Flying Safety

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HEADQUARTERS UNITED STATES AIR FORCES · RESTRICTED

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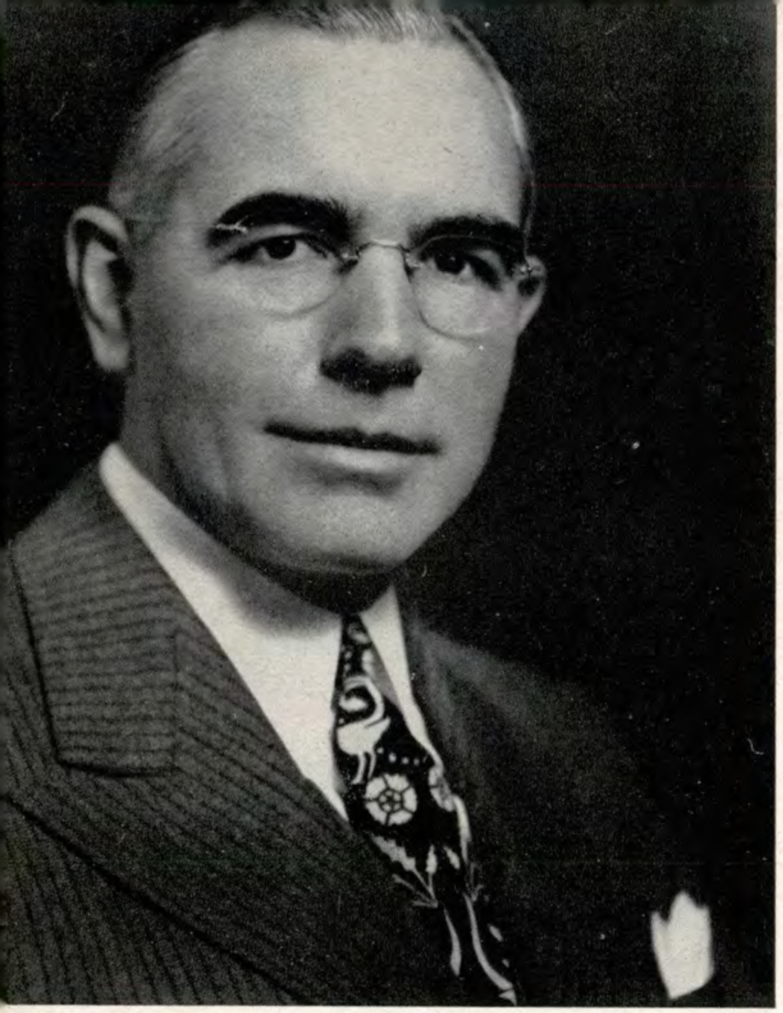
in this issue **RESCUE AT SEA**



FLYING SAFETY in the NATIONAL ECONOMY

By

JOHN A. McCONE

UNDER SECRETARY OF THE AIR FORCE

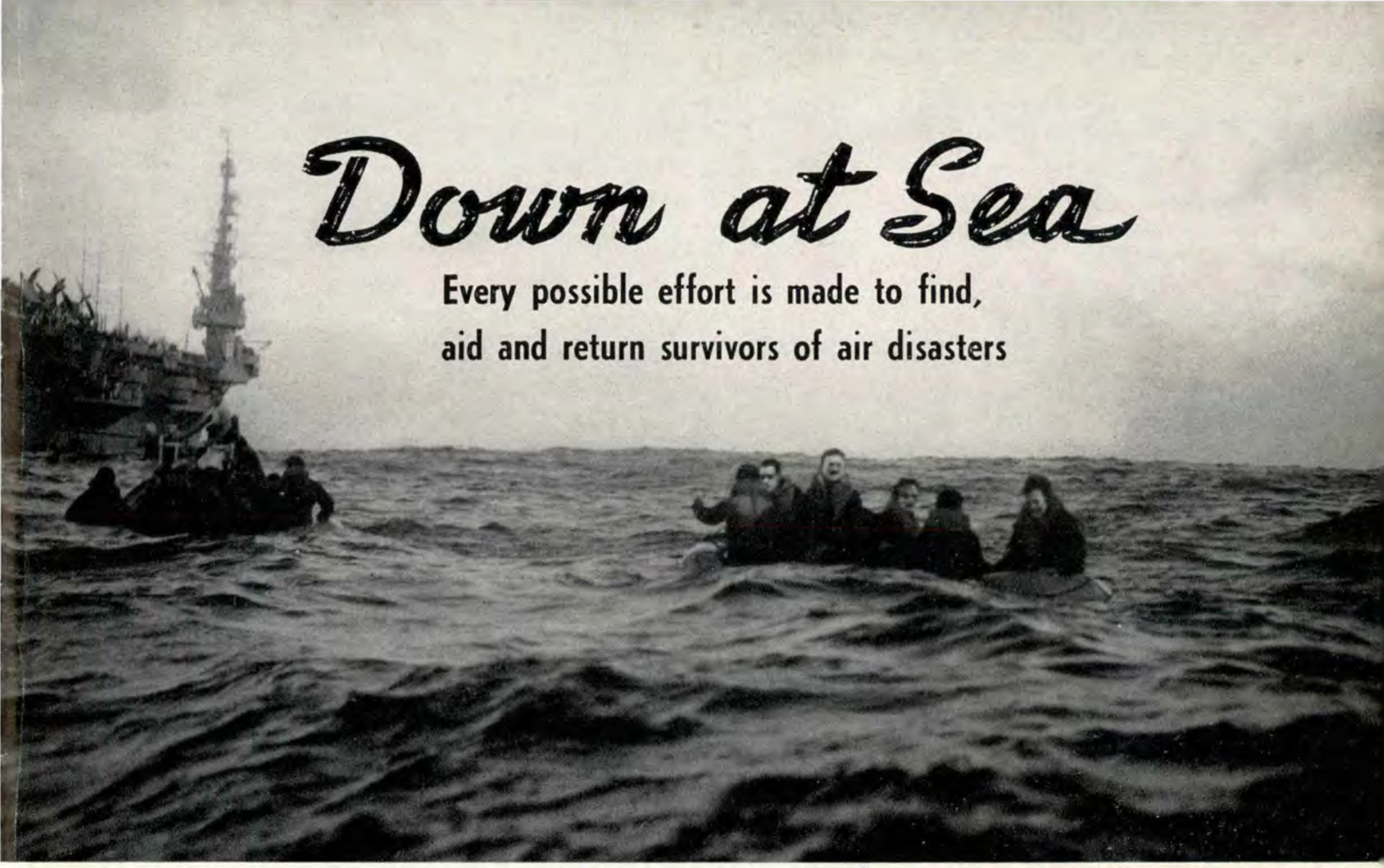
In the last analysis flying safety depends upon the skill of flight and maintenance crews and upon the wisdom and foresight of the men who build our planes. Therefore, it involves the efforts of most of the Air Force and the air industry that builds the mechanical foundation of the Air Force.

An effective flying safety program helps all of these contributors to flying safety to work together. Through a systematic analysis of accidents and their causes, it informs the builders of planes concerning the troubles of crewmen, and it tells the operators the things they need to learn from the men who put their planes together.

Most accidents occur because someone is mistaken. And everybody makes mistakes. But it is also a human characteristic to find out why mistakes are made and learn how to prevent them. Many lives are saved through an understanding of the costly misfortunes of a few. These lessons can no longer be learned by hearsay or through chance conversation. A modern air force must have a safety program that is just as carefully constructed and administered as any other element of its organization.

The battle for safety can never be won completely, but every safe and successful flight is a victory in itself, just as every damage and every loss is a defeat. I am confident that the efforts of all members of the Air Force to achieve and maintain the highest possible standard of safety will be unrelenting.

John A. McCone



Down at Sea

Every possible effort is made to find, aid and return survivors of air disasters

A carrier comes to aid of USAF crew. Survivors wear sun lotion

We can't rescue you if you are not alive.

That statement made by the Chief of the Air Rescue Service, Col. Richard T. Kight, pinpoints the responsibility of air crews engaged in overwater flights.

The Air Rescue Service has reached two very important conclusions over a period of years in the rescue business. The first of these conclusions is that time runs out all too fast throughout a search and rescue mission. Records show that the critically injured survivors of an aircraft accident usually die during the first 24 hours if not given aid. So the aim of rescue agencies is to get there first with aid in order to save the greatest number of lives.

The second of these conclusions is that it must be assumed that there is not even one able-bodied, logical-thinking survivor at the scene of the aircraft accident. This may be a startling conclusion because every man thinks, "If I am forced down, I'll make the best use of my equipment," but the records of actual rescues include numerous accounts where supposedly able-bodied logical-thinking survivors failed to accomplish extremely simple tasks in basic logical order and thus hindered, delayed and even prevented their own rescue.

The explanation is that shock following an aircraft accident is often so great as to cause those of strong mind to think and act illogically. This second conclusion clearly illustrates the need for air crews to make survival procedures second nature and to develop crew

Below are excerpts of a few of the hundreds of messages received, sent or monitored by the Coast Guard Rescue Coordination Center in New York during the search for an Air Force C-124 lost in the Atlantic. Terse as they are, they tell of the vast effort and variety of ships and planes that combed the ocean. Plane sent no SOS. Cause of crash not determined. Numerals indicate date and time: 230510Z—23 (day of month) 0510Z (Greenwich time).

230510Z—ALERT DECLARED X LAST CONTACT WITH AF 5882 0106Z X

231045Z—DISTRESS PHASE NOW OPERATIVE . . . LAST POSITION 0047Z 51.30N 27.05 W X URGENT URGENT URGENT

231434Z—AIR SEA SEARCH NOW IN PROGRESS FOR AF 5882 REQUEST CONFIRM THAT THIS AIRCRAFT DID NOT RETURN TO KLIZ

231445Z—LIMESTONE OPS ADVISE A/C PASSED POINT NO RETURN CERTAIN A/C DID NOT RETURN AND NOT AT ANY OTHER AF X AIRCRAFT BELIEVED DOWN AT SEA X REQUEST ALL SHIPS BROADCAST THIS INFO X OCEAN STATION VESSEL CHARLIE PROCEEDING LAST REPORTED POSITION TO SEARCH

231459Z—FM COMEASTAREA TO COGUARD RADIO STATIONS X BROADCAST FOLLOWING EMERGENCY 500/8280 KCS QUOTE LARGE FOUR ENGINE US AIR FORCE A/C 5882 REPORTED DOWN AT SEA X 55 PERSONS ABOARD X LAST REPORTED POSITION AT 0047 GMT 5130N 2705W X BOUND UK X ALL VESSELS IN VICINITY BE ON LOOKOUT FOR POSSIBLE SURVIVORS X LISTEN 500 AND 8280 KCS FOR POSSIBLE DISTRESS SIGNALS UNQUOTE OPERATIONAL IMMEDIATE

231645Z—FM SS CHUNGKING VICTORY . . . RECEIVED BROADCAST DISTRESSS . . . ALTERING COURSE FOR SEARCH

232055Z—FM NSZV USS GEN MUIR . . . PROCEEDING TO LAST REPORTED POSITION AIRCRAFT X ETA 240500Z

240153Z—FM SS EXCALIBUR INTERCEPTED ON 500 KCS SENDER UNKNOWN BEGINS BELIEVED TO HAVE SIGHTED WRECKAGE X

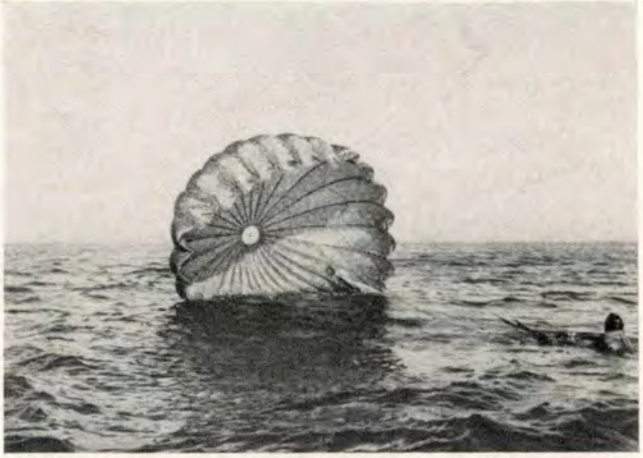
2402542—WRECKAGE AND FLARES SIGHTED X PROCEED MAX SPEED

242120Z—CG CASCO HAS PICKED UP PILOT'S DUFFLE BAG X

272015Z—X LARGE ARRAY OF SHIPS AND PLANES IN AREA WITH UNSUCCESSFUL RESULTS X

302223Z—NO FURTHER DEBRIS SIGHTED TODAY UNLESS OTHERWISE DIRECTED CG CASCO RETURNING TO OCEAN STATION CHARLIE

Down at Sea



Rescue is speeded if a position report is made before bailout

Air Rescue Service SA-16 amphibian takes off on search mission

The USS Coral Sea joined in recent search for Air Force C-124

discipline based on the proven techniques of using survival equipment.

The first step in effecting a rescue of a crew down at sea must be taken by the pilot who experiences an emergency or observes another plane in distress.

If the first alert comes after a plane is overdue, hours will necessarily elapse before the first plane or ship begins its search. This is a strong argument for accurate and frequent position reports. Rescues of air crews downed in the open sea all tell the story that the first few hours are the most critical for survivors. If a man keeps his head and makes sensible use of his equipment from the start, he has a good chance of being alive when the rescue planes locate his position.

A probable cycle of rescue operations goes like this:

A plane in trouble or an accompanying plane indicates potential or actual distress by radio and/or IFF signals.

Receiving stations (which may be other airplanes, ships at sea or radio stations ashore) relay this information to a rescue operations center.

The rescue operations center throws the search on all available communications and direction finder (DF) facilities . . . plots a course of action . . . dispatches rescue craft . . . watches all incoming and outgoing reports from rescue craft and monitors radio communications when possible . . . arranges fighter cover, when required . . . keeps informed on weather . . . designates an on-scene commander who may be the senior officer present at the scene of the crash, or the commanding officer of the first air or surface craft to arrive at the scene.

Rescue crafts proceed and conduct search and locate survivors. Survivors are picked up, given medical attention and landed ashore.

The above may sound like a simple one-two-three procedure, but search and rescue at sea is not simple because of the condition that can best be described as *approximate*. For example: the pilot of a bomber files a flight plan of the bomber's intended flight plan across the ocean and every hour he must report this position to the nearest ATC center. Thus, the bomber's *approximate* position is known at all times, but, just how approximate is it? If the bomber is traveling at 300 MPH and if an incident occurred between reports, it could be down anywhere along the 300-mile line. Remember, also, that radio reception could be bad or the radio could go out or the plane could get lost, so *approximate* could turn out to mean almost anywhere.

When there is plenty of time, the radio operator, or the pilot in the case of a single-seat airplane, can get

The pilot witnessing a distress incident or sighting a survivor must: circle, keep survivor in sight. Drop drift markers and dye marker if the survivor does not use his. Remain at low altitude to keep survivor in sight. Establish radio communication with base or ocean station, reporting position and circumstances. Never leave survivor unless relieved, recalled, rescue is accomplished, or fuel is running low.

Cover Illustration: Various types of rescue craft are pictured in action —An SB-29 with droppable life boat, an SA-16 amphibian, a helicopter rescue, and a Coast Guard Weather Station vessel holding its position in heavy seas. Photos on cover and those illustrating this article courtesy Department of Defense, Air Rescue Service, U. S. Coast Guard and Naval Aviation News

out a good long SOS and if somebody is listening, perhaps his position will be accurately spotted and help sent immediately. But rescue people always have to be prepared for the worst to happen. The worst being such as the case of the Air Force C-124 in which there apparently was no time for the crew to even send out a short signal—then, what are the chances? When this pilot did not arrive as per his flight plan, traffic control and operations at his destination presumed the plane missing. Rescue coordination centers on both sides of the Atlantic were notified of this incident, given the airplane's flight plan and last reported position, and requested to begin search and rescue operations. After studying all available information, the rescue controllers plotted the most probable search areas and began search operations with all available aircraft and ships.

An Air Rescue operations officer briefs pilot for search flight

The search for the C-124 was a tremendous operation, with planes of the U. S. Air Force, U. S. Navy, U. S. Coast Guard, and the Royal Air Force flying hundreds of sorties over the entire Northeast Atlantic. Warships, Coast Guard cutters, military transports, ocean liners and freighters were diverted from their courses and stations to criss cross the vast stretches of ocean. Only tragic bits of wreckage were found; no survivors.

Destroyers rushed to scene of C-124 distress in North Atlantic

The same means of search employed since the airplane was invented—visual search with the human eye —is still the means by which survivors are most often located. This system is very costly when you consider that on some of the bigger missions up to 100 aircraft have been employed on search for days.

The number of aircraft and ships required to take part in a search seems to be directly proportionate to the lack of position reports and adequate signaling equipment aboard the life rafts.

In one case, a B-29 ditching in the Atlantic with its position only *approximately* known, 151 sorties were flown over a period of four days, for a total of 1,194 hours, before the survivors were sighted. In addition to this vast aerial search, numerous ships of the United States and British Navies, as well as the United States Coast Guard, participated. The area searched extended 650 miles from north to south, and 750 miles from east to west, or, roughly equivalent to a rectangle with corners at New York, Chicago, Little Rock and Charleston.

The refueling unit on an island at the center of the search area issued 338,420 gallons of gasoline and 14,162 gallons of oil to searching aircraft during the four-day period. In addition to this huge expenditure, the mission was supported by planes operating from continental bases. The effort paid off when the crew was located by an alert scanner in an SB-17.

Submarines have rescued numerous airmen forced down at sea

Action by survivors afloat to attract attention: "Gibson Girl" transmitter, operate at least five out of each 15 minutes coinciding with international listening periods at X-15 and X-45 o'clock if possible. Self-contained radar beacon transmitter, operate periodically. Radar reflector, erect at once. When search craft are seen or heard, also use pyrotechnics, flags, mirrors, dye marker, and whistles in fog or darkness.

After ditching, airmen row to rescue boat dropped by FEAF B-17

Ocean is plotted into search areas at Air Rescue Service Center

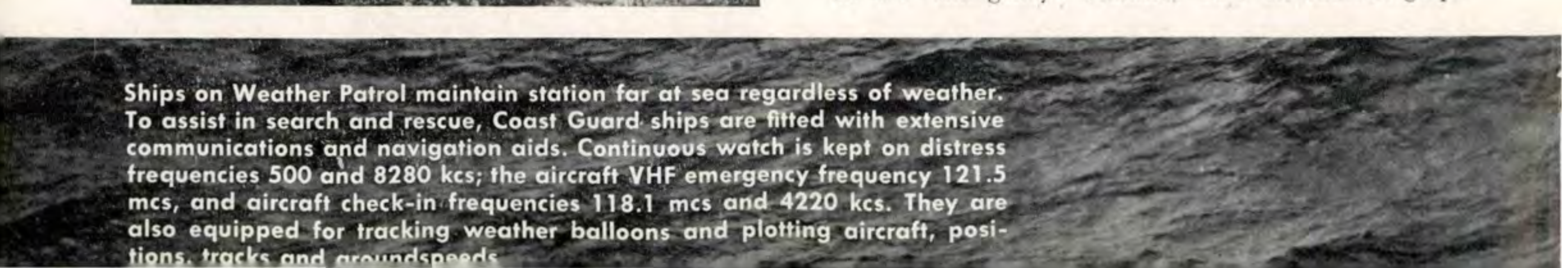
Rescue aircraft and vessels operate as a group to accomplish a common mission, and the essence of completing a successful operation is close teamwork.

If the crash is at sea and beyond helicopter range, then an amphibian with medical aid aboard may land and evacuate the survivors. If the sea is too rough for amphibians to land, then other aircraft can drop an airborne lifeboat, equipped with aid supplies. Pararescue survival specialists can also be dropped to assist the injured survivors aboard the lifeboat and render them first aid until the seas calm to permit amphibian landings or until larger surface craft arrive.

The Air Force is now receiving two pieces of equipment that will assist in the solution of the notification and search phase of the mission. One item is an automatic keyer which is a small two-pound unit that can be wired to existing high or very high frequency radio sets—and by the flip of a switch on the part of a radio operator or other crew member, will turn on the transmitter, select a preset frequency and send a distress S.O.S. The other piece of equipment is a small personalized survival transceiver, which is called the URC-4. It weighs about 4½ pounds and transmits or receives very high frequency over line of sight distance. It will be carried aboard all aircraft and when used by survivors, will assist in the close-in search effort. It should prove most useful in aid and rescue operations as well, in that it will permit communication with the survivors.

To solve the big problem of finding survivors, the USAF has under development a so-called Crash-Locator Beacon and a Crash-Locator Bearing Recorder. The crash locator beacon is an electronic device to be installed in all USAF aircraft. It will be so designed that upon crash impact it will be automatically ejected from the aircraft and begin transmitting distress signals instantly on high or very high frequencies. It will transmit a signal on standard distress frequencies on which bearings can be taken by ground stations and on which search aircraft can home in. The crash-locator beacon bearing recorder is an automatic receiver which will be capable of recording the signal of a crash-locator beacon and of taking and recording bearings on such signal. An alarm device will be incorporated in the receiver which will call to the attention of the attendant that the signal is coming in. The attendant can then alert the rescue organization directly and help will be on the way in a matter of minutes.

Aircraft Distress Communication Procedure — When an aircraft is threatened by serious and imminent danger and requires immediate assistance, the pilot will: Turn on IFF emergency—Transmit SOS on radiotelegraph



Ships on Weather Patrol maintain station far at sea regardless of weather. To assist in search and rescue, Coast Guard ships are fitted with extensive communications and navigation aids. Continuous watch is kept on distress frequencies 500 and 8280 kcs; the aircraft VHF emergency frequency 121.5 mcs, and aircraft check-in frequencies 118.1 mcs and 4220 kcs. They are also equipped for tracking weather balloons and plotting aircraft, positions, tracks and groundspeeds.

and/or MAYDAY on radiotelephone followed by aircraft identification and a 20-second dash. When VHF is used, transmit MAYDAY (three times) followed by call sign of aircraft (three times).—On completion of the above distress calls, the following information should be transmitted: best estimated position, time, course, speed, altitude, nature of distress, and intention of aircraft commander as to ditching, bailing out or crash landing.

The first transmission by the aircraft will be on the assigned air-ground frequency or the frequency of last communication contact. If the aircraft is unable to establish communications on the above frequency, one or more of the following will be used: The international distress frequency, 500 kc—U.S. emergency and safety frequency, 8280 kc—International emergency VHF frequency, 121.5 mc—and any other available frequency in an effort to establish communication with any ground station. The distress call and message should be repeated at intervals on the various frequencies utilized until an answer is received.

Immediately prior to ditching, bailing out or crash landing, the pilot or radio operator will tie down the radiotelegraph key. If the aircraft is equipped with VHF, the pilot will break the safety wire on the VHF control switch and throw the switch to transmit position, or use any other means available to obtain continuous transmission.

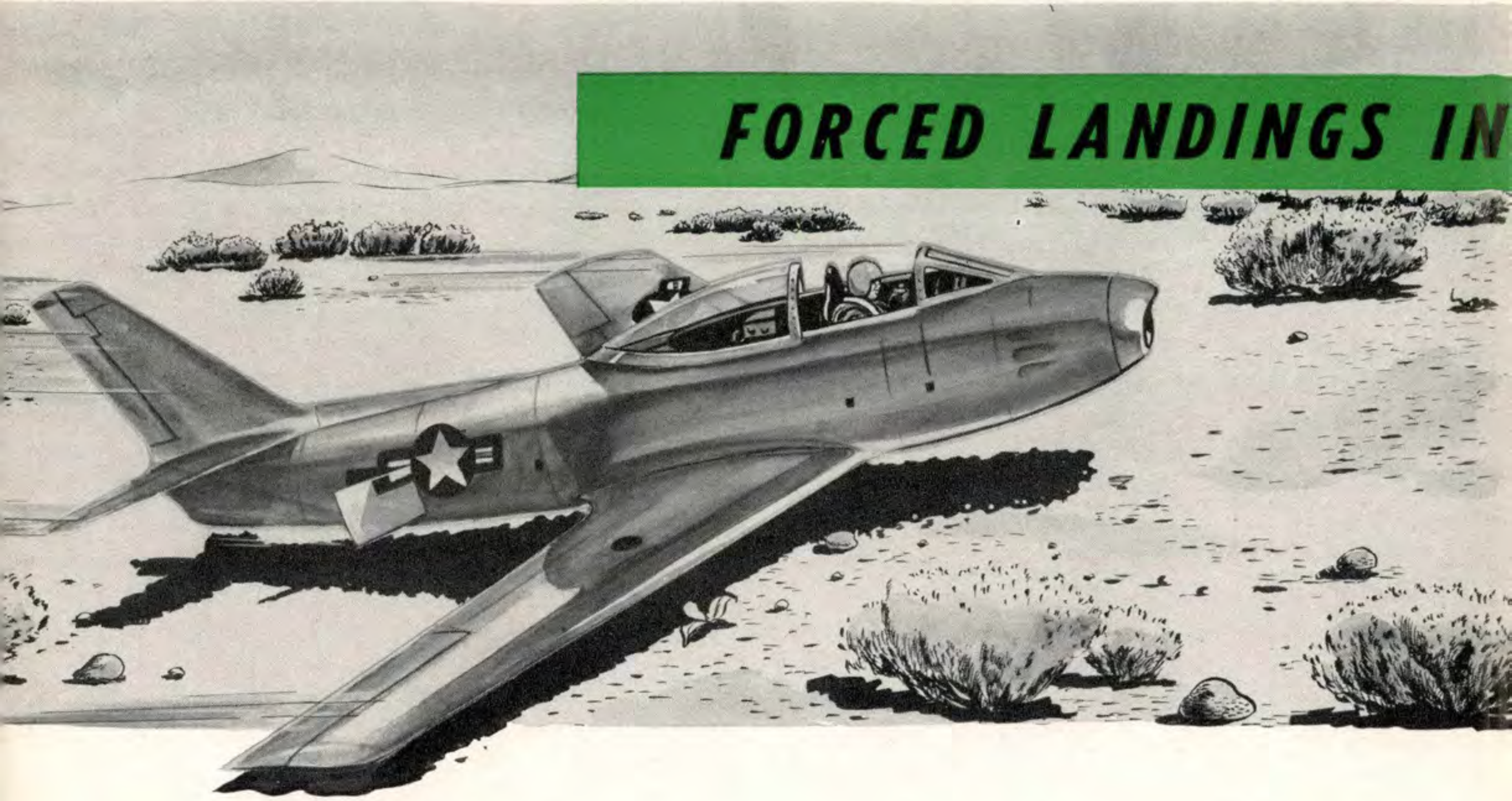
If the aircraft no longer is in distress, a message canceling the state of distress must be transmitted on the same frequency or frequencies used for transmitting the distress calls and messages.

The USAF, through the Air Rescue Service, has launched into a program of training rescue specialists, standardizing search and rescue techniques and procedures, and procuring special equipment. When this program is carried to completion, it will be possible to complete a rescue mission in a matter of hours instead of days, as at present. In the meantime, however, all members of air rescue organizations continue to abide by the policy that: Air Rescue Service exists only to save lives; the probability of finding survivors diminishes with each minute that passes after an air disaster occurs; in each and every incident it must be presumed that there are survivors, and every possible effort must be made to find, aid and return these survivors to safety. Furthermore, that the thoughts and efforts of every man be directed toward creating an organization better equipped and trained to carry out any rescue by day or night in the least possible time so that all will know that no life has been lost through a wasted minute or a misdirected effort.

Pararescue teams are prepared to jump to aid of downed flyers

Crew of 3rd Rescue Squadron scramble for mission at base in Japan

The search and rescue control room has all latest information on the availability of rescue units and any other ships that may help a plane in distress. The New York Coast Guard Center plots positions, courses and speeds of military and large merchant vessels in the North Atlantic. Selected ship positions from this plot, showing radio watches are transmitted daily to all international airdromes on both sides of Atlantic for the information of flight crews planning overseas flights



FORCED LANDINGS IN

As a jet fighter pilot, do you think you can handle a flameout safely—even if an airstart should fail? What are your chances for walking away from a forced landing without a scratch? What can you do to improve your chances?

These are vital questions that roost in the subconscious of most jet jockeys. The Directorate of Flight Safety Research conducted a survey of 97 jet forced landing accidents which occurred between 1 July 1949 and 30 November 1950, and now you can profit from the experiences of these pilots. Only forced landings resulting in accidents were studied because only a few of the many successful landings with no injury, and minor or no damage, are reported.

This survey showed that your walk away chances are good. This is attributed mostly to the higher stressed cockpits—high G-Force seats, and the wearing of the shoulder harness. To use statistics: 98 per cent of the aircraft involved were substantially or totally wrecked; yet, 75 per cent of the pilots were not injured. When one considers that 95 per cent of these jet forced landings were accomplished without a fatality, the picture becomes even brighter.

Although some of these fighters were pretty badly torn up, it is modern high stress cockpit design that enabled 75 per cent to walk away or suffer only minor injury. These cockpits form a protective shell for the pilot. One airplane hit so hard that the pilot drove his feet through the weaker forward cockpit floor, and lived. Another cut a 600-foot swath through a grove of pine trees, and still another hit at an indicated airspeed of about 230 knots, on a flat angle. Yet in each of these instances, although the aircraft shed wings and tails, the cockpits remained intact and the pilots are narrating their experiences.

A large number of P-1 helmets were dented and scraped, with no personal injury to the wearer, and there were four specific occasions in which the P-1 averted serious head injuries or possible fatalities.

In two cases where pilots attempted to land gear-down at other than a regular airfield, both aircraft were totally wrecked, one pilot was killed and the other received major injury. Therefore, to draw on the ill fortune of others, it is almost desirable for a pilot to make a wheels-up landing when landing off an airport.

Of the total number of partially extended gear landings, more than half occurred in the F-84. There were 10 cases where the pilot's planning did not allow for the time lag in pumping the gear down manually.

These unfortunate pilots were still pumping away at the emergency nose gear system up to a point where the nose of the aircraft hit the runway. This condition is being corrected in later models with a pneumatic boost.

There is still no substitute for calm analysis and keen judgment required to handle an emergency, and this survey shows that these are personal attributes of the individual pilot. (Paul Mantz, noted stunt flier, will give crash landing tips in a future issue.)

Looking at these accident statistics, there are indications of shortcomings in some jet pilot training programs in tactical outfits. It seems once a jet pilot has left advanced flying school, he may be inclined to relax emergency training and procedures, when the fact is that they should be intensified and applied to new aircraft.

JET FIGHTERS

Airstarts call for more practice. In more than 28 per cent of flameouts, airstarts were unsuccessfully attempted. While the reason for the failure of these units to start is not always known, the Forms 14 often show that airstart procedures were either too hastily or incorrectly performed. This phase of training is one that cannot be "overlearned."

Airstarts should not be practiced in mid-air, but should be simulated on the ground in class 26 mock-ups or jet captivairs when available. In the opinion of many, mid-air starting practice is dangerous as it puts the pilot in a very critical position if the start should fail.

Fuel exhaustion, a factor most vital for jet pilots in their preflight planning, showed up in the survey with alarming regularity—approximately 25 per cent of total causes of forced landings. Here again is reflected inadequate training in flight planning, or an utter disregard for the range limitations of jet aircraft. Here, too, as a contributing factor, is poor flight leadership. In four accidents, wingmen became separated from their flight leaders, subsequently became lost, exhausted their fuel while stooging around looking for a field, and finally had to crash-land.

This poor flight leadership was evidenced in three accidents involving weather. Accident investigation boards recently have emphasized the problem of retaining a high experience level among these leaders as top time men are being siphoned off for schools, overseas combat and staff positions.

Concerning the weather problem, low instrument proficiency and reluctance of the pilots to fly in weather accounted for seven per cent of the forced landings. This figure may be shaved as more T-33's with hoods are used for instrument training.

The primary cause factor leading up to the emergencies was powerplant failure with 51 cases, or 53 per cent. Each pilot should be thoroughly briefed regarding any characteristic weakness of the engine in his aircraft, thereby knowing what to expect in the way of a failure, and how to meet the emergency.

Another obstacle that hindered these distraught pilots was loss of their control boost, due to insufficient hydraulic pressure. This condition led to at least one fatality and was a suspected factor in three others. Several others were so occupied in maintaining aileron control that they failed to plan their approach properly and wrecked aircraft resulted. The answer to this problem is that it is essential that any program of practice forced landings be done with boosters off, in order to familiarize pilots with the possible loss of this system under actual emergency conditions.

Flaps and speed brakes were used in about 60 per cent of the landings. However, full dependence on these controls will not prevent overshooting or undershooting of the intended landing area, for many of the overshooting planes had flaps down. This indicates that the pilots in these high, fast approaches had either forgotten how or were reluctant to slip, "fish-tail" or "S" their aircraft to assist in losing altitude and slowing up. Then, again, perhaps they had never been briefed in the slipping characteristics of their tactical jet type aircraft. Air Training Command incorporates this phase in the jet training program at Williams Air Force Base as part of the check-out. This is more or less based on the old theory of using every trick available when attempting to groove a dead stick landing.

Approaches are most important in this business of staying in one piece. Straight-in approaches outnumbered the 360° overhead pattern in power off landings, three to one. In making the 360° "pitch-out" tactical pattern the pilot's judgment was affected more adversely than in the straight-in type. Of 21 pilots who used the tactical approach, more than 50 per cent overshot; 25 per cent undershot, and the remaining percentage hit their intended landing area. This was accompanied by two fatal and two major injury accidents.

The rectangular pattern was in favor of the pilot. Fifty per cent touched down in their intended area; 25 per cent either overshot or undershot, and the remaining 25 per cent did not apply (ditching at sea, etc.). These figures point to a large spiral type descent over the intended area (if altitude is to be lost) with a rectangular pattern plus a straight-in final, as being good solid emergency flying. It also emphasized the fact that the 360° overhead pitch-out is strictly for the older sports, loaded with jet time.

In report after report, the killer was excess airspeed on final and touchdown. Contrary to any rumor, *the stalling speed of an F-86 is the same with or without hydraulic pressure.* Without hydraulic pressure or electrical power a pilot would not have his flaps or speed brakes, but the stalling speed would still remain equal to stalling speed with only gear down *without* the emergency.

It is the psychological effect of *having* to groove it that possibly influences the thinking of the pilot. The fear of undershooting is subconsciously compensated for by building up an *excess* airspeed of 60 knots on up. This condition has proved just as disastrous as the low airspeed antic.

Regarding this high-speed approach, pilots placed too much emphasis on the fuel-load speed ratio. Adding an average of five knots to the aircraft per 100 gallons, over normal landing as specified in tech orders, is sufficient. Using this guide, 15 knots would be the maximum airspeed increase required with a full internal fuel load (external should be salvoed).

• Head for nearest airfield • Set up proper glide angle • Decide at 10,000 feet whether to bail out or crash land • Gear up for all but runway landings • Establish a pattern to prevent over or under-shooting • Use flaps and speed brakes if available • Jettison external loads • Canopy open • Shoulder harness and safety belt locked • Switches off

Following complete engine failure, the pilot of this F-86 glided nearly 75 miles to clear rough terrain and landed with minimum damage

First, actual forced landing procedure—

The following is an SOP covering both the actual emergency and simulated forced landings developed by jet units:

- When the emergency occurs, head for the nearest field—
- Set up proper glide according to A/C Tech Order—
- Airstarts should be attempted (if engine is not damaged, etc.) down to approximately 10,000 feet above terrain. It is this altitude where a decision to bail out or crash land can be more accurately made.
- If an airport landing is to be made with known runway length, gear should be down and locked at sufficient altitude if practicable to enable pilot to concentrate on pattern work. If gear cannot be completely downlocked, either by normal or emergency methods prior to final approach, this study showed that it was safer to retract gear for a belly landing.
- As for pattern a circular constant-rate descent is the most feasible approach, the outer perimeter of which is close enough to insure the pilot that he can make the runway from any point. Downwind and, of course, base legs can be easily set up off this circular pattern. These legs should be close enough to the field to safeguard undershooting. A pilot can slip off excess altitude on downwind, base and/or final and be assured of grooving it on the first third.

- Flaps and speed brakes should be used, if available, to lower the aircraft's touchdown speed. In water landings, study has indicated that the flaps will rip off or "give" on impact and cause a nose-in effect. Landing gear should be up on all ditchings in the water.
- Jettison external loads before touchdown if possible. Sliding or braking distance will be shortened. Wing tanks, if empty, will afford additional buoyancy in ditching.
- Canopy should be opened prior to final approach, when speed permits, either manually or mechanically.
- Make sure shoulder harness is tight and locked—also P-1 helmet is on securely.

A preflight check should be made on the crash harness lock by the crew chief and pilot to ascertain that it will function when needed.

The major recommendation of this survey is that because of the gross misjudgment of patterns, speed and powerless characteristics of the jet aircraft which these pilots are flying, a vigorous program of simulated forced landing practice be adopted by all jet tactical outfits.

In setting up this simulated policy it should be emphasized that the final decision is that of the Unit's commander based on local conditions such as traffic, runway length (9,000 feet should be available to compensate slight errors), local terrain features, etc.

For your interest, here is listed the operational SOP as set up by the 81st Fighter-Interceptor Group, Larson AFB. This procedure is the guide for a simulated forced landing program in Western Air Defense Command:

"Prior to takeoff, a thorough briefing of the procedures established by this memorandum will be given by a qualified instructor pilot. The instructor pilot will also supervise this landing from Runway Control.

Procedure—

a. Initiate pattern over the field at 10,000 feet MSL, or above.

b. Request permission from tower to simulate a dead stick landing.

c. Return throttle to IDLE position.

d. Extend gear at 185 knots IAS or less.

e. Simulate hydraulic failure—do not use speed brakes or wing flaps.

f. Establish a descending spiral over the field for the traffic runway.

g Normal gear down, green light on, check will be made on base leg and final clearance for landing will be received from the tower.

Caution—

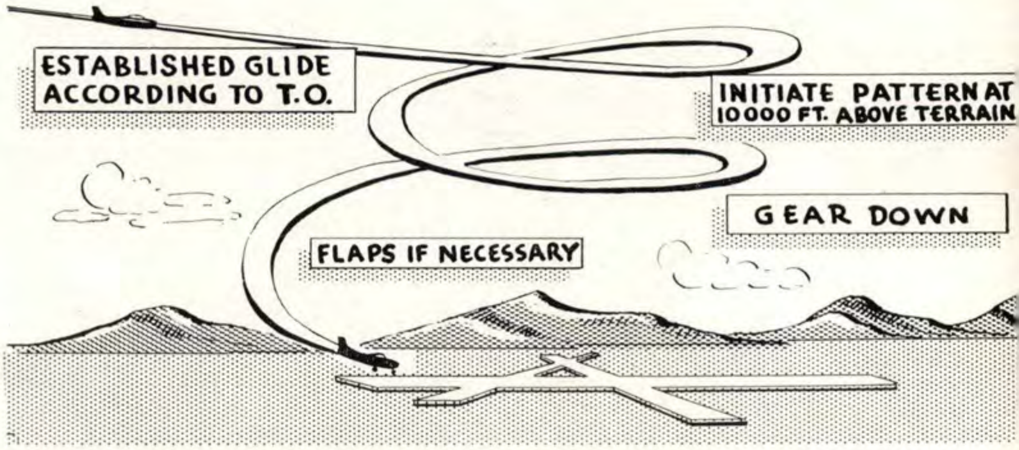
a. Speed brakes, wingflaps or power will be utilized at any time it is necessary to effect a safe pattern.

b. Simulated dead stick landing will not receive priority in the landing pattern over other jet aircraft.

c. A minimum IAS of 150 knots will be maintained until a landing is assured.

There is one recommended deviation on this SOP and it pertains to paragraph "e" in reference to use of flaps. To simulate a correct configuration of the proper rate of descent without power, flaps could be used. The amount used will counteract the slight thrust of an idling engine.

Units with similar type aircraft are encouraged to exchange information and ideas on emergency forced landings and training.



Approaches are most important in landing with a flameout. After spiraling down to 10,000 feet above the intended area, a rectangular pattern plus a straight in final is the most successful. In a 360° "pitch out" tactical pattern your judgment will be affected more adversely than in the rectangular pattern.

Modern high stress cockpit design and use of shoulder harness and protective helmets enable pilots to walk away from wheels-up landings. The pilots of these three fighters chose favorable fields for emergency landings

report for E.A.D.

a reservist gets back in the saddle —but this time without cowboy boots

"No, no, don't crush that flighter! The days of 'Hot Shot' and his droop snood are gone. No more cowboy boots. This is the new Air Force, men—new, that is, since you left the stick-and-throttle business five or six years ago . . ."

This could well be a greeting to thousands of Air Force Reservists as they are processed prior to duty assignment. It was the greeting I got.

Many things had happened since my separation in 1945, and this Air Force is modern in comparison to the operation then—blue uniforms, jets, instrument procedures, safety equipment such as the ejection seat for high-speed bailout, automatic opening parachute, compact survival kits, advanced electronics, armament and maintenance equipment and methods. Even paper work has advanced—new forms for flight plans; no item for "additional pay for mount" on the new pay vouchers, which you don't have to fill out anyhow.

Almost every branch of the Air Force has made rocket-assisted strides in development during the past five or six years, and it soon becomes apparent that the primary concern of us "retreads" is the matter of bringing ourselves up to date. The great majority of us realize that we have quite a bit of book work to do. Perhaps the average individual has a very good picture of his own limitations due to "rustiness," yet our problem hinges on the ability of supervisory personnel to correctly evaluate our flying techniques and to give all of us thorough and adequate checkouts without returning us to the status of cadets.

Some new men may climb back in the cockpit, with a desire to live in the past. An ex-fighter pilot may resent long hours in a T-6, as a former B-24 driver becomes bored with the right seat of a bomb wagon and would like to show his instructor "how we used to do it" over Dortmund and Rabaul.

It is at this critical stage that a flight instructor should "allow" the student to get into situations that will impress upon him the fact that time away from flying takes its toll, both in judgment and technique . . . And to do this safely will require finesse and proficiency on the part of the IPs.

On recent visits to several Reserve bases I had the opportunity to sound out some of the men awaiting EAD orders, and I found that many of them had definite opinions of what they felt was needed in the way of a refresher course. Most of them would like to go back to primary (which is now T-6 basic) and have the necessary time to work on fundamentals which is the foundation for safe flying.

The training of recalled pilots is at present under the direction of the command to which the men are assigned and bases are setting up curriculums which include intensified ground school and diversified flying, instrument instruction, radio procedures and navigational flights.

In looking over some aircraft accident records, I found that statistics show a large percentage of the recent accidents have been due to lack of knowledge of the aircraft flown. Flight Safety officers feel that this lack of training can be traced right back to supervisory personnel for allowing "three-trips-around-the-pattern" as an adequate check-out. This is particularly true in the case of field grade officers, as the check-out pilot often dislikes to point out weaknesses in the superior officer's procedure. It should be remembered that a "light" colonel can get just as "rusty" and forget just as much as a lieutenant in the span of five or six years and he's going to stay just as dead, if he has a fatal crash.

Swapping yarns with a few of the check-out pilots brought out some of the faux pas which we "back in the saddle" boys commit and further emphasize the need for this basic type of flight training. One pilot stalled a plane in the traffic pattern while his attention was directed outside the cockpit keeping track of the runway. Another, during a simulated IFR check, failed to pretune his radio compass and command set to facilities requiring radio fixes for an instrument departure. He also waited until he was airborne to check the operation of this radio equipment.

Another incident, on the humorous side, was the pilot approaching a midwest Air Force base in a T-11. A radar warning net picked him up as he neared the field and it was suggested that he make this a practice GCA. He replied on VHF that he was sorry, but the aircraft was not equipped with the necessary GCA equipment!

I overheard a Flight Safety officer talking to a check pilot at one base. Some points he got across were to take nothing for granted, *know* what the new man knows, know how he thinks and reacts under the stress of a single engine go-around. *Know* that only if this man is fully checked out can he be a safe pilot, and then if he does get into trouble he will have knowledge on which to base his judgment. This works both ways—a transition student has to assume the responsibility of learning and accepting constructive criticism of his flying technique. Failing to do so may cost his life and possibly the lives of his passengers.

Flying the gages is not all needle, ball and airspeed; this we soon learn. There are noteworthy changes in radio navigation and the instrument approaches, of which GCA is the simplest for the majority of pilots. GCA passed the tests of its severest critics during the Berlin Airlift. But GCA operators are quick to point out that the "A" in GCA stands for *A*pproach, not Landing. It should be remembered that it is not a blind *landing* facility—yet.

There are many other innovations, including the defense zone procedures which have to be learned. The Radio Facility Charts (AN 08-15-1) is one of our most valuable handbooks, and reading it helps smooth out radio/telephone technique. Being able to state the message quickly, clearly and with a lack of *'ers* and *duhh*, will give another pilot a chance to report his position.

Assigned to a reserve unit for weekend flying for a year before the call, I felt that keeping up with the Regular pilots would be just routine. But a jolt to my pride as a "hot shot" came on my first extended cross-country, which I flew right seat. Not having been checked out in the aircraft, and with a VIP aboard, the instructor pilot did most of the driving. We landed at Bolling. The business at hand was finished. RON. Then the next morning we checked WX for Wright-Patterson, filed an IFR clearance requesting 8,000 feet as altitude to Patterson Field.

After we fired up the engines, I called in for tower clearance.

It came back: "Taxi out to runway 31, run up engines on mat south of runway—altimeter setting 3001." We were checking mags when Bolling tower interrupted with "A/F—Here is your instrument clearance. Are you ready to copy?"

With pencil in hand and radio facility chart ready, I replied in the affirmative.

"ATC clears AF—To climb VFR to 2,500 feet with a left turn out of traffic, north of the Pentagon. To proceed on the southwest leg of the Washington range to the Mount Vernon intersection. Cross Mount Vernon 4,000 feet to climb to 7,000 feet on course to the Springfield intersection. To proceed on Red 61 to the Arcola intersection, cross Arcola at 8,000 feet. Cleared Red 18 to Elkins. Direct to Wright-Patterson. Cruise and maintain 8,000 feet while in control areas. OVER."

Then came the embarrassment of not being able to read that clearance back in its entirety.

It is rumored that a tower operator is jolted somewhat when an Air Force pilot reads back a clearance verbatim—but I didn't even come close!

The pilot eased the situation by finishing the readback. Then and there I made up my mind to sharpen my radio procedure with a heavy Link schedule—at the suggestion of the VIP—a general—who was listening in.

There are chuckles in "there-I-was-with-my-face-red" yarns being swapped among reservists back on active duty. And while we all enjoy a good story about another fellow's embarrassment, it's safe to say that behind all these episodes is a serious effort to take the rust off and get back in the groove.

TERRY

Air Force Reservists ordered to active duty at the same time as Terry Lee and Charles C. Charles found many changes. Training of recalled pilots is under the direction of the command to which the men are assigned and, for most of them, little time is lost in getting back in the saddle.

POTENTIAL ACCIDENTS

It may be only an incident on a routine flight—but, ignored, it could lead to crashes

THE F-86 PILOT ARRIVED back at his base after completing a routine training mission and entered the traffic pattern for a landing. All went well until he extended the landing gear and then his heart turned over.

The nose gear warning light indicated the nose gear was not locked down.

All emergency procedures known and a few more were tried but the light remained on.

Cautiously, the pilot landed and the nose gear did not collapse.

But he had done a little sweating and he could have ended up in quite a spot. So before he wiped off the sweat and banished the incident to the back of his mind, he wrote up the occurrence in the Form 1 and held a short conference with the Engineering Officer.

The investigation which followed revealed a crack in the nosegear actuating cylinder almost the full length of the barrel assembly. The crack was indirectly caused by improper installation of the return hydraulic fitting. This led to inspection of other F-86's in the squadron and the fitting was found to be improperly installed on 23 airplanes. This situation was, of course, corrected.

Up to this point, the action was pretty much routine. But from there on a new plan, evolved in ConAC before that command was split three ways, took over. This plan calls for a follow-up system which does not permit the action to stop at squadron level.

This preventive program recognizes the fact that many incidents in the nature of potential aircraft accidents occur every day. The fact that the pilot avoids an accident does not lessen the importance of these incidents, because the next pilot who finds himself in a similar situation may not be so lucky or experienced—and may not write up the difficulty.

The program was initiated to publicize these incidents command-wide. The individual reports the incident to his squadron superiors. It is investigated there and a report in a standard form is forwarded to the group commander. The information is disseminated to the other squadrons in the group with pertinent instructions. The group commander relays the information to wing headquarters where it is passed on to other wings and groups of the entire command through the medium of a "Weekly Activity Report."

In the case of the F-86 incident, this procedure was followed. Also, because the matter was considered of interest to F-86 organizations outside the command, a U. R. was submitted so that Air Force-wide action could be taken. It is impossible to say how many accidents were prevented by this one instance of cooperation. The chances are pretty good that money, time, equipment and possibly lives were saved.

The program is not limited to items which indicate materiel failure. Anything which may be considered a potential accident cause factor is put into the mill. And these may include such things as poor pilot technique which results in excessive "G" forces on the plane, improper taxiing, poor traffic patterns, faulty maintenance or inspection techniques, erratic operation of gear or flaps or oxygen system, flameouts, failure of flight instruments, faulty installation of accessories, etc. The plane does not have to be in operation either. If a pilot or anyone else observes a potential accident cause during a preflight inspection or even while just strolling across the ramp, the same procedure applies.

With regard to reporting occurrences for which the individual himself is primarily responsible, through lack of training or just plain carelessness, it is emphasized that the report will not be used as a basis for punitive action. Thus, the individual has no reason to "cover up"

for himself, and more cooperation results.

The seriousness with which this program is taken at higher levels is indicated by the fact that each group headquarters has a Potential Aircraft Accident Investigation Board which reviews each incident report. In some cases this board is able to initiate corrective or preventive action in addition to that recommended by the squadron. Active interest at higher levels assures support at lower levels.

One fighter group showed a marked decrease in the actual accident rate within two months after it initiated the program. Although it cannot be attributed definitely to the program, the decrease was undoubtedly a result of the practice of giving more attention to *potential* accident causes rather than concentrating solely on *proven* accident causes. The latter, of course, cannot and has not been neglected. This particular fighter group, which is now overseas, kept a running record of potential accident reports in comparison to flying hours, and computed a potential accident rate just as the actual accident rate is figured.

As another phase of this "foresight" program, great emphasis has been placed on proper preflight briefing. For example, the aforementioned fighter group published a group directive on the subject of briefing and flight clearance. The directive made it the duty of each flight leader to pre-plan the flight and brief each member of the flight thoroughly on each phase of the mission.. The directive went so far as to provide a briefing checklist for each of the seven types of training missions the group pilots were frequently called upon to perform.

For example, one briefing checklist was specifically for air-to-air gunnery missions. It included a section of general information such as how many planes will participate, type formation, start engine time, takeoff and rendezvous, radio procedure, guns and ammunition information, etc. It also included sections on the gunnery pattern, after-firing procedure, gun and camera switches, weather, fuel and emergency procedures. Under each heading was a separate detailed checklist aimed at insuring that each pilot understood his specific duties and responsibilities and at the same time knew the flights' objective and how that objective was to be accomplished.

To make certain that briefings were conducted properly, the local clearance form carried a certificate on the reverse side which had to be accomplished by the leader before his flight was cleared. He certified that he had been briefed and had briefed his flight in accordance with pertinent directives. He also outlined the briefing he had passed on to his flight regarding weather information and emergency weather procedures.

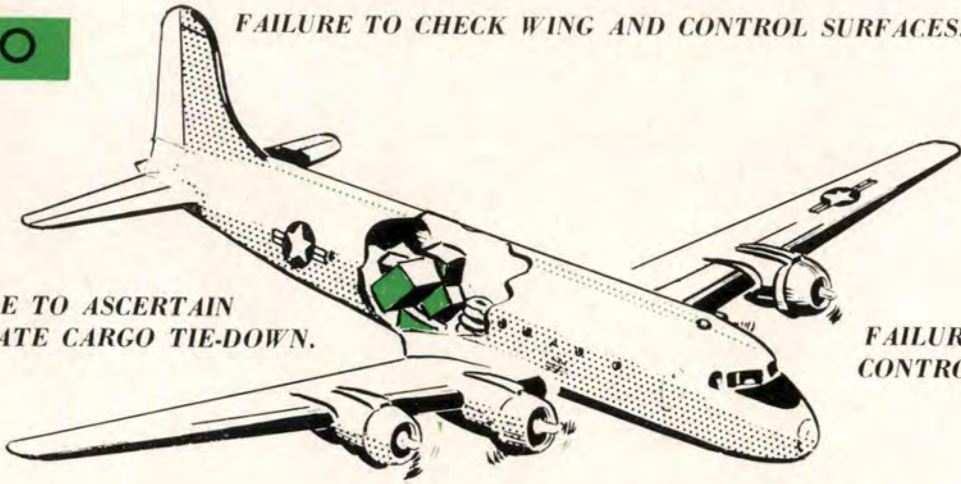
The success of the aircraft accident prevention program as outlined here depends to a large extent upon the enthusiasm with which it is accepted by the pilots. What a pilot discovers and reports one day may save a friend's life the next day—and vice versa.

Errors IN VISU

THE OPERATIONAL EFFICIENCY OF THE AIR FORCE HAS BEEN GREATLY REDUCED BY THE LOSS OF LIVES AN

CARGO

FAILURE TO CHECK WING AND CONTROL SURFACES.



FAILURE TO ASCERTAIN ADEQUATE CARGO TIE-DOWN.

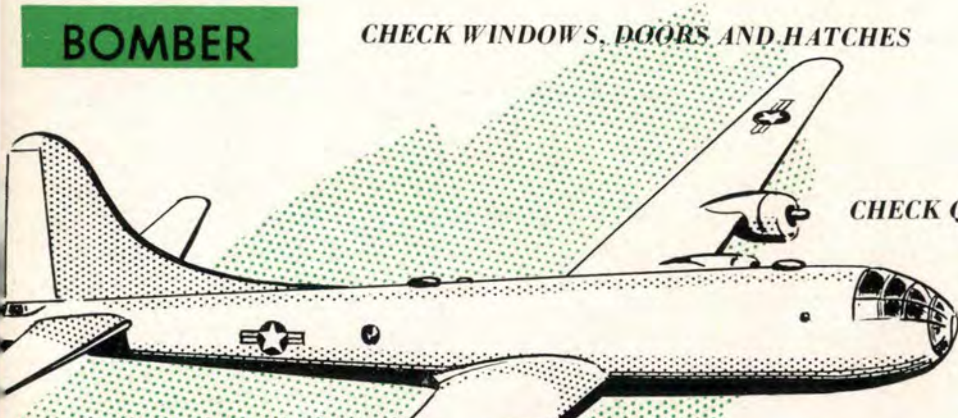
FAILURE TO CHECK CONTROL MOVEMENT.

During the period of this survey failure to make comprehensive visual inspections of both the interior and exterior of cargo aircraft resulted in accidents.

MISC.

BOMBER

CHECK WINDOWS, DOORS AND HATCHES

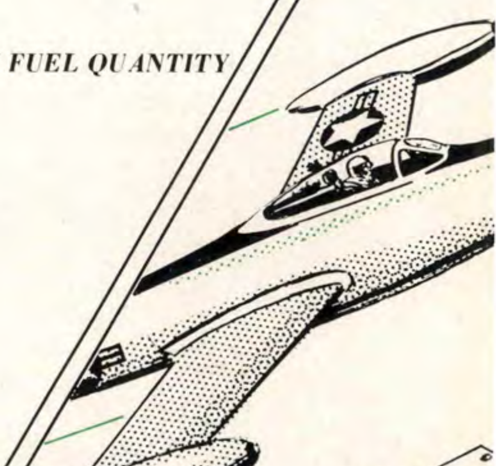


CHECK QUADRANT CONTROLS

CHECK FUEL QUANTITY

CHECK LANDING GEAR

Recommendation: That greater stress be placed on fuel quantity and consumption relative to anticipated flight conditions.



A THOROUGH VISUAL CHECK OF BOTH EXTERIOR AND INTERIOR OF AN AIRCRAFT BEFORE TAKE

AL INSPECTIONS

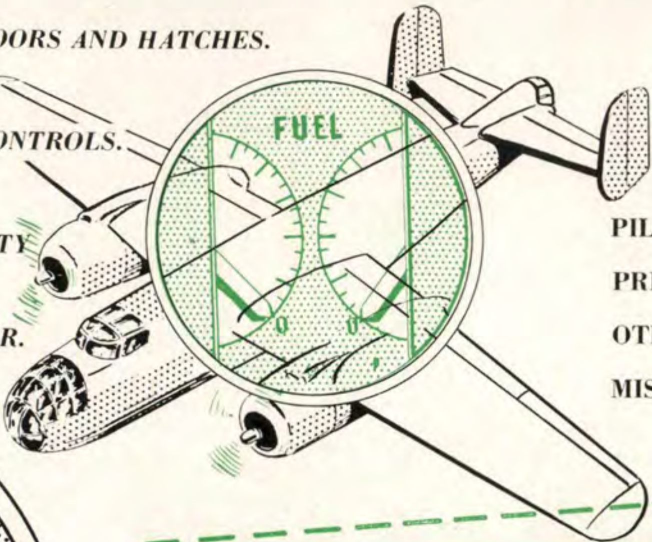
D AIRCRAFT AS A RESULT OF INADEQUATE FLIGHT PREPARATIONS.

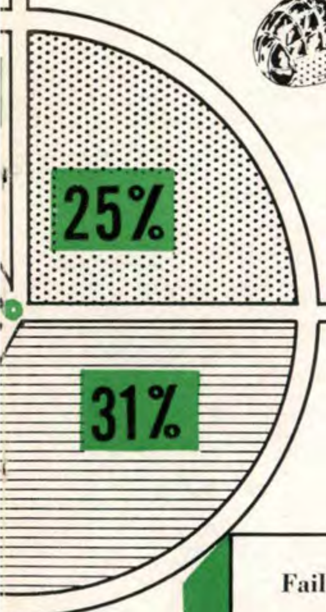
WINDOWS, DOORS AND HATCHES.

QUADRANT CONTROLS.

FUEL QUANTITY

LANDING GEAR.





TRAINER

PILOTS MADE MORE ERRORS (36) WHILE MAKING T PREFLIGHT INSPECTIONS OF AIRCRAFT THAN AT A OTHER TIME PRIOR TO TAKEOFF. THESE 36 "LITTL MISTAKES DURING INTERIOR AND EXTERIOR VISU INSPECTIONS MIGHT APPEAR TRIVIAL BUT

DURING A ONE-YEAR PERIOD JUST PAST, INADEQUATE FLIGHT PREPARATIONS CAUSI 61 ACCIDENTS, AND THE DAMAGE TO AIRCRAFT FIGURES OUT AT $44,987 PER ERRO

ITEMS MOST OFTEN OVERLOOKED IN VISUAL INSPECTIONS ARE:

FIGHTER

1. FUEL

Failure to check fuel quantity and fuel caps.

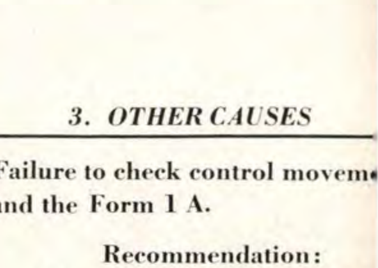
Recommendation:
Don't ask someone else about your fuel supply.
Be sure of an ample reserve.

Check

2. RADIO

Failure to thoroughly check ALL radio equipment prior to takeoff.

Recommendation:
Be familiar with the condition of your radio equipment before takeoff.



3. OTHER CAUSES

Failure to check control movem and the Form 1 A.

Recommendation:
Visual inspections should b standardized for each type aircr on each base.

OFF WILL PAY YOU DIVIDENDS—IT CAN SAVE YOUR LIFE.

TRANSONIC SAFETY

By GEORGE S. WELCH
Senior Test Pilot
North American Aviation, Inc.

THE F-86E SABRE HAS NEW CONTROLS TO GIVE THE PILOT A BETTER GRIP ON THE LION HE'S HOLDING BY THE TAIL

DURING HIGH-SPEED combat maneuvers, when a pilot's attention is focused on the enemy, little time can be given to the Machmeter. And yet this is the time when limits are easily exceeded and pilot and plane safety can be jeopardized by damage from excessive loads or loss of control. Critical limits of some aircraft are often exceeded at high Mach numbers even without the distractions of combat. It was to this end—better and safer control in the transonic regime—that North American Aviation's control research and test programs have been directed.

For transonic controllability, the new F-86E utilizes an adjustable horizontal stabilizer like its predecessor, the F-86A, but the installation and method of control are entirely different. To put it simply, the control stick is connected to the horizontal stabilizer through mechanical and hydraulic units, and the elevator is merely geared to the stabilizer. In other words, the pilot flies the airplane with the horizontal stabilizer instead of the elevators—hence the name "flying tail." On the earlier F-86's the elevator was controlled in the conventional manner and the incidence of the horizontal stabilizer was changed by a separate electrical actuator whenever a trim switch on the control stick was operated. The flying tail (and also the ailerons) is actuated by an irreversible hydraulic control system, and an artificial load system provides the necessary feel.

When making the initial flight test of the F-86E through the transonic speed range, I was somewhat surprised to find that I did not feel the usual stick reversal or heavy stick forces—phenomena common to high-speed flight from about Mach .85 up—which have always been experienced by pilots flying in the transonic zone. Stick forces had gradually increased with speed but were easy to handle at all times. The irreversible horizontal stabilizer control, besides nullifying the heavy air loads encountered at high speeds, had provided excellent longitudinal control comparable to handling qualities experienced at low speeds.

Before describing the new control system in more detail, it might be well to briefly review the reasons for the transonic phenomena and the steps taken so far to counteract them.

Buffet, which limited practically all straight-winged aircraft to about Mach .85, was offset by the use of thinner wings, and finally by a swept-wing and tail configuration. Although the first airplane to fly faster than sound, the Bell X-1, was straight-winged, the wings were extremely thin and fabricated at a cost prohibitive to present production methods. Once past Mach 1, buffet is no longer present, and flight control is again normal or stable. It's the transonic zone which currently presents the most problems to pilot and designer.

During flight at transonic speeds, airflow over flight surfaces reaches simultaneous speeds of subsonic, sonic, and supersonic, creating pressure differentials and shock waves. These shock waves form air fences ahead of the elevators that blanket out the range of elevator movement and result in loss of elevator control. With loss of elevator effectiveness, a pilot will encounter shock wave conditions which can send the airplane into a dive from which there is no recovery.

These conditions can be understood if you consider that normally (beyond the trim speed) any increase in airplane speed requires more forward pressure on the stick, and that the opposite is true when speed is decreased. However, if you were to increase your speed into the transonic zone, you would find that at about Mach .85, your airplane would begin to dive or "tuck its nose" and that an opposite pressure (pull) on the stick would be required to maintain level flight. This would result in loss of elevator effectiveness and would prevent the pilot from recovering from the dive. As speed is increased past Mach .9, a push force is again required to keep the nose down and the airplane level.

The early F-86's with the variable-incidence horizontal stabilizer, were able to trim out this condition by changing the horizontal stabilizer's angle of attack. Although this was a big step in making transonic flight smoother, easier, and more practical, the new *linked horizontal tail* is a better answer for good control in both the low and high-speed flight regimes.

Excellent control is maintained at all speeds by eliminating independent control of the horizontal stabilizer and elevator and by linking the two together with a fixed gear ratio so that stabilizer deflections for takeoff, landing, and slow speed produce large elevator deflections, and at high speed the elevator maintains a trailing position. The severe air loads ordinarily imposed on the elevators at high speeds are reduced to a safe minimum by the deflected stabilizer.

On earlier F-86's it was necessary to remember to retrim the stabilizer when changing from one speed range to another. For example, if the incidence of the stabilizer had been adjusted for high-speed flight and speed was cut for maneuvers without stabilizer readjustment, the airplane could easily be overstressed before the pilot could trim out the excessive stick forces. However, with the F-86E, the pilot has ample control power to avoid this.

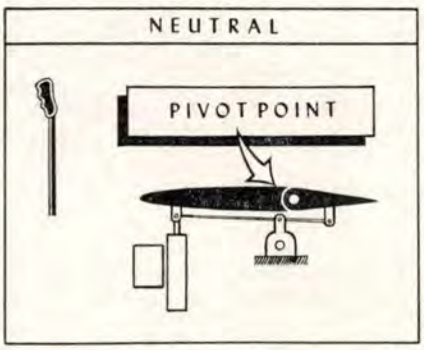
float." If the main power cylinder should fail, a second actuator, in tandem with the first, automatically takes over with pressure supplied from an emergency hydraulic system with an electrically driven pump. This standby system is engaged by a pressure-sensitive switch set to operate when the main system pressure drops below a safe value. A manual switch is also provided for pilot selection of the normal or emergency system. The type of control valve employed in this system makes the

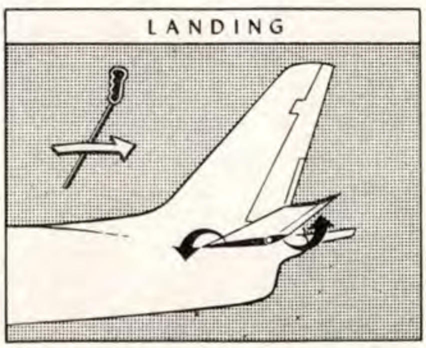
The irreversible feature of the control system is obtained by metering hydraulic pressure through a control valve to the actuating cylinder. If pressure is lost, the control surface remains in position and does not "free actuator irreversible; that is, air loads on the stabilizer or elevators cannot feed back through the system to the control stick.

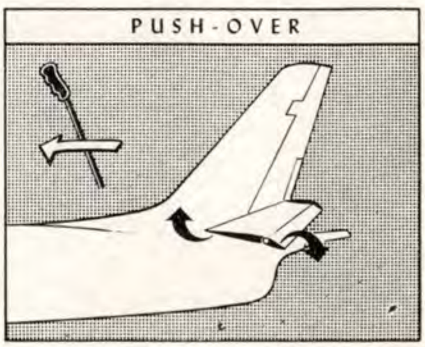
Since this irreversible feature produces zero control stick operating loads, conventional stick feel is obtained by an artificial load feel system. This system incorporates a spring bungee for unaccelerated flight and a bobweight on the control sector for accelerated flight. The spring tension of the bungee is designed so that stick forces in unaccelerated flight are directly proportional to stick displacement. Trim is obtained by shifting the no-load position of the bungee by means of a trim switch on the control stick grip. The bobweight provides additional pounds per G to the stick force in accelerated flight. This artificial part of the control system simulates the true load feel sufficiently well to keep the pilot aware of air loads, and at the same time limits forces to non-fatiguing stick loads.

The new control system greatly reduces the pilot's fear of being in an out-of-trim condition if the boost fails. With the irreversible system there is no need for trim tabs; therefore, even in the middle of an acrobatic maneuver, a boost failure will not affect the control of the airplane. The irreversible feature also provides tremendous control power for high accelerated turns in transonic flight, and eliminates undesirable variations in stick forces due to large airspeed and Mach number changes.

The F-86E flies at all speeds with desirable light stick forces, which makes for more safety, more sensitive response and less pilot fatigue in actual combat.







"-But Nary a Drop to Drink"

Generations of seafaring men have gazed across ocean waters and remarked, "Miles and miles of the durned stuff—but nary a drop to drink."

When disaster overtook a sailing ship, the lot of her crew was comparatively the same as that of a modern airplane crew after ditching. Shortage of water and food as a problem of survival remains unchanged.

Water rations reduced to a thimbleful a day will not last forever. Survivors must realize that the only bountiful supply of good fresh water is over the horizon on board the nearest rescue aircraft or passing ship. That is why men cast adrift on a raft must team together, retain their common sense and bend every effort toward attracting search and rescue units for a quick relief from their plight. A busy and well-planned routine on board a raft is essential not only to their immediate well being but to the probabilities of survival. Man can survive up to ten days on water alone. Food absorbs the water in the system, so unless there is some assurance of an auxiliary water supply, such as rain water, strict rationing of water becomes a necessity. Injured personnel require first consideration and likely will require more water than the others.

Why not, a person might ask, simply supply life boats and rafts with plenty of emergency water instead of desalting kits and sunshine distilleries? That is a good question.

In aircraft and in any kind of floating equipment for lifesaving, there is the space and weight problem. Naturally, it is better to carry equipment weighing a few pounds than to carry as much water as the equipment is capable of producing. But there are other problems, as well. Strange as it may seem, there is the problem of suitable containers.

Canned water has been considered and is in use to some extent. But what is best to can it in? Glass? Breakable. Plastic? Breakable, too. The container must be able to withstand rough usage and freezing of its contents. So far, regular tin cans have proved to be about as good as anything else.

There is a safe method by which the drinking water supply can be augmented and that is the employment of a small portion of sea water. Recent years of research have revealed that by mixing one part of sea water with two or three parts of fresh water, no serious effects will result. The drinking water will take on a brackish flavor, but it will stretch the supply.

As time passes, even good natured men become surly and often those considered more self-reliant go berserk. They may try to cheat, steal food and wrangle with the others. Driven mad with thirst, more than one sailor has succumbed to an overwhelming urge and has dipped into the sea for a drink. Feeling the cooling water trickle down his hand and arm, he eagerly drinks his fill. Sneering at his mates, he laughs at them for he has cooled his parched lips and throat and has found relief momentarily. A few short hours after that, he is again crazed with thirst. In agony, his tongue thick and parched, his mouth burning with fever, he drinks more. The more he drinks, the more he wants until driven by sheer madness, plunges over the side. His raft mates are torn between pity and relief, for it has been a horrifying experience for them to witness.

A good survival manual will tell you that sea water is poison—and it is.

Excessive sea water in the stomach produces dehydration. Here is how it works: Sea water aggravates your thirst and increases water loss by drawing body fluids from the kidneys and intestines, eventually resulting in serious convulsions and delirium. Actually it is a process of dehydration from within. Water evaporates through the skin. Some survivors have reported that by remaining in the sea for hours at a time they prevented evaporation of water from their bodies.

There are 44 known elements in sea water as well as hydrogen, oxygen, neon, helium and argon gases. Doubtless other elements are present, for research in this field is in its infancy.

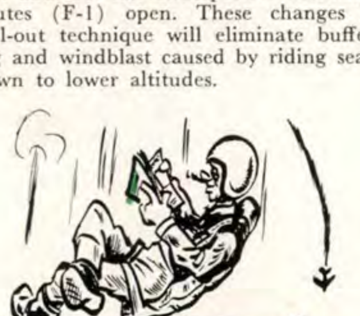
Salinity records show that in certain isolated seas where evaporation is very marked, like the Red Sea, the maximum concentration of four per cent or more occurs. The North Atlantic on the average is more saline than the North Pacific. Salinity is least in the Arctic, with three per cent.

Your chances of survival in the ocean are directly proportional to how well you know your emergency procedures and how frequently and how carefully you check your survival equipment. Examine all your emergency equipment, including water supplies, and conduct your briefing for every single flight over water as though you knew you would have to ditch or bail out at sea on that flight.

KEEPING CURRENT

RESERVE TRAINING — Officers and Airmen being brought back to EAD at Olmsted AFB are being given a one or two-week course, depending on their activity in the Reserve program. "Project Pitch-In," is an AMC refresher and orientation course. An officer who has been active in the Reserve program will receive the one-week course, and officers with little or no reserve activity will be given an additional week's refresher in what is called "Interim Officer Training."

FIGHTER BAIL-OUT has been simplified by two new developments of Air Materiel Command: first, the quick disconnect assembly that combines all attachments such as oxygen supply, G-suit hose and radio headset wires into one cable that breaks when the ejection seat is fired. The second improvement is the relocation of the emergency oxygen supply from the ejection seat to the pilot's body, thus permitting pilots to leave the seat and free-fall until pre-set automatic chutes (F-1) open. These changes in bail-out technique will eliminate buffeting and windblast caused by riding seats down to lower altitudes.



3rd ARS—KOREA—To further bolster the morale of downed airmen the H-19 Sikorsky ten-place helicopter flew two sorties and carried out 15 men during the biggest scale of operations by the 3rd Air Rescue Squadron to date. In two days, 77 sorties were flown through intense mortar and small arms fire and evacuated 148 men.

The H-19 was recently flown to Japan by Air Proving Ground aboard a C-124 and is undergoing operational service tests in Korea.

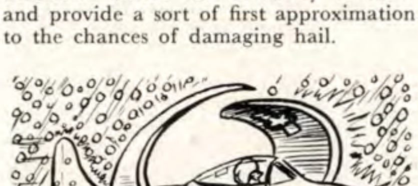
• • •

FISH NET—The Aero Medical Lab at Air Materiel Command has devised a new fish-net type harness to keep the "troops" from rattling around in the rear passenger compartment of cargo and transport planes and assault gliders. Designed specifically for added protection to the fully equipped paratroopers and combat infantrymen, it can withstand a crash force of approximately 8,000 pounds or 32 G's.

This harness easily fits over the wearer plus a 150-pound pack; has already passed its tests in the Air Force's human decelerator sled at Edwards AFB, Muroc, California, and is slated to become standard equipment.

FORECASTING HAIL—Until recently, most meteorologists have been rather pessimistic about the possibility of making accurate locality or seasonal forecasts of hail occurences and intensity. However, during the past year, attempts by the Severe Storm Warning Unit of AWS in forecasting the location of hailstorms and the average size of the stones, have met with very encouraging results.

There is now a good prospect that such quantitative forecasts can ultimately be refined to a point where all flights can be routed to avoid serious hail damage. Meanwhile, pilots should heed the short range forecasts of the likelihood of thunderstorms which are relatively accurate and provide a sort of first approximation to the chances of damaging hail.



In the Spring, the heavy hailstorms of the region just east of the Colorado Rockies occur mainly to the rear of a cold front or of a deep "cold-low" passing eastward, but in other months there does not seem to be any particular relation to air mass, fronts, lapse-rates height of freezing level, or wind pattern.

Attention of all pilots should be given to the AF Reg 55-29 which is a questionnaire on hail encountered in flight. It is felt that close cooperation between pilots and weather forecasters will bring about a more accurate plotting of the severest hail conditions and the danger zones to be avoided. Reports from AWS state that these hail questionnaires are already being returned in numbers, indicating more frequent hail encounters by aircraft than had been surmised.

• • •

PILOTAGE—Many a USAF pilot, lost or temporarily "misplaced" has thanked an alert CAA radio communicator for safe guidance to his destination, or to a field where a successful landing could be made.

Most of these communicators are pilots in their own right and can "fly" a plane from their little house on the ground, bringing the craft out of an emergency situation to a safe landing. By being familiar with the surrounding terrain and the location of landmarks and their appearance from the air, it is not too difficult for an alert operator to locate a pilot from his description of the territory over which he is flying.

To cite a few examples of this: A night-flying National Guard pilot contacted CAA radio at Macon, Ga., and reported his position as unknown. Visibility was reduced because of thunderstorm activity in the vicinity. Landmarks were difficult to distinguish in the darkness. Then the operator communicator thought of the searchlight used to advertise a certain drive-in theater. The operator of the theater was requested to leave the searchlight on. About an hour later the alerted pilot saw the powerful beam, determined his position, and proceeded to a safe landing.

Another pilot's position was established when he reported passing over a swimming pool. A sharp communicator remembered there was only one town in the vicinity with such a swimming pool.

A military aircraft lost near Knoxville, Tenn., was brought in safely after the communicator kept in continuous contact with the pilot for 21 minutes, relaying steerages and identifying landmarks. The plane was landed with but five gallons of fuel in the tanks.

One communicator, checking through some flight plans, saw that a pilot was headed into an area where a violent storm was developing. The pilot was warned and changed his route.

These are but a few of the daily assists given to the airborne by the chairborne. Don't hesitate to call upon these CAA guardians of the airways, if you become lost or confused—they might be able to save YOUR life.

DOUB

Commendable airmanship, knowledge and coolness under emergency conditions, enabled two aircrews to save the Air Force a B-29 and an F-82, recently. Not only was valuable government property returned safely, but invaluable evidence of what caused the emergencies was brought back so that maintenance personnel could learn and correct these deficiencies in other aircraft.

It is with pleasure that *Flying Safety Magazine* recounts their exploits below—

The 56th, formerly the 512th, Strategic Reconnaissance Squadron, M Weather of the Air Weather Service, MATS, stationed in Japan is assigned the mission of flying certain prescribed weather tracks over Korea and the North Pacific Ocean in support of the Korean effort. One of these tracks covers a course of about 600 miles east of Japan, south to Marcus Island and the return leg to the home base.

On a recent mission, Capt. Donald G. Ketcham and his crew, flying a WB-29, had just completed the turn at Marcus Island at an altitude of 18,000 feet and approximately 1,000 miles from home, when serious engine difficulty developed.

The right scanner reported a serious oil leak in number three engine to the pilot. Shortly after this transmission the oil quantity gage showed zero and the oil pressure gage started to fluctuate. The number three prop was feathered after two attempts, but in a few minutes came unfeathered, and ran away to 3,600 RPM and all attempts failed to reduce the high RPM. The crew was alerted and the radio operator was instructed to send an emergency message to the home base and to alert the Air Sea Rescue. After three minutes at 3,600 RPM with moderate vibration, the RPM decreased to 1,200. The engine ran smoothly for approximately 10 minutes then ran away again to 3,300 RPM with terrific vibration. The radio operator was told to send another message advising the ground station to stand by for an SOS since it was felt that if the vibration continued, a bail-out would be necessary.

The plane was slowed down to 160 MPH which decreased the vibration and the RPM dropped to 2,600 for awhile; then the RPM increased along with the vibration. This cycle kept up till the prop shaft broke and the prop left the plane two hours and thirty minutes after the first attempt had been made to feather it. With the loss of the number three prop, everything seemed normal except for a moderate vibration which was thought to have been a rough engine. The flight continued on to the alternate for which course had been set at the outbreak of the trouble. Four hours and forty-five minutes after the emergency had developed, the plane made a landing.

After landing it was discovered that when number three prop left the aircraft it had damaged the nacelle and knocked 10 inches off one blade of the number four prop. This caused the vibration which was attributed to a rough engine. The initial cause of the engine trouble was the failure of number 10 piston pin boss, or piston rings, resulting in failure of all front row pistons.

Captain Ketcham's skill, coolheadedness and the cooperation of his well trained crew averted what could have been a major disaster.

1st Lt. Kenneth E. Davison and Capt. Bernard C. DeLosier, the Radar Operator, of the 318th Fighter-All Weather Squadron, were scrambled in an F-82F from McChord AFB, Washington, under the control of GCI to intercept an unidentified aircraft. They climbed to 20,000 feet as instructed, and flew at that altitude for about 30 minutes, then climbed to 32,000 feet. After reaching that altitude, they were instructed to start a normal letdown toward home base. When still about 10 miles from base, and at an altitude of 24,000 feet, GCI instructed them to climb to 35,000 feet. The pilot increased power to start this climb. Up to this time the engines had been performing normally with all indicators of manifold pressure, RPM, oil and coolant temperature and oil pressure normal.

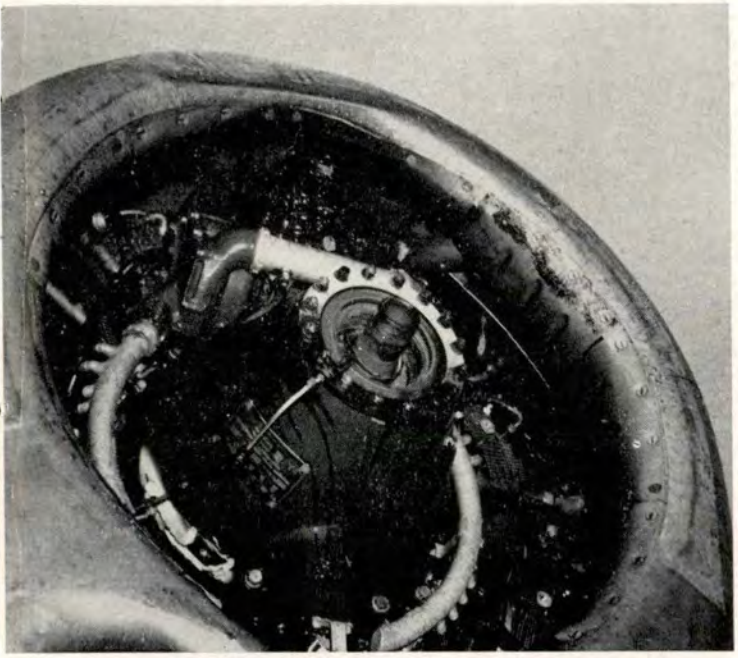
Upon reaching 27,000 feet, an explosion occurred in the right fuselage aft of the observer's cockpit. Black smoke filled the right cockpit and poured from a gaping hole which had been blown in the top portion of the fuselage. Lieutenant Davison immediately feathered the right prop and shut down the engine while Captain DeLosier, thinking the plane was on fire, prepared to bail out. With the feathering of the prop, the smoke cleared away and the pilot started a turn toward the field, maintaining less than 200 MPH for fear the right fuselage might fail. It was then discovered that there was no right rudder control and the use of all of the left rudder trim and full left rudder while not sufficient to maintain coordinated flight was enough by which a landing could be made. The explosion also caused the loss of all radio communication. A slow descent to the field was made and a successful single engine landing was accomplished with no further damage.

The explosion which was caused by the failure of a coolant expansion tank and relief valve, caused a large portion of the fuselage to stick out into the airstream, and would have maimed or killed the Radar Observer, had he attempted to bail out.

At the time of the accident, Lieutenant Davison had 626 hours total pilot time, 29:55 of which was in F-82F aircraft. He displayed exceptionally good judgment and a high degree of flying skill in landing the aircraft under such conditions.

LE TROUBLE

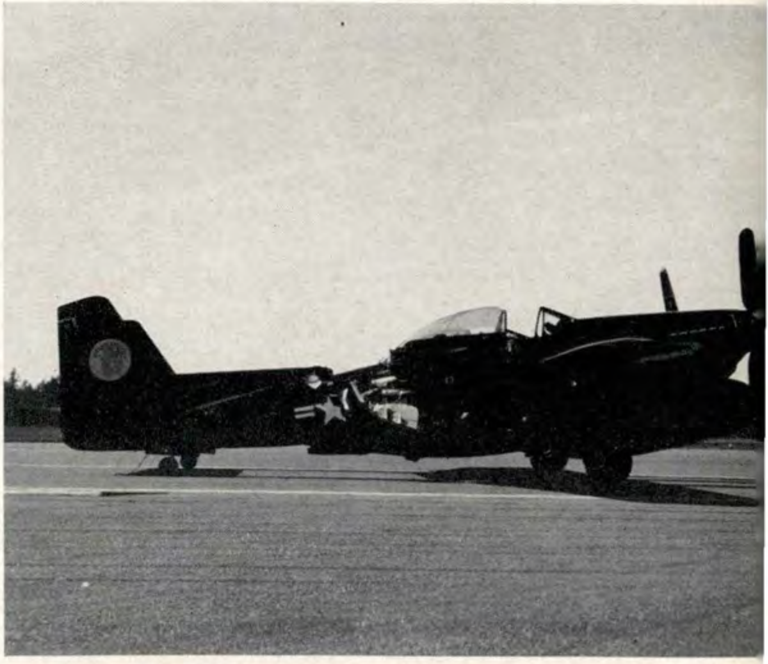
In emergencies, using the old bean and not the panic button saves lives and airplanes



After failure of all front row pistons, number 3 engine threw its prop in flight, but the crew brought the WB-29 back to base

Crew members front row: Simone, McCall, Wolfe, Deere and Moran; in back row, Allen, Huff, Ketcham, Nichols, Caldwell and Glasen

Capt. Bernard C. DeLosier, radar operator, and 1st Lt. Kenneth E. Davison returned to tell story of explosion in their F-82F



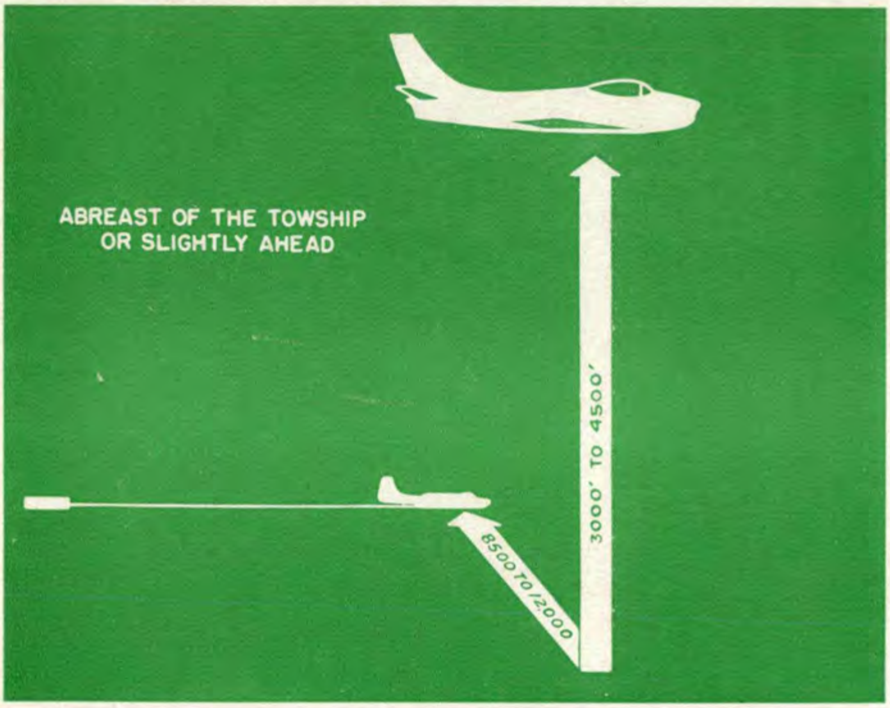
The radar operator could not have bailed out successfully and the pilot, with skill and courage, landed the mangled plane

GUNNERY PROCEDURES

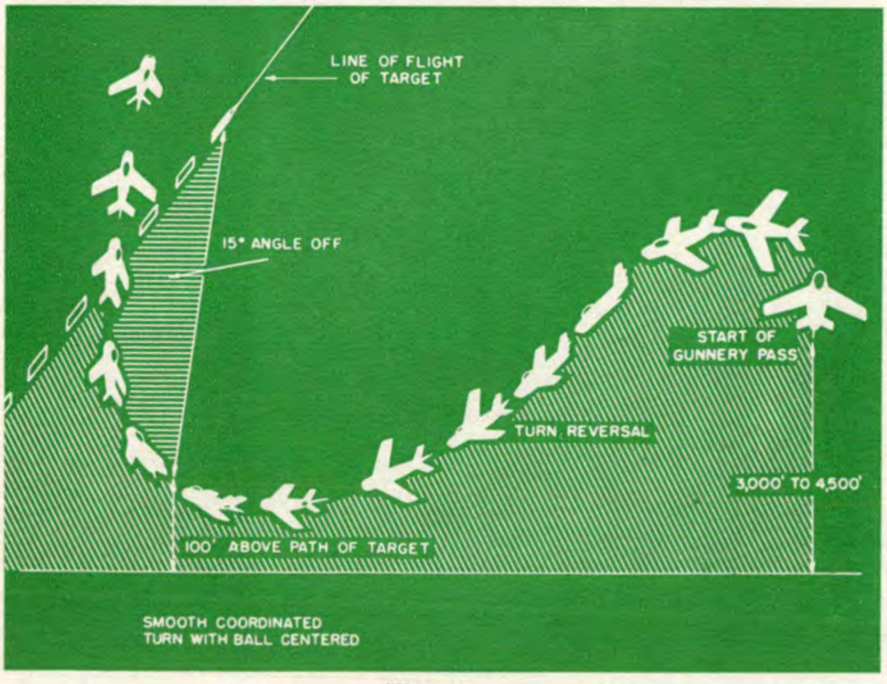
GUNNERY PRACTICE has been an important part of fighter training for many years. Although it's paying off now in Korea, the training at times became rather costly.

An example of this was a rash of collisions with towed targets not too long ago. **Some pilots flew into targets still attached to the tow plane, and others collided with targets which had been shot loose.**

In the interest of eliminating such accidents while at the same time insuring the best possible aerial gunnery training, the following "guide" is presented. It was prepared by personnel of the 3525th Aircraft Gunnery Squadron at Nellis AFB, Nevada, as a recommended SOP for initiating and terminating the standard high side attack of a jet fighter aircraft on a towed banner target.



Illus. 1



Illus. 2

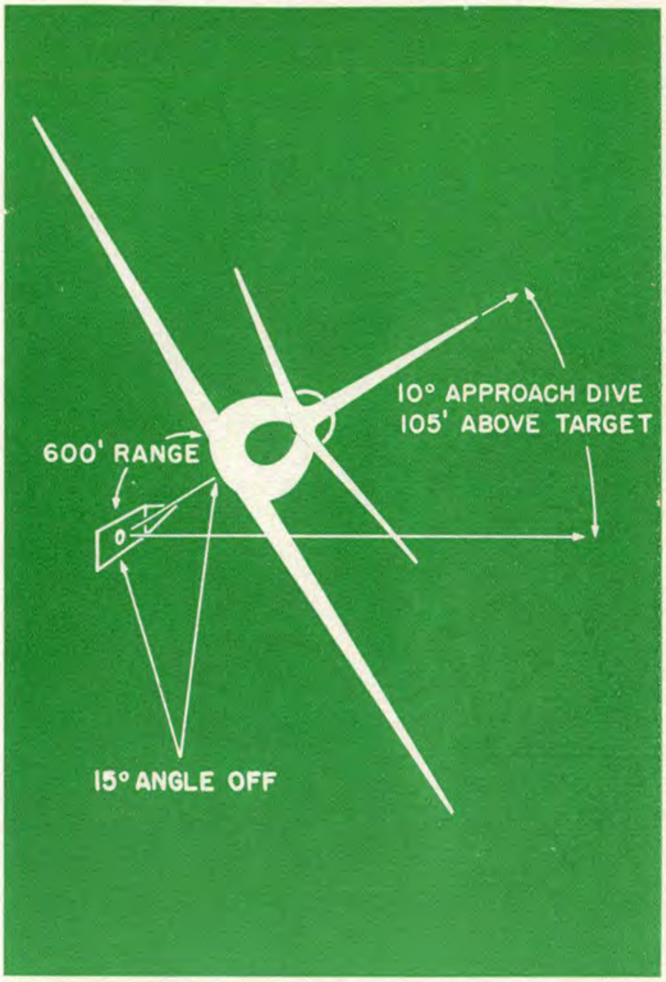
Initiating the Attack

The attack should be instituted from a position 3,500 feet to 4,500 feet (depending upon the type of aircraft being used) above the tow altitude and from a distance of 8,500 feet to 12,000 feet opposite or slightly ahead of the tow plane. (See illus. #1.)

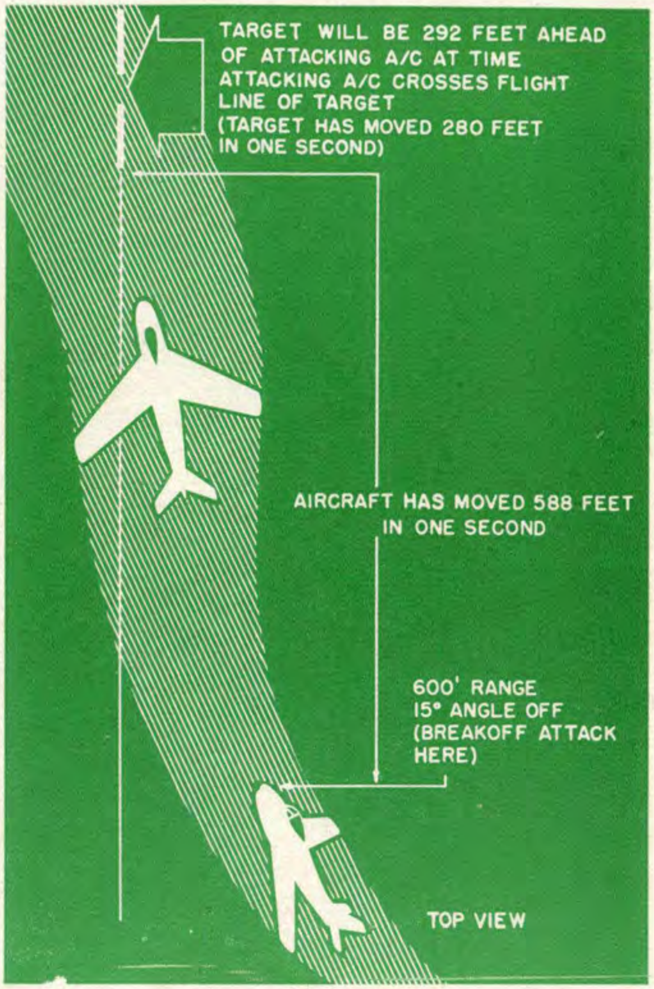
From this position, with the proper power setting and airspeed, the aircraft is maneuvered into a diving turn toward the target. The configuration of this diving turn will be of such a nature as to allow the pilot, after he completes his turn reversal, to approach the line of flight of the target from above. This approach or curve of pursuit then should be made toward the target as a slight dive of not more than 10° and not less than 5°. At no time should a firing pass be made from below the level of the tow target.

Open fire range and open fire angle-off are determined by the pilot and governed by the type of training being conducted and the limitations of the equipment being used; however, the cease fire range and cease fire angle-off should never be less than 600 feet and 15°. (Illus. #3.)

The particular position of the fighter in initiating the attack identifies this type as The Standard High Side Attack. (Illus. #1.) The first turn into the tow ship and target is of utmost importance as it is the maneuver that determines the manner in which the actual firing is accomplished. A fair degree of flexibility is available to the pilot in this initial turn for any necessary adjustments as suits his needs or particular techniques for spacing his aircraft and planning his attack; however, once the turn reversal has been completed and the curve of pursuit begun, there is very little the pilot can



Illus. 3



Illus. 4

do to change or alter any one of the several vital factors that constitute a good attack. (Illus. #2.)

These factors, such as a slight diving attack, harmonized speed, range, angle-off and G forces necessary to sustain the attack are all a result of the technique and judgment used by the pilot from the initial turn, to the point of turn reversal. Each of these factors contributes such a vital portion to the attack that should any one of the combined total that constitute a successful attack be out of phase or magnitude, the attack can terminate very unfavorably for the pilot. This is particularly true if he should press the attack beyond the 600-foot range and 15° angle-off limitations. For example:

Slight Diving Attack

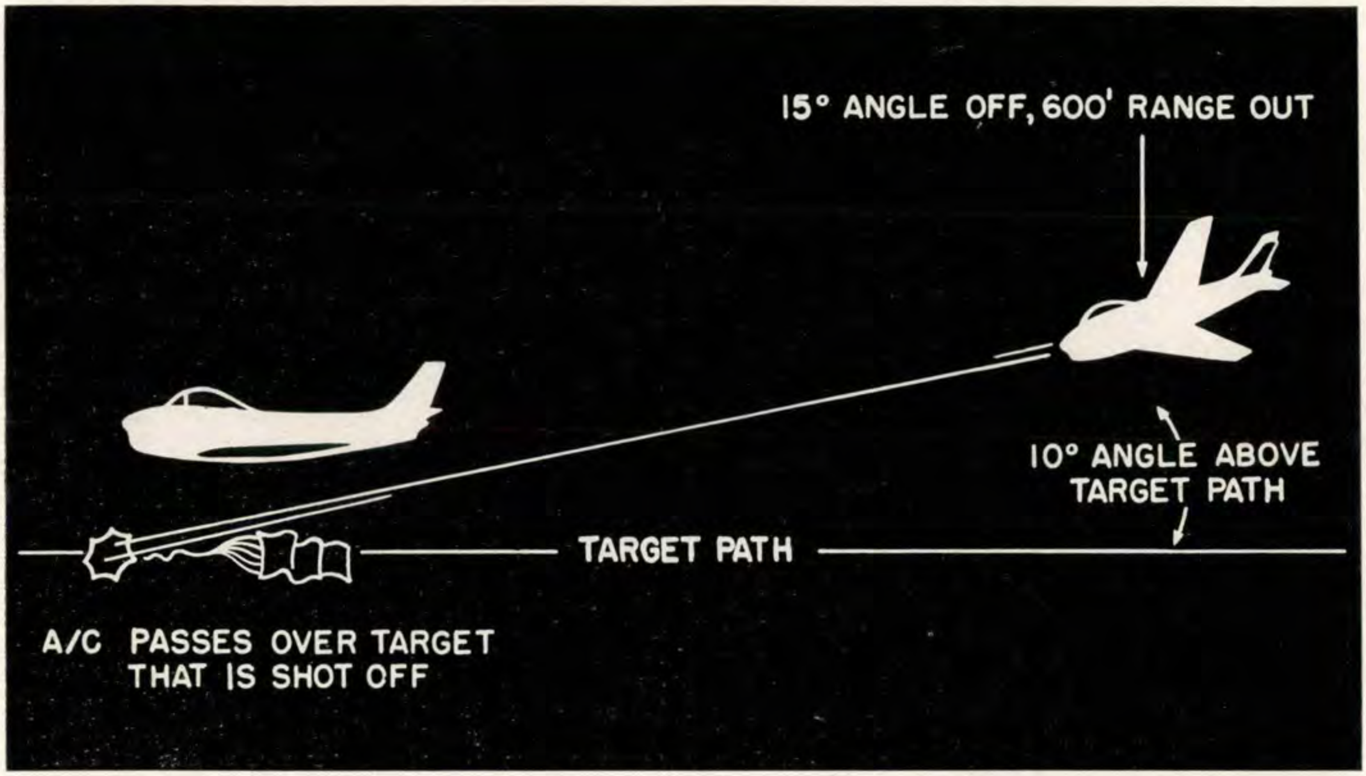
If the pilot extends the dive of the initial diving turn into the tow ship and target he will end his attack by firing up at the target and possibly from a very low angle-off. This condition is extremely difficult to maneuver out of and should the target be shot off, collision is a certainty, in addition to the possibility of hitting the tow ship with gunfire. The firing portion of the attack should be flown in a slight dive at approximately 5° to 10°. The pilot and his aircraft will then be 55 feet to 105 feet above the line of flight of the towed target at the cease fire point of 600 feet range and 15° angle-off. (Illus. #3.)

Maintaining proper airspeed is important because firing at any speed other than that for which the guns were harmonized automatically introduce a proportional aiming error. This error is a result of changes in angle of attack of the plane.

If the pilot initiates the diving turn from a position too far laterally from the tow ship and target, he will be forced to fire out of effective range or from a very low angle-off. If he should initiate the turn from a position too close in, he will be forced to fire at too close a range for the angle-off he will have, resulting in prohibitive G forces on himself and the aircraft and end with a snap shot at best.

Should the pilot attempt to fire under G loads in excess of that required to sustain the curve of pursuit attack, he sacrifices absolute control of his aircraft to the extent of the overage of the G forces. Because of these G forces, a perfect collision course with a shot-off target can easily result, even though firing had ceased according to the SOP, i.e., 600-foot range and 15° angle-off.

If the turn reversal is delayed too long, and the attacking aircraft reaches a point too far to the rear of the target, it will result in having to fire too far out, or will end up in too low an angle of attack, with the attacker "chasing" the target.



Should the pilot fire below the 15° angle-off limitation, he increases considerably the possibility of shooting the target off as the apparent towing area of the target and the apparent length of the safety webbing foreshorten rapidly from 15° angle-off on down. At 15° angle-off, the apparent length of the 100-foot safety webbing is only 27 feet. At 10° angle-off, it is only 17 feet, and at 5°, this apparent length is only 9 feet. (Illustrated at right.)

Should the pilot press his attack, firing or not, to a range of less than 600 feet, he is placing himself and his aircraft in an extremely hazardous position because the rate of closure cannot be accurately judged to always effect a safe, clean breakaway. With the target traveling at a speed of 190 MPH IAS, or 280 feet per second and the attacking fighter traveling at a speed of 400 MPH IAS or 588 feet per second, the closing or overtaking speed will be 308 feet per second.

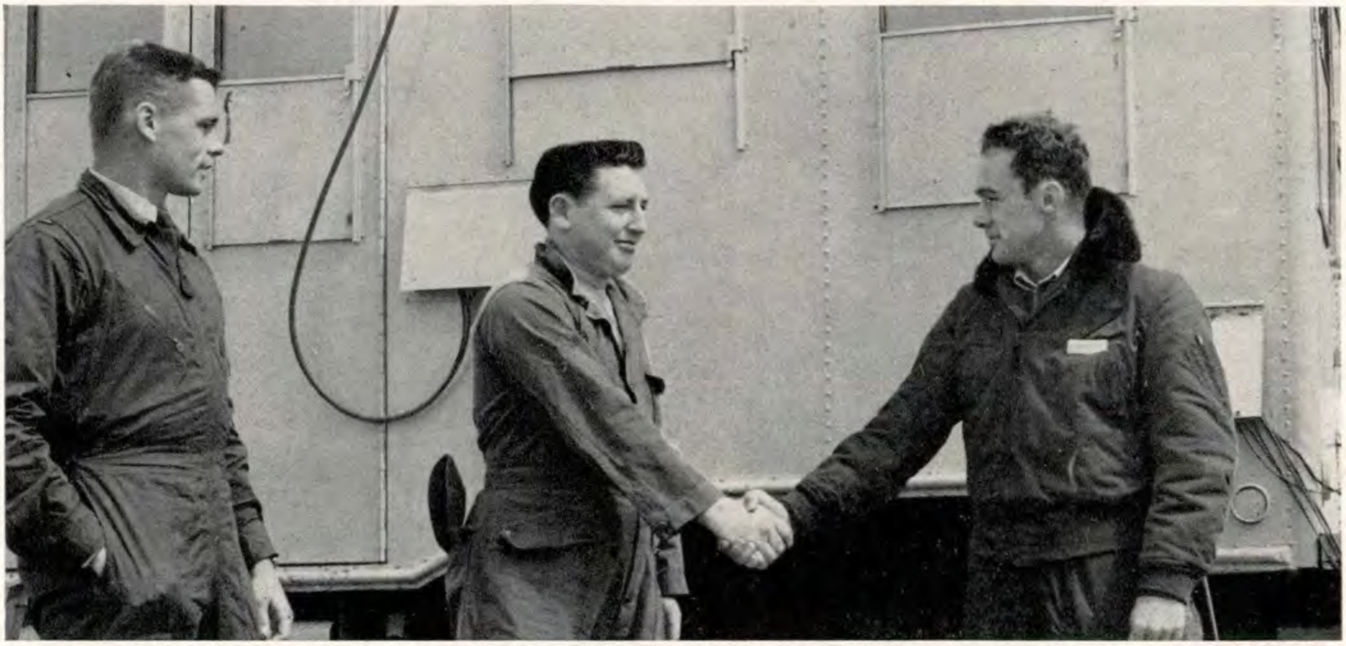
Terminating the Attack

Upon reaching a minimum range of 600 feet and a minimum angle of 15° or whichever occurs first, the pilot should terminate his attack by rolling out of the banked turn to the side of the target from which he initiated his attack. This is basically an aileron movement. This roll-out should be accomplished in such a manner that the path of the attacking aircraft, as the aircraft crosses over, will be *above* the flight line of the target. (Illus. #4.)

If a pilot extends his firing pass to a 400-foot range, the 2/5 of a second average human reaction time leaves only 185 feet of aircraft travel in which the aircraft must change direction to avoid colliding with the target. It can easily be seen that a split second of indecision can result in disaster or at best a very violent, disconcerting, uncomfortable maneuver that serves only to detract from the overall effort spent in training. (Illus. #4.)

Even under conditions of an ideal curve of pursuit pass, i.e., firing from above target level, having harmonized speed, sufficient amount of G's to sustain the attack, sufficient range and angle-off, should the target be inadvertently shot off, a fair degree of pilot skill and attention is necessary to avoid collision. Consequently, should any factor or combination of factors supporting a good, reasonably safe curve of pursuit attack be compromised, the pilot is no longer depending on his skill, but on his luck, to avoid the collision.

Saved: *Two Fox Eighties*



The DF Steer was Good, and the F-80's Landed Safely After Flameout. Left to right, Lieutenant Brandt, Sergeant Franklin and Lieutenant Moore.

By Capt. MILES D. BAKER, Flight Safety Officer, Kirtland AFB, New Mexico

As two flight instructors from Williams AFB, 2nd Lt. Dana T. Moore and 2nd Lt. W. E. Brandt, prepared for the next to the last leg of their week-end cross-country, little did they know that they would be shaking the hand of a D/F operator at their next destination, thanking him for steering them to safety.

Their formation of two F-80's was cleared IFR 500 on top from Bergstrom direct to Kirtland, a distance of 620 statute miles. As the two climbed out on top on course, the sun was bright and everything was serene.

Approximately one hour and 30 minutes out, it became evident to Lieutenant Moore, who was leading the flight, that his radio compass set was no longer receiving. He immediately called Lieutenant Brandt, advising him to take the lead and get his range receiver working. Lieutenant Brandt took the lead, but very soon reported that his radio compass also was inoperative.

There they were, on top of a solid overcast flying toward mountainous terrain with no means of receiving any directional radio stations or ADF homing facilities. To add to their difficulties, Lieutenant Moore discovered that the leading edge tanks on his airplane refused to feed. With the fuel in the leading edge tanks unobtainable, his 30-minute reserve was gone; in fact, it meant that he would be running out of fuel about five minutes short of Kirtland, and Albuquerque was reporting a solid overcast. What a lousy situation.

A quick check of the Radio Facility Chart by Lieutenant Brandt showed that Kirtland had a VHF-D/F station. An urgent call was immediately sent out to the Kirtland facility. No luck. VHF signal probably blocked by mountains. As they neared their ETA, repeated calls were made. At last, Kirtland D/F answered. Lieutenant Brandt quickly advised the operator of the difficulty and asked for an emergency steer. The first steer transmitted showed the flight to be slightly north of course. A correction was made and from then on, the D/F operator had Lieutenant Brandt transmit almost continuously so as to bring the aircraft directly over the field. The farther they flew, the more evident it became to Lieutenant Moore that he was going to run out of fuel before he could get the fighter on the ground.

As the fighters neared their destination, a letdown was started. At that moment holes began to appear in the clouds and the letdown continued to 12,000 feet. As Lieutenant Moore peered into every hole looking for the field, the engine on his airplane flamed out from fuel starvation. Almost at the same time that the engine died, a Kirtland runway was spotted. Lieutenant Moore glided his airplane down through the clouds keeping the field in sight. He maneuvered his F-80 so as to come across the end of runway 35, at 7,000 feet (field elevation: 5,330). A perfect 360° overhead approach was flown. The wheels and flaps were lowered and the fighter touched down in the first 1,000 feet of the 10,000-foot runway.

Minutes later, both pilots were vigorously shaking the hand of Sgt. Wilbur J. Franklin, the D/F Operator.

Here is a case of Air Force teamwork plus individual skill — Sergeant Franklin's ability to bring the fighters in directly over the field, and Lieutenant Moore's ability to cooly land his jet fighter intact, under emergency conditions.

Kirtland D/F Homer just paid in advance for another five year's operation.

CROSS FEED ★

FLYING SAFETY IDEA EXCHANGE

CARE OF PARACHUTE — Perhaps like all parachute riggers I was attracted to the pictures of the parachutes on page 9 of the February issue of *Flying Safety*.

I am going to ask the following question: "What is wrong with this picture?" As innocently as it looks, I think that this should be the last picture that would be printed in *Flying Safety*. Why?

Being mainly concerned with the maintenance and operation of the parachute, I am going to say what is wrong with this picture. This picture shows the carelessness upon the part of the airmen whose lives are concerned. Taking care of a parachute in such a manner shortens its life. There is no telling what foreign element and stains the parachute will come in contact with when placed on the floor. Gasoline, oil, hydraulic and grease stains cause deteriorations of the parachute pack, parachute harness, the parachute canopy and the lines. It is the experience of this parachute rigger to officially say that less than 25 per cent of all the parachutes constructed ever see the complete harness or canopy life expectancies.

Parachutes should be conserved properly and they will function properly.

S/Sgt. Nicholas S. Battipaglia
Parachute Rigger USAF

Editor's Note — Flight Safety Research agrees with Sergeant Battipaglia that proper care of the parachute cannot be over-emphasized. The picture under question, unfortunately had to be reduced for publictaion to such size that the canvas strip upon which the crew placed its equipment for inspection is not clearly visible. Strategic Air Command crews do use such a protective covering over the ramp during their inspections. A portion of this same picture has been blown up to show that proper procedure was followed in this case.

HANDY HULL — Ingenuity and forethought could easily be included in the occupational description of Sgt. James H. Vickers of Air Rescue Service Flight B, 6th AR Squadron, at Ernest Harmon AFB, Newfoundland. By solving a problem through salvage reclamation, Sergeant Vickers' idea not only increased operating efficiency of his flight but also boosted savings of the USAF economy program.

While watching a trailer truck as it hauled a condemned C-54 hull to the dump area for burning, Sergeant Vickers — remembering last year's storage difficulties — had an idea the discarded hull might still be usable. He immediately obtained permission from his commanding officer to have it placed in the flight area, where he and his crew of helpers lost no time in restoring its usefulness. Soon the airmen had transferred the condemned eyesore into an attractive storage building. They even painted it yellow, with black diagonal stripes —the Air Rescue Service colors.

The 60x10-foot fuselage provided ample room at one end for storage of Flight B rescue vehicles and power units, the remaining space being used for storage drums of oil, fuel, solvents and grease—all readily accessible. Indoor storage and use of the normal C-54 heating system eliminated freezing of the fluids which heretofore had impaired flight operations.

FLAP RETRACTION—Pilots flying the B-50 or the B-29, or any other aircraft on which flap retraction at take-off is critical may be interested in the following discussion. As most pilots know, flaps produce a greater lift coefficient, i.e., more lift force per square foot of area per mile per hour of speed. They also produce greater drag, and when the flaps are retracted these two effects disappear simultaneously. However, because of the inertia effect of the mass of the airplane, a reduction in the drag coefficient is not instantly accompanied by a corresponding increase in speed. Some time is re-

quired for the acceleration to be accomplished and the speed increases slowly until finally, at the new speed, the reduced lift coefficient is sufficient to support the airplane. During this period, before the new speed is reached, the airplane will sink unless the nose is raised enough to increase the angle of attack of the wings to provide the higher lift coefficient.

Increasing the angle of attack of the wings also *increases the airplane drag,* which slows down the acceleration process. Therefore, it is better to leave the flaps down until a certain minimum speed is attained, at which it is safe to go through the change in altitude required. Another safe procedure is to keep the flaps down until enough altitude has been gained to offset the sinking that would accompany flap retraction without lifting the nose.

Another way to safely go through the critical period of flap retraction is to retract the flaps very slowly, so that the speed increases as the lift coefficient decreases and there is no sudden loss of lift. Other reasons dictate the speed of flap retraction and the mechanism usually retracts the flaps faster than would be optimum for take-off. Many pilots who understand their aerodynamics have solved the problem by retracting the flaps by easy stages in several small increments, thus approximating the slow retraction discussed above.

Unfortunately, a discrepancy exists in the two most trusted sources of written pilot information; the T. O. for the B-50 and the Boeing Field Service News Issue #112 for July 1949. Pilots reading both may be at a loss to know which to follow. The T. O. specifies a minimum IAS 5 MPH lower than that specified by Boeing Field Service News. Boeing has been informed of this difference and has explained that their figures were preliminary data unsubstantiated by flight tests. Flight tests have since been made which resulted in the table shown in the T. O.

The following paragraph is quoted from Boeing FNS #112, p. 8: "Flaps should be retracted continuously once these airspeeds are reached, since intermediate flap settings give less improvement than with flaps full up."

This is true for a continuing state of motion, but is untrue for a changing state of motion such as occurs during flap retraction and critically so at low altitude following take-off.

Continuing the quotation: "During flap retraction the nose must be held up if it is desired to avoid excessive gain in airspeed with subsequent loss in rate of climb." This statement should read: "Nose should be held up to avoid sinking due to loss of lift before the airspeed has reached its new value corresponding to the flaps-up condition."

On take-off, *know the critical minimum speed corresponding to the take-off weight of the airplane—do not start flap retraction before that speed is reached and then only if reasonable ground clearance has been attained.* Depending on altitude, flaps may be retracted by increments or, with more ground clearance, continuously, but in any case do not permit the aircraft to sink. This can be insured by raising the nose as necessary to maintain level flight or slight climb. Do not expect the speed to increase immediately on flap retraction—this takes time, but loss of lift occurs instantly. Therefore, use judgment and gain speed and some altitude before retracting the flaps. —*Col. C. R. Laubenfels.*

• • •

LANDING GEAR LIGHT— Through observations made while flying C-47 and C-45 type aircraft, I have decided it was time to quit putting knots in my sacroiliac, by attempting to make visual gear checks at night or during bad weather.

Such knots might be eliminated by the adoption of a small light which could be rigged on a portion of the landing gear itself, and may either be turned on by a microswitch when the gear is fully extended, or may be manually operated from the cockpit. The light should be designed in such a manner as to shine away from the pilots' cockpit, and provision made to turn the light off during day operation and after gear check has been completed at night.

The observation light could also be installed on or in the engine nacelle, in such a position as to avoid dirt and slush picked up by wheels during ground operations. All types of aircraft may utilize this light and installations could be adapted to the individual type of aircraft. For example, this light could be installed inside of the bomb bay on B-25 and B-26 type aircraft, one on each side.

It is believed that this light would involve little time and expenditure and would contribute to safe flight.

Capt. Henry S. Dutch
Hq, 452nd Bomb Group (L)

Flying Safety

RESTRICTED

DEPARTMENT OF THE AIR FORCE
THE INSPECTOR GENERAL, USAF

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Deputy Inspector General
For Technical Inspection and
Flight Safety Research

DIRECTORATE OF
FLIGHT SAFETY RESEARCH
Norton Air Force Base, California

Brigadier General Richard J. O'Keefe, Director

VOL. 7, No. 5 MAY, 1951

CONTENTS

The printing of this publication has been approved by the Director of the Bureau of the Budget, 9 August 1950.

Facts, testimony and conclusions of aircraft accidents printed herein have been extracted from USAF Forms 14, and may not be construed as incriminating under the 70th Article of War. All names used in accident stories are fictitious.

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"With loyalty will I endeavor to aid the physician in his work and devote myself to the welfare of those committed to my care."

SHE SAVES LIVES
YOU CAN SAVE YOUR OWN

Mal Function