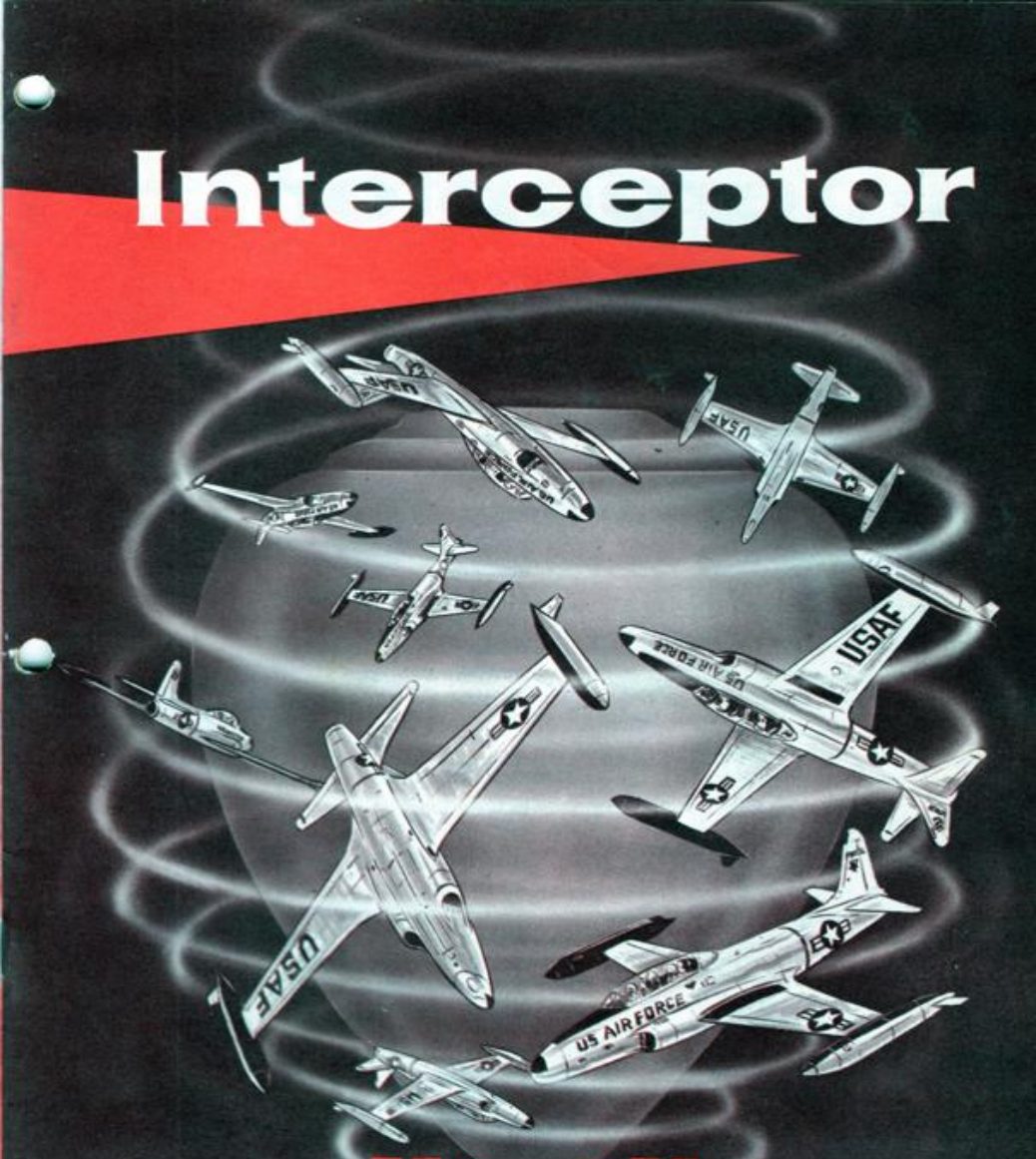
Interceptor



SPINNING THE "T"

FEBRUARY 1968

FOR THE MEN RESPONSIBLE FOR AEROSPACE DEFENSE

Interceptor

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Hq ADC Field Printing Plant
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spotlight

There is only one thing in the world of which everyone thinks he has enough, and that is intelligence. — Descartes

departments

special features

OUR COVER

Spin and spin recovery in the T-33 have always been a thrill. A. W. (Tony) LeVier and Sammy Mason, both of Lockheed, provide us an interesting discussion on the grand old lady, page 8.

memo

from the CHIEF OF SAFETY

PILOTS AND P.T.

COL OLIVER G. CELLINI

We know that one of the Safety problems we have to live with is the aging of our equipment. Aging airplanes, like aging anything else, have a tendency to come unglued in unpredictable places; that is, problems arise solely because various parts and pieces just "ain't what they used to be."

Well, sorrowfully, the aging process is not confined to just equipment—you and I are racing at great speeds either toward, through, or beyond the "magic age of Jack Benny." I'll admit to you about me that I don't bounce back or recuperate like days of yore—when "fighter pilots were fighter pilots and women were glad of it" sort of thing, and I'll also admit from recent personal experience that staying in good physical shape becomes real important when you're faced with a trying physical experience. I recently had a stint in the hospital.

I am not a "jockstrap" or P.T. nut by any way, shape, or form, but I've always maintained fairly good shape in pursuit of my outdoor hobbies of hiking, hunting, fishing, and golf. I strongly feel that any man in the military organization owes it to his country to be fit enough to do his job — and in ADC this requires a lot of fitness. For the fighter aircrews, the job can suddenly become tremendously physically demanding for many reasons — escape and evasion, survival on the ground or in the air over a combat zone, or even the trying daily experiences of weather approaches, formation flying, and long hours of refueling missions in the cockpit. You also owe it to your family to keep fit enough to stay around in the retirement years. Well, you won't stay around long unless you maintain some sort of a personal IRAN program for the body. Preventive maintenance, periodic inspections, good servicing, and continuous use apply in the safe operation of both our equipment and ourselves. We all know the type of "Weightlifter" who confines his program to the hoisting of martinis at the bar. I'm old enough to recall some now dead contemporaries who were proliferers of this sort of dim-sighted activity.

I'm not recommending to you that your P.T. level of ability be a hundred yards in 9.4 seconds—but I am recommending, and the ADC Surgeon backs me up on this, that you maintain a good level of physical fitness for the sake of your family, your country, and yourself.

HOT LINE

ACTUATION OF SURVIVAL KITS

The following information regarding actuation of the survival kit will be incorporated in applicable Dash One Tech Orders:

a. As soon as the parachute has been deployed, actuate the survival kit by grasping the yellow release handle and pulling sharply upward and backward to separate the handle from the kit.

b. *Caution*: The release handle must be pulled rapidly through the complete arc of travel to allow proper functioning of the survival kit system. Failure to follow this procedure will result in malfunctioning of the kit and could present a serious hazard to the aircrew during parachute landing.

AUTOMATIC SURVIVAL KIT ACTUATORS

Automatic actuators will be installed in all F-106 Survival Kits. Installation is tentatively scheduled to commence in late January 1968. Due to the special mechanical skills and tooling required to complete installation, actuators will be installed by traveling teams from the Survival Kit SRA and OCAMA. All affected units will be advised of the installation schedule as soon as itineraries and kit delivery dates have been established.

The Automatic Survival Kit Actuator arms the survival kit upon parachute opening; however, deployment of the kit is delayed until the preset altitude (10,000 ft) is reached. If parachute opening is below the preset altitude, kit deployment is delayed by the timer to insure full parachute opening is achieved prior to kit functioning. This automatic device will eliminate an aircrew performance step and will prevent back and leg injuries sustained by aircrews during parachute landing falls with undeployed survival kits.

Installation of the automatic actuator does not eliminate the manual actuation capability. The "yellow handle" will remain and can be used should the automatic feature of the kit fail.

Installation of the automatic survival kit actuator will complete the zero altitude, zero airspeed ejection capability for the F-106 aircraft.

T-33 TAILPIPES

The pilot departed his home base on a cross-country mission and climbed to approximately 30,000 feet. During descent for his first intended stop and at 85 percent, the overheat light came on. When the throttle was retarded to 65 percent, the light went out. After landing, the pilot entered the discrepancy in the aircraft forms. An operational check was performed on the ground and the system checked okay. The pilot resumed the flight and did not have an overheat indication. When he reached the base of destination, the pilot verbally told Transient Alert the problem, but no entry was made in the aircraft forms. A thorough inspection of the aft section and tailpipe revealed that six adapter retainer assemblies were missing. The three support cables were attached to the tailpipe. However, with six tailpipe adapter retainer assemblies missing, the tailpipe separated enough for exhaust gases to escape, resulting in an overheat condition. Further investigation at the home base revealed that a tailpipe, P/N 456 (Ref T.O. 1T-33A-4, page 2-112, Fig 33), which does not require adapter retainer assemblies, had been replaced with an articulated tailpipe, P/N 412896-1 (Ref T.O. 1T-33A-4, page 2-113, Fig 33A), which requires six adapter retainer assemblies to join the two sections. A message has gone out to all ADC Bases utilizing T-33 aircraft directing a one-time inspection be made on all T-33 aircraft with the articulated type tailpipe to insure that these assemblies are properly installed.

HELP WANTED

Our January 1968 issue contained an article "Recollections of a Fighter Pilot." The INTERCEPTOR would like to extend an open invitation to all jocks, RIOs, Weapons Controllers, etc, for similar articles based on personal experiences. Misery loves company.

In the interest of self-preservation, we reserve the right to massage unprintables and to translate Sanskrit. If so desired, names will be withheld to protect the guilty.

Send creations to: The Editor, INTERCEPTOR Magazine, Hq ADC (ADCSA-E), Ent AFB, CO 80912.

A letter written home from SEA in the awful Spring of 1966. The names of the people you will recognize because they are ADC pilots. This dramatic, true account of the few days at A Shau was not originally intended as public domain, but as a personal letter from a pilot, nick-named "Buzz," to his loving wife "Judy." Buzz is now safely back and the Commander of the 98th FIS Suffolk County N.Y. Our thanks to Lt Col Monroe E. "Buzz" Blaylock, 98th FIS.

—The Editors

Dearest Judy

As you can imagine, it has been a very eventful three days, starting back on the 9th when Ken Baird and I were diverted to cover the rescue of the AC-47 crew that had been shot down a mile and a half up the valley from Ashau. Two H-43s out of Da Nang made it through some miserable weather and picked up three survivors out of a crew of seven. Ken and I had good shooting as the VC were surrounding the -47 when we finally located the place.

After the choppers left for Da Nang, the FAC asked us to strafe in the vicinity of the camp. However we were both "Winchester" (out of ammo), but put a pass down over the place. Looked peaceful enough, and radio transmission from the camp indicatd no major problems.

On the morning of the 10th we started getting intelligence reports that Ashau was under heavy mortar attack by a large ground force. Naturally the 1st Air Commando was first back into the fray. Two of our flights that were headed north were diverted by "Hillsboro" (Airborne Command Post). Bernie Fisher and Denny Hague in one flight and Jon Lucas and "Paco" Vasquez in a second ended up thrashing around under a 400 foot ceiling along with a flight of two A-1Es from the 602nd Air Commando.

Ground fire from automatic weapons on ridges to the north and east was especially heavy. However our troops hung tight and made repeated strafe passes around the perimeter of Ashau. Rudy King, one of the 602nd types, took a 50 cal. hit in the windshield and headed back to Nha Trang with a face full of glass. Just a few minutes later, his leader, "Jump" Meyers, was hit hard in the engine and with a sizable fire bellied in on the Ashau strip. Bernie made a pass over "Jump" just as he leaped out of the burning plane. He thought that "Jump" was probably badly burned and would probably die without medication, even if the VC didn't get him.

Bernie knew that the U.S. Special Forces probably couldn't help as the

strip was outside the perimeter of the camp, so he decided to land and pick his old friend up. Sounds crazy, but that's exactly what he did. He briefed Danny and Paco on his plan, set them up to strafe down both sides of the strip, then calmly put gear down and set up his final approach. Due to smoke and low viz in the rain, he was long the first time, so made a touch and go and put it down OK on the second try. Skidded to a stop close to "Jump", who set new track records getting to the bird, and he then taxied to the far end for takeoff. Neither got a scratch, but Bernie's bird had 19 holes when he landed back at Pleiku. Jon Lucas had his hydraulics shot up, had an electrical fire in the cockpit, but made it to Da Nang OK. Denny and Paco escorted Bernie home to Pleiku. Neither was shook up by the whole incident until they started counting up the holes—"Paco" had 22 individual strikes—and like always, the old bird didn't give an indication she'd been scratched. Needless to say we had an enthusiastic homecoming for the conquering heroes.

By this time (about noon) our last flight, Will Darsey and John Stewart, who had strafed for an Army Caribou resupply bird, landed and reported the weather to be right on the deck. They had also had radio contact with the camp and were worried that it might be overrun at any time. Pete Hagsmith and I were next on the schedule and were itching to get up there, but the weather reports from the Army Airborne Command Post kept telling of a solid undercast.

About 2:30 o'clock in the afternoon we leaped off anyway, checked in with "Hillsboro," who diverted us immediately to Ashau. When we came up on camp frequency, could hear an Army Caribou holding on top asking for some fighter escort with fire power, as he'd made one attempt and had run into too much ground fire. We joined up with the Caribou at 3:15 and penetrated on his wing. Don't know how he hit the center of the valley as weather was about 300 feet—magic I guess. We busted down to the camp at 140 knots and about a mile short, pushed it to full bore, and strafed down each side of the camp. He put some of the supplies into the camp, and we all turned around in the valley and got the hell out of there. Just after we started north up the valley at about 200 feet under the weather, I got to talk on the radio to the camp commander, a Major, whose call sign was "Envious One-Two." I learned that of the U. S. Special Forces and the CIDG remaining, some 200 were crammed into two bunkers in the north edge of the camp. They were holding out against over 2,000 VC and those crazy fools didn't want to leave—they wanted reinforcements by American Marines and said they could hold the camp with a little help. He also told me that the plan was that the Marine chopper outfit from Hue Phu Bai was going to try to evacuate the entire camp at 5 o'clock. Later heard him talking to his airborne command post, said that if the evacuation didn't come off, there would be no use coming back the next day. Anyway, Pete and I started organizing to give air cover during the evacuation attempt. I stayed down in the valley, Pete climbed up on top and eventually got six A1Es in trail with him to await the choppers. When they finally arrived about two or three miles north of Ashau, Pete brought two A-1Es down through the weather, tracking on my UHF/ADF—weather about 400 feet at this point. They got in trail with me and we went busting down the valley past a sky full of Marine H-34s choppers, Super-Chief call sign. As we neared the camp, I told Will and John to drop their napalm east and west, which they did, and I strafed the camp itself. Envious One-Two had said, "Hell, strafe any place, you'll get more of them than us."

We zapped back up the valley—I picked up two more A-1s and back we went. Got there just as the choppers were landing. I didn't have a bullet left, but Dick Roehm and Ken Ruhm had napalm and CBU, so plastered both edges of the camp. What a sight, choppers everywhere, the A-1Es making repeated strafing passes on the south half of the camp—will try and send pictures later; thick automatic weapons and ground fire just filling the air, and those Marine choppers just sitting there, 50 yards north of the camp, picking up people, and the weather was something less than 100 foot overcast at this point. Three were shot down including the squadron commander, also the copilot of the airplane that picked me up the 12th, plus another. We gave them cover as they departed—all of us were out of ammo, but kept buzzing along the sides of the landing zone. They got 59 out—all Vietnamese. Some of the choppers were so crammed by battle-shocked troops that they had to throw them off by bouncing the choppers until they were light enough to take off. Colonel House, the HMM-163 Squadron Commander, gathered together his people that had been shot down, 12 U.S. Special Forces Americans from the camp and 90 Vietnamese, and led them north about two miles right through enemy positions. About 60 were picked up next day, and 20 some on the 12th. All in all, about 2/3 of the camp personnel have been recovered. All of the Marines, five Air Force types, me included, have been pulled out. The whole thing was truly a beautiful story of courage on the part of so many people and all Services. Those Marines have got guts. Envious One-Two was re-

covered and we hope to talk with him—fly him down to the squadron for a couple of beers.

On the afternoon of the 12th, Pete and I got scrambled to cover the helicopter pickups that were still going on. Isolated little groups were being located and picked up, and still catching hell from automatic guns—50 caliber and 30 caliber. FAC put us in on a line of four guns. We had two 1,000 bombs each—so only made one bomb pass each. As I was pulling off, noticed three more positions firing, so rolled into strafe, Pete right behind me. On second pass, was walking the burst right down the trench line when another one opened up off a bit to the right. I stamped on rudder and swung my guns over for a few rounds — felt three hits in the engine area just as I was pulling off. Everything seemed OK, so I told Pete I was heading for home and for him not to go in again. Then I noticed no oil pressure and as I was watching, the fuel pressure went to zero, then the engine quit. Told Pete I was getting out and started to glide away from Ashau and gun positions to the east. At about 2500 feet, took a nose dive out over the wing, tumbled a bit, stabilized on my stomach, waiting for just a smidge, and pulled the D ring at about 1,000 feet. Wanted to get below the ridge line before chute opened, as was only about a quarter of a mile from gun positions we had been hitting. Bit my tongue a bit when the chute opened, watched my bird hit the ground going straight down, then just had time to slip away from one big tree into a smaller one. Sild down the side of it to the ground, light as a feather. Immediately got my survival gear together, got my radio out, and called to Pete that I was OK. He had choppers on the way already.

I could hear Viet Cong all around, I thought, but there were tree frogs, birds, etc. The choppers got there about 20 minutes later, but couldn't pick me up because of winds and altitudes, so Pete flew over on a heading for me to walk to a clear area at lower altitude. So traveled about 1/8 of a mile in the next 45 minutes. Jungle vines and brush every step of the way; was so tired and breathless, couldn't even talk to Pete on the radio. The jungle was very dense and dark, and I had to use three flares to pin point my position for the choppers. Finally, at about one hour after bailout, those chopper drivers tried again. Both pilots on the controls holding the bird just on edge of stall, put down the cable and sling—seemed like an hour until it got down, and I put my hands on it. Dove into the sling, yanked three times on the cable, and off we went—sideways through the trees. The chopper was so close to a stall they couldn't even hoist me until they got moving. I just hung there, looking the countryside over. It took about three minutes to hoist me up to the bird, all the time floating along towards HUE. The two gunners pulled me in and I just lay there on the floor catching my breath—drank a whole canteen of water, bummed a cigarette, and smiled a lot. They gave me an apple and an orange which I ate—the first in Vietnam.

Landed at Phu Bai out of three ship formation, two H-34 choppers straining to hold 100 knots and Pete in his A-1E, with his flaps down, hanging right in there. Broke from 100 feet — the hardest and scariest part of the whole mission. The whole base was there to meet us, everyone as happy as I about the whole thing. NBC and CBS TV cameramen right there with films and a rapid interview. If you happen to see it, I'm the one in the dirty flying suit. Pete had parked his bird elsewhere, so came running up right into the cameras shouting bad words with tears in his eyes. Had us two beers right on the spot, and off to the club for a couple more.

Called Colonel Knight, said we'd be home in a couple of hours, had dinner with Colonel House, Squadron Commander, and pilots involved in rescue, and then climbed into Pete's A-1 and back to Pleiku. Colonel Knight and Colonel Gutches met us at the airplane with a pitcher of martinis. Debriefed and got my scratches washed and to the club where the squadron was waiting. Quite a number of drinks while Pete and I told our stories.

Started calling you about one o'clock in the morning, and only took about 20 minutes—weren't we lucky that you were at Dorothy's. Wished I had been a little bit more sober — don't remember much of what we said except that I was OK. While I was thrashing my way through the jungle, twice I came upon beautiful red flowers like a snow plant. Said to myself—maybe out loud—"Going to take that home to Judy!" Picked both of them and stuck them in my filght suit pocket —sorta' affirming in my own mind that I was going to get out and deliver them in person. Lost them both —am not going back for more.

Only aftermath are lots of scratches, little stickers in my hands, arms, legs, and a stinking cold which I caught while riding in that open-air chopper while soaking wet with sweat. Also have to spend a half day tomorrow making new maps as my others went in with the bird.

Colonel put out the word today—no more multiple passes on gun positions unless somebody really needs our help, like Ashau. Everytime we get hit, it's generally in the third or fourth pass. I believe I'll go along with his directive from now on. Don't worry, fine, both physically and mentally, and have learned a very satisfying lesson about me.

All my love,

Buzz

SPINNING THE "T"

Our thanks to Lockheed Aircraft Company's TONY LEVIER and SAMMY MASON, who really need no introduction to any man, or woman, who calls himself, or herself, a pilot..... The Editors

January 19, 1968
Colonel Oliver G. Cellini
Chief of Safety
Aerospace Defense Command
Ent Air Force Base, Colorado

Dear Ollie

I read with interest the comments of our "Northern Buddy" regarding T-Bird spinning in Afterburning of your October 1967 issue of INTERCEPTOR. Since I'm an "old T-Bird driver" I couldn't pass up the opportunity to put in my two cents regarding some past history. I asked Sammy Mason for his comments and they are enclosed herein. Also, an article by Sammy on how to recover from spin of the Navy TV-2 (USAF T-33A) is enclosed.

I just read Sammy's article, which I think is a "dandy" and might be just the thing for a reissue of the INTERCEPTOR. If you care to republish the article, I would suggest that special mention be made of the exact configuration on which Sammy conducted the spin tests.

First off, ole Tony, "me", did the first stall and spin tests on the T-33. The original "Bird" was "wild." In fact, you couldn't get it to spin. However, for reasons unknown for some time, what it did do was far worse than a spin. Finally, we discovered what was causing the "strange behavior." It was caused partly by the following:

The original "wedge" stall fillet on leading edge at wing root was for "stall warning" and to make incipient stall or air flow separation even on both R-L wings to reduce the tendency to autorotate (tailspin). It did, however, stall too much of the wing, root, and too much of the "aft" fuselage. The flow separation of the air caused severe tail buffet, which didn't help the wear and tear of the rear end at all.

The stalling of the "aft" fuselage reduced the directional stability which would retard spin recovery, and also contribute to entry into the maneuver call the "Thing." The T-33 would literally tumble all over the place, completely out of control. Many, many T-Birds crashed from this crazy maneuver that no one understood at that time, except possibly myself, and I didn't know everything. Nevertheless, I was doing some stalls one day with a modified "wedge stall fillet" and after making nineteen different stalls in landing configuration, starting from 20,000 feet on each stall, I ended up in the "Thing" on the last stall. First, the T-Bird went into a NOSE SPIN, then an INVERTED SPIN, and finally a NORMAL SPIN. I lost many thousands of feet before I recovered. I discontinued any further testing that day. However, I did discover one *very* significant thing that eventually solved the great mystery. In approaching all of my stalls using the same exact procedures, i.e., speed bleed off rate, etc., I discovered that the T-33 would stall with only partial back stick (or up elevator) and that pulling the stick back further, even though the plane appeared to be in full stall, the characteristics were strange and stall recovery more difficult, if not impossible, which was the case of my nineteenth stall.

My report of this incident caused deep concern. Also, in my report I recommended "limiting" the up ele-

vator to something less than the 38°. My reasoning was from some old tricks we used from years before. If an aircraft has a bad stall, fix it so you can't stall it by limiting the "UP ELEVATOR."

Our Engineering Branch put the T-Bird into the wind tunnel to determine what reduced up elevator angle we could tolerate in consideration of the requirement of raising the nose on T. O. with forward C.G., and to be able to flare for a landing. The wind tunnel tests revealed some very startling things. With elevator angles up in excess of approximately 23°, the air flow over the "vertical fin" started to stall which, of course, reduced the directional stability (stiffness) and also reduced proportionately the rudder effectiveness.

At the full 38° up elevator angle, the vertical fin was so badly stalled that, if the left and right wing stall had the least bit disymmetry in stall pattern, "ZAP" autorotation set in and the T-Bird fell into unpredictable oscillations. You would go for a ride whether you wanted to or not.

The end results of our findings produced the following T-33 configuration changes:

1. Re-cambre of the "wedge stall fillet" to "unstall" the fillet at high angle of attack.

2. Install a "sharp edge stall strip" outboard of the original "wedge fillet" and attached exactly right for each individual T-Bird.

3. Limit the up elevator angle to 22° +0 —1°. I flew this configuration and found, much to my delight and pleasure, a NEW T-33. It stalled as good as the "best", it spun beautifully, and recovered in less than a turn. Overhead maneuvers were a cinch and often we got down to ZERO indicated air speed. It was absolutely a NEW BIRD.

I suggested that "I—LeVier" go into the field, and give everyone the "WORD". Unfortunately, it couldn't be done at that time. However, later on, due to new problems brought on by the limited up elevator travel I was dispatched on an indoctrination training program to all T-33 training bases in the U.S. to explain the reasons for the new and improved configuration and to show the Air Force how to stall and spin the T-33. Surprisingly enough, I found that few of the troops really understood what it was all about. Also, no one liked the limited "UP ELEVATOR". Pilots found that nose lift-off speeds were higher and flares for landing were marginal because of the restricted up elevator. Actually, the 22° elevator angle was enough, providing the pilot had the proper C.G. and Vi. for the particular maneuver in question. Anyway, everyone rebelled about the limited up elevator and as time went by, the T-Bird elevator angles were changed to the present 26° +2° —0°. I guess this has worked out to a pretty fair compromise because it's been like that for quite a few years without any squawks.

As for the RCAF T-Birds, I understand that somewhere along the line they chose 30° ± ½° elevator up angle. This will stall the vertical fin to such an extent as to make spin recovery different from what can be expected from the configuration we tested, which was a much finer "T-Bird" in my opinion.

Thanks for the opportunity to discuss a great old aircraft and some of its earlier characteristics.

Sincerely yours,

LOCKHEED CALIFORNIA CO.
A. W. LeVier
Director of Flying Operations

A. W. (Tony) LeVier, whose flying career spans the time from propeller aircraft of the 1930s to the age of faster-than-sound jet flight, began his flying career in 1928 at the age of 15. He has flown competition with the greatest racing pilots on earth, and won first place awards for the 1938 Greve Trophy Race in the National Air Races at Cleveland, the 1938 Pacific International Air Races in Oakland, California, and the Sohio Trophy Race at Cleveland in 1947. In 1939 and 1946 he took second place in the Thompson Trophy Race. Tony joined Lockheed in 1941 and became a production test pilot on the Hudson and the P-38 Lightning. He has been first to fly more new aircraft types than any pilot in the history of aviation. His "firsts" include the XP-80 Shooting Star, the T-33, the F-90, the F-94, the T-33B, the T2V-1, the F-80R, the Saturn, the Constitution, the F-104 Starfighter, and the U2. Tony is now Director of Flying Operations for the Lockheed-California Company and contributes much to flight safety through his published articles. He is in demand in this country and abroad as a lecturer, and co-authored, with John Guenther, his own story in the autobiographical "Pilot". He also holds the honor of being one of the founding members of the exclusive Society of experimental Test Pilots.

DESK MEMO

To: A. W. LeVier
From: Sammy Mason
Subject: Spinning the T-33

With all due respect for our Canadian friend with the ruffled spin feathers who no doubt is a proficient T-Bird driver, I don't think he has discovered anything new about spin recovery technique.

It is impossible to word a manual in such a way as to make a pilot flight proficient. If a pilot desires a thorough proficiency in spin recovery for a particular airplane, the only answer is actual flight practice.

However, I feel the USAF Dash One covers the spin recovery technique better than the RCAF Manual in that it gives priority to the rudder in stopping rotation. There are several good reasons for this that I outlined clearly about ten thousand flying hours ago in an article for the U.S. Navy in their "Approach" Magazine (February 1956).

I'm wondering if the present day T-Bird is configured the same as when I conducted the spin tests on it. Elevator angle is critical and as I recall all of my spins were done at 22° up elevator.

While we were making the Bird safe for the troops I had some interesting rides in this machine, but I can't get too excited about it now—I'm too awed by the "Lodestar".

Sammy Mason

TEXT OF ARTICLE FROM FEBRUARY 1956 ISSUE OF APPROACH MAGAZINE

The Test Pilot Talks On SPINNING THE TV (T-33A)

By
Sammy Mason
Engineering Test Pilot
Lockheed Aircraft Corporation

The TV-2 (T-33A) with the stall strip on the wing leading edge has excellent stall characteristics, and the erect spin characteristics in the normal flight training configuration are consistently good.

The spin characteristics are best with the landing gear and flaps retracted, tip-tanks installed and empty, and ballast in the nose equivalent to the approximate weight of guns and ammunition. Of course if guns and ammunition are installed, the ballast is not required. Under these conditions, the proper recovery procedure will stop a spin in a quarter turn.

Before getting down to the details of spin and recovery characteristics, I'd like to say a word about altitude. Most airplanes spin best at low altitude where the air is heavy and rotational speed is slower. There is quite a bit of truth in the statement that "an airplane spins best just before it crashes".

Well, say what you will, I like lots of ground clearance when spinning these modern machines. About 20,000 to 25,000 feet is a good starting altitude for the TV-2 (T-33A). I personally would not recommend starting an intentional spin above 25,000 feet because the rotation will be fast.

The TV-2 (T-33A) is like any other conventional airplane for starting a spin out of a level flight stall. Push the rudder pedal and pull the stick full aft. The spin pattern may vary a little from one airplane to another and will be somewhat dependent upon the entry speed and rate at which the controls were moved to the spin position.

A rough entry, where the controls are abruptly placed into the spin position, may produce an oscillatory type of spin with variable rotational speed and variable nose positions in relation to the horizon. The oscillations may vary with the nose down near to or even slightly past vertical. These oscillations are nothing to become concerned about when the airplane configuration is as described previously. In general, T-Birds will spin with the nose quite well down.

CHOP THAT POWER OFF

One thing I haven't mentioned yet —and it is important—*don't leave power on.* Whether the spin is entered accidentally or for practice, the first act of importance is to pull the throttle back to idle position. Reducing power reduces the rotational speed.

The recovery procedure for the TV-2 (T-33A) is something like this: If the airplane is oscillating, wait until the nose is well down and apply full rudder opposite to the direction of spin and consider that the rudder is the only control that will stop the spin. For in the T-Bird, it is the only effective control in stopping rotation. Hold the stick full aft until the rotation stops, then neutralize rudder and release the back pressure against the stick.

So you don't like to hold the stick back that long. You figure that the stick ought to be popped forward long before the rotation stops. The truth of the matter is, I used to do it that way too, but I've learned differently. For good consistent recoveries, hold the rudder on until rotation stops, then release the back pressure on the stick.

In my experience with spinning airplanes, I have found that forward stick application too early will produce a speed up in rotation. In many airplanes, this speed up is of no concern, but in some airplanes, like the T-Bird for instance, a rather fast rotating type of spin may develop.

This type of spin can be stopped by moving the stick full aft, applying rudder opposite from the direction of spin and waiting until the rotation has stopped before back pressure is released. The stick should never be shoved forward abruptly during a recovery. For one thing, it is a very good way to make the spin progress from erect to inverted.

Speaking of inverted spins some airplanes actually spin better on their back than they do right side up, but the TV-2 (T-33A) is not one of these.

Intentional inverted spins in this airplane are to be avoided. As a general statement, it is easy to stop an inverted spin which has not been deliberately forced and allowed to progress. Should the spin be forced by placing and holding the controls in the spin position, which for an inverted spin is stick forward, considerable difficulty may be experienced in stopping rotation.

If an inverted spin has started, pull the stick full aft and apply full rudder opposite to rotation (these movements are done simultaneously). After rotation has stopped, neutralize rudder and release back pressure on the stick—then recover from the ensuing dive. Following this procedure will stop an inverted spin "right now".

I recall one particularly inverted spin in which I used wrong rudder in attempting to effect recovery, and I had done hundreds of inverted spins. Normally it is not at all difficult to determine rotational direction, but if you are experiencing difficulty in stopping the spin give a little thought to the direction of the rudder relative to the direction of spin.

It is not difficult to recognize an inverted spin. Your feet will want to fall away from the rudder pedals and your hand away from the stick, not to mention that you will be hanging on your belt.

Now that we've covered the essentials of erect and inverted spins, you might like a word on the fine points of using aileron during erect spins. If the airplane feels as though it is skidding during the spin, a slight amount of aileron in the direction of the spin is helpful.

However, care should be exercised to avoid using too much aileron. Aileron against the spin retards recovery appreciably.

Stalls out of turns should never result in a spin. Release of back pressure against the stick at the moment of stall, plus minor rudder and aileron adjustments, will prevent a spin entry.

WATCH YOUR AILERON PROCEDURE

However, should an accidental spin develop from such a centrifugal maneuver, the rotational spin will be faster and the spin pattern may appear a little different. If the airplane appears to be rotating about the longitudinal axis such as in an aileron roll, some aileron against the spin will be effective in stopping rotation in addition to the rudder, but do not use aileron if the spin appears to be of the same pattern as that encountered when starting from a normal level flight stall. The pilot's handbook recommends neutral position of the aileron. You'll never go wrong if you follow that procedure.

The gear-and-flap-down spin is not as good as the clean spin, consequently I would recommend that practice spins be performed with the airplane clean. With the gear and flaps down, the recovery procedure is the same and recovery should be prompt if not delayed too long.

If recovery procedures are delayed for one reason or another, and the airplane response is slow, clean it up by retracting gear and flaps. Then use the normal procedures.

One final word:

I've never seen a book that described how to learn to balance a bicycle in motion. The same thing applies to spins.

The best way to learn is to get the actual experience. It is one thing to have the knowledge—and this is important; however, there is no substitute for trained reactions when it comes to flying.

Now the T-Bird was built to offer the unquestionable advantage of instruction "on the spot," therefore I recommend taking advantage of instructor training. ★

Sammy Mason has been flying for thirty-four years and accumulated over 20,000 flying hours. He was well known prior to going to work for Lockheed in 1950 for his Aerobatic Performance as a member of the "Hollywood Hawks" Air Show. He was a flight instructor during World War II and is still an active instructor. Three of his sons are commercial pilots and his oldest son, Mike, is a Lockheed pilot.

Recently Sammy again made the news as he became the first pilot in aviation history to do a full complement of Aerobatic Maneuvers in a helicopter. At the recent Paris Airshow, he performed a series of Low Level Loops, Slow Rolls, Immelmanns, and Cuban Eights (no spins) in the Lockheed Model 286 Rigid Rotor Helicopter. He lives in Santa Paula, California, is the father of eight children, and the grandfather of four.

selective identification feature

by
TSGT BOBBIE L. MASHBURN
Quality Control NCOIC Test Flight Section, 4600 Cons Acft Maint Sq, Peterson Field, Colorado

Technological advances in our aircraft navigational systems are now progressing more dramatically than at any time since the advent of radar. Yet, when we view the cockpits of all but a few aircraft, the SIF (Selective Identification Feature) systems stand out in contrast and have remained relatively unsophisticated in their operation. Possibly it is because of this simplicity that the systems' operational theory is often misunderstood. Ease of operation and the fact that the aircrew can neither see nor hear SIF, may also be the basis for the numerous misconceptions which surround this very important aid to navigation.

Contrary to being simple, SIF systems are very complex and presently employ a whole new concept in computerized electronics. They offer a preponderance of possibilities for future application and their present uses greatly exceed those normally experienced in routine air operations. Therefore, some analysis of the problems and principles of radar which led to SIF development is required before the many factors involved can be thoroughly understood.

Surveillance and precision radar provide many functions which have proven to be of paramount importance in today's air operations. However, these systems do have several inherent deficiencies. Aircraft which have small reflective surfaces are difficult to track. Some radar units are susceptible to radar cancellation speeds or, commonly called, blind speeds. Others react unfavorably to weather phenomena and scope clutter caused by precipitation. These and other problems, such as the need to immediately identify an aircraft, were basic requirements for the development of the Selective Identification Feature.

In the early stages of radar design, one particular problem was the

use of constant frequency signals. For example, if a continuous and constant frequency signal were transmitted, it would be impossible to distinguish between various echoes at different distances, for they would all be alike. There were several methods developed which satisfactorily solved this problem. Perhaps the most important and the one now used in SIF was the pulse modulation technique.

In pulse modulation systems, the transmitter is turned on for short periods and off for longer periods. During the period when the transmitter is turned on, it transmits a short burst of energy. The echo may be received in time intervals as short as one-half millionth of a second.

SIF, while employing the pulse modulation technique, does not rely upon the echo for its operational functions. The airborne system is partially quiescent until a challenging signal is received. It is this received signal which then triggers the transmitter into operation. The transmitted reply is independent of and stronger than echoed radar signals.

A radio frequency (RF) voltage wave generated by a transmitter alone cannot produce an intelligible signal. This would be much like keying the UHF communications transmitter and not speaking into the microphone. In other words the RF voltage radiated is only a carrier of information. At the transmitter, the desired intelligence is impressed on the carrier. In SIF, these impressed transmissions consist of powerful bursts of energy formed into groups or pulses of specific shapes, time duration, and spacings. When these pulses are picked up by the receiver, the reverse of modulation occurs; the intelligence is removed from the carrier. At the receiving SIF monitoring station, this information is displayed on an indicator which gives a visual indication of the coded signal returned by the aircraft.

SIF interrogating systems are normally operated in conjunction with a primary surveillance or long range radar. This result is an extremely versatile system which enables the traffic controller to make rapid and positive identification of aircraft within his jurisdiction. In addition, it enables him to more effectively manage the display of data on his radarscope.

The standard equipment designed for use by FAA air traffic control facilities is the Air Traffic Control Radar Beacon System (ATCRBS). This system differs from the military in that it is designed to identify and to provide control services to individual aircraft rather than for identification of friend or foe.

The SIF transponders carried by USAF aircraft transmit a coded identification (I/P) reply that is different from civil IDENT, but is compatible with the ATCRBS. The emergency signal is also different and is not completely compatible with an ATCRBS decoder system. Due to this incompatibility of the two decoders, the Air Force agreed to use Code 77 as an emergency reply on Mode 3. With these two exceptions, the civil Mode A is the same as Mode 3 in military equipment. Thus the common air traffic control mode is called Mode 3/A.

The International Civil Aviation Organization (ICAO) recommended that two codes in Mode 3/A be reserved for special purposes. Code 76 for radio communications failure, and Code 77 for aircraft emergency. Code 77 has been designated emergency; however, the air traffic control decoders will not process Code 76 as a special code and operational use of this feature has not been specified.

An exact analysis of the way various positions of the SIF controls affect the airborne system would be quite lengthy and complicated. However, it is possible to obtain an additional understanding of these functions by defining several of the operating features:

STANDBY: The complete power requirements are supplied the transponder and after a delay of normally one minute the equipment is ready to operate. This position also provides several equally important functions other than insuring proper warm up of the system.

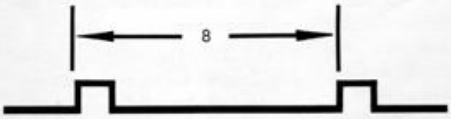
Occasionally recycling from Low or Normal to Standby will eliminate minor malfunctions such as sticking relays. Essentially all that occurs in recycling is the opening and closing of relays. SIF does not channelize in the manner of voice communications equipment.

Improper use of the SIF equipment may cause interference with ground radar displays. It is for this reason that the control should not be turned to Low or Normal until just prior to takeoff.

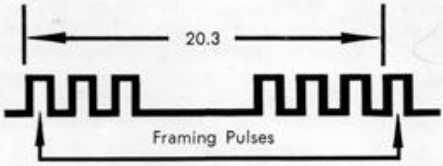
In each of these two uses, Standby eliminates waiting for the delay circuits to re-energize which would be necessary if the equipment was placed in the OFF position.

LOW: Contrary to the beliefs of many, the Low position does not reduce transmitter power. In this position, the sensitivity of the receiver is reduced approximately to half of that available in Normal and Emergency positions. Thus, the transponder will reply only to strong interrogations. This prevents SIF replies to Side Lobes or reflections of the antenna pattern when an aircraft is flying in the proximity of the ground interrogator. Elimination of these replies reduce clutter near the center of the SIF ground monitor.

To illustrate a complete cycle of SIF operation, the following signal patterns based on both FAA and military systems are shown in traffic control Mode 3.

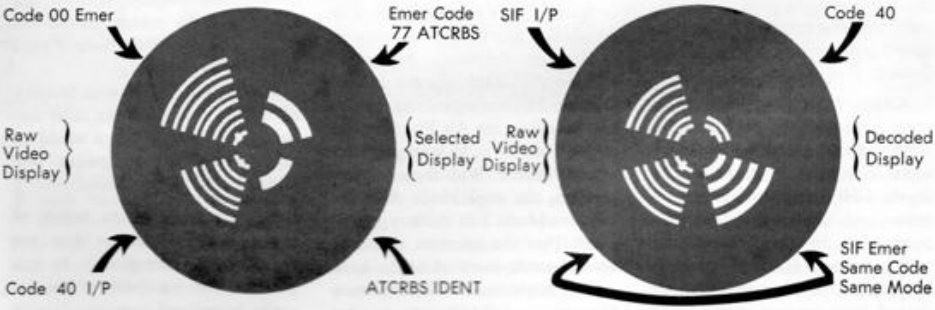


Standard Mode 3 Interrogation: Pulse spacing is measured in millionths of a second (microseconds) from the leading edge of the first pulse to the leading edge of the last pulse.



Typical Aircraft Mode 3 Reply: The signal is comprised of two standard framing pulses spaced 20.3 microseconds apart. Information pulses (Code 76 illustrated) are spaced within the two "brackets" in specific increments depending upon the SIF code selected.

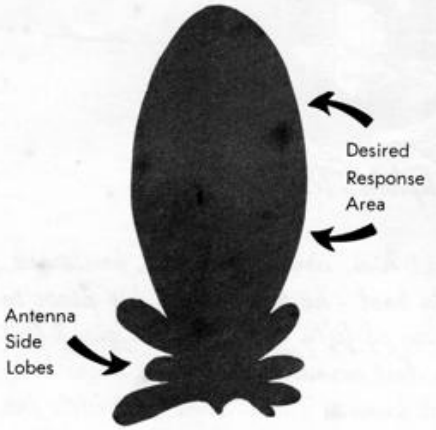
Several of the possible surface radar displays for Mode 3 would appear as follows:



Air Traffic Control Radar Beacon System (ATCRBS)

Military Display SIF

Raw video, which is seldom used, permits complete code trains to be displayed without decoding action. In order to eliminate the clutter of numerous code trains, the controller selects various displays which are abbreviated and different from the raw video returns.



Radiated SIF Interrogation Pattern

This feature is used with discretion due to the greatly reduced interrogation range of the airborne transponder. Later model SIF units have Side Lobe suppression circuits which are compatible with supplemental features now being installed in the ground system and automatically prevent replies in this undesirable signal area.

I/P: Often called the double mode, the identification of position transmissions consist of two complete code trains. The civil air traffic control decoder will present a Bar symbol which differs from the military two slash presentation. Once activated the system remains in I/P approximately 30 seconds.

EMERGENCY: In this position, the receiver is fully sensitized. The reply consists of four distinctive and successive groups of reply code trains. In Emergency these replies will be returned regardless of the settings on the mode toggle switches on the master control panel. In many aircraft equipped with ejection seats, ejection and/or loss of canopy closes an auxiliary switch which automatically provides emergency response to interrogations.

In the FAA traffic control system, emergency response will only be noted if the Mode 3 code selections are set at Code 77. It should be noted that selection of Code 77 will activate the FAA alarm without selecting the emergency position on the master control. In addition to the radar display, the emergency signal will activate a flashing red light and a buzzer alarm at the ground operating position.

In maintenance our goal is to retain the original qualities of design throughout the complete operational life of each aircraft system. However, both airborne and ground systems are subject to variances which may affect the operational efficiency of the equipment. A brief descriptive account of any malfunction, rather than "Inoperative" or "Intermittent" will greatly assist the maintenance technician. For example, these possibilities should be considered in the discrepancy "SIF Intermittent":

• Mode 1 has 32 codes available; Mode 2, 400 possible reply codes may be selected; and in Mode 3/A there are 64 possible replies. Code 00 is a valid number used to indicate the absence of all information pulses.

• Consideration should also be given from the interrogating station. While it is true that the system is designed to operate over several hundred miles, this range may be less in different areas. The frequency band used contains very short radio waves which travel essentially in a straight line and are easily reflected from objects in their path.

• When two or more aircraft with operating transponders are within 3.3 nautical miles of each other on the same general radial from the interrogating station, the reply signals may garble and the decoder equipment can cause the generation of false targets between the aircraft. Also, it may cause cancellation of part or all of either or both actual returns. False returns and cancellation may occur even though altitude separation exists.

• Aircraft attitude will affect the quality of the display since the transmitting antenna is normally located on the bottom of the aircraft. If the aircraft is in a turn or climb away from the station, the wings or fuselage may block the pulse pairs transmitted by the interrogator, and the transponder may not be activated.

By specifying mode and codes in operation and a description of the discrepancy as reported by the controller, many clues to the possible cause of the malfunction become readily available. In short, the aircraft form entry can make the difference in many manhours of trouble-shooting or effective maintenance accomplished with greater speed and efficiency. ★

The Fighter Pilot

Say what you will about him: arrogant, cocky, boisterous, and a fun-loving fool to boot – he has earned his place in the sun. Across the span of fifty years he has given this country some of its proudest moments and most cherished military traditions. But fame is short-lived and little the world remembers. Almost forgotten are the 1400 fighter pilots who stood alone against the might of Hitler's Germany during the dark summer of 1940 - and in the words of Sir Winston Churchill gave England "Its Finest Hour." Gone from the hardstands of Duxford are the 51's with their checkerboard noses that terrorized the finest fighter squadrons the Luftwaffe had. Dimly remembered - the 4th Fighter Group that gave Americans some of their few proud moments in the skies over Korea. How fresh in recall are the Air Commandos who valiantly struck the VC with their aging "Skyraiders" in the rain - and blood-soaked valley called A Shau? And how long will be remembered the "Thuds" over "Route Pack Six" and the flak-filled skies above Hanoi? So here's a "nickle on the grass" to you, my friend, for your spirit, enthusiasm, sacrifice, and courage - but most of all to your friendship. Yours is a dying breed and when you are gone - the world will be a lesser place.

Friar Tuck

THE AMERICAN FIGHTER PILOTS ASSOCIATION

The AMERICAN FIGHTER PILOTS ASSOCIATION has evolved from the original Night Fighter Association which was formed in 1951 by former members of World War II night fighter squadrons and supporting units. A year later, the organization was enlarged to include personnel of air defense units and individuals interested in the aims and purposes of the Association.

At the annual convention in 1967 the name of the organization was changed to the American Fighter Pilots Association, and the constitution was redrafted to reflect a broader scope of objectives.

The American Fighter Pilots Association at the time of the name change had a membership which included many of the oustanding names in aviation. The Association is now trying to multiply its membership and aspires to becoming recognized spokesman in aviation and space matters affecting this Nation and its security.

The sense of the American Fighter Pilots Association is that the issues of air preparedness and national defense should bear the recommendations resolved from the premium knowledge and experience of the men of military aviation. The Association seeks to be the vehicle of this expression, while at the same time advancing the cause and career of aviation.

OBJECTIVES

- *Provide aid to families in need, especially as a result of Vietnam or national conflict.*
- *Provide contact with POWs via known methods, i.e., State Department.*
- *Provide communication with past, present, and future fighter pilots of America via news media, youth education, etc.*
- *Establish an active voice relative to all aspects of fighter aviation via representatives of DOD, Congress, news media.*
- *Impress DOD with the value of morale.*
- *Reactivation of international gunnery, rocketry, and bombing meets.*
- *Establish scholarships.*
- *Support publicly the national objectives in Vietnam.*
- *Encourage the qualified youth of America to seriously consider the career of a fighter pilot.*
- *Reestablish the social and intellectual dignity of the career military officer.*
- *Reconfirm the principles that made America strong.*
- *Ascertain that our fighting forces are provided the most advanced and superior equipment possible.*
- *Insure that fighter aviation is an extension of the will of the American people to preserve the principles of freedom.*

For further information, contact: American Fighter Pilots Association
P.O. Box 90363, Airport Station, Los Angeles, California 90009

OPERATIONAL READINESS INSPECTION TEAM

HQ, ADC

Help Wanted!

Would you like a free trip to some of the most glamorous spots in the U.S.A.? Would you like a free airplane ride and an all expense paid trip? Would you like a week long business trip on a job with a challenge? Would you like to mingle with some of the masterminds of your career field? If so — ORI needs you!

At least twice a month a message similar to the following leaves the ADCIG office: "Request you furnish ten SAGE INDs, one tracking officer and two BUIC weapons directors to augment the ADC ORI Team 1-10 March 1968." The message is sent to the numbered air forces and from there is filtered down to the units where the final selection is made.

The Permanent Party members of the ORI Team would like to send the request for augmentees by name as there are very definite characteristics that are essential in an augmentee. This would be the ideal situation but it is often difficult and impractical. Therefore we have found it better to make a request by numbers and depend on the people who make the selection to send us well trained, fully qualified people. Other qualities needed are the ability to work well with other members of the team, the ability to talk tactfully and intelligently with the people being inspected and the ability to work long hard hours writing and rewriting the report.

There are many benefits that can be gained from an ORI trip, both for the augmentee and for his boss. Each augmentee gets a chance to examine first hand the procedures of another unit. Some of these are good, unfortunately some of them are not so good. The augmentee can then evaluate these procedures and report back to his commander on the good points of the ORI and suggest that they be implemented into his own unit. Many weak areas in operational procedures have been improved by knowledge augmentees have received on ORI trips.

Another advantage of an ORI trip is that the augmentee gains vast knowledge of the overall operations of the aerospace defense system. Many areas are checked into that the augmentee may never see at his parent unit doing his routine duties. A chance to get away and see new areas is always an exhilarating experience.

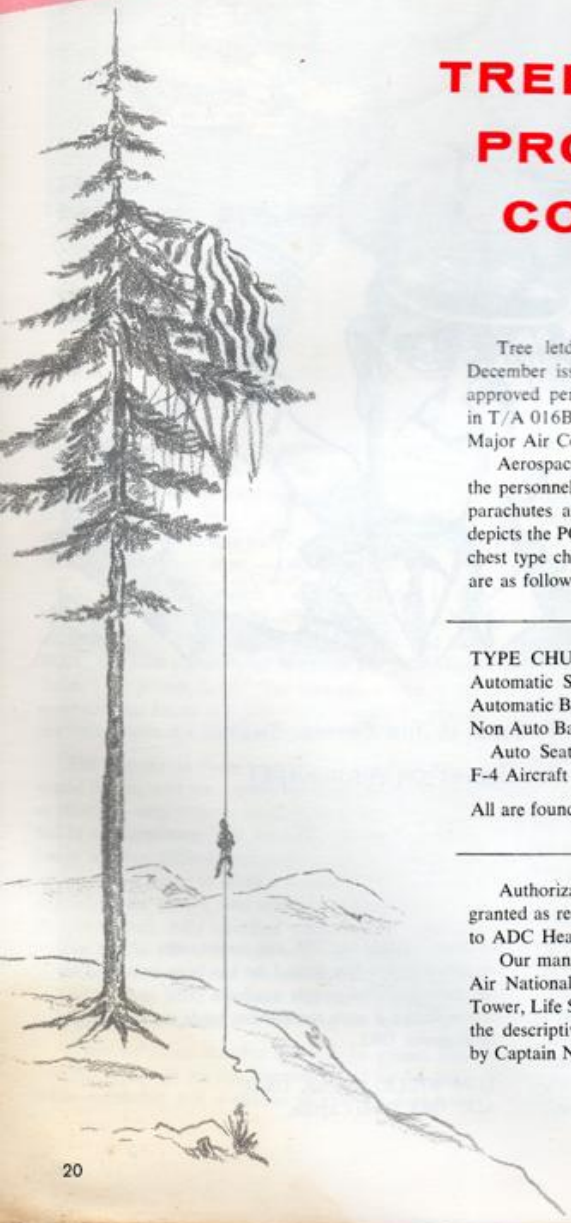
Of course an ORI trip is serious business and must not, *and cannot*, be treated lightly. But each trip always has its funny side. When you are selected for augmentation you can count on having numerous baggage drills. You may get on and off of more aircraft than you ever thought were in the USAF inventory. Frequently we have cases of lost baggage (which always turns up sooner or later), late aircraft, missing aircraft, broken aircraft. Just when all seems hopeless you can be assured someone will come to the rescue.

The final product of any ORI is the Blue Book. This product is not easy to put together and requires many hours of concentration, hot room sessions, soul searching, hot room sessions, writing and rewriting, and

"He wants to know if this is the office that bans the loading of bombs on airplanes!"

finally more hot room sessions. Seventy-five percent or more of the contributions for the blue books come from the augmentees. We in ORI appreciate the augmentees' contributions and could not conduct our job without their help. We need good help and depend on their tact, judgment and contributions. A request for augmentees is *not* a request for a warm body, it is instead a request for one of your best qualified, most professional professionals. After an ORI, the commander of the unit inspected would like to feel he has been evaluated by the most qualified people available. This can only be accomplished if each commander sends his best people to augment ORI.

TOM WILLE, Colonel, USAF
ADC ORI Team Captain



TREE LETDOWN PROCEDURES CONTINUED

Tree letdown procedures were published in the December issue — since that time the Air Force has approved personnel lowering devices which are listed in T/A 016B, and are available when authorized by the Major Air Command.

Aerospace Defense Command has now authorized the personnel lowering devices for the various types of parachutes as listed below. Our photo demonstration depicts the PCU-10P as used on the automatic back and chest type chutes. The devices and their stock numbers are as follows:

TYPE CHUTES	DEVICE NO.	STOCK NO.
Automatic Seat	PCU-9/P	16708356788
Automatic Back and Chest	PCU-10/P	16708976730
Non Auto Back and Non Auto Seat	PCU-11/P	16708356790
F-4 Aircraft Only	PCU-12/P	16708356791

All are found on page 52 of T/A 016, Part B.

Authorization approval for each ADC unit will be granted as required upon submission of AF Form 601a to ADC Headquarters (CEMO).

Our many thanks to the 101 Fighter Group, Maine Air National Guard, and especially to MSgt Paul E. Tower, Life Support Equipment NCOIC, who furnished the descriptive material. The picture demonstration is by Captain Nicholas Eremita, the Flying Safety Officer.

The CPU-10/P lowering device is packed in a foam padded container and replaces the standard parachute back pad.

150 feet of lanyard is stored inside the lowering device container. The last 25 feet of the lanyard is yellow to serve as a warning.

The lowering device container is snapped into the parachute and becomes the back pad. The lanyard is tacked to the left inside of the parachute harness. The lowering device snap and buckle is stored in a packet sewed to the outside of the parachute harness below the left riser release.

When the lowering device is needed, the snap and buckle is removed from the storage pocket.

The snap end of the lanyard is fed through the "V" formed by the risers or can be put around a tree limb and is secured to the snap ring.

The friction type buckle is then snapped to the parachute chest strap. Crewmen are cautioned to double-check this hookup to insure the friction buckle is snapped securely.

The parachute riser releases are then released one at a time with one hand holding the lowering device lanyard just below the friction buckle to preclude a too rapid descent. Head should be turned in opposite direction to eliminate possible facial injury when the canopy release is actuated.

After both riser releases are actuated, the crew member is then free of the parachute canopy and proceeds to lower himself. The rate of descent is adjusted by controlling the feeding of the lanyard through the friction buckle.

SEAT BELTS: Why Bother?

by CAPTAIN GORDON C. WADDLE

I was enjoying the Sunday drive through the park at Lake Afton, Kansas this past August. Everything was just fine until I attempted to pass another car. He moved into my lane. Yes, we hit, my front fender and his rear right fender. There was only minor damage to his car, but the impact broke the left front axle on my car.

The posted speed limit was 20 miles per hour, so there should have been no real problem. Such was not the case. We were both contestants in a legal, nationally sanctioned and approved Sports Car Race. The speeds were closer to 100 than 20. Consequently, there was a real problem, and things got worse before they got better. The other car finished the race; mine didn't.

My car continued on three wheels for a hundred feet or so, then control problems developed. I instantly changed from a calm and competent race car driver to an unwilling but committed accident victim. What a ride! Sixty to zero in 20 feet is sudden, especially when the crash and bang technique is used. The braking objects used included hay bales, large wooden posts (the car became much narrower as it went between them), a large tree, a low concrete wall, and finally, a woven wire fence. Of these objects, only the hay bales were damaged. The rest were just as strong and firmly in place as they were before the incident. The car didn't fare so well. It was still upright and had one wheel still attached, but otherwise it was mostly just twisted scrap. And myself — thanks to a lot of luck plus a seat belt and shoulder harness — I was unscratched and able to crawl out of the wreckage and walk away.

I know from this experience that my seat belt and shoulder harness saved me from injury and prevented what could easily have been a fatal accident.

Yes, I definitely believe in, recommend, and use seat belts whenever and wherever I drive. Always use your seat belts. Even in normal driving, the time when you may change from a relaxed driver or passenger to an accident victim is not predictable, and you may find out too late.

safety officers' FIELD REPORTS

DEUCE BARRIER ENGAGEMENT. At the beginning of the takeoff roll, pilot noted altimeter decreasing rapidly. Next he experienced a nose wheel shimmy although, according to airspeed indicator, he had not reached 80 knots (usual nose wheel disengagement speed). He disengaged nose wheel steering. Shortly afterward he realized there was still no airspeed indication and initiated an abort. Nose of the aircraft had lifted without back stick pressure being applied (takeoff trim is set for 145 knots). Pilot lowered the nose, placed throttle at idle and deployed the drag chute. He hesitated to use the brakes because he did not know his airspeed and did not want to blow a tire. When he recognized he would be unable to stop by the end of the runway, he extended the tail hook. The BAK-12 barrier (threshold) was engaged two feet right of center line and smooth arrestment began. MA-1A cable (90 feet down the overrun and not interconnected with the BAK-12) was engaged by left gear, barrier probe, and right drop tank, which caused the aircraft to swerve to the right. The front section of the drop tank bent down and back, allowing the cable to engage the right gear and the aircraft straightened out. Deceleration was effected by both the BAK-12 braking system and the MA-1A chain. The aircraft stopped 540 feet from point of BAK-12 engagement on the right edge of the overrun, heading within a few degrees of runway heading. Skin damage was confined to external tanks, barrier probe, and landing gear fairing doors. Reason for abort (no airspeed) was pitot and static lines were reversed during installation of radome. No pitot-static check performed.

F-89J FLAMEOUT. The aircraft was in a snap-up tactic, climbing from 35,000 feet to intercept an F-101 target at 49,000 feet. In afterburners, passing approximately 39,000 feet, the right engine rpm dropped to 85% and EGT reached 910°C. The engine was immediately shut down. An airstart was not attempted; a single engine landing was made. A shorted cannon plug at the altitude idle bled in the afterburner control box caused the right eyelid to close while in afterburner operation.

F-101F COMPRESSOR STALL. While flying at 35,000 feet on a functional check flight afterburner operation on the left engine was terminated. The engine immediately began to compressor stall. EGT was noted to rise and the throttle was stopcocked. Maximum EGT observed was 640°C. Airstart was attempted, but engine would not accelerate above 62%. Oil pressure fluctuated rapidly from 15 to 40 psi, so throttle was again stopcocked and single engine landing was made at home base. Investigation revealed that the compressor shifted forward, damaging stators, rotors, and compressor case of N-1. Metal particles were found in sixteenth stage bleed valve, therefore major damage to N-2 is suspected. Suspected cause of the compressor shifting is bearing failure.

AFCS, F-101F. After level-off at 24,000 feet, 330 KIAS, the aircraft yawed and rolled hard to the right. Opposite rudder and aileron were applied and augmentation stabilizer was disengaged. Aircraft responded normally for the duration of flight. Immediate emergency was declared and uneventful straight-in approach and landing accomplished. The rate gyro assembly was removed and replaced. System operationally checked okay after replacement of rate gyro assembly.

BACKUP INSTRUMENT LIGHTS. As the result of an incident which occurred when the instrument light fuse failed during a night takeoff, this unit has been experimenting with the addition of a lighting switch which would provide backup lighting for night takeoffs and landings. One aircraft has been modified by the addition of a switch which permits the secondary lights to be turned on without turning off the primary lights. This switch permits the pilot to have both the primary and secondary lights on and thus hopefully avoid a sudden blackout during a critical phase of flight. This aircraft is presently being flown at night by as many crews as possible and critical comments being solicited. Present plans are to have this modification submitted on an Air Force suggestion form.

F-106A SPEED BRAKE LOSS. Aircraft was being flown in the local area to lighten fuel load before landing. The pilot stated he descended from 5000 feet to 3500 feet at 340 KCAS and opened the speed brakes. He heard a "pop" and immediately returned the S/B switch to neutral suspecting a loss of speed brakes. The secondary hydraulic system gauge slowly fell to zero and the hydraulic warning light started to blink. Shortly afterwards the pressure returned to 3000 psi and the light went out. Loss of both speed brakes was confirmed by a pilot in a local T-33. T-33 pilot said that both S/B were missing, the drag chute was in the canister, but a strap was streaming from the area. The F-106 pilot lowered the gear with the normal system. Hydraulic pressure went to zero, but returned to 3000 psi when the gear locked down. A straight-in approach was made. Upon touchdown pilot attempted to deploy the drag chute using both the normal and emergency systems. The drag chute did not deploy. Aircraft was stopped without trouble. The high pressure pneumatic low warning light came on when the aircraft turned off the runway. The pilot stated that on previous flights, when the S/B were opened, the plane yawed severely to the left, and remained until the S/B were closed. Investigation revealed the lower S/B hinge assembly was broken off flush with the trailing edge of the aircraft skin.

F-102A, MM-3 MALFUNCTION. After takeoff it was noticed that the attitude indicator was indicating a 3 - 5 degree right bank with wings level. Since the weather was clear, the mission was continued. The cause was an internal malfunction of the gyro which could be duplicated on the ground. The gyro was removed and replaced, correcting the problem.

F-101B, LOW OIL PRESSURE. After holding pattern entry, oil pressure on the left engine began to fluctuate and fill below safe limits. The engine was shut down and the instrument approach continued to landing with the affected engine restarted on GCA final. Investigation revealed that an oil line between the CSD and the CSD oil accumulator was leaking.

F-101B, NOSE GEAR SHIMMY. During landing, the nose strut lower torque arm broke causing violent nose shimmy. Investigation revealed that the nose gear steering damp unit had failed internally and was locked in approximately a four degree right turn. The unit was removed and replaced. No other defects were found.

VIBRATIONS, F-104A. Vibrations after takeoff. Extreme vibrations were felt after takeoff just after coming out of afterburner. Emergency landing was made with no further problems. Maintenance could not duplicate the vibrations on the ground, but as precautionary measures, oil samples were taken and the stability and trim system checked and bled. FCF was flown and again some vibrations were noted after takeoff. Vibrations were found to be coming from the right main gear which was rubbing against the coastdown chaff pad in the top of the wheel well. Gear stop was readjusted and aircraft has been flown since with no further discrepancies.

F-101, FUEL SYSTEM MALFUNCTIONS. On two separate low altitude flights involving the same aircraft, fuel transferred back into the wing tanks after feed out. During the first flight, indications of excessive fuel consumption developed after total fuel decreased to 6,000 lbs. After landing, fuel was observed venting from the wing tanks which were checked and found full. A high altitude flight was flown with no problems encountered. During another low altitude flight the problem occurred again. Wing tanks were reselected twice after they had been initially emptied. On each occasion they yielded about 500 lbs. The fuel control relay panel was removed and replaced. No further incidents occurred.

- After level-off and the wing tanks fed out, loss of fuel was noted by excessive decrease in fuel quantity. The malfunction was isolated by operating the wing tank press to test circuit and observing that the green light illuminated. The wing tanks were fed out again, but refilled within 5 minutes after the switch was turned off. Fuel began venting overboard at approximately 200 lbs. per minute. The flight was completed by feeding out the wing tanks each time they refilled. The refueling valve between the fuselage and wing tanks had struck open allowing the fuselage tanks to drain back into the wing tanks where fuel then vented overboard from the wing pressure relief vents.
- At another location, there were seven fuel feeding malfunctions involving six different aircraft during a 3-month period. Four instances of slow feeding drop tanks were experienced. Plumbing and wiring on all aircraft involved were ground checked OK. No difficulties were encountered on subsequent flights. Three instances of excessive fuel consumption occurred and fuel siphoning took place during drop and wing tank switch activation in two cases and in the third case wing tanks refilled with subsequent siphoning.

√ POINTS

This section of the magazine has been designed for you. Be you a headquarters type at any level, a commander, safety officer, pilot - interceptor, transport, light aircraft - radar intercept officer, mechanic, a civilian in industry, weatherman, doctor, designer, or Indian Chief. This is your corner.

We solicit your ideas, items, notes, photographs, sketches, and pictures. The writing should be less than a paragraph - preferably a sentence or two.

We would sincerely appreciate your inputs mailed directly to: The Editor, INTERCEPTOR, Box 46, Ent AFB, Colorado 80912.

√ While tire chains are your biggest bargain (in terms of safety) for wintertime driving, snow tires with metal studs inserted add a large plus to regular snow tires. They should give an additional 5,000 miles of additional safety. (9CSA)

√ Frostbite, hypothermia (subnormal body temperature), and exposure injuries can and will occur though the temperature is as high as +40°F. Low temperature plus a wind chill factor will deplete body warmth rapidly, and exposed flesh will freeze. A rough guide to follow when exposed to the winter elements is to subtract one degree of temperature for each mile per hour of wind. We all know that human flesh will freeze when exposed to +31°F temperatures, but did you know that with a —30°F temperature plus a 30 mph wind, exposed human flesh will freeze in 30 seconds? (4600WGOOT-L)

√ Most of our bases are using "Last Chance" inspections just prior to takeoff. The time spent while waiting for the bird to get its last checkover can be used for a "last chance" check of personal equipment. Here are some items that can be rapidly checked to insure that your equipment is ready if needed: seat pins, lanyard, gold key, chin strap, shoulder harness, quick releases secure, parachute hooked up, and seat belt tight. (14ODC-LS)

√ According to the AMA every adult over the age of 40 needs a thorough eye examination at least every two years for eye defects and possible diseases. (9CSA)

√ T-BIRD JOCKS - At 15,300 feet, cockpit pressure should not exceed 8,000 feet, regardless of temperature setting. (ADCM 51-33)

✓ When conducting RCR checks, readings from the James Brake Decelerometer were meant to be taken in a vehicle equipped with standard road tires as opposed to studded snow tires. There is no factor available for application when other than standard road tires are used. (AFIAS)

✓ On 14 December 1936, the U.S. Signal Corps tracked an airplane at a distance of seven miles in the first test of the radar principle in the United States. (ADC-PS)

✓ Should you experience a crash landing, it is better to remain with the aircraft. You should not leave the aircraft unless it is **definitely more** advantageous to do so. If you have bailed out, you should try to make your way to the crashed plane. Search and Rescue personnel can spot aircraft wreckage from the air far easier than they can spot a man. Most rescues have been made when downed crews remained with the airplane. (AFM 64-5)

✓ A Biorhythm theory conceived by Dr. William Fliess, a German physician and biologist, claims to pinpoint periods during which humans may be particularly accident prone. The theory is attracting serious interest in aviation circles and is currently being used to schedule some pilot flight schedules and other operations. (AFSC DH 1-6)

✓ Why Zero Defects, Cost Reduction, etc? A few of the reasons could be because the approximate annual expenditure to maintain a single place fighter interceptor squadron is $7.5 million; a BOMARC squadron, $2 million; an EC-121 squadron, $7 million; and a radar squadron, $1.5 million. (ADC-PS)

✓ Recently Minnesota became the 25th State to pass legislation requiring eye protection for school lab and shop students, teachers, and visitors. How about your operation? 85% of our productive activities depend on your vision. (9CSA)

✓ Everyone knows winter weather makes driving more difficult. Tire chains and snow tires help, but they do not preclude careful driving. Don't count on your wheels—YOU are in charge. (ADCSA)

✓ Most skiing accidents have been occurring between two and four P.M. Fatigue, changing trail conditions due to melting snow during midday and refreezing in later afternoon, formations of snow crystals in the air that hinder vision - all are accident factors. Remember, skiing is a fine, healthy, outdoor winter sport - but carelessness can maim or kill you. (ADC-PS)

Broken-Legged Voodoo

TAXIING ACCIDENT?

Would you believe the above accident was the result of: (a) Takeoff?, (b) Landing?, (c) Loss of control while taxiing?, (d) None of the above. ANSWER: (c) is correct. Well, you see, the pilot was taxiing down a wet runway intending to do a 180° turn at the end for takeoff. While proceeding to the end of the runway, he decided to do a runup on each engine as he cleverly suspected that there was something wrong with one of them. He ran up number one, looked it over, and decided it was okay. He did the same for number two, then looked up and saw that he was going like a greased brick with only 2000 feet of runway remaining. Had he kept his cool he could have spent a more pleasant day by engaging the barrier; however, he decided to try and turn off on the high speed taxiway at the end. When he tried to turn, the aircraft swapped ends and ended up in this position.

Now we in the hallowed halls of the ivory towers sitting with feet propped up, in the complete safety of our airconditioned domain of expertise, some 2000 miles from the scene of the action, can say that more supervision is required and that we would like to encourage our commanders to indicate exactly where and how runups shall be done at their units. However, we have some deviously minded people, and therefore no matter how many regulations are written and how many briefings are given, we cannot expect the commanders to legislate for every possibility. Thus, we have to expect the airframe drivers who allow themselves to become involved in this sort of display to support the team by also displaying a little common sense.

BULLETIN

. . . As of 1303 CST, 12 January 1968, the 4780 Air Defense Wing, Perrin AFB, completed one year major accident free with over 42,000 flying hours of which 41,000 hours were single engine jet.

THE WAY THE BALL Bounces

ACCIDENT RATE

1 JAN THRU 31 DECEMBER 1967

	ADC	ANG
Thru December 1967	4.3	4.7

MAJOR — ALL AIRCRAFT

ON TOP OF THE HEAP

MO	ADC	MO	ADC	MO	ANG
51	62 FIS	42	87 FIS	72	132 Ftr Gp
47	414 Ftr Gp	41	444 FIS	59	162 Ftr Gp
44	48 FIS	33	18 FIS	57	112 Ftr Gp
42	4600 AB Wg	32	408 Ftr Gp	47	141 Ftr Gp

ACCIDENT FREE

BOX SCORE

ACCIDENTS FOR DEC / CUM TOTAL	1st AF	4th AF	10th AF	14th AF	4600	ANG
CONV	1					1
T-33		1	1			
F-100				1		
F-101	5		1			
F TF-102				2		5
F-104				1		
F-106		1 2	3			
B-57	1					
F-89						
EC-121						

MINOR ACCIDENTS THIS PERIOD — 0
MINOR ACCIDENTS CUMULATIVE — 7

CUMULATIVE RATE

1 JAN THRU 31 DECEMBER 1967

	ADC	ANG
JET	5.7	4.2
CONVENTIONAL	0.8	10.8

BY AIRCRAFT

T-33	2	0
F-89		0
F-100	34	
F-101	8	
F TF-102	6	6
F-104	24	
F-106	8	
B-57	5	
EC-121	2	

RATE = MAJOR ACCIDENTS PER 100,000 FLYING HOURS

*Change in criteria.

we point with

LT COL ALEXANDER MACDONALD
178 Ftr Intcp Sq (ANG)
Hector Field, Fargo, ND

PRIDE

C-54, ENGINE BURNED OFF AIRCRAFT

Lt Colonel Alexander Macdonald was Aircraft Commander on the North Dakota Air National Guard's C-54 which was returning home to Bismarck after picking up the Governor of North Dakota and his wife at Springfield, Illinois. Seven other passengers were on board for proficiency or orientation training. Twenty minutes after level-off at 8,000 feet, the number three engine went into an overspeed condition in excess of 4,000 RPM, with no warning. Power was reduced on all engines and the malfunctioning engine isolated. At this time the mixture control on the number three engine was placed at idle-cutoff; however, for reasons unknown, full idle-cutoff position could not be attained. Engine fuel was then shut off to the engine as the aircraft decelerated through 140 KIAS with still no effect on the runaway propeller. Attempts to feather the propeller were futile. An emergency was declared.

At this time an intense fire broke out in the malfunctioning engine. Fire extinguisher bottles were actuated but had only momentary effect since the fire was apparently originating within the engine itself. Lt Colonel Macdonald then made an emergency high speed descent, through an undercast, to preclude the fire from causing structural damage and igniting the fuel tanks. Pieces of the engine cowling burned off and left the aircraft.

A crash landing appeared to be imminent. The fire grew more intense and shortly thereafter the engine mounts melted and the engine fell off the airframe.

They then proceeded to the nearest airport which was at Moline, Illinois. An approach to land at the Moline airport was initiated; however, the right main gear would not extend with normal or emergency procedures. With the threat of fire now gone and the aircraft still controllable, the decision was made to proceed to Peoria, Illinois, where crash and foaming equipment was available.

While circling to burn off fuel, all known procedures were unsuccessful in lowering or raising the gear. All possible sources of technical information on the C-54 were contacted, including the MAC Command Post at Scott AFB. No new ideas on lowering the jammed gear were offered.

They were informed however, that the USAF Crash Rescue School, with extensive fire fighting equipment, was located at Chanute AFB, Illinois. They proceeded then to Chanute AFB, where preparations were made to foam the runway for a crash landing.

While circling Chanute AFB, emergency gear extension procedures finally caused the faulty gear to come down and locked. With the gear down, loose electrical cables hanging in the missing engine bay caused severe arcing near venting fuel lines. Electrical power was shut off and landing delayed until runway foaming was completed.

Master ignition switch was cut on the flare out with emergency brakes applied on landing roll. Air brakes were effective only on the left side causing the aircraft to stop just off the side of the runway with minimum damage. All personnel deplaned without incident.

Throughout the rather tense experience the crew briefed the passengers on crash procedures and kept them informed of the situation, preventing panic from further complicating the already serious conditions. The exceptional flying ability, professional manner, and cool restraint exhibited by Lt Colonel Macdonald, his crew; Lt Colonel Thornton Becklund, Copilot, and TSgt Dale Ness, Flight Engineer, most certainly prevented loss of life and aircraft.

Lt Col Macdonald's skill and judgment in saving an aircraft and the lives of the passengers makes him worthy of the ADC "We Point with Pride" award.

AFTER BURNING

Address your letters to The Editor, INTERCEPTOR, Hq ADC (ADCSA-E) Ent AFB CO 80912
To be published, your letters must be signed,
but names will be withheld upon request.

PARACHUTING PROCEDURES

Reference Afterburning Section of the November issue of the INTERCEPTOR and letter to the Editor written by the Commander, Sea Survival School.

I must agree with the writer, all schools, Air Force, Command, and Base level, should be teaching the same parachuting procedures to aircrew members. However, it must be remembered that the T.O. does not and cannot cover all situations that a crewmember may be faced with after an emergency bailout; no more than a Dash-One, covers all situations that an aircrew member may encounter while flying. So experience plays an important part in teaching both parachuting or flying procedures.

Experience has taught us throughout many years of teaching aircrewmen parachuting procedures that the MAJORITY of aircrewmen lacked confidence in the shoulder quick releases (J-1). Fearing an inadvertent release from the canopy, either through malfunction of the release or excitement on their part, the aircrewmen would not pull down the safety covers of the releases while still airborne. This lack of confidence has cost us many fatalities.

To help the aircrewmen gain confidence in the releases, to induce them to pull down the safety covers, and to prevent the loss of a canopy through an inadvertent release while still airborne, the arm-through method for the seat and back pack and procedures as outlined in the August issue of the INTERCEPTOR for the chest pack were introduced within the Air Defense Command.

Are we teaching procedures in accordance with current Air Force T.O.s? Of course we are. The only thing we have done is add a confidence builder and safety factor. The important factor is that the aircrewmen have accepted the procedures as outlined in the T.O. with our added procedures, but would not have accepted the procedures as outlined in the T.O. without our procedures.

To bring the parachuting T.O. up to date, a conference was held in July 1967 at Wright-Patterson AFB. Each command in the Air Force was represented, including the Sea Survival School. The procedures as mentioned were accepted by all commands. I do not have any idea when this new T.O. will reach the field, or whether the procedures were changed after the conference.

The letter states that "some regrettable fatalities" have occurred because we are not teaching exactly as the T.O. says. PROVE IT! The procedures that we are teaching have not caused any fatalities. As a matter of fact, our procedures and training have reduced our fatality rate. There's one thing I can say about our life support training in ADC — we know what we are doing and what we are talking about.

SMSgt Anthony Martino
NCOIC ADC Life Supp Tng School
4780 Air Def Wg (Tng)
Perrin AFB TX 75090

***Amen!**

DECEMBER'S COVER

I was finally moved to write a note for you, the editor, and your staff of the INTERCEPTOR. I sneaked a copy of your December '67 issue home and my wife and boys thought your cover was hilariously funny. My eight-year-old boy immediately recognized "The Goose" landscape since we were stationed there recently and he allowed as how ol' Saint Nick's landing turned out like a jet fighter's landing he once observed.

Your articles have been especially excellent for the past six months. I don't necessarily agree with everything you've printed, but that should remain my prerogative.

The Life Support feature is a good way to keep jostling the brain a little after the aches have disappeared following the Tyndall and Perrin show.

And speaking of heroes — those guys at the Life Support schools who do their jobs in superb fashion day after day deserve far more recognition than they'll probably ever get. Although I've never had the dubious honor of stepping out of an aircraft, I thank my lucky star for the training those Life Support Instructors have shared with me!

Captain Robert G. Bratton
322 Ftr Intcp Sq
Kingsley Field, OR 97601

***We all appreciate a little acknowledgement once in a while and especially from the people who are doing the job in ADC. The fine troops in the Life Support business deserve all the recognition we can shed their way.**

TREE LETDOWN PROCEDURES

In the December issue I read with interest your article on "Tree Letdown Procedures." However I believe that your demonstrator made a slight error.

In viewing all photos, I failed to see where the tape was passed through the chest strap "V" ring twice, as required. Note that the fifth step states, "Again feed the tape through the chest strap "V" ring, making sure the second loop of tape is above the first".

To those in need of accurate procedures may I suggest clarification?

TSgt John H. Kopka
Quality Inspector
74 AD Msl Sq (74MME-QI)
Duluth MN 55804

***Your keen observation of our demonstration is correct. I might explain that our demonstrator is one of the highly qualified troops at Perrin's Life Support School, and the reason we failed to show the tape wrapped "twice around" the chest strap "V" ring is not the fault of the demonstrator, but of the photographer or us, who somehow lost or misplaced that sequence photograph. We sincerely appreciate your interest in our magazine and wish to compliment you again on your professional attention to detail. This is the type of support that so greatly adds to our safety programs.**

SANTA'S THANK YOU LETTER

Thanks for the tale concerning my plight,
For it backs up my story concerning that night.
Since I got home later than normal,
Things around here have been quite formal.
Now my wife trusts me, you understand,
It's just that she knows I'm in demand.
I told her about the reindeer I caged,
And all she did was become enraged.
"Bah Hum-Bug," she snorted like thunder,
"You think I'd fall for that story 'bout the Wonder?"
But now that she's seen the last INTERCEPTOR,
She's repented her ways; so I guess I'll accept her.
Please give my regards to the boys at Goose Bay,
And thanks for the "quick fix" applied to the sleigh.

S. Claus

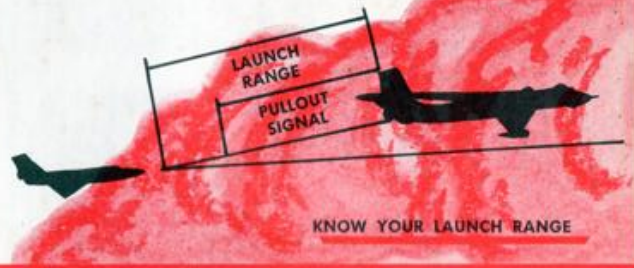
the Cold Hard Facts..

One mid-air can spoil your whole day. IWS offers the following helpful hints.

Collision warning display is not available without Radar Range Tracking (ROT).

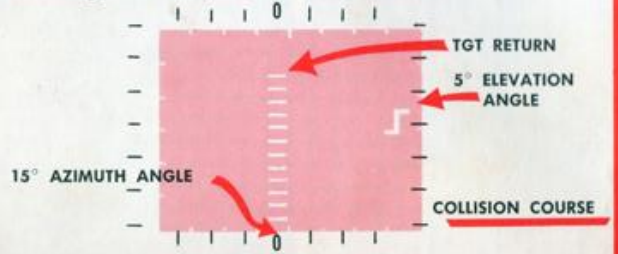
NO COLLISION WARNING WITHOUT ROT

The desired launch range occurs before the minimum range or pullout signal is displayed. Know your launch ranges. Initiate pullout when radar range indicates you are inside launch range rather than waiting for the pullout signal.

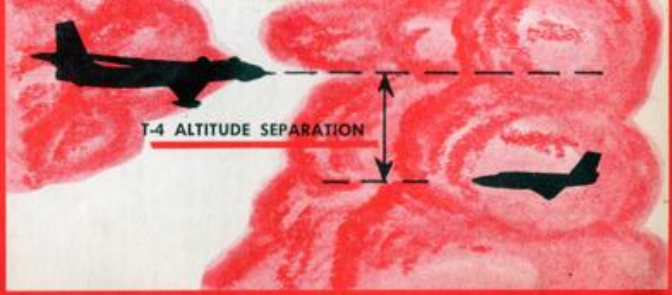


KNOW YOUR LAUNCH RANGE

If the target return progresses down the scope at a constant azimuth angle, and the elevation angle remains constant, collision with the target will result when the target return coincides with the bottom of the "B" sweep. In the example, the azimuth angle of 15° and the elevation angle of 5° will exist at the time of collision.



A collision avoidance feature is provided in the T-4 Tactics Package by using altitude separation between interceptor and target. If altitude separation is not apparent to the aircrew at contact, he should take the necessary action to establish vertical clearance.



COLLISION AVOIDANCE