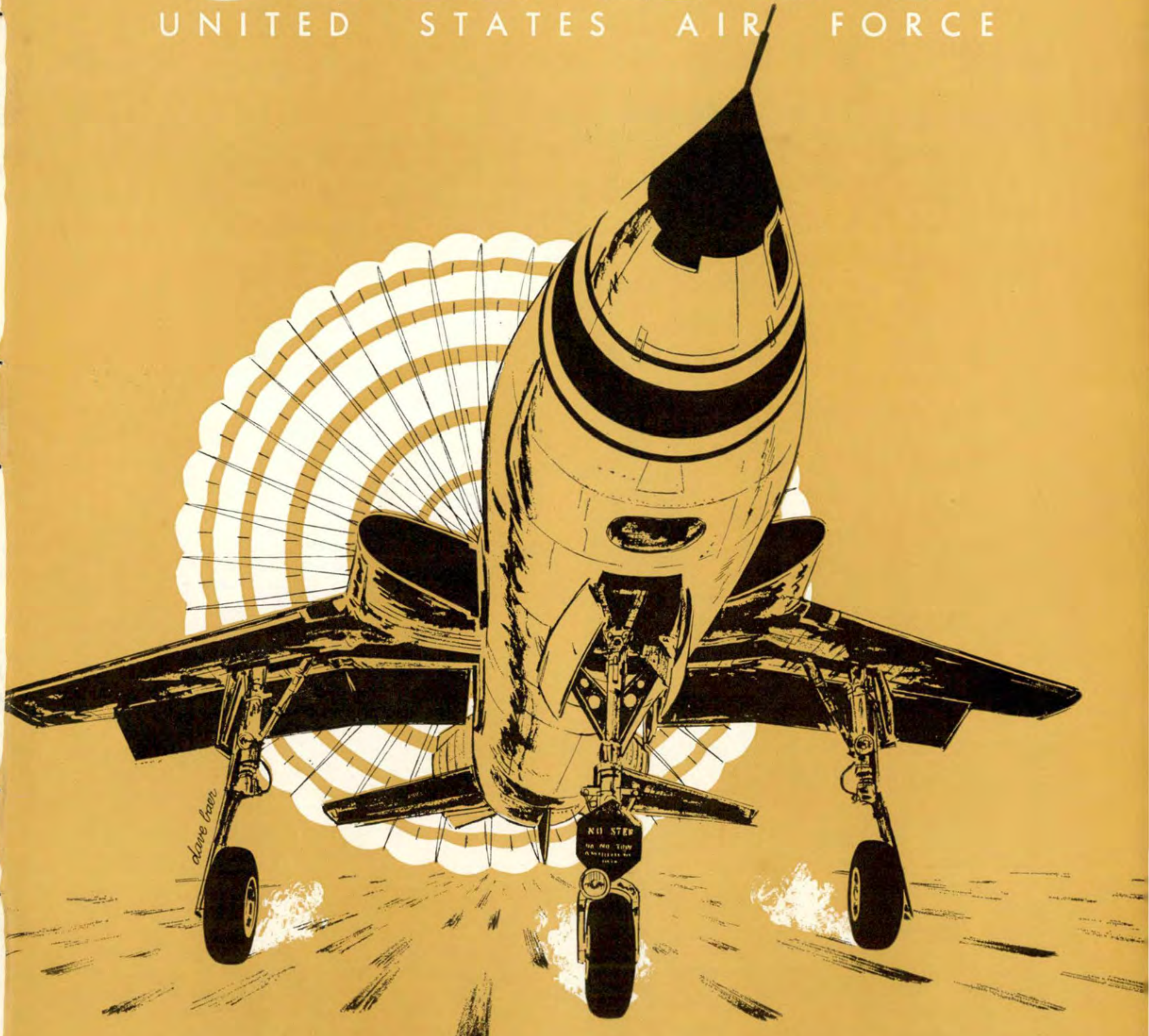
April 196

AEROSPACE SAFETY

UNITED STATES AIR FORCE



F105 Landing Techniques

WET WEATHER TIPS

WHAT DO YOU DO when it becomes necessary to pack up the gear, wife and kiddies and haul the birds off to a different clime? Depends on a lot of things, but if you're going from the Mojave desert sands to an "it rains here every afternoon" climate, you might want to know something about how to live with such weather.

The transition to clouds-on-clouds presents some operational problems to pilots who are used to clear and forty every day and haven't seen a cloud bigger than a powder puff for several years. When your new base is near the ocean you have some additional problems, mainly concerned with corrosion.

Considering these things quickly impels those responsible to dig into their memories as to "how we used to do it at good old Seaside AFB." Another big assist can come in the form of advice from those who have been living with the problem.

One tactical fighter outfit faced with the aforementioned situation did just that. They asked for help from PACAF and got the following in reply from Clark AFB. Although some specifics might not apply, e.g., F-100 drag chutes, there are some good general pointers and the fighter wing receiving this information was kind enough to pass a copy to Aerospace Safety to share with all units.

OPERATIONS

All flying operations are closely supervised through a Wing Supervisor of Flying, located within the Wing Operations Center (WOC); a Unit Clearing Officer, located within squadron operations and base operations; Mobile Control Officers qualified in each type tactical jet aircraft airborne; and a Weather Observer, located in a weather tower on the flight line, who continuously observes and reports weather to the Base Weather Station. Primary communication facilities as well as back-up facilities are installed between all the above agencies. WOC flight-follows all cross-country flights.

Weather recall procedures are contained in a Wing Regulation. The recall is initiated by the Wing Supervisor of Flying or the Unit Clearing Officer based on continuous weather-watch reports received from the Mobile Control Officers and the Weather Tower Observer. The call is broadcast from the Control Tower, RAPCON, GCI, and the Air-to-Ground Gunnery Range.

MAINTENANCE

Unusual maintenance difficulty during the rainy season is experienced in three primary areas: drag chute, engine afterburner, and fuel quantity systems.

To reduce failures in the drag chute system, vertical and horizontal teleflex cables (P/N 21-12075 and P/N 223-73706) are changed at 50-hour intervals, and the aft control box (P/N 12280) at 200-hour intervals, or more frequently if binding is evidenced when checking in accordance with applicable tech orders.

Afterburner failure rates triple during the rainy season. The main system problems are exhaust nozzle control valve (P/N 21-379636); afterburner igniter (P/N 21A-352343, and P/N 21-302229) failures; and sticking eyelids and eyelid actuators.

To help alleviate the problems, tailpipe covers are kept in place as much as possible, and definitely during all rain. The AB eyelids are actuated manually by operating the exhaust nozzle control valve during initial engine run each day; after last run each day the eyelids are pushed open before putting the tailpipe cover in place. Spraying the eyelids and rollers with liquified graphite has also proved beneficial.

Consideration is being given to changing the afterburner (rear portion, birdcage) on the 100-hour post flight inspection to help eliminate some of the intermediate aft section removals for eyelid and eyelid actuator replacements.

FUEL

The majority of fuel quantity problems are caused from atmosphere, rain or condensation, in the probe areas and transmitter. All probe covers are being removed, the area dried with ground heaters, and then the probes and wires are painted with a moisture and fungus resistant (S/N 8010-840-7494). Probe covers are reinstalled with new gaskets, cap screws torqued evenly to insure a good seal, and the area around the cap is varnished. Wires and connections on the transmitters are also being painted. ★

Lieutenant General W. H. Blanchard
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IN THIS ISSUE

T-Bird Tale of Accidents

OUR T-33 EXPERT has come up with some figures that should be of interest to all T-Bird drivers. These statistics are just that, so interpret them as you will. Regardless of the interpretation, we must admit that a lot of aluminum has been spread across the landscape.

MAJOR ACCIDENTS

1949	1950	1951	1952	1953	1954	1955
4	22	64	152	286	311	340
1956	1957	1958	1959	1960	1961	1962
293	244	164	133	73	77	39

The archives show the first four T-33 major accidents occurred during 1949. Including those, the total through 1962 was 2203. The T-33 is over the hill in both numbers and age. By phasing documents, our inventory of 1884 T-Birds will decrease to zero at the end of the next ten years.

There are some who appear to be determined to hasten the bird's demise. A review of 1962 experience shows that pilots are too frequently losing control of the aircraft at low altitude. Nine accidents accounted for 60 per cent of the T-33 pilot fatalities. Seven of these accidents occurred in the traffic pattern or during acrobatic maneuvers. Items:

- The pilots were buzzing and were observed to slow roll.
- An aircraft was flown into the ground.
- After making a flyby for a gear check the pilot racked the aircraft tight on the break and crashed short of the runway killing both occupants.

Five pilots were killed in three accidents in which the aircraft were stalled in the traffic pattern.

DTIG has recommended to SMAMA that a representative number of T-33s be given an alignment check to make sure the birds are not getting stretched out of shape. Meanwhile, T-Bird pilots, look to your proficiency. It's your necks. ★

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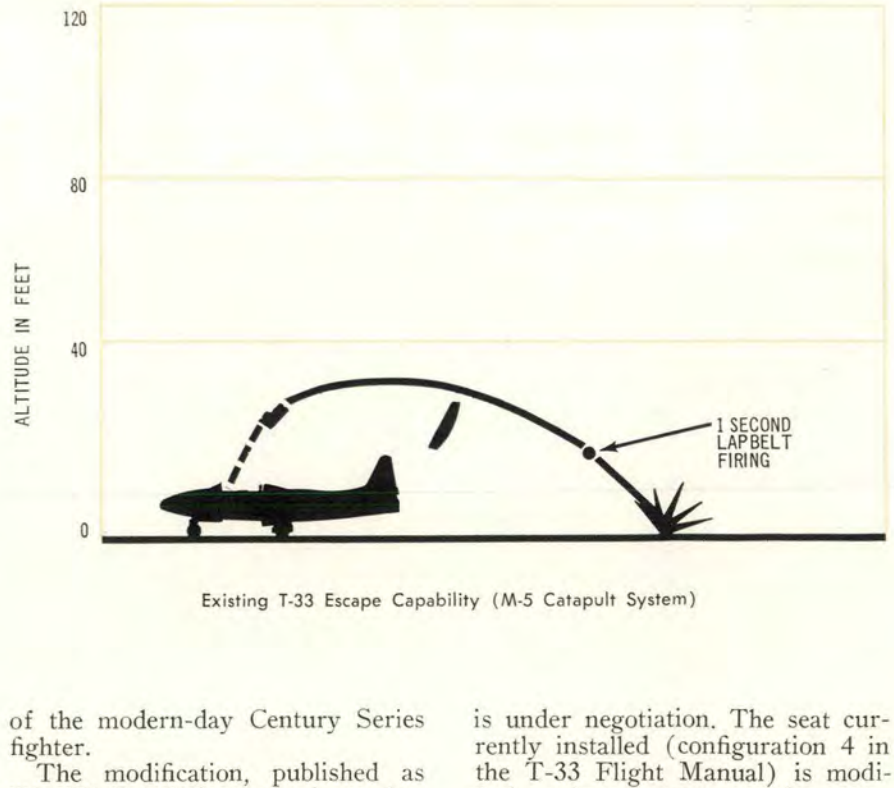
Volume Nineteen Number Four — USAF Recurring Publication 62-1

more KICK in the t-bird seat

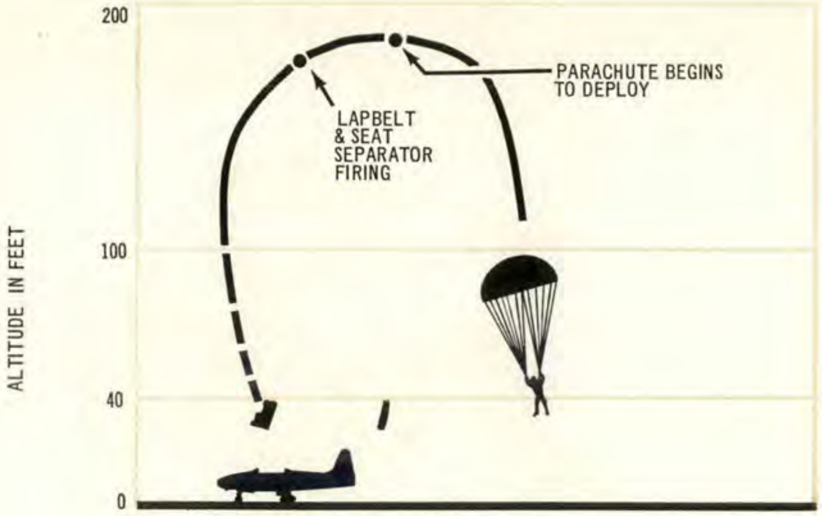
W. W. Richards and Dennis Brinkworth
Lockheed-California Company



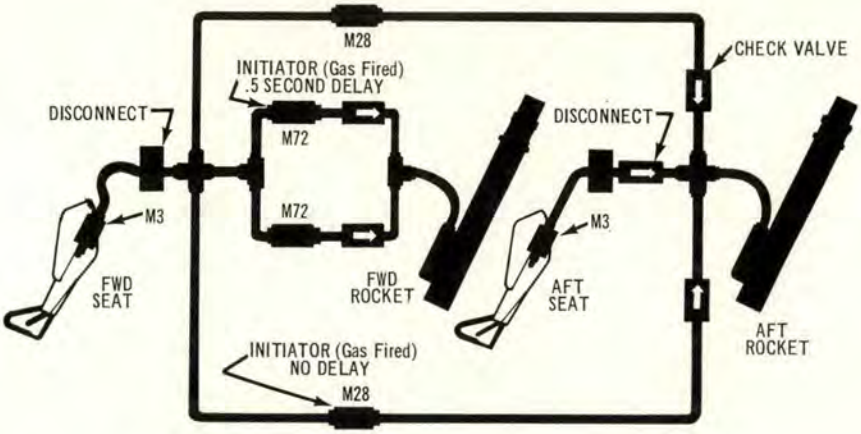
Existing T-33 Escape Capability (M-5 Catapult System)

THE HISTORY of the T-33A aircraft indicates that AF Serial 51-4040 was the first production trainer in the USAF inventory to be equipped with ejection seats. As the design and efficiency of escape systems progressed, so did the T-33A escape system. The progress was accomplished with many modifications of the original ejection seat and canopy jettison systems. The configuration in current use has a minimum ejection altitude of 100 feet at a minimum speed of 120 knots IAS in straight and level flight. Now the T-Bird escape system is again undergoing modification, by the Lockheed-California Company on an expedited schedule, to give it the zero altitude capability of the modern-day Century Series fighter.

The modification, published as TO 1T-33A-615, results in an improved escape system that will retrofit all USAF T-33A aircraft. Retrofit of MAP country T-33A, RT-33A, and Navy T-33B aircraft is under negotiation. The seat currently installed (configuration 4 in the T-33 Flight Manual) is modified to incorporate a rocket catapult, a seat/man separator, and the MA-6 inertial reel. The rocket catapult is designed to provide a zero-elevation capability with a minimum



New T-33 Escape Capability (Rocket Catapult)



T-33 Ejection Sequencing

of 90 knots IAS. Seat trajectory peak varies with aircraft speed at ejection. Trajectories demonstrated by the sled tests using 5, 50 and 95-percentile dummies varied from a maximum of 199 feet at 93 knots IAS to a minimum of 80 feet at 400 knots IAS. Ground-level escape capability was demonstrated at 90 knots and at 240 KIAS. Successful escape was demonstrated at 400 KIAS, however, *not* at ground level. The total thrust duration of the catapult rocket is approximately ½ second. One second after seat ejection begins, the seat/man separator is actuated. The parachute is deployed automatically when the man leaves the seat.

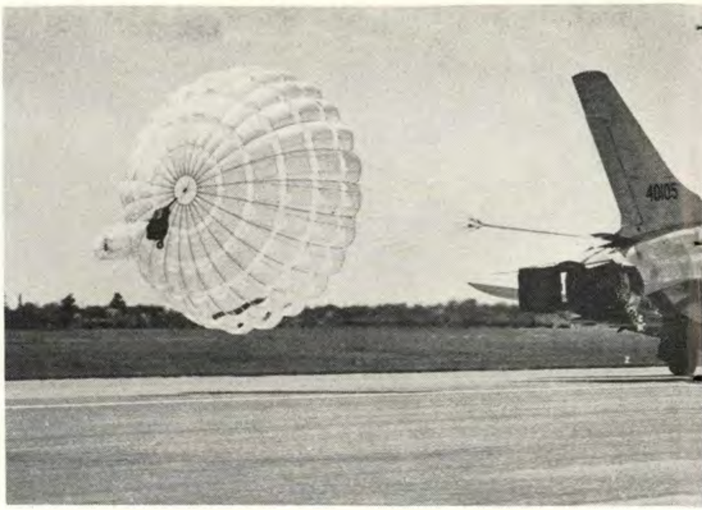
The ejection seat controls are so arranged that any time the forward cockpit ejection seat trigger is squeezed, the forward and aft seats are ejected in sequence. Squeezing the aft cockpit ejection trigger causes only the aft cockpit seat to eject. A sequencing system is provided so that when the forward cockpit ejection seat trigger is squeezed, the aft cockpit seat ejects first, followed by the forward cockpit seat ½ second later. Thus, the aft cockpit occupant will not sustain burns from the forward cockpit seat rocket blast during ejection.

Sequencing is accomplished by connecting the M3 initiator in the forward seat armrest to an M28 instantaneous gas fired initiator which fires the aft seat rocket catapult and an M72 ½-second delay initiator to fire the forward seat rocket catapult. The secondary canopy jettison system is modified by relocating the T-handle to the right-hand side of the instrument panel center stand in each cockpit and routing the teleflex cable to the external canopy jettison M3 initiator. Each T-handle may be pulled independently to jettison the canopy. This provides a true backup system in the event the primary M3 initiator fails to fire.

A command ejection selection system is provided to ensure against any ill-advised or inadvertent dual ejection by a student pilot occupying the forward cockpit. The system consists of inter-connected control levers mounted on the right-hand sill in each cockpit. The levers are mechanically connected to a locking device which locks or unlocks the forward cockpit seat right-hand armrest. When the levers are in the aft command position the forward seat right armrest is locked so that it cannot be raised.

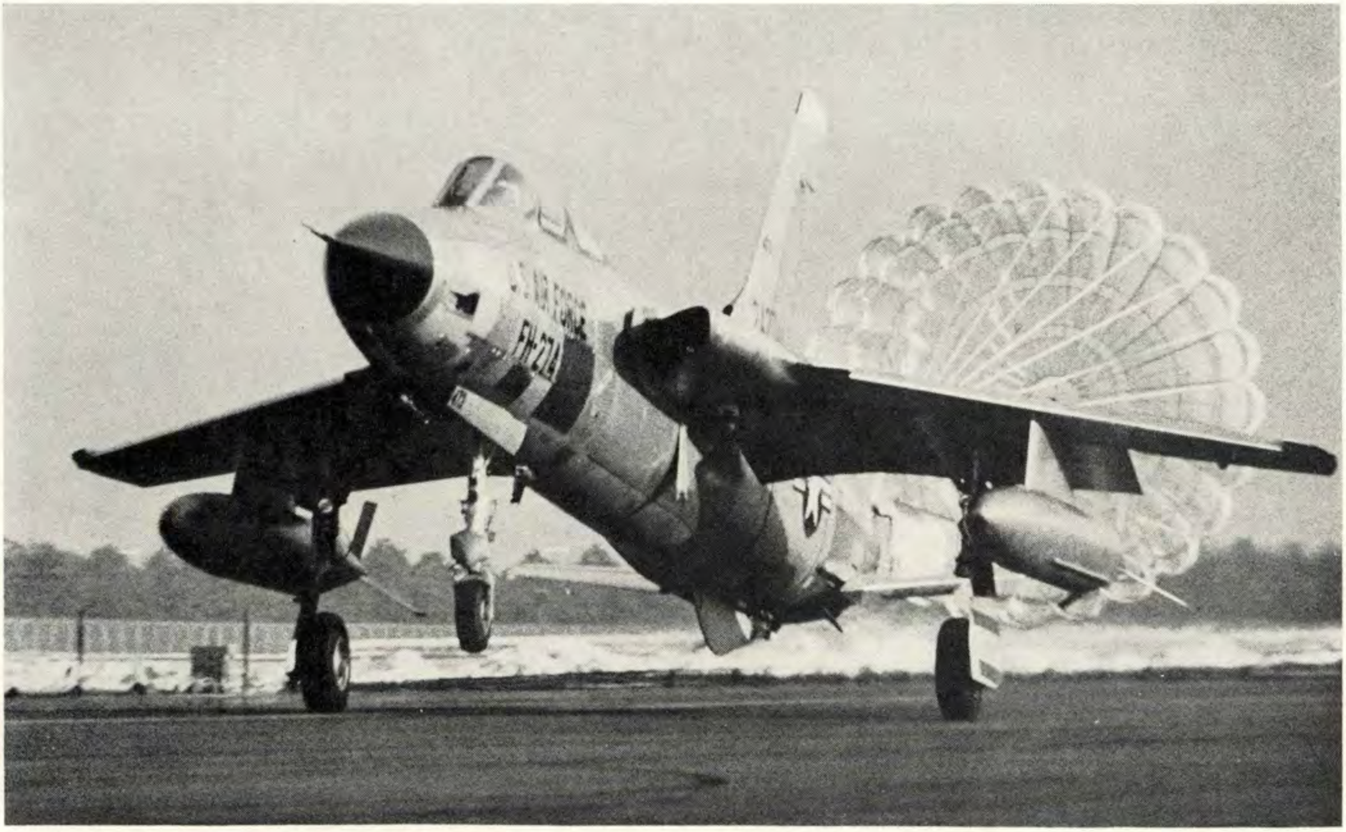
Thus, the canopy cannot be jettisoned nor the seat ejected using the ejection seat right-hand armrest controls from the front cockpit. However, it is not necessary to move the levers to the forward command position after the aft occupant ejects, because when the aft seat leaves the aircraft a tripper releases the forward cockpit seat right armrest locking device so that the forward occupant will be free to eject himself when he chooses. When the levers are in the forward command position, both seats are ejected in sequence under control of the forward cockpit occupant; however, the aft cockpit seat can be ejected at any time, regardless of the position of the command ejection selection levers. ★

F-105 Landing Techniques



WHEN TALKING about minimum landing distance in the F-105, the question is often asked as to which is more effective: holding the nose off or dropping the nose immediately and getting on the brakes. And does it help to raise the flaps after touchdown? And what technique is best on a wet runway? This article will attempt to answer these questions.

Slowing of an airplane after landing depends upon the sum of the forces acting on the airplane. For a minimum landing roll, minimum thrust and maximum drag will provide the best results. Idle thrust is obviously the minimum thrust which can be used in day-in and day-out operation. The drag or braking force on the airplane is made up of two parts: first the wheel brakes; and second, aerodynamic drag. Considering wheel braking, the braking force which can be generated depends on the coefficient of friction



Bill Wait

Assistant Chief Flight Test Engineer

Republic Aviation Corporation

between the tire and runway, and the proportion of the airplane weight being supported by the tire to that still being lifted by the wing. Aerodynamic drag is dependent upon two factors — the attitude and configuration of the airplane and the indicated airspeed.

The minimum landing distance on runways of different coefficients of friction requires different techniques. On runways which have a high coefficent of friction (dry) the best performance will be realized by maximum dependence on the wheel brakes. On a slippery runway (wet), with a low coefficient of friction, the wheel brakes are less effective and the best results can be realized from greater utilization of aerodynamic braking.

The consideration of these factors results in the recommended techniques described in the flight manual for the F-105 airplane. The high speed portion of the ground roll is the time to utilize aerodynamic braking since the indicated airspeed is high with consequently high aerodynamic drag for effective braking. The drag chute is particularly effective in this speed range. In the case of the F-105 the drag chute absorbs about 60 per cent of the total energy of a normal landing. High angle of attack and full trailing edge flaps, the combination which provides maximum aerodynamic drag, does reduce the weight on the main wheels and consequently this reduces the wheel braking which can be applied without skidding the tire.

As the indicated airspeed falls off, the aerodynamic drag also decreases and a point is reached where greater total braking force can be exerted if the maximum aerodynamic drag is sacrificed by reducing the angle of attack and lift, thereby putting more weight on the main gear for greater wheel braking. At this point, if maximum performance is desired, any lift increasing devices such as the flaps should be eliminated to get maximum weight on the wheels. However, in the case of the F-105, the lift created by the trailing edge flaps in the three point attitude is very slight and the small additional wheel braking is compensated for by the residual aerodynamic drag of the extended flaps. On wet slippery runways, when wheel brakes are not effective, an advantage exists in keeping the flaps down to retain the highest aerodynamic drag possible. On dry runways with high coefficients of friction, there is a little net advantage to retracting the trailing edge flaps when the nose is lowered to obtain maximum weight on the wheels for braking, but this advantage will be less than 500 feet and in most cases 100 to 200 feet. Therefore, it was considered that the advantage of a single procedure, resulting in optimum characteristics when the greatest difficulty would be encountered in stopping the airplane (slippery runway), would more than offset the very slight disadvantage of this single technique on a dry runway. A secondary consideration in the recommendation to retain the deflected flaps during the landing roll is that the flaps would not have to be lowered again in case a go-around was required.

In summary, the Flight Manual says to use the following procedure for landings in the F-105.

1. Touchdown at recommended speed.
2. Throttle — idle.
3. Drag chute — deploy.
4. At 130 KCAS — lower nose.
5. Brakes — as required.

The only change made to this procedure, due to adverse runway conditions, is to hold the nose off as long as possible on slippery runways in order to utilize maximum aerodynamic braking. ★

• • •

"Never saw traffic so heavy . . . Can't even get a word in on Guard."

THE LOST ENGINE

Left to Right: Hole in the ground and remains of the lost engine, the crew, two views of the nacelle with something missing. Crewmen in second photo are, l-r, 1/Lt Richard T. Barrows, Navigator; Capt Carryl B. Clement, Pilot; Capt Harry W. McCabe, Copilot; Capt Thermon O. Jones, Radar Navigator; Capt John A. Forrester, Engineer. Not shown is SSgt John W. Bennett, Gunner.

SO FAR AS THE CREW WAS CONCERNED, the night of October 17 culminated several days planning for the SAC "Bar None" mission. The crewmembers met in Ops for the final, detailed pre-takeoff briefing, then proceeded to the aircraft to give it a thorough preflight. The crew chief pointed out that Nr 7 engine had just been locally overhauled and that Nr 8 had also just been installed after a depot rebuild.

Takeoff roll was started at 2120. Decision and unstick speeds were reached as predicted. The pilot called for flaps up. As the copilot called the last 30 per cent, the gunner reported sparks were coming from the flap well in the vicinity of the Nr 4 pod. His assumption was that the flaps were binding, but as the flaps reached the UP position, a severe explosion rocked the aircraft.

The flash temporarily blinded both pilots. The gunner reported Nr 8 on fire. The fire warning light for Nr 8 engine came on. The pilot reached out to chop the throttle as the copilot pulled the firewall switch.

Fire, streaming over the starboard wing, gave the appearance of a developing wing fire. All crewmembers checked their equipment, having been forewarned by the pilot of possible bailout.

At this point the gunner called out, "We just lost number eight engine!"

"Yes, I know. We just cut number eight," the pilot acknowledged.

"No—I mean we lost it! It fell off," explained the gunner. He finally convinced the pilots.

Two and a half minutes after takeoff, the Nr 8 engine separated from the aircraft and fell to the ground.

Command Post and Ground were informed of the emergency. Frequencies and runways were kept clear in case an immediate landing was necessary. The air-

Capt Carryl B. Clement
93 Bombardment Wing
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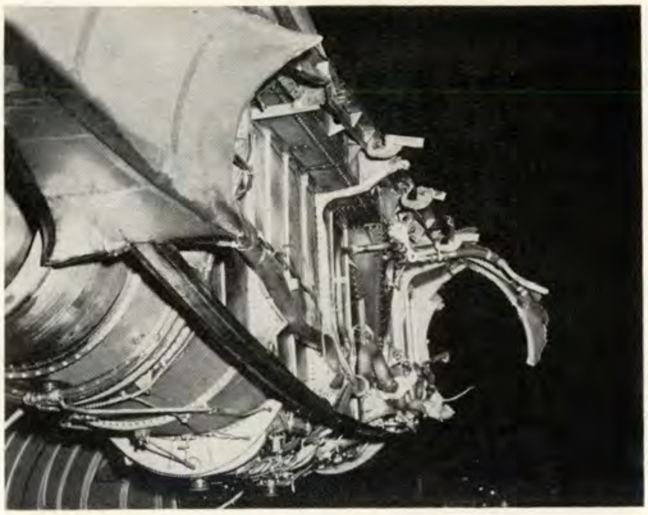
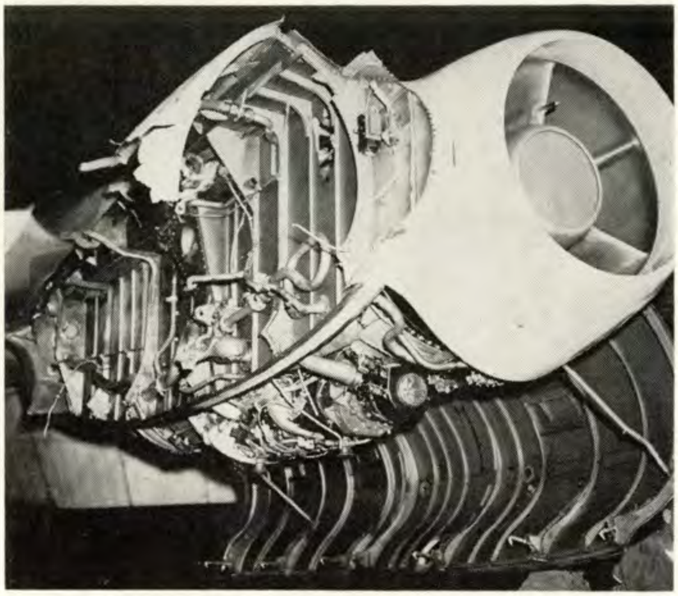




craft commander assigned monitoring duties to everyone: radios, continuous scan of the right wing, aligning the radar cross hairs on the end of the runway in case an immediate landing became necessary, airspeed and altitude.

Nr 7 had also been shut down because of the fire and the loss of Nr 8. All fuel was isolated from the Nr 4 pod. However, fuel continued to pour into the slipstream from the area of the right drop tank. The fire had gone out and, except for the fuel leak, this had become a nearly "normal" emergency. At approximately 1000 feet, the pilot was able to add enough power to begin a shallow climb. Aircraft controls responded satisfactorily.

With the emergency somewhat contained, what next? After radio consultation with the Wing Commander in the Command Post, it was decided that the aircraft would be flown in the local area under radar surveillance at 4000 feet to burn off fuel and achieve a lower gross landing weight. Factors affecting this decision were:

- The fire was out.
- Aldis lamp confirmation of the loss of Nr 8 engine had been obtained, and at no time had there been a fuselage fire warning light.
- The aircraft had adequate power and controllability—the pilot was able to maintain both lateral and forward-aft CG by use of trim.
- Fuel drippage was from the extreme outer edge of the right wing.
- Weather was forecast to remain good.
- Overall multi-jet B-52 experience and maturity of the pilot.
- The main factor which ruled out immediate landing was the marginal six-engine rate of climb, should a go-around be required.
- For more than two hours the aircraft orbited. "Howgozit" performance data were worked up for the aircraft in its landing configuration.

At 2330 a successful landing was made. The aircraft was stopped straight ahead and the crew evacuated. The fuel leak was in the right drop tank, which had been punctured by pieces of the exploding engine. Fire prevention washdown of the engine, wing and immediate ground area was made. The lost engine was located in a farmer's field.

Suggestions:

By Captain Carryl B. Clement, AC: "The first item on the red bordered pages of the good book — the Dash One — is the most important. 'Stop and think!' Of course you know what to do after you have thought it out. And give each crewmember something to do. This will keep hands off the ejection seat handles."

By SSgt J. W. Bennett, gunner: "It is important to keep the entire crew up to date as the emergency develops because some crewmembers cannot see the entire situation and have to judge from what they hear."

By Captain T. O. Jones, navigator: "It is essential that all crewmembers be informed of the aircraft's altitude. It will aid in successful ejection and help prevent early ejection." ★

THIRD MAN THEME

Above right, 1/Lt Ronald C. Anderson, navigator, 55 WRS, McClellan AFB, takes a fix. Below left, 1/Lt Donald W. Huff, navigator, 53 Transport Sq, passes flight information to the copilot prior to takeoff.

EIGHT YEARS AGO, one rainy night, a transport aircraft began an IFR approach to a Pacific Island. The pilot reported out of three thousand. He was cleared to two thousand, but did not acknowledge. Observers saw the aircraft descend over radio towers, landing gear extended, landing lights on. Sixty-six were killed when the plane exploded against the face of a mountain nine and one-half miles north of the intended base of landing. Investigators expressed the belief that the radio towers had been mistaken for radio range station towers — both had the same lighting system.

Last year, at another Pacific Island, another transport crashed during an attempted instrument approach. This time the aircraft was on course, just 1000 feet too low.

. . . And in between there have been many other like accidents.

In an attempt to find out what can be done to prevent such accidents from happening to perfectly good airplanes flown by qualified crews, we queried MATS. As the following points out, they put much stock in the navigator.

"Navigator to pilot — over Shad intersection at 0145, ETA Sea Isle VOR 0225, fly the 325 radial of the Sea Isle VOR." From this it sounds as though the navigator's job is finished. The flight from Lajes to Dover has reached controlled airspace and letdown for Dover will begin upon reaching the Sea Isle VOR.

That may have been the way it was done once, years ago, but not any more. It would seem pointless for a person to complete 95 per cent of a project, then close up shop and quit. However, that is the case when a navigator spends eight or ten hours guiding an aircraft across an ocean, only to turn off his equipment, fold up his charts and put his head on his arms.

This business of navigator monitoring works on departure as well as on arrival. The heart of monitoring is a comprehensive briefing, including emergency plans, such as returning to the airfield after takeoff. To monitor the progress of the aircraft effectively the navigator must know what is planned. He learns this as the aircraft commander gives the before-takeoff or before-approach briefing. Prior to takeoff he must have the SID before him and must know how the radios will be set up on navaids. He copies all clearances in order to verify that the pilot reports correctly and complies with all instructions. With the aircraft commander busy flying and listening to instructions from ground controllers and with the copilot changing communication frequencies, tuning and identifying navaids, plus of course the challenge and reply checklists, a third man to constantly check the aircraft's flight path provides a sizeable safety contribution. Transposition errors such as, cleared to 2700 feet, heading 120, aircraft actually flying heading 270, altitude 1200, are far less likely to occur. It has happened. Don't bet your life on its not happening again.

In radar equipped aircraft the navigator can make an even greater contribution. Radar provides an excellent means of checking position and terrain clearance. Though the APS-42 wasn't designed as an aircraft detection device, a good set does quite well. The navigator has much more experience and time to tune in a sharp return. From an Aircraft Accident Summary we learn, "An aircraft was cleared for an IFR takeoff (200-foot ceiling and one-half mile visibility). Shortly after takeoff the aircraft struck a hill two miles from the end and one-fourth mile to the right of the runway. The aircraft was destroyed by impact and fire. Investigation revealed no materiel failure. The primary cause of the accident was attributed to pilot factor in that the pilot failed to maintain his outbound track." In this case the pilot either drifted off his heading or turned too soon. A monitoring navigator should have noticed this, and possibly prevented the crash.

There's a job for the navigator on airways, too. Particularly in congested areas, 500 feet too high or too low can make the difference between life and death. Policy in one unit is for navigators to call 50 feet above or below assigned altitude. Monitoring of UHF and VHF frequencies on airways allows the navigator to keep track of all instructions relayed by ground controllers. These often have to do with altitude changes and clearances to reporting points.

But, when all the hours of empty ocean are behind, when landfall is made — this is the critical period. Fatigue has had a chance to do its insidious work, mental relaxing is a natural tendency and getting every one "up" for the last crew effort provides the AC with a real challenge. A case in point . . . the aircraft commander was advised that destination weather would drop below the two-mile visibility minimum. He continued and began the approach with one-fourth mile viz and a partially obscured sky. Inbound to the airfield the aircraft began to disintegrate due to unexpected contact with the terrain. The plane was destroyed by its self-generated fire three hundred yards short of the runway. Primary cause was listed as pilot factor in that the pilot descended below published minimums. The aircraft had operated normally in all respects prior to the crash. Would this accident have been prevented had the navigator called 50 feet above minimums?

Prior to arrival over the last fix before destination, the type of approach should be decided upon and the procedure outlined on the letdown plate reviewed. The navigator should have his own copy of this plate and should complement this with a local area chart. He should know, before descent begins, all pertinent information — field elevation, runway headings, relationship of obstacles to the field, emergency safe altitudes and, of course, approach procedures. As the approach progresses he monitors the radios — UHF, VHF and interphone — as well as headings, altitudes and relative aircraft position. The navigator may never be called upon to say a word. He's like the backstop on the baseball field, or the spare tire on an automobile, a useless item until a need arises. But to have him and not use him would be like turning an ILS off while making a GCA.

In addition to repeater indications of pilots navigational instruments, the navigator on radar-equipped aircraft has a real ace in the hole. With radar he can monitor such sophisticated approaches as ILS; he can point out, or at least monitor, ranges and bearings to the field, or more important, range and bearing of obstacles. These obstacles might be high terrain, weather or other aircraft, any one of which could serve as the disastrous obstacle to a safe landing. Radar also provides him with a good cross check of the accuracy of other navigation systems — ADF, VOR, TACAN, even GCA—systems which he has checked and assured are tuned and identified as briefed by the AC.

Some of the more modern aircraft are equipped with Doppler radar. Drift and ground speed indicators of this equipment are particularly valuable. The navigator can pass drift information to the pilot and ground speed to provide the all important, accurate ETA which means a better planned approach. Using search radar the navigator can give directions for flying an approach. With doppler he can set information for an automatic approach similar to the ILS coupler approach.

If you plan to initiate the navigator into the departure-arrival team there are a few difficulties that, forewarned may mean forearmed and smooth this phase. First is the area of attitudes. If there are those who have the idea, "He's the pilot, that's his responsibility; I'm the navigator, that's my responsibility, and ne'er the twain shall meet" . . . get the ungarbled word to these troops. Second, since navigators get little formal training in the intricacies of airways and instrument flying it is essential that navigators be completely conversant with all flying regulations and procedures. Third, navigators, especially the least experienced, show a reluctance to approach the pilot with the suggestion that he might be wrong. Standboard navigators and pilots can correct this situation. Fourth, provide the navigator with his own set of publications. If necessary, the navigator can copy pertinent information from the pilot's plates, but a duplicate set is more satisfactory.

Above, navigators Maj Edgar M. Parmentier and Capt Stephen A. Byrne, Jr., discuss their flight prior to departure from Dover AFB. Below, 1/Lt William P. Pannell, navigator, 85 Air Transport Sq, Travis AFB, lays out the tools of his trade.

THIRD MAN THEME

CONTINUED

Why not use this third man as a second pilot? The navigator has acute hearing and vision, is highly trained in planning and monitoring the path of an airborne aircraft, and has little else to do during departure and arrival. The antennae of his receptors can be locked on heading, altitude, airspeed, clearance, compliance. No mag drops or tailpipe temperatures distract him while a transmission is received from New York, San Francisco or Tokyo. If you have this third man, put him on your team! ★

* * *

CREDITS: The above article is a consolidation of material provided by MATS navigators: Lieutenants Joel V. Falk and Thomas O. Myers, 1607 ATW; Captain David K. Totten and Keith M. Bratton, 62 TCW (H); Captains Walter Huff and Donald Kilkemeier, 1601 ATW.

ABORT!

EVER WATCH THE PROS ON THE GOLF CIRCUIT? If so, every once in a while you will see one get set for a shot, then, for no apparent reason, step back, relax a moment, then again take his stance and hit the ball. When this happens it is because something occurred to break the golfer's concentration as he was getting ready to make the shot. Remember, these are professionals — an amateur would probably not back off, but would make his swing and miss the shot.

Admittedly, the professional who makes his living at the game has more at stake than the amateur. He is playing for money.

Now let's compare the golf pro with another kind of professional, the aircrewman. When the golfer gets careless and goes ahead when everything isn't just right, he loses money. When the airman goes ahead when everything isn't just right, he may lose his life.

Following are some cases in point:

During takeoff and at about 105 knots the pilot of the twin engine transport noted an unusual vibration. He aborted the takeoff. During deceleration, and at about 70 knots it was observed that the Nr 2 propeller was missing. There were no injuries to crew or passengers and only the lower cowling of the Nr 2 engine was damaged when the propeller separated from the engine.

* * *

During takeoff of a sister aircraft, at near maximum performance conditions, it was noted that water had not been turned on. Although the computed performance and flap setting had been predicated on a wet takeoff, this pilot did not abort. Shortly after climb had been initiated, the prop on Nr 2 engine was feathered. Then, various additional discrepencies were committed or omitted and the aircraft crashed. One fatality, several injuries.

* * *

The jet bomber pilot noted a slight vibration at start of takeoff roll. He continued. The vibration stopped. After takeoff the mission was aborted because of failure of the left wing tank to feed. Upon landing, the aircraft was subjected to severe vibration because of failure of the right shimmy damper. Inspection revealed cracked midsection frame on Nr 4 and 5 engines, sheet metal damage to firewall assembly, fairing assembly and tail cone and fairing assembly.

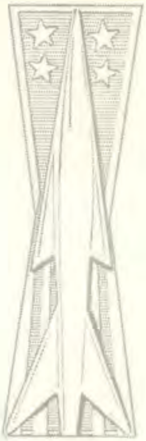
* * *

Ground witness reported hearing backfiring during the takeoff roll of a four engine transport. Takeoff was continued, although severity of the malfunction was such that parts were being shed on the runway. After liftoff, and soon after passing the field boundary, the aircraft went into a descending turn, crashed and burned. All occupants were killed.

* * *

It may seem that the decision to abort is an elementary one. Yet, as examples have shown, on occasion professional flyers fail to abort even when their lives are at stake. Professional golfers, on the other hand, with only money to lose, rarely proceed until everything is as right as they can make it. ★

missilanea



DURING DOWNLOADING OF GARs from an F-102A the loading crew chief attempted to open the doors in accordance with TO 1F-102A-2-12, paragraph 1-24. Operation was normal to the point where he actuated the armament bay door control switch to the open position. The doors would not open. An alternate method of removing screws from the left hand flipper door, connecting external air source to door actuators and blowing the doors open was used. The missile on rail Nr 6 was found to have a broken glass dome. Damage to the missile occurred when the doors were closed following the last loading. The aircraft did not fly after missiles were last loaded. During the past 60 days this aircraft had been loaded 11 times with missiles and had flown 15 sorties with WSEMs. Launcher operation was normal at all times until this incident.

Primary cause was attributed to the rocket blast deflector striking the missile glass dome due to the launcher rail being out of rig.

RECOMMENDATION: The frequency of operation of the launching system is dictated by placing the aircraft on alert status, practicing turnaround and mass loading exercises and maintaining loading crew proficiency. The number of operations are believed to be in excess to that originally considered when the 100 hour interval was established. The major air command will conduct a study of assigned F-102 units to determine if the rigging inspection requirements should be increased to a more frequent interval.

• • •

GAR-2A. Two missile crewmembers were transferring a GAR-2A from handling frame to the casket when the missile fell about two feet back on to the missile handling frame. Damage consisted of dents and scarred flippers, cracked stabilizer and rocket motor. The missile was clamped to the handling bar but frost on the bar and the missile permitted the missile to slip. Obviously you have to be a little more careful and take necessary precautions when unusual conditions exist.

• • •

TURN OFF A-C POWER FIRST! When Minuteman maintenance operations require shutting down the motor-generator set in the launcher, be sure to turn off power to the AC motor first. Turning off the power to the DC motor first will result in burn-out of the voltage regulator.

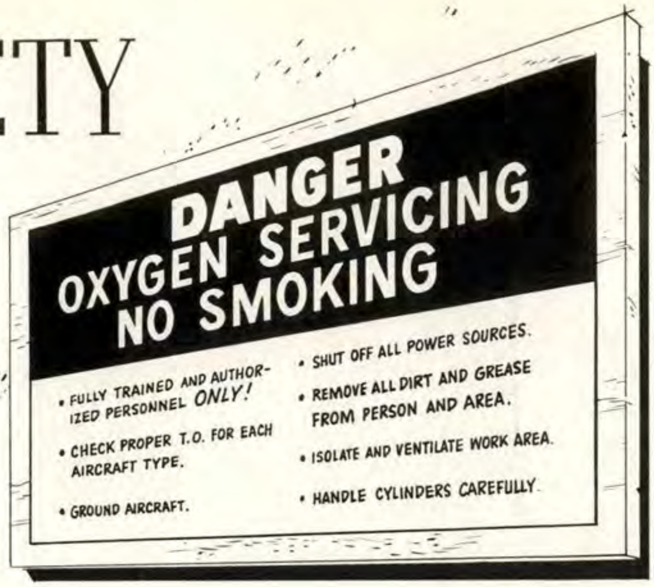
During normal operation of the motor-generator set, the field of the DC motor is excited, but the brushes are held off the commutator by brush lifters as long as AC power is supplied. If AC power fails, the brush lifters are de-energized, allowing the brushes to touch the commutator. The DC motor then keeps the M-G set running on power from the batteries.

The DC section of the voltage regulator is connected across the power line to the DC motor field windings. The DC motor field is energized in both modes of operation: AC and DC. Therefore, the DC motor windings are always surrounded by a strong magnetic field. If DC power is turned off under these conditions, the collapsing magnetic field induces a very high voltage in the motor windings. This is similar to the process that occurs in an automobile ignition coil to produce a spark in the cylinders. Before the motor brushes touch the commutator (which happens in about 25 milli seconds), the voltage can only be dissipated through the voltage regulator. As a result, the diodes in the regulator burn out, and the taxpayer has to buy another regulator — price, a few hundred dollars.

Turning off power in the correct sequence will prevent this expensive goof. Follow the instructions in T.O. 21-SM80A-2-11, and be sure to open the DC breaker for the SCN and G&C before shutting down the motor-generator. ★

Minuteman Service News, Boeing Aero-Space Division.

OXYGEN SAFETY

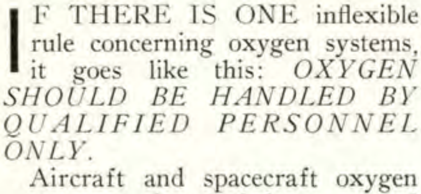


Courtesy: Lockheed Service News

IF THERE IS ONE inflexible rule concerning oxygen systems, it goes like this: *OXYGEN SHOULD BE HANDLED BY QUALIFIED PERSONNEL ONLY.*

Aircraft and spacecraft oxygen systems are installed for personnel safety and welfare (primarily to prevent hypoxia). Like some of our other protectors, however, oxygen can bite back, damaging the human and the machine. Neglect and improper use of oxygen equipment show up in the accident records as fires, explosions, and hypoxia incidents. These results can and must be prevented by proper training and continuous attention to details.

In military combat airplanes, the oxygen system is regularly in use. In military transport airplanes, however, the oxygen system is rarely used, and the system either entirely or in part may be unpressurized or inactive for long periods. In current pressurized transports, for example, the oxygen system is activated only after a loss of pressurization above approximately 14,000 feet. (Air Force regs require use of oxygen above a cabin pressure of 10,000 feet — above 8000 feet if for long periods.)



With this as background, let's get into the subject of more immediate concern: the safe handling and maintenance of oxygen systems. Oxygen safety begins with equipment design and must continue through manufacture, installation, servicing, inspection, maintenance and use. In the final analysis, the most dangerous area in the oxygen story is procurement and handling.

PROCUREMENT AND HANDLING

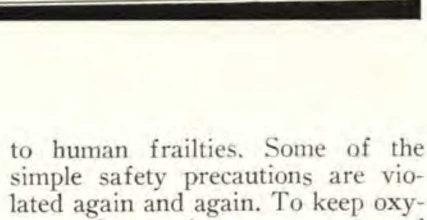
Aviator's breathing oxygen is procured to specifications MIL-0-27210A1. Oxygen procured to these specifications has a minimum oxygen content, disregarding moisture content, of 99.5 per cent by volume and does not contain more than 0.005 milligrams of water vapor per liter of gas at 70°F and 760 millimeters of mercury. It is odorless and free from all poisonous substances and adulterants including drying agents.

You'll see a lot of *do nots* concerning oxygen, and here is a big one: do not use "welding" or "hospital" oxygen in an aerospace breathing system. These grades practically always contain enough water to freeze and plug the valves and lines of an aircraft system.

This and many other things to watch out for are included in the training and experience that make a qualified oxygen handler. Assuming the handler is qualified, he is also human and therefore subject to human frailties. Some of the simple safety precautions are violated again and again. To keep oxygen safe, we have to repeat and repeat the simple rules.

KEEP OXYGEN AWAY FROM FIRES

Remove all power from electrical or electronic equipment when the oxygen system is open or leaking. While oxygen does not burn, it supports combustion. With any combustible material in the area, a spark may be all that's needed to cause a fire or an explosion. While filling the oxygen system in an airplane, make sure the airplane is electrostatically grounded and ground the oxygen filler hose to the airplane.



KEEP OIL AND GREASE AWAY FROM OXYGEN

This goes for dirt and dust too. Install dust caps, plugs, and covers on the equipment when you are not using it. A drop of oil in the wrong place can cause an explosion; dirt and dust can, too, or they can plug the system. This seems simple enough, but people have been known to use oil type lubricant on oxygen fittings. This means, too, that tools used by oxygen handlers must be degreased and used with care to maintain their cleanliness. Even the clothes of an oxygen handler must be absolutely free of grease and oils.

HANDLE CLYINDERS AND VALVES CAREFULLY

A cylinder with a broken valve can become a rocket or torpedo. Open and close valves slowly by hand only. If the valve cannot be closed by hand, return the cylinder for repair or replacement. Be sure the cylinder is firmly supported before you open or close a valve. And always open or close a valve slowly.

SERVICE WHEN THE AIRPLANE IS OUTSIDE THE HANGER

Preferably the airplane should be isolated from other aircraft, especially if the other aircraft are being serviced or maintained. Safety regulations during servicing of the oxygen system should be even more rigid than those applied to fueling the airplane. Smoking or open flames must be prohibited within 50 feet of the airplane. Also, fire extinguishers should be situated close at hand while the airplane is being serviced. No power should be on the airplane and no maintenance should be performed while the oxygen system is being serviced. And no personnel other than those engaged in servicing should be on or near the airplane.

NEVER MIX OXYGEN WITH OTHER GASES

Never use oxygen in systems intended for other gases. Never charge the oxygen system with anything but oxygen. To quote from the Technical Manual of Maintenance Instructions, Oxygen Equipment (NAVAER 02-50-1). "At Columbus, Ohio, a cylinder of hydrogen was used in recharging the oxygen system of an aircraft. This caused an explosion which killed four men and demolished the aircraft. The cylinder was plainly marked HYDROGEN. This incident demonstrates the need for adequate instruction of ground personnel in the handling of oxygen." This can happen. One transport crew filled a fuel tank with water for a one-time flight to their home base. At altitude, temperature was lower, the water froze, the tank burst. In addition to the general precautions to be taken in handling oxygen, there are special precautions which must be observed with liquid oxygen.

Liquid oxygen is cold. At —297°F, any concentration will cause a quick freeze (burn) on flesh. The handler should wear protective clothing with no pockets, keeping sleeves and trouser legs rolled down. Face shield and heavy gloves are also needed. When working with a partner, each should know what the other is doing at all times.

The clothing can become contaminated with oxygen vapors. Be sure, therefore, that the vapors are dissipated before smoking or moving near a fire or sparks. And, as mentioned earlier, clothing contaminated with oil and grease can ignite spontaneously in the presence of oxygen vapors.

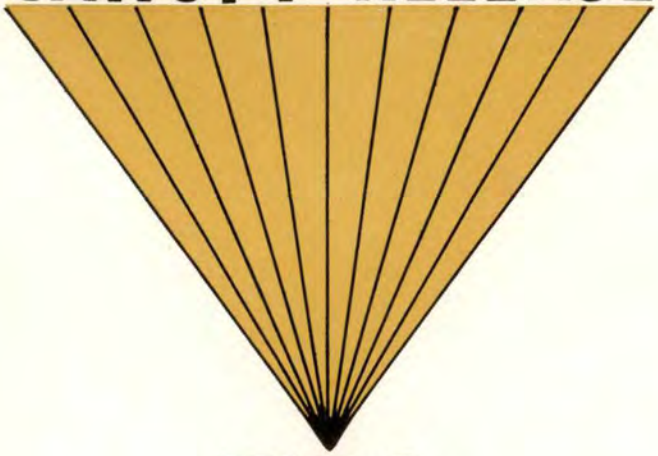
OXYGEN SYSTEMS

Each aircraft type has its own peculiar oxygen system. Oxygen systems, however, can generally be classified into one of three basic types: low pressure gaseous, high pressure gaseous or liquid. Low pressure gaseous systems operate in the range 50 to 90 psi or 400 to 500 psi. With high pressure gaseous systems such as that used on the C-130A, C-130B and GV-1, the pressure is approximately 1800 psi at the supply cylinders. The operating pressures of liquid oxygen systems are 70 and 300 psi. Don't fill a low pressure system from a high pressure supply. This was tried on an island base a few years ago; fire occurred and the interior of a large transport was gutted.

It should be pointed out, however, that the 1800 psi supply pressure on the early C-130s is reduced to 300 psi in the distribution system, which is the same as the distribution pressure on the C-130E. ★

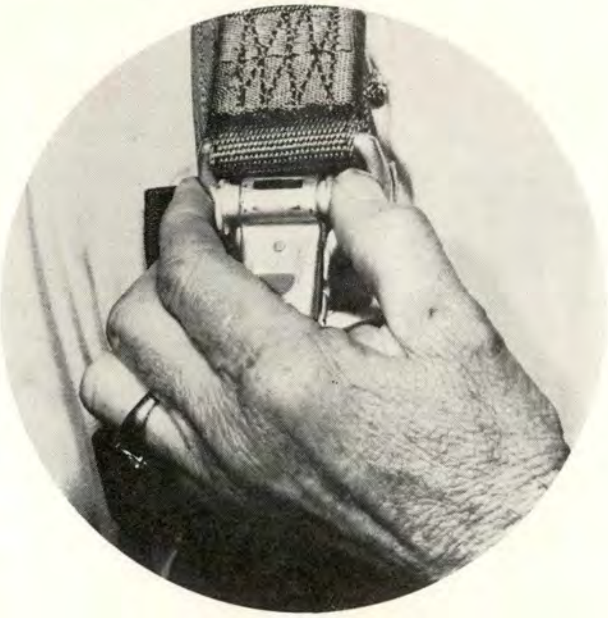
Here's what happened when an Air Force wife at Charleston AFB reached in her purse for a laundry slip. The Chief of Safety, Lt Col Robert Gambrell, and the lady's husband did some experimenting and determined this can happen with any type book matches. They pose the question as to what could happen should this occur to aircrew members who carry book matches in flight?

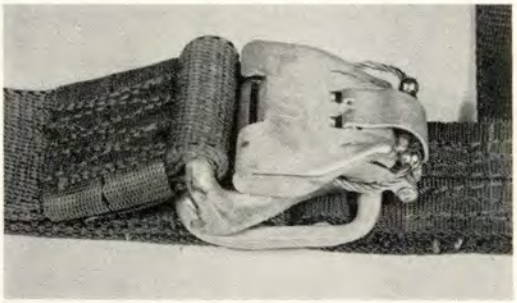
PARACHUTE CANOPY RELEASE TIPS



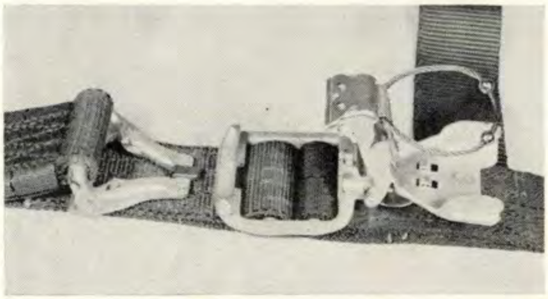
Alfons M. Hegele, Aeronautical Systems Division, AFSC

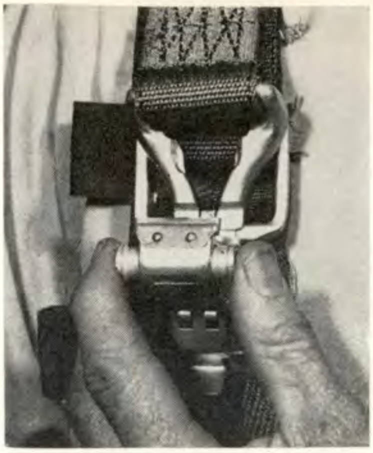
The photo BELOW illustrates the most critical motion in canopy release. Note that an overbalance of squeeze force is being applied with the thumb. The latch arm fails to release for two reasons: the arm is being forced to one side as far as manufacturing tolerances permit, thus demanding a greater travel of the retention hook on that side; the button under the index finger is not receiving enough squeeze force to unlatch the retention hook underneath.





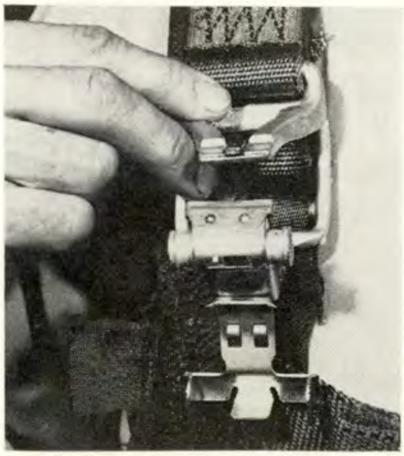
Improvements are in the offing. The most promising design yet proposed to eliminate the squeeze motion of the J-1 parachute canopy release is shown at left. (Single or dual releases are installed at the shoulder position of all Air Force personnel emergency parachute harnesses.) Note that it appears very much like the standard model except for the cable loop nestled under the safety clip. BELOW LEFT, the safety clip is pulled open and the "pop-out" cable loop deployed into position for the final release motion. At this point (instead of the standard button squeeze), one or more fingers can be hooked into the cable loop. BELOW, sharp out and downward jerk using the weight of the arm will separate the release.

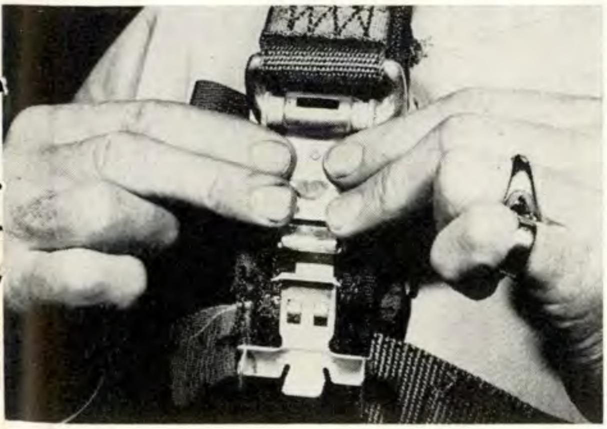




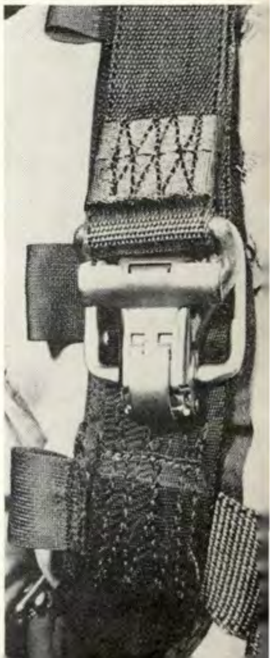
ABOVE LEFT we see the same motion being accomplished with about equal squeeze force being applied to each button. Both retention hooks are disengaged and the latch arm is free to swing out. To achieve this it helps to give specific thought to the squeeze motion before you think about pulling out on the latch arm. Combine this with alternating side to side or shaking motion of the hand and the retention hooks tend to "bounce" out of any small remaining engagement. In the center photo the latch arm is shown after it has been swung out from its stowed position. For additional reference on the three basic release motions, refer to Figures 3-16, 3-17 and 3-18 in Technical Order 14D1-2-1, Section III. A caution note in paragraph 3-17b states: "When depressing the latch arm buttons the latch arm may be forced sufficiently to one side to prevent complete disengagement of one of the button latches. A sideward pull on the latch arm, first in one direction then the other, while the buttons are depressed, may be required to free both button latches." At your first opportunity go through the whole sequence of operating and reassembling the release several times. Start by pulling off the safety clip (ABOVE RIGHT).

The clip may seem to pull off hard at first since it is designed to be firmly seated and resist being jarred out during the parachute opening. Give a sharp outward jerk on the finger grips. No preliminary squeeze is necessary (as in the motion to follow). The TO advises that this safety clip be removed during descent as a part of preparation for landing. After the clip is open (BELOW LEFT) squeeze the buttons (CENTER) and shake from side to side (like a puppy shakes a sock). Avoid a conscientious effort to pull outward on the lever arm until you feel the lever arm come free from its retention hooks. The lever arm will now swing easily out and down to permit the riser link to rock loose. BELOW RIGHT, reassemble the release for another practice run.





Fit the "heel" of the riser link into the hook-shaped (notched) body of the release. BELOW LEFT, swing the "toe" of the link down flush with the body and fold the lever arm over it and press firmly until the retention hooks click into engagement. BELOW CENTER, prop the straight end edge of the safety clip against the square end of the lever arm as shown. This poises the end edge of the clip over the safety clip groove immediately below the square end of the lever arm. Push the clip up toward the buttons until it springs over center and snaps into place. The release is ready to go again, BELOW RIGHT. Practice some more; this may save you from being dragged through a barbed wire fence some day.



COMPLACENCY . . .

. . . and what it can do.

MEETING IN BASE OPERATIONS at 0700, the C-47 instructor and his student pilot were introduced and proceeded to the flight planning room for permission briefing while the engineer was dispatched to the aircraft to make preflight preparation and pick up a jug of coffee from the inflight kitchen.

A composite flight was selected for best utilization of four hours of scheduled airborne time; one hour local VFR after takeoff to be used for demonstration and proficiency training to include power-off stalls, full feather of one propellor at altitude, standard traffic pattern, a short field takeoff and landing, and Dash One procedures associated with all phases of C-47 operations. The three remaining hours were to be used for IFR training including IFR approaches and a full stop landing from a low visibility approach.

The lieutenant accomplished all the paperwork and preflight planning under the supervision of the instructor. FLIP documents, NOTAMs, Form "F", and performance data, PIF, and trip-kit were checked.

Dash One inspection of the aircraft was made with the engineer, and Form 1 discrepancies were discussed, after which the instructor took the pilot position and the student took the copilot position. All required checks were completed with the instructor explaining each checklist item. One item not on the checklist was added, i.e., the fire warning lights actuated, because they were considered necessary prior to starting the engines.

Shortly after takeoff, all instruments were checked; indications were normal except Nr 2 cylinder head temperature indicated approximately 295 degrees. The aircraft was leveled off with the cowl flap full open and power reduced while the flight engineer checked the engine from the passenger compartment. He saw no indication of malfunction. Other engine readings were compared with the cylinder head temperature, and it was assumed that the trouble was not in the engine, but in the indicator system.

A decision was made to remain in closed traffic and land. The indicator was to be repaired prior to proceeding with the mission.

A normal traffic pattern was flown with all standboard traffic pattern items completed and discussed. On downwind, just prior to turning base leg, one quarter flaps were lowered; one half flaps were lowered on base. The aircraft rolled out on final with an indicated airspeed of approximately 100 miles per hour. As the airspeed fell below 97 mph, three quarter flaps were lowered; a slight buffeting was encountered, but was considered normal for a C-47. At approximately 300 feet, full flaps were lowered. Simultaneously, the aircraft appeared to be in a high speed stall. Flaps were set for one quarter, the gear retracted, power applied, and the C-47 nosed down. The rolling and yawing condition continued as speed increased and did not stop until the recovery was completed. After the aircraft was climbed to altitude, full stalls, power off, were completed, in clean, gear down, and full flap configuration. It was discovered that the high speed stall sensation did not occur with the indicated airspeed kept at 85 mph or below with full flaps extended. The aircraft stalled at the Dash One speed unless certain speeds were exceeded with each flap setting. The aircraft was very stable in the full stall condition; it was held in a full stall, stick full back, until it progressed through three successive stalls. The wings remained level throughout this stalled out condition, and no rudder or aileron action was required.

After completing the shakedown at altitude, descent was made and a normal traffic pattern flown. A short field landing from a steep approach was accomplished without difficulty. Eighty miles per hour was indicated on final approach. The same flap settings and procedures were used as in the previous landing attempt. Power was cut at approximately 100 feet above the ground. No difficulty was encountered.

After landing checks were completed and after parking the aircraft, the crew performed an inspection of the empennage and control surfaces with full flaps lowered for inspection. All mechanisms were in good shape with the exception of the flaps. As the four flaps were checked from left to right, each became progressively worse. The right outboard flap could be moved up and down approximately four inches. Control rods all had excessive play. One short rod which worked in a bushing was very worn and loose.

Although the Instructor Pilot had been taught the importance of checking the flap control condition in his earlier days of flying the C-47, his confidence in the USAF aircraft inspection system caused him to become complacent. Because he took this one item for granted, he might have been found indirectly at fault in an investigation.

The preceding true story illustrates the results of complacency on mechanical condition and safe operation of USAF aircraft. Failure by omission is an ever-present possibility. Every omission reduces USAF effectiveness.

All elements of the USAF mission are important with each job having its place in accomplishing that mission. Failure, at any point, by an individual to perform his assigned duty by the book results in a decrease in the effectiveness of the USAF, for our job is to launch military vehicles of all sorts. We must be effective and "SAFE" as we carry out that important job. Regardless of an airman's assigned duty in the USAF, he has control of at least a small part of the USAF effectiveness. Is he man enough to shoulder his share of the responsibility? ★

Capt Herman C. Baldwin, 1984 Communications Sq, Tinker AFB, Oklahoma

EJECTION

RELEASE OF SURVIVAL KIT

Robert H. Shannon, Safety Officer, Life Sciences Group

QUESTIONNAIRES completed by crewmembers who have ejected from USAF aircraft reflect an increasing number of instances involving failure to release the survival kit during parachute descent. Recently, several pilots questioned this procedure during landings in wooded areas. They argued that the survival kit could become entangled in the trees and out of reach. Should this happen and the crewmember is seriously injured, items of equipment necessary for survival would not be available. This is a valid point; however, a check of ejection experience definitely supports the recommended procedure of deploying the survival kit as soon as possible after the chute opens.

In the first place, the record indicates that the occurrence of a combination of factors such as a crew member being seriously injured, landing in a wooded area, and having the kit hang up in a tree is extremely remote.

Secondly, and most important, is the increased probability of injury on landing because of the added weight of the survival kit. This is a far more realistic hazard than the possibility of the kit being out of reach. Although some crewmembers have landed with the kit attached and experienced no adverse effects, others have sustained serious injuries directly attributed to the added weight of the kit. The most recent case involved an ejection from an F-105 in December 1962. The pilot stated that he intended to release the Firewel kit but was more concerned about trying to check parachute oscillation. Immediately after the oscillations stopped he broke out of the overcast very close to the ground leaving little time for any action other than preparation for landing. He hit some tall trees which caused the chute canopy to collapse 30-40 feet above the ground. On landing, the pilot sustained a severe vertebral injury with resultant paralysis of the lower extremities. He was exposed to the effects of cold, rain and snow for approximately 30 hours before rescue. Fortunately, this pilot was recovered in time; however, this case could easily have had a tragic ending. SURVIVAL KITS SHOULD BE DEPLOYED DURING DESCENT IN ALL CASES. ★

Hats On, Please!

Maj William R. Detrick, Aviation Physiologist,
Life Sciences Group

MUCH HAS BEEN SAID and written from time to time on retention of current masks and helmets during and after ejection. So, even though no surprise — here's the straight scoop!

From 1 January 1961 to 30 June 1962, a total of 339 ejections were recorded in the USAF. Of this total, 71 per cent of the individuals receiving this boot in the pants retained their mask and helmet — not an enviable record, but it's the best we can give you so far. There is hope for better things, however, if we consider some of the variables — namely, the chin strap and visor.

First, let's consider the chin strap — that little piece of fabric that you carry the helmet by which when fastened becomes a rather irritating little gadget, particularly on hot days. The record shows that with it fastened during ejection your chances are 81 per cent in favor of retention but when unfastened only 41 per cent are retained.

How about the visor? Well, with the chin strap fastened and visor down, 91 per cent of the hard hats are kept — but with the visor up this drops to 72 per cent. On the other end of the scale, with the chin strap unfastened and the visor down only a mere 57 per cent were retained and, worse yet, with the visor up only 33 per cent kept them on.

We could go on and on and snow you with even more figures such as P-4 type helmets versus the newer HGU-2/P type and the older MBU-3/P mask versus the newer MBU-5/P. Then there's the MBU-3/P's with and without retention kits installed — many possible combinations in all. No room here for all the figures involved; however, they all tell about the same story.

It boils down to this: Your chances of retaining your hard hat are doubled if you'll take the time to fasten your chin strap before takeoff. If you'll also remember to lower your visor before ejection you can increase your chances in favor of retaining your equipment by another 20 per cent. How about the old wives tale that if you fasten your chin strap, the helmet may break your neck (on ejection)? Nothing to it! No reported cases of broken necks from this cause — that chin strap will let go long before your neck. On the other hand, many pilots landing in trees and among rocks have reported it was real nice to have that extra shell on their noggin. There's not always a soft pile of straw or sand waiting for you.

One other word on the helmet — that strap on the back known as the nape strap will help keep the helmet from rotating forward if it's fitted rather snugly. Ask your PE Tech to check it for you.

Remember — keep your head (and your hat) by fastening the chin strap before takeoff and lower the visor before ejection. Assuming proper fit of helmet and mask, your chances in favor of retention are excellent. ★

This is the final of three installments of Major Weir's article about helicopter flying in all kinds of conditions. The plan is to publish his story in its entirety in the Flying Safety Officers' Special Study Kit.

RIDE THE WILD HORSE conclusion

Maj Charles O. Weir, 3635 Flying Training Group, Stead AFB, Nev.

• *Landing Site Selection*

When selecting a landing site, weigh the advantages of different type areas, i.e., ridges, hilltops, saddles, knolls, valleys and canyons. The velocity of the wind will be one of the first and most important factors to consider. If the wind is relatively calm, it is usually best to select a hill or knoll for landing, where full advantage of the wind effect may be realized. Extreme care must be exercised when light winds exist (0-5 knots) because they are usually variable, difficult to evaluate, and may be very detrimental if a downwind condition is encountered during the takeoff or approach.

Whenever possible, approaches to ridges should be planned along the ridge or at a slight angle rather than perpendicularly. This procedure will help avoid downdrafts during the final phase of the approach and provide a better abort route, should an abort become necessary.

In planning the approach, consideration must be given to a number of factors. Wind must be evaluated to the best advantage. Consider obstacles in selecting the best approach route. *Weigh and consider all factors carefully.* Keep the top of the landing area in view at all times during the approach.

• *Landing Site Evaluation*

A complete landing site evaluation must be made to assure a safe operation from unfamiliar or unprepared sites.

In performing a landing site evaluation, execute as many fly-bys as are necessary to obtain all the information required. Make at least one high reconnaissance and one low reconnaissance before conducting operations into a strange landing area.

• *High Reconnaissance*

Prior to the first landing in a strange area, the pilot should circle the area to determine the general terrain characteristics. The high reconnaissance should be flown at an altitude of approximately 300 feet above the ground to permit observation of the intended landing area and all possible approach and takeoff routes. On the high reconnaissance, thoroughly evaluate the wind for direction and velocity. Movement of trees, smoke, bushes, etc., will assist the pilot in making the wind evaluations.

To determine drift, a rectangular pattern flown around the intended landing area should be sufficient to determine drift and wind direction. Drift and estimated wind velocity may also be determined by flying at a constant airspeed over the landing area on each of the four cardinal headings. Throughout the entire landing site evaluation process, note the location and intensity of turbulence in the immediate area. Carefully observe the obstacles in the vicinity of the landing area. Note their estimated height and location with reference to best approach and departure route. Consider the landing area. Check for suitability of landing. Such items as slope, rocks, stumps, undergrowth and marsh land must be taken into consideration to determine if the helicopter can be landed at the selected area. Check the pressure altitude to determine whether it is the same as that used for flight planning. (To accomplish this, set 29.92″ hg in the window of the altimeter and read pressure altitude directly from the instrument.) Check free air temperature and carburetor air temperature. Determine if power lines, cables or similar obstacles are in the immediate landing area or near the selected approach route.

Power lines are very difficult to see from the air and a thorough search for supporting towers or poles should be made. Should evidence of power lines be found, proceed with the utmost caution until positive location is established. Select the most desirable approach and takeoff routes. Such routes should have the least obstacles yet be consistent with the wind direction and velocity.

Insure that landing areas are of sufficient size to permit safe landing and takeoff under the prevailing operating conditions. In determining size of landing area, consideration must be given to operating weight, wind direction and velocity, obstacles, temperature, and other variables which influence helicopter performance. *Remember, never select a landing site for convenience only, but consider all relevant factors in the determination.* Prior to descending for the low reconnaissance, determine the maximum power available. This will provide the pilot with an expected performance capability of the helicopter should any unusual or unexpected conditions occur during the low reconnaissance.

• *Low Reconnaissance*

The low reconnaissance is flown in the direction determined to be the best route during the high reconnaissance. Accomplish the following during the low reconnaissance. If terrain, weather, and all other factors are favorable, fly a rectangular pattern at approximately 50 to 100 feet above all obstacles and at an airspeed commensurate with flying safety for the existing conditions. Recheck the size, slope and obstructions in or surrounding the landing area. Recheck the wind for the intended landing area. This recheck is necessary in order that any changes in direction or velocity may be noted subsequent to the high reconnaissance.

• *Power Check*

The importance of the power check cannot be overemphasized. The power differential determined in this check is the final factor for consideration in the pilot's analysis as to whether a safe approach and landing can be made.

Fly the helicopter across the landing area at an altitude of approximately 50 to 100 feet above obstacles. As the point of intended landing is approached:

- (H-19 Procedure) Establish 2400 rpm, 20 knots indicated airspeed and keep the helicopter level over the point of intended landing. Note the manifold pressure required. Insure that the helicopter is neither accelerating, decelerating, climbing or descending during the check. After noting the manifold pressure required,

RIDE THE WILD HORSE

establish a normal climb (50 knots). Maintain 2400 rpm and determine the maximum manifold pressure available.

- (H-21 Procedure) Establish 2700 rpm, 30 knots indicated airspeed and keep the aircraft level over the point of intended landing. Note the manifold pressure required. Insure that the helicopter is neither accelerating, decelerating, climbing, or descending during the check. After noting the manifold pressure required, establish a normal climb (60 knots). Maintain 2700 rpm and determine the maximum manifold pressure available.

The difference between the manifold pressure required to maintain low speed level flight and maximum manifold pressure available is known as the power differential. A minimum of 5″ hg is the minimum power differential that will assure adequate power available for a one- or two-foot hover at density altitudes below 10,000 feet. At density altitudes above 10,000 feet, a minimum power differential of 6″ mp is required.

- (H-43 Procedure) Establish 100 per cent N2, 20 knots indicated airspeed, and keep the aircraft level over the point of intended landing. The reading of the torquemeter and power turbine tachometer (N2) will be noted over the site. After passing the site, increase the collective pitch slowly to determine the maximum torque that can be obtained without a change in aircraft attitude and without causing the rotor speed to decrease. This will indicate the torque available. From this, you can determine the difference in torque required on the power check and the torque available. Five PSI torque differential will indicate sufficient power to sustain a hover.

NOTE: Preceding power differential requirements are based on helicopters with internal loads only. When sling loads are being carried, greater power differentials are required to compensate for the higher hover necessary.

Accurate power checks at low level, low airspeed over the landing point become more difficult to obtain as the wind velocity or turbulence increases. As a general practice, when winds exceed 20 knots, an estimated ground speed of 10 knots should be flown instead of the designated airspeeds. This will not prove as accurate, but should give a close indication of the available power differential.

As the wind increases in velocity, more consideration must be given to possible turbulence during the power check. During such conditions the approach to the power check should be made steeper to compensate for expected turbulence.

When winds of 10 to 20 knots exist, a null area usually exists over knolls or hilltops. When landings are to be made in such areas, the power check should be obtained while in the null area.

It should be remembered that the power check is only a guide to be used by the pilot to supplement and cross check his flight plan and assist him in the determination of whether a safe landing can be made.

• *Hovering And Landing (Operational)*

Bring the helicopter smoothly to a one- to two-foot hover. Low hover requires a minimum of power, reducing the possibility of RPM loss and subsequent settling. Should settling occur, the helicopter will touch down more gently from the low hover. Land as soon as possible. Decrease the collective pitch slowly while maintaining maximum RPM until the entire weight of the helicopter is supported by the landing gear. Maximum RPM should always be maintained until it has been determined that the surface will support the helicopter.

Consider the rotor diameter and be constantly alert to insure adequate rotor clearance. The angle of descent over an obstacle must be sufficiently high to insure rotor clearance. Exercise extreme caution when hovering in confined areas to avoid swinging the aft or tail rotor into obstructions.

The importance of preflight planning for any helicopter flight and particularly operational helicopter flights cannot be overemphasized. Prior to any helicopter departure for a remote area or site, power required and power available upon arrival must be computed. Such items as weather upon arrival, direction and velocity of the wind, en route turbulence, and adequacy of landing site must be carefully analyzed before departure. Refer to the appropriate Flight Manuals for complete details in preflight planning and proper use of performance charts.

Turbulent air is encountered at low altitudes in the vicinity of irregular or mountainous terrain. The degree of severity is directly related to three main factors — thermal effect, wind velocity, and the contour of the terrain. The general effects of a strong wind over a mountain barrier are an accelerated wind speed and reduced pressure over the crest, with turbulence and relatively low pressure on the lee side. The increase in wind velocity over a crest is likely to be greater when the wind is at a right angle to the ridge. Isolated peaks tend to create severe turbulence by wind swirl effect rather than increased wind velocity.

With a wind velocity over a mountain barrier, downslope wind usually occurs in the lower altitudes on or near the lee slope. Contour has a definite effect on lee flow pattern. The lee flow of air over a gentle contour provides the simplest pattern and the least turbulence, although downdrafts are often severe on the lee side of the crest during periods of high wind velocity.

In winds of approximately 10 knots and higher, turbulence will usually be found near the ground on the downwind side of trees, buildings or hills. The turbulent area is always relative to the size of the obstacle and the velocity of the wind. You can also expect it close to, and on the upwind side of a barrier, such as trees, buildings or hills.

Turbulence can be encountered on bright sunny days over the border of two dissimilar terrain features, such as a ramp bordered by sod. The primary cause of this type of turbulence is the vertical air currents produced by the heating effect of the sun.

General procedures and precautions are recommended when flying in high winds and/or turbulent conditions. You should make frequent checks of direction and estimated wind velocity during flight. If severe turbulence is encountered, reduce airspeed and land as soon as possible. Crossing mountain peaks and ridges at low altitude under windy or turbulent conditions can be very dangerous. The safest crossing can be made by flying downwind. This will insure that downdrafts will be encountered after ridge crests have been crossed. If this is not practical, altitude should be increased proportionately before crossing such areas.

The minimum altitude for flying over a high ridge depends on the wind velocity, type of terrain, and the degree of slope. In strong winds over steep slopes, severe turbulence may always be expected. Plan your flight to take advantage of the updrafts on the windward slope and wherever possible avoid the downdrafts prevalent on the lee side. In high winds it is possible to encounter downdrafts of sufficient intensity to render full power inadequate to prevent extreme loss of altitude.

You should always exercise extreme caution when flying in canyons and valleys; assure adequate terrain clearance before entering such an area; always maintain an "out;" plan ahead, and at all times know which way to turn in event of emergency. Fly the upwind slope whenever possible to take advantage of updrafts, and in the event of a forced landing, always be in a position to autorotate downhill and into the wind.

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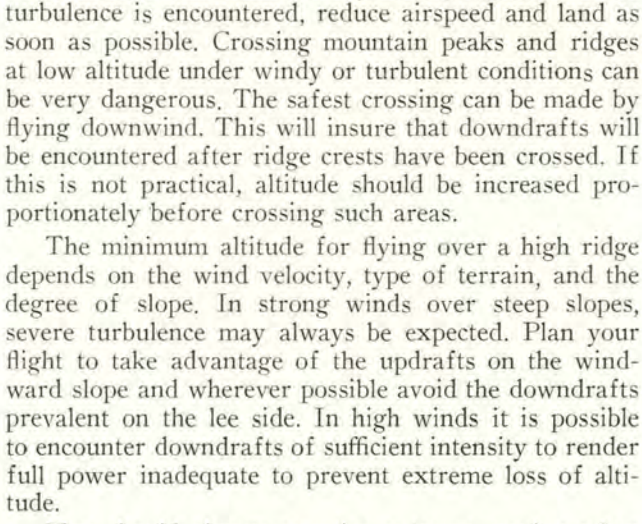


"Oh, dat last job wasn't so much. After a while ya' can troubleshoot dese boids automatikal."

Winds below 35 knots can normally be used to an advantage during takeoff or approach, but in higher winds turbulence may cancel out any wind advantage.

Watch for RPM surges during turbulent conditions. Strong updrafts cause the RPM to increase, whereas downdrafts cause the RPM to decrease. Usually the surges are small and the RPM will correct itself; however, if the RPM begins to approach the maximum limits, corrective action must be taken.

Fly as smoothly as possible and maintain attitude control. Prevent excessive airspeed build-up to avoid the possibility of blade stall.

Avoid flight in or near thunderstorms. Dangers to be encountered in thunderstorms include hail, freezing rain, swirling winds and vertical air currents which have been known to be strong enough to exceed the structural limitations of the helicopter. If thunderstorms cannot be avoided, land as soon as possible and await passage. Use extreme caution during helicopter shutdown if gusty or high winds exist.

Providing all of these procedures are used, takeoffs as defined in the appropriate Dash Ones can be utilized to effect safe departure from any of these areas. When possible, a power to hover check should be made prior to any particular type of takeoff.

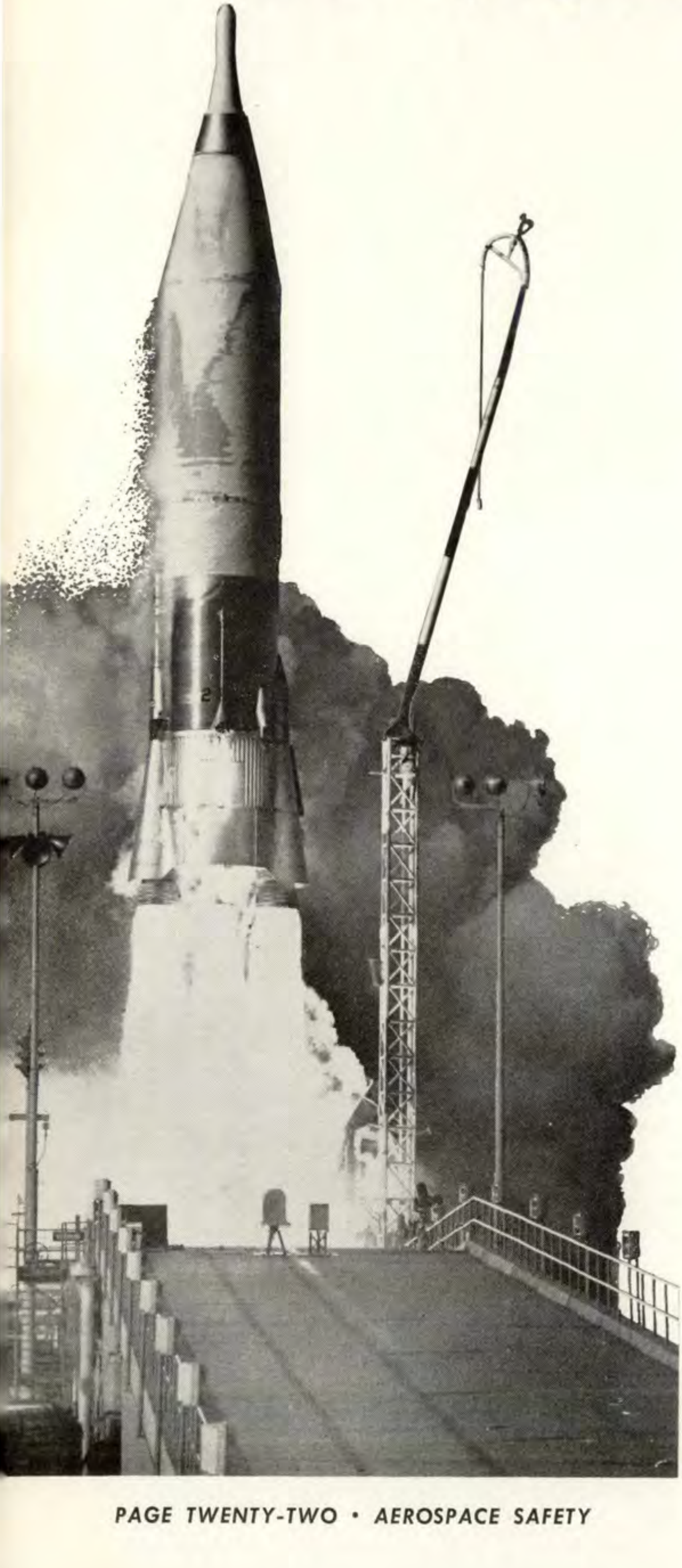
• *Conclusion*

Only through study of these factors and joining them into our daily practice can we attain the skills necessary to arrive at a "go or no go" situation. A reading file should be maintained in each Helicopter Operations Section so that pilots can familiarize themselves with factors governing their daily flying duties. A good article to start with would be "Turbulence Definitions" published in the December 1962 Aerospace Safety Magazine. Your Dash Ones abound with a wealth of information on like items. Talk with your base weather man frequently; he can fill you in on a lot that normally doesn't come out during your routine weather briefing on your '175. Study as you fly — develop the habit — it can save your neck. It's up to you. Constant study, planning, maintaining top physical and mental alertness — remembering the hazards — coping successfully because you are prepared will certainly enhance longevity.

The successful mountain pilot is a product, like a gem that is polished to a shining finish. He will sparkle in his difficult task. It takes work, supervision, study, planning and sound application of all these to attain the razor edge of sharpness. Would you supervisors settle for anything less when it comes to dispatching your helicopter to a landing area the size of a postage stamp at 10,000 feet? Do we want to "Ride the Wild Horse" or shall we tame him — with knowledge?

It is our choice. ★

The $5,000,000 Speck of



This incident is fictional, but illustrative of a real problem.

VANDENBERG AFB. The famed Vandenberg call, "There Goes One," came at 1007 one morning last fall. Voiced by the men, the wives and the children on this West Coast base, it brought the same reaction that all missile launches have caused since the first flight here five years ago — people ran outside to watch. This time they got to see one of the things they always watched for, just in case.

Ten thousand feet above the mist-shrouded Pacific, the flight came to an abrupt end. As though at some magician's touch, the slender missile was replaced with a huge, scalloped-edged ball of flame. Then, because of the slowness of the speed of sound, realization of the destruct came moments later when a heavy blast terminated the reverberating thunder of the first stage engines. The silence that followed served to emphasize the death of the missile.

The watchers went back to what they had been doing, each awed in an individual way by having seen a spectacular explosion.

Cost? $5,000,000!

Actually, spectacular though it was, the loss did not total $5,000,000. True, this was the cost of the missile and its gold coated payload, but from this total certain returns had to be deducted. For the Air Force crew that made the launch, the training experience was worth inestimable thousands. There was also a dollar value for the manufacturers' engineers who viewed the entire proceedings. NASA personnel who participated benefited as well. The many hands that played a part in the construction of this particular missile had gained just that much more experience, as had those who took care of the transporting and erecting.

Still, this was a failure. The fact that the programmed trajectory had been cut short when the range safety officer had pushed the destruct button made this fact irrefutable.

When the safety officer's index finger had made that fateful downward movement it signaled more than just a spectacular explosion two miles above the California Coast; it signaled the start of a painstaking investigation of each phase of the life cycle of that missile. Design concepts would be re-examined, as would engineering drawings and all recorded data. Since like missiles had performed as programmed in the past, modifications that had been made on this one were in line for a most careful scrutiny.

This was what was behind the public relations announcement which said, "All data will be reduced by skilled investigators in an effort to pinpoint the cause of failure."

Rust

Major T. J. Slaybaugh

When they started, investigators took the positive approach; they would find the cause or at least the most probable cause. At the very least they would find the area of the malfunction and then subject all components to a rigorous re-testing. At $5,000,000 a shot, repeat failures can not be tolerated!

It didn't take long to begin to isolate the problem area. Telemetered and tracking data bore out the fact that the missile had begun oscillating along its planned trajectory soon after leaving the pad. At first the oscillations were slight, but they became progressively larger. One ex-pilot pointed out that it was obviously a case of overcontrolling — "like a bomber pilot on his first flight in a T-Bird." Just to make sure, all areas were checked. It wasn't thrust — that had been perfect. Both the thrust monitoring devices and fuel burnoff measurements confirmed this. Temperatures were in limits. Acceleration schedules checked out perfectly. Fuel samples were rerun through the lab. Sequential photographs were studied. Wind-aloft readings, taken immediately before and after launch, crossed off the Met factor.

The trouble was limited to the guidance system, and subsequently isolated in the autopilot. Exact duplicates were re-tested. All worked perfectly. Signal strengths were varied and operation was normal within design tolerance.

Once satisfactory operation had been proven within design parameters, tests were started outside these parameters. Add stress until the inflight malfunction was duplicated, was the order that came from high up. Overloading of circuitry still failed to duplicate the malfunction. Now try something else.

This was when the first real break came. Circuitry changes were made. Current was directed along shortened paths rather than through its normal routing. By the simple expedient of pinching two wires close together at a terminal area, it was found that current would jump across, only residual current then followed designed routing. What did this do? The auto pilot was completely assembled according to design specs with this one change. When power was connected the autopilot performed as, apparently, the one had on the missile that had to be blown up. Trajectory changes were not immediately sensed, and when sensed resulted in a corrective signal that was applied for too long a time due to the countering signal also being delayed.

More experimental work disclosed that a piece of conductive solder located between these same two terminals had a like result. A piece of rust or moisture also would duplicate a like current bleed-off.

What would be the most likely cause, how could it have occurred, what was the preventative? Quality control was a prime suspect. But no single piece of Air Force hardware is more carefully inspected than the missiles, especially their critical components. Inventories were checked. In not a single case was there any foreign particle of solder. Each and every connection was well within tolerance. Moisture was checked, and again nothing.

What about rust? If no moisture, surely no rust. Someone thought of the container. How about that? After all, the quality control had to do with the component. The container was just another of those familiar black metal boxes. No one ever checked those.

But, fortunately, someone did now. Several black boxes were brought in, opened, then tapped lightly over white paper spread across a lab desk. There, most certainly, was the cause of it all — little brown specks of rust! Each one potentially capable of causing a $5,000,000 failure.

Today, when the investigators finished and wrote up their report, rust was listed as the "most probable cause." Recommendations to prevent recurrence spelled out rigid quality control, and storage and inspection criteria for all component containers.

The investigators had another suggestion: that this mishap be given the most widespread publicity possible as another example of the importance of each and every aspect of the missile business, *no matter how routine,* if failures are to be prevented. ★

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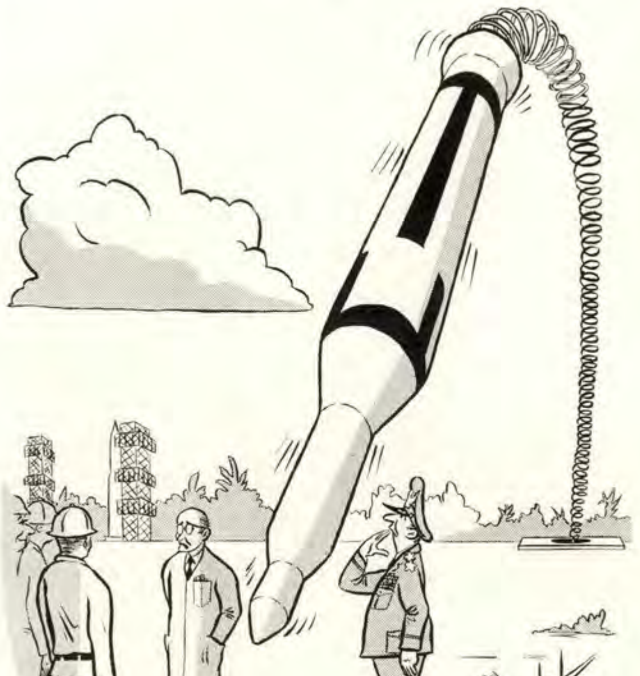

"Gentlemen, as much as the Air Force appreciates a good sense of humor . . . "

HI-FI LIFE SAVER

ABOUT A YEAR AGO the OSV TANEY dropped a life raft equipped with a new locator beacon into the waters of the Pacific near Oceanship November.

A few months later an F-102 pilot bailed out into the snow and cold of the Arctic.

Early in January of this year a control tower operator at Palmdale, Calif., started receiving a signal from an unknown source.

What's the connection? In each of the above cases a signal from a locator device successfully accomplished its purpose of attracting someone to the source of the signal.

The locator beacon dropped with the life raft was being tested by the Coast Guard and United Air Lines, assisted by MATS and a dozen other airlines. The device had these characteristics:

Frequency	121.5
Power output	750MW
Modulation	925 cycle tone, A-2 modulation
Operating Life	50 hours
Size	3⅞"x3⅞"x29"
Weight	9.5 pounds

A NOTAM was published to publicize the exercise and cooperation of aircrews was requested. Reports were to contain:

1. Time and aircraft position when the signal beacon was first detected.
2. Time and aircraft position when the signal was lost.
3. Altitude of the reporting aircraft.
4. Maximum signal strength in "S" units.

On March 23, 1962, the Taney ditched the beacon as planned. Within three seconds the ship's radio officer reported receiving the beacon signal. The signal had a distinctive wobbling tone due to the rise and fall of the beacon in the sea. Although the tone was slightly annoying it did not interfere with normal communications. A Slick aircraft, overhead at the time, reported hearing the beacon immediately.

In the 33 hours during the test a total of 63 aircraft (25 of which were MATS) reported receiving the beacon. Many picked up the beacon on the VOR. Quantas, at 39,000 feet, received the beacon signal from 270 miles. A Coast Guard C-130 pinpointed the beacon's location, using its VHF ADF. The signal was useful out to 120 miles at 8500 feet. Two aircraft flying north and south of the test site reported not hearing the beacon. This, too, provided valuable fix information. Beacon power output at start and end of test was 750 milliwatts. The water activated battery had not been depleted at the end of the 33-hour test. The beacon's position was plotted to within a few miles by using passing aircraft reports.

Among the conclusions reached were these:

- All transoceanic aircraft can be useful as search aircraft, even if just passing by and using any 121.5 mc receiver, including VOR.
- Unindoctrinated crews of vessels and aircraft from many (foreign and domestic) airlines and government agencies can effect a rapid,

reliable, interference-free and successful search for a ditched beacon. The ditched beacon was reported within three seconds of ditching and its location established within the first few hours.

As a result of this test United Air Lines, following FAA approval of the new beacon, retired its old Gibson Girls.

The experience of the F-102 pilot in Alaska was a different story. It was for real and the pilot was rescued one hour and forty minutes after ejecting. Here's the story:

When his engine quit the pilot told GCI that he was leaving the aircraft and ejected at 8000 feet. After landing intact on the snow-covered tundra, he spread out his parachute for a signal, turned on his SARAH beacon and placed it in a nearby tree. Meanwhile the pilot of the other aircraft in the two-ship formation descended and circled the crash but could not locate the downed pilot who had landed some 4-5 miles from the wreckage. With the weather getting worse — ceiling 300-400 feet and falling snow — and darkness setting in, the pilot assumed he would be spending the night at his icy perch. Shortly, however, he heard engines and through the gloom he could make out the H-21 helicopter that rescued him. He also spotted a C-123 that was in on the search.

Bailout was at 1325. Pickup by the H-21 was at 1538 and the helicopter had flown 160 miles from its home base to the rescue site.

The third example was one of those odd things that shouldn't have happened but did, and which must be guarded against, for, as you'll see, obvious reasons. At about noon the tower operator in an aviation company tower received a short burst of an emergency rescue beacon transmitter signal. He immediately asked a transport aircraft enroute to Los Angeles to attempt to locate the source of the signal. He then called the FAA tower operator who soon confirmed the signal which was on a frequency of 243.0 mc. For a short time the signal was lost. The transport aircraft also reported losing the signal, but the pilot reported that it seemed to be coming from an area north of the nearby Antelope Valley golf course.

Meanwhile the company tower operator had called George AFB and requested assistance of a helicopter equipped with direction-finding equipment. Within the hour the helicopter pilot reported picking up the signal with ADF and a few minutes later reported the location. The signal was coming from an emergency beacon transmitter attached to a parachute. The tower operator had first heard the signal a few minutes prior to takeoff of an F-100. The F-100 pilot was wearing the parachute with the operating beacon attached. The aircraft landed approximately 45 minutes later and the beacon continued to transmit long after the pilot had left the aircraft.

These incidents, varied as they are in type, illustrate that locator devices can do a job and that there is a definite need for them. Recent events have resulted in SAC, TAC and ADC urging procurement of an improved locator that will operate automatically. Additional support has come from the Personal Equipment Advisory Group, with representatives from all commands, and from personal equipment specialists of the Life Science Group, DTIG.

ASD has evaluated the available commercial devices and written a specification for a personal locator beacon. The specification is well within the state of the art and it appears that an improved locator device will be forthcoming. ★

QUOTABLES

Recommendation by accident board after a major accident: "All pilots be briefed not to retract landing gear during landing roll phase of flight."

From a teletype requesting assistance in accident investigation: "The complications involved in all factors are too numerous to adequately describe in writing or otherwise."

USAF Record — "I was pretty well banged up. I think I set a record for being scared."

(This aircraft went through power lines.) "On first pass I was high so the bomb hit short. On second and third passes my bombs hit the top of the target. On the fourth pass the bomb *hit on a fly*."

Fractured pride — Pilot was found (3 PM MST) 12 miles from the site of his ejection — in good condition except for his injured foot and fractured pride.

What Did I Say? — Overt self confidence is not trasferable to the aircraft itself.

It Did, I Did — (Dropmaster retrieving static lines) "I decided to remain in bed over the weekend and report to the Flight Surgeon early Monday, 31 July, if the pain persisted. It did and I did." End of statement.

Tiger Wing — This Wing has re-emphasized to all pilots the requirements for a charged battery. . . . "

Accident Prevention — Foolproof — "It can be admitted that the accident would not have occurred if the pilot or supervisor involved had not cleared the aircraft for takeoff."

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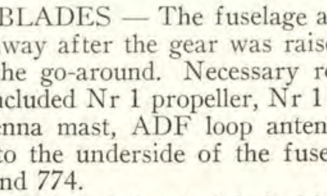
AERO BITS

T-29 BENT BLADES — The fuselage and prop contacted the runway after the gear was raised by the copilot during the go-around. Necessary repair-replacement action included Nr 1 propeller, Nr 1 engine, trailing wire antenna mast, ADF loop antenna and sheet metal repair to the underside of the fuselage between stations 607 and 774.

History of flight relative to this incident: the pilot in the left seat was accomplishing a GCA full stop landing. All gear checked down and locked with the pressure up. Touchdown was right gear first and as the aircraft touched down, the copilot noticed what he thought to be a settling of the aircraft to the left. He reported hearing the horn and called to the pilot that the gear was up. A thud was felt and at the same instant the pilot applied full power for a go-around. The copilot states that he raised the gear as the aircraft climbed straight ahead and that there was no unusual noise or vibration. The gear was lowered in the pattern, indicated down and locked, and a normal full stop landing was made. The three blades of Nr 1 prop were bent back, indicating little or no power on the engines at time of contact.



THINK YOU GOT TROUBLES? Here's a troop who had more than his share. During descent in weather, the pilot of an F-106 leveled at 21,000, called Approach Control and was advised that weather was 1000 and three and that GCA was off the air.

After receiving instructions to proceed to a Tacan fix, he entered a holding pattern and started a right hand turn to the outbound leg. During the turn the attitude indicator showed a rapid roll to the right and started to spin, showing alternately climb and dive. The radar horizon was turning rapidly at the top of the scope. With airspeed building rapidly, the pilot went to idle and applied left aileron to center the turn needle. As the needle centered, he applied back pressure and opened the speed brakes. The attitude indicator continued to spin. The altimeter read 16,000, fluctuated to 18,000 then dropped to 14,000. Airspeed was in the transonic region and rate of descent was too great to read accurately. With the turn needle centered, the pilot was applying about 4G. As the airspeed began to decrease, the aircraft broke out at about three to four thousand feet and the pilot could see the ground. He was in a wings level attitude about 45 degrees nose down. Increasing back pressure, he was able to level at about 1000 feet.

During pullout the right drop tank separated, the gear indicated unsafe and the optical sight became unstowed, hitting the pilot on the helmet. Recognizing his position as being about 15 miles from the end of the runway, the pilot asked for a DF steer. Weather was now 1000 obscured with one and one-fourth mile in snow. The gear was still a problem, but mobile advised that the gear appeared to be down when the pilot made a circling approach.

On final the pilot flashed landing and taxi lights and all were visible to mobile, indicating gear down. A successful landing was made with three-quarters of a mile visibility in heavy snow.

IMPROPER TECHNIQUE? An H-43B hover-taxied from the alert pad to the training area. Two crew firefighters were off loaded for the purpose of practicing hook-ups of the dummy fire suppression kit. The helicopter departed the area to establish a traffic pattern and approach for practice hook-ups. The wind was calm, visibility 15 miles and the temperature plus 8°F. While the helicopter was flying the traffic pattern, the fireman placed the hook-up positioner as directed by the pilot. After hook-up, the fireman laid the positioner down and while he was proceeding to the front of the aircraft, the helicopter drifted to the right and forward. The hook-up man indicated to the pilot that he was not centered over the kit and to make a correction to the left. The pilot reduced power and applied left cyclic stick. When the aircraft descended, the left front gear contacted the kit. The helicopter tipped to the right, the rotor blades struck the ground and the aircraft rolled onto its right side.

Investigation revealed that although the dummy fire

suppression kit turned over during the accident, it had been partially frozen to the ground.

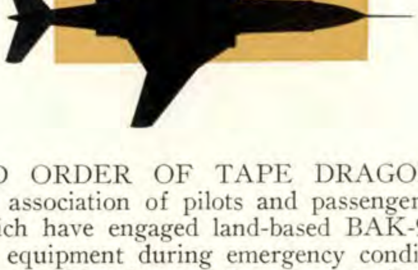
Pilot factor was cited as the primary cause in that the pilot used improper technique in attempting to center the aircraft over the dummy fire suppression kit. The reduction of collective allowed the helicopter to settle onto the kit prior to left cyclic correction taking effect, causing the aircraft to roll over to the right and crash.

A contributing cause was that the dummy fire suppression kit was partially frozen to the ground. This plus an off-center position of the helicopter was the situation in which the pilot found himself prior to attempting pick-up.

Lt Col James F. Fowler, Transport Sec.

HAND 'EM TO HIM. Recently, during recovery at a strange base, a pilot started the engines of his F-101B. The crew chief then pulled the nose gear downlock pin and attempted to toss it to the pilot. Result: poor aim, ingestion of the pin, engine change.

From now on, there's one pilot who, when he's at a strange base, will inform ground crewmen to physically hand him gear pins and anything else they want to hand the pilot.



"GRAND ORDER OF TAPE DRAGONS," an honorary association of pilots and passengers of aircraft which have engaged land-based BAK-9 aircraft arresting equipment during emergency conditions has been announced by the manufacturers, the E. W. Bliss Company.

The purpose of the association, according to a company spokesman, is to promote air safety through proper understanding and use of this equipment.

Members of the Tape Dragons receive a certificate, wall plaque, key chain medallion and wallet card indicating the time and place of the emergency "save."

Aircraft using the system are generally equipped with a hook which is let down from the tail during an emergency to engage a wire-rope pendant stretched across the runway and attached to nylon tapes. In some systems, the pendant is arranged to "pop up" and engage the plane's landing gear. The tape is wound on reels which pay out the tape as the aircraft decelerates. The reels are coupled to friction brakes which absorb the energy of the impact and gradually bring the plane to a stop.

Application cards have been sent to bases equipped with the BAK-9 arresting barrier by the Bliss Company. Should you become eligible, pick up a card, fill it out and send it to the E. W. Bliss Company, Canton, Ohio.

IT'S-THE-LITTLE-THING-THAT-KILLS-YOU Department! The T-Bird with student and IP aboard was lined up for a wing takeoff. One tiny item at that point started a string of events that nearly cost the two men their lives and the Air Force an aircraft.

As the two aircraft started to roll, Nr 2 was momentarily slowed by a cocked nosewheel and Nr 1 built up a widening lead. To regain his position, Nr 2 poured it on and started making up the deficit. He had too much, however, and overtook the lead and slid across under his right wing.

At this point—about 20 feet above the ground—the instructor decided he'd better take over and do something about the rapidly deteriorating situation. He

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"HA! Pay up, Quimby! I told you I could make the center taxi strip."

pushed the stick forward and rolled to the right, then applied back pressure and left aileron. Trouble was, he didn't have enough room and the resulting loud thumping noise came from the tiptanks and aft section striking the ground. The tips ruptured and the lower aft section of the fuselage was damaged. Fortunately, the IP was able to maintain control and fly out of the emergency by making a gentle climbing turn to the downwind leg. Lead assumed chase position, the now gushing tiptanks were dropped and a normal landing was made.

Obviously this is a case of the instructor letting the student go too far before taking over. We've been doing this since shortly after '03, and will probably be doing it in '04—twenty 04, that is!

The board listed a couple of other findings. (Incidentally, they called the first one Supervisory Factor.) One of these was operator factor on the part of the IP, in that his corrective action was excessive and resulted in the aircraft striking the ground. Then they got around to the fact that the instructor had completed instructor pilot training *then* went to survival training. He returned to home base a month and one-half later to begin upgrading flights for standboard checks. Shortly afterward, the above described incident occurred.

Remember, it's the little things—

DEFECTIVE JETTISON SWITCH — An airman recently received a broken right thumb, lacerations of three fingers and mouth injuries when an ejector cartridge fired while he was inserting cartridges in the center line fuel tank of an F-105. Prior to arming the pylons and center tank they were checked for stray voltage by the crew using a PSM-6 and a 500 Ohm resistor. No stray voltage was found and the load chief instructed the airman to proceed with the arming. Following the accident it was found that the belly tank jettison switch in the cockpit was defective, allowing 24 volts DC to activate the jettison circuit to the center line pylon.

THE WEATHER WAS BEAUTIFUL—so clear you could see a hundred miles. The air was smooth, and the cockpit of the Gooney Bird was warm and comfortable. Both pilots were tankinng up on coffee, frankly to help to stay awake. Flight level was 9500 feet VFR on top. A 30-knot quartering tailwind augmented the truly "field grade" flying conditions.

The airplane was a plushed-up Goon, with nine hitch-hiking passengers relaxed in the back, either asleep, reading or just thinking of what they were going to do when they arrived at their various destinations in the eastern part of the United States. The pilots had taken off from a west coast base that morning and, other than being held up an hour for smog to lift, the flight was pleasant and, in the minds of both, routine.

Ahead, about 15 miles, the huge meteor crater, a familiar land site just west of Winslow, Arizona, appeared slightly to the right of the flight path and the crew knew they were on course and also that the wicked terrain of the north Arizona mountains was safely behind them. They now "had it made" with the first refueling stop planned at Amarillo.

Suddenly the quiet purr of the two 1830 engines was broken by a very quick retort, so fast and momentary that neither pilot was sure which engine had lost power, and neither the crew chief nor passengers had noticed the interruption. Gas tanks were changed and carburetor heat was applied. The engines continued to run smoothly as if nothing had occurred and the pilots decided to proceed as far as Kirtland, approximately 175 miles away. About five minutes later another momentary loss of power was experienced, again so quick that it was impossible to say on which engine. A precautionary landing was made at Winslow.

Investigation revealed a bad gas and oil leak in the accessory section of the left engine coupled with a broken impeller seal, necessitating an engine change.

The point of this story is: *A precautionary landing was made.* There were no real symptoms of a dangerous condition. Many of us have experienced momentary loss of power and continued many hours of flight with no further incident. In this particular case, a landing field was in sight; the next suitable one was approximately 175 miles away. Terrain averaged 6000 feet. It was tempting to proceed to Kirtland, an Air Force base with adequate maintenance facilities. Albuquerque also is a much larger town. The pilots decided on a *precautionary landing* at Winslow; thus, a possible inflight fire or loss of an engine with a heavily-loaded aircraft over high mountainous country was averted. ★

Lt. Col J. M. Rodgers, Transport Section

WELL DONE

Captain Walter J. Swaney

CAPTAIN WALTER J. SWANEY, 334 Tactical Fighter Squadron, Seymour Johnson AFB, North Carolina, was practicing air refueling hookups at 20,000 feet in an F-105. After completing one wet hookup, he positioned his aircraft approximately 60 feet behind the tail of the tanker and requested some practice dry hookups. The tanker scanner instructed Captain Swaney to stand by, and almost immediately the entire drogue and hose separated from the tanker. Because of his slow airspeed and heavy gross weight, Captain Swaney was unable to maneuver away. The hose and drogue struck his aircraft, broke out the right front side panel, shattered the center windshield safety glass and cracked the left side panel. The hose then lodged between the right air intake and the fuselage. The increased drag caused the aircraft to stall. Captain Swaney was able to recover at 12,000 feet and the hose dropped away from the aircraft a few minutes later.

Arriving at the base, Captain Swaney made a straight-in approach to the runway. When he decreased the speed below 200 KIAS, windblast caused a violent vibration in the cockpit, making it difficult to read the airspeed indicator. When he increased the airspeed to 230 KIAS he could see the airspeed indicator, but could only tell the runway by its color in contrast to the surrounding grass. He could not hear any radio transmissions and had trouble breathing because of the terrific windblast. Despite these difficulties, Captain Swaney continued the approach and made a smooth landing. WELL DONE! ★

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