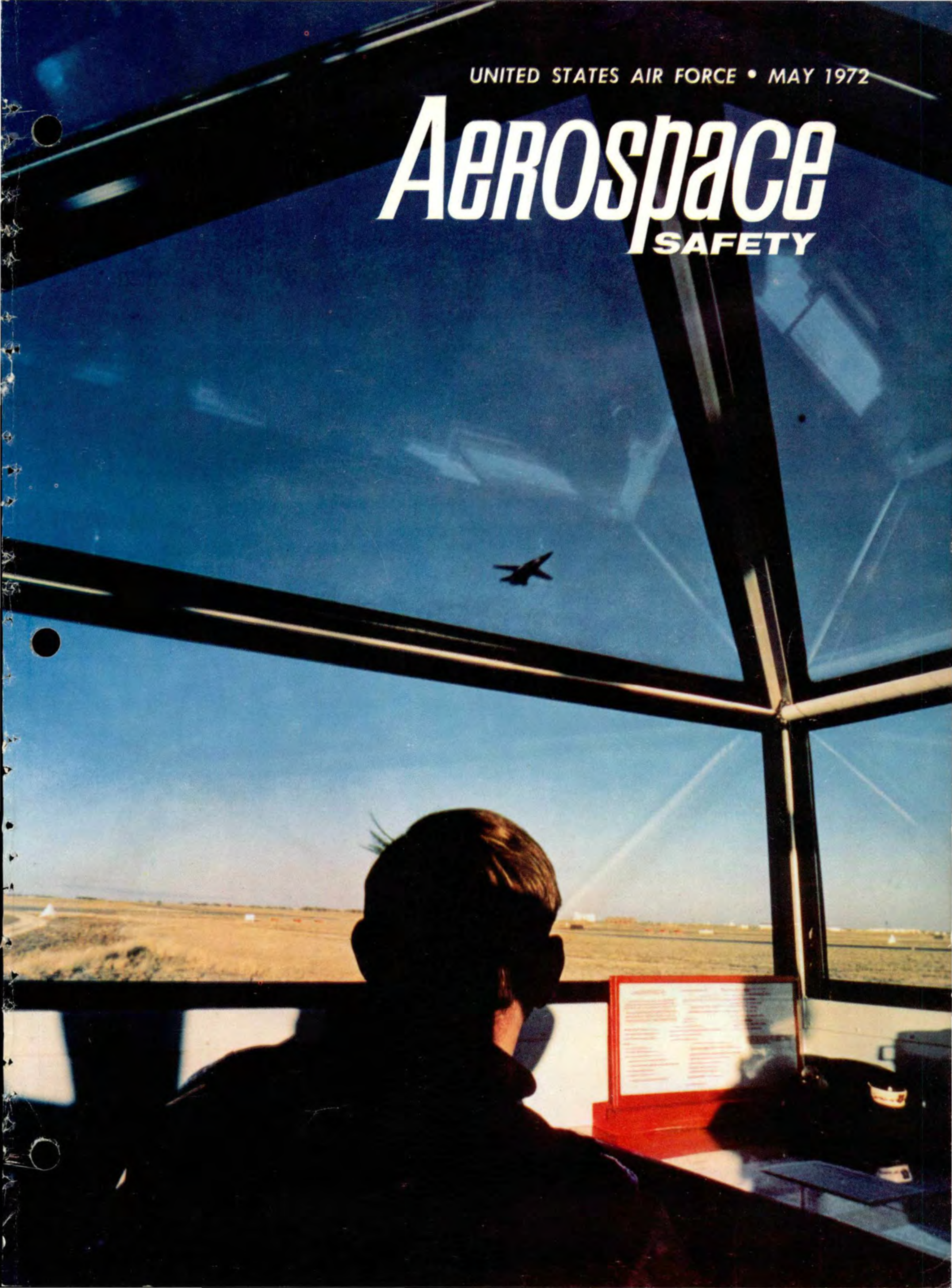
UNITED STATES AIR FORCE • MAY 1972

Aerospace SAFETY



COVER PHOTOGRAPH BY TSGT EDDIE P. BOAZ, AEROSPACE AUDIO VISUAL SERVICE.

UNITED STATES AIR FORCE MAY 1972

Aerospace SAFETY

FOR AIRCREWS, MAINTENANCE & SUPPORT TECHNICIANS

SPECIAL FEATURES

REGULAR FEATURES

DEPARTMENT OF THE AIR FORCE • THE INSPECTOR GENERAL, USAF

MAY 1972 AFRP 127-2 VOLUME 28 NUMBER 5

THE back side of the attitude curve

COL SCOTTY O. FERGUSON
Directorate of Aerospace Safety

It was gratifying to see our accident rate hit the lowest point in Air Force history, last year (2.5). But there are days when that rate doesn't mean much; not when there are four major accidents in one day —three of them bad ones, totaling two dead and two badly mangled pilots. It kind of gets you right in the squadron patch and makes you churn a little inside, too.

When you're in a unit for a good long time, and your outfit has been fortunate enough not to have had a bad bash, and the familiar faces are all still climbing in the cockpits, it may be difficult to get excited about another unit's misfortune. But when you sit here at the Safety Center and get the bad news in bunches, it takes a little out of you. After a couple of years, you feel a direct responsibility every time you read, "No apparent ejection attempt," or "Aircraft had double engine flameout immediately following takeoff—two fatalities." It gets to you because you suspect that perhaps you didn't look deep enough or communicate well enough to prevent whatever went wrong.

It shouldn't come as a shock to anyone that we're flying some airplanes that require pretty delicate maintenance and some pretty fancy stick and rudder work; and that means super maintenance, super inspections, super operations, and super supervision. It also means everybody in the business has to work together. Anything less, and the aircrews are starting their takeoff roll on the back side of the power curve.

When one considers that a fighter pilot is within a fraction of a second of buying the farm each time he completes a weapons delivery, and that all aircrews are almost as close on each takeoff and landing, it should come through to all of us that cool, calculated perfection in one's work prior to an aircraft takeoff is as important as the life or lives of the warm bodies in it.

When a guy gets nailed by a ground gunner or a MIG pilot, that's one thing and you can pretty much accept it. But to lose a young tiger, or an old head, because something broke or went ape or because he was put into an operational situation beyond the ability of a Lindberg to handle, then we've failed—badly. And it's the worst kind of failure, because it isn't one you can mend—it's final.

We all need to do a lot of soul-searching and ask ourselves, "Am I really doing the best I know how—no shortcuts, no hurry-up jobs—precision all the way?" If just one guy along the way to getting an airplane in the air isn't completely professional in accomplishing his required duties and tasks, you can bet that the end result will be another smoking hole and probably a requiem for another aviator who got short-changed.

It's all a matter of attitude. If you're going to do a job, do it the best you know how. If you don't think your knowledge is quite good enough for a particular task, be big enough to admit it and get help. Above all, don't just not give a damn! We're talking about people's lives! ★

egress systems update

ROBERT H. SHANNON
Directorate of Aerospace Safety

SECOND IN A SERIES ON UPDATE OF USAF AIRCRAFT EGRESS SYSTEMS

A-7D, RB-57F, B-57G

THE ESCAPAC escape systems manufactured by McDonnell Douglas have a long history of highly successful use by the U S Navy. We were introduced to the ESCAPAC 1C in the RB-57F aircraft. It was subsequently chosen for the entire B-57 fleet, primarily as a result of the emphasis placed by the USAF Task Group Review cited in the first article in this series.

Because of the system's relative newness to the Air Force, our operational experience is quite limited. There have been two ejections from the A-7D and two from the B-57G to date, all of which were successful. The Navy advises that they have had 206 ejections with a 90 percent success rate. They report that 71 of these were below 500 feet, with 59 (83 percent) of the 71 successful recoveries.

We are not often fortunate enough to acquire a system with such a successful history already documented. Certainly we can and have profited greatly by the Navy experience. As stated earlier, this is a new system as far as the Air Force is concerned, not just a modification of an existing in-service seat.

Basically, the ESCAPAC 1C is a small, extremely rugged, lightweight seat with a demonstrated recovery capability from a static condition (0-0) to 600 knots, the latter being an Air Force qualification test requirement to assure safe tail clearance at all operational speeds. It incorporates such features as the aforementioned ground level escape, tht DART (Directional Automatic Realignment of Trajectory) Stabilization System, controlled acceleration, dual single-motion ejection controls (face curtain and seat-mounted D-ring), inherent leg restraint (without physically attaching the pilot to the seat), increased comfort, integrated ground safety, and minimum maintenance.

FIGURE 1

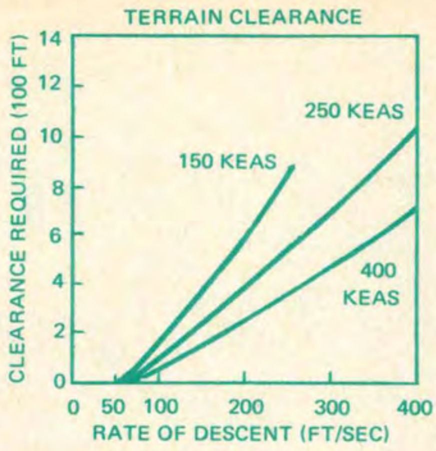
SECONDS	EVENTS
Time (T) = 0	Ejection initiation. Catapult stage ignites; Inertia reel locks. Parachute 2.0 second delay cartridge arms Harness release 1.0 second delay cartridge arms Emergency oxygen actuates
T = .15	Rocket motor ignites
T = .32	DART action starts
T = 1.0	Harness release operates Man-seat separation occurs
T = 2.0	Parachute pack opens (if below present altitude of 14,000 ft MSL ± 500 ft).

Parachute line stretch and inflation are dependent on airspeed at time of ejection. For example, at 200 to 250 knots, approximately 2 additional seconds are required for chute deployment. Total system operation time from initiation to a fully developed chute would be on the order of about 4 seconds under these conditions.

Typical sequence of events is shown in Figure 1.

Let's take a look at these events. After initiation the catapult tubes separate at the top of the guided stroke and the rocket sustainer stage ignites, propelling the seat away from the aircraft. At 0.32 second the DART action starts, which stabilizes seat trajectory, compensates for adverse center of gravity variations, limits maximum rotational rates to acceptable values, and provides consistent and predictable seat trajectories. The legs are drawn back due to inertia and held against the seat by the dynamic forces. Lateral leg restraint is provided by the extended seat sides.

After a 1.0 second delay the harness release actuator separates the pilot's harness at three points and releases both ejection controls from the seat (eliminating the possibility of hanging onto the seat structures). Immediately following harness release, two bladders, one mounted on the seat pan and one on the inside seat back, are inflated with high-pressure nitrogen, forcefully and rapidly separating the pilot from the seat. After an additional 1.0 second delay and when below 14,000 ft MSL, the chute is deployed. From this point on, you are on your own. Your life support training will determine how you handle the parachute descent and parachute landing fall.

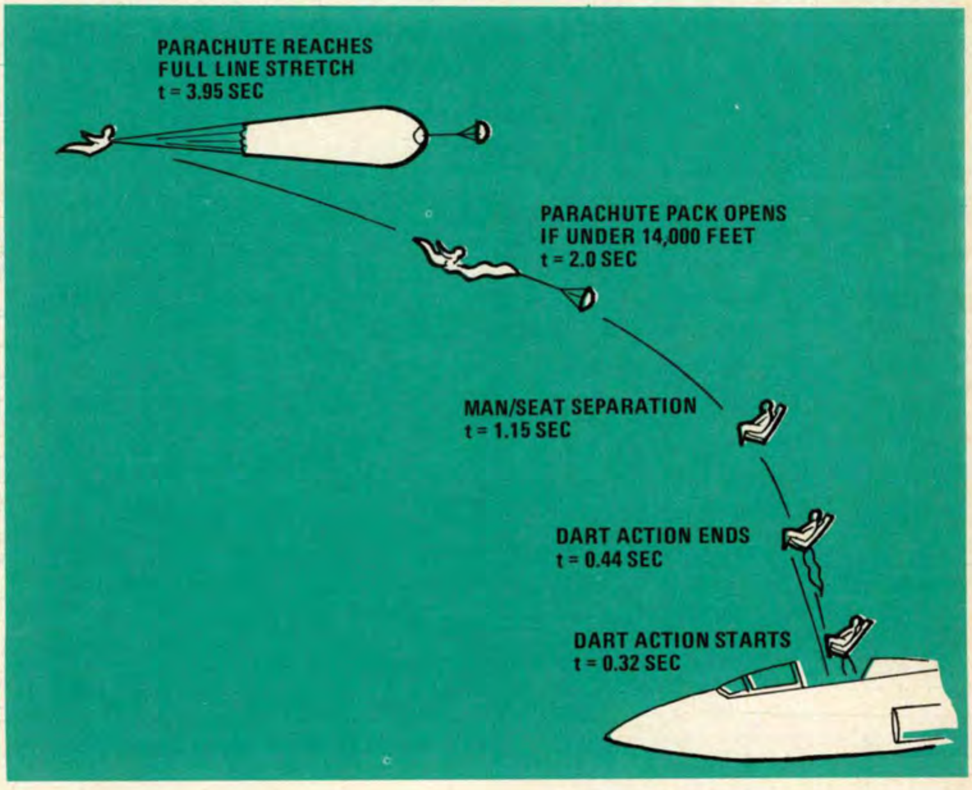


Various airspeed and sink rate conditions; pilot reaction time not included.

This then is essentially how the ESCAPAC 1C ejection system works. It's a good system with proven reliability, but do not stop here in your quest for information. Know your Dash One procedures, insist on frequent in-depth briefings from your life support people. Get all the life support training you can. Should you ever desire to know anything concerning this system that you cannot get an answer to, write a letter or call the AF OPR, which is the Life Support System Manager at Kelly AFB.

The ESCAPAC 1C can and will save your life should you find yourself faced with a situation requiring inflight escape; BUT YOU MUST GIVE IT A CHANCE TO DO THE JOB. The latest state-of-the-art features incorporated in this system were put there for one purpose and one purpose only—to give you a better hack at it in an emergency under marginal conditions. The added capability afforded by this or any other system must never be the basis for staying with the aircraft just a "little longer" in an attempt to salvage a futile situation. This attitude has resulted in the tragic and alarming loss of far too many Air Force crewmembers over the years. No system, regardless of its capability, can save your life if it is not used within its design capability. ★

ESCAPAC IC ESCAPE SEQUENCE (TYPICAL)



THE I.P.I.S. APPROACH

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

ARCS and RADIALS REVISITED

Anyone who flies with TACAN or VOR/DME should have in his bag of tricks at least one or two techniques of computing leadpoints to fly from radials to arcs and from arcs to radials. AFM 51-37, Chapter 12, offers a number of different methods, all of which offer reasonable accuracy and are not particularly difficult to use.

Here is a slightly different method that you may find useful, particularly if your maneuvering speed is more or less constant. This was offered to us by a C-123 type at HRT who swears by it. As he says, "Try it, you'll like it!"

1. Find your bird's turning radius from AFM 51-37, page 8-14. For example, maneuvering at 150 KTAS and 30 degrees of bank will produce a turn radius of 3500 feet (no wind). Converting this to miles $\frac{3500}{6000}$ gives a radius of approximately 0.6 NM. If you're always at 150 knots using 30 degrees of bank, lead all radial to arc intercepts by 0.6 NM.

2. Here's a handy-dandy formula for computing the arc to radial leadpoint:

$$\frac{\text{Turning Radius (ft)} \div 100}{\text{DME}} = \text{Leadpoint (degrees)}$$

Let's plug in some numbers and see what we get. Using the same radius of turn (3500 feet) and assuming the seven DME arc,

$$\frac{3500 \div 100}{7} = \frac{35}{7} = 5 \text{ degree leadpoint}$$

If you are on the 10 DME arc, the leadpoint becomes

$$\frac{35}{10} = 3.5 \text{ degrees}$$

For a given groundspeed and angle of bank, your radius of turn is always the same. All you need remember, then, is your radius of turn in miles and one percent of your radius of turn in feet (0.6 NM and 35 in our example). Lead an arc intercept by 0.6 NM and lead a radial intercept by $\frac{35}{\text{DME}}$.

Don't forget to compute the actual numbers for your particular aircraft.

The formulas and techniques discussed above and in AFM 51-37 can be used as an effective aid in developing a better awareness of your turning performance and greater precision in instrument flight. Use of groundspeed, where known, will compensate for the effects of wind.

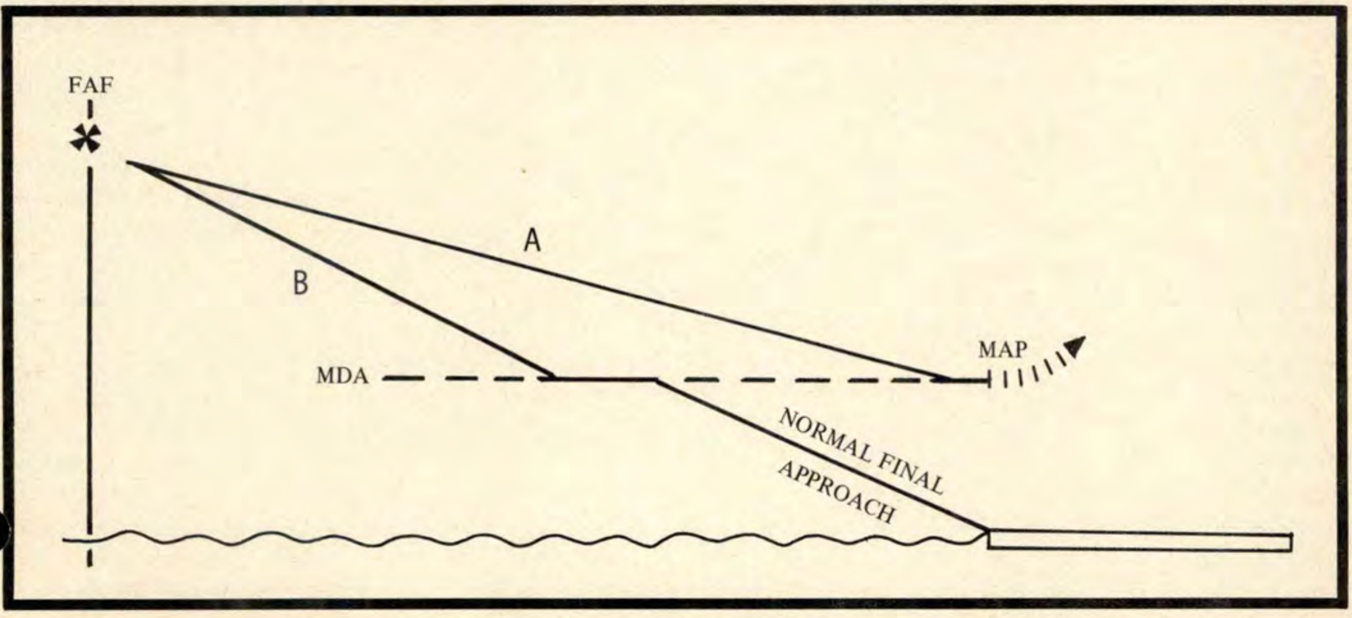
MISSED APPROACH POINTS

The USAF IPIS has received numerous inquiries concerning the missed approach point for non-precision approaches. Pilots are particularly concerned when they arrive at the MAP and find that they are not in a position from which they can make a normal landing. This is a fairly common occurrence as there is no requirement, nor is it possible, for the MAP to coincide with some point from which all aircraft can make a normal landing.

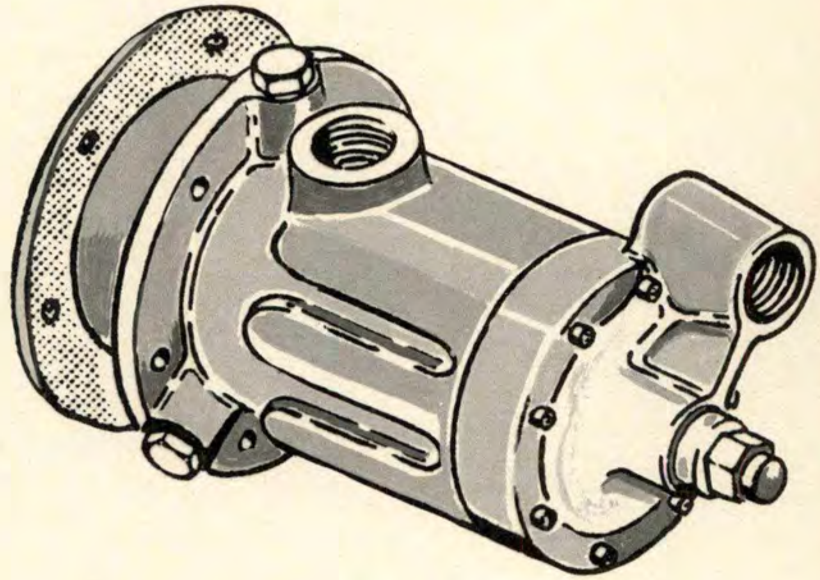
When an on-airport facility (VOR or NDB) does not provide a final approach fix, the facility itself serves as the MAP. For procedures which do provide a final approach fix, the MAP may be no further from the FAF than the runway threshold. In either case you may find yourself over or beyond the landing runway when the time comes to make the missed approach.

It is entirely possible that a descent made so as to arrive at the MDA and the MAP simultaneously would never intercept a normal final approach profile. (EXAMPLE A.) However, flight at MDA along the final approach will, for a straight-in approach, intercept or come very close to a normal final approach at some point. For this reason, AFM 51-37 requires that you "Descend to the MDA so that visual reference with the runway environment can be established as early as possible before reaching the missed approach point." This is shown in Example B.

The normal descent gradient for a final approach is 300 feet per mile with a maximum of 400 feet per mile. If you descend at a rate equivalent to a 300 to 400 feet per mile descent gradient (3 to 4 degrees descent angle), you will be assured of arriving at your MDA prior to both the runway and the MAP. The actual vertical velocity may be determined by reference to the Rate of Descent Table in the front of the approach procedure booklet. Another method is to multiply the descent gradient by your groundspeed in miles per minute. For example, 300 feet per mile times two miles per minute (120 knots) equals 600 feet per minute vertical velocity. Using this computed rate of descent, you should have sufficient time and distance remaining to identify the runway environment and maneuver to intercept a normal final approach profile. ★



HOT HYDRAULICS



This article is reprinted from Northrop Service News and is aimed primarily at F-5 troops; however, much of the info is applicable to other aircraft and is, therefore, recommended reading.

On 19 July 1971, TO 1F-5-706 was published directing that temperature-indicating tape be installed on the hydraulic reservoir sight gage glasses. This was done to give air and ground crews warning if the temperature of either or both hydraulic systems had exceeded the normal operating range on a previous flight or ground engine run. This was quickly followed by other technical order changes specifying when the temperature-indicating tape should be inspected, changing trouble-shooting procedures, and revising pilot operating instructions in case that a hydraulic system malfunction is detected in flight.

Many personnel in F-5 operating units have questioned the reasons for the changes since the hydraulic components of the flight control systems have been remarkably free of problems. As experience with the F-5 operation increases, it is natural that new techniques should be developed, which continue to improve the economy, simpilicity, and safety of the aircraft. The purpose of this article is to explain the reasons for the installation of the temperature-indicating tape and for other technical order changes and to advise you of an improvement being considered for installation in all F-5 series aircraft.

Some time ago, it was discovered during a test on the flight control test stand that some hydraulic tandem servovalves controlling flow from both flight control and utility hydraulic systems (horizontal stabilizer and aileron actuators) would require higher operating forces when the fluid temperature in the two hydraulic systems differed by an abnormal amount. It was further observed that servovalves with minimum clearances were more susceptible to this condition. Because of these discoveries, the minimum allowable internal clearance of the servovalves (as measured by lap leakage) was increased on all aircraft. This production change was effective on aircraft delivered approximately in April 1970 and on subsequent deliveries.

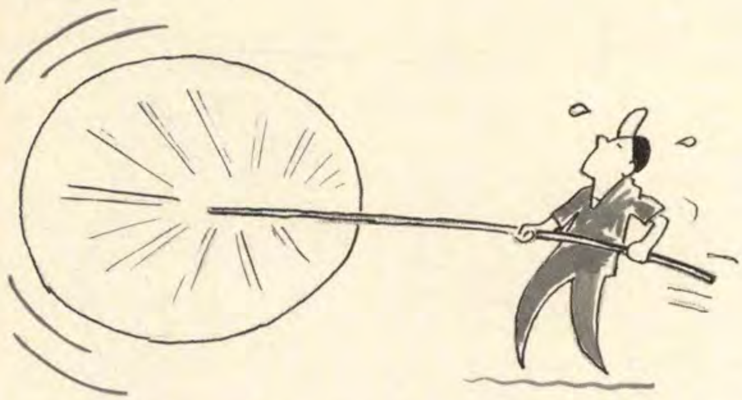
The high temperature in either hydraulic system can be caused by any of the following malfunctions:

• A pump malfunction may occur that causes the pump to put out excessively high pressure. The high pressure then opens one or more of the relief valves in the system. As the hydraulic fluid is forced through the relief valve(s), which acts (act) as a restricted orifice(s), the flow rate of the fluid is increased. The energy used in creating the high flow rate at high pressure is converted to heat. Because of the pump malfunction, the high-pressure hydraulic fluid keeps the relief valve(s) open, thus perpetuating this heating condition.

• A relief valve malfunctioning in such a way that fluid is bypassed at normal system pressure can cause heating for the above reason.

• A "blown" seal or other defect that bypasses fluid from system pressure to system return may create excessive heat. The size of the internal leak will affect the amount of heat. Maximum heating will occur when maximum energy is put into the system. This occurs whe[n] the internal leak bypasses a large amount of fluid under high pressure.

FLUID



It should be noted that hydraulic system pressure on the cockpit indicator may be normal or lower than normal with the second or third of the three malfunction conditions described above.

As a matter of interest, the oil cooler that was removed from production aircraft in 1965 did not have enough cooling capacity to prevent excessive hydraulic fluid temperature during any of the malfunctions described above.

About one year ago, two jet aircraft with flight control actuators identical to those installed in the F-5 encountered momentary servovalve binding. In both cases, the control problems resulted from excessively high fluid temperature at the flight control servovalves. The high temperatures were the result of one or more of the conditions described above.

A study program was initiated to determine cause of excessive servovalve forces and develop solutions for the problem. Based on Northrop tests, high servovalve forces induced as described above can have a critical effect on the controllability of the aircraft, depending upon how high valve forces become and upon whether or not the high forces are constant or intermittent. The valve forces result in high stick forces and control surface overshoot. The combination of high stick forces and surface overshoot will, in a severe case, result in pilot-induced oscillation (abnormal pitch or roll oscillation as the pilot attempts to control the aircraft), which could be critical in low level flight or landing pattern. Generally, high forces will occur throughout the total stroke of the valve, particularly at breakout from the neutral position. Cycling rate of the controls does not change the force level. The tests indicated that the critical temperature differential would be achieved about eight minutes after a malfunction was simulated on a test stand. The interim solution is publication of TO 1F-5-706, adding temperature-indicating tape to the sight gage of the hydraulic reservoirs. A black color on any of the temperature-indicating spots shows an unsatisfactory condition that must be investigated prior to further flight.

In answer to a number of questions from operating units, the indicating tape with four temperature-indicating dots was specified in case subsequent investigation disclosed that some temperature higher than 180°F would be acceptable. Investigation has confirmed that temperatures of 180°F or higher indicate an unsatisfactory condition in the hydraulic system and must be corrected prior to further flight.

In regard to troubleshooting high hydraulic fluid temperature, TO 1F-5A-2-2 states that any time a high temperature is detected, the affected hydraulic pump should be removed and tested in accordance with TO 9H4-2-41-83. This is important. However, if the pump is operating properly, relief valves and other hydraulic components in the affected system must be checked until the cause of the high temperature (bypassing) is identified and corrected.

For the pilot, an inflight indication of excessive hydraulic pressure could mean excessive temperature in a few minutes. TO 1F-5A-1 dated 1 January 1971, Change 2, 1 September 1971, directs immediate termination of the mission. Instructions for pilot action in case of flight control malfunction are also given and should be known by every F-5 pilot.

For the future, a system has been devised to give the pilot an indication in flight of high hydraulic system temperature by use of the existing caution system. Using the proposed system, the caution light that now indicates low hydraulic pressure would also come on if high temperature is detected. Reference to the hydraulic pressure indicator would then enable the pilot to evaluate the problem. In case of either low pressure or high temperature, the flight should be terminated.

Countries using the F-5, other than USA, currently are being asked if they desire installation of the high-temperature warning system.

In summary, a potential problem has been identified in the F-5 and corrective action taken. No actual occurrences have been reported in the F-5, but action has been taken to provide operating and maintenance instructions necessary to minimize the probability that any serious inflight malfunctions due to high hydraulic fluid temperatures will ever occur. ★

THAT SINKING FEELING

A two-engine aircraft was on a day VFR pilot upgrade training mission. After approximately two hours of flight, the IP in the left seat was making a landing to instruct the student pilot in copilot duties.

The copilot visually checked the gear and gave a gear down and locked signal by moving his left hand in a clockwise arc. In the process he hit the number two feathering button. The instructor pilot, noticing the power loss, advanced the throttles to maintain glide path and airspeed. The copilot, apparently not realizing what had happened, asked if a go-around was being attempted and, without a command from the IP, raised the gear.

Upon learning that the gear had been raised, the IP started a single engine go-around and instructed the flight engineer to bring the number *two* engine back in. The engineer, not wanting to be outdone by the copilot, pressed the number *one* engine feathering button. At this point, the IP called for gear down; the copilot—you guessed it—lowered the flap handle.

The IP, observing that the gear handle was not down, placed it down and made a smooth touchdown 4500 feet down the 9300 foot runway. The flight engineer moved the gear latch lever from the spring lock position to the positive lock position. The left main gear retracted and the aircraft came to a stop at the 6000 foot point on the runway. Fortunately, the three pilots and flight engineer were not "physically" injured.

You may think this is reminiscent of Ripley's believe it or not, but this fiasco actually happened.

In another mishap the aircraft commander was assisted in a more passive manner. A two-seat fighter aircraft being returned to home base under night VFR conditions landed gear up, slid 5000 feet, and was destroyed. The landing light on this aircraft is located on the nose gear and cannot be seen with the gear up. This accident could have been prevented by (1) the pilot lowering the gear when the GCA final controller transmitted "wheels should be down," (2) the other crewmember informing the pilot of no gear, (3) the runway supervisory officer either notifying the pilot of the absence of a landing light or firing a flare and sending him around, (4) the tower operator transmitting landing light information to the pilot, or (5) a supervisor of flying in the tower ascertaining that the gear was down or sending the aircraft around.

Many other situations also resulted in landings without the benefit of undercarriage, e.g., initiation of a missed approach, to include gear retraction, and a subsequent decision to land; or delaying gear extension because of low fuel.

During the past ten years, 132 Air Force aircraft were unintentionally landed gear up, an average of over one per month. In the vast majority of the cases the pilot had plenty of help. Supervision was cited in 35

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Directorate of Aerospace Safety

of the 132 occurrences, and in 90 instances other crewmembers assisted prior to the screeching sound.

Another common denominator was some distraction or deviation from the normal routine.

Based on these experiences, it is evident that we must (1) place more emphasis on supervision of the landing phase, and (2) make certain that all crewmembers are thoroughly briefed to be especially alert during any situation which deviates from the normal—so that they don't allow themselves to be lured into a gear-up landing. ★

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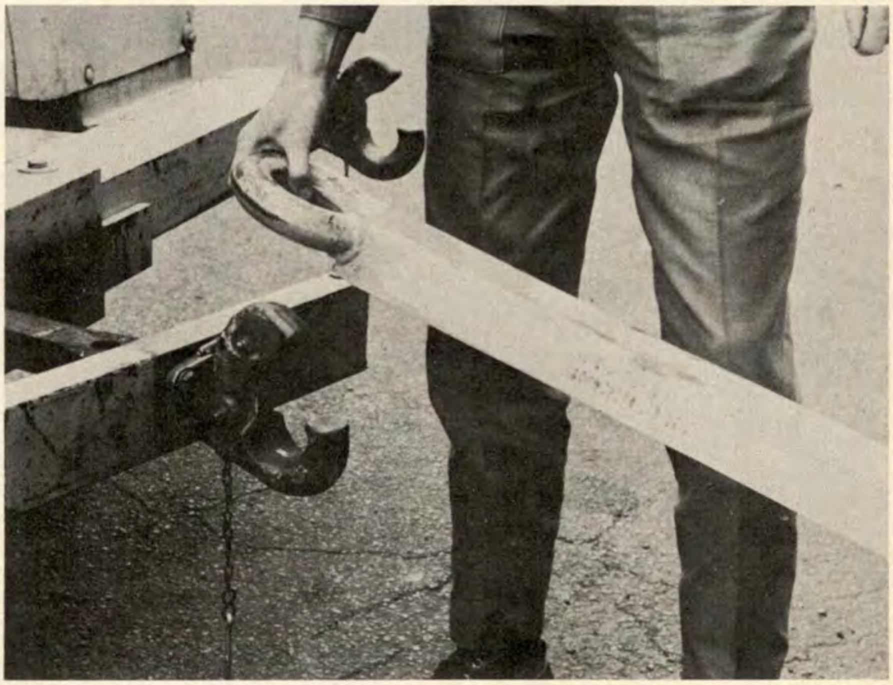
ONE MAN AGE



One of Aerospace Safety *magazine's pet projects is publicizing good ideas. WRAMA estimates that adoption of the mechanical hitch shown here will result in salary savings, in one major command alone, of more than $300,000 annually.* Aerospace Safety *would like to hear of other good ideas, with a safety motif, from its Air Force-wide readership.*

Positioning of ground equipment (AGE) is a difficult and hazardous task for one man, especially in ice and snow. Use of the mechanical hitch above, however, takes the work—and the hazard—out of the job. Mounted on an extending member, the hitch will extend 12 inches and swing 45 degrees to either side. The tractor operator merely backs to within 12 inches of the AGE tongue, dismounts, pulls the extendable hitch out and hitches up the AGE. He then remounts and backs up further until the extending member spring locks in place (and even if he forgets, the design strength of the extended hitch is greater than that of the AGE tongue).

Check TO 36-1-50 for info regarding the hitch and its acquisition. ★

NUCLEAR SAFETY AID STATION

NOT WHAT, BUT HOW?

AFTO 22

At one of the missile launch control centers recently an indication lamp burned out in the signal data recorder drawer. When the technician attempted to replace the indication assembly, it arced and a Data Store and Processor lockup occurred. Although a tech order warning note stated that damage could occur when the assembly is replaced, it did not indicate how. (The locking pins come in contact with the metal frame, causing a short.) In this case, one individual found out how. To preclude others from making the same mistake, an AFTO 22 has been submitted to clarify how personnel injury or damage to equipment could result.

Perhaps you know of similar conditions that should be clarified. If so, submit an AFTO 22.

MAN THE PUMPS

One common problem that faces the Air Force every spring is the accumulation of ice and snow at Minuteman launch facilities, resulting in water accumulating in the bottom of the missile silo. Fortunately, weapon system designers have provided pumps to remove the water, but this doesn't remove the primary cause—launcher closure seals that do not prevent water from entering the launcher. Contributing causes of water accumulation are:

- Accumulation of ice and snow at missile launcher.
- Warm air and ground temperatures resulting in thawing.
- Heavy spring rains.
- Inadequate site drainage due to natural damming.

AFLC (OOAMA) has a modification requirement to improve the seal or possibly implement a new design seal. Until the problem is solved, the Air Force will have to cope with the spring weather conditions of 1972.

To preclude or reduce possible damage to Air Force resources, the following corrective actions should be continued or undertaken.

- *Continue or increase present aerial and ground inspections of sites before and during spring thaw.*
- *Review and evaluate for drainage conditions prior to and during periods of thawing.*
- *Implement snow removal plan when required.*

SAC Wing Commanders should:

- *Review the adequacy and effectiveness of the flood control plan.*
- *Ensure that all key personnel become thoroughly familiar with required tasks and responsibilities.*
- *Utilize the accident/incident/deficiency (AID) reporting system.* ★

REX RILEY'S CROSS COUNTRY NOTES

In spite of everyone's efforts, the major irritant to our transient troops remains the inability to obtain fuel in a relatively short period of time after landing. Nobody argues with the fact that VIPs should be refueled as rapidly as possible and that mission requirements take priority, but what is inexcusable is the fact that communication often breaks down between transient service and the refuelers. In one particular instance I was told we could expect fuel in ten minutes. This ten minutes lasted for two and a half hours. I was also told by one alert troop that it was the policy of the refueling section to wait until the aircraft had chocked before a fuel truck would be dispatched. There must be a reason for this, but I just can't think of a good one. In another case one transient troop thought the other had called refueling and vice versa. As a result nobody called.

ATIS INFO. In case you have a VHF radio or VOR aboard your aircraft, I strongly advise you to use it to contact the ATIS when arriving in high density areas. From this recorded broadcast you can get a neat bunch of information. For one thing it's a quick way to get a current weather status. If everyone would do this it would significantly reduce the amount of chatter in critical areas. Then when you get your controller, tell him (phonetically) INFORMATION RECEIVED. (Reference, FLIP Enroute)

PILOT TO DISPATCHER. Most of our bases have by now gone to the expense of installing a UHF radio in Base Ops and call it Pilot to Dispatcher. Normal freq is 372.2 mHz. However, we are finding that most pilots don't make maximum use of this facility. I recommend you call in as early as possible before landing and see if there might be some unexpected delays like an aircraft broke on the runway or excessive delays on refueling which might be avoided if you have enough fuel to divert.

TRANSIENT QUESTIONNAIRES. Knocking around the countryside and talking to Base Ops types we have come to the conclusion that only about 25 percent of the transient pilots are filling out the transient questionnaire. This is about the only tool that the bases have going for them except when I act as a go-between and forward comments that come directly to REX. Let's get with it and give the base something to work from. They are interested in improving their service, so let them know what's right and wrong. Your thanks for a good job does wonders for the transient troops' morale! ★

THE

REX RILEY *Transient Services Award*

LORING AFB	Limestone, Me.
McCLELLAN AFB	Sacramento, Calif.
MAXWELL AFB	Montgomery, Ala.
HAMILTON AFB	Ignacio, Calif.
SCOTT AFB	Belleville, Ill.
RAMEY AFB	Puerto Rico
McCHORD AFB	Tacoma, Wash.
MYRTLE BEACH AFB	Myrtle Beach, S.C.
EGLIN AFB	Valparaiso, Fla.
FORBES AFB	Topeka, Kans.
MATHER AFB	Sacramento, Calif.
LAJES FIELD	Azores
SHEPPARD AFB	Wichita Falls, Tex.
MARCH AFB	Riverside, Calif.
GRISSOM AFB	Peru, Ind.
CANNON AFB	Clovis, N.M.
LUKE AFB	Phoenix, Ariz.
RANDOLPH AFB	San Antonio, Tex.
ROBINS AFB	Warner Robins, Ga.
TINKER AFB	Oklahoma City, Okla.
HILL AFB	Ogden, Utah
YOKOTA AB	Japan
SEYMOUR JOHNSON AFB	Goldsboro, N.C.
ENGLAND AFB	Alexandria, La.
KADENA AB	Okinawa
ELMENDORF AFB	Alaska
PETERSON FIELD	Colorado Springs, Colo.
RAMSTEIN AB	Germany
SHAW AFB	Sumter, S.C.
LITTLE ROCK AFB	Jacksonville, Ark.
TORREJON AB	Spain
TYNDALL AFB	Panama City, Fla.
OFFUTT AFB	Omaha, Nebr.
McCONNELL AFB	Wichita, Kans.
NORTON AFB	San Bernardino, Calif.
BARKSDALE AFB	Shreveport, La.
KIRTLAND AFB	Albuquerque, N.M.
BUCKLEY ANG BASE	Aurora, Colo.
RICHARDS-GEBAUR AFB	Grandview, Mo.
RAF MILDENHALL	U.K.

Twice a year they come—like a gathering of the clan. But the occasion is not a celebration—although it has some aspects of a ritual. They are there for three or four days of head-knocking with one goal in mind: to ensure that USAF aircrews are getting the best possible life support equipment.

The participants are Life Support Officers from all the commands, and about a squadron of experts from the Life Support Program Office in ASD and the Life Support Systems Manager at SAAMA, Kelly AFB. The meetings are held alternately at Wright-Patterson AFB and Kelly.

The most recent conference was held at Kelly, 7-10 March, with the Systems Manager hosting the meeting. It began with presentations by Robert Shannon, Directorate of Aerospace Safety, on 1971 USAF ejection experience, and a preliminary summary of evasion and recovery experience in Southeast Asia. Shannon also discussed US Navy ejection experience with the ballistic spread parachute. Then the Command representatives took their turns at the podium. Mostly they stated problems and asked pointed questions about the status of required items such as new batteries for survival radios and beacons, better seat cushions, protective clothing, survival kits, helmets and so on.

But hardware is not the only subject. There was considerable discussion on the complexity of some of our life support equipment, the need for better education; questions on the adequacy of technical data and the need for abbreviated checklists for disassembly and assembly of items that require periodic inspection and replacement of components.

Many hardware items are straightline efforts, from statement of a requirement, through development, testing, procurement and delivery. But other items present knotty problems. For example, there are explosive devices (cartridge and propellant actuated) used in a number of applications in survival gear. These are small and seldom present much of a risk even when inadvertently fired. However, they *are* explosives and have had to be stored and handled as such.

LSOs in the field would prefer to store these devices in the life support equipment shops, for convenience, rather than in a far-removed explosives storage area. The matter was discussed at length during the conference. However, AFM 127-100, 2 December 1971, now permits this. Paragraph 4-12 specifically references explosives items in egress maintenance shops, and paragraph 5-17 covers Class I quantity distance items. (For an analysis of the changes to AFM 127-100, see "Keeping Up With the Times," page 30, this issue.)

Since both the SPO and the SM reported on perhaps 75 items each, there is not room here to comment on all of them. However, we'll mention a few to give you an idea of what's coming down the road. It is suggested that your Life Support Officer could obtain a spot during your next Flying Safety meeting for a quick rundown on items of particular interest to you and your mission.

- Custom fit helmet liner. This has been in OT&E and the final report is due this spring.
- Dual lens visor for AFH-1 ballistic helmet and HGU-2A/P, and HGU-22P helmets—should be available in some areas by the time you read this.
- B-52 headrest spacers. The SM is providing drawings for local manufacture, with April target date.
- Rerouting of oxygen lines and hoses in T-33A. The routing has been not only unsatisfactory but a safety of flight hazard; it will be changed. Kits for TCTO are scheduled for delivery between July and September, 1972.
- Single motion ejection initiation systems for the F-105, -101, -100 and -102. All of these have been approved and modification should be accomplished on all sometime this year or early 1973.
- Egress system improvements for F-101, F-5/T-38, B-52, A-37.

Other items being considered, developed or tested include a new letdown plate holder for SAC, a seat with a sleeping bag contained in the seat cushion, quick single point har-

LIFE SUPPORT CONFERENCE

ness release, fire retardant material for parachute canopies, lithium batteries that tests indicate are superior to current batteries for survival radios and beacons, Ventile fabric exposure suits, Nomex jackets.

Perhaps the most significant project now in progress is the development of integrated life support systems that will emphasize the integration of all life support equipment functions from design through operation. The overall project includes development of subsystems to fit into the general framework of the integrated system. It is an ambitious and far reaching effort, but perhaps someday . . . .

Meanwhile, the engineers, technicians, managers and users of the life support equipment the aircrews depend on get together twice a year in their head-banging sessions that can't help produce a lot of good things.

You get a little better appreciation of the effort that goes into our life support equipment when you consider that:

All of your clothing, from boots to helmet was developed, procured and furnished in life support equipment channels. Likewise, your ejection seat, survival kit, that parachute strapped to your back, the beacon in your chute, the survival radio, flotation gear, restraint gear and oxygen system. These are just some of the many things that make it possible for the aircrew to operate with a certain amount of comfort and confidence that, when the machine fails, not all is lost.

ED. NOTE: Impressions of this conference by a first-time observer:

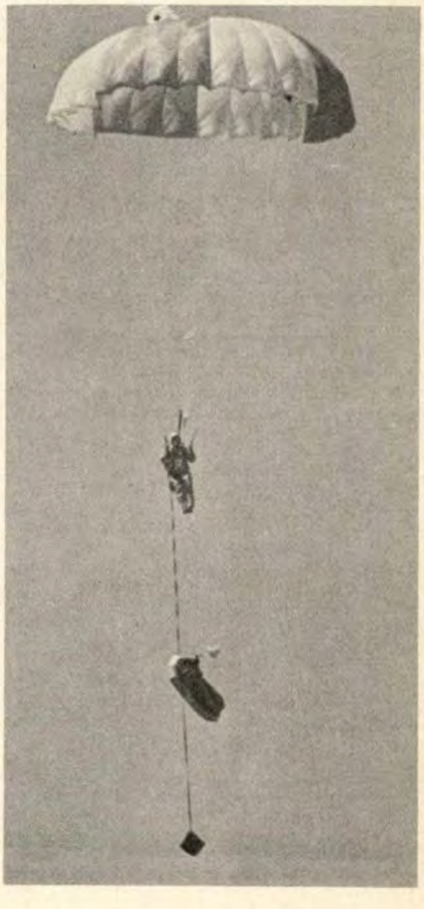
• Life Support Officers and NCOs from the Commands appear to really know their business and were very aggressive in stating their cases.

• There appears to be a need for the commands to be a little more definitive in stating requirements.

• Lead time on some new equipment and modification of existing items seems exorbitant (at least to a layman).

• SPO and AMA managers and technicians are highly competent and current; however, the system still seems to have some built-in inertia.

In sum, these meetings are excellent in that they bring together, face-to-face, representatives of the users, developers and managers. The payoff is a better break for aircrews. ★



TO SERVE THOSE WHO FLY

COL JOHN W. ORD, USAF, MC, Chief, Clinical Sciences Division

LT COL WILLIAM H. KING, USAF, MC, Chief, Flight Medicine Branch

School of Aerospace Medicine, Brooks AFB, Texas

Figure 1. The percentage of patients successfully returned to flying status, following evaluation by the Aeromedical Consultation Service, is presented for fiscal years, 1955-1971.

"What's it like to be a grounded pilot? He is like a stranded fish. A traveler whose passport has been lifted. Grounded is a dirty word . . . ."

These phrases introduce a new Training Film (#6522), currently being distributed throughout the Air Force for showing at flying safety and medical group meetings. It focuses upon the *man* in the man-machine system and upon a unique organization which assists the Air Force in resolving difficult medical problems among flyers. The Aeromedical Consultation Service at the USAF School of Aerospace Medicine, Brooks AFB, Texas, exists exclusively "To Serve Those Who Fly," a reference to the school motto and the title of the new movie produced by the Aerospace Audio-Visual Service.

Recently case number 10,000 arrived at Brooks to begin a three-day outpatient evaluation. The Consultation Service schedules no patients requiring hospitalization, but still it gets no easy cases. One or several questions concerning the patient's health status must be evaluated with reference to the aerospace environment in which he works. Any finding which might compromise flying safety or the capability for completing the mission must be thoroughly scrutinized. But the investment in a trained aircrew member is also weighed carefully, with conservation of the combat-ready force a primary consideration.

Figure 1 depicts the return-to-flying rate for patients evaluated by the Consultation Service during the past 17 years. During the early years of the service, one-third or fewer of the patients were returned to flying duties. During recent years, a return rate of almost two-thirds has been achieved. Efforts are continuing to study borderline medical conditions to determine criteria by

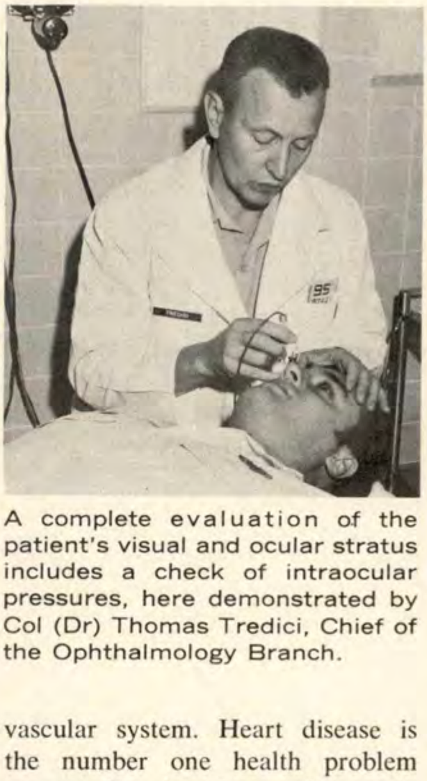
A baseline EEG is routine for all pilots and navigators evaluated at SAM. Here technician Sue Matthews and Dr Ed Liske, Chief of the Neurology Function, monitor the patient's response to mild hypoxia.

which individuals may be returned to duty without compromise of flying safety.

The majority of patients referred to the Consultation Service are pilots and navigators. But other aircrew members, air traffic controllers, physiological training technicians, Air Force Academy cadets and allied military flyers are eligible for referral. Candidates for the Aerospace Research Pilot School and other special flying programs (U-2, SR-71) are also evaluated, as were most of the astronauts during the selection phases of the NASA space flight program.

But the typical patient arrives at the School of Aerospace Medicine (SAM) because of a medical problem. It may have come to attention because of symptoms or it may have been discovered during the course of a periodic physical examination. In either instance the evaluation has been initiated by his base flight surgeon and approved by the surgeon of his major air command. The referral procedures are outlined in Air Force Regulation 161-23.

The most frequent type of problem concerns the heart or the cardiovascular system. Heart disease is the number one health problem among the American adult male population and flying personnel are not immune to its hazards. A disabling heart attack occurring to a pilot at the controls of an aircraft could have obvious disastrous consequences. There have been a sufficient number of such events in civil aviation to make this a serious consideration and not just a fanciful supposition. Therefore, a large portion of the efforts of the Consultation Service are devoted to the early detection of coronary artery disease, the process of narrowing of the blood vessels which supply the heart muscle. Over two hundred patients per year are referred to SAM for evaluation of their cardiovascular status.



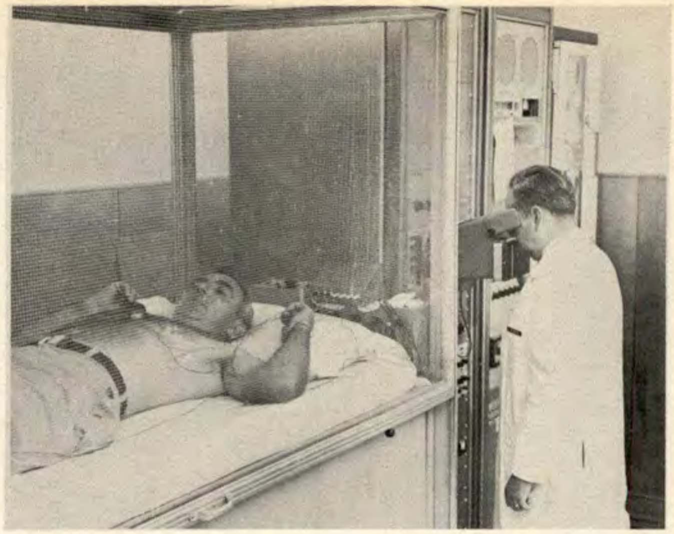
A complete evaluation of the patient's visual and ocular stratus includes a check of intraocular pressures, here demonstrated by Col (Dr) Thomas Tredici, Chief of the Ophthalmology Branch.

A key to the early detection of heart disease among the Air Force flying population is the USAF Central Electrocardiographic Library established at SAM in 1957. Copies of electrocardiograms, required for flying personnel upon entering training and annually after age 35, are funneled to SAM from throughout the Air Force. Over 700,000 records are currently on file, with an average of 125 new tracings received each day. Over a ten year period 72 cases of silent myocardial infarction, which might have gone otherwise unrecognized, were found upon review of routine electrocardiograms. But more commonly, comparison of serial changes in electrocardiograms from year to year give subtle clues as to the development of heart disease long before the appearance of clinical symptons, during the period when something can still be done to prevent its consequences and possibly to prolong the individual's flying career and life expectancy.

The second major category for referral to the Consultation Service includes problems related to the function of the brain or central nervous system, such as a disturbance of consciousness or history of a significant head injury. Vertigo, motion sickness, visual disturbances and emotional disorders are other common causes for referral.

In order to evaluate such problems, SAM is authorized staffing and equipment which are second to none in military medicine. Assigned

A special piece of equipment at USAFSAM is the Goldmann perimeter for the detection of any impairment in a pilot's field of vision. This study is being conducted by SSgt Dean Wright of the Opthalmology Branch.



The vectorcardiogram provides a three-dimensional look at the heart's electrical activity and supplements scalar electrocardiographic studies. The technician, Mr. Adolf Guzman, makes a permanent photographic record of the study.

physicians are trained in the specialties of areospace medicine, ininternal medicine (including cardiology, gastroenterology), ophthalmology, otolaryngology, neurology and psychiatry. In addition, consultations in other specialties are furnished as required at the nearby Wilford Hall USAF Medical Center. Special facilities at SAM include a low-pressure chamber instrumented for medical monitoring and for special x-ray procedures at simulated altitudes, and a human centrifuge to produce the accelerative forces of flight.

Tests at SAM differ from those usually performed at base level by the application of dynamic or stress testing in addition to baseline or resting studies. The testing situation and the results are made as meaningful as possible with reference to flying activities.

SAM is designated as a USAF repository not only for electrocardiograms but also electroencephalograms, recordings of the electrical activity of the brain. Sophisticated devices for the study of acoustical problems and the function of the inner ear or labyrinth and special photographic equipment for documenting diseases of the eye are included in SAM's space age equipment.

But the unique quality of the Consultation Service is the orientation of all members of the staff to the problems of flight operations and the total team approach to the evaluation of each patient. A flight surgeon is in charge of the over-all evaluation and brings together data and opinions from other specialties. Each patient has the undivided attention of his flight surgeon and consultants. Each case is presented to senior members of the staff at daily case conferences and the results reviewed by the branch and division chiefs. The Consultation Service does not take any short cuts. Each case is investigated thoroughly to the limit of medical capability.

The result in the majority of cases is a favorable recommendation for return to flying duties. With a continuous effort to refine criteria for measuring the effects of obscure disease, the trend is for greater numbers of patients to be returned safely to the cockpit. While the Consultation Service is not authorized to take final action with regard to the patient's flying status, a follow-up system is established to verify the decisions rendered by the Surgeon General and major air command surgeons.

The Aeromedical Consultation Service represents the focal point of the USAF Medical Service support of flight operations which rests on the foundation of the care rendered to each patient by his base flight surgeon. Unlike other medical facilities concerned primarily with the treatment of disease, the emphasis at SAM is placed upon the early detection and prevention of serious disorders.

In many areas there are opportunities for a flyer to help himself to decrease the risk of significant disease factors, e.g., by following a sensible weight control and exercise program, and by bringing medical problems promptly to the attention of his flight surgeon. Rather than delaying a checkup because of a fear of grounding (perhaps until a more serious complication develops), the flyer might take assurance that a dedicated effort will be made to resolve his problem and to keep him on flying status.

The Consultation Service recognizes that the Air Force mission is to fly and to fight with an alert and healthy pilot at the controls of each aircraft. ★

I'M JOHNNY

During the Berlin Airlift it was not all uncommon for us line pilots to find ourselves scheduled with a behind-the-lines type who needed his four hours for the month. And, because of the perennial crew shortage, their help was greatly appreciated.

Anyway, I reported in the 14th Ops one dismal morning (this was SOP at Rhein Main), was assigned a block time and tail number, noting as I glanced at the scheduling sheet, that I didn't have a copilot. However, just as I was about to throw a snide remark across the desk at the dispatcher, in walked a Captain type wearing the usual scruffy sheepskin parka. His question, "Could I get a little flying time?" immediately filled the void on the scheduling sheet and during the introductions I learned that he was an expediter (a term coined by one of Tunner's minions to explain the presence on the ramp of a man who informed you that you weren't going to make your block time—a fact which you were already well aware of). Anyway, to make a long story short, we slogged out through the mud, found the airplane, preflighted it and had one last cigarette while the Polish DPs finished tying down the coal. I took the left seat, briefed my copilot and engineer and fired up. Although I noticed my right seater wasn't exactly familiar with the checklist, and also didn't exactly sound like Lindberg on the radio, I chalked it all up to lack of practice because of his ground job.

The takeoff was normal, if chewing up almost the whole runway can be considered normal, and off we headed toward Darmstadt clawing for altitude. As we reported over Fulda, the first streaks of dawn appeared and by the time we hit Peanuts, it was truly Charlie Fox Baker (as we used to say) and GCA did their usual prime job of pointing us at the runway. I flared over the graveyard and made a landing even I was proud of, discounting the roughness of the PSP.

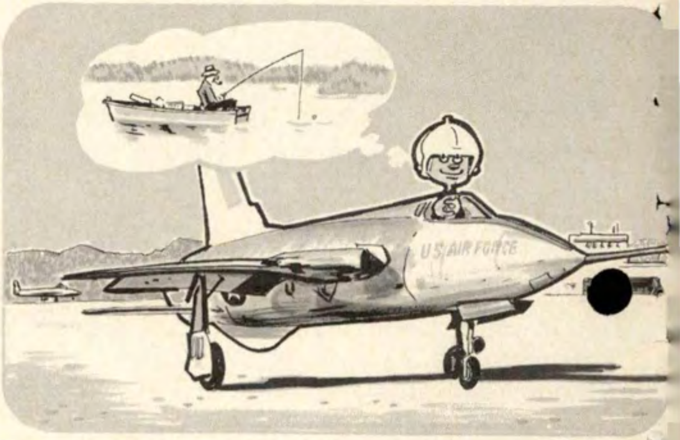
During the offload, while we were cocoaing up at the chow wagon, I asked my copilot if he wanted to take the left seat back to Rhein Main. He allowed as to how he'd enjoy that a bunch. I figured I would too, as his radio technique stank and he had a heck of a time managing the check list and GCA procedures at the same time coming in. Taxiing out, I again noted his obvious lack of practice in that he was rough as a cob on the nose wheel steering and when we stopped for runup, I actually thought he was going to collapse the nose gear strut! Fortunately, we were empty and there were no passengers walking around in the back end. Takeoff, considering all that had gone on before, wasn't too bad, really, although it took him about three thousand feet before he could establish any semblance of a steady climb speed. But, once we got to altitude and engaged George, his tracking etc. was damn good and we hit our checkpoints right on the money. Needless to say, all my previous IP experience and expertise were used in talking him through the approach and landing. Aside from one rather loud, terse remark relative to his "big flat feet off the brakes!" we didn't do anything to the bird to render it unflyable, and it was a tossup whether the landing should or should not have been entered in the Form 1 (781 to you zoomies). Frankly, I was more than a little relieved when he explained he had to get back to his jeep job and couldn't go another trip to Berlin. I lied when I shook hands and told him "I enjoyed it, let's do it again sometime," and he lied too and said, "Me too," and we both promptly forgot each other.

Epilogue: About a week later I happened to attend some function at the O Club and I ran into this same officer at the bar. He came up to me and shook hands, at the same time telling me how much he had enjoyed flying with me last week. It was then I noticed that his wings were peculiar—they weren't pilot's wings; they were navigator's! ! ! ★

-- FLY ME TO BERLIN

Psychological

WHEN YOU--



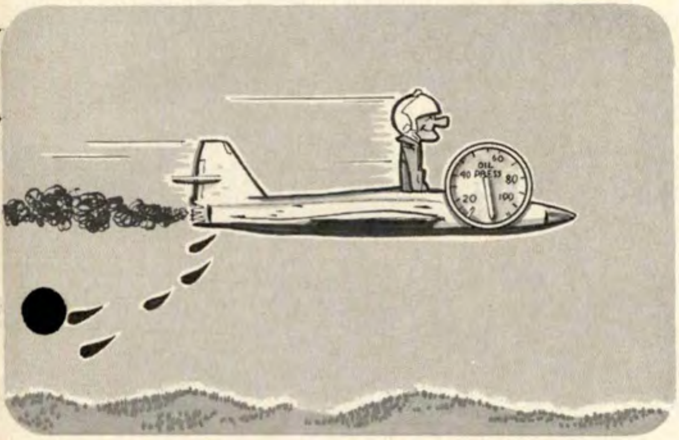
get complacent and decide that the sortie doesn't need your undivided attention.

just have to do something with your left hand after landing.

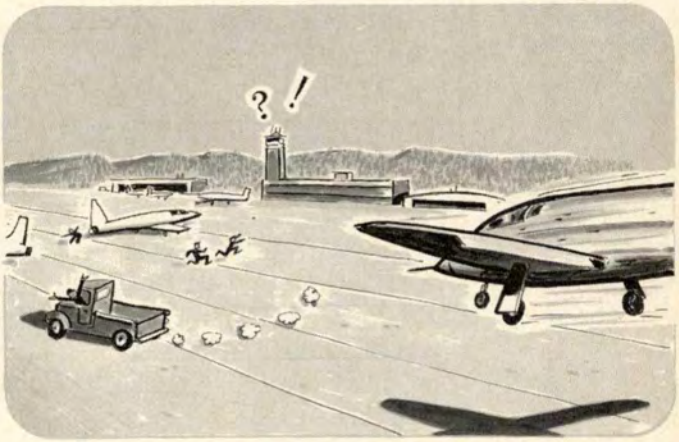
decide to heck with the weather, the flight is a real operational necessity.

SET

are determined to hit the target—with something!

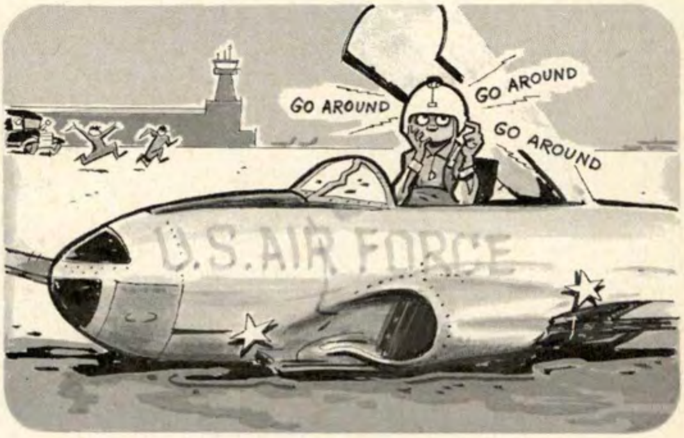


assume the gage is wrong and "It'll probably be okay."



have made up your mind to land on the first attempt—no matter what!

press on betting the weather forecast was wrong.



are so fascinated with all the chatter on the radio and the flares going off, you forget the gear.

six flameouts

Let's say you are in Maintenance and one of your birds develops what seems like an incurable disease. What would you do? Perhaps the following will provide some food for thought.

The first symptom of the disease started with a flameout of one of the engines on a T-38. The only thing you could find was low throttle cable tension which you corrected. Next day there was a repeat and again you adjusted the cable tension. Then number three flameout. This was getting serious, so you took the "if you can't fix it change it" approach.

The new engine seemed to have caught the virus because it promptly flamed out on two different flights. You reflect on the fact that two engines in the same bird have flamed out five times and decide that you had better go to the head doctor for guidance. Your major command comes down with directions to remove and replace the AB sequence valve, check engine alignment, check air seal clearance and rig the A-8 feedback cable.

Surely now, the patient will recover. And that seems to be the case during the FCF. About the time you relax, 1.9 hours after completion of the test flight you get the bad news. Yep, flameout number six.

Desperation sets in. You get the maintenance team together and announce that you are going to find out exactly what is wrong before you lose the patient. With tech data in hand you tear into the bird and come up with some very interesting ailments. The AB fuel control is out of rig. Fix! The right bleed valve is leaking. Fix! The right IGV rigging is out of limits. Fix! The AB sequence valve leaks. Fix! Engine alignment is 0.17 in. below maximum limits. Fix! The A-8 cable is out of rig. Fix!

Talk about sick birds.

Finally the patient is pronounced physically fit and ready to resume normal activities. You are happy to know that the bird is OR and making every scheduled sortie.

Think about this story. On six different occasions the lives of the crews were jeopardized and there was the possibility of losing the aircraft. That's pushing the odds a bit too far. You can shorten those odds on your bird by doing the job right the first time. ★

later

FUMES

in the cockpit

LT COL RUSSELL B. RAYMAN, USAF, MC, Directorate of Aerospace Safety

During the six-year period, 1 Jan 66 to 1 Jan 72, there were 55 reported cases of fumes in the cockpit. Forty-eight aircraft were involved: fighter (21), transport (17), trainer (9), helicopter (1). All the substances identified (see Table I) are, in some way, toxic and, therefore, threaten flying safety. Furthermore, a toxic substance is more dangerous in a confined cockpit.

TABLE I

Toxic Fumes in the Cockpit

Fumes	No. of Cases
JP-4	11
Oil	10
Electrical Fire	9
Oxygen Contamination	7
Carbon Monoxide	5
Unknown	5
Chlorobromomethane (CBM)	2
Hydrochloric Acid (HCL)	1
Naphtha	1
Ether	1
Methyl Ethyl Ketone (MEK)	1
Propane	1
Ammonia	1
TOTAL	55

It is unnecessary to delve into the pharmacology-toxicology of these noxious agents to make our point clear; a few generalizations will suffice. These substances can cause a number of symptoms to incapacitate a crewman: irritation and burning of the eyes, ears, nose, and throat; spasm of the larynx with difficulty breathing; headache, giddiness, and vertigo; nausea and vomiting; drowsiness and stupor. Often these symptoms are insidious. The pilot may notice the smell of "shoe polish" or "sweet air" and continue on the mission, slowly becoming dizzy and drowsy without realizing any performance decrement.

The fumes of JP-4, oil, or of an electrical fire may occur due to mechanical malfunction, and prolonged exposure may cause irritation of mucous membranes, dizziness, or stupor. These effects can be eliminated if the crewman, upon first detecting strange odors, begins breathing 100 percent oxygen or actuates the emergency bailout bottle.

In seven cases, the oxygen was contaminated by either methane, propane, ethylene oxide, paint, or dry cleaning solvent. In each case, the pilot reported an unusual odor during the flight. This can be particularly dangerous since the fumes are within the oxygen system itself. Therefore, there would be no alleviation with 100 percent oxygen. Only use of the emergency bailout bottle would be effective, or removal of the oxygen mask (providing cabin altitude was below 10,000 feet).

Carbon monoxide is particularly dangerous because of its toxicity. It can be formed by the incomplete combustion of organic compounds and it is often the by-product of fires. Although it is itself an odorless gas, other products of combustion that are simultaneously formed by fire do have an odor which warns one of impending danger.

The fumes of CBM, naptha, ether, MEK, HCL, and ammonia have been reported on transport aircraft. In most instances, storage containers were either improperly sealed or contained leaks. Crewmen transporting such dangerous cargo should be fully cognizant of its properties in accordance with AFM 71-4.

Of the 55 reported cases, two aircraft were destroyed due to fumes in the cockpit (carbon monoxide in an A-1E and electrical fire fumes in a B-57); several others narrowly averted disaster.

In summary, we aircrewmen must realize the potential danger of fumes in the cockpit. If foreign odors are detected, sound judgment rather than perfunctory disregard must dictate action. We do have alternatives: 100 percent oxygen, the emergency bailout bottle, removal of the oxygen mask, canopy jettison, abort if fumes detected on the ground and land if fumes detected while airborne. ★

ONE THAT DIDN'T HAPPEN

The cause of the following incident was internal failure of the aircraft battery. But the real story lies in how the pilot, through sheer professional competence, kept it at the incident level.

The aircraft was an F-4D, descending for landing at home base. During the descent, the rear cockpit suddenly filled with white smoke. Both crewmen selected 100 percent oxygen and the pilot dumped cockpit pressure, but the smoke didn't clear and the back seater was unable to read the checklist. The pilot made an immediate radio call to his wingman, informed him of the problem, requested a lead to home base for an immediate landing and turned his generators off.

When the generators left the line, the smoke stopped coming into the rear cockpit, the intercom went silent and the gear and flap indicators went "barber pole." The pilot suspected battery failure and extended the ram air turbine. Intercom was regained.

The crew turned off all electrical switches and checked all circuit breaker panels, but found no circuit breakers popped. The pilot turned on the generators again in an attempt to isolate the failed system, but smoke started pouring into the rear cockpit again and he turned them back off.

The wingman had declared an emergency and had led the F-4 back to the landing pattern. The pilot blew the gear down and made a no-flap, approach end, BAK-9 barrier engagement, engaging at about 150 knots. Rollout was normal, but rollback was experienced and the aircraft swerved toward the right side of the runway. The pilot applied left brake, but it didn't correct the right-side vector, so he immediately turned on his left generator to regain nosewheel steering, applied full left rudder to straighten the aircraft and turned the generator back off. After the fire engines arrived, he shut down the engines and the crew made a normal egress from the airplane.

Crew coordination, quick thinking and a thorough knowledge of aircraft systems saved the day—and maybe a bundle of dollars to boot.

ONE THAT BACKFIRED

Right after takeoff, at about 200 feet, the number two recip engine of the C-123K started backfiring. Normal procedures were used to shut down the engine, and the crew discovered during the shutdown that the mixture controls for both recip engines were in the AUTO LEAN position!

Ops

Both mixtures were returned to full rich, and number two was restarted and run at reduced power for the rest of the flight. As soon as restart was obtained on number two, number one recip started backfiring and it, too, was run at reduced power.

Due to the possibility that they wouldn't be able to get reverse power on landing, the crew diverted to another field with a longer runway, where the emergency landing was made without further incident.

It kind of makes you wonder what might have happened if they'd been in an unmodified 123 without the help those jet engines give. And we wonder why there's always someone who thinks he can do without the checklist!

COMMANDERS: Does this level of standardization prevail in your squadrons? This crew apparently followed checklist procedures only during their requalification check flights!

ρο

AND ONE THAT FELL OUT OF THE SKY

The pilot was upgrading in the A-7, flying a transition mission with an IP flying chase. On final, the IP noted 16 units AOA. In the flare the A-7 suddenly experienced an excessive sink rate. The pilot tried to compensate by rotating the aircraft to an excessively nose-high attitude, and ended up dinging the tail cone and the aft engine removal access door.

Winds at the time were varying all over the compass at 10-20 knots. A good bet is that the pilot encountered a wind gust during the critical portion of his flare.

AOA is an excellent landing aid under normal, stable conditions. But during gusty wind conditions, the proper gust correction should be added to the airspeed, and the airspeed—not AOA—should be the primary reference.

Besides . . . the correct way to salvage a questionable approach/landing is to add power and go around.

topics

AFTER THE MIDAIR

If you have never had to do a controllability check because of structural damage, the routine may seem pretty cut and dried. The usual steps are to put at least 10,000 feet of air between yourself and terra firma, set up landing configuration, and slow to near landing airspeed. If in the course of this exercise the aircraft becomes difficult to control, we note the critical airspeed and decide between ejecting or attempting to land. If we decide to land, we remember the control difficulty airspeed and try not to get that slow again until the wheels are rolling. Simple, isn't it? Simple, that is, until we consider one critical factor: the rate at which airspeed is reduced during the controllability check may be the difference between a successful recovery and disaster!

In reducing airspeed we are not trying to locate an airspeed at which control authority is insufficient to sustain or regain a desired flight attitude. That is an uncontrollable airspeed, and when we get there the paragraph in Section III entitled "Ejection" applies. What we are looking for when we slow down is a zone between full controllability and zero controllability, an airspeed range in which the airplane is telling us that pretty soon it's going to give up unless we speed up. The width of this marginal zone may vary with the situation, so what we are looking for is the earliest possible indication that the aircraft is getting difficult to control. We note that airspeed and recover to the controllable airspeed range. The point, then, is that we must reduce airspeed at a cautious enough rate that we do not pass too quickly into the uncontrollable area. If we aren't cautious enough, the score can quickly become airplane 1, pilot 0, without the pilot even getting at bat.

A second reason for slowly reducing airspeed during the controllability check concerns the need for accuracy in determining the control difficulty speed. The decision whether to eject or land rests on the feasibility of attempting to land at higher than normal speed. It's also nice to know the exact "no lower than" airspeed during the actual landing approach. If your idea of this speed is only a vague WAG because of a hasty controllability check, you still run the chance of losing it in the flare.

Successfully recovering your aircraft after a midair collision or other structural damage can be a stern test of your mental and motor skills. You can help your odds with a properly performed controllability check at altitude. An essential part of this is the careful and deliberate determination of control difficulty airspeed.

(ATC Safety Kit)

FLIP CHANGES

VFR Supplement/Aerodrome Sketch Book—United States:

Effective with the 25 May 1972 issue, the VFR Supplement and AERODROME SKETCH BOOK will be combined into a single publication. The VFR Supplement dated 22 July 1971 was the last issue of that FLIP in the present format.

A Military Aviation Notice (MAN) effective to 25 May 1972 has been issued in lieu of the scheduled VFR Supplement for 1 Mar 72.

The AERODROME SKETCHES dated 9 Dec 71 was the last issue of that FLIP in the present format.

All holders of the aforementioned FLIPs are requested to take extreme care in their handling to assure extended life until the 25 May 72 issue.

JOLLY GREEN PILOTS' ASSOCIATION REUNION
9-10 June 1972
Ramada Inn, Fort Walton Beach, Florida

For information contact: Major Clyde E. Stowell, 39 ARRS Wing, Eglin AFB, Fl 32542. Phone 872-3593 or (904) 244-5217.

NOT AWAKE YET?

It was one of those rainy, pre-dawn T-Bird launches. Everything seemed normal through the start, taxi, takeoff and climb, but when the pilot attempted to level off he found he couldn't retard his throttle past 98 percent.

He returned to home station and tried a surveillance approach (viz was a mile and a half), but the ASR approach lined him up too far right for a safe landing. He cleaned up the airplane and headed for a place with better weather.

At the alternate, the pilot lined up on a precision final and cut the fuel shutoff switch about 250 feet in the air, when he figured he had the field made. The touchdown and rollout were routine.

Maintenance inspectors found the intake covers in the plenum area jamming the throttle linkage. Neither the pilot nor the crew chief had bothered to remove the duct covers during their respective preflight inspections.

It's sometimes not too pleasant out there in the cold, rainy dark. But a checklist and a flashlight can save all kinds of grief.

WHO OWNS THE RUNWAY?

A recent incident at a joint-use airfield spotlights a potential trouble spot which needs airing.

A USAF bomber contacted the FAA control tower, advised them of an unsafe nosegear indication and declared an emergency. The crew requested and received permission to make a fly-by for a visual check of the gear. Tower advised that the gear appeared down and cleared the aircraft to break to downwind for landing.

When the aircraft was on downwind the tower requested that the aircraft make a short approach. Soon thereafter, a commercial airliner reported south of the field and was directed by tower to maneuver for landing on an intersecting runway. Tower advised the airliner of the emergency in progress.

Tower then cleared the airliner to land and directed the USAF aircraft to turn base. The bomber did so, then tower asked that he delay his turn to final as long as possible. The USAF pilot delayed as requested, then advised tower that he was turning final.

The USAF pilot continued his approach. The airliner continued his approach and landed—as cleared—on the intersecting runway. The USAF pilot made a go around from short final, was cleared for closed traffic and landed without further incident.

There's a lot of pressure directed at tower controllers to keep traffic flowing smoothly, and we recognize that the expeditious flow of traffic—particularly commercial traffic—keeps everyone happy. However, USAF and FAA regs agree that, when a pilot declares an emergency, he's entitled to priority handling. A little lost time is a small price to pay for the resolution of an emergency—even for a commercial airliner.

WHEN IN DOUBT CHECK IT OUT

On the second leg of a dual cross-country mission, the student pilot noted symptoms of hypoxia and had difficulty breathing (cabin altitude was 17,000 feet). The student switched to 100 percent oxygen and performed a PRICE check, but had to loosen his mask to facilitate breathing. The IP initiated an immediate descent to below 10,000 feet cabin altitude.

The breathing difficulty persisted, even at the lower altitude, and the IP completed an emergency landing out of an instrument approach. Investigation revealed that the front cockpit oxygen regulator had failed internally, restricting oxygen flow in both the normal and 100 percent position, and that the exhalation valve in the student's oxygen mask had stuck.

But here's the kicker: the student had noted breathing difficulty during the first leg of the flight! And he neither mentioned his problem to his instructor nor took the trouble to check out his equipment on the ground during the stopover.

ED. NOTE: Obviously there was a deficiency somewhere. We find ourselves wondering whether the student just didn't realize the potential seriousness of the situation—in which case the training provided him is subject to criticism—or whether he wasn't able, for some reason, to communicate his problem to his instructor—in which case the atmosphere for instruction leaves much to be desired. ★

Toots

is interested in your problems. She spends her time researching questions about Tech Orders and directives. Write her c/o Editor, Aerospace Safety Magazine, AFISC, Norton AFB, CA. 92409.

Dear TOOTS

TO 00-5-1, para 1-2(b) states: "TOs published in the form of work cards must be referred to during operations and maintenance of systems" . . . "items on work cards will be referred to as that inspection item is accomplished."

TO 00-20-1, para 4-42 states: "the inspection work cards outline the minimum inspection requirements" . . . etc.

TO 1C-130A-6, para 4 of the introduction states, in part, "maintenance personnel should observe both the equipment being inspected and the components in the surrounding area" . . . etc.

From these references I learn that:

a. Work cards are considered Tech Data.

b. Work cards must be used as inspections are being accomplished, item by item.

c. It is expected that the mechanic will check the surrounding area and components for discrepancies.

d. That during inspections mechanics will be involved with components that are not on his work card, but in this case it is okay.

e. In many instances, work is accomplished with no real Tech Data at hand.

Would you like to comment?

Old and Grey and in QC

Dear Old and Grey

Yes, I would like to comment. First, let's say you are inspecting the engine nacelle, work cards in hand. The card requires inspection of the fuel pressure transmitter. While inspecting this item, you perform the surrounding area inspection and discover the fuel cross-feed manifold leaking. No, you do not need additional tech data to cover inspection of this item.

Now once the leak has been discovered, it should be documented in the AFTO Form 781. Once the discrepancy has been discovered and documented, then you must have specific tech data available during repair.

Toots

PRIDE

Pride in workmanship is the mark of a special type of individual. What I call pride is the man who, after completing a job, goes back over it again to make sure everything is just right. I am confident that a great majority of our maintenance people possess this quality. There are, however, a few who are causing the rest a lot of headaches. These few include both mechanics and supervisors. You have only to read a few of the incident and accident messages to start wondering what happened to the pride of these few individuals.

To show you just what I mean:

- An F-4 had completed combat tactics and during descent the pilot could not move the control stick to the right. After a straight-in approach and landing, a Wiggins clamp retainer was found lodged in the right lateral control bellcrank.

- Number two engine on a T-38 would not rotate during start attempt. A number four turnlock fastener was found lodged in the third stage compressor section.

I could list more; however, the basic point is clear. A little more pride in workmanship could have prevented both these incidents. So be a professional; take that second look and insist that the inspector take a good look before signing the forms.

Toots

Tech TOPICS

BRIEFS FOR MAINTENANCE TECHS

overtorque

The mission was complete and the B-52 headed home, when a muffled noise was heard coming from the area behind the forward pressurized compartment and the copilot noticed cabin pressure slowly climbing. The crew went to 100 percent oxygen, declared an emergency, and made an immediate descent.

During descent the number one fuselage overheat light came on. The left forward alternator was turned off and RAM selected. The overheat light went out following these actions.

Maintenance had overtorqued a bolt on the hot air line support bracket to the point of stripping the threads in the nut plate. The bolt separated from the clamp which allowed the duct to vibrate until failure occurred, releasing 16th stage air.

It is extremely important that the integrity of the pressurization system be properly maintained. Tech data should be closely adhered to, and that means right down to the torquing of the last bolt. Remember, a chain is only as strong as its weakest link.

double entry

During climb check the A-7D pilot noted that wing fuel was not transferring. He leveled the aircraft and selected wing emergency transfer, but the wing fuel still would not transfer. Then the A.C. generator failed and would not reset. The RAT was extended, wing fuel dumped and return to base accomplished without further incident.

The problem soon became evident. The motive flow line quick disconnect couplings had not been reconnected following a starter change. The CSD oil reached an over-temperature condition and caused CSD decoupling. (EDITOR'S NOTE: For you who are unfamiliar with the A-7 fuel system, motive flow is fuel under pressure which operates the ejector pumps for fuel transfer. The ejector pumps have no moving parts and operate on the venturi principle. Motive flow fuel is also routed through the oil cooler to maintain operational temperature of the CSD oil.)

During removal of the starter the maintenance man had entered "starter removed and motive flow lines disconnected" in the same block of the 781. **Corrective action was to reinstall the starter.**

TO 00-20-5, para 2-86, states that only **one** defect will be entered in each block of the 781A.

COMMANDER: *It took years to develop the maintenance and documentation procedures spelled out in tech data. In the SAFETY business we know the price of deviations. That IN-basket getting you down? Spend an hour with QC and Plans and Scheduling some morning. Get refreshed on Forms 781 management. Try it—you'll LIKE it! S[o] will your unit.*

F-100 drag chute

When the pilot arrived at the aircraft the drag chute was installed, doors secured, and the safety pin attached to the side of the aircraft. During his walkaround the pilot climbed up and checked the sight hole. The cam and rollers appeared normal; however, the cable was noted coming out of the track at the retaining fingers where it goes under the butterfly doors. The pilot pushed the cable back into the track, and the compartment doors appeared normal with the lock pin secured.

On landing, the pilot was advised by the tower that his chute had dropped on the runway. The chute was recovered but the cable was missing. Maintenance had improperly locked the cable retaining jaws under the butterfly doors. The jaws had vibrated loose in flight allowing the cable to pull free. Due to the condition of the exhaust nozzle area it is believed that the cable had trailed behind the aircraft for some time before the nylon webbing frayed enough and the cable separated.

attention-prevention

Human error continues to take its toll in aircraft accidents and incidents. Often it is a case of some members of a team not knowing what the other members are doing, or in this specific case, not waiting until the all clear is given before proceeding with the operational check of an explosive system.

The aircraft was being prepared for loading of MK-82s. Voltage checks were completed at the wing stations and the crew moved to the centerline tank. One crewmember removed the tank safety pin, then reached into the aux air door area and discovered that the ejection gun cover was still installed, indicating the tank jettison system was armed. Before he could pass this information to the team chief, the team chief gave the signal to the cockpit man to actuate the switch. **The tank jettisoned.**

How could this explosive incident have been prevented? By following the step-by-step dearm and operational checkouts procedures in tech data. Personnel error set this one up in that the individual who dearmed the system failed to remove the centerline jettison cartridge. Personnel error also completed the chain that produced the incident. The team chief did not follow the step-by-step procedures in tech data. Deviation from tech data led to rush, and rush led to giving the signal to actuate the switch before all crewmembers had indicated they were ready.

wanted: good QC

LT COL DONALD J. SCHWENE
Directorate of Aerospace Safety

The C-130 was climbing in icing conditions. After the leading edge anti-icing checks were completed, the C-12 compass system indicated out of synchronization in MAG mode and remained intermittent and unreliable after resynchronization.

Investigation after landing revealed burned wiring for the C-12 compass, the leading edge anti-icing control, and the overheat and temperature indicating system. All bleed air and anti-icing manifold clamps in the left wing leading edge were loose and improperly torqued. The aircraft had recently been returned from a depot level maintenance facility.

This incident illustrates the necessity for stringent quality control at all maintenance levels up to and including depot.

C-123 oil leak

Everything was normal throughout the functional check flight on the C-123 until just prior to landing, when the number one propellor began leaking oil. The engine was shut down.

The problem was a defective spider hub (with a flat spot) that was installed in the oil control, which allowed the seal to leak. This incident was caused by lack of attention to detail during assembly. This and similar incidents indicate superficial attention to work requirements on the part of both maintenance technicians and supervisors.

F-4 gear problem

During GCA approach, when the landing gear handle was placed down all three gear remained up and locked. The circuit breaker was checked and cycled and the gear handle recycled, but the gear still failed to extend. The emergency extension system was selected and all three gear went to the down and locked position.

This F-4 had just returned from IRAN when TCTO 924 had been completed. During this TCTO, wire bundle 53-79252-124 was routed through the landing gear switch instead of over it, as required by the TCTO. This improperly routed wire bundle prevented the down switch from making electrical contact when the gear handle was placed down.

This incident was a clear cut example of not following technical directives. If the mechanic had taken the time to follow the procedures in the TO, rechecked his work after completion, and insisted on a second set of eyes checking the work, this incident could have been prevented.

despite the checklist

Two egress technicians, call them Chuck and Sam, were dispatched to remove the rear seat from a T-38 for a "G" suit hose change. The seat was dearmed in accordance with 1T-38A-2CL-1, Chuck reading the checklist and Sam performing the actual work.

Following seat dearming, the seat removal sequence was started in the same manner; Chuck read the checklist and Sam performed the task. After completion of item 12, Sam stood in the cockpit facing aft and proceeded to lift the seat. As the seat reached a point approximately 12 inches above the full-up position, the lap belt M-32 initiator fired.

How does an incident such as this occur? Let's go back and take a look at just what happened.

During the dearm sequence when Chuck called for the M-32 lap belt initiator safety pin to be installed, Sam installed the pin around the communication cable next to the initiator and, when the seat was raised, the initiator bell crank contacted the oxygen quick disconnect body and activated the initiator.

How can this type incident be prevented? This unit has instructed all egress personnel to inspect the installation of the safety pin with a mirror during the dearming sequence. They will also tie the safety pin streamer to the oxygen hose. Sounds like a good idea.

torque it, tiger!

A review of recent incident reports indicates we are having the same old problem of many maintenance troops not using torque wrenches as required by the tech order.

Why will a maintenance man use the tech order to install an item or make rigging adjustments, then fail to follow it while torquing the item?

Here are a few examples of incidents involving improper torquing we receive daily.

• F-4D. PC-1 hydraulic failure in flight. The PC-1 pump return line was found loose. The threads had been stripped from overtorquing

• T-37. Overheat light on in flight. Hot air leak due to insufficient torque on bleed air line clamp.

• B-52G. Number one engine oil pressure fluctuation; engine shut down in flight. Oil filter assembly drain plug stripped by over-torque.

Supervisors, how do your shops measure up? Do your troops fully understand and follow the instructions in the tech order? How do you verify your torque wrench calibration? Reference TO 32B14-3-1-101.

Tech Topics

crew chief

The next time you preflight your aircraft ask yourself a few questions. Am I preflighting the aircraft in accordance with tech data? Or am I using untested and unproven methods? Am I giving 100 percent of my attention to the job or am I just going through the motions? When you sign the 781, ask yourself if there was anything more that you could have done to make this a safer flight. **Would you strap in behind the pilot with no second thoughts as to the condition of the aircraft?**

Remember before you were designated a crew chief, you had to exhibit certain qualifications, such as knowledge of the aircraft and its systems, proper use of tech data; you were also judged on personal qualifications such as integrity, maturity and sound judgment.

The supervisors who designated you a crew chief were confident that you possessed these qualifications. Don't let them down, prove in every task you perform that you are the professional crew chief they judged you to be.

cross-threaded "B" nut

Immediately after liftoff, the F-4 pilot noticed that airspeed was not increasing normally and vertical velocity was less than normal. As the climb continued the airspeed slowly decreased to zero. A T-39 joined up and accompanied the F-4 during the landing approach.

Cause: The pitot static system failed due to a leak at the pressurized compartment bulkhead fitting. The "B" nut that connects the hose fitting was cross-threaded. So what's the answer? How do we prevent cross-threading? The answer would seem to lie in well-trained, conscientious people and first-class supervisors.

airborne quality control

The gages were all in the "go" range as the FCF pilot released brakes, and the T-38 accelerated for takeoff. Line speed—good; liftoff—just right. The FCF card ought to be nothing but check marks on this one. Gear up. No problems. Wait a minute, now. The red light is still on in the gear handle. And what's that funny noise? Rats! Must have a gear door hanging. Out of burner, gear down, and uneventful landing.

Troubleshooting quickly revealed that the gear torque actuator hoses had been improperly connected. They had been crossed, which is a clearly stated "no-no" according to TO 1T-38A-2-8. Considering the frequency of maintenance error occurrences resulting in premature mission terminations, this one would be hardly worth reading about, except for one nagging thought. How did the red X get cleared?

Now we are looking at not just one man's mistake, but two. One man did the work wrong, and another looked at the work and said it was right. And there is more. We wonder how the bird got through the ground operational check for gear retraction. Or did it even get a retraction check? TO 1-1-300 says it should have.

The accident prevention argument in this regard is simple. We don't like it much, but we have to agree that "to err is human." That is why we have quality control. That is why we need well qualified people to inspect work and sign off red Xs. That is why we require system ground operational checks. If we can catch these human errors on the ground we will prevent maintenance factor flight accidents.

(Adapted from ATC Safety Kit) ★

EXPLOSIVES

KEEPING UP

SOME IMPORTANT CHANGES IN AFM 127-100

The cover of the new AFM 127-100 looks just like the old one, but in between there are many important changes. Some of the more significant changes are listed below, in chapter-by-chapter form. Of course, a thorough study of the new manual is a must for everyone involved with explosives.

CONTENTS:

• The contents section has been expanded, and the index in the back of the book has been deleted.

CHAPTER ONE: *Introduction*

• A whole new section has been added covering administration, engineering, training and evaluation.

• The commander must appoint a *qualified* safety representative to manage the program.

• Each organization involved with munitions must appoint both an Explosives Safety Officer *and* an Explosives Safety NCO.

• More detail is devoted to the requirements for Unit OIs.

• The Base ESO must maintain a map showing locations of explosives by class and quantity, clear zones, transport routes, and waivers and deviations.

• The Wing/Base Commander must provide for a formal inspection of all explosives locations at least once per month. Inspection guidance is now included here, rather than in TO 11A-1-41.

CHAPTER TWO: *General Safety Precautions*

• Live explosives may not, of course, be placed on static display. It is now also prohibited to render live explosives inert for that purpose; static displays must be built up from inert components.

• Explosives area boundaries must now be posted at 300-foot intervals, rather than 500-foot intervals.

• Information on waivers and deviations is now included in Chapter Eleven.

CHAPTER THREE: *Fire Protection*

• It's now mandatory that each fire station maintain a map showing all explosives areas and their applicable fire symbols and hazard markers.

• All personnel likely to be involved in firefighting or munitions storage must be trained in the interpretation of symbols and markers.

• Locations having 1000 rounds or less of Class 1 small arms ammo need not be posted with fire symbols, nor posted on the fire stations' maps.

• General parking areas must be at intraline or greater distances from explosives locations.

• All operating support equipment, including portable air compressors, generators, etc., should be located 50 feet or more from explosives.

• Wording has been expanded on chemical munitions warning signs, making the identification of var munitions easier.

CHAPTER FOUR: *Storage*

• It is no longer permissible to use excess magazines for storing general stores. A segregated area must be set aside *exclusively* for the storage of explosives.

• It is no longer required to post AFVA 127-2 at storage spaces inside the base explosives storage area.

• Flammable liquids *may not* be stored with explosives.

• More detailed instructions have been included pertaining to storage in explosives assembly operations, egress shops, gun shops and chemical agent storage areas.

• Storing Class One and Two Munitions with riot control and smoke agents is now authorized.

• Non-lethal chemical munitions may be stored with other munitions under the Group 100-2 provision.

CHAPTER FIVE: *Quantity/Distance Criteria and Related Standards*

• The chapter has been extensively revised to present material in an orderly sequence.

• All "(T)" class designations have been deleted.

• There are significant changes in table 5-10 and Class Seven explosives, and in the tables for ha group IV missile launch and propellant static test stallations. Close review by those involved is warranted.

GORDON S. TAYLOR, Directorate
of Aerospace Safety

SAFETY WITH THE TIMES

• Class Seven POL safety distances must now be computed on the basis of unbarricaded stores.

• Quantity/Distance criteria for concrete-covered aircraft shelters has been added to the chapter.

CHAPTER SIX: *Electrical Hazards*

• Electric power transmission line standards no longer apply to miscellaneous explosives locations such as survival equipment rooms, egress shops or arms rooms.

• The point of measurement is now from the nearest *conductive* point on the building (metal window frames, lightning arrestors, metal doors, etc.)—not from the nearest point on the building.

• The agency which tests munitions storage lightning protection systems must now furnish a copy of their report to the user, so that he may document compliance with inspection criteria.

• Specific details and requirements are given for grounding aircraft for explosives load or unload operations.

• The section covering hazards of electromagnetic radiation has been revised. Of particular note are the shorter distance considerations and the computation of electro-explosive device safety distances. An easier-to-use nomograph is provided.

CHAPTER SEVEN: *Transportation*

• The manual now requires that hazard classification be assigned to explosives prior to any transportation.

• Additional guidance is provided for controlling incoming explosives shipments.

• On-base explosives movement routes must be designated and must avoid built-up and key facilities.

• Environmental/ecology controls have found their way into the manual; note that the maximum carbon monoxide concentration for any eight-hour period has been reduced from 100 parts per million to 50.

• Only one fire extinguisher is now required on each transport vehicle (although two are still preferred).

• Data have been included for placarding vehicles transporting chemical munitions and vehicles in host-nation countries.

• Explosives-loaded vehicles may not be held more than 24 hours in holding yards.

• Extensive changes have been made in the portions covering vehicle delivery and rail shipment of munitions.

CHAPTER EIGHT: *Site Plans, Construction and Utilities*

• The manual now requires submission of site plans for bare base and limited base locations, with allowance for operational contingencies.

• Reinforced concrete walls have been further devalued to 425 pounds per single cell (better check your multicubicle magazines).

• Sandbag type walls have been reduced from the formerly required six feet to five feet thick.

CHAPTER NINE: *Chemical Munitions and Defense Biological Research Samples*

• Information on chemical markers and firefighting procedures have been moved to Chapter Three.

• The new binary chemical munitions are now covered in appropriate sections of Chapter Nine.

• The chemical hazard symbol "D" is no longer required for napalm munitions, and Smoke Signals require no chemical symbols (except for HC Smoke, which needs the symbol "B" plus a single diagonal).

• References to use of copper sulfate in first aid kits have been dropped.

CHAPTER TEN: *Manufacturing and Loading of Explosives*

• No significant changes.

CHAPTER ELEVEN: *Waivers and Deviations*

• Provides expanded guidance for preparation and submission of waivers and deviations.

• Much of the information in Chapter Eleven was drawn from the old Chapter Two, but it is easier to locate now that it is in a separate chapter. ★

ENGINE MAINTENANCE RUNS

Each year valuable USAF assets are destroyed or damaged during maintenance engine runs. Almost without exception the individuals involved either were not fully qualified for the task or omitted a portion of the engine run checklist.

What constitutes a "qualified" individual? AFR 60-11 spells out the basic requirements for aircraft operation on the ground for all personnel.

This regulation states: ". . . no person may start, operate, warm up, or test engines installed in aircraft except:

"(1) Rated or student pilots who have been checked out in the particular aircraft or who are being supervised by a qualified instructor pilot or flight examiner.

"(2) Qualified mechanics who have:

(a) Familiarized themselves with the flight manual for the aircraft and engine involved.

(b) Received practical instructions in starting and ground operation of engines on aircraft involved, operation of brake systems—both normal and emergency—and radio operation and procedures.

(c) Demonstrated their proficiency to one of the following: a qualified maintenance officer, maintenance superintendent, standardization/evaluation flight engineer/mechanic, or instructor pilot who will certify the qualification by making an entry in the records of the airman concerned."

Annual requalification is mandatory unless required more often by the individual's supervisor. Maintenance supervisors, quality control personnel, and safety officers should make this area an item of interest to insure only qualified individuals are operating their aircraft and engines.

(TIG Brief No. 4, 10 Mar 72)

"NEAR MISSED APPROACH," FEB ASM

I read with interest the "Near Missed Approach" article on page 18 of your February 72 issue. Your statement, "no one on this crew had a very high regard for his own safety or for the loss of combat effectiveness," may be an unfair appraisal. Although the pilot should have initiated a missed approach sooner, especially if he were in a rain squall area and advised to do so by GCA, he nevertheless may have read his altitude as much higher than he actually was.

We all remember that question on the annual instrument written test about flying into an area of lower pressure. It asks, "are you higher or lower than your altimeter indicates?" The answer, of course, is that you are lower than the altimeter says you are.

I have had at least two rather hairy experiences on final approach where my altimeter told me I was well above DH for a PAR but in reality I was just about flying into the ground.

The B-66 pilot made a mistake by continuing his approach under the circumstances and transitioning to TACAN at only three miles from the field. However, I really wonder if the altimeters on the airplane indicated anything near terrain level when he struck the power line.

Yes, we can learn something from this incident—when the GCA controller says "radar contact lost" and one is in heavy rain, especially squall type rain, he should not rely on an altimeter for accuracy. Lots of things are happening in a rain squall and one of these things for sure is the possibility of a very inaccurate altitude indication.

Lt Col Tom Doyle
McChord AFB, Washington

Your point is a good one; rapid barometric changes near the ground can be very dangerous. No one on the crew in question, however, denied or rebutted the contention that they all allowed the aircraft to descend below minimums. The phrase "TACAN Approach/Missed Approach" was taken from the pilot's testimony, and indicates to us that he was putting off making a decision until he saw how things worked out —and that attitude has cost us a lot, over the years.—ED.

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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.

Sergeant LEWIS A. LOPES

523d Tactical Fighter Squadron, APO San Francisco 96274

On 16 July 1971 Sergeant Lopes singlehandedly extinguished a tire and brake fluid fire on a C-118 aircraft. As the C-118 was preparing to take the active runway, Sergeant Lopes, who was chief of the quick-check arming crew, noticed that the left main tire had caught fire. He immediately ran in front of the burning aircraft and signaled the pilot to stop. By this time, spraying brake fluid had fed the fire, and flames were shooting out the rear and above the aircraft's landing gear, threatening the wing structure. Sergeant Lopes took a fire extinguisher, rushed to the landing gear and extinguished the flames.

Sergeant Lopes' alert response to this emergency saved a valuable aircraft from further damage or destruction and prevented the aircrew from suffering injury or loss of life. WELL DONE! ★

USE IT

OR

LOSE IT