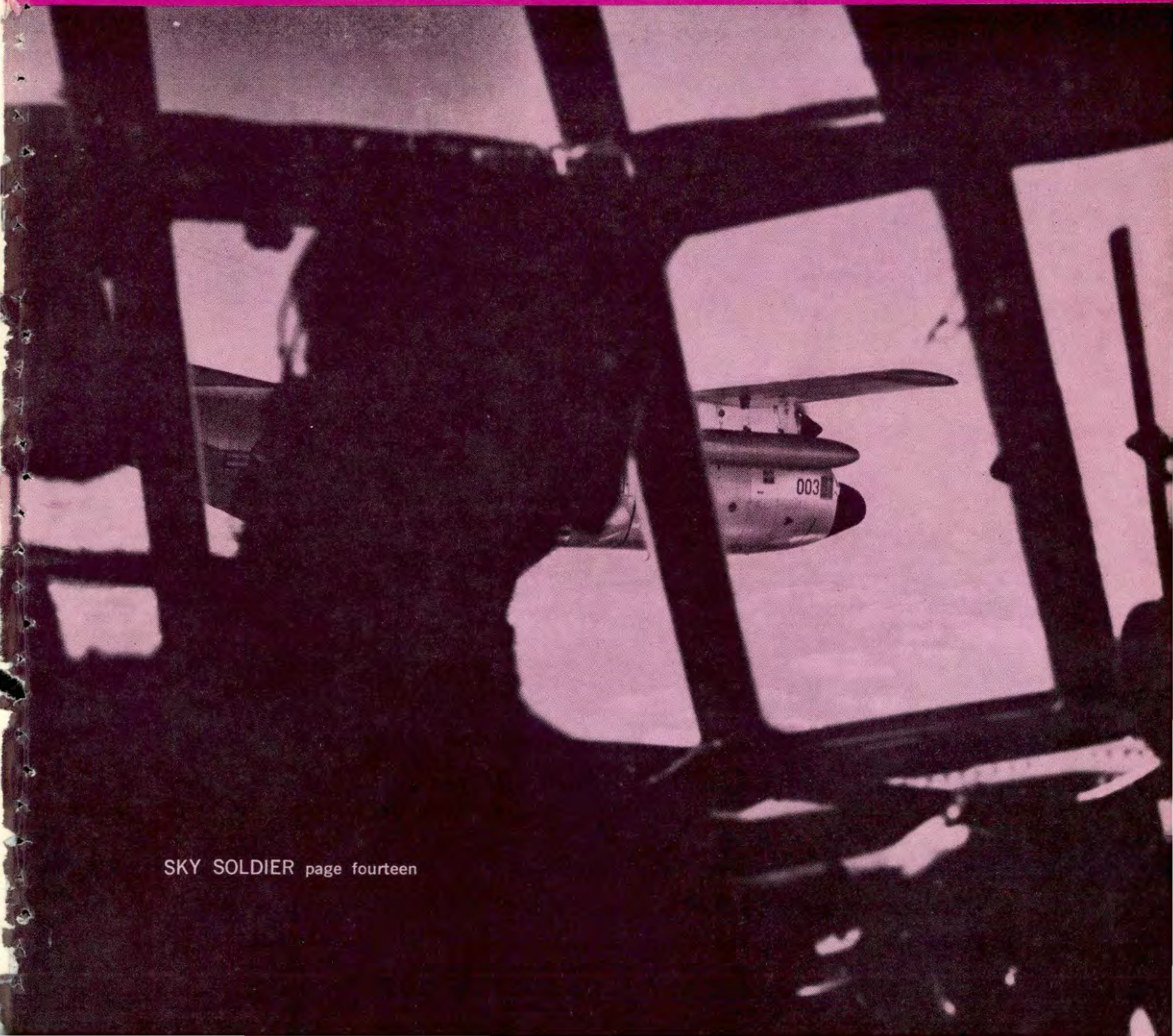
AEROSPACE SAFETY

UNITED STATES AIR FORCE

FEBRUARY 1965



SKY SOLDIER page fourteen

AEROSPACE SAFETY

CONTENTS

SUBSCRIPTION — AEROSPACE SAFETY is available on subscription for $3.00 per year domestic; $4.00 foreign; 30c per copy, through the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. Changes in subscription mailings should be sent to the above address. No back copies of the magazine can be furnished. Use of funds for printing this publication has been approved by Headquarters, United States Air Force, Department of Defense, Washington, D.C. Facts, testimony and conclusions of aircraft accidents printed herein have been extracted from USAF Form series 711, and may not be construed as incriminating under Article 31 of the Uniform Code of Military Justice. All names used in accident stories are fictitious. No payment can be made for manuscripts submitted for publication in the Aerospace Safety Magazine. Contributions are welcome as are comments and criticism. Address all correspondence to the Editor, Aerospace Safety Magazine, Deputy The Inspector General, USAF, Norton Air Force Base, California 92409. The Editor reserves the right to make any editorial changes in manuscripts which he believes will improve the material without altering the intended meaning. Air Force organizations may reprint articles from AEROSPACE SAFETY without further authorization. Prior to reprinting by non-Air Force organizations, it is requested that the Editor be queried, advising the intended use of material. Such action will insure complete accuracy of material, amended in light of most recent developments. The contents of this magazine are informational and should not be construed as regulations, technical orders or directives unless so stated.

AFRP 62-1 FEBRUARY 1965 VOLUME 21 NUMBER 2

FALLOUT

BAD BRAKES

The basic tips for crewmembers to lessen the hazard of brake/wheel fires, page 25, Sept. issue, are real fine as far as they go, but what about warning the crewmembers to stay the heck away from the brakes *after* the aircraft stops? The fire fighters aren't the only ones who are exposed to the explosion hazard.

On a technical visit to an AFSC station, I rode with the fire chief to an emergency declared by a transient C-130 which landed, fairly heavy, with No. 1 feathered —with the result that when he turned off the runway onto the taxiway, the right brakes were white-hot and dripping gobs of metal. So the crew stopped the aircraft on the taxiway—and what was the first thing they did? They got out to gawk at the brakes, just abeam of the wheel, in precisely the position of greatest hazard.

Our fire departments follow the procedure of using minimum amounts of CB, in the event there is a fire. If the brake is merely hot—smoking—we let it air-cool, preferably all out by itself, like on a power check pad or other unoccupied hunk of geography so that if there is a subsequent explosion we won't kill people or bang up other aircraft. If our firefighters approach a brake fire, they do it from ahead or behind—*never beam on.*

I might suggest that attention be drawn to the Dash One procedures for the F-4 type aircraft, particularly the spotting of spiked planks for deflating tires in the event of a brake/wheel fire. This needs pre-planned coordination between the firefighters who carry and position the spiked planks, and the aircraft drivers who should stay in the front office and taxi the bird over the planks. Specifically, stress "pre-planned," since the normal action taken by the pilot is to stop the aircraft and admire the subsequent proceedings from afar. Most firefighters are not checked out in taxiing F-4 aircraft.

Martin P. Casey
Fire Protection Engineer
AFSC, Andrews AFB

SEVEN SECONDS

I wish to take exception to the statement on page 8 of the October issue, wherein the statement is made: "The average time taken to read a standard Air Force aircraft altimeter is seven seconds."

If you time seven seconds by a sweep second hand, you will realize that anyone who is that slow reading an altimeter should not be flying an airplane. I would be very interested in learning where this figure was derived from.

We, in this office, enjoy your magazine.

Major R. R. Lawrence
Fairchild-St. Augustine CMO
St. Augustine, Fla.

Time to read an altimeter was determined during an experiment conducted in 1947. Dr. Walter Grether at the Aeromedical Laboratory, Wright-Patterson AFB, ran the experiment.

Keep the elephants moving

As we start into another year, I would like to comment on how things are going in this business of preventing accidents. I will have to qualify this slightly since magazine production timetables require that this copy be prepared before all the information on 1964 is complete. However, assuming no drastic change, we can forecast performance through the end of calendar 1964.

The inescapable conclusion is that even holding the line on accidents is hard, continuing work that needs the attention of every one of us in the Air Force, as well as everyone in our supporting organizations. This is obvious when we compare accident rates, PMV and aircraft fatality rates, aircraft destroyed rates and mishaps of all kinds in the growing missile inventory. Last year some rates were up slightly, some down, but we held the line overall. To do this required a lot of people working a lot of hours at this business of safety. In addition to experts within our own ranks we called upon those in industry for all-out efforts when major deficiencies came to light.

Late last year I visited USAF Headquarters and Air Force major commands to brief commanders and their staffs on the USAF accident picture. My goal in these briefings was twofold: to focus attention on the problem areas that are most severely crippling our combat potential and to discuss ways of more effectively tackling these areas. I can assure you that your commanders share my concern for safety. They, too, realize that safety officers and industry specialists cannot fight the battle successfully alone. Every individual supervising, operating, maintaining and supporting our weapon systems must join the team. Our newer equipment is more complex, tolerances are more critical than they have ever been and some of our older equipment is now beginning to cause trouble from normal wear and tear—flight control problems in our older century series fighters being an example.

Records here in the Directorate of Aerospace Safety disclose that the maintenance-materiel area is our leading accident cause factor. Operator error type accidents are second. Admittedly, many "pilot error" type accidents still occur, and most are preventable, but on the other hand our operators are preventing many more accidents than they are causing. There is no doubt that, at this stage, if we are to make any substantial inroads in accident prevention in the year ahead, we must have better quality control, better hardware and the continued best efforts of dedicated aircrew and maintenance people.

I believe the path ahead can be negotiated with minimum risk, provided we know the hazards we face and operate accordingly.

We must cut down on our backlog of Time Compliance Tech Orders. We know that accidents result when things are not done, or are done incorrectly. The fact that there may be a very plausible reason for non-compliance has no value as far as preventing accidents is concerned.

It is likewise true that no *apparent* efforts, such as implementing directives, are of any real value whatsoever until the *intent* is fulfilled.

Utopia doesn't exist in the safety business. There are always shortages of skills, unforecast operational requirements, additional duties, special projects, personnel changes, etc., to be faced. These are normal. The military establishment must stay flexible, must be able to adjust to changing situations and still get the job done. Hannibal's legions probably had difficulty getting elephants across the snow-covered Alps. But I imagine they soon learned that sympathy seeking was a waste of time, that the only effective action was making the elephants move. If we are to hold the line this year, and on into the future, it will be by hard work. We won't get the job done merely by crossing our fingers and hoping accidents won't happen.

Excuses are never solutions, only temporary crutches to postpone ultimate failure. Even if hazards appear to loom ahead like Alps, the requirement is clear. We have to keep the elephants moving!

Jay T. Robbins

JAY T. ROBBINS
Brigadier General, USAF
Director of Aerospace Safety

ZERO DELAY LANYARD

A study of the use and non-use of the zero delay lanyard in USAF ejections was initiated in September, 1963, by this headquarters. As a result of this study and subsequent conferences with personnel of the Systems Engineering Group (SEG), it was concluded that a revision of the existing zero delay lanyard requirement was in order to improve the success of low level ejection.

The new procedure agreed upon was: keep the lanyard hooked at all times below 10,000 feet and hook it at high fix on penetrations and at 10,000 feet on en route descents. It was expected that this revised procedure would be immediately reflected in the Dash Ones. This has not happened in all cases. However, this revision is expected to become effective for all aircraft at about the time you read this.

Robert H. Shannon, Safety Officer, Assistant for Medical Services

The purpose of this article is to explain the reasons behind the change in use of the zero delay lanyard.

Basis for the change is simply USAF ejection experience. This experience shows that the probability of survival in low level ejection is greatly enhanced by attachment of the lanyard. On the other hand, failure to attach the lanyard for low altitude ejection has contributed to a significant number of fatalities.

Now to clear up some points of dispute:

Although it would seem obvious that use of the zero lanyard would increase the probability of seat/chute entanglement, our studies do not show a positive correlation. Entanglement has occurred under varying conditions of flight (high speed, low speed, high altitude, low altitude, controlled and uncontrolled) with and without the lanyard attached. In general, the man/seat separator has reduced seat/chute entanglement, particularly in ballistic ejections. In contrast to this general downward trend, the recent increase noted has been primarily associated with rocket assisted ejections. During the period 1 January 1958-31 May 1964, there were 140 rocket ejections. In 18 (14 per cent) of these cases, there was seat/chute involvement. This compares to 38 (4 per cent) cases in 1003 ballistic ejections during the same period. The sustained thrust of the rocket seat, particularly at lower speeds, is a probable contributing factor in the increased incidence of seat/chute entanglement in rocket ejections. This resultant lack of differential in aerodynamic forces is further compounded by any attachments between the man and the seat. Such attachments include personal leads and the chute arming lanyard as well as the zero delay lanyard. In the above cited 18 cases of seat/chute involvement during rocket ejections, the zero lanyard was connected in eight cases and not connected in nine cases (one involved the F-106 "B" seat).

With regard to the hazard associated with high speed, high altitude ejection, with lanyard attached, 15 years of ejection history and close to 3000 ejections have emphatically proven this to be a minor concern. Approximately 95 per cent of all ejections are made below 400 KIAS with only two per cent at speeds over 500 knots. The average IAS at time of ejection ranges between 200 and 225 knots. Only eight per cent of the ejections are initiated above 20,000 feet and the majority of these are between 20,000 and 30,000 feet. The average ejection altitude is less than 10,000 feet. Experience has shown that, barring a catastrophic situation, when an emergency necessitating ejection occurs at high speed or high altitude, there was usually time to slow the aircraft down appreciably or descend to a lower altitude, or both, before ejecting. In the event of a catastrophic situation (severe uncontrollable condition or break up of the aircraft), ejection is the only means of survival regardless of speed or altitude.

There has not been a single ejection fatality in the USAF definitely attributable to parachute opening shock. The few high speed ejection fatalities are attributable to either severe flailing or ram air pressure (high "Q" force), or both, occurring before parachute opening. Even in these cases, seldom has extensive chute damage occurred. The threshold value for lethal injury resulting from ram air pressure, according to a study by Stapp and Neely "High Speed and Thunderstorm Effects on USAF Ejections," is approximately 8.5 psi. This is equivalent to an IAS of approximately 600 knots at sea level. Lethal flailing injuries, however, could occur at slightly lower speeds. In a high speed ejection, the velocity of the seat/man mass will decelerate from 25 to 50 per cent during the first one to two seconds. Therefore, the chute will deploy near or within its structural limitations as well as within man's physiological tolerances.

We do not consider the zero lanyard as optimum equipment. It was introduced some six years ago as an interim measure to enhance the success of low level escape. The advantage of the additional one second afforded by this equipment far outweighs any of its disadvantages. Improved zero/zero systems are being successfully tested and should begin to show up in Air Force equipment in the near future. In the meantime, existing equipment such as the zero delay lanyard must continue to be employed.

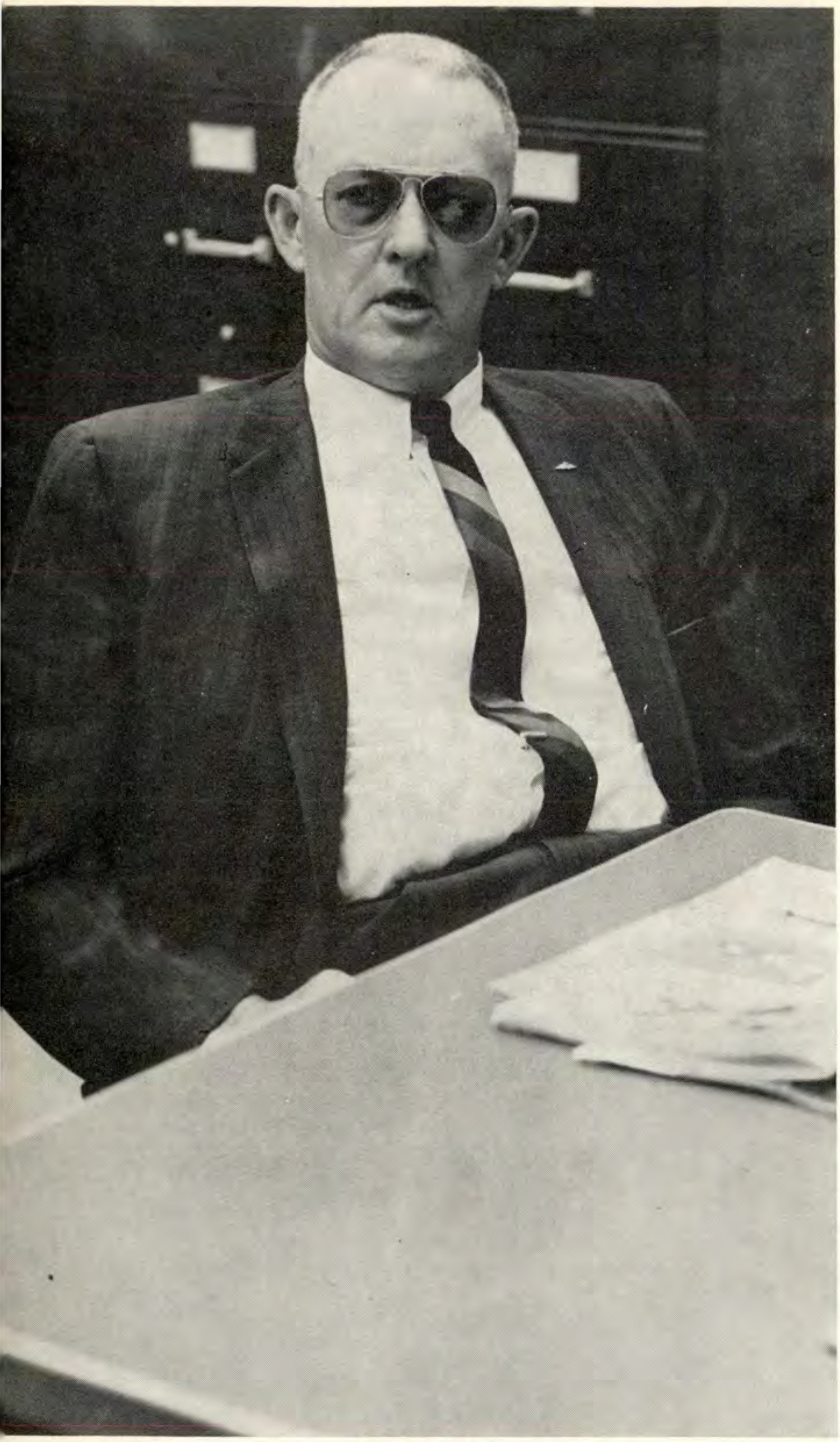
In the 15 years of USAF ejection history, over 500 USAF crewmembers have been killed. Seventy-seven per cent of these were killed as a result of ground impact with an unopened or partially opened parachute. Most fatalities resulted from attempted ejection outside the existing low level capability of the system. Until the optimum escape system is in use, one that insures safe egress within both extremes of the aircraft operating envelope, efforts must be concentrated in the most critical areas. These are, irrefutably, low altitude and slow speed.

REVISED ZERO DELAY LANYARD PROCEDURES

• Connect the lanyard prior to takeoff and disconnect before reaching 10,000 feet.

• The lanyard should be left connected for missions and flights in which 10,000 feet will not be exceeded, to include missions where a maneuver may temporarily exceed 10,000 feet.

• Connect the lanyard prior to high fix, or on passing through 10,000 feet during enroute descent. ☆



Tony LeVier's first remark, as he sat across the desk, was that he can not get by with everything in an airplane, despite what others may believe. "I've flown a lot of airplanes for the first time . . . but you can bet I knew the airplane pretty well. I lived with it . . . made taxi tests with it . . . kept notes of characteristics I'd noticed and when it was time for the first flight I always felt I knew that airplane as well as one possibly could."

TIPS FROM. . .

An aviation legend walked into the office the other day, sat down and gave some off-the-cuff views on accident prevention for the readers of AEROSPACE SAFETY magazine. This man, A. W. "Tony" LeVier, Director of Flying Operations for Lockheed, is well known to long-time readers of this magazine, but for any newcomers we present a brief résumé.

Tony first flew when he was 15 years old. He had been "hooked" ever since he could remember, but it was in 1928, when he was 15, that he found a fortune—a ten dollar bill in a theater aisle. This immense wealth provided him the wherewithall to purchase his first flight instruction. He had found his lifework, but he didn't solo until he was 17, after scraping and saving the necessary funds to finally accumulate nearly eight hours of flying time. From then on he literally lived at airports, every cent he could spare going for more precious flying time; two years later he had a grand total of 200 hours and a transport rating. From his logbook it would appear that he would fly anything with wings. And, given the chance, he would fly it first. He's credited with 15 firsts, starting with a frail-looking Pietenpol monoplane in 1933, and including such famous aircraft as the XP-80A, T-33, F-94A and B, XF-104 and the U-2.

But, sitting across the desk he made the point at the outset that, despite what many may believe, he can't get by with everything in an airplane. He, in self analysis, rated himself as an average pilot. Every man is entitled to his own opinion, but most of us will agree that Tony LeVier is far above average as a

TONY LEVIER

pilot. Here may be one of the real nuggets to come out of his views on safety—he doesn't consider himself to be infallible, or anywhere near infallible, no matter what others may tell him. In fact, by his own admission, if there is anything natural born or instinctive about his ability as a pilot it is the respect he has always held for airplanes and his own limitations. As he put it, every pilot should carefully assess his own limitations, then never attempt to operate outside those limitations.

This brought him to his next point, and the one which he pressed more than any other—self discipline. Self-discipline he contends, includes a continual health and physical conditioning campaign. There are times in a pilot's career, especially if he specializes in racing and test work, when his every faculty is required in split second decisions and reactions. It's too late to start a 5BX program then. When your tiny racing plane flips inverted at 75 feet, sluggish reactions won't hack it. He recalled a recent accident in which a Century Series pilot, buzzing a boat, attempted a roll, crashed into the water, killed himself and cost the Air Force a first line aircraft. Obviously, he contended, this pilot displayed a complete lack of self-discipline, since the hazard of attempting such a maneuver on the deck has long been known.

To further emphasize the importance of operating within safe limitations, he told of a company pilot who put on demonstrations of precision flying at low altitude. As he became more skilled he cut down the safety margin. Finally, one day, one little thing went wrong, he had no margin left, and he killed himself. When you recall that Tony LeVier's career as a racing and test pilot spans over 30 years it is not difficult to imagine that he has lost many associates and friends who shaved their safety margin too thin then, with a slight misjudgment or mechanical problem, bought the farm.

We asked Tony to compare modern aircraft with those of World War II vintage: "Are aircraft really more demanding today?" After reflecting a moment, he pointed out that as long as he can remember people have been saying that current aircraft are tougher to fly. "They said it 20 years ago about the P-38 and they still say it," he said, "but this is a relative thing. I would say the requirements today are a lot stiffer than 15 or 20 years ago—the requirements at each point along the way. Today airplanes are more demanding but we are training for it. If you want to get down to opinions, I would say the military pilot today is better trained than he was in World War II. Pilots get the same sort of training generally, but they are thinking more deeply today.

"For example, I can remember when we came out with an airplane called the F-94C. It was supposed to be better than the '94A and B. Performance was much better than that of the two earlier models. An Air Force colonel questioned me, 'How can our young second lieutenants fly this airplane? They will crash all over the place.'

"I told him what I still believe is true, that while the aircraft have changed, so have the pilots, primarily through better training. Today we have the best trained and best qualified pilots in history. They're trained to fly high performance aircraft, therefore, although the airplane might be more sophisticated, so is the pilot. In other words, his capability matches the airplane today just as well as was the case 20 years ago.

"I had it asked of me 10 years ago. If you build and design an airplane with the idea that a man can fly that airplane, then man can fly it. If it meets the requirements set up by the customer, a man can fly it. If you give them adequate training, most pilots should be able to fly such aircraft. In the old days in the P-38 and all old planes, hardly ever was a pilot checked out properly. Sometimes the crew chief simply showed him the cockpit.

"Along with self-discipline, you can't beat good judgment," Tony pointed out. For an example, he took the Split-S maneuver. "You've got to know your own limitations and those of the aircraft. Below a certain altitude for a specific airplane, you're dead. It just isn't possible to pull out. If a pilot knows the airplane and his own skill, then judgment takes over. Without using good judgment a pilot might try to cheat a little—Split-S at too low an altitude. There's only going to be one loser in this game and there's no question about who it's going to be.

"Getting back to the demands of modern aircraft," he said, "I've flown a lot of airplanes for the first time. There wasn't any Dash One, I had to write my own. But you can bet that I knew the airplane pretty well. I lived with it all the way through design and production. Then I made taxi tests with it, even getting it off the ground for a few feet to see how she felt. I kept notes of characteristics I'd noticed and

. . . he doesn't consider himself infallible or anywhere near infallible, no matter what others may tell him.

when it was time for the first flight I always felt I knew that airplane as well as one possibly could without having actually had it in the air."

We led into the landing problem by recalling that one-third of our accidents come on landing and that half of these are caused by pilot error. Tony was quick with a suggested reason (this has been a pet subject he's covered in this magazine in the past): too many pilots want to set the bird down right on the end and, as a result, get too low and too slow. Landing short, the leading pilot-caused landing accident problem, can also stem from a steep approach, he emphasized. Come down final in the over-four-degree slope range and you are soon going to land the bird hard, and very likely bash it for good, he points out. Get up around six degrees and flare is nearly impossible due to exceeding the CL max limits at the flare. He was the first to deadstick an F-104. His engine had flamed out and when he discovered he had no leading edge flaps he confessed he would have punched out except that, at low altitude, he didn't have a chance with the downward ejection seat in the early model. He had to ride it in, but fortunately he was able to play speed and flare so as to get it down on a dry lake bed.

He hasn't always been this fortunate. With some hesitancy (why anyone would hesitate to trust an editor, we'll never know) he pulled a sheaf of paper from an inside jacket pocket and let us look at it. The title of this six page true confession was *The Case of the Delinquent Aviator*. With candor few people possess, Tony lists the most unique qualifications we've ever seen for views on accident prevention. It's long and detailed, but remember, this currently qualified F-104 pilot has a career that dates back to barnstorming days before many present military pilots were born. In many cases he had to try it first. He didn't have the advantage of learning from others. Now, in the pages of AEROSPACE SAFETY magazine, he shares selected experiences so that others may learn the safe way. Here's the breakdown Tony made on himself: 94 accidents and incidents, 8 crashes, 59 near crashes, 5 tailspins to ground level, 26 forced landings, 31 engine failures, 5 canopies lost, 20½ pilot errors, 37 material failures, 1 midair, 9 near midairs, 7½ aero phenomena, 4 occupational hazards, 38 different aircraft.

Tony had his first close call in 1930. He got into a power spin in a Waco 10 biplane. He was doing low altitude acrobatics at the time. He chalks this one up to pilot error.

Thirty-five years ago, flying a Travel Air 4000 in haze, he had his first near midair collision. This problem, which he agrees is as bad or worse today, he shrugs off as an occupational hazard.

He faced his first materiel problem in 1931 when an exhaust pushrod let go on a Wallace Touroplane and he made his first forced landing.

Two years later, when airport lighting was primitive (if existent at all) he missed the field one night with a Travel Air 6000 and ran into a ditch. The dollar loss he remembers was $75—all out of the pilot's pocket.

Acrobatics taught him a lot about what he calls aeronautical phenomena. Sometimes the lessons are particularly vivid. He got into an inverted falling leaf in an OX5 Travel Air and had a real affinity for spins at low altitude. He survived one at 300 feet in his Great Lakes Trainer.

His lesson on improper CG came the hard way—he spun a T. P. Swallow at low altitude because of it.

Weather plagued him too. He made a forced landing in a Porterfield when he got carburetor ice. His plane had no carburetor heat. Later, in the same plane, he got lost in fog. He gives the reason as improper flight planning and says nobody was to blame but the pilot.

He got his first real taste of racing planes in 1935 and promptly made a forced landing in a Mendenhall Special when a magneto failed. A few days later he crash landed it after takeoff when the carburetor fell off.

He learned the need for takeoff planning in the days before performance charts. He snagged a fence on takeoff in an International. This he charges off to occupational hazard. The $5.00 repair bill to fix the fence helps him remember. These were the thin depression years.

He experienced design deficiency in 1936 when the canopy blew off his Pobjoy Racer due to faulty design of the latching mechanism. Tony won his first big race, the 200 mile Greve Trophy race at Cleveland, in the Schoenfeld Firecracker in 1938. But the gear couldn't take the strain of the rough landing field and his plane came unglued during the landing.

From 1942 through 1944 he successfully coped with 14 engine failures in P-38's. Twice he got lost above weather over England in P-38's, once during his first encounter with a jet stream and the other time when his radios failed. His first midair collision occurred in a P-38 during a dog fight with five F-4U's (other pilot's fault).

In 1944 he made his first flameout landing in the XP-80A. In 1945 he lost a $1,000,000 airplane and suffered his most serious injury, a broken back, when a turbine wheel chopped the tail off an XP-80A during a maximum speed run at 10,000 feet. When the tail came off the plane began to tumble so violently he became nothing more than a helpless passenger. Fortunately the tumbling let up enough to enable him to pull the canopy release. When he hit the catch on his seat belt on the second try he was literally catapulted out of the tumbling airplane. Because of his speed he feared his chute might rip if he opened it. While he delayed he saw beside him, and moving at about the same speed, the tail-less, tumbling P-80. Chute opening proved no problem but due to oscillations near the ground he came in as if out of a high swing and the ground hit him "like a sledge." This broke his back.

He experienced rapid decompression in the XR-6VI Constitu-

"Along with self-discipline, you can't beat good judgment," Tony pointed out. "You've got to know your own limitations and those of your aircraft."

Among the highlights of Tony LeVier's aviation career were air races in his Cosmic Wind racer "Little Toni," and test flights in the XP-80A. He is currently a qualified F-104 pilot and is Director of Flight Operations at Lockheed, Burbank, Calif.

tion when a window blew out over his head. He successfully belly landed the XF-90 when the gear failed to extend and has lost control in this airplane and in the F-94 during supersonic dive tests.

One of his closest scrapes came in 1952 when another aircraft, flying IFR on a VFR clearance, almost hit him.

He relearned an old lesson and picked up a few more gray hairs when he tried to land in calm air too close behind an R4D and his Bonanza flipped inverted on final.

Another thrill came in 1954 when he first experienced pitch-up in the XF-104.

In the past decade the number of near midairs have increased markedly and provided him with his closest brushes with the old scythe swinger.

Last year? Nothing much except he didn't see the wires and flew through them with a helicopter. Most of the bad things that can happen in an airplane have happened to Tony LeVier. He doesn't want them to happen to others. With strong personal discipline, he says, pilots need not repeat the same type of pilot error accidents. Landing, he points out as an example, is like a horizontal Split S, and if you steepen the bank and rack it in, and keep cutting your margin, one day you'll stall and bash your bird.

He says we have to emphasize this business of discipline and good judgment and we have to relate experiences that may serve to deter others from repeating aircraft accidents. Aircraft are more demanding, and the chances of walking way from an accident are becoming less and less, particularly in jets. But, he adds, training is much better, we have a great wealth of experience, and if we exercise self-discipline and learn from the mistakes of others we do not have to repeat them.

For Air Force safety officers LeVier had some encouraging words. As he prepared to walk out the door to a waiting aircraft we asked him the weight he would give to a safety program.

He replied, using an analogy, "If you had so much money to spend and that money would buy 1000 airplanes, down the road somewhere you would have more of them left if, instead of buying a thousand, you bought 950 and put the money for the other 50 into training, safety education and aircraft mods." ☆

BYLINE OMITTED

Aerospace Safety Magazine regrets the failure to credit Archie Caldwell, Directorate of Aerospace Safety, as the author of *Guns Don't Kill . . . People Do*, page nineteen, January 1965.

A Fighter Pilot's Share

By a student attending the USC FSO course

I'm a fighter pilot. I've been asked to do a safety story. To come up with one I've been remembering past experiences and recalling hairy tales and war stories from stag bar bull sessions.

But, I've got to be truthful. My close brushes with death have not occurred in the T-Bird, the F-86 or the F-106. They've occurred in that much less glamorous, much more dangerous weapon system — the family automobile! I'd rather do a story on airplanes because I think they are much more exciting, but if I'm honest with myself, I've got to tell you about the real killer.

I became impressed on my first tour in Europe. At the time I was in an F-86 outfit. During happy hour, while we were talking airplanes, a couple of us decided to go to a local restaurant for a real gourmet feast. We took quick showers, hopped into my oversized American car and headed for town. We were in a hurry; didn't even have time to fasten the seat belts. Although I thought I was paying close attention to the narrow, winding road, the car got into a skid while rounding a curve, went off the road and bounced off an iron railing. Through no skill on my part, the car came back onto the road and slid to a stop at the edge of a small village. Luckily we weren't injured. We got out to look at the damaged front end. We stood there a while, examining the mangled iron in the pungent "Smog" formed by columns of steam arising from the customary manure piles that decorated the immediate landscape. Soon several of the local citizenry joined to peer at us, point at my damaged car and jabber about the excitement we'd caused.

I learned something from this personal experience. The fact that the base commander later revoked my driver's license for 30 days (reckless driving) probably helped me remember. As I think back, it could have been worse, much worse: we could have been injured, or killed, the car could have been demolished, the report could have carried a notation on my prior presence at the Happy Hour function.

Here's another reason why, when asked to do a story on safety, I have to go to the PMV route. In the three years that I was stationed in Europe, my squadron did not lose a single pilot in an aircraft accident. That was an all-weather interceptor outfit operating in some of the worst flying weather in the world. Yet, during that same three-year period, *five* of our squadron pilots were killed in automobile accidents. In addition, two other pilots were severely injured in an accident and were lost to the squadron for more than 90 days.

It seems especially tragic to me when a pilot gets killed in an automobile accident. If a pilot dies in an aircraft accident you can rationalize and say, "Well, he was a professional pilot, a military man and he lost his life while serving his country." Such is not the case in a car accident. Here is a man with invaluable training and experience who is a vital part of the Air Force combat capability. If he dies, both the Air Force and his country suffer. This is to say nothing of the man's family and friends.

When I look at this business of safety objectively and try to fulfill this assignment on safety, I have got to hit at the Number One hazard as I see it. The primary objective of our safety program is to prevent accidents and to conserve the combat capability of the Air Force. Let's apply the medicine where the hurt is.

Each man in the Air Force must be made to realize his obligation to preserve his share of the country's combat capability—himself. Each time he gets into his car he should say to himself, "I'll drive as if my life depended on it."

Let's face it, friend; your life does! ☆

Seat Belts

"I was returning to the support base, alone, from one of our launch control facilities. The military station wagon I was driving gave me only a few seconds notice before it started to roll to the left. I grabbed the steering wheel with both hands and hung on. As it rolled to the left and hit the road, I saw the windshield crack in a million places and heard the breaking of glass behind me. Going over the top and to the right-side-up position, I still held on to the steering wheel and could feel the car roll again to the left. This time the entire windshield blew outward. On the second roll it was harder to hold the wheel. Again there was the sound of breaking glass and the crunch of metal. The car came to rest right side up. After a moment and a deep breath I looked around and saw that every window, with the exception of the two wings and the one in the right rear door, was broken. Both front doors were jammed shut, so I climbed over the seat and out the right rear door.

"The car was beyond repair. The hood, which evidently had come off the first time over, was now standing upright partly embedded in the right front fender and partly under the right front wheel. Loose gear and the back seat had been thrown clear and were now strewn on the road. The roof was crumpled, and if I had been driving with an arm out the window it was obvious I would have lost it. There was a slight cut on my thumb, my cap was still on and a few muscles felt stiff. Otherwise, I was okay.

"It was several hours later that I noticed two bruises, one on each thigh. The seat belt which held me tightly in place had left a reminder." ☆

A Missile Combat Crewmember

THE IPIS APPROACH

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

Have a question on instrument flying? Send it to the USAF Instrument Pilot Instructor School (ATC), Randolph AFB, Texas.

Q. some of the instructors of our organization are of the opinion that if the approach chart omits "Localizer Only" minima, the published circling minimum altitude applies. The 300-foot and one-mile "Localizer Only" minima apply only when published. The other group of instructors feel that 300 feet and one mile apply unless specifically indicated higher or not authorized. Which group is correct?—*Captain J. F. Huffaker, 62nd Troop Carrier Wing, McChord AFB, Wash.*

A. When ILS "Localizer Only" minima are not published, and a "Localizer Only" approach is being made, the pilot should not descend below the published circling minimum altitude established for that aerodrome.

"Localizer Only" minima referred to in par 40b (5), AFR 60-16 and par 3a, AFR 60-27, are the lowest possible ceiling and visibility that the Air Force will accept for publication. In a situation where published minima at non-Air Force installations are lower than those listed in AFR 60-16, Air Force minima will apply.

The published "Localizer Only" weather minima serve two purposes for the pilot:

(1) To determine if the existing weather is at or above the published minima to initiate the approach, and

(2) By adding the published "Localizer Only" weather ceiling to the field elevation, he can determine the minimum indicated altitude to which he can descend on that approach. For example, the minimum indicated altitude for a "Localizer Only" approach at McChord is 722 feet. (400-foot weather ceiling plus 322-foot field elevation.)

Although it is not stated in AFR 60-16 or AFR 60-27, the "Localizer Only" weather minima do not include obstruction clearance in accordance with JAFM 55-9, Criteria for Standard Instrument Approach Procedures. The obstruction clearances required for a "Circling Approach" (Par 1.0800) and a "Localizer Only" approach (Par 5.0702) in JAF 55-9 are 300 feet. Thus, a pilot who misinterprets AFR 60-1 and descends to 300 feet above the field elevation may not be provided the required 300 obstruction clearance. The seriousness of such a misinterpretation can best be illustrated by the following examples:

(A Western Aerodrome)—A descent to 300 feet above the field elevation during final approach, without glide slope, would place the aircraft 125 feet above a 301-foot obstruction located within the final approach area. Discounting altimeter errors, an aircraft would clear the obstruction. However, the aircraft would be 175 feet BELOW the 300-foot obstruction clearance required by JAFM 55-9.

(An Eastern Aerodrome)—This instrument approach indicates an obstruction of 551 feet MSL within the final approach area. The pilot who interprets AFR 60-16 (300-1) as his authorized minimum altitude without glide slope, would descend to 300 feet above field elevation or 545 feet MSL. This would place the aircraft six feet BELOW the obstruction. Pilot adherence to the published circling minimum altitude will provide adequate obstruction clearance in both cases. These examples were not selected to "point the finger" at any base, but serve to indicate a deficiency that exists when "Localizer Only" minima are not published.

POINT TO PONDER. "What can I do about the '40-degree error' in TACAN bearing information?" This is a question we often hear and for which there is no cut and dried answer.

The error is caused by erroneous measurement of one of the phases of the signal transmitted by the ground station. This occurs most often when the aircraft is in a "fringe" area such as near the cone of confusion or near the maximum range of the facility.

Recognizing the 40-degree error is normally no problem because the heading required to maintain a course will be in gross disagreement with the selected course.

Methods of correcting the 40-degree error are limited. In many cases the equipment will correct itself when the aircraft is flown away from the "fringe" area. If the error persists you can sometimes correct it by rechanneling or turning your receiver off and then on again.

If you encounter the 40-degree error (remember it can be 40 degrees or a multiple of 40 degeees), you should consider the bearing information unreliable. Adding or subtracting the error and continuing to rely on the TACAN bearing information is certainly not recommended. If your aircraft is TACAN-only equipped you will have to rely on some other method of recovery to your destination, such as RADAR or DF.

Proper preflight planning and a constant awareness of your position in flight is the key to avoiding trouble caused by the TACAN 40-degree error. ☆

SHAKY'S SUCCESSOR

By Major T. J. Slaybaugh

Oceans will shrink, instrument reading (even at night) will be easy, vibrations will virtually cease, the noise level will drop markedly and the clouds flown in for so long will be far below.

These are a few of the outstanding impressions in store for MATS C-124 crews once they begin flying missions in the latest MATS transport, the C-141.

When we learned that the first C-141 (The Spirit of Oklahoma City) had been delivered to the "University of MATS" at Tinker AFB we arranged to go on a flight to report some impressions. The MATSmen waiting impatiently to fly airlift missions have every reason to be impatient. Major M. D. Rich, the first pilot to enter C-141 training direct from C-124's, is enthusiastic. Lt. Colonel E. E. Schleier, Jr., a veteran C-135 pilot and commander of the 1741st ATS at Tinker, compares the '141 favorably with the '135, an aircraft of proven reliability and well liked by the crews. Instructor Pilot Captain George Mizell says any qualified transport pilot should have no difficulty transitioning to the '141. His opinion is worth considering. He is one of a small handful of MATSmen to survive the careful screening that selected the best qualified men in MATS—pilots, navigators and engineers—for the initial instructor cadre. He came from a C-135 squadron at McGuire, and before that flew the line in C-118's and C-54's.

But let's get aboard; find out how this large, but compact transport flies. Naturally, we've figured takeoff performance and completed thorough preflight checks. We enter the long cargo compartment through a crew door on the left forward fuselage. A few steps up a short ladder and we're in the "office." Immediately we're impressed with this layout. There is plenty of elbow room. The "chairs" are as good as any in MATS. The pilots can adjust forward, back, up and down and sideways. Two things stand out as soon as you're in a pilot seat—the nearness of the ground and the visibility. You're really up front in this one and you have practically a picture window at each side. Oh, we forgot one thing about the seats—the navigator said "be sure and tell everyone the navigator finally got a seat that reclines." And while we're on the subject, the navigators will drool when they see this one. Among other things, there's an astro tracker, a Loran-C and Doppler. The desired flight path can be programmed into any one of these, the desired course maintained through the autopilot hookup and the navigator can monitor position and progress through continuous readout. Better get in your DR and Bellamy drift work while you can, fellas—you won't have much use for these in the '141. We wondered how good the radar was (it's iso-echo equipped) and asked if the navigator could provide GCA service. We were shown during a subsequent approach and were sold when the navigator pointed and said, "See, there's the taxiway and runup area; we can even tell the pilot when he's over touch down point."

We were able to get a good impression of the engineer's station since we had three sergeants aboard to work this position. One had come from C-135's, one from C-133's and one from C-124's. "How about the vertical instruments?" As close as we came to an unenthusiastic reply was, "After 15 years looking at round ones, these take a little getting used to." There's no doubt that they can be scanned more rapidly and quite accurately. The panel seems rather austere for a big bird, then you remember there's no need for prop and mixture controls, and feathering buttons. It's doubtful if veteran C-124 and C-133 engineers will shed any tears over the fact that they have no props to worry with.

Communications and navaid problems should be solved. This bird has dual VOR, UHF, ADF, VHF, TACAN, DME and HF. How about that! About where the engineer sat in the '118 and '54, there's a big comfortable chair for the third pilot and a complete set of radio controls. He can communicate with the airlift command post, or anyone else as necessary, while the copilot is handling normal traffic control communications.

Now let's take a ride. This doesn't involve much delay if the clearance comes through on time. There's no long runup in this bird—none at all, really. The checklists can be run by the time No. 1

position is reached. After a momentary power check pause in lineup, we're on our way. With no cargo and just under 80,000 pounds of fuel this bird really moves out. Power, obviously, is ample. Nose steering is conventional (rudder pedal steering to be added later) with rudder control coming in well under 100 knots. Rotation, this flight, is 115 knots, and as climb attitude is reached, we're airborne. Climbing now, and accelerating, it's gear up and flaps up at 160. Hold it until 280 knots indicated, then raise the nose to hold four-engine climb speed. It's smooth! Old Shaky, you're through! The sound you hear is a "rushing air" sound. Faintly, as an undertone, the whine of the four big jets reaches the flight deck. We can converse without headsets if necessary, but with the handy interphone switches we use radio. The centrally located, realistic attitude indicator gets a lot of attention. Out on the nose like this, the pilot simply must fly with frequent instrument reference. You've heard of the vertical scale flight instruments (VSFI)—they're great! The altimeter gives a direct reading. This eliminates the 10,000-foot error. The airspeed tape has a white triangle at the 200-knot point. This triangle can be seen at all speeds between 100 and 300 knots. Somebody came up with a winner here. You'd really have to work at it to misread your air speed. Both altimeter and airspeed have another handy "extra" that has strong safety implications. This is officially known as the command marker, but in pilot's jargon will probably be referred to as the "bug." Suppose minimums are 1200 feet. Hold the command marker switch until 1200 appears. Have the copilot set his 100 above, at 1300, if you want. Then compute your approach speed—let's say it's 131—set the airspeed bug (excuse, command marker) at 131. Now you have set a double barred pointer at the selected altitudes and airspeeds. Hold the airspeed in the marker. When the altitude marker moves down to the indice you're at minimums.

C-124, C-133 and C-135A engineers agreed that the panel on the C-141 is one of the best yet. Close location in relation to cockpit windows permits the engineer to aid in scanning. Photo is of mockup; aircraft panels differ slightly.

Of course, there are other vertical tape instruments — EPR, N_1 RPM, N_2 RPM, EGT and FF are lined up in this order on the center panel. The pilots are enthusiastic about these.

Quickly, some other goodies. Right in front of each pilot is a master caution light. When this flashes on look over at the banks of lights on the annunciator panel. Now you're told, specifically, what's wrong. Low oil quantity, No. 4. Actually this happens to us, so a precautionary shutdown is in order. Once the checklist is completed (and it's a lot simpler than prop jobs), George Mizell gets in the left seat and decides to head for home. He chooses to cruise at 20,000 instead of 10, so up we go, 1500 feet per minute, 96 per cent, 260 indicated on three engines. This bird has power! In fact, during landing practice power has to be reduced to below horn and light settings to not exceed pattern speeds. One of the frequent jobs for the copilot is to hit the horn silencer button. He can't turn off the light in the wheel shaped gear handle. (Please, never hide this light under a paper cup. This was tried a few years back and a C-124 landed sans gear.)

Landing attitude will probably seem nose low—actually, the object is to touch down with the nose just inches off the runway, then ease it

Mockup shows excellent flight deck layout. Flight crews are enthusiastic about such features as visibility, vertical tape instruments, white lighting and communications.

SHAKY'S SUCCESSOR

continued

on. Remember, you sit much lower than in a C-124, even lower than in a C-135, C-118 or C-54. Reversing is accomplished by raising the throttles and coming on back. It feels similar to a recip during reverse, and reversing is most effective immediately after the nose is lowered. Simultaneous braking is SOP if you are shooting for minimum ground run. Brakes are metered anti-skid.

Safety aspects? We mentioned the excellent instrumentation. White lighting will be a real boon to tired old MATSmen's eyes. Every instrument is individually lighted. There is no glare or fussiness and chart and map reading is much easier. You could say systems are resplendent with redundancy. For example, there are three separate hydraulic systems.

All controls are power boosted and feel is generally comparable to any transport aircraft. The yaw damper takes a little getting used to. It sort of wants to push the rudder back against your foot as you start a turn. Presently, cross-wind component is 15 knots—a little low for Travis, Lajes and some other favorite MATS stops. The rudder steering mod is expected to help. And maybe "Rube Goldberg" will revise his sun visor so that it can be slid around the track, not have to be unclamped and re-clamped (a two-handed operation) with every change in direction.

Magazine space limitations require that we cut this flight short now. That's right, there's no popping in your ears. The cabin altitude was 1200 feet when we were at 29,000. And there were no pressurization surges. That's another thing that will help reduce fatigue on the long MATS missions.

There's more, much more — enough to make a book. In fact, there is a book, the C-141 Dash One. Let's hope it's the one you'll soon be using.

You'll enjoy it. ☆

Is the NAVAID "Out UFN"?

Maj Robert C. Adkins, Directorate of Flight Facilities,
Central Communications Region, Tinker AFB, Oklahoma

Are you part of the 10 per cent who "don't get the word?" By "the word" we mean NOTAMs. The AF NOTAM System is designed to give everyone concerned the word and in a minimum period of time if, and we repeat, *if* those responsible do their job.

Here, quickly, is how it works. The system starts with the guy in the tower or RAPCON who detects a NAVAID malfunction by a monitor alarm or pilot report. He normally advises Base Operations which has the responsibility for sending the NOTAM. The Base Ops troop prepares the NOTAM in proper format and gives it to the local weather office, which in turn, fires it off to the Tinker Central NOTAM Facility via the Operations Weather Support (OWS) circuit. At Tinker, the NOTAM is edited and transmitted back to all of you (we hope) through the same OWS circuit to each base weather station. The base weather attendant gives the new NOTAM to the Ops dispatcher, who, in turn posts it to his NOTAM board. The whole sequence should take about 30 minutes. Every 12 hours a complete new summary is sent out.

Like we said, this is the way it is supposed to work; however, now and then it happens—a NOTAM is not received or posted in time to be used.

What can we do about it? Plenty —as pilots, we should check the Enroute Supplement and the NOTAM board. By the way, read the small print in the Enroute Supplement. You might find "ILS - O/S UFN." This, of course, means no ILS at that base. The NOTAM summary should be "clean" for only a short time after the transmission times of 0900Z and 2100Z. Soon after being posted, the summary should start collecting changes—new NOTAM's or line-outs as cancelled NOTAM's. If you note, as I have on occasion, that no changes have been made for a period of several hours since being posted, you can bet someone is not doing his job. Go to the Base Ops dispatch desk and *ask*.

As for others connected with the system—keep the NOTAM moving. Don't wait to see if the equipment will be fixed in an hour or so. AFM 55-13 says a NOTAM will be sent WHEN there has been an interruption, etc. Weather people should realize that NOTAM's can mean "go" or "no go" for pilots and for that reason have direct influence on whether a mission can be flown.

Base Ops bears the brunt of responsibility. AFM 55-13 requires them to review and update the NOTAM summary at least once *each* hour. They must make sure that each NOTAM that concerns their own base has been posted and is *accurate*.

It's up to all of us: pilots, Operations, Weather, ATC controllers and the Central NOTAM Facility, to make sure this system works. It's a good system, but like most, no better than its weakest link. Don't let that link be you. ☆

MISSILANEA

AMMONIA CONTAMINATION — An AGM-28 mated to a B-52 had just returned from a mission when the ground crew noticed massive ammonia discoloration on the missile body and lower portion of the pylon. The missile was washed down, then downloaded and taken to the maintenance hangar for further inspection and decontamination. When the forward body was removed, ammonia corrosion was found throughout the forward pressurized and warhead compartments. An ammonia leak check was performed in accordance with T.O. 21M-AGM-28B-2-9, but did not reveal a leak in the system. The ammonia bottle was weight checked and found to be 15 pounds light. The bottle was pressurized with nitrogen and the filter valve was submerged in water. This check revealed a leak at the "B" nut between the filter valve and the ammonia bottle. Further investigation disclosed that the "B" nut was loose. Removal of the union between the manual valve and the ammonia bottle revealed that a teflon ring was missing. In addition, the "B" nut was not the required nut as shown in the parts breakdown; use of the incorrect nut prevented installation of a teflon ring (Ref T.O. 21M-AGM-28A-4-1, Fig 95, Index 9 and 10).

This is the second incident of this type reported in a two-months period and in both incidents the missiles were returned to the depot for extensive maintenance.

OCAMA has recommended that "O" rings be updated to the latest configuration in accordance with T.O. 21M-AGM-28A-4-1, dated 1 March 1964, changed 1 June 1964, Fig 95, Index 9-10-11, at the next maintenance servicing of the ammonia beam bottle.

Major E. D. Jenkins
Directorate of Aerospace Safety

HAZARD ANALYSIS —A TWO-WAY STREET— "Too many, and I'll never submit another!"

This answer caught the safety officer off guard, especially since it came from one of the most experienced and respected technicians. It had been an innocuous question—"How many AFTO 22's (T.O. System Publications Deficiency Report) have you submitted?"

The missile safety officer recovered from his surprise and asked, "Why do you feel that way?"

The technician explained that he had submitted a large number of reports during his missile experience and only a very few had been accepted. The great majority of the forms were never heard of again. He had experienced innumerable and repeated frustrations by receiving only a few of the forms back and these with the notation "Disapproved" without any reason for their rejection. After all, he said, he had devoted a great deal of time and effort to the submission of these forms and should have had at the very least something more than the word "Disapproved."

The safety officer explained that the value of a hazard analysis program, such as AFTO 22's and hazard reports must depend on the professional knowledge, application, and especially the favorable attitude of each individual. These programs cannot succeed otherwise. And hazards ignored, or at best tolerated, can later trip an unwary and innocent individual.

Actually, the correction of this condition is a simple one. It requires only that each reviewing agency take the time to inform each sender of the disposition of the reported hazard and give an explanation for those that are rejected. In this way the submitter will know what additional action he may take to resolve what is, to him at least, an important problem. It provides a personal incentive—he is told that his ideas are being given just and full consideration.

It is not enough to expect full and enthusiastic support at the working level without also expecting the same support at the supervision and management level. The hazard analysis program can undoubtedly be more productive as a result of making people at the working level feel that their efforts are worthwhile. This is the two-way street; to be effective, communication must travel both ways. ☆

Major K. H. Hinchman
Directorate of Aerospace Safety

Part of the 600,000 pounds of cargo that was airdropped, all within the objective area, on D-Day.

SKY SOL

Mission planning: that important first step in accident-free operation.

Split-second timing over dro[p]
to be successful. Navigators

TIEN BING VI

DIER

The pictures on these pages show typical action as, last fall, over 70 USAF aircraft, under operational control of the 315 Air Division, air dropped and air landed more than 3800 personnel and over 3,800,000 pounds of cargo in the United States-Republic of China Exercise on Formosa. Pacific based aircraft were massed in Okinawa for the start of the exercise which was climaxed with airdrops and landings in the exercise area on Formosa. Using the 463L roller system, C-130's were off loaded in less than 10 minutes. Air dropped cargo using this system exited the aircraft in less than 10 seconds. The exercise was designed to improve the combat readiness of participating units, exercise the airborne capabilities of the U.S. Airborne Brigade; evaluate the effectiveness of marshaling plans, procedures and techniques, and provide training in all phases of combat airlift and tactical air operations.

Brig Gen Richard H. Ellis, Troop Carrier and 315 Air Div commander, briefs loadmasters.

Using the 463L roller conveyor system, crews onload and offload cargo in minutes, airdrop cargo in less than 10 seconds.

Sharp-eyed maintenance men are vital for safe mission accomplishment.

zone is mandatory if mission is of the 35th TCSq plan mission.

Ground support must be the best. SSgt R. E. Wing, of the 51st OMSq., refuels.

SKY SOLDIER

Capt John A. Dale, aircraft commander, briefs his crew.

5 a.m., Capt. Harold L. Hale and 1/Lt Frederic L. Riggle check final items before starting their C-124 engines.

C-124's of MATS' 1502d Air Transport Wing line up for takeoff.

A scanner's eye view as C-130's fly formation en route to drop zone.

An Army vehicle is blurred by its lightning exit from a C-130 of the 315 Air Division.

The mark of success: On time, on target, and without accident.

THE CHANCE TAKERS

Like adventure? Suppose you had been looking over the pilot's shoulder on this one.

Approach Control contact was established early in the penetration, descent made to 4000 feet and handoff to GCA. Windshear makes frequent heading changes necessary. It's rough, too. Pull the harness tighter and hang on. Near minimums—still not aligned. The pilot adds power, pulls the nose up and starts a missed approach. Around the GCA pattern to line up again for a full stop landing. Again runway alignment is off at minimums. Power . . . nose up . . . missed approach. Weather worsens during the circuit for the third try. Visibility is down to two miles in rain and fog. Wind continues to be cross, gusting to 20 knots. GCA advises loss of target at four miles and cautions not to descend below 500 feet. Target picked up again at two and one-half miles. Too far left. Go around. Again power . . . nose up. Slant range viz is zilch. "Can't see the runway at one mile," the pilot says. He checks the fuel. "Request short pattern." You're for that.

You hear the supervisor of flying's suggestion to change runways. GCA says it will take 20 minutes to set up their equipment on the other runway. Another look at the fuel gages. The pilot turns the suggestion down and continues his left turn to try again. Pattern is short and glide slope is intercepted at five miles. Good azimuth on the GCA scope, but no elevation.

At four miles GCA instructs, "Start descent." You're 200 feet left of course. At three miles GCA picks up intermittent reception on the elevation and advises 20 feet low. Left to right drift is carrying you across center line. At one and one-half miles, still intermittent elevation reception, aircraft is 100 feet right. Large azimuth corrections to the left are given. At one mile GCA advises go around if runway not in sight.

Visual contact now. Too far right. Left turn . . . low . . . power. THUMP. On the left side. Climbing out again. There's a warning. No. 1 generator.

A minute later, low oil pressure, No. 1. The pilot doesn't shut it down. He wants that engine, if at all possible, because of the crosswind. He asks for an ILS to a different runway. Cleared.

During turn to base leg for ILS approach, No. 1 seizes. He declares emergency fuel and an engine out. ILS not working properly (the "thump" was the aircraft striking the ILS antenna on the previous missed approach). GCA headings to the runway are being given on Guard. At one and one-half miles a streak of light ahead and below. The strobe lights! There's the runway. Touchdown! Aircraft starts to right. Full aileron and rudder. Stops on the right edge. Everybody's had it. The pilot shuts down right there.

Well, from over the pilot's shoulder it has been exciting. Now that you're down and safe you feel better about it. But for a while there your mental urging was to go to the alternate.

The analysts had an explanation. Striking the ILS antenna was due to a severe crab and heading changes the pilot was unable to follow at the last minute. And when he went visual the heavy rain obscured the lower part of the windshield. This prevented his sighting the strobe light, therefore he was unable to determine his correct altitude at a very critical moment. During this fraction of a second the aircraft got too low, striking the antenna. Also, they contended, GCA should not have cleared the aircraft to descend without elevation information unless they advised the pilot of altitude vs. distance during the approach. Further, the pilot should not have descended without either GCA elevation or surveillance.

Recommendations included: better radar to present isolated precipitation patterns, improved airport approach lightning to include roll bars and VASI lights and wider runways.

This case was another in a series that illustrates the risk in attempting approaches and landings in marginal weather. Here are a few others.

A transport hit a TACAN facility during an attempted approach with a thunderstorm over the field and a ceiling obscuration due to rain.

A fighter made repeated missed approaches in a thunderstorm area and finally the pilot ejected when fuel was exhausted.

A jet bomber touched down in a field short of the airport, became airborne, took out a power line, then made it to an alternate.

"History Repeats," August '64, "Kilo Confusion," November '63 and "Non Support of the Pilot," April '62, are other AEROSPACE SAFETY magazine articles that illustrate the hazards of attempting to recover aircraft in marginal weather.

Now let's stop beating around the bush. If mishaps such as these are going to be prevented we have got to take the safe route. If we continue to operate as we have in the past (and apparently we are), then let's accept such mishaps as the occasional price that must be paid for known risks. But if we want to prevent accidents let's look at the problem objectively:

We know that heavy precipitation blots out aircraft returns on controllers' scopes.

We know that rain removal sys-

THE CHANCE TAKERS
continued

tems are inadequate in heavy precipitation.

We know that approach lighting is inadequate at many bases (the system is shown on every approach plate).

We know that the coefficient of friction is much less on wet and icy runways.

We know the length and width of all runways (every approach plate also gives this information).

We know that weather moves, and that conditions often improve if we hold a few minutes.

We know that "legal" minimums aren't necessarily safe minimums, especially when associated with heavy precipitation, crosswinds, turbulence, darkness, lightning, icing conditions, approach zone obstructions, cliffs, sea walls...or any other condition that can make an aircraft approach more hazardous.

So . . . why do we have mishaps such as the one recounted at the beginning of this article? We have them because supervisors fail to carry out their responsibility and divert aircraft to suitable alternates. We have them because these supervisors make decisions on the basis of operational convenience rather than safety. As long as approaches are "legal" they are in the clear.

So long as this concept of operation continues we can continue to write articles to illustrate the hazards. They will do no good.

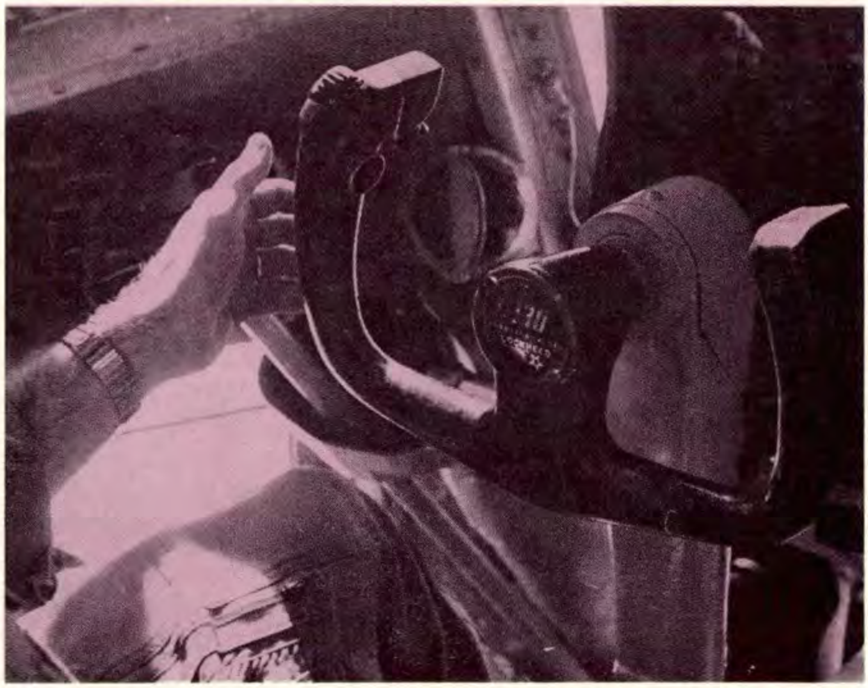
So long as the chance taking supervisors at all levels fail to assume their moral obligation, air crews, passengers and aircraft will be lost during marginal weather approaches.

One more thing—pilots, if you have supervisors without the courage to make decisions, to send you to an alternate when safety dictates, exercise your prerogative and divert to a safe alternate. Remember, the supervisor *might* lose his job—you *can* lose your life. ☆

We repeat . . .

WHAT DOES IT TAKE?

In final analysis, safety of every flight must rest in the hands of the aircraft commander.



Capt John T. Taylor, Chief, Flight/Nuclear Safety Div.,
Robins Air Force Base, Georgia

Not so long ago, a transient aircraft with an uncontrollable propeller was diverted to another USAF base. To keep the RPM within limits, the pilot was forced to fly with partial flaps, maintaining an uncomfortably low airspeed. Work was in progress on their one and only runway at the home station; however, the runway was usable in the event of an aircraft emergency. Basically, all that was required was that Flight Operations clear all equipment from the runway until the distessed aircraft could be recovered.

The pilot in command of the aircraft was uncertain about his prerogatives under emegency conditions. The Operations type who ordered this aircraft to divert should also bone up on a few USAF Regulations. Here are some selected extracts:

AFR 60-16, 20 Nov 62.

Par 5. Command and Control of Aircraft:

a. The organization commander responsible for the flight will designate the pilot in command of the aircraft. This pilot, regardless of grade or pilot rating, commands all persons on board and is responsible for the safe operation of the aircraft.

Par. 8 Compliance With Air Traffic Control Procedures:

A pilot will comply with ATC procedures unless an emergency makes deviation necessary in the interest of safety.

Par 9. Distress:

a. An aircraft in distress has the right-of-way over all other air traffic.

Par 17. Landing and Takeoff:

b. Normally, landing and takeoff will be made on the runway most nearly aligned with the wind or as recommended by the airfield control tower. If, for reasons of safety, the pilot does not concur in the tower recommendations he may land or take off on any usable runway when cleared by the control tower for such landing or takeoff.

Par 59. Deviations From This Regulation. Deviations from this regulation may be made as follows:

a. At any time when an emergency or special circumstances exist . . .

AFR 60-22, 10 Apr 62.

Par. 8. Emergency Procedures:

In emergency situations requiring immediate decisions and action for the safety of the flight, the pilot in command of the aircraft may deviate from the provisions of this regulation to the extent required for such emergency.

AFR 60-23, 26 Jul 62.

Par 5.

b. When an aircraft experiencing an inflight emergency is approaching the airfield to land, all takeoff, landing, and taxi operations, except emergency operations (crash rescue vehicles, etc.), will be discontinued and the traffic pattern will be cleared. When possible, such action should be taken in time to insure availability of the landing area to the approaching aircraft.

These are your prerogatives, pilots. Use them. If you're not willing to exercise your command authority as aircraft commander, move over—your replacement is waiting. (See AEROSPACE MAINTENANCE SAFETY Magazine, August 1964, page 10.) ☆

ANATOMY OF A GCA

Maj Roger B. Condit, 2031 Comm Sq, AFCS
Selfridge Air Force Base, Michigan

"That was the worst GCA I ever had!" remarked a thoroughly disgruntled pilot the other day. "When I broke out, I was lined up with the parking ramp and had to go around."

This was typical of several remarks made by pilots during a period when the elements were far from stable. The underlying connotation in all these remarks was that the GCA controller was the culprit.

One thing is certain. They truly were bad GCAs! If a pilot cannot land out of a GCA, it is a bad one. For that matter, *any* kind of an approach from which a landing cannot be made is a bad one. But let's examine these approaches. Let's look at the anatomy of a GCA.

First of all, let's establish who or what was *not* the culprit. It was not the controller. It was not the pilot. It was not an erratic electronic device that caused the wrong information to be given the pilot. What was it then?

It was turbulence! That's what it was!

A GCA is entirely different from any other approach in that a middleman — the GCA controller — feeds the information to a pilot which enables him to make adjustments to course and glide slope. (This is done electronically by other NAVAIDS.) Although the radar used on final approach of a GCA is precise to a high degree, there is a time lag created by the middleman. He cannot possibly transmit corrections to course and glide slope as rapidly as an electronic device, an ILS, for example, can indicate on a cockpit instrument.

A GCA is often compared to ballroom dancing, for to borrow the words from an old song, it "takes two to tango." One must lead and the other must follow. And if you get a couple out on the floor with a fair idea of the rudiments of the dance, they'll get by all right even if they don't qualify as Arthur Murray instructors.

Let's get back to anatomy again. There are three factors in a GCA—the pilot, the controller and the elements. If the first two of these know the rudiments of a GCA and the third is insignificant, there just wouldn't be a bad one. However, let's examine the third factor when it *is* significant. Here is the real culprit—turbulence.

If the controller gives the pilot a heading correction, but, because of turbulence, the pilot is unable to hold it; if several of these corrections are given but can't be held; if the aircraft is bouncing along the final approach like a yo-yo with a snarl in the string, then this makes for a loused up GCA! Certainly no pilot will claim to being able to hold his aircraft on a constant heading during turbulent air conditions. Add this to the fact that he is constantly being displaced vertically and horizontally and it can readily be seen why a GCA is a very difficult approach to accomplish successfully during these conditions.

All this can lead to one question that deserves an answer. As a pilot, you may ask, "How, then, do I safely get my bird on the ground?" The answer is not all inclusive since we recognize that there will be times when you will have no choice but to land under such conditions. However, if you have a choice, don't make an approach during turbulent conditions. Go to an alternate or if the condition is temporary and you have sufficient fuel to hold, wait for the condition to pass. Lastly, if you have the option of taking an ILS, take it, with GCA monitoring the approach! This NAVAID will indicate course and glide slope deviations more rapidly and eliminate the middleman. ☆

Last month, in the article "How Safe?", Major Mozley discussed Silo Safety Evaluation—the questions that must be answered, the actions necessary, the hazards involved in determining the condition of the accident site prior to allowing investigators to penetrate.

In this article the author follows up with advice on how to conduct a systematic, organized search for the accident cause.

Seeking the Golden Easter Egg

Maj Curtis N. Mozley
Directorate of Aerospace Safety

The silo safety evaluation has been made, the venting gases are under control, or in such a condition that work can be done around them, and the "purge" fan is operating. The Missile and Launch Complex Systems Group has the necessary equipment, and the early statements of witnesses have been obtained by the Launch Operations and Witness Group. With these preliminaries accomplished, the investigators, rather than embarking on a haphazard, random type search through rubble for answers, should now conduct a systematic, organized investigation.

Since past silo "blows" have not damaged the Launch Control rooms, it is recommended that this area be used as the silo investigation control area. Assuming that entry into the silo proper can be made from the Launch Control room via the normal entrance tunnel, use of the control room facility expedites the investigation. The base civil engineer is capable of providing electrical power into the Launch Control room. It is possible that a portable generator can tie into existing circuitry throughout the Launch Control area. Experience has proven that, in the main, the electrical equipment in the complex, other than the silo, has remained in usable condition, as have communication land lines. With a little civil engineering ingenuity, even the water systems can be made functional once more.

After electrical power has been restored, priority should be given immediately to land line communications between the Launch Control area and the base facility being utilized by the rest of the Accident Board. (All activities at the silo must continually be made known to the Coordinating Group Leader.) The Coordinating Group should give equipment requirements to the Base Contact Officer well in advance of programmed utilization time. The capability of immediate contact with other investigation groups at the base enhances the efforts of the "silo rats."

Intensive investigation of the destroyed silo generally can begin three or four days after the mishap. Placement of the purge unit into position on the cap as soon as possible after the fire has died out dictates the time, but normally, sustained investigative operation has been possible within the time period indicated. The use of a "sequence of events" diagram, provided by the Witness Interrogation Group from initial witness testimony, will channel first investigative efforts within the silo. By this time, the Witness Interrogation Group will have arrived at a plausible time sequence and derived from the launch crew/witness personnel possible cause factors and suspect malfunctioning systems. Taking this information, the Missile and Launch Complex Systems Group Leader should program his objectives. Considering the adverse working conditions within the silo, he should direct his team's investigative efforts into a systematic process of elimination. Of course, the most suspect missile/AGE system will be the first to be investigated. In conjunction with this effort, the next logical "suspect" should receive attention.

By proper division of the Group's personnel into system teams, strides toward the end objective can be made.

COMMUNICATION NEEDED

Communication within the silo is a safety requirement. The first trip into the silo and to the bottom levels will be for the placement of safety gear and field telephones. A minimum of four field telephones should be used. The locations may be varied, but one should be topside on the cap, one in the Launch Control area, and the other two within the silo. It is advisable to have a telephone close to the area where work is being concentrated. With all telephones interconnected, a system of signal rings can be arranged. When personnel are in the silo, the field telephones in the Launch Control area should be monitored. This doesn't necessarily mean that someone should listen all the time, but personnel should be available to answer the proper ring. When the crane is being used to lower personnel or equipment into the silo, the field telephone on the cap, as well as a field telephone in the silo, must be manned.

A minimum of two emergency breathing apparatus units should be placed on each of the bottom levels of the silo. Wood planking may be used across dangerous areas where floor grating has been blown or burned away. Extremely hazardous areas should be roped off or flagged.

No more than two teams should be working in the silo at one time. An officer should be in the Launch Control room at all times when personnel are in the silo. As one of his safety duties, he should maintain a log to monitor the location of personnel within the silo. Investigators in the silo must keep the silo coordinator advised by field telephone of their movements as well as progress.

Teams at lower levels are at a disadvantage. Bits of concrete may be kicked through the grating by work groups above. By the time these pieces fall a hundred or so feet and disturb other bits of concrete, the shower really thrills the receiving troops! It is amazing how big, brawny men can completely hide inside a hard hat until all the little bits of rock and debris have bounced off. Then they come out looking for somebody to punch in the nose! All movement in a destroyed silo has to be done "like on eggs." Safety belts and rope must be used while climbing, stepping across open areas, etc. Nothing is more needless or undesirable than an accident while investigating an accident.

CLUES AVAILABLE

Witness testimony, recorded console indications at time of accident, and knowledge from maintenance records will probably point to a specific subsystem as the prime suspect. A team of investigators should be assigned to thoroughly check and evaluate all portions of this system. The Atlas F LOX transfer system will be used for illustration.

First, insure that everything has been done to safeguard the working area, then completely check out the system. Don't make the mistake of leaping to early conclusions predicated on the discovery of a possible cause factor. For example, the discovery of a valve broken off its normal bracket might not be the cause but could later prove to be a result. Thoroughly investigate the system, from the storage tanks through the transfer system, and into the missile. Be sure to note and photograph any suspected abnormality. Take sufficient pictures, measure alignments, and use available technical advice prior to disassembling portions of a system. As much care should be taken in removing parts for topside scrutiny as was taken in the original installation. Ends left open after disassembly operations, as well as parts going topside, should be covered with pliofilm then taped. Identification tags should be wired on all removed parts, regardless of their size or seeming importance.

After a complete system or part of a system has been checked, efforts should be directed into allied or directly related systems until all possible cause factors have been eliminated.

In the interim period, the Accident Board Explosive Material and Fire Pattern Group joins the Launch Complex Group for their portion of in-silo investigation.

The Launch Operations and Witness Group and the Maintenance Inspection and Records Group continue to provide information throughout the course of the investigation and are available for obtaining, confirming, or refuting data for the Launch Complex Group. If a suspected item or system is coming to the foreground as a prime contender, all pertinent facts should be extracted from maintenance records to complete the package.

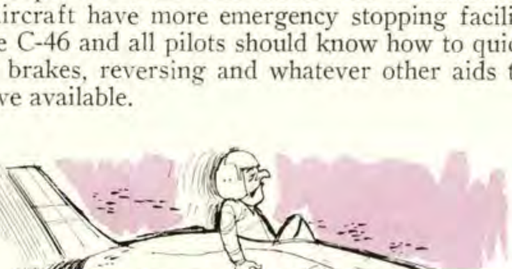
If all available leads seem to have been exhausted, it is possible to proceed by logic. Taking all KNOWNS into consideration, it is likely that a reason for the mishap can be determined. For example, in conjunction with the sequence of events it might be concluded that a particular event was caused by a specific system malfunction. The basis of this conclusion is the Accident Board's knowledge from confirmed and verified witness testimony that: (a) certain lights gave particular indications at a given time; (b) a piece of support equipment performed abnormally during the countdown; (c) detector alarms functioned or, conversely, didn't operate as they should have when they should have; (d) debris within the silo gives, or does not give, evidence of having been deformed by fire prior to or after the explosion. Investigating personnel should then direct their efforts toward either proving or disproving their theory.

The function of each subgroup of an Accident Investigation Board is to determine, then present to the voting members of the Board, their concept of what happened, how it happened and recommendations to preclude recurrence. The Board members must critically evaluate all presentations and agree by a majority vote that certain things did happen and were caused by a particular malfunction or error. Therefore, the group investigating in the silo has to be most thorough and complete in their presentation and opinion as to the cause of the mishap. They are the hardware experts and are expected to come up with the answer in most cases.

As a recap, the job in the silo is a dirty one. It is very tiring and dangerous climbing up, down, around, and through, but when the team finds the "Golden Easter Egg," it is most gratifying. The recommendations your Board makes may prevent future silo blows and save lives as well as a valuable silo-missile complex. ☆

Rex Riley's CROSS COUNTRY NOTES

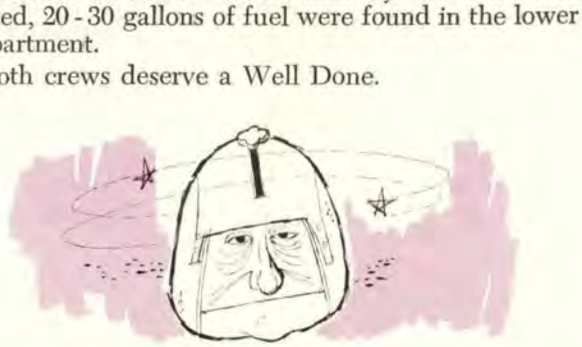
AH, C'MON HORSE, WHOA! Rex was reminded of the cartoon of the rider desperately hauling on the reins as his horse went over the cliff when he heard about this C-46 driver. Seems he felt the left brake pedal becoming squishy right after he turned into the parking ramp area. A quick check of the brake hydraulic gage confirmed what the left foot suspected—the pressure was falling rapidly. The flight engineer immediately began actuating the emergency hand pump. No luck. Since the aircraft, in which the crew had now become passengers, was heading directly for a parked C-130, the pilot applied left throttle and started a wide circle. The C-130 was missed and, after a three sixty, the airplane being in a relatively clear area, the pilot tried to continue his circling as a means of getting the thing stopped. But, as the transport slowed it began to straighten out and line up nose to nose with a KB-50. This time distance did not permit the out turning maneuver, so they cut the switches and waited. Collision with the KB-50 stopped the errant C-46. Looks like these troops did their best under the circumstances. Some aircraft have more emergency stopping facilities than the C-46 and all pilots should know how to quickly use air brakes, reversing and whatever other aids they may have available.



KUDOS TO REFUELING CREWS! Rex sometimes points the finger at offenders but he also believes in giving a pat on the back when it is due. Consider this one: A couple of KC-135's were refueling when the O-ring seal in the manifold fuel line of the receiver failed and the cockpit was drenched with JP-4. This crew acted fast. They disconnected, turned off all electrical equipment, went to 100 per cent oxygen and started an emergency descent.

The crew compartment was a mess, insulation and floor padding saturated, heavy fumes. The other airplane followed them down, then took the lead so that the receiver could follow. Lead made radio contact and led the receiver into a safe landing. After the aircraft had been abandoned by the crew and isolated, 20 - 30 gallons of fuel were found in the lower compartment.

Both crews deserve a Well Done.



HOW AN OHR CAN HELP. When things have gone wrong there are several actions the victim can take. He can tell his tale of woe at Happy Hour, or to the little woman, or his secretary—these actions tend to relieve the pent up feeling, but otherwise are ineffective. In the military there are means whereby the get-it-off-the-chest urge can be satisfied AND some good may be done as well. One of these is the OHR. Here's an example. A pilot had flown from the southwest to near his eastcoast destination, then began to get the "confused assist" treatment. Seems some of the info on his 175 hadn't been passed—he wanted to land at the Podunk Navy field, not the Podunk Municipal, and his bird was TACAN only. Trouble started when a helpful soul advised that his destination had only 5000 feet of paving. The pilot then tried for a nearby Air Force base. They didn't want him—official business only. He was cleared to a TACAN which he couldn't pick up—it was out but neither the pilot nor the controller had the NOTAM'd info to this effect. Then the controller's radar faded, fuel was low, positive identification was lost, the pilot noted he was off the coast and headed east, made a 180, squawked emergency, headed back for a pair of runways he had spotted earlier, was given steers and made a safe landing.

This one (Rex didn't go into all the details) fits all the requirements for the ineffective Happy Hour treatment. But this boy took the time and trouble to fill in all the details in an OHR. As a result, a complete investigation was made and action taken to plug the holes in the system.

A bonus result, and Rex quotes, "The incident had been referred to the Center's Training Department and the subject matter, with all the indicated deficiencies, has been included in controller training courses and crew briefings." ☆

FAA ADVISORY

Bob Terneuzen, FAA Liaison Officer
Directorate of Aerospace Safety

ARE YOU PAINTING ME?

During the past several months numerous letters have been received from USAF pilots requesting information concerning the different types of radar equipment used in the air traffic control business and how these systems are used. Let's look at this equipment.

Primary radar (also referred to as search radar or skin paint) is that system used to provide service wherein no cooperative radar equipment, i.e., radar beacon or transponder is required aboard the aircraft. Many factors, such as aircraft speed, direction of flight, altitude or type of aircraft limit the usable range of primary radar. Narrow silhouette aircraft (T-33, F-100, etc.) usually present poor target returns to a controller through the primary system. Identification of an aircraft with this system is limited to either cooperative maneuvers by the aircraft when requested by the controller or position reports given by the pilot when over identifiable fixes appearing on the controller's radar display. On the other hand, it has the advantage of not requiring special equipment aboard the aircraft and can be used within its limitations by any pilot having two-way radio.

It is through the use of the Primary system that the controller is able to identify areas of precipitation and thunderstorm activity. As you know, through reading our previous articles concerning weather observed on radar, the controller can never be sure that he is identifying all areas of adverse weather.

A secondary surveillance radar system, more commonly referred to as Radar Beacon, is usually associated with the Primary radar system. This system, when installed, may be operated independently of the primary radar, or in conjunction with it. It requires that the aircraft be equipped with a "transponder" which is triggered by the ground equipment and replies on a selected aircraft code. The advantages of the radar beacon system are that usable range is greater; radar reflectivity of the aircraft does not affect the return, and by use of selected codes, or the "IDENT" feature of the aircraft transponder, radar identification can be established without requiring maneuvers of the aircraft or detailed position reports by the pilot.

In today's system, the low altitude controller (usually below FL 240) will use radar information from both of the above systems simultaneously. This is necessary because he controls aircraft that may or may not be equipped with a transponder. The high altitude controller (generally above FL 240 and Area Positive Control Airspace), on the other hand, normally uses radar information from the radar beacon system alone. This is possible because aircraft operating in this airspace are required by regulation to be equipped with a functioning transponder and the controller can avoid displaying the many unnecessary aircraft targets that would be received through the Primary radar system. Primary radar will normally be available, however, to be used by the high altitude controller to supplement his radar beacon information (to the extent that it does not derogate his display) when he needs it to provide weather data, information regarding chaff drops, and as a standby for radar beacon or transponder failure.

As most USAF pilots realize, each air route traffic control center utilizes more than one radar system. These radar systems generally appear at more than one control sector, within the center, and are arranged so as to form an overlapping picture that precludes the complete loss of radar services should one radar system fail. Regardless of this fact and of the reliability of the radar systems described, never become complacent to the degree that you find yourself entirely dependent upon the ground radar system to determine your position in space. Provide a secondary back-up system of your own through constant reference to other navigational aids. In addition, when relying on radar traffic information issued by a controller, remember that because of poor target quality some aircraft may not be showing a target return on the radar scope.

Keep alert and look around to stay alive! ☆

HEAR YE HELO HANDLERS

1/Lt Bruce S. Washburn, Det 23 Central ARC,
K. I. Sawyer Air Force Base, Michigan

Have you ever taken the front off a piano, you know the piece that holds the music on an upright model, and just sat there doodling around the keyboard, watching gadgets move? One fingered novice or virtuoso, it is simply fascinating to plink away at the keys, watching this little hammer strike that little wire, and listening to the ring of the notes. Try it sometime.

But in the meantime, what does tinkling the ivories have to do with that syncopated bumble bee called a helicopter? Just as the sweetness of the music depends on the skill of the artist and the tuning of the instrument, so the successful mission requires a proficient pilot and crew in a sound machine. Leaving the condition of the aircraft in the excellent hands of the maintenance men, let's emphasize a few pointers in the operational field where hitting a wrong note could raise unholy din and discord if things broke the wrong way.

First, let's consider indoctrination of the operational control commanders, many of whom have never set foot inside one of these gyrating machines. Down he comes to your operational section for an orientation ride to familiarize himself with chopper capabilities. Beware the pitfalls of overdoing it and casually wringing out the bird from redline to redline! If the man had any previous knowledge of helicopters he will probably be silently praying for his life as he watches the gages wind and unwind, and good old terra firma slowly but surely spin into orbit. Or, if he never rode the quivering creature, he will probably endure the ride bumpily and not so blissfully, and come away with some gross misconceptions about the machine and the "idiots" who fly them. Things that happen on the ride won't be forgotten and will be translated in all innocence into some weird mission requests at a future date. Give him a good background of sound information on the realistic capabilities of the helicopter, not some animated ideas of a Disneyland cartoon. As pilots, you should realize you will have to say "No" to a mission involving more than a little element of calculated risk. And the look of the eagles or stars can be mighty persuasive to the bars.

Remember, those not qualified as helo pilots can be expected to have a lot of misconceptions.

Watching a helicopter show on TV doesn't help. Civic minded councilmen and civic minded commanders could conceivably come up with some strange notions. It is perfectly obvious to any chopper pilot with an ounce of common sense and caution that a church steeple is no place to hang up a career if something goes wrong. Commemorating local history by hanging an eagle-shaped weathervane on the thing may be all right, provided the stunt isn't attempted using a chopper as the stepladder. There are many signposts along the way to make a professional helicopter pilot say "No" to the suggestion of such a preposterous mission.

Pilots should remember that investigation boards show no sympathy for prestige hunters. Rescue commanders stand behind pilots as far as they can, under the concept of the calculated risk, but the essence of this concept is that calculated risk is justifiable only on a life-saving mission. And, should a powerless bird slither down the steeple not even the calculated risk concept can be stretched enough to cushion that sudden stop.

A large amount of helicopter flying time is in direct support of the transport mission and the missions of the technical support services of Air Force Communications Service, Air Weather Service, Air Photographic and Charting Service and Air Rescue Service. With a substantial percentage of allocated flying time used up on actual missions, less time is spent on missions strictly for training. When the pressure of the actual mission with its rigid performance requirements is off, there is a temptation to relax standards of personal and aircrew discipline, as when flying around the flagpole. Don't succumb. Just because you are not out to pick up an ejected pilot from a snowbank, there is no reason to ease up and compromise in standards of aircrew discipline. The pocketbook is where it hurts the most, and there is no big umbrella of financial immunity if a bird gets bent while hedge-hopping or hover-buzzing on a training mission. Tomfoolery is hardly the intent of the operational leeway allowed a rescue crew commander in exercising his good judgment. If not for yourself, give your superior a break and make no compromises. He will be shaking in his boots right along with you if you roll one of those HH-43B Huskies or any other helicopter into a little magnesium ball.

Because so often the pilot is the only "on-scene" individual with the technical helicopter know-how, his responsibility is great. He must use good, mature judgment based on fact, never emotion, no matter how heavy the pressure. ☆

SNOW, SLUSH, DENT 81 AND POT 1

Have you ever heard a snowball build up? The following was overheard on UHF at about 0900 hours one wintery day. The players, in order of appearance are:

Dent 81 – the aircraft.

Pot Control – a command post.

Pot One – commander of the local unit.

"Pot Control, Dent 81, over."

"Dent 81, this is Pot Control, go ahead."

"Roger, Pot, Dent 81 is six zero southeast. Approach control advises you have 600 feet and one-half mile, with an RCR of five. We plan to divert to our alternate due to the condition of your runway. Over."

"Dent 81, Pot Control, stand by while we advise Pot One of your intentions."

(There followed a one or two minute pause.)

"Dent 81, Pot Control. Pot One advises that he is in his vehicle at the edge of the runway, and that the runway is not in as bad a condition as the RCR indicates. Over."

"Pot, Dent 81, we are rather heavy, about 5000 pounds under our max landing weight and the charts indicate a landing would be unsafe due to the excessive stopping distance. Over."

"Roger, stand by one."

(Another one or two minute pause.)

"Dent 81, Pot One advises that a C-130 just landed and encountered no difficulty. He reported the braking action was fair." (C-130's have four huge, reversible propellers.) "Pot One said he doesn't think you will have any problems and suggests you give it a try. Over."

"Pot Control, Dent 81, roger, we are four zero east and will make an approach. Out."

"Pot Control, out."

Now the radio is silent and we eavesdroppers go on about our chores. We look up just in time to see a most magnificent spectacle. Have you ever seen a big jet come whistling down a runway, spoilers up, snow and slush blowing out behind, rapidly running out of runway? A truly inspiring sight. Dent 81 came to rest on a graded area, on the centerline, about 200 feet off the runway. No real damage to the airplane, although I understand it required quite a few new tires. I believe Pot One will hesitate before recommending a pilot land when the flight manual indicates it would be unsafe.

Things can look a lot different from the driver's seat of an automobile at zero knots than they do from the driver's seat of an airplane at 130 knots.

In the winter things have a habit of snowballing. ☆

Aerobits

SNOW BANKS AND ICE CHUNKS— The co-pilot was taxiing the KC-97 from the left seat under supervision of the IP in the right seat. Moving down the ramp and heading for a taxiway, the right tip-tank struck a snow drift, damaging the tank and allowing fuel to spill out. The taxi line and snow drift had been clearly marked with red dye marker, but due to a sudden thaw the dye marker had become obliterated.

And now for ice chunks—a twin jet. During flight at assigned altitude of 20,000 with no icing, no freezing precip nor snow forecast, the aircraft encountered moderate to heavy ice. A higher altitude was requested, but ATC was unable to grant the request. A short time later an attempt was made to vector the aircraft around the precipitation areas. In the process the aircraft was cleared to descend to 12,000. While passing through 16,000, structural ice dislodged and was ingested. Immediate flameout occurred on both engines. Restarts were successful and the aircraft was diverted to a nearby field where a successful landing was accomplished.

FUN IN THE SNOW. Every once in a while the fact that snow on the runway makes for longer takeoff ground runs is reproven. Early this winter it was done, in duplicate, by a couple of our multi-engine jets. The highly qualified instructor pilots planned their takeoff rolls at 8600 feet, critical field length as 10,700 feet. The first to go appeared to qualified observers to be considerably in excess of the planned 8600 feet. Next man's turn. For the second aircraft, a qualified observer stationed himself in a position to measure the unstick point. The second aircraft broke ground between 10,200 and 10,400 feet or 1600 to 1800 feet in excess of planned roll. Light snow was falling at the time, visibility reported as one and one-half miles.

Prior to these incidents snow had been cleared from both aircraft and, earlier, the runway had been plowed. At takeoff time it was estimated that loose, dry snow had accumulated to a depth of one inch, with isolated depths of two inches. Subsequent experimentation with the Dash One chart for snow covered runways disclosed that if the average depth were estimated to be 1.2 inches, and one-third of this was taken as the value for the loose, dry snow, the computed takeoff run of 8600 feet projects to 10,200 feet.

Some do, some don't. In previous "tests" aircraft have failed to make it and bashed off the far end. A little more snowplow exercise would seem to have been in order, especially before No. 2 ran his "test."

F-101 YA' BETTER BELIEVE. The left overheat light began flashing while the aircraft was on final of the fifth strafing pass. Throttle was retarded to idle and the light went out after about three seconds. The engine was operated at idle and the aircraft returned to base. On final, with the engine still at idle, the left overheat light came on again when the airspeed was decreasing through 200 knots. The left engine was shut down. The light went out. No further difficulties.

Cause: bad overheat connector.

ICED-UP GOON—Overseas, the C-47 departed a north country base en route to a middle Europe destination with a passenger stop en route. During the descent for the passenger stop, mixed clear and rime ice was observed to be building up on the wings. Carburetor heat and propeller deicing were used, but deicer boots were not operated. The aircraft remained on the ground for 20 minutes, during which time the engines were kept running. The aircraft was then cleared for takeoff.

Takeoff run was normal, but when the aircraft became airborne it began to roll to the left. Aileron and rudder were used, but were not effective. The throttles were then retarded. The left wingtip and left main wheel struck the ground to the left and at the far end of the runway. Both wheels then made contact with the ground and the pilot was able to keep the aircraft righted and roll across a grass area at a 45-degree angle to the runway. The aircraft was stopped with no further damage and inspected. The left wingtip had been damaged beyond repair and the outer aileron tip and hinge received minor damage. The pilots stated that there was ice on the leading edge of the left wing when they got out and inspected the aircraft. Weather at the time: Wind 13 knots directly down the runway, visibility two kilometers, light snow, 1500 scattered, 2000 overcast, temperature minus one, dewpoint minus one, altimeter 29.96.

GEAR UP BEFORE CLIMB ESTABLISHED-BELLY LANDING—Recently a pilot retracted the gear before a climb was established and the aircraft settled back to the runway for a belly landing.

It has happened before, but this fact is no consolation to the pilot involved who was charged with pilot factor by the board, which could find no other possible explanation for the accident.

Possibly this type of accident will occur again. However, in the interest of prevention, all pilots should be reminded that unless a positive climb has been established, the gear should not be retracted.

The days of the "Hot Pilot" went "thataway" many years ago, but every now and then one still crops up.

Lt Col Eugene J. Budnik
Directorate of Aerospace Safety

F-105 SHUDDER. On final for a low level bombing run at 560 knots the aircraft seemed to shudder. The pass was aborted and a climb initiated. Instruments were checked. No discrepancies. The aircraft was flown back to base. On post flight inspection the aft fairing on the right 450 gallon drop tank was found to be missing. The screw holes had elongated through continual airborne vibration allowing rivets to loosen and fall out.

T-29 DROP IN FUEL PRESSURE. The Dash One explains three ways of handling this problem in flight. Here are the symptoms and the solution as used by one crew. Climbing through 10,000 feet the right fuel pressure was noted at 19 psi. The booster pump was turned on. The pressure increased to 22.5 psi, then slowly fell to 22 psi. Approximately five minutes after level off at 11,500 feet the booster pump was turned off and pressure dropped to 17 psi. The fuel low pressure warning light did not illuminate and the engine continued to run smoothly. The propeller was feathered and a single engine landing made without further difficulty. Investigation revealed that the fuel balance line had been improperly torqued, causing a kink in the line that prevented proper pressure regulation with increased altitude.

Aerobits

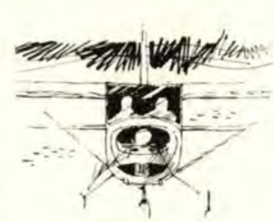
WEAK WINDSHIELD—A couple of pilots had a harrowing and painful experience when the left windshield of their TF-102 blew out during flight. The aircraft was straight and level at 40,000 feet with a cabin altitude of 18,000. Airspeed was .82 Mach. Suddenly the windshield failed causing explosive decompression and a cockpit full of flying glass. Both men received injuries.

The oxygen mask of the pilot in the left seat was blown off and he suffered hypoxia. Aircraft control was lost. The man in the right seat managed to regain control and place the mask over his partner in the left seat who recovered enough to assist in reattaching the mask. Noise, windblast and glass fragments made communications, control and seeing extremely difficult, especially for the night landing.

This crew got a lot of help from a wingman, GCI and Approach Control, which enabled the pilot in the right seat to make a successful landing. Later, both pilots' oxygen masks were declared unsafe for further use.

The windshield had been installed new just 29 days prior to this incident. However, about three weeks before it failed, the windshield had been struck by a bird while the aircraft was at low altitude, traveling at 250 KIAS. Following the birdstrike, the windshield had been cleaned and inspected with no damage found.

PIT STOP—The Cessna, with pilot and three passengers, landed after dark. Since the aero club runway and ramp were not lighted, the tower gave the pilot permission to land on the main runway and park on the ramp. The landing was routine and the pilot waited at an intersection for the Follow Me truck. When the truck arrived the pilot turned off the landing lights so that the driver would not be blinded. He then began to taxi toward the truck with lights out. When the Follow Me vehicle turned to direct the aircraft to the proper taxi route, the pilot turned on his lights and saw a refueling pit immediately in front of the aircraft. He tried to stop, cut the throttle and turned off all switches, but the aircraft ran into the curbing and base of the refueling pit. There were no injuries but there was extensive damage to the aircraft.



WHAT ELSE CAN GO WRONG?—A B-47 crew returning home in an aircraft that had just gone through modification had their hands full when:

- The forward main gear failed to retract fully.
- During recycle, the aft main failed to extend fully and had to be extended by the ELGE system. (Gear was left down for remainder of the flight.)
- Prior to takeoff at base where mod was made, fuel flow on engines 1, 2 and 3 dropped to zero but came up in about a minute. On runup prior to takeoff, No. 2 hung up at 65 per cent. This sort of thing continued throughout the flight along with an oil pressure indication of zero on one engine.
- No. 4 generator and No. 5 alternator went off the line.
- Weather deteriorated at home so aircraft diverted to another base.

After a visual gear check by a T-33 pilot, a GCA was made and the aircraft stopped on the runway to have downlocks installed. Then during taxi, No. 1 accelerated slowly and 2, 3, 5 and 6 would not respond to the throttle.

When Maintenance checked the aircraft it was found that a main gear circuit breaker was found to be popped and serious contamination had occurred in the main fuel tanks (metal particles, sand and fibre particles).

WELL DONE

MAJ RICHARD B. HUNT

CHIEF, FLIGHT OPERATIONS DIVISION, LOCKHEED AFPRO, PALMDALE, CALIFORNIA

Major Richard B. Hunt's performance in handling a double emergency in a TF-104G has earned him a Well Done.

On 17 March 1964 Major Hunt was flying a first Air Force acceptance flight in a TF-104G. While performing a specified test Major Hunt noted sluggish operation of the engine nozzle system. Upon subsequent throttle advance, the nozzles closed partially and then failed to the full open position, resulting in practically total loss of thrust. Major Hunt declared an emergency and proceeded toward Edwards AFB. After two unsuccessful afterburner light attempts, the emergency nozzle system was successfully activated and a routine precautionary landing pattern was entered at Palmdale. At approximately the low key point in the precautionary landing pattern, Major Hunt detected and correctly diagnosed an insidious failure of the airspeed indicating system wherein the airspeed began indicating approximately 100 knots higher than the correct airspeed.

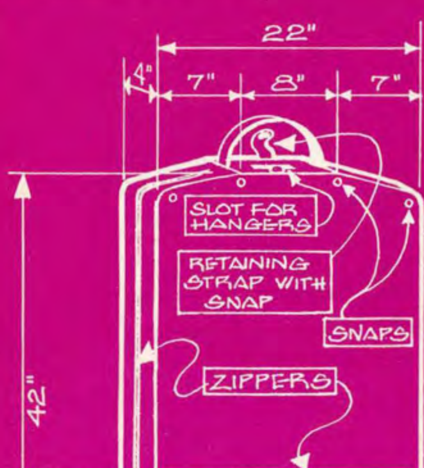
The precautionary pattern was continued by flying a combination of power and attitude. Major Hunt successfully touched down less than 1000 feet down the runway in a normal, slightly nose high attitude (the indicated airspeed was 295 knots at touchdown). The landing roll was completed normally and a turn off the runway was made at an estimated 15 to 20 miles per hour (indicated airspeed now 145 knots).

The cause of the first emergency was failure of the engine nozzle pump. Foreign material in the pitot-static lines caused the airspeed indicator to malfunction.

Major Hunt's skill and judgment reflect great credit upon himself and the United States Air Force. WELL DONE!

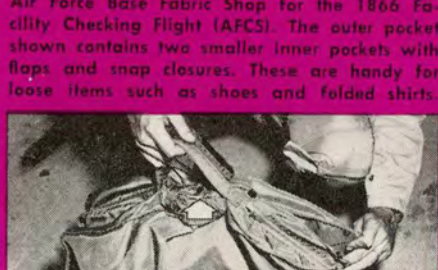
TRAVEL POD

Contributed by Capt Robert L. Giordano
1866 FCF, Hq AFCS, Scott AFB, Ill.



The clothing bag was designed by the Scott Air Force Base Fabric Shop for the 1866 Facility Checking Flight (AFCS). The outer pocket shown contains two smaller inner pockets with flaps and snap closures. These are handy for loose items such as shoes and folded shirts.

Short strap at top of bag snaps over reinforced slot for clothes hanger hooks. This effectively seals the opening and provides a retainer to keep hangers from dropping into the bag when carried by handles. Note full length heavy duty zipper along bag.



Bag is folded and four snaps are provided for securing the bag for easy carry by the handles at each end. Note clothes hanger hook retained by strap at reinforced slot. Material is sage green nylon twill which is not moisture proof.

Fiberboard panel designed to fit the floor of the T-33 baggage pod provides cut-out handle for easy pull out and loop for hooking clothing bag. Bags may be stowed folded with the first bag hooked leaving space for the second, or stacked and both hooked.

☆ U.S. GOVERNMENT PRINTING OFFICE 1965 751-214/5