AEROSPACE

SAFETY

UNITED STATES AIR FORCE

THE PIVOT POINT

See Inside Front Cover

JANUARY • 1961

THE PIVOT POINT

Command and Supervision starts the 1961 safety program. Command and Supervision is the appropriate kickoff point for any and all safety efforts. In some respects it is going to be rough to measure up to or improve upon the results of the 1960 program. 1960 produced a year of nuclear accident-free operations and the percentage of missiles hitting the target rose impressively. Fewer deaths, lost-time accidents and savings in damage to property resulted from a stepped-up ground safety program. Flying safety produced a new all time low rate of 6 accidents per 100,000 flying hours, and more than substantial reductions in fatalities and destroyed aircraft. All in all, 1960 was quite a year. The commanders and supervisors who pushed through such improvements are to be congratulated.

If these compliments imply that we can now put our feet on the desk and rest on our laurels, you've been led astray. There will be no rest or letup in the massive safety efforts until we have wiped out the types of accidents that show positively we aren't doing enough. Until the "preventable" accidents are eliminated you'll be living with safety on a day-to-day basis. What is "good enough?" I don't really know what "good enough" constitutes, but I do know that if one-fourth of the human failure accidents (pure carelessness, inattention to duty, show-off, lack of training, and so on) had been prevented last year, there would be a lot of nice folks around in 1961 who aren't. So until the "preventable" accidents just don't come off, it must be admitted "we're not doing enough."

If I were a Commander I'd face the fact that accident prevention is my personal responsibility as a commander. I'd remember every day that proper supervision, good leadership and full attention can prevent accidents. If my unit had any kind of a preventable accident, I'd be the first to admit I'd failed in some way as a Commander. I'd be proud to realize that an accident-free year was also my responsibility.

Mr. Commander, you have the finest job in the world. Don't duck it! JLT

IN THIS ISSUE

Chief, Literature Branch
Lt. Colonel Francis D. Hessey

Editor
Lt. Colonel Jimmie L. Tissue

Art Editor
SMSgt. Steven A. Hotch

Feature Editor
Amelia Askew

Production
Major Francis H. Dawson

Distribution
SSgt. James D. McFall, Jr.

VOLUME SEVENTEEN NUMBER ONE — USAF RECURRING PUBLICATION 62-1

•THE BIG• •MIX

Major General E. J. Timberlake
Vice-Commander-in-Chief, Headquarters USAFE

In discussing the integration of safety in USAFE, I would like to cover three basic areas. First, I shall give you a brief look at our command, its mission and operation. Then I shall discuss the background and reasons for our decisions in establishing our present safety organization. And finally, I'd like to give you a look at what we now have and are doing.

Our command is not too different in most respects from other combat commands. A high degree of readiness and short alert posture is the heart of our operations. We probably handle a greater variety of weapon systems than many other commands, and this *does* play a key part in our organization and its safety functions. For example, we operate both tactical and reconnaissance fighters and bombers, and combat cargo, transport, and support and special activity aircraft.

Our missiles cover the field. We have airlaunched GARs, surface-to-surface airbreathing missiles, and the Intermediate Range Ballistic Missile. In these systems we use a large number of munitions and warheads. Many of our units are responsible for as many as three different types of warheads.

Our geographical location has a marked impact on safety. First, being only a few minutes by aircraft from the Soviet and Satellite borders, a maximum state of readiness is demanded in all cases. Next, the 14 countries and 12 languages in our area have a marked effect on such activities as Air Traffic Control and Ground Safety. Additionally, we often are called upon for major operations beyond this area, such as our recent airlift to the Congo. Our weather ranges from desert and tropic to arctic, with probably the most significant being in our Central and UK areas where our best base is under IFR more often than Pittsburgh. While we are not necessarily proud of it, we operate combat aircraft probably from the worst airfields in the world. I'm talking about our regular permanent installations. We have only two in the entire group that have runways of up to 10,000 feet and all are generally slick blacktop which are wet much of the time. The land is not available to do much lengthening or to even expand sideways from the runways.

Finally, and of this we are proud, we have our NATO responsibilities. I am not sure all of you realize just how closely we are involved with the other NATO nations. This includes operations of all types and is beginning to provide the Free World with a greatly increased strike capability. However, this does compound the overall safety considerations. For example, consider a modern U. S. weapon system on short alert in the hands of a NATO country with the increased problems of training, inspection and evaluation, not to mention the control of safety and release procedures. USAFE has these responsibilities.

With this brief look at our Command, let's go back a few years for some of the background and reasons why we developed our present safety system in USAFE. About the end of 1958 we had what was—I am sure for that period—a normal placement of safety functions and organization within our Headquarters.

The safety function, as was common to our management thinking then, was superimposed on the headquarters staff structure. We had a flight and ground safety operations, of course, but no one agency that I or any other commander could look to for across-the-board safety recommendations. Also we were extremely weak—or practically nonexistent—in the nuclear and missile safety areas.

In this same general time period, various incidents were highlighting the nuclear safety field. These included the South Carolina incident that received wide news coverage and others which were included in a *Saturday Evening Post* article a while back. We had some indications of our own that emphasized the requirement for a re-evaluation of our safety system. In one case, a trained, well qualified NCO declared an intent to kill himself by firing his .45 pistol at a bomb on which he was working. While serious detonation was not possible, it did take several hours —and the help of his wife and child—to persuade the sergeant to stay with us a little longer. A review of the records of this highly skilled man revealed repeated cases of psychotic behavior and treatment. While the details are not by any means complete, the case established a requirement for an improved system for screening and watching the people who had such jobs.

Our initial screening indicated that 3500 people had freedom of movement or access to special weapons. Examination of records caused us to reassign 104 people or 3% of all those we had in positions considered sensitive. Many of our people, including safety supervisors, became aware of the significance of the profile blocks on personnel records.

We then began to think along these lines: the traditional concept of locating the flying safety function under one staff agency and usually not coupled with its partner—ground safety—caused us to consider a regrouping of functions. This became all the more necessary when it was realized that there was no single staff agency monitoring the nuclear or missile safety activities. Both are of compelling interest to practically all of the classical staff agencies. In other words, Safety did not have a focal point.

It was brought to my attention that some years back,

• *THE BIG MIX (Cont.)*

in certain headquarters, the function of ground and flying safety had been merged in order to utilize the experience of both agencies. Recall, if you will, the ambiguous line of demarcation between accidents charged to ground safety and those charged to flying safety. It was all too obvious that a merger of talent, functions, and experience was in order.

Frankly, the placement of the safety activities in USAFE was frightening. No one really wanted to assume the overall responsibility.

The Inspector General—normally undertaking flying safety studies—was reluctant to offer recommendations. He simply stated the facts. However, at the time I am speaking of we did not have a normal setup in USAFE. Flying safety was under the control of the operational side of the house and physically located 68 miles from the Command Section. Operations people, thinking that flying safety should be a part of operations, often felt that the I.G. people were thinking unrealistically.

Ground safety in our headquarters was under—of all things—the Provost Marshal. Otherwise, ground safety was something left to the bases, and, if suitable macabre displays were made available, that took care of that! No one really seemed to realize that the overall operation of aircraft and the related ground support equipment were tied together with an umbilical cord that defied separation.

I then directed a study to be conducted of the entire safety effort. I hoped that the resultant study would place all of the safety functions in one staff agency. This agency would then evaluate the safety of our operations, develop policy and provide the necessary guidance. No doubt other commands were doing the same. In any event, as a result of this study we activated our present safety program in July of 1959.

A period of manning and detailed organizational regrouping resulted in full operation a few months later. It couldn't have been too soon for us. I shall not go into the details of organization or function, but I do feel it pertinent to mention some of the major factors involved which gave us such fruitful results.

First, we have not made any change in assignment of the inherent safety responsibilities of commanders, supervisors, or staff agencies. The safety function is superimposed on our staff organization reporting to me and is designed with a professional capability equal to that of the other Directorates of USAFE Headquarters. In addition to normal safety functions, the Directorate of Safety is the action agency for across-the-board unique safety matters such as nuclear weapon systems safety studies, NATO weapon systems safety, and the safety study of major operations such as the Congo airlift.

With this background, let's look briefly at our present safety organization and what we have done to implement the system down through our subordinate headquarters and units. First, our Headquarters Safety Directorate consists of four divisions: Flight, Missile, Nuclear and Ground Safety, and is manned by 31 people. The people themselves, I feel, are of prime importance.

Overriding priority was given to the assignment of personnel to this function. They include Century Series Aircraft Bomb Commanders, Missile Operations Officers, a Commander of one of our Tactical Depot Squadrons, the key man from our Headquarters' special weapons office, and such people in similar critical spots. They were assigned regardless of any objections or reclama. This was done based on my sincere belief that there is no more important operation in our Command. This agency's primary job is to assure that our combat capability and readiness remain in being, and be constantly improved. We expect them to do this by being the guiding agency in preventing us from inadvertently or accidentally destroying, jeopardizing or restricting our readiness posture.

We have similar but correspondingly smaller safety organizations in our numbered air force and air division headquarters. After a considerable period of study, evaluation and test, we are now moving into a program to carry this type of function and organization down through wing and separate group organizations. The majority of these wings and groups are now organized with combined safety offices. The great variety in our units at this level has caused us to move with caution. We do feel that unless adequately manned and supervised, a combined function at unit level can create an inadvertent diluting of the flight safety effort in the furthering of ground safety or one of the newer safety efforts. We are convinced that nuclear safety is of overriding importance, but we do not in any way intend to allow this to degrade our flight or missile safety functions. Our feeling is that the combined safety functions offer a far better method of effectively achieving the mandatory objectives and also give the general across-the-board improvement that we desire.

If we can evalute our system at this time, I would say that a new, positive attitude has developed: Everyone is in the act, including the Chiefs!

But, one fact is clear. From a military point of view, no measure of safety dare reduce the effectiveness of our various manned and unmanned combat forces. Safety and operational effectiveness must have the same relationship as the heart and the mind. Operations must dictate, but safety must point out the compatibility of accomplishment with reliability. And reliability is what we are after.

If we could state that the reliability of our various weapons systems approached 90%—as against 30% in WW II—then we could maintain our present superiority of military force at a far less cost than presently experienced. And I insist that reliability is a direct function of the efficient utilization of things and people. An assurance that neither will fail because of faulty planning or faulty practices. I would recommend, if it were possible, to somehow merge the elements of "operations" and "safety" into the overall concept of reliability.

The right kind of safety emphasis can aid in attaining a high reliability. For example: During the check of various alert-type aircraft, the safety people discovered a discrepancy in sequence of the continuity check between a particular aircraft and weapon. This particular weapon systems check was not made until the takeoff roll; accordingly, weapon reliability could not be assured. Now, regardless of aircraft, the continuity check is made in proper sequence, thereby increasing reliability.

On the other hand, safety measures sometimes im-

pose restrictions that seem irksome, but these measures pay off. For instance, at one of our advance bases in Turkey, a mechanic inadvertently jettisoned the external fuel tanks of an alert aircraft. An earlier restriction, imposed by our safety people, prevented the installation of the weapon ejector cartridge. If the cartridge had been installed at the time of the fuel tank drop, the weapon could have dropped on the ramp. You can imagine the confusion!

Both of the examples I have quoted are uniquely illustrative of my safety argument: That a proper merging of operations and safety can increase reliability.

Let me disgress by jumping ahead for a moment. If we think we have problems now, I ask you to look ahead a few years. Without doubt in the period 1965-1970, we will base our retaliatory effort on a mix of truly mobile missiles and manned aircraft. You are aware of the SAC plan for mobile train-based Minutemen. We, in the theater type air forces, must go the same route. With a force truly decentralized and scattered over many countries, the responsibility of conducting reliable operations truly presents many difficult problems. During this period the same unrelaxing attitude toward a safe operation must be maintained.

Nuclear safety will continue to be a war planning consideration during this period. Without doubt a definite threat exists in the possibility of an enemy inspired nuclear detonation on one of our bases. Such an incident would have as its objective the creation of official and public indignation among people of our NATO allies which could result in banning the storage of special weapons in oversea areas. Such an incident could conceivably destroy NATO.

The USAF is rapidly departing from the shotgun technique of weapon delivery system. By shotgun technique, I mean the scheduling of weapons on a given target with the hope that the laws of probability of a destructive hit will apply. Our weapon delivery systems are now terrifically expensive and exceedingly sophisticated. One weapon is capable of performing the same destructive task as many hundred formerly accomplished. Each weapon scheduled for a target must eliminate that target. This means that the reliability factor must approach one hundred per cent.

This Utopian result can only be realized if, among other things, we ruthlessly eliminate accidents caused by malpractice. Unsafe operating conditions will degrade the reliability of a weapon delivery system just as surely as poor operational planning will affect the effective accomplishment of the mission.

I firmly believe that efficient operations are safe operations. I believe that safe operations do not necessarily jeopardize effective operations, but this is true only as long as proper emphasis combined with common sense is applied.

We in USAFE believe we have a workable safety organization—properly placed and with sufficient emphasis given to the entire program from the Commander-in-Chief down to the weapons loading team. ★

• • •

· TWO POINTS OF VIEW ·

". . . and you'll only see scattered cirrus along your route."

"Brother, try busting 200 and 1 in a thunderstorm sometime if you want a real thrill."

MORE  TESTS

In December we published an article entitled "True Automatic Start," which is the first part of Captain Hanks' story about the T-33 test program conducted at the Flight Test Center, Edwards AFB, California. If you haven't already read it, run—don't walk—to the nearest copy of Aerospace Safety.

We promised to give you the rest of the story on those test results and here it is. While Captain Hanks' article expands on some statements in the Dash One, there is no conflict. So, on with the details and look for the commercial at the end.

What did we find out about the Ni-Cad Battery? This item is supposed to have a much longer life than the old lead-acid battery, and it does. With a dead engine or failed generator it will support all essential aircraft, communications, and navigation systems for more than 20 minutes. The UHF gets weaker, the Omni "Off" flag begins to show, and the various warning lights dim noticeably but all continue to function. The air test included the above items plus all fuel pumps, standby inverter, and ARN-6. The UHF quit at 22 minutes. On a ground test to complete electrical failure, the symptoms were the same with complete loss occurring suddenly (a'la T.O.) at 28.5 minutes when radios quit, pumps slowed, and lights dimmed out. In each case the battery recharged with no apparent damage.

On airstart attempts using the starter it was found that the battery was badly discharged after two consecutive attempts.

For initial ground starts, the Ni-Cad battery isn't as good as the lead-acid type it replaces. Four out of five manual/battery ground start attempts failed because of inadequate starter action. The RPM either remained too low to try a start (less than 8%) or hung up and refused to climb past 11-12% during the test. The moral is obvious: Use an auxiliary power unit unless it is an emergency.

Flap retractions were also tested. Suppose you're in a flameout pattern with full flaps down. If the pattern is turning out short, the obvious question is whether or not to raise the flaps. The next question then is, when is it no longer safe or beneficial?

With up to full internal fuel, it is safe to raise the flaps and play with them as long as the airspeed is kept at or above 140 knots. At 140 knots, the point of no distance gained through raising the flaps is near the entry to the flare. The aircraft rotation required to continue the flight path is moderate when the wings are level and easily obtained even in the final turn. The change in pitching moments as the flaps come up actually helps the rotation. The sinking feeling is mild to slightly alarming but can be met with moderate back stick. With flaps up, do not get below 140 knots before the flare entry. This speed is safe; a few knots less leads to stall buffet in the flare.

A real kick, again with no serious control problems, can be obtained by putting the flaps back down after the flare and before the flaps-up stall speed arrives. Putting full flaps back down at 125 knots adds a thousand feet or more to the float distance after the flare. The nose must be lowered some to keep from climbing. To allow full use of the pattern adjustments possible with flap position changes we recommend the following:

- A basic 20-degree flap setting from high key to preclude buffet in the turns, to set up for a fairly normal type landing if no changes are required, and to allow changes in either direction if necessary.
- Flaps full up as soon as the pattern appears to be short, maintaining 140 knots thereafter into the flare.
- Flaps full down prior to stall buffet after the flare to gain additional distance and a lower touchdown speed.

De-icing fluid will not cause a flameout or prevent an airstart. Neither will a slug of air (there is no such thing) from an empty fluid tank. Like the book says, fluid causes a slight RPM and EGT depression at cruise RPM, and more if the RPM is less. At idle from 36,000 feet the RPM will drop from around 80 to 20% by the time 30,000 feet is reached. The EGT falls to 175° C. This is close to a flameout, but, as altitude decreases farther, the engine recovers by itself with fluid still on. The above (worst) conditions were recorded after 4.5 minutes of a 7-minute shot during a glide at 160 knots. All three airstarts attempted after stopcocking at this point (with fluid still on) were successful. Out of nine airstart attempts while preloaded with de-icing fluid, one was unsuccessful. In this case, the second try worked.

During gangbar starts late in the program, de-ice was on from start initiation. All were successful.

The question of switching from normal to emergency and back: Switching from emergency to normal fuel system when above 23,000 feet is very likely to produce a flameout. The existing RPM and throttle position or action seem to have little effect. The changeover is accompanied by a thud and rapid RPM drop and recovery.

During 17 tries we found that switching from normal to emergency fuel system is a smooth operation at any



PART TWO

Captain Norris J. Hanks
Air Force Flight Test Center

altitude up through 40,000 feet (the highest tested). Switching at 80% RPM, without throttle action, produces a slow engine RPM change to the emergency regulated value accompanied by a change in EGT. The highest EGT encountered was 550°C. The acceleration and rise are slow enough to allow reduction of throttle if things should get out of hand. At high altitude, the RPM and EGT will decrease if normal system idle is above 80% RPM and the throttle is at idle. Do not hesitate in selecting emergency when a faulty or iced-up system is suspected.

Ever make a ground manual start? Seventeen ground manual/APU starts were made with no overtemp problems. However, the throttle had to be reduced below idle in all cases. A quick stopcock ends all difficulties.

The critical part of the start is after the throttle is opened. There is a slight delay and then the fuel pressure starts rising. The throttle should be retarded to just below idle as the pressure passes through 35 psi. There is another slight delay and then the light-off occurs. At the EGT passes through 300°C or the rumble is sensed, the manual start fuel switch must be turned off. The book, and experience, say to shut off the switch by closing the cover. This is the key point in a cool start. Then with the throttle below idle, the EGT can be played like a fiddle to control the engine acceleration. We found several T-33s with switch covers that would not shut off the manual starting fuel switch (UR'd). It pays to check the cover action prior to lighting the fire.

Now about practice flameouts: At any base with jet aircraft, there is always agitation to practice actual flameouts. There is no denying that confusion decreases and proficiency increases with the number of actual experiences. During this program, nine pilots were given rides in the front cockpit where they demonstrated to themselves the various results described here. One hour, and ten or so flameouts after takeoff, most of them were pro-airstarters; and all nine of them felt that a tremendous gain in confidence and proficiency was derived from their flight. However, this was a closely supervised program in a test environment and still there were a few screams from the rear cockpit.

Without haggling over the possibility of setting up and maintaining the many special conditions such as preflighted ignitors, prebriefed chase, tower, and crash personnel, continuous command supervision, and the continuity of a single project pilot accomplishing the airstarts or supervising from the rear cockpit, there are major safety factors physically present at Edwards that are pretty hard to duplicate. They include:

- A dry lakebed about 10 miles long and 6 miles wide.
- A 15,000-foot runway with a 5-mile overrun onto the lake.
- Three other airfields and several other dry lakes ideally scattered about to provide landing spots at all times.
- A restricted area free of all but controlled aircraft.
- Atmospheric conditions not conducive to canopy frost and fog even in winter.

Also, one cannot deny that a flameout, especially at altitude, is quite a thermal shock for the hot section of the engine. Any mild overtemps, not reported, would also reduce engine life. One turbine wheel failed during this program, on initial climbout on the 15th flight after 127 flameouts. Investigation showed that it had been cracked for some time. All of our test aircraft engines were inspected prior to release after the tests and found good. However, the turbine that failed had been inspected after the one overtemp of the program when the switch cover failed.

During the program six flamed-out landings were necessary. Previous similar tests had about the same ratio of flameouts to emergency landings. An operational base could probably expect higher ratios. As in other areas, the question is, would the risk of an occasional loss during training be worth the "saves" due to training? *(Ed. Note: If ever the Air Force approves the practice of intentionally flaming out the T-33, we'll be the first to let you know. Right now, a lot of people are working real hard to prevent flameouts.)*

Conclusions and recommendations:

- The Ni-Cad battery is great. Be sure that you know whether your T-33 has the old lead acid or the Ni-Cad. It will make a real difference if you're flamed out.
- Don't try a battery ground start except in a bona fide emergency.
- Use your de-ice—flamed out or not!
- Don't be afraid to switch the fuel system into "emergency" if things aren't going too well in the ice department.
- Twenty degrees of flaps is recommended as an initial setting in the flameout pattern. This allows adjustment either way and a good pattern and landing.
- Pull flaps "up" as required to extend the glide—but do not get below 140 knots until the flare. Put them back down after the flare to gain additional distance.
- To best simulate a flamed out approach use speed brakes out, 60% and 180 knots down to 10,000 feet. Below 10,000 feet, use 45%, 140 knots, landing gear down at the appropriate time, one-half flaps (varied) from high key to flare, and then throttle to idle after the flare. Practice putting full flaps back down occasionally.
- Good flying! ★



William Tell

Weapons may have changed from arrows to rockets, but marksmanship has remained the same. The annual turkey shoot at Nellis Air Force Base, Nevada, was an accident-free Weapons Meet, professionally planned, supervised, supported and executed.

The ranges were set up, the air-to-ground targets cleared, dart tow aircraft standing by, and team members ready and eager to start the best Fighter Weapons Meet ever conducted. Brig. Gen. John N. Ewbank, Commander, Nellis AFB, fittingly summarized the purpose of the meet when he said, "I think that all of us, in sober reflection, realize that the great good to come from this elaborate event is the demonstration of the degree of excellence achievable in tactical air operations and the opportunity to further refine and improve techniques and procedures through the gathering of such an immense pool of talent from all over the world."

Worldwide attention was focused on Nellis AFB during that week in October. Visitors included high ranking Air Force officers, foreign Air Attaches, Members of Congress, members of national press, radio and television. Top management of aircraft and the missile industry also was in attendance. Many static displays from these industries added to the luster of the growing aerospace age.

Months of planning by the Project Officer, Lt. Col. John L. McGinn, and his staff, went into the preparation of William Tell 1960. Official rules had to be prepared and approved. Housing and transportation for participants and guests had to be arranged. Material and reserve supplies for any eventuality had to be procured and stocked. Judging standards covering every phase of the Meet had to be prepared. A 100-man team of judges had to be assembled and briefed. All together, an almost infinite number of detailed, arduous tasks needed finalizing before the teams arrived.

Throughout this effort, the guidelines were realism, consistent with safety.

- A select group of Nellis IPs wrote the judging standards, insuring maximum possibility for realism without compromising safety.
- Targets were selected and laid out realistically, yet only those allowing adequate approaches and pullout altitudes in this rocky country were utilized.
- Coordination with the Federal Aviation Agency was achieved months in advance to reserve block altitudes for high level routes. These routes were worked out in conjunction with FAA officials to minimize any possible conflict with civil airway traffic.
- Low level routes were carefully laid out to avoid populated areas and yet allow adequate checkpoints for nine miles per minute "on the deck" navigation.
- Tried and proven Nellis AFB standardized procedures were made mandatory for use during the meet.
- A comprehensive set of air munitions safety rules

1960★

and procedures employed at Nellis were prepared by the Wing Air Munitions Safety Officer and handed out in booklet form to team armament personnel.

• Highly qualified Nellis IPs were detailed as Team Liaison Officers. They were of invaluable assistance too in briefing the teams in all procedures to be used at Nellis.

• Extensive ramp construction was in progress during the meet. Within each team operations an airfield diagram was posted for ready reference by team members, giving up-to-date information on all taxi hazards, thus minimizing any possibility of incidents and accidents from this source. Also, special emphasis was given to the elimination of the Foreign Object Damage potential in the construction areas.

• Qualified Nellis IPs served as mobile tower officers during the entire meet. Their duties included coordinating all takeoffs and landings, assuring adherence to traffic patterns (pilots were briefed on letdowns and traffic patterns for Nellis runways) and assisting pilots with emergencies.

• A formal briefing was conducted for each flight. These briefings included support pilots who flew target and judge aircraft.

After arrival at Nellis, team members received a generalized briefing on the support they would receive, and on facilities, operations, safety, search and rescue. They were encouraged to submit Operational Hazard Reports on all near-accidents and hazards so that the Wing FSO could take action to correct the situations.

Pilots were briefed on the locations of emergency airfields and the hazards of attempting crash landings on the many dry lakes in the area. They were cautioned, if at all possible, not to eject over the Grand Canyon area, and emphasis was placed on how to land and what to do after landing in this rocky, mountainous terrain. Survival technique and procedures were discussed, and all pilots were required to carry survival kits which included flares, water and a signal mirror.

Briefings on emergency procedures included names and numbers to call if an emergency occurred, what to do if forced down, how to proceed after a landing was made, and the procedures used by helicopter rescue teams.

A week of "pre-meet" practice preceded the shoot which gave team members an opportunity to perfect their technique in events similar to those to be conducted during the meet. During this period, the judges also flew so as to familiarize themselves with the various profile routes and the judging procedures for air-to-air missions were evaluated and finalized. While awaiting

Kudos to these winning units:

First Place
Gen. Jesse H. Auton Trophy
(Highest Total Points)
4520th Combat Crew Training Wing, TAC,
Nellis AFB, Nev.

•

Second Place
John L. Mitchell Trophy
(Tactical Unit, Highest Total Points)
18th Tactical Fighter Wing, PACAF,
Kadena AB, Okinawa

•

Third Place
479th Tactical Fighter Wing, TAC, George AFB, Calif.

•

Fourth Place
474th Tactical Fighter Wing, TAC, Cannon AFB, N.Mex.

•

Fifth Place
20th Tactical Fighter Wing, USAFE, Wethersfield, U.K.

* * * *

Gen. Hoyt S. Vandenburg Trophy
(Highest Points, High Explosive Events)
4520th Combat Crew Training Wing, TAC,
Nellis AFB, Nev.

* * * *

Major Thomas B. McGuire Trophy
(Highest Points, Nuclear Weapons Events)
18th Tactical Fighter Wing, PACAF,
Kadena AB, Okinawa

* * * *

Butler-Hebel Memorial Trophy
20th Tactical Fighter Wing, USAFE, Wethersfield, U.K.

* * * *

Individual Award Winners:

Team Captain (Highest Total Points)
Col. George I. Ruddell, 479th TFW, George AFB, Calif.

•

Highest Total Points
First Place
Capt. Aubrey C. Edinburgh, 4520th CCTW, Nellis AFB

•

Second Place
Capt. Melvin C. Elliott, 18th TFW, Kadena AB

•

Third Place
Capt. Harlan C. Wyman, 4520th CCTW, Nellis AFB

* * * *

High Explosive
First Place
Capt. Aubrey C. Edinburgh, 4520th CCTW, Nellis AFB

•

Second Place
Capt. William J. Warren, 831st ADiv.
479th TFW, George AFB, Calif.

* * * *

Nuclear Weapons
First Place
Capt. Aubrey C. Edinburgh, 4520th CCTW, Nellis AFB

•

Second Place
Capt. Melvin C. Elliott, 18th TFW, Kadena AB

William Tell 1960 (Cont.)

the "big day" there was plenty of opportunity for non-participating personnel to familiarize themselves with the Las Vegas "strip" as well as the Nellis airstrip.

Through the magic of television, spectators in the southern Nevada area had a front-row seat to watch the Worldwide Fighter Weapons Championship of the U. S. Air Force. For the first time in Tactical Fighter Weapons meet history, all events could be seen live on Channel Five. Super-miniaturized cameras, carried in F-101B and F-104D aircraft, enabled the viewer to share with the fighter pilot the exacting requirements of air-to-air firing on supersonic targets, air-to-ground attacks on realistic targets and the latest nuclear weapons delivery techniques. Thus, television not only provided on-the-spot coverage of all phases of the meet, but also provided the Air Force with training film materials invaluable to the tactical air training program via kinescope recordings.

Five teams from three major commands competed in the meet:

4520th CCTW, Nellis AFB, representing TAC F-100 training complex.

474th TFW, Cannon AFB, TAC F-100.

479th TFW, George AFB, TAC F-104.

18th TFW, Kadena AFB, PACAF F-100.

20th TFW, Wethersfield, USAFE F-100.

Each team competed in all sorties, both high explosive and nuclear. The meet consisted of 9 sorties, 5 high explosive and 4 nuclear weapons events. The high explosive events consisted of air-to-air dart (2 sorties) and GAR 8, close support and interdiction. Nuclear weapons events were profile LABS without IP, profile drogue retarded and profile laydown.

For dart firing, the tow pilot established a predetermined heading at 30,000 feet altitude and advised the participant he was "on course." Thirty seconds later, the tow pilot made a left-hand 180 degree 2G diving turn, at indicated .75 mach, leveling at 25,000 feet. A straight and level course was then held for 30 seconds at .75 mach and then a similar diving turn to the right was made. Five seconds after rolling into these turns, the tow pilot cleared the competing pilot for firing. At start of rollout, the competing pilot was directed to cease fire.

Only one attack could be made during each turn and the minimum attack speed was .90 indicated mach. The F-100s carried 50 rounds in two guns and the '104s carried 100 rounds in their M61 cannon.

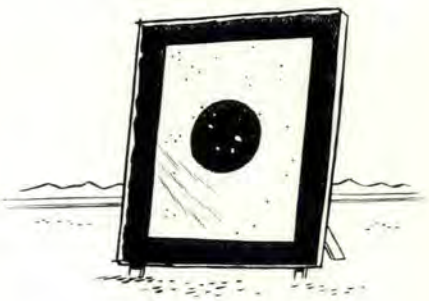
Upon completion of the mission the tow pilot returned the target to Nellis AFB and hits were then awarded. However, if the target was not returned, hits were awarded provided the airborne judge positively saw the target destroyed, or the gun camera film verified the target was hit.

For GAR 8 firing, each participant had to rendezvous at a predesignated time with the target aircraft, which would set course from the IP at designated times. After crossing the firing line, the judge advised the participant, "You have 60 seconds to fire." Upon the participant's request, the target aircraft made a 20-degree pullup at .80 mach and fired a 5" HVAR target rocket. The participant then tracked the target and fired his GAR.

The participant flew on the wing of the target aircraft and if he was not in proper position at time of target firing request (abreast), the target pilot would not fire and the participant lost the mission.

For high explosive ground attack targets, two different target complexes were established, each consisting of three targets. These targets were as realistic as possible and were established on difficult terrain. A minimum ground attack speed of 450 knots and a minimum altitude of 50 feet above the terrain was established for these targets. Only one attack was allowed and attacks had to be made on the first pass over the target.

The first high explosive ground attack sortie simulated a close air support mission and was controlled by a Tactical Air Control Party. After takeoff, the pilots contacted the Air Force Control, who gave them the location of the TACP using standard Air Force grid maps and coordinates. The TACP directed attacks on



the targets. Attacks had to be made within 30 degrees of the heading directed by the TACP.

For napalm, the target had to be destroyed to get credit. For low angle strafing, an invisible 1600-foot foul line was thrown in to make the problem more difficult. Hitting the right target was also required. There was no restrictions on airspeed, technique or dive angle for dive bombing; however, a minimum recovery altitude of 1000 feet above the terrain was established. Violation of any of these requirements, of course, constituted a foul, giving the participant a zero for the event.

The second high explosive ground attack sortie simulated an interdiction mission. Three hours prior to takeoff time, the pilots were given an intelligence description and summary of the targets to be attacked. Locations were given by reference to grid maps and a time on target (TOT) was established. Types of attack for this mission were low angle strafing, skip and dive bombing. Again, participants had to adhere to the airspeed, altitude and attack restrictions to avoid being fouled.

The Nuclear Weapons events were a thorough test of the pilot's skill and knowledge in navigation, target analysis and bomb delivery. One over the shoulder LABS, drogue retarded and laydown, were hi-lo-hi maximum range profile missions. One LABS over the shoulder mission was a lo-lo-lo maximum range profile mission. For this particular mission, a target folder was issued to the pilot three hours before takeoff. This tested the pilot's ability to quickly organize and plan a mission for an emergency or re-strike target.

A realistic combat situation was developed for these missions which required the pilot to navigate to and from the target within specified corridors. Navigation for these maximum range missions was accomplished without radio aids. A 75-mile dash was required for each target. On this dash a minimum of 500 knots TAS and a maximum altitude of 1000 feet above the terrain was established. Once within the range boundary, the attacking aircraft could drop down to 50 feet above the terrain.

The airborne judges and the ground judges scored the pilot proficiency of each team member in hits scored, navigation, timing, airspeed and altitude violations during attack, and escape maneuvers.

Heralded by a startling supersonic pass of a stubby winged F-104 Tactical Fighter, 15,000 spectators observed a fitting climax to William Tell 1960—an impressive firepower demonstration featuring the present tactical aircraft inventory. Pilots from the USAF Fighter Weapons School left no question in anyone's mind as to the versatile and lethal ability of the F-100 Super Sabre. However, the F-104s and '105s ably demonstrated latest nuclear bombing techniques. Most impressive was the pinpoint accuracy of the GAM-83, Martin Bull Pup, launched from an F-100 more than two miles from the target. Other events included a drop of 250 paratroopers and heavy equipment from C-130 aircraft. The Royal Canadian Air Force Golden Hawks and the USAF Thunderbirds also put on a superb display of precision flying.

William Tell 1960 represented a lot of work and effort on the part of many people. Team aircraft flew 616 sorties supported by 334 F-100 sorties throughout the time preceding and during the week of the meet.

Helicopter support amounted to 639 sorties throughout the same period. Aircraft involved in the firepower demonstration flew 268 sorties. Tons of ordnance were handled, loaded and delivered on the target—and yet, throughout the event, not a single accident occurred on the flight line or in the air. Throughout all this flying, only three inflight emergencies occurred: an AC Generator failure and two No. 1 Flight Control System failures.

Credit for the outstanding manner in which William Tell 1960 was accomplished goes to all participants—from the supervisory personnel and judges, support pilots, team pilots and ground support people, to the behind-the-lines men who performed every chore from scoring to opening and closing the ranges.

So ended William Tell 1960! ★

Credit for material: The Flying Safety, the Armament Safety Project, and Information Officers, Nellis AFB.

AIR TO GROUND TALK

Maj. Ross A. Beckham, Jr., USAF, Hqs FAA

The heart of the Air Traffic Control system is the brief, clear and rapid exchange of intelligence between pilot and controller.

Not too long ago, while flying cross-country IFR or VFR, position reports were made to and flight information was obtained from radio stations (Flight Service Stations). Everyone was aware that an Air Route Traffic Control Center (ARTCC) was controlling IFR flights, but they seldom, if ever, talked directly with the center controller.

Control of air traffic then was effected indirectly by relay of flight information, i.e., pilot reported to radio stations. This information was relayed to the ARTCC controller by landline, acknowledgment and any information for the aircraft was then passed to the radio station and subsequently transmitted to the aircraft by the radio station communications specialist. This of course was a time-consuming process, necessitated by the lack of adequate air/ground communications facilities.

It became apparent as aircraft speeds and the number of controlled flights increased that the controller must communicate directly with pilots in order to effect efficient air traffic control.

The UHF frequency 301.4 mc was then assigned as an ARTCC (High Altitude) frequency and set up in channel 6 in the aircraft radio equipment. However, some 26 centers were all using this same frequency, and quite often when attempting contact with a certain center, the pilot would be receiving several other centers and numerous aircraft, but no "joy" with the center he wanted. Many times this resulted in a forced return to reporting to radio stations and indirect control again.

It was now recognized that additional air/ground communications equipment was a must and so evolved "DISCRETE FREQUENCIES," an individual, separate frequency for each center area. In addition, to assure the desired result, ground receivers/transmitters had to be located within range of the aircraft. Peripheral sites (Radio Communications Air Ground Sites) were selected, equipment installed and control remoted to the ARTCC, and a discrete frequency was published for each center. Frequency 301.4 mc remained in use as a backup for the discrete and was usually located at the same peripheral site as the discrete frequency.

Although these discrete frequencies provided numer-

Voice Communications—Priorities and Frequencies

Priority	Civil/Military-VHF	Military-UHF
Low Altitudes (Below 24,000 ft.)		
First Priority	ARTCC Sector Discrete Frequency as Directed	ARTCC Sector Discrete Frequency as Directed
Second Priority	Air Carriers-Company Radio. General Aviation FSS* 126.7/120.7 Military Aircraft-FSS-135.9/135.0	ARTCC-301.4
Third Priority	Air Carrier-FSS-126.7 General Aviation-FSS-126.7; 122.1/122.2 or VOR	FSS-272.7, if unable, FSS-255.4
High Altitudes (FL 240 and above)		
First Priority	ARTCC Sector Discrete Frequency as directed	ARTCC Sector Discrete Frequency as Directed
Second Priority	Air Carriers-Company Radio. General Aviation FSS* 126.7/120.7 Military Aircraft-FSS-135.9/135.0	ARTC Center High Altitude Center Area Discrete Frequency
Third Priority	Air Carriers-FSS-126.7 General Aviation Aircraft FSS-126.7; 122.2/122.2 or VOR	FSS-272.7 or ARTCC-301.4

*Flight Service Station, formerly—ATCS
(It should be noted that frequency 301.4 has been retained in high altitude communications only as the lowest priority; however, it is now the second frequency priority in low altitude communications.)

ous advantages, utilization thereof was limited to a degree because of aircraft radio equipment. Without manual tuning capability in the aircraft, discrete frequencies had to be preset prior to flight in many aircraft.

Since 301.4 mc was already preset (channel 6) some pilots elected to rely on this frequency and take their chances on making the necessary radio contacts. Communications efforts on 301.4 mc had reached the almost impossible state when many bases opportunely preset center area discrete frequencies in their aircraft radio equipment.

Subsequently, communications on the area frequencies increased to such an extent in some areas that they were as congested as 301.4 mc. Based on air traffic workload, centers were then divided into two or more sectors with an individual controller assigned to handle traffic within each specific sector. More air/ground communications equipment was installed and discrete frequencies were provided for each sector, in addition to the center area frequency. Although the sector frequencies are published on En Route Flight Information publications, it is not practicable to attempt to preset them in a nonmanual tuning radio. Pilots of aircraft without manual tuning capability, then, must continue to utilize center area frequencies. With manual tuning and with aircraft radio controls relocated directly in front of the pilot, what a pleasure, to be able to talk to the controller you want, when you want, without floundering all over the cockpit to dial in a frequency. It is understood that an active high priority retrofit program is now under way to equip all military aircraft with this capability.

The above is primarily based on high altitude operations; however, the same principle pertains to low altitude.

Pilots requested to tune in flight, to a Sector or any frequency not present in their radio, should immediately advise the controller by transmitting "UNABLE" or "NO MANUAL TUNING CAPABILITY." Also, as has been pointed out in previous articles in this magazine, pilots in a difficult situation should not attempt frequency or mode changes until such time as the situation is under control. Advise the controller, if possible, that you cannot comply immediately because of weather, wingman in weather, turbulence, etc., but will change as soon as practicable. ★

(Ed. Note: For additional details on en route air/ground communications see Flight Information Publication, Planning, Section II, Air Traffic Control Procedures, U. S. and Alaska, Paragraph V-B, Page II-7.)

PERSONNEL—*Our*

We must re-examine and reappraise our thinking on ground safety as a basic concept of Air Force policy. It is generally accepted practice in our modern, materialistic society to overemphasize production and gloss over, as unimportant, other aspects of the system which make high productive goals possible. One, if not the most important, contributing facet of high production is freedom from injury to personnel or breakdown of equipment. However, these safety contributions are scarcely ever mentioned, much less given their proper weight, in the production reports. Actually, without safety there could be no worthwhile production. The safety engineer must lead the way in reorienting the thinking processes of all other Air Force personnel so that safety will ultimately achieve its merited place as a part of normal operations.

At this point, it seems appropriate to give careful consideration to ground safety philosophy and programming to assure that it keeps pace with a rapidly changing Air Force.

A clear philosophy of safety is the fountainhead of all accident prevention endeavors. Without such a philosophy, safety lacks a proper channel to reach its destination. How many commanders, regardless of echelon, have furnished this safety channel by setting out a written statement—their organization's safety philosophy? It is not necessary to draw up a complicated document couched in legal phraseology to accomplish this purpose. All that is needed is a concise statement of your organization's concept of safety, a definition of areas of responsibility and a clarification of safety goals.

The overriding safety philosophy in the Air Force is based on two basic concepts.

First, our personnel live, work and train in an environment which is often hostile to them. This hostility is not confined to the world of nature with its floods, earthquakes and storms. It comprises also the man-made environment of airplanes, missiles, fuels, machines, high tension electric lines and equipment. Compounding the dangers are such prosaic items as the roller skate or baseball on the stairs and the tragic results of the speeding vehicle operated by the drunken driver.

The second concept is that our personnel are dynamic and impatient, resulting in a reckless attitude which must be eliminated. This recklessness involves not only the self-destructive few, but also those who take the attitude, "It can't happen to me."

Probably every ground safety procedure, to a degree, is designed to overcome both of these frailties, that is, to protect men from their environment as well as from themselves. The living and working environments of men should be viewed as phenomena which need to be tamed and made foolproof. Beyond that, it would be helpful to think of the men as being unable or unwilling to protect themselves without continuing indoctrination and assistance.

Insofar as areas of responsibility are concerned, the problem is twofold. In the first place, men are not expendable. We must accept primary responsibility for the men assigned to work under our direction. We want to return them to their homes at night in the same good condition as when they reported for duty. This responsibility spreads downward from the Secretary of Defense and the Air Force Chief of Staff, to every member of the management team. It cannot be evaded because personnel without guidance will not, or cannot, assume responsibility for themselves.

Air Force management is charged with the responsibility of making every building, every machine and process, and every job, at every installation, as accident-proof as possible.

Secondly, we are charged with the responsibility for continuing indoctrination of all personnel to maintain safety consciousness which carries over into off-duty hours.

In carrying out these heavy responsibilities, Air Force commanders and supervisors must accept these principles of management since they are responsible for the safety of the men working under their direction. Although the Ground Safety Director, acting for his Commander, is responsible for setting out safety procedures, the supervisor is responsible for insuring that the Commander's directives are carried out at the operating level.

It must be remembered that the Ground Safety Director is not an operating official and exercises super-

• • •

Films Teach More in Less Time

Instructors and supervisors are convinced that the quickest and most effective means of informing and keeping USAF personnel abreast of rapid technological developments is through the showing of films. *Aerospace Safety* is aware that film information is publicized regularly in other publications. The Air Force Film Library Center, however, is desirous of reaching as many military and civilian personnel as possible, by listing below some films that are available upon requisition. The Form to use is AF Form 253, in triplicate, and the address: Air Force Library Center, 8900 South Broadway, St. Louis, 25, Missouri. And here is the list:

FTA 461c High Altitude Refueling F-105 Aircraft: A 6-minute film, black & white, procedures for refueling a formation of four F-105s from a KB-50J.

Greatest Asset

Carl M. Holland, Chief Ground Safety, Hq ARDC

vision only over the personnel assigned to his office. Although the Director is a man with special qualifications and training in accident prevention, he is only one man and cannot be at all places of operations at all times. Therefore, he must serve as a technical advisor to all operating officials and accomplish his functions through personnel having direct supervisory control.

Basically, our safety philosophy is very simple. We believe that accidents are caused by men or machines and, therefore, can be prevented. Since the machines are man-made the problem is basically the improvement of man's behavior.

Safety philosophy, to be fully effective, must be translated into a practical program, tailored to fit the specific needs of a specific installation. Admittedly, this is a difficult task. Evasive practice, such as copying the program of another installation or command, often results in negating much of the effectiveness of a sound safety philosophy. We should be satisfied with nothing short of the best program for each command or installation under conditions as they exist today.

The first step in designing a safety program is to make a careful analysis of the command's safety needs today and for the foreseeable future. The analysis should cover such factors as the degree of adherence to safety responsibilities at present and what is needed to improve the overall ground safety experience.

In small commands, setting up a safety program is often dumped on the shoulders of someone who already is carrying a full-time job. Sometimes commanders, unaware of the difficulty encountered in devising a good plan, classify safety planning as an additional or part-time job. It is possible, even under such adverse conditions, that a good safety program could result. More often the job is only half done and the program suffers.

In larger commands, there is danger that safety planning will not be given proper emphasis in the over-all mission. Budget limitations and manpower authorizations tend to hit safety functions harder than other programs. This results in a neglected ground safety program, grown by improvisation and as ill-befitting an expanding command as a hand-me-down suit.

Principally, there are four things which must be applied in setting up a program: Judgment, experience, reinforcement and inspiration. The use of good judgment on the part of commanders, supervisors, engineers, and safety engineers, can eliminate hazards at the inception stage. This can be accomplished by careful design of machinery, installation and shop layouts, by systematic surveys, and by analysis of factors which may lead to accidents.

Accumulated experience, if wisely used to teach others good safety practices, will result in fewer accidents. It will make personnel more aware of unsafe conditions and practices and lead to thinking of safety on their part.

Reinforcement is necessary in any endeavor, especially in safety, to keep principles ever-fresh in mind. This repetitive tool is required because the habit of forgetting is more easily acquired than the habit of remembering. By constant review of prior accidents, the use of safety posters, bulletin boards, and base newspapers, safety habits can be reinforced and built in personnel as a considered way of life.

Inspiration must be furnished from time to time so that the program will not lose its force. This tool is effective at conferences, by personal contact, appeals to emotions and common sense. Finally, inspiration will be transformed to the employee who will assume more safety responsibility of his own accord.

These powerful tools, used effectively, can convert a safety program from a chore into a crusade.

Safety is not only good management in the human relations field; safety is good business across the board. Safety guards know-how and experience. Safety prevents loss of life, time and property. Safety raises efficiency and morale.

So let's plan safety until we have a dynamic and living safety program. Let's work at safety until all personnel understand and use safety practices to build safe work habits, both on and off the job.

The Air Force has never been willing to settle for anything but the best in any task it undertakes. We will not settle for anything less than the best ground safety program in the Department of Defense. This is a challenge to every commander and supervisor in the Air Force. ★

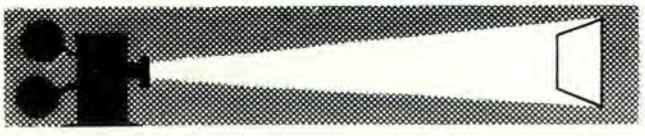
• • •

FTA 461d High Altitude Refueling F-101C Aircraft: A 6-minute, black & white film, refueling the RF-101C from a KB-50J.

FTA 450 "Ballistic Missile Safety Precautions." A 14-min. film, color, of Atlas ICBM safety programs.

SFP 639 THOR—the IRBM: A 26-min. film, color, Thor missile and its role in the IRBM defense concept.

TF 1-5292 Survey of Astronautics: A 23-min. film, color, shows crewmember of manned space station; also orbiting satellites and purposes they serve. ★



C·NOTES

The F-105, like other Century Birds, was designed to land on all three rollers. But—and again like the others—already in its young career it has been landed in other than ideal configurations. The Flight Manual goes into detail on how to handle such untoward situations. And in the case of belly landings, it recommends against them. However, it does recommend the best procedures in case a landing sans wheels is elected.

Early in the testing history of this aircraft, three such landings were accomplished. The techniques followed and the results that ensued may be of value to some pilot who finds himself in the same fix. Bear in mind though that these first birds were test aircraft; configurations may have varied slightly from the '105s you're flying today, and weights and fuel loads were probably lower than you'll find in later models.

In the first case when a gear-up landing was found necessary, the pilot used full leading edge flaps, 80% trailing edge flaps, and made a shallow, power-on descent at 170 knots. Over the runway he slowed to 160, and touched down ventral fin first at just less than 160 knots. The fin dragged for 270 feet, then the nose dropped rapidly and the main fuselage struck the runway in a level attitude. Substantial damage ensued, although the pilot was not injured. The aircraft skidded a total distance of 2000 feet, and the pilot reported that excellent lateral control was available during the major portion of the skid. The canopy was not intentionally jettisoned, although it flew off at the point of main impact. The pilot recommended a higher touchdown speed in case of a similar future exigency.

The second case occurred under similar circumstances, with the exception that a higher touchdown speed was used. Less damage to the aircraft ensued, and, again, the pilot was not injured.

In the third case, more details are available. The pilot elected to use full LE and TE flaps and flew the final at 210 knots indicated airspeed. Touchdown was made at 190 knots, and the drag chute was deployed at 180. The aircraft slid 3500 feet on the un-foamed runway and a slight fire developed in the aft section. The canopy was not jettisoned prior to landing and the pilot was not injured.

To date there have been no attempts to land the F-105 with only one main gear down nor with one main gear and the nose gear. The good book says landing with this configuration is not recommended "at this time." There is one case, however, where the aircraft ended up in this condition. Touchdown was made on all three rollers; shortly afterwards, the right tire blew out and the wheel commenced skidding. The pilot was able to hold the aircraft on the runway with left brake until the speed diminished to about 40 knots. At this time the aircraft veered off the runway to the right and the right gear was torn off. The aircraft made a lazy, 180-degree groundloop to the right. There were no injuries, and the aircraft was repairable, probably because the shoulders of this runway and the adjacent area were maintained in excellent condition.

There has been one two-legged landing with a completely retracted nosegear that resulted in an amazingly low amount of damage. In this case expended ammo cartridges had gotten into the nosewheel well (for reasons we won't discuss here) during a gun-firing mission, and the nosewheel was really nailed into the UP position. The pilot intentionally bounced the aircraft on landing in an attempt to dislodge the gear, but without success. Touchdown was at normal speed, and the drag chute was deployed with the nose still well off the runway. The pilot had excellent longitudinal control and feel of the aircraft in this configuration. He did not notice his airspeed, but said as he felt elevator control diminish, he gradually lowered the nose to "about a foot off the runway" and held it there. The nose finally fell to the runway with a slight thump. Only minor damage was done to the nose section and radome of the aircraft. This '105 slid 5000 feet in this configuration, and it was never necessary to touch the brakes. Foam was not used. The pilot submitted an excellent argument for not jettisoning the canopy prior to touchdown. In his case he knew his fuel was practically exhausted and that crash trucks were immediately available in case he couldn't get the canopy off by himself. He felt that in case of a flash fire during the landing roll, or slide, the canopy would have offered excellent protection. Note that the good book in most cases leaves it up to the pilot whether or not to jettison the canopy prior to such emergency landings. We think this pilot used excellent judgment by weighing all the factors as he did. He was able to open the canopy manually and without help.

Several people have probably seen the opening scene of a reel of selected accident pictures shown during safety presentations. The one I have in mind depicts what happens to an F-100 when the pilot had a cocked nosewheel on takeoff and the trouble he got into when he attempted a landing and subsequent go-around. Don't sweat this if it happens to you in the '105. The one case reported to us indicates that the nosewheel cocked to the left 40 degrees on takeoff, and could not be retracted into the nosewheel well. No amount of yawing, high speed flight and G-pulling would straighten it out. The gear would lock down normally. In this case the pilot elected to land on the right side of the runway, which he did at 160 knots and imme-

diately deployed the drag chute. The nose was lowered gingerly to the runway at 120 knots; the aircraft lurched slightly to the left, and then rolled straight ahead. Investigation revealed that somebody forgot to service the nose strut with air.

All of the above examples have been cases of intentional landings with unsafe or abnormal gear conditions. And let's keep it that way. If you land with your gear in an abnormal condition, be sure it's because you intended to do it that way. Last year there were 37 cases of belly landings throughout the USAF that the pilots *didn't intend* to make.

And just in case you think this picture looks pretty rosy—and we agree it does—it's still up to you to make the decision whether or not to land the bird in an abnormal condition, or to take the "down express." This picture is just as rosy—6 saves for 6 tries—a 100% success rate for ejection attempts. ★

Major Glenn Crum, Fighter Branch.

F105

An interesting inquiry has been received from 1st Lt. Gary T. Edick, 5th Fighter Interceptor Squadron, Minot AFB, N. Dak., following his reading of the article about simulated flameouts published in the November issue. The article he refers to is entitled "Don't Do It!" Lt. Edick writes, "Nothing was mentioned on the feasibility of a night SFO," and gives an incident as an example. His letter is quoted:

"A pilot is on a VFR night mission in an F-106A, and 45 minutes after takeoff he notices 60 psi on the oil pressure gage. Two minutes later he gets an "Oil Press" light on his warning light panel, all indications of high oil pressure. However, audible and other instrument indications show smooth engine operation. The pilot declares an emergency and returns to home base.

"Now then the F-106A Dash One recommends use of a flameout landing pattern when experiencing oil pressure difficulties, due to the possibility of engine seizure. The Dash One, however, states 'Night flameout landings should not be contemplated regardless of weather or field lighting.'

"Here's my question: With the engine running smoothly, but with two warning indications still evident, should the pilot bail out, attempt a night SFO, attempt a straight-in approach (not recommended by the Dash One), or is there another solution?

"The example furnished is not only applicable to oil pressure emergencies. There are others in all kinds of jet aircraft in which an SFO is recommended. However, no real solution is given for such conditions at night. What do you recommend?"

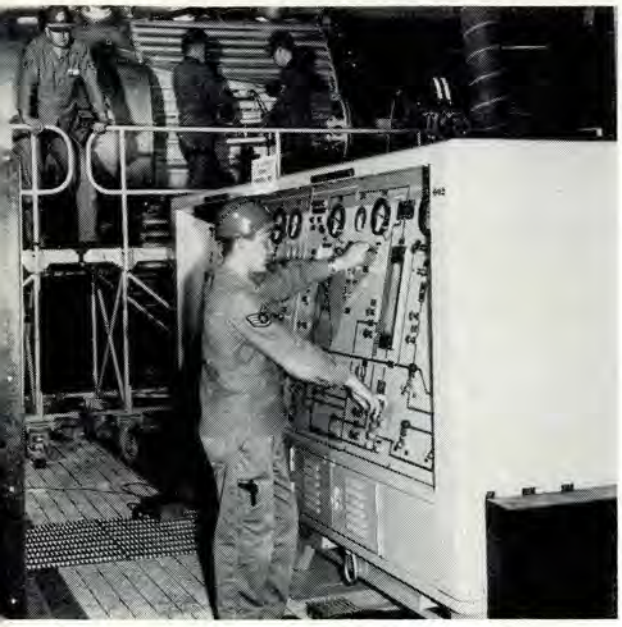
The '106 incident and inquiry have been discussed at some length in the Fighter Branch, and here is a direct quote from the Flight Manual: "The instructions in this manual are designed to provide for the needs of a pilot inexperienced in the operation of this aircraft. This book provides the best possible operating instructions under most circumstances, but *it is a poor substitute for sound judgment.* Multiple emergencies, adverse weather, terrain, etc., may require modification of the procedures contained herein."

There is no school solution for the problem you mention, Lt. Edick, and indeed no school solution for many emergencies experienced in flight. The Flight Manual only states that *actual* flameout landings should not be attempted at night and past experience indicates that SFOs should not be *practiced* at night. Nothing in the Manual says that a night SFO approach should not be attempted when conditions warrant. ★

Capt. Martin O. Detlie, Fighter Branch.

F106

TEACH · DON'T PREACH



At three o'clock in the morning, the snowcovered prairies of Wyoming near Francis E. Warren AFB are mightly lonely places. The biting wind whistles across the vast empty spaces and not a glimmer of light relieves the darkness. Under the riding moon and the scudding clouds the earth is asleep, waiting for the dawn. Here and there, blending into the rolling countryside, huge concrete structures stand silent, apparently lifeless. They are the missile pads of SAC's 706th Strategic Missile Wing. Within them, bathed in the glare of high-powered lamps and both warmed and cooled by special machinery, the mighty Atlas missiles lie in their coffins.

But even mighty Atlas, technological marvel though it is, must be nursed by puny man. All through the night the great bird is constantly checked, watched over, babied. The crews assigned to each missile pad observe an unvarying inspection ritual. Several hundred yards away in the Launch Control Center, while the checks on the pad are being performed, the missile's overall condition is being carefully monitored by the Launch Control Officer (LCO) and his assistants. No detail of the bird's functioning escapes the electronic scrutiny of the automatic sequencer which flashes its diagnosis on the standby status board. Missile pads fan off from the Launch Operations Building which contains the Center much the way first, second, and third base fan off from home plate. It was here in the Launch Control Center of the 564th's Complex A that Captain Paul B. Fine, Squadron Missile Safety Officer, sat studying the missile status board. He was on duty that night as secondary Launch Control Officer for the complex. The "ready state A" glowing on the status boards meant that all three birds were set to go in minimum reaction time.

Suddenly, his heart jumped, as the warning buzzer broke the stillness. One of the green condition lights flashed red. Something had gone wrong with the bird on pad A-1. In an instant, what had been a multimillion dollar weapon poised for a flight into space had become an inert mass, an expensive but useless weapon. The LCO reached for the phone to call the pad. In the meantime the missile systems analyst technician (MSAT, pronounced as a word like "M Sat"), a cool-headed master sergeant, sprang into action to "check the logic." (To the missileers, checking the logic means anything from consulting the Tech Orders to ripping into the black boxes to see if something has short circuited or gone awry.)

By backtracking on the last few items he'd inspected, the technician soon discovered that opening the hydraulic temperature control door (HTC) on the side of the Launcher made the light go red on the standby status board and knocked the bird out of the ready. There was a sigh of relief in the blockhouse, for at first Captain Fine and the LCO had conjured up all kinds of disasters to their charge.

"This incident," Captain Fine later related, "while apparently insignificant, taught me and those on the pad that night a lasting lesson—that no shortcut or by-guess-and-by-God procedure is worth the heart-stopping, agonizing moments when the lights flash red and say the bird is in trouble. We learned then, and we're still learning, that every move on the pads must be coordinated with the LCC, and that only previously validated procedures can be used. For safety, no guessing or hoping will do. *We've got to know!*"

The 564th is America's first fully operational ICBM squadron whose sole duty is to remain combat-ready. Warren AFB is exclusively a combat base, part of SAC's deterrent capability. They have been "EWO" (emergency war order), as the troops will tell you, since August 1960. A completely combat-ready ICBM unit, the squadron—and its parent wing—have an awesome responsibility. Their importance is out of all proportion to their numbers. They cannot afford to fritter away the smallest fragment of their combat capability through accidents or incidents. To insure that they do not, the entire Wing is enthusiastically and aggressively pursuing a carefully thought out accident-prevention program. From Colonel George T. Chadwell, Commander of the 706th, all the way to the technician on the pad, SAC's missileers are imbued with the safety point of view.

And helping to keep them that way is the work of men like Captain Fine and his safety NCOIC, TSgt Elmer Reston. Safety is Captain Fine's fulltime job; he finds it a demanding one.

"If I were to sum up our safety methods in a phrase," says Captain Fine, "I'd say, teach—don't preach! We build our working techniques around this philosophy. You cannot legislate against stupidity and ignorance but you can change them, through education. A valuable concept I learned early in my safety training was this: You don't teach people safety; you teach them how to work and act safely. There's a bit of a difference.

"In our missile operations, with their widely separated pads and Launch Control Centers, it is imperative that technicians be taught to act as their own safety supervisors. We just don't have enough safety people to go around. Like flight crews, who do not have safety supervisors always peering over their shoulders, we must teach our missilemen to think safety and act safety on their own. Fortunately, the job is not as hard as it seems. Remember, psychologists teach that good habits are just as easy to build as bad ones. And that all of them are easier to make than to break. We take advantage of this knowledge."

Captain Fine's safety program is based on getting new men off to a good start. From their first working day, they know that the 564th will not tolerate slipshod or careless work, for this leads to accidents. Fine is a firm believer in the value of the heart-to-heart talk with the men, especially the new ones. In short order he can discover just what safety training they've had and their point of view toward the job. The good supervisor, he maintains, must be a student of human nature and an amateur psychologist. He can then try to predict how a man will act in a certain set of circumstances and assign him accordingly. If he's the type who is likely to lose his head in an emergency, he'd best be kept out of critical areas.

To illustrate what can happen when blind panic seizes a man in an emergency, Fine tells the story of the engineer at a southern missile training site who twice ran full tilt into a brick wall while trying to get away from the scene of a missile accident. He got away on his last try, but only because after he picked himself up for the third time he was headed in another direction. Or, as another example, there's the case—recorded on film—where men fleeing from a missile emergency at a Florida site ran right by a pickup truck that had slowed to permit them to climb aboard.

"To my way of thinking," Captain Fine says, "these things show the necessity for sound psychology and good human engineering in the approach to safety problems. You cannot expect people to think rationally or clearly when they are tired or upset, especially in moments of high stress. Yet, designers fail to take these things into consideration sometimes. We have on the pads, for illustration, a panel with 17 knobs for the control of high-pressure gases. Twelve of the knobs turn one way, and five the other, yet both types do the same thing. This is a built-in hazard for tired or excited people. It is almost an invitation to an accident.

"Things like this are corrected, of course, as soon as we can get to them. In the meantime we rely on education to keep our people alert to a particular hazard like that. We take color slides of the deficient area—like the eye-level pipe protruding into a work passage—and make sure that every man sees it and is warned of it. We use film slides frequently. They're one of our best training aids. When we can get films we use those too. As the film program for missile operations gets into full swing, it should be one of the finest safety tools in the kit.

"Naturally, we take advantage of some of the fine safety publications available, like the SAC Safety Memo, Aerospace Safety Magazine, Combat Crew, and the Aerospace Accident and Maintenance Review. These are made available for the launch crews and the technicians at spots where they're likely to relax a moment and look for something to read. And, of course, we study the missile hazard reports (MHRs) and unit safety survey guides.

"Since SAC Reg 58-6 requires that all launch crews get two hours of formal safety instruction per month we get a good portion of our safety message across then. Our follow-up sessions are devoted to checking on how much they have retained, and also in discussing or analyzing the latest MHRs or accident/incidents. It's surprising how many opportunities there are throughout a shift for short discussions of safety methods or impromptu lectures. Sgt. Reston and I seize every chance for keeping the safety point of view fresh in the minds of the men."

One of the best times, Fine has discovered, for briefing the crews on some special point of safety interest is at shift change. There are ten minutes or so available which can be put to profitable use. In addition, the old crew can brief the new on any special problems that might have come up, or about any hazardous conditions that have revealed themselves.

There has been a great deal written about the safety hazards stemming from bored crews suffering from the monotony of isolated spaces and dull stretches of duty with little to do. So far, this has definitely not been one of Warren's problems. On the contrary, the men have so much to do on a shift that the problem is to keep them from becoming fatigued. The launch crew for three birds is made up of 16 men. There are three guidance technicians and one officer, and 12 missile launch technicians. Among them are experts in each of the special fields necessary for the maintenance and servicing of the missiles. There is, for example, a liquid fuel specialist, a ground support equipment (GSE) electrician, two missile mechanics, a missile engine mechanic, and a facilities technician for taking care of the all-important airconditioning and heating for the birds, and the firefighting system.

These men are constantly on the move from pad to

"-7-6-5-4-3-2-1-"

pad as their services are required. And just because the Atlases are lying inertly in their coffins does not mean they don't require repair and service. As the deputy squadron commander, Lt. Col. Stephens, says, "The systems go ape just sitting there. Transistors burn out, valves weep, joints drip, and red lights flash on the standby status board." The systems are constantly being energized at a T-minus condition; this exercising wears them out, giving them the equivalent of years of use.

One safety innovation of the 564th of which Captain Fine is proud, is the Pad Chief System. It was introduced by Colonel Julius Pickoff, Commander of the 564th, to give continuity to the pad's operation. The Pad Chief is one of the 16-man crew, but is only on duty during the day shift. He gets to know his pad as well as he knows his own living room. As the focal point of the activities on the pad, he is in the best possible position for briefing new crews. Although always on his own pad, the Pad Chief acts as a clearing house for new techniques, improved working methods, or special information down from topside. The Pad Chief so far has proved a valuable addition to the safety effort.

SAC's familiar standboard system is also being applied at Warren in an effort to further strengthen the safety program. Standardization Boards have proved their worth many times over in the field of aircraft operations. In the area of missile activities, safety supervisors feel standboards are of help in the task of improving missile handling techniques, standardizing operational methods, and insuring uniformity of practice. Perhaps in time through their work in evaluating and testing crews, SAC may begin choosing select missile crews as is now done with manned aircraft.

One of Captain Fine's favorite teaching devices is what he calls the "object lesson." It's a wonderful antidote to the gambling instinct of "it won't happen to me." To which Captain Fine adds: "But once!" For sometimes there'll be no second chance. The boys on the pad, Fine relates, were a bit careless in properly sandbagging their high-pressure lines sometimes. With up to 8000 psi surging through the lines, they can be more deadly than a cobra if they break. It took just one incident to teach troops, in a way they'll never forget.

Two civilian workers were transferring a high-pressure gas through 20 feet of pipe. They had failed to sandbag the lines with 40-pound sacks and had not fastened the safety chains used to secure the valve stems in case of a break. The line broke near the valve and swung around with the viciousness of a bullwhip. Three times it knocked one of the workers down, and broke his arm before he could finally get the valve shut off. The other man had his face badly lacerated by the whirling pipe. Both were hospitalized from an accident that should never have caused injury. As Fine points out to his men, you may not have been able to prevent the accident, but with the proper safety precautions you can prevent the injury. "Since that day," says Captain Fine, "I've yet to see one of my boys fail to sandbag a high pressure line properly. But those are expensive lessons we want to avoid."

One of the accidents most often mentioned by missile safety people underscores the newness of some of the hazards they are working with. This one also concerns high pressures. So high, in fact, that they make World War II's 150 psi seem like water pistol pressures. A worker in one of the civilian missile plants, detecting the telltale hiss of a leak in a high pressure line, put his hand in behind the pipe to discover the leaking spot. The pressure in the line, about 8000 psi, sliced off his fingers as neatly as if a surgeon's scalpel had done the job. Ignorance was the cause of this tragic accident. Safety education would have prevented it.

"Safety engineers have shown," Fine points out, "that 88% of all accidents are caused by people error—the human element. About 10% are due to unsafe conditions and the other 2% are so-called acts of God. So even if our machines were all perfect and never caused a hazard, we'd still have the bulk of our injury and waste through accident. The only solution, as I see it, is to build safety into the working conditions, and they try to make it, and keep it, part of the working climate. If working conditions are so set up that the *right* way to do something is the *only* way it can be done, good safety habits will be formed. And good safety habits are half the battle."

Captain Fine's feelings are seconded by TSgt Reston. Safety NCOIC. Reston has a brass knuckles, no-nonsense approach to accident prevention.

"The good supervisor should be able to spot a potential accident before it results in injury or disablement. Safety experts have proved that every person who suffers a serious injury caused by an unsafe act, has had probably 300 narrow escapes as a result of the very same unsafe act. Imagine having 300 chances to prevent an accident! Yet people are maimed and killed every day through preventable accidents.

"The one drawback to real safety efficiency," he goes on, jokingly, "is that your name is mud no matter which way the dice fall. If there are no accidents, people say 'What do we need this guy for?' If there are accidents, they say 'Why didn't this guy prevent them?' But to me, this safety work is the most satisfying field I've been in since I joined the service. Just think, in our Air Force missile program, there hasn't been a single service fatality because of a missile accident. That's a record to be proud of—and I'm proud to be helping to make it."

Colonel Julius Pickoff, Squadron Commander of the 564th, stands foursquare behind the safety program. "We use a go-slow policy," he says. "We don't want anyone pushing. If a man is puzzled or uncertain, we want him to back off and either seek help or wait until he can find the right answer. With some people, there's never enough time to do a thing safely and correctly—but always enough time to do it over. We want it—indeed we must have it—right the first time. Haste and pressure are deadly, especially with inexperienced people. As Major Magee, Wing Safety Officer, is fond of quoting, 'The hurrier you do, the behinder you get.' No, we encourage the slow and easy approach. We'll get the job done—right!" ★ **Joseph A. Dolan**

CHECKLIST •

Thought for the month—"Don't bother to invent a better mousetrap. Instead find some way to make mice useful."

Nuclear Weapons Orientation Advanced Course (WOA)—Do you have need for becoming acquainted with the nuclear weapons program? If you do, apply for the WOA Course at Sandia Base, New Mexico. This course is conducted by the Orientation and Employment Division, Atomic Weapons Training Group, Field Command, Defense Atomic Support Agency. That's quite a mouthful but then it's quite a course. In the five days of instruction and field trips they cover operation and physical characteristics of stockpile atomic weapons, effects and employment, stockpile dispersal sequence, methods of delivery, future developments and last, but not least, nuclear safety.

The instructors, facilities, and treatment of students are superior. You'll return to your base recommending the course to others. Prerequisites are: Major, GS-12 or above. Lower grades, however, may attend if justified and approved by Command, Field Command, DASA. A Top Secret clearance is required.

F-101 Rain Clearing Switch—Several windshields have been damaged recently because the rain removal switch was "on" with the aircraft on the ground and the engines running. This switch is not tied into the telepanel and is not automatically cut out in any way, so extra care must be taken to make sure it is off. If it is left "on," the damage may require windshield replacement. Worse still, if the damage goes undetected or unreported the weakened area could give way in flight under high "q" with possible fatal results. Fortunately there have been no reports of this happening, but the potential is always there. So if the switch remains on while running engines on the ground, be sure to write it up for an inspection and repair.

Photo Flash Bulbs—The operator of a fleet of business aircraft recently issued the following bulletin: "What could have been a serious situation was averted recently through the alertness of our Flight Group. Baggage was being loaded aboard one of the planes when smoke was observed coming from a package awaiting stowage. Investigation revealed that the package contained photo flash bulbs that had exploded and ignited film and packing material.

"Radar beams operating at the airport were suspected, and to confirm this the Engineering Department's Safety Section conducted tests, with and without the radar operating. They were able to flash the bulbs by simply holding them in their hands within range of the beams.

"As a matter of policy and in the interest of safety, photo flash bulbs are not to be taken aboard or loaded on any of the Company's aircraft. This prohibition should be just as valid when traveling on the commercial airlines.

"Apropos of this, a report of a European accident recently was received in the FSF office. This report included a reference to photographic flash bulbs in the cockpit. The accident was a fatal one and glass particles were found in the flying helmets of the crewmembers. Tests were conducted to determine whether or not the glass was from the flash bulbs. In the course of the tests, the potential dangers inherent in the bursting of a flash bulb in an aircraft cockpit or cabin were demonstrated. A photograph of a bursting bulb illustrated the consequential high velocity dispersal of glass particles and burning magnesium. In this investigation, however, it was concluded that none of the glass extracted from the helmets originated from the type of flash bulb used. While bursting flash bulbs in this instance had nothing directly to do with the accident, the danger was there. The bulletin issued by the company operating a fleet of aircraft was written with good reason. (Flight Safety Foundation.)

Mechanized Weather Forecasts—More rapid and expanded weather support for Strategic Air Command crews will result from use by Air Weather Service of a new electronic computer now being tested at SAC Headquarters. The new computer is located in the Global Weather Central of the 3rd Weather Wing in SAC's underground command post at Offutt AFB, Nebraska. "This computer works five times faster than the one we have been using and will allow us to do a great deal more to improve our support to SAC," said Col. Anthony T. Shotgren, Commander of the 3rd Weather Wing, which is charged with global weather support to SAC.

The new computer will produce 24 to 36-hour wind and pressure forecasts for five levels in the atmosphere up to 55,000 feet in 20 minutes. This operation would be impossible by manual methods in the short time available for making such forecasts.

The IBM Model 7090 also gives these AWS experts the ability to complete detailed forecast verifications and climatological studies never before possible. For instance, from current data the computer will tell forecasters how accurate forecasts were that were made 24 to 36 hours before. Only by continuously checking their accuracy and analyzing any mistakes can weathermen improve their forecasts and learn more about the earth's erratic ocean of air.

The new computer can also write planning manuals, based on climatological data, that tell SAC crews the speed and direction of winds they are likely to encounter on training missions—or on bombing missions they would fly in case of war. ★

"...I KNEW WE'D MAKE IT"

As the saying goes, "The first liar doesn't have a chance." Captain Ricketts' story in the July issue reminded me of *my* flight to remember. And, please, no recriminations, no cheap advice. A lot of air has passed over the props since then, and the statute of limitations must surely protect me by now.

It happened more than ten years ago in connection with the project—who remembers the name?—which ferried F-80s across the North Atlantic to Furstenfeldbruck. In fact, after the ferry mission was complete, the now defunct *Collier's* carried a nice article on it, but didn't tell the whole story—not my part of it, anyway.

I had just returned to home base from an aerial mapping project down Birmingham way. Those were the days when we did it the hard way: mosaics from 14,000 feet, staggering along in an A-26. Reference chart was Coast and Geodetic, vintage '08, not a very good year for charts, I understand.

Anyway, when I walked into squadron operations that morning the Ops Officer informed me that I was supposed to be on my way to Selfridge. It took him a little while to straighten me out because I thought he had mistaken me for some other navigator. "But sir," I said, "I just this minute got back from the wilds of Birmingham. Was there for three weeks, and just three months ago I came back from Japan. Not only that, but I'm waiting now for pilot's school. You must have me confused with someone else."

At the briefing that afternoon I met the rest of the crew and heard about the mission. The following day we took off for Selfridge in one of the tiredest base flight type Gooney Birds you'd ever want to see. My navigation equipment was a bit limited too. No sextant (*who* used one in an A-26?), no navigation tables, no Air Almanac, and the old B-5 driftmeter on the bird had about half the mirror left. You navigators will probably recognize the symptoms.

At Selfridge we learned that our part of the exercise was to haul a piece of refueling equipment—some kind of adapter for which I didn't fully understand the requirement. We were to press on ahead of the '80s and stay one jump ahead of them so they could use this gadget if they needed it. The route was from Selfridge to Dow, Goose Bay, Greenland (Bluie West 3, I think they called it then, Narssarsuak now), Keflavik, Kinloss, and on to Fursty.

Right away I knew that I'd better scrounge a sextant and some books. These, on a fighter base? After I had drawn a picture of what I wanted, I was directed to the Air Reserve unit in a little shack down at the end of the ramp somewhere. Did he by any chance have a spare sextant? Well, he might have—if I could tell him what one looked like. He really wanted to help me out.

I wound up with an A-10 untouched by human hands but certainly well used by the local spider population. Books I got too, half a set of H.O. 218s in a paper sack. I started to inquire about collimating the sextant (adjusting the line of sight) but thought better of it. I knew I couldn't draw a picture of a collimator. He had, however, heard of an Air Almanac but he hadn't "seen one of them things for years."

By now it was becoming fairly obvious that this would be an interesting trip. Really interesting, if I didn't get my hot little hands on an Air Almanac. The pilot, an old soldier, was not too concerned. "We'll get one at Dow," he said. "No sweat." Those were his words: "No sweat."

At Dow, of course, they had no Almanac, either. On a stroke of inspiration I went into the weather station. I thought I'd borrow theirs, the one they used to get their sunrise-sunset data. "Well, look," I said, "how DO you get that data?"

"The Coast Guard over in Bangor," was the reply, and he looked at me as if to say, "You wouldn't expect ME to compute it, would you?"

Now you can believe this or not but I called the Cutter tied up in Bangor Harbor and conned the Quartermaster into lending me his book. He was as good as his word too. He left the book at the recruiting station in the Post Office where I picked it up later that afternoon. I had to ride a bus into town to get it.

I tried, by George, I tried.

The next day we took off for Goose and got there. We sat at Goose waiting for the weather to break; not for us but for the '80s. We took off one day for Greenland for about two hours, got loaded up with ice, and returned to Goose. The project officer for the '80s met us, congratulated us on our courage, and observed lightly that we should be ready to go in an hour. This was before crew rest regs and all that kind of thing. In fact, looking back, it must have been before flying safety!

An hour later, at about 1900, we departed again. We flogged along at a hot 145 (Gooneys didn't move any faster then than they do now) through the same ice and stuff, and began to see water about 4 hours out of Goose. I heated up the B-5 driftmeter (by blowing on it) and started groundspeed by timing. All the problems over the celestial equipment had been for naught. At those latitudes in midsummer the stars just don't hardly come out at all, and the sun at that hour was too low to do anything but confuse the issue.

As we approached the radio beacon on the coast of Greenland (BW-1?), our intrepid copilot, a second balloon F-80 reject type who shall remain nameless, said, "No sweat" (vocabularies were somewhat limited in those days), "I have a null. It's just 45 degrees to the right."

Mistake Number One. But let me explain. This troop was a junior birdman fresh out of pilot's school, and I thought if anyone would recognize a null, he would. So we turned. My ETA ran out 10 minutes later, with no land in sight. Now, as you probably know, Greenland is a pretty big place, not easy to miss completely if you happen to be in the neighborhood. And sure enough the nameless one had a solution, a null which happened to be only 90° to the *left*.

Obviously, it was time to make a decision. I did, and when I checked the static on the radio compass I confirmed the null, all 360° of it. Naturally the old soldier

Major C. O. Cummins, Director of Safety, 392d Combat Support Gp (SAC) Vandenberg AFB, Calif.

was open to suggestions. I suggested a return to the original course, and a letdown since we were between layers. This we did. Below us, water appeared, but there were some likely looking rocks ahead, rapidly approaching us at 500 feet. I was unable to identify any of the rocks so the old soldier decided that discretion was the better part of valor and elected to climb—and climb. We broke out on top at 11,000. The coast line, as we were already aware, was all clobbered up but we could see lots and lots of snow and ice inland.

After many tries we were able to contact the ground station. Aha, our troubles would be over. One measly little DF steer would do the job. But this was one of those days when everything you touch turns! Seems that their DF antenna had been blown down in high winds the week before. Meanwhile, back at the ranch, I was still trying to sort out one fjord from another. This, again, is not easy.

It was at this point I think that a jet jockey who was sandbagging the trip with us woke up and came forward to see what was going on. After all, he'd been asleep for 7 hours and weren't we due to land pretty soon? We didn't really lose patience with him until he ran through the whole routine, "Well, have you tried this, and that?" Lacking any new, fresh, and/or different ideas, he was invited to return to his prone position. We promised to wake him within the hour, one way or another.

With one hour of fuel left, the old soldier and I decided to continue looking for 30 minutes, and to keep our eyes open at the same time for a nice soft snowbank to land in. That little item bothered me somewhat also because we had no rations. Personally, however, I was better equipped than the rest since I had purchased a 40-ounce bottle of Scotch at Goose, with which I'd planned to celebrate at journey's end. Down there on the icecap I might freeze my toes in my low-cut shoes but I'd be happy. Time passed. We picked a spot to put the bird down. The fjords still all looked alike. We called the field and informed them that since we couldn't find them they would have to find us.

Then a stranger entered the conversation. An AACS B-17 on final thought he might come up and take a look for us before we committed ourselves irrevocably. Ten silent, strained minutes later the crew chief in our bird went "all funny."

"There he is! Don't you see the Aldis lamp blinkin?"

The chief was right, too. It took us only 10 more minutes to get over the field. I think we had logged 7 hours and 50 minutes before we finally cut engines.

That's about it, except that the Scotch was opened at the BOQ. The B-17 boys had a drink, the old soldier had a drink, and the copilot almost got a poke in the nose when he refused, saying, "What do I want a drink for? I knew we'd make it."

As far as I know, that hunk of machinery we carried so lovingly in our old Gooney was never touched. I *still* don't know what it was supposed to be used for. ★

HAMMERED

Capt. Benjamin R. Battle, 78th Fighter Gp (AD) Hamilton AFB, Calif.

It was the day before the Fourth. It had been a busy one and I was a bit bushed as I sat with my wife, watching television. My mind might have been on the program but more than likely I was remembering each takeoff of my outfit, replete with F-104s, as it departed that morning for a southern base. With a twinge of envy perhaps, I watched them leave, hit contrail level, and disappear. This was the first trip the unit had taken since I left it to become Flight Test Maintenance Officer. I guess I was lonesome that night. Then the phone rang.

My boss was on the line, saying something about #720 being out of commission for an engine change at England AFB. Following the usual apologies, he said what I already knew was coming: "Eight o'clock takeoff in the morning, gotta' get them a spare as soon as possible. I'll send an engine down behind you, and when it is repaired, test hop it and bring it home."

"Yes sir!" And my plans for a quiet 4th of July were shot. But, what the heck? It meant flying time and any ride in the F-104 is a pleasure—well, almost any ride. Thus, my lonesome feeling was gone. I packed my clothes and thought of the trip that lay ahead.

Promptly at 0800, the 4th of July, my ATC clearance came through and I pressed the button which brought the J-79 to life. Taxi, takeoff, and I was on my way to Kirtland, flying high above the holiday traffic. After shooting the letdown and low approach I entered the pattern for a normal landing and taxied on in. A member of the alert crew said, "You had us worried, Captain. Somebody said you were overdue."

An Omen? Maybe not, but I did turn up overdue and missing the next day while en route back to Kirtland from England.

The leg to England was uneventful; the engine change was accomplished and I test hopped the aircraft at noon the day after the Fourth of July. A hard afterburner switchover, noted on the ground, was considerably smother in flight, and the cabin pressurization required reduction in power but worked all right at all power settings afterward. Therefore, the airplane was released for flight back to California.

I cleared the BOQ and returned to base operations, ate lunch and proceeded to file out. Since the route was preplanned by my old unit, I had no problem completing the Form 21A and the DD Form 175. Next, I went to the weather office and received a briefing on the en route and destination weather. Generally, this briefing consisted of scattered thunderstorms, max cloud tops at 35,000 feet and a coverage of other weather which would be along my route in case of an emergency landing.

Forms completed—I went in quest of the AO who was out on the ramp. While he checked the Form 175 for correctness we talked about the performance capabilities of the F-104. He signed the clearance. We parted with a handshake and a promise from me for a ride in the F-104B at the first opportunity.

Finally, I arrived at the airplane where a couple of pilots were looking 'er over; I proudly donned my spurs and Mae West. Then came a careful preflight and I was ready to leap. After strapping in, I waited a few minutes for a power unit, and then called the tower for my clearance.

"Roger, 720, your clearance is on request."

I received my clearance and read it back.

After being given the usual "Roger," I fired up, ran through my checks and taxied out. "Boy, is it ever hot in this cockpit," I thought, as I sat there. I waited for a T-Bird to take off and then took the active. Throttle up to 100%, I released the brakes and lit the 'burner. I was on my way home.

In the air, I reefed 'er up slightly to show the F-100 jocks what a *real* airplane performed like, smiled to myself, and bid a fond adieu to the tower. Departure control insured altitude clearance between my '104

BY THOR

and the T-Bird which took off in front of me before handing me off to GCI site Goatee. Goatee came through loud and clear to give me flight following to my first reporting point, Lufkin. I had held afterburner until about 15,000 feet altitude to insure sufficient terrain clearance in case the AB switchover was hard, but it was smooth. As on the test hop, I had to pull the power back to get cabin pressurization. Continuing the climb on course, I looked around and saw my tiptanks spurting fuel. Inasmuch as tiptank fuel is not metered through the cockpit fuel quantity gage, I made a mental note to monitor fuel estimates carefully.

Shortly after reaching my assigned flight level, 350, I left Goatee Control for Center and made my position report over Lufkin. All was calm and serene as I progressed on to Waco and another position report. Looking North, I could see thunderstorms and I thought of the rumors I had heard about an F-102 that crashed while flying through thunderstorms in that area. I was clipping along at .90 Mach and was hitting my ETAs right on the money.

After I had been airborne about 50 minutes I came across scattered thunderstorms and spotted a line of the things running north to south across my flight path. It wasn't possible to judge their tops at this point so I flew on until it became apparent that at FL 350 I would soon be IFR. I began to climb under VFR conditions to remain on top and lit secondary sector burning at 40,000 feet. *(Ed. Note: The afterburner of the J-79 engine has four sectors of burning; the pilot selected ½ AB power.)*

I thought of the fact that I was on an IFR clearance with a "hard" altitude of 350 assigned, and immediately calculated that:

- I'd remain VFR.
- There'd be no other aircraft near me, coming out of a thunderstorm.
- That the F-104 could top the thunderstorm.

I remember thinking how lucky I was to be in an F-104 which had such tremendous performance capabilities. However, I did begin to worry about the excess fuel I was burning and checked my fuel quantity gage. Still plenty left! "Ought to be reaching the top anytime now and can come out of 'burner to coast down the other side," I thought.

Forty-seven thousand, airspeed getting low. I entered a thin wisp of clouds fully expecting to break out momentarily for the descent to 350.

• HAMMERED BY THOR (Cont.)

The 'burner quit! "Two bar widths down, think of thunderstorm flying, Ray. That's it—attitude gyro and a known power setting."

I retarded the throttle and was on my way down, checking the turbulence via the attitude gyro. Everything was looking good and I'd just begun to relax—when the cockpit filled with a white vapor.

"Rapid decompression. Get the oxygen to 100%." After looking at the oxygen selector switch, I looked back at the instrument panel. Surprise! "This beast has quit!" I thought. Back with the throttle. Hit the airstart switches. Hit 'em again and still a third time. "You haven't any flight instruments! There's the OFF flag in the attitude gyro, and without pitot heat you won't have airspeed or altimeter.

"No start yet, throttle position makes no difference. Back to 100% position. You get ignition for 30 seconds, quit fanning the airstart switches, but hit 'em one more time."

Meanwhile, my beloved '104 was plunging earthward. I erroneously believed the needle and ball to be operative and kept glancing at it. It was centered all the time so I figured my wings were level. They weren't.

A sudden surge—the cockpit cleared—and the emergency strip lights lit and unlit as the engine started again. "Close, old boy, but you're going to come out okay. Uh, oh, it takes two minutes on the ground for that attitude gyro to warm up. It's colder up here, doubt if the ice has burned off that pitot head. You're in a thunderstorm anyway so those instruments will give you false readings."

That needle only bobbled slightly so I rolled it harder to the left and the needle centered. "That attitude gyro—I need that damned attitude gyro. Are you inverted? No instruments to help you. What's that? The attitude gyro tumbled and shows all white. Still the OFF flag. Ease back on the stick, positive G, and you're in good shape."

In the next few seconds, the nightmare of my life occurred. I blacked out in a condition of increasing G. My back gave way with a pain that felt like it was sprained. I gasped for breath wondering what had happened.

Shortly thereafter, I felt and heard two thumps, followed by a grinding noise. My reaction was, "I'm dead. Is the airplane hitting the ground? It must be. But why am I here?"

I was desperately clinging to the last hope of life when I came to. My head was down so that my eyes were just over the canopy rail, but through the rain I got a glimpse of the ground.

"Get out of it. You'll never fly it." And just as fast as that, I made the decision which saved my life, for the left tiptank had come off and sheared the horizontal stabilizer.

After pulling the ejection ring I was aware of a rush of air and then I was down and out. A tug on my body brought me up short just as I was reaching to release the seat belt. "What was that? Strange—I can't get my head back." So I reached up cautiously and placed my hands on the risers with a sigh of relief. The orange and white panels were all intact and the seat was floating above me. A muffled explosion followed by an orange fire brought my attention back to earth where the airplane had crashed. A sickening feeling crept over me as I thought of losing my first airplane. But it wasn't over yet. I was still floating toward earth.

Strapped to my rear was a Firewell Kit which contained a life raft and survival equipment; I pulled the handle to release it. Naturally, it had to hang up on the right-hand side, but I managed to kick it free. I looked at the ground. I was drifting and going in backwards, when I saw the edge of a caprock coming my way. "Oh, no, you're going to hit on the edge of it and get pulled off. You might make it." I tried twisting around, without any luck, but I did clear the caprock.

When I reached up the second time to try to rotate the risers, I hit the ground. I was on the ground and still alive. It was raining.

For a few seconds, I lay there trying to get my breath back before I checked myself over. My elbows were skinned but there was no other apparent damage. The chute had collapsed and the risers were spread over me like a spider web and it took a few seconds to get out of the harness. My attempt to spread the parachute out using heavy rocks to hold it down was unsuccessful because of my back injury and the heavy winds.

Having failed with my chute, I went after the survival pack to get the radio and parka I erroneously believed it contained. Neither was there. I started my hike through the desert to a windmill and later found a one-man house trailer which provided shelter and a bed throughout a lonely, rainy night.

The next morning at 0530 I was found by a rancher on horseback who took me to his house for breakfast and later to a telephone so I could call my wife. Thus, I had survived the most exciting five minutes of flight in my career!

In rehashing this flight, these are some of the things I learned from my experience and which I would like to pass on to others. You've heard them before and you'll probably hear them again. They're worth repeating.

- Pay particular attention to the weather surrounding your flight plan route even though VFR conditions are forecast. IFR weather can move into your path unexpectedly.
- Be aware of existing radar advisory services and their capabilities. Don't trust your eyeball to judge cloud tops, particularly thunderstorms.
- Always advise some FAA faciilty of your intentions before deviating from AFR 60-16.
- Know your engine and flight instruments; know which ones are operative under varying emergency conditions.
- Have a minimum altitude for ejection—a point at which you will automatically eject when you do not have the aircraft under positive control. I cannot emphasize this one too much!
- And last but certainly not least, there's always the One-Eighty! Seems a wiser choice than to tackle a thunderstorm, be it a summer or winter type. ★

"THE FLY AND I"

Col. C. M. Shook, 4900th AB Gp, AFSWC, New Mexico

The effect that altitude has on the performance of aircraft, engines, animals, and insects is sometimes given too little consideration by the pilot who has been flying from bases near sea level. Usually, the pilot from the low country notices that his traffic pattern for landing at 5000 feet doesn't correspond to the one at home plate. He is sometimes amazed (perhaps even scared) as he watches a beautiful runway like the 12,700-foot strip at Kirtland fade behind him during the takeoff roll before he becomes airborne. The rate of climb and acceleration just doesn't correspond to the sea level performance of the same aircraft.

I remember well during WW II, while flying the "Razorback," P-47, which had the bulletproof glass in the forward part of the windshield, that flies would get in the space between the bulletproof glass and the windshield. On one flight in particular, a fly accompanied me. As we began our climb to altitude, the fly would be very active and distracting. It would start out while in the lower atmosphere with the normal speed for a good French fly. As the old jug gained altitude and the air became lighter, the fly would slow down and finally the air became so thin that flying was out of the question. Certainly the temperature also had a great effect on the fly's performance. But most of all it was the thin air, just as the thin air of the high country increases the takeoff and landing roll of an aircraft. As the fly and I returned to home plate and descended to a lower altitude, the fly would flick his wings and continue with the air show.

A good rule of thumb for determining the equivalent length of a runway at 5000 feet as compared with one at sea level is to take two-thirds of the available runway. For instance, at Kirtland the 12,700-foot east-west runway is equivalent to 8400 feet at sea level for an F-100D, grossing 33,000 pounds. For you airplane drivers from the low country, it's important to remember that the line speed and go-no-go speed at the higher altitudes will vary considerably with takeoff technique, gross weight, and temperature.

The point I would like to make is this: The time to make your "decision point" is in Base Operation. There you have all the time you need to figure the acceleration check, go-no-go speed and distance, refusal speed, takeoff speed and takeoff roll.

Suppose your F-100 is blowing and going at 130 knots and you've used 4000 feet of the runway and you're not real sure whether you'll make it or not. Remember, Kirtland is 5352 feet above sea level, the runway temperature is about 100°F, and your airplane is grossing out at 33,000 pounds. You've got to decide "go or no-go." Which will it be? If you haven't used the Dash One or a "handy dandy reference chart" you have a real touchy decision to make, and the wrong decision might kill you.

Recently we had an F-100 pilot from the low country who was faced with a decision very similar to the hypothetical case above. He aborted at the 4000-foot point, jettisoned his tanks and made a successful barrier engagement. Damage to the aircraft was merely to the landing gear doors.

In this example the question is not whether the pilot could have made it had he continued. The point is: He had made his "decision point" and he aborted when the airplane didn't perform as expected.

We enjoy having you pilots from the low country visit us, but please get acclimated to higher altitudes before you hit the barrier! ★

CROSS COUNTRY NOTES FROM Rex Riley

Rex has been on the road again trying to find out what's new in the field, and to encourage some of our very intelligent Air Force people to write an article or two for the magazine. As usual he found some things that were not only disturbing but dangerous to the troops who fly. In telling you about some of these there is no attempt to try to change the world. These are things that commanders, supervisors and the working troops can correct by more attention to their jobs. No attempt has been made to identify an individual, a base, or even a command.

With preliminaries out of the way, let's take a look at NOTAMS and the system:

Like the good book says, Rex checks the NOTAMS before he leaps off for the particular base for which he intends to land and even the alternate. On this flight the first NOTAM check was primarily confusing. There were 12 NOTAMS for the base we'll call Pea Patch AFB. The first thing noticed was that the "Q" signals weren't decoded (you know the route-like "QUEGOS," which might tell you the runways are missing). As the "Q" signals were being deciphered it was noticed that one of the NOTAMS was over 3 months old! A little further along Rex discovered that there were 3 changes for the VOR frequency—from 109.8 to 117.6 to 114.4 and I'll be darned if you could figure out which was supposed to be the current one. The jet letdown book showed 117.6 and when Rex got to Pea Patch, sure enough it was 114.4. The Base Operations Officer showed Rex that there were only 4 current NOTAMS which meant that First Base had 8 cancelled, confusing and possibly dangerous NOTAMS in their files.

The next 3 bases on the itinerary were equally as bad. As Rex knew exactly what Pea Patch's status was he decided to check specifically for that base. Second Base had 2 NOTAMS out of 4, Third Base had one and Fourth Base had 8. What really tore it was when Rex checked the NOTAMS for Luke AFB and home plate (Norton). At Fifth Base there wasn't a single NOTAM in the file. This was more than suspicious. The Chief Dispatcher checked with Military Flight Service and you probably have guessed right—there were 4 NOTAMS for Norton and 3 for Luke. And they were of such a nature that had Rex cleared for either base without the poop there could have been a real hassle in the clouds.

The Chief Dispatcher at Fifth Base was real interested and apologetic for his poor NOTAM file. He knew it was bad but his dispatchers were on CQ, barracks orderly and so forth. Rex suggested a large type sign on the NOTAM file saying "Beware—NOTAMS incomplete," until they were in top-notch shape. We couldn't get one Base Operations Officer even remotely interested in his own sorry file. Other excuses were: lack of help, pilots steal the NOTAMS, and the NOTAM system itself is lousy. Whether these are excuses or reasons won't make an awful lot of difference to the pilots or crewmembers who splash themselves all over the countryside just because somebody on the ground didn't do their job.

Now, a word about the NOTAM system. It needs a good thorough overhauling. People aren't all bad nor are they all inefficient—so when you find so many failures there has to be some things at fault within the system itself. Too many complaints are being heard about the system for them not to have some merit. Are we going to sit around until an airplane and crew are lost before a better system is prescribed? With the brains and experience of the people responsible for NOTAMS and system design it's just not possible to fail to come up with something a whole lot better.

If what has been said here has caused some of you to be distrustful of NOTAMS, that's good—you should be. It's not meant, however, for you to stop checking the NOTAMS. Keep on checking them and when you find an irregularity bring it to the attention of the Ops Officer. If there's any doubt about your bases of intended landing, check with Flight Service.

Rex didn't really mean to preach a sermon, so let's get a little humor into the act.

* * * * * If you've read *Aerospace Safety* more than once, you know we've campaigned hard and long for simple and uncomplicated IFR departure instructions. Things have improved a great deal in the last year but we're not out of the woods by a long shot. As an example, Captain George J. Kertesz, Vance AFB, sent us this gem, copied word for word (except we've renamed the center, VOR, etc.). Here it is:

"ATC clears AFJ 14342 to the Saylor Omni via the 289 degree radial of the Backsonic Omni until intercepting the 064 degree radial of the Saylor Omni and then direct Saylor. Climb to and maintain flight level 250. After takeoff make a right turn to a magnetic heading of 090. Climb to 3000 feet and reverse course. Maintain 3000 feet until passing the 211 degree radial of the Podunk Omni. Report reversing course. Report

289 degree radial of Backsonic Omni. Report 211 degree redial of the Podunk Omni. Contact Backsonic Center on 317.5 after takeoff. *Jet 342 be advised that the Saylor Omni is off the air for maintenance.*" In all honesty it must be said that the last statement came from the local control tower, not Backsonic Center.

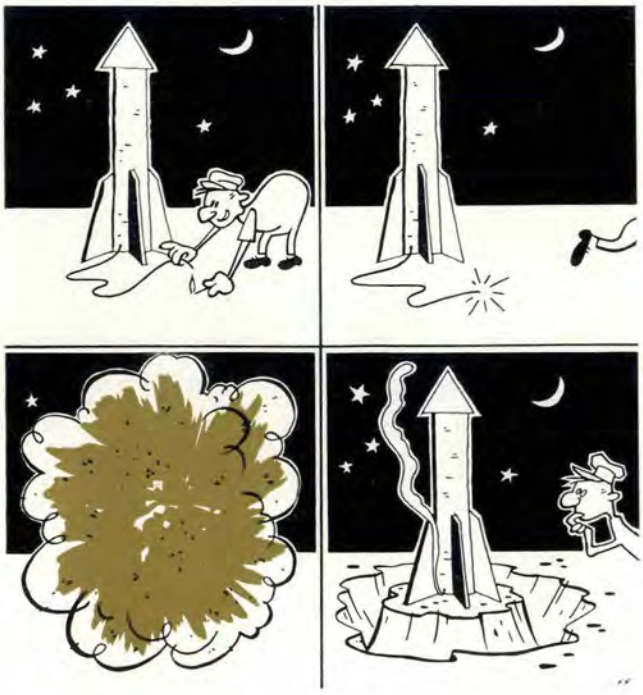
* * * * In checking the En Route-Supplement to see what facilities a particular western base had to offer, Rex came across this statement "3-inch lip each end rwy 07-25." Nice little warning, but this same bit of advice has been in effect for over 3 months. Now Crimenetly, Old Somerset, just how long does it take to get some high powered coordination to fix a 3-inch lip? Wouldn't it be interesting to read the accident report, with indorsements thereto, if one of our shiny aircraft knocked its gear off on the "3-inch lip?" Want to bet that the primary cause factor would be "Pilot factor"—undershot runway, instead of "supervisory error?"

• • •

Here's one with an old familiar ring. It's about a cross-country to a well known base in a T-Bird, "At the time the aircraft landed, the highest ranking individual in base ops for one hour was a brand new Airman Second. In all fairness I must say that the AO was reachable by telephone; however, the Base Ops Officer's phone number was unknown. After finishing our business we waited at the aircraft for one hour and forty-five minutes to get 150 gallons of JP-4 in each tip. What impressed me was that the maintenance crew was not busy, actually; it just simply ignored transient aircraft even though the day's flying had just finished. The pilot had stopped at this base before and he and a couple of pilots from another base in the same locale have reported that transient and maintenance service at our stop is unspeakable. I was a passenger and I must say that this was by far the worst "service" I've seen in my entire Air Force career. My pilot was real shook up and his poor old fingernails took a beatin'. If I can help it, I'll never go in there again."

Rex doesn't blame you a darn bit. This is only one of the complaints that have been received about this base. Lt. Heinz and Sgt. Duncan (Aerospace Accident & Maintenance Review) have been advised that some transients are getting a bad shake there. Lt. Heinz is real concerned and has promised a visit soon. ★

• • •



REX SPECIAL

If you T-33 jocks read and believed the letter published in Fallout (November 1960), you may be flying around the countryside 300 feet off the altitude you think you're flying. Specifically, we quoted a letter from Hq USAF, on "Application of Altimeter System and Instrument Error Corrections." Everything was going along fine until an example was given, using the T-33 and in Par 3c (4), stating: "To maintain 15,000 feet assigned altitude, the pilot in command would fly 14,850 feet indicated altitude." Unquote, and we offer our apology.

It should have stated: "To maintain 15,000 feet the pilot in command would fly 15,150 feet indicated altitude." Here's why it's wrong: The example given combines the altimeter correction algebraically with the desired *pressure* altitude. The correct method is to add algebraically the net position and instrument error correction to the *indicated* altimeter reading to obtain correct *pressure* altitude. Since a pilot knows only the desired pressure altitude, he must begin with that and find the indicated altitude. A convenient method is to change the algebraic signs of the altimeter corrections and then add them to the pressure altitude. This may be as clear as mud now. So we suggest a "go" at the Handbook or a perusal of WADD Message WW2PH-24-9-112, dated 25 September 1960, to all major commands.

So far we haven't heard of any accidents because of the boo-boo. Probably because very few T-33 troops go cruising around the neigborhood at 15,000 feet. Rex doesn't; do you? There must be some sharp-eyed troops who are reading the magazine 'cause we've had a few discreet and more than a few indiscreet inquiries about the "sanity" of the staff. If you were planning to point out the error, please save your strength. Write us an article instead.

FALLOUT

LETTERS TO THE EDITOR

More About Doppler

We enjoyed the article, "It Sees . . . It Remembers" in the October issue but feel one of the statments made therein to be incorrect: "Continuous-wave Doppler, as opposed to pulse or other modulation techniques, starts operating while the aircraft is on the runway and continues to function throughout the flight, even including the extreme attitudes of terminal maneuvers, until the plane is back on the runway again."

The AN/APN-105 and AN/APN-131 Doppler navigators, designed and manufactured by Laboratory for Electronics, Inc. for use in the Republic F-105, employs other than continuous wave transmission techniques and operates from the start of the takeoff run until completion of landing. It not only operates through "extreme attitudes of terminal maneuvers" but also operates accurately in memory modes throughout maneuvers such as dive bombing, toss bombing, etc.

We here at Lab for Electronics would appreciate your clarifying this point to your readers.

Charles M. Harden, Manager
Laboratory for Electronics Inc.
Lexington, Massachusetts

Publishing an article like the one referred to does not constitute endorsement of the particular equipment. Aerospace Safety Magazine is merely interested in advanced equipment that does its job properly so the pilot can complete his mission successfully and safely.

• • •

Flying Boot Survival Kit

I appreciate the opportunity to give you a specific breakdown on our boot survival kit and hope it will be useful to other units. The idea is not mine, originally. I made our kit similar to one I'd seen on a transient pilot, thinking perhaps it would be an added insurance policy for some of the best people I know—Our Pilots.

Our boot kit is made from scrap leatherette and it takes only 20 minutes or so to complete the project. The container size is 5" long, 2½" wide, and 1¼" thick, and, as the photo shows, you close it with two lift-the-dot fasteners. Attaching the kit to the boot is a simple matter, if one is fortunate enough to have access to a 29K-73 Singer Sewing Machine. There is ample room to sew the kit to the outside of the flying boot.

Now for the contents: Nails; flies @ 35c each; sinkers @ 2c each; leader & 4 hooks, 25c; needles, 10c; Scout Knife, $1.05. Then, the Benzalkonium Chloride, chapstick, water purification tablets, safety pins, bandaids, snare wire, matches and waterproof container, wash & dry cloth, boullion cubes, caramels, and the very best of Luck. Fortunately, our pilots pitched in to buy many of the items contained in the kit; the Medical Section gave us the bandaids, Benzalkonium Chloride Tincture, chapstick and water purification tablets. Food service donated the boullion cubes and caramels, and Civil Engineering gave us the nails.

The remaining items—match containers, safety pins and snare wire—were obtained through Supply.

Thank you and I hope others will find such a kit helpful.

TSgt Dan Girolamo, USAF
Personal Equipment Technician
192d FIS, ANG, Reno, Nevada

As has been said many times, you just can't beat this NCO ingenuity. Congratulations to the 192d for having TSgt Girolamo in its PE Shop.

• • •

Oh, My Achin' . . .

All of us CRT pilots know that the T-33 is here to stay for a while. Most of us are required to wear the seat type parachute while piloting the beast, so that after flying anytime over 1:30 we develop "fannyitis" and run out of unused comfort spots. The blame, however, does not lie in the fact that a seat type parachute is used, but in the design of the canopy package. The MD-1 survival kit has a contoured fiberglass seat that solved the fanny fatigue problem. I've flown several 10- and 11-hour missions in an F-100 and I know some pilots who have flown over 14 hours without getting too many aches and pains. What has been or is being done to improve the comfort of the seat pack parachute and the seat cushion pad used with back packs? If a new type seat pack parachute is contemplated, what is the expected delivery date to the field?

If a new type seat pack is not contemplated, I recommend that a contoured fiberglass shell top pack (with standard foam rubber pad similar to the arrangement of the MD-1 survival kit) be developed for the canopy. If this is too great a project—moneywise—then I recommend that a feasibility study be made to fit MD-1 fiberglass contoured shell tops to the top of seat pack type parachutes. Personally, I should prefer this arrangement for comfort over the back pack and seat cushion arrangement.

Lt. Col. Charles C. Jones, USAF
Brooke Army Medical Center
Ft. Sam Houston, Texas

A message from the Fighter Branch: "We're suffering the same discomfort, and our sympathies go out to you. The answers to your questions, however, must come from ARDC, and we invite them to contribute."

• • •

For Lt. Col. Rex Riley

The "not-so-happy" pilot with NOTAM trouble pointed out a problem that probably exists to some degree at all airfields. However I feel compelled to point out what must be a serious flaw in his training: and that is the use of frequency 243.0. As everyone in Southern California knows, the primary use of this frequency is to get "Big Photo" to "Cease Buzzer." Secondarily, it is March Ground Control.

By the way, you've got a good magazine there but you're losing me on this space kick. As an air-breathing animal, I prefer air-breathing machines.

LCdr V. Thompson, USN
Attack Sqdn 126 USNAS
Miramar, California

Most AF jocks refer to 243.0 as Navy Primary. This is a mutual problem and both sides need more training or discipline.
Rex.

The Chart Thief

We've been plagued by the ever-present problem of the letdown/approach chart snatcher. All efforts were expended to prevent continued absences of the necessary approach charts from the Handbooks.

Finally—Eureka!—SSgt Joseph Crete, an operations specialist, came up with the bright suggestion of putting meaningful slogans on the cover of each book. These slogans, when read, drive home the ultimate meaning of a missing approach plate under certain extreme conditions—radio failure, severe weather conditions, and so on. They are printed on high visibility tape with black grease pencil, then covered with scotch tape to prevent erasures while handling the books.

Since the implementation of this idea, our Handbooks have reached a new high in retaining their completeness. The photograph shows four of these slogans although the one on the first book has been partially obliterated.

I hope this suggestion may be as helpful to some other unit as it has been to our organization.

Capt. John B. Roach
FSO, 94th TC Wg (M) (R)
Laurence G. Hanscom Fld, Mass.

Does anyone else have this same problem?

Information on the books, from left to right: "Stop 'St. Louis' Chart Missing. Correction 'St. Peter'." "Do not forget to replace charts. The life you save may be mine." "Do not remove charts. It's what's in here that counts." "Chart snatcher. Manslaughter."

• • •

Poster Artist

Posters have contributed much to the flight safety program. Lt. William H. Critch, a C-118 pilot of the 48th Air Transport Squadron, MATS, puts the finishing touches to one as his Commander, Lt. Col. Clayton Findlay, looks on. The 48th has a fine record—an inspiration, no doubt, to its members who have completed numerous posters dealing with aircrew proficiency and flying safety. Competition invited!

BB At Bolling

Below, this flight safety bulletin board showing various publications promoting aircraft accident prevention is kept up to date in Base Operations, Bolling Air Force Base, Washington, D.C. One of the more effective methods used in Bolling's flight safety program is the moving "Times Square" tape like the center sign which reads: "Use Wing Walkers." Messages, changed frequently, are easily inserted in the tapeholder.

Superintendent of Documents
U. S. Government Printing Office
Washington 25, D. C.

Please send Aerospace Safety Magazine for one year to the following address. Enclosed is a check or Money Order for $3.00 ($4.00 for foreign mailing.)

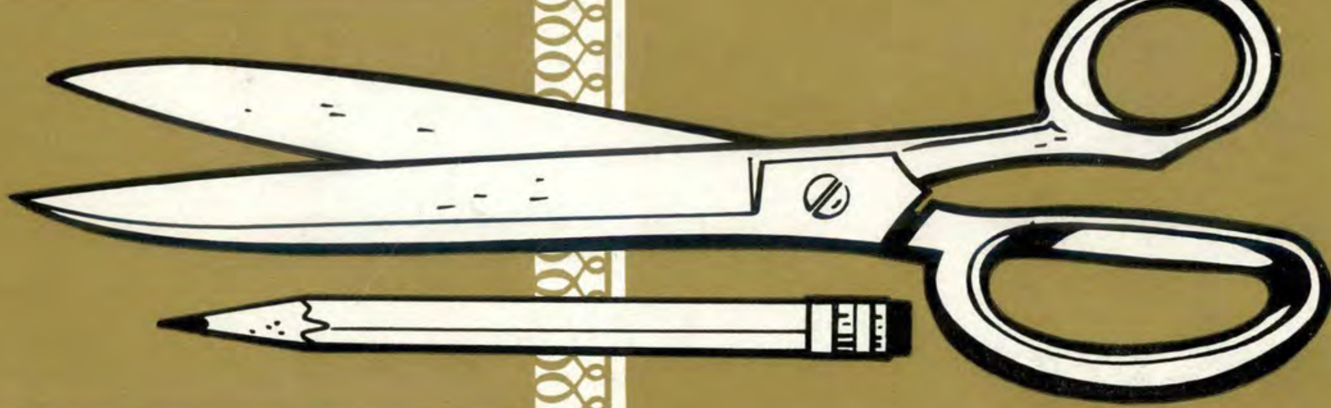
Name__________

Address__________

City__________ State__________

(USAF Periodical 62-1)

Clip a Coupon



Superintendent of Documents
U. S. Government Printing Office
Washington 25, D. C.

Please send Aerospace Safety Magazine for one year to the following address. Enclosed is a check or Money Order for $3.00 ($4.00 for foreign mailing.)

Name__________

Address__________

City__________ State__________

(USAF Periodical 62-1)

Superintendent of Documents
U. S. Government Printing Office
Washington 25, D. C.

Please send Aerospace Safety Magazine for one year to the following address. Enclosed is a check or Money Order for $3.00 ($4.00 for foreign mailing.)

Name__________

Address__________

City__________ State__________

(USAF Periodical 62-1)

Superintendent of Documents
U. S. Government Printing Office
Washington 25, D. C.

Please send Aerospace Safety Magazine for one year to the following address. Enclosed is a check or Money Order for $3.00 ($4.00 for foreign mailing.)

Name__________

Address__________

City__________ State__________

(USAF Periodical 62-1)

The name of the magazine has been changed but the mission hasn't; it has just widened its scope and intent in that it covers safety fields additional to flying. For the benefit of the newcomers and to remind the oldtimers, *Aerospace Safety Magazine* is available by subscription. Reader response—criticisms and bouquets—plus the number of contributed articles on safety are significant. The great push to get flight personnel interested in becoming safety-conscious *before* an accident happens is picking up at a pretty good pace. Also, the continued exchange of ideas with and the subscriptions from industry, allied services and individuals are always welcome. As the coupon states, for three or four bucks, depending on where you are stationed, you can make sure of receiving a personal copy. Three or four dollars aren't many, it's true, especially when compared to the millions invested in the birds your units may be flying. How about starting the year with a gilt edge security?

*U. S. Government Printing Office 571213