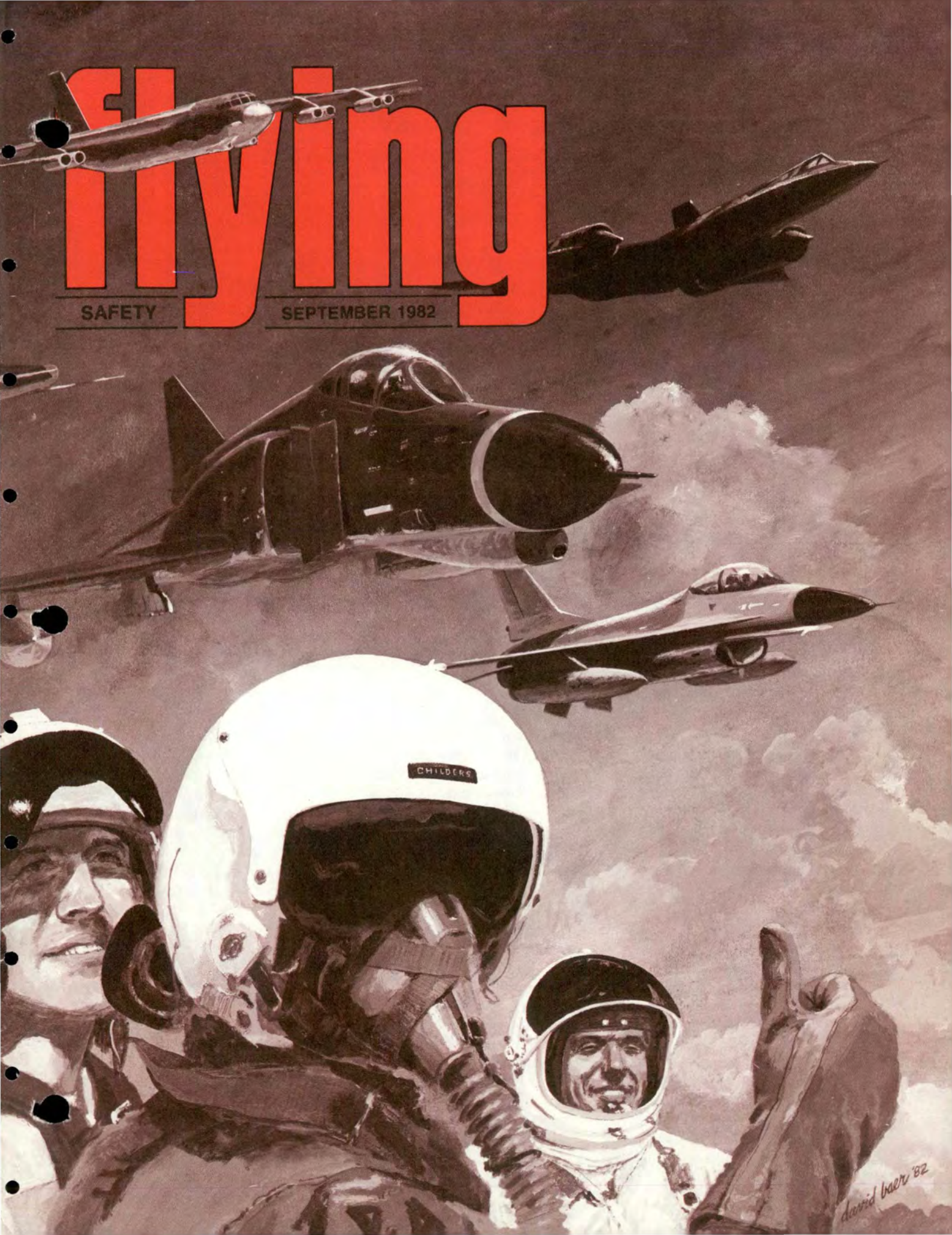
flying
SAFETY
SEPTEMBER 1982
CHILDERS
david baer '82

THERE I WAS

■ . . . flying an F-4 fast FAC mission in SEA one day as a pilot systems operator (PSO) or GIB (guy in back), having just completed pilot training and F-4 RTU. As we approached the border of NVN my attention was drawn to the RHAW gear indications of AAA and AI radar threats. Working under an overcast, the ceiling of which was continuing to get lower all the time, the front seater decided to pull up and climb on top.

The next time I looked inside the cockpit, I was horrified. I couldn't move. All I could do was yell "pull up," which was what the pilot was already doing. The altimeter read 1,800' (not counting any "lag") and we recovered in the valley of Mugia Pass — you know, the one with the 5,200' peak to the east and 3,000' ridge running north south to the west. The terrain elevation in the valley is about 1,300'. As we broke through the clouds, realizing immediately what had happened, I had to pinch myself to see if I was still "around." We were both visibly shaken.

The pilot had gotten "vertigo" as he pulled up and had not transitioned to instruments after all the visual reconnaissance work we had been doing. The lesson to me was clear. From then on I flew as if the GUF (guy up front) was trying to kill me. I also never allowed my attention span to be diverted to one single area too long. I always kept a cross check going. Hopefully, it paid off.

Several times after that I would watch as the pilot transitioned from VMC to IMC and kept the turn going until he was over 90 degrees of bank in IMC conditions. I would "calmly" say "roll left" or "you want me to take it?" After 3,000 plus hours, all in the F-4, A-7, and F-16, the lesson has been a lasting one, especially in single-seat aircraft where situational awareness is critical and demands that your attention span not be channelized in one direction for any length of time.

The lesson is very clear. Thanks for sharing. Perhaps your experience will help prevent a pilot from flying a good aircraft into the ground. ■

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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 1983, 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.

BLACK SEPTEMBER

MAJOR JOHN E. RICHARDSON, Editor

■ Last year was one of the best in terms of flying safety. The Air Force achieved its second best mishap rate ever, and the fighter/attack types ended the year with the lowest rate ever.

This record is definitely something to be proud of, but there are some less than shiny moments that we need to address. For example, the number of ops-related mishaps went up. In particular, collision with the ground mishaps increased by five over the previous year.

After a disastrous January, the monthly mishap experience began to come down, and by August was showing real progress. Then came September! There were nine Class A mishaps in September. That was not much above the experience of the previous months except for one thing. All but one of the nine were operations-related mishaps. Every one of those eight was preventable! Let's review them and see what can be done to prevent a repeat.

■ The mission was scheduled as a solo navigation sortie. The aircraft was observed at a very low altitude over uninhabited terrain. The aircraft was seen to fly down a valley at a low altitude and make a pass over a building complex. Just after this pass, the aircraft struck some power lines at less than 50 feet AGL. The pilot was killed instantly.

■ Up to this point, it had been a successful aerial demonstration mission. In setting up for landing, the pilot flew a tactical pitch-up, but established a downwind too close to the runway. The pilot attempted to fly an extremely tight, steep base turn rather than abandon the approach. The aircraft entered a high AOA, high sink rate condition from which the pilot could not recover.

■ The pilot had leveled off as he entered a valley enroute to a fighter contact point. He was busy coordinating fighters and ground force positions as well as trying to establish his position. At the same time, a helicopter was crossing the valley enroute to an unlisted landing zone. The pilot, preoccupied with other tasks, failed to notice that he had descended below the directed minimum altitude of 500' AGL. The helicopter pilot allowed his aircraft to climb above the 200' AGL mandatory altitude placing the two aircraft on a collision course. Neither pilot saw the other in time to prevent a midair — probably because both had channelized attention to duties other than clearing.

■ The aircraft was on a night training mission. While making an airborne radar approach to a deployment field, the aircraft hit the ground short of the runway and was destroyed. The aircraft was almost 200 feet low throughout the approach which contributed to the short landing.

■ The pilot was maneuvering in the vicinity of the target. He failed to notice that the airspeed was decaying and initiated a sharp turn. The aircraft entered an accelerated stall. The pilot was unable to break the stall and ejected.

■ The flight returned to base expecting VMC for recovery. When instrument conditions were encountered, the flight lead did not abandon the visual approach or set up for instrument approaches. Number Two sighted the runway at about one mile and attempted to line up for landing. In this attempt, the aircraft entered a low-speed, high sink rate condition from which recovery was not possible.

■ The aircraft was on an orientation mission for the passenger in the rear cockpit. During the flight, the nonrated passenger attempted to perform a loop. Because of improper technique, the aircraft entered a nose-high, low airspeed condition. The IP did not perform a correct vertical recovery, and the aircraft departed controlled flight — too low for a safe recovery.

■ During a low level combat SAR training mission the student pilot incorrectly performed an evasive maneuver in response to a simulated attack. While critiquing the student, the IP executed an aggressive evasive maneuver at an altitude and in a direction which did not provide obstacle clearance.

In 1981, we had 17 mishaps involving some sort of discipline

breakdown. This added .5 to our mishap rate. Looking at September, we see that almost one-half of those discipline breakdowns occurred in that month! The breakdowns included everything from deliberate, flagrant violations of the rules to disregard of ROE or good flight sense.

The aircrew was not solely at fault in every case. In at least four of the mishaps supervisors were aware of or even contributed to the violations of the rules.

September is the start of the fall exercise period. Flying activities in many areas become much more intense. This is all the more reason for increased attention to those areas which cause or contribute to accidents: overcommitment, misplaced priorities, over-aggressiveness, and willful disregard for the ROE, personnel or aircraft limits.

After the disastrous showing in September, the trend was turned around to the extent that there were fewer ops-related mishaps in the entire fourth quarter of 1981 than in the one month of September. It can be done.

A record like September cannot and must not be repeated. You aircrews and supervisors can prevent a repeat because you are in the best position to identify and overcome discipline problems. The goal for this 35th anniversary of the Air Force should be no discipline-related accidents. ■

THE PR

■ As the F-100 passed the 1,000 foot remaining marker, sending up a spray of water from the wet runway, it became apparent that the bird was not going to stop. What had started out as a routine air refueling mission had ended up being not so routine, after all.

That morning during the preflight, the pilot joked with the crew chief about how the weatherman had lied to them again. It was starting to sprinkle and the overcast appeared to be getting thicker instead of breaking up as forecasted. He didn't worry very much about the two bald main gear tires, since no red cord was exposed. He climbed into the cockpit and strapped in. Before takeoff he checked again to confirm that he had removed the seat pin, recalling how he had once flown an entire mission with the pin installed. Of course, that was way back when he was in transition school; by now he was much too experienced to make that kind of mistake again. He had a lot of pride in flying the old no-flap C model F-100 which was notorious for being hard to get off the ground, hard to get back on the ground (at 185 knots), and hard to stop after it was on the ground. This takeoff wasn't so difficult, though, and he soon joined up in the number 2 position.

The rendezvous with the tanker went smoothly and soon the flight leader was cleared in for refueling. Number 2 carefully trimmed the rudder, recalling how he had had so much trouble in transition school when he had not known about this useful technique. Proficiency in probe and drogue refueling was another source of pride. It was a contest for him to see which flight member could hook up on the first attempt, without missing the basket. He was enjoying the flight a little more, now that the competition was on.

Lead missed on his first attempt, but hooked up nicely on the second try and received his fuel with no problems. After a smooth disconnect, Lead moved to the reform position and number 2 was cleared in.

He felt very smooth on the controls today and, to his great pleasure, put the probe directly into the center of the basket on the first attempt. After receiving his fuel, he was careful to make a smooth disconnect and then moved to the reform position where he watched number 3 and number 4, who both had some difficulty getting hooked up.

With the refueling portion of the mission completed, the flight broke away from the tanker. Number 2 was happy about taking the honors in the informal competition, but suffered a sinking sensation as he saw the airspeed indicator drop to 120 knots. The flight leader assured him that the formation was indeed at 300 knots and that he would lead him back to the field for a formation landing.

Number 2 was unhappy about the interruption of such a good flight, but was not overly concerned with the minor emergency. He had been making good landings lately and was confident that he could make the landing even on his own, if necessary. His concern was aroused, however, when tower reported the weather as 1,000 feet overcast and 3 miles visibility with rain showers at the field. The formation landing was scrubbed because of the wet runway, so now number 2 had to be taken all the way down to the runway threshold and dropped off.

Two's airspeed indicator now read zero as Lead established final approach airspeed of 185 knots. Number 2 thought that 10 knots slow (175 knots) was better for the wet runway landing, but he didn't want to criticize the leader. Besides, he still was confident in his own ability to handle the situation.

About two miles from the runway, the formation broke out of the overcast and number 2 saw the runway lights through the light rain. When he looked back toward the leader, he was shocked to see him starting a go-around already, while waving goodbye and pointing to the runway. Two was cleared to land and didn't want to be embarrassed

OUD FIGHTER PILOT

by calling for help, so he decided to continue on his own. He still was confident that he could make it, but began to worry about getting too slow. He quickly added power and maintained the established rate of descent.

Visibility over the nose seemed about right for the landing attitude and the controls felt familiar to him. The aircraft felt good in the flare but floated much more than was normal, so he realized that he was too fast. After touchdown at 2,000 feet, he deployed the drag chute but discovered that the speed brake was already up since he had forgotten to lower it while concentrating so hard on the landing. This was another factor in the long landing.

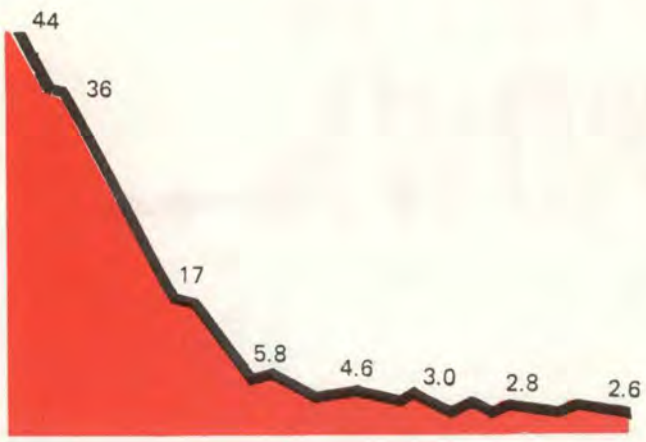
As the aircraft began hydroplaning on the bald tires, nose wheel steering became useless. He steered with the rudder as the aircraft slowed to what he considered a fast taxi speed. With the antiskid cycling continuously, Two realized that the aircraft would not slow down any further. He knew it would be embarrassing to have to resort to the arresting barrier, and entertained thoughts of turning off the antiskid to try further braking, or even of making a high speed turn-off at the taxiway. Although his personal pride nearly got him into more trouble, he did lower the tail hook in time. He twisted in the seat and watched as the cable snapped upward and then became taut in the grasp of the hook.

Yes, number 2 was embarrassed as the ground crew pulled him out of the barrier, but he was also grateful that he had managed finally to swallow his pride in time to keep from hurting himself. If he had done so earlier, when Lead left him two miles from the runway, he probably could have avoided the barrier engagement.

I was number 2. I certainly found out a lot about myself that day and learned a very good lesson in flying safety. — Reprinted from *Aerospace Safety*. ■


CHILDERS
david baer '82

Then and NOW



MAJOR JOHN E. RICHARDSON, Editor

■ When Stuart Symington took the oath of office as the first Secretary of the Air Force September 18, 1947, air power was already a major force in military strategy. The record of accomplishment during World War II is well documented. There is another side to that story, not as well known but just as important to the newly formed United States Air Force.

Despite the many successes of the US Army Air Forces during the war, the safety record was not so shiny. According to a report published by the chief of flying safety in 1945, from December 1941 to December 1944 there were 46,597 major aircraft accidents in the United States. (During World War II no statistics from accidents overseas were published.) These accidents in CONUS resulted in 13,000 fatalities and 12,200 destroyed aircraft. In 1947, there were 1,555 accidents for a rate of 44 accidents per 100,000 flying hours.

This was one of the challenges facing the new service. Such losses in combat capability obviously could not be allowed to continue. Therefore, flying safety very early became a most important consideration.

Over the past 35 years there have been some very notable successes in reducing both the number and the rate of aircraft mishaps. The 1981 total of 80 class A mishaps and a rate of 2.44 per 100,000 hours is evidence of the effort expended in flying safety in the Air Force.

Despite our achievements, there is much more that can and must be done. The rate can be further reduced. To see how and where, let us look at the last 35 years and both what has improved and where we haven't done so well.

After the end of World War II the United States rapidly demobilized. Air Force strength dropped from 2¼ million to only 300,000 between V-J day and 31 May 1947. At the same time, the number of effective combat groups fell from 218 to two. In addition to struggling with the problems of defining its position in relation to the Army and Navy, the Air Force was faced with a drastic loss of experience and capability in both aircrew and maintenance personnel. The lack of qualified maintenance people was a major factor in aircraft mishaps. Many could be traced directly to inadequate maintenance. But there were also plenty of mishaps in the ops category. Here are some typical examples.

■ A pilot was checking out in the AT-6. After a local flight of about 1+25, the AT-6 returned to base for touch-and-go landings. The IP demonstrated one and then the pilot made two successful landings. On the fourth approach the pilot made a normal landing but on go-around raised the gear instead of the flaps. Despite immediate attempts to reverse the gear handle and add power, the gear collapsed and the aircraft slid to a stop just off the runway.

■ A flight of three P-51s was being ferried to the ANG at a western base. At the final recovery base the first ship landed safely in the middle of the runway. Number Two landed on the right side of the 150 foot wide runway to stay out of lead's prop wash. The pilot made a normal 3-point landing but after about 2,000 feet of roll the right wheel hit a ridge of snow along the edge of the runway. The aircraft veered right — the pilot was unable to correct, and the aircraft hit a four-foot high snow bank and tipped up on the nose damaging the propeller.

■ A second lieutenant was flying a solo transition flight in an AT-6. His brother was riding in the back seat. The pilot flew in the local

continued

Then and NOW

continued

area for about an hour. This flying included at least one reported "buzzing" incident. Then as he turned for home base, the pilot flew into a shallow valley at an altitude below the surrounding hills. While in the valley, the pilot initiated a loop at a very low altitude. At the top of the loop the AT-6 engine failed. The pilot tightened the loop and as he pulled through the bottom struck some power lines at 70 feet AGL shattering the canopy and forcing a crash landing in a nearby field.

Even as the Air Force was being organized, major changes in equipment and tactics were in progress. The F-80 was already operational and soon the F-84 and F-86 would follow. The B-47 was on the drawing boards. The jet age with new problems and challenges was arriving. Unfortunately, as evidenced by the mishaps used as examples, some of the old problems had not been solved.

History did not allow the fledgling Air Force much time to organize. Within the first five years Air Force members were challenged first by the Berlin Airlift and then by the Korean War. The Berlin Airlift not only demonstrated that airpower could supply an entire city's needs, it also showed that even in a high risk operation, flying safety was possible. In spite of congestion, poor weather and intense operational pressure, the mishap rate for the Berlin Airlift was only half of that of the entire Air Force. Historians attribute this directly to command interest in operations safety.

Further evidence that emphasis on safety could pay off was shown in the buildup for Korea. Unlike the buildup for World War II, Korea did not cause a sudden increase in mishaps. In fact, the major accident rate actually decreased throughout the war reaching a record low by 1953. In 1952, just five years after its creation, the Air Force had reduced the mishap rate from 44 to 29, a significant achievement. By 1952 the global mission of the Air Force was well established. New aircraft like the B-47 were providing the capability to project airpower worldwide. The decreases in mishap rates were encouraging but as the following examples show there was still much that could be done.

- A B-47 with an IP and two student pilots was on downwind for a final landing when all six engines flamed out. The pilot could not get the engines started and so ditched the aircraft in the ocean short of the runway. The actual cause could not be determined but it is possible that the student AC mispositioned the fuel switches resulting in flameout of all six engines.

- A flight of six F-86F day fighters scrambled on an intercept mission. After several passes on some B-47 targets, the fighters broke up into three two-ship elements and began their recoveries. During the flight, the weather had deteriorated to the point that three of the aircraft were unable to find the field on recovery and the pilots were forced to bail out.

- A B-25 was enroute IFR to a western base. The pilot reported over a radio beacon 25 miles east of

the intended landing base and was given clearance to the ILS outer marker. This was the last contact with the aircraft. Apparently, the pilot had misidentified his position and overflew the landing base hitting a mountain to the west.

By 1957 jet aircraft were the mainstay of the Air Force. The regular AF fighter force had been all jet since 1954, and jet bombers were the principal weapons of deterrence. The five years from 1952 to 1957 saw the introduction of the first of the "century series" fighters. By 1957 the sleek shape of the F-100 Super Sabre was a familiar sight at Air Force bases around the world. The "interim" bomber, the B-52, entered the inventory in 1954, and by 1957 was rapidly assuming a pivotal role in the strategic bomber force. Although these changes in aircraft meant great changes in capability and new problems for flight safety, mishap rates continued to come down. The 1957 major accident rate of 13.6 was the lowest in Air Force history even though there had been a 12 percent decrease in flying time over that of 1956. A part of this record can be attributed to the fine showing of the newer aircraft. Much more reliable than previous types, such aircraft as the F-100 and F-102 showed the effect of improved design. For example, the F-102 in 1957 recorded the lowest accident rate of any jet fighter during its first operational year.

Although pilot factor mishaps continued to dominate the statistics in 1957, there was an increase in material and maintenance-related mishaps. This was primarily due to increased complexity which made material failures much more serious.

- A B-52D took off on a routine training mission. The takeoff roll and climb appeared normal for the aircraft gross weight until the landing gear was retracted. Then, while still at an altitude of 100-200 feet AGL, the nose of the aircraft started up to an abnormally nose-high attitude. Despite efforts of both pilots, the nose continued up finally achieving an angle of 50-60 degrees. The aircraft climbed to about 1,500 feet where observers saw all eight engines compressor stall. The aircraft stalled and nosed over. It appeared for a while that the crew would be able to recover, but the aircraft stalled again at a very low altitude. Part of the crew attempted to eject but were outside the ejection seat envelope.

- A pilot was scheduled for a mission in an F-100C to check out the yaw damper operation. Earlier that day the pilot had flown a dual checkout flight with an IP. The aircraft crashed on the solo flight because the pilot exceeded his capabilities while performing aerobatics at a very low altitude.

The year 1962 was a significant one for the Air Force. The previous year had been a shock to the old order as the Soviet Union and the United States both put men into space. While these accomplishments in space captured the imaginations of most everyone and foreshadowed the future for

continued on page 17

FOD UPDATE

MAJOR BRIAN D. HUDSON
Directorate of Aerospace Safety

FOD (foreign object damage) traditionally receives a lot of attention. But, as this article points out, some of it may be misplaced. Written for Maintenance *magazine, it is reprinted here to give aircrews some insight into our current Air Force FOD experience.*

Before you write the problem off as only of concern to the maintenance troops, think of how you can help — particularly on preflight. How well do you check for loose fasteners?

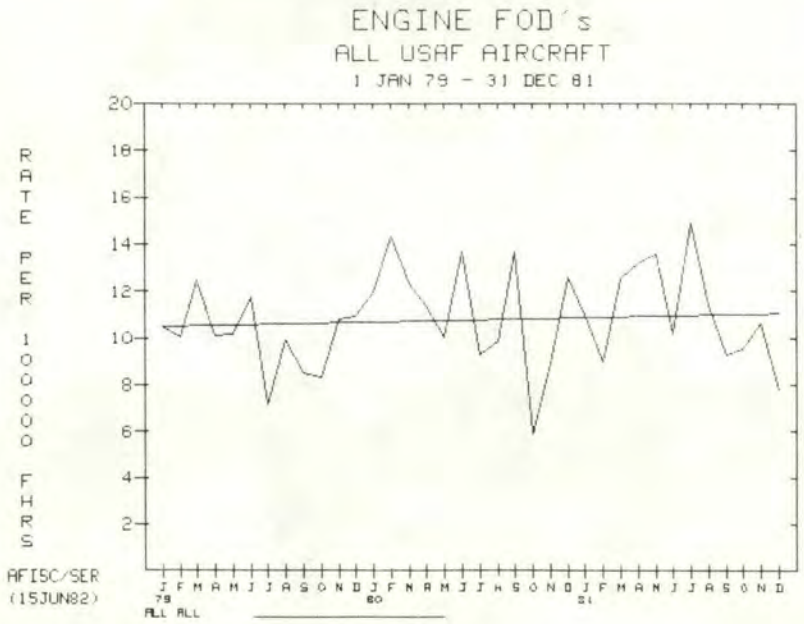


Figure 1

■ In reviewing the 1981 FOD figures, versus the real-world effort that goes into holding them down, it seems that we sometimes expend huge numbers of man-hours on efforts of secondary importance. Like not draining the swamp in the famous alligator story, our FOD swamp has only been partially emptied through Air Force-wide tool control. The bulk of what remains is in the form of hardware. While a lot of alligators remain to distract us, draining the swamp is still the most profitable objective.

The pursuit of our goal calls for a closer look at where we spend our dollars and man-hours for FOD prevention. Training, tool control, and cleaning the ramp (or work area) are certainly the three major consumers. Training is something that will always be a central element in the program, and the present efforts are necessary to insure at least a minimum exposure to the reasons and procedures of FOD prevention. Tool control and ramp clean-up are other matters, however. They both directly prevent FOD, but evidence over the past 3 years indicates that tools create less than one percent of all FOD. Even totaling the entire "equipment" category in the accompanying tables (including tools, headsets, pins and other similar items), less than 8 percent

occurs due to our mishandling or failure to account for such items. Our tool control has reached a point where its major significance lies in preventing damage to and jamming of flight controls or critical systems other than engines. Of course, these results sometimes produce losses of both pilot and aircraft, and for these reasons tool control must remain high on our "do" list in maintenance.

Looking once again at the statistics, we see that ramp debris runs from one to three percent. In a similar fashion to tool control, we spent thousands of hours "FOD walking," and those hours certainly produce visible results. The sheer amount collected is often beyond belief; however, we can easily spend too much effort on this part of the program. Such clean-up, accompanied by mechanical sweeping and vacuuming, has undoubtedly helped, but the total man-hours should be carefully weighed against other options. Rather than a daily "ramp tramp" (which will undoubtedly net some FO), why not spend some of those same man-hours looking into wheelwells, cockpits, radomes, compartments where panels are already open and double-checking the security of panel fasteners. Odds are you will find FO which has a far higher chance of causing damage.

This brings us to the major reason for engine FOD: hardware. The security and control of hardware are factors requiring greater attention than we've given them so far. Hardware is consistently the confirmed cause in over one-third of all FOD mishaps. Additionally, it is suspected to be the source of most mishaps which remain undetermined (36 to 45%) or which can only be traced to a "metal object" (12 to 17%). To say that hardware is involved in at least 50 percent of all engine FOD is a reasonable assumption.

With this figure in mind, FOD prevention personnel need to insure their units truly stress the necessary controls. Over the years we have had some hardware material and design deficiencies which have caused FOD, but the most frequent sources come through human failure in accounting for excess parts, not removing work residue, improperly installing hardware, or using incorrect fasteners. These are aspects of the problem that demand an increased share of our available FOD prevention time. What are your squadron procedures? Does everyone know what they are, and how well are they followed? Screw bags, torque limiters, color and number coding panels and screws, and controlling bench stock issues are some of the most common techniques in use. Each unit must decide which methods suit their operation best and then insure adherence.

Overall, the FOD prevention managers must first insure their units' efforts truly stress the greatest hazards first. A glance through the accompanying tables will quickly show where our major problems are. We cannot expect more dollars or man-hours to fight FOD, but we can spend what we have in the right places. ■

FOD Mishaps (High Six)

	1980				1981		
MDS	GND	FLT	TOTAL	MDS	GND	FLT	TOTAL
F-4	13	110	123	F-4	15	143	158
F-111	5	34	39	A-10	1	42	43
F-15	5	30	35	F-111	3	33	36
C-130	7	20	27	F-15	3	33	36
A-10	2	18	20	T-38	5	24	29
F-5	0	12	12	F-16	2	14	16

GND: Discovered during ground maintenance.
FLT: Discovered during intent for flight.

1981 FOD Causes (High Six Aircraft)

MDS	UNDET		HDWRE (screws, nuts rivets, wire)		METAL OBJECTS		EQUIP. (headsets, pins, flags, cords, tools)		RAMP DEBRIS		RICOCHET	TOTAL	
	GD	FLT	GD	FLT	GD	FLT	GD	FLT	GD	FLT	FLT	GD	FLT
F-4	3	49	6	55	2	25	4	7		2	5	15	143
A-10		11	1	24		6		1				1	42
F-111	2	10	1	12		7		4				3	33
F-15	2	12	1	13		5		2		1		3	33
T-38	1	11	3	8			1	2		3		5	24
F-16		4				3	2	4		3		2	14

1979/80/81 FOD CAUSE PERCENTAGES (AF total except ice; intent for flight)

	UNDETER-MINED	HARDWARE	METAL OBJECTS	EQUIPMENT	RAMP DEBRIS	RICOCHET	TOTAL
1979%	36	33%	17	7%	3	4%	100
No.	(137)	(125)	(64)	(26)	(11)	(15)	(378)
1980%	45	32%	12	8%	1	2%	100
No.	(155)	(111)	(42)	(28)	(3)	(7)	(346)
1981%	40	35%	13	8%	3	1%	100
No.	(146)	(128)	(48)	(28)	(11)	(6)	(367)

A WILD RIDE

BENJAMIN S. LAMBETH
The Rand Corporation
Santa Monica, CA

This narrative of an F-4 mishap summarizes the highlights of an emergency. It is an excellent dissertation not only on the actual emergency but also dissects the author's decision sequence and extracts useful lessons not only for F-4 crews but all pilots and crewmembers.

■ We were a scheduled two-ship flight of F-4Cs on a routine ground/attack sortie, and I was riding in the rear cockpit of the lead aircraft. Following a standard formation takeoff, we shook our wingmen out to a loose echelon position off the left side and commenced a gentle, northeasterly climbing turn to an assigned altitude of 5,000 feet toward our low level entry point. The weather was clear with a thick haze layer starting at around 1,000 feet and scattered clouds above.

We cancelled IFR early and proceeded visually to the hack point, letting down gradually to our planned run-in altitude of 500 feet above the water. Since the visibility was good and all our enroute reference points were easily identifiable, we pushed up the speed to compensate for the late takeoff.

We were level on course at 500 feet and 520 knots true airspeed, with the wingman deployed approximately 6,000 feet off our left wing in a tactical spread formation. I had the map in my lap, was calling off times and checkpoints to the pilot in the front seat, and could see our initial turn point closing rapidly in the right quarter-panel. The pilot and I were discussing the upcoming turn and the new heading for the next leg to the target when the situation promptly uncorked — approximately ten minutes into the mission.

The out-of-control gyration began with an abrupt, uncommanded pitchdown whose onset came completely without warning. The violence of the maneuver snapped the stick forward and pinned both my hands against the canopy. The pitch angle must have been close to 30 degrees nose down, since all I could see out of the cockpit was water. This pitchdown was accompanied by a loud bang, which I interpreted to be an engine explosion, and was immediately followed by an extremely violent pitchup along with severe aircraft vibration. The second event was forceful enough to cause me very sharp and intense lower back pain and was all I needed to convince me that the aircraft was definitely out of control. We then experienced another hard pitchover which again filled my entire sight picture with water and caused me to go immediately for the lower ejection handle with both hands.

I had positive upward pressure on the handle and was weighing the risks of remaining with the aircraft a moment longer versus ejecting immediately despite all the adverse conditions that prevailed — low altitude, high speed, possible high sink rate, and an extremely unfavorable body position — when the aircraft again pitched up hard and filled the canopy with sky. At that instant, I asked the pilot if it was time to get out. He replied, "Wait just a second," so I relaxed my pull on the handle and tried to assume some semblance of a proper body position in the seat. By this time, the pilot had apparently regained a measure of control over the aircraft, because the pitch oscillations subsequently ceased, the vibration dampened, and we began a wings-level climb.

On reflection, it was a good thing we had been on hot mike, because if the pilot had not immediately acknowledged my call or had I been unable to query him as to our status following the second pitchover, there is no doubt that I would have proceeded to eject myself out of the aircraft a fraction of a second later, notwithstanding my concern that we were probably outside the seat envelope.

As things turned out, the positive upward vector and apparent regaining of aircraft control took some of the urgency away from the decision, so I released my grip on the handle, ran the seat all the way down to the stops, and commenced cleaning up the aft cockpit for the controlled ejection I was still certain would be coming at any moment. (It was only hours later that I recalled having forgotten throughout the entire remainder of

the flight to tighten my oxygen mask fittings and lower my helmet visor.)

Throughout the gyration, there always seemed ample time for deliberate and rational decision making. All the same, it was so thoroughly disorienting that I had no presence of mind whatever to think about attempting to gather up the stick and fly the aircraft, even though I had no assurance that the pilot was not incapacitated. By the time of the second pitchover, my sole concern was physical survival and how much time I had remaining to eject, since the combination of violent pitch oscillations, the loud explosion, and the heavy vibration all seemed to indicate that either inflight disintegration of the aircraft or impact with the water was imminent.

In the circumstances, with the severe loads that were operating on the aircraft, it was difficult to have much situation awareness of the world outside or what the aircraft was doing in relation to it. My predominant recollection was a sensation of very hard and exaggerated pitching, as though the slab was alternately deflecting back and forth from stop to stop.

The first clear impression of what was occurring outside the aircraft came during the second pitchup, when the pilot began to take control of the situation and I saw ourselves wings-level and climbing.

As the aircraft began climbing and communications with the wingman were reestablished, I remained convinced from the severity of the preceding events that a controlled ejection — hopefully over land — within the next few minutes was the best outcome we could expect from the situation.

I turned to the tachometers and saw a 50 percent rpm indication on the right engine, suggesting either a rollback or a flameout. Also, our airspeed had decreased to 300 knots and was still bleeding off slowly in the climb. Our rate of deceleration must have been something to behold, since 520 knots true airspeed had been the last number I remembered just seconds before the pitch oscillations began.

We started a gentle right climbing turn to 5,000 feet heading toward the shoreline. The wingman joined up on our left wing to look us over. The vibration of the aircraft continued, although with considerably reduced intensity, and the pilot proceeded to shut down the Number Two engine. The G meter was pegged both ways, indicating that we had sustained at least 10.5 positive Gs and 5 negative Gs during the course of the gyrations. At this point, I asked the pilot for a status check.

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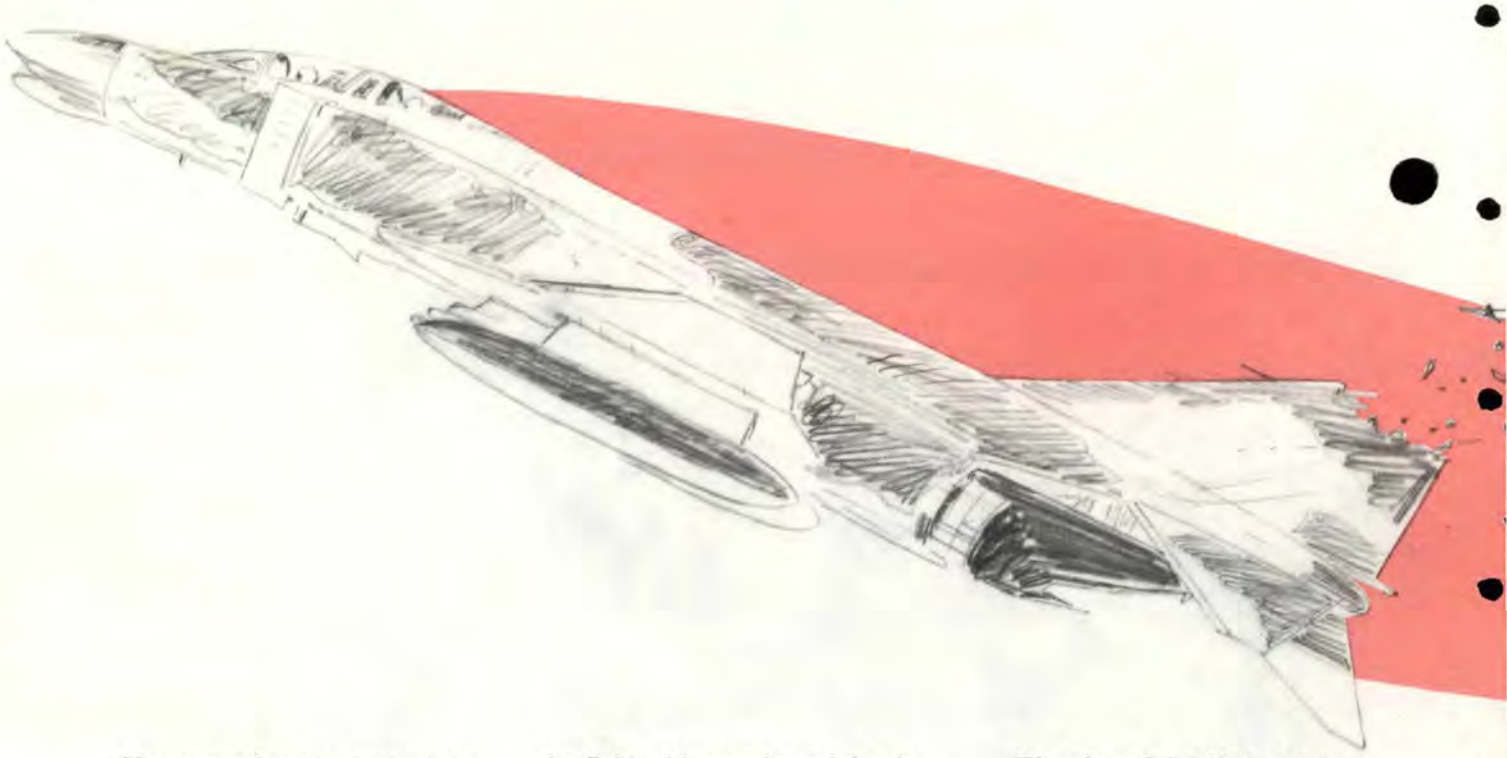


He responded that he had the aircraft under control and that we were on the way home, which was the first time since the onset of the emergency when I began to believe we might just have a chance of getting the machine safely back on the ground. The wingman advised us that our left wing tank and pylon had separated from the aircraft, that we were streaming fuel, and that the top of our vertical stabilizer was gone. The pilot cleared the area below and jettisoned the right tank without incident.

Prior to crossing the shoreline in a northwesterly heading, the pilot began dumping fuel to get our gross weight down to an acceptable level for landing.

Attempting to return on a direct bearing to the TACAN, the pilot noted that his compass card had frozen (as had mine in the aft cockpit). He then tried, without avail, to raise approach control for radar vectors. We thus proceeded VFR, squawking 7700 on the IFF and descending to below 3,000 feet in an effort to pick up the field visually through the haze layer, with the wingman navigating for us on the wing. The pilot then switched to tower frequency, declared an emergency, and proceeded direct to the field with steering advisories from the wingman.

We crossed the field at 800 feet, extended the ram air turbine, lowered the gear and flaps, and commenced a gradual left button-hook turn to final approach with approximately 6,000 pounds of fuel remaining. Total elapsed time from engine start to shutdown was one hour.

During postflight examination of the aircraft and a review of events with the pilot, the wingman confirmed that the emergency was easily as serious as it appeared at the time. The wingman had observed the entire sequence and described it as a series of extremely pronounced angle of attack translations, without any appreciable variation in our forward vector of flight. He recalled noting an initial pitchdown of some 30 degrees, followed by a hard pitchup to around 60 degrees nose-high, at which time a large cloud of fuel vapor erupted from the aircraft and the left tank separated. This gyration then repeated itself, leading him to believe the aircraft was about to swap ends just moments prior to the pilot's successful recovery to controlled flight.

The aircraft itself showed numerous signs of having endured a stressful ride. The aft portion of the vertical stabilizer, along with the radar warning antenna, had broken away. There were lengthy skin cracks along the underside of the right wing. The pylon that had secured the left tank had sheared at both ends and was cocked some 20 degrees inboard. Finally, both engines had torn from their forward mounts and partially dropped from their supporting structure.

The mishap was caused by the sixteenth-stage compressor disc in the right engine which had separated from the shaft and then was ingested by the hot section. The instantaneous loss of thrust caused by the resultant engine failure, in turn, imparted a substantial deceleration moment and nose-down pitch trim change to the airplane. Given our high airspeed, this most likely produced the initial pitchover.

The situation immediately prior to the first pitchover was totally relaxed, with no suggestion of impending trouble. My own estimate of the duration of the gyrations prior to the pilot's regaining control was some three to five seconds. The VGH recorder

aboard the aircraft later indicated that this span was actually closer to 40 seconds. In all events, the period of time in which we were actively considering abandoning the aircraft without delay was very brief by any measure. What follows is the way I recall my reactions and the logic train that supported them.

Decision Making Under Stress

The first pitch oscillation was essentially a massive attention-getter. It was at the start of the second oscillation when I realized we were in danger and confronting an imminent decision to eject. As I mentioned above, the second pitchover sent me reflexively for the lower ejection handle. At that instant, a series of vivid and conflicting flash-images began to run through my mind, producing a classic approach-avoidance decision dilemma.

The first of these images was a stark recollection of all the flying safety articles I had read about crews who had delayed ejecting too long and thus failed to get out. On top of this, there was no assurance that our situation was not rapidly progressing from bad to worse. As comfortable and familiar as the cockpit seemed — despite the violent pounding — compared to the uncertainties of a high-speed, low altitude ejection, the aircraft was plainly getting to be a place I didn't desire to be much longer. I was not at all eager to become another delayed ejection statistic.

Offsetting this urge to get out, however, were some persuasive arguments for hesitation that kept me from pulling the handle at that instant. For one thing, for all I knew we were still transonic, possibly sinking rapidly at very low altitude, and in very dense air. My body position, moreover, was such as to almost guarantee severe spinal injury during an ejection. And we were over water, which added the risk of my coming down in the chute unconscious and drowning. Although I never doubted the technical reliability of the seat, I did feel real momentary concern that an ejection attempt might not be survivable in the face of all these adverse parameters.

Second, the aft cockpit of the F-4 is hardly the ideal vantage point for gauging what is happening out in front. I had some doubt about the accuracy of my visual cues, particularly concerning whether or not the aircraft was descending. Furthermore, the command selector valve was set for sequenced ejection. Had it been the pilot's choice to abandon the aircraft, I would have automatically gone first whether I wanted to or not. I hadn't been told that the pilot was still trying to salvage things and was not yet ready to give up. (As it turned out, while the pilot was attempting to haul in the stick with his right forearm, he had his left hand on the lower ejection handle and was as ready to get out as I was.)

A final case for hesitating, which may reflect poorly on my survival instinct but requires noting, was my concern to avoid doing anything that might appear panicky or unprofessional under the cold scrutiny of the Monday morning quarterbacks. The unit was having its annual reunion that evening, and I was planning to attend. A fleeting vision thus occurred of me punching out, having the pilot land a perfectly good Phantom minus a backseater at the base, getting plucked out of the water an hour later, and having to take heat at the bar for the rest of the evening as a result. Good reason or bad, that seemed, at the moment, like something to be avoided at every cost.

A WILD RIDE continued

It was with this confluence of mental impressions and a firm decision to eject staring me in the face that the aircraft again pitched up and ought me enough time to ask the pilot for help, and produced the delay that led to the happy ending. Nothing succeeds like success, and I can only applaud the pilot's superb airmanship that got us both safely back on the ground. Yet to this day, I cannot say with confidence whether my own survival, involving a decision over which I had independent control, was mainly a consequence of wisdom or good luck.

Lessons Learned

As a low time civilian pilot (some 500 hours) with no first-pilot fighter experience, I feel myself scarcely the most competent authority on how best to profit from the sort of experience discussed above.

All the same, the emergency was a major personal learning experience for me and generated some thoughts I would like to share with the fighter community.

Sorting the problem under pressure is not as difficult as it sounds. I cannot judge how I would have responded had this been my first fighter sortie, but for anyone with a modicum of air sense, events almost naturally impose clarity of thought in a life-threatening situation. Samuel Johnson once observed that there is nothing quite like the prospect of an imminent hanging to concentrate the mind. In retrospect, I was astonished at how measured my situation analysis was in the rush of the emergency. I certainly would never have predicted it or counted on it in advance. If this experience is a useful guide, my sense is that any catastrophic error one might be prone to make in such a situation would not be over whether to eject but over when. This leads to a corollary thought.

Don't trust someone else's judgment to keep you alive. From the moment I was on the flying schedule and we began our mission planning, I had unquestioned confidence in the pilot's abilities as a fighter driver. We had flown together before, and I knew from experience that I was paired with a skilled and disciplined aviator — among the best. Yet when things started coming unglued, I had no assurance that the pilot was on top of the situation. We certainly weren't carrying on a conversation with each other during the gyration — for good reasons. But, at the time, I didn't know whether to read the pilot's silence as an indication that he was concerned with more important matters or was incapacitated.

One of the problems of not being pilot-in-command (whether in a fighter aircraft or any other) is that you can easily slip into a passive mode and depend on the other guy to do the thinking and be responsible. Needless to say, this can lead to gravely counterproductive consequences when a crisis arises. Had I experienced this emergency in a single-seat airplane, with no one else aboard to rely on, I can easily imagine that I might have skipped all the situation analysis and ejected just to be on the safe side.

This is no more than speculation, but, from my experience, I would judge that the decision to eject when there remains the slightest ground to think twice is less confounded for the aircraft commander than for the backseater. My point here is simply to question whether my hesitation due to second-guessing about the pilot's preferences, notwithstanding our safe recovery, was entirely well-advised given the information I had at the time.

Don't go for the ejection handle unless you've made up your mind to get out. Postflight inspection of the rear cockpit indicated that I had come within one-eighth of an inch of jettisoning the canopy and had, consequently, ridden a partially armed seat all the way home.

During the peak of the emergency, I definitely put tension on the handle, but I was not aware that I had started it moving and clearly had not intended to do so.

Obviously, perceptions can be very misleading in such a situation. After we landed, my raising of the lower guard did nothing to secure the seat. The slightest additional disturbance of the handle could have completed the canopy jettison sequence.

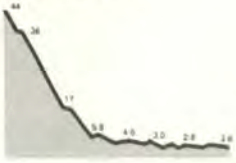
Don't worry about your image. It is a familiar refrain that a fighter pilot would rather die than look bad, but there are times when suspending pride is the intelligent thing to do. One can imagine a variety of legitimate reasons for delaying ejection in a situation such as we experienced.

As it turned out, we did the right thing by staying with the aircraft. The pilot and I agreed later, however, that neither of us would have felt the slightest remorse had we opted instead to be safe rather than sorry by ejecting. You can always justify such a decision to an accident board after the event and cope with an error of judgment that kept you alive. There is no cure whatever for riding a sick airplane into the deck. ■

About The Author

Mr. Lambeth is a senior staff member of The Rand Corporation specializing in operational matters of concern to the tactical air forces. He was flying in the aircraft that experienced the emergency – with the approval of the National Guard Bureau – to enhance his appreciation of fighter employment techniques in connection with his work on Rand's Project AIR FORCE research contract. Although a civilian with no military background, he has flown extensively numerous types of USAF fighter aircraft and is a licensed FAA private pilot.

Then and NOW



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aviation, other events soon took precedence.

Aerial reconnaissance had long been a function of the Air Force. Its value was reemphasized on October 14, 1962, when the first hard evidence of Russian missiles in Cuba was discovered. President Kennedy was advised of the situation on the 16th and in the next six days the Air Force proved how fast it could mobilize in a crisis. By October 22, not only had TAC moved thousands of men, thousands of tons of equipment and hundreds of aircraft into the southeastern United States, but SAC had gone to 100 percent alert and MATS (the forerunner of MAC) had moved hundreds of Army and Marine troops into staging areas ready for any contingency.

In the area of flying safety, mishap rates continued to decline. However, there was a change in cause factors from 1957. In 1962 material factor was the cause of 53 percent of all mishaps, while pilot factor accounted for only 42 percent. Another disturbing statistic was that material failure accidents made up only 24 percent of the fatalities while pilot factors accounted for 66 percent of all aircraft fatalities. On the positive side, in earlier years weather had been a significant factor in aircraft mishaps; by 1962 the percentage of weather-caused mishaps had dropped to less than 1 percent.

- While on a simulated bomb run a B-58 broke up in flight and crashed. A failure in the stab aug system allowed the aircraft to yaw to such an angle that aircraft structural limits were exceeded and the aircraft broke up.
- An F-86F was making a strafe pass when the range officer saw pieces coming from the aircraft. The range officer told the pilot to eject but before he could, the aircraft began a series of rolls and crashed 3,000 feet beyond the target. Investigators found that a portion of the wing had failed causing the aircraft to depart controlled flight.
- A C-130 was transitioning to an ILS recovery. The pilot descended below minimum safe altitude and crashed into a mountain short of the ILS approach.

Although the Cuban crisis was successfully resolved, half a world away events in Indochina were developing into the next major challenge for the US Air Force. The first USAF combat unit deployed to Vietnam in 1962, and by 1967 USAF units were heavily involved in combat both north and south of the DMZ. By 1967 other developments and improvements had come to the Air Force. The F-4 was now the mainstay of the fighter force. The F-111 was proving its capabilities as a penetrating bomber over North Vietnam. The major mishap rate continued to drop. Down to 4.5 per 100,000 hours, this reflected a real accomplishment considering the intensity of operations in Southeast Asia. The emphasis on material failures in the period from 1962 to 1967 had the desired effect, and the percentage of material failure causes in major mishaps fell to 49 percent. But unfortunately pilot factors climbed to 47 percent. The following examples indicate the kinds of problems.

- An F-4D was on a ground attack training mission. The IP in the flight called for a "SAM Break" and shortly thereafter saw the wingman go out of control. The pilot was unable to recover and abandoned the aircraft. The pilot had stalled the aircraft during the maneuver and then used improper recovery techniques. However, he was set up for the mishap in a sense because the IP failed to consider the

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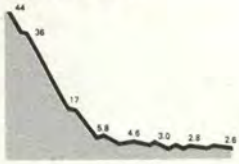

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CG before calling for the break.

- A C-141 took off from a base in the combat zone. On takeoff the controls felt mushy, so the aircraft commander sitting in the right seat took control of the aircraft. But before he could take any action, the aircraft crashed into the sea 6,000 feet off the end of the runway. The crew had failed to complete the lineup check and so took off with the spoilers deployed.
- A flight of four F-4s was returning from a mission. In the pitchout after about 90 degrees of turn, Number Two stalled and departed controlled flight. The pilot had maneuvered the aircraft into a high angle of attack and then ignored all known warnings and indications of adverse yaw. Then he failed to initiate proper recovery controls, and the crew was forced to eject.
- Returning from a CAP mission, the flight lead placed the aircraft in a diamond formation and began a barrel roll to the left. During the maneuver Number Two lost position and collided with Number Four. The crew of Number Two ejected, but Number Four was able to make it back to base.

The year 1972 was the last major effort for the Air Force in Vietnam. The final cease fire was signed on January 23, 1973. This agreement came largely due to the continued pressure from Air Force bombing of Hanoi and Haiphong. In 1972 the major mishap rate climbed from the 1971 low of 2.5 to 3.0. All categories of mishaps, fatalities, and destroyed aircraft climbed significantly. The cause factors were heavily weighted toward ops with pilot factors accounting for 60 percent of the total mishaps and material failures 39 percent.

- An EC-47Q had returned to the traffic pattern after completing its mission. After two practice approaches by the copilot the AC took over for the final landing. A normal VFR pattern was flown to touchdown, after which the aircraft developed a left drift. The aircraft commander attempted to correct the drift with throttle, and the aircraft swerved toward the right side of the runway at a 45-degree angle off runway heading. The crew attempted a go-around, but the aircraft struck some tall trees just beyond the base perimeter. The

aircraft continued to fly and maintained about 150 feet AGL. The aircraft was vibrating and the AC called for gear up and then stated that they had lost an engine and to feather Number Two. Shortly thereafter, the third pilot sitting aft observed the Number One engine go into feather followed by loss of all engine noise. He then heard the AC say "You feathered the wrong one! Bring it back in! Bring it back in!" The aircraft struck some tall trees and crashed.

- A pilot was practicing test flight procedures in an A-7D. The pilot initiated the test at a low altitude, and during the third maneuver allowed the aircraft to depart controlled flight too low to safely recover. The pilot observed two complete rotations before ejection at about 500 feet AGL.
- A C-119K departed on an eight-hour ferry flight. The flight was normal for the first three and one-half hours, but due to strong winds the flight was 36 minutes late at that point. From this point a radar plot showed the aircraft proceeding on course for another 15 minutes at which time it made a sharp left turn and disappeared from the radar. Subsequent investigation indicates that the aircraft encountered light to moderate turbulence followed by a sharp vertical wind shear which caused the left wing tip to fail. The failure bent the wing tip down into the airstream and caused the abrupt left descending turn. As the aircraft broke out of the overcast, the pilot found himself in a box canyon. His last-ditch attempt to gain altitude resulted in further breakup of the aircraft and the final crash. Thunderstorms had been forecast along the route, and it is most likely that the aircraft flew into a thunderstorm initiating the accident sequence.

By 1977 Vietnam was behind us and the Air Force had turned to other problems. But the experience of Southeast Asia was not forgotten. Training the way we plan to fight had become the goal. Red Flag and similar exercises were sharpening the skills of a new generation of aircrews. But there was a cost. In 1977 the Class A mishap rate rose from the all-time low of 2.38 in 1973 to 2.78.

These increases led to an in-depth study of Air Force flying operations. Called Change Pace this study concluded that the increase in mishaps was directly related to operations factors. The study recommended several actions in the areas of training and utilization of aircrews to ensure that they received the best possible training, that marginally productive tasking be eliminated, renewed emphasis be placed on self-discipline, and leadership by example.

One area that was addressed was the area of aircrew discipline. This is not a new problem. In fact it has been with us since the early days of flying. While there are still instances of deliberate violations of

Then and NOW

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directives, the majority of the violations today are in the category of overcommitment. All too often an aircrew breaks the rules because of an excessive desire to succeed. The purpose is worthy — mission accomplishment. Unfortunately, the result is often the opposite.

- An A-10 was Number Two in a flight of two. During a simulated strafe pass on an uncontrolled range the pilot descended through the briefed minimum altitude and then failed to recover. The pilot was attempting to recover at impact and never initiated ejection.

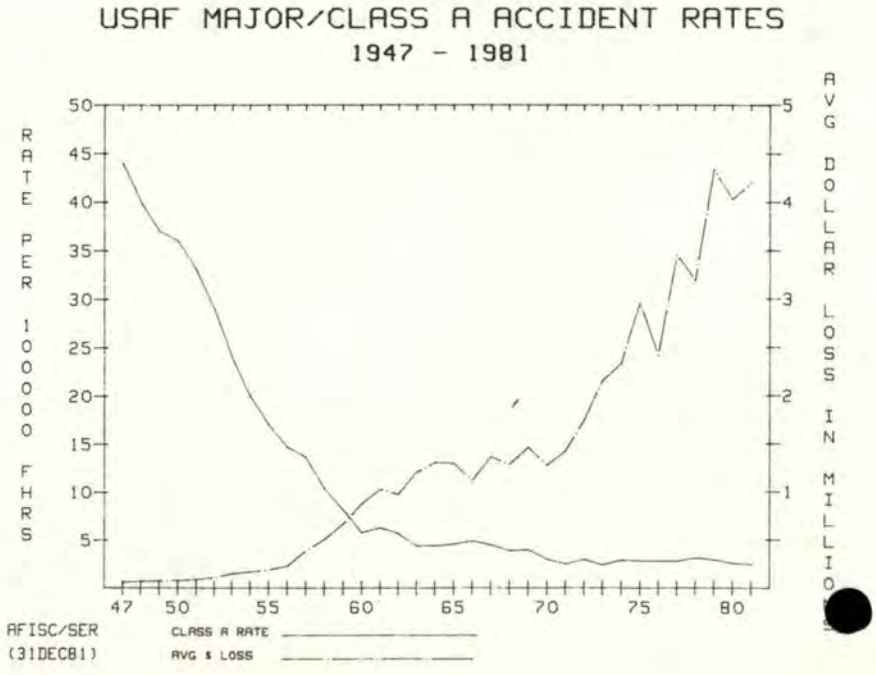
- A flight of two F-4s was scheduled for a low altitude mission in support of an exercise. The flight was normal until reaching the VFR low level entry point. Lead initiated a left descending turn through a hole in the clouds. The flight continued to descend until both aircraft struck trees on a cloud obscured ridgeline. Both pilots failed to maintain VMC and both WSOs failed to monitor flight instruments and terrain clearances.

- A multi-engine command and control aircraft was deployed for a joint exercise. Due to many conflicting factors the crew (unaugmented) exceeded their crew duty day. There was a lengthy delay for maintenance prior to launch from the deployment base. The crew, frustrated by the delays and their own fatigue, elected to make a non-standard departure which failed to account for high terrain. As a result, the aircraft struck high terrain on departure and was destroyed.

The final score for 1982 is not in yet, but so far it appears that not enough has really changed. Mishaps continue to plague the Air Force in some basic categories. While logistics problems seem to have increased somewhat, the basic operator problems of overcommitment, channelized attention, and loss of situational awareness continue to cause many of our mishaps.

In the past 35 years the USAF has achieved some resounding successes. Some of the most notable are in the area of mishap prevention. One has only to look at the graphic depiction of the descending mishap rate to see that. However, on the other hand, a graph of the cost of mishaps each year shows the opposite trend. Clearly, we have to keep doing better. If we don't, we can't afford to replace the losses.

What will it take to do better? There isn't any simple solution. But the clues are there in the history of the past 35 years. Of particular interest to those of us who wear wings are those factors traditionally labeled "operator." We can and must learn from previous mistakes. We can and must fly smarter and better. Right now we have the best aircraft and equipment ever. I also firmly believe that we have the best aircrews ever. What we have to do is live up to that standard. If we do, the next five years will be marked by real achievements in flying safety. ■



Letters To Rex

■ In a recent letter to Rex, TSgt Craig S. Smith, Base Ops NCOIC, 475th ABW, Yokota AB, Japan, describes a Dispatcher Information File which has worked well for his unit. Their problem was the lack of an effective system for passing information from shift-to-shift. The following is an excerpt from his letter.

"Each dispatcher is required to review a Dispatcher Information File prior to coming on shift. We have a card system that shows the dispatcher 'In The Red' when new information is available. He/she turns over the card to a green side when they are current. This is especially good when someone goes on leave or off duty. Procedural changes are passed on effectively, therefore eliminating the word-of-mouth system where the message is not passed properly, if at all."

Thanks to TSgt Smith for the tip. If your unit has a procedure that works, pass it along. You never know when someone needs an idea.

We also received copies of a letter from Col Ronald W. Yates, Commander, 4950 Test Wing, Wright-Patterson AFB, Ohio. Col Yates' comments were to the 46 AERODW/CC, Peterson AFB, Colorado, concerning superb maintenance support from the Transient Alert people at Peterson. He had experienced engine problems during a departure from Peterson and the T/A folks solved the difficulties with minimum delay. The following is an excerpt from his letter.

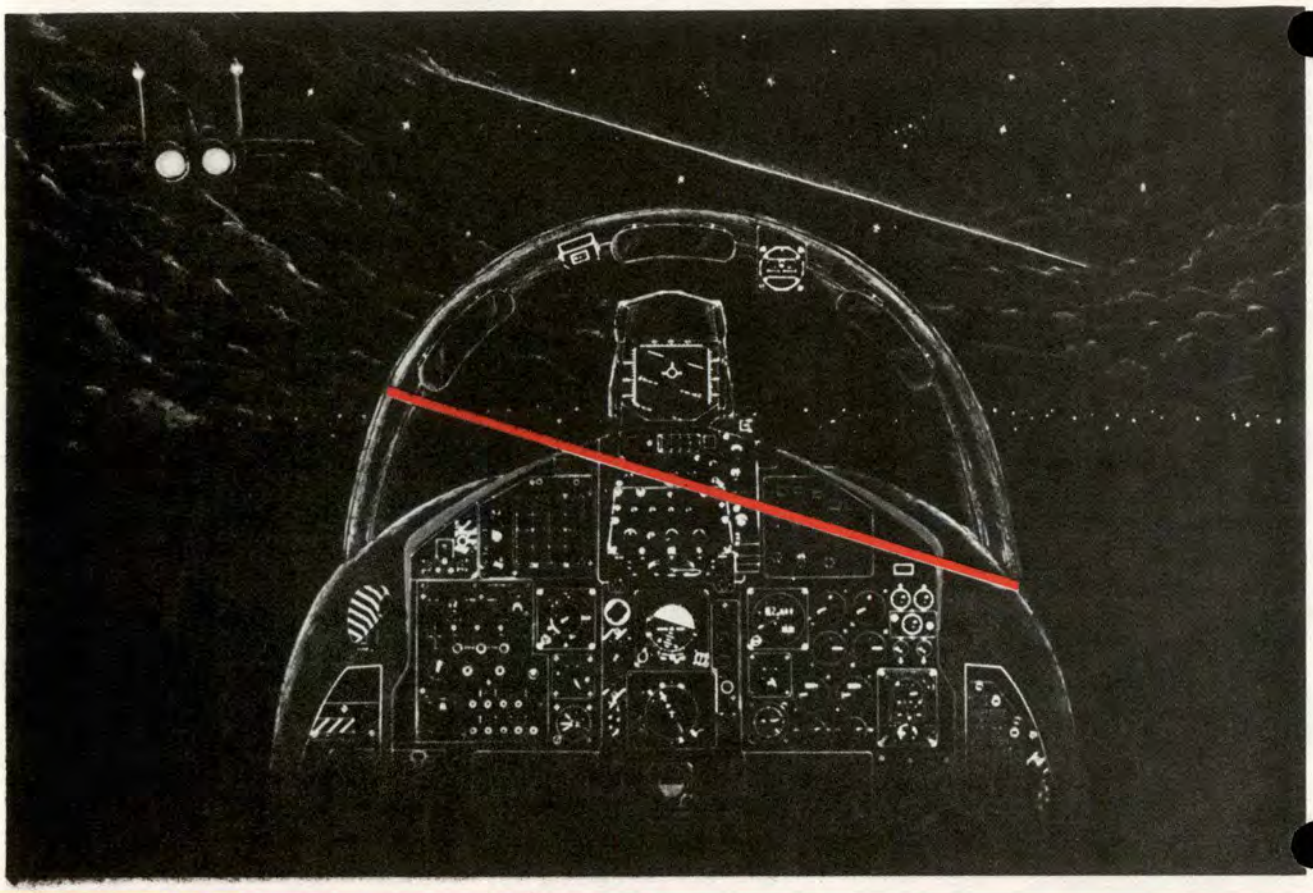
"I was expecting extensive delays with the typical slipping ETIC, but the 'can do' attitude of your people was a pleasant surprise.

Please extend my thanks to MSgt Lawrence Foster, SSgt Randy Harrel, and Sgt Randy Hodges. They made things happen. Again, thanks for a super job!"

Hats off to Peterson Transient Alert. Their service and positive attitude are well known, and comments like this are well deserved.

Lieutenant Colonel David R. Honodel, AF Advisor to the 434 TFW, Grissom AFB, Indiana, called recently to sing praises for Shaw AFB, South Carolina transient services. He supports our recent evaluation at Shaw by saying that their entire operation is very impressive. He says all personnel take great care to insure transients receive first-class services, particularly the Transient Alert folks. He received fast service from T/A, and the aircraft forms were actually in better shape on departure than when he arrived. Thanks to Lt Col Honodel for the call. It's great to hear good words for the hard-working people at Shaw.

The Rex Riley Transient Services Certificate is awarded to those units who excel in base-wide support for transient aircrews. If you feel comments are appropriate (pro or con) about a base where you have stopped, write to HQ AFISC/SEDJ, Norton AFB CA 92409, or call AUTOVON 876-2113. ■



THE LASER

MAJOR TIMOTHY J. SHAW
Directorate of Aerospace Safety

■ The weather was 800 feet overcast with 1.5 miles visibility. Dallas flight, a flight of two interceptors, used 20 second takeoff spacing for radar trail on a standard instrument departure. After takeoff, Dallas Two entered the clouds and called "no contact." The pilot, while trying to find lead on radar, allowed the aircraft to enter a diving right turn. Shortly thereafter, the aircraft impacted the ground and was destroyed. The causes of this mishap: channelized attention and spatial disorientation.

Scientists have been working on a laser instrument that could significantly reduce pilot workload, reduce the tendency to channelize attention, and prevent spatial disorientation. This instrument is the Peripheral Vision Horizon Display (PVHD). The PVHD is a wide field of view artificial horizon. In order to be visible in all lighting conditions, including bright sunlight, a powerful light source is required, in this instance, a laser. A helium-neon laser directs a beam of red light approximately 1/6-inch wide across the entire instrument panel.

Signals from the aircraft's pitch and roll attitude are processed in a micro-computer. The micro-computer then controls the movement of optical scanners, manipulating the laser beam to parallel the horizon. The pilot will perceive changes in aircraft attitude by sensing the bar of light with his peripheral vision. The laser horizon is not intended to replace the primary attitude reference nor is it intended to be part of an instrument crosscheck. Its purpose is to alert the pilot to changes in attitude through his peripheral vision during IFR flying, much the same way the real horizon does during VFR flying.

The PVHD combines knowledge of the eye and brain with laser and aircraft technology. It operates on

the principle that a person's orientation information is sensed directly by the peripheral visual fields. This information requires no processing; it goes directly to the core areas of the brain dedicated to orientation. The beauty is that it removes central vision from the orientation loop. Conveying useful information about orientation with central or foveal vision requires second order processing. It is not an automatic function but requires work.

Foveal vision encompasses an angle of about 2° up to 10° directly in front of the eyes. Considerable brain activity is required for foveal vision to process orientation information. Memory comparisons and logic have to be used with this vision. No logic processing is required for peripheral vision balance information. Combine these facts with the finding that the pilot will look (using central or foveal vision) at his primary attitude indicator approximately 80 percent of the time under difficult IFR conditions, leaving only about 20 percent for other areas or problems.

It is hoped the PVHD will free more of the pilot's central vision and thus logic activity for interpreting other data during IFR conditions. At the same time, the PVHD is being tested to confirm that it will alert the pilot to changes in pitch and roll through peripheral vision, drawing attention back to the primary attitude reference for aircraft control corrections.

Stage A prototypes of a peripheral horizon using a Zenon Arc Discharge Lamp have been demonstrated for Canadian forces in their Sea King and CH-135 "Huey" helicopters. Prototypes have also been used in a Boeing 747, Air Canada DC-8, and Lockheed Tristar. The USAF is currently testing the Stage B model that uses the laser in an F-4E, A-10, NT-33, and in a GAT-3 simulator at the School of Aerospace Medicine, Brooks AFB, Texas.

So far, tests of Stage B laser prototypes are only about 30 percent complete. No firm conclusion can be made yet, but earlier demonstrations have indicated that pilots flying IFR with the PVHD seem to be able to handle more emergencies for longer periods before becoming overloaded. It has also been found that the red laser horizon line does not interfere with the reading of other flight instruments and is a compelling display at night or in weather conditions.

Trial demonstrations were also conducted to determine whether location of the roll axis of the horizon line made any difference. If centered in front of the pilot, the pilot perceives the roll axis of the

HORIZON

aircraft to be directly in front of him even in a wide cockpit, like helicopters with side-by-side seating. If the horizon line is centered in the middle of the instrument panel when the aircraft rolls left, the horizon line will rotate clockwise, causing the pilot in the left seat to think his nose is low, while the pilot in the right seat will think the nose is high. However, the individual quickly adjusts to off-centering.

Results of all the tests will not be complete until 1983. Based on preliminary results, PVHD shows promise as a device to reduce work-load, reduce channelized attention, and eliminate spatial disorientation as contributing causes to aircraft mishaps and pilot fatalities. ■

OPS topics

Hard Landing

■ A flight of two A-10s departed home station on a planned instrument mission to an outlying field. The mission was normal — several approaches with the student as lead and the IP flying chase.

On the final landing, the student requested a TACAN approach for a full-stop with the wingman/chase making a low approach. During the approach, the student mistakenly selected 7 degrees of flaps instead of a full 20 degrees.

The IP started his go-around at about 100 AGL and 500 feet short of the runway threshold. At the same time, the RSU controller saw the lead aircraft start its flare and also develop a high sink rate.

The controller transmitted an immediate go around call, but it was too late to prevent a hard landing. The nose gear collapsed, and the aircraft slid off the right side of the runway. Because the pilot had selected only maneuver flaps, the stall margin in the flare was reduced from 14 knots to 6 knots. In addition, the higher AOA required meant a more nose-high attitude and adversely affected the pilot's judgment of the aircraft altitude when initiating the flare.

A computer simulation after the mishap showed that with a flare at 100 AGL and throttles at idle, as in the mishap, the pilot had one second to recognize the high sink rate and initiate a go around in time to prevent a hard landing.

It was the investigator's opinion that had the pilot extended full flaps, the lower nose position would have prevented his misinterpretation of the visual clues and the high flare.

Improved Investigative Capability

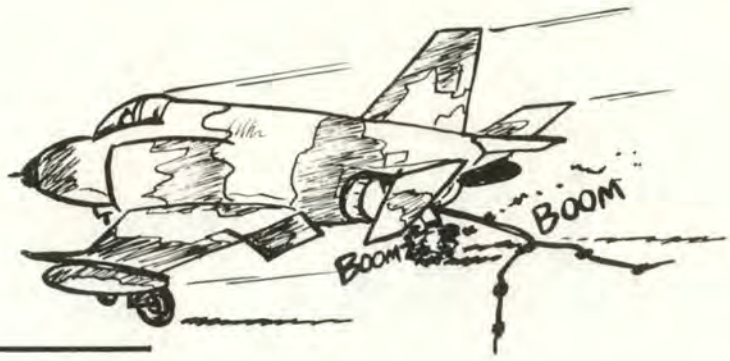
Detachment 8, 1365th Audiovisual Squadron at Hill AFB, recently demonstrated a capability to assist aircraft safety investigators. Through the creative use of in-house technology, the damaged videotape from the accident aircraft was reconditioned, repaired, and enhanced to the point that analyses was possible. In the past, Safety Investigation Boards (SIBs) have relied on other Federal agencies for this technical capability.

Because the ability to provide this service may vary between AAVS units located throughout the world, Safety Investigation Boards should make their request directly to AFISC/SEP technical assistance group just as they do to request other types of technical assistance. AFISC/SEP will coordinate this request through HQ AAVS/DO for action.

The recently developed AAVS capability adds another valuable investigative tool to our Air Force safety system. Thanks and congratulations.

Waterskiing 38's

An AT-38 two-ship returned to base after a formation mission. There were isolated thunderstorms in the area, and after one formation low approach the instructor decided to full stop on the next approach since the thunderstorms were moving toward the runways. The runway used for the



previous approach was now unusable, so the flight lined up on the other runway which was still relatively clear.

One pilot was solo so the IP had him take the lead, and at three miles he reported the runway in sight. The IP then slowed to take spacing behind the lead. The lead pilot stated that he made a normal landing except that he was approximately 5 knots fast.

While aerobraking at 130 knots, the aircraft entered some standing water and began to hydroplane. The pilot was able to control the drift, and at 100 knots lowered the nose gear to the runway.

Water spray from the nose wheel then entered both intakes flaming out the engines. Seeing the 3,000 foot remaining marker pass, the pilot applied brakes, and both main tires blew. The aircraft came to a stop still on the left side runway.

The IP landed 9,000 feet behind lead and also encountered hydroplaning. He was able to control direction but could not stop before passing lead. Before landing, neither pilot was aware of the water on the runway which had recently collected after a shower passed.

Low Level Birdstrike

Two F-106s were flying a scheduled low level route at 420 kts and 600' AGL when lead flew through a flock of Great Egrets. At least four birds struck the aircraft shattering the right windscreen panel and canopy and temporarily blinding the pilot. Despite some injuries, windblast, and lack of communications the pilot was able to recover at a nearby naval air station.

This variety of bird is frequently seen on the low level route. According to the unit FSO the unit pilots are now much more aware of the problem. How about your unit? Are there any similar problems on your low level routes?

A Slightly Different Blown Tire Case

Although the set-up for this blown tire incident is a bit different than normal, the result is the same. Approaching 100 knots on takeoff roll, an F-4E crew felt a pronounced side-to-side rocking motion which gradually decreased as speed increased to lift-off.

There were no other unusual indications; however, the crew elected to make a low approach for a visual tire check. The RSO saw no visible tire damage or evidence of tire fragments striking the aircraft, so the aircrew raised the gear and proceeded with the mission.

After GCI contact, another F-4 joined up. Again the tires and gear were checked without discovering any evidence of damage.

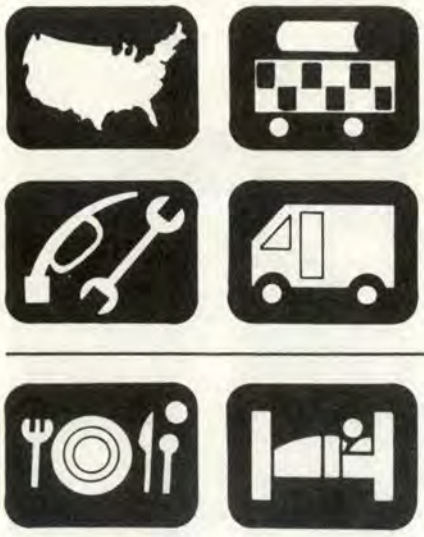
The crew then contacted the squadron SOF who directed that they treat the problem like a blown tire — burn down fuel and return for an approach end barrier engagement.

The crew accomplished all the appropriate checklists including turning off the antiskid. The approach and touchdown were normal. The aircraft first touched down 300-400' short of the cable. The pilot was using rudder for directional control and had some difficulty maintaining alignment prior to engagement.

After engagement, the aircraft pulled sharply to the right. Several witnesses heard or saw the right tire blow out shortly after barrier engagement. Both tires were found to have skidded — the right more severely — leaving a skid mark from a point 300 feet short of the cable to where the aircraft stopped.

The pilot did not recall using aircraft braking or having his feet on the brakes prior to the sharp pull to the right. However, given the difficulty with runway alignment and the rudder inputs, it is likely that the pilot inadvertently applied the brakes. With the antiskid off it would be very easy for the wheels to lock at high speeds.

The rocking motion felt by the crew on takeoff roll was due to the unusually rough surface of the runway. (This runway was seldom used by F-4s.) ■



X-COUNTRY NOTES

MAJOR WILLIAM R. REVELS
Directorate of Aerospace Safety

Transient Alert Contract Maintenance

■ There is a continuing trend throughout the Air Force toward a transition from military operated Transient Alert (T/A) organizations to civilian contractors. The goal for this transition process is to reduce costs while maintaining adequate service for transients. The change has been discussed by many and cussed by some, but, nevertheless, you can expect to encounter Transient Alert Contractors more frequently in the future.

During the travels of Rex Riley, we've encountered several new contractors, and they seem highly motivated to providing quality service. Probably the most notable difference with the new contractors is their cut in manning for T/A. Most contractors have made drastic cuts in personnel, as much as a 50 percent reduction in some cases. This manning reduction is balanced with highly experienced personnel and usually a capability to call in standby people for surges. In some cases, contractors also have arranged for heavy maintenance assistance from on-base military organizations. In general, aircrews can expect fewer personnel on hand during stopovers, but they should be an experienced group.

The typical contractor's employee will have experience in military flight line operations — many are former Transient Alert technicians. This, of course, is a significant advantage when incoming personnel to many military organizations are quite inexperienced. Whether or not the contractors can overcome the problems of short manning with experience is yet to be determined, but they are motivated to give it a go.

As always, the quality of service is a two-way proposition, and aircrews who cooperate with contractors will get the best service. Plan your stopover to avoid the peak periods when possible, and when you can't, be sure to allow extra time for servicing. Try to call ahead with your requirements before takeoff, and don't forget that all important call to the dispatcher at least 30 minutes prior to arrival. The Base Ops dispatcher should be able to give you good information about the best arrival and departure times. When you're on the ground, be sure to let T/A know your needs and where you can be contacted. Those aircrews who insist on arriving at peak traffic periods without prior notification can expect delays. Make stopover planning a part of the mission planning phase and give Transient Alert a chance to make you happy.

Trip Reports

You may be thinking Rex has had a case of writer's cramp this summer, but that's not the case. The various trips have simply outdistanced the follow-up duties of report and article preparation. The following notes are a cross section from visits since last spring.

First of all, a special word of thanks to the Air Training Command and the 14th FTW, Columbus AFB, Mississippi. Through their kind cooperation, Rex was given the opportunity to return to his days of yesteryear and the cockpit of a T-37 for a series of evaluations throughout the southeast. Lieutenant Rich Rice of the 14 FTW was the assigned IP for this trip and did an outstanding job of coordinating and planning our travels. My thanks to Rich for a superb week on the road.

New Rex Riley Award

MOODY AFB GA Moody joins the Rex Riley list of preferred bases with highly motivated personnel in all areas and a fine record of transient services. Expect a fast turnaround if you're in a hurry, or pleasant stopover if time is

available. The Moody people take pride in their transient services program, and the results are obvious.

Reevaluations

COLUMBUS AFB MS Columbus continues to provide excellent services to transient aircrews. The new T/A contractor provides quality service and has maintained manning at approximately the same level as the previous military operation. When arriving during student training periods, keep your eyes outside — traffic is heavy to say the least. Columbus has one of the finest VOQ's I've ever seen.

KEESLER AFB MS Keesler is upgrading ramp facilities for transients as well as local operational needs. By the time you read this, construction should be well on the way to completion, but call ahead to check parking availability. A temporary PPR is in effect for the construction period. Personnel at Keesler are interested in your needs and willing to smooth out problems during the construction period.

EGLIN AFB FL Eglin maintains its reputation as a favorite stopping place for transients. Base Ops is currently coping with a manning problem, but personnel are working hard to minimize the impact on aircrews. Give the Base Ops folks some patience during this period of shortages, and they'll show you their best effort.

PATRICK AFB FL Patrick will soon complete a total remodeling job in Base Operations. The new facility includes everything you need for turnaround, all at arm's reach. The

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	Valparaiso, 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	Victorville, CA
PETERSON AFB	Colorado Springs, CO
CLARK AB	Philippines
MOODY AFB	Valdosta, GA

X-COUNTRY NOTES

continued

people at Patrick are also motivated to provide service which matches the new look, so give them a try on your next trip south.

ROBINS AFB GA Robins has excellent facilities with conscientious personnel working hard to provide quality service. A new T/A contractor will assume responsibility this winter. Initial indications are that a solid contract is being developed and that transient services in the future will maintain the high standards established at Robins.

MYRTLE BEACH SC Myrtle Beach is a highly favored stopping place with excellent facilities and personnel willing to go the extra mile. Remodeling is planned in Base Operations, and a new parking ramp for large aircraft is underway. Expect quality service at Myrtle Beach. You won't be disappointed.

SHAW AFB SC Shaw has an excellent record of fine service. Personnel are enthusiastic, facilities are good, and base support is very efficient. Again, a call ahead is advisable because of local operational requirements. In any case, you can expect good support for transients at Shaw.

MAXWELL AFB AL Maxwell has recently completed a transition from military Transient Alert to a contractor. The new contractor has cut manning substantially, but is currently providing quality service with highly experienced personnel. The transient flow has remained steady with a variety of DV's passing through, including the President of the United States. The new contractor has been confronted with a variety of challenges, and you can expect good service at Maxwell.

RANDOLPH AFB TX Randolph has always maintained a strong position in the world of transient services. The new T/A contractor at Randolph should be an active player in keeping these standards up. Again, there has been a cut in manning in T/A, but they do maintain a 7-day per week schedule at 16 hours per day. The experience level is also high and motivation to provide quality service is obvious among the T/A people. Show the new contractor some cooperation and they'll do a good job for you.

As you can see, there are already many bases changing to contract Transient Alert. When a Rex Riley base transitions from military to contract T/A, a new evaluation is required to maintain the Rex award. At the current rate of change, this evaluator is having some difficulties keeping up with the flow. You may expect, however, that shortly after changeover to a contractor there will be an evaluator arriving for a look at the new service program. In the meantime, the rules are the same, quality service from all bas agencies dealing with transient aircrews is the norm for the Rex Riley award. ■

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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
Kenneth E. Teague

CAPTAIN
Curtis V. Neal

50th Tactical Fighter Wing

■ On 3 October 1981, Captain Teague and Captain Neal were on a cross-country mission in an F-4E. During takeoff, at approximately 240 KIAS, the aircrew felt and heard a thump from the left side of the aircraft. Then, as Captain Teague deselected afterburner at approximately 300 KIAS, the left engine fire light illuminated, followed almost immediately by the right engine fire light and overheat lights. Captain Teague informed Captain Neal of the fire and overheat lights, and Captain Neal selected the tower frequency. They cleared the area and jettisoned all three external fuel tanks with both engines at military power. The fire lights remained illuminated, the overheat lights had become intermittent, and the EGT for both engines was above the military power limit. Captain Teague immediately initiated a turn toward base, declared an emergency with the tower, and was cleared to land. The aircrew completed all necessary checklist items. During deceleration for their approach, Captain Teague momentarily selected idle power on each engine individually. The left fire light would extinguish but the right would not. The aircrew decided to use both engines for maneuvering to final approach due to high gross weight. With a steady right engine fire light and intermittent indications of left engine fire, the gear and flaps were lowered for final approach. The aircrew flew a steeper than normal 17 unit approach at 180 kts with both engines in idle power. After deploying the drag chute and passing the approach end arrestment cable, Captain Teague lowered the tail hook and shut down the right engine with the fire light still illuminated. The aircrew made a successful departure end arrestment, shut down the left engine, and safely accomplished emergency ground egress procedures. Subsequent investigation revealed extensive fire damage to both the right and left engine bay areas. The prompt, decisive actions, effective crew coordination, and professional expertise demonstrated by Captains Teague and Neal averted possible injury or loss of life and minimized aircraft damage. WELL DONE! ■


WB 97
U.S. AIR FORCE