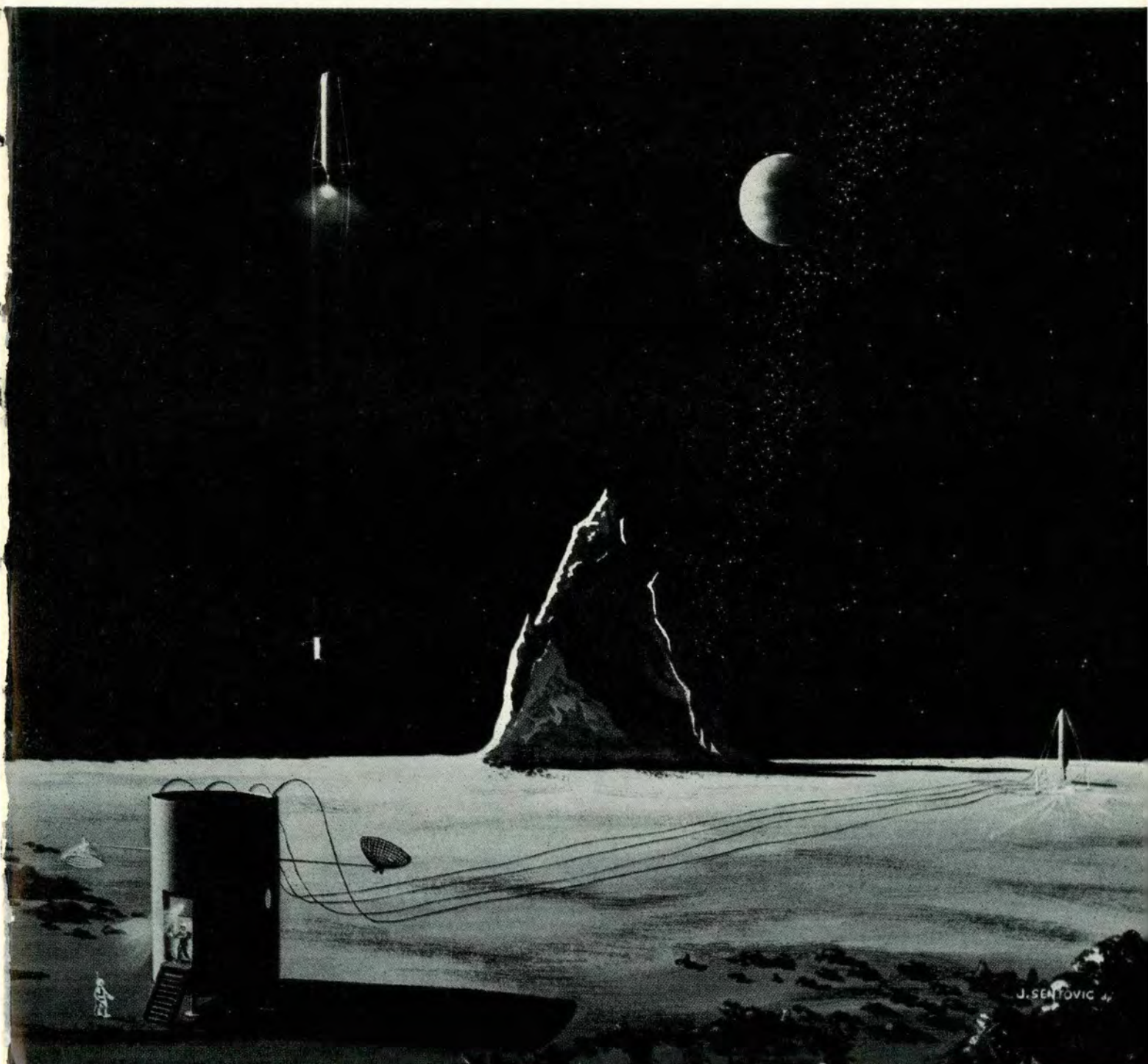
AEROSPACE

SAFETY

UNITED STATES AIR FORCE



JULY 1960 • FLIGHT PREPARATION

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In This Issue

CROSS · FEED LETTERS TO THE EDITORS

A Matter of Form

Your article "A Matter of Form" in the April issue has been read with great interest and has also created much valuable discussion here. I think CMSgt Cauthron and SMSgt McCambridge did a wonderful job in their question and answer contributions.

I have a question in mind: During our discussions of this article I noted that some people are under the impression that Block A on 781 Part II is for items such as PO *(postflight)*, PR *(preflight)*, and FCF *(functional check flight)* only. My interpretation is that any major maintenance, although the word "major" has been extracted from the 00-20A-1, is to be entered with appropriate symbol and signed off either by the supervisors or printed from the inspected column of the 781A. Any help to clarify my question will be greatly appreciated.

Flying Safety Magazine is valuable to us. I think the sergeants covered the subject very nicely, especially the section on pilots' responsibilities on the forms.

TSgt Thomas E. Moore, AF14272657
Tech Air Adv. Delaware ANG
New Castle Co. Airport.

Provisions are made in Block A for inspection status AND maintenance actions required prior to the first flight of the day. Follow the instructions in Par. 5-43, T.O. 00-20A-1 and you can't go wrong. Thanks for the nice words, Sarge.

• • •

Above or Below Ten

The age old problem of misreading the 50,000′ altimeter still creates a hazard. In this regard I have observed a point of interest which could be very helpful. Possibly 99 out of 100 pilots are aware of this and I've just now woke up—but here it is for what it's worth.

The 10,000′ indicator is attached to the small outer disc. Printed on the small outer disc are the letters "ALT." When the 10,000′ indicator is rotated clockwise to any value above 10,000′ the "ALT" also rotates. Therefore, any time the aircraft is above

10,000′ the "ALT" is not setting in a horizontal plane, but almost in a vertical plane. When the aircraft is at 20,000′ or above, the "ALT" is to the right of the zero indices and in a partially inverted position.

Now for the meat of this: When descending, if the "ALT" is to the left of the zero indices, you are *below* 10,000′. *(PHOTOGRAPH)*

Bernard J. Hughes
Project Pilot, NAFEC, *(FAA)*
Atlantic City, N. J.

• • •

Charts et cetera

Over a year ago I reached the fission point and exploded my anger and frustration all over a couple of pages of correspondence and dispatched the entire contaminated mess to your office. Somehow you were courageous enough to print part of it in the Crossfeed section of the November 1959 issue. The device that triggered the blast was the then new FLIP, Low Altitude Enroute Chart; High Altitude Enroute Chart, et cetera, et cetera!

For more than 365 days I've remained an extremely unstable, radioactive mass that needed only to approach an en route navigation kit and—Whammmo!—another mushroom cloud. All this

PUTTING ON A NEW FACE

In keeping with the changing weapons of the modern Air Force, official publications such as *Flying Safety Magazine* must also change if they are to reflect accurately what is going on today. Therefore, with this issue—after almost 17 years—the name of this publication has been changed to *Aerospace Safety* and will contain an increasing amount of information on missile and nuclear safety subjects.

The age of military ballistic missiles is here with the recent organization of operational units employing such weapons as the Atlas and Thor. And since aircrews and FSOs have long been concerned with safety problems of air to air and air launch ballistic missiles, the increased emphasis on missile safety is certainly warranted. Further, we can expect soon to have manned missiles and be faced with the myriad problems attendant to this historic event. Just as the jet brought problems peculiar to itself, so will the manned missile. But basically, most of our future problems will probably be traced to the same source: human and materiel frailty.

In the testing phases of the now operational missiles, the Air Force has employed its past experience in accident prevention with increasing success. There have been failures, of course, and there will continue to be. This is to be expected in any new venture. But when men mount the missiles, efforts toward accident prevention must be even more precise and thorough. Much has been learned in the testing phase; now the lessons learned must be amplified and applied in operational units.

Aerospace Safety can be a prime tool in the safety education of the missilemen of today and the future. It can become this only if the necessary accident prevention material is made accessible to it. Some of this material will become available in the files of the Directorate of Flight and Missile Safety Research, but most of it must necessarily come from the men of the operational units. We trust that the men of these units, like the men of the flying units before them, will consider this magazine their clearing house of safety information so that all may profit from the knowledge gained.

F. D. H.

Cover illustration by J. Sentovic, Convair/Astronautics

abnormal explosive activity reduced my nervous system to a batch of loosely joined, supersensitive scars. My friends no longer call me "Good Ole Jack H." I became, frankly, a nefarious, iniquitous, surly chief pilot, impossible to placate. The result was a promotion and an assignment to Staff and Command College. I must be grateful.

But, being completely fagged, a bit lonely and nearly blind, I was esthetic when the pilot issue of the new FLIP chart series reached my desk. Believe me, much time was devoted to evaluating the product and filling out the reaction form. I also know our WESTAF recommendations were the culmination of a myriad of sound suggestions from the transport units.

My initial reaction was that the ACIC troops, including my once again old buddy, "Mike" Kelly, did good. If the relatively minor format changes are adopted and if a decent holder is provided and if a usable planning chart is evolved, then I will regress to my normal sloppy, gregarious self and cease being springloaded to the Perpetually Omophagous position.

Capt. Jack H. Wrinkle
Hqs WESTAF, Travis AFB, Calif.

Our Gal Friday went to look up the word "Omophagous" and she hasn't been seen since.

• • •

Subscriber from Izmir

I'm the FSO of the Instructors Training and Standardization Squadron, Turkish Air Force, based at Gaziemir-Izmir. I had my flying training in the United States back in 1955 and since then have been a subscriber of *Flying Safety Magazine*. Last year I renewed it for another three-year period.

Even though there is a lot of information in the magazine, to be more helpful I am writing to ask about your FSO kits. I was very glad that you were sending them to me, but here's the trouble: they were not received regularly and some were missing. In fact, in the last six months I didn't receive any at all. If you've dropped my name from your mailing list I hope that you can put it on again because the limited number of kits you send to the Turkish Air Force are distributed to jet bases. I pay for *Flying Safety* from my own pocket and would pay for the kits too but I know they are not for sale, and anyway I don't have that much money.

Here is some information about our outfit. In 1958 we had only one accident in our squadron, and 1959 was an accident-free year. And during the past 510 days there wasn't even a single mishap. In this period we had emergencies, such as deadsticking airplanes down, but all of them were handled professionally without damaging the aircraft. I am sure that my Commanding Officer, my friends' understanding, your publication, and I—all together—made this possible.

I know I've asked for many items from you in this letter. But after all I give them back as flying safety, and we use T-6 and T-34 type airplanes. You know they are all American.

Thank you for reading.

Sadi KABAN
Lt. FSO, Std. Filo
Glaziemir-Izmir, Turkey

It's good to hear from you again. You're on the FSO Kit mailing list through your MAAG. Congratulations on the fine fly-safe record. Keep up the good work!

• • •

Eye Protection

I have read with interest and appreciation your articles on safety. I was rather startled, however, to note a photograph on page 6 of the April issue showing a very unsafe operation. The picture is at the top of the page and shows two airmen and one officer—without the benefit of protective glasses—intently watching a welding operation. I expect the hospital had three new additions with badly flash-burned eyes. I believe your pictures should graphically portray safety as well as the accompanying articles.

Lt Col Leo H. Vanderhoven
Asst Director of Materiel
Hqs 50th Tac Ftr Wg *(USAFE)*

We are pleased to hear from you, Colonel. A couple of other readers have already called our attention to the missing eye protectors.

The only sensible way to prepare yourself for flight is to...

TAKE NOTHING FOR GRANTED

Maj. Howard A. Olson, Director of Flying Safety, Western Air Defense Force

Not many aircraft accidents are formally attributed to *inadequate preparation for flight*, but many have at least one contributory ingredient that could have been eliminated if the preparation had been thorough.

At the Fifth Worldwide USAF Flying Safety Conference in September 1959, the seminar on Flight Preparation defined its problem thusly: To prevent recurring aircraft accidents resulting from inadequate flight preparation by:

- Motivating personnel to follow proper procedures in flight planning.
- Supplying aircrew and support personnel with adequate information, equipment, and facilities to perform flight planning duties.
- Insuring thorough preflight inspections of aircraft by aircrew personnel.

This is another way of saying that accidents can be prevented if *people use things the right way to get the job done.*

A flying organization commander might express the problem in this way: Are my men and machines properly integrated with the mission? But though he wonders, the commander can never really know unless he can crawl into the mind of every man in his organization. As evidence of the commander's dilemma, witness the classic post accident statements so often heard, like "I can't understand it! Klotznagel was one of the finest assistant flight commanders in my group," or "Old Eisenshard was the best instrument pilot in the umpty-umpth squadron."

What the commander *means* is, "I *thought* Klotznagel and Eisenshard were the best pilots. . . ." However, since the commander can't crawl into the mind of every man in his organization, check the torque and safetying of every nut, bolt, and screw on every airplane, and stand by the shoulder of every aircrew member who is flying or preparing to fly, we can't hang the rap on him. So, this flight preparation business turns out to be a subject of *individual, personal responsibility*. Based on this fact then, exactly what are you—as a pilot, a navigator, an R/O, or an engineer—supposed to do to prepare for flight? To put it simply, how do you—as a man—fit in with that machine in flying the mission? How are you to evaluate and prepare yourself, the airplane, and the plan to carry out your mission? Deciding which of the ingredients to examine first is something like the old chicken-or-the-egg problem; but for convenience and since it's the most universal and, up to now, indispensable of the ingredients, let's consider the man first.

You be that man! How well prepared are *you* to take that airplane out there on that mission you're supposed to fly today? Are you physically, intellectually, and psychologically ready? There should be no question about being psychologically ready. You *want* to fly! You *like* to fly! Nobody drafted you. You picked yourself to fly. You like the outfit, the money, the uniform, the work, the prestige, but most of all you really *like* to fly. But the Old Man has been on you about that late report and that weather penetration and landing last night scared the devil out of you—and then there's that PTA meeting tonight. Boy, are *you* ready!

Now, physically? Just whip out that favorite old picture of yourself, steely-eyed, brown, and lean of cheek, gut and flank: Aviation Cadet Rupert J. Wilmerding, the Hero of Elm Street, U. S. Army Air Corps. Compare it with what you see in the mirror. Too many martoonis? Alas, the breath is a little shorter, the belt line a little more deeply indented, the cheeks and flanks not so lean, the eyes not so steely as before, the hand not so sure, quick and steady. Are you as ready as you could be, Rupert?

Intellectually—do you *really* know what makes any airplane fly, and do you *really* know the airplane you are flying?

"Sure, let's see, now, rho vee squared over two is the uh, well, anyway, you take an airfoil and push it through the air and, well, wait a minute and I'll show you with my hands."

"Yeah, the ID-249 works off the 28 volt primary DC bus—no, I think it's the secondary monitored bus—. Well, I got it right on the questionnaire, anyway."

Friend, if this is *you*, you have some preparations to make before you even drive through the front gate at Oogahonk Air Force Base! Flying doesn't *need* to be dangerous, but it *can* be; and it certainly *will* be if you are no better prepared as a man than the above Rupert J. Wilmerding, Lieutenant Colonel, USAF, Command Pilot. Certainly you'd prefer to be referred to as "Old Rupe sure *is* a good pilot" instead of "Old Rupe sure *was* a good guy."

Flying can, and frequently does, demand the best of a man, physically, psychologically and intellectually. Seldom do you have the opportunity to *get* prepared. You must *be* prepared. Know yourself, your airplane, your job, your mission. Give your full attention to the flight while you are planning and carrying it out, and keep yourself physically and intellectually conditioned so that you can confidently and effectively do your flying job.

Now then, let's consider the machine. There it stands, that sleek, alert, beautifully precise assembly of steel, aluminum, rubber, neoprene, nylon, bakelite, copper, plastic, glass, paint, silk, leather, oil, compressed air, chewing gum, spit, baling wire and dreams. It has been filled, chocked, latched, placarded, polished, torqued, rubbed, inflated, screwed, pounded, tightened, thumped, loaded, twisted, pulled, adjusted, bolted, safetied, wiped, taped, tied, inspected, patted and signed off.

OK, Rupert, it's yours. Now, do you want it? This next step—or rather some oversight during the next step—has given more gray hair and created more moments of stark terror in flight for more pilots than would care to admit the cause of same gray hairs and moments of stark terror. The pilot is morally, legally, and irrevocably responsible for the condition of the aircraft that he has accepted for flight.

Granted, he must accept many things on trust, but studying the Form 781, checking the aircraft visually, and accomplishing the detailed checklist in the Flight Handbook, he can check quite thoroughly on the probable dependability of the aircraft. Too often, however, this inspection is carried out from memory. Too often, pilots become only memories because they have placed a mistaken trust in their own memory. Official Dash One checklists are published in pocket size so there is scant excuse for not using them in flight preparation.

These checklists are not cure-alls, however. When they are used complacently, when you look without really seeing, and miss an innocent-looking and obvious killer item, the checklist is useless. How many aircraft have crashed on takeoff with gust locks still installed, or nose armament doors not latched, or fuel selectors on empty tanks? You must *use* the checklist; *check* the items; *see* the things you're looking at, and *think* about what you see.

And finally there's the mission. The reason we have an Air Force is to exploit for military purposes the range, mobility, flexibility, speed, ability to penetrate and firepower delivery capability of airplanes and missiles *(I refer you to AFM 1-2.)* The airplane is a special kind of vehicle that is best used to move something or somebody from here to there in a hurry, with accuracy, dependability and effectiveness. In the military, at least, it has ceased being a toy, a flying carpet, a handy personal vehicle for going to Bowl Games, or a substitute for a psychiatrist's couch for those people who sublimate their frustrations by deliberately seeking danger, or by demon-

strating their unappreciated "raw courage." These elements have either been eliminated by wise legislation or have eliminated themselves by self-education or self-destruction.

When you lay on a mission or plan a flight, consider its purpose and what it will accomplish.

In planning a flight, nothing can be taken for granted. Weather, winds aloft, communications facilities and frequencies, flight procedures and airbase facilities—all are in a constant state of flux. While you were on that trip, the good ol' dependable home base radio beacon, for example, might have been reduced from 500 to 25 watts power, and the frequency might have changed from 234 kc to 342 kc. "NOTAMS, what NOTAMS? That's my home base; I can get in OK." Famous last words.

One of the peculiarities of today's military flying is that quite regularly, on one flight, the aircraft may fly over ocean, desert, mountain and arctic areas. Each of these surface areas poses special survival problems for a downed aviator. Every mission plan should have a prominent place for briefing and for emergency escape and survival equipment planning. Not only the probable but any reasonable contingency should be prepared for. Anything less, when techniques and facilities are available, is an inexcusable dereliction.

Frequently omitted, or only casually prepared, is the preflight organization and study of departure, route and terminal charts, procedures, and navigational aids. It is much easier to organize the necessary charts and aids before engine start than it is to hunt for them in a cramped, dark cockpit while you're flying the bird with your knees and trying to remember what the last altitude and frequency assignment was.

Probably the best single specific planning guide to come out of the deliberations of the Flight Safety Conference Seminar on Flight Preparations is what they chose to call the "Ten Point Flight Planning Procedure." It is a step-by-step plan for pilots to use while preparing their flight plan, themselves, and their aircraft for the mission. It can also be used by commanders and operations officers to evaluate their own flight planning facilities for completeness, organization and convenience to pilots. It is recommended that commanders and operations officers organize their facilities and procedures to guide aircrews through this or a similar flight preparation sequence:

- NOTAMS.
- Preplanning weather check and runway temperature.
- Flight Planning: *(a)* Form 21a; *(b)* Charts and publications.
- Fill out Form 175.
- Final weather briefing.
- Check departure plan.
- File Form 175 with clearance authority.
- Personal equipment check.
- Aircraft preflight: *(a)* Thorough walk-around inspection; *(b)* cockpit and interior check; study and sign off Form 781.
- Check and organize navigational charts and letdown publications.

The above flight preparation sequence is not guaranteed to stop all aircraft accidents. It is not a magic formula for safety but it is a step in the right direction. The pilot who intelligently uses this or a similar flight planning sequence will be much better equipped to accomplish his flight effectively and safely than he otherwise would be. ▲

• TWO POINTS OF VIEW •

"Yes sir, Captain, full fuel service, oil, oxygen, and de-icing fluid, she's all ready to go."

"!!#* Blankety-blank-big dumb nut. On takeoff I lost my dipstick and two tanks were siphoning fuel. Next time I'll do my own preflight."

THE MISSILE SAFETY PROGRAM....

...OFF THE GROUND

BrigGen Walter E. Arnold, Director of Flight and Missile Safety Research, left, and Col. G. W. Kinney, Chief, Missile Safety Division, DFMSR, right, examine the Atlas control panel during an SM-65 safety survey at Vandenberg AFB, Calif.

Getting out the word on the new Missile Safety Program has been a major effort with the newly established Missile Safety Division, Directorate of Flight and Missile Safety Research. Air Force Regulations 58-4, "Responsibilities for Missile Accident Prevention Programs," and 58-10, "Missile Accidents *(Reporting Regulation)*," have been published. The first Missile Safety Officer Special Study Kit also has been published and sent to the field.

Getting out this word has been followed by action: safety surveys have been conducted at Vandenberg, Francis E. Warren, and Suffolk County Air Force Bases. Of the many problem areas identified by the survey teams, the lack of current technical orders seems to be the major deficiency common to most units. Staff action to effect timely publication and distribution of technical orders is being undertaken. Missile Safety Surveys are planned for all ballistic missile weapon system sites and for all organizations, down to and including squadron level, within 30 days of their receiving a missile capability.

As mentioned earlier, AFR 58-10 describes missile accident reporting. In addition, a missile hazard reporting program is in air staff coordination, with early publication in sight.

The missile industry naturally plays an indispensable part in our safety effort, and liaison efforts are already underway.

The second Air Force-Industry Conference on missile safety was held at Riverside, California, on 1 - 3 June. Covering every phase of missile operation—from design to target—the conferees engaged in discussions on safety problems in design for military environment, simplified weapon system safety design for reliability and safety, safety problems generated by concurrency in weapon systems development and operational status, and the manufacturer's part in missile safety. Other topics discussed included liquid propellant engine safety programs, missile training problems in the Air Force, operational safety in missile weapon systems, and ballistic missile provisioning.

And another note of progress: plans to create Air Force-Industry Accident Review Boards to investigate selected missile accidents have been completed. The first of such boards dealing with the SM-65 Atlas has been established.

Also, efforts to furnish professional training for missile safety personnel are underway. Success in getting a university-level course established hinges upon the resolution of AFSC problems. Identifying Missile Safety Officers by AFSC has already been accomplished by the interim designation 0101, but new proposals are under study.

Missile Safety, like Flying Safety, will utilize the visual arts to get its points across. Programmed for production in the Fiscal Year 1961 are 50 reels of motion picture films dealing with Missile Safety to be produced by Air Photographic and Charting Service *(MATS)* for early release. A two-reeler on BOMARC safety is scheduled during the first quarter of the Fiscal Year 1961, as well as two- and three-reel films on GENIE, TITAN and HOUND DOG. According to the Education and Records staff, suggestions concerning motion picture ideas are welcomed by the Missile Safety Division.

Missile Safety, prominently featured during the last two Worldwide Flying Safety Officers Conferences, will share equally with Flight, Ground, and Nuclear Safety in the forthcoming First Annual Air Force Safety Congress. Seminar chairmen have been selected and topics assigned for study. As it shapes up now, this should be the best conference yet. More details on this will be provided in a subsequent issue. ▲

Countdown ...FOR SAFETY

17-16-15-14-13-12-11-10-9-8-7-6-5-4-3-2-1

John V. Neeson, Assistant Chief, Education & Records Br., Missile Safety Div., DFMSR.

It is X-1 Day. A chill salt spray from the Pacific Ocean whips across the ATLAS 576-B-2 coffin. 1st Lt. Don Regenhardt briefs his safety team on today's countdown for safety.

"Okay, fellows. Jeffers, you take the launch complex and Whitey, you take the fallback area. Keep in touch with me at all times. Jeff, don't forget to brief the new guys on the Missile Accident and Emergency *(MAET)* Team and make sure you check the mezzanine."

A 1957 graduate of the U. S. Naval Academy, Lt. John Donald Regenhardt is a 26-year-old Missile Safety Officer *(MSO)* assigned to the 1st Missile Division *(SAC)* Safety Office at Vandenberg Air Force Base, California. His responsibilities include "monitoring missile launches and other hazardous operations from a safety viewpoint." Scheduled to attend Massachusetts Institute of Technology to work towards a master's degree in astronautics, Don Regenhardt has been an MSO at Vandenberg for two years.

Supervising the countdown for safety is an everyday occurrence for him but it is never "routine."

Today, his job is to assure the safety of a double propellant loading operation of the Atlas ICBM. He is being assisted by TSgt Garland H. Jeffers and SSgt Jerome J. *(Whitey)* Schwartzhoff, missile safety technicians.

The countdown for safety is a two-day affair. An X-1 Day starts with Lt. Regenhardt reviewing the actual missile operation countdown with the Test Conductor or Launch Control Officer and noting any changes or innovations. Sgt. Jeffers performs the technical safety inspection to insure that everything is in safe condition prior to the operation. At the blockhouse, which contains the launch control equipment and consoles, Jeffers makes a physical inspection of the building and equipment. He checks for the proper functioning of blast doors, escape hatches and ventilation system. In case of missile malfunction, these items are very important to the launch crew. Jeffers also checks the cable tunnels to "insure that they are usable for escape purposes and that they are sealed at the blockhouse." After all, a missile is loaded with liquid oxygen and RP-1 fuel and if it should blow up, personnel must be protected from the blast and ensuing fire. Escape routes must be carefully checked in advance.

Lt. Regenhardt tests his communications with the pad and the fallback area. On the pad, TSgt Jeffers is busy. With the missile safety checklist in hand, he checks the powerhouse and the pump station to make sure that all pumps are operational and that all water is in storage. Since this operation is with a laydown-type missile, he checks the area and ground support equipment to make sure that loose objects are removed. His next step is to insure that the missile bay area and launcher area are clean of gas and fluid leaks and that all movable items are properly stored.

Today's operation is a double propellant loading. In effect, this means that everything will be done in connection with the missile to prepare it for flight except press the firing button. The preparation for the flight of a missile is a complicated and hazardous operation. Fuel and oxidizer when combined represent an explosive potential rivaling an equal amount of TNT. Pressurization —up to 8000 pounds per square inch—must be contained. The man who checks for even a pinhole leak with his bare hand by running it over a line may very easily draw back a bloody, mangled stump. And cryogenics *(that means bitter cold, boy—down to* MINUS *297°F.)* poses some other problems. Liquid oxygen, nitrogen, and helium are supercold. LOX is dangerous since it will rapidly combine with grease or fats creating highly explosive or fire producing gels. And the man who gets it on his clothes had better stay away from cigarettes until he changes garb, unless he is deliberately courting severe burns.

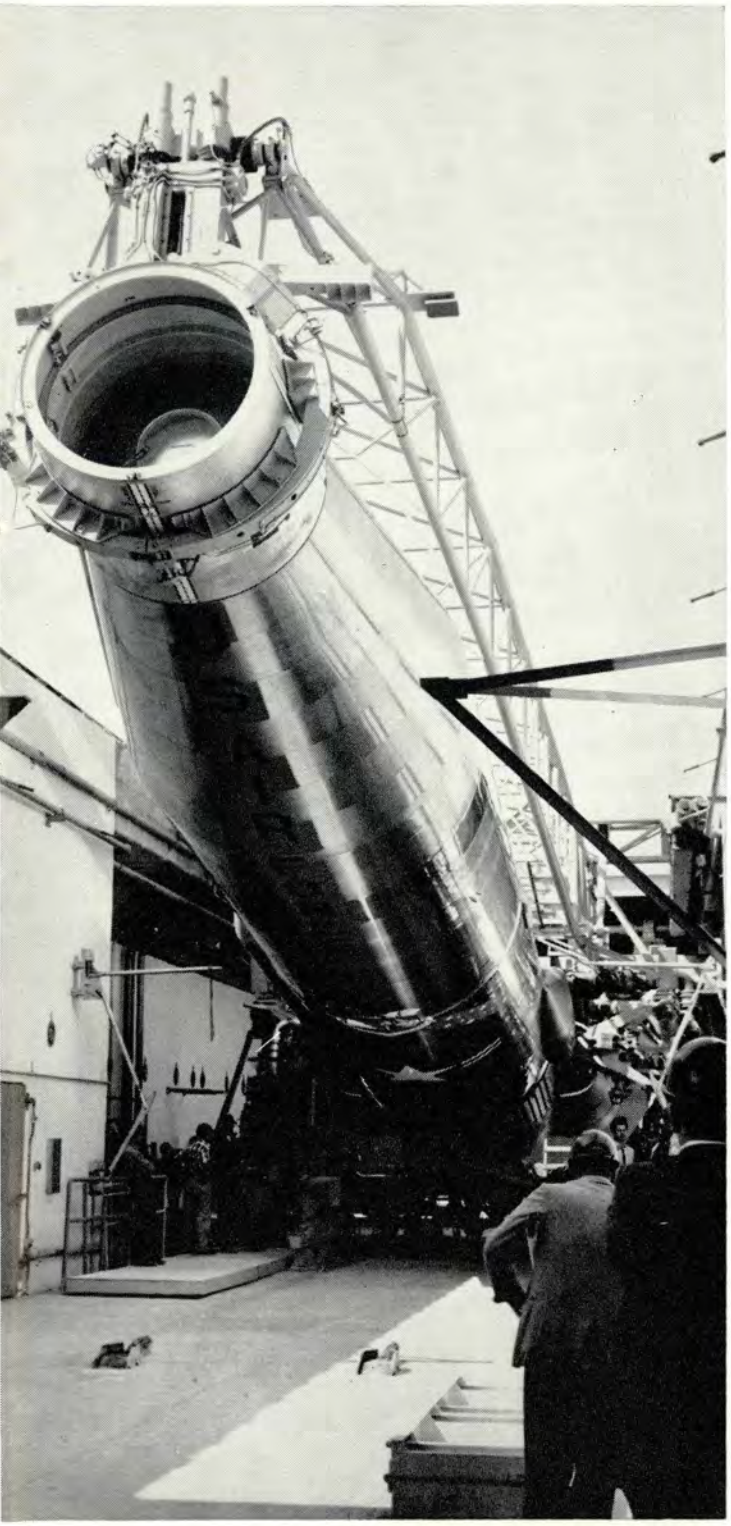
TSgt Jeffers has the job of making sure that pad personnel are aware of the dangers involved. He must make certain that good safety practices are being observed and that there are no physical hazards present.

He checks with the fire crew chief, SSgt Frederick F. Hines, and together they make sure that the fire fighting lines and nozzles are serviceable. They also check to see if the CO_2 bottles are in place and properly secured.

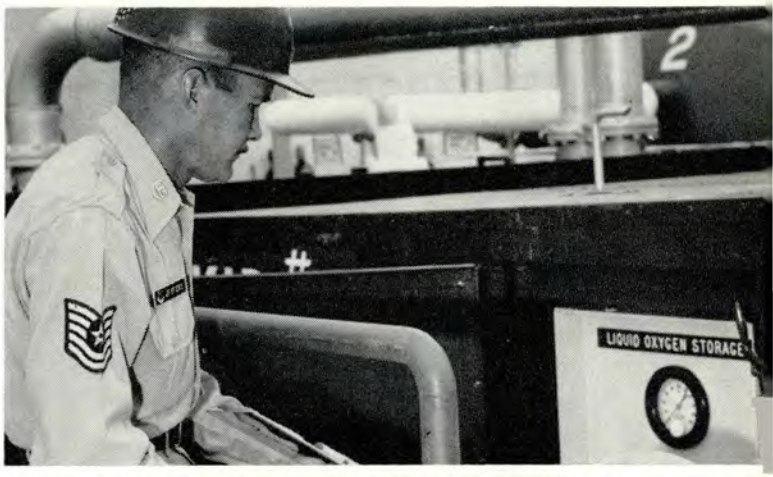
A native of Syracuse, Kansas, Jeffers is a veteran of 14 years of military service. He attended flexible gunnery and armament courses at Harlingen, Tex., and Lowry AFB, Colo., in 1942. He also attended the Ground Safety Course at the University of Denver, the Missile Safety Course at Chanute AFB, Ill., and the ATLAS Planners and Supervisor's Course at San Diego, Calif.

Describing his job as Pad Missile Safety Technician at

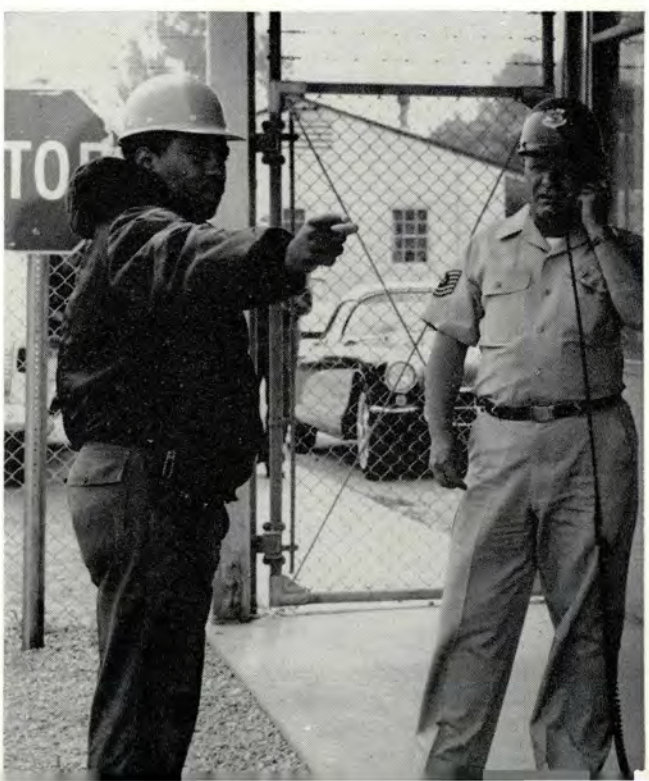
Machines raise the Atlas ICBM into vertical position on the launching pad at Vandenberg. When all hookups and connections have been made, the missile will be lowered to a horizontal position for storage indoors. The 6300-mile-plus range Atlas is SAC's mainstay.



1st Lt. Don Regenhardt at the Launch Control Safety Console signals "area clear" to the Test Conductor and Launch Control Officer during a double propellant loading exercise of an Atlas ICBM at Vandenberg.



In conducting the "Countdown for Safety," TSgt Garland H. Jeffers, launch complex missile safety technician, checks ground support equipment in advance of double propellant loading of an Atlas.



A/3C Alvin McCoy of the 392d Combat Defense Squadron points to a vehicle still in the "fallback" area and advises fallback area missile safety technician TSgt J. L. Peters that the area is not clear.

Vandenberg, TSgt Jeffers says it is both "challenging and interesting." He says, "This job is much different from other ground safety assignments I have held—say, like my last job at March Air Force Base. Here at Vandenberg, things are much different. There's a greater amount of more hazardous materials in a more concentrated area. Most of our people here are just now beginning to appreciate how hazardous some of our problems are. You might say that this appreciation grows on them with experience.

"The rinky-dinking that goes on, for instance, is more common with the newer men," Jeffers adds.

"Rinky-dinking" is performing an unauthorized operation or doing something regarded as patently foolish.

Jeffers queries: "Can you imagine the damage to hydraulic mechanisms when they're acuated inadvertently by some rinkydinker testing missile circuits with a jumper instead of the proper black box?"

Making the countdown for safety, TSgt Jeffers keeps his eyes peeled for unauthorized activity or evidence of unsafe conditions. On X-1 Day he checks to insure that the flame bucket and flame area are clean. On the coffin-type ATLAS setup, flame buckets of steel have been found unnecessary; they are now replaced with water-cooled concrete flame diverters.

Following this, the LOX storage area is checked for cleanliness, leaks and storage level. Gaseous oxygen *(GOX)* storage areas are also checked as are the manifold storage bottles used for nitrogen and helium. On the 576-B launch emplacement, the upper part of the missile hangar is utilized for terminal boxes and assorted electronics equipment. Called the mezzanine, Jeffers gives this a close check in line with Lt. Regenhardt's order. In the lower portion of the building, the Pressure Control Unit is thoroughly inspected to insure against leaks. Pressurization equipment keeps the thin-skinned ICBM inflated. Malfunction means the collapse of the bird and its probable loss.

An examination is made of the fuel transfer equipment to assure sufficient quantities of fuel on hand and to make sure that there are no leaks and that housekeeping is good. Here is where LOX and RPI are brought in and processed for pumping into the ATLAS. For instance, LOX is passed through a subcooler to assure its being as cold as possible before being pumped into the bird.

The safety countdown on X-1 Day is completed when TSgt Jeffers reports to Lt. Regenhardt that high pressure pads and bottle skids have been checked for leaks and that his checklist is complete and satisfactory. Lt. Regenhardt informs the fallback area missile safety technician, Sgt. Schwartzhoff, that the area is now OK for traffic.

Whitey Schwartzhoff's last assignment was at Walker Air Force Base, N. Mex., as a ground safety technician. Like his sidekick, Sgt. Jeffers, he claims that being a pad missile safety technician is the best job he's had since he enlisted at Fort Snelling in 1946. Whitey's experience has been in both safety and fire, and crash-rescue work, a combination considered valuable for his work in heading the Missile Accident Emergency Team. Whitey trades off with Jeffers on who will handle pad duties and who will work the fallback area, which is the safety zone that no one is permitted to enter during missile loading or testing operations. A third member of the team is TSgt James L. Peters.

All of the missile safety technicians must be versatile and technically knowledgeable for their duties at Vandenberg. Being technically informed is important and they have to be right every time. Lt. Col. Frank G. Morong, Chief of the Missile Safety Operations Division, 1st Missile Div., Office of Safety, says, "Our MSOs and missile safety technicians are the best I have ever worked with. Morong, who has had top safety assignments in the Pentagon, USAFE and SAC, and holds a degree in civil engineering from the University of Maine, is pretty much in a position to judge.

Today is X-Day, that is, Day of Operation. The countdown for safety enters its second phase. Lt. Regenhardt, TSgt Jeffers and TSgt Schwartzhoff are on the pad at daybreak to assure that all safety items are checked. Lt. Regenhardt goes over to the blockhouse and assumes his position at the safety console. TSgt Jeffers again assumes the duties of launch complex missile safety technician and Sgt Schwartzhoff takes the fallback area.

Schwartzhoff briefs the Combat Defense Force team on the requirements for vehicle and personnel control for today's operation—a double propellant loading. Vehicle control is established before personnel performing the operation come on duty.

Phones are plugged in at four different locations and communications are checked. The Area Status keys are turned to "NO." These keys actuate a red visual warning light on the launch control panel.

The crew chief, driver and hand-lineman of the fire truck are on hand with their equipment and last minute instructions and information are exchanged. The medical

Sgt Jeffers briefs A/1C G. L. Jodoin of the 392d Med. Gp, and A/3C D. D. Ward, SSgt F. F. Hines, and A/2C A. J. Palukaitas, firemen of 392d Instln Sq, on duties as emergency team members.

Sgt Jeffers and CONVAIR technicians conduct stray voltage checks on the bird prior to connecting the igniters. Here, Sgt Jeffers verifies "no voltage" on the vernier engine igniters of the Atlas.

attendant is also on hand with an ambulance and indicates that everything is set.

Meanwhile, Jeffers is performing ordnance checks. Retrorockets and destruct packages are checked at the Air Depot Squadron checkout site. However, igniters for the vernier, booster, and sustainer engines, and the gas generator, must be checked out on the pad. At the same time, the separation charges for the booster and for the re-entry vehicle, as well as the vernier engine solo pack squib and the umbilical eject cartridges, must be given a careful checkout.

The loudspeaker on the pad blares, "Minimum radiation and no-switching period is in effect. There will be no switching of any system until further notice!"

In addition, platforms will not be moved and the stretch condition will not be changed while ordnance is being installed. Jeffers will make sure that no more than three persons—the ordnance technician, his assistant and Jeffers himself—will be on hand during the installation of ordnance equipment. Although re-entry vehicle separation charges may have already been installed at a prior time, a "no voltage" check is made before each one is hooked up. "No-voltage" checks are also made prior to connecting all of the other ordnance.

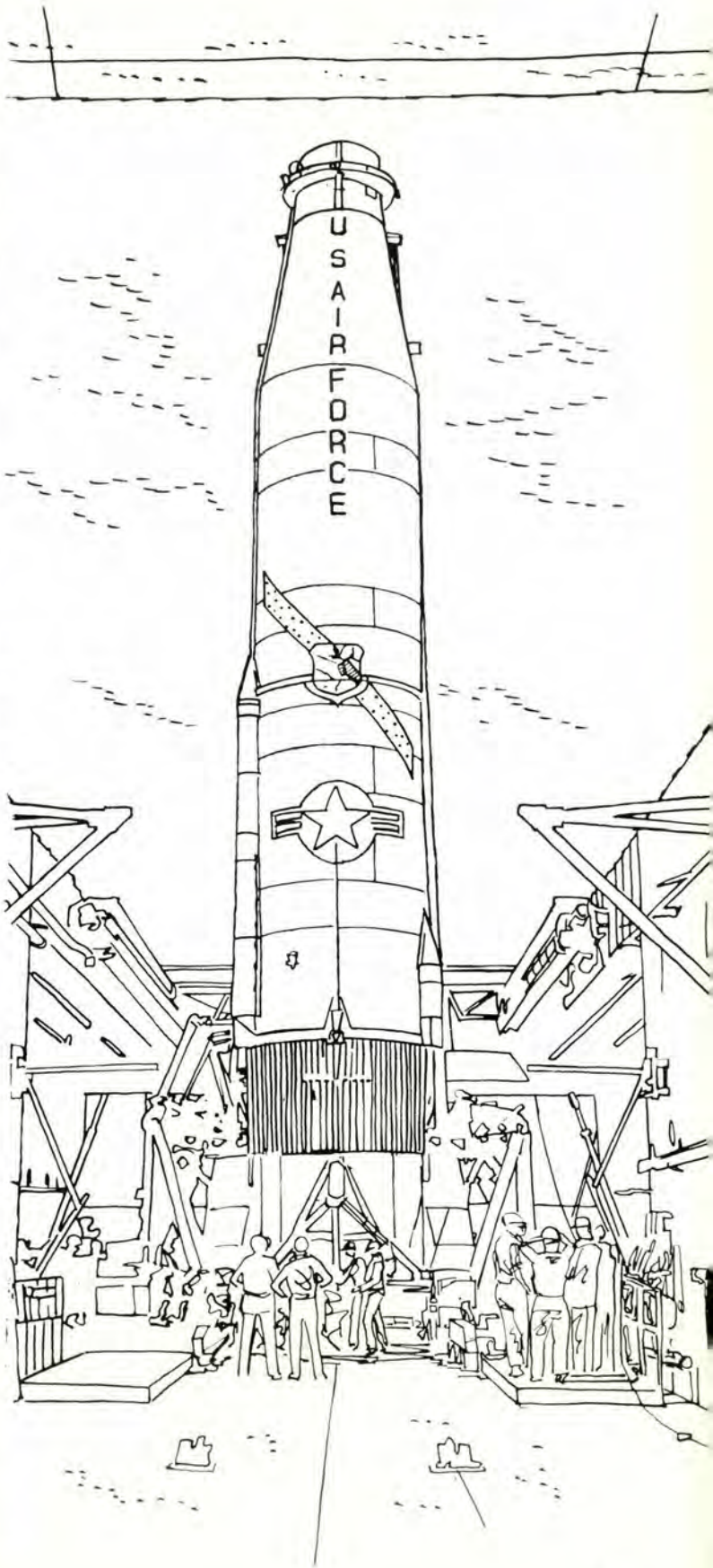
A recheck is made to ascertain that roadblocks have been activated and that unauthorized vehicles have been cleared from the danger area. CDF stands by for final area clearance. The Command Post is notified that the danger area is being cleared. Jeffers signals the ambulance attendant and fire crew to return to the fallback area. He watches while the pad crew clears the area and a final area clearance is verified when he switches the pad status key to "Area Clear—YES."

The pad is now clear. The blockhouse door is closed. The Combat Defense Force NCOIC reports to the fallback area. There Sgt Schwartzhoff reports danger area clear. Jeffers informs Lt. Regenhardt that the MAET is fully manned. Regenhardt informs the Launch Control Officer that everything is OK and blockhouse status key is turned to "YES."

The Operational Countdown begins! Another "Alert Bird" is added to our defense inventory. ▲

Photo Credits TSgt. William Burnette, APCS, Vandenberg AFB.

Stray voltage checks are conducted at each step of ordnance installation to prevent the inadvertent firing of squibs, separation charges, retrorockets, igniters, and command destruct packages.



THE TURNING POINT

Captain T. J. Slaybaugh, Editor, MATS Flyer
Reprinted from MATS Flyer

"Experience is a jewel, and it had need be so, for it is often purchased at an infinite rate."—Shakespeare.

Somewhere along the line those of us who by career choice have invaded the area designed originally for feathered creatures find that we have reached a turning point. We find that derring-do is being supplanted by a safety consciousness and more and more, as we venture forth in furtherance of our chosen profession, our actions are tempered by safety-influenced judgment.

The period of transition varies with individuals and is normally gradual. With many it comes as the waistline grows, the hairline shrinks and drive is more imagined than real. We might term it the seven-year itch period because by the time we receive the starred wings we have begun to be affected by the change. We have experienced enough "close ones" of our own, reflected on more "close ones" of others and our thinking has begun to be colored by the flying safety material we have been required to brush against during the years. Slowly we become more safety conscious.

On occasion we recount adventures at "two for one" gatherings and, though we "belong" because we have had our share of narrow escapes, we begin to realize that most were caused by our own ignorance and inexperience. We may even pause to reflect occasionally that had we paid heed to the advice available we would not have had nearly so many highly adventurous but unnecessary close calls with disaster. We enter the uncomfortable phase of the transition. We are torn between the urge to barge on through to see what is behind the next cloud and the urge to swing around the side just in case there may be another plane on the other side. Our conscience begins to plague us more when we forsake the time for a walk-around for a last cup of coffee or when we survey the potential from a bar stool vantage point in an RON town.

The transition time accelerates with each report of a fatal mistake of one of our old flying buddies, especially when the victim is of equal experience and considered a professional. We now conduct our own personal accident investigation review in our own minds. We resolve our investigation into information we tuck away in a gray matter cubbyhole for instant guidance should we ever become confronted with a like situation.

We are changing from "potential accidents" to accident prevention practitioners.

It is a big change really, and it takes time. In a way we rather hate to admit change, but eventually we make the turn. Usually by the time we acquire the wreath signifying command of our chosen element we have passed the turning point. There is one fallacy in this. The elements fail to become impressed and our command of the situation is only as strong as our safety-influenced judgment. Too often

TRAPPED!

Lt. Col. James W. Bradford, Hqs USAFE

"Tower, expedite my takeoff, I've got a long haul and am heavily loaded." The Tower gave the T-33 pilot takeoff instructions for what was destined to be another entry in the book of "one T-33 destroyed, two pilots dead."

The pilot in command and flying the bird was no new head. He had 4920 total hours with 232 first pilot hours in the T-33. Yet he chose to clear IFR to an airbase 864 nautical miles away bucking a 110 knot wind on the nose. Further, the base to which he was clearing had a current NOTAM to "expect indefinite delay in landing" because of an operational exercise in progress.

Flashing back to the episode of events, the pilot climbed VFR on course and made his first position report to the ARTC center as IFR-VFR on top, flight level 400, and he gave his ETA for the next reporting point. At the next fix, where the pilot was eight minutes late and recomputing time-distance, he was making good a ground speed of 252 knots. He gave his ETA for his third reporting point *(based on a flight planned ground speed of 300 knots)* instead of recomputing his actual ground speed for the previous leg; the heading was within a degree or two of the previous heading.

After 2 hours 56 minutes of flight, the pilot contacted a GCI site and stated that he had lost his navigational equipment and requested assistance. Thirteen minutes later, the pilot informed the GCI site that he had 96 gallons of fuel remaining, could not make his destination or alternate, and asked for a steer to an intermediate base *(civilian airport)* approximately 20 miles away. The civilian airport weather was reported as 400 overcast, ½ mile visibility, rain and fog, north-south runway closed because of snow and ice on the runway. The pilot did not declare an emergency; however, the GCI site declared an emergency to ARTC.

The pilot, after changing from GCI to Center frequency, was advised that the civilian airport did not have radar available; so he decided to proceed to another airport where surveillance radar was available. The newly selected destination was reporting 900 overcast, 4 miles visibility in rain and fog.

The pilot was not 28 miles west of the airport at 15,000 feet *(on top still)* and had 50 gallons of fuel remaining. He finally entered the overcast with 28 gallons remaining. After several heading corrections, much conversation on guard channel, radar's losing the blip a time or two, the parrot squawking emergency, and the pilot's declaring "I'm running on the fumes," the T-33 broke out underneath the overcast at approximately 3000 feet down the runway and too high to effect a landing.

Power was applied, gear and flaps retracted, and a pull-up started for a low visibility approach. The aircraft

we feel that our now vast experience provides us with the know-how we need to operate in safety. We are cautious, but tend to rely more on caution than continued study—study that is absolutely essential to keep up with technological advances in our field. If we are able to deflate our self-complacency with the realism that gray hairs are indicative of age, not necessarily wisdom, we can better apply our experience to our own accident prevention program.

Let's pause now to assess, in retrospect, the shortcomings of our own safety education. Surely, when we first sported our wings, we were told by old heads of the dangers of buzzing; yet we cheated the old scythe swinger to experience this exhilaration. Remember the classmate that didn't make it? We were also cautioned against pitting our flying skill against the violence of a thunderstorm; but this advice was unimpressive until we proved it to ourselves the rough way. We were reminded of the danger of cross winds, but didn't become believers really until we scraped a wing tip. We were directed to taxi with caution, and were finally impressed with this sage warning—after we had lamely explained that "the brakes didn't seem to do any good on the ice."

And so we learned.

Experience is the best teacher? Not in today's high speed age; unless it's someone else's experience.

Now that we are in a position to teach, and have accidents to members of our command reflected upon us individually if we fail, unless we are careful we will probably fall back on the same methods that we were unimpressed by.

If we could take the student by the hand and lead him through the crash areas we have had to probe in accident investigation assignments, we could probably impress him. Certainly we could if it were possible to share our memories of seared and torn bodies and grotesquely twisted controls. But if we look for less morbid means and all too often have a tendency to go to the other extreme and settle for token compliance with safety requirements. We then sacrifice intent on the oft-used altar of apparent compliance. We flow with the current, our efforts neither noticed nor effective, but sufficient to cover us in case of an accident.

Were every pilot his own flying safety officer in fact, we would have a simple job. But prior to the turning point, were *you* flying safety conscious, or did you, like most of us, have to learn the hard way?

Safety consciousness has, in most cases, stemmed from within. After the turning point it has been pretty well indoctrinated into the professional pilot as one of the many parts that make him a professional.

Now, can safety consciousness also stem from above? If you are a supervisor, therein lies a great challenge.

Your challenge is to sell flying safety.

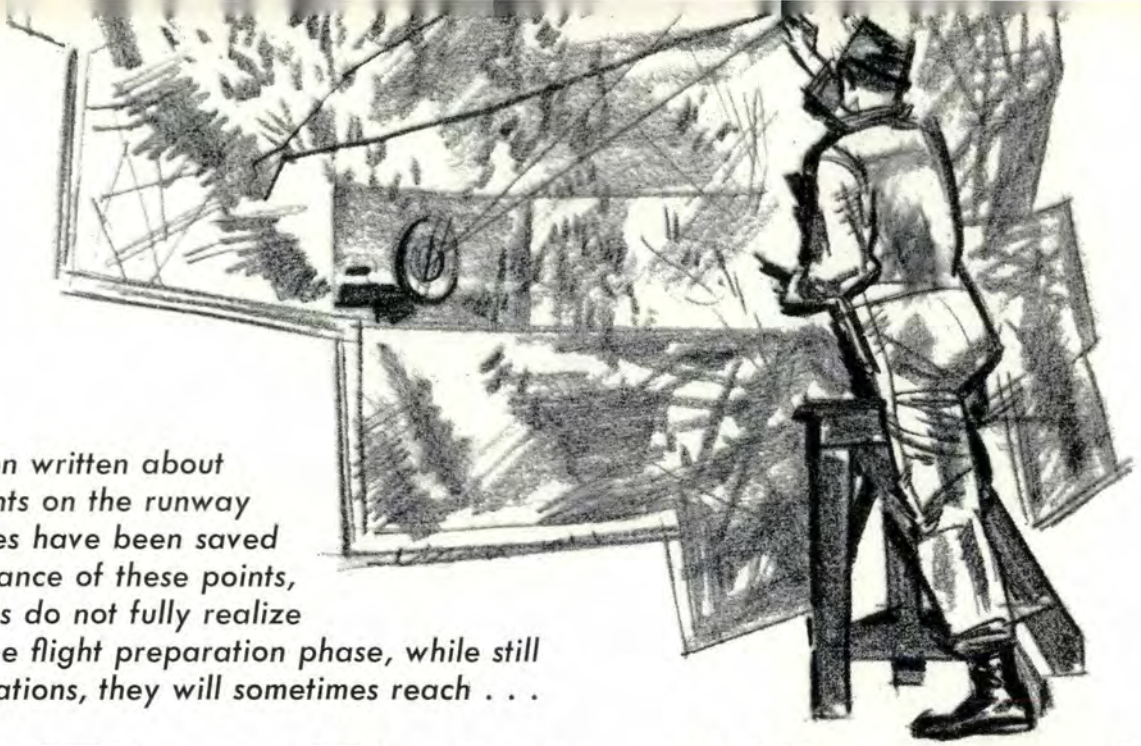
Before you set up a program, however, remember how hard you were to impress, then throw out any method that failed to work on you. When you have done this, then you face your real challenge. ▲

flamed out in the turn. At approximately 100 feet the canopy left the T-33. The two pilots ejected at approximately 50 to 75 feet and both were killed when their chutes failed to deploy fully. The T-33 had been airborne 3 hours 41 minutes at the time of the crash.

The Aircraft Accident Investigating Board, in recharting the actual flight path of the T-Bird, determined that the pilot was 210 miles NNE of his intended track, yet the pilot never asked GCI for his geographical position. Other findings determined by the Board included:

- The Form 21A indicated the pilot used 410 knots true airspeed and an average wind of 110 knots from 260 degrees. There was no allowance made for the installation of baggage pod. The recommended TAS for flight planning at 40,000 feet is 405 knots with the reduction of 7 knots for installation of the baggage pod.
- In recomputing an identical flight plan, the T-33 should have been able to reach its destination with 89 gallons of fuel and its alternate with 62 gallons.
- There was no evidence that the pilot ever used a computer in flight. His ETA's were identical with those entered on the 21A where he estimated a 300 knot ground speed; yet his actual ground speed varied from 252 to 268 knots for the various legs flown.
- The cause of the accident was fuel exhaustion because the pilot in command of the aircraft failed to declare an emergency at first realization that he was lost or unsure of his position over a solid overcast.
- The GCI site did not offer adequate assistance when the pilot requested navigational help. Anyone in the site familiar with jet operations should have been familiar with nearby recovery bases and offered the pilot information on availability of radar (GCA), runway length, weather conditions, etc.
- Questionable judgment was exercised by the pilot in filing an extended flight plan into an area of marginal weather conditions and strong headwinds. Any slight changes in adverse weather conditions, including stronger headwinds, would negate the flight plan and would result in insufficient fuel reserve as required by AFR 60-16.
- Control of the aircraft by surveillance radar was inadequate and unprofessional in manner. Several inaccurate positions relative to the position of the airport would instill distrust in the pilot as to the accuracy and dependabiliy of the information given him.
- The pilot delayed too long after engine flameout to eject. He was aware of the cause for power loss and made no attempt to conserve or gain altitude prior to ejection.

There is little left to be said about this flight except that it never should have been undertaken. Everything had to be on the money; winds, weather, navigation equipment and so on. This pilot, although well experienced, gambled and lost. He had several "second chances" but failed to take advantage of them. He permitted himself to be *TRAPPED*. ▲



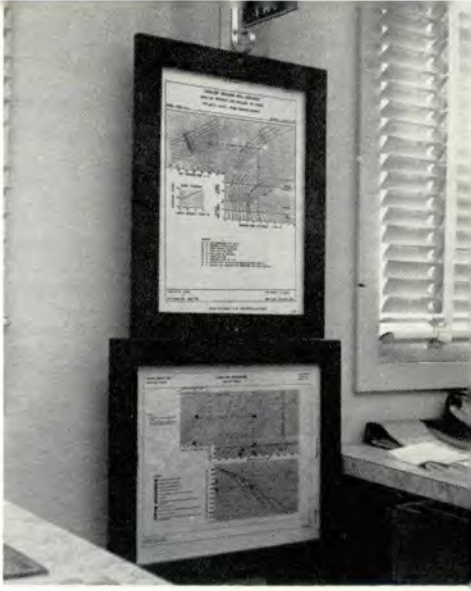
Much has been written about go-no-go points on the runway and many lives have been saved by the observance of these points, but most pilots do not fully realize that during the flight preparation phase, while still in Base Operations, they will sometimes reach . . .

The First Point of Refusal

Captain Joe Ross, DFMSR, is shown at the second stop of Willie's assembly line flight planning facilities. First stop was the weather office for preplanning weather check and winds.

Flight preparation as practiced at Williams AFB is approaching what is known as an exact science. Base operations personnel have made it easy and attractive to fully research a planned trip. In such a facility the pilot is not tempted to bypass any segment of the most important part of a flight—the beginning. An important by-product is that oftentimes this thorough approach yields the information that the flight should not be attempted in the first place. The accident files at DFMSR are replete with examples to prove that on many occasions the NO-GO decision should have been the correct one. ▲

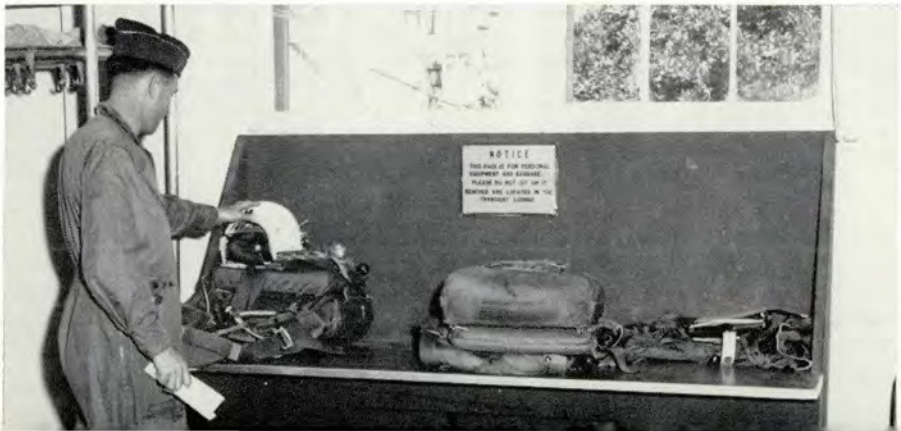
Transients will welcome three flight planning tables, each with its own maps, charts, computers, etc. Note that each flight planning station and facility is prominently identified by an attractive sign.



Immediately adjacent to the flight planning room is the next stop, the weather office. It too is well laid out and attractive. Right, guessing at takeoff roll is eliminated by reproduced Dash One charts.

Left, at next stop, Captain Ross has the AO check his DD 175. Note how the signs aid transient pilots. Below, the AO briefs the pilot on VFR departure routes to avoid traffic in the local flying area.

Left, placed so that transient and base pilots can't miss it, is the routine and "latest word" information. Below, before leaving base ops, Capt. Ross collects gear from convenient PE and baggage rack.



how far is down yonder?

We were standing perilously close to the edge of the Grand Canyon. The only thing between us and the void was a shoulder-high stone fence. As we peered down into that awesome, beautiful gorge, I idly mused aloud, "Wonder how far it is down to those rocks?"

My companion answered without hesitation, "Nine zillion miles."

"Ridiculous," I scoffed. "It's only about 4000 feet."

He solemnly shook his head and repeated "Nine zillion miles."

I was about to discuss comparative distance estimates with this obstinate 5-year-old when my whole attention was diverted by a toothsome morsel in halter and shorts whose dimensions fore and aft I could more closely estimate.

When you're on terra firma with no real danger of testing Newton's Law of Gravity, the difference between 9 zillion miles and 4374 feet is purely academic. Diversions are not harmful, either, especially if they are scantily dressed. When you're in an iron bird, however, "how far down those rocks are" becomes all-important, and the diversions may be those same rocks joining you in the cockpit.

A lot of effort has been expended in making gadgets that tell birdmen how far it is to those rocks. One gadget in particular has black boxes full of more wire and tubes than my television set and can measure the distance down there more closely than you can pace off the length of your backyard fence. The trusty old altimeter—if one recognizes its limitations—offers all the information necessary to know how far it is down there. Yet every year several birdmen just don't read closely enough; consequently, the DFMSR statistics continue to grow.

You probably remember the F-100 jock last year who made several passes down to minimums and never saw the patch, even though the ceiling was over 2000 feet. He ran out of fuel and hit the silk before he realized he was reading the altimeter only 10,000 feet too much. Don't scoff! I started to when I read of this incident until I remembered one day over Kirtland when the visibility was so good I could see two days in any direction. I let down from 40,000 and blithely entered the traffic pattern at 16,700 feet instead of 6700. The field looked so small that I really thought I was going either blind or off my rocker until I recognized my mistake. I've never told that one before—pride, you know.

If you read the altimeter wrong and are high enough, you get another chance—*if* you're observant. Not many pilots get that other chance, though, if they read it wrong and are low. Recently a B-47 with everything hanging was on a long GCA final at night in rain. The pilot had just finished a routine penetration with an IP and navigator reading off altitude indications several times. He was cleared to descend from 4500 feet to 3600, prior to reaching glide slope. As he leveled off at "3600" feet, the navigator was on the scope with the hangars and the runways showing 12 miles away and the IP was computing final approach speed.

At this time the wheels started rolling on what was obviously not the runway. The pilot gave it six engines worth and pulled up to 4200 feet. The IP and navigator both observed the altimeter climbing through 3800 feet. The GCA final controller picked them up on his precision at 4000 feet and they finished the GCA and landed.

The rear gear was askew and very muddy so the Flying Safety Officer went back along the path and found unmistakable B-47 tracks in a plowed field 11 miles away at 2600 feet above sea level. They looked the bird over with a fine-tooth comb, even bench checked all the gadgets, including the altimeter, and gave the '47 a clean bill of health. The only conclusion you can draw is that they misread the altimeter.

"But how could they *all* misread the altimeter?" you ask. I don't know, but they did.

This bird touched down on a plowed field. If it had been on a shoulder-high stone fence or on a small hill 50 feet higher, there would have been another "undetermined." It's impossible to tell how many of these "on the hillsides" and "in the trees" accidents were the results of a jock's not reading his altimeter closely enough.

Nine zillion miles or 4374 feet? Your altimeter will tell you if you pay attention to it. Get diverted safely by babes . . . not by rocks in the cockpit. ▲

Lt. Col.
Keith Conley
Bomber Branch
DFMSR

CB is nothing to play with. A faulty fire extinguisher turned this B-47 into...

A FLYING GAS CHAMBER

I **was slugged** with a fire extinguisher while flying at 27,000 feet in a B-47. No, it wasn't felonious assault by one of the crew, and I wasn't hit with the container. I was almost overpowered by escaping chlorobromomethane *(CB)* fumes from a damaged extinguisher. The effect couldn't have been worse had I been hit over the head with a sledgehammer. Fortunately, I had help in flying the aircraft or I might have made the pages of a Form 14. A trifling deficiency such as a badly sealed fire extinguisher could have cost the Air Force an aircraft and crew. There may be a lesson for you in this story but I honestly wish I weren't telling it.

I was leader of a two-ship flight of '47s on a training mission. After leveloff at 27,000 in the soup, I unhooked my mask to blow my nose. The copilot called and said he thought the cabin air conditioning system had exploded. He saw fluid apparently coming through the bulkhead next to the fourth crewmember we were carrying. It had sprayed into the man's eyes and was burning them badly.

As I rehooked my mask, I alerted all hands and instructed them to go to 100% oxygen and emergency toggle lever. Although I had taken several breaths of the cabin air and had noticed the powerful cleaning fluid odor, I felt no nausea or dizziness at the time. The copilot and I followed the amplified emergency procedure checklist for smoke and fumes elimination. For once, though, the Dash One instructions didn't help.

The only first aid we could give to the injured man was to pour water in his eyes. We had to get down in a hurry. I declared an emergency and requested an immediate descent to 5000 feet. Memphis Center cleared us down and direct to Little Rock AFB. I dropped the gear and started down. The oxygen gages showed 3 litres remaining, or about an hour's supply. Since we needed about 2 hours to burn off fuel before landing, it looked as if things might get cozy.

During the descent we opened the inner door and, using a spare interphone cord, lowered the fire extinguisher to the outer compartment. The copilot and I examined it first, however, and verified that the handle was spread and the safety seal still intact. Even with the extinguisher removed the fumes persisted, for the CB had saturated the fourth man's clothing and seeped into various openings in the cockpit area. The fumes seemed to affect the eyes less with the cockpit pressurized and the periscopic ports open.

Ten minutes after declaring the emergency, Little Rock weather deteriorated to 800 overcast, rain, and gusty winds. Since the aircraft gross weight was still 25,000 pounds above maximum landing weight, I decided to proceed to McConnell AFB where the weather was clear with 15 miles visibility. We flew with the gear down to burn off fuel.

Things began looking up. The fumes were dissipating, the oxygen was holding at 3 litres, and the fuel weight was coming down fast. Apparently we had it made! Then the CB hit me, like an anvil.

The instruments got fuzzy, my stomach started doing somersaults, and my head felt like a balloon. The simplest tasks required a major effort. My eyeballs were mired in glue as I tried to crosscheck my flight instruments. I rechecked my oxygen on 100% and warned the copilot to ride the controls and monitor the instruments all the way down.

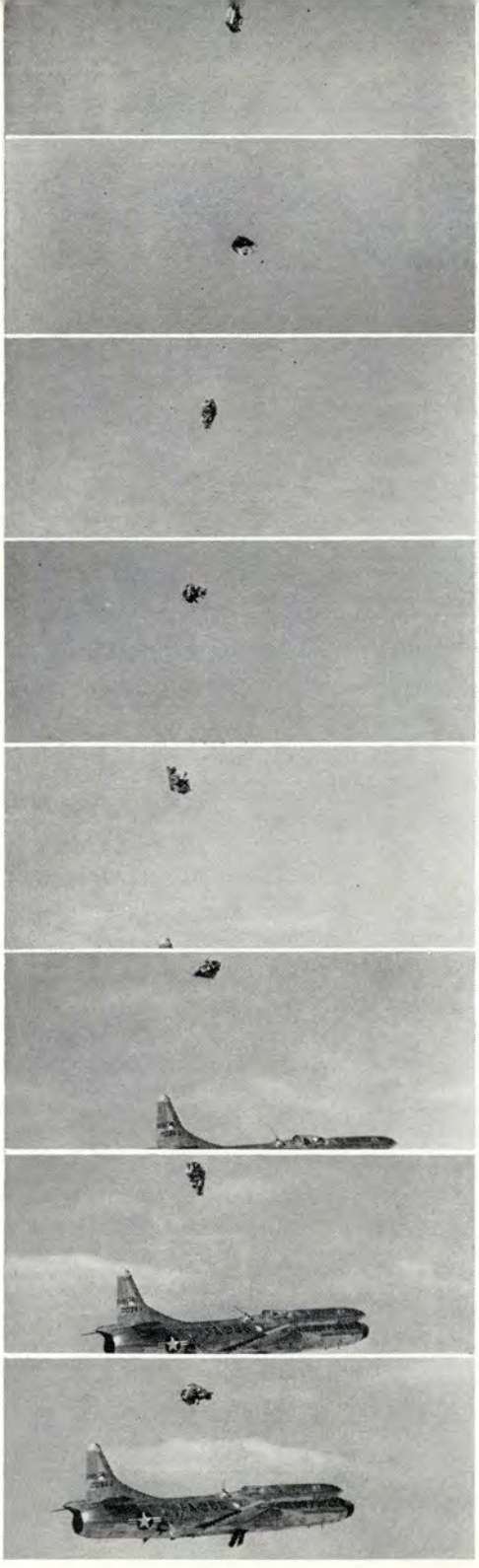
I flew a wide pattern into McConnell and let GCA bring me in. All went well until flareout where I lost my depth perception completely. The aircraft hit nosegear first and bounced. I applied power and executed a go-around. The second landing was mechanical: I started my flare strictly by the altimeter. The '47 touched down smoothly. I stopped on the runway and ordered the crew to abandon the aircraft.

We were all nauseous and groggy while riding to the hospital. I was aware for the first time of a burning sensation on my nose. It was caused, I found out later, by liquid CB thrown on my face by the cabin air conditioning system. My disability had been caused by a mere four or five breaths of the contaminated air I had taken while my mask was off and what had been trapped in the mask and hose. If I had received a stronger dose of fumes, or had I flown 30 minutes longer, I believe it would have been impossible for me to land the aircraft. So persistent is the odor of CB that it could be detected two days later in my oyygen hose.

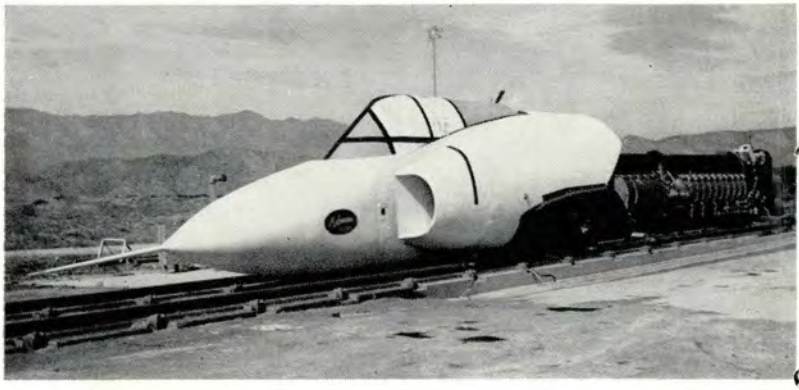
Chlorobromomethane is nothing to play with. The fumes can cause ulcers in the cornea of the eyes, permanent damage to the liver, and a toxic reaction in the brain. The effects can be fatal. They almost were to me. Of course, any chemical fire extinguishing agent except water is dangerous—and unpleasant—in high concentrations. Your safeguard is the obvious one of avoiding accidental opening of the extinguisher. The way some of this equipment is abused and thrown about, it's a miracle this kind of accident doesn't happen more frequently.

My experience taught me two lessons: use a chemical fire extinguisher in a closed cockpit only as a last resort; and if one discharges itself, get rid of the fumes immediately, even if it means blowing the canopy. If you do breathe any of the toxic vapors, get down in a hurry before you get hit with that anvil. ▲

Capt. James R. McCarthy, 67th Bomb Sq., Chennault AFB, La.



Mockup of experimental nose type capsule. Part of Research and Development program is to solve escape problems for future weapon systems.



Experimental pod or canopy capsule is shown on sled prior to track test.

Model B ejection seat for use in F-106 is launched in high speed test.

Below and left, above, sequence shots of inflight ejection test from F-94.

If your place of business is a crew station in an Air Force aircraft, turn the old expression around. Make it read . . .

LEARN and LIVE

Mr. C. V. Mayrand, Aircraft Laboratory, Wright Air Development Division

There may come a time when all else has failed and you must ride your aircraft down or eject. At that time the decision to initiate escape is of primary importance. As an aircrewman, you and you alone control this vital link in the escape process.

Every effort is being made by the equipment designers to reduce the time delays in the system from the instant you pull the "go-handle" to chute deployment. The initial decision, however, must be made by *you*—based on your appraisal of the emergency situation and such factors as condition of the aircraft, altitude, attitude, speed, terrain, population density in the area, and other crewmembers if you are in a multiplace aircraft.

This could be the most important decision of your life, also your last, and it deserves serious consideration now. The best way to make this point is to use testimony provided by a man who made the decision and used the system. The pilot in this case made a successful ejection from a T-Bird at a very low altitude. He concluded his ejection report by stating that he hoped his experience would help further flying safety for all personnel. Here are his comments on making the decision to escape.

"The only recommendation I have to make is that more emphasis be placed on a timely decision to eject. I waited too long. The field elevation here is 166 feet, so the ejection altitude was about 250 feet above the terrain. The aircraft landed about ¼ mile away. It was almost stalled when I left, and I surely would have been a fatality if the aircraft had not made up my mind for me. I was one of the people who said it couldn't happen to me. But it did, and I would like to help spread the word around that it can happen to anyone."

Often we make a mistake and chalk it up to experience with a casual "We Live and Learn." In many cases the penalty for mistakes is small; the error can be corrected, and we learn from experience. In the case of escape from high performance aircraft, however, the penalty for mistakes can be supreme and there is often no second chance. If your place of business is the crew station in a USAF aircraft, it behooves you to put a new twist into that expression and make it "We Learn and Live." There is no time for last-minute cramming when the emergency occurs. You must pass this critical test with what you have previously learned. To further complicate matters, no one can predict when you will be tested on your knowledge of escape and survival procedures.

You may question whether training and "handbook learning" really pay off. Your *Aerospace Safety Magazine* answers this question by periodically bringing to your attention operational escape and survival experiences, both successful and unsuccessful. True, extreme emergency conditions do occur wherein the best trained and most proficient crewmembers cannot control the situation to effect a successful escape. However, this is the exception rather than the rule. To further support the "Learn and Live" approach, let's consider this escape experience:

A fire developed in the fuselage of a B-47 aircraft during takeoff. The aircraft commander warned the crew to prepare for bailout, and a few seconds later gave the order to go. The navigator, in the downward ejection seat in the nose of the aircraft, related that he completed the ejection procedures as though he had done them a thousand times before, although his thoughts at the time were a feeling of disbelief that it was really happening. He stated that the only sensation experienced as the seat ejected was a big "whoosh" after which he separated from the seat and found himself tumbling. He reached for the parachute ripcord and found that it was not in place, having been pulled by the zero delay lanyard. The chute deployed and there was just time for the navigator to get his feet into position before hitting the ground.

The ejection report stated that at the time of escape the aircraft was in a climb attitude at a speed of 175 knots IAS and 400 feet above the terrain. Obviously, the possibility of successful escape with a downward ejection seat under these conditions is touch and go, and there is no room for mistakes and delays. In his report this ejectee offered the following advice which deserves our attention:

"To me, the important thing about this low altitude ejection, with minimum time available, is that the sequence must be virtually habitual and unthinking. I have mentally gone through the sequence every time I have flown, but believe it would be much surer to have downward ejection trainers available, and make practice on them mandatory. The importance of pulling the pins from the seat before takeoff cannot be overemphasized. There would not have been time to pull them *after* the emergency developed."

Knowing what to do in emergency situations is important regardless of the type of aircraft you fly. However, let's discuss the means of assisted escape, namely, ejection seat or capsule escape systems.

It is a fact that learning about and becoming proficient in ejection seat escape procedures would be simpler if we did not have to contend with such a variety of equipment—equipment which is frequently modified during its service life. As an air crewmember you may feel that every time you turn your back, there's a switch in parachutes, lap belts, system timing, and so on. There have been many changes, but this variation in equipment is the result of the efforts of escape-system engineers to improve the performance of the equipment and to eliminate deficiencies.

During the past decade the simple catapult ejection seat, which required manual opening of the lap belt and manual actuation of the parachute, has evolved into a fully automatic ejection seat system. If you are an "old hand," you have witnessed this change in equipment through the years. The basic steps were the introduction of jettisonable canopy systems, the use of cartridge actuated devices in place of cables and mechanical linkages, the incorporation of automatic opening lap belts and their integration with the automatic opening parachute, the reduction of system time delays, and the incorporation of the zero delay parachute lanyard.

Rocket catapults, positive seat-man separation devices, single-motion ejection controls, and provisions for additional arm and leg restraints have been more recent. The latest equipment is being incorporated into existing ejection seat systems where possible. When installed, this equipment provides a reliable ground level escape capability and increases the performance of the ejection seat system under high speed conditions. A new approach in ejection seat system design is currently undergoing qualification tests and is scheduled to be installed in the F-106. This system, designated the Model "B" Seat, is aimed at further increasing the capability of the ejection seat to provide successful escape under a wide range of altitude and speed conditions.

The first capsule-type escape system scheduled for operational use in USAF aircraft is now in the developmental testing phase. This encapsulated seat system is scheduled to be installed in the B-58 aircraft. Here again the goal is to provide an escape capability throughout the flight envelope of the aircraft. In addition the capsule system removes the requirement for flight crews to wear cumbersome environmental protective garments. To meet the escape needs of the future, research and development is being conducted on pod and nose type escape capsule systems.

Mockup of pilot's encapsulated seat developed for the B-58.

The problems associated with providing a reliable escape system for modern high performance aircraft are complex. Frequently, the requirements for successful escape under different possible escape conditions are 180° out of phase.

For example, successful escape at low altitudes requires a minimum time delay in the system from seat ejection to parachute deployment. Under high speed conditions, the requirement is reversed and longer time delays are needed to permit deceleration to safe parachute deployment speeds. Aircraft operation and escape requirements also conflict, and it is possible in this case to provide so much protective equipment and restraint for the escape condition that normal aircraft operation is compromised to the extent that emergency situations are produced as a result.

It has been said that escape systems do not directly contribute to the completion of a specific mission. But, the expenditures in weight, complexity, manhours, and dollars associated with escape systems are made to provide you with a means of survival during emergency conditions and to return you to the job for which you are trained. This is the way escape systems contribute to the success of the over-all Air Force mission.

Your sources of information on how to use the ejection seat escape system are the various training courses, flight safety lectures, and the aircraft flight manuals. During the past few years, instructions on escape procedures have become somewhat involved. This has been due to equipment changes such as the introduction of the zero delay parachute lanyard, changes in the type of parachutes used and a change in the automatic lap belt delay time. These changes were made to improve the low altitude escape capability and have proved successful. The distribution and installation of this equipment is now just about complete, and the flight manuals are being revised to eliminate obsolete information and simplify the instructions.

Flight manuals provide minimum ejection altitudes for the various combinations of ejection seat equipment. These figures are provided to show the minimum altitudes that must be achieved or available in the event of low altitude emergencies such as fire on takeoff. They apply to level or nose-up aircraft attitudes. These figures were never intended and should not be used as a basis for delaying ejection. *Whenever possible eject above 2000 feet.*

The question of ejection altitude brings us to a second important factor in escape: aircraft attitude at the time of ejection. Obviously in emergencies involving loss of control, you have no choice but to eject as rapidly as possible. In cases of low altitude ejection, where conditions permit, raise the nose of the aircraft to increase the vertical height attained during the ejection trajectory. In this way you use the aircraft and consequently your speed at the time of ejection to propel you upward, gaining height and time which are so vital in low altitude escape. Conversely, if the aircraft is in an uncontrollable diving attitude, the aircraft speed propels you toward the ground, greatly reducing the safe ejection altitudes. This is why flight manuals emphasize *ejection above 10,000 feet over the terrain under dive conditions.*

The escape operation might be compared to athletic activity: First, we have training, conditioning, and prepa-

Long overdue is a zero altitude escape system. Here is one using rocket catapult, seat/man separator, and 1 and 1 second timing system. Extreme right, seat clears the '94; on the way up; top of trajectory and seat separation; parachute blossoms; and finally the successful descent.

ration of equipment; then the actual play *(stroke, swing, or pass as the case may be);* and finally the important follow-through action.

Preparation of equipment prior to flight involves important details such as proper attachment of restraint and survival equipment, connecting the lap belt key, and checking to see that the zero delay parachute lanyard is connected and the safety pins are removed. These may seem like small details, but neglect of such routine matters has caused and continues to cause escape fatalities.

Whenever the opportunity presents itself, get the feel of the equipment. For example, if training or deactivated seats are available, make use of them. Pull up the ejection seat handgrips and check to see where both your elbows end up. They should be inside the forearm—or armrest—guards provided on the majority of upward ejection seats. Get the feel of how far you must extend your fingers to grasp the trigger and squeeze it up to the handgrip. Practice locating and grasping the control on seats equipped with a D-ring ejection control on the front of the seat *(all downward ejection seats and the new F-104 upward ejection seat).*

As in sports, body position is also important. Should you have to look down to find the ejection control and eject while bending forward, you are more susceptible to back injury. Practice assuming the proper ejection position.

Once you start the ejection procedure, you—like a quarterback—may be required to exercise an option because of a malfunction in the enclosure jettisoning system. Know the alternate methods of getting rid of the canopy. Time permitting, you will want to try them before ejecting through the canopy. Some aircraft, as you know, are equipped with all-metal reinforced canopies and hatches, and ejection cannot be completed until the enclosure is jettisoned. You start the play when you eject from the aircraft, but success often depends on your follow-through.

The effect of ejection varies with the speed, equipment, and individual. Normally, however, by the time you become aware of events, the lap belt will have opened and you will be separated from the seat. Should you find yourself still in the seat, check to see that you have released your grip on the ejection controls and that the lap belt has released. If the belt has not opened, release it manually and push free of the seat—remembering that you must now manually deploy the parachute.

Should you eject at high altitudes you may experience spinning during the free fall. Resist the temptation to manually override the automatic parachute opening device at high altitude or you will be subject to high opening shock. After separation from the seat on all ejections below 14,000 feet, manually pull the parachute ripcord if it has not already been pulled by the zero delay lanyard. This is a back-up action just in case the lap belt key was not connected or there is a failure in the automatic chute deployment system.

Once you are descending in the chute the goal may be in sight, but you still have to get by the obstacles of a ground or water landing and subsequent survival and rescue. The techniques of parachute landing on ground or in water, the effective use of survival equipment, the use of location devices and rescue operations, all are important parts of the over-all escape operation. I leave this aspect of the escape problem to specialists in those fields who provide you with such informative articles as "Down—But Not Out" in the January 1960 issue of *Flying Safety Magazine.*

Although we have compared the escape from an aircraft to athletic activity, we by no means wish to infer it is a game. Like all aspects of military aviation, it is serious business. To stay in business, subscribe enthusiastically to the motto, "Learn and Live." ▲

CHECKLIST

The following information paraphrased from an ARDC message to TAC about spins in F-100F aircraft is passed on for the benefit of those immediately concerned:

"North American Aviation data indicates that the F-100F is unique as compared to the other F-100 models in that a much greater portion of the aircraft's total energy is converted into motion about the vertical axis *(yaw)* whenever slow speed and high asymmetric drag are encountered simultaneously. The net result is that *(a)*, the spin progresses from the incipient to steady state much more rapidly than in other F-100s; and *(b)*, the spin is extremely flat. Rotation may be as high as 40 rpm. A pilot has very little time to recognize a spin and apply corrective action prior to reaching steady state conditions, and once steady state rotation has been achieved the aircraft is generating inertia moments in yaw that are well beyond the maximum capability of any of the flight controls.

"NAA data further indicates that almost every time the drag chute has been deployed during spin recovery, it merely wrapped around the vertical stabilizer and did not help recovery.

"In view of the preceding, it is AFFTC's (Air Force Flight Test Center) opinion that *(a)* the F-100F is not recoverable from a fully developed *(steady state)* spin, and, *(b)* the F-100F may be recoverable from the incipient state by using pilot's handbook recovery procedures. *There is, however, no data available to verify this last statement relative to incipient state spins.* Since in all configurations the ailerons are the greatest generator of asymmetric drag, caution should be used at slow speeds to preclude rapid and or excessive use of ailerons. There are no known cases where an F-100F drag chute was successfully used as a spin recovery aid and wind tunnel tests indicated that the standard chute was ineffective. Spin dynamics are such that there may be a remote possibility the chute could interfere with canopy or seat ejection. *For this reason and since there appears to be little possibility of benefit, use of drag chute even as a last ditch spin recovery procedure cannot be recommended."*

From Convair F-106 Interceptor Service Notes comes the following tip for F-106A and B drivers: Continuous nosewheel steering can be maintained by depressing the nosewheel steering button and holding it in this position throughout the taxiing operation. When weather conditions are such as to cause the nose gear to bounce off the runway, the pilot should engage the nosewheel steering and maintain it in the engaged position upon landing, or at the start of taxi for takeoff. This procedure will insure continuous nosewheel steering even if it leaves the ground momentarily. Several incidents have been reported where the pilot lost nosewheel steering during taxi because of wind gusts which caused the nosewheel to bounce off the ground.

Lt. Col. Jackson Saunders, Fighter Branch, DFMSR, picked up this small safety checklist on a recent fuel stop at Laredo AFB, Texas. The transient alert airmen there hand these cards to the pilot right after engine start and just before chock removal. Looks like a winner to us. Anyone care to follow along?

> We hope you have enjoyed your stay at Laredo AFB, Texas.
>
> For your personal protection and in the interest of flight safety
>
> Would you recheck:
>
> - Zero D-ring lanyard hooked up.
> - Automatic lap belt lanyard hooked up.
> - Helmet chinstrap fastened.
> - Oxygen bailout bottle connected.
> - *Please show me* your seat pins before you taxi.
>
> FLY SAFE AND HAPPY LANDINGS.

Air Staff safety officers and representatives of all major commands met at Norton Air Force Base, 5-7 April 1960, to formulate plans for the First Annual USAF Safety Congress. Since all safety efforts were reorganized under the Deputy Inspector General for Safety, this conference is planned to discuss problems of all safety areas: flight, missile, nuclear and ground.

The planning conference evolved preliminary outlines of problems in four general areas to be studied by individual seminars for each of the safety areas. In addition, it was determined that the first day of the congress would be devoted to discussions by commanders from throughout the Air Force directed toward the solution of mutual safety problems.

The First Annual USAF Safety Congress will be held 12-16 September 1960; the location will be announced later.

The FAA has announced that procurement of the distance measuring portion of the VOR/DME navigation system is expected in the near future. This equipment is designed in accordance with the standards recommended during a special meeting of the International Civil Aviation Organization.

VOR, the international standard since 1949, provides direction-of-flight information to the pilot, while DME shows the distance to a selected ground station. VOR and DME are abbreviations for Very High Frequency Omnidirectional Radio Range *(VOR)* and Distance Measuring Equipment *(DME)*. Combined as the VOR/DME system for the international, short range navigation system, they will accurately locate the aircraft as it flies cross-country. The new equipment will provide the pilot with exact information on his distance from the VOR/DME station. In the United States and many areas abroad, pilots already obtain bearing, or direction aid, from VOR.

VORTAC, which is an augmented version of VOR/DME*(T)*, is currently being installed in the ZI to meet military navigational requirements. At present there are about 600 VOR facilities ground based at key points in each control area along U. S. Federal airways. An additional 175 VORs are under procurement. Eighty-five VORs have been commissioned as complete VORTAC facilities. An additional 170 VORTACs are operating on a test basis. Outside the ZI there are 160 VOR facilities in operation throughout the world.

The number of stations capable of providing distance information is being increased regularly. The FAA soon expects to have 255 such facilities commissioned. The plans call for approximately 1100 by 1965. Increasing numbers of aircraft, at the same time, are being equipped with airborne DME.

Procurement of the new distance measuring equipment is another link in the planned short range navigation system for the entire United States that will meet international standards. The DME can also serve with the instrument landing system *(ILS)*, now in worldwide use, to give distance data. ▲

Seats Away

Mr. Robert H. Shannon, Aero Medical Safety Division, DFMSR

The ejection success rate has improved in recent years. This is the result of more automatic ejection equipment and improved techniques and procedures. However, the problem of clearing the seat after the release of restraining equipment has become serious. This is not the fault of the equipment; pilots and crewmembers are simply holding on to the seat long after they should have let go.

The first report of this new seat separation difficulty was made in 1958. An ejectee stated that he had had to make a conscious effort to let go of the ejection seat handles after the lap belt had opened automatically. Since this report, 31 other ejectees have related that seat separation was delayed because they couldn't let go of some part of the armrest. Of the reported cases, 16 were during the last 6 months of 1959.

These people lived to tell their problem; in the last two years, 6 others have died because they failed to let go. There were 13 other fatal ejections at very low altitude in which the crewmember struck the ground still in the seat. Although it could not be proved, holding on to the seat may have been a factor in some of these deaths.

Why this difficulty did not occur prior to 1958 is not easily explained. Perhaps it was not reported, but it is more likely that the solution to one problem created another. Previously, with the manual lap belt, it was normal to follow activation of the lap belt release with a push or kick to get clear of the seat. With the advent of the automatic lap belt, the hands remained on the armrests and the need to push away from the seat was not apparent under the stress of the moment. Regardless of the reason, holding on has become an increasingly critical problem and corrective action is needed. The detailed documentation which follows further emphasizes the urgency of the seat separation problem:

- Typical of the 6 unsuccessful ejections is one initiated with 1100 feet of terrain clearance. The pilot failed to clear the seat prior to ground impact, although there was nothing attaching him to it. Autopsy disclosed multiple fractures of both hands in a tightly clenched position. No other reason than holding on was found for his failure to clear the seat.
- The remarks of the 31 successful ejectees failed to disclose any significant trend. In some cases, they expressed the feeling that they were holding on to the last tangible part of the aircraft; others indicated mental confusion; and many said they simply *forgot* to let go. *[Ed. Note: See Crossfeed letter "Let Go!" in the February issue.]*
- Here are several verbatim reports of these experiences. An F-106 pilot who ejected at 10,000 feet stated, "I didn't let go of the seat immediately, and as result, the automatic opener didn't work fast enough. On a low altitude ejection, this could have been fatal. Suggest this problem be brought up to other pilots."
- Another crewmember stated, "I was completely disoriented and I even thought perhaps I was dying. When I could see again, I wondered why the chute hadn't opened yet, knowing that it had a zero escape mechanism. It was then that I looked at my hands and noticed that I had a death grip on the seat handles. The seat hadn't left me yet."
- An F-100 pilot reported, "I had to make a conscious effort to let go." In still another instance, the pilot said, "When I was outside, and after making one tumble, I noticed that I was still holding myself in the seat. At low airspeed—mine was 180 knots—I felt that I could have held on to the seat until I hit the ground."

Holding on is a normal response to stress. It is illustrated by the common expression "a drowning man will clutch at a straw." This tendency to hold on when under stress can be overcome in two ways: by training, and by mechanically separating man and seat.

The recent development of an automatic man/seat separation device will reduce this problem when the device becomes generally available. Several prototypes of man/seat separators are in the process of being qualified. Currently, seat separation devices are installed in some F-104 aircraft. The need for man/seat separation devices has been recognized and efforts will continue to have them installed in all USAF ejection seats.

Meanwhile, increased emphasis on the importance of positive action in effecting seat separation is needed. Crewmembers should receive recurring simulated ejection experience, including seat separation, to prepare them for an actual emergency. Many of the crewmembers who have made successful low level ejections have reported that such training made their responses automatic and probably saved their lives. ▲

OVER...

...AND UNDER SUPERVISION

Lt. Col. C. G. Brosnan, KC-135 Project Officer
Cargo Branch, DFMSR

Frequently members of this Directorate are queried as to the reasons why the USAF aircraft accident rate continues to decline despite the increase in the number of high performance aircraft in the inventory. There is no simple reply to this question because of the many factors involved. However, to proclaim the obvious, it is necessary to mention the increased experience and effectiveness of flight crews, commanders, the logistic and flight support functions and of the aircraft industry which provides the vehicles.

Probably the most dramatic results in reducing aircraft accidents in recent years have been achieved by commanders. Their evergrowing awareness of the effect of accidents on the combat potential of the Air Force has produced a sharpening of their best management tool, i.e., improved supervision. With the precedent set by some of our key commands, commanders have been brought into the accident prevention picture from the smallest detachment up through the highest echelons. In other words, the military chain of command has been put to work to cope with the problem.

Because of the phenomenal gains made in transitioning from the postwar condition of sporadic or no supervision of flying to the present state of affairs, it is difficult and perhaps even unwarranted to be critical of the supervisory functions connected with flying. Nevertheless, recent aircraft accidents have pointed up the need for self-appraisal in the area of supervision. Some recent accidents are cited to stimulate thought on this subject.

Conscientious supervisors, in an attempt to tie up all loose ends, can suppress "on scene" discretion by imposing inflexible directives which cannot cope with all situations. For example, several of our training base commanders have properly and realistically imposed safety margins for training crews in order to provide enough cushion for possible aircraft malfunction and crew inexperience. Training mission takeoff loads are computed so that critical field length never exceeds 90% of the available runway. This is a very fine procedure, approved by everyone, and expressed as a written directive. However, in the case in point, the philosophy behind the directive —that of providing margins for safety—was lost in antiquity. It became an inflexible rule from which no one would willingly deviate.

On one of these training bases which possessed two runways, a high crosswind condition existed on the primary runway. Logic dictated that the secondary runway, which was more nearly aligned with the wind, should be used. Computation of takeoff data revealed the secondary runway to be adequate for takeoff. However, the above cited directive was in effect, requiring that critical field length not exceed 90% of the runway available.

The critical field length requirements for the aircraft in question exceeded the 90% factor by several hundred feet. The use of this runway was discarded, therefore, in favor of the runway with the high crosswind component. This created a marginal takeoff situation requiring an increase in takeoff speed to satisfy flight manual recommendations. The supervisor on the scene was aware of the situation and attempted to cope with it. In fact, recognizing the marginal crosswind condition, he required that an IP accompany the student crew, although the flight was previously scheduled as a solo mission.

In final analysis, the aircraft was committed to takeoff with little or no margin for safety because of the 90% directive, but under conditions contrary to the philosophy under which it was conceived. Result—the pilots lost control of the aircraft on the takeoff run and crashed with catastrophic consequences.

To supervise is to oversee with the power of direction. There are times, however, when those supervised are in a better position to render a judgment than the supervisor is. This is particularly true when the subject pilot is a competent aircraft commander—and airborne—while the supervisor is on the ground with a necessarily limited knowledge of the AC's situation or problem.

To illustrate, let's take a look at another major accident. The aircraft returned from a mission and started penetration. During the few minutes involved, the base weather deteriorated from ceiling obscured, 3 miles in ground fog, to below minimums. This was an unforecast and unexpected condition. After leaving the low station, the aircraft was given a GCA to the base. Meanwhile, the weather observer reported the base going below minimums and advised GCA and the supervisor of flying. The pilot, in the meantime, reported to GCA that he had the runway in sight and that he was commencing his final approach.

The supervisor of flying, upon learning of the weather condition, relayed instructions to the pilot, through GCA, advising him to discontinue the approach. The pilot protested that the field was in sight and that he wished to continue approach. GCA then advised the pilot that the supervisor of flying had directed him to discontinue approach. The approach was discontinued and the pilot then tuned his radio to the supervisor's frequency and advised the supervisor that he had the field in sight and was committed to land due to low fuel state, two facts of which the supervisor was unaware. Upon realizing the situation, the supervisor authorized a landing. In the interim, the weather had deteriorated to zero/zero. The aircraft

crashed 3300 feet short of the runway.

The primary cause of this accident was charged to the pilot, for two reasons: first, his fuel state at impact was barely enough for him to have proceeded to his planned alternate; second, he flew too low on GCA final. How differently the story would have ended had the supervisor given the pilot some credit for judgment and training and had he stayed out of the act during the first approach.

These incidents have been cited to provoke a serious examination of some of our methods of supervision so that we may learn from our mistakes, and be alert for possible trends. Oversupervision can have just as disastrous results as undersupervision. We cannot afford the luxury available to the old artillerymen wherein they fired over and under and then for effect. Supervision of flying activities must be effective the first time. ▲

• • •

"C" Notes

Lt. Col. Waring W. Wilson, Fighter Branch, DFMSR.

It used to be that pilots caused less than one-third of the F-100 accidents. Recently, however, this picture has changed.

During 1957 when the F-100 rate was 62, pilots caused 33% of the accidents. And in 1959 the overall rate was 29, with pilots causing about 23%. The pilot factor rate was reduced from 21 to 7. This shows a really great achievement in 2 years because pilot-induced accidents were reduced by two-thirds. It's easy to see why, too, if you can remember the number of F-100 hours on your squadron board in 1957. Sometimes, nowadays, one pilot has more Super Sabre time than the whole squadron had in 1957.

In the first 4 months of 1960, however, pilots caused 47% of all F-100 accidents. The whys and wherefores are hard to come by.

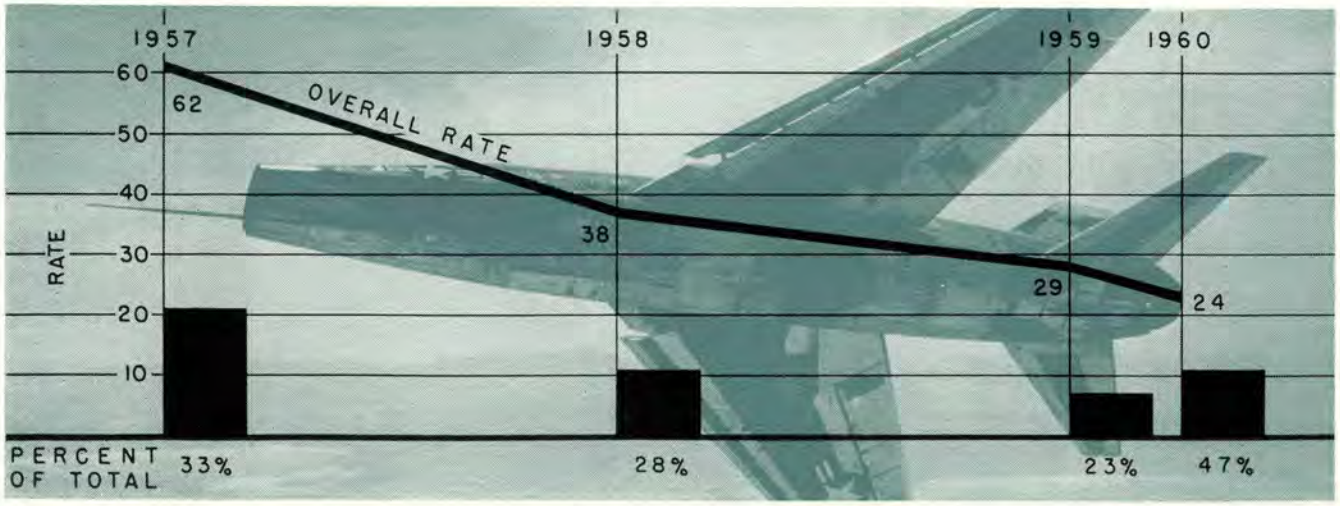
Another thing that clouds the picture is the relationship between pilot factor and materiel failure. A large number of pilot factor accidents started out as materiel or maintenance factors and could theoretically have been overcome by timely analysis and proper emergency action. Therefore, when the accident boards met, the error was placed on the pilot because his action or lack thereof was the factor which made the accident inevitable. Materiel failure rates are decreasing for two reasons:

- Most of the deficiencies have been recognized and corrected.
- Maintenance men and pilots alike have learned to overcome some of those that remain.

The overall rate for 1960 is down to 24, but pilots have caused 47% of the total. Moreover, the pilot factor rate, which was 7 in 1959, is now up to 11. An analysis of accidents reveals that most of them were not caused by pilots failing to react properly to emergencies. In 11 of the total of 14 pilot-factor accidents, there were no maintenance or materiel factors involved. One pilot became lost, three got into spins, two caused midair collisions, and four made short or hard landings. One pilot flew into the ground on a skip bomb pass. Most of these pilots had several hundred hours in the F-100; yet they made grievous and sometimes fatal mistakes.

How come? As we said earlier, the answers are hard to come by. Is it because the high-time pilot is getting cocky and overconfident? Is it because familiarity breeds carelessness? Or is it just a passing statistical bulge which will go away if we ignore it?

It might behoove all pilots to remember that the airplane does not change; the man does. He can be more proficient or he can be less proficient. He can learn and he can forget. And when he stops learning and starts forgetting, the airplane is still waiting to get him! ▲



There are many good approaches to improved safety of flight. Colonel Adams believes that Scott AFB has an excellent one in . . .

THE FLIGHT PLAN COORDINATOR

Col. Frank L. Adams, Commander, Midwestern AACS Region, Chanute AFB, Illinois.

How often have your painstaking flight planning efforts been completely destroyed by the "revised route of flight" which followed "ATC clears——?" And how often have your flight planning efforts been voided by unplanned and fuel consuming departure routes? Have you ever been delayed on the runup pad for an hour or so, burning fuel and fouling plugs, waiting for your IFR clearance? The problems of departure sequence, airway routes, communications requirements, and arrival procedures can be greatly reduced by effective preflight planning.

We in Hqs Airways and Air Communications Service *(AACS)* recommend the services of an air traffic control Flight Plan Coordinator to assist you in planning your flight. This system will be of special value to "armchair" pilots and pilots recently returned from overseas. A trained Flight Plan Coordinator can coordinate your needs to insure maximum use of Federal Aviation Agency/ USAF, local base, and AACS air traffic control planning which is designed to provide the best cross-country service.

Where the Flight Plan Coordinator system is used, a more even flow of traffic is assured. Radio communications and coordination between air traffic control facilities will be reduced. Pilots properly briefed on their routes, requirements, and air traffic control procedures will be more qualified to follow their filed flight plans, "Paper explosions" in the cockpit after receiving a revised route of flight in the ATC clearance will be past history. As a result, safety will increase and you will gain better service with less strain on both you and the air traffic controllers.

All bases should have some type of Flight Plan Coordinator *(FPC)* system. The most comprehensive system could be established at bases having extensive cross-country, nonoperational flights. Examples are command headquarters or heavily used refueling stop bases. The least comprehensive FPC system could be used at off-the-beaten-track operational bases.

Flight planning assistance can be provided at the base operations counter, in a corner of the main base operations room, in a separate flight planning room, or a combination of these places. Bases with a greater requirement for FPC assistance should provide a separate briefing room; and conversely, those with lesser requirements could give personalized service at the operations counter.

Your FPC system should arm the pilot with all information essential to complete his flight. Examples are:

- Control takeoff time.
- Local field conditions.
- Standard Instrument Departure Routes.
- Radio frequencies required.
- Best airways to follow *(preferred routes)*.
- Arrival routes at destination.
- Hazardous en route and destination weather *(as displayed on visual aid)*.
- Special information.
- Applicable NOTAMS.

This data can be supplied by personalized, individual briefing, or through self-service, or a combination of service. Visual aids and handouts should be used extensively to enhance the briefing. Some visual aids are:

- Flight planning charts showing best airways routes.
- Hazardous condition weather charts.
- Local conditions chart showing such things as the runway in use, field condition, barrier position, runway temperature, and pressure altitude.

Handouts that can be used are:

- Standard instrument departure routes.
- Base layout charts.
- Completed Forms 21a or a card index file containing recommended airways routes.
- Special interest items.

Captain Charles King, assistant ops officer at Scott Air Force Base, has developed an excellent FPC system for his base. Why not visit Scott and see for yourself how his system works. If you could see the "before" and "after" of his work, we feel sure you'd want an FPC system for your base.

Pilots should solicit their flight planning briefing immediately upon entering base operations. First, a realistic control takeoff time that can be made good plus or minus 3 or 4 minutes should be established. Your control takeoff time will determine your position in the takeoff sequence and will reduce delays on the runway pad. Traffic will be spread out, service will improve, and you will have a better outlook on your proposed flight. Air traffic departures need to be regulated by control takeoff times the same as base automobile traffic is regulated by staggering work hours.

Second, after obtaining your control takeoff time, proceed with your preflight planning. An effective Flight Plan Coordinator must have both an aeronautical background and a sincere desire to do the job. He may be either an officer or a civilian. If an officer, he should be jet qualified and possess clearing authority. If he's a civilian he should have knowledge of meteorology, air traffic control procedures, aircraft operating characteristics, and flying or air traffic control experience.

Captain King says that his FPCs are doing an excellent job primarily because of their interest in the work and their desire to provide the best possible service. All his FPCs are either jet qualified or are attending a jet qualification course. Some pilots at Scott AFB plan their flights by using the self-service aids provided. If they "buy" the right routes at the self-service counter, the FPC will give them a control takeoff time and send them on their way. Errors in self-service flight planning may draw a "You can't get there that-a-way," which means

that the pilot must go back to the salt mines and start over again.

The Flight Plan Coordinator can only assist you in planning your flight. He will have telephone drops to the local approach control facility, the control tower, and the air route traffic control center to keep him currently apprised of the air traffic flow. He will have extensive training and will personally flight check the routes which he offers. The data that he gives you has been coordinated with air traffic control and is current.

With all this preflight planning we expect your clearance to read: "ATC clears Air Force 77711 to the Summertime Airport via flight planned route, maintain flight level 350." ▲

We don't say that the FPC system is unique to Scott AFB, although this is the first base to have its valuable FPC service described. If your base has given it a whirl, we'd like to hear from you.

Another thing, this article may be timely in view of USAF's requirement to establish and publish Standard Instrument Departure (SID) Routes, tentatively set for August 1960; also FAA's requirement that each pilot will receive adequate SID briefing prior to departing on an IFR flight. The author believes that the Flight Plan Coordinator may be the answer. You know, he may be right. However, Aerospace Safety wishes to point out that the manning situations at some bases may present a difficult problem.

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HERE WE GO AGAIN

Maj. John C. Makely, New Jersey Air National Guard, McGuire AFB, N. J.

The following article was originally a letter written by an Air National Guard Squadron Commander to his pilots at the beginning of this year. His squadron had just completed a very successful 1959 after a rather sorry 1958. We believe the letter can be an inspiration and invitation to any squadron to do better in 1960.

Yes, a new year is well on its way and here we go again. When 1959 rolled around, I was trying to hide from the wing and group commanders after their comments on our sorry showing for 1958. But during 1959 we started to get hot and finally got so good that at the beginning of this year we considered ourselves a real operational outfit. Now that we seem to be on top looking down we can begin to realize that it is going to be tougher to stay up here than it was to get here.

You all remember 1959. We talked, pleaded, yelled, and connived so much with all of you that you will probably never forget it. It was flying safety, operational readiness, Spaatz Trophy, flying safety, LABs, and flying safety again.

The main accomplishment in staying on top *is* flying safety. With a safe flying operation, everything else will fall in line. Flying safety to me means that all of you know your airplane, the operational procedures, USAF and ANG flying regulations, the emergency and instrument weather procedures. It means that you have and use common sense when it comes to weather flying, cross-countries, and your own personal physical fitness. It also means to me that any one of you can load up with bombs, take off, climb up through an overcast, find a hole over the target, smack it with a 100-foot hit on an over-the-shoulder run, come back on a GCA, land on a slick, wet runway, taxi in, and tell the intelligence officer "no sweat."

How did you get this good? Very simple. You all reported on time and listened with attention and understanding to all of the speakers when they were passing out pertinent safe flying information. You made use of all your time when you were present on the base, studying and reading the many publications on flying and on your operational activities. You kept the Link trainer operator so busy boning up on TACAN and your instrument procedures that he always looked beat. You chased your wife and kids and/or girl friend away when you were putting new information in your procedures book or sneaking a look at the flight manual.

You always went for pizza or coffee after free beer or stag nights so that you would be physically fit to fly next day. When you couldn't get into the air on marginal weather days you attacked the ground school program with the same eagerness and application. These and many other things—like how sharp you looked in your ever-clean flying suits and jackets and your pressed uniforms at inspection—brought us to the top. Now, all we have to do is continue the excellent work and we will stay on top.

Now for the flight commanders. They are the key people in the flying business and they need your respect, cooperation, and loyalty. For those of you who were recently made element and flight leaders for training purposes, just remember that when you sign the clearance you are the boss and completely responsible for everyone on your wing. Don't overextend yourself or anyone else for expediency.

And, as I started this short note, "Here we go again." In 1960 all you have to do is get your total flying time, instrument and night time, simulated flameouts, drag chute landings, short field landings, Link, qualify in LABS, and, well, whatever else they can think of. You might tell your family that you're going to spend a little more time at the field this year because we also have to qualify in air-to-air and ground gunnery. But, if we do all these things with the same spirit I described above, we should have no problems.

The year 1959 was great. You all know that I appreciate the time, effort, and cooperation received from all of you. There is no doubt in my mind that this is the best flying unit and the best bunch of guys with whom I've been associated. There is absolutely no reason why it can't happen once more—in 1960—and as I said before, "Here we go again!"

Complete knowledge of your bird and mission, confidence in yourself and your ability, respect and regard for the ability of others, consistent flying and common sense—added together they mean safe flying and no accidents in 1960. ▲

a flight to remember

Capt. William F. Ricketts Jr, 360th Bomb Sq, Davis-Monthan AFB, Ariz.

After six hours of fighting unforecast headwinds, sweating out fuel, and grappling with a wing-heavy condition caused by trapped fuel, the emergency airfield came into view and we entered the downwind leg. I called the Hawaii Air Guard's Shako Control, who'd picked up my first Mayday call hours earlier, and told him we were now OK. He signed off, wishing us luck.

Now the sun began to shine down on us once again. We had it made, even with enough fuel to go around, if necessary. Of course, I never go around, except on check rides. Once I'm set up for a landing, that's what I do and I'd been thinking of nothing but landing this beast for what seemed an eternity. Well, almost, anyway. So, with a great sigh of relief, I put down the gear handle and prepared to have at it!

Strange, I thought to myself, no green lights. As I turned base I noticed a clock showing ZERO that should have been jumping with joy.

"Where the tarnation is my hydraulic pressure?" I thought out loud.

"Don't ask me. I haven't got it," replied Captain Billy S. Young, my navigator.

Needless to say, that sun I was basking in suddenly went behind a very dark cloud, and my sigh of relief turned into a pant of panic.

Now why won't that darn gear go down like it's supposed to? I thought. Very unreasonable of it. Nothing for it but emergency procedure. Let's see . . . I can . . . I should. First I'll . . .

BLANK—nothing but a very big mental BLANK. All my carefully learned emergency procedures deserted me in that moment. Don't tell me this has never happened to you!

There I was, at the end of a long, rough trail, low on fuel, my gear stuck up, and brain gage showing EMPTY. I couldn't even remember the Lord's Prayer!

The rat race that landed me in this predicament had begun several weeks earlier at my home base of Langley. Ferry crews were needed, so away we went to pick up a B-57 at McClellan AFB, California. Of course, the birds weren't ready when we got there, so we patiently made the rounds in the local area for about two weeks. Finally, glued and wired together—the aircraft, that is—we completed our test hops and fuel consumption checks, and settled down to wait for the proper winds, old stuff to us nonrefuel types. A 40-knot headwind was MAX for us to make the jump to Honolulu.

Well, finally it happened, so we blasted off in the lead. We flew loose formation—in sight—and climbed to about 37,000 to start our cruise climb. Our bird was something of a dog, however, and wouldn't top 43,000 so there we stayed! The other ships slowly caught up and passed us as they reached for 50,000 and climbed out of the headwinds.

Everything was OK for us, though. We made Ocean Station "November" and they asked us for the winds aloft. *They* asked *us!* What a laugh! Us with only preflight DR to go on; no Loran, no celestial, no nothing. Just track

out halfway on San Francisco commercial radio, then in on Honolulu's commercial band.

Anyway, we hit the point of no return and still felt good about the flight. What we didn't know was that soon after this point the winds increased to 125 knots on the nose. We started to guess that all wasn't well, but still figured we wouldn't flame out 'til touchdown. We all knew that at worst we could glide in from 43,000 feet with no sweat, if you consider a dozen aircraft on flameout approaches to same airport at the same time "no sweat!" We told ourselves, however, that things could be worse, and with no place to go but forward, we kept going. Then, in the words of the famous old saying, something—was it eggs?—hit the fan.

I noticed the need for more and more trim to keep the right wing up. A close check showed the right internal wing tank gage still where it was when I first turned it on. A check of circuit breakers and loadmeters led me to the conclusion that the pump was OK but the valve just hadn't opened. Moisture freezing and locking the fuel valve wasn't unheard of, so there you are. We had been instructed to use these tanks briefly at level off to check for flow.

Billy, who had been figuring our fuel at a furious rate, now even put down his copy of "The Young Lions" and really got interested. Finally, he said "Anyway you want to cut it, Dad, we won't make it!"

Well now! This really put a different light on the situation. All we could do was to try and get within swimming distance. We advised everyone in the gaggle and they offered their condolences. I suppose we could have gone back to Ocean Station "November" and asked for their hospitality, but having spent 18 days a year before rocking and rolling my way home from the Philippine Islands, I wasn't too interested.

With 1500 pounds of trapped fuel, we headed into the setting sun. With about 200 pounds of usable fuel, we hit North Hilo intersection and didn't appear to be moving very fast. You just don't go very far on 200 pounds in any aircraft, and we still had 160 miles to go, bucking that 125-knot headwind. Time to act! So, saying goodbye to the fellows, I flipped the IFF to Emergency and UHF to Guard.

Hardly had the ARC-27 channelized when I heard a beautiful voice saying, "Aircraft squawking Mayday in the vicinity of North Hilo. This is Shako Control. Can I be of assistance?"

Could he? In my usual rock steady voice I gave him a quick rundown on our plight. Right away he came back with a heading of 190° which he said would take us to a lovely little airfield nearby.

How could this be? We were in the middle of the Pacific Ocean, for all intents and purposes. But anyhow—as I've said before—I cranked her over to the left, shut down one engine and pulled the other back to idle, and started a slow glide down at flameout airspeed.

Now Billy, who had been silent for some time *(meditating?)*, asked for a repeat on the name of the field we were heading for. I couldn't pronounce it and didn't have the slightest notion where it was and didn't care. It would be nice, though, to know how long and how high the strip was. Shako tried to tell us, but his accent, plus the various Navy, Coast Guard and Air Rescue planes trying to get in on the act of saving our hides, made it difficult—to say the least. We looked up Kaneohe but it was in another direction. Kahoolawe was only an island. Kamuela wasn't even listed, and Kahului was on Maui—whereever that is. The name Shako had given us sounded like all of them, but who cared as long as it wasn't wet! *(They should number them like in Korea and even Japan there for a while.)*

I could see Shako's reasoning. The turn put us abeam of the wind instead of head on, so wherever we were going, this was the shortest way. By this time Guard channel sounded like a Girl Scout meeting. Shako sounded like he wanted to cut a few throats. So did we.

We discussed dropping the tiptanks but could see no good from it. If we made it, we'd need them to get to Japan. If we didn't make it, it didn't matter. So we kept them. We decided to bail out no later than 3000 feet if we didn't have the field made. Still had 200 pounds of usable fuel. Must be going on fumes.

As we passed down through 20,000 feet, I noticed the need for trim to hold the left wing up. Happy day! The lower, warmer altitudes had thawed our wingtank valve. Now we had 1700 pounds of usable fuel—still not enough to get to Honolulu from this altitude but at least we would land on our wheels instead of on our feet.

Now an island showed through some scattered clouds. What a wonderful day! With a little more help from ol' buddy Shako, I soon spotted the field. We said goodbye and much thanks, switched to tower frequency and started No. 1 engine. Now the fun began. That cotton pickin' gear! I had a quick mental picture of what our situation would have been if we had gone on to Honolulu. All those airplanes in the pattern screaming emergency fuel or none, and us with a gear that refused to come down! I heard later that Honolulu Approach Control went completely mad. They were reputed to have said "All aircraft with emergencies, hold your position!"

One orbit around the field to clear the stupidity from my mind and let's try to get that crazy gear down. Of course! Pull the "T" handle and pump like mad. There they go. Billy made some comment about "What's all that grunting and groaning up there? Ain't you ever done any manual labor before?" I ignored him.

Three green and turn final. Flap switch down. Round out, touch down and get on those brakes. Remember, you've only got three applications. No sweat! A 40-knot wind down the runway, and uphill. Easy stop for a no-flap landing. Here comes the civilian crash crew, so cut the engines and let's head for the bar. Now we've really got it made. Time to relax. It's all over. That's what you think! So did I.

I took my feet off the brakes and took a few deep breaths. Funny! We were rolling again and turning. Didn't think they would have a tow bar here. They didn't—it was the wind that was turning us around for a dash back down the runway. I remembered the big ditch at the end, and jumped on the brakes, but of course no fluid, no

pressure, no brakes! They hadn't covered this in the Dash One.

The native crash personnel sensed my trouble and started throwing chocks in front of the wheels. Did you ever see a B-57 spit chocks? Fortunately, none of the boys was injured. Now they hit on the only solution. Brute manpower! A whole mess of them grabbed various parts of the bird and very slowly brought us to a stop. Whew!

"Well, open the canopy and let's get out of here before something else happens," called Billy. Too late. Something already had. The canopy was hydraulically operated. Now the sun was really coming into our little greenhouse and it was getting hot. I pulled out the Dash One, knowing full well what it said. If the normal system doesn't work to open the canopy, blow it! Well now.

I wasn't too sure where we were but I was sure it was a long way from a replacement canopy. I could picture us as beachcombers with long beards. Nope, don't blow that ever-lovin' piece of lucite. So with much yelling and Indian sign language we got the boys outside to open the pressure door on the right side so we could talk to them. More yelling and gesticulating and we got them to open the door on the left side, reach in, move the well-hidden valve and then pump the handle provided for ground use.

Naturally, the valve on this bird was different from any other B-57 in the Air Force, so it took time. By now the temperature in the cockpit was really high. Still the canopy remained shut. They actually had to take turns pumping. After an eternity or two, three things happened at once: the flap indicator suddenly showed full down; the canopy started to open; and I remembered the no-flap landing.

I habitually put the flap switch down on turning final but this time, with no main pressure, the flaps stayed up. Those poor boys had been working in the heat of the day pumping my flaps down. What a blow. I didn't have the heart to tell them and I don't think they ever noticed.

The hydraulic fluid, by the way, had been lost through a microscopic leak in the high pressure line from the right engine pump, should anyone be interested. It took three Gooney bird trips from Hickam and a few long distance phone calls before we got a new stainless steel line made that would fit. And many 55 gallon drums of JP-4 had to be flown in to us for refueling. Incidentally, we were at the airfield at Kahului, Maui. About nine months later I chanced to pass along the same route and gave Shako a call for old time's sake. I sure wish I could have met that boy.

Yes, that was a flight to remember. Did I learn anything from it? Let's see.

I would say the main lesson learned—or rather relearned—was the matter of *control*. When trouble comes along, as it surely does sometimes, try to maintain control of the aircraft and especially of yourself. I believe this is the dividing line between fatal and nonfatal accidents. Every accident report I have read where the crew survived was due to the crew's maintaining some semblance of order amid the chaos. For those catastrophies with no survivors, we can only guess. Sure, when the moment of truth arrives, we are all scared, but not unconscious. Usually there is time to stop and think. Until that bird starts to hit the ground, there *is* time—use it!

Even if all the fuel is gone and all the engines have quit, you still have time. If your bird is still flying, then fly it until you're sure you can't save it—then get out. If you are over water, who wants to swim that bad? If you're over land, why walk when you can ride? Here at Tucson you can be within easy gliding distance of the field but it may take weeks to walk. Control yourself, boy! This could be the theme of my story.

Morals? Lots of 'em, I suppose. The wind problem could surely use a going over, though not for the first time. A few months later while deploying to Okinawa a similar situation existed. I understand much was said and written about that hassle. The whole squadron arrived over Honolulu short of fuel, due to winds. Surely the Fly Safe Boys got *wind* of that one? Ow!

I can't for the life of me understand why the Ocean Stations can't provide wind data out there. They have radar and balloons and could track aircraft. We must have been on their scopes for nearly an hour. Why not compute winds aloft for poor aviators? What are they there for? I'm not trying to provide an answer, just pointing out an area for improvement.

Moral: Keep off Guard channel until you need it. Don't get in on an emergency unless asked or forced to. A fellow can only use so much help, so stand by. Don't complicate a "save" with additional chatter.

Moral: If you ask for help, put yourself in your savior's hands. Either trust him completely or not at all. He is not in trouble or he wouldn't be fooling with you, so he will be able to think much more clearly. Besides, he already has procedures to cover nearly any emergency in his area.

Moral: This business of the names of airfields and other facilities—you can study the route all you want but if you can't speak the names properly or understand them when they are pronounced correctly, you might just as well not know them. The "K" system in Korea was a beautiful thing. I can find my way to K-53 but can you find anyone who would recognize the name if he heard it on the radio? I can't even spell it.

Here's a subject that I'd like to see carried further. Many names sound the same to the uninitiated. I was on a flight from Ashiya in southern Japan to Tokyo and when we were over Tsuiki, my copilot made the position report with an ETA for Iwakuni. What he actually said really raised a panic in ARTC. He said we were over Atsugi and estimating Wakkani! Only about 1000 miles off. Far fetched? Not at all. I could go on all day and I'm not the only one who has flown other than between St. Louis and Kansas City.

Moral: Don't let *anyone* talk you into some weird procedure if you are sure of the proper one. That routine of checking the wing tanks on level-off for flow was for the birds. Another B-57 buddy had a similar problem over the North Atlantic. Since he was going into one of those cold ports he had no chance of thawing out the valve. Normal procedures will usually do the trick. I gathered that the people who briefed us were experts but found out different.

Well, that's about all I remember except for an hour's work towing the bird off the runway with an old surplus 6 x 6 truck and a piece of cable. And since we'd lost about 10 pounds in sweat, our next stop was the nearest house of refreshment. Things got a little hazy at that point but one thing I'm sure of—I'll never forget that flight! ▲

TIPS FOR T-BIRD DRIVERS

Major Wallace W. Dawson
3510th Flying Training Wing, Randolph AFB, Texas

Another bent T-Bird—landed long—overshot—wet runway—fog on the windshield—PRANG. This isn't new, original, smart or safe.

A few years ago, fog forming on T-33 windshields was a problem. It was a problem because the defogging system just wasn't husky enough to do the job. This posed a problem but not an insurmountable one. With a little skull exercise, a little time, and a few bucks, the system was improved, enlarged and made efficient.

Now we all know that you can lead a horse to water but if he'd rather have cognac, you've had it. In other words, you can give a guy the best equipment in the world but you can't make him use it.

The flight arrived over a southeastern U. S. base in the early evening. The pilot was cleared for a standard north omni and made the penetration. The pilot first sighted the runway at 2 miles out and 20 degrees to the right. He was cleared by the tower to make a circling approach. Windshield fog was giving him a hard time. The aircraft touched down long on a 7000 foot runway which was wet from rain. Naturally, the airplane couldn't be stopped on the runway. The barrier should have stopped this runaway aircraft but it didn't because the speed brakes were down. *SIGH, SIGH.*

GCA was available though not requested. The pilot's attention was distracted by the high intensity runway lights but he did not ask that they be turned down. At the time of the accident there were 223 gallons of go-juice aboard. The weather certainly wasn't bad enough to prevent a go-around—2500 broken, 8000 overcast with 4 miles in rainshowers.

This pilot had so many aces in the hole, so many alternate courses of action, so many outs, that this accident should really not have happened.

There's no need to Monday-morning quarterback this one—the errors are obvious. *Drive carefully!*

I never knew what meticulous meant until I rode with a guy in a T-Bird the other day. He figured everything down to a gnat's posterior and then he figured it all over again. Really kept track in the air too, double-checking all the time. His completed '21A looked better than any I'd ever seen. Well, all this is good, real good, but the thing that really impressed me was what happened after we got where we were goin'.

This guy insisted on pulling a post-mortem after each leg. He went over the entire flight in minute detail to find out if he had done anything wrong—and if so, where, why and what he could do to keep from doing it again. This included some little things. At least they looked little to me and I told him so. He looked at me in amazement and then said, "But, dad, there's only one right way to do things and if you don't do 'em that way, then you must be doin' 'em wrong." Kinda' like the "if you ain't with us you must be agin us," approach.

Sounds pretty logical too when you think it over a bit. After all, any one of us can still learn. A lot of our flights are called "training" flights and "training" anything is designed to encourage learning.

There's another aspect too: money. Some years ago a slipstick expert figured that two captains and one T-Bird for two hours cost 4000 smackers. This was so long ago that it's bound to be more now because a smacker just don't buy as much these days as it used to.

So, after a while I kinda' got to agreeing with this guy, especially on the post-mortem part. Now it seems like a real smart idea to take a few minutes *after* the flight is over to dissect it and see if anything was done wrong. One thing for sure, if anything was done wrong and you think about it like this, the chances of your doin' it wrong again are a great deal slimmer than somewhat.

We might wrap this up by simply saying we know we're gonna' be flyin', we've got to. Chances are, on every flight we do something that even if it's not technically wrong, could have been done maybe a little better or faster, or more thorough. Finding these little things that could be improved upon and doing just that is only a step towards efficient operation. And how many times have you heard that an efficient operation is a safe operation? ▲

This Golden Eye duckling was born with instinctive knowledge of flight technique. His instinct tells him when he is ready for that first big step, the solo, and here we see him launching himself unafraid on inadequate wings from his tree trunk perch preparing for the day his wings will grow strong enough for that first solo and those long migrating cross-country flights. *(Note the one-point landing.)*

Man—without this instinctive gift from Nature—must rely on experience, painfully gained, to insure him of success in his ventures above the earth's surface. Thorough flight preparation is a *must* phase in the struggle for safety of flight. Without it, all that follows is doomed.

Our thanks to Walt Disney Productions for the use of these most interesting photographs.

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