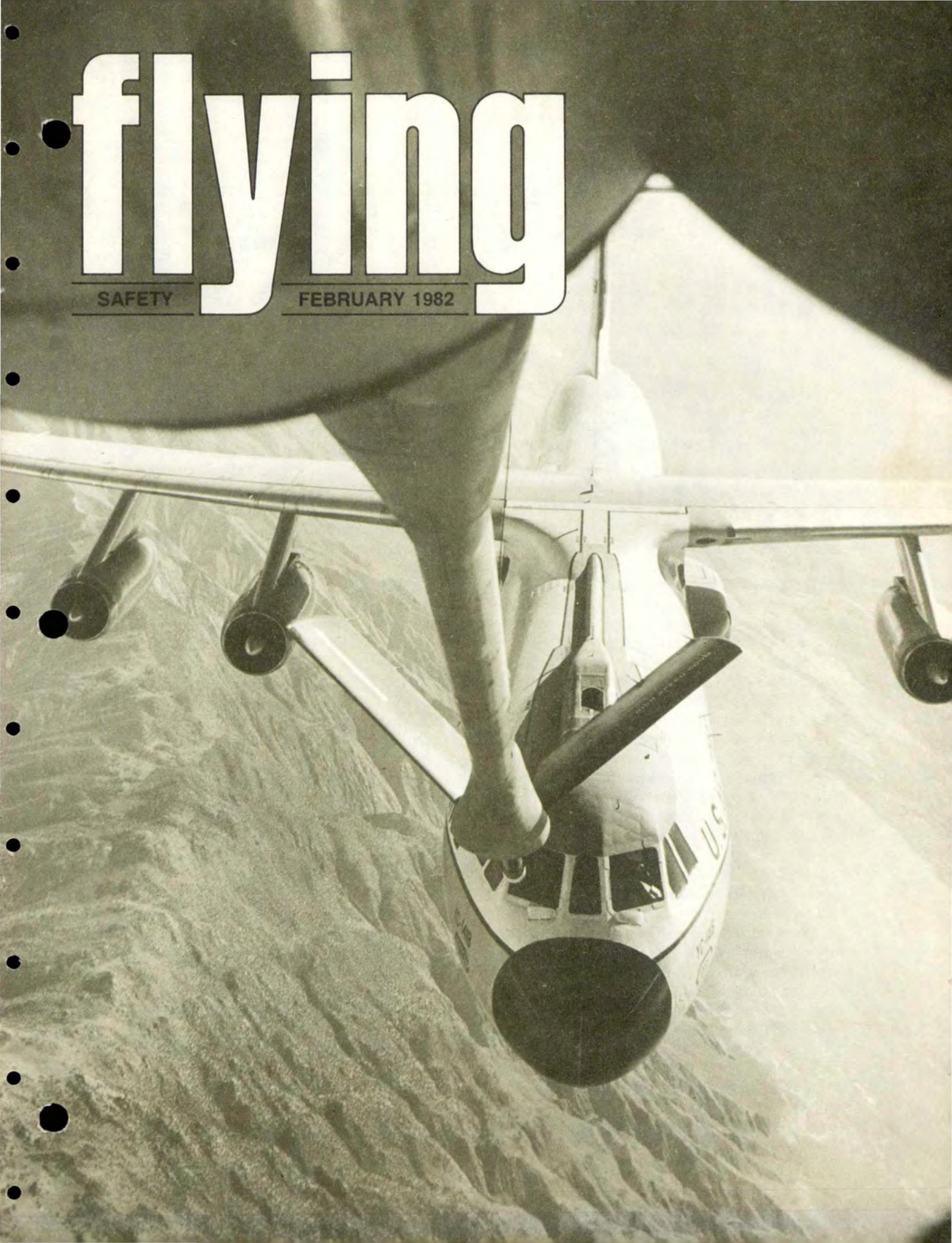
flying

SAFETY FEBRUARY 1982



Flying Safety Week

US Air Force Flying Safety Week, 17-21 May 1982, will involve all commands and all units in a comprehensive look at flying and support activities to find innovative ways to prevent mishaps.

■ This special emphasis program springs from two incentives: (1) a recommendation by the System of Cooperation of the American Air Forces (SICOFFA) that each member nation conduct a special emphasis week for flying safety; (2) a letter from Deputy Secretary of Defense, Frank C. Carlucci, to all military departments expressing concern over the rising cost of aircraft accidents.

Such an emphasis on mishap prevention is not new to the Air Force. The Air Force Inspection and Safety Center (AFISC), as the executive agent for safety, has been working such programs for years. One recent example was called CHANGE PACE, an in-depth look at how we do the business of flying in the Air Force and, through an analysis of aircraft mishaps, where we can improve.

Mr. Carlucci's letter led to BROAD LOOK, a study of flying operations and mishaps. BROAD LOOK is an across-the-board assessment of the way we do our business in maintaining readiness while preserving our forces. The BROAD LOOK initiative consists of seven phases.

Phase I is an analysis of mishaps involving destroyed aircraft during the period January 1979 - October 1981. Phase II centers around a survey team and data gathering team, with travel to PACAF, USAFE and CONUS units. The survey team is administering questionnaires in the field, while the data gathering team will focus on perspectives of upper management and workers in operations and maintenance. Phase III will be a logistics team visit to the ALCs and HQ AFLC, AFSC, and USAF. Phase IV will be compilation of survey and field data. Phase V will be distribution of major concerns and key issues to MAJCOMs. Phase VI will be preparation of briefings and a written report of findings. Phase VII will culminate the entire effort in the Chief of Staff directed Broad Area Review.

All of this meshes with "Flying Safety Week" because the entire effort requires involvement. BROAD LOOK is meant to involve most all of our flying air forces.

"Flying Safety Week" will be the chance for everyone to think about ways of reducing mishaps in flying operations. Units should do the same type of analysis. Each unit can do their own "broad look" to see where and how they can do the job better and more safely.

How each unit conducts this review and what other activities are involved in "Flying Safety Week" is at the discretion of the MAJCOMs and units. In the January issue of the *USAF Safety Journal,* AFISC provided safety officers some suggestions on how to conduct their flying safety week. The one common and overriding theme is get everybody involved — from the commander to the newest squadron pilot to your youngest crew chief — in looking for new and better ways to do the job, identify and fix the safety problems, and reduce the loss of combat resources from aircraft mishaps.

There will be more information coming on "Flying Safety Week." The April issue of *Flying Safety* will concentrate on giving you information you can use to start your discussions and reviews.

Flying safety is receiving special attention at the highest levels in the Department of Defense. While attention to mishap prevention is a part of our daily routine, as crewmembers we have a unique opportunity to make major contributions to the total effort. As the people most concerned with the problem, we have a perspective which can be especially valuable. But it will only be valuable if we participate actively. ■

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flying

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SPECIAL FEATURES

REGULAR FEATURES

DEPARTMENT OF THE AIR FORCE • THE INSPECTOR GENERAL, USAF

SUBSCRIPTION — FLYING SAFETY is published monthly to promote aircraft mishap prevention. It is available on subscription for $21.00 per year domestic; $26.25 foreign; $2.50 per copy, domestic; $3.15 per copy, foreign, through the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. Changes in subscription mailings should be sent to the above address. No back copies of the magazine can be furnished. Use of funds for printing the publication has been approved by Headquarters, United States Air Force, Department of Defense, Washington, D.C. Facts, testimony and conclusions of aircraft mishaps printed herein may not be construed as incriminating under Article 31 of the Uniform Code of Military Justice. All names used in accident stories are fictitious. No payments can be made for manuscripts submitted for publication in the FLYING SAFETY Magazine. Contributions are welcome as are comments and criticism. Address all correspondence and, Postmaster: send address changes to Editor, FLYING SAFETY magazine, Air Force Inspection and Safety Center, Norton Air Force Base, California 92409. The Editor reserves the right to make any editorial change in manuscripts which he believes will improve the material without altering the intended meaning. Air Force organizations may reprint articles from FLYING SAFETY without further authorization. Prior to reprinting by non-Air Force organizations, it is requested that the Editor be queried, advising the intended use of material. Such action will ensure complete accuracy of material amended in light of most recent developments. The contents of this magazine are non-directive and should not be construed as regulations, technical orders or directives unless so stated. Authority to publish this periodical automatically expires on 30 Oct 1982, unless its continuance is authorized by the approving authority prior to that date. Distribution: 1 copy for every 3.0 aircrew and aircrew support personnel.

A LITTLE SHORT

MAJOR JOHN E. RICHARDSON
Directorate of Aerospace Safety

■ One of the things most difficult for a pilot to explain is a short landing.

There is a widespread opinion that since we pilots practice landings so often (at least once each flight), we should not have any problem with the maneuver. Unfortunately, mishap data does not support this conclusion. Pilots, historically, have a great deal of difficulty with landings.

It seems to me that part of the problem is that because we do practice landings so much it is easy to become complacent. Thus our attention slips a bit and we are not totally prepared for the maneuver. Then if anything goes even slightly wrong, a mishap becomes very likely, if not inevitable.

This can happen to anyone and very easily as the following sequence will illustrate.

The bomber crew was scheduled for a 2 + 30 night pilot proficiency sortie. An IP was in the left seat, a fully qualified copilot in the right, and a third pilot in the jump seat. The plan was to shoot multiple approaches and landings, and for the first four approaches everything went smoothly. The IP flew three approaches and then let the copilot have a chance. The first approach by the copilot was very good and so, as previously briefed, the IP set up the fifth approach as a no-flap pattern and landing. All proper checks and procedures were accomplished, even to notifying the approach controller of the wider turn radius and higher speeds during the approach.

The copilot intercepted the ILS course smoothly and made an excellent approach. As prebriefed, just prior to decision height the IP took control of the aircraft to demonstrate a 100 foot AGL no-flap low approach. As he took the aircraft the IP switched the nav mode select switch to TACAN and the heading mode to manual for runway alignment. This removed the ILS glide slope information from the pilot's display. This would not have been especially troublesome except that the VASI lights were NOTAM'd out so

neither pilot had any external reference to a glideslope.

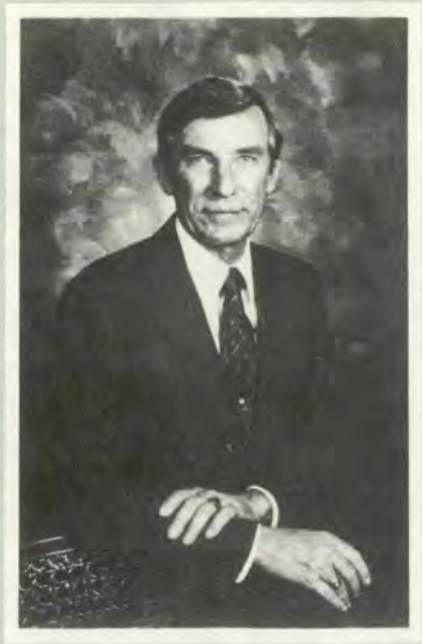
The pilot made his descent from 200 to 100 feet on the attitude indicator. He made what he thought was a one bar width pitch change from a level flight attitude reference. Unfortunately, the pilot had not adjusted the attitude indicator on final, and so he did not have an accurate level flight pitch reference.

The copilot and other crewmembers heard the pilot announce "taking control and descending to 100 feet." At this point they agree that the nose pitched over and they all felt "light in the seat." The copilot felt that the nose was about the same place it would be for a flaps down descent but was not sure. The nose was down for only a few seconds then came up. At this time the copilot could see the ground in the landing lights. He realized then that the aircraft was sinking rapidly and touchdown was imminent, but before he could say anything the aircraft landed about 170 feet short of the overrun damaging some approach lights. The pilot had recognized the high sink rate and applied power but too late to prevent the touchdown.

This mishap has no glaring errors. Instead, a lot of little things combined to put the crew in an untenable position. First, the runway environment was a virtual "black hole." There were no lights in the area and with the VASI system out the crew had only very limited outside references. The pilot had also lowered his seat to aid in flying instruments; however, this deprived him of some outside references. If the pilot had, as he believed, leveled at decision height and then descended using a one bar width pitch change, the aircraft vertical velocity would have been 600 fpm, and the aircraft would not have hit where it did. However, if, when the pilot reached decision height and took control of the aircraft the pitch change was made not from level flight but from the previous pitch reference for the glideslope descent, the resultant increase in vertical velocity to around 1,500 fpm would make the aircraft impact right where it actually did. The pilot had not practiced no-flap approaches very often. Consequently, the required difference in pitch attitude was not as apparent to him as it might have been. The nose of the aircraft was down for only a few seconds, but that was enough when combined with reduced power and a no-flap configuration to assure a short landing.

What can be done? There is no super master caution light in the cockpit which can be set to warn of such a situation. The warning has to be in the pilot's head.

Landings are complex maneuvers and, although we do practice them regularly, whenever things are a bit out of the ordinary our mental master caution should be on. It might save us from an embarrassing or dangerous situation. ■



Flying Safety Editor Retires

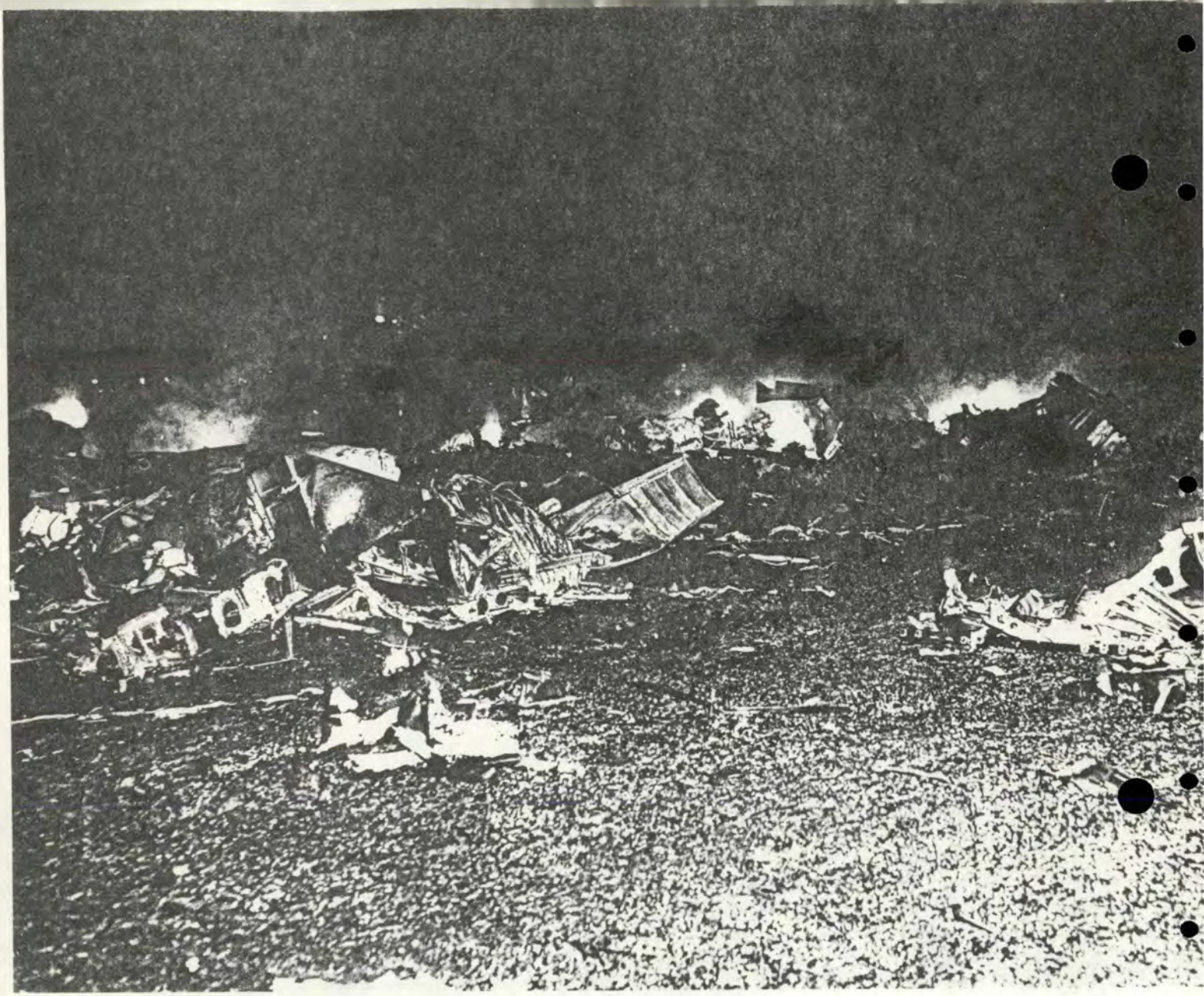
■ In January 1961 what was then *Aerospace Safety* magazine acquired a new managing editor, Robert W. Harrison.

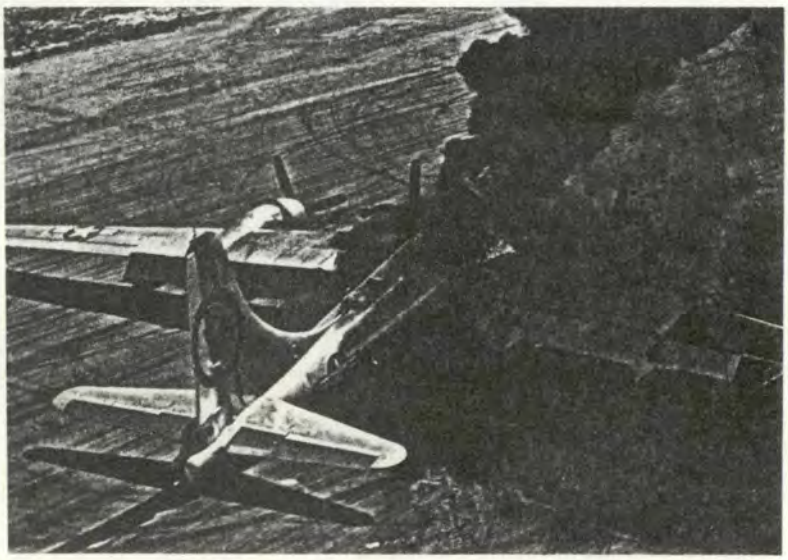
For the next 21 years he was one of the driving forces on the magazine and in the U.S. Air Force mishap prevention program. On 8 January 1982 he retired with nearly 30 years of Federal service.

During his years with the magazine, Bob kept himself fully apprised of the breadth and scope of Air Force flying operations. An aviation enthusiast and pilot, Bob flew (by his own count) in at least 23 different aircraft types in all areas of the world from Vietnam to Alaska and Korea to Germany.

Bob's keen interest in flying safety and aviation and his abilities as a writer and editor have sustained *Flying Safety* magazine as a powerful force for mishap prevention.

We wish him well in his retirement. His knowledge and counsel will be sorely missed. ■





Sunday evening November 18, 1951, a B-29 exploded and burned on the runway at Yokota AB. Ten firefighters were killed in the fire.

. . . The Aircraft Has Crashed And Is Burning

SMSGT DONALD W. WARNER
Fire Protection Engr. Tech.
Tyndall AFB, FL

■ Sunday evening, November 18, 1951, it was already dark at Yokota AB, and the lights of hangars on both sides of the runway were shining brightly. After supper, the firemen were chatting around the stove when the bell rang to notify us of the start of flight operations.

"My truck, nr 4, the largest of all the trucks, was positioned in front of the garage at the center of the runway. I was watching a B-29 taxiing to the south along the runway. I thought it had taken off when I heard Mr. Kanekubo cry 'Crash! Crash!' I lost no time in climbing up to the higher step to see the B-29 aflame at the south end of the runway.

"Our trucks sped along the runway to the scene of the accident. I opened the valve of the foam and water hose in preparation. Three or four trucks were following us. When we reached the south end of the runway, the burning B-29 exploded and blew up.

"I was nearly blown off the truck with the blast. The tranquil, starry sky instantly turned into a flame-curling hell. In the column of fire I saw two smashed trucks that had arrived ahead of us. Scraps of the B-29 came showering down.

"As our truck stopped, I jumped off with the line in hand. I checked the nozzle again and moved forward. Two or three people from the other trucks joined me. The heated bullets of machine guns exploded and hissed in every direction, forcing us to take a crawling position.

"Then came the second explosion. Suddenly everything looked red and my right leg was paralyzed from the thigh. I knew instantly I was seriously injured.

"I was surrounded by fire and sensed I would be scorched to death. I called out at the top of my lungs, but my cries were lost in the noise of the flame, explosion of bullets, and the engines of the fire trucks. I spotted three crushed fire trucks in the flame on the right side."

The account above is a part of a translation of a memo prepared by a fire fighter after an aircraft crash. Mr. Saburo Maeyama survived although one leg was lost and is still employed at the Yokota AB Fire Department. Three American and seven Japanese fire fighters died while fighting the fire. The story is presented here so you can better understand WHY we fire fighters must do the things we do. Why you see us "getting it" down the flight line; why we need aircraft to train on; why we have practice fires. . . .

The days when fire fighters spent the day waxing trucks, sweeping floors, and playing cards have long since passed. Yet, that impression of what we in fire protection do at the fire house lingers on. The fire fighter of the Eighties is faced with seemingly impossible responsibilities. From your perspective, you see the fire fighter at training fires, aircraft training sessions, aircraft emergencies, etc. What you are really seeing is the END product of what we do the most — train. Training is an important duty, second only to actual fire fighting and rescue.

Our training program is so important because that is how we ensure that the fire fighter is prepared to perform fire fighting and rescue. We may be faced with seemingly impossible situations at any time, and our training program is designed to prepare us.

continued

Some of Yokota's fire equipment after the B-29 mishap. A graphic illustration of the potential for disaster in any aviation mishap.

. . . The Aircraft Has Crashed And Is Burning continued

In very broad terms, our training program has two objectives: (1) To successfully accomplish rescue and fire fighting and (2) To protect fire fighters involved in fire fighting and rescue operations. Our major problem with such objectives is how to accomplish rescue and fire fighting while reducing the risk to the fire fighter to an acceptable level. The answer, of course, is an effective training program.

. . . the aircraft has crashed and is burning . . . the crew is in the aircraft . . . the engines are running . . . forward firing munitions are involved. . . .

This is a very familiar scenario for Air Force fire fighters. It's a situation we dread, but must train the most to confront. As crewmembers or passengers of aircraft, you probably don't realize the extent to which we go to save your life!

Fortunately, we don't have to perform in this situation often; but when you deal with life, you can't take any chances. We can rewrite the scenario to exclude some of the problems, but in so doing, we're taking a calculated risk that we will not be faced with that situation. Our business dictates that we be ready to perform fire fighting and rescue under the worst possible conditions.

Because it is impossible to be totally proficient in every fire or rescue emergency, we place priorities on the "most critical." That is, we train to perform those operations to which we are most likely to be exposed. For instance, on a base with a "fighter" mission, we train more on fighter aircraft rescue and fire fighting; on a base handling large amounts of munitions, we train more on munitions fire protection; on an AFLC base, we train more with structure fire protections, etc.

If you want to know the real meaning of "readiness," visit your Fire Department. We were worried about readiness long before the word became popular.

We consider aircraft crews and passengers to be the most vulnerable to fire: You're surrounded by fuel; there are many ignition sources if a leak occurs; airplanes crash! With this in mind, consider these facts:

- Generally, we have about 20 fire fighters on duty to respond to an aircraft fire within the first five minutes. Think of the number of people on an aircraft who may require rescue!
- Our fire fighting vehicles carry enough agent to fight fire for about two minutes. So, during the first two minutes of fire fighting, we must extinguish the fire (or at least get the people out). Should your aircraft crash or catch fire, how much fuel would be involved?
- Experience and studies indicate that we must begin to apply fire fighting agent on the aircraft fuselage within about 45 seconds after the fire occurs if we are to be successful in rescue and fire fighting. After that time, the aircraft skin begins to melt and the fire progresses to the inside of the aircraft. Once the fire is inside, our chances of putting it out are reduced substantially. In simple terms, this means we have to get to the aircraft within 45 seconds.

Now you should understand "why" when you see us "getting it" down the flight line. You should also understand that we aren't just wasting fuel when we have a practice fire. We're learning how to control a large fire with minimum agent, in minimum time. When we borrow your airplane to train on, we're doing it for your health as well as ours.

During a rescue and fire fighting operation, there's no time to check Tech Orders or to get refresher training. The fire fighter must, therefore, commit all the steps in the fire fighting and rescue operation to memory. You can well imagine how difficult this is! When dealing with aircraft, the fire fighter must memorize rescue procedures for each aircraft, specifically:

- How to approach the canopy/entry door controls with the engine(s) running.
- How to open the canopy/entry door manually — the normal method of operation may fail.
- How to shut down the engines.
- How to safety the ejection system.
- How to release the crewmembers/passengers from the seats.
- How to remove the crewmembers/passengers from the aircraft.

We simply cannot do this without your help. We MUST have the aircraft! The fire fighter must

practice these operations over and over because each item to be performed requires several steps which must be in proper sequence.

The larger the aircraft, the more difficult rescue and fire fighting becomes. Consider a C-5 landing crash with 200 troops. People can be in several compartments. We can't even search the entire aircraft in two minutes, let alone perform all the rescue. In such cases, we have to take extra measures to be successful, but hands-on training is the most critical element.

You B-52 crews pay attention! Of all aircraft in the inventory, yours is the most difficult for rescuers. If you expect to be rescued, you'd be wise to provide any assistance you can to train fire fighters. If there's ONE aircraft that is the fire fighter's nightmare, the B-52 is it! Look at the scenario: You've crashed and are burning; your engines are running; nobody has escaped from the aircraft, and you're carrying munitions. The first thing we have to do is control the fire. Then we have to go through top hatches over ejection seats to throttle back the engines (assume the crew is unconscious); then we begin the difficult task of pulling an unconscious person up a ladder (from the lower deck), through the top hatch and to the ground. To further complicate matters, a tail gunner is included on some aircraft. We can do this only with extreme difficulty during training. Set the plane on its belly, set it on fire, and you can imagine how much more difficult the job is. If the fire fighter is not proficient in the rescue efforts, no one may survive. Think about it the next time you're asked to participate in the fire fighter's training.

You fighter jocks may think you're in better shape. Not so. Consider the "pilot's dream" — the F-16. The scenario: You've crashed and are burning; you have

continued

The Aircraft Has Crashed And Is Burning continued

not escaped (perhaps are unconscious); the engine is running more or less wide open, and you have forward firing munitions. The fire fighter's first task is to extinguish the fire, then get to the canopy controls with the engine running! Will the engine ingest the fire fighter? Some people say yes, some say no. We've not been able to get a satisfactory answer. If the fire fighters are successful in reaching the canopy controls, the gun is pointing at their head. If this doesn't discourage them, the next task is to open the canopy. Hopefully, this can be done using the "normal" opening procedures; however, if the normal method does not function, we have to do it manually. Have you ever opened the canopy manually? If not, you're in for a treat! Of course, we could jettison the canopy, but this is our last ditch effort because other problems are created by canopy jettison. After the canopy is open, the engine is shut down and the rest of the operation is relatively simple.

Just a note or two about Air Evacs. We send a big fire truck to accompany all Air Evac aircraft with litter patients. We stand in the hot sun and in the coldest winter weather to ensure we will be "Johnny On The Spot" if a fire occurs. Yet, Air Evac aircraft are among the most difficult to get for fire fighter training. We realize that you are on a very tight schedule and that your patients come first, but if we fire fighters are to give you the best possible service, we need your help. A little training goes a long way.

Why, you ask, do we have to assume the worst? All those situations created by the scenario have actually occurred. True, they don't happen every day, but they do occur.

We can't do our job without your help! Rest assured that if the fire fighter doesn't have an effective training program which includes emphasis on aircraft "hands-on" rescue training, you are in deep trouble if you find yourself in a burning airplane.

There are things you can do to help. First of all, express an interest in the fire fighter's training program. Ask if there's something you can do to help. Second, if you're asked to help, please do help. Third, if you will be landing at a base which doesn't have your type of aircraft and you can spare the time, call ahead and invite the rescue crew to "tour" the aircraft. This is extremely valuable to our rescue capability and will be greatly appreciated. For transient aircraft, typically the only information we have is written procedures in our rescue Tech Order.

The bottom line: We need your help so we can do our job better. We don't like to depend on "luck," and you should be glad we don't. With your help, we can all sleep better at night! We invite you to visit us at the fire house — the first cup of coffee is free. ■

Hazards Of LOW LEVEL Flying -- part III

COLONEL GRANT B. McNAUGHTON, MC
Directorate of Aerospace Safety

■ The first two parts of this series touched upon the contribution of anomalies of perception and of attention to collisions with the ground. This third section will address factors under the general heading of "Knowledge." Later sections will address factors which, for convenience, are listed under the headings of "Judgment" and "Discipline." It should be recognized that these categories are not "pure" and that there is undoubtedly some overlap. The hazards of low level flight involve combinations of these and probably other factors which often interact in complex ways. In analyzing the human factor causes of a "pilot error" mishap, the board must often reconstruct a "most probable" scenario, which may be speculative, based upon its own knowledge, experience, and logic train. The board's opinion may be even more speculative in the absence of a live pilot who possesses the insight and honesty to tell exactly what was going on inside his head.

KNOWLEDGE of the aircraft and its performance, his environment and of himself. First, the aircraft.

■ *Performance.* Changes in the aircraft weight, CG and configuration will affect the aircraft's performance and the way it should be flown. Knowledge of these effects is essential to avoiding loss of control, especially at low altitude, where there is minimal altitude margin for recovery and often no time margin for ejection.

A change in gross weight and CG apparently failed to register upon an RF-4C pilot, as evidenced by the way in which he maneuvered his aircraft. This was an experienced pilot who had been "complimented" for his aggressive ridge crossings and reactions to threats by heavy jinking in the vertical plane — but who was forced to terminate the mission prematurely for fuel.

The next day, he took on an extra 7,000 pounds of fuel (14,800 pounds total onload), filling all internal tanks, including those in the tail, leaving the aircraft at a more pitch sensitive configuration than others he'd flown on previous days. Shortly thereafter, he reacted to threats by aggressive jinking in the vertical and departed the aircraft. (He recovered it, too, but there just wasn't enough altitude).

Another instance involved a misunderstanding of the function of performance indicators on the A-10: The peak performance tone and the stall warning tone. As a result, a pilot stalled the aircraft while maneuvering near the ground and wisely ejected. Interestingly, nine of 17 A-10 pilots interviewed from the mishap wing had the same misconception, and most of those nine were experienced pilots.

■ *Flight path trajectory at increased angle-of-attack.* AOA, as in a pull off from an ordnance delivery pass, the higher nose position may give the pilot a false impression of climb although the aircraft is still descending. This tendency to mush along the velocity vector hinders visual clearance of the flight path. Dramatic evidence of mushing in a stall was captured on gun-camera film of an A-10 impacting trees on a pull-off from a strafe attack.

■ *G required to maintain coordinated level flight at higher bank angles;* basically a trig function (1/cos of the bank angle). Several A-10 mishaps have highlighted this factor — in which sustained high bank angles plus airspeed bleed-off (from the Gs) and nose drop, committed the aircraft to sacrifice more altitude than was available.

60° - 2 G	80° - 6 G
70° - 3 G	85° - 11 G
75° - 4 G	90° - ∞

continued

continued

Hazards Of LOW LEVEL Flying -- part III

■ *Wing drop with bank angle:* Another trig function — sine of bank angle X wing length. A B-52 incident highlighted this factor. During a test mission over a forest, the pilot was briefed to maintain a certain bank angle at 250 feet AGL. At the incident bank angle of about 43°, the tip of the 92-foot wing was almost 60 feet below the fuselage centerline. Radar altimeter readout at that bank angle could have indicated an extra 26 feet of altitude. Ground elevation of 65 feet on the charts was actually closer to 100 feet, and the pine trees averaged 86 feet (although many reach 110 feet). During their maneuver at an indicated altitude of precisely 250 feet MSL, the crew felt thumps and assumed birdstrikes. Postflight of the wing revealed wood fragments and pine needles — not feathers.

■ *Effect of undetected, insidious descent.* Over absolutely level terrain, e.g., water, at a ground speed of 500 knots (800 FPS), the following descent angles will lose 100 feet altitude in the given number of seconds = (another trig function — 1/sin of descent angle).

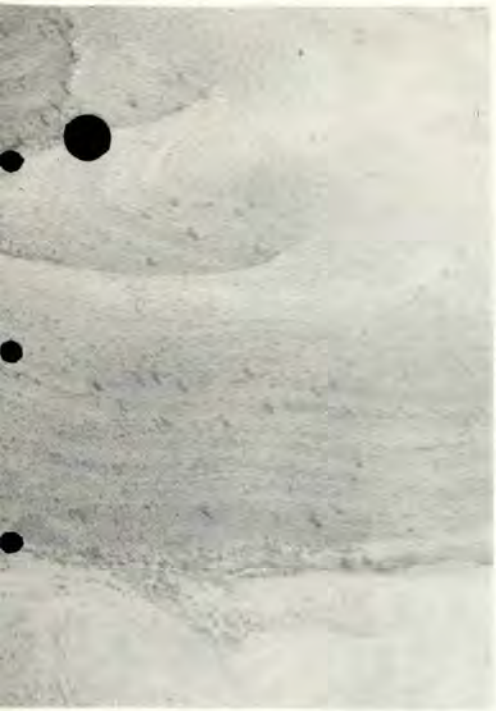
Descent Angle	*Time to Impact from 100 AGL at 500 Kts*
0.5°	14.3 secs
1.0°	7.2 secs
2.0°	3.6 secs
4.0°	1.8 secs

While returning from a demanding night tactical low level, a transport was flying over glassy, smooth water at 500 AGL, at about 275 KIAS. Because of the exercise, all nonessential lights were taped over, including the low altitude warning lights. Due to fatigue and relaxed vigilance from successfully completing the tough part of the mission, no one on the flight deck noted the insidious descent — just over 1°. At 275 knots a 1° descent would lose 500 feet in about 65 seconds. The board figured that's probably what happened. Beautiful night, glassy smooth surface, and 65 seconds of inattention to the altimeters.

ENVIRONMENT Failure to incorporate an awareness of base altitudes, minimum enroute altitudes, density altitude, obstructions, and deceptive terrain features has led to several mishaps. For example, a highly experienced F-4 Lead, accustomed to flying at a sea-level base, committed against an F-15 crossing his nose at 12,000 MSL. After shooting the first F-15, he checked 6 in time to see the lead F-15's wingman closing rapidly. He executed a split-S, which in his aircraft at his entry speed (about 350 KIAS) required 6,800 - 7,500 vertical feet. Since the floor of this range was 5,660 feet MSL, he just didn't have quite enough room.

In planning a low level, a current map is a handy tool for elevations and even for obstructions. You should realize that elevations are not always accurate (as in the B-52 wingtip incident) and, in any event, do not include the height of trees. Obstructions should be noted but may not be depicted, even on a current chart. Ironically, both obstructions hit this year (a TV tower and high tension lines) were clearly depicted on the chart. (The TV tower had been there since 1964, right in the middle of a low-level route).

An example of a deceptive terrain feature is the "bujarto," or alluvial fan of western desert ranges. These fans have subtle slopes which may go undetected. A rise of only 40 feet per 1,000 feet (2.3°) may not even register with the pilot. But at a



groundspeed of 500 KIAS (800 FPS), it means an effective descent of 32 FPS. Even in level flight, 3 seconds worth of inattention to your flight path will put you right down there with the bacteria. This was a factor when an A-7 made an evasive turn into subtly rising terrain and brought home a wingtip full of sand.

Finally, you, the pilot, the only guy or gal who can really prevent a pilot error mishap, you need to know yourself.

■ *Perceptual limitations* Everybody has them and everybody's different. Ask yourself, "What are my visual limitations? How well do I spot obstructions, bogies or birds? How easily is my focus trapped? Can I learn to use my eyes better?" (There are facets beyond simply reading the 20/20 line involved here — not well understood, not even tested for yet. All we know is that some have incredible flying vision, and most don't, but perhaps some can improve upon it.) A former aggressor pilot noted for his remarkable vision explained his technique for spotting bogies in this way. GCI would call bogies at, say 10 o'clock, 25 miles. To avoid empty field myopia, this pilot would pick out a ground object at roughtly 25 miles (already he's better than 20/20), focus on it intently, then look at small sections of 2 o'clock sky. If unsuccessful after 3-5 seconds, he would quickly refocus to his distant ground object and repeat the procedure. He would usually spot his quarry within 3-5 attempts and at ranges consistently exceeding 20 miles.

Clearly, such a gift is priceless to an interceptor pilot. But what does it take to survive flying low level? Acuity, accommodation, contrast sensitivity, or something else? Hopefully, research may eventually shed some light here. But in the meantime, one thing certainly necessary is attention to your flight path. Ask yourself, "Do I divide my attention appropriately?"

It should be realized that man is basically a lousy monitor. He does not pay attention very well, he gets distracted easily or tends to fixate excessively. These tendencies need to be controlled by a combination of awareness, training, an abiding system of priorities, and personal discipline — plain hard work for most of us. As professional pilots, you should take pride in the fact that you have been able to master many of the basic faults besetting us all.

The next question you need to ask yourself is, "How well prepared am I for this mission?"

You also need to be aware of how fragile that mastery, that control mechanism, can become under the onslaught of stresses such as fatigue, hangover or personal problems.

The next question you need to ask yourself is, "How well prepared am I for this mission?" Some days are 100 feet, others 1,000 feet. And some days I shouldn't be flying at all. If you're not going to be honest with your boss or your flight surgeon about this one, at least be honest with yourself. Realize you're not up to par and don't do anything dumb. The other side of the coin is when you're feeling 1,000 percent — you have 10 hearts, a hundred arms, too strong for mortals, bring on giants-type of feeling; ask yourself, "Do I feel so good I'm likely to do something really dumb?"

To round yourself out, you finally need to be aware of your own basic motivations such as the desire for success, recognition and approval. These normal drives are two-edged swords and we'll discuss them and some of the problems they've caused in the next two parts on judgment and discipline.

To paraphrase the Academy's dictum, man's flight through the low level environment is sustained by the power of his knowledge — of his machine, of his environment, and of himself. Learn well and live long. ■

BOOM-BOOM -BASH

(Another BDA* report)

*Boom Damage Assessment

MAJOR ARTHUR P. MEIKEL
Directorate of Aerospace Safety

This article is a follow-up to the May 1981 Flying Safety magazine "Refueling BDA* Report." It is a summary of 1981 air refueling mishaps. At the time of writing, approximately 11 months of 1981 data were available; the 1981 trends were well defined. In order to get the word out early, this analysis contains only 11 months of 1981 statistics. As in last year's article, the facts will be presented along with obvious trends; but most of the conclusions and appropriate corrective actions will be up to the reader. The information presented is drawn from safety reports and contains the opinions of the safety community.

Much of the 1981 news is good. However, there are several areas which need work and one major area of concern.

To start, let's look at 1981 mishaps.

■ The number of mishaps for the first 11 months of 1981 was 34. In 1980, a good year, the total was 32. The flying hours in 1981 increased to 3.26 million over 1980s ~~3.6~~ 3.16 million. There is no good measure of how much the flying time increase equates to increased refueling exposure. However, a general assessment is that once 1981 mishaps are adjusted for flying time differences the totals should be similar to 1980s.

This is where the similarity ends. The trends in 1981 are markedly different to those of the last four years. There is one major area of increased mishaps along with many bright spots. The major increase in mishaps for 1981 was the result of the boom striking various parts of the receiver. In 11 of the 34 mishaps in 1981, the damage was caused by the boom damaging antennas, doors, windows, and aircraft skin. In 1980 there were only two such mishaps reported. Now that we have looked at our worst area; we will list some good areas.

In most cases, the numbers in the improved areas are the best in five years. A pat on the back goes to:

■ **Fighter Pilots** Fighters were involved in half of the reported air refueling mishaps. This is much lower than in previous years. Fighter pilots look even better when you realize that in eight of the 17 fighter mishaps they were victims of "boom attack." (For this report, damage to four F-16s on one mission and three on another is counted as one mishap each.) This leaves only nine mishaps. Three of those mishaps involved Navy receiver pilots, one a foreign

corrected by page 13, March 82 issue

1981 A/R MISHAPS BY AIRCRAFT TYPE BY MONTH

Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
C-141B C-141B F-4 (Navy) RF-4C F-15 B-52H	B-52G	C-141B	F-15 F-4E F-15	E-3A RC-135 RF-4C A-10A B-52D	E-3A F-4N	A-7D WC-135B	RF 4C B-52D HH-53	F-111D KC-10	A-7E F-5 B-52D B-52H F-4 F-16 F-16	F-4 C-5	

nation's pilot, and one mishap involved a KC-10 nozzle design failure. Keep up the good work.

■ **C-141B Pilots** The new C-141B program put lots of new receiver pilots in the air. After two mishaps in January and one in March, the C-141B community got its act together and from March through November had no reportable mishaps.

■ **B-52 Pilots** In 1980 six out of seven B-52 air refueling mishaps involved night operations in which ice shields were damaged due to excessive closure. In most cases, a breakaway was not called and damage wasn't discovered until postflight. In 1981, that mishap occurred only twice — once in February and once in October with a CCTS boom operator. Congratulations to the B-52 community and to boom operators for keeping them away from the ice shield. Six B-52s have been damaged in mishaps in 1981. Two mishaps involved "boom bash" in which B-52 windows were replaced.

■ **AFLC and Signal Coil Maintenance** There have only been three signal coil induced mishaps. This is a sharp reduction from past years and the 11 mishaps in 1980. The number of brute force mishaps resulting in damage has been cut in half (six). Could it be that both boom operators and receiver pilots are handling signal coil problems better?

■ **E-3A Pilots** Even though the E-3A was involved in two mishaps, it really wasn't their fault. They were tapped by a boom once and in the other mishap suffered onboard equipment damage while evading a stray KC-135 autopilot input.

■ **Boom Operators** Yes, even though the number of boom strikes are up, the number of mishaps involving nozzle binding are down significantly. Boom operators have been getting disconnects prior to nozzle binding.

■ **Instructors** Only nine mishaps involved student boom operators or receivers. These include experienced people in a new situation or a new type receiver. The 12 student related mishaps in 1980 are representative of previous years.

Now comes the not-so-good news:

■ **Boom Strikes** As we have already mentioned, 16 receivers have been damaged in 11 mishaps by the boom hitting receiver aircraft (i.e., skin, windows, receptacle doors, antenna, and canopies). Some boom operator target study is in order.

■ **The Navy** Three mishaps involved the Navy, and there will be more Naval exposure in the future. Their refueling is primarily probe and drogue. All three instances involved poor disconnect procedures. Navy receivers should be in the center of the envelope at disconnect.

■ **KC-10** Entry of a new tanker to the inventory has surfaced two major problem areas. First, it is difficult for boom operators to judge where the longer boom is in relation to the receiver (high strike potential), and, second, there is a design problem with the nozzle. If the nozzle looks loose, it may well be. In several instances in 1981 it came off through no fault of the receiver. The nozzle will not be held by internal wiring and plumbing once the attachment is broken. While an engineering fix is being sought, get away from a KC-10 nozzle if it doesn't appear to be properly attached.

■ **Tanker Autopilot** In at least four reported cases, unscheduled autopilot inputs have caused what amounts to unusual attitude practice while air refueling. If the tanker pitches up, you have to be sure the tail doesn't swat you like a huge flyswatter. If the tanker pitches down, you have to avoid running into the middle of the KC-135. In either case, tanker pilots, boom operators, and receiver pilots must be alert and ready to override the autopilot, effect a disconnect, and breakaway as the case may be.

In summary, the total number of refueling mishaps is about the same as 1980, but the causes are different than in the past. The total number of mishaps would reflect the improvement in many areas if it weren't for the dramatic increase in "boom strikes" and new problem areas. These new areas are increases in exposure of the KC-10, the C-141B, the Navy, and also KC-135 autopilot problems.

For many people, keep up the good work. For others, the areas for improvement are clear. Until the next summary, "May all your contacts be safe and wet." ■

CMSGT JERRY J. AMMONS
93 BMW
Castle AFB, CA

■ When a mishap occurs during air refueling, how often do we think, "How dumb?" Is it really dumb, or is it just that all involved failed to pay full attention to what they were doing?

Air refueling, as we all know, can be very dangerous. Because we do it every day, it becomes a normal operation and very commonplace. This can cause us to fall into a trap. Air refueling requires full coordination, full attention, and above all, full crew involvement. Always be alert and know the exact position of the other aircraft. If, at any time, you become unsure of what the other guy is doing during air refueling or he becomes erratic in the envelope, get some separation, call a breakaway — if you feel it is necessary.

Stop the surprises during air refueling. Coordinate with the receiver/tanker concerning track, times, altitudes, A/R freqs, offload and training requirements. How many times have you been upset when you arrive at the refueling area and find out you don't have the time to do what you would like to do? What happens when you are expecting 10,000 pounds more fuel than the tanker will give you? How many times have you, as a tanker pilot, wanted some autopilot off training and the receiver informs you he is on a 60-4 check and doesn't want to do this? Just think how upset these things make you. Could that be an invitation to a mishap?

Remember also when you are flying in cell, keep the leader informed. He cannot be an effective leader if he doesn't know the requirements and have a plan for the cell. Why not take a few minutes on mission planning day and visit or call your counterpart to coordinate the requirements for the air refueling. Doing this will prevent being surprised at the ARCP the next day.

How many crewmembers are really current on the procedures for air refueling? The refueling is a means to an end for the receiver but very essential to the mission accomplishment. (You can't "hit" the target if you "hit" the tanker first). The tanker crews are the A/R experts, but the receiver crews must also know the rules. If you are a qualified boom operator, are you prepared to call a breakaway before the receiver gets into the structural parts of the tanker? Receiver pilot, how many times have you called a breakaway? Why do you depend on the boom operator to decide if a breakaway is necessary? As a receiver pilot, do you know the boom limits for your type aircraft? What do the pilot director lights tell you? How many fighter pilots know that their upper limit is 25 degrees elevation, and at this point they will not get a red pilot director light to direct them down?

Let's not forget the navigators. How many of you are ready to jump

Air Refueling-- No Surprises PLEASE

in there and save a rendezvous if things don't go right? Are you aware of what equipment the receiver aircraft has to effect the rendezvous? What about radios, do you know how many the receiver has? Are you sure of how much time there is from the IP to the CP? The point to be made is: How much do you know about tech order procedures? As qualified crewmembers it is our responsibility to know all the procedures *and* follow them.

Look at the experience level of our crewmembers. In the past few years we seem to be getting very young crewmembers in all positions. We have new boom operators who have very few hours in the airplane, and there are receiver pilots who are equally as new in their airplane. It is not expected that these people will know everything, but we do expect them to follow the tech data for their airplane. How much practice do the crewmembers now get?

We find that the hours spent in actually flying and refueling are constantly going down. Because of this, we should make every minute count. If the receiver pilot does not have a range time or low level time to meet, stick around awhile and give the boom operator a few extra contacts. This will increase his proficiency and also yours. It is a fact that the majority of the air refueling mishaps occur when the airplanes are being flown by qualified crewmembers. So you can see, even the more qualified crewmembers need practice. Talk to each other. Tell the boom operator if he is too close to the canopy. Tell the receiver if he is consistently high in the envelope.

The maneuvers that are demonstrated at the Central Flight Instructor Course (CFIC) of the Strategic Air Command are all designed to make the new instructors aware of how to accomplish air refueling in the safest, smoothest, most professional manner possible. They show how smooth a refueling can be if properly coordinated and properly flown. Some of the maneuvers that are demonstrated at CFIC are the turns and altitude changes, (we call this the WIFF), boom effects on the tanker and receiver, the effects of small power changes by both the receiver and tanker, and a demonstration which is called the 300 foot closure.

The WIFF shows how a receiver can safely stay in the refueling envelope if the tanker maintains a smooth platform, even though the tanker is turning and changing altitude. The effects of the boom on the tanker/receiver are clearly demonstrated by the boom operator actually turning the tanker with the boom. After the receiver is in the envelope, the boom operator demonstrates how he can actually cause the receiver to drop back by raising the boom and how he can have the tanker "back" into the receiver by lowering the boom. The power changes that are demonstrated show how much effect a small power change can have on the ability of the receiver to stay within the envelope.

One of the most dramatic demonstrations is the 300 foot closure. In this one, the receiver is in trail with the tanker approximately 300 feet ahead. The tanker pilot then reduces the airspeed by three to five knots. It takes the receiver about one minute and 15 seconds to move from 300 to 200 feet. It then takes about 40 seconds for him to close from 200 to 100 feet. From 100 feet to where the receiver would contact the tanker is only 15 seconds. Unless a breakaway is called and action is taken by the receiver to avoid a collision, there would be no way to avoid a midair. In this one demonstration, it is shown that a large receiver aircraft has so much forward momentum that he cannot stop with power reduction alone.

It is possible that a mishap involving a B-52 and a KC-135 was caused by this very type closure. All of the maneuvers demonstrated at CFIC are for the sole purpose of showing what can happen during the air refueling operation. Under no circumstances should they be performed away from a controlled environment.

Mishaps don't just happen. They are frequently caused by lack of attention or lack of communication. Seldom are mishaps caused by inability. Knowledge is the key. Know your aircraft limits, know the tech data, and know *your* limitations. Work toward being a professional and strive always for an accident-free refueling. Remember that you are the key to prevention of accidents, and only you can prevent them. Fly the aircraft! ■

BLOWN TIRE SEASON

Lt Col Horst A. Gaede, GAF Directorate of Aerospace Safety

■ If the study of mishap reports is part of your daily routine, you seldom need a calendar to know what time of the year it is. Birdstrikes, for instance, follow a seasonal pattern, and blown tire reports come in at higher rates and frequencies during the winter months. Intuition would tell us we should expect this with wet/icy/patchy runways. We all know that it's that time of the year again where RCR values go down, and time entries under the "Instrument" column of a pilot's flight record sheet go up.

Yet, some airplanes contribute more than others to the statistics — the 'ole F-4 being one of them.

To give some numbers: Since 1970 we have lost four F-4s in landing mishaps; we have Class B'ed another four, and recorded hundreds of Class Cs. As a matter of fact, over the recent past, we experienced 30 to 40 blown tire mishaps per year, adding up to an annual mishap rate of about 10 per 100,000 flight hours. At this point you may be inclined to respond — "So what? That's not excessive!" But wait. We have to understand that every one of these mishaps bears the potential for catastrophe, severe damage to valuable resources, and possible injury or even loss of life. Shouldn't this be more than enough reason for concern?

In previous articles about tires, brakes n' such, we addressed landing techniques, the do's and don't's, and tire abuses. We also talked about characteristics of the Mark III antiskid system and its limitations. Looking at some of our latest blown tire mishaps, I think there is another lesson to be learned (or learned again). Many of those who joined the club of "tire blowers" stepped on their brakes too soon when there was hardly any need for them to do so. And then, there are still a good number of operators who have the habit of checking brakes at high speed. While challenging anyone to prove me wrong, I'll take a crack at the following statement: If we could talk every F-4 pilot out of a brake check at high speeds, we would see fewer blown tires.

To pass on some of my philosophy (I welcome yours): To tap the brakes for a check at high speed does not make much sense. For one, with a smooth antiskid system, it's hard to tell if everything works properly at these speeds, especially when we talk speeds in the neighborhood of 150 knots. Secondly, you are in a speed regime where braking effectiveness is low anyway, and it takes some sensitivity to feel any deceleration at all. But what's more important, if your antiskid system is not cooperating, let's say you hydroplane and the wheels don't spin up to those magic 48 knots to get the antiskid on line, or there is a malfunction which puts you back to manual brakes, this could mean trouble all the way. A blown tire can cause a lot of directional control problems at this point. The narrative of the mishap report

Blown tires can be serious. The best prevention is to avoid high speed brake checks.

ould read something like: "An on-speed landing was performed. Touchdown speed was 170 KIAS. After approximately 1,000 feet of roll, the pilot tapped the brakes and the left tire blew shortly thereafter. . . ." This pilot was able to keep it on the "straight and narrow," a few others didn't.

The bottom line: Get out of the habit of tapping your brakes or stepping down on them too soon. Give the drag bag a chance to work for you at high speeds. That's when it works best anyway! When the aircraft slows down, the ability to feel the brakes and get better deceleration *both* improve. There is certainly less chance to skid or blow a tire once you're down to 100 knots, antiskid working or not. By the way, if we had a way to aerobrake this air machine down to reasonable speeds as some of our other fighters do, we would not ave developed such bad braking abits. ■

MAIL CALL

■ Recently, while reading your magazine, I came across your survey and felt my response would be better expressed in this letter. Let me start by saying your magazine does flying safety a great service. Since I read *Flying Safety* on a regular basis, I find that many of the experiences are applicable to the majority of pilots. Although aircraft category and size may be different, the experiences and errors are often quite common.

Being an Air Traffic Controller in the Air Force and also a private pilot, it is easy for me to relate to and ponder over many of the mishaps reported. I am not sure where the fault lies, but I feel that the controllers need to be better represented in your magazine. Many times aircraft incidents could be easily avoided if only the pilot had a better understanding of the system that is there to serve him. Since the A.T.C. system is a service, it is necessary for the pilots to understand and cooperate while working within that system.

It is partially the controllers' fault for not speaking up and telling all those war stories that they have "lived" through, too. It would be a great service to your readers if you could possibly pick a base a month and describe in detail its particular A.T.C. structure and idiosyncrasies. Most Air Force bases have either a flying safety program or a collision avoidance program already established at the A.T.C. facility and from these programs your staff could compile a good report. In addition to this information, you could talk with the controllers and find out from them, first hand, why delays are bought and what pilots can do to assist in fast, safe, and quality service.

In your reports, go beyond the runway and Navaids available and tell the pilots about any additional airports the controller is working or those airways in his airspace that he is also responsible for or the verbal or manual coordination and with whom it is done just to hand off an aircraft. Go beyond the airport proper and explain that Air Force controllers' radar stretches out to not only service his Air Force companions, but also a great number of civilian pilots.

We, too, feel that safety is very important, and with good cooperation on all our part, safety should be no factor. Your thoughts on this matter are deeply appreciated, and any further assistance on my part is yours for the asking.

SSgt Dirk L. Fox
APO New York 09406

Thank you for your suggestion. Flying Safety *would be glad to help tell the controllers' side of the safety story of someone will give it to us. 16XXs and 272XXs, if you have a story to tell that could contribute to safety of flight let us know so others can benefit from your experience. As Sergeant Fox says, flying safety is a cooperative effort.*

■ After reading the article "Planning and Flying the VFR Arrival" in your December issue I have one small correction. The designations for cloud cover have changed. The weather forecast you refer to should have read:

18 SCT 30 SCT 80 BKN

But, other than that, I really enjoyed the article and will make it required reading for all my forecasters.

Capt Robert L. Eggum
Ft Carson CO

X-COUNTRY NOTES

MAJOR WILLIAM R. REVELS
Directorate of Aerospace Safety

Rex Riley Program?

NEVER HEARD OF IT.

■ The above comment was the response I received as I introduced myself during a recent Rex Riley Transient Services Award evaluation. Was I surprised? You bet I was, because this particular organization had been on the Rex Riley list for quite some time. Hopefully, the incident is isolated, and most transient services organizations are familiar with Rex — certainly those who hold the Transient Services Award. Just in case there are a few people who need to know and don't, or want to know and haven't heard, a review of the Rex Riley program is in order.

BACKGROUND The Rex Riley transient Services Award program was established in the early 1950s to recognize Air Force installations providing outstanding service and facilities for transient aircrews. Although enjoying several different names over the years, the program has survived and still serves as a mark of distinction for Air Force airfields throughout the world. The goal of the program is mishap prevention through the recognition and improvement of USAF transient services.

We feel that one of the mainstays of any installation aircraft mishap prevention program should be the facilities that are used by transient aircrews. Not only are we interested in the obvious flight line hazards and operations, but we also attempt to evaluate (and improve) facilities which could be classed as irritants. These include flight planning, messing, transport, billeting, and other areas which could directly, or indirectly, affect aircrew frame-of-mind or fatigue levels. In short, we are targeted to seek out and bring attention to any condition which could increase the probability of a mishap.

ELIGIBILITY As a minimum, bases must meet the following criteria in order to be eligible for evaluation under the Rex Riley Transient Services Award program.

- Active USAF, AFRES or (AF) ANG installation, listed in the IFR supplement as possessing facilities to serve transient aircraft and crews.
- Available hours to transients a minimum of 8 hours per day and five days per week.
- Have no continuing OBO or other major limitations to transient aircrew arrival or service. (NOTE: PPR status is not an automatic ineligibility factor. Many installations are using PPR as a valid management/sequencing tool. A permanent PPR restriction will

continued

CROSS COUNTRY NOTES

continued

be evaluated by the Rex Riley program director for determination of eligibility.)

The award program is administered by the Safety Education Division of the Air Force Inspection and Safety Center. Although not a formal IG-type inspection, the evaluations are carried out on a no-notice basis using extensive checklists. Evaluators basically look at such areas as Base Ops facilities, billeting, availability of meals and transport, and transient servicing and maintenance. The goal is to visit/revisit every Air Force base serving transient aircrews within recurring two year periods.

ENTITLEMENTS Units selected for the Rex Riley Transient Services Award will be added to the award lists published in *Flying Safety* and *Maintenance* magazines. They will remain on the list and move upward as seniority is increased.

In addition, a certificate suitable for Base Ops display will be forwarded to the commander of the unit responsible for airfield management, (mini-certificates for other base agencies are available from "Rex" upon request.)

Transient alert personnel are authorized to wear Rex Riley patches at the unit commander's discretion. Standardized design is provided but units are responsible for the local procurement and expense of patches should they be desired. REMOVAL — Bases having the award removed will receive a letter of explanation, and the base's name will be deleted from the next list published. Removal will result from:

- An unsatisfactory evaluation.
- The advent of continuing or permanent restrictions published by a base which severely limit the availability of services to transients. (As determined by the Rex Riley program director.)
- Transient Alert personnel are involved in a mishap or allow a safety of flight item to go uncorrected.
- A base is closed.
- Should a Rex Riley base undergo a drastic change to operations, i.e., MAJCOM change, or military transient alert to contract maintenance, a reevaluation must be accomplished to retain Rex Riley status.

Letter To Rex

The folks at Sheppard AFB recently contacted us to advise of a change in their VOQ status. There has been a substantial increase in training programs at Sheppard which requires a sizeable portion of VOQ space be converted to BOQs for student use. This, of course, means on-base transient quarters must be reduced until new quarters can be constructed — a project which will be underway soon.

As an interim measure, contract quarters have been arranged for transients. The contract quarters will be very close to base and are located within easy walking distance to restaurants. The Sheppard folks do not expect great inconvenience for aircrews and will strive to keep problems to a minimum.

The off-base transient quarters will probably be in use for at least one year, so plan your stopovers accordingly. Thanks to Sheppard for keeping us informed.

Addition To Rex Riley List

Peterson AFB joins the Rex Riley Award list with a fine history of quality service. Peterson has excellent facilities, with service oriented personnel. The Peterson people go the extra mile to give you the best — try them out on your next trip.

Reevaluations

KIRTLAND AFB — Recent civilian manning shortages have created operational restrictions at Kirtland. The shortages, created by the controllers' strike, limit Kirtland to three military arrivals or departures per hour. At this time negotiations are underway to

reduce the problem; however, PPR has been initiated until relief can be found. Kirtland is still an excellent stopping place and a liberal PPR policy is being followed. Transients should call for PPR approval early. During peak periods, some arrival and departure juggling may be necessary to meet the current restriction. The base Ops people are working hard to keep the service up during the period of shortages.

Kirtland has recently increased the Snack Bar hours and is "riding herd" on the vending machine operators. The Snack Bar is now available during weekends.

SCOTT AFB — Still a fine turn around base with very fast transient alert personnel. Scott TA is under a civilian contract and they do a fine job.

A construction project is underway on Scott's east ramp and should greatly increase parking availability. A temporary PPR is in effect during construction, so call early — especially if you're going to arrive on a weekend.

OFFUTT AFB — Offutt maintains its strong efforts in handling transient aircraft. A new vending machine center has been added adjacent to Base Operations and provides a wide variety of goodies 24 hours a day.

WRIGHT-PATTERSON AFB — Always a good stopping place with excellent facilities and service. The Base Operations facility will soon have a new data terminal for rapid flight plan delivery and center coordination.

BUCKLEY ANGB — Continues to have a fine Base Operations facility with fast and efficient transient services. Plan your arrival and departures carefully due to high density traffic in the Denver area. Be sure to call ahead for best service.

TINKER AFB — Still a good stopping place located conveniently for coast-to-coast travel. Currently, there is considerable remodeling underway in the Snack Bar and Passenger Terminal as well as the main ramp. By the time you read this, most of the work should be completed and Tinker will be better than ever.

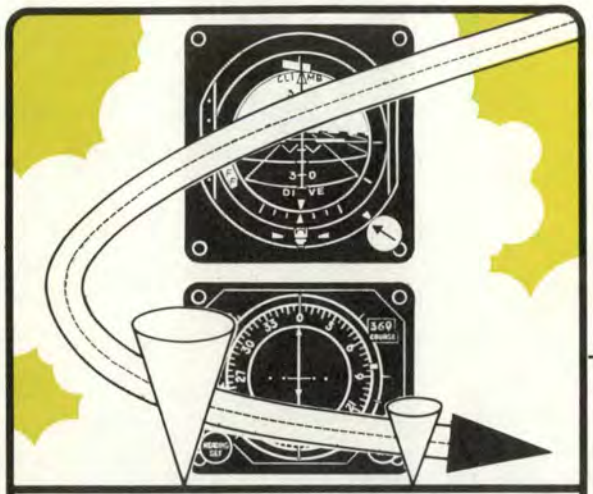
Rex Riley List Removal

BASE X — This base provides an example of what happens when the total unit is not involved with transient services. In this case, Base Operations provided the cause for Rex Riley list elimination. NOTAMs were out-of-date, planning charts were out-of-date, the FLIP had pages missing, and housekeeping in the facility left a lot to be desired. Despite the fact that transient alert provides excellent service, and other base agencies were highly satisfactory, this unit was removed from our list due to poor service in Base Ops. The Rex Riley award insures service in all areas, and current award holders should be certain everyone is on board.

For questions or comments on the Rex Riley program, contact AFISC/SEDAK, Norton AFB CA 92409, AUTOVON 876-2113. ■

THE REX RILEY *Transient Services Award*

LORING AFB	Limestone, ME
McCLELLAN AFB	Sacramento, CA
MAXWELL AFB	Montgomery, AL
SCOTT AFB	Belleville, IL
McCHORD AFB	Tacoma, WA
MYRTLE BEACH AFB	Myrtle Beach, SC
MATHER AFB	Sacramento, CA
LAJES FIELD	Azores
SHEPPARD AFB	Wichita Falls, TX
MARCH AFB	Riverside, CA
GRISSOM AFB	Peru, IN
CANNON AFB	Clovis, NM
RANDOLPH AFB	San Antonio, TX
ROBINS AFB	Warner Robins, GA
HILL AFB	Ogden, UT
YOKOTA AB	Japan
SEYMOUR JOHNSON AFB	Goldsboro, NC
KADENA AB	Okinawa
ELMENDORF AFB	Anchorage, AK
SHAW AFB	Sumter, SC
LITTLE ROCK AFB	Jacksonville, AR
OFFUTT AFB	Omaha, NE
KIRTLAND AFB	Albuquerque, NM
BUCKLEY ANG BASE	Aurora, CO
RAF MILDENHALL	UK
WRIGHT-PATTERSON AFB	Fairborn, OH
POPE AFB	Fayetteville, NC
TINKER AFB	Oklahoma City, OK
DOVER AFB	Dover, DE
GRIFFISS AFB	Rome, NY
KI SAWYER AFB	Gwinn, MI
REESE AFB	Lubbock, TX
VANCE AFB	Enid, OK
LAUGHLIN AFB	Del Rio, TX
FAIRCHILD AFB	Spokane, WA
MINOT AFB	Minot, ND
VANDENBERG AFB	Lompoc, CA
ANDREWS AFB	Camp Springs, MD
PLATTSBURGH AFB	Plattsburgh, NY
MACDILL AFB	Tampa, FL
COLUMBUS AFB	Columbus, MS
PATRICK AFB	Cocoa Beach, FL
ALTUS AFB	Altus, OK
WURTSMITH AFB	Oscoda, MI
WILLIAMS AFB	Chandler, AZ
WESTOVER AFB	Chicopee Falls, MA
McGUIRE AFB	Wrightstown, NJ
EGLIN AFB	Valpariso, FL
RAF BENTWATERS	UK
RAF UPPER HEYFORD	UK
ANDERSEN AFB	Guam
HOLLOMAN AFB	Alamogordo, NM
DYESS AFB	Abilene, TX
AVIANO AB	Italy
BITBURG AB	Germany
KEESLER AFB	Biloxi, MS
HOWARD AFB	Panama
GEORGE AFB	California
PETERSON AFB	Colorado



ON COURSE

■ When do I descend? What rate should I use? Since the onset of adverse weather more and more pilots have been asking these questions. Here are some actual questions we've received along with a technique for complying with ATC descent instructions. NOTE: While this technique works for us, it is not the end-all "magic" answer. If you use something different, and it works . . . give us a call and we'll pass it on.

Q. When I receive instructions from Air Traffic Control (ATC), must I comply immediately?

A. When ATC issues an instruction, pilots are expected to comply with its provisions upon receipt. ATC, in certain situations, will include the word "IMMEDIATELY" to impress the urgency of an imminent situation. In such cases, pilots should ensure safe expeditious compliance with the instruction. (Ref. Airman's Information Manual, Sec 4, ATC Clearances/Separations, para 270b.)

Q. What rate of descent should I use when cleared to descend from an enroute altitude?

A. ATC expects (1) if an altitude change of 1,000 feet or less is required, descend at a rate no less than 500 feet per minute; or (2) if an altitude change of more than 1,000 feet is required, the descent should be made as rapidly as practicable to 1,000 feet above the assigned altitude and then attempt to descend at a rate of no less than 500 feet per minute until the assigned altitude is reached. One technique that may be used is to compute the altitude to be lost, in thousands of feet, and double it. That number will be the distance between the start descent point and level off point. For example, if you are cruising at FL350 and are cleared to cross the 25 DME fix at 10,000 feet, start descent at 75 DME (35 - 10 = 25 X 2 - 50 NM, 25 + 50 = 75 DME). When using this technique, initially establish a 5 degree pitch change to start descent and adjust your pitch during the descent to make 10,000 feet at 25 DME.

Q. If I am cleared to descend "at pilot's discretion," what does ATC expect me to do?

A. The term "at pilot's discretion" means ATC has offered the pilot the option to start descent when he wishes. He is authorized to conduct the descent at any rate he wishes and to temporarily level off at any intermediate altitude. However, once he has vacated an altitude, he may not return to that altitude. (Ref: FAA Handbook 7110.65, para

233b/AIM Sec 4, 270c.)

Q. When instructed to cross a particular fix at or above/below a specific altitude, what technique should be used?

A. The manner in which the descent is executed to comply with the crossing altitude restriction is, as stated in the preceding answer, "at pilot's discretion." Descend at any rate you wish but make the crossing altitude restriction. If you have a choice, avoid cruising long distances at low altitude and conserve that costly fuel.

The following examples and explanations are offered to further clarify any misunderstanding that may exist. (Ref: FAA Handbook 7110.65, para 233.)

CLEARANCE #1. RUDY 22, DESCEND AND MAINTAIN SIX THOUSAND." The pilot is expected to commence descent upon receipt of the clearance, and to descend at the expected rates, specified above, until reaching the assigned altitude of 6,000 feet.

CLEARANCE #2. ROTUN 01, DESCEND AT PILOT'S DISCRETION, MAINTAIN SIX THOUSAND." The pilot is authorized to conduct the descent within the context of the prior explanation of "at pilot's discretion."

CLEARANCE #3. RENO 01, CROSS XRAY VOR AT OR ABOVE FLIGHT LEVEL TWO FOUR ZERO, DESCEND AND MAINTAIN SIX THOUSAND." The pilot is authorized to conduct descent "at pilot's discretion," until reaching Xray VOR. He must comply with the clearance provision to cross the Xray VOR at or above FL240, and after passing Xray VOR he is expected to descend at the rates specified above until reaching the assigned altitude of 6,000 feet.

CLEARANCE #4. RUDY 22, CROSS XRAY VOR AT SIX THOUSAND, MAINTAIN SIX THOUSAND." The pilot is authorized to conduct descent "at pilot's discretion," but he must comply with the clearance provision to cross the Xray VOR at 6,000 feet.

CLEARANCE #5. ROTUN 01, DESCEND NOW TO FLIGHT LEVEL TWO FOUR ZERO, CROSS XRAY VOR AT OR BELOW TEN THOUSAND, DESCEND AND MAINTAIN SIX THOUSAND." The pilot is expected to expeditiously comply with the instruction to descend immediately to FL240. After reaching FL240, he is authorized to descend "at pilot's discretion" until reaching Xray VOR. He must comply with the clearance provision to cross Xray VOR at or below 10,000 feet. After Xray VOR the pilot is expected to descend at the rates specified above, until reaching 6,000 feet.

NOTE: A pilot, while operating on an unpublished route or while being radar vectored, may receive an approach clearance with the stipulation to cross a fix, facility, or point at or above a specified altitude. (Example: "Cross XRAY VOR at or above five thousand, cleared for VOR approach.") This clearance allows descent "at pilot's discretion" to the crossing altitude specified. In this case, the controller has assured you IFR obstacle clearance from the point at which the approach clearance is received, until you are established on a segment of the instrument approach procedure. If you are uncertain of the meaning of clearance, you should *immediately request clarification* from ATC.

We hope these articles provide timely information to you, the reader. If there are any subjects you would like to see in the future concerning instrument flying — let us know at AUTOVON 487-5834. Keep it "On Course." ■

OPS topics

Check The EPA Mileage Rating

■ An F-111 had returned from a mission and while maintenance worked on a radar problem with the right engine running, the engine flamed out from fuel starvation. The aircrew had flown a 3 plus 11 sortie which included low level nav range work and approaches. They had no problems with fuel indications and landed with 2,200 pounds showing on the totalizer. The crew had checked the individual fuel pointers in the before descent check. The crew also saw the fuel low light on after landing.

Then 20-25 minutes later while running only the right engine, it flamed out with 1,300 pounds showing on the totalizer.

All the gauges were within tolerance and did indicate that flameout was imminent if you understand the system.

The normal sequence of fuel use in the F-111 is wing tanks first, then aft, then forward. The procedure for checking whether a tank is dry is to monitor the caution light for the tank fuel pump. However, if the pilot switches tanks at the initial flicker of the light a small but in this case significant amount of fuel can be trapped. Thus, the totalizer will indicate more fuel than is actually available. This problem can be overcome easily enough by comparing the forward fuel pointer with the totalizer.

In this case the forward pointer indicated 1,000 pounds lower than the totalizer. So, when the crew landed they actually had 1,200 pounds not 2,200 pounds of fuel. This could have been a very significant difference in other circumstances.

White Knuckle Time

A dual T-38 had just rolled off the perch when the RSU controller transmitted a call that there were two aircraft in the final turn. There was no response from either aircraft, so the RSU controller made a second call. One of the aircraft with the IP flying in the front seat rogered the call.

Because he did not see the other aircraft, the IP rolled out of the turn, looking for traffic. He then spotted the other aircraft ahead and slightly high outside his turn so he maneuvered his aircraft to stay behind the preceding T-38. When the IP again rolled into a final turn, the aircraft entered wingrock, and the nose dropped suddenly. The IP immediately initiated a stall recovery.

The aircraft recovered from the stall and had started to climb when it passed over a set of high tension wires. The IP felt some buffet or impact as he passed over the power lines and, after landing, found part of a cable imbedded in the left main gear door.

Ejection Decision

Have you ever thought about ejection? The Air Force Inspection and Safety Center has recently completed a movie entitled "Ejection Decision, A Second Too Late." The movie emphasizes a timely escape decision for aircrews flying ejection seat equipped aircraft.

Although based on the AFISC Life Sciences Division briefing on ejection, the movie has plenty of action and very few statistics. Among other things, it features a real life ejection and several recent ejectees recounting their experiences.

By the time you read this, the film will be available from your Base Film Library under accession number 52563DF. Suggest it to your Flying Safety Officer to liven up the next Flying Safety Meeting.

Cleared For Takeoff

A CT-39 received clearance for takeoff and started to roll. Just about rotation speed the pilot saw a light aircraft on the runway taxiing toward the CT-39. The pilot continued the takeoff and cleared the Cessna 152 by about 60 feet.

The sequence of events which set up this near-miss could happen anywhere. The CT-39 had been holding for two F-106s, then was cleared for expedited takeoff ahead of a T-33 on short final. At the same time, the Cessna had taxied up to a midfield taxiway for the same runway. The Cessna pilot was calling for takeoff clearance when the Tower interrupted with the clearance for the CT-39.

The Cessna pilot heard only the words "cleared for takeoff" not the call-sign, and acknowledged with only the Cessna call numbers "025." Tower did not hear this response nor could the CT-39 and the Cessna hear each other since one was operating on UHF and the other on VHF Tower frequency. The Cessna pilot taxied onto the runway and proceeded toward the approach end for takeoff. The Tower controllers were concentrating on the clearance between the CT-39 and the T-Bird on short final and did not see the Cessna until the CT-39 pilot called about the near-miss.

Chute — No Drag

Both crewmembers confirmed the presence of a drag chute in their F-4D during preflight. They also remembered having some slight difficulty removing the drag chute streamer cable. But since everything else seemed normal, they pressed on.

On landing, the drag chute did not deploy, and when the crew checked they found that the chute was missing. The investigators decided that normal wear of the drag chute door mechanism and minor slippage of the door locking mechanism allowed the door closing tension to be less than required. The drag chute streamer cable being slightly off center gave the crew chief a proper tension indication. When the aircrew removed the streamer cable extra tension was gone allowing the door to vibrate open in flight and the chute to jettison. The clue to the reduced tension was the binding of the streamer cable.

continued

OPS topics continued

Instrument Approach Obstacles

Many U.S. pilots train and fly in relatively flat coastal or plains areas and, as a consequence, assume that altitudes depicted on instrument approach charts are all referenced to a relatively flat terrain in terms of elevation, which is normally synonomous with airport elevation. The assumption is not correct. It fails to take in to account man-made obstacles or the criteria that go into designing an instrument approach.

As an example, on an instrument approach chart, the decision height (DH) or minimum descent altitude (MDA) are given in altitude above mean sea level. Depicted next to the DH or MDA is another altitude known as the height above touchdown (HAT) or the height above airport (HAA), depending upon whether the approach is being made under precision or non-precision procedures. The HAT or HAA is an actual altitude above the ground and is referenced either to the precision approach touchdown point or to the altitude of the airfield.

Most pilots know that an HAA provides a deceptive guarantee of actual obstacle clearance, since airport elevation and the terrain or obstacle elevation under the missed approach point (MAP) may be different. Safe clearances are assured by approach design criteria, but the clearance may not be the same as the difference between the MDA and the airport elevation.

When an aircraft is inbound to an airfield on final instrument approach, obstacle clearances depend upon the actual location, not airport elevation. Depending upon the type of approach navigation aid and the location of the navaid in relation to the airport, the guarantee of obstacle clearance during the final approach segment varies from between 250 and 300 feet.

This should not affect a pilot if he, or she, is not cutting corners. However, if one requires an occasional prod to keep instrument flight precise, consider this possibility.

An approach chart advertises a MDA of 800 feet with 500 feet given as the HAA. Sounds like a nice, safe 500-foot altitude cushion. It is — in the area of the MAP. The problem is that, in the final approach segment prior to the MAP, the obstacle clearance criteria may put an aircraft at an altitude not anticipated by the unprepared pilot. In the approach zone, clearance of as little as 250 feet may apply because of upsloping terrain or man-made obstacles.

Pilots should fly approaches as shown on the chart and not modify them to suit the occasion. Proficiency is always important, but so is self discipline in following the rules. — Courtesy FSF *Accident Prevention Bulletin*, Aug. 1981.

Try Try Again?

A pilot had difficulty starting the right engine on an F-111 so he advanced the throttle slightly on start, and the engine started normally. Later, as the pilot pulled in to the quick check area and retarded the throttles to idle, the right engine flamed out. Maintenance found that the throttle was misrigged enough that when the throttle indicated idle in the cockpit it was actually still in cut off. This is why the pilot had trouble starting the engine and had to advance the throttle.

Cockpit FOD

The F-5 pilot was at 500 feet AGL and 500 knots when the stick jammed. It took several tries but the pilot was able to overcome the restriction and recover the aircraft. The altitude at recovery was *200 feet AGL*. After landing, investigators found a lens cover from the cockpit flood light lying on the floor near the stick boot.

Lost Ladder

After servicing the water on a KC-135, the crew chief placed a five foot ladder which he had been using on the right wing next to the fuselage planning to take it in through the over-wing hatch. However, the crew chief became involved in other prelaunch duties and forgot about the ladder. The crew did not see the ladder and taxied with it still on the wing.

As the aircraft backtaxied down the runway for departure, the ladder slid off the wing and landed on the runway. Two more aircraft after this KC-135 took off on the same runway, but none of them saw the ladder. (They used the taxiway, not the runway to reach the starting point of their takeoff.) About 45 minutes after the mishap, a landing C-130 saw the ladder and reported it to tower.

Big Wind

A C-5 was parked approximately 170 feet from a hangar at a Far Eastern base. On taxi out, the C-5 began a minimum radius turn to clear the wingtip of another aircraft. The combination of resistance to the sharply turned gear trucks and a slight crown to the ramp required the AC to set an EPR of 1.6 on all four engines. Then, as the aircraft started to move, the AC had to add some more power to make the turn.

At this point, the C-5 engines were about 250 feet from the hangar door and angled about 45 degrees. The jet blast, estimated at 50 knots, buckled the hangar door as the C-5 turned. C-5 qualified witnesses did not believe that the AC used an excessive or unusual amount of power.

Unplanned Deployment

An AT-38 pilot had completed a successful mission. He stepped out of the cockpit onto the crew ladder and reached back into the cockpit to get his parachute. As he lifted the chute from the cockpit the gold key on the arming lanyard knob caught on something in the cockpit. As the pilot continued to lift the chute, the lanyard was pulled deploying the chute. ■

CAPTAIN
Louis W. Buckner

CAPTAIN
Thomas E. Stickford

CAPTAIN
Michael R. Witherspoon

CAPTAIN
Randolph P. Allen

FIRST LIEUTENANT
Timothy B. Vigil

STAFF SERGEANT
Michael Stailey

Second Bombardment Wing, Barksdale Air Force Base, Louisiana

■ On 7 February 1981 a B-52G departed Barksdale AFB and, while climbing through approximately 14,000 feet, experienced total DC power failure. As a result, Captains Buckner and Stickford had only emergency lighting, some panel lighting, emergency instruments, and fuel quantity indications. There was no power to the navigational equipment and the only operable radio was the HF. Because of bad weather at Barksdale, Captain Buckner decided to continue on the flight plan route using dead reckoning navigation. The Barksdale Command Post coordinated communications on HF. Another airborne B-52G was directed into position off the wing of Captain Buckner's aircraft. The situation was compounded by the inability to transfer or burn a major portion of the aircraft's fuel because there was no electrical power available to the pumps. As the fuel in the main tanks was depleted, the aircraft CG moved toward the aft limit for flight. Wright-Patterson AFB was selected for an emergency landing since it was VFR and had a suitable runway. The aircraft interior was progressively cooling to the outside air temperature requiring the crew to unstrap and put on cold weather gear to prevent frostbite. Icing conditions were encountered and the pilots' windows began to ice over due to the inoperative anti-ice system. As the aircraft made a turn, engines one and two flamed out because of fuel pump cavitation and could not be restarted. The other B-52G maneuvered in front, and Captain Buckner rejoined on his wing in an extended fingertip position. An immediate landing was now necessary because the CG was near the aft limit and only one approach could be flown due to the aft CG, engine out condition and other factors related to a go-around. Captain Buckner maintained position on the other B-52 until the runway was in sight at eight miles. A visual, six-engine, no-flap approach and landing was then made at a gross weight of 375,000 pounds (reported later to be the heaviest no-flap landing ever made in a B-52). Captain Buckner's superior airmanship and his crew's outstanding coordination and thorough knowledge of aircraft systems prevented the loss of a valuable aircraft. WELL DONE! ■

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UNITED STATES AIR FORCE

Well Done Award

Presented for outstanding airmanship and professional performance during a hazardous situation and for a significant contribution to the United States Air Force Accident Prevention Program.

CAPTAIN
George E. Boyd

CAPTAIN
Stephen M. Johnson

1401st Military Airlift Squadron
Wright-Patterson Air Force Base, Ohio

■ On 12 May 1981 Captains Boyd and Johnson departed Andrews AFB with four passengers enroute to Otis AFB, MA in a CT-39A. The weather at Otis AFB was less than 600 overcast and two miles visibility with rain and light fog. During cruise, the aircraft lost the VHF radio and IFF transponder system and then, while in the descent at 20,000 feet, cabin pressurization was lost and cabin pressure climbed to 11,000 feet. During the descent, the aircraft entered light icing and moderate rain. Minutes later, on a radar vector to final during an ILS approach, the aircraft lost complete electrical power. All emergency action checklist procedures were immediately accomplished. Nonetheless, the crew were unable to recover the aircraft's electrical power. The only instruments available to them were the airspeed indicator, the altimeter, the magnetic compass, the ball in the turn-and-slip indicator, and the exhaust gas temperature and tachometer gauges. Communication with ground control agencies was not available. Normal CT-39A systems such as fuel crossfeed valves for wing tank balancing, flaps, trim, and hydraulic pressure, were all lost. The crew, realizing the proximity of the coast and absence of obstacles, descended in instrument conditions and were able to break out of the weather over water. They maintained approximately 400 feet over the water in intermittent visual meteorological conditions. Fortunately, while in a holding pattern near the coast line, the aircraft commander observed the runway at Otis AFB. A low pass was made over the field and a green light was received from the tower for landing clearance. A closed visual pattern was flown and the gear lowered using emergency gear extension. The aircraft was successfully recovered with an inoperative antiskid on a wet runway and with complete electrical power failure. Due to their superior flying skills Captains Boyd and Johnson narrowly averted an aircraft accident and possibly saved six lives. WELL DONE! ■