFT TYPE/ NR. INSTALLED OR PROJECTED (P)	PARAMETERS	COMMENTS
CRASH RECORDER			
Cockpit Voice	C-133 (fleet)	4	Crash resistant, water ejectable
Flight Data	C-133 (fleet)	84	and UHF locator
CRASH LOCATOR			
Crash Position	Various transport		Ejectable airfoil with UHF
Indicator in Tumbling Airfoil	aircraft (1,000+ P)	——	locator beacon
STRUCTURAL INTEGRITY PROGRAM (SIP)			
VGH—Airspeed, Acceleration & Altitude	Various aircraft (400+)	4	Data for SIP. Not survivable.
VOICE WARNING SYSTEM			
Voice Interruption Priority System (VIPS)	B-58 (fleet)	19	Plays record, does not record
TURBOJET ENGINE ANALYZER			
Engine Analyzer System (EASY)	F-105 (18) F-4C (18)	24 per engine	Not survivable
FLIGHT PERFORMANCE (ENGINE & AVIONICS)			
Data Acquisition System	C-141 (1)	250	Not survivable
	F-111 (1)	108	Not survivable
Performance Recorder System	C-141 (8)	250	Not survivable
Digital Adaptive Recorder System	T-37 (1)	12	Not survivable
Malfunction Detection Analyzer & Recorder	C-5A (fleet)	984	Not survivable
Malfunction Detection & Recorder System	Various (800+)	50	Not survivable
CRASH DATA POSITION			
Indicator Recorder System	C-5A (fleet)	100+	Recorder & UHF beacon in ejectable airfoil

a story on SUPERVISION

Lt Col Thomas B. Reed, Directorate of Aerospace Safety

After 16 years of cockpit duty, I find myself behind a desk with a title of Project Officer, Directorate of Aerospace Safety, Deputy Inspector General for Inspection and Safety, USAF. Flying is now an additional duty with Safety Officer my primary duty. This article isn't to expound on the job title with all the flattering phrases on how important the duties are or what a "wheel" I am. Rather, I am trying to ponder if there really is a different emphasis on Safety as seen from the bottom position as a crew member compared to the view from higher echelons.

In all my flying time, I've always felt the pilot executed full final decision on course of action to be taken while flying. These just automatically took into consideration mission requirements and flying safety, with the prospect of getting fired if a wrong decision led to a damaged or destroyed aircraft; right decisions, of course, leading to a satisfying military career.

I laugh at myself when I try to equate a person who never has an accident with one who always makes the right decision. Time has dampened the shakes down to light vibrations whenever I recall this particular episode which, when faced with numerous alien problems, the "right" decision was always made.

While stationed at Barksdale AFB, Louisiana, I found myself facing the very short end of a business venture in Thermopolis, Wyoming. Feeling the urgency for an immediate trip to try and salvage the operation, I called the local aero club to see if I could get an airplane for three days. With no background in light airplanes, except the 650 h.p. T-6 that I took basic training in over 12 years before, the management felt I should have the whole nine yards. So before they would trust a well-experienced, many-motored jet pilot to that toy (Piper Tripacer) they insisted I have a checkout. Really not too embarrassing—only three or four times around the flag pole. True, the first two traffic patterns looked like the sine-wave on an oscilloscope, but after assurance by the manager that I was safe, and something to the effect that they needed new members and the business, I proceeded to mission plan.

At Base Ops I picked up the appropriate JN charts and drew a line direct from Barksdale to Thermopolis, Wyoming. Having been told it would take two refueling stops to make the trip, I just divided the leg into three equal parts and figured a small town on the Red River in Oklahoma and one stop in Colorado would do the trick. After all the thorough preparation, I took off early the next morning with two small boys who wanted to share the great adventure with their Dad.

The procedure in jets was to take off, climb out, and look for a checkpoint. Using the same procedure, after climbing above the tree tops, I told the boys that the large lake ahead was our first checkpoint—

the Texarkana Reservoir. When arriving over the body of water, very ceremoniously for the boys' benefit, I put an X on the map and the time. Little did I know I was already hopelessly lost. The lake was the Shreveport municipal water supply, much closer and farther south than I wanted to be. The heading was only a mere 30-40 degrees off. After flying well past the time the Red River should have come into sight, I began to have the gnawing suspicion that something was radically wrong. Well overdue at the river and suspicious of all the roads and auto traffic, similar to that around Fort Worth and Dallas, I could see down through the haze, I turned due north to find the elusive river. At last a river and a town with a small airport came into view.

Upon landing, I noticed a complete lack of interest or courtesy on the part of the management. No "follow-me" vehicle or anyone to park me on a refueling pit. That was OK, though, because I wanted to stroll around the small hangar and see if I could find the name of the place painted on a building. One does feel a little stupid asking where he is, even when in an automobile. But skill will out, and finding I was very near to my original field meant no harm done. After gassing up, away we went. This time I really meant to navigate. If you've ever tried to pick up checkpoints off a JN chart, two to five thousand feet above terrain, doing 90 to 110 miles an hour, forget it.

Now it was the heat of the day. The airplane began to bounce around like a rowboat in a very choppy sea. With one very sick boy, able to remain in the seats only with the aid of seat belts, I'd gladly have quit if I could only have found a place to land. The fuel got so low and with no town in sight I was really clanked up.

On finding a barren field by a paved road, I decided it was time to land. On downwind, the engine quit. That's when I was first really honest with myself and really cussed myself out for being so stupid as to endanger the lives of the two boys and myself. After changing fuel tanks, I got the engine going again, and after completing a go-around for being too long and hot, I made an uneventful landing. I hitchhiked to the nearest town and had the local sheriff haul me out some gas. He pointed me off in the right direction and I decided to try the third time.

It was now near evening and I wanted to climb over the Wind River mountains. For a long time it looked as though I would have to go through the canyon, but at last I was high enough to cross a saddle-back and could spiral down to the destination airport. Guess my chagrin when I found the city had applied to the Federal Government for financial aid in improving the runway and it was neatly bulldozed into a 5-foot high strip 4000 feet long. A dirt road into the field had to suffice for a landing field. It was too dark to be looking for another field.

After concluding the business arrangements, which also fell flat, I knew a better method of small airplane flying existed. To assure a safe arrival home, it was follow the river then switch to the major roads with a planned stop every two hours. No problems, and thanks for CAVU weather.

Now if you haven't been too bored with this fairy tale, I'm sure you'll recognize the complete lack of one major ingredient for safety —Supervision! How often we had sat and contemplated, thinking supervisors were just watching to catch us making mistakes. One trip through reality that compares with this journey and I'm sure you will agree that supervision is making sure the person is properly trained, properly prepared, and properly

motivated so he will not be caught in an alien situation.

Don't let your base aero club fail in its obligation to give the supervision necessary to protect our most valuable resource: experienced crewmembers.

The details of the cure for the obvious ills cited by Col. Reed are as follows:

- *Obtain detailed metro including winds aloft for the intended altitude.*
- *Compute magnetic headings and times from checkpoint to checkpoint, using AF Form 70.*
- *Fly these headings and trust your clock, using pilotage to check and verify your progress, not to "pick" your way along.*
- *If they are anywhere near your route, fly airways, at least until you are thoroughly familiar with light plane navigation. It can be much tougher than navigating high performance aircraft.*

Most of our Air Force aero clubs now require that a well qualified light plane pilot check the paper work for at least the first leg of all cross-countries flown by persons with limited light plane experience. Also, they should counsel them with the necessity for thorough dead reckoning type preflight planning. Does yours? Ed.★

the I.P.I.S. approach

By the USAF Instrument Pilot Instructor School, (ATC)) Randolph AFB, Texas

TURBOJET ENROUTE DESCENT

The turbojet enroute descent, often conducted in lieu of a published penetration, provides the pilot an uncomplicated method of descending to final approach, aids in expediting movement of air traffic, and usually reduces total enroute flying time. The enroute descent may be via non-radar routings using navigational aids depicted on high altitude publications or via radar vectors. Air Traffic Control will not insist that an enroute descent be conducted, will not authorize an enroute descent if abnormal delays are anticipated, nor will they terminate the service without the pilot's consent, except in an emergency.

In order to perform an enroute descent in a safe and professional manner, the pilot must be aware of several items that should be accomplished either prior to or during descent:

a. *The range at which the descent is started* should depend upon altitude and intended rate of descent. Controllers assume a rate of descent that approximates the normal penetration descent of most aircraft —4000 to 6000 feet per minute. When the descent is started at a range greater than aircraft altitude in thousands of feet plus ten miles, a more gradual descent may be desired. In this case, the descent rate should be coordinated with Air Traffic Control—there may be altitude/range restriction because of other air traffic. Remember, commencing descent early at a high descent rate will result in prolonged operation at low altitude with corresponding high fuel consumption.

b. *The type of final approach to be conducted* must be understood by pilot and controller. The pilot should request enroute descent to a specific final approach fix that serves the destination airport. He will then have a definite clearance limit fix which could prevent confusion in the event of two-way communications failure.

c. *Plan descent* to keep airspeed at or below 250 KIAS when below 10,000 feet within 30 NM of destination airport, unless aircraft operating limitations or military normal operating procedures require greater airspeed. This provides a more consistent flow of air traffic, makes the controller's job less complicated and allows the pilot more time to accomplish cockpit duties.

d. *Remain oriented* in relation to the final approach fix by using all available navigational aids, especially when the descent is conducted via radar vector. Plan ahead to insure that the aircraft is properly configured and that you are prepared to fly the approach when cleared by Air Traffic Control.

Enroute descents to an ASR or PAR final approach can result in a chaotic situation, unless your intentions, in the event of two-way communications failure, are coordinated with Air Traffic Control prior to commencing descent. The IPIS recommends that you select a published approach suitable for weather conditions and request a clearance from Air Traffic Control to fly this approach in the event of two-way communications failure during the enroute descent.

A complete understanding of the guidance outlined in this article is a minimum requirement necessary for ensuring the successful completion of an enroute descent. Of equal importance are the operating characteristics and limitations of individual aircraft. The flexibility of the enroute descent makes it a desirable maneuver in many instances; yet, because of this flexibility, the pilot is required to exercise more judgment than normally required during published penetrations. ★

By now, safety officers Air Force-wide have been introduced to the new format of the combined Study Kit, formerly distributed separately as the Flight, Ground and Missile Safety Officers' Kits. Be that as it may, word has filtered back that the "new" kit is being handled in the same old way by a select few. Said few prefer to keep the bundle intact, stuffed with the material that came in it, in order to pretty up a work area or whatever!

The only flaw in that viewpoint is that that's exactly what the kit material was NOT put together for. Sure, there's a healthy portion aimed specifically at the safety officer, such as material he can use at his safety meetings. Then there's still more in it in-

The latest Study Kit has arrived from the Directorate of Aerospace Safety, and the task of distributing it begins. This is the way it is done by one safety officer.

Pack up your troubles with

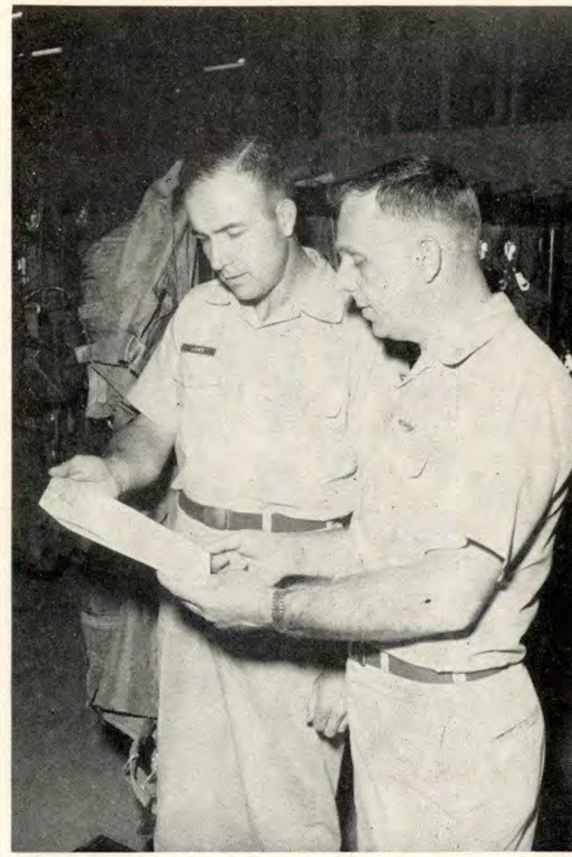
First stop. Base Ops, where the FSO drops off a poster to the chief dispatcher. The latter, being a smart fella, immediately finds a pretty girl to pin it in a prominent place.

Next on the tour of Kit material drops is the Chief of Maintenance, who sorts through posters and potential safety topics and in turn hands it down to the NCOIC of maintenance control.

tended to keep him abreast of the state of the art. But, there is a healthier portion that should be pulled, reproduced if necessary, and directly distributed to "other" personnel for their safety programs and for personnel like the flight surgeon, chief of maintenance, personnel equipment NCOs, line chiefs, and others.

In short, sort the contents of this combined safety kit. Look through the material. *Distribute it where it will do the most good.* Find a receiver and pass it along. Pretty, the kit is, sometimes, but it's beautiful when there's not a sheet of paper left between the covers. If there's a poster on the cover, use it, too.

How's that for a view? ★

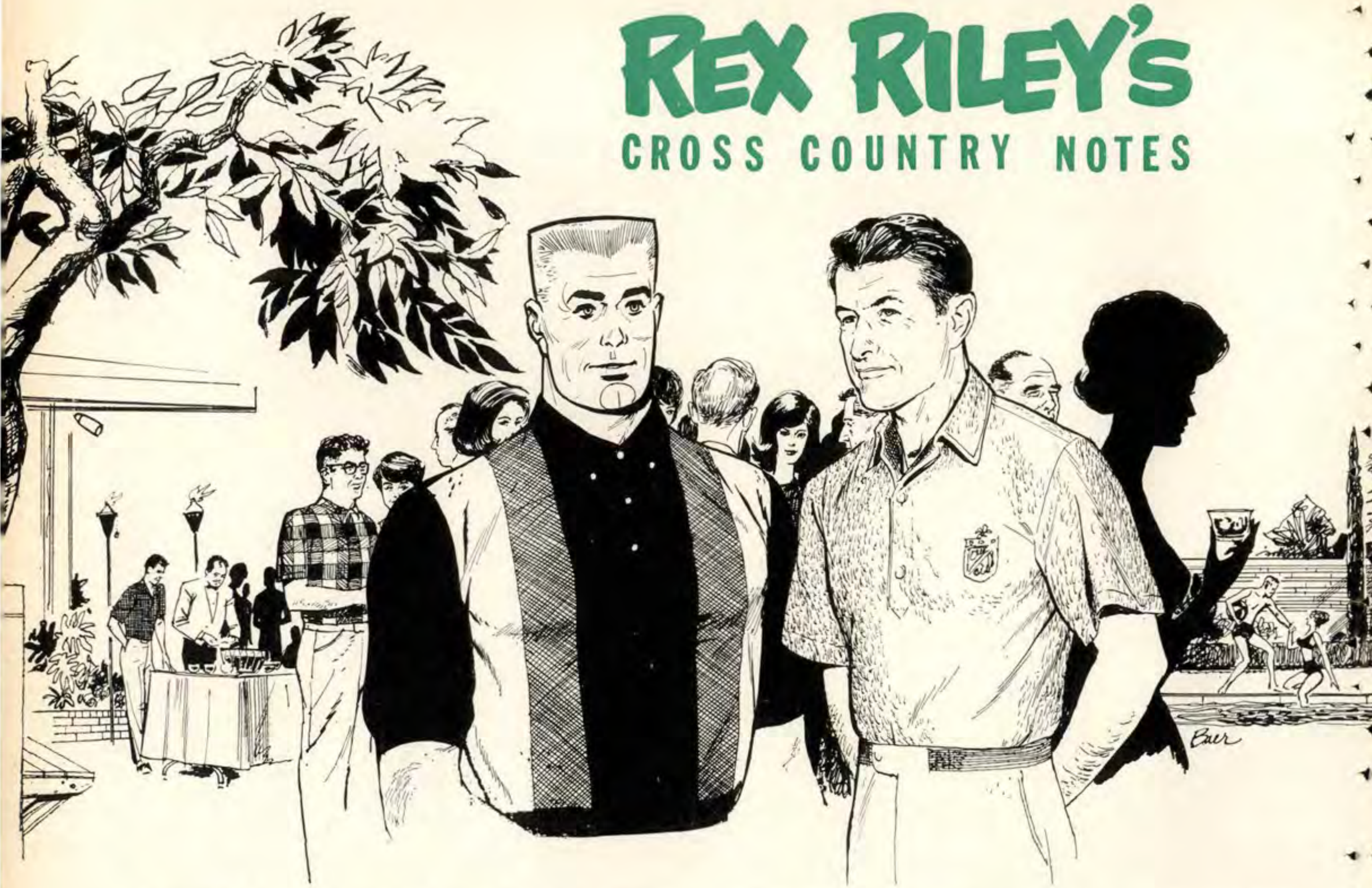


Another step on the tour of the Safety Officer is the NCOIC of personal equipment, where the FSO drops off pertinent Kit data—one of the many specific areas touched on by the Kit.

...YOUR ~~OLD~~ NEW KIT BAG!

The hour grows late, the day wanes, and the Safety Officer makes still another stop with his wares—a sitting session with the Flight Surgeon. Tomorrow, more rounds until Kit info is depleted.

The NCOIC of maintenance control briefs and feeds material to his NCOs who in turn make safety more than a word.



REX RILEY'S CROSS COUNTRY NOTES

FLYING SAFETYGRAMS. Major Swart H. Nelson, Flying Safety Officer at Nellis AFB, circulates timely reminders with "Flying Safetygrams." Here's one particularly worthy of note by all aircrew members.

"During the investigation of a recent aircraft accident I was amazed to find the pilot was not wearing gloves. When asked where his gloves were, he stated they were in his flight suit pocket. He also volunteered that he had not worn gloves for the past several years. Interviews with other crews revealed that there are a surprising number of pilots at this base who fly without gloves.

"We have all seen crew members who have survived an aircraft fire and owe their lives or at least their extremities to the protection given by proper clothing.

"None of you would think of flying high performance fighter aircraft without a parachute or intentionally violate a regulation, so *wear your gloves.*

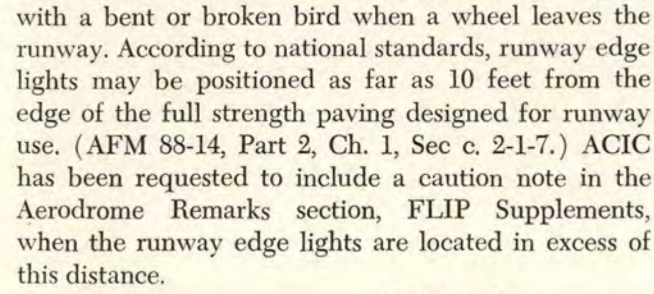
"*Wear your gloves,* not only because it is covered by regulation but because it could save you a hand or a finger."

Gloves are also important to other than high performance fighter types. If you don't believe it, try going down an escape rope with gloves on and then without them.

IT'S STILL HAPPENING. A recent multi-engine recip gear up landing was caused by these errors: (1) IP didn't monitor student during landing phase; (2) Student raised the gear handle after completing the before landing check; (3) IP failed to check the gear handle and indicator lights; (4) IP didn't verify with tower that gear was down and locked; (5) The gear check portion of the pilot's checklist was deleted in a recent revision; (6) IP allowed communications difficulties, inoperative nav lights, and other traffic to abnormally distract him; (7) The flight engineer didn't advise the pilot of the gear up condition. Don't let it happen in your outfit.

KNOW THE RUNWAY. Judging from the reports, some pilots are still assuming the runway lights mark the edge of usable runway surface, and are ending up with a bent or broken bird when a wheel leaves the runway. According to national standards, runway edge lights may be positioned as far as 10 feet from the edge of the full strength paving designed for runway use. (AFM 88-14, Part 2, Ch. 1, Sec c. 2-1-7.) ACIC has been requested to include a caution note in the Aerodrome Remarks section, FLIP Supplements, when the runway edge lights are located in excess of this distance.

Lt Col A. D. Lutes,
Directorate of Aerospace Safety



THE BIG SKY. Sunday I was on the patio in the sun, smelling the orange blossoms and reminiscing with a fellow airplane driver. As we talked, we could hear many aircraft passing over, enroute to and from the Los Angeles basin. We were able to pinpoint very few of the elusive targets and logically drifted into a discussion of this phenomenon. We ended the discussion with a smug shrug and the conclusion that it's a big sky; we have lots of protective regulations and radar to warn and guide us. Satisfied with that reasoning, my friend climbed into his VW and serenely joined the avalanche of Sunday evening drivers on the freeway to LA.

The first panic Monday AM was the result of a midair collision between a USAF fighter and a civilian Bonanza. How could this be? What happened to the big sky? Where was the radar warning? A review of the incident shows that the fighter was on an IFR clearance at an assigned altitude of FL210. The Bonanza was on a VFR on-top clearance and had reported in at FL215. The fighter driver stated that he had glanced down at his flight log and instruments; when he looked up the Bonanza filled the wind screen. He took evasive action; however, it was too late to avoid the collision.

How could this happen? Sure the sky is big, but our air routes and regulations force traffic to flow along a relatively small number of main arteries in the sky. There has also been a tremendous increase in the number of aircraft using these routes; therefore, these highways in the sky are becoming congested just like our highways on the ground. On the ground we have built limited access super highways. In the air we have established positive controlled air space for our super highways. However, this limited access area only extends down to FL240. Below this altitude we revert back to the first come, first through, close your eyes and lean on the horn traffic control that characterizes our old ground road system. The results are very similar. In the period 1962-1966 Air Force aircraft were involved in 133 midair collisions. These accidents took a toll of 160 lives. In the first four months of 1967 there were 11 accidents resulting in four fatalities. These figures become even more impressive when the near midairs are added. In the period 1964-1966 Air Force aircraft were involved in 74 near-miss incidents. During this same period there was a total of 207 near midair incidents reported to FAA. One of these was at 11,000 feet. All of the rest were below 9000 feet and the majority were below 5000 feet.

A typical example involved a T-29 on an assigned altitude of 13,000 feet, heading 144 degrees. The pilot stated that he saw a small civilian plane at one o'clock, level. The T-29 pilot took immediate evasive action and climbed above the light aircraft. He did not observe any evasive action by the light aircraft.

Many of us have become complacent and don't look around as much as we used to. A large part of this complacency has arisen from the sense of security that radar following has given us. We need to remember that radar does not see all. Most of the non-transponder equipped aircraft do not show on the radar screen and most of the small civilian aircraft do not have transponders. The second factor that has affected the looking habit of many pilots is the false impression that being on an IFR assigned altitude clearance guarantees them separation. This is true only under actual instrument conditions. An assigned altitude under visual conditions will not protect you from VFR or VFR on-top traffic.

Our air traffic problem is going to become more acute as civil aircraft increase in number and are flown more frequently. Our control system and regulations will be updated, radar will become more effective, anti-collision devices will be developed and used. However, the ultimate responsibility will always rest on you, the pilot. Watch out!

Major Don O'Connell
Directorate of Aerospace Safety

For Meritorious Achievement in Flight Safety for the period 1 January through 31 December 1966, the units listed here have been selected to receive the Air Force Flying Safety Plaque. The stringent criteria insure that each recipient has achieved an outstanding flying safety record while maintaining mission capability.

Flight Safety Awards

AFRES	913th Troop Carrier Group, Willow Grove Air Reserve Facility, Pennsylvania 349th Military Airlift Wing, Hamilton AFB, California
ANG	142d Fighter Group, Portland International Airport, Oregon 178th Tactical Fighter Group, Springfield Municipal Airport, Ohio
AAC	317th Fighter Interceptor Squadron, Elmendorf AFB, Alaska 17th Troop Carrier Squadron, Elmendorf AFB, Alaska
ADC	18th Fighter Interceptor Squadron, Grand Forks AFB, North Dakota 445th Fighter Interceptor Squadron, Wurtsmith AFB, Michigan 507th Fighter Wing, Kincheloe AFB, Michigan
AFLC	San Antonio Air Materiel Area, Kelly AFB, Texas
ATC	3575th Pilot Training Wing, Vance AFB, Oklahoma
MAC	61st Military Airlift Wing, Hickam AFB, Hawaii 60th Military Airlift Wing, Travis AFB, California 438th Military Airlift Wing, McGuire AFB, New Jersey
PACAF	815th Troop Carrier Squadron, Tachikawa AB, Japan 352d Tactical Fighter Squadron, Phan Rang AB, Vietnam 6314th Support Wing, Osan AB, Korea 41st Air Division, Yokota AB, Japan
SAC	28th Bombardment Wing, Ellsworth AFB, South Dakota 4133d Bombardment Wing, Andersen AFB, Guam
TAC	431st Tactical Fighter Squadron, George AFB, California 64th Troop Carrier Wing, Sewart AFB, Tennessee 4442d Combat Crew Training Wing, Sewart AFB, Tennessee
USAFE	26th Tactical Reconnaissance Wing, Ramstein AB, Germany 66th Tactical Reconnaissance Wing, RAF Upper Heyford, England

THE LARGE ONE

It will cast a giant shadow no matter what the angle of the sun; its wings are wider than many runways. The T-tail surface is over 65 feet in the air, and—the span of that tail surface is exactly twice the wingspan of the P-39 Aircobra of World War II.

So it's big. What else is unusual about it? For one thing, it has 28 wheels with fat tires so it can range into soft fields with its cargo of hardware and supplies for troops of our global forces, and it kneels to accommodate cargo and passenger loading; kneels either front legs only, or rear legs only for drive-on loading; adjusts to truck bed height for direct loading.

It is Lockheed's latest star, the C-5A. The first airplane is already taking shape at the big Air Force facility in Marietta, operated by the Lockheed-Georgia Company. It is scheduled to roll out in February of next year, and it won't be much later that many of you will get your first glimpse of it. Perhaps you'll even be treated to a close-up look if one of them gets thirsty in your neighborhood.

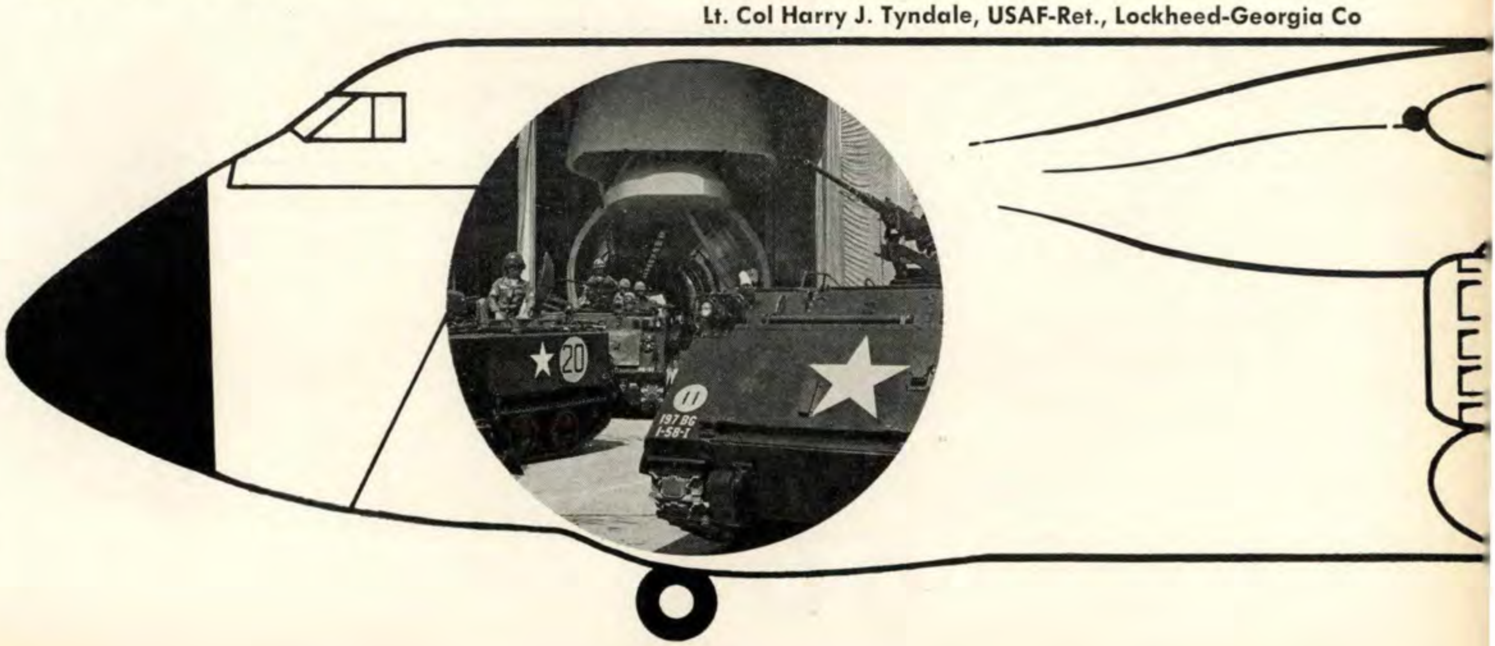
One thing is sure, if a C-5A were to visit your base, it would be noticed. If the pilot were to ask you to "fill 'er up," you might want to check with POL to see if they have an adequate fuel supply on hand. This bird can drink up to 49,000 gallons of JP-4.

Engine men will get a kick out of seeing the size of the four GE TF39 engines. The nacelles measure 8½ feet across and they are about 12 feet above the ground. Each engine delivers more than 40,000 pounds of thrust at takeoff.

Yes, there's something of interest to nearly everyone in the C-5A. It will carry missiles, planes, tanks, trucks (two lanes of traffic), helicopters, boats, or anything else that would fit into a two-car garage that is 144 feet deep and 13½ feet high.

All that is down in the basement. The living level is upstairs, divided into three sections. The operations office, up front, is big and well equipped. The flight panel displays the latest in vertical tape instrumentation and flight director systems. The automation potential of the C-5A extends from rotation on takeoff to roll-out on touchdown. It will have a Honeywell Automatic Flight Control System and an All Weather Landing System.

Lt. Col Harry J. Tyndale, USAF-Ret., Lockheed-Georgia Co



The flight engineer's station resembles a research laboratory. It has an electronic Malfunction Analysis Detection and Recording Subsystem (MADAR) that can tap over 600 test points, identify and record certain failures on paper tape, and analyze other types of failure or malfunction on an oscilloscope.

Navigators will have the latest in radar and inertial doppler navigation systems. They will be able to plan and accomplish missions that include letdowns at destination, to 500 and 1 minima with airborne radar fixing, and considerably lower if radar beacon facilities are available.

Behind the flight station are Pullman-style accommodations for the relief crew which will be carried on long missions. With up to 5500 nautical miles basic range and inflight refueling capability, there will be some long ones flown for sure.

Further aft on the upper deck, is a troop compartment with 75 aft-facing seats. On a typical airlift mission for the Army, the drivers and crew of the equipment being transported will be the primary passengers.

What we really want to talk about, however, are some of the new and unique engineering provisions that were written into the C-5A contract. They are going to have real meaning for those of you who will be directly associated with the operation of this aircraft.

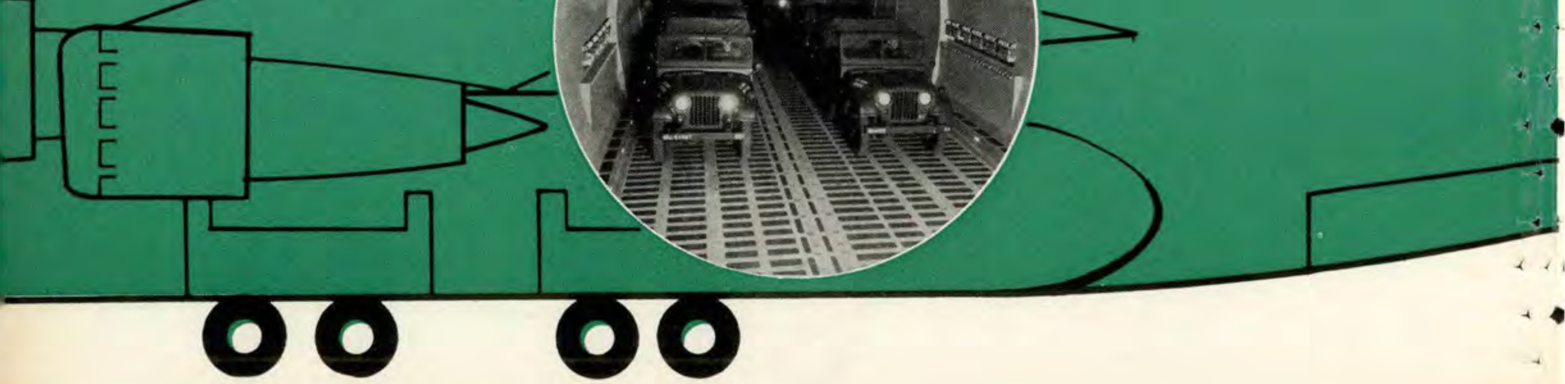
Maintainability engineering has received a very special effort by a staff of engineering specialists bearing that name. The aircraft must demonstrate an availability rate of at least 75 per cent. A turn-around of under 53 minutes must be demonstrated, and it must be accomplished within an 18.6 manhour expenditure. Overall, the C-5A is designed to require less than 19 direct manhours of maintenance per flight hour.

It follows that, if goals like these are to be achieved, the aircraft will have to be unusually free of those failures and malfunctions we have all seen so much of over the years. That's where the reliability and safety engineers come into the picture. Every concept, idea, part, system and assembly is scrutinized by them before it is accepted. This applies to components supplied by subcontractors as well as in-house activities.

Safety engineering has been a consideration in every design decision made since Lockheed-Georgia decided to bid for the C-5A contract. A preliminary system safety plan was included in the proposal, and the USAF included a safety MIL-SPEC in the procurement contract. Thus, safety is a joint USAF/industry effort in the C-5A. USAF participates in the safety program at the management level, by chairing the System Safety Group which monitors it.

The C-5A will have all the appearances of complexity that inevitably accompany the new systems and features of advanced aircraft designs. But please don't look for a lot of gimmicks and gadgets. One of the objectives of system safety engineering is to minimize functional complexity as new capabilities are added to the new weapons systems.

Look instead for a higher degree of convenience, reliability and functional simplicity among the many new systems and controls. Look for simple failures or malfunctions to remain simple, rather than be the first of a chain of events as they have frequently been in the past.



These are the objectives the safety engineer works toward. He analyzes each part and system proposed for the aircraft, asking himself "What could possibly happen if it did fail?" If his analysis suggests that it could possibly precipitate another failure, or a chain of them which could lead ultimately to a really serious situation, then his job is to engineer that possibility out of the system.

He starts with fault analysis techniques on pieces; but his efforts and requirements grow as the system grows—from component, to sub-system, to system. At each point, he must write a study, analysis or report. He must present his findings at periodic Design Review meetings. He must coordinate the safety programs and efforts of other suppliers.

As of today, a design engineer coordinates his creations through a value engineering group, a human factors group, a maintainability group, a reliability group, a standardization group, a corrosion prevention/control group, and most recently, a safety group. This is the extent of effort expended to assure that you get high quality systems.

We believe the C-5A will reflect the benefits of all this assurance engineering. We would like to tell you more about this bird and its special features, but to keep it interesting, we think it wise to talk about it a bit at a time. Perhaps a system at a time if appropriate. Look to these pages for periodic reports on the C-5A and system safety engineering. We believe you will find both to be worthwhile reading. ★

The C-5 will hold just about anything—trucks, side by side; busses, tanks, missiles, helicopters. And the crews can go with their machines, riding upstairs in comfort.

A PILOT WHO HAD SURVIVED A TOUR IN SOUTHEAST ASIA WAS KILLED LAST WINTER, AND OTHER OCCUPANTS BARELY ESCAPED WHEN THEIR HOUSE BURNED DOWN. THIS IS A GRIM REMINDER THAT FIRE CAN BE EITHER . . .

friend OR FOE

A1C Howard T. Wainwright
3501 Student Squadron
Reese AFB, Texas

Nature can be as beautiful as the purest dreams of any man and warm the hearts of millions, then turn on us and run rapidly, uncontrolled, through our lives carrying death and destruction in its wake. Fire, being one of the wonders of nature, is probably the most useful to man when controlled, and yet the most destructive when allowed to rage uncontrolled.

Man has, throughout the ages, exploited the flame and learned to bring it into his dwelling in a controlled state of utility and beauty. He has used the light from a flame to guide himself and register his position during the absence of sunlight, the heat from a flame to cook his meals and warm his home, the beauty of a flame to add brilliance and symbolism to his acts, and even the destructive qualities of a flame when it was necessary for the disposal of unwanted waste and foliage. Therefore, all characteristics of fire can be, by some means, useful when controlled and not allowed to rage wild in unbound freedom. For once ignited, a fire knows no rules of conduct and behavior except those afforded to it by man and its basic needs of heat, fuel, and oxygen. Through these three basic needs, we have learned how to control a fire's inert quest for freedom and restrict a flame's existence in order to receive its benefits.

Fire prevention is the idea of preventing a useful and desired servant from developing into a giant of rage. It is something we know about and practice only when we know the facts. For years a person may practice fire prevention and be safety conscious, but one careless unsafe act on his part can destroy him and his loved ones and cause great property damage.

Vast resources are spent on fire prevention yearly at all levels of government and by private enterprise. Why then, do we still lose so many lives and millions of dollars in property damage yearly to the devastation of unwanted and uncontrolled fires? Carelessness is the prime factor in the cause of all major fires, even though arson and ignorance cause a small percentage. Education and the authorities can deal with this small percentage. Carelessness, however, can only be rectified by constant appeals and reminders to the public to observe the facts and rules governing fire prevention.

A fire must have three things in order to exist: oxygen, fuel, and heat! Outside heat must be added to a fuel, but once the fuel has ignited, it generates enough heat to become self-sustaining until the fuel or oxygen supply runs out.

We have developed ways to remove one, two, and even all three of the basic requirements so as to control or extinguish fire. The most common method of control is the regulation of fuel, as with any gas or kerosene heater, stove, or lamp. Even when burning unwanted trash, fuel regulation is applied by enclosing the fire in a non-flammable container. This keeps the flame restricted to one area and does not allow it to spread to other flammable materials close by.

Occasionally, heat regulation is used to restrict or confine a fire to one location, although this is not a truly effective method. An example would be the open burning of leaves in a yard while keeping the grass cool with a water spray. Here, the fire is restricted by the cooling water spray along the ground, but sparks and burning leaves can be carried up into the air and deposited elsewhere to begin another unwanted blaze.

Regulation of the oxygen supply to a fire is generally the most difficult method of controlling a fire, especially a big one. This method is used to adjust the intensity of a flame such as on a Bunsen burner or acetylene torch.

Fires can start anywhere when the three basic quantities are present in the correct proportions. Since oxygen is forever present in the open air, all that is really required is the joining of a fuel with an amount of heat necessary for its ignition. For some fuels, great temperatures are necessary for ignition while others require relatively low temperatures. The amount of heat required depends on the chemical composition of a material and its physical state. Flour, for example, will not burn if you pour a cupful over a flame, but when spread over a large area and mixed with the air, a small spark will cause such a rapid burning, an explosion can occur. If you stick a piece of paper into a plate full of burning gasoline, only the paper above the level of the gasoline will burn. This shows that gasoline liquid does not burn—just the fumes. Of course, gasoline will emit fumes at a normal temperature and is, therefore, considered highly flammable. Take two pieces of wood, identical in size and composition, and soak one in water. The dry wood will ignite prior to the wet wood because of the heat absorbing characteristics of the water. From these examples you can see the variety of fuels, heat ranges, and their proportions.

A flame is not necessary for starting a fire. An electrical heating device may supply sufficient heat to ignite many fuels, especially if it is capable of producing a spark. When you make toast in the morning, no flame is involved and yet the toast is cooked—and sometimes burnt! Electric motors and generators have generated sparks at the brushes and these have been responsible for fires when the right fuel was present. A misconception of heat is that it has to be hot to the touch. Phosphorus ignites at a temperature lower than our own body temperature—it will blaze if you hold it in your hand!

Ignorance about fire and fire control is slowly being resolved through education, but carelessness is a problem no one has been able to solve. No one would intentionally throw a lighted cigarette into a barrel of gasoline, yet they throw lighted cigarettes into dry, grassy fields which is even worse. Countless times a man throws a cigarette away with no ill results and it becomes a habit, a very dangerous habit. One day, his cigarette will land upon just the right fuel to cause an enormous fire that will cost many lives and millions of dollars. This is just one example of an unsafe act occurring over and over again with no problem resulting until that fatal time. There are more just like it: smoking in bed, practical jokes with fire, unsafe storage of gasoline, dirty oily rags, or any combustible material, faulty electrical wiring, leaking gas heaters—the list is endless.

Fire prevention is knowledge and respect for the characteristics of fire, and thinking before acting. Let no unsafe act be your downfall—it only takes one! ★

USAF AERO CLUB DIRECTORY

As a service to Aero Club members, AEROSPACE SAFETY provides this directory. We will try to update it quarterly by listing any changes and we'll try to give you a complete new listing twice a year.

Here's the way to read it: Base name, hours of operation, gas (octane), all have oil available, and phone number. Clubs located on base are printed in black, those located off base in color with the name of the airport. Happy Landings!

STATE & CLUB	HOURS	GAS	PHONE
Alabama			
Maxwell-Gunter (Gunter AFB)	0800-sunset	80	3149
Arkansas			
Blytheville	0800-1700	80	691
Arizona			
Davis-Monthan	0800-1700	80	327-7632
Luke	24 hours	80	935-7411(2050)
California			
Beale	0730-1700	80	634-2131
Castle (Merced Muni)	0800-1800	80/100/130	722-3638
Edwards	0900-1730	91/98	72474
Hamilton	0800-2000	100	883-7711(4447)
Space Systems Div (LAX)	24 hours	80/100	643-1668
March	0800-1800	80	22255
McClellan	0730-sunset	80	2434/4142
6594 Aerosp Test Wg (Moffett Fld, San Francisco)	0800-1600	80	739-4510(2584)
Norton	0800-1700	80	382-2545
Oxnard	0730-1800	80	486-1631(3279)
Travis	Sunrise-sunset Night on request	80	437-3470
Vandenberg	0830-1730	80/100	866-5310
Colorado			
Ent (Peterson Fld, Colorado Springs)	24 hours	80/100	4310
Lowry	0730-1630	80/100	366-5363(508)
USAF Academy	0800-sunset	80/115	472-3568
Florida			
Orlando (Herndon Muni)	0700-2400	80	841-6511(738)
Patrick	0700-2100	80	494-4356
Tyndall	Sunrise-sunset	80	21237
Georgia			
Moody	Prior request	80	215/225/483
Robins (Macon Muni)	0800-1700	80	788-1443
Illinois			
Chanute	0730-1630	80	893-3111(2284)
Scott	0930-1700 Wknd 0800-1700	80/100	AL 6-4394
Indiana			
Bunker Hill	0800-1700	80	689-7268
Kansas			
Forbes	0800-1700	80	5165/4517
McConnell	0800-1700	80	MU 5-1151(5180)
Louisiana			
Barksdale	0800-1800	80	423-8871
England	24 hours	80	346
Maine			
Loring	0700-2000	80	7284
Maryland			
Andrews-Bolling (Hyde Aprt Clinton, Md.) Clinton, Md.)	0900-1700	80/100	297-9229/4618
Massachusetts			
Hanscom Fld	0800-1700	80	CR 4-6100(3329)
Otis	Sunrise-sunset	80	563-2215
Westover	24 hours	80	2536
Michigan			
Selfridge	0830-1630	80	26105
Mississippi			
Keesler	Sunrise-sunset	80	3948
Missouri			
Richards-Gebaur	0800-1730	80/100	DI 5-5687(240)
Whiteman	0800-1700	80	3486
Nebraska			
Offutt	24 hours	80/100	3939
New Jersey			
McGuire	0800-1700	80	3113
New Mexico			
Holloman (Alamogordo Aprt)	Daylight	80/100	473-0490

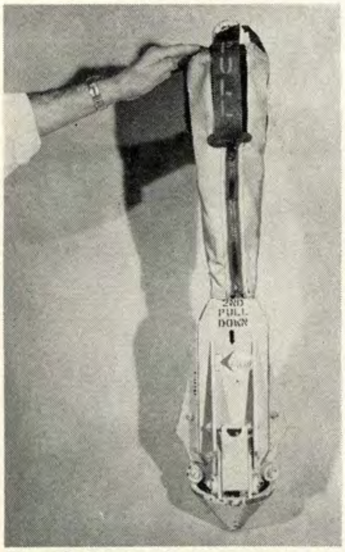
Kirtland (Albuquerque Sunprt)	Prior request	80	247-1711(3486)
Walker	Daylight	80	347-2330
New York			
Griffiss	24 hours	80/100/115	330-3435
Stewart	0800-sunset	80	8535
Suffolk County	24 hours	80	288-1900(613)
North Carolina			
Seymour-Johnson	0730-1630	80	245
Ohio			
Wright-Patt (Wright Fld, Dayton)	0730-1630	80/100	255-3847
Oklahoma			
Tinker AFB	24 hours	115/145	PE 2-7321(2467)
Vance	1400-1900 Wknd 0800-1800	80	AD 7-2121(2506)
Oregon			
Adair (Corvallis Muni)	24 hours	80	924-5511(878)
South Carolina			
Charleston	0800-1700	80	747-4111(3614)
Shaw	0800-sunset	80	2636
South Dakota			
Ellsworth	0800-sunset	100	399-7967
Tennessee			
Arnold (Wm Northern Fld, Tullahoma)	Sunrise-sunset	80/100	455-2611(591)
Texas			
Bergstrom	0730-1730	80	EV 5-3586
Kelly (San Antonio Int'l)	0800-1800	80/100	TA 4-2313(64)
Perrin	0800-1800	80	237
Randolph	1000-1830	80	4364
Reese	0900-1700	80	709
Sheppard	0830-1730	80	2160
Webb (Howard County Aprt, Big Springs)	Sunrise-sunset	80/100	AM 3-4930
Virginia			
Hq USAF (MCAS, Quantico)	0800-1800	80	Quantico 1000 (27388/26770)
Langley	Sunrise-sunset	100	764-2743
Washington			
Fairchild	0800-1700	80	CH 7-5443
Alaska			
Eielson	24 hours	80	377-1223
Elmendorf	24 hours	80/87	752-4167
Canal Zone			
Albrook	24 hours	80	86-7180
Puerto Rico			
Ramey	1000Z-2200Z	100	22251/7287
European Area			
Bentwood (RAF Woodbridge, Suffolk)	Sunrise-sunset	80	WB 733(457)
Bitburg	Sunrise-sunset	80	7410
Sembach	Sunrise-sunset	80	7630
Wheelus	Sunrise-sunset	100	3110
Pacific Area			
Clark	0600-1800	80	44201
Hickam (Wheeler AFB, Oahu)	0700-1900	115/145	667790/667445
Kadena	Sunrise-sunset	115/145	24296/24460
Misawa	24 hours	115/145	3881

MODIFIED FOREST PENETRATOR

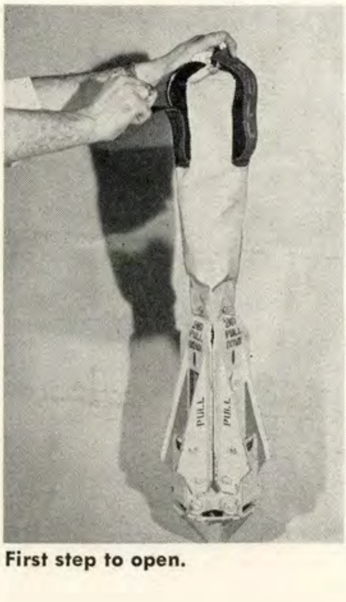
Courtesy: Special Services Div., Directorate of Personnel Services, Randolph AFB, Texas.

In the June/July Safety Officer Study Kit there is a functional layout and complete explanation of the Kaman Forest Penetrator. Here's a modified model which will soon be in the field. Time from receipt of the penetrator to donning the sling is considerably reduced by using the technique shown here.

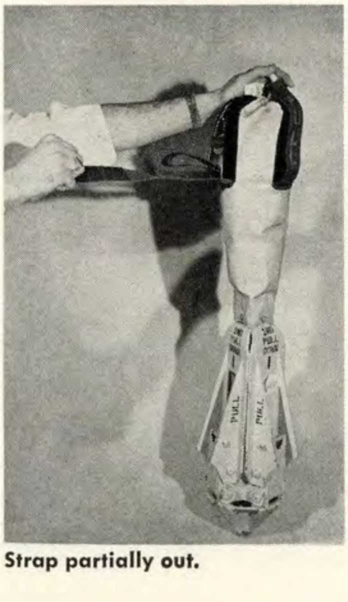
Although not yet available, development is being rushed on a plastic shield, similar to that in this drawing, for protection of the individual during ascent to the hovering helicopter.



Stored Straps. A prototype cover. Changes: (a) word "pull" to be "pull out." Black on yellow. (b) Zipper in opposite direction to eliminate possibility of inadvertent opening. (c) Addition of lanyard or seat paddle approximately at "pull" arrow.



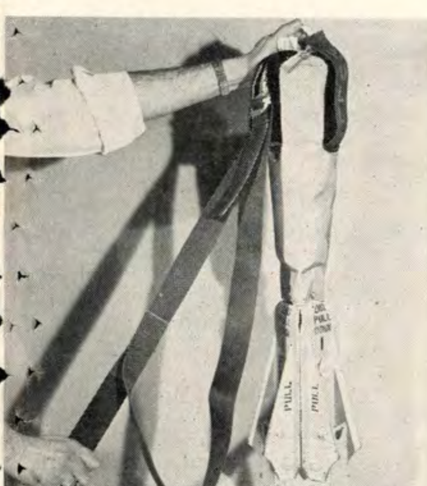
First step to open.



Strap partially out.

Tighten safety strap.

Putting on strap. Note hook still engaged.



Strap full out.

Daedalian FLYING SAFETY TROPHY

MAC

Lt Gen Theodore R. Milton, left, Air Force Inspector General, presents Daedalian Flight Safety Award to Maj Gen Don Graham, commander of the 21st Air Force, for the Military Airlift Command which was selected as having the most effective aircraft accident prevention program in the Air Force in 1966. Award was given at the annual convention of the Order of Daedalians at Lackland AFB. Kelly AFB is the national headquarters for the group.

HOT WEATHER is with us and it'll be getting hotter as summer comes on. Let's be aware that aircraft performance deteriorates as the temperature goes up. This, we already know, but what about people—people who operate and maintain the aircraft? A seldom discussed aspect of hot weather is its effect on individuals. These effects differ. Hot weather can cause fatigue in varying degrees, so when a pilot has to fly twice a day, it takes its toll on his general condition—his capabilities. To enable us to get along on better terms with hot weather, perhaps we should modify some of our living habits, e.g., get more rest and exercise, eat properly, in general, pay more attention to our health.

As warm weather becomes warmer, the loss of a turbine cooler can be disastrous, if the pilot doesn't get his aircraft down soon enough. It takes but a few minutes for dehydration and heat exhaustion to start taking effect. Like hypoxia, these effects are insidious and will sneak up on you before you realize it. Many bases are having an influx of young and inexperienced maintenance men. They're good troops but because they are inexperienced, they need your help to understand the aircraft assigned to their care. Make sure the necessary help in making good preflights and write-ups is available to them.

Hq 4510 CCTW (TAC) (OSF)
Luke AFB, Arizona

T-29—"On takeoff roll I noticed the airspeed coming up slowly but realized we had plenty of runway. I then nearly had heart failure when the pilot yanked the aircraft off at 100 knots (120 computed T.O. speed), and I began pushing forward on the yoke at 80 kts. Of course, I was shouting at the pilot at the same time and he was shouting back that he had plenty of airspeed. A quick check of his airspeed indicator showed 140 knots so I relaxed a bit as mine dropped to 20. Looking around I saw the source selector valve in alternate position. I placed it in static source and the instruments indicated normally. After the shakes wore off, I started thinking about the difference in static and alternate source and knew that this didn't seem right, so I tried it again after level-off. The airspeed indicator showed 40 knots low on airspeed and the altimeter read 2000 feet low. After several more checks in flight the instruments read the same in both static and alternate source. I could only conclude that the lines had been partially blocked and switching back and forth had cleared the alternate source line. Then I reflected on how many T-29s could have a partial blockage of the alternate source line and what if this source is actually needed in flight. The alternate source is never checked in flight and could give seriously erroneous readings when needed.

"A good suggestion for you T-29 drivers when cruising along with 'George' in control is to flick the static source selector switch and see if there is any difference in airspeed, altimeter or rate of climb indications.

"I'm sure that this takeoff would have been really hairy if conditions had been IFR. I would have been reluctant to believe his airspeed and he certainly would not have believed mine, so we could have been fighting the controls right into the ground."

The source selector valve is a checklist item and should have been caught before takeoff, but we do agree with the writer that the alternate source should be checked more often in flight.—Ed.

FOAMED PLASTIC CUPS. A little over a year ago there appeared in this magazine an item about foamed plastic cups and some of their characteristics. The item ended with this sentence, "A recommendation has been made to proper authorities that the use of these cups aboard aircraft be discontinued."

This caused a bit of concern in some quarters so we asked the Air Force Materiels Laboratory to test these cups under laboratory conditions and give us their recommendation. Their opinion is that the cups should *not* be used aboard military aircraft. Here, in part, is what they had to say:

"Commercial airlines provide an ashtray at every seat, within easy reach of each passenger, thus there is little or no tendency for passengers to use coffee cups for ashtrays. Oftentimes this is not the case on military aircraft, and the coffee cup usually becomes the most readily accessible container for cigarette butts. Although the polystyrene cup per se, does not present an excessive fire hazard, it does introduce other problems. Because a hot cigarette will burn through the cup wall very quickly it will frequently burn the hand or clothing of the individual who tried to crush it out on the cup wall. Moreover after burning through the cup, the hot ash is very likely to fall into such inaccessible places as underneath seat cushions, hidden areas of floor coverings or into cavities on the floor from which it cannot be readily removed or extinguished. Any such contact with combustible material introduces an unnecessary fire hazard which is preventable.

"Polystyrene cups have many virtues and are regularly used in our laboratory. However, for the reasons cited in the paragraph above, we recommend that the prohibition against the use of these cups on Air Force aircraft remain in effect."

We, too, think these cups are mighty fine; use them frequently in the office and at home. But we have to stick by the original recommendation.

DURING A helicopter accident investigation it was determined that the rotor blades struck the pitot tube and top of the pilot's compartment during a landing on sloped terrain. The investigating board received several unconfirmed reports that this same thing had occurred at least nine times dating back to 1964. Research of accident and incident records was made in an attempt to provide the board with circumstances which could help them develop a sound recommendation for corrective action. Only three of the occurrences, including the one under investigation, had been reported. Why?

- Because someone just didn't care?
- Because someone didn't understand the value of reporting?
- Because reporting involved a little extra time and paper work?
- Because someone just simply didn't want to be embarrassed, so it was covered up?

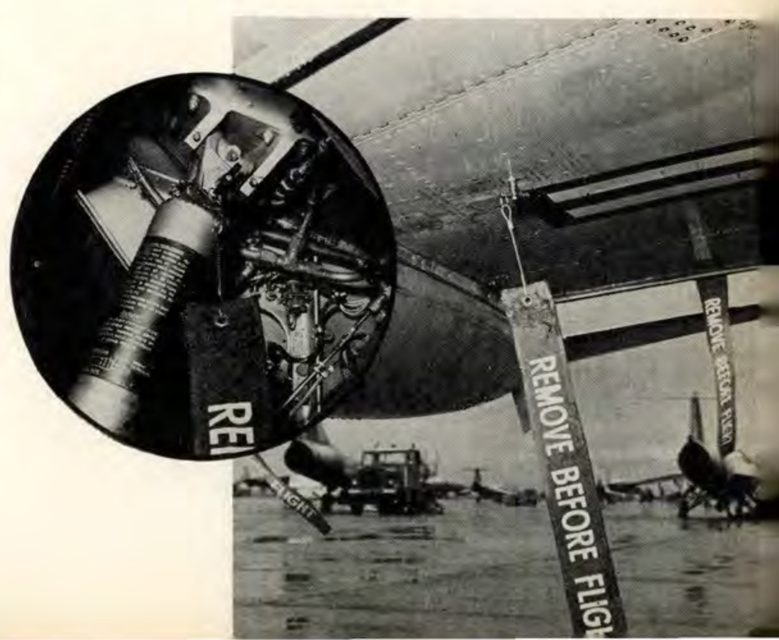
Only the pilots, commanders and safety officers can answer these questions. Meanwhile, an accident board struggles with a condition which probably needs correcting before more aircraft are damaged or loss of life occurs.

Lt Col Robert E. Englebretson
Directorate of Aerospace Safety

OUTSTANDING SERVICE, partially! "After landing, prior to climbing out of the cockpit, I handed the alert crew chief the tip tank pins. He went immediately to insert them. I was quite impressed with the service provided for my F-104. The maintenance was quite outstanding. The intake inspection doors were opened to check the IGVs, the hydraulic bay door was lowered, and accumulators and fluid levels were checked. The windscreen was cleaned. I was sure lulled into a sense of security that the alert maintenance personnel were familiar with the Star fighter. This mood was quickly dispelled when I checked my landing gear during postflight and found my tip tank pins installed in the liquid springs.

"This occurrence re-emphasized the point—double check all personnel servicing your aircraft, even if they are well qualified and provide excellent service."

From an OHR



FALLOUT

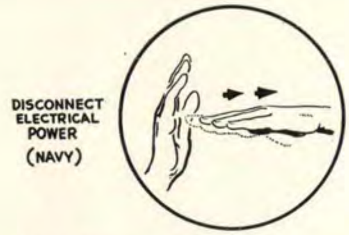
Continued from inside front cover

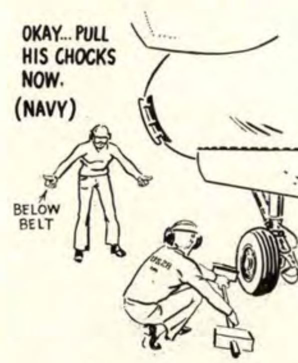
To illustrate the use of the Navy's standard aircraft handling signals, I'll use Captain Unser's four tales:

• In the first situation the pilot had to read the Lineman's lips before he realized he had an engine fire. What if it were at night and the pilot couldn't see the Sarge's face? The standard Navy signal for "engine fire on deck" is for the lineman to point to the engine with one hand and make a horizontal figure eight with the other. At night he would do the same with his wands.

• In situation number two the pilot was trying to tell his wingman that he was in trouble and wanted to eject but he had no radios. The standard Navy signal for "I'm in trouble" is for the pilot to put his arm across his forehead. He might also have given his wingman the signal to "loosen up and fly a free cruise position on me" which is to point over alternate shoulders with his thumb.

• In number three, the lineman misinterpreted the pilot's "finger to nose" signal to mean "pull the pins on the gear." The signal we use for "pull the pins" is to insert the index finger of one hand into the closed fist of the other hand and pull it out in view of the lineman. For aircraft that use ground locks instead of pins, we use the signal of clenching the fist of one hand and grabbing that wrist with the other hand to indicate "install or remove ground locks" depending on whether the plane is entering or leaving the line.





• In the final tale, the lineman misinterpreted the "pull chocks" signal to mean "electrical power out" when he saw only one of the pilot's hands. Our signal for "electrical power out" is to make a horizontal "T," using both hands, fingers extended, and then pulling it apart in view of the lineman. The reverse means to "plug in power." This leaves very little room for misinterpretation.

The hard and fast rule for pilots and plane directors is:

If you don't understand the signal or you're not sure of it, STOP! Don't bet your plane or your life on an assumption.

Generally speaking, all signals given by a lineman or taxi director above the belt are for the pilot and all signals given below the belt are for the ground crews.

This letter is my opportunity as a fellow aviator to ". . . throw a nickel in the grass . . ." Perhaps it can help repay you for the knowledge and safety tips we receive from your great magazine. Keep up the good work.

C. A. Lang, LtJG, USNR
Air Anti-Sub Sq 28
FPO New York 09501

WELL DONE

☆ U.S. GOVERNMENT PRINTING OFFICE 1967 251-219/10

1ST LT

JOHN D. PETERSON

3501 PILOT TRAINING SQUADRON
REESE AFB, TEXAS

On 13 October 1966, First Lieutenant John D. Peterson and another instructor were engaged in a weather reconnaissance mission in a T-37B. Approximately 30 miles southeast of Reese AFB, the aircraft collided with a sandhill crane that weighed approximately six pounds, and had a four- to five-foot wing span. The bird struck the right nose area, destroying the windscreen and glare shield. The radio and circuit breaker panels were bent and torn from their mounts.

The pilot in the right seat was struck in the face and killed on impact. Blood coated the cockpit and right side of the canopy so heavily that effective vision was reduced to zero. Pieces of windscreen and bird struck Lieutenant Peterson on the helmet, neck and shoulder. He gained control of the aircraft and headed for Reese AFB, but he was unable to communicate since the UHF radio had failed, and heavy arcing in the instrument panel necessitated turning off battery and generator switches.

After reaching home field, the pilot flew an electrical failure pattern so that the runway supervisory unit would be able to see the aircraft damage and alert the crash crew. Lieutenant Peterson executed a minimum run landing to facilitate turning off the runway in front of the tower. He taxied the aircraft directly to an ambulance in front of the crash station before shutting down the engines. The canopy could not be opened in the normal manner because of the damaged electrical system. Lieutenant Peterson inserted the safety pins in both seats and the canopy jettison "T-Handle" before aiding the crash crew in manually raising the canopy. Lieutenant Peterson displayed outstanding airmanship and presence of mind throughout the emergency. His professional actions averted the loss of an aircraft. WELL DONE! ★

CAPTAIN

WILLIAM J. EIBACH

401 TACTICAL FIGHTER WING
APO NEW YORK 09283

Captain William J. Eibach, with Colonel Ralph C. Jenkins in the rear cockpit, was on a cross-country flight from Torrejon AB, Spain, to Wheelus AB, Libya, in an F-100F. The flight proceeded normally to a point 130 NM north of Wheelus AB when the A/C generator went off the line and the cockpit filled with smoke. The A/C generator was reset and stayed on for approximately five minutes, after which it again failed. In about five minutes, the engine began to surge between 85 and 90 per cent rpm. Captain Eibach was now 65 to 70 NM from Wheelus; he reduced the throttle setting, selected emergency fuel, and initiated a descent from flight level 330. Shortly after commencing the descent, at approximately FL 300, the engine flamed out. An airstart was accomplished on the emergency fuel system and the power advanced to 90 per cent rpm. Instrument indications remained normal for approximately two to three minutes, then the second flameout occurred. Another airstart on the emergency fuel system was accomplished. Three subsequent engine flameouts and airstarts were accomplished, placing the aircraft over Wheelus AB at 13,000 feet. Being in an ideal position for a flameout landing, Captain Eibach discontinued further airstart attempts and concentrated on the flameout landing pattern. Colonel Jenkins was briefed that if the pattern were not perfect at the base leg point they would eject. The base leg position looked perfect and both pilots elected to land the aircraft. The approach was continued and the flameout landing successfully terminated. Subsequent investigation revealed that the CSD had failed resulting in A/C power loss. The aft and intermediate boost and transfer pumps had failed, and the DC boost pump was also inoperative.

The professional skill and superior flying ability displayed by Captain Eibach prevented the loss of the aircraft. WELL DONE! ★

KNOW YOUR SURVIVAL GEAR

MK-13 MOD O FLARE

Which End?

NIGHT

DAY